

The adaptive reuse of grain elevators into housing: how policy and perspectives affect the
conversion process and impact downtown revitalization

by

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A thesis
presented to the University of Waterloo
in fulfilment of the
thesis requirement for the degree of
Master of Arts
in
Planning

Waterloo, Ontario, Canada, 2013

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

Abstract

This mixed methods study seeks to examine how the conversion of grain elevators into housing is an effective method of adaptive reuse. It uses theories and concepts on heritage preservation, downtown revitalization, place theory and environmental sustainability. Based on the literature review, there is a need for change in planning policy and there are both advantages and disadvantages to adaptive reuse. The methodology and data sources include examining and analyzing planning documents, surveys for the public and professionals, and demographic data. Case studies included converted grain elevators located in Australia and Norway and also a case study in Canada for the purpose of future recommendations. These methods answer the research question of how do planning policies and the perspectives of planning professionals and the public affect the process of the adaptive reuse of grain elevators into housing? Subsequent questions include topics such as whether adaptive reuse is an effective approach to downtown revitalization, which policies impede or facilitate the process, how perspectives influence decisions, and how demographics are linked to housing availability. The significance of this study on planning practice is that it helps form policy recommendations to address the needs of the public and help improve the efficiency of adaptive reuse in the planning process. In conclusion, the public and professionals were generally in favour of this type of adaptive reuse but many had concerns about cost and gentrification. Also, more policies need to be created that address adaptive reuse specifically. For the future use of the Toronto case study I recommended that converting the grain elevator into housing is the optimal choice. The limitations of this study include data availability, non-responses for surveys, language barriers, case study locations, and time constraints.

Acknowledgments

First, I would like to thank my advisor, Dr. Luna Khirfan for all of her support throughout my program and providing me guidance through my thesis. I would also like to thank Dr. Robert Shipley for providing assistance and ideas for one of the case studies.

I want to thank my family for all of their love and support during my program, especially my parents Tom and Jackie. I could not have accomplished this study without them. I would also like to thank Katie and Andy Hartley for showing me around Hobart which gave me the initial idea for this thesis. Also, I want to thank my fellow graduate students and friends for their encouragement, especially Cynthia Shih and Taja Brenneche.

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1.0 Introduction

1.1 Problem and Motivation

A common method of heritage preservation is through the adaptive reuse of historic buildings. Buildings often have been converted from industrial uses, agricultural uses, or places of worship into residential, office, and retail uses (Shipley, Parsons, & Utz, 2006). These adaptively reused buildings can provide many housing choices. The problem is that there are sometimes limitations when using the adaptive reuse process to revitalize a building, especially the economic issues and meeting social needs such as housing (Bullen & Love, 2010). There are many benefits to using this process of change but also examples where it was not as efficient or environmentally sustainable (Phipps, 2008; Bullen & Love, 2010). Therefore, this study focuses on the adaptive reuse of grain elevators specifically because there is a gap in research for this unique type of building.

However, common questions that we should ask first are: why should we care and why is heritage preservation important? First, the motivation behind this study is that there is a debate whether it is more beneficial to adapt or demolish existing buildings. We should care because grain elevators located downtown are a unique type of building stock. We should care about these buildings because reusing them is a way to preserve a city's industrial history. This is important, especially for a city like Toronto where many new high rise condos are being built in recent years. These buildings tend to create a more homogeneous skyline. Converting heritage buildings into new uses can help to break up this monotony.

Further, environmental issues including pollution and brown field remediation can be prominent in densely populated areas with previously industrial uses. To facilitate this, adaptive

reuse has been proven to be environmentally sustainable as many building materials are being reused (Wilkinson, Kimberley, & Richard, 2009). In addition, heritage preservation and also the revitalization of structures into different uses can be used as method for managing changes in society such as the trend of decreased industrial sectors in North America (Poitras, 2009). As a result, this study discovers what changes, particularly in policy and heritage preservation practices, need to be made regarding planning approaches.

1.2 Purpose Statement

This mixed methods study seeks to examine how the adaptive reuse of grain elevators might be linked to downtown revitalization and how policy and perspectives can affect the process. This study consists of two complementary parts. The first part surveys the existing planning approaches and literature (such as policies and design guidelines) that impede or facilitate this adaptive reuse process. The survey yields a thematic classification of these approaches that offer a better understanding of available choices for the adaptive reuse of grain elevators. The second part of the study includes three different sources of data collection and analysis. I examined planning policies in Hobart, Oslo, and Toronto through planning documents and surveys. Next, I used electronic surveys to gauge local residents', planners', architects', developers' and builders' perspectives of the availability of affordable housing, issues related to gentrification, approaches to heritage preservation, and their preferences on adaptive reuse. Through these surveys, I categorized the variables to evaluate the influence they had on the adaptive reuse of these types of buildings. The variables include commercial performance, residential performance, building demand, costs, risks, and sustainability of building. Lastly, I investigated the correlations between the location of an unused grain elevator and the

demographic makeup of the immediate and surrounding areas. The findings from this study lead to recommendations for the unused grain elevator.

1.3 Research Questions

There are two main research questions for this study: How do planning policies affect the process of adaptive reuse of grain elevators into housing? How do the perspectives of planning professionals affect the process of the adaptive reuse of grain elevators into housing? Subsequent questions are as follows: How does adaptive reuse affect downtown revitalization? How do planning policies impede or facilitate this adaptive reuse process? How do perspectives of professionals and the public differ on adaptive reuse influence decisions on the process? How are demographics and housing availability linked to this process?

1.4 Key Concept Definitions

Below are the definitions of terms specific to the context of this study:

Adaptive reuse: refers to the change of use of a structure but maintaining heritage features (Cunnington, 1988).

Grain elevator: refers to typically tall, cylindrical, concrete grain containers.

Heritage preservation: refers to the concept of maintaining historic architectural features of a structure (ACHP, 2010).

Downtown revitalization: refers to the concept of improving downtown areas either aesthetically, economically, environmentally, or socially (De Sousa, 2002).

1.5 Theoretical Framework

The diagram below (Figure 1) shows the conceptual framework. The process started with

the literature review consisting of the advantages, disadvantages, grain elevators, and demographics. The review identified a problem where I found that the success of the process depended on the perspectives of the professionals in the field and the public. To solve this problem, I focused on three case studies (two grain elevators that have been converted into residential units and one that has not been converted yet). I focused on the following variables: residential performance, risks, costs, environmental sustainability, building demand, gentrification, housing availability, heritage conservation, and aesthetics. I collected data from professionals in the field and the public on these variables to determine how the conversion process and revitalization is affected and also to recommend the optimal choice for the Toronto case study.

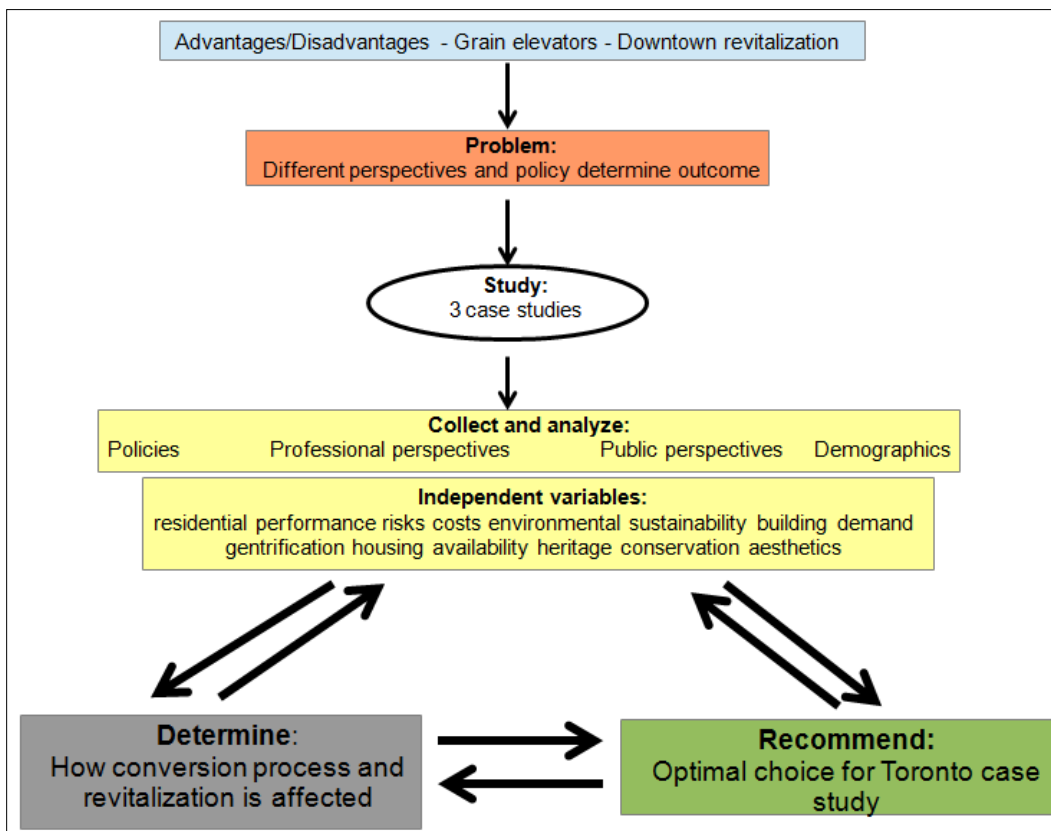


Figure 1: Conceptual map of research topic

Therefore, this study combines the theories and concepts of heritage preservation, downtown revitalization, place theory and environmental sustainability. It examines concepts such as maintaining a city's identity, culture, history and unique sense of place through a modern form of urban renewal. It also investigates the settlement patterns and links between the location of populations and the built environment. Finally, it promotes environmental sustainability practices through the concept of re-use.

1.6 Expected Results and Significance

The expected results of this study were to discover what changes, particularly in policy and heritage preservation practices, need to be made to facilitate the adaptive reuse process of grain elevators. It was also expected to find better links between human perspectives and demographic and spatial data. The significance of this study for planning theory is that it will create a more comprehensive availability of information on adaptive reuse specifically for grain elevators. Also, this study will address and add to the general knowledge of theories and concepts on heritage preservation, downtown revitalization, environmental sustainability and place theory. For planning practice, this study is also important because it will allow the formation of policy recommendations that address the public's needs for affordable housing and also their general perspectives on adaptive reuse.

1.7 Structure of thesis

The structure of the full document follows the data analytic approach. After the introduction, I provide a literature review which identifies the main theories that have been researched and also the gaps that exist in the literature. Next, I describe the study areas, including

the location, and also the data that will be collected. In the third section, I explain the methods used for all of the data collection and analysis. The greater part of the paper is the findings and analysis of the surveys. Lastly, I close the paper with a conclusion where I discuss recommendations, limitations, and future research.

2.0 Literature Review

2.1 Introduction

The following is a literature review for on the adaptive reuse of grain elevators. The research questions involved in this topic ask how this process is linked to downtown revitalization. This study also examines if it is better to adapt or demolish these structures and the planning policies that impede or facilitate this process.

Although there is little literature on this specific topic, the review focuses more on the general themes of adaptive reuse, due to the limited number of studies on adapted grain elevators in particular. The review is addressed by themes that were commonly found in the literature. It focuses on the advantages and disadvantages and issues of converting buildings and the issues surrounding planning policies. Next, I discuss grain elevators in general and their challenges. This section is followed by a review of existing grain elevators that have been converted into a new use and how typologies can be created from this review. Lastly, I examined a general overview of downtown revitalization and how it can relate to adaptive reuse. The literature review then provides justifications for the research in this study and also how it will answer the research questions.

2.2 Adaptive Reuse

2.2.1 Defining Adaptive reuse

Adaptive reuse can be defined in many ways. As mentioned earlier, adaptive reuse can be defined as the change of use of a structure while maintaining the heritage features of that structure (Cunnington, 1988). Another definition of adaptive reuse comes from Langston et al

(2008, p. 1710) who simply states that adaptive reuse is “to leave the basic structure and fabric of the building intact, and change its use”. He also states that adaptive reuse is a process used when “a particular function is no longer relevant or desired, buildings may be converted to a new purpose altogether” (Langston et al., 2008, p. 1710). Conejos et al. (2013, p. 95), define it as “a significant change to an existing building function when the former function has become obsolete”. Also, adaptive reuse can be used as a term for buildings that are still in good condition but are simply changing the use (Langston et al., 2008). Therefore, the definition depends on the research where some focus on preserving heritage while others consider any building to be adapted, historic significance or not, if the original use has changed. For the purpose of this study, a more general definition is used since many examples and case studies have additions and façade changes to the structures and the buildings might not necessarily be of historic significance. Although the basic appearance of the grain elevators are maintained to a certain extent in the case studies used in this study, it is difficult to measure the number of heritage features have been maintained since the main idea is to create a new purpose for the building.

There are many reasons why adaptive reuse is used as an approach for redevelopment. Many buildings that are deemed to be obsolete or are in disrepair are often used for other building projects for construction materials alone (Langston et al, 2008). However, adaptive reuse can be a different approach for development where the majority of the building is kept intact and subsequently used for a different purpose than originally intended (Langston et al., 2008). In general, the main benefits of adaptive reuse of historic buildings tend to be environmental sustainability factors and also to promote pride in our heritage (Langston et al., 2008). However, many buildings that seem to have been reused, have been demolished because of economic factors where it can be less costly to construct a completely new structure (Langston

et al., 2008). The following sections will go into more detail regarding the advantages and disadvantages.

2.2.2 Advantages of Adaptive Reuse

The adaptive reuse of buildings have many advantages. Historically, adaptive reuse of buildings was seen as a cost saving approach due to the savings in building materials even though there was more labour involved (Cunnington, 1988). Presently, reusing a building tends to have a shorter time period of development creating a time advantage which results in reduced costs (Langston et al., 2008; Shipley et al, 2006). Also, the study by Shipley et al (2006), who is an expert on heritage planning, concluded that the return on investments were high for heritage developments.

Another major advantage of adaptive reuse is the connection to heritage preservation. Langston et al., (2008), created a list of reasons why a building might become obsolete and adaptive reuse would be a solution. His list includes physical, economic, functional, technological, legal, and social obsolescence and create a measure of the potential of adaptive reuse by ranking these factors. Using an obsolete heritage building for adaptive reuse is a method of preserving history. In the planning field, heritage preservation through adaptive reuse has been thought to be beneficial because of the aversion to major demolition practices seen in past urban renewal projects (Bullen & Love, 2010). After the creation of heritage preservation acts in North America such as the Ontario Heritage Act in 1975 in Canada or the National Historic Preservation Act in 1966 in the USA, there has been more promotion of adaptive reuse projects (ACHP, 2010; Ontario Ministry of Tourism and Culture, 2010). In the UK, the Department of Environment has stated that “new uses are often the key to preservation” which means there is an

added benefit of governmental support of adaptive reuse projects (Cunnington, 1988, p. 17). In general, heritage preservation through adaptive reuse is a method of placing value on our culture and society which is an important way to contribute in taking pride in our heritage (Langston et al., 2008). These heritage benefits also create social benefits. They create attractive and unique streetscapes with character, create a sense of community, promote an 'image' of a place, and also create vibrant areas due to less vacant buildings resulting in less crimes (Langston et al., 2008). However, Weiss (2009, p. 2) raises the question whether heritage is actually being preserved “when total transformation is required for heritage buildings to be culturally and economically productive”. Nonetheless, it is difficult to measure the amount of heritage being preserved. Weiss (2009) does state that adaptive reuse projects help to maintain the identity of the area while at the same time can show a transformation of industry.

Adaptive reuse also has environmental benefits. Conejos et al. (2013, p. 96) state that “there is no better example of the environmental benefits of effective sustainability in practice than the recycling of buildings”. He mentions that adaptive reuse reduces carbon emissions from the built environment and creates more energy efficient buildings (Conejos et al., 2013). Specifically, adaptive reuse projects create environmental benefits “through the recycling of materials, reuse of structural elements and the reduction in generated landfill waste (Langston et al., 2008, p. 1711). Adaptive reuse has also been described as a way to 'bypass' the landfill since the building is not being demolished and not adding to the waste (Yung & Chan, 2012). Adapting buildings can lead to less environmental impacts for a city and promote sustainable development (Wilkinson, Kimberley, & Richard, 2009; Poitras, 2009).

The environmental benefits of adaptive reuse can also be seen in the new urbanist movements and smart growth concepts. The promotion of new urbanist communities recently have included

principles of Traditional Neighbourhood and Transit Oriented Developments with a preference for higher density, pedestrian friendly and less automobile dependence (Fainstein, 2003). The charter created by the Congress for the New Urbanism displays the importance of historic preservation and brownfield redevelopment which can include adaptive reuse projects (Congress for the New Urbanism, 2010). The Congress also has a special promotion of the “sprawl retrofit” concept which involves converting suburban buildings such as underused or abandoned shopping malls into new urbanist villages (Congress for the New Urbanism, 2010). Therefore, all of these goals can be met through adaptive reuse projects.

Adaptive reuse also benefits downtown revitalization. It helps with the revitalization of downtowns because it has the potential to be cost efficient (Cunnington, 1988). Also, it helps to conserve heritage properties which seem to be a major element in downtown revitalization projects (De Sousa, 2002). Lastly, it tends to be an aspect of the smart growth concept where the revitalization of downtown areas is promoted more than suburban areas (Resnik, 2010).

2.2.3 Disadvantages of Adaptive Reuse

Although there are many benefits for pursuing adaptive reuse projects, there are also many issues. These issues include the architecture and design, existing conditions of the neighbourhood or specific building, the financial cost of conversion and changing land use zoning laws. Also, negative social effects of gentrification can occur such as displacement.

The architecture and design of buildings that have been converted might not make financial sense if the building in question requires more structural support to complete the conversion (Bullen & Love, 2010). Also, there has not been a lot of research on building characteristics that are best suited for this process (Kincaid, 2000). In Rabun's (2000) book on

the structural analysis of historic buildings and adaptive reuse, he mentions that many architects and designers are not analyzing the original capacity for loads and stability which might create challenges for new uses. He also describes the history of construction materials and states that other challenges may occur due to the building material being insufficient for the new use. Specifically for grain elevators, there can be structural limitations that make adaptation difficult due to the unique shape and relatively bare structure (A + U, 2007). An example in Copenhagen, Denmark indicated that changing the structures of these grain elevators too much physically could result in unstable conditions (Slessor, 2006). Physically, some adaptive reuse projects result in only facade preservation. This is generally not recommended because the interior of the buildings should be considered since they are just as valuable as the facades (Cunnington, 1988). Other issues with existing conditions include the fire safety of the building, disability accesses, and obtaining permits to alter heritage buildings might be difficult to overcome (Langston et al., 2008).

The existing neighbourhood conditions can greatly impact the adaptive reuse process. According to a study by Burchell and Listokin (1981), there are different types of neighbourhood conditions that are classic locations where adaptive reuse occurs. The types of conditions range from well to poorly maintained structures and structures from high to low vacancies (Burchell & Listokin, 1981). Obviously, the neighbourhood type where there is good maintenance and low vacancy is the easiest and best one for adaptive reuse because of the higher potential for success since less drastic changes and investments are needed (Burchell & Listokin, 1981).

Another issue is the financial cost of redevelopment and renovations. Although many projects save money by reusing building materials rather than building new, this is not always the case. Despite savings in time, the cost might be too high if the building has expensive issues

such asbestos, poor structural elements, and non-compliance to fire safety regulations (Langston et al. 2008). The cost usually depends on the structural condition of the building and how much needs to be altered (Langston et al., 2008; Worthington & Worthington, 1984; Cunnington, 1988). This notion can relate to the three types of neighbourhoods as outlined by Burchell and Listokin (1981) because depending on the neighbourhood condition, the adaptive reuse projects may cost more or less. If redevelopment does result in higher costs than new construction, other factors must be more important to pursue the project such as “the architectural or historic interest of the building, its ultimate financial value, [and] the desirability of the new site” and this also assumes that demolition is not permitted (Cunnington, 1988, p. 19). Also, some adaptive reuse projects can be financially inefficient due to their property values exceeding the selling prices of these buildings (Phipps, 2008).

On the social side of adaptive reuse, gentrification could be a major issue if displacement occurs (Sirmans, & Macpherson, 2003). However, overcoming this negative impact can be challenging since it is difficult to create sustainable development like adaptive reuse while also provide social inclusiveness and cohesion (Yung & Chan, 2012). For example, sometimes after the conversion of an industrial building into loft condominiums, affordable housing can be lacking in a city’s housing stock (Walks & August, 2008). This result can cause higher income tenants and surrounding residents to push lower income citizens out of the building or area due to rent increases (Walks & August, 2008; Sirmans & Macpherson, 2003). Although heritage preservation contributes to the revitalization of the community, it actually might impede the production of affordable housing as well. Therefore, there is an obvious tension seen between historic preservation, affordable housing and the creation of mixed-income neighbourhoods (Sirmans & Macpherson, 2003).

However, researchers have been focusing too much on the causes of gentrification instead of the effects and also mostly focus on the middle class (Slater, Curran & Lees, 2004). Also, the term gentrification might not be an accurate way to describe the phenomenon when it comes to adaptive reuse. Typically, the term gentrification was used when describing the renovating or restoring of historic residential properties, not for redevelopment projects where there is a change in use. Gentrification experts, Lees, Slater, and Wyly (2008) weighed the positives and negatives on gentrification. Their review found that positive promotion was made by policy makers that deemed it a process to stabilize and socially mix neighbourhoods. However, they also discovered that policy makers ignored the negative aspects and list displacement as the main impact. Hutchison (1992), another expert on gentrification, discovered that studies on gentrification show the process in a more positive light if the interpretation falls into the urban ecology approach which includes demographics ecological and socio-cultural factors. He also states that the benefits are also found in both the city and the specific gentrified neighbourhood and that studies do not focus enough on the extent of the displacement (of industry, people, jobs and decreased tax revenue). He also says there is a trend where more profitable luxury gentrification are created versus underproduction of non-luxury housing which is more needed (Hutchison, 1992). All of these authors are critical of the flaws found in gentrification studies. Therefore, there is clearly a debate whether adaptive reuse projects can use the term gentrification for this type of change and if benefits or detriments these neighbourhoods.

In summary, the existing condition of a neighbourhood plays has a significant influence on downtown revitalization where these areas tend to have a deteriorating condition in the first place. Also, an important factor to the success of adaptive reuse is the financial viability of these

projects which could be deemed too costly for a revitalization project. Lastly, if downtown areas are trying to promote mixed use and affordable housing, adaptive reuse may cause issues of displacement of residents. Saving historic structures can be a way to keep an existing population interested in downtown areas and create a vibrant and safer space (Langston et al., 2008).

2.2.4 Planning policies related to adaptive reuse

Adaptive reuse also focuses on challenges with planning policies because not only are you changing a heritage property, you are also changing the original use. Therefore, adaptive reuse of buildings could interfere with land use and zoning laws and regulations (Langston et al., 2008). Also, there may be issues with floor space ratios since the ratios from the original use might not meet the standards for the new use (Langston et al., 2008). Planning permits will usually be needed for the change of use of a building even if no physical structural changes occur (Laurence, 1979; Cunnington, 1988). Some experts have also pointed out that for these redevelopment projects, there should be policies put in place for the changing land uses that create jobs instead of just creating more condominiums (De Sousa, 2002). Specifically for Toronto, there is a need for more research on creating employment based lands when undergoing these revitalization projects (De Sousa, 2002).

Restricted business districts and also building codes can be a challenge as well (Laurence, 1979). It was found that applications usually have to be made to change the use of a building and difficulties might be encountered if the use does not comply with zoning laws or the local plan (Cunnington, 1988). This may create the need for an application to make changes to the building and an approval from a municipal board which might not happen (Cunnington, 1988). Also for building codes, they tend to deter revitalization projects because of the complexities found in

older buildings (Galvan, 2006). To combat this hindrance, the suggestion was to create more codes specifically for these types of projects called “rehabilitation codes” to be used especially for renovators (Galvan, 2006, p. 1744).

Even more strict rules can be presented if the building in question is a designated or listed heritage building (Cunnington, 1988). There should be a set criteria or standards that can identify a building as a heritage property because designation sometimes poses issues and prolongs the process (Kincaid, 2000). Although there are guidelines set out in legislature such as the Ontario Heritage Act, there still seems to be issues over designating these properties (Kincaid, 2000; Ontario Ministry of Tourism and Culture, 2010).

Another factor in planning policy is the role of participatory planning. Participation from the community on adaptive reuse projects is considered a challenge but also important (Yung & Chan, 2012). Involving the public in the planning process “can ensure that the constraints, challenges, interests, and needs, etc. of the affected parties and concerned groups in both public and private sectors are taken into account in the preparation and implementation of the reuse proposals” (Yung & Chan, 2012, p. 356). Therefore, because the adaptive reuse of heritage buildings includes so many factors that the public might object (building changes, use changes, heritage preservation, etc.), it is imperative that they be involved in the process.

2.3 Grain Elevators

2.3.1 Types and Designs of Grain Elevators

There are many types of grain elevators and over time, the designs have changed as technology and the uses changed. Types include cement, concrete, low oxygen, bunker, bag, sand and salt (Beedle, 2001). Originally, grain elevators were made of stone, but due to the higher cost

of stone, they are now commonly made concrete, cement, or steel (Beedle, 2001). For this study, the focus is on concrete grain elevators for comparison purposes due to the similar characteristics found in each case study.

Grain elevators made for agricultural purposes are composed of three aspects of design which are bulk material, geometric design, and structural design (Carson & Jenkyn, 1993). The design for bulk material has an important role due to the nature of the materials. The bulk material, such as grain, can have a variety of properties like size and moisture content which can lead to differences in the way they move inside the grain elevator and the friction between the bulk material and the walls (Carson & Jenkyn, 1993). The geometric design for grain elevators is also important because it can affect the way the material moves within it and also affect the useable capacity (Carson & Jenkyn, 1993). Early grain elevators were actually rectangular or square but the benefits of movement of the cylindrical design became apparent and eventually the standard (Beedle, 2001). The main goal for the “geometric design is to maximize the usable capacity of a grain elevator while minimizing its capital cost, overall height, etc.” which is just as important as how the shape affects the movement of the bulk material (Carson & Jenkyn, 1993, p. 2). Lastly, the structural design is the part of the design process where the amount of stress or pressure is evaluated (Carson & Jenkyn, 1993). This design aspect has to take into consideration the different pressures and stresses the grain elevator goes under when being filled, emptied, and when its being used just for storage (Carson & Jenkyn, 1993).

2.3.2 Challenges with Grain Elevators

Although there are many examples of converted grain elevators, many challenges can occur when using this type of structure. Many articles have discussed the dangers of grain elevators and how they can collapse. Hundreds of grain elevators collapse each year due to many

reasons including improper filling, deterioration, and not meeting the design and code requirements (Carson and Jenkyl, 1993). Moisture is one of the main challenges as it can cause deterioration (Silver, 1993). The Ontario Ministry of Agriculture, Food, and Rural Affairs outlined the issues that can occur to deteriorating grain elevators. One of the main dangers is the collapse of a grain elevator still in use when farmers fill them with grain despite the fact the tower has started to deteriorate (Johnson, 2008). The cause of these collapses are due to silage acid which is created by the material, such as grain, when it has moisture in it and “when these acids touch the concrete grain elevator walls, they react with the Portland cement matrix that binds the aggregates together “ (Johnson, 2008, p. 1). Figure 2 demonstrates how the acid can make the grain elevator not structurally sound because of the weaknesses in the walls. The weaknesses eventually cause the wall to be crushed (Johnson, 2008).

Therefore, because of the many dangers and challenges faced with this type of structure, any conversion project should begin with a thorough assessment of the grain elevator. The assessment must determine if the structure is about to collapse or has any acid damage. If so, the proper precautions must be made to make it structurally sound. The grain elevator should have proper maintenance and any repairs should be made before future uses.

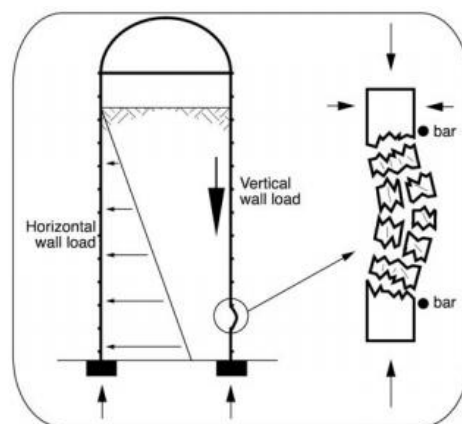


Figure 2: A grain elevator demonstrating weaknesses caused by acid damage (Johnson, 2008)

2.3.3 Designs of Converted Grain Elevators

To be more specific, the following section focuses on the design of converted grain elevators. These examples of grain elevators were not just used for housing; many have been converted into other uses. One of the main reasons why grain elevators were used for adaptive reuse projects was because they were no longer being used for their original purpose. Bruns (2011, p. 12) studied the adaptive reuse of liquid storage tanks and found that they were becoming “an obsolete feature of city infrastructure”. Bruns (2011) also said that the location of these structures were undesirable and can become safety hazards due to being vacant and that they should be used for more sustainable purposes. The sites of these structures were deemed to be no longer economically justifiable and that the location of these structures has high property values due to the proximity to the waterfront (Bruns, 2011). Therefore, the case studies in this paper were chosen based on their location. They are located close to downtown areas that were no longer industrial or in the agricultural sector.

The design and construction process of converting a grain elevator into residential units can also be a challenge. Gillies (2011, p. 23) studied the adaptive reuse of grain elevators and determined that there were two types of spaces in the original building, “those that are designed to allow human use/occupancy, and those that are meant for machines and grain storage”. This notion was also reinforced by Bruns (2011) who stated that many other types of industrial buildings, such as warehouses or factories, are much easier to adapt because they not only held the products but also the workers inside. Bruns (2011) argues that converting certain storage facilities (in her case oil tanks) into uses that were not originally inhabited by people is much more difficult due to many missing features like adequate space for a person to move freely. Rigby (2009) studied a farm complex to be redeveloped that included a grain elevator and found

that many of the grain elevators had open-air hallways between the different rooms which would have to be enclosed. She also found that other openings would have to be enclosed to make the structure habitable. Plumbing, bathroom fixtures, kitchen facilities, and heating/cooling systems would also have to be put in place before the structure was to building code for habitation (Rigby, 2009). Therefore, the general design goal was to create “habitable spaces throughout the entire structure” (Gillies, 2011, p. 23).

The main design challenges Gillies (2011) found were to create light inside the structure and movement between the bins. He found that both of these challenges can be solved by creating holes. The holes create windows for light to come in and other holes can create passageways between the bins (Gillies, 2011). He also mentions that these holes do not necessarily have to look like the typical rectangular window shapes to allow to pass through but rather there are endless possibilities for the hole designs that can create just as much light. Other challenges with reusing these agricultural heritage buildings are due to contamination. Due to the industrial use in the past, some of these sites would be considered brownfields and would have to undergo brownfield redevelopment (Bruns, 2011). Bruns, (2011) says that brownfield redevelopment is typical along the waterfront and port areas because many of these industries are now gone and are vacant. However, because of their location, they are usually close to the central business districts and therefore are very attractive for redevelopment (Bruns, 2011).

Most of the converted grain elevators were smaller structures, resulting in a single family home, not the high rise towers like the case studies in this paper. For example, in an area north of Goderich in Ontario, Canada, a homeowner connected two separate grain elevators together (30 feet apart from each other) by constructing a single family home between them as shown in Figure 3 (Kearney, 2010). The grain elevators used to be part of an old creamery farm and now

that the conversion has taken place, the property is worth \$1.7 million (Kearney, 2010). However, lots of the examples were high rise towers. For example, in a town called Hasle in Denmark, a multi-tower grain elevator structure is being advertised for vacation residential purposes located on the waterfront as shown in Figure 4 (T. Brenneche, personal communication, September 17, 2012).



Figure 3: A single family house constructed between two grain elevators in Goderich, Ontario. (Kearney, 2010)



Figure 4: Future vacation residences in Hasle, Denmark. (T. Brenneche, personal communication, September 17, 2012)

One design website posted an idea for a pre-fabricated grain elevator house called “House-in-a-Can” created by architects Austin + Mergold shown in Figure 5 (Meinhold, 2009). The design shown in Figure 6 also features different layouts based on the number of grain elevator towers (Meinhold, 2009). The article suggests that using grain elevators is a good choice because of their sturdiness and the ability to withstand different types of weather conditions (Meinhold, 2009).

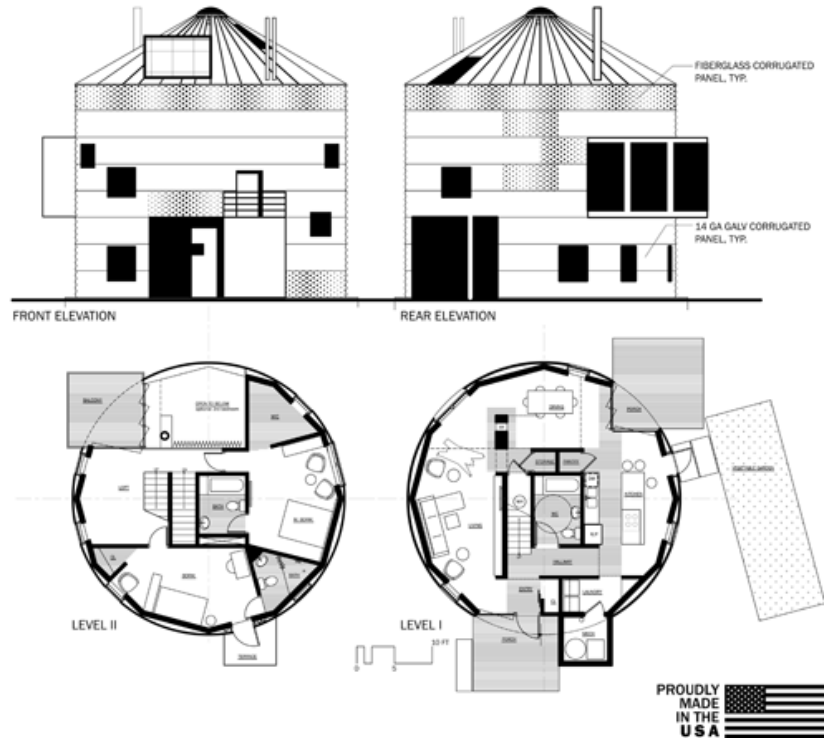


Figure 5: Exterior and interior design of “House-in-a-Can” idea showing a possible layout for a living space (Meinhold, 2009)

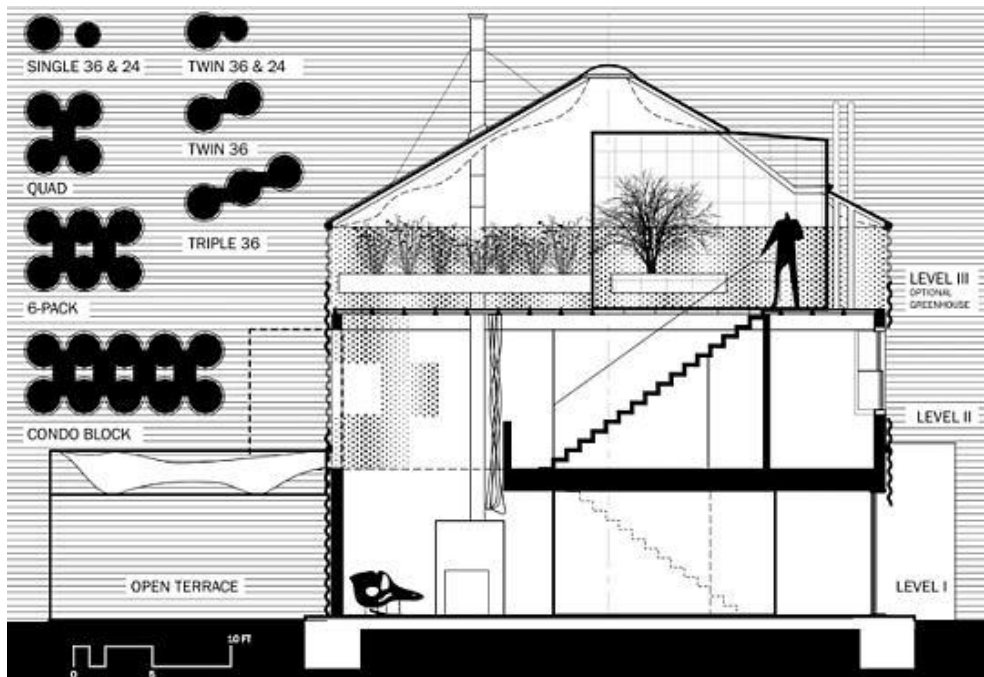
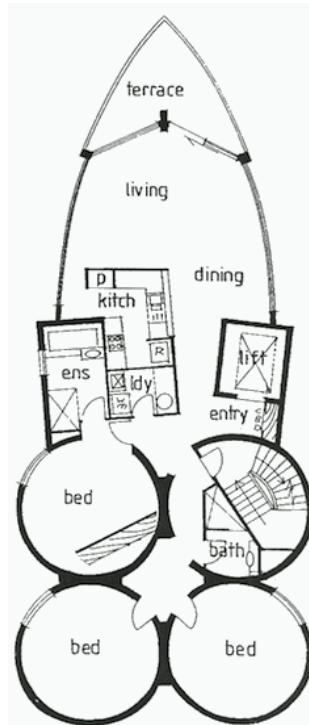


Figure 6: Design of “House-in-a-Can” showing the different layouts of grain elevators if there are multiple towers. (Meinhold, 2009)

Another example in Victoria Australia, shows a converted a grain elevator into residential purposes where the structure is not a single family dwelling but a multi unit apartment building (Kane, 2012). The design of this building has constructed one apartment per floor (Kane, 2012). Figure 7 and 8 illustrates the unusual interior layout of the apartments and the balconies were added to the exterior.



**Figure 7: Interior layout of apartment unit located in Victoria, Australia.
(Kane, 2012)**



**Figure 8: Exterior view of converted apartment shows the addition of balconies.
(Kane, 2012)**

Although it seems that the most common new use of converted grain elevators is for residential purposes, there are some examples of other uses. One multi-tower grain elevator structure in Oklahoma City, USA was converted into a rock climbing business as illustrated in Figure 9 (Rocktown, 2009). It is now also part of an art project where the exterior of the building is being painted by artist Rick Sinnett (Silo Art Project, 2012). Other uses include a hotel at the University of Akron in Akron, Ohio, USA which used to be a grain elevator used by Quaker Oats as seen in Figure 10 (Quaker Square Inn, 2012). Lastly, a design competition was held in Amsterdam, Netherlands for a former sewage grain elevator complex and the winning design (Figure 11) depicts a “multifunctional cultural center, housing a wide range of diverse activities, including a spectacular open rooftop playground on one silo, and restaurant Praq op ‘t daq built on the rooftop of the other.” (Jordana, 2009, p. 1).



Figure 9: Rocktown climbing gym interior and painted exterior (Jeremy & Kathleen, 2009)



Figure 10: Quaker Square Inn Hotel at the University of Akron was a former mill complex for oats. (City of Akron, 2009)

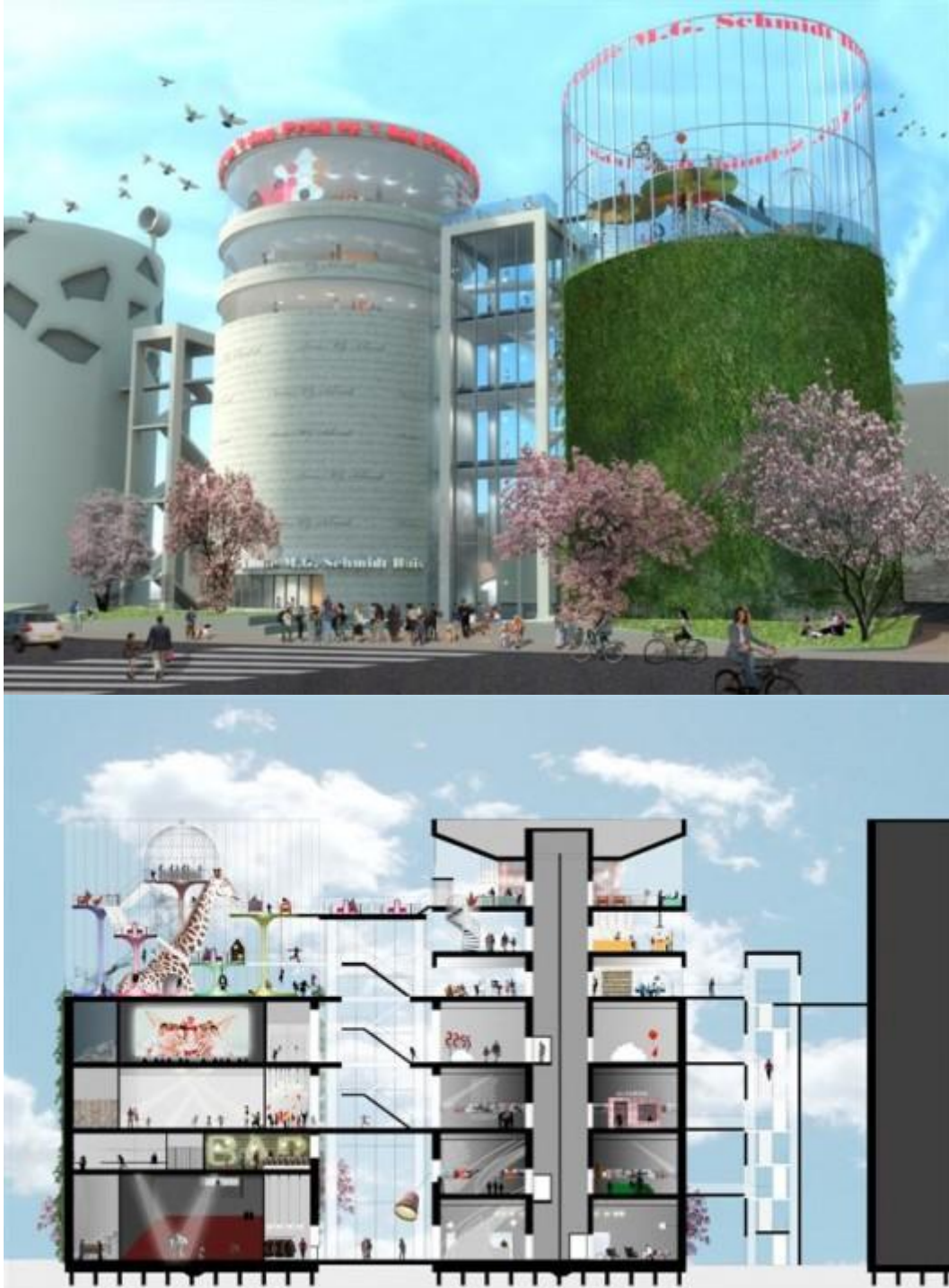


Figure 11: Exterior and interior of the design competition's winning design to convert a former sewage silo complex into a multifunctional building. (Jordana, 2009)

2.3.4 Typologies of Converted Grain Elevators

To summarize the variety of designs for adapted grain elevators, I created simplified diagrams (Table 1) to create a visualization the different typologies. The previous section clearly shows the diversity of the designs possible, depending on the designers, architects, original structures, and use. The differences range in number of grain elevator towers and the subsequent arrangement of multi-tower structures, additional structures, height of the bins, and the new use. 32 examples of converted grain elevators were found using Google image search and various design websites. Of the 32 examples investigated, 12 were high rise residential, 6 were mid rise residential, 9 were single residential, and 4 were used for other purposes. Therefore, the most common adaptive reuse project found was using the high rise grain elevators for residential purposes. Using this information, I categorized these buildings into simplified types and placed them into a chart format for easier comparisons.








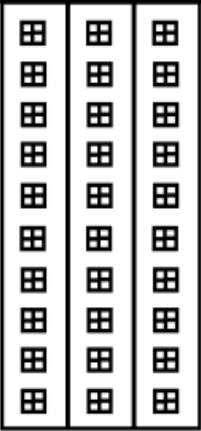
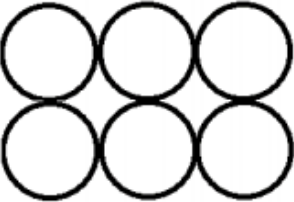
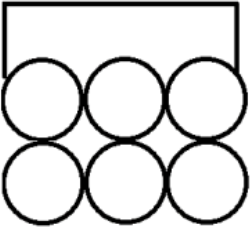
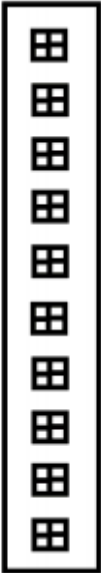
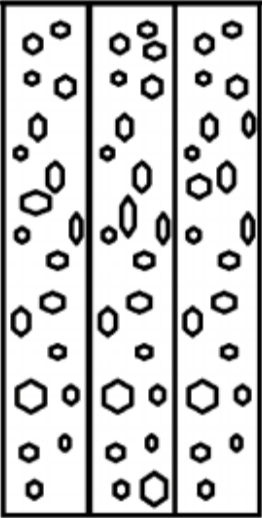
Number of Towers and Arrangement	Additions	Height	New Use
Single tower 	No addition 	Single storey 	Single family house 
Multi-tower arranged in a single file 	Generic extension on single tower 	Low or mid rise 	Multi-residential 
Multi-tower arranged in a cluster 	Generic extension on multi-tower 	High Rise 	Other use that is unusual such as rock climbing 

Table 1: Typologies of adapted grain elevators

After creating this chart and discovering the typologies, it is clear that the possibilities for adapting and reusing grain elevators are seemingly endless. Some structures' original uses have become almost unrecognizable due to additions, façade alterations, and their new purpose. The most popular new use for grain elevator towers based on the examples found is residential, either single family homes or multi-resident buildings like apartments, condominiums, or hotels. This result may be because it could provide the highest financial return on all the renovations. As for the arrangement, if they are in a cluster form, they tend to be even numbers making the structure symmetrical. As mentioned earlier, these styles of arrangement are part of the geometric design which originally allows for the ease at which materials move within the structure and to utilize the maximum capacity while also reduces costs (Carson & Jenkyn, 1993). Since the new uses are no longer moving bulk material inside, additions and other major changes to the shape of the structure can be acceptable. The additions tend to be on just one side of the structure, although there are examples where the addition actually surrounds the entire grain elevator resulting in completely covering the outer walls. For height, most of the examples seem to be mid to high rise structures (approximately 20-30 metres). This may be because they are being advertised continuously on the internet such as hotels or rock climbing and more noticeable, whereas a single family dwelling would tend to only appear if it is for sale and therefore more difficult to find online.

2.4 Downtown Revitalization

2.4.1 Defining downtown revitalization and its process

Another major aspect of this paper is the effect that the adaptive reuse of grain elevators into housing has on downtown revitalization. Downtown revitalization can be described as a process which improves downtown business districts and also eliminates the slum areas (Gotham, 2001). As mentioned earlier, these improvements can be seen in either some or all of the aesthetic, economic, environmental, or social aspects (De Sousa, 2002). Since this study focuses on residential units, another definition for revitalization as made by Toronto Community Housing (2012, p.1) is that “revitalization goes beyond replacing housing in a poor state of repair. [It is about] transforming communities to build great neighbourhoods for everyone”. Therefore, this process can be described as one that also attracts other investments to the downtown which results in improvements in public amenities such as transportation, educational buildings, and green space and can create jobs and affordable housing (Toronto Community Housing, 2012).

Although literature on downtown revitalization often mentions that it is difficult to “evaluate the ‘health’ of a downtown” there are some factors that can be assessed even though the methods of measurement can influence the outcomes (Mullin & Kotval 2003, p. 1). Common factors that can determine if a downtown has been revitalized are whether improvements have been achieved on a city’s walkability, transit systems, housing, basic amenities, culture, entertainment, aesthetics, safety, and also the cleanliness (Leinberger, 2005).

To simplify downtown revitalization, Leinberger (2005) created a twelve step process to improve downtowns. Since this is a very simplified method, Leinberger (2005) advises that cities should follow these steps but in a way that it suited for that city. Therefore, for the case studies in

this paper, this process will be applied in a more customized way. To summarize the twelve step process for downtown revitalization, see table 2 below.

Step	Description
1	Consult with the public and advisory committees and create a vision of what needs to be improved based on initial research on the city’s history, demographics, and infrastructure and also determine what is and is not working presently.
2	Create a strategic plan should based on a city’s character, housing, infrastructure, retail, culture, employment, community involvement, non-profit organization involvement, marketing, and social values.
3	Form a partnership between the public and private sectors. However this can be difficult as projects tend to get too political which slows down the process.
4	Replace zoning codes with form based codes to lessen confusion and maximize flexibility to obtain building permits.
5	Focus on the business improvement districts since they can influence the surrounding areas with positive impacts.
6	Use a “catalytic” developer.
7	Some development projects will fail, having that initial push or ‘catalyst’ will help to continue other successful development projects which will occur later since revitalization is a long process.
8	Convert industrial buildings into rental units (as well as creating new buildings) but admits that it can be challenging for developers if the building is decrepit and can potentially remove cheap office units from the market.
9	Use residential units because they have the ability to have high rental costs because of their location so they can be profitable.
10	Focus on affordable housing even though these types of projects can be challenging due to funding cuts.
11	Focus on for-sale housing since the demographics of downtowns tend to have childless young professionals and also baby boomers that can afford to buy a house.
12	Before retail outlets are created, proper housing needs to be put in place first as retail outlets are considered “followers” in real estate development.

Table 2: 12 Steps to Downtown Revitalization (Leinberger, 2005)

2.4.2 How it relates to adaptive reuse

From the description of downtown revitalization and the subsequent steps to take in the process, it is clear that housing and heritage have a major impact on the health of downtowns.

Leinberger's twelve steps noticeably focus on different housing types (including conversion projects) to improve downtowns and the different results that can occur. Therefore, converting grain elevators into housing can be a possible method for downtown improvement. The availability of housing downtown is imperative since vibrant cities provide places for people to live, work, and play without proper housing, it would be difficult to attract potential workers to the area. Since zoning could be a major issue with adaptive reuse projects due to the possible need for a zone change, it makes sense to use form based codes in the process.

2.5 Summary

In summary, it is obvious that there is still the question of whether it is better to demolish or to adaptively reuse a building due to the many advantages and disadvantages discovered. Bullen & Love (2010) concluded that demolition occurs only if a building is deemed to have a lower life expectancy than a new building and if cost factors are an issue. It also depends on how much importance is put on the heritage conservation aspect and if the building is viable for this process (Bullen & Love, 2010). Both of the advantages and disadvantages in the adaptive reuse process can be said to be closely connected to the downtown revitalization process. Also, planning policies play a significant role in facilitating or impeding this process whether it is regarding designated land use zones, building codes or heritage preservation policies.

For grain elevators specifically, there is a vast variety of types of structures and new uses. Since this study is looking specifically at grain elevators made of concrete, it was discovered that this type of material can have many challenges, mainly deterioration. Most of the examples have been converted into residential purposes and are located in many different countries. To simplify the diversity of these adaptive reuse projects, I created a table and found that the popular types

were multi-unit and multi-storey residential units.

Heritage preservation through adaptive reuse should be part of the process of downtown revitalization efforts. However, there are still many questions unanswered on this topic, therefore it is reasonable to propose that more research needs to be done. If adaptive reuse is generally viewed as being positive for downtown revitalization, original research needs to be collected on the issues surrounding what is facilitating and impeding this process in this study. To answer all of the remaining questions, this thesis focuses on the adaptive reuse of grain elevators.

3.0 Case Studies and Locations

3.1 Criteria for case study selection

This study examines three case studies where large, multi-bin grain elevators exist. These case studies include two converted grain elevators and one grain elevator that has not been converted. For the converted grain elevators, this paper studies the Hobart Silo Apartments located in Hobart, Australia and the Grünerløkka Studenthus in Oslo, Norway. The grain elevator that has not been converted is the Canada Malting Silos located in Toronto, Canada.

There are many reasons why these case studies were chosen. Using the examples in Hobart and Oslo show that both luxury styled housing and affordable units are possible options for grain elevators. Also, there is a focus on grain elevators that meet certain size requirements to aid in comparisons. The selected case studies are all approximately 30 metres in height or taller and have multiple circular bins creating more space and potential for different housing options. This size allows for the potential for a high rise and high density residential unit. Another reason for choosing these structures is that they are located in urban areas, not rural, so the probability for reuse is higher. Data availability also plays an important role for choosing these sites and census data and planning documents are relatively accessible. Also, the City of Toronto conducted a heritage assessment for the Canada Malting Silos. The City concluded that a policy needs to be developed to help manage the grain elevator complex and also to create guidelines for the future reuse of the structure (City of Toronto, 2007b). My research seeks to find the policies that need attention and possible changes and to create these guidelines for other adaptive reuse projects.

The rationale for choosing these three case studies is due to both their similarities and

differences. In general, they are similar in size, former uses, current uses, location, building age, and project completion dates. The differences involve the more detailed uses including luxurious apartments compared with cheaper student housing style residences. To compare buildings that are similar in structure, history, and use makes it a stronger case to demonstrate that this type of new use either has succeeded or failed in contributing to the cities' downtown revitalization. The reason to choose some that are slightly different is to demonstrate that there are alternative uses and to also determine which one might be better suited for the case study in Toronto. Also, using case studies located on three different continents demonstrates its universal appeal and the ability for this type of project to be completed in different climates and populations. These types of projects do not necessarily have to cater to high income populations but can also serve populations in need of affordable housing arrangements.

3.2 Case study located in Hobart, Australia

The first case study is located in Hobart, Australia at 1 Castray Esplanade in the Battery Point neighbourhood of Hobart as seen in Figure 12. The location of these apartments in this particular neighbourhood is significant in terms of planning policies as the guidelines are stricter than adjacent areas of the city (P. Newman, personal communication, September 19, 2011). The reason for these stricter policies is because this area has great importance in the city's settlement history. As the name suggests, this area used to serve as a military battery location in the early 1800s and was also a penal colony (Battery Point, 2010). Over the next few decades, the military post grew and attracted other types of settlers who mainly established farms in the area (Battery Point, 2010). This port area was involved in the shipment of timber, flax, and rum so it is clear that the grain elevators in the area later became part of this industry (Battery Point,

2010). With the influx of settlers, homes had to be built in this area resulting in a growing residential area (Battery Point, 2010). Today, this area still serves as a major port but also remains a historic residential area with a history rich in the military, the penal system, and the agricultural industry (Battery Point, 2010).

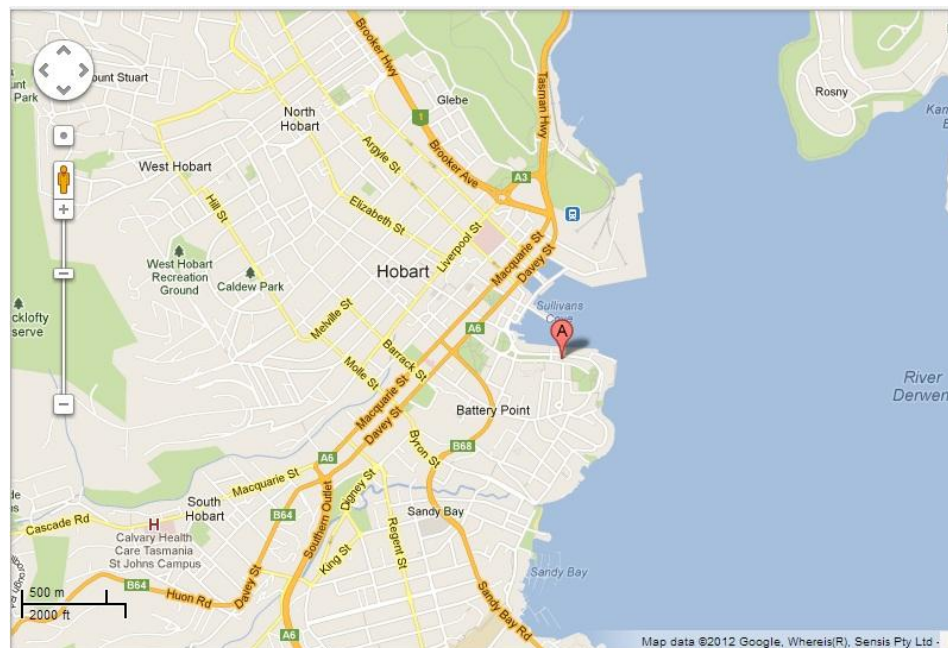


Figure 12: Location of the Salamanca Silo Apartments case study in Hobart, Australia demonstrating its proximity to downtown and the waterfront. (Google Maps, 2012)

The history demonstrates the strong connection to heritage and therefore makes sense that these silos remained. The previous use of these silo structures was to store wheat and to create a gravity feed using underground ducts for transport ships that would be docked along the waterfront (P. Newman, personal communication, September 19, 2011). After changes to the wheat industry, the grain elevator became unused and remained this way for many years. The structure began to go into disrepair which sparked an opportunity by local developers to begin a revitalization project (P. Newman, personal communication, September 19, 2011). During this time, the downtown area of Hobart was growing and more people wanted the downtown living experience. This desire created a large demand for more residences and also for more luxurious

places to live (P. Newman, personal communication, September 19, 2011). Having the grain elevator close to the conveniences of downtown and also having the ability to provide harbourfront views, it seemed to be a perfect fit to be converted in housing units.

Today, the Battery Point neighbourhood is the most expensive area in Hobart to live (Hobart City Council, 2010). Therefore, it makes sense that the Salamanca Silo Apartment building was converted into a luxury residence and why these apartments cost over \$1, 000, 000 (Watchorn, 2012). The Salamanca Silo Apartment building is 35 metres in height and has 11 floors above ground. The companies that were involved in this project were Heffernan Button Voss Architects and also Fairbrother and Gandy and Roberts. The project cost was \$15.2 million and was completed in 2001.

The design of these apartments stemmed from the need to please the public. The architects that designed this building wanted to make the public comfortable with the changes that were happening in this area by making them complement the surrounding buildings and feel of the area (Newman, 2011). Although the historic grain elevator remained intact, the design included a more contemporary look with the additions to the existing structures. The resulting building is simplistic, and modern, without hiding the structure's historic past as seen in Figure 13 (P. Newman, personal communication, September 19, 2011).



Figure 13: Photo of exterior showing the addition attached to the original silos (P. Newman, personal communication, September 19, 2011)

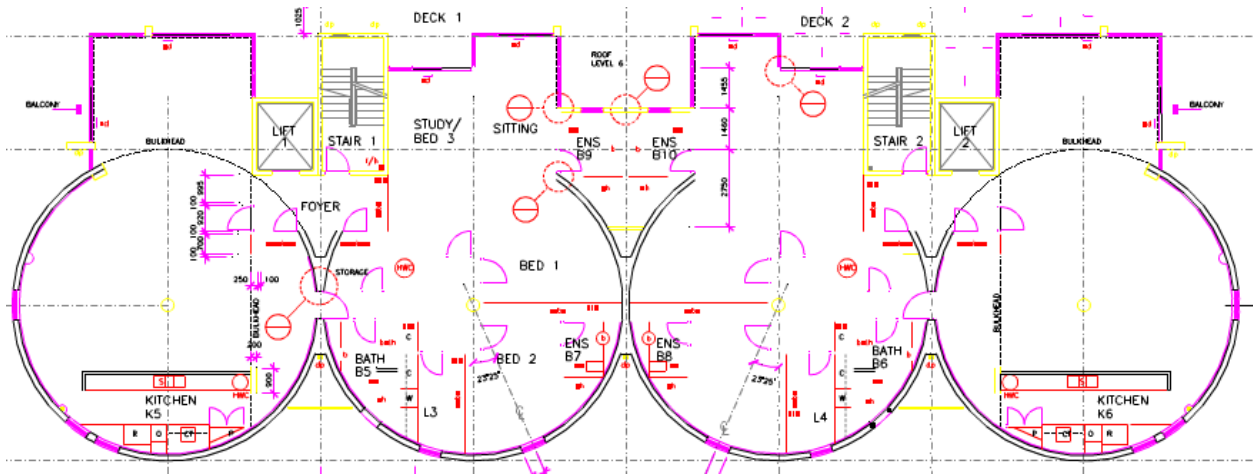


Figure 14: Design of interior on one of the residential floors demonstrating the curved walls and the additions (P. Newman, personal communication, September 19, 2011).

However, the new design (as seen in Figure 14) and use of the grain elevator did not come without its challenges. The planning policies specific to the Battery Point neighbourhood say that “any new developments could only be 3 stories in height to continue the wall of existing adjacent historic buildings” (P. Newman, personal communication, September 19, 2011, p.1). Since the resulting structure is well over 3 stories, this policy became difficult due to the fact that the “required floor area to make the development financially viable” was not possible with this low rise height (P. Newman, personal communication, September 19, 2011, p.1). To change these development rules, Hobart City Council, a developer, and an architect debated over the desired changes. The public was also given the opportunity to voice their opinions. These deliberations spanned over a 2 year period and included discussions on the historical significance and also the aesthetic qualities of the structure (P. Newman, personal communication, September 19, 2011). After these discussions, it was agreed that the historic integrity had to be maintained by making as little alterations as possible to the side facing the historic neighbourhood (P. Newman, personal communication, September 19, 2011). This created a compromise where the side facing the Salamanca Market maintained its historic aesthetic qualities while the side facing the harbourfront was significantly altered with the additions of more floor space and balconies (P. Newman, personal communication, September 19, 2011).

3.3 Case study located in Oslo, Norway

The second case study is located in Oslo, Norway at Marselis' gate 24 in the Grünerløkka district in the city as shown in Figure 15. The settlement of this district is similarly significant to the city's history. Although it is not located on the sea water's edge, it is located on waterfront along a river and park system called Aker (International Intervision Institute, 2012). Aker was at one time the industrial hub of Oslo due to the river being the power source for mills (International Intervision Institute, 2012). The grain elevator case study would have been part of this industry. Similar to Hobart, the industrial uses eventually fell into decline and by 1970 the area was in disrepair and suffered from pollution (International Intervision Institute, 2012). To combat this decline, the City of Oslo started to revitalize the river and park system in the 1980s through their Ministry of Environment (International Intervision Institute, 2012). This project is still on-going and has transformed many industrial sites into new uses. The main goals of the project were to create a cultural heritage area to honour its industrial history, preserve nature, and promote new housing using historic industrial buildings (International Intervision Institute, 2012). This case study falls into the latter goal.

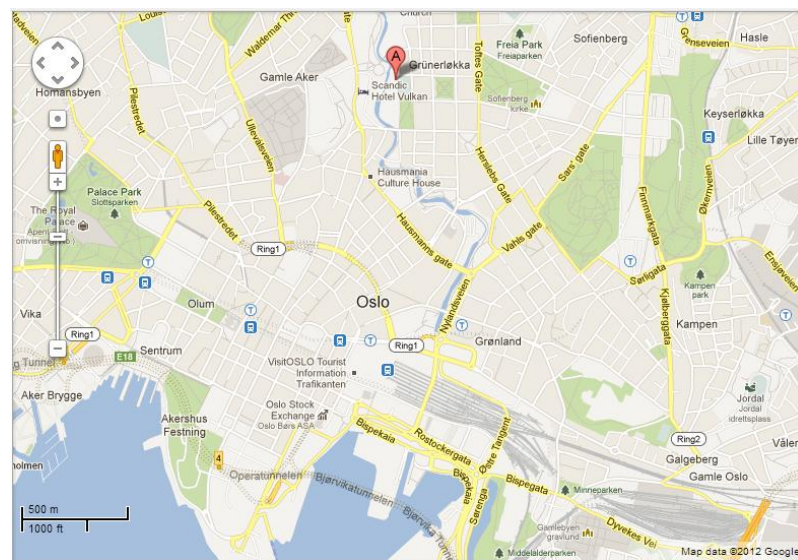


Figure 15: Location of the Grünerløkka Studenthus in Oslo, Norway demonstrating its proximity to downtown and the riverfront. (Google Maps, 2012)

The former use of this structure was a grain elevator. It was 53 metres in height and completed in 1953 (Oslo Planning and Building Services, 2002). For forty years, this structure served as a grain elevator until 1993 when it was zoned for residential purposes (Oslo Planning and Building Services, 2002). Today, the building now called the Grünerløkka Studenthus, is slightly taller than the Salamanca Silo Apartments. It is 43.88 metres in height and has 18 floors above the ground (Grünerløkka Studenthus, 2012). The companies that were involved were HRTB Arkitekter AS (HRTB Happiness Frydenlund artist for colouring) and Ingrid Løvstad as interior designer (Grünerløkka Studenthus, 2012). The project also involved Scandiaconsult, AS, Oslo, Ingeniørene Bonde & Co., Studentsamskipnaden i Oslo (Grünerløkka Studenthus, 2012). The project cost around \$18 million USD (Grünerløkka Studenthus, 2012). The residence is approximately 9000m² which costs just under approximately \$3000 per square metre in USD (Grünerløkka Studenthus 2012). The current state of this building began with a project called the Project for Student Welfare Oslo, Øystein Myhrvold (Mowè, Beite, & Lone, 2008). The project began in 1999 and was completed in 2001 and is owned by a group called the Student Life in Oslo and Akershus (Mowè, Beite, & Lone, 2008; Grünerløkka Studenthus, 2012). The cost to rent an apartment ranges from approximately \$690 CDN for an unfurnished room to \$1464 CDN for a furnished one bedroom apartment with a loft (Sio, 2012).

The design of this building involved converting the 9000m² grain elevator into 226 student apartments (Grünerløkka Studenthus, 2012). The conversion process mainly consisted of creating floors and windows (Ifi, 2003). This conversion resulted in 22 rooms called “dublettløsning” which translates to two rooms that share bathrooms and kitchens and it also includes 165 one bedroom units and 39 two-bedroom units as seen in Figures 16 and 17 (Oslo Planning and Building Services, 2012). Because of the grain elevator’s circular shape, the rooms

in the apartments are round. Although some might feel that this would be challenging furniture wise, the designers felt that it created special opportunities for unique designs (Mowè, Beite, & Lone, 2008). Not only was the design of the outside of the building considered, the furniture had to be designed in a way that complemented the roundness and the raw concrete of the walls which provided more opportunities to use more colour (Mowè, Beite, & Lone, 2008).



Figure 16: Exterior of Grunerlokka Studenthus (Boyer, 2013)

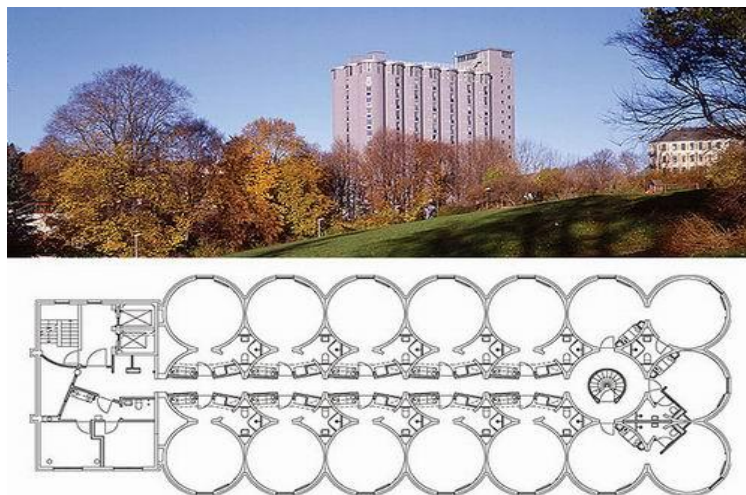


Figure 17: Design of the interior of the Studenthus showing the minimal amenities inside. (Skyscraper City, 2011)

3.4 Case study located in Toronto, Canada

The last case study is the Canada Malting Silos located in Toronto, Canada at 5 Bathurst Street as shown in Figure 18 and is owned by the City of Toronto. It is also listed on the City's inventory of heritage properties. The following historical information was taken mostly from a study by Historica Research Limited (2007) unless otherwise stated. The study stated that the previous use of these silos involved two grain elevators and an interconnected germination building and kiln building. The development of this site is also similar to Hobart and Oslo as it is located on a waterfront. The study also stated that the reasons for developing at this site location were because it had a "ready supply of malting barley, reliable energy, ample good quality water and effluent removal facilities, [and] access to transport" (p. 9). Settling at the Bathurst location made sense as it met all of these requirements. Being on the waterfront allowed ship access for both transportation and shipping and the water was used for cooling purposes. Also, being located downtown provided close access to the railway system.

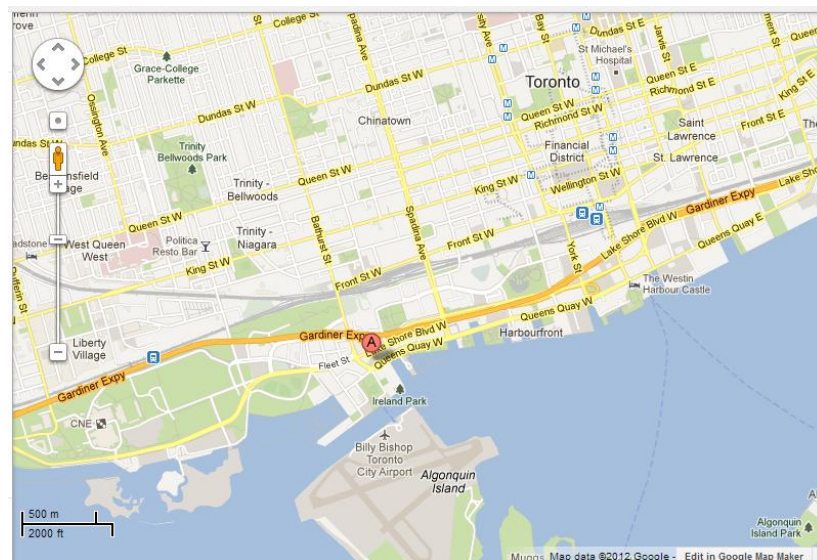


Figure 18: Location of Canada Malting Silos in Toronto, Canada demonstrating its proximity to downtown and the waterfront (Google Maps, 2012)

The original building was built in 1928 after the repeal of prohibition in Ontario in 1927. The malt production continued until 1987 when it stopped and has not been used since. Originally, this building was constructed because of the popularity of using malt in the production of alcohol and to help revitalize the harbourfront based on plans from 1912. It is interesting to note that waterfront revitalization plans were put in place in the early 20th century and plans are still being created today for Toronto. This fact clearly demonstrates the dynamic nature of cities and how planning projects can never be finite. More specifically, the complex was built as part of revitalization plans for the grain industry in Toronto since many of the remaining grain elevators were destroyed by fires. Plans show that from 1928 to 1946, the site grew because of the increase in alcohol consumption and was completed in 1946 with some later additions completed in 1953. Over time, the industry grew and the Canada Malting company wanted to build a new complex. However, due to cost constraints, they decided to continue using the Bathurst location but eventually suffered due to over-capacity worldwide in the 1980s. This decline resulted in the company closing the Toronto location and producing in other cities such as Calgary, Thunder Bay and Montreal.

Since this structure is still not being used, there have been many alternatives with a cost analysis that were prepared by the City through a heritage assessment. In 2007, Trow Associates completed a structural assessment which determined that the building was at an advanced decay stage. To determine the building's heritage quality, they completed a Heritage Impact Assessment which resulted in five options for the building's future. The first alternative preserves all of the existing structures on the site and would cost \$20.6 million (Bowes, 2009). Other changes that would be involved in this option are the removal of any leftover grain or any parts that are damaged beyond repair (Bowes, 2009). If repairs or structural reinforcements are

needed, they would be completed for this option (Bowes, 2009). Alternative B requires the remediation of the grain elevator structures and costs a bit less at \$17.7 million (Bowes, 2009). This option involves the demolition of the structures located west of the silos and also 6 of the south silos (Bowes, 2009). Also included in this option are stabilization techniques for the remaining structures (Bowes, 2009). Alternative C is described as preserving a “symbolic representation” of the silos and would cost \$15.279 million (Bowes, 2009). The north silo structure and the 6 southern silos would be demolished (Bowes, 2009). This option also includes stabilizing the remaining structures (Bowes, 2009). The fourth alternative would cost \$8.4 million and would preserve a “modified tiered symbolic representation” of the silos (Bowes, 2009). This option involves demolishing most of the silos except for the 9 silos in the southern group which would also be tiered (Bowes, 2009). The last alternative is to completely demolish all of the structures on the site and would cost \$7.65 million (Bowes, 2009). The last option is the least expensive but does not preserve any of the historic structures (Bowes, 2009). The Heritage Impact Assessment concluded that the cultural value of the property needs to be updated, determine if the complex also has industrial process values, make a site recording to the standards of the Historic American Engineering Record guidelines, demolish the kiln and germination buildings, and to reuse the site (Bowes, 2009).

The design of this structure can be separated into the grain elevators and the malting buildings as shown in Figures 19 and 20. Currently, the Canada Malting Silos in Toronto, Canada are not in use and have not been converted into housing because their exact future use is still unknown. The height of this structure is similar to Hobart’s case study. It is also 11 floors above the ground and 37 metres (Emporis, 2012). The last renovation that was completed was in 1944 (Emporis, 2012). The architects for the original silos are J.S. Metcalf and Goldsmith Borgal &

Company Architects (Emporis, 2012). The building is made of reinforced concrete which was a method patented by the J. S. Metcalf Company to create strong towers and also reduce risks of explosions (Historica Research Limited, 2007).



Figure 19: Photo of current state of the Canada Malting Silos (Kevill 2012)

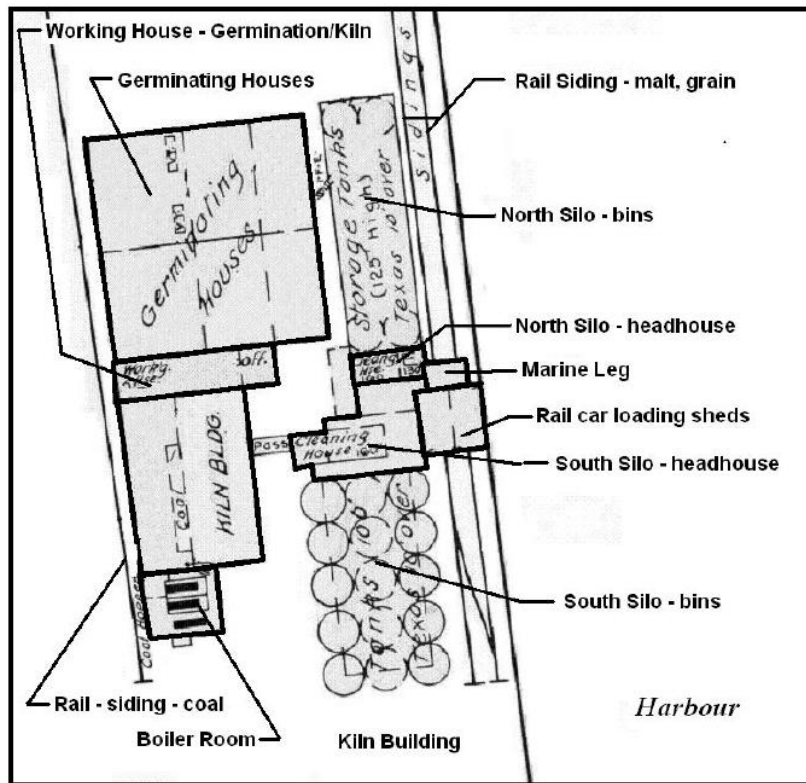


Figure 20: Historic design and uses of the Canada Malting Silos. (Historica Research Limited, 2007)

3.5 Summary Table

Table 3 below summarizes the similarities and differences of the three case studies. The examples in Hobart and Oslo were built and converted in relatively similar years and have similar costs. They differ in their present use as one is luxury apartments and the other is a student residence. The Toronto case study shows that it is similar to the other examples but has not been converted yet.

Case Study	Built	Adaptive reuse	Cost (usd)	Height (m)	Historic Use	Present Use
Hobart, Australia	1951	2001	\$15.2 million	35	Grain elevator	Luxury apartments
Oslo, Noway	1953	2001	\$18 million	43.88	Grain elevator	Student residence
Toronto, Canada	1928	N/a	N/a	46	Malt production	Not being used

Table 3: Case study comparison

4.0 Methodology

4.1 Research Design

The main concerns found in the literature review were with economic, social, environmental, and heritage factors. Converting grain elevators into residential units also faced many challenges such as structural elements and design. However, they are also a way of promoting heritage preservation and environmental sustainability. Planning policies showed a lack of specific guidelines for this type of adaptive reuse and many obstacles that can slow the conversion process. The research design for this study builds on the literature as it is designed to seek information on whether adaptive reuse is the optimal solution for an unused historic grain elevator. Previous studies on this topic were more specific to the architecture and technical aspects of the conversion process and not comparative with different case studies. One previous study by Bullen & Love (2010) used interviews to determine whether adaptive reuse or demolition was the solution for heritage buildings not being used.

This study uses similar methodology to the Bullen & Love (2010) on the adaptive reuse of industrial buildings in Australia. My study seeks to answer similar research questions and uses similar data collection methods because they are viable. Their research design aimed to understand the issues that can arise when considering adaptive reuse of unused historic buildings and how the owners of the buildings and other stakeholders deal with those issues. Because of the diverse and dynamic nature of adaptive reuse, I used an interpretive research approach. This study uses a similar rationale as Bullen & Love's because of the importance of context in these types of projects and how it impacts social, economic, and environmental factors. Although they used in-depth interviews of different professions in the field such as architects, developers, and planners,

they did not consult the public or use other sources of information in their analysis. Therefore the research design for this study is similar to Bullen & Love's but also has the methodological contribution in that it has the addition of the public's perspective and also the analysis of planning documents and demographics. Adding the public's perspective is important because of the nature and goal of planning. We are trying to improve cities and without the public's input, we would miss their needs.

4.2 Variables

The variables that were set out to evaluate the research were commercial performance, residential performance, risks, costs, environmental sustainability, building demand, gentrification, housing availability, heritage conservation and aesthetics. This list was based on the variables from the Bullen & Love (2010) adaptive reuse study to determine which factors influence decision-making. Commercial performance and residential performance were related to vacancy issues and having tenants in the building. The risks, costs, and building demand relate to structural and financial issues. Environmental sustainability, heritage conservation, and aesthetics refer to the operational attributes that also measure building performance. Lastly, gentrification and housing availability measure the social performance. The best data collection methods that better gauge environmental sustainability, building demand, and aesthetics are surveys from the professionals in the field and from the public. The commercial and residential performance, risks, costs, gentrification, and housing availability were best gauged by planning documents and demographic data. However, all of these variables overlapped into all data collection methods.

4.3 Data collection

Three types of data sources were used for the three cities: Hobart, Oslo, and Toronto. The three data sources were planning documents, surveys, and demographics. These sources were used in that order and focus on specific case studies which are explained in detail in the following section. The primary sources are the surveys and the secondary sources are planning documents and demographic data. Unfortunately, the survey responses from participants in Oslo were limited. Possible reasons for this are explained further in the limitations section. Despite fewer responses from professionals in Oslo, participants from the public and also information from planning documents were used to compensate.

Literature review and case studies

Most data sources from the literature review were peer-reviewed journals and books on urban planning, design, environment, and architecture which were found using the University of Waterloo's online library system and bookstacks, Google Scholar search engine to find articles, and Google Books. Many of the photos of grain elevators were collected from internet blogs, travel websites, photo websites, and also architecture and design websites. Other examples came from thesis papers on adaptive reuse of grain elevators and journal articles. One example came from a personal contact who was traveling and visited one of the grain elevators and sent the information via Facebook.

For the case studies, information came from non-peer reviewed sources. Most came from websites about design and architecture. For Hobart, much of the information came from contact with an Australian designer who worked on that project. This contact was simply made at the initial stages of the research proposal to seek out primary information regarding the property

using email contact information from the design firm's website. I also used municipal websites to find historical information about the cities. Specifically, information on the Toronto case study came mostly from a heritage assessment document that the city had posted on their website. Most of the case study data was either collected electronically through websites or through personal email contact. For the Australian designer, a hard copy of the information on paper and cd was sent and received through the mail.

Planning documents

All of the planning documents were found on the municipal websites since these were the most up to date sources for these types of documents. Most planning policies were posted publicly on the specific departments' website such as city development or city planning. I collected these documents that specifically mentioned housing, heritage, and design. These documents includes by-laws, policies, the Planning Act, urban design guidelines, and official plans. Since these adaptive reuse projects are a part of heritage conservation, I explored any heritage assessment documents that have been conducted for the areas where my case studies are located. Also, I collected environmental impact assessment documents because of possible contamination issues on these sites.

Surveys

The data sources came from a survey website service called Survey Monkey. Both public and professionals provided the data through that website. The anonymous data collection was completed through a variety of social media websites and through emails which contained the recruitment letters. The recruitment letters explained the study and included the website link to

the Survey Monkey website. Each city and data source had its own unique website link to make tracking the responses clearer. The recruitment letters were sent out in May 2012 and the survey data was collected after a few weeks to give adequate time for participants to respond. It should be noted that the nature of the social media websites is that posts are eventually moved out of view as new posts are made so it did not make sense to wait longer than that.

For the public recruitment, I posted a recruitment letter electronically on a variety of social media websites. The purpose of having a variety of recruitment locations was to ensure that responses would be made and covered a variety of demographics. First, I used the news website called Reddit for each city. This website contains sub-pages specific to each city and country. The website states the number of subscribers to these pages but it is not known if these subscribers are still “active” readers and therefore the number of potential viewers is unknown. However, this website was chosen due to its popularity and the thought that this popularity would encourage more responses from readers. For Toronto, I used the Reddit Toronto page as it had many recent posts and seemed active. However, for Hobart and Oslo, the city specific pages did not seem to have any recent posts so I assumed these pages were rarely visited and it was not worth posting the recruitment letter there. Therefore, for Hobart and Oslo, I used the country specific pages instead of city specific. Next, I posted a recruitment letter on a variety of Facebook groups including general city groups, heritage groups, and student groups. These types were chosen because they seemed to have active recent posts and that these groups may be more interested and inclined to participate in the survey. For Toronto, the groups included Protect Toronto’s heritage buildings, Toronto Canada, UofTeng, and Toronto’s first post office. For Hobart, the Facebook groups included University of Tasmania Arts Society and Salamanca Market which is located close to the case study. For Oslo, the Facebook groups included

Studentfest Oslo and New to Oslo.

For the professional recruitment letters, I used an online phone directory to recruit participants. Approximately 50 recruitment letters were sent to professionals in each city. I searched for these professionals using an online version of the telephone directory called the Yellowpages (“Gule Sider” in Norwegian) but I used municipal websites to find the contact information of the municipal planners,. The professions chosen were municipal planners, private planners, architects, engineers, and developers or builders which I deemed to be the most likely to be involved in adaptive reuse projects. The search results were arranged by relevance and I chose approximately ten in each field. I found the email addresses on the company websites and were either a specific person or a generic company email address.

Sampling methods

The method for these surveys is different for each type. For the professionals, I targeted specific groups because I needed to recruit professionals in this specific field. I chose this method to provide the opportunity to gain perspectives by experts on the specific topic since they have experience in the planning field. I selected professionals such as city planners, architects, developers, and engineers using the contact information listed on municipal websites and through the phonebook listings. I contacted the participants chosen from the online phone directory in order of relevance based on the search results. For the public, I targeted active online social media groups to ensure responses. Since these were conducted through social media groups using Facebook and Reddit groups both local to the participants’ area, it provided a method to discover generalizations of the public’s needs and allow for public participation.

Demographics

I collected demographic information mostly from municipal websites of the case studies. Also, I used statistical websites including StatsCan and mapping websites if the municipal website did not provide all of the necessary data.

Researcher observation

The source of the onsite information for the Toronto case study was my own personal observation. A site visit and visit to the surrounding area was conducted for the Toronto case study on April 19, 2012. Information was recorded on pen and paper and photos were taken.

4.4 Data management

Planning documents

To manage the information collected from the planning documents and to specifically answer the question of how planning policies impede or facilitate the adaptive reuse of grain elevator process, I created categories of the information to overlay the findings with other data.

In general, there is a specific focus on the documents for the cities or areas where the case studies are located. Through examining these documents and finding the common themes, I discovered the frequent reasons why adaptive reuse occurs and does not occur. Once reasons were found, I made planning policy recommendations to either improve the efficiency of the process or to provide missing guidelines that are noted to be needed.

Within all of these documents, the information was organized into four categories which included design policies, housing policies, heritage policies, and land use policies. Some common planning categories were omitted such as transportation since they were determined to

not be directly related to the actual buildings and also to keep a focus on the case studies.

Surveys

For the professionals in the planning field, I used qualitative questions and also rating scales through an electronic survey called Survey Monkey. The questions focused on measuring the effectiveness of adaptive reuse of grain elevator as a way to revitalize downtown and also to measure its practical use for housing. After data collection, I analyzed the answers to these surveys manually, not through a computer program, and collected common words and themes. These answers were also compared based on the type of profession of this group to see how they differ and whether there are differences in perspectives and concerns depending on their background. I also compared answers based on the city.

For the public, I conducted similar electronic online surveys. The questions were similar to the ones for the professionals but also less technical. I used a ranking system ranging from strongly agree to strongly disagree and also provided an opportunity to provide questions and comments if needed. The questions focus more on their opinions on their likes and dislikes for aesthetics, views on gentrification and how they feel it could or has revitalized the downtown area.

Demographics

The third method that I used was spatial analysis of demographics and land use. This is a small section in the study to help answer the question of how are demographics and housing availability are linked to the adaptive reuse process. This method involved using maps provided from municipal websites and also statistical websites for more detailed data. These maps

illustrate the demographics in the area and also the land uses. I collected census data, demographic data such as age, income, family size, and housing types. After finding this information, the location of the Toronto case study was compared to the demographics and land uses to explore how it could be related to downtown revitalization efforts. I used data at the census tract level if it was available. This made the data more accurate and helped to find any patterns that existed near the case study.

4.5 Data analysis

I performed different kinds of data analyses depending on the type of data collected. For the planning documents and examples found in the literature review, I completed visual comparisons to determine the similarities and differences in the physical structures of the converted grain elevators and how they could be applied to the Toronto case study. Also, I completed a content analysis of the different policies and building regulations by comparing the similarities and differences found in each city and also what the common issues were for each city. This analysis was to determine what types of planning policies might be impeding Toronto's case study from being converted into a new use.

For the surveys, after I collected and manually categorized the data, I analyzed the results. I found common issues and key words and compared them to the different groups that participated. This included similarity and differences found within the professional field and also how they related to the public's perspectives. I also conducted a comparative analysis was also conducted based on the location of the case studies.

For the demographics, I completed a visual analysis to determine the demographic make up of within the area of the Toronto case study and also the surrounding areas. Then I compared

demographic data to the needs of that population and I determined the best option for the unused grain elevator.

5.0 Findings and Analysis

5.1 Introduction

The following section is the findings from the data collection of planning documents, surveys, and demographics. These three sources will be discussed in more detail, the findings from the collection, and the results from the analyses of the collected data. Most of the analysis offers comparisons between the case studies and also between the data sources. I also compare the results of the study with the findings from the literature review and how closely they relate to the findings.

5.2 Planning Documents

5.2.1 Description of documents used

I examined the planning documents that including official plans of the three cities, planning schemes of particular neighbourhoods, heritage planning policies and assessments, and waterfront planning policies. As mentioned earlier, within all of these documents, I organized the information into four categories: design policies, housing policies, heritage policies, and land use policies. The reason for omitting some of the other categories such as transportation and environment is that these categories are not directly related to the adaptive reuse of one building. I then compared the information from these four categories with each city to find the similarities and differences to determine what might be impeding Toronto's case study from being converted into a new use. Table 4 below summarizes the findings and the analysis of the planning documents.

Variables	Hobart Policies	Oslo Policies	Toronto Policies
Design	-planning schemes for neighbourhood describe design guidelines including maintaining character, minimum alterations, consider heritage features	-design guidelines not in great detail but focus on design standards for accessibility and designing for maximum capacity of buildings	-focus on waterfront designs to promote public space and improve accessibility -proposals must be approved by a design review board
Housing	-affordable housing strategy -strategic plan promotes variety in housing	-focus on variety of housing types while giving adequate space for surrounding infrastructure	- waterfront plan emphasizes variety in housing types including affordable housing
Heritage	-planning schemes identify culturally significant areas -buildings on heritage register must be protected but may be altered if no other option is possible -applicants must submit many documents for gaining conversion approval	-Cultural Heritage Act and heritage register list properties as either formally listed, formally protected, or considered worthy of protection	-heritage property inventory describes which properties are designated under the Ontario Heritage Act -Official Plan states that heritage easements must be secured to maintain areas of heritage value
Land Use	-planning scheme states that activity in certain zones should not change -maritime industries should be modernized but also maintain heritage significance	-development plan promotes mixed use areas -park revitalization plan mentions converting industrial sites into housing	-waterfront plan promotes mixed use areas -innovative approaches are recommended for community infrastructure
Similarities	-value importance of preserving heritage, mixed use areas, and affordable housing -many submission requirements to gain approval for conversion projects		
Differences	-different focus on types of land use (eg. Oslo focused on green space) -heritage designations differed as one case study was on the heritage register and the others were not officially designated but still listed as significant		
Implications	-many submission requirements impede the approval process for conversion -promotion of heritage conservation facilitate the approval process for conversion -analysis found contradicting policies which made it difficult to determine which projects would be approved faster than others		

Table 4: Summary of planning document findings

5.2.2 Design related policies

Hobart's city council planning schemes for Battery Point and Sullivan's Cove describe some of the design guidelines. The Salamanca silo apartments in this city are located within both of these areas. The Battery Point planning scheme states the general requirements in an appearance schedule. Some of these include maintaining a similar characteristic and conformity within the area to consider the aesthetics, heritage, architecture and townscape of the neighbourhood (Hobart City Council, 2012a). It also says that the neighbouring properties should be consistent but also can express individuality (Hobart City Council, 2012a). This policy relates to the grain elevator because it does offer unique and individual characteristics compared to other residences in the area. Although the round and smooth cylinders stand out, the policy states that the features should consider maintaining the area's heritage and cultural significance. This may have been an impediment when initial plans of the adaptive reuse process were made. However, the city council also states a policy in which uniqueness overrides if it is within the other limits stated and therefore the silo apartments fall within the policies (Hobart City Council, 2012a). Therefore, also within this document, the requirements for the condition of the buildings are described. It states that the facades should be identifiable to reduce similarities in the horizontal appearance (Hobart City Council, 2012a). However, it also states that this policy does not apply if the building in question is either a renovation, conversion or an extension project. More relative to the converted grain elevator project are the policies relating to conversion and extensions to existing buildings. The document states that the alterations should be minimal and that changing or removing existing elements should also be avoided (Hobart City Council, 2012a). This section can definitely be an impediment to adaptive reuse projects. In the Sullivan's Cove Planning Scheme, it states that some of its objectives are to

encourage architecture that is considered modern but also should feature elements of the area's history (Hobart City Council, 2012d). It also states that the designs should "incorporate historic cues, whilst not relying on historical mimicry" (Hobart City Council, 2012d, p. 29). Therefore, the design on the silo apartments makes sense because it incorporates modern elements with the addition but does not try to imitate historic features but simply uses existing ones. However, many of these guidelines state contradicting policies. The guidelines are difficult to follow because they are not consistent with each other. Therefore, many design related policies could have impeded the conversion process and caused debates on which policies are more important.

For Oslo, their city's official Master Plan does not mention any design policies in great detail but does state that developments must strictly follow design standards (City of Oslo, 2008b). More details were found in a document titled Strategic Plan for Universal Design with action plan 2010-2015 (translated from Norwegian) which outlines some of the city's design guidelines (City of Oslo, 2009). This document states that the City's Planning and Building Act from 2010 and the New Anti-Discrimination and Accessibility Act from 2009 have a large influence in the design policies (City of Oslo, 2009). These documents describe some design standards such as designing buildings that can be used by the maximum number of people without burdening the normal function of the building (City of Oslo, 2009). Therefore, when designing the adapted grain elevators for residential uses, these policies may have hindered some design elements. For example, the unusual round shape of the building might have created accessibility issues.

For Toronto, I examined a document called the Central Waterfront Secondary Plan. In this plan, it states that developing the waterfront will maintain the success of the city by promoting the public space and improving accessibility (City of Toronto, 2007a). It also states that the

design principles need to be peer-reviewed or go through a Design Review Board to ensure the quality of the projects (City of Toronto, 2007a). Therefore, this policy demonstrates another impediment for the adaptive reuse process as it creates another step. These extra steps would be one of the reasons why the Canada Malting Silos are not being used. The document also discusses new development and how designs should consider the adjacent areas and avoid private spaces (City of Toronto, 2007a). It does not mention what to do when an existing building is being used and extensions or changes are being made so this is a gap in policy where new policies can be created.

5.2.3 Housing related policies

In Hobart, there are many planning documents that mention housing policies. For example, the City's Affordable Housing Strategy document states that the City faces challenges with providing affordable housing but the Strategic Plan promotes variety in housing (Hobart City Council, 2012c). It defines affordable housing as households that have sufficient income left over after paying rent for other basic necessities (Hobart City Council, 2012c). The fact that the case study is located next to the most expensive neighbourhood in the city and was converted into luxury residences goes against the City's affordable housing strategy. These details could be another reason why the applications and redevelopment project required so much time for approvals. In the Sullivans Cove Planning Scheme, it states that there should be a variety of housing types for different incomes (Hobart City Council, 2012d). Again, this demonstrates another document which could have created issues in getting application approvals.

Oslo's 2008 City Master Plan document mentions housing in almost every section meaning that there is a significant focus on improving the City's housing inventory. More

specifically, one of the goals is to “[p]rovide a suitable framework for adequate and varied housing developments” (City of Oslo, 2008b). This section mentions how developments should have adequate space so that projects do not hurt the local infrastructure and services (City of Oslo, 2008b). These policies are significant because the grain elevator already existed. Therefore, it would not have required significantly more space for the redevelopment and would have had minimal obstructions in the surrounding area. This document also goes into detail that the City lacks a variety of housing choices (City of Oslo, 2008b). This fact means that this redevelopment project could have been perceived as unique and a different type of housing. However, it also states that concentrations of similar demographics can change the city’s composition and create problems with populations not being able to move to other areas later in life (City of Oslo, 2008b). Since this building is used just by students, this could add to a population concentration that the city is trying to avoid and therefore might have been an issue during the application process.

For Toronto’s housing, I examined the Central Waterfront Secondary Plan again. It states that the area should have a mix of housing types including housing that ranges in size, price, and design (City of Toronto, 2007a). As for the income of the area, the documents explain that the goal of the plan is to create affordable rental housing or lower cost housing that would compose a quarter of the market (City of Toronto, 2007a). From personal observations, there are many new higher priced condominiums near Toronto’s waterfront but also public or affordable housing units very close to the grain elevator. If the area around the grain elevator is not at the 25% figure for affordable housing, this option could be considered for its new use and facilitate the adaptive reuse process

5.2.4 Heritage related policies

Hobart's Battery Point Planning Scheme document outlines the policies related to heritage. Their heritage schedule intends to identify historic and culturally significant areas and consequently outlines measures to control new developments and protect the heritage (Hobart City Council, 2012a). This document also mentions that buildings that are on the heritage register by the Tasmanian Heritage Council must be protected but describes some exceptions including safety concerns over the environment and public health (Hobart City Council, 2012a). It also states that the building can be removed or demolished if there is no alternative possible. This policy explains how a project like the redevelopment of the grain elevator was allowed since the option was actually feasible. However, the document explains a possible impediment to the conversion process since the changes have to be approved by the Tasmanian Heritage Council before any work is done (Hobart City Council, 2012a). For the case study in particular, the property is not listed on the Tasmanian or Australian heritage registers (Tasmanian Heritage Register, 2012; Australian Heritage Places Inventory, 2012). However, it is located in a historic area and many surrounding properties have heritage value. For example, the historic signal station mentioned in the case study description is near this site (Tasmanian Heritage Register, 2012). The historic area of the grain elevator coincides with the fact that there were many policies holding back this project initially as explained earlier in the paper. The document also outlines that any changes or developments made to historic buildings must be designed in a way that maintains the characteristics of the area and removal of cultural significance is avoided (Hobart City Council, 2012a). This policy could be the reason why the extension on these grain elevator apartments were not made to the front facing façade, only on the back so they are less noticeable and maintain the characteristic of the silo shape for the public to be seen from the

street. To add to the list of requirements before gaining approval for the conversion projects, the document outlines a list of submission requirements for all applicants. Applicants must submit a conservation plan, a statement of significance, a statement of heritage, and a report that summarizes any concerns on environment, public health or safety if the reason is to make changes to the building or remove it (Hobart City Council, 2012a). This list demonstrates another impediment that can slow down the process since many documents must be approved before adaptive reuse can be started.

For Oslo, the Norwegian Cultural Heritage Act of 1978 outlines various regulations for different types of sites. More importantly, the City maintains a list of heritage properties on what they call a “Yellow List”. The properties on this list are divided into three categories: formally listed, formally protected, or considered worthy of protection (City of Oslo, 2008a). The Grünerløkka Studenthus case study is listed in this document as worthy of conservation (City of Oslo, 2012). Therefore, what this designation means is that since the site is not formally protected or listed, there are no legally binding heritage regulations for it to follow (City of Oslo, 2008a). Therefore, this site was not subject to the Norwegian Cultural Heritage Act meaning the adaptive reuse process was definitely made easier by not having to follow more legislation.

In Toronto, the Canada Malting Silos are on the list of the City’s heritage property inventory with a status as “listed” but the City’s website also states that the 1922 and 1944 silos were designated as heritage properties in 2010 (City of Toronto, 2012a). What this means is that the property is legally designated under the Ontario Heritage Act as a heritage property but the public register must not have been updated online (Ontario, 2009). As part of the City’s downtown revitalization plan, the Toronto Official Plan states that one of their policies is to preserve the architectural and cultural heritage of downtown by restoring and maintaining

historic properties (City of Toronto, 2010). This policy is also part of their goal for mixed used areas (City of Toronto, 2010). Since the property has already been officially designated, this might help expedite the process of downtown revitalization but could impede the redevelopment since designated properties have more policies placed upon them. For example, it states that “[w]hen a a City owned heritage property is sold, leased or transferred to another owner, a heritage easement agreement [must] be secured and public access maintained to areas with heritage value” (City of Toronto, 2010, p. 67). This policy will add to the process if the City is no longer the owner of the property if it is redeveloped in the future.

5.2.5 Land use related policies

As for land use related policies in Hobart, the Battery Point Planning Scheme document outlines the land use policies for the zone which is adjacent to the case study site. Specifically for change of use, it states that activities that rely on the location by the river for activity should remain and that other industries that do not should not locate in this zone (Hobart City Council, 2012a). This policy facilitates the adaptive reuse process for this case study because at the time, it was no longer being used for industrial purposes and did not require use of the waterfront. Therefore, it seems that the change of use would be approved easily. However, the policy also states that traditional industrial activity should be maintained and encouraged (Hobart City Council, 2012a). This policy would seem to impede the adaptive reuse process if the City were trying to bring back the building’s historic grain industry uses. Fortunately, the document states that maritime industries should be modernized in a way that conserves the heritage significance and maintains the character of the area (Hobart City Council, 2012a). This policy seems to contradict earlier ones but it clearly facilitated the adaptive reuse process of the grain elevator in

that area. It also mentions that public access should be made to the shore (Hobart City Council, 2012a). However, the design of this case study includes a large extension of balconies and floor space on the wall that faces the waterfront. This design feature goes against the previously mentioned policy which also can be contributed to issues in gaining approval for adaptive reuse. As for the residential land use, the document states that the housing stock should be either maintained or improved (Hobart City Council, 2012a). This is a possible facilitator in granting approval for the conversion of the grain elevator since they increased the housing stock in the area. In the Sullivans Cove Planning Scheme document, residential uses are promoted and different types of industry uses are prohibited (Hobart City Council, 2012d). Making industrial uses prohibited in this area definitely helped convert the grain elevator into residential uses. It also mentions that it promotes the mixed uses of buildings (Hobart City Council, 2012d). The first floor of the apartment building contains offices and therefore would promote the mixed use goal (P. Newman, personal communication, September 19, 2011).

For the case study in Oslo, the city's 2008 City Master Plan outlines some of the land use policies. It mentions that the number of workplaces in the building zone to be added has been reduced from original numbers from 2004. The reason for this change is that the Groruddalen Valley Comprehensive Development Plan wants a more mixed use area (City of Oslo, 2008b). As mentioned in the case study description for the grain elevator building in Oslo, a major park revitalization plan was put into place and it included converting the industrial sites into housing. Therefore, this shows how both the policies and plans in the Municipal Master Plan and the Aker River redevelopment plan have facilitated the adaptive reuse process and that changing the land use in this area could have been easier in the approval stage.

For Toronto, the Central Waterfront Plan document outlines that it should balance the

number of places to live and work, therefore promoting a mixed-use area (City of Toronto, 2007a). It recommends that schools, community service buildings, and parks should be an important part of the waterfront (City of Toronto, 2007a). Based on personal observations, the site in which this case study sits is currently undergoing construction of a public park that commemorates Irish immigrants which surrounds the grain elevator. To the north of the building is a community centre with a playground, and to the northwest is a large park north of the Billy Bishop airport. Therefore, having these services already in place, this land use policy would help facilitate the conversion of this grain elevator into housing since other uses have been covered. However, the document also states that “innovative approaches” are recommended for community infrastructure (City of Toronto, 2007a, p. 11). This could either impede or facilitate the adaptive reuse since it could be considered an innovative approach for a school but not for housing. For the Malting Silos specifically, this document states that “The Canada Malting Silos, a landmark and important heritage feature on the Central Waterfront, will be retained and improved. The City will pursue innovative proposals for a mix of public and private activities and uses that can successfully transform the silos building into a unique special place on the Toronto waterfront” (City of Toronto, 2007a, p. 6). Therefore, it seems as though the city has decided to make the land use for this area mixed which could slow down the process since so many options have to be considered before choosing the most appropriate one.

5.2.6 Similarities and Differences

When comparing the three case studies and the planning documents for each city, it is easy to see the similarities and differences. One major similarity is that all three cities value the importance of preserving heritage and have policies in place to do so. However they seem to

differ in the types of land use since it seems Oslo was more focused on promoting green spaces around the case study and the other two cities had a focus on housing. All three cities also had many requirements and document submissions required to gain approval for these conversion projects. Some cities had more than others but in general, were similar.

One of the major differences between these three case studies is the heritage designations. In Oslo, the grain elevator was listed on the heritage register but not officially designated. In Hobart, the grain elevator was not listed on the heritage register but is still considered to have heritage value. In Toronto, the grain elevator has been officially designated as a heritage property. These differences could be part of the reasons why Oslo and Hobart grain elevators have already been converted whereas Toronto's grain elevator future is still unknown. Therefore, the heritage value of a property definitely plays a significant role in the conversion process.

5.2.7 Summary

To summarize, it is clear that planning documents show policies and general rules that can impede or facilitate the adaptive reuse project. To slow down the process, there are many submissions that must be approved before any changes are made. To speed up the process, there was a general idea that promoting heritage conservation was positive. However, the analysis demonstrated that many policies have contradicting counter-policies. It was difficult to determine which policies the cities favoured more than others if contradicting statements were made. This fact seems to create "loopholes" in the legislation as potential developers could argue that one policy is more important than others and that the adaptive reuse of the grain elevator into housing follows more closely the city's vision. In conclusion, many projects could be approved with the

correct wording in the applications for conversion or could be argued in a way that the city would see that the plans follow more closely their goals and visions in their plans.

5.3 Survey: Statement ranking for professionals

The next part of the study analyzed the perspectives of professionals in the planning field. The first part of the survey asked them to rank twelve statements from strongly agrees to strongly disagree. These statements measure the importance of commercial performance, residential performance, risks, costs, environmental sustainability, building demand, gentrification, housing availability, heritage conservation and aesthetics by determining how concerned they are for each variable. These variables were based on the variables used by the Bullen & Love (2010) adaptive reuse study to determine which factors influence decision-making. These statements are indicative of the concerns that professionals in the field have regarding financial, planning, and general factors. Table 5 below show the responses from the participants.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Rating Average	Response Count
The new uses for these types of buildings are better than demolishing it.	33.3% (5)	26.7% (4)	20.0% (3)	13.3% (2)	6.7% (1)	3.67	15
It is important to have businesses/commercial use on the main floor of these buildings.	30.0% (6)	45.0% (9)	20.0% (4)	5.0% (1)	0.0% (0)	4	20
It is important to have no residential vacancies.	0.0% (0)	25.0% (5)	35.0% (7)	35.0% (7)	5.0% (1)	2.8	20
The amount of financial risk for these types of buildings is important.	15.0% (3)	60.0% (12)	25.0% (5)	0.0% (0)	0.0% (0)	3.9	20
The cost of these types of projects is a main factor for whether they are completed.	30.0% (6)	40.0% (8)	25.0% (5)	5.0% (1)	0.0% (0)	3.95	20
The environmental sustainability for these buildings is important.	26.3% (5)	57.9% (11)	15.8% (3)	0.0% (0)	0.0% (0)	4.11	19
The planning policies in the area are an important reason why or why not these projects are completed.	30.0% (6)	35.0% (7)	10.0% (2)	20.0% (4)	5.0% (1)	3.65	20
The gentrification of the area surrounding the building is a positive effect.	20.0% (4)	45.0% (9)	25.0% (5)	10.0% (2)	0.0% (0)	3.75	20
Availability of other housing options in the surrounding area is important.	10.0% (2)	35.0% (7)	40.0% (8)	10.0% (2)	5.0% (1)	3.35	20
It is important to maintain the heritage/historic value of the building.	30.0% (6)	30.0% (6)	35.0% (7)	5.0% (1)	0.0% (0)	3.85	20
These buildings are beautiful.	25.0% (5)	15.0% (3)	45.0% (9)	15.0% (3)	0.0% (0)	3.5	20
I would want this silo structure (shown below) to be converted into housing.	15.8% (3)	36.8% (7)	31.6% (6)	5.3% (1)	10.5% (2)	3.42	19

Table 5: Results of ranking survey from professional participants

Of the 20 survey participants, 15 participants fully ranked all of the statements due to a glitch in the electronic survey settings requiring responses for all answers to continue. The strongest agreed upon statement was “The environmental sustainability for these buildings is important”, followed by “It is important to have businesses/commercial use on the main floor of these buildings” and then “The cost of these types of projects is a main factor for whether they are completed”. The least strongly agreed upon statement was “It is important to have no residential vacancies”, followed by “Availability of other housing options in the surrounding area is important” and then “I would want this silo structure (shown below) to be converted into housing”.

To further analyze the trend of the professionals’ opinions, I put the above statements into three categories (see table below): financial concerns, planning concerns, and general concerns (including aesthetics, personal preference, and gentrification). I calculated averages for the frequency of response to determine what the professionals were most concerned about. To calculate these numbers, the average ranking numbers were placed into the corresponding category. Next, each number was added together and then divided by the number of statements. After averaging the rankings for each category, the highest ranking category would be the planning concerns, closely followed by financial concerns, and lastly, the general concerns. This result was expected because professionals in the planning and related fields would therefore have a more vested interest in the planning concerns. Table 6 below shows which statement corresponds to each category and the results of each.

Category	Statement	Responses
Financial concern	It is important to have businesses/commercial use on the main floor of these buildings. It is important to have no residential vacancies. The amount of financial risk for these types of buildings is important. The cost of these types of projects is a main factor for whether they are completed.	$4+2.8+3.9+3.95/4$ $=3.6625$
Planning concern	The planning policies in the area are an important reason whether these projects are completed. Availability of other housing options in the surrounding area is important. It is important to maintain the heritage/historic value of the building. The environmental sustainability for these buildings is important.	$4.11+3.65+3.35+3.85/4$ $=3.74$
General concern	The new uses for these types of buildings are better than demolishing them. The gentrification of the area surrounding the building is a positive effect. These buildings are beautiful. I would want this silo structure (shown below) to be converted into housing.	$3.67+3.75+3.5+3.4$ $2/4$ $=3.585$

Table 6: Statement categories and frequency of responses

For the optional comment box, of the 20 participants, 6 participants provided additional comments to elaborate on their ranking choices for the statements. Generally, the response was in favour of adaptive reuse projects and they recommended adaptive reuse of these types of buildings. Similar to the public's results, key words/phrases that were common in responses were: heritage, cost, new use, and surrounding area/gentrification. The main concern in the comments seemed to be the cost. Simply put, a participant stated that the economics will determine if these projects are completed. The comments stated that the cost of converting the grain elevators into residential units is not the concern, but rather the comparison of building new

would be more lucrative since new buildings could create more units into the building, thus creating more profit.

Regarding the surrounding area and gentrification, one participant said that the “conversion of industrial buildings into residential should not contribute to the demise of [the] surrounding viable industrial or commercial enterprises” and that the “residential use fits in well with the surrounding uses”, specifically in Hobart. Also for the Hobart example, a participant referred to it as a “bonus” to both the area and to the city because “it puts people onto streets where there was previously little pedestrian traffic and it provides oversight. It had provided a pleasing building and associations with the one time working nature of the port are maintained”.

The survey also provided a space below the statement ranking section for participants to elaborate on their ranking choices and any other concerns. Table 7 below shows (directly copied from the survey results) of the results with open comments from participants. Table 8 summarizes the results for each category and also the similarities, differences, and implications.

- It is inappropriate to destroy the heritage attributes of a building like the Malt Plant by cutting the silo's apart to make windows for residential units. There are options for the future use which have been proposed that do not require this kind of heritage destruction.
- Economics will be the determinant
- The limit is not so much cost of construction/conversion, but the comparative costs to a new structure: a developer can get more suites into a new building, increasing profit. If legislation required them to stay, a developer could find a way to make a profit - if there were not other more lucrative options on their table.
- conversion of industrial buildings into residential should not contribute to the demise of surrounding viable industrial or commercial enterprises.
- We proposed the first design for housing (and restaurants at the lower level in the Hobart silos. This may colour my opinion in relation to some of the questions above. The design that proceeded works very well and is proven a considerable bonus to the area and the city. It puts people onto streets where there was previously little pedestrian traffic and it provides oversight. It has provided a pleasing building and associations with the one time working nature of the port are maintained. In similar circumstances such interventions are recommendable.
- Building re-use is an important element in the urban landscape. I only have first hand knowledge of the Hobart example and its conversion to residential use fits in well with the surrounding uses.

Table 7: Responses from professionals regarding the rankings from the comment box

Variables	Responses
Financial concerns	-second highest ranking of statements were regarding financial feasibility
Planning concerns	-highest ranking of statements were regarding planning issues
General concerns	-third highest ranking of statements were regarding the aesthetics, gentrification, and personal desire of converting grain elevators into housing
Similarities	-most responses were in favour of the adaptive reuse of grain elevators -responses were mostly concerned with the financial and planning aspects
Differences	-responses from Hobart agreed more strongly with the statements regarding the environment, heritage, and that conversion was a good idea -responses from Toronto showed more concern with financial feasibility -responses from Toronto showed a more neutral response about converting Canada Malting Silos -some professionals did not think this was an appropriate method of heritage preservation
Implications	-many responses thought gentrification would create positive effects for surrounding areas which might lead to disregard to displacement issues -although many professionals were in favour of the conversion process, financial feasibility might impede this process -one professional opinion though adaptive reuse was not an appropriate method to preserve the Canada Malting Silo showing how disagreements could also impede the process

Table 8: Summary of results of rankings from professional participants

5.3.1 Strengths of adaptive reuse

As mentioned in the survey summary, the general response was in favour of the adaptive reuse of grain elevators. Many professionals perceived the conversion of grain elevators into housing to be an appropriate use of these grain elevators. Interestingly, the majority of professionals agreed with the statement that gentrification of the area that might occur because of these projects could actually be a positive result as they mention it would improve the area. However, this goes against what was found in the literature review. As Sirmans, & Macpherson (2003) state, the literature on adaptive reuse tends to mention that gentrification can cause issues of major displacement of residents. The survey responses mentioned that the conversion of the

building would bring more people to the area creating positive effects.

5.3.2 Challenges of adaptive reuse

The results of this ranking survey determined the professionals' perspectives on the main challenges surrounding the reuse of grain elevators. Note that this is further discussed in section 5.5. From the ranking system it is clear that the main perceived challenge is the cost. These views corresponds to the literature review. Money could be saved by reusing the building to an extent but structural conditions play a major role (Worthington & Worthington, 1984; Cunnington, 1988). However, the survey results did not give actual reasons why they thought the costs would be too high for the projects to work. The findings from Phipps (2008) explain that one of the reasons for these projects to be financially inefficient is that if property values exceed the selling prices, the costs become too high which was not mentioned in the survey results. The participants mentioned that gentrification would occur but that it would be a positive effect for the area as it brings more people to the area.

The results of this survey do not seem to show concern by the professionals of the existing conditions of the buildings but the existing conditions of the surrounding neighbourhood and whether the adapted grain elevators would be appropriate. This consideration was confirmed in previous literature to be a determinate for adaptive reuse. As described by Burchell and Listokin (1981), the condition of the neighbourhood can determine whether adaptive reuse projects cost more or less.

As for preserving heritage, this was also perceived as a challenge by the professionals. One professional stated that "it is inappropriate to destroy the heritage attributes of a building like the Malt Plant by cutting the silo's apart to make windows for residential units. There are options for the future use which have been proposed that do not require this kind of heritage

destruction”. This perspective was seen through the other examples of adaptive reuse of grain elevators into other uses such as rock climbing facilities. As the literature and analysis of planning documents demonstrated, many adaptive reuse projects have to make physical changes to heritage buildings or the process is not possible. However, the planning legislature seemed to have “loopholes” to get around making changes to the buildings if the heritage and cultural “significance” remained which may cause damage and decrease the heritage value.

5.3.3 Role of location in responses

The survey participants consisted of professionals located in Toronto and Hobart. Unfortunately, none of the professionals located in Oslo responded to the recruitment letters. This issue may be due to a language barrier which is discussed further in the limitations section. Ten professionals in Hobart completed the ranking part of the survey but some participants skipped a few of the statement rankings. Ten professionals in Toronto completed this survey and did not skip any rankings.

The differences in responses correspond to their locations. In Hobart, the grain elevator was converted successfully and the professionals in this area know that. They are familiar with the adaptive reuse of grain elevators because there is an example in their city. Therefore, their responses tend to be more in favour of this process. In Toronto, the Canada Malting Silos have not been converted so it makes sense that the professionals in Toronto would be more skeptical. They might not have seen any examples firsthand which might make the idea seem less feasible. As a comparison, most of the participants from Hobart agreed or strongly agreed with the statements. The most agreed upon statements were to do with the environment, heritage, and that conversion was a good idea. The Toronto results also mostly agreed with the statements but

had less “strongly agree” responses. This group seemed to be more cautious with their answers and placed a heavier weight on the importance of financial feasibility. They also did not agree as much that it is the best idea to convert the grain elevator in Toronto since most of the responses were “neutral”.

5.4 Survey: Statement ranking for the Public

The survey for the public was similar to the professionals but had less technical questions. The survey had the same format where the participants ranked statements from strongly agree to strongly disagree. Again, these statements measure the importance of commercial performance, residential performance, risks, costs, environmental sustainability, building demand, gentrification, housing availability, heritage conservation and aesthetics. These variables were based on the variables found by the Bullen & Love (2010) adaptive reuse study to determine which factors influence decision-making. These statements are indicative of the concerns that the public has regarding financial, planning, and general factors. Below are the responses from the participants showing the number of participants and results. The response rate and demographics are unknown due to the nature of the social media website used to recruit participants.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Rating Average	Response Count
These buildings are beautiful.	31.1% (14)	46.7% (21)	15.6% (7)	6.7% (3)	0.0% (0)	4.02	45
I would enjoy living in these types of buildings.	24.4% (11)	57.8% (26)	11.1% (5)	2.2% (1)	4.4% (2)	3.96	45
The new use of these buildings is better than demolishing it.	53.3% (24)	37.8% (17)	4.4% (2)	4.4% (2)	0.0% (0)	4.4	45
It is important to maintain the heritage/historic value of these buildings.	37.8% (17)	31.1% (14)	22.2% (10)	6.7% (3)	2.2% (1)	3.96	45
It is important to create environmental sustainability for these buildings.	44.4% (20)	46.7% (21)	6.7% (3)	2.2% (1)	0.0% (0)	4.33	45
It is important to have businesses or retail stores on the main floor of these types of buildings.	13.3% (6)	20.0% (9)	51.1% (23)	15.6% (7)	0.0% (0)	3.31	45
It is important to have no residential vacancies in these types of buildings.	2.3% (1)	15.9% (7)	54.5% (24)	22.7% (10)	4.5% (2)	2.89	44
It is important that the building conversion creates positive effects for the surrounding area.	43.2% (19)	47.7% (21)	6.8% (3)	0.0% (0)	2.3% (1)	4.3	44
It is important to have other housing options available in the surrounding area.	31.8% (14)	34.1% (15)	27.3% (12)	6.8% (3)	0.0% (0)	3.91	44
The cost of these projects is a main factor for whether they are converted.	26.7% (12)	44.4% (20)	20.0% (9)	4.4% (2)	4.4% (2)	3.84	45
I would want this silo structure (shown below) to be converted into housing.	35.6% (16)	44.4% (20)	15.6% (7)	2.2% (1)	2.2% (1)	4.09	45

Table 9: Results of ranking statements from public participants

Of the 51 participants, 44 answered the statement ranking section and 6 skipped it due to a glitch in the online survey where it was not required to answer all statements to complete the survey. In general, most participants agreed with the presented statements. The statement that had the strongest agreement was “The new use of these buildings is better than demolishing it.”. The next strongest agreed statement was “It is important to create environmental sustainability

for these buildings”. Next, participants strongly agreed with “It is important that the building conversion creates positive effects for the surrounding area”. The statement that was the least agreed upon was “It is important to have no residential vacancies in these types of buildings.”. The next least agreed upon statement was “It is important to have businesses or retail stores on the main floor of these types of buildings.”.

To further analyze the trend of the public’s opinion, I put the above statements into three categories: financial aspects, public interest, and personal desire. After averaging the rankings for each category, the highest ranking category was the public interest, closely followed by personal desires, and lastly, financial concerns. This result goes with the expectation that the public would be more concerned with public interest statements since it relates closely to them. This result was different than the most popular concern of the professional participants.

Category	Statement	Responses
Financial concern	The cost of these projects is a main factor for whether they are converted.	$(3.31+2.89+3.84)/3$ $=3.346$
	It is important to have businesses or retail stores on the main floor of these types of buildings.	
	It is important to have no residential vacancies in these types of buildings.	
Public Interest	It is important to have other housing options available in the surrounding area.	$(3.96+4.33+4.3+3.91)/4$ $=4.125$
	It is important to maintain the heritage/historic value of these buildings.	
	It is important to create environmental sustainability for these buildings.	
	It is important that the building conversion creates positive effects for the surrounding area.	
Personal desire	These buildings are beautiful.	$(4.02+3.96+4.4+4.09)/4$ $=4.117$
	I would enjoy living in these types of buildings.	
	The new use of these buildings is better than demolishing it.	
	I would want this silo structure (shown below) to be converted into housing.	

Table 10: Statement categories and frequency of responses

For the voluntary comment box, 12 of the 51 participants in the survey filled it out for an opportunity to provide any comments or questions that they might have about their answers to the statement rankings. Most answers were a few sentences long and were generally in favour about the idea of converting grain elevators into housing. I noted the following common words or phrases: “unique”, “cool”, “beautiful”, “appealing”, “nice”, “amazing”, “always a fan”, and “I want one”. Only one participant asked a question wondering what the future plan was for the Canada Malting Silos building. The key words/ideas that I found in these responses included: affordable, heritage, cost, real estate, vibrant city, location, new use, surrounding area, design, sustainability, amount of work to be done/safety, transportation, and gentrification. Table 11 below summarizes the frequency of key words and concepts participants used in the open comments section.

Key Concept or Key word	Frequency in responses
affordable	1
heritage	1
cost	3
Prime real estate	1
Vibrant/revitalized	1
location	4
New use	6
Surrounding area	3
design	3
Uniqueness, aesthetics, appeal	5
Environmental sustainability	2
Construction work	2
Transportation	1
Gentrification	1

Table 11: Frequency of key words and phrases

We don't have much affordable housing in Toronto. I would love to live in somewhere that is both affordable and a heritage site.

Though a very cool concept, the cost would be astronomical to convert and retrofit these buildings for residential (or commercial use). This space is prime real estate in Toronto and can be better utilized to create a vibrant Toronto waterfront.

These buildings are beautiful! The fact that they are repurposed silos would be a draw. I could see these residences being extremely sought after, especially with such proximity to the lake! I hate apartments/condos, but now I want one!

I would support a conversion to housing or another use over demolition. As for the question "The cost of these projects is a main factor for whether they are converted." I answered yes because I feel the city won't support it because they are far to conservative.

I'm neutral on the last one because I don't know the general area around. The building would be nice, but the viability depends on the area around as well.

I was always a fan of that old factory and think it'd be awesome to see it converted into something habitable.

Can you provide any further information if any about what the plans are for this structure?

Personally, it looks like they will need a fair deal of work done to them. However, they could turn out amazing once everything is said and done. I would probably enjoy living there, I would love the scenery and would also like some nearby residency for neighbours and the like.

I personally would not want to live there because I prefer having my walls at right angles, for efficient space use and furniture layout. Speaking in more general terms though, about the Canada Malting Silos, everything comes down to cost. What is the cost of demolishing the existing silos, disposing of or recycling the building material, and building a new structure? How does that compare to the cost of repurposing them, adding floor and all the necessary safety features so that they meet residential building codes? If a buyer wants to purchase the existing silos and repurpose them as residences, then that's fine with me.

I think the attractiveness of the silo conversions will be entirely subjective, but I personally found the examples from Oslo to be appealing. I also find the idea of circular rooms, instead of the traditional rectangle or square room, to be very appealing and unique. Additionally, I think the malting silos in Toronto would be excellent candidates for conversion to condominiums - there is already existing transportation infrastructure in the area, available lot space for parking (if required) and grocery stores within walking distance.

Explore rent-geared to income/public housing wait-lists; avoid recapitulating urban renewal as gentrification.

Converting these buildings would create unique housing units, which would be in demand, but if the units are circular, like some of the examples shown on the previous page, then I can see furnishing the units as a major drawback. Another important issue will be the surrounding area. Since there is a lot of development along the lakeshore, the area is becoming more appealing. This project probably would not have attracted much attention 20 years ago. Given its location along the lake, with no surrounding tall buildings, this building is well positioned to make use of green sources of energy, solar, wind, etc. to improve the sustainability.

Table 12: Responses of rankings from public participants

5.4.1 Strengths of adaptive reuse grain elevators

One main desirable aspect that the participants was that they found the idea of a “unique” housing option appealing. Many also found the locations of the buildings to be desirable as they would have unobstructed views and that the views would be of the waterfront. These responses correlate to the literature review and planning documents that mention the importance of having an “innovative” design. Many of the planning documents promoted heritage conservation but also felt that having an innovative and unique design would be more appealing.

5.4.2 Challenges of adaptive reuse grain elevators

Of these key words/ideas, the main concerns or negative aspects that the respondents mentioned were the cost and the surrounding area. Most found the idea of adaptive reuse appealing but seemed to question the financial viability of this type of project. Some broke down the costs of different aspects of these projects such as adding floors, recycling materials, and disposing materials and one participant predicted that the City of Toronto would not be supportive of this idea because the person thought the government was too conservative. The concern for the surrounding area was more geared towards the amenities available in that area such as transportation, parking, and grocery stores. The surrounding area was one of the defining factors whether the respondent said they would consider living in that location.

Although some of the respondents had an interest in heritage buildings, only one respondent mentioned the heritage aspect. Similarly, although in general it seems that promoting environmental sustainability is a popular trend, only two respondents mentioned this idea in the comment section. Not many mentioned the actual design aspect of the converted buildings. One participant felt that the circular shape of the silos would be beneficial to an apartment because it

would add to its uniqueness. However, two participants felt the opposite. They were concerned with the ability to find furniture that would fit in the rooms or work with the walls since having a straight wall might be difficult to find. Although these participants were against the rounded walls, they still found the general concept appealing. These results were unexpected as the survey and literature review focused more on the exterior of these buildings rather than the interior.

5.4.3 Role of location in responses

6 out of 9 participants in Hobart completed the ranking survey. These participants mostly agreed with the statements and were in favour of the conversion process but concerned with environmental issues and gentrification. 16 out of 18 participants from Oslo completed the survey but a few statements were skipped. They had similar results to the Australian participants and were generally in favour but also thought the environmental factors and gentrification were important. 25 of the 27 Toronto participants completed the survey. They also had similar results to the Norwegian and Australian participants but with a higher importance on maintaining heritage value. Table 13 below shows the responses from each city.

City	Number of participants who completed survey	Comparison
Hobart	6	-generally in favour of adaptive reuse -more concerned with environmental issues
Oslo	16	-generally in favour of adaptive reuse -more concerned with environmental issues and gentrification
Toronto	25	-generally in favour of adaptive reuse -more concerned with maintaining heritage value

Table 13: Number of responses from each city

Although the Norwegian professionals did not respond, there were more public

participants from Oslo than Hobart. Toronto responded the most which may be because the social media groups were more active or they felt more inclined to give their say about a possible future for the Canada Malting Silos. The responses did not vary much with respect to location except for Toronto's higher concern with heritage. Again, this may be due to the fact that the case study located in Toronto has not been converted.

5.4.4 Role of type of social media platform

12 participants were recruited from Facebook groups and 35 from Reddit groups. The responses in general were similar. The differences in responses can be seen with the type of group. For example, the responses that came from the student groups were in favour of these conversion projects but were not that concerned with heritage value. In contrast, the responses from heritage groups had the greatest concern for the heritage value and were in much higher favour of these projects. Most of the responses were from the Reddit groups so it is unknown what their background or interests are.

5.5 Survey: Open-ended questions for professionals

The second part of the survey for professionals included six open-ended questions. The following sections analyze the responses to each question. Below is a table of the results and the response rates separated into Hobart and Toronto professionals. There were no responses from the 50 professionals in Oslo who were sent the survey and therefore are not included in table 14.

Question	Hobart	Toronto
<p>Why or why not do you think silos are an effective structure for adaptive reuse into residential purposes?</p>	<p>I believe conversion of existing structures (particularly those with high embodied energy such as mass concrete) is important from both an environmental sustainability perspective and as part of maintaining a continuous historical record of buildings in a city/town</p> <p>Embodied energy is retained. Locations often on waterfront which should be made available for wider uses. Scale within otherwise historic framework of lower buildings can be off-putting (as at Salamanca Place)</p> <p>Solid - easy to adapt</p> <p>They are sturdy structures with the capacity for adaptations.</p> <p>Because the structure is existing, it will not be changing the view or shape of the skyline and therefore will not have the same planning problems that constructing a building of this height would traditionally face.</p> <p>They contain appropriate sizes, they house many providing views and proximity to waterfronts in many situations, they do not involve large impact in demolition and they re-use costly infrastructure in an efficient manner lengthening its life-cycle (reducing the effect of embodied energy)</p> <p>Strong exterior shell, diameters suitable for creation of divided spaces.</p> <p>All existing structures should be considered as candidates for re-use, not just silos</p>	<p>The round nature of the silos are not conducive to creating useable living space where furniture and appliances tend to square edges (generally).</p> <p>Largely depends on the context and surrounding uses.</p> <p>Very costly to convert to residential and provide the same amenities as a standard high-rise building.</p> <p>Space could be better utilized with a better looking building</p> <p>it's not that the structure is effective, it's that they will introduce character. Tearing down an interesting building to put up a boring one may make more money, but degrades the cityscape.</p> <p>I wonder if the cost of conversion will make the projects feasible.</p> <p>Cost too much!</p> <p>little to no flexibility in maximizing site use</p> <p>I do not think they are an effective structure for adaptive re-use to residential because they would not create good floor plates for units, would be extremely expensive to re-mediate and you destroy a part of the heritage value of conserving the building by cutting holes into the silos for windows.</p>
<p>Response rate</p>	<p>50 professionals were sent the survey and 8 completed this question.</p>	<p>50 professionals were sent the survey and 9 completed this question.</p>
<p>What do you think are the main challenges surrounding these types of adaptive reuse projects?</p>	<p>Planning issues; broader community dislike for post-use industrial buildings; social programming (community support or otherwise often depends on the type of housing, ie. high-end housing or social housing will have different levels of community support or disapproval)</p> <p>Fitting new works into the fabric in a cost effective manner. Often, this means trying to squeeze in an extra floor which can mean, uncomfortably low ceiling heights in units.</p> <p>Fitting in with the surrounding land uses - we</p>	<p>Market acceptance, safety, context, accessibility.</p> <p>Cost, surrounding context, protecting employment uses.</p> <p>Construction costs, below-grade parking.</p> <p>Coversions are expensive</p> <p>project economics. Developers want to maximize profits. Having to build around an existing building is more expensive, and limits the suite size and number.</p>

	<p>have silos locally in Launceston where their conversion to residential would not be appropriate due to industrial uses nearby</p> <p>In the hobart case, the need to cut a large slice down the front of the concrete cylanders.</p> <p>Showing that the existing building is structurally fit for purpose. Convincing the surrounding community that the development will have positive effect on the surrounding area.</p> <p>There are significant cutting costs due to wall thickness. The only significant social challenge I have encountered is the general or popular view that they are "ugly" structures which block others views and should be removed. In the light of the advantages of adaptive re-use this is selfish and lacks aesthetic insight.</p> <p>Planning layouts to fit in with the circular format.</p> <p>The cost of adaption - whether it is viable; whether the existing structure and materials are safe; whether the form and new use are compatible with local land use and urban design policy</p>	<p>My perception is that they often located away from the downtown core, in industrial areas ... access and the lack of local supportive community services might be an issue for people living in these buildings</p> <p>Cost too much</p> <p>construction costs, no flexibility with building location or orientation, existing policy regimes,</p> <p>Cost, community opposition, contamination of the site.</p>
Response rate	50 professionals were sent the survey and 8 completed this question.	50 professionals were sent the survey and 9 completed this question.
How do you think current planning policies affect the completion of these adaptive reuse projects?	<p>Often Planning Schemes do not have provision for unusual developments and as such projects such as these in Tasmania have long periods in which community representations may be made, which effectively slows down the approval process. This can be a blessing or a curse depending the quality of the project and depending on which side you are on! From an environmental sustainability perspective the adaptive reuse strategy should be encouraged by all planning bodies. Heritage restrictions should also play a secondary role to that of environmental sustainability.</p> <p>Conversion from industrial to residential requires changes in planning schemes which can involve significant expense, raise community ire, etc.</p> <p>Some (many) planning laws would be challenged by such action - to the point where a complex change to the planning restrictions would be required.</p>	<p>Planning policies can provide some general direction about adaptive reuse but if it does not make sense from a market or financial perspective, in my view they will not be built.</p> <p>Unsure.</p> <p>No barrier.</p> <p>Dont know</p> <p>If designated historical, meaning that it cannot be torn down, developers will work on it as a last option. The neighbourhood has to develop to support the higher unit costs in such a building.</p> <p>industrial resuse policies? depends on what the surrounding land uses are</p> <p>They dont. Planners can be quite supportive, if details vcan be worked out.</p>

	<p>They encourage them, because it's easier to get approval for adaption of existintg to to get approval for a new tower.</p> <p>Current planning policies allow for these developments as shown by the case studies presented here, and must make it easier to retrofit an existing structure rather than build a new one in contrast to the usual demolish and rebuild approach.</p> <p>Here they tend not to inhibit. The building exists forcing demolition would be a very difficult exercise. Generally, unless there are very strong heritage related objectives residential and other popular uses are gentler than grain storage and where the former use is no longer required, these are uses which planning authorities would find it hard to object to.</p> <p>Sometimes they actually support them. In the Hobart case the height/envelope of the extant silos was considerably larger than any new building would have been permitted of under the planning policies for that area.</p> <p>planning policies need to be explicit to support re-use. It is not sufficient to be tacit. They need to reflect broad considerations of sustainability</p>	<p>X</p> <p>Current planning policies tend to make adaptive reuse projects difficult as the projects are not generally easily pigeon holed into the zoning regularly in place and the uses generally contemplated in Zoning By-laws.</p>
Response rate	50 professionals were sent the survey and 8 completed this question.	50 professionals were sent the survey and 8 completed this question.
Why or why not would you be part of a project that converts silo structures into residential units?	<p>I would consider it carefully, depending upon the type of proposal, but could not say exclusively whether i would or would not be involved in one of these projects due to the complex factors mentioned above.</p> <p>Happy to be involved and participated in the foyer re-design for the Salamanca Silos.</p> <p>Would love to be - I have a record of assisting in the conversion of old church and barn buildings into residential uses. This would be another challenge.</p> <p>They are inevitably challenging and interesting projects for a structural engineer.</p> <p>Becoming involved in a quality conversion project such as these would provide the opportunity not only for work, but the prestige that goes with being involved with a relatively</p>	<p>If it makes sense from a contextual, market and financial perspective, I would participate.</p> <p>I may be involved, through my work.</p> <p>I would be interested in such a conversion from the perspective of adaptive reuse of a heritage structure, and a positive use of an otherwise empty and disused structure.</p> <p>Not my field</p> <p>I would love to be involved! The challenges of getting it right, and the uniqueness are appealing.</p> <p>not my area of expertise really .. also not certain that I like their appearance from an aesthetic point of view</p> <p>Need to undestand cost. No sense simply</p>

	<p>unique and positive construction project. Reasons for being cautious include working with an existing structure, which brings about uncertainty as to what the capacity of the existing structure is to fulfill its new purpose and how this might be ascertained. Working on an existing structure like this is also high risk and likely to be subject financial variations on the project as it progresses which may end in legal dispute.</p> <p>I seek vital urban spaces. I like to work and work in a variety of situations and ways. There would be circumstances where I may object to such conversions but they would be very much fewer than the times I would strongly support them (whether or not the project comes my way and whether or not the concept was originally 'ours' as in this case)</p> <p>I would be part of such a project because it is sensible and sustainable.</p> <p>I would only be involved if the project had merit and was supported by local strategy and policy</p>	<p>pursuing ideas if the cost is much too high, as I believe it is likely.</p> <p>x</p> <p>I would not be a part of it because I do not believe that it is appropriate to destroy the heritage attributes of a unique building such as the Malt Plant to create residential units.</p>
Response rate	50 professionals were sent the survey and 8 completed this question.	50 professionals were sent the survey and 8 completed this question.

Table 14: Responses for open -ended questions from professional participants

5.5.1 Physical design of silos as an effective structure for adaptive reuse

The first question in this section was “Why or why not do you think silos are an effective structure for adaptive reuse into residential purposes?”. 17 of the 20 professional participants that started a survey answered this first question. The answers were exactly even on both sides. Seven thought using grain elevators were an effective structure to convert into housing and seven thought they were ineffective. The other three participants did not pick a side or their answer depended on requiring other information. These results correlate to the literature because both positive and negative aspects were found for adaptive reuse in general.

The participants that were for using grain elevators for residential purposes had a variety

of reasons. One participant pointed out that “all existing structures should be considered as candidates for re-use, not just silos”. A few of them reasoned that the environmental benefits were the main reason why they were an effective structure to use. More specifically, one participant thought that the lack of demolition would create less environmental impacts and would decrease the effects of embodied energy. This result correlates to the literature where it was determined that adaptive reuse promotes environmental sustainability (Wilkinson, Kimberley, & Richard, 2009; Poitras, 2009). Other factors that participants thought were good reasons for using grain elevators were the physical form and materials. They used words like “strong”, “sturdy”, and “solid” to describe the silos. Some of them thought that grain elevators were easy to adapt because of factors like the ability to create divided spaces, were the appropriate size, and the right height. However, as the literature explained, many adaptive reuse projects are difficult due to structural limitations, weaknesses in the structure, and instability (Bullen & Love, 2010; A + U, 2007; Slessor, 2006). Lastly, a few mentioned that there would be benefits of maintaining the historic record of the city by re-using them and the fact that they are not adding additional obstructions for views.

The participants that were against using grain elevators for residential purposes pointed out similar key words or phrases as the group that was in favour of it but in a negative way. For example, one participant pointed out that the scale of the Hobart building was “off-putting” in relation to the other historic buildings in the Salamanca district and that the embodied energy was retained not decreased. Many of them thought that the properties should be used for other purposes, particularly that the waterfront “should be made available for wider uses”. These opinions correlate to the planning legislature analysis where it was determined that public access should be promoted and also the building should fit into the character of the neighbourhood. The

physical form of these buildings that were criticized included the rounded walls not being conducive for furniture and appliances, awkward floor plans and that better looking buildings could be built instead. As for heritage concerns, one participant felt that the fact that these adaptive reuse projects would alter the buildings, specifically cutting holes into the silos for windows, it would “destroy a part of the heritage value”. Although the literature review determined that heritage preservation was an advantage to adaptive reuse, these results seem to contradict that since the opinions seem to be that the heritage value is perceived to be decreased to many professionals (Bullen & Love, 2010).

The participants that were for using grain elevators did not mention any financial concerns whereas the participants against it mentioned it a few times. A few in this group felt that the cost was too high for the conversion. Most of the participants that were unsure which side to pick made their answer depend on the financial feasibility of these projects. One participant pointed out that “tearing down an interesting building to put up a boring one may make more money, but [it] degrades the cityscape”. This correlates to the literature because although it was found cost can be a concern, many factors determine the financial feasibility of the project (Worthington & Worthington, 1984; Burchell and Listokin, 1981). Therefore, it makes sense that there was a difference in opinions on the cost concerns. Other factors that were determinants of the effectiveness were what the surrounding area was like or the context. One participant did not think it was particularly effective but that it made up for it in the “character” that it would bring to the area.

5.5.2 Main challenges with this type of adaptive reuse project

The second question in this part of the survey was “What do you think are the main

challenges surrounding these types of adaptive reuse projects?”. 17 of the 20 professional participants that started a survey answered this second open-ended question. Overall, the main challenge perceived by the professionals was the cost since 10 of the 17 participants mentioned the word either “cost”, “economics”, or “expensive”. As explained in the first open-ended question results and analysis, the participants felt that cost was a major factor in the feasibility of adaptive reuse. Again, since the results of this question seem to be split whether the cost was mentioned, this difference in opinions correlate to the literature that stated many aspects of these projects have an effect on the cost of construction and financial returns (Worthington & Worthington, 1984; Burchell and Listokin 1981). One professional stated in the survey response that “[h]aving to build around an existing building is more expensive, and limits the suite size and number”.

Another common response that the professionals stated were about design and aesthetic challenges. Concerns about the safety of the structures and materials, following urban design policies, perceiving them as “ugly”, cutting into the concrete, fitting in with surrounding buildings, adding floors, and possible low ceilings were all mentioned. Since the overall appearance of these adaptive reuse projects was considered a challenge, it might affect downtown revitalization efforts. This is due to the fact that many downtown revitalization projects implement some sort of improvement on aesthetics (DeSousa 2002). Therefore, if these adaptive reuse projects are deemed to be “ugly”, then improvements in aesthetics for downtown revitalization effort will not be achieved.

Another major challenge found in the responses was concerns about land use. Many participants mentioned that the land use change might not comply with planning policies or that they would be located in industrial areas. When I analyzed the planning documents, I found that

many policies are strict with complying with land use zones but also have many measures in place to change the designated land use. For example, in the 2008 Municipal Plan for the City of Oslo, it had mentioned it changed its goals and therefore is trying to implement a mixed use area that once used to be mainly industrial. This demonstrates that many policies that are in place can usually be changed if the change is deemed to be more beneficial than the current designated land use.

Lastly, social issues were also thought to be a challenge for many professionals. Some mentioned that there might be a lack of access to local supportive community services, effects on the surrounding communities, and that social programming might not support this idea since many programs depend on the type of housing (ie. whether it is affordable). These concerns are accurately described in the literature since displacement can be caused by gentrification and also that often converting industrial buildings into housing creates expensive units and therefore lacks affordability (Sirmans, & Macpherson, 2003; Walks & August, 2008).

5.5.3 Main concerns for type of profession

The third question in this part of the survey was “For your particular profession, what would be the main concerns for this type of project?”. 17 of the 20 professional participants that started a survey answered this question. Due to the nature of the anonymity of the participants, it is unknown what their exact professions are that correspond to the answers. Some surveys were sent to a general info email address and the actual profession of the person who filled out the survey is unknown (unless stated in his or her response), other than the fact they he or she works at a company related to the planning field. Therefore, the answers in general were not analyzed based on profession.

Again, the concerns listed here are similar to the ones mentioned in the previous survey responses. Some participants focused on the environmental concerns such as contamination. Many mentioned the cost would be of their greatest concern in their field. Another major concern was the design of the building. This is probably due to the fact that architectural firms were one of the groups targeted for responses. Other participants mentioned they were concerned with the buildings' interaction with the surrounding areas.

One of the interesting aspects of these responses is that most mention a variety of concerns. This correlates to the nature of the urban planning profession since it is a more all encompassing profession that takes into consideration many factors such as design, environment, finance, social issues, and heritage. Therefore, although specific professions were targeted, it is apparent that concerns overlap the different careers as they are all related to the planning field.

5.5.4 Planning policy and its effect on these projects

The fourth question in this part of the survey was “How do you think current planning policies affect the completion of these adaptive reuse projects?”. 16 of the 20 participants answered this question. Some participants thought that they had no effect on these projects, had major effects on these projects, or they were unsure. 7 responses had the notion that planning policies tend to impede the process whereas 5 responses thought the policies facilitate it.

For the participants that perceived the planning policies to facilitate the adaptive reuse of grain elevators, many mentioned that policies often change in some way to support the project. Other reasons were that planners often support these ideas and can influence decisions, new planning policies with height restrictions should not apply to existing buildings (only to new ones) and some just felt it was “easier” to get approval for conversion rather than approval for a

new structure. The analysis of the planning documents corresponds to these answers as well. Many policies seemed to contradict each other or had exceptions when applying them to adaptive reuse projects since they can fall into two different land use categories. These opinions also correlate to the literature review which mentioned that changing the use requires permits, there are often stricter rules for heritage properties, and that more research is required to make changes to policy (Cunnington 1988).

The participants that felt the policies impeded the adaptive reuse process often mentioned how many factors can slow it down. The participants felt that heritage buildings had to go through more policies, zoning changes might be required since the building is converting into a new use, and also that the current planning policies in general need to be changed because they are not explicit enough to relate to adaptive reuse projects. The literature review found similar concerns since it was suggested that more policies be put in place and also that more research needed to be done (De Sousa 2002; Galvan, 2006). The analysis of the planning document also revealed similar results. Since many policies seemed to contradict each other when applying them to an adaptive reuse project, it was determined that this creates confusion as to which policy should be followed. However, the planning document review showed that some municipal plans contain sections on “change of use” for buildings but there was still confusion as the policies were not explicit enough which is similar to one of the participants concerns.

5.5.5 Downtown revitalization as a result of adaptive reuse

The fifth question in this part of the survey was “How do you think the adaptive reuse of silos into residential units adds to the revitalization of downtown areas?”. 17 of the 20 participants answered this question. The responses were mostly positive or mixed saying that this process does revitalize downtowns or that it can but it depends on certain factors. Some

responses did not state explicitly how it did or did not revitalize the area but said that the buildings should be used for other purposes instead of housing. The range in opinions on this question can be associated with the literature that stated downtown revitalization success is difficult to measure (Mullin & Kotval, 2003).

For the responses that did not agree, they thought that the size of these projects would not have a big enough effect on the downtown. Others thought that the location of grain elevators might not be close enough to downtown to affect it since historically they were located in industrial areas. Another participant thought that if they are isolated from downtown, it could create “stereotypical post modern-era ghettos”. These answers correlate to the literature found on downtown revitalization since many factors are involved, not just heritage preservation and aesthetic changes (DeSousa, 2002). However, the locations of the case studies are located in urban areas in these cities and are not isolated. Therefore, it is interesting to note that many people have the perception that industrial buildings are only located in industrial zones and not close to residential areas or downtown where the zone could now be designated as mixed-use.

The participants that agreed that the process had an effect on downtown revitalization also felt that they were positive. Many participants felt that converting the grain elevator into housing means that more people would be therefore living in the area and creating more activity. One participant explained that this increase in population density results in economic demand for services in the areas creating an overall improvement. Another participant felt that having occupancy in a previously unused building is positive and can “alleviate collective community fears” of decay and violence. The participant also mentioned that more social housing should be created to revitalize the area so you do not create a gated community. These ideas conform to the literature that stated improvements in safety, housing, and aesthetics are all factors in

achieving downtown revitalization (Leinberger, 2005).

5.5.6 Personal desire for the adaptive reuse of silos into housing

The sixth question in this part of the survey was “Why or why not would you be part of a project that converts silo structures into residential units?”. 16 of the 20 participants answered this question with a variety of opinions. Eight of the participants would be interested to work on this type of project, four participants did not want to work on this project either because it was not part of their work or did not think it was a good idea, and lastly, four participants wanted to be involved depending if certain factors were met. Some of these factors included financial feasibility, design, and planning policies.

The reasons varied for the participants that were interested. Some liked the appeal of the “uniqueness” factor, the heritage conservation aspect, sustainability factors, and creating “vital urban spaces”. One participant felt that there was a “prestige” gained from working on these projects due to the unusual construction.

The reasons also varied for the participants that did not want to be involved. One participant felt that these types of projects “destroy the heritage attributes” of these buildings. Others did not want to be involved due to concerns over cost, not being supported by local planning policies, and the risks involved from working with an existing structure.

5.6 Summary of all survey responses

In summary, the results from the surveys show a general interest and positive association with the adaptive reuse of grain elevators. Many participants especially liked the unique aspect of these conversion projects and felt that it was a good way to preserve heritage, promote environmental sustainability, and increase housing stock. However, many participants were

opposed to the concept. They felt that the costs would be too high and not financially feasible. Some participants simply did not like the aesthetics of the buildings. A lot of participants had concerns over the actual conversion process and felt it was destroying the heritage features. Table 15 summarizes the results for all survey responses.

Comparison	Professionals	Public
Results	-generally in favour of adaptive reuse -concerns with financial feasibility -concerned with heritage preservation	-generally in favour of adaptive reuse -concerns with financial feasibility -some did not like the aesthetics of the buildings
Similarities	-both concerned with financial feasibility -both in favour of adaptive reuse projects in general	
Differences	-public had more concerns with the aesthetics and function of the interior of the buildings while the professions were more concerned with the exterior	
Implications	-the perspectives of the professionals and public generally conformed to the information found in the literature review -the professionals thought that gentrification of the area would be a positive effect so there might be negative implications if displacement is not addressed -professionals thought that conversion projects would decrease the heritage value in buildings instead of preserving it	

Table 15: Summary of all survey results

In general, the opinions and perspectives of the public and professionals were quite similar. The concerns were generally the same and had similar reasons for opposing the idea. One of interesting differences found was that there seemed to be more of a concern with the interior of the completed structures for living purposes for the public whereas the professional responses mainly focused on the exterior.

As for whether the public and professionals opinions matched the findings in the literature, it was often the same but there were some mixed results. For example, the professionals felt that gentrification would create only positive effects in the area and did not

mention any possible negative effects that the literature review found such as displacement. Also contradictory was that some of the professionals thought the structures would be easily adapted but the literature revealed that structural limitations can create problematic conversions. Lastly, many professionals felt that the conversion projects decreased the heritage value whereas the literature suggested that heritage preservation was considered an advantage.

5.7 Statistics on Toronto's case study area

To make recommendations for the Toronto case study, not only did I use the results from the surveys, but also the demographics of the area. Although the perspectives of professionals and the public provided information that showed an interest in a conversion project for the Canada Malting Silos, statistics are needed so the recommendations are not strictly opinion based.

Due to the availability of data, I examined only the statistics of Toronto to assist in the recommendation for the future use of the Canada Malting Silos. The silos are located within Ward 20 and characteristics were compared with the city's averages. These characteristics included population, immigration, families, households, income, shelter costs, and travel characteristics. I also examined the pollution levels and poverty levels of the city.

For the population, this area had the highest percentage of people aged 25-35 (28.3% in 2001 to 29.1% in 2006) whereas people aged 35-44 are the largest group in Toronto on average (City of Toronto, 2006c). This means the case study area has a younger demographic makeup. This area also has a higher percentage of English speakers compared with the rest of Toronto and a larger number of residents that have immigrated (City of Toronto, 2006c). The couples living in this area have less children compared with Toronto (50.8% without children in Ward 20 compared with 32.7% without children on average in Toronto) (City of Toronto, 2006c). This

correlates to the building type in this area since the majority of residents (87%) rent and live in an apartment compared with Toronto on average (55.4%) and many people tend not to raise a family in an apartment building and prefer a single detached house (City of Toronto, 2006c). The residents in this area also relied less on cars for transportation than Toronto on average (City of Toronto, 2006c).

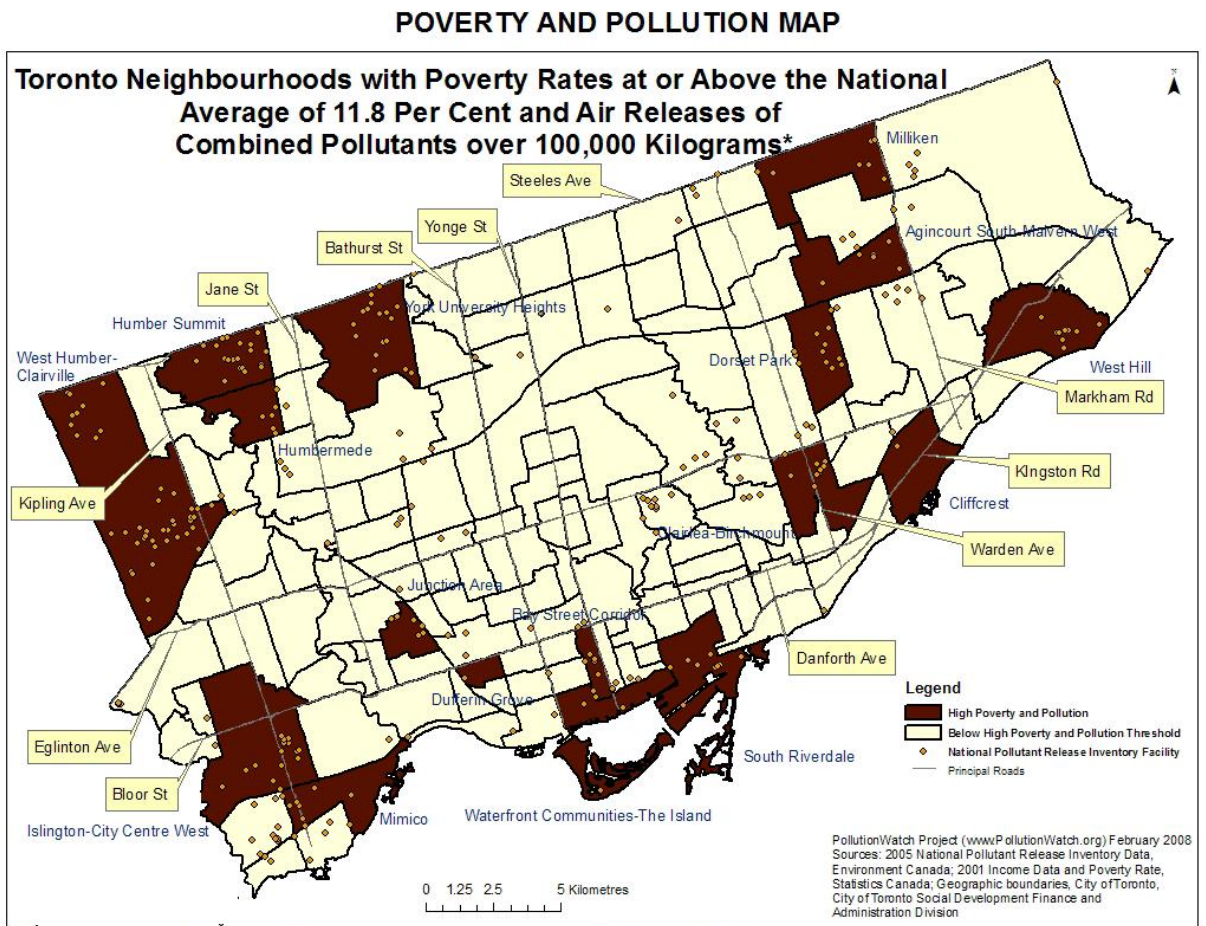


Figure 21: Map showing Canada Malting Silos near high poverty and high pollution areas. (Pollution Watch, 2008)

Since the ward is quite a large area and has a wide range of housing types and demographics, a closer inspection using census tracts demonstrates the issues in more detail. The case study is located in the Niagara neighbourhood #82 (City of Toronto, 2006b). Again, this smaller area’s statistics show a much lower percentage of children and seniors and a higher

percentage of renters than the rest of Toronto (City of Toronto, 2006a; City of Toronto, 2006b). As for poverty and environmental concerns, Pollution Watch (2008) completed a study and it demonstrates that the area is located near areas of high rates of poverty and pollution as shown in Figure 21. Therefore, using the analysis of the planning documents examined earlier, I determined that the housing policies on affordable housing and variety of types are very important. From the surveys, the concerns about the environmental sustainability of the building also demonstrated their importance for this area since it is considered polluted.

6.0 Conclusion

6.1 Summary of analysis and answering the research questions

To summarize this study, the literature review provided information on the advantages and disadvantages of adaptive reuse, types of grain elevators and their challenges, concerns with planning policies, and downtown revitalization. I described three case studies in detail outlining their historic settlement patterns and current uses. Using the information from the literature review and the case studies, I completed a planning policy analysis. Also, I distributed and analyzed specific survey questions to the public and professionals in the field. I also completed a short examination on demographics.

The results of this study can now answer the research question whether planning policy facilitates or impedes the adaptive reuse of grain elevators into housing. To summarize, the planning policies have both impeded and facilitated this process in a variety of ways. First, many of the policies are contradictory in their wording and create confusion as to which policies are more important. They also often did not explicitly have policies in place that dealt with adaptive reuse. Many of the planning documents also outlined the submission requirements which very often were lengthy and required many different types of approvals from different groups. All of these findings demonstrated how policy has impeded the adaptive reuse process. On the other hand, there were policies in place that seemed to help facilitate these types of projects. The most common one is the preference for heritage preservation. These policies would create a more positive reaction to project proposals and might cause contradicting policies to be overridden. Many of the documents also favoured increasing or improving the housing stock which is exactly what the adaptive reuse of grain elevators into housing would do.

Next, the question on how the perspectives of professionals and the public on adaptive reuse influence decisions on the process can be addressed. Although the results showed a general positive view of the adaptive reuse of grain elevators, there was a definite mix of opinions on some of the questions. Therefore, this outcome can be said to influence the planning process by creating more potential concerns to be researched and also ideas from the public that might differ from the professionals working on these projects. This outcome can be considered a both positive and a negative since it is beneficial to have concerns for aspects that were not considered before so future problems might be avoided but this can also increase the length of the process since more research will probably have to be performed. The results from the survey also demonstrated that discrepancies found in planning policies can sometimes be easily changed if planners support the project. Therefore, support for these projects might increase the speed at which they are completed.

As for its effect on downtown revitalization, the survey results were generally positive but also included mixed opinions. The literature review found that adaptive reuse can be a part of the method for improving downtown but other factors should be considered. The survey results mostly agreed but some participants felt that it would not have a strong enough influence to noticeably affect the downtown areas.

6.2 Recommendations for the Toronto Case Study

Recommendations for the future use of the Canada Malting Silos in Toronto, should be based on the links between the results from the study's analysis and the area's statistics. To begin, one of the initial questions was whether demolition was a solution for this case study. Based on all of the findings, this is not the best option. Most importantly, this building has been

protected and designated as a heritage property under the Ontario Heritage Act creating an extremely unlikely outcome of demolition. This fact also builds on the City's goal of downtown and waterfront revitalization by using heritage preservation as one of the methods. Based on the analysis of the other planning documents, there were missing policies about adaptive reuse specifically in Toronto's documents. The other cities had more policies in place that directly related to converting buildings into a new use. If these policies were created for Toronto, it might make the planning process easier. As for what the new use should be, the findings show a need for housing. Mixed use areas were favoured, but this area already has parks, public areas, and community centres so housing is a reasonable option. Based on the other findings in the planning documents, affordable housing and diversity of housing options is strongly promoted. Therefore, the type of residence for the grain elevator if converted into a new building should be affordable, not expensive based on the goals of the planning documents and also the demographic makeup of this area.

The results of the survey can also help to make recommendations. The participants in the survey who were identified as being professionals in planning or related fields generally favoured the adapted reuse of grain elevators into housing and many said they would support the idea if it came up in his or her work. Although I found that the Toronto professionals seemed to be less interested in this conversion, I determined that this might be because they have not seen examples firsthand compared to the other participants. The public's response to this idea was also generally positive both in residents of Toronto and non-residents. They were interested in its "uniqueness" and thought it would be beneficial to the city. Although both the professionals and the public had concerns with the costs, it was not as much of a deterrent as originally thought. Since the cost of owning one of the apartments in Hobart is over \$1,000,000, this would

hopefully offset the construction costs. The apartments in the Oslo are simpler in construction and would be much cheaper. I determined that the rental prices there were similar to Toronto prices and therefore show the variety in cost and quality of housing that can be created with these grain elevators. This recommendation also correlates to the social concerns in the findings. Many participants were concerned with gentrification and how the surrounding area would be affected. If these grain elevators were converted into affordable housing units, this would help balance these issues. Also, many professionals were unsure about the surrounding area for the Toronto example. However, based on personal observations, this location is ideal for living. It is downtown, close to public transportation, has waterfront and skyline views, and is close to amenities. Lastly, the professionals thought the conversion of the grain elevators into affordable housing would have a positive effect on downtown revitalization by improving the safety and increasing the population in the area.

Based on the findings in the statistics, this area's population is growing and I found a higher percentage of couples without children living there. These statistics mean that more housing might be needed in this area and it should be an apartment style, not single-detached since that was the trend found in the area. Since this area also had a high rate of poverty and pollution, these facts further the recommendation for affordable housing with sustainable design for the new use.

In conclusion, based on the findings, it is recommended to convert the Canada Malting Silos into affordable housing units. Although, it must be stated that many participants opposed this idea and that disadvantages were found on adaptive reuse. However, the positive feedback and advantages found were determined to be more prevalent.

6.3 Limitations

While this research study included a variety of methods of data collection to answer the research questions, there were some limitations. The limitations for this study were mostly caused by the number of survey responses. Although there were many responses, it is always better to have more responses to questions were decreased due to people declining to participate. Although response rates are lower for electronic surveys compared to mail in responses, it was more practical to distribute the questions for this study electronically due to the location of the case studies (De Leeuw, 2008). Limitations could also be attributed to not agreeing to the consent forms on the surveys. This problem also leads into the potential issue of not being on site for some of the case studies.

Other limitations that arose were data availability. It was difficult to find demographic data for smaller areas such as census tracts for all of the cities. It was available for Toronto but not found for Oslo in which only city-wide statistics were found. Specific data needed to create original GIS maps was not available for all of the case studies and therefore, I could not complete a comparative spatial analysis. Another potential limitation of this study is that it only focused on certain types of adapted grain elevators and not all. There might be information that is missed by not examining a large sample. However, the study involved in-depth, qualitative research so using a large sample of grain elevators would not be feasible due to time constraints. Other data that was difficult to find was financial statistics on the case studies specifically. It would have been beneficial to have rental costs or housing costs of these buildings for comparison and also to better determine financial feasibility.

Another limitation that was frequent was translation issues. Since one of the case studies was located in Oslo, many documents were in Norwegian and were difficult or impossible to

translate using tools such as Google Translate with confidence. The consequence of this is that some documents could not be used even though they would have been beneficial to the study. Another limitation is that the survey was distributed in English and although English is common in Norway, this might have deterred participants. This was evident in the lack of responses from the professionals located in Oslo.

In summary, some limitations could be overcome with more time and also better access to data. For a continuation of this study, I recommend to increase the number of Norwegian participants, collect more financial data for cost comparisons, and collect more demographic data for a spatial analysis.

6.3. Future Research

Due to these limitations and some of the mixed results from the study, further research is needed. Since the study was mostly qualitative research and therefore had fewer participants, further research could be conducted by adding more participants, especially professionals located in Oslo. This would create a more accurate view on their opinions and could see if their perspectives match the current planning policies and literature. Since the results of the planning policies were sometimes contradictory or not detailed enough, more research is needed to determine the best way to combat addressing adaptive reuse projects in policies. Also, due to the fact that the literature found both advantages and disadvantages of adaptive reuse and also the survey results demonstrated a mix of opinions, the research questions might have to be narrowed down even further. This way, it will lessen the number of exceptions on the general idea of the best methods to complete adaptive reuse projects on grain elevators.

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Appendix

Recruitment Letter for Public

Hello,

My name is Megan Kevill and I am a MA student working under the supervision of Luna Khirfan in the School of Planning at the University of Waterloo, Canada. The reason that I am posting to this page that we are conducting a study that enquires about the conversion of waterfront concrete silos into housing units focusing on the following case studies: Canada Malting Silos in Toronto, Canada, Grünerløkka Student House in Oslo, Norway, and the Salamanca Silos Apartments in Hobart, Australia. We are currently seeking volunteers from the public as participants in this study.

Participation in this study involves answering questions in a short online survey about your perspectives and opinions on this type of housing and how you think it can affect downtown revitalization of buildings. You are presented with several statements. For each statement you are asked to pick how much you agree or disagree with it. You are also given a chance to leave any comments or questions you may have. Participation in this study would take approximately 5 minutes of your time. I would like to assure you that the study has been reviewed and received ethics clearance through the Office of Research Ethics, University of Waterloo. However, the final decision about participation is yours.

If you are interested in participating, please visit **survey website link**. If you have any questions first, feel free to contact me at mkevill@uwaterloo.ca.

Sincerely,

Megan Kevill

Recruitment Letter for Professionals

Hello,

My name is Megan Kevill and I am a MA student working under the supervision of Dr. Luna Khirfan in the School of Planning at the University of Waterloo, Canada. The reason that I am contacting you is that we are conducting a study that enquires about the conversion of waterfront concrete silos into housing units in focusing on the following case studies: Canada Malting Silos in Toronto, Canada, Grünerløkka Student House in Oslo, Norway, and the Salamanca Silo Apartments in Hobart, Australia. We are currently seeking volunteers from professionals in the urban planning field as participants in this study.

Participation in this study involves answering questions in a short online survey about your perspectives and opinions on this type of housing and how you think it can affect downtown revitalization of buildings. You are presented with several statements. For each statement you are asked to pick how much you agree or disagree with it. You are also given a chance to answer more open ended questions and leave any comments or questions you may have. Participation in this study would take approximately 15 minutes of your time. I would like to assure you that the study has been reviewed and received ethics clearance through the Office of Research Ethics, University of Waterloo. However, the final decision about participation is yours.

If you are interested in participating, please visit <https://www.surveymonkey.com/s/PZBVRPL>. If you have any questions first, feel free to contact me at mkevill@uwaterloo.ca.

Sincerely,

Megan Kevill

Public Recruitment Sources and Survey Links

Toronto

Reddit Toronto

<http://www.reddit.com/r/toronto/>

Survey Link: <https://www.surveymonkey.com/s/P6W35W7>

Protect Toronto's Heritage Buildings (826 members)

<https://www.facebook.com/groups/2481376319/?fref=ts>

Survey Link: <https://www.surveymonkey.com/s/P6ZBTR3>

Toronto Canada (4291 members)

<https://www.facebook.com/groups/TorontoCanada/>

Survey Link: <https://www.surveymonkey.com/s/WSXR62R>

University of Toronto Engineering (2582 members)

<https://www.facebook.com/groups/uofteng/>

Survey Link: <https://www.surveymonkey.com/s/WSN7BDL>

Toronto's First Post Office (344 likes)

<https://www.facebook.com/TOs1stPO>

Survey Link: <https://www.surveymonkey.com/s/P6ZBTR3>

Hobart

Reddit Tasmania

<http://www.reddit.com/r/tasmania/>

Survey Link: <https://www.surveymonkey.com/s/P6XFXRC>

University of Tasmania Arts Society (358 members)

<https://www.facebook.com/groups/181671505204326/>

Survey Link: <https://www.surveymonkey.com/s/WSSJXJ2>

Salamanca Market (1692 likes)

<https://www.facebook.com/SalamancaMarketPlace>

Survey Link: <https://www.surveymonkey.com/s/PZ7QLRS>

Oslo

Reddit Norway

<http://www.reddit.com/r/Norway/>

Survey Link: <https://www.surveymonkey.com/s/P6GJSGJ>

STUDENTFEST OSLO (2563 members)

<https://www.facebook.com/groups/216216362420/>

Survey Link: <https://www.surveymonkey.com/s/PZL7S25>

New to Oslo (1825 members)

<https://www.facebook.com/groups/35649967964/>

Survey Link: <https://www.surveymonkey.com/s/WSMLND5>

Professional Contact Sources

Oslo –professional contacts search results:

MUNICIPAL PLANNERS

Results from municipal website contacts

Survey Link: <https://www.surveymonkey.com/s/P5K9STK>

PRIVATE PLANNERS

http://www.gulesider.no/query/what/cs/search_word/konsulenter%2Bog%2Br%C3%A5dgivning%2B-%2Bplanleggingskonsulenter/district_codes/21/geo_area/Oslo

Survey Link: <https://www.surveymonkey.com/s/P58SYJ7>

ARCHITECTS

http://www.gulesider.no/query/what/cs/header_code/58/search_word/arkitekt/district_codes/21/geo_area/Oslo

Survey Link: <https://www.surveymonkey.com/s/P5VPCB8>

ENGINEERS

http://www.gulesider.no/query/what/cs/header_code/994/search_word/r%C3%A5dgivende%2Bingeni%C3%B8rer%2B-%2Bbygge-%2Bog%2Banleggsteknikk/district_codes/21/geo_area/Oslo

Survey Link: <https://www.surveymonkey.com/s/P57NFZK>

DEVELOPERS/BUILDERS

http://www.gulesider.no/query/what/cs/header_code/994/search_word/r%C3%A5dgivende%2Bingeni%C3%B8rer%2B-%2Bbygge-%2Bog%2Banleggsteknikk/district_codes/21/geo_area/Oslo

Survey Link: <https://www.surveymonkey.com/s/P59ZSG7>

Hobart –professional contacts search results:

MUNICIPAL PLANNERS

Results from municipal website contacts

Survey Link: <https://www.surveymonkey.com/s/PZF3WW9>

PRIVATE PLANNERS

Contacts found from

<http://www.yellowpages.com.au/search/listings?clue=Town+%26+Regional+Planning&locationClue=hobart%2C+tasmania>

Survey Link: <https://www.surveymonkey.com/s/PZGKDYC>

ARCHITECTS

<http://www.yellowpages.com.au/search/listings?clue=Architects&locationClue=hobart%2C+tasmania>

Survey Link: <https://www.surveymonkey.com/s/PZBVRPL>

ENGINEERS

Contacts from

<http://www.yellowpages.com.au/search/listings?clue=engineers+structural&locationClue=hobart%2C+tasmania&selectedViewMode=LIST&emsLocationId=>

Survey Link: <https://www.surveymonkey.com/s/PZHLJDW>

DEVELOPERS/BUILDERS

Contacts from

<http://www.yellowpages.com.au/search/listings?clue=developer+builders+construction&locationClue=ho bart%2C+tasmania&selectedViewMode=LIST&emsLocationId=>

Survey Link: <https://www.surveymonkey.com/s/PZPFLRJ>

Toronto –professional contacts search results:

MUNICIPAL PLANNERS

Results from municipal website contacts

Survey Link: <https://www.surveymonkey.com/s/PZY6STV>

PRIVATE PLANNERS

<http://www.yellowpages.ca/search/si/1/planners/Toronto%2C+ON/rca-01379600-Regional-Rural-Urban-Planners>

Survey Link: <https://www.surveymonkey.com/s/PZJ7L3X>

ARCHITECTS

<http://www.yellowpages.ca/search/si/1/architects/Toronto%2C+ON/rca-00066200-Architects>

Survey Link: <https://www.surveymonkey.com/s/PZQMCB7>

ENGINEERS

<http://www.yellowpages.ca/search/si/1/engineers/Toronto%2C+ON/rci-Toronto>

Survey Link: <https://www.surveymonkey.com/s/PZSRKRP>

DEVELOPERS/BUILDERS

<http://www.yellowpages.ca/search/si/1/developer/Toronto%2C+ON/rca-01100000-Real-Estate-Developers%C2%B2rci-Toronto>

Survey Link: <https://www.surveymonkey.com/s/PZTL3BB>

Blank housing survey for Public

Housing survey for public

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CONSENT TO PARTICIPATE:

Title of Project: The effectiveness of the adaptive reuse of silos on downtown revitalization.

You are invited to participate in a research study conducted by Megan Kevill, under the supervision of Luna Khirfan of the School of Planning at the University of Waterloo, Canada. The study is researching waterfront concrete silos that were historically used in the grain industry but have been converted into housing units. The case studies that underwent this change are located in Oslo, Norway and Hobart, Australia. The study is also investigating the Canada Malting Silos located on the waterfront in Toronto, Canada which are currently not in use. The objectives of the research study are to determine how effective the adaptive reuse of these silos is on downtown revitalization and to gain perspectives and opinions on the planning policies from professionals in the planning field and the opinions from the public. The study is for a Master of Arts's thesis.

If you decide to volunteer, you will be asked to complete a 5 minute online survey that is completed anonymously. Survey questions focus on opinions on heritage building aesthetics, environmental sustainability, and costs/benefits. Participation in this study is voluntary. You may decline to answer any questions that you do not wish to answer and you can withdraw your participation at any time by not submitting your responses. There are no known or anticipated risks from participating in this study. It is important for you to know that any information that you provide will be confidential. All of the data will be summarized and no individual could be identified from these summarized results. Furthermore, the web site is programmed to collect responses alone and will not collect any information that could potentially identify you (such as machine identifiers).

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The anonymous data collected from this study will be maintained on a password-protected computer database in a restricted access area of the university. As well, the data will be electronically archived after completion of the study and maintained for two years and then erased. Should you have any questions about the study, please contact Megan Kevill at mkevill@uwaterloo.ca. Further, if you would like to receive a copy of the results of this study, please contact either investigator.

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please feel free to contact the Director, Office of Research Ethics, at 1-519-888-4567 ext. 36005 or ohrac@uwaterloo.ca.

Thank you for considering participation in this study.

*

1. Consent to Participant:

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

Consent to Participant: With full knowledge of all foregoing, I agree, of my own free will, to participate in this study. I agree to participate.

I do not wish to participate (please close your web browser now).

Housing survey for public

[Exit this survey](#)

Background: These buildings used to be grain silos for many decades. After changes to the industry, the buildings remained unused for a period of time. They were then converted into apartments by constructing the necessary changes such as windows, plumbing, floors, walls, etc. to the silos.

The following questions will be about this type of new use for these buildings.

Exteriors and interiors of silo apartments in Hobart and Oslo



Figures courtesy of:

<http://www.hbvarchitects.com.au/>

http://www.salamancarealty.com.au/rent/view_hobart_silos__the_very_best_address_battery_point_12369

http://no.wikipedia.org/wiki/Fil:Grunerlokka_Studenthus.JPG

http://www.hrtb.no/prosjekter/bo_silo.html

<http://www.hrtb.no/prosjekter/pdf/silo.pdf>

Housing survey for public

[Exit this survey](#)

*

2. Please rank the following statements whether you agree or disagree with them.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
These buildings are beautiful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would enjoy living in these types of buildings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The new use of these buildings is better than demolishing them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important to maintain the heritage/historic value of these buildings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important to create environmental sustainability for these buildings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important to have businesses or retail stores on the main floor of these types of buildings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important to have no residential vacancies in these types of buildings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important that the building conversion creates positive effects for the surrounding area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important to have other housing options available in the surrounding area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cost of these projects is a main factor for whether they are converted.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would want this silo structure (shown below) to be converted into housing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Please provide any comments or questions you may have about your answers.

Please provide any comments or questions you may have about your answers.

West and East views of the Canada Malting Silos in Toronto, Canada.



Housing survey for public

[Exit this survey](#)

Thanks!

Dear participant,

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In summary, the title of this study is “the effectiveness of the adaptive reuse of silos on downtown revitalization”. The main goals of this study are to determine what factors facilitate or impede the adaptive reuse of silo structures and also to determine if adaptive reuse is an effective approach towards downtown revitalization.

A copy of the thesis will be available online on the Faculty of Environment Theses and Dissertations Collection website after its completion.

Thank you,

Megan Kevill

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Housing survey for professionals

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Housing survey for professionals

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The following questions will be about this type of new use for these buildings.

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<http://www.hrtb.no/prosjekter/pdf/silo.pdf>

Housing survey for professionals

[Exit this survey](#)

*

2. Please rank the following statements whether you agree or disagree with them.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The new uses for these types of buildings are better than demolishing them.
It is important to have businesses/commercial use on the main floor of these buildings.
It is important to have no residential vacancies.
The amount of financial risk for these types of buildings is important.
The cost of these types of projects is a main factor for whether they are completed.
The environmental sustainability for these buildings is important.
The planning policies in the area are an important reason whether these projects are completed.
The gentrification of the area surrounding the building is a positive effect.
Availability of other housing options in the surrounding area is important.
It is important to maintain the heritage/historic value of the building.
These buildings are beautiful.
I would want this silo structure (shown below) to be converted into housing.

West and East views of the Canada Malting Silos in Toronto, Canada.



3. Please provide any comments regarding your choices above.

Housing survey for professionals

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Please provide your professional perspectives and opinions on the following open-ended questions. Feel free to provide as much information as you can.

*

4. Why or why not do you think silos are an effective structure for adaptive reuse into residential purposes?

*

5. What do you think are the main challenges surrounding these types of adaptive reuse projects?

*

6. For your particular profession, what would be the main concerns for this type of project?

*

7. How do you think current planning policies affect the completion of these adaptive reuse projects?

*

8. How do you think the adaptive reuse of silos into residential units adds to the revitalization of downtown areas?

*

9. Why or why not would you be part of a project that converts silo structures into residential units?

Housing survey for professionals

[Exit this survey](#)

THANKS!

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Thank you,

Megan Kevill

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Personal Observations at the Canada Malting Silos site and surrounding area (April 19, 2012 4pm)

Silo site:

- Ireland park is still under construction
- pieces of the silo walls are crumbling or breaking off but generally seems to be intact
- silo site has a great view of the waterfront, the downtown skyline, and park areas
- lots of boat traffic around silo site
- park along eastern water edge is empty even though the weather is nice (16C sunny)
- silo site is fenced off and not accessible due to construction

Immediate surrounding area:

- small baseball diamond is on western side of site not being used
- community centre next to silo site on north side
- community centre full of children
- lots of runners and bikers and one couple using bench (lots of benches around here and trees)
- lots of car traffic on the airport road to Billy Bishop Toronto City Airport
- kids playground was packed (basketball, playground set)
- bixi bike racks
- pretty empty big park with maybe 10 people walking around
- Little Norway park also has some swings, monkey cars, baseball diamond
- youth at community centre are mostly visible minorities
- lots of people walking dogs
- very clean park
- “non-violence starts here” sign at the Little Norway court
- mixed income levels of housing in area
- close to Tip Top Tailors lofts