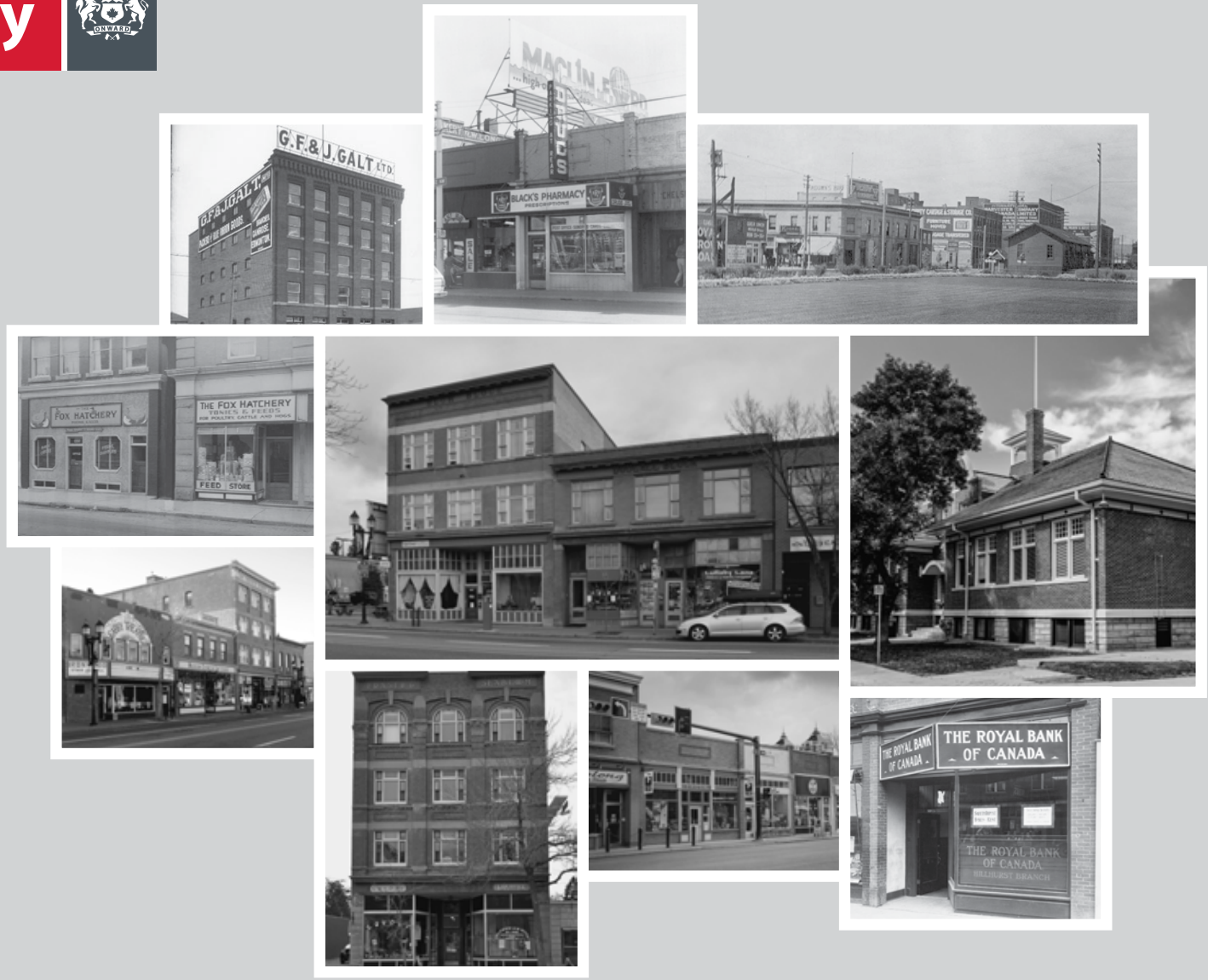
Calgary



Heritage Value Analysis & Conservation Tool Development Focused on Commercial Streets

Phase 1 Report

Publishing Information

Title: Heritage Value Analysis & Conservation Tool Development Focused on Commercial Streets – Phase 1 Report

Contact: 311

ISC: Unrestricted

SR: 21-0003921-ADV-9793

Note: All images used in the cover collage are historic images of Calgary and it's Commercial Areas from The City Calgary and the Glenbow Archives (now housed at the University of Calgary Library Archives).

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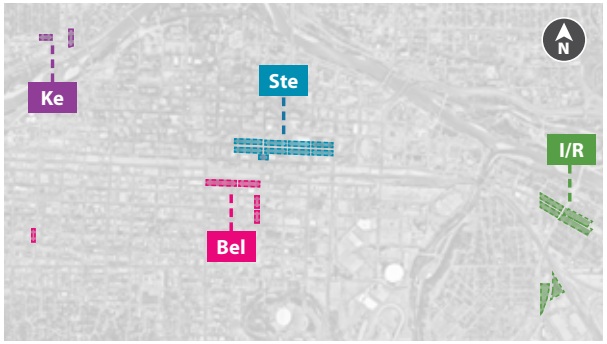
Overview

Value of Calgary's Heritage Commercial Areas

Heritage has value in Calgary. That value includes the Economic Value of the buildings, and the Social and Environmental Value these commercial areas represent.

Four heritage commercial areas were the subject of this study:

- Beltline/ Victoria Park
- Inglewood/Ramsay
- Kensington
- Stephen Avenue



Economic Value

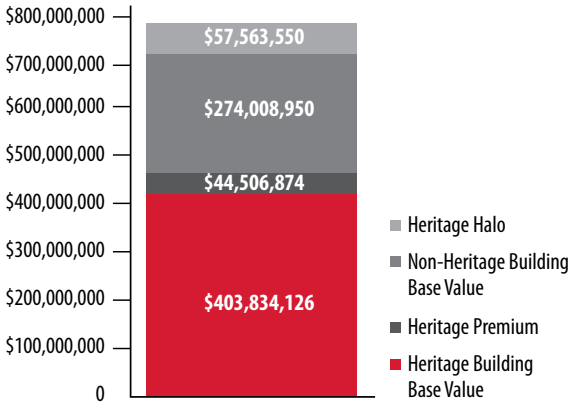
The heritage buildings in these four areas have a Base Economic Value of nearly $404 million plus a Heritage Premium of an additional $44.5 million. Heritage Premium is the additional value that the market places on a property because of its heritage character and quality.

The non-heritage buildings in the four areas have a Base Economic Value of just over $274 million, but benefit from a Heritage Halo Effect amounting to more than $57.5 million. Heritage Halo Effect is the additional value non-heritage properties receive because of their proximity to heritage properties.

Heritage areas are magnets for creative class and knowledge sector businesses.

Even excluding Stephen Avenue, heritage areas have 1.5x more jobs per acre.

Figure 1: Components of Economic Value



Social Value

Beyond the Economic Value, these heritage commercial areas have a Social Value to the citizens of Calgary in excess of $80 million. This amount was determined based on a Willingness to Pay Survey taken by a sample of Calgarians who said what they would pay to maintain the heritage character and quality of the four areas.

3 out of 5 Calgarians were willing to pay to maintain Calgary's heritage commercial areas.

The willingness to pay survey found a value of $60 per person.

Environmental Value

The heritage buildings in the four areas also have Environmental Value totaling nearly $49 million. Environmental Value reflects the "embodied energy" in existing and replacement buildings, plus the embodied carbon and the landfill costs if these buildings were demolished. These buildings represent:

$29 million in offset landfill costs

$10 million in embodied energy

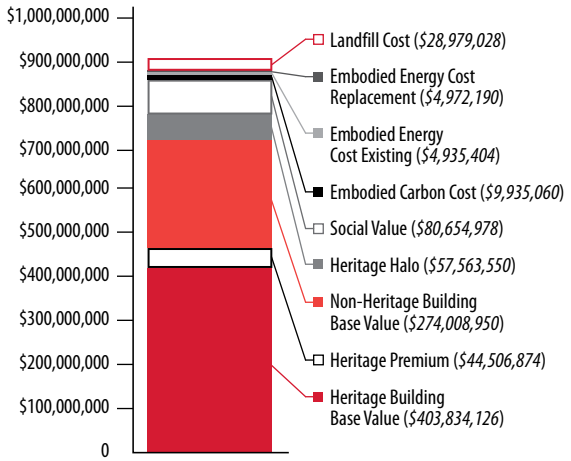
$10 million in embodied carbon

Triple Bottom Line Value

The concept of the Triple Bottom Line recognizes the importance of not just financial, but also social and environmental value. Heritage commercial areas in Calgary not only provide profits, but also dividends to people and to the planet.

In total, these four areas have a Triple Bottom Line Value of more than $900 million. **This is $231 million more than just their Base Economic Value.**

Figure 2: Triple Bottom Line Value of Calgary's Heritage Commercial Districts



Summary

The City of Calgary retained a consulting team of Lemay, and specialized consultants Heritage Strategies International, Altus Group, and CBRE to undertake a multi-phase heritage analysis. This focused on commercial streets with the goal of developing tools which support heritage conservation and repurposing of heritage resources located on Calgary's commercial streets. This report focuses on measuring Heritage Value.

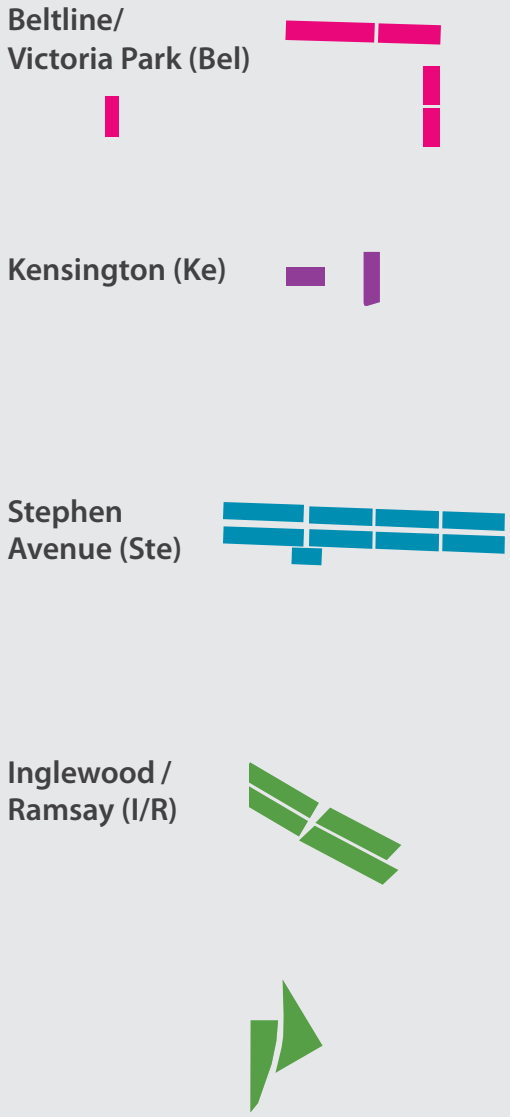
A second phase anticipates the creation of a Policy and Financial Tool Analysis, intended to provide incentives for the conservation of heritage buildings and areas.

Four commercial areas were selected by The City of Calgary – portions of Downtown Core/Stephen Avenue, Inglewood/Ramsay, Beltline/Victoria Park and Kensington. For comparison purposes, four comparable non-heritage areas were selected and used where appropriate within this report – Marda Loop, Mission, 17th Avenue and Bridgeland. In alignment with Council Policy and to develop a complete understanding of the monetized value of the identified heritage commercial areas, the Triple Bottom Line approach was used for the investigation. Its analysis considered the Economic, Social and Environmental values of these areas.

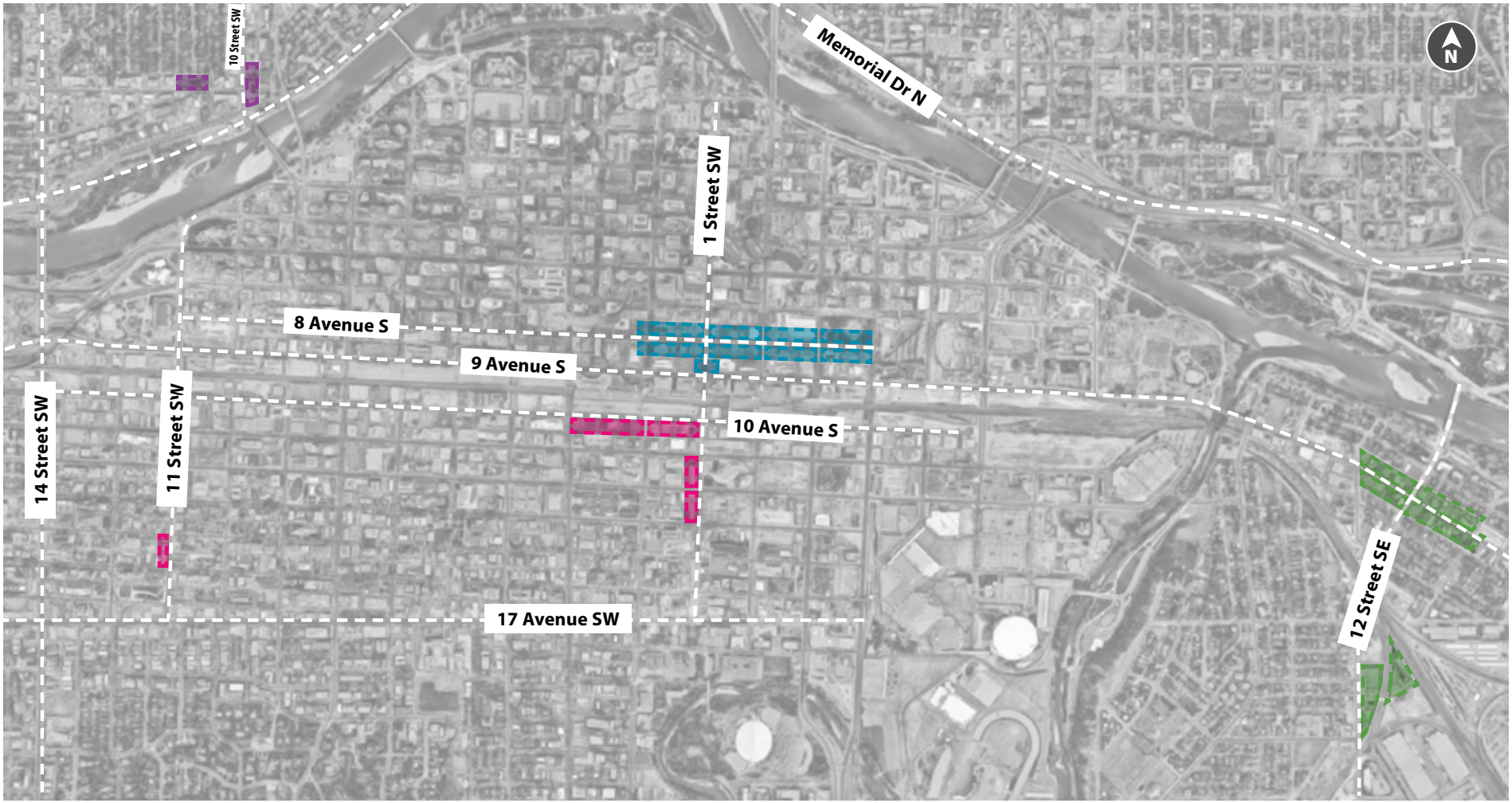
This investigation identifies the amount of value attributable to the heritage character of the areas; in other words, the economic lift relative to non-heritage areas.

The importance of heritage conservation is recognized nationally and internationally through the work of many public and private sector entities. It has generally been acknowledged to provide benefits to municipalities and communities. These benefits have typically been perceived in terms of community revitalization, business development and awareness of sense of place. However, rarely are these heritage areas analyzed to determine a monetized value of the associated economic, social and environmental benefits – the Triple Bottom Line.

In all four areas and according to each of the three categories, the heritage areas display a significant monetized value. The methodology, tables and charts in the report indicate the magnitude of these values. Also evident in the analysis, is the vulnerability of individual heritage buildings or areas as they become fragmented and lose their streetscape appeal.



Map 1: The Four Commercial Heritage Areas



Bel Beltline/Victoria Park

Ke Kensington

Ste Stephen Avenue

I/R Inglewood / Ramsay

Economic Value

Quantifying the Economic Value is relatively straightforward. It includes the value of the real estate itself, data on business and employment patterns, impact on nearby properties and similar variables.

In the end, heritage buildings are real estate. Most of the Economic Value of a commercial heritage building is determined by the marketplace.

Owners and investors in commercial real estate establish Economic Value by calculating a building's ability to generate revenues through rents or by providing space in which the owner's business operations are housed. The value of a heritage building may be further enhanced by the quality and desirability of its heritage character. This analysis evaluated the Economic Value of heritage buildings in the four commercial areas. The three key questions addressed were:

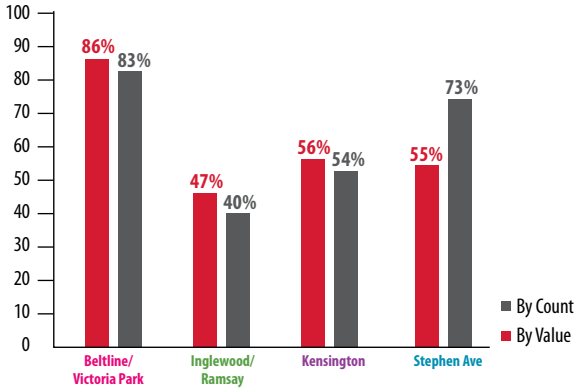
1. What is the Economic Value of the heritage buildings as simply real estate?
2. Is part of that value attributable to their heritage character?
3. Is there an economic "lift" to non-heritage buildings because of their proximity to heritage buildings?

Table 1: Total Economic Value of the Four Commercial Areas

	Heritage Buildings	Non-Heritage Buildings	Total Value
Beltline/ Victoria Park	$75,368,500	$12,071,500	$87,440,000
Inglewood/ Ramsay	$36,093,500	$40,932,000	$77,025,500
Kensington	$15,798,000	$12,410,000	$28,208,000
Stephen Avenue	$321,081,000	$266,159,000	$587,240,000
	$448,341,000	**$331,572,500**	**$779,913,500**

The total economic value of the four commercial areas is **$780 million**.

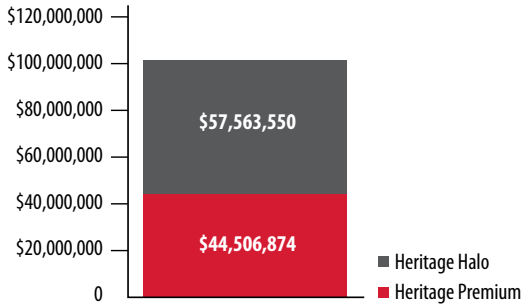
Figure 3: Heritage Areas' Heritage Buildings by Value and Count



In each of the four areas, heritage buildings constitute a significant share of the entire building inventory both by number and by value. 57 per cent of the total is attributable to heritage buildings within those areas.[1]

But those numbers do not tell the whole story. Based on an in-depth analysis by the real estate consulting firm Altus, there is a premium attached to heritage buildings of $36.60 per square foot. In the aggregate that means of the $448 million in value, more than $44 million is attributable to their heritage character. This is the "Heritage Premium." In addition, Altus found that the value of non-heritage buildings in the four areas was enhanced by their proximity to heritage buildings. Of the $331 million value of the non-heritage buildings, more than $57 million is a result from this "Heritage Halo" effect. Taken together, the "Heritage Premium" and the "Heritage Halo" result in a total Heritage Bonus of more than $100 million in these four commercial areas.[2]

Figure 4: Economic Bonus from Heritage



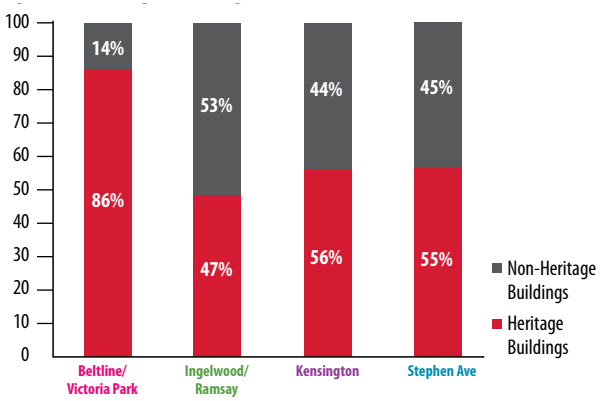
[1] All data on property values comes from the Calgary Assessment data.

[2] Both the Heritage Premium and the Heritage Halo were calculated based on a multiple regression analysis conducted by Altus. Using an analysis of actual sales data, this approach isolates a single variable — in this case the added value of heritage and proximity to heritage — and quantifies its contribution to the entire value of a property. That increment was then characterized as "Heritage Premium" for heritage buildings and "Heritage Halo" for non-heritage buildings close to heritage buildings. A more detailed explanation of this process can be found in Appendix B.

The heritage bonus in these four commercial areas is **more than $100 million**.

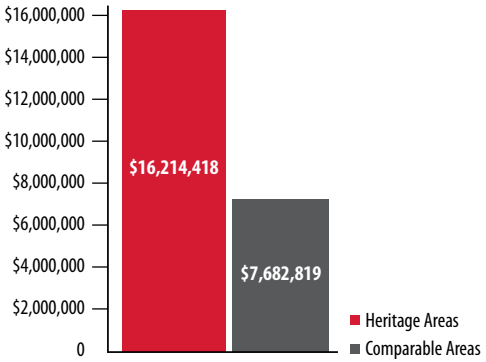
This value analysis also considered the economic attributes of the four heritage commercial areas as compared with four comparable areas in terms of density of jobs, businesses, economic value per acre, and types of businesses. While each of the four comparable areas contained some heritage buildings, the share in each was much smaller than the comparable heritage area.

Figure 5: Heritage Buildings' Share of Value



But differences in the share of heritage buildings are not the only contrasts between the heritage areas and their comparable areas. The value per acre is more than twice as great in the heritage areas.

Figure 6: Value by Acre



Social Value

By surveying Calgarians representing a geographic and demographic cross-section of the city, this analysis of Social Value found that these historic commercial areas are visited often by residents and are greatly valued for their historic character, walkability and concentration of locally-owned businesses. This survey reveals that Calgary's heritage corridors have a significant social value and their worth cannot be measured through market transactions alone.

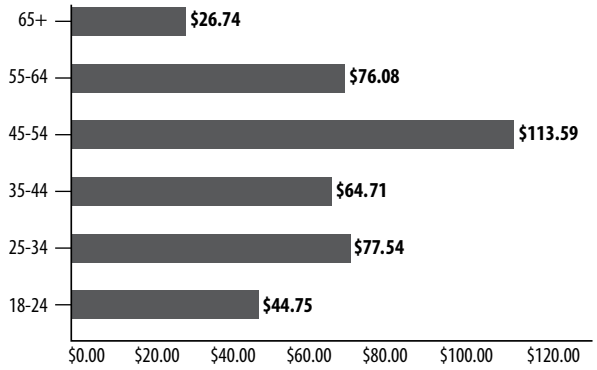
Some values can be measured by actions of the marketplace — the price of cattle, oil or houses, for example — but it can be difficult to estimate values that are not traded in the marketplace. One method, increasingly used worldwide for environmental and heritage resources, is the Willingness to Pay (WTP) approach. Willingness to Pay estimates non-economic values based on a survey methodology. To estimate the Social Value of this Triple Bottom Line analysis, a WTP survey was conducted, asking a cross-section of Calgarians about four heritage commercial areas. Respondents were asked what they would be "Willing to Pay" to maintain the heritage character of the four areas, and a series of questions about how often they used the areas and what the most important variables were when choosing a commercial district to visit.

Calgarians **value** the city's historic commercial areas.

Table 2: Share of Population Willing to Contribute by District and Dollar Amount

	$0	$1	$5	$10	$25	$50	$100	$500
Beltline/ Victoria Park	40.9%	2.7%	7.4%	8.7%	13.4%	14.8%	9.4%	2.7%
Inglewood/ Ramsay	35.1%	2.0%	7.3%	9.3%	15.9%	13.2%	13.2%	4.0%
Kensington	39.5%	2.0%	7.2%	11.8%	13.2%	13.2%	10.5%	2.6%
Stephen Avenue	39.5%	2.0%	7.2%	11.8%	13.2%	13.2%	10.5%	2.6%

Figure 7: Social Value per Person by Age



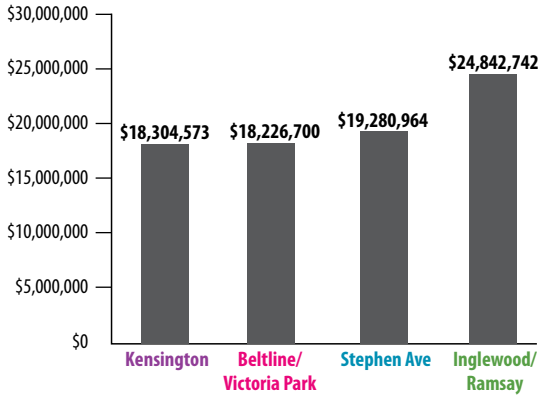
Results indicate that Calgarians value, in measurable dollar amounts, historic commercial areas. The survey asked: "How much, if anything, would you be willing to contribute as a voluntary, one-time donation to maintain the historic character and quality of each of these commercial neighbourhoods?" As is typical in WTP surveys, a sizable portion was unwilling to pay anything. But more than half of Calgarians were willing to pay at least something to maintain the character of these commercial heritage neighbourhoods.

Across all age groups, Calgarians value heritage corridors. The distribution of responses corresponds to most individual's ability to pay (i.e. individuals who were likely well established in their careers were willing to pay more, whereas the oldest and youngest groups were willing to pay less).

Willingness to pay indicates social value held by those **unlikely to directly benefit** from the Economic Value of the area.

The Willingness to Pay approach indicates the Social Value of these areas to those who are unlikely to be direct beneficiaries of the economic values of the area. Based on the survey results, Inglewood is the most highly valued district. Here are the values of the areas:

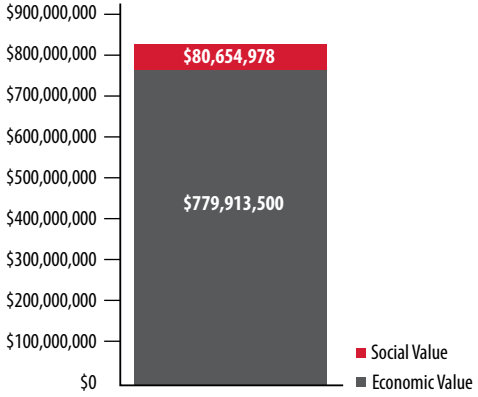
Figure 8: Social Value by District



The Social Value of these heritage areas is more than **$80 million**.

In other words, the Social Value of the historic character and quality of these four commercial areas is more than $80 million in addition to their Economic and Environmental Value. That amount translates into a Social Value of around $60 per person. Even considering the margin for error (+/- 7.3%), the likely monetized Social Value of the four areas is between $74,767,165 and $86,542,791.

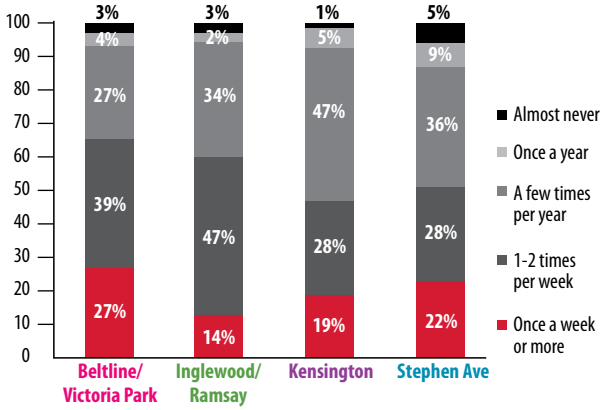
Figure 9: Additional Social Value



This Social Value represents more than 10 per cent in additional value beyond the value calculated in the economic analysis. It is evident that measuring the value of heritage on a Triple Bottom Line basis reveals the worth of heritage in Calgary is far more than can just be demonstrated in market transactions.

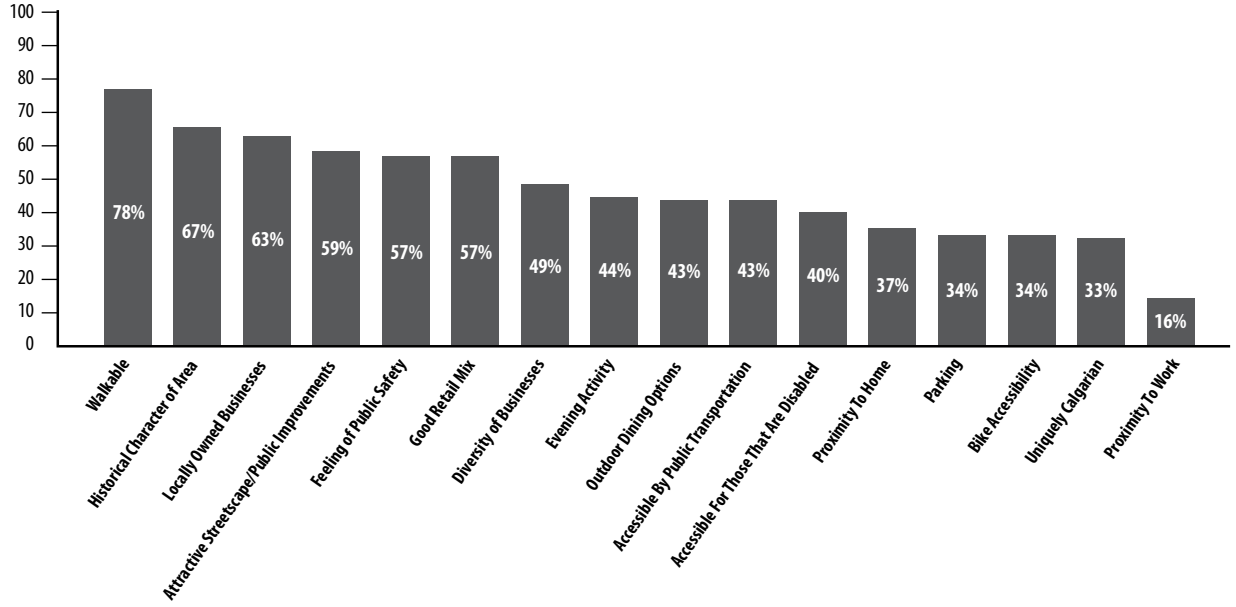
Beyond just asking the Willingness to Pay question, Calgarians were asked how often the four historic commercial areas were part of their everyday lives. Nearly every district is visited by respondents at least once a month.

Figure 10: How Often Do You Visit Each Of These Areas?



While the primary purpose of the survey was to estimate the Social Value of these heritage commercial areas, survey questions revealed other attributes of these areas important to Calgary citizens. The qualities that Calgarians look for in commercial areas are all part of heritage areas: walkability, historic character, locally-owned businesses and diversity of business types.

Figure 11: Ranking of "Very Important" Variables in Choosing a Commercial Area to Visit.



Environmental Value

The purpose of the environmental analysis is to form the third leg of sustainability, the Triple Bottom Line monetized value that supports conservation and repurposing of heritage resources situated on Calgary's commercial streets. Heritage conservation is a recognized sustainability approach across planning, development and construction industries. It is well established that changes in our global climate can adversely impact our natural environment (air, land, water, space and health).

One of the strongest ways to measure the dollar value of the environmental benefit of conserving and reusing the existing building stock is through the analysis of all the energy used in the lifecycle of a building. This "embodied energy" includes all the non-renewable energy consumed:

- Initial energy to acquire, process, manufacture and transport building materials, and construct the building.
- Recurring energy to maintain and repair the building.
- Operating energy to heat, cool, ventilate and light the building.
- End-of-life energy to demolish and dispose of the building.

Figure 12: Embodied Energy 7 Basic Construction Materials

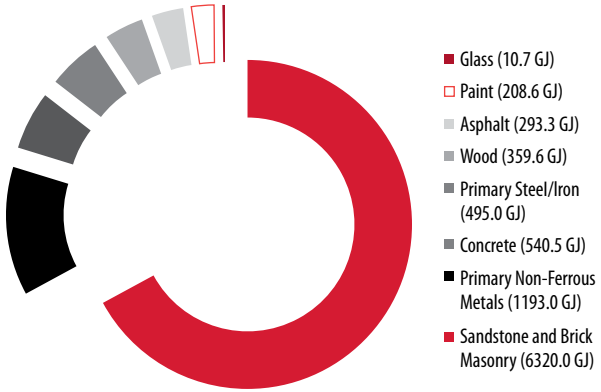
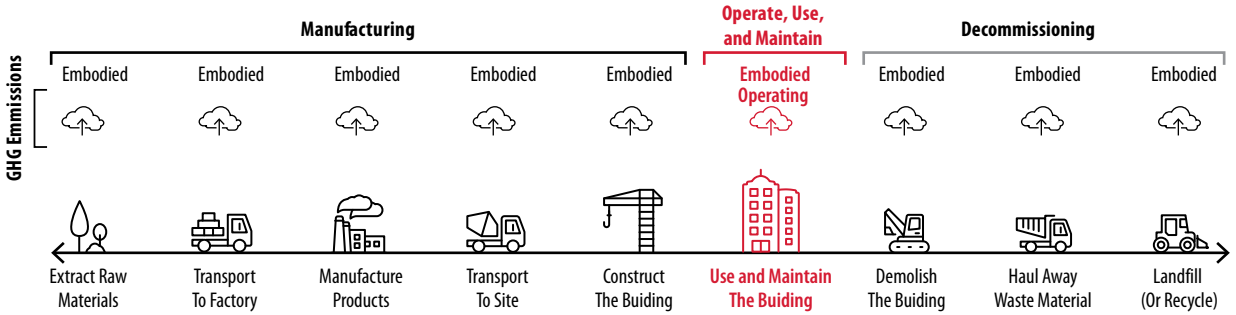


Figure 13: Embodied Carbon in Buildings



Embodied energy speaks about the non-renewable energy which goes into constructing a building. In addition, the retention and reuse of existing buildings reduces the need for natural resource extraction to manufacture new construction materials and reduces the demolition materials destined for landfills. Both of these would otherwise have a monetary and environmental cost.

To demonstrate the significance of embodied energy within the heritage areas, (specifically the heritage resources) a case study of a heritage building within the Stephen Avenue area was used. The embodied energy of the original construction materials can be broken out into seven basic original construction materials which represent approximately 50 per cent of the total embodied energy to construct the building, see Figure 12.

Examining the total embodied energy of construction materials used to construct (or manufacture) a building provides an understanding of the significant initial investment into a building; however, there are additional factors that must be considered. Using even a generic model of a 14,440m^2 (15,500 ft^2) three-storey commercial building, the embodied energy increases as the building ages. By 25 years it has increased 56.6 per cent, by 144 per cent when it is 50 years old, and 325 per cent by the time it is 100 years old.

The rationale for including the embodied energy cost associated with the construction of a new building replacing a demolished heritage building is to acknowledge that there is greater value, to a property owner, in a functioning building than in a vacant lot. The replacement building being factored into this scenario is considered a direct replacement of the original in a like-for-like arrangement so that the values do not become skewed.

In 2000, **12%** of Canada's waste disposal was from **construction and demolition sources**.

Statistics Canada, 2005

The carbon footprint of materials is referred to in terms of embodied carbon in buildings. This process, as it relates to the construction industry, is shown in the diagram below. With the consumption of embodied energy comes a significant investment in embodied carbon. Though represented as one of many steps in the following diagram, the operation, use and maintenance of a building represents a significant length of time. As the decades (and in some cases the centuries) pass, the value of the embodied energy and carbon grows exponentially.

Embodied Carbon within this report is expressed as a mean value derived from the quality carbon offset price estimated at $50 CAD and the alternate "shadow price" used by Public Services and Procurement Canada of $300 CAD when assessing carbon from real property. Environmental Value is derived from a series of factors (embodied energy costs, embodied energy cost of an equivalent replacement, landfill dumpage costs and mean embodied carbon costs at $175 CAD per kg CO2/ m^2). These values were established using our comparison case study, reduced to a unit rate and applied to the area of heritage buildings within each area.

Figure 14: Environmental Value – Total Monetized

Figure 15: Environmental Value – Total Monetized Per cent Representation

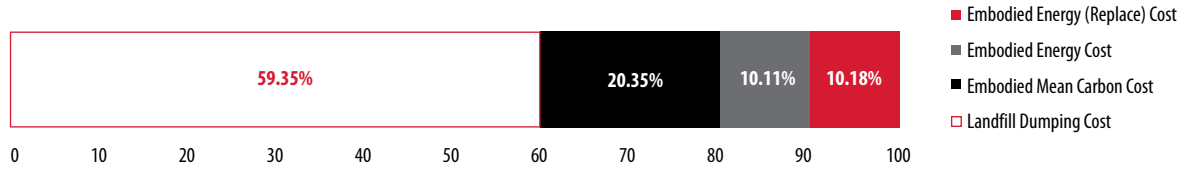


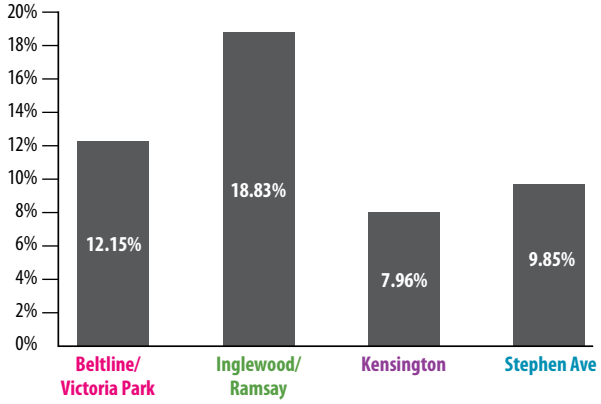
Table 3: Breakdown of Environmental Value by District

	Embodied Energy Cost	Landfill Dumpage Cost	Embodied Energy (Replace) Cost	Embodied Carbon Cost	Total
Stephen Avenue	$3,197,212	$18,761,949	$3,219,155	$6,432,276	$ 31,610,592
Inglewood	$687,266	$4,033,035	$691,984	$1,382,670	$ 6,794,955
Beltline	$923,992	$5,437,116	$932,894	$1,864,040	$ 9,158,042
Kensington	$126,934	$746,928	$128,157	$256,074	$ 1,258,093

The methodology to examine the existing heritage buildings within these areas for Environmental Value result in a value which is only applicable to the heritage buildings rather than across the area. For comparison, this value is represented as percentage increase relative to Economic Value. Inglewood exhibiting the largest percentage increase at 18.83 per cent compared to Stephen Avenue at only 9.85 per cent despite having the largest value of overall heritage buildings. This difference is largely attributed to the difference in areas.

Using a representative case study to determine comparable unit values, embodied energy, embodied energy cost of an equivalent replacement, landfill dumpage cost and base embodied carbon allows us to apply these values to the square footage of each heritage building within the areas to achieve an Environmental Value. This calculation was applied only to existing heritage buildings as defined. The monetized Environmental Values related to the heritage buildings within each of the areas are shown in the Environmental Value by District table, see Table 3.

Figure 16: Per Cent of Environmental Value Additional Relative to Heritage Building



Buildings in Canada **consume**:

33% of energy produced
50% of natural resources
12% of water usage

Buildings in Canada **generate**:

25% of landfill waste
10% of airborne particulates
35% of greenhouse gases

from a 2014 study by CAGBC

In summary, the monetized environmental value of the heritage buildings within these areas, when considering investment to date and potential replacement costs, amounts to nearly $49 million. It is important to note this value is in addition to the Economic and Social values. Given the Economic Value of all buildings across the four areas amounts to $779,913,500 the Environmental Value addition of $49 million represents a significant existing investment which must be considered. This Environmental Value, much like the Social Value, suggests there is an inherent value in the heritage buildings and their heritage areas that extends beyond current real estate assessments and sales transactions.

Figure 17: Heritage Districts – Environmental Value Addition

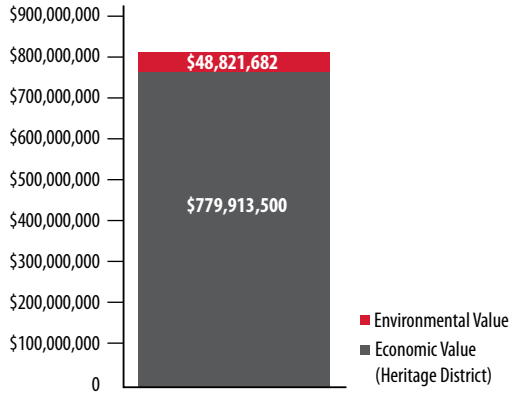


Table 4: Heritage Area Value Analysis

Areas	Heritage-Identified Properties	Non-Heritage Properties in Heritage Areas	Total Value
Assessment Base			
Beltline/ Victoria Park	$75,368,500	$12,071,500	$87,440,000
Inglewood/ Ramsay	$36,093,500	$40,932,000	$77,025,500
Kensington	$15,798,000	$12,410,000	$28,208,000
Stephen Avenue	$321,081,000	$266,159,000	$587,240,000
	$448,341,000	**$331,572,500**	**$ 779,913,500**
Heritage Influence Value			
Beltline/ Victoria Park	$7,480,000	$2,096,000	$9,576,000
Inglewood/ Ramsay	$3,582,000	$7,106,000	$10,688,000
Kensington	$1,568,000	$2,154,000	$3,722,000
Stephen Avenue	$31,864,000	46,205,000	$78,069,000
	$44,494,000	**$57,561,000**	**$102,055,000**

Altus Group provided the data which was used by HSI to complete the analysis.

Economic Lift

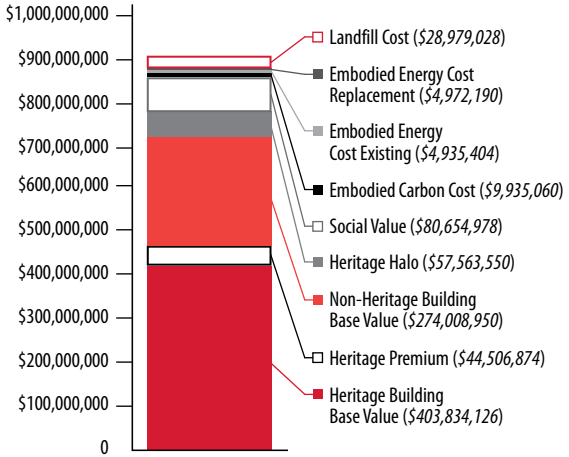
According to Altus Group's regression analysis of the property transaction data, the following significant findings were made:

- Across all property transactions, the average selling price was $368.80 per square foot (PSF).
- There was a significant influence of heritage on property value: Heritage characteristics add $36.60 PSF (all other factors held constant).
- There was a significant influence of location in one of the four heritage study areas for non-heritage properties: this characteristic adds $64.00 PSF (all other factors held constant).

Conclusion

The high-level results of the Triple Bottom Line investigation are shown in the preceding text, graphs and tables and further detailed in the following sections. All indicators point to an economic, social and environmental benefit in conserving Calgary's heritage commercial areas. Furthermore, the economic lift realized by heritage and non- heritage properties from being within or near to heritage areas has been identified and quantified based on actual sales data. Heritage conservation advocates have long believed that heritage areas contribute to the economic, social and environmental well-being of citizens and their cities. The Single Bottom Line value of real estate based on assessment and sales data alone has historically been the metric for the understanding of monetized value. With the advent of tools for measuring and monetizing the notions of Social Value and Environmental Value, a Triple Bottom Line approach to determining a more realistic and relevant monetized value of heritage buildings and heritage areas is possible. The economic, social and environmental analyses of the four heritage areas makes a very compelling Triple Bottom Line economic argument for the retention of historic buildings and historic areas in Calgary.

Figure 18: Triple Bottom Line Value of Calgary's Heritage Commercial Districts



1. Introduction

1.1 Background

In the fall of 2020, The City of Calgary engaged Lemay, Heritage Strategies International, Altus and CBRE to do a value analysis focused on commercial streets.

The heritage value analysis is Phase 1 of a multi-phase project that will assist The City's heritage conservation initiative to develop tools which support conservation and repurposing of heritage resources located on Calgary's commercial streets.

The heritage value analyses identifies the:

- Triple Bottom Line value of concentrated commercial heritage areas.
- Value heritage resources and/or areas contribute to adjacent properties and to the city as a whole.
- This study will fill gaps in The City's understanding of the value contribution of heritage areas on commercial streets in Calgary.

Heritage resources can unlock Triple Bottom Line (economic, social, environmental) benefits for municipalities and communities. In addition to the aesthetic, social and educational value of heritage sites, the benefits of heritage conservation include:

- Job growth in skilled trades.
- Reduction in construction and demolition waste.
- Economic resiliency during recession periods.
- Positive contribution towards "sense of place" and community identity.
- Avoided environmental impact through reuse of structures.
- Promotion of a compact urban form.

Phase 1 of this project will help The City understand the combined use and non-use Economic Value of the city's heritage commercial areas.

This project's mission is to deliver an effective program of tools and incentives for heritage areas and assets on commercial streets to encourage their conservation and long-term economic viability. Heritage conservation is only viable when it finds a balance among physical, social and economic factors; this work should support The City in doing so. Phase 1 will clearly and specifically identify the Social, Economic and Environmental Value (Triple Bottom Line) that Calgary's rare heritage commercial areas possess, which will guide development of tools and incentives to support the economic vitality of these heritage areas and their surroundings.

Phase 2 will assess and design effective and implementable policy tools and financial incentives that will encourage investment in heritage areas and assets, supporting their long-term economic vitality and conservation. Together, this work will represent a ground-breaking analysis in Canadian heritage and will help to advance The City's position as a leader in heritage planning.

1.2 Introduction to Four Commercial Heritage Areas

Beltline

- West side of 1 Street SW (11 Avenue SW to 13 Avenue SW)
- South side of 10 Avenue SW (1 Street SW to 4 Street SW)
- West side of 11 Street SW (14 Avenue SW to 15 Avenue SW)

Inglewood / Ramsay

- 9 Avenue SE (11 Street SE to 13 Street SE + Gresham Block)
- East side of 11 Street SE (18 Avenue SE to 21 Avenue SE + Standard Soap Company, 1240 20 Avenue SE)

Kensington

- East side of 10 Street NW (Memorial Drive to 134 10 Street NW)
- North side of Kensington Road NW (10A Street NW to 11 Street NW)

Downtown Core

- Stephen Avenue (Banker's Hall 'Trees' to City Hall) and 1 Street SW (7 Avenue SW to south side of 9 Avenue SW)

1.3 Concept of Triple Bottom Line

In western capitalist economics, a simple Single Bottom Line model has historically been used to determine the costs of goods and services and whether an undertaking was profitable or not. Incidentals and, at times, unpleasant side effects were excluded from the calculations and were termed negative externalities. Such notions as displaced labour, unsafe work conditions, environmental degradation, resource depletion and so on were excluded from the real cost of doing business. This was so that companies could show profits to shareholders even if there was a toll extracted from society and the environment. With the emerging awareness of workers' health and safety, community well-being, environmental protection and resource conservation came a realization that these realities had an impact on every business decision being made by individuals, corporations and governments. Assessing the costs of goods and services as well as development, which includes the economics, the social and the environmental impacts became known as the Triple Bottom Line model.

The economics member of this trio is generally well understood in its simplistic form. However, by adding the duo of social and environmental externalities, the equation has undergone a large shift. Quantifying Social Value can be a challenge and for this investigation the notion of "Willingness to Pay", with data gathered through a public survey, has been used to demonstrate monetized social value. In the 1970s, as a result of the first Middle East Oil Embargo, the embodied energy within construction materials and construction processes was calculated as a metric in the movement toward energy and natural resource conservation. At that time, heritage conservation advocates recognized the calculation of a monetized value for embodied energy as a powerful argument for the conservation of historic buildings. In more recent decades, the monetized value of embodied carbon has been added to the justification for conserving historic buildings and areas.

2. Analysis - Triple Bottom Line

2.1 Economic Value of Calgary's Heritage Commercial Areas

In the end, heritage buildings are real estate. Most of the economic value of a commercial heritage building is determined by the marketplace. Owners and investors in commercial real estate establish the economic value by calculating the building's ability to generate revenues through rents or by providing space in which the owner's business operations are housed. But the value of a heritage building may be further enhanced by the quality and desirability of its historic character. This analysis evaluated the economic value of heritage buildings in four Calgary commercial areas.

The three key questions addressed were:

1. What is the economic value of the heritage buildings as simply real estate?
2. Is part of that value attributable to their heritage character?
3. Is there an economic "lift" to non-heritage buildings because of their proximity to heritage buildings?

The analysis began with a simple inventory by count of the heritage and non-heritage buildings in each of the four areas, as shown in the graph below. In the four areas there are a total of 137 commercial buildings, 86 of which are heritage buildings.

The total economic value of real estate in the four commercial areas is nearly $780 million, with just over 57% of the value attributable to the heritage buildings.

Figure 19: Heritage/Non-Heritage Buildings, by Count

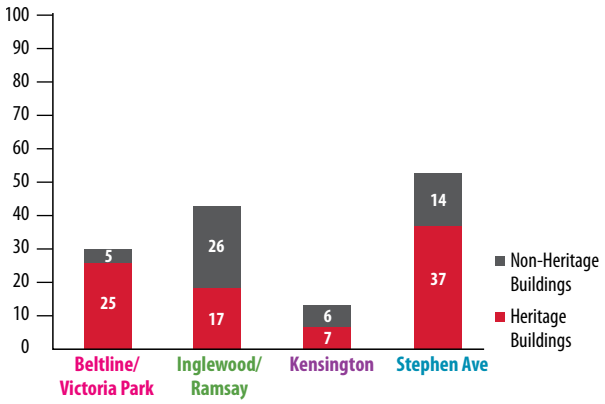


Table 5: Total Economic Value of Real Estate

	Heritage Buildings	Non-Heritage Buildings	Total Value
Beltline/ Victoria Park	$75,368,500	$12,071,500	$87,440,000
Inglewood/ Ramsay	$36,093,500	$40,932,000	$77,025,500
Kensington	$15,798,000	$12,410,000	$28,208,000
Stephen Avenue	$321,081,000	$266,159,000	$587,240,000
Total	**$448,341,000**	**$331,572,500**	**$779,913,500**

The share of the total value of heritage vs non-heritage buildings by district is shown in Figure 20. In three of the four areas, the value of the heritage buildings exceeds half of the total value, reaching more than 86% in the Beltline/Victoria Park district. Only in Inglewood/Ramsay does the value of the heritage buildings fall slightly below half of the total value.

Buildings within the areas were characterized as "Heritage Buildings" if they met one or more of three criteria:

1. Buildings currently formally designated as heritage structures.
2. Buildings not designated but on the city's heritage inventory.
3. Buildings deemed of heritage quality by city heritage staff, but not yet designated or on the heritage inventory.

That third category are referred to as "heritage assets." Both Inglewood/Ramsay have designated buildings while all four areas have buildings on the heritage inventory.

The number of buildings in each district by category is found in Table 6. The share (%) of each district's heritage buildings by category is shown in Figure 21.

Throughout the remainder of this report no distinction will be made among the three categories; "heritage buildings" will be used to refer to the aggregate of the three classifications.

Figure 20: Heritage Buildings' Share of Value

Figure 21: Categories of Heritage Resources, by Area

Table 6: Number of Buildings in Each District, by Category

	Designated	On Inventory, Not Designated	Heritage Resources	All Heritage
Beltline/ Victoria Park	0	21	4	25
Inglewood/ Ramsay	4	13	0	17
Kensington	0	5	2	7
Stephen Avenue	15	20	2	37

In the four areas there are a total of 137 commercial buildings, 86 of which are heritage buildings.

Of the 86 heritage buildings in the four areas, slightly more than two-thirds are located in the Stephen Avenue and Inglewood/Ramsay areas. The fewest are found in Kensington, which is substantially smaller than the other three areas. The distribution of heritage resources generally corresponds with the size of the respective areas with Stephen Avenue the largest at 20.5 acres and Kensington the smallest at 2.9 acres. Though there are only 7 heritage buildings in Kensington, those 7 comprise more than 50% of total buildings in the district.

In each of the four areas, heritage buildings constitute a significant share of the entire building supply both by number and by value.

To further understand the economic characteristics of each district, the comparative size, value per acre, and other characteristics were calculated and are found in Table 7.

Figure 22: Share of Heritage Buildings, by Area

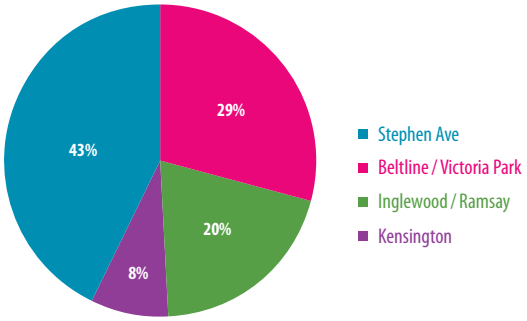


Table 7: Comparative Size, Value per Acre, and Other Characteristics Calculated

	Beltline/ Victoria Park	Inglewood/ Ramsay	Kensington	Stephen Avenue
Acres	7.9	16.8	2.9	20.5
Value/Acre	$11,035,623	$4,591,079	$9,678,248	$28,687,109
Value of Heritage Buildings/ Acre	$9,540,316	$2,148,423	$5,447,586	$15,662,488
Jobs/Acre	94.8	45	61.1	587.9
Businesses/ Acre	8.5	6	11.3	112.4
Jobs/ Business	11.2	7.5	5.4	5.2
Permits	5.4	3.4	5.8	11.6

Value Bonuses – The Heritage Premium and the Heritage Halo

But those numbers do not tell the whole story. Based on an in-depth analysis by the real estate consulting firm Altus, there is a premium attached to heritage buildings of $36.60 per square foot. In the aggregate that means that of the $448 million in value, more than $44 million is attributable to their heritage character. This report refers to the enhanced value of the heritage buildings as the "heritage premium." In addition, Altus found that the value of non-heritage buildings in the four areas was enhanced by their proximity to heritage buildings. This proximity enhancement is referred to as the "heritage halo". Of the $331 million value of the non-heritage buildings, more than $57 million comes from this "heritage halo" effect. Taken together, the "heritage premium" and the "heritage halo" result in a total Heritage Bonus of more than $100 million in these four commercial areas.[1]

[1] Both the Heritage Premium and the Heritage Halo were calculated based on a multiple regression analysis conducted by Altus. Using an analysis of actual sales data, this approach isolates a single variable — in this case the added value of heritage and proximity to heritage — and quantifies its contribution to the entire value of a property. That increment was then characterized as "Heritage Premium" for heritage buildings and "Heritage Halo" for non-heritage buildings close to heritage buildings. A more detailed explanation of this process can be found in Appendix B.

Figure 23: Heritage Areas' Heritage Buildings, by Value and Count

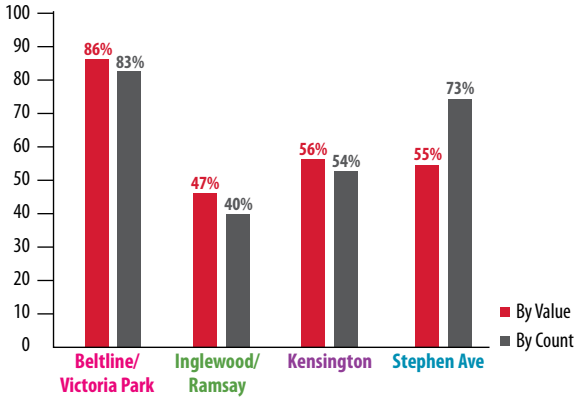
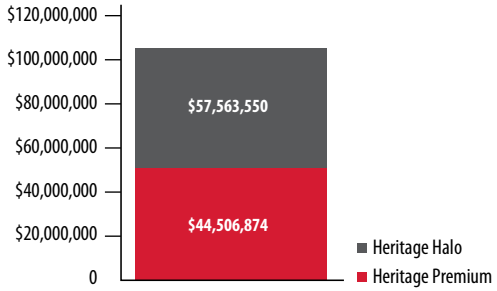


Figure 24: Economic Bonus from Heritage



Revisiting the original values of heritage and non-heritage buildings in the four areas helps to put these Heritage Bonuses in a larger context. The nearly $800 million in total value can be subdivided as shown in Figure 25, with nearly $404 million identified as the "base value" of heritage buildings which sees an added value of more than $440 million thanks to the heritage premium. The base value for the non-heritage building is $274 million, which is enhanced by more than $57 million in value stemming from the heritage halo.

On a percentage basis, Figure 26 demonstrates the contribution of base values and Heritage Bonuses to the overall economic value of the four heritage commercial areas. In sum, more than 13% of the total economic value of properties in the four heritage commercial areas stems from Heritage Bonuses.

Figure 25: Components of Economic Value

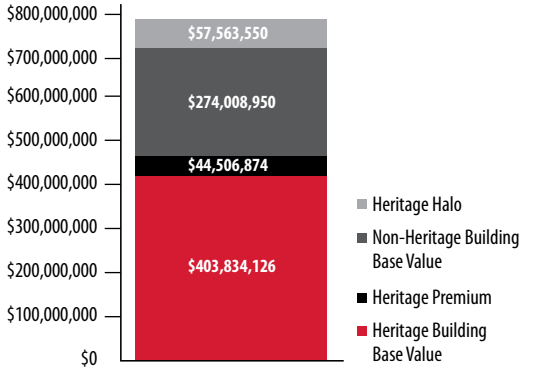
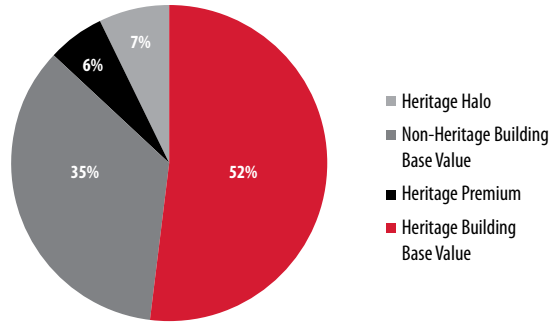


Figure 26: Sources of Value in Heritage Commercial Areas



Economic Snapshots

Base information was gathered for each of the four heritage commercial areas. To create these economic snapshots, data assembled included: size of district; value of all properties and of heritage properties; values per acre; number of jobs, businesses, and building permits issued (Data source for Jobs and Businesses: ESRI Business Analyst). While there is a considerable range in data among the four areas, each represents a level of economic density that provides positive benefits for the City, businesses, workers, and consumers.

Economic density is a commercial district measure that reflects the amount of economic activity and value within a generally small geographic area. Why is that important? From the perspective of the City, economic density provides significant tax revenues from a concentrated area but with a much lower per/acre; per/building; per/business cost of providing public services, including public safety, transportation, water and sewer lines, curbs and sidewalks, and other public investments. Economic density improves fiscal efficiency because it allows a finite area to generate relatively high tax revenues while confining the delivery of the requisite public services to a localized geographical area.

Businesses often benefit from economic density in part through the concept of clustering. Clustering is the congregation of types of businesses either selling the same goods or services (e.g., women's clothing stores) complementary goods (e.g., jewelry and accessories) or focused on a similar target market (e.g., working women between 25 and 50). Because of the critical mass created by clustering, customers will disproportionately be drawn to those areas, benefiting individual businesses that are part of the clustering categories. While business owners often like to say, "I own an independent business," most businesses – including both goods and services – are actually highly interdependent and need each other to survive and prosper.

Customers clearly benefit by having a range of goods or services choices available within a limited area. Worldwide, long before it was called "clustering," wherever there was a marketplace, clustering was likely to occur. New York City's Diamond district is basically one block long on 48th Street between 5th and 6th Avenues but includes more than 1300 businesses and has a worldwide reputation for jewelry. In the old city of Hanoi, each of the 36 streets is named for a product, the vendors of which are clustered on that street. Among the street names are Roasted Fish, Sandals, Wooden Bowls. Theater districts in London and New York, mid-century motels in the MiMo district in Miami, lobbyists on K Street in Washington, are all examples of clustering which results in economic density to the customers' benefit. Workers also benefit from economic density as those areas mean that goods and services are proximate to one's place of work. The demand from that workforce creates further opportunities for new and existing businesses in the same area.

Each of the four heritage commercial areas demonstrate a **high economic density**.

Heritage buildings in Beltline/Victoria Park represent more than 85% of the total value of the area and the district has the second highest concentration of jobs per acre behind Stephen Avenue. The average business size is also largest in Beltline/Victoria Park with an average of just over 11 jobs per business.

	Beltline/ Victoria Park
Acres	7.9
Number of Properties	30
Value of All Property	$87,440,000
Value of Heritage Property	$75,368,500
Value per Acre	$11,035,623
Heritage Value per Acre	$9,512,104
Heritage as Share of Value	86.2%
Jobs	751
Jobs per Acre	94.8
Businesses	67
Businesses per Acre	8.5
Jobs per Business	11.2
Number of Permits	43
Value of Permits	$9,243,697
Permits per Acre	5.4

Inglewood/Ramsay is the only one of the four areas where the value of heritage buildings is less than half of the total building value. It is also where the value per acre of all buildings and of heritage buildings is the lowest. Investment in the area also lags behind the other three areas, with only 3.4 permits per acre per year.

	Inglewood/Ramsay
Acres	16.8
Number of Properties	43
Value of All Property	$77,025,500
Value of Heritage Property	$36,093,500
Value per Acre	$4,591,079
Heritage Value per Acre	$2,151,341
Heritage as Share of Value	46.9%
Jobs	755
Jobs per Acre	45.0
Businesses	101
Businesses per Acre	6.0
Jobs per Business	7.5
Number of Permits	57
Value of Permits	$8,451,423
Permits per Acre	3.4

Kensington is the smallest of the four areas with an area of just 2.9 acres. Even so, the 33 businesses in the area employ 178 people. Only Beltline/Victoria Park outperforms Kensington in the share of value of the district coming from heritage buildings.

	Kensington
Acres	2.9
Number of Properties	13
Value of All Property	$28,208,000
Value of Heritage Property	$15,798,000
Value per Acre	$9,678,248
Heritage Value per Acre	$5,420,340
Heritage as Share of Value	56.0%
Jobs	178
Jobs per Acre	61.1
Businesses	33
Businesses per Acre	11.3
Jobs per Business	5.4
Number of Permits	17
Value of Permits	$1,451,520
Permits per Acre	5.8

Stephen Avenue is the ultimate example of economic density in a heritage commercial district. By total numbers of jobs or businesses, or the per acre numbers of each, Stephen Avenue is the standout performer. With more than $100 million in average annual building permits, this clearly remains an area attractive to private investment.

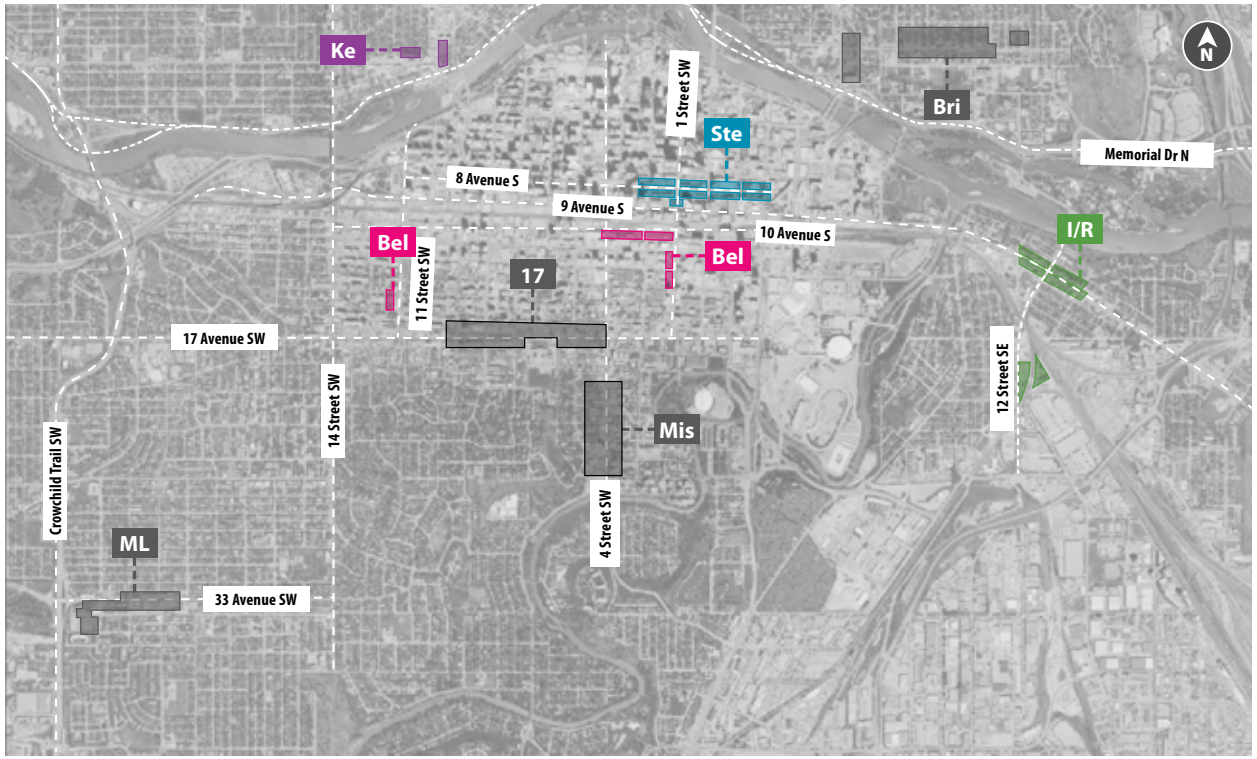
	Stephen Avenue
Acres	20.5
Number of Properties	51
Value of All Property	$587,240,000
Value of Heritage Property	$321,081,000
Value per Acre	$28,687,109
Heritage Value per Acre	$15,685,045
Heritage as Share of Value	54.7%
Jobs	12035
Jobs per Acre	587.9
Businesses	2301
Businesses per Acre	112.4
Jobs per Business	5.2
Number of Permits	237
Value of Permits	$101,201,398
Permits per Acre	11.6

Comparison with Comparable Non-Heritage Areas

This value analysis also considered the economic attributes of the four heritage commercial areas as compared with four comparable non-heritage areas in terms of density of jobs, businesses, economic value per acre, and types of businesses. While each of the four comparable areas contained some heritage buildings, the share in each was much smaller than the comparable heritage area.

Based on input from local real estate expertise and others, the four comparable areas were identified as:

1. **Beltline/Victoria Park** – **Bridgeland**
2. **Inglewood/Ramsay** – **17 Avenue S.W.**
3. **Kensington** – **Marda Loop**
4. **Stephen Avenue** – **Mission**



When combined, the economic importance of these four heritage commercial areas becomes clear. With a total area of less than 50 acres, the value of commercial property in these heritage areas nears $800 million, most of which comes from heritage buildings.

The heritage areas have more than **seven times the businesses** and more than **five times the jobs** per acre than the comparable non-heritage areas, giving them a significant economic impact.

Compared to the aggregate of the four comparable non-heritage areas, the economic edge of the heritage areas becomes even more apparent. While the total value of properties in the heritage areas and the comparable areas is approximately the same, the heritage areas are generating that value in half the total area. The economic density in jobs and businesses per acre is an advantage for the City, businesses, customers, and workers in the heritage areas.

	Heritage Areas	Non-Heritage Areas
Acres	48.1	99.5
Number of Properties	137	189
Value of All Property	$779,913,500	$764,075,880
Value of Heritage Property	$448,341,000	$73,131,500
Value per Acre	$16,219,227	$7,682,619
Heritage Value per Acre	$9,323,783	$735,322
Heritage as Share of Value	57.5%	9.6%
Jobs	13719	5338
Jobs per Acre	285.3	53.7
Businesses	2502	679
Businesses per Acre	52.0	6.8
Jobs per Business	5.5	7.9
Number of Permits	354	567
Value of Permits	$120,348,038	$268,922,745
Permits per Acre	7.4	5.7

When looking at Beltline/Victoria Park versus Bridgeland, the non-heritage district is nearly 4 times as large in terms of area, but the greater density of Beltline/Victoria Park's results in a property count that's only a third fewer. Total property value is greater in Bridgeland, but on a value per acre basis, Beltline/Victoria Park's value is almost three times as much. This is parallelled by job density, where the total number of jobs is greater in Bridgeland, but the jobs per acre are far more in Beltline/Victoria Park.

	Beltline/ Victoria Park	Bridgeland
Acres	7.9	30.7
Number of Properties	30	45
Value of All Property	$87,440,000	$129,102,500
Value of Heritage Property	$75,368,500	$8,347,500
Value per Acre	$11,035,623	$4,200,258
Heritage Value per Acre	$9,512,104	$271,580
Heritage as Share of Value	86.2%	6.5%
Jobs	751	1,069
Jobs per Acre	94.8	34.8
Businesses	67	150
Businesses per Acre	8.5	4.9
Jobs per Business	11.2	7.1
Number of Permits	43	84
Value of Permits	$9,243,697	$69,202,783
Permits per Acre	5.4	2.7

The Inglewood/Ramsay versus 17 Avenue S.W. comparison is the one instance where the non-heritage area rates higher on the economic density measures than the heritage district. It is also the only one of the four heritage areas where the value of the heritage buildings is less than half of total value. On almost every measure the 17 Avenue S.W. commercial district outperforms Inglewood/Ramsay.

	Inglewood/ Ramsay	17 Avenue S.W.
Acres	16.8	26.6
Number of Properties	43	58
Value of All Property	$77,025,500	$321,499,000
Value of Heritage Property	$36,093,500	$45,110,000
Value per Acre	$4,591,079	$12,107,278
Heritage Value per Acre	$2,151,341	$1,698,790
Heritage as Share of Value	46.9%	14.0%
Jobs	755	1,784
Jobs per Acre	45.0	67.2
Businesses	101	224
Businesses per Acre	6.0	8.4
Jobs per Business	7.5	8.0
Number of Permits	57	230
Value of Permits	$8,451,423	$94,676,133
Permits per Acre	3.4	8.7

Kensington is only one fifth the size of Marda Loop. The overall value comparison between the two shows a similar disparity. On a per acre basis, the heritage area demonstrates greater economic density. Given that heritage buildings make up 56% of the value in Kensington and less than 3% in Marda Loop, the fact that the value per acre of heritage buildings is 24 times as much in Kensington than the comparable district may not be surprising. The economic density of the heritage buildings give Kensington the edge in both jobs and businesses per acre.

	Kensington	Marda Loop
Acres	2.9	15.4
Number of Properties	13	36
Value of All Property	$28,208,000	$121,134,880
Value of Heritage Property	$15,798,000	$3,524,500
Value per Acre	$9,678,248	$7,875,911
Heritage Value per Acre	$5,420,340	$229,155
Heritage as Share of Value	56.0%	2.9%
Jobs	178	735
Jobs per Acre	61.1	47.8
Businesses	33	117
Businesses per Acre	11.3	7.6
Jobs per Business	5.4	6.3
Number of Permits	17	96
Value of Permits	$1,451,520	$38,871,277
Permits per Acre	5.8	6.2

Stephen Avenue and Mission, its comparison district, are most similar among the four sets of comparisons, with nearly the same number of total properties and the heritage district only 24% smaller in area. But the comparability largely ends there. Because Stephen Avenue is home to more high-rise structures, the economic density is certainly among the highest in Calgary, with almost 600 jobs and 112 businesses per acre. Even so, many of these businesses located within the district are small businesses, with an average of just over 5 jobs per business.

	Stephen Avenue	Mission
Acres	20.5	26.8
Number of Properties	51	50
Value of All Property	$587,240,000	$192,339,500
Value of Heritage Property	$321,081,000	$16,149,500
Value per Acre	$28,687,109	$7,181,211
Heritage Value per Acre	$15,685,045	$602,960
Heritage as Share of Value	54.7%	8.4%
Jobs	12035	1750
Jobs per Acre	587.9	65.3
Businesses	2301	188
Businesses per Acre	112.4	7.0
Jobs per Business	5.2	9.3
Number of Permits	237	157
Value of Permits	$101,201,398	$66,172,552
Permits per Acre	11.6	5.9

Figure 27 reflects the respective share of heritage and non-heritage buildings in each of the four areas which are the subject of this analysis and their comparison commercial district.

Density of activity is also a measure of sustainable economic health. In many cities, commercial areas with an abundance of heritage buildings have shown a significantly greater economic density. That is true in Calgary as well.

Even excluding the most dense heritage area, Calgary's heritage commercial areas are **1.5x more dense in jobs per acre** than comparable areas.

The four heritage areas are home to substantially more jobs than their non-heritage counterparts–over 13,700 jobs compared to just over 5,300. On a per acre basis, the job density in heritage areas is 5 times greater than in their non-heritage counterparts.

With Stephen Avenue being a heritage area situated in the heart of downtown, where many Calgarians work in tall office buildings, one might argue that it makes an unfair comparison. However, even without Stephen Avenue, heritage areas are 1.5 times more dense in jobs per acre.

Business density was also higher in the heritage areas. There are over 2,500 businesses in the four heritage areas, as opposed to only 680 in the comparable non-heritage areas, meaning business density in the heritage areas was 8 times greater.

When Stephen Avenue is excluded, most of the heritage areas still outperform their comparable areas in business density.

Figure 27: Share of Heritage Buildings, by Count, Heritage Districts vs Comparable Districts

Figure 28: Jobs per Acre

Figure 29: Jobs per Acre, Excluding Stephen Ave

Figure 30: Businesses per Acre, Excluding Stephen Ave

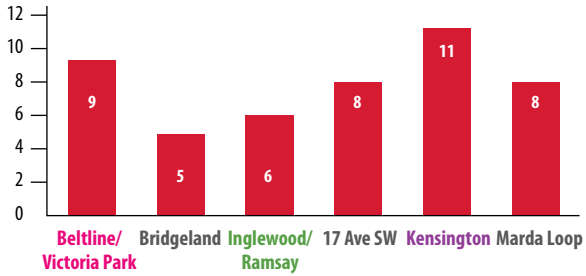
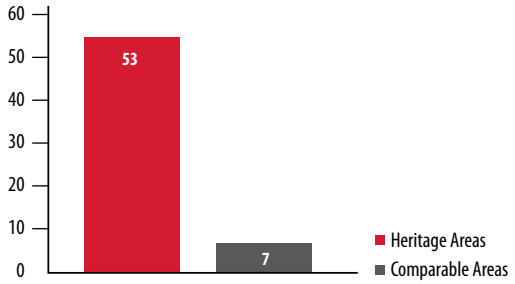


Figure 31: Businesses per Acre



But differences in the share of heritage buildings are not the only contrasts between the heritage areas and their comparable areas. The value per acre is more than twice as great in the heritage areas.

Calgary's commercial heritage areas also show greater density when it comes to the type of businesses located there.

The heritage areas studied attracted higher numbers of key industries, including knowledge and creative class businesses. These are exactly the kind of industries that contribute to the **diversified economy** that Calgary seeks to build.

Having a strong creative/knowledge class is vital to post-industrial economies, as these workers drive economic growth through innovation. The concentration of knowledge and creative class industries in Calgary's heritage areas is a positive economic growth indicator. The data shows these types of businesses are showing a strong preference to locate in Calgary's heritage areas.

A city's quality of place is a major factor in being able to attract these knowledge and creative class businesses and their workers. As revealed in the Willingness to Pay survey, areas that have a concentration of heritage resources embody many of the attributes that Calgarians find important, demonstrating that they are the ideal places for investment. Fostering and supporting these areas are crucial for the future of Calgary's economy.

Figure 32: Value per Acre

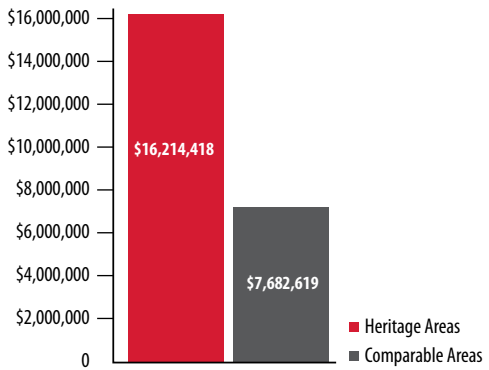
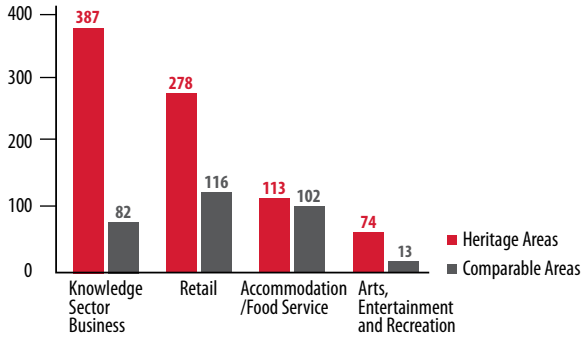


Figure 33: Businesses in Select Industries



2.2 Social Value of Calgary's Heritage Commercial Areas

The assignment from the City of Calgary was to estimate the economic value of four heritage commercial areas on a Triple Bottom Line basis – economic, environmental, and social. To complete this assignment, it was important to make a distinction between quantification and monetization. Quantification is the measurement of variables through a numerical process reaching conclusions that are expressed as numbers. Monetization is a form of quantification expressed in dollar (or other currency) terms. The task for this report was not only to quantify, but to monetize the values of these historic commercial areas.

As found elsewhere in this report, assessing economic value is relatively straight forward, beginning with the value of the real estate itself supplemented by data on comparative rent and occupancy levels, business employment patterns, catalytic impact on nearby properties and similar variables. The buildings themselves are an economic asset and the activities within the buildings are also economic. In essence this portion of the study could be defined as "the economic value of economic assets."

On the environmental side, there are a number of variables that can be quantified – materials that might otherwise go into the landfill, embodied energy, relative energy use, etc. Those quantified components are not easily monetized but "not easy" does not mean "impossible." The monetization of the environmental values of these commercial areas is also found elsewhere in this report.

The most difficult, however, is the social component, where both quantification and subsequent monetization are a challenge.

Willingness to Pay [1]

When a business is deciding how much to charge potential customers for a good or service, it may conduct what is called a "Willingness to Pay" (WTP) analysis. From a business product approach WTP is defined as "the maximum price a customer is willing to pay for a product or service."

Environmental and cultural economists have adapted the WTP method as a means to both quantify and then monetize social value.[2] This approach was first used to monetize the value of natural sites (parks, wetlands, recreational areas) for which there is little or no market-based evidence of economic value. It has subsequently been adapted to look at heritage resources, particularly by the World Bank.[3]

In a business context the WTP analysis might be done through surveys, focus groups, auctions, or revealed preference analysis. When applied to environmental and cultural resources, however, WTP is nearly always done through a survey approach. Willingness to Pay surveys are an indirect approach that has been used for valuing heritage resources elsewhere in the world, but rarely in North America.

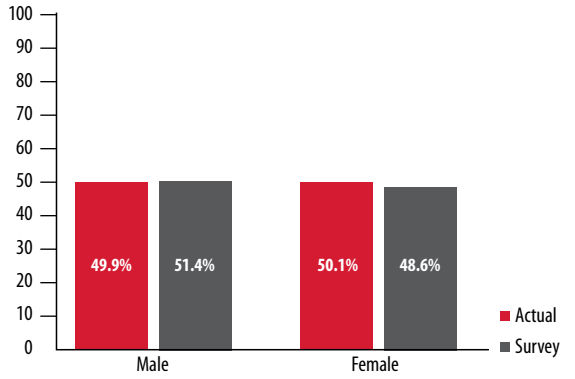
Because the methodology is well established, and a method of reaching and surveying a cross section of Calgary citizens was available through the City, a Willingness to Pay analysis was done to estimate the social value of the historic commercial areas.

The Calgary Survey

A survey of 11 questions was distributed through the City of Calgary Twitter account between December 9 and December 15, 2020. The total number of respondents was 178.[4] Demographically and geographically, the responses were generally reflective of the Calgary population as a whole.

By gender the respondents were nearly a mirror of the actual distribution in Calgary, see Figure 34.

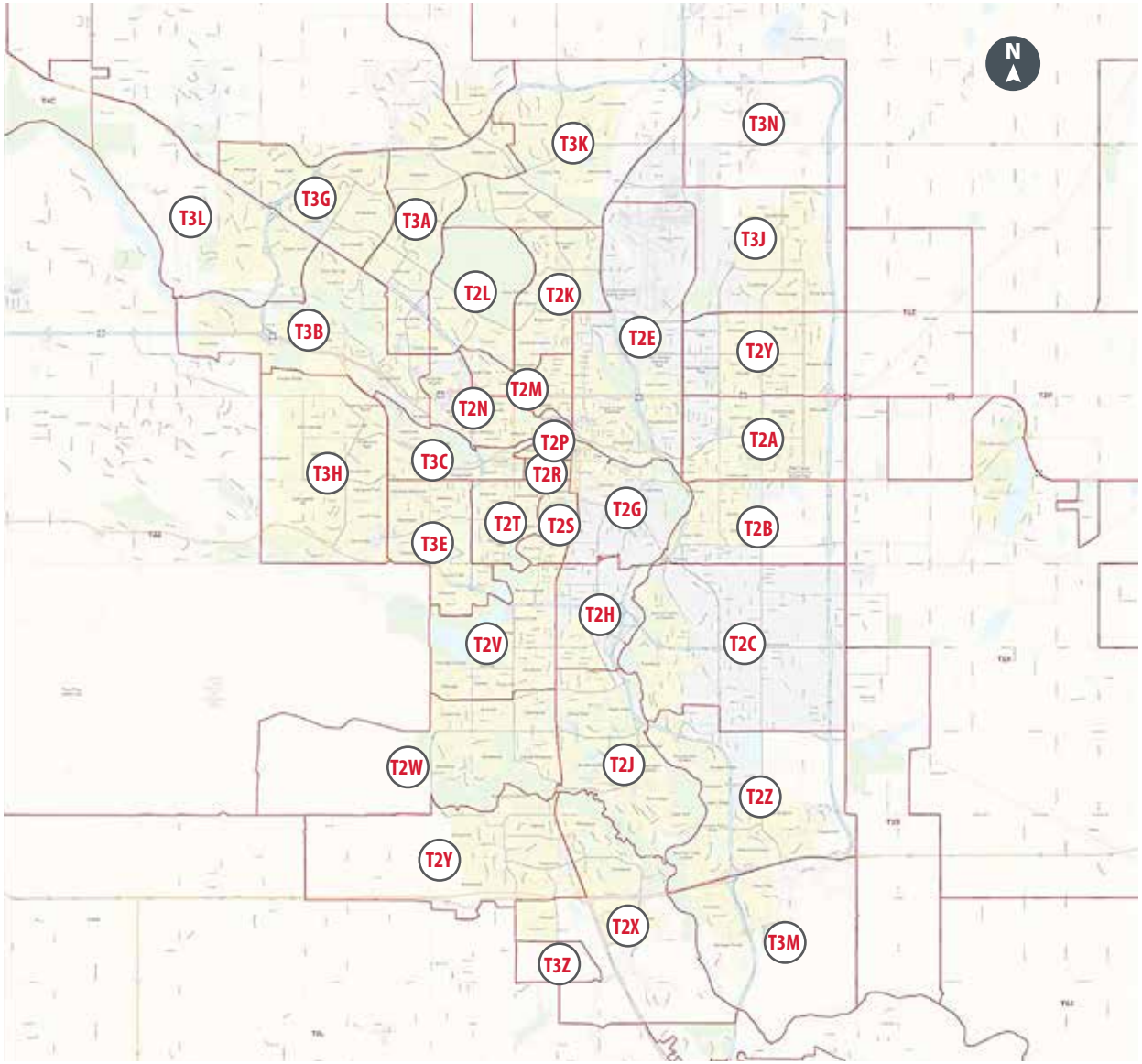
Figure 34: Responses by Gender, Actual vs Survey



[1] A more complete explanation of the Willingness to Pay approach can be found in a recent Harvard Business School Online post: https://online.hbs.edu/blog/post/willingness-to-pay.
[2] The World Bank's application of WTP studies to cultural resources is described here: https://www.researchgate.net/publication/228599417_Economic_analysis_of_investments_in_cultural_heritage_Insights_from_environmental_economics
[3] Examples of World Bank WTP studies include Macedonia and Georgia: https://openknowledge.worldbank.org/handle/10986/17386.

[4] The respondents were also widely dispersed geographically. Surveys were submitted from 28 of the 32 Postal Codes in Calgary. In Map 2, the Postal Code is circled when responses were received from that area.

Map 2: City of Calgary Postal Codes, by Area



Respondents were asked how long they had lived in Calgary. Figure 35 shows their answers.

As can be seen, a substantial share of respondents has lived in Calgary for more than two decades. Unfortunately, no data was available for the actual distribution of the population by length of residence. However, once people reach the age of 35, statistically very few move to a new city. Therefore, a proxy for the length of tenancy is to compare those who stated they have lived in Calgary for more than 20 years and the share of the adult population older than 35. While not exactly the same, the 66.2% of respondents reporting having lived in Calgary for more than 20 years is not significantly different than the 70.5% of the population older than 35.

The one demographic characteristic where there was a statistical skew between the survey respondents and the entire population of Calgary was in age. Both the youngest (18-24) and the oldest (65+) were underrepresented in survey responses compared to their actual share of the Calgary population while Millennial-aged respondents (25-34) were more likely to answer the survey than is reflected in their share of the population.

Because this slight imbalance might affect the final value estimates, the survey responses were weighted by age group to reflect the actual chronological distribution in Calgary.

The purpose of this extended discussion of the characteristics of the survey respondents is to indicate that statistically the results of the survey are such that a high level of reliability can be placed on the responses within the noted margin of error (+/- 7.3%). The fact that for the most part respondents reflected the overall population of Calgary adds to the confidence in the numbers.

Figure 35: How Long Have You Lived in Calgary?

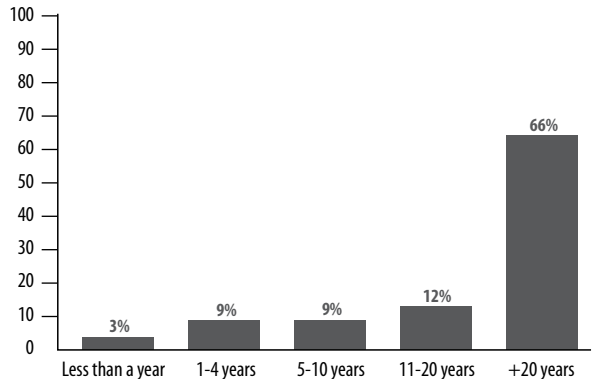


Figure 36: Long Term Residents

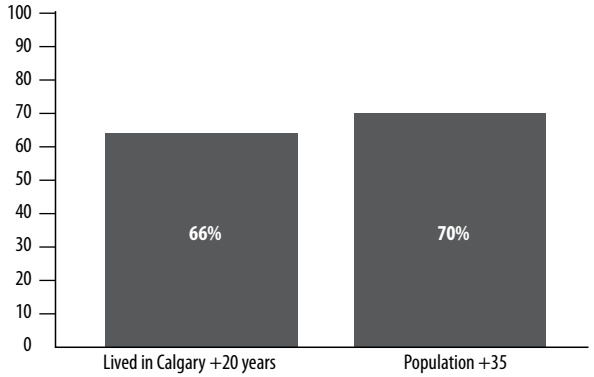
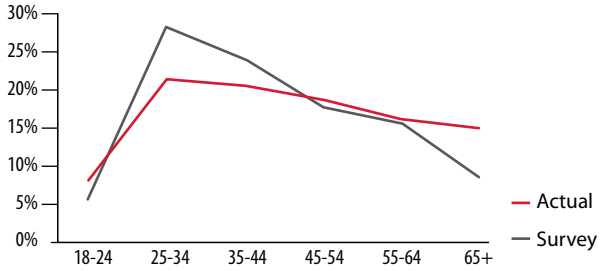


Figure 37: Actual Age Distribution



What are Calgarians Willing to Pay to "maintain the historic character and quality of each of the historic commercial areas"?

The specific question survey respondents were asked was, "How much, if anything, would you be willing to contribute as a voluntary, one-time donation to maintain the historic character and quality of each of these commercial neighbourhoods?" The question was worded so that the respondent understood that his/her contribution would be one time and voluntary. The options ranged from $0 to $500. As in any Willingness to Pay survey, a substantial percentage (from 35% to 41%) were unwilling to pay anything. However, the responses indicate that most Calgarians do value, in measurable dollar amounts, these historic neighbourhoods.

To be as conservative as possible, it was assumed that each respondent answered based on what their household would be willing to pay, rather than as an individual.

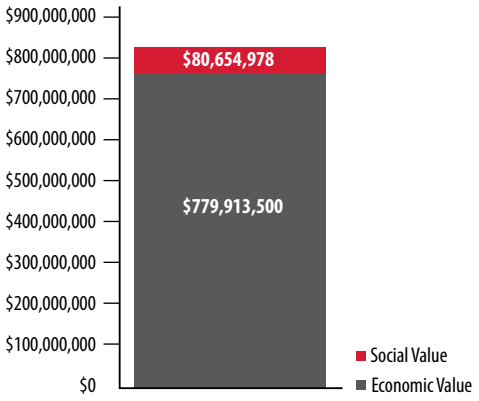
Table 8: Share of Population Willing to Contribute by District and Dollar Amount

	$0	$1	$5	$10	$25	$50	$100	$500	Total
Kensington	38.7%	2.0%	6.0%	12.0%	13.3%	12.7%	12.0%	3.3%	100%
Beltline/ Victoria Park	40.9%	2.7%	7.4%	8.7%	13.4%	14.8%	9.4%	2.7%	100%
Stephen Avenue	39.5%	2.0%	7.2%	11.8%	13.2%	13.2%	10.5%	2.6%	100%
Inglewood/ Ramsay	35.1%	2.0%	7.3%	9.3%	15.9%	13.2%	13.2%	4.0%	100%

Again, this Willingness to Pay approach indicates the social value of these areas to those who are unlikely to be direct beneficiaries of the economic values of the area. Based on the survey results here are the values of the areas, see Table 8.

In other words, the historic character and quality of these four commercial neighbourhoods are valued at more than $80 million as a social value that is in addition to the economic and environmental value of the areas. That means there is a social value of these heritage areas of around $60 per person in the City of Calgary. Even considering the margin for error (+/- 7.3%), the likely monetized social value of the four areas is between $74,767,165 and $86,542,791.

Figure 38: Social Value Addition to Economic Value



Additional Findings from the Survey

While the primary purpose of the survey was to estimate the social value of these heritage commercial areas, survey questions revealed other attributes of these areas that Calgary citizens value.

One of the questions asked respondents, "In choosing a commercial district to visit, how important is each of these variables?" Respondents then ranked various characteristics as: Very Important, Somewhat Important, Neutral, Not Important, and I don't know." Table 9 illustrates the share for each variable that respondents ranked, "Very Important." Other than "Walkable," Historic Character was at the top of the "Very Important" list.

One way to understand why "Historic character of area" is important is to look at what other variables were identified as "Very Important" by those who rated an area's historic character as "Very Important", as shown in Table 11.

These areas are also part of the daily or weekly lives of most Calgarians. The survey asked, "How often do you visit each of these areas?" The answers are as follows, see Table 10.

Nearly every district is visited by respondents at least once a month. For those who ranked Historic Character as "Very Important," Beltline/Victoria Park is the commercial district visited at a monthly rate significantly greater than respondents as a whole, see Table 12.

Table 9: In choosing a commercial district to visit, how important is each of these variables?

	Very Important
Walkable	77.7%
Historic character of area	66.7%
Many locally owned businesses	62.8%
Attractive streetscape/public improvements	59.0%
Feeling of public safety	57.2%
Good retail mix	56.8%
Diversity of types of businesses	49.0%
Evening activity	43.7%
Outdoor dining options	43.2%
Accessible via public transportation	42.8%
Ease of access for people with disabilities	39.7%
Proximity to home	36.6%
Ease of parking	34.0%
Bike accessibility	33.8%
Uniquely Calgarian	32.9%
Proximity to work	16.2%

Table 10: How often do you visit each of these areas?

	Once a week or more	One or two times a month	A few times a year	Once a year	Almost never
Beltline/ Victoria Park	25.3%	32.9%	30.1%	5.5%	6.2%
Inglewood/ Ramsay	12.2%	44.2%	34.0%	5.4%	4.1%
Kensington	20.4%	27.9%	44.9%	4.8%	2.0%
Stephen Avenue	23.3%	27.4%	34.9%	8.9%	5.5%

Table 11: Variables rated "Very Important" by Respondents who ranked "Historic Character" as "Very Important".

Walkability	82.7%
Good Retail Mix	70.4%
Many Locally Owned Businesses	68.4%
Attractive Public Improvements	68.4%
Diversity of Types of Businesses	59.2%
Feeling of Public Safety	57.1%
Outdoor Dining Options	53.1%
Evening Activity	48.0%
Uniquely Calgarian	45.9%
Ease of Parking	35.7%
Proximity to Home	33.7%
Proximity to home	36.6%
Ease of parking	34.0%
Bike accessibility	33.8%
Uniquely Calgarian	32.9%
Proximity to work	16.2%

Table 12: Ranked Historic Character as "Very Important".

Visit Once a Month or More	All Respondents	Historic Character "Very Important" Respondents
Beltline/ Victoria Park	48.3%	66.0%
Inglewood/ Ramsay	56.5%	61.2%
Kensington	50.7%	46.9%
Stephen Avenue	58.2%	50.0%

Social Value Conclusions

The citizens of Calgary measurably value the heritage commercial areas of Beltline/Victoria Park, Inglewood/Ramsay, Kensington, and Stephen Avenue. They have expressed their assigned "willingness to pay" which aggregates to $80,000,000. This is a value in addition to the economic and environmental values of those areas. This social value is more than 10% of the total economic value calculated elsewhere in this report. It is clearly evident that measuring the value of heritage on a Triple Bottom Line basis reveals the worth of heritage in Calgary is far more than can just be demonstrated in market transactions.

Further, those who hold a commercial district's historic character as very important also look for business areas that include high quality urban attributes including walkability, good retail mix, concentration of locally owned businesses, and attractive public improvements.

Finally, what this Willingness to Pay analysis demonstrates is that while automobile-oriented shopping centers, big box retailers, and international chain stores may be important, it is the character-rich heritage precincts with their concentration of local businesses that provide Calgarians a "public good" that has monetary value beyond the selling price of buildings.

2.3 Environmental Value

The purpose of the environmental analysis is to form the third leg of the three-legged stool (or third pillar) of sustainability, the triple-bottom-line monetized value, which supports conservation and repurposing of heritage resources situated on Calgary's commercial streets. Environmental benefits derived from heritage conservation are inextricably linked to sustainability as an approach to the design and construction industries.

Definitions

One of the strongest metrics to monetize the environmental benefit of conserving and reusing the existing building stock is through the analysis of all the energy used in the life-cycle of a building, called the embodied energy, which includes all the non-renewable energy consumed:

- Initial energy to acquire, process, manufacture, and transport building materials, and construct the building.
- Recurring energy to maintain and repair the building.
- Operating energy to heat, cool, ventilate, and light the building.
- End of life energy to demolish and dispose of the building.

Embodied energy speaks about the non-renewable energy which goes into constructing a building. In addition, the retention and reuse of existing buildings reduces the need for natural resource extraction to manufacture new construction materials and reduces the demolition materials destined for landfills both of which would otherwise have a monetary and environmental cost. Economists have historically referred to environmental degradation and resource depletion as (negative) externalities and excluded them from the cost of doing business and, therefore, dismissing the true cost or triple-bottom-line economics of the complete life-cycle of a building.

Since the majority of energy used on earth historically has been hydrocarbon energy, our concern for the release of greenhouse gases into the atmosphere has lead to an accounting for embodied carbon, not just embodied energy, in the life-cycle of the built environment.

In 2013, the Federal Provincial Territorial Historic Places Collaboration (FPTHPC) commissioned MTBA & Associates Inc. to develop a framework to consider the position of heritage conservation relative to the larger sustainability movement. The report *Building Resilience: Practical Guidelines for the Sustainable Rehabilitation of Buildings in Canada* acts as a sustainable building toolkit to reinforce the FPTHPC position that "heritage conservation contributes to creating a sustainable built environment and resilient communities".

Canada's Historic Places Initiative – Heritage Conservation Brief develops statements regarding sustainable development (i.e. "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" or, stated differently with the same meaning "Sustainable development requires that the rate of depletion of non-renewable resources should foreclose as few future options as possible" – Brundtland Commission report *Our Common Future* 1987):

- Heritage conservation is an integral part of sustainable development.
- The reuse of heritage buildings has environmental, social, and economic benefits – the three pillars of sustainable development.
- The rehabilitation of heritage buildings reduces waste and conserves energy.
- The social and cultural values of heritage buildings are non-renewable resources.

In 2000, 12% of Canada's waste disposal was from construction and demolition sources.

Statistics Canada, 2005

According to the Canadian Green Building Council (CAGBC), buildings in Canada in 2014:

Consume

- **33%** of energy produced
- **25%** of landfill waste
- **50%** of natural resources

Generate

- **10%** of airborne particulates
- **12%** of water usage
- **35%** of greenhouse gases

As stated by the Intergovernmental Panel on Climate Change (IPCC), "…over the whole building stock, the largest portion of carbon savings by 2030 is in retrofitting existing buildings and replacing energy using equipment…" and as many building design experts have confirmed, buildings can be made at least 50% more energy efficient, without a financial premium in a life cycle analysis, through the implementation of best practices in regular routine maintenance and building systems upgrades (Stephen Pope, Natural Resources Canada; John Straube, PhD, P.Eng.). Of course, when there is the will and finances available, a building can be made to be net energy positive and carbon neutral.

Heritage conservation is recognized as critically important at the provincial level through Alberta Culture and Tourism, at the national level through Parks Canada (Standards and Guidelines for the Conservation of Historic Places in Canada and other resource documents), and internationally through International Council on Monuments and Sites (ICOMOS). Thousands of municipalities worldwide have policies or programs designed to help conserve their heritage resources. Calgary City Council has acknowledged the value of heritage conservation through approval of the Calgary Heritage Strategy and other city-wide policies, including Municipal Development Plan, Cultural Plan for Calgary, Guidebook for Great Communities, One Calgary 2019-2022 Service Plan and Budgets, The Inventory of Evaluated Historic Resources, City-wide Conservation Grant Program, and others.

Referencing the notions of "use and non-use value" as described in *Heritage Planning* (2014) by Harold Kalman, the City of Calgary wants to understand the combined economic value of these notions in the heritage commercial areas of the city. As part of its sustainability strategy, the City of Calgary has adopted a LEED Gold requirement for all new buildings and LEED Silver requirement for major renovations. While caution must be exercised in improving the energy efficiency of a historic building, upgrading the building envelope and mechanical and electrical systems are possible while retaining the building's heritage character and maintaining its hygrothermal balance.

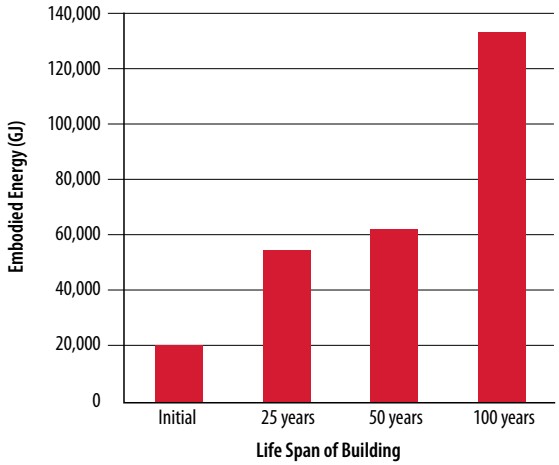
Generic Case Study

To demonstrate the significance of embodied energy over the life-cycle of a typical building, the following case study of a generic office building, which could be found in any city in Canada, is worthy of a review.

The total embodied energy of a 4,620 m^2 (50,000 ft^2) generic, 3-storey office building with underground parking increases by 56.6% when it is 25 years old, 144% when it is 50 years old, and 325% when it is 100 years old. When this building is demolished, the embodied energy goes to waste. Therefore, a frequent cycle of demolition and rebuilding does not fit with sustainable development practices. (Building and Environment, 1996).

Calculation of embodied energy in construction materials dates back to the work of Bruce Hannon et al at the University of Illinois culminating in the 1976 report titled *Energy Use for Building Construction,* just prior to and during the first international oil embargo when oil and gas shortages were endemic and energy prices soared. Energy efficiency became a household word at the time. This was the case until energy prices dropped to near previous lows and most people lost interest in sustainability and even fewer in the notion of embodied energy. However, at the advent of the confluence of increased energy costs and a burgeoning awareness of environmental degradation, there was a new move in the 1980s toward sustainable development lead by the UN Brundtland Commission Report and programs such as LEED and other international sustainability initiatives.

Figure 39: Total Initial & Recurring Embodied Energy of an Office Building

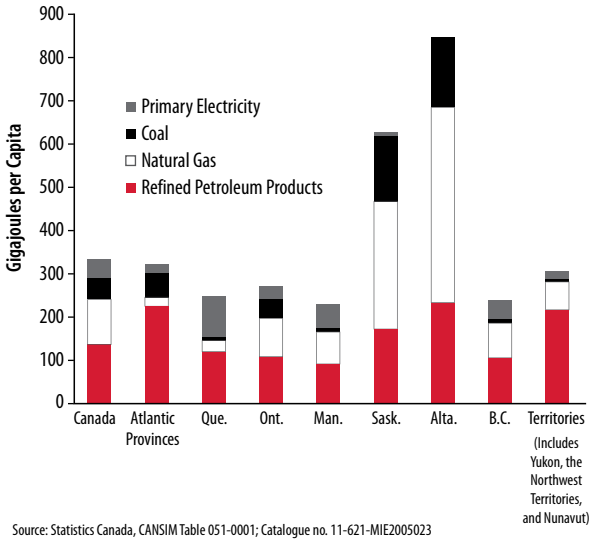


The real significance of the establishment of embodied energy in the life cycle of buildings is that the environmental impact of decisions can be quantified and thereby monetized. Proponents of heritage conservation always had a gut feeling that conserving and reusing the existing building stock was the right thing to do and this can now be demonstrated in monetary terms. This is not to say that existing buildings would not benefit from upgrades to systems while maintaining their heritage character. Just like all things, buildings and building systems require life cycle maintenance and, at times, replacement. As components and systems in existing buildings can be made more energy efficient, the argument for conserving the existing building becomes even stronger.

It has long been argued that the existing building is the most sustainable building. Carl Elefante again reinforced this notion at the Association for Preservation Technology International (APTi) conference in Ottawa in 2017. This proposition is based on the fact that a constructed building already exists, its embodied energy has already been expended, and the materials used in heritage buildings were often highly durable with life expectancies generally greater than with many contemporary materials. Additional factors have been introduced into the debate including life cycle assessment, environmental sustainability, concerns with energy use in building operations, elimination or drastic reduction in landfill debris, and emissions of greenhouse gases (GHG) into the environment.

Regarding greenhouse gas emissions, the environmental sustainability movement has embraced the notion of becoming net energy neutral or net energy positive while lowering GHG (carbon) emissions in Canada to zero by 2050. This lofty goal will be achieved through the use of a combination of strategies including ensuring high performance building systems, on site energy generation, connecting to area energy sources, purchasing clean offsite energy, and so on. Why this is so important globally, in general, and in Alberta, in particular, is demonstrated in Figure 40 which shows energy consumption in Alberta according to source. Examples of existing buildings which have been successful in lowering energy use as well as GHG emissions are noted in the case studies beginning on page 37.

Figure 40: Primary Energy Consumption, by Source, 2003



Source: Statistics Canada, CANSIM Table 051-0001; Catalogue no. 11-621-MIE2005023

The argument for conserving historic buildings also includes the contribution to an enhanced quality of life and sense of place for citizens, however, this section reconciles the financial value of retaining historic buildings and groups of buildings based on environmental factors.

Studies have shown that historic buildings performed comparable to or better, from an energy use perspective, than those constructed in the mid 20th Century.

Often this was a result of design strategies such as:

- 40% fenestration as opposed to full curtain wall.
- Use of mass masonry wall construction as opposed to thin building skins.
- Use of natural daylight when possible as opposed to uniform electric lighting during daylight hours.
- Natural ventilation with operable windows as opposed to sealed windows and 100% mechanical ventilation.
- Highly durable materials and finishes as opposed to those requiring frequent replacement or repairs.
- General acceptance of a range of interior conditions by occupants as opposed to an expectation of very specific environmental controls regarding temperature, humidity, illumination, among others.

With the advent of higher performance building envelopes, contemporary buildings' energy use has been significantly reduced. This fact poses a challenge to proponents of heritage conservation and requires a more fulsome look at life cycle of historic buildings. The conservation of heritage buildings can compete with higher performance contemporary buildings by implementing upgrades to the building envelope in terms of reducing air leakage, improving window thermal performance, mechanical upgrades, and energy efficient lighting as well as by acknowledging the numerous long life cycle elements such as mass masonry and timber compared to contemporary buildings constructed using shorter life cycle elements such as curtain wall and window wall systems. This approach would extend the life cycle benefits of retaining the heritage building.

Demolishing a building, sending construction materials to the landfill, constructing a new building, redeveloping the infrastructure to service the new building can all be monetized. This value can be compared to the cost of retaining and rehabilitating a heritage building with the net savings realized in terms of less financial expenditure and less environmental cost. Rehabilitating historic properties can be a critical part of promoting energy efficiency by preserving the energy already represented by existing buildings (the embodied energy), rather than expending additional energy for new construction. A new, green, energy-efficient office building that includes as much as 40% recycled material would nevertheless take approximately 65 years to recover the energy lost in demolishing a comparable existing building. (Richard Moe, Sustainable Stewardship, Traditional Building, June 2008). Utilizing environmental measurement tools developed over the last 5 decades, the data presented in the environmental analysis portion of this study demonstrates conclusively that retaining existing heritage buildings provides significant financial benefits.

Preservation (Conservation) Protocols and Embodied Energy

The publication of *Energy Use for Building Construction* was recognized by the Advisory Council on Historic Preservation (ACHP) as a new research tool that had the potential to support its mission as the federal (USA) oversight organization for historic preservation. A study was commissioned by ACHP culminating with the 1979 report *Assessing the Energy Conservation Benefits of Historic Preservation: Methods and Examples*. As mentioned earlier in this report, discussions regarding energy use in general declined as energy prices declined after the 1970s so the embodied energy argument lost traction until the confluence of high energy prices, energy insecurity, and climate change brought the notion of conservation back on the table. Three different methodologies were developed in the 1979 report to assist in determining embodied energy:

- **Concept model** – planning approach where building types are given embodied energy value per square metre; values more appropriate for buildings using modern materials than for historic buildings.
- **Inventory model** – accurate accounting of material used in building; challenge for heritage buildings which do not have construction documents; requires hands on investigation.
- **Survey model** – assumption that most embodied energy is in the bulk of architectural materials: wood, paint, asphalt, glass, stone and clay, primary iron and steel, primary non-ferrous metals.

The Concept Model methodology was used in the calculation of embodied energy for the four heritage commercial areas as there were no available construction documents of the representative building and conducting an in-depth survey of material quantities was beyond the project mandate. For the purposes of demonstrating the environmental monetized value related to heritage conservation, an order of magnitude approach to calculating embodied energy was utilized and deemed sufficient.

Athena Sustainable Materials Institute

Impact Estimator for Buildings and, previously, EcoCalculator consider many additional sustainability metrics such as CO2e. For the calculation of embodied carbon in the four heritage commercial areas, the following embodied carbon benchmark calculation tools were utilized:

deQo database of embodied Quantity outputs

CLF Carbon Leadership Forum

Embodied Carbon Intensity Benchmarks

deQo database of embodied Quantity outputs

Database of Embodied Quantity Outputs

- Online database that allows architects, engineers and researchers to input and compare the embodied carbon of different building structures.
- Developed by the MIT Building Technology Program
- The methods and data structure were developed with input from the Carbon Leadership Forum; key variables included material quantities (kg material/ m2) and Embodied Carbon Coefficients (ECC, expressed in kg CO2e/kg material).
- Output: GWP in kg $CO2e/m^2$.

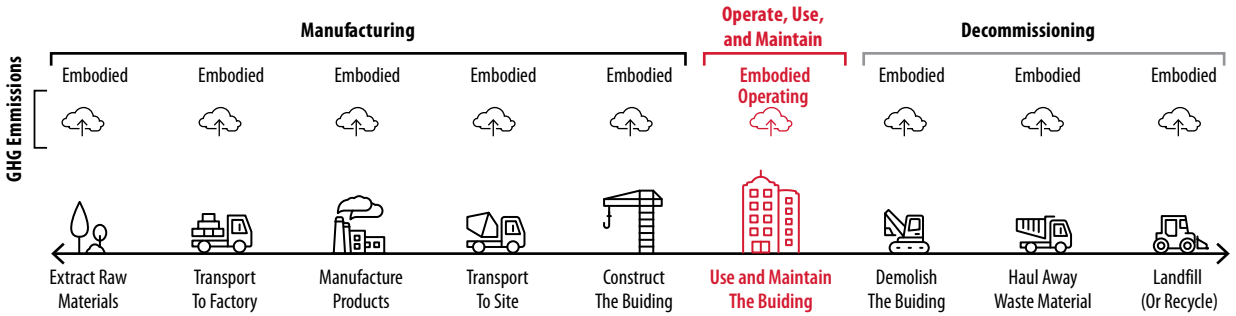
Embodied Carbon Benchmark - Data Visualization Project

CLF Carbon Leadership Forum

- Online database that allows architects, engineers and researchers to input and compare the embodied carbon of different building structures.
- Developed by the Carbon Leadership Forum, a non-profit organization at the University of Washington.
- This project compiled the embodied carbon results from over 1,000 building LCA studies.
- Building embodied carbon in the buildings was normalized per unit floor area with units of kg $CO2e/m^2$.

Embodied Carbon in Buildings

- Refers to the carbon footprint of materials and it considers the greenhouse gases release throughout the supply chain (extraction, refining, processing, transportation and fabrication.
- It makes up to 50% of the whole-life greenhouse emissions of a new building (embodied + operational).
- Unlike operational carbon emissions, the embodied energy and carbon cannot be reversed.



Representative Case Study

Stephen Avenue Building

Area	Stephen Avenue
Year of Construction	1890s
Address	8 Avenue SW
City of Calgary Assessed Value	$ 5,500,000
Market Value Based on Sale (2017)	$ 8,600,000
Number of Storeys	3
Gross Floor Area	1,440 m^2 (15,540 ft^2)
Building Dimensions	10m x 48m (approximate)
Building Use	Commercial / Residential (restaurant at grade, offices/residences above)
Main structure description	Mass masonry construction with sandstone cladding front facade and brick backup walls
Building envelope description	Front facade: 60-40% 2 side walls: 100-0% Rear facade: 80-20%

Embodied Energy in Seven Basic Original Construction Materials

(Note: these seven basic construction materials account for 50% of embodied energy so resulting number must be doubled to realize 100% embodied energy):

Sandstone & Brick Masonry	400 m^3; 441,400 units x 0.01432 GJ/unit = 6320 GJ
Concrete	152.4 m^3 x 3.5468 GJ/m^3 = 540.5 GJ
Primary Steel/Iron - Reinforcing bars and beams	9,818 kg x 0.05 GJ BTUs/kg = 495 GJ
Primary Non-Ferrous Metals - Piping, Wiring, and Architectural Finishes	4,545 kg x 0.26 GJ/kg = 1193 GJ
Paint - Interior walls, ceilings, windows, and doors	1743 L x 0.1197 GJ/Litre = 208.64 GJ
Glass - Windows, doors, and storefronts	70 m^2 x 0.1525 GJ/m^2 = 10.675 GJ
Wood - Floors, roof structure. and finish	(20 windows @ 0.89 GJ = 17.8 GJ + (20 doors = 13.8 GJ) = 31.6 GJ (59,516 board feet x 5229 BTUs/board foot) = 328 GJ (3.11 x 108 BTUs)
Asphalt - Roofing (tar saturated felts) + (roofing asphalt) = total	480 m^2 x 11.4 kg/m^2 = 5472 kg; (5472 kg x 0.038 GJ/kg = 207.9 GJ] + (5472 kg x 0.0156 GJ/kg = 85.4 GJ) = 293.3 GJ
Total Embodied Energy	**9420 GJ x 2 = 18,840 GJ (18,840GJ/1440 m^2 = 13 GJ/m^2)**
Embodied Carbon (Lemay analysis of Stephen Avenue Building & CPB 201-8 Avenue SE):	
Stephen Avenue Building 8 Avenue SW	453 Metric Tons CO2e / 1440 m^2 gross floor area = 0.32 Metric Tons CO2e/m^2
Calgary Public Building 201 8 Avenue SE	3635 Metric Tons CO2e / 10,430 m^2 gross floor area = 0.35 Metric Tons CO2e/m^2

Search Category	By Material in North Ameria		1-6 Stories		Average
Database	deQo	CLF	deQo	CLF	
kg/CO2/m^2	289	293	340	334	314
m^2	1,440				
kgCO2e	416,160	421,920	489,600	480,960	452,610
Metric tons CO2e	416.2	421.9	489.6	481.0	452.6
Carbon offset price $50 CAD	20,810	21,095	24,480	24,050	22,609
Carbon shadow price $300 CAD	124,860	126,570	146,880	144,300	135,653

Assumptions

A preliminary assessment based on the location of the project and the materials of the structure the estimated embodied carbon of the building can range from 416.2 – 489.6 Metric Tons CO2e.

Current quality certified carbon offsets prices is estimated at $50 CAD (quote from Solutions Will for VCS certified carbon offsets, February 2021), but the Government of Canada (PSPC) is using a calculated "shadow price" of $300 CAD when assessing carbon from real property.

Conclusion

For an average of 453 Tons CO2e of embodied carbon, value is estimate between $22,609 and $135,653.

Disclaimer: This is not a carbon quantification or a recognized methodology. Results are only meant to give an order of magnitude of embodied carbon based on available average data from other buildings of different locations in North America. We recommend doing a life-cycle assessment of identified projects or a carbon quantification from actual bill of materials of buildings in Calgary for reliable results.

Stephen Avenue

	Summary
	Gross Area of 43 Heritage Buildings in Stephen Avenue Area: 109,719 m^2
Total Embodied Energy Cost	$ 2,870,980
Delivery to Site Premium Cost	$ 287,098
Demolition Energy Cost	$ 38,554
Landfill Costs of Demolition	$ 18,761,949
Embodied Energy Cost of New Building Construction	$ 3,219,155
Embodied Carbon Cost	$ 1,837,793 or $ 11,026,759*
Total Embodied Energy In Construction, Delivery, and Demolition	
Total Embodied Energy in Representative Building	20,977 GJ
Calculate Unit Energy/m^2	14.57 GJ/m^2
Calculate Embodied Energy in Area	1,598,606 GJ
Calculate Current Cost of Embodied Energy ~$2/GJ	$ 3,197,212
Embodied Carbon Cost PSPC shadow price*	$ 1,837,793 $ 11,026,759*
Embodied Mean Carbon Cost	$ 6,432,276
Total Monetized Value	
Embodied Energy Cost	$ 3,197,212
Landfill Dumpage Cost	$ 18,761,949
Embodied Energy Cost of New Building Construction	$ 128,157
Embodied Mean Carbon Cost	$ 6,432,276
Grand Total	**$ 31,610,592**

* Indicates shadow price of carbon used by Government of Canada Public Services and Procurement Canada (PSPC).

Inglewood/Ramsay

	Summary
	Gross Area of 18 Heritage Buildings in Inglewood/Ramsay Area: 23,585 m^2
Total Embodied Energy Cost	$ 613,210
Delivery to Site Premium Cost	$ 61,321
Demolition Energy Cost	$ 8,302
Landfill Costs of Demolition	$ 4,033,035
Embodied Energy Cost of New Building Construction	$ 691,984
Embodied Carbon Cost	$ 395,049 or $ 2,370,292*
Total Embodied Energy In Construction, Delivery, and Demolition	
Total Embodied Energy in Representative Building	20,977 GJ
Calculate Unit Energy/m^2	14.57 GJ/m^2
Calculate Embodied Energy in Area	343,633 GJ
Calculate Current Cost of Embodied Energy ~$2/GJ	$ 687,266
Embodied Carbon Cost PSPC shadow price*	$ 395,049 $ 2,370,292*
Embodied Mean Carbon Cost	$ 1,382,670
Total Monetized Value	
Embodied Energy Cost	$ 687,266
Landfill Dumpage Cost	$ 4,033,035
Embodied Energy Cost of New Building Construction	$ 691,984
Embodied Mean Carbon Cost	$ 1,382,670
Grand Total	**$ 6,794,955**

* Indicates shadow price of carbon used by Government of Canada Public Services and Procurement Canada (PSPC).

Beltline

	Summary
	Gross Area of 15 Heritage Buildings in Beltline Area: 31,796 m^2
Total Embodied Energy Cost	$ 826,696
Delivery to Site Premium Cost	$ 82,669
Demolition Energy Cost	$ 11,192
Landfill Costs of Demolition	$ 5,437,116
Embodied Energy Cost of New Building Construction	$ 932,894
Embodied Carbon Cost	$ 532,583 or $ 3,195,498*
Total Embodied Energy In Construction, Delivery, and Demolition	
Total Embodied Energy in Representative Building	20,977 GJ
Calculate Unit Energy/m^2	14.57 GJ/m^2
Calculate Embodied Energy in Area	461,996 GJ
Calculate Current Cost of Embodied Energy ~$2/GJ	$ 923,992
Embodied Carbon Cost PSPC shadow price*	$ 532,583 $ 3,195,498*
Embodied Mean Carbon Cost	$ 1,864,040
Total Monetized Value	
Embodied Energy Cost	$ 923,992
Landfill Dumpage Cost	$ 5,437,116
Embodied Energy Cost of New Building Construction	$ 932,894
Embodied Mean Carbon Cost	$ 1,864,040
Grand Total	**$ 9,158,042**

* Indicates shadow price of carbon used by Government of Canada Public Services and Procurement Canada (PSPC).

NOTE: Volumes estimated based on typical historic building construction; detailed inventory required to confirm precise construction assemblies and quantities.

Kensington

	Summary
	Gross Area of 10 Heritage Buildings in Kensington Area: 4,368 m^2
Total Embodied Energy Cost	$ 113,568
Delivery to Site Premium Cost	$ 11,356
Demolition Energy Cost	$ 1,538
Landfill Costs of Demolition	$ 746,928
Embodied Energy Cost of New Building Construction	$ 128,157
Embodied Carbon Cost	$ 73,164 or $ 438,984*
Total Embodied Energy In Construction, Delivery, and Demolition	
Total Embodied Energy in Representative Building	20,977 GJ
Calculate Unit Energy/m^2	14.57 GJ/m^2
Calculate Embodied Energy in Area	63,467 GJ
Calculate Current Cost of Embodied Energy ~$2/GJ	$ 126,934
Embodied Carbon Cost PSPC shadow price*	$ 73,164 $ 438,984*
Embodied Mean Carbon Cost	$ 256,074
Total Monetized Value	
Embodied Energy Cost	$ 126,934
Landfill Dumpage Cost	$ 746,928
Embodied Energy Cost of New Building Construction	$ 128,157
Embodied Mean Carbon Cost	$ 256,074
Grand Total	**$ 1,258,093**

* Indicates shadow price of carbon used by Government of Canada Public Services and Procurement Canada (PSPC).

2.4 Heritage Area Vulnerability

As demonstrated in the multiple regression analysis of the property transaction data by Altus Group, there is a clear correlation between the monetized value of heritage and non-heritage buildings and their presence within or proximity to heritage areas. Due to this symbiotic relationship, any negative impacts on the current conditions would have a deleterious economic effect. Similarly, as demonstrated by the Willingness To Pay survey, a loss or degradation of any of the heritage areas would result in a social cost, and commensurate economic loss, to the citizens of Calgary. Exacerbating the situation is the environmental cost resulting from the loss of heritage fabric, as has been demonstrated. The vulnerabilities that heritage areas face can be slow and incremental or rapid and wholesale as the City of Calgary has experienced over the decades. Heritage streets and heritage areas which are integral and intact appear to be less vulnerable to building demolition and unsympathetic development.

Table 13: Heritage Area Value Analysis

	Heritage - Identified Properties	Non-Heritage Properties in Heritage Areas	Total Value
Assessment Base			
Beltline	$ 21,648,000	$ 65,792,000	$ 87,440,000
Inglewood	$ 36,094,000	$ 40,932,000	$ 77,025,500
Kensington	$ 14,420,000	$ 13,788,000	$ 28,208,000
Stephen Ave	$ 312,851,000	$ 274,389,000	$ 587,240,000
Totals	$ 385,012,000	$ 394,901,000	$ 779,913,500
Heritage Influence Value			
Beltline	$ 2,149,000	$ 11,422,000	$ 13,571,000
Inglewood	$ 3,583,000	$ 7,106,000	$ 10,689,000
Kensington	$ 1,431,000	$ 2,394,000	$ 3,825,000
Stephen Ave	$ 31,058,000	$ 47,637,000	$ 78,695,000
Totals	$ 38,222,000	$ 68,559,000	$ 106,781,000

2.5 Conclusion

Heritage conservation advocates have long held an intuitive sense of the economic, social, and environmental value of extant heritage buildings and areas. As the sustainability and environmental movements have grown and as many organizations have adopted a Triple Bottom Line approach to development, the ability to demonstrate justifications for heritage conservation has benefited from the development of new assessment tools. A "willingness to pay" survey tool was employed in this investigation to ascertain the monetized value of the four identified heritage commercial areas to Calgary's citizens using a broad array of factors. The results were positive indicating that the areas contribute on a social basis. With the advent of the notions of embodied energy and embodied carbon, more recently, the ability to quantify and monetize environmental value reinforces the conservation approach. The included figures and text confirm the monetized values associated with the retention of the four heritage commercial areas. The three legs of the three-legged stool, the economic, the social, and the environmental values, confirm the triple bottom line value of the retention of historic buildings and historic areas.

Figure 41: Economic Value by Area

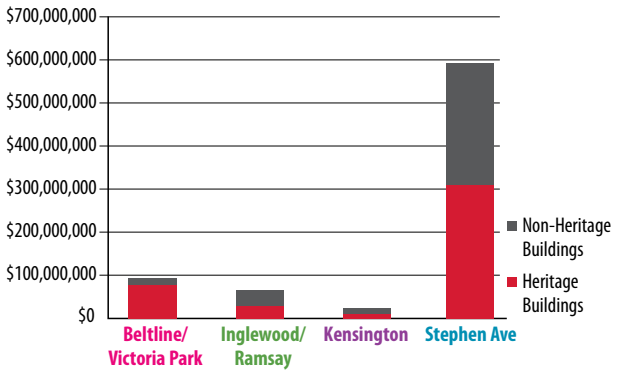


Figure 42: Social Value by Area

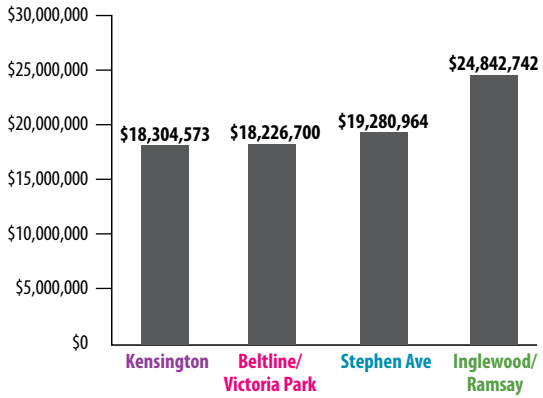
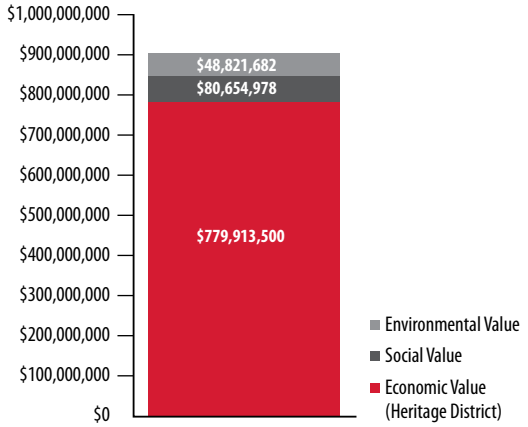


Figure 43: Environmental Value by Area

The results of the Triple Bottom Line investigation have been displayed in the preceding graphs, charts, tables, and explanatory notes and, as stand-alone content, make a strong argument for the conservation of historic buildings and assemblies of buildings in the identified commercial areas in Calgary. Furthermore, the economic lift provided to non-heritage properties within or proximal to the historic areas has been clearly demonstrated in real estate assessment and sales data. Adding to the economic argument are the monetized social and environmental values resulting in a cumulative value much greater than the economic value on its own.

Figure 44: Heritage Areas Cumulative Value - Economic, Social, Environmentsal



Appendices

Appendix A – Background and Best Practices Review

Introduction

In July, 2020, the City of Calgary issued a Request for Proposals for "Heritage value analysis and conservation tools development focused on commercial streets." The response of Lemay was selected to undertake this analysis along with their subcontractors, Altus Group, CBRE, and Heritage Strategies International (HSI). The City anticipated two phases of work, Phase 1 being a Heritage Value Analysis and Phase 2 (to be awarded later) a Policy and Financial Tool Analysis.

The first step in Phase 1 was to conduct research and identify "best practices." However, it is important to note that this was not meant to be best practices for heritage tools, etc., but rather best practices in the metrics and methodologies for measuring the values of heritage conservation. This document represents the fulfillment of that first step.

Some Definitional Distinctions

The City of Calgary should be commended for putting itself at the cutting edge by requesting the calculation of the values of its commercial heritage resources on a "Triple Bottom Line" (TBL) basis. The entire Lemay team is looking forward to making the necessary calculations to respond to that request. To do so, however, requires some important definitions and definitional distinctions. There are four pairs of concepts that require such definitions and distinctions:

1) Best practices vs good practices.

2) Triple Bottom Line vs Use/Non-Use Value concepts.

3) Quantification vs Monetization.

4) Metrics and methodologies.

"Best Practices" is defined as: "a procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption" (Merriam Webster) and as: "a working method or set of working methods that is officially accepted as being the best to use in a particular business or industry, usually described formally and in detail." (Cambridge Dictionary).

One UN agency defines "Good Practices" as: "a practice that has been proven to work well and produce good results, and is therefore recommended as a model." The distinction, however subtle, is important. Wherever possible this report identifies examples of "best practices" but all examples presented are at a minimum "good practices". Here is why the distinction needs to be made. The phrases within the definitions such as "produce optimal results" and "best to use in a particular business" are not always possible. Limitations in the availability of the ideal data, for example, is a frequent challenge. The reality is that in research such as this, the analyst is limited by the nature, form, accessibility, and reliability of the requisite data. Whenever possible the "best practice" can be used, but limitations frequently mean that "good practice" needs to be the substitute approach. Having a minimum threshold of "a practice that has been proven to work well and produce good results" by necessity is the standard for inclusion in this report, and, by extension, in the subsequent applications of these methodologies to the Calgary context.

Second, the RFP specifically requires the analysis to be framed in the "Triple Bottom Line" concept. John Elkington who coined the phrase "triple bottom line" defines it as a sustainability framework that examines a company's social, environment, and economic impact." As an environmentalist, it is not surprising that Elkington used that framework in that it parallels the three elements of "sustainable development." Those "pillars" of sustainable development ultimately emerged from the work of the Brundtland Commission, set up by the United Nations General Assembly in 1983. But Elkington's twist a decade later on the framework was specifically for "a company's social, environmental, and economic impact." Thus, most of the specific examples of calculating a triple bottom line amount have applied to companies, and, to a lesser extent, to organizations. But there is no inherent reason the approach cannot be applied to an inventory of heritage resources, which is the City of Calgary's mandate.

From a very practical standpoint, however, the RFP notation to "complete a best practice review from other municipalities in North America for valuation of heritage areas" is not possible, in that we have found no North American city that has conducted a comprehensive and credible TBL analysis as envisioned by this RFP. There are examples which are included in some of the example studies, where economic, environmental, and social impacts and contributions have been measured. But none of these have attempted to fully monetize the non-economic components. There are some methodologies (although not all from North America) that have monetized the non-economic values that are cited later in this report, just not in a triple bottom line framework.

The RFP also briefly references the concepts of Use and Non-Use values. That distinction can be useful and is not in conflict with the triple bottom line approach, but it is not the same thing. Both Direct Use Values and Indirect Use Values are economic values, but the latter falls into the category of Public Good with the former as a Private Good. Then there are the Non-Use values such as Option Value, Existence Value, Bequest Value, and Altruistic Value, each of which could theoretically be quantified and monetized. But those various values do not fit neatly into the economic/social/environmental framework of the triple bottom line. So, the metrics and methodologies included in this report are structured around the TBL, not the use/non-use distinction.

Third, it is important to note the distinction between quantification and monetization. For the economic values of heritage, quantification and monetization are essentially one in the same. That is because such metrics as property values, rents, tax generation, etc. are quantified in monetary terms. Even the economic measurements that are not immediately measured in dollars– vacancy rates, rates of change in values, time on the market for resale, etc. – can be converted to dollar amounts with relative ease.

On the environmental side, there are a number of variables that can be quantified – materials that might otherwise go into the landfill, embodied energy, relative energy use, etc. But those quantified components are not easily monetized. "Not easy" does not mean "impossible" but it is a challenge.

So, for the economic element quantification and monetization are basically the same. The environmental element quantification with monetization is a challenge. The most difficult, however, is the social component, where both quantification and subsequent monetization are difficult. Willingness to pay surveys are an indirect approach that has been used for valuing heritage assets elsewhere in the world but very rarely in the United States.

Finally, this document identifies both metrics and methodologies. The metric is what is measured while the methodology is the approach to quantify the metric. Multiple metrics are provided within each of the three TBL components, each with a best practice/ good practice methodology attached. Then for each there are two or more examples of the application of the methodologies to heritage resources.

Using a combination of these approaches should allow the Lemay team to generate a triple bottom line number for the City. It is important also to make clear that, if done right, the dollar amounts of these values are cumulative but not duplicative. That is to say that the total TBL value is the economic value plus the environmental value plus the social value. Therefore, care must be taken to assure that each metric is appropriately chosen and the methodology applied to avoid double counting economic contributions of the heritage resources. It is likely that, for any number of reasons, not every one of these metrics nor their associated methodologies will be utilized in valuing Calgary's commercial heritage resources. However sufficient examples of both metrics and methodologies are provided so that the outcome sought by the City under this RFP can ultimately be provided.

Economic Value

The economic value is the foundation upon which the Triple Bottom Line calculations are based. The numbers generated here are ones commonly in use in the real estate industry, but also by tenants, ad valorem taxing authorities, and others. The metrics, and to a lesser extent the methodologies, are generally understood beyond the rather narrow world of the analysis.

Property Values

Methodology: Value per Square Foot (as compared)

This is probably the best known and understood measurement in this report. Those shopping for a new house, for example, will decide, "Should we buy that one for $150,000 or this one for $160,000." The value of any given property is determined by the actions of buyers and sellers in the marketplace. Therefore, in the example above there is some combination of attributions that made property B worth $10,000 more than property A. For this assignment the key variable will be "is it or is it not a heritage property?" One of the ways to determine the significance of heritage status is to look for any difference in value. This would typically be done on a dollar per square foot basis (the unit of comparison) rather than a total value of the property being compared. It is important to note that any given number has little meaning in and of itself. Significance only emerges when number A is compared to number B. The comparison of the metric numbers will be central to this analysis.

Examples:

PlaceEconomics1[1], An Analysis of the Baltimore Historic Preservation Tax Credit (2020)

https://www.placeeconomics.com/wp-content/uploads/2020/09/Analysis-of-the- Baltimore-CHAP-Credit-7_31_2020_small.pdf

PlaceEconomics, Saratoga Springs Enhancing the Values Through Historic Preservation (2018)

https://www.placeeconomics.com/wp-content/uploads/2018/12/Saratoga-Springs-12.12.2018-smaller.pdf

[1] Many of the examples given in this document are studies conducted by PlaceEconomics. PlaceEconomics is the name under which Heritage Strategies International does work within the United States. These citations are not driven by corporate ego, but rather the reality that PlaceEconomics has done more analysis of the values and impacts of historic preservation than any other firm or institution in North America. Further "best practices" or at least "good practices" is a base criteria of the work done by the firm.

Change in Property Values

Methodology: Rate of Change Over Time (as compared)

Real estate values are rarely static; most commonly they change over time. An important measure in real estate investing is the amount of increase in value year by year. The most common way to measure this is to find the values from two or preferably more time periods then calculate the rate of change in the value between periods on an annual basis, expressed as a percentage of the initial value. Again, the unit of comparison is usually dollars per square foot and the rate of change is a percentage number annualized.

Examples:

PlaceEconomics, An Analysis of the Baltimore Historic Preservation Tax Credit (2020)

https://www.placeeconomics.com/wp-content/uploads/2020/09/Analysis-of-the- Baltimore-CHAP-Credit-7_31_2020_small.pdf

PlaceEconomics, Saratoga Springs Enhancing the Values Through Historic Preservation (2018)

https://www.placeeconomics.com/wp-content/uploads/2018/12/Saratoga-gs-12.12.2018-smaller.pdf

Commercial Rent

Methodology: Price per Square Foot (as compared)

In the end, a piece of commercial real estate is some multiplier of the amount it can generate in rent. From a tenant's point of view, the rent represents the value of the attributes of the space being located, including size, condition, character, proximity to markets, nearby tenants, efficiency of use and other variables. If the value of the real estate is a reflection of what the property is worth to the owner, the amount of rent willing to be paid represents the worth to the tenant.

Examples:

PlaceEconomics, Investing for Today, Preserving for Tomorrow: Preservation Easements and the Resurgence of Downtown Columbus (2019)

https://gbxgroup.com/media/1395/columbus-economic-impact-study.pdf

PlaceEconomics, Preservation Positive Los Angeles (2020)

https://www.laconservancy.org/sites/default/files/files/documents/Preservation%20Positive%20L.A.%20Study_Web.pdf

Commercial Vacancy

Methodology: Rate (as compared)

The ownership of real estate is almost inherently a long-term commitment. But for commercial properties the value of the real estate will be driven by the rents generated, and the leases that convey a possessory interest to a tenant are nearly always shorter than the likely ownership period of the landlord. Thus, the amount of time a property sits vacant between the departure of one tenant and his/her replacement by another can be a significant variable in the profitability of the property. Further, vacancy is also a reflection of demand for the space by the marketplace.

Examples:

PlaceEconomics, Reality & Recovery: Historic Preservation in the City of New York (2020)

https://www.placeeconomics.com/wp-content/uploads/2020/09/NYC-Report- Update-Draft-August-31-2020_small.pdf

PlaceEconomics, Using the Right Tools: Preservation Easements and Downtown Columbia, South Carolina (2018)

https://gbxgroup.com/media/1467/columbia-economic-impact-study_july-018.pdf

Businesses

Methodology: Businesses location revealed preference (as compared)

Business types are rarely distributed equally among the available commercial space. There are often patterns of locational choices among business types that favour one neighbourhood, building typology, relative proximity, etc. over others. When aggregated, these choices may indicate a revealed preference" of types of businesses (and/or the workers they employ) of one type of building or business district.

Examples:

National Trust for Historic Preservation, Older, Smaller, Better: Measuring How the Character of Buildings and Blocks Influences Urban Vitality (2014)

https://forum.savingplaces.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=b73e8fc7-7fb2-0fc7-202c-d0ed58ff3089&forceDialog=0

PlaceEconomics, Reality & Recovery: Historic Preservation in the City of New York (2020)

https://www.placeeconomics.com/wp-content/uploads/2020/09/NYC-Report- Update-Draft-August-31-2020_small.pdf

Direct/Indirect Jobs and Income from Investment

Methodology: Number of jobs and related labour income over multiple years.

In the Use/Non-Use approach to thinking about the values of heritage conservation, the jobs created through the process of historic building renovation falls into the "Indirect Use" category, meaning that it is an economic measurable but the benefit comes not directly from building use but rather through an economic activity resulting from the building use. This can be measured both in numbers of jobs created, and labour income generated and calculated on a direct, indirect, and induced basis.

Examples: National Park Service & Rutgers University Center for Urban Policy Research, Annual Report on the Economic Impact of the Federal Historic Tax Credit for FY 2018 (2019) [PIEM]

https://www.nps.gov/tps/tax-incentives/taxdocs/economic-impact-2018.pdf

PlaceEconomics, The Missing Key: A Study of the Impact and Potential of the Pennsylvania State Historic Tax Credit (2019) [IMPLAN]

https://www.placeeconomics.com/resources/the-missing-key-a-study-of-the- impact-and-potential-of-the-pennsylvania-state-historic-tax-credit/

Jobs

Methodology: Jobs per 1,000 Square Feet (as compared)

Density is most commonly thought of in regards to the number of people living in a square mile of area. But recent analysis has also revealed the importance of density of employment. A great density of employment usually translates to more pedestrian activity, higher sales per square foot, more external impacts of employees, and other positive consequences.

Examples: National Trust for Historic Preservation, Older, Smaller, Better: Measuring How the Character of Buildings and Blocks Influences Urban Vitality (2014)

https://forum.savingplaces.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=b73e8fc7-7fb2-0fc7-202c-d0ed58ff3089&forceDialog=0

PlaceEconomics, Making the Connections: A Study of the Impacts of Historic

Preservation in Indianapolis (2018)

https://www.placeeconomics.com/wpcontent/uploads/2018/04/IndianapolisImpactReport_Final1.compressed.pdf

Social Value

As was noted in the introduction, both quantifying and then monetizing the social component of a triple bottom line analysis is the most challenging. There is no direct way to quantify what is a largely qualitative set of feelings. Therefore, the approach needs to be indirect. Using some combination of the metrics below it should be possible to assign a dollar amount (or at least a range of dollar amounts) to the heritage commercial districts in Calgary representing their social value.

Public Attachment

Methodology: Willingness to Pay

One indirect approach that has been developed to measure social value is survey based and is known as the Willingness to Pay approach. It is described as "willingness to pay studies measuring the external effects, i.e. those welfare increasing effects of artistic activities not captured by the market."[2] While it has not been widely (if ever) applied to heritage precincts in North America, there are international examples of valuing heritage assets through this method elsewhere in the world.

Examples:

Throsby, Investment in Urban Heritage: Economic Impacts of Cultural Heritage

Projects in FYR Macedonia and Georgia (2012)

https://openknowledge.worldbank.org/bitstream/handle/10986/17386/NonAsciiFileName0.pdf?sequence=1&isAllowed=y

Laplante, Meisner, and Wang, Environment as Cultural Heritage: The ArmenianDiaspora's Willingness-to-Pay to Protect Armenia's Lake Sevan (2005)

http://documents1.worldbank.org/curated/en/855881468742817483/pdf/wps3520.pdf

[2] What Values Should Count in the Arts: The Tension Between Economic Effects and Cultural Value, page 2: http://www.crema-research.ch/papers/2005-24.pdf

Pedestrian Count

Methodology: Rate (as compared)

When data is available, pedestrian activity can demonstrate much about the vibrancy of urban spaces. Studies suggest that there is a relationship between older, character rich areas and pedestrian activity levels. These areas have a wide diversity of businesses that encourage round the clock activity, resulting in more pedestrian foot traffic. Additionally, smaller building footprints and traditional architecture provides for a more human-scaled experience and visual interest at the street level. This increase in pedestrian traffic bolsters the argument that these older areas are economic engines and have an overall greater impact on the economy of the city.

Examples:

National Trust for Historic Preservation, Older, Smaller, Better: Measuring How the Character of Buildings and Blocks Influences Urban Vitality (2014)

https://forum.savingplaces.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=b73e8fc7-7fb2-0fc7-202c-d0ed58ff3089&forceDialog=0

Schneider, Arnold, and Ragland, Methodology for Counting Pedestrians at Intersections Use of Automated Counters to Extrapolate Weekly Volumes from Short Manual Counts (2009)

https://safetrec.berkeley.edu/sites/default/files/publications/methodology_for_counting.pdf

Locally-Owned Businesses

Methodology: Inventory + Survey of Willingness to Pay

Commercial neighborhoods are often valued for the character of their buildings. But just as often they are valued by the nature of the businesses located there. A sizable share of North American consumers holds as important the opportunity to buy from stores that are locally owned. A higher share of locally owned businesses can result in an expressed preference for the business district.

Examples:

Halbesleben and Tolbert, Small, Local, and Loyal: How Firm Attributed Affect Workers Organizational Commitment, (2014)

https://www.researchgate.net/publication/267506705_Small_local_and_loyal_How_firm_attributes_affect_workers'_organizational_commitment

"Stroope, Franzen, Tolbert, and Mencken, College Graduates, Local Retailers, and Community Belonging in the United States (2014)

https://www.tandfonline.com/doi/abs/10.1080/02732173.2014.878612

"Walk Score®, Transit Score®, and Bike Score®

Methodology: Score (as compared)

The Walk Score suite of metrics is a proprietary algorithm used to assess a location's access to various different amenities. Locations are provided with a score based on how pedestrian-friendly they are and how well served they are by public transit or biking infrastructure. Scores recorded in older areas and historic districts can then be compared to both the city average and similar areas of new construction. It has been found that older areas, with more diverse building types and building ages, have significantly higher Walk Scores, Bike Scores, and Transit Scores. This adds to the overall quality of life and wellbeing of residents.

Examples:

National Trust for Historic Preservation, Older, Smaller, Better: Measuring How the Character of Buildings and Blocks Influences Urban Vitality (2014)

https://forum.savingplaces.org/act/research-policy-lab/older-smaller-better

PlaceEconomics, The New Nashville: A Study of the Impacts of Historic Preservation (2019)

https://www.placeeconomics.com/wp-content/uploads/2019/06/Nashville-Report-6.19.19-spreads-smaller2-compressed.pdf

Environmental Value

Although the concept of sustainable development is built on three pillars -- economic, social, and environmental -- for many the environment is first among equals. The TBL approach, grounded as it is in the sustainable development framework, requires first a quantification of and then the monetization of the environmental contributions and impacts of heritage.

Tree Cover

Methodology: Rate (as compared) and Added Value per Acre

Urban tree canopies perform many important functions, including reducing the urban heat island effect, lowering levels of air pollution, providing wildlife habitats, aids in stormwater management, and improves the aesthetic quality of a community. The methodology for obtaining tree canopy cover data can range from field survey and GIS documentation, to advanced LIDAR technology. Where available, this data can be used to compare the size of the canopy in older areas of the city against newer areas. It can also be used to calculate the economic value of tree cover.

Examples:

PlaceEconomics, Enhancing Paradise: The Impacts of Historic Preservation in Miami-Dade County (2018)

https://www.placeeconomics.com/wp-content/uploads/2018/11/Miami-Dade-spreads.pdf-8.30.18-smaller.pdf

TreePeople, Los Angeles Tree Canopy Assessment (2019)

https://www.treepeople.org/sites/default/files/pdf/tree-canopy-data/Tree%20Canopy%20LA%202016%20Report_FINAL%2020190425.pdf

Embodied Energy

Methodology: Building Concept Model; Building Survey Model; Building Inventory Model

Embodied energy is defined as the amount of up-front energy investment associated with extracting, processing, manufacturing, transporting and assembling building materials. Put simply, it is the energy already expended to build a building. A number of different models have been developed, most notably by the National Association of Preservation Commissions and Costanza, to estimate the amount of embodied energy in existing buildings. However, as a general rule of thumb, embodied energy is calculated at about 1.1 MBTU (million BTUs) per square foot for a generic commercial building.[3]

Examples:

Hasenfus (Thesis), Measuring the Capital Energy Value in Historic Structures (2012)

http://repository.upenn.edu/hp_theses/224

ACHP, Assessing the Energy Conservation Benefits of Historic Preservation: Methods and Examples (1979)

https://dnr.mo.gov/shpo/docs/ACHP_embodied-energy_1979.pdf

"Robert Costanza, Embodied Energy and Economic Valuation (1980)

https://www.researchgate.net/publication/6029194_Embodied_Energy_and_Economic_Valuation

Energy Use

Methodology: BTUs per Square Foot (as compared)

Energy use is the calculation of energy needed to operate a building, including heating, cooling, and electrical service. Operating energy use varies greatly from building to building and is dependent on a number of factors, including envelope and system performance, as well as building management and maintenance occupant behaviour and building life span[4]. Some cities, such as New York, have undertaken long-term initiatives to help gauge the energy usage and consumption of buildings. This information is reported by building owners in BTUs (British Thermal Units) and made publicly available online by the City. Using the age and square footage of the building, it is possible to calculate and compare energy usage for buildings by the decade in which they were built.

Examples:

PlaceEconomics, Reality & Recovery: Historic Preservation in the City of New York (2020)

https://www.placeeconomics.com/wp-content/uploads/2020/09/NYC-Report-Update-DraftAugust-31-2020_small.pdf

National Trust for Historic Preservation, The Greenest Building: Quantifying the Environmental Value of Building Reuse (2011)

https://forum.savingplaces.org/viewdocument/the-greenest-building-quantifying

National Trust for Historic Preservation, Realizing the Energy Efficiency Potential of Small Buildings (2013)

https://forum.savingplaces.org/viewdocument/realizing-the-energy-efficiency-pot

[3] Cronyn and Paull, Heritage Tax Credits: Maryland's Own Stimulus to Renovate Buildings for Productive Use and Create Jobs, an $8.53 Return on Every State Dollar Invested (2009).

[4] National Trust for Historic Preservation, The Greenest Building: Quantifying the Environmental Value of Building Reuse (2011).

Life Cycle

Methodology: Life Cycle Assessment (LCA)

Life Cycle Assessment (LCA) is a methodology that assesses the environmental impacts that one object has on the world around it. It is an internationally recognized approach to evaluating the potential environmental and human health impacts associated with products and services throughout their life cycles, beginning with raw material extraction and including transportation, production, use, and end-of-life treatment. Among other applications, LCA can identify opportunities to improve the environmental performance of products at various points in their respective life cycles; inform decision making; and support marketing and communication efforts. LCA is increasingly being employed by the construction industry to evaluate the environmental performance of buildings, building materials, and construction practices.[5] Using modeling software developed by the Athena Sustainable Materials Institute, it is possible to quantify a number of different metrics, including embodied energy, determine which stage of a building's life has the most environmental impact, and compare the life cycle impacts of buildings undergoing rehabilitation as opposed to demolition and new construction.

Examples:

National Trust for Historic Preservation, The Greenest Building: Quantifying the Environmental Value of Building Reuse (2011)

https://forum.savingplaces.org/viewdocument/the-greenest-building-quantifyingEmbodied Effects for Existing Historic Buildings, Prepared for Parks Canada (2009)

Athena Sustainable Materials Institute, A Life Cycle Assessment Study of Embodied Effects for Existing Historic Buildings, Prepared for Parks Canada (2009)

http://www.athenasmi.org/wp-contentuploads/2012/01/Athena_LCA_for_Existing_Historic_Buildings.pdf

Athena Impact Estimator and EcoCalculator - LCA tool

http://www.athenasmi.org/our-software-data/impact-estimator/

http://www.athenasmi.org/our-software-data/ecocalculator/

Energy Diversion

Methodology: Multiple ratios comparing environmental consequences of rehabilitation versus new construction

Using a methodology developed by Cronyn and Paull, it is possible to use the square footage of a rehabilitated building to quantify a number of different environmental benefits, including Vehicle Miles Traveled (VMT), travel-related CO_2, vehicles taken off the road, acres of greenfield land preserved, and demolition debris diverted.

Examples:

Cronyn and Paull, Heritage Tax Credits: Maryland's Own Stimulus to Renovate Buildings for Productive Use and Create Jobs, an $8.53 Return on Every State Dollar Invested (2009)

https://www.abell.org/sites/default/files/publications/arn309.pdf

PlaceEconomics, Historic Preservation: An Overlooked Economic Driver - A Study of the Impacts of Historic Preservation in Rhode Island (2018)

https://www.placeeconomics.com/wp-content/uploads/2018/03/Rhode-Island-Report_3.2.18-pages-smaller.pdf

Demolition Debris/Waste

Methodology: Volume per Square Foot Demolished

It is estimated that 14% of the waste received by landfills in Canada is Construction & Demolition (C&D) debris. C&D materials include bulky, heavy materials such as concrete, lumber, asphalt, gypsum, metal, brick, glass, plastic, and other finishes–many of which are salvageable for reuse. Rather than sitting in a landfill, reuse keeps building materials out of the waste stream, preserves embodied energy, and creates less air and water pollution. The United States Federal Emergency Management Agency (FEMA) has developed techniques and equations to estimate the amount of C&D debris generated by the demolition of a structure. Using the length, width, and height of the structure, one can estimate the total volume (cubic yards) of C&D debris that might end up in a landfill as the result of traditional mechanical demolition.

Examples:

FEMA, Debris Estimating Field Guide (2010)

https://www.fema.gov/sites/default/files/2020-07/fema_329_debris-estimating_field-guide_9-1-2010.pdf

Loucks, Engineering Calculations: Demolition & Waster Source Volume Calculations (2012)

https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5357505.pdf

[5] National Trust for Historic Preservation, The Greenest Building: Quantifying the Environmental Value of Building Reuse (2011).

Conclusion

The City of Calgary will be at the cutting edge in North America in providing decision makers and citizens a comprehensive, Triple Bottom Line valuation of the four historic commercial districts that are the subjects of this analysis. This information should set the bases for identifying appropriate tools, policies, incentives, and strategies to enhance and maintain Calgary's historic built environment and the differentiation, identity, and character that those heritage buildings provide. While all of the metrics and related methodologies identified in this report will not necessarily be used in calculating the TBL values, they do represent a range of good and best practices with related analyses that should ground the next steps in this assignment.

Appendix B – Premium Analysis

March 30, 2021

Memorandum to: Mark Chambers
Lemay

From: Peter Norman
VP & Chief Economist
Altus Group

Subject: Value of Heritage Characteristics in Calgary

Our File: P-6465

Altus Group has been asked to analyse the potential relationship between heritage status of a commercial property and its value in the City of Calgary. The focus of this investigation is on small to mid- sized properties. The evidence related to this investigation will assist in defining the potential value in recognition of heritage commercial properties in general and the potential value of heritage conservation within a heritage district setting in particular.

Methodology

Altus Group collects data on property transactions. The study team assembled a database of property transactions to use for the study. All commercial property transactions were pulled and sorted to include retail and office properties, and to include small and medium sized properties. Retail properties that were classified as freestanding or street front properties were included as well as office properties under 20,000sq. ft. Several non-relevant properties were removed from the database including retail strip, neighbourhood and community centres and power centres, automotive repair shops and dealerships, gasoline stations, non-arms-length and non-market transactions and transactions that were clearly land redevelopment matters. All transactions were collected from the period January 2010 to November 2020. In all, some 530 property transactions are used in this analysis.

Further analysis of the data were undertaken. Some 37 (or 7%) of the transactions were identified as heritage properties. This identification process included whether the property was listed with the City of Calgary in its Heritage Properties Register and also a manual review by Lemay was undertaken identifying properties with significant heritage features whether on the Register or not.

A further analysis was undertaken to identify properties (other than the ones in the first group, i.e., "non heritage properties") in the transaction database that are also located in one of the four heritage areas identified in this project. In total some 14 (or 3%) of the sample met this criteria.

The data were also annotated with the intended use of the property (office use, retail use by type of retail) and the date of the transaction.

A multiple regression analysis was undertaken on the resulting sorted and cleaned dataset. The dependent variable in the analysis is the transaction value per square foot of GFA registered in the property transaction. The independent variables include the year of the property transaction, a dummy variable indicating inclusion in the heritage category, a dummy variable indicating inclusion in the heritage adjacent category and a dummy variable for retail use.

A multiple regression analysis is a standard analytical tool for determining the statistically significant contribution of characteristics on a dependent variable. In effect, it measures the effect of a characteristic, while taking into account any other influences (or "holding them constant").

According to Altus Group's regression analysis of the property transaction data, the following significant findings were made:

- Across all property transactions, the average selling price was $368.80 per square foot (PSF).
- There was a significant influence of heritage on property value: Heritage characteristics add $36.60 PSF (all other factors held constant).
- There was a significant influence of location in one of the four heritage study areas for non- heritage properties: this characteristic adds $64.00 PSF (all other factors held constant).

These findings were tested with statistical tests. The finding on the value impact of heritage characteristics is accurate to 80% significance and the finding on the value impact of heritage adjacency on values is 80% significant.

Value Impacts

We understand that aggregate values have been compiled to represent the four study areas. Within these study areas, heritage properties account for 49% of the total assessed value. This proportion ranges from 25% in Beltline/Victoria Park to 53% in Stephen Avenue area. Taken together, Stephen avenue area is the largest, accounting for 75% of the properties by value across all the study areas, and 81% of the heritage properties by value. In total, the assessed value of the heritage properties across all the areas amounted to some $385 million.

Given the results set out above, there is strong evidence that a component of the value of the heritage properties relates directly to heritage attributes. Our assessment is that up to $38.2 million in value across the four areas is attributable to the heritage status, and a further $68.6 million in value across the four areas can be attributed to the component of value in non-heritage properties that relates to their being in the heritage district. In total, some $106.8 million in the assessed value of properties across the four districts can be related to the heritage characteristics of the four districts.

These findings are set out in the exhibit below.

We trust the foregoing is in order

City of Calgary Heritage Area Value Analysis

District	Heritage-Identified Properties $ (000s)	Non-Heritage Properties In Heritage Areas $ (000s)	Total Value $ (000s)
Assessment Base			
Beltline/ Victoria Park	21,648	65,792	87,440
Inglewood/ Ramsay	36,094	40,932	77,026
Kensington	14,420	13,788	28,208
Stephen Avenue	312,851	274,389	587,240
Total All Areas	**385,012**	**394,901**	**779,913**
Heritage Influence Value			
Beltline Victoria Park	2,149	11,422	13,571
Inglewood/ Ramsay	3,583	7,106	10,689
Kensington	1,431	2,394	3,825
Stephen Avenue	31,058	68,559	106,781
Total All Areas	**38,222**	**68,559**	**106,781**

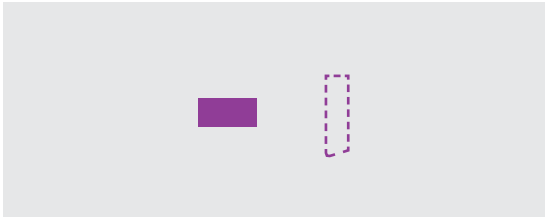
Altus Group based on data from Heritage Strategies International

Appendix C – Catalogue of Heritage Districts

Ke

Kensington

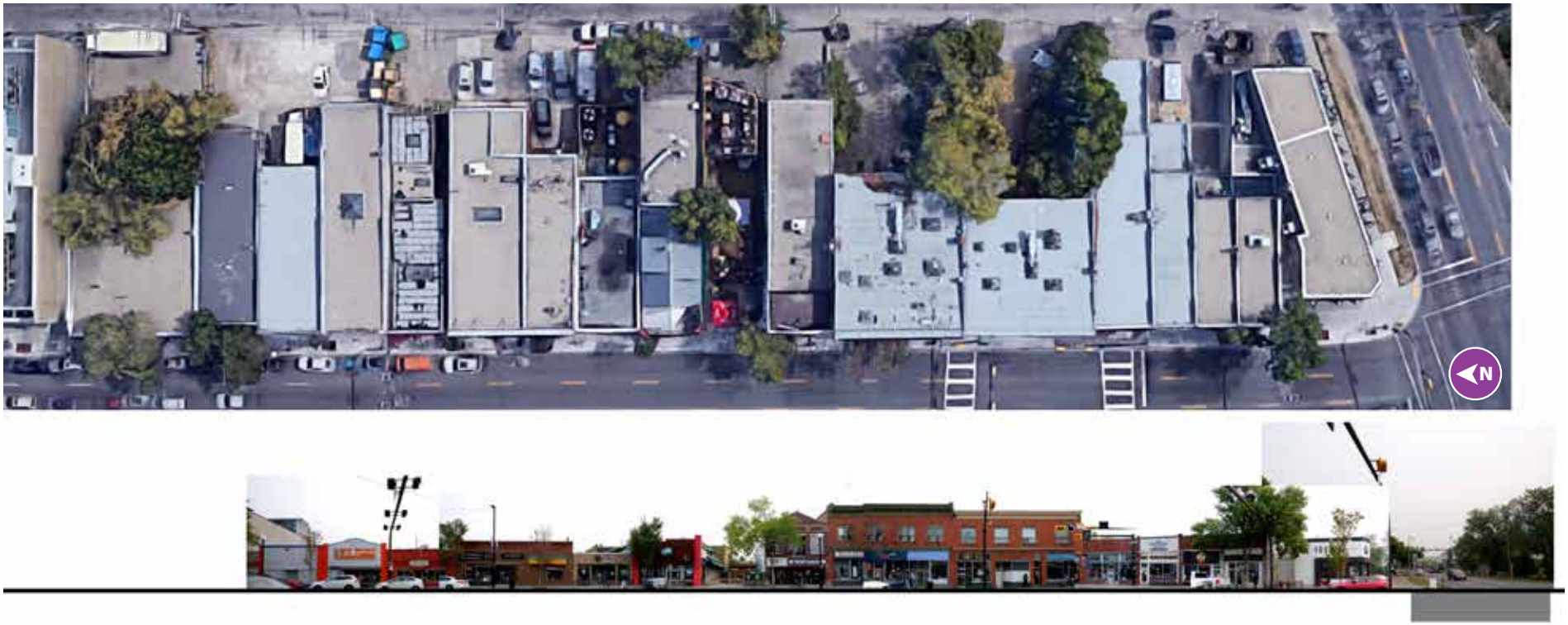
Kensington Road NW - North side
10A Street NW to 11 Street NW
1100-block Kensington Road NW



Ke

Kensington

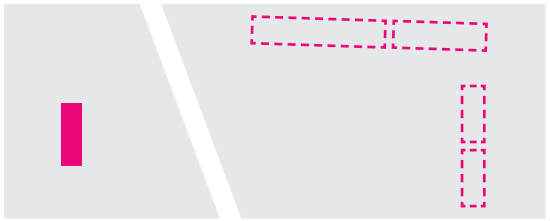
10 Street NW - East side
Memorial Drive to 134 10 Street NW
100-block 10 Street NW



Bel

Beltline

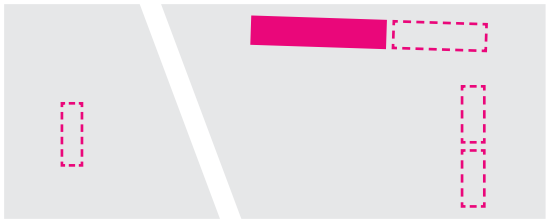
11 Street SW - West side
14 Avenue SW to 15 Avenue SW
1400-block 11 Street SW



Bel

Beltline

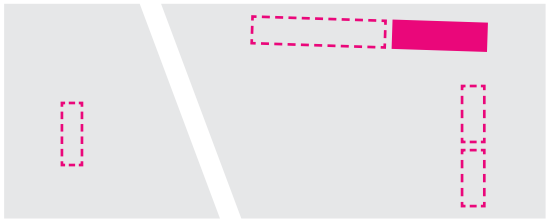
10 Avenue SW - South side
2 Street SW to 4 Street SW
300-block 10 Avenue SW



Bel

Beltline

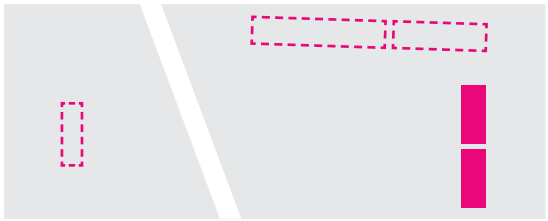
10 Avenue SW - South side
1 Street SW to 2 Street SW
200-block 10 Avenue SW



Bel

Beltline

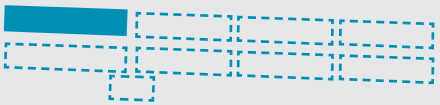
1 Street SW - West side
11 Avenue SW to 12 Avenue SW
1100-block 1 Street SW



Ste

Stephen Avenue - Downtown

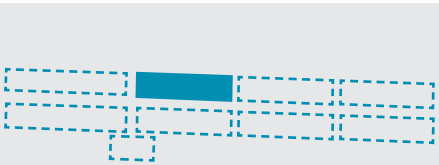
8 Avenue S - North side
1 Street SW to 2 Street SW + Part of
3 Street Block
200-block 8 Avenue SW



Ste

Stephen Avenue - Downtown

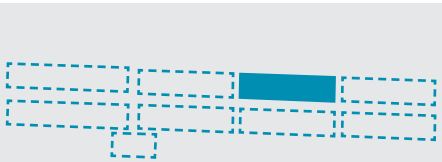
8 Avenue S - North side
Centre Street S to 1 Street SW
100-block 8 Avenue SW



Ste

Stephen Avenue - Downtown

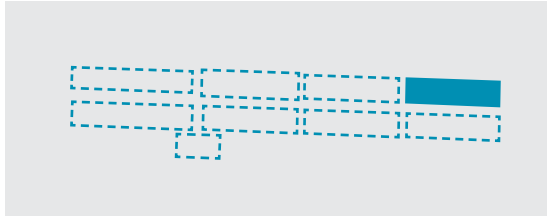
8 Avenue S - North side
Centre Street S to 1 Street SE
100-block 8 Avenue SE



Ste

Stephen Avenue - Downtown

8 Avenue S - North side
1 Street SE to Macleod Trail SE
200-block 8 Avenue SE



Ste

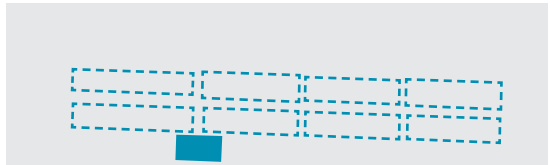
Stephen Avenue - Downtown

8 Avenue S - South side
1 Street SW to 2 Street SW + Part of 3 Street block
200-block 8 Avenue SW

Ste

Stephen Avenue - Downtown

1 Street SW - West and East side
Grain Exchange Building +
The Edison Building
800-block 1 Street SW



Ste

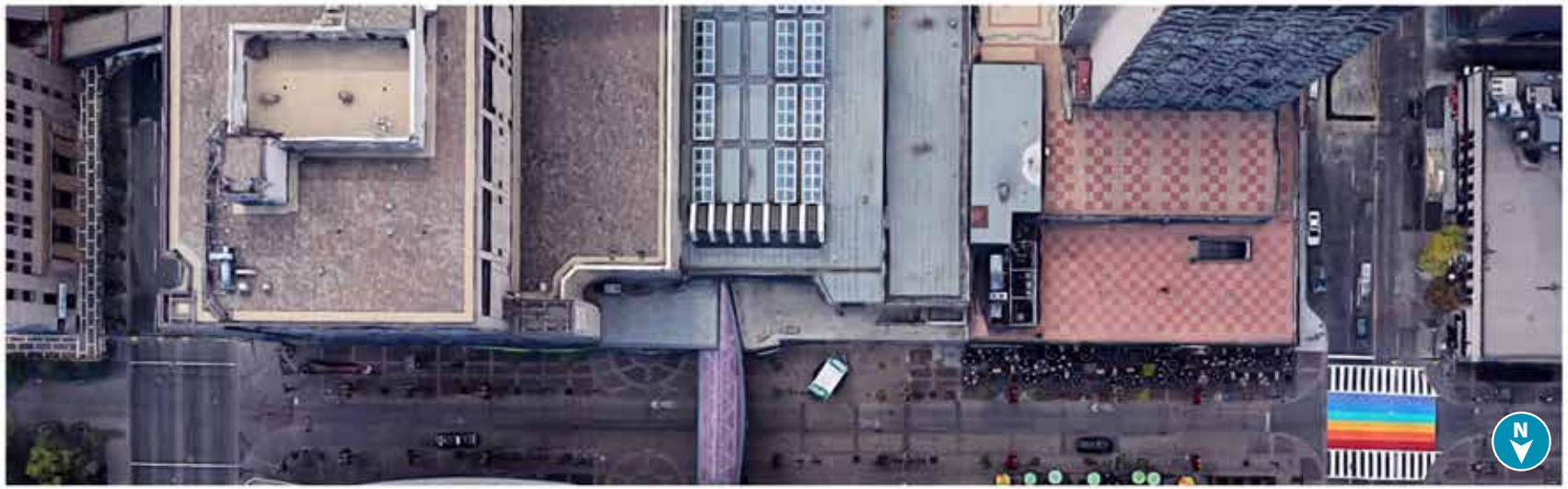
Stephen Avenue - Downtown

8 Avenue S - South side
Centre Street S to 1 Street SW
100-block 8 Avenue SW

Ste

Stephen Avenue - Downtown

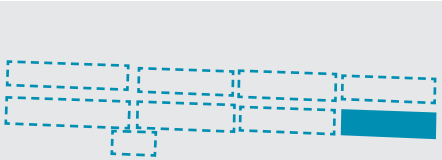
8 Avenue S - South side
Centre Street S to 1 Street SE
100-block 8 Avenue SE



Ste

Stephen Avenue - Downtown

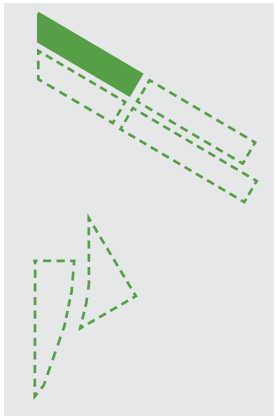
8 Avenue S - South side
1 Street SE to Macleod Trail SE
200-block 8 Avenue

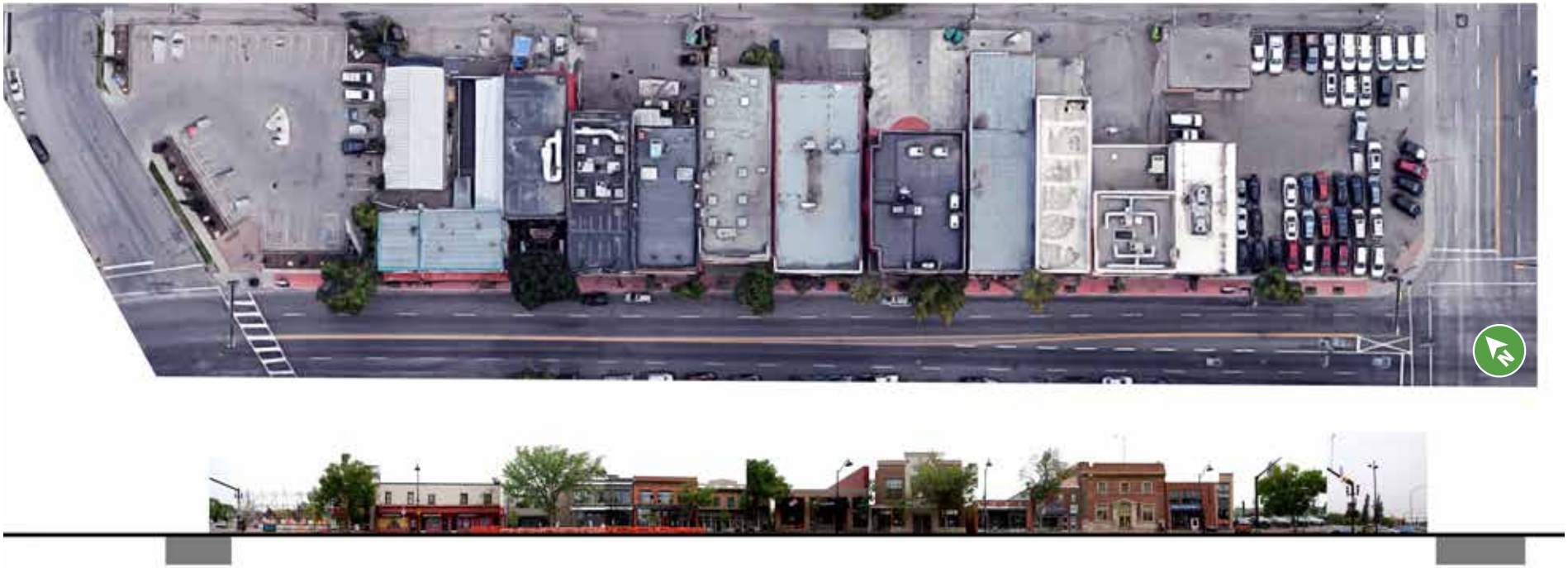


I/R

Inglewood/Ramsay

9 Avenue SE - North side
11 Street SE to 12 Street SE
1200-block 9 Avenue SE

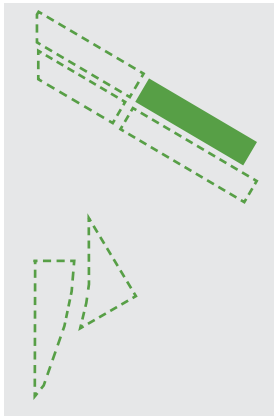


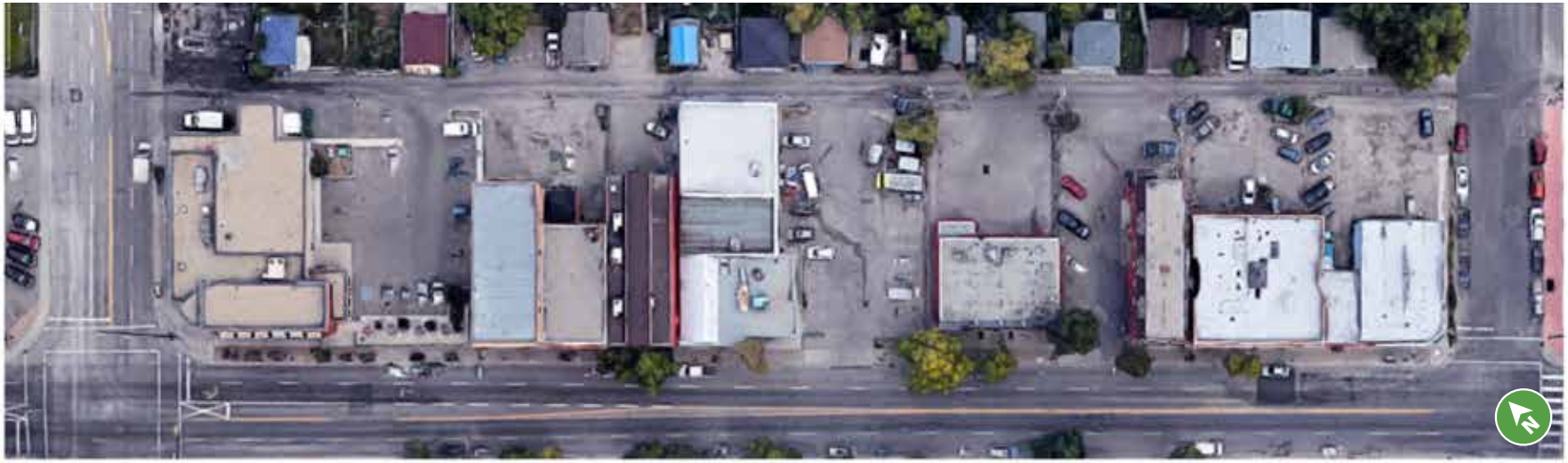


I/R

Inglewood/Ramsay

9 Avenue SE - North side
12 Street SE to 13 Street SE
1300-block 9 Avenue SE

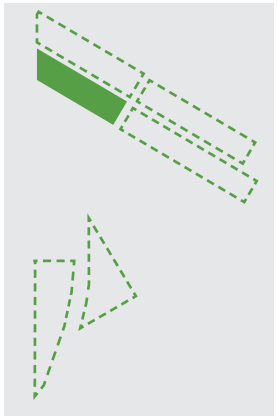




I/R

Inglewood/Ramsay

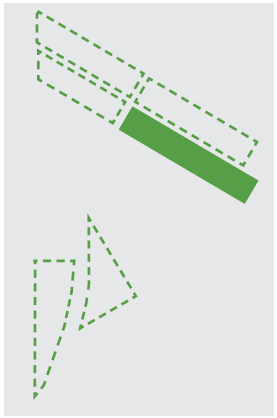
9 Avenue SE - South side
11 Street SE to 12 Street SE
1200-block 9 Avenue SE



I/R

Inglewood/Ramsay

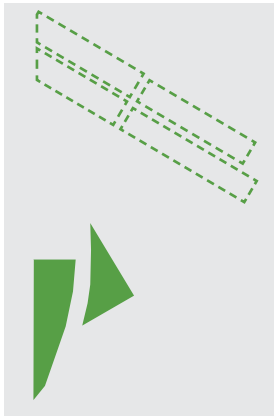
9 Avenue SE - South side
12 Street SE to 13 Street SE
+ Gresham Block
1300-block 9 Avenue SE

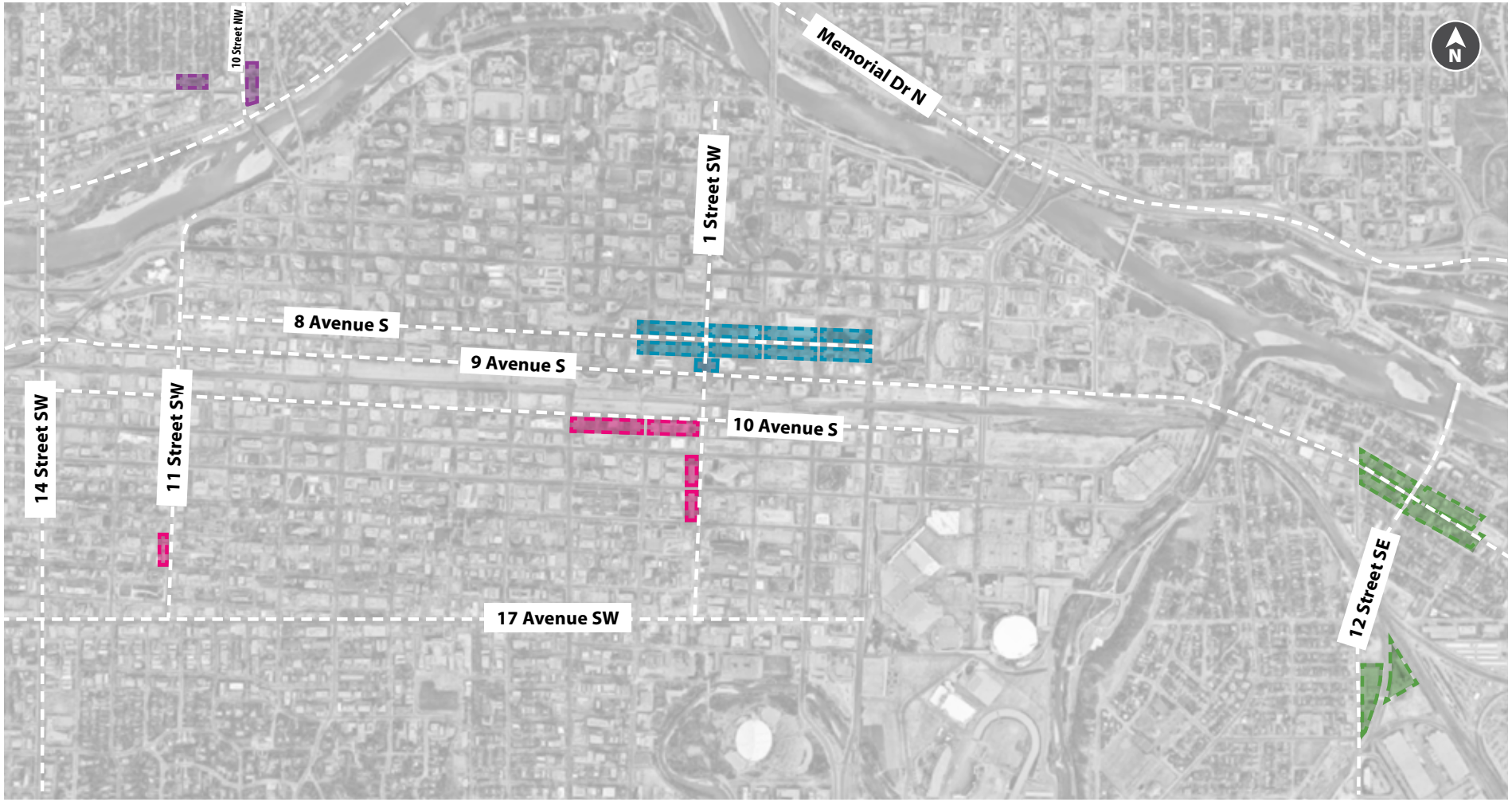


I/R

Inglewood/Ramsay

11 Street SE - East side
18 Avenue SE to 21 Avenue SE
+ 1240 20 Avenue SE





Bel Beltline/Victoria Park

Ke Kensington

Ste Stephen Avenue

I/R Inglewood / Ramsay