Evolving Calgary's Suburban Built Form

Patrick Saunders

McGill University Master of Urban Planning SRP
2012

Table of Contents

EXECUTIVE SUMMARY

Cities are the manifestation of the collective wealth, knowledge, and values of communities and societies. Each city grows and evolves alongside its residents, who are defined by, and take pride in, the city they live in. Metropolitan regions are now home to over 80% of Canadians. Of those who live in Census Metropolitan Areas (CMAs), nearly two in three live in postwar suburban districts. Canadian urban growth largely took place during times of low energy prices as cities grew into vast agricultural greenfields surrounding their older industrial-commercial centres. Our metropolitan areas are thus predominantly low-density automobile-oriented spaces. These postwar patterns of suburban growth and development are, however, now being questioned as sustainable ways to grow, and many major Canadian cities are seeking to address this challenge. For example, during the 1990s, Vancouver directed 80% of its growth to already urbanized areas. Toronto directed 44% of its growth to urbanized areas. Calgary, however, directed only 22% of its growth to urbanized areas, leaving 78% of new development to take place on greenfield sites surrounding the city (Taylor, Z. & Burchfield, M, 2010). This is due to a variety of factors, including but not limited to geographical limitations, municipal policies, and the timing of 'boom-and-bust' growth cycles.

This paper examines the evolution of suburban Calgary. It is not intended to critique and find fault with Calgary's low-density pattern of growth, as the consequences of 'sprawl' have been well documented by others, notably Foran (2009). Rather, its purpose is to better understand suburban Calgary, and from this understanding, to propose strategies that can improve the metropolitan region through its suburbs.

The paper is divided into three sections with a chronological structure examining the past, the present, and the future. The first, *Evolution of the Suburban Built Form*, provides a historical account of suburban growth in Calgary. It first places these patterns of expansion within the Canadian context, describing the particular suburban forms of Calgary along with the politics and processes that went into shaping both pre-war and post-war growth. As is the case in many Canadian cities, suburban landscapes from before and after the Second World War differ greatly.

The second section, *Analysis: Optimising Suburban Landscapes,* is a critical examination of Calgary's contemporary suburban form. The section draws on scholarly and professional work by others to evaluate the strengths and weaknesses of Calgary's suburbs. Notably, it uses the seven qualities of responsive environments (Bentley, *et al.,* 1985) as a framework for an analysis of Calgary's suburbs. This section also introduces the concept of suburban intensification, and provides tools, techniques, and precedents for healthy examples of suburban intensification that have proven successful within the context of Calgary.

The final section, *Site Plans for More Resilient Suburbs,* points towards potential futures for Calgary's suburbs. Two original case studies for intensification strategies are presented. These projects could serve their local and metropolitan contexts by increasing accessibility to services, locating residents in strategic locations near major transit lines, and making better use of underutilized and underperforming spaces within the suburban landscape. The first example, located in the community of Southwood in the southwest quadrant of the city, examines the feasibility of the intensification of a ubiquitous site in suburban Calgary: a post-war neighbourhood strip mall. The second case study focuses on a vacant parking lot adjacent to the Whitehorn Light Rail Transit (LRT) station. This case study examines the benefits of a

Transit-Oriented Development, which can provide underserviced areas with services, diverse and affordable housing, and a community 'heart'.

Calgary's low-density pattern of development has created many comfortable, safe neighbourhoods. For the city to stay strong, however, these spaces must adapt and evolve to stay healthy. Calgary is undergoing some political and social evolution as well. Politicians and policymakers now seek to implement strategies for suburban intensification and smart growth, while popular demand for walkable, accessible neighbourhoods continues to grow. Given the social energy and specifics of Calgary's suburban development patterns, the opportunities to strengthen and intensify nodes within suburban communities are now abundant.

ACKNOWLEDGEMENTS

I would like to express my very great appreciation to my supervisor, Nik Luka, for his support throughout the writing of this paper. The assistance and comments provided by Geneviève Vachon was also greatly appreciated. Thank you both very much.

INTRODUCTION / CONTEXT

Home to approximately half of Canadians, the suburbs are one of the most comfortable, familiar, and ubiquitous landscapes in the country (Fortin et al., 2001; Harris, 2004; Luka & Trottier, 2000). Despite their critiques, the suburbs are characteristic of Canadian metropolitan regions. Across Canada, suburbanization has created homogeneity to the urban periphery, where low-density residential areas are separated from other uses by strict zoning bylaws, homes are mass-manufactured, and freeways intersect the landscape.

Suburbanization, or growth beyond the urban core, has existed as long as cities have developed, but since the mid-twentieth century, Canada's urban landscape has been dramatically transformed. Following the war, an era of modernization fuelled by industrialism and fordist production of housing (Harris, 2004) allowed Canadian cities to grow in ways that had not previously been possible. Higher rates of car ownership allowed for more dispersed patterns of development. Federal subsidies for mortgages encouraged corporate homebuilding and made single-family housing more easily attainable. Downtown office buildings became taller. Shops moved from main streets into malls. Expressways replaced streetcars; airports replaced train stations. Combined with federally-underwritten residential mortgages, this new metropolitan morphology afforded the average Canadian the luxury of moving into a suburban dwelling, idealized as a single-detached house on a quiet street providing privacy with generous setbacks from the street and neighbouring houses, creating spaces of anonymity and conformity (Evenden, L.J., & Walker, G.E., 1993; Harris, 2004; Lortie, A., 2004). Across North America, this suburban shift has happened peacefully and pervasively, and with generally little resistance

By the early 1990s, the metropolitan balance had tipped towards the suburbs, which by then had more jobs and a greater population than core urban and rural areas combined (Southworth, 1993; Owens, 1993). However, critics of suburbs present arguments pointing out the wasteful consumption of land, decaying downtowns, dependence on the automobile, lack of walkability, and/or socially isolating characteristics due to its strict separation of land uses and low-density residential areas (Brueckner, 2001; Burchell, 2005).

Criticisms are important for planning because they alert us to opportunities to develop strategies for change. Canadian suburbs are evolving, albeit slowly. Rising energy prices make commuting more

costly. With less industry and manufacturing, inner-city life is becoming more desirable (Bourne, 1992). The suburbs are no longer exclusively the realm of the middle class. Before the year 2000 in the United States, more than 50% of people living below the poverty line resided in inner-city neighbourhoods, but in the past decade 55% have been found in the suburbs (New York Times, 2011)

To Generation Y, who are becoming first-time homebuyers, privacy is defined by a computer setting rather than a building setback. In a context of changing social norms and constant improvements in technology, innovations in housing and suburban form lag enormously. Although suburbs are evolving demographically, economically, and politically, in many ways, new suburbs being built are substantially similar in form to those built in the 1950s [Johnson, 1996]. Some new alternatives to typical suburban form are starting to appear, such as Transit-Oriented Development, which takes advantage of building sites within easy walking distance of mass transit, and New Urbanism, which mimics historical housing and neighbourhood forms. (Cervero, R; Talen, 1999) Although projects of this sort represent less than one percent of suburban land (Wheeler, 2008), they are increasing quickly.

As cities evolve, suburbs must evolve correspondingly. In Calgary, the current mayor and planning director are strongly in favour of policies for suburban intensification and smart growth. Calgary's mayor, Naheed Nenshi, has mandated that '*Calgary will be a city of sustainable, walkable, liveable, complete communities'* (Nenshi, 2010).

OBJECTIVES AND METHODS

Today's pattern of suburban development must operate in a new manner. When examined through criteria such as cost, aesthetic value, public health, traffic, and exclusionary principles, suburban development is often underperforming. It should be operating more financially efficiently. Urban design must create healthier and more livable spaces. Environment must be protected and conserved, and where we live must make us a healthier society. Cities need to become less car-oriented, and must be equitable places for a wide diversity of the population.

With these criteria in mind, this paper is designed to provide an understanding of suburban development in Calgary that is written from an Urban Design perspective. Urban Design is not simply referring to the aesthetic quality of a space, nor is synonymous to the city beautiful movement, but rather it is a term that refers to both the physical and socio-cultural aspect of urban space (Carmona, et al. 2003). In this paper, it is assumed that good Urban Design fosters places which enable interactions among the users of a space. Good Urban Design should prioritize people by creating environments which are responsive to its user's needs (Bentley, et al,, 1985). As a field of study, Urban Design has been largely preoccupied with urban cores, and studies of form at the urban fringes have been less of a focus. However, understanding past, present, and future suburban form must be a critical focus for future regulation and policy creation. To better understand the past, present, and future of suburban form, the paper analyses Calgary's suburbs through three different lenses.

First, the paper attempts to provide a thorough and detailed account of the historical development of the built environment of suburban Calgary. Before prescribing any directions for future growth, it is essential to understand the historical context that created the exiting template on which future growth will occur. Especially pertinent in this component is the analysis of the changes that occurred during the postwar shift towards a more fordist suburban model that emphasized

segregated, low-density land uses and a hierarchical road network. The information contained in this component will draw largely from work done by notable Canadian historians and urbanists including Sandalack and Nicolai (2006), Foran (1978, 2009), Harris (2004), and Bourne (1987, 1992, and 1996), historical planning documents, as well as first-hand information gained through various site visits.

Secondly, the paper attempts to look beyond the Calgary's physical suburban built environment, and place its particular patterns of growth in the context of relevant literature and theory. Using concepts such as performance dimensions, a better understanding of how well suburban Calgary is operating is defined. Existing tools that can be used to guide growth and precedents that provide beneficial suggestions are also examined in order to better support future development directions. The information contained in this sections will be largely based on urban planning and urban design literature, with emphasis on dimensions of performance, as described by Bentley *et al.* (1985), and Lynch (1960), as well as the concept of Suburban Intensification (Dunham-Jones, E; Williamson, J., 2011). Theories of New Urbanism and precedents using this model are examined. New Urbanism is a model that combines good Urban Design ideas as well as time-tested planning principles (Talen, 1999). The literature will then be applied to the Calgary context using research from various sources, including demographic data analysis, City Council documents, newspaper articles, and first-hand site visits.

Finally, a prescriptive analysis is applied to two sites in suburban Calgary. These case studies are based off the ideas examined previously in the paper, and are used to show that based on a strong understanding of the particular growth patterns of suburban Calgary and based on the relevant theories and models of suburban growth, a more sustainable type of growth is achievable and beneficial in Calgary. Information contained in this section is mainly the suggestion of the author, with opinions being based on research done in the previous sections and detailed site visits and site analyses.

DEFINITIONS

Suburban growth is a polarizing issue, conjecturing images of both the idealized American Dream as well as monotonous 'sprawl' devastating natural landscapes and productive farmlands. In defining the suburbs, Statistics Canada (2008) uses four parameters to objectively differentiate the suburbs from the central city based on jurisdictional and quantitative criteria:

1. Administrative or political boundaries;

2. The boundaries of the city's central core (commonly known as the inner city);

3. Distance from the city centre; and

4. Neighbourhood density (for which various classifications are created using metrics such as people per square kilometre or percentage of single and semi-detached homes)

When defining continuity and change in suburbs over time, it is important to use more qualitative criteria. A familiar term for suburban growth is 'sprawl', which often carries a pejorative connotation. A simple, unbiased definition of sprawl that is based on three quantifiable criteria is: "unlimited outward extension into undeveloped areas; low density; and leapfrogging development" (Burchell, 2005: 8.). A more qualitative definition describes sprawl as "low density, auto-dependent land development taking place on the edges of urban centres, often 'leapfrogging' away from current denser development nodes, to transform open, undeveloped land, into single-family residential subdivisions and campus-style commercial office parks and diffuse retail uses"

(Soule, 2006: 3). Bruegmann (2005: 18) states that sprawl is "low density, scattered, urban development without systematic large scale or regional public land use planning", but he also states that the mere concept of sprawl is "hopeless as an objective description of the infinitely complex and fast-changing urban world around us and counterproductive as an analytic concept". This allows for various interpretations of sprawl. For one, it could suggest that proper land-use planning could negate the effects of sprawl. It could also be interpreted that systematically planned suburban growth is not considered sprawl. Finally, there is an undertone of futility in planning suburban growth, for suburbs react to many inputs, with some observers such as Gordon and Richardson (2001) arguing that they should be left to evolve themselves according to market forces.

The use of the term *sprawl*, however, will be limited in this paper due to its polemic and pejorative nature. This paper is not intended to be a critique of Calgary's suburbs, but rather an explanation and future vision of them.

To further clarify definitions of terms used in this paper, certain terms are both used and omitted due to the particular nature of terminology used in Calgary. *City,* rather than *metropolitan region*, is used when defining the urbanized area of Calgary. The term metropolitan region has connotations that there may be one or more jurisdiction within the urban area. Because Calgary is mono-jurisdictional, this term is rarely used to describe the city. Another term with specific connotations is *community.* While this term usually refers to a social network, it has been appropriated by the City, planners, and residents to be used in synonymously with *neighbourhood* or *district.* Due in part to its hierarchical road network, Calgary communities are well-defined spatially and well known as individual places.

Words can take on various connotations, including the term *suburb*, which can be further broken down into categories in the Calgary context, as discussed in section 1.5.1. However, while universally one exact definition may not be fully agreed upon, there is a general consensus on what a suburb is. Notably, it is often distinguished as being beyond the heavily urbanized core. However, the suburbs are more urban than rural, which allows for some urban theories to be adapted to the suburbs.

THEORETICAL UNDERPINNINGS OF RESEARCH

Although most urban theorist's work focuses on the urban landscape, many ideas can easily be applied to the suburban landscape as a subset of the urban environment. There are therefore various methods of interpreting suburban form. For example, the understanding of place may be considered through analysis of the environmental context of a place. Iain McHarg (1969) was proponent of understanding form and place as a product of its ecological realm. Later theories, such as Landscape Urbanism echo this thought. James Corner (1996) highlights the need to understand horizontal ecological landscapes and organic infrastructure of a city. With its initial growth happening in a river valley at the juncture of the Bow and Elbow Rivers, topography was the initial shaper of urban form in the city. As the city grew, the shortcomings of large-scale suburban development can be attributed to the lack of sensitivity to the environmental context. Other theories, such as those from Kevin Lynch (1960) interpret cities through their legibility, or how their parts can be recognized through a visual pattern. Calgary's inner city is easily navigable and imageable. It has notable elements that add to this legibility, such as landmarks like the saddle-inspired arena, or the Calgary Tower, now dwarfed by surrounding skyscrapers. The Bow River to the north and the CP Rail tracks to the south form clear edges to downtown. Unique paths, such as the

elevated +15 system or the recently opened Peace Bridge connect inner city places. Districts, from historic Inglewood to newly developing East Village are easily defined, and nodes, such as Olympic Plaza or the Barkley Parade attract diverse crowds.

However, suburban Calgary has become increasingly monotonous and decreasingly legible. Resilient urban landscapes often are legible landscapes, so in evolving, Calgary's suburbs should aim to achieve a more definable visual quality. Along with the idea that a city can be 'read', it can also be analyzed through its physical form. Anne Vernez Moudon (1997) has shown that the morphological analysis of urban form is usually defined through a set of principles; form, resolution, and time. Its primary definition is through form, or physical elements. These are buildings, related open spaces, and streets. Urban form is scale dependent and is generally analyzed at the levels of the building, the block, the city, and the region. Finally, there is an important acknowledgement that urban from must be understood within its historical context. Cities evolve, and exist as a result of the transformation and replacement of urban space. Using these principles, the following research will create a descriptive outline of the morphology of the Calgary suburb on which a prescriptive argument can be developed to guide future development in the city.

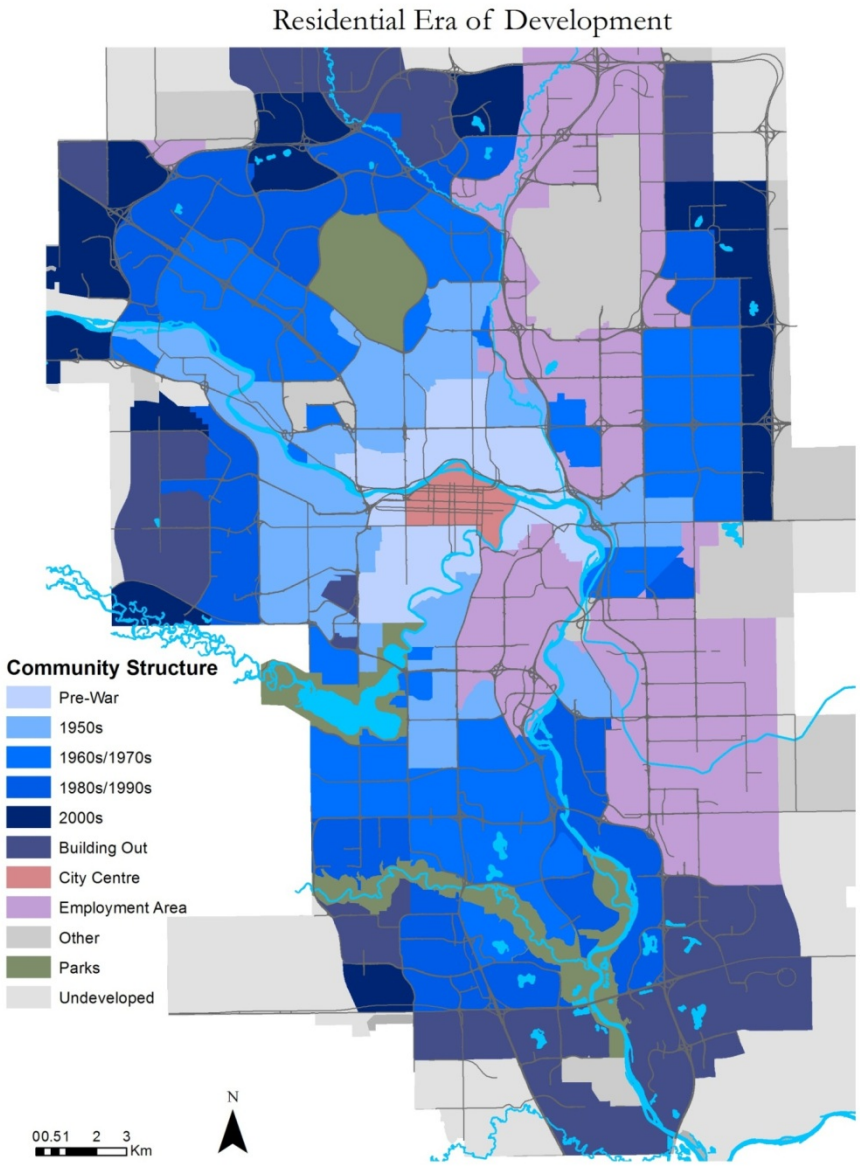


Figure 1 – Prewar development in Calgary was compact and concentrated around the city centre. From the 1950s onward, suburban growth expanded greatly into the vacant surrounding land.

PART 1 – EVOLUTION OF THE SUBURBAN BUILT FORM

Among Canadian cities, Calgary, Alberta is a prime example of a low-density, suburban city, with few barriers preventing its outward expansion. However, with a growing population of over one million people, the city is facing constant pressure from its rapid expansion, fueled heavily by strong economic growth in the oil and gas sector. This stimulus draws people from across the country and worldwide to settle in the city. Census data show that over the last five years, Calgary's metropolitan area grew at a rate of 12.6%, the highest in Canada and more than double Canada's average growth rate of 5.9%. Historically, Calgary's growth is largely tied to the boom-and-bust cycle of the economy, attracting many people to the city at a time. Quickly built, affordable houses on the city's periphery are a simple solution to the increase in housing demand, and now the city is facing issues endemic to sprawling suburbs across the continent, such as increasing travel times, environmental and agricultural land degradation, or social isolation. However, the reasons explaining the growth of Calgary's suburbs are often different from those across Canada, the United States, and Europe, where early suburbs were often the result of the reaction against inner city life. Suburbanization in Calgary was the result of mechanisms that are characteristic of a young city, whose suburbs were created before the inner city could reach maturity.

Figure 2 Recent suburban growth in Calgary, Alberta

1.1. CANADIAN SUBURBANIZATION IN HISTORIC PERSPECTIVE

Before the growth of Calgary, the first forms of suburbanization in Canada took place in the late nineteenth century in the country's largest cities. Historic suburbanization in Canada has well documented and researched by historians and urbanists, with especially notable work done by Richard Harris, who, in his book *Creeping Conformity: How Canada Became Suburban 1900:1960,* examines the morphology of suburban Canada and its relation to Canadian society and culture (Harris, 2004). Often these pre-industrial suburbs were settled by the bourgeoisie, who had the economic means to purchase larger plots of land for their homes. In cities, residents could only live as far from employment as they could walk. Those who had access to other transportation, such as a horse-carriage, were able to live beyond average walkable distances. Suburbs also provided an aristocratic alternative to the city. Not all early suburbs were upper-income households. Several early industrial suburbs were settled by labourers, immigrants, or religious groups. The village of Rouleauville, for example, was established in 1899 adjacent to the south edge of Calgary to ensure a French Roman Catholic presence in the west. Though simple in form, the architecture had distinct French influence. Like many early suburbs, Rouleauville was built incrementally, and its street layout is based on the grid pattern.

Suburbanization happened more frequently at the beginning of the twentieth century. The streetcar, which radically altered Canadian suburban form, allowed for large expansion of urban space. With the streetcar, workers no longer had to live within walking distance of their employment. Combined with escalating population growth (Canada's population jumped 34% during the first decade of the twentieth century), Canadian suburbs

flourished. Streetcars became popular in nearly every Canadian city. Predominately in the west, but occurring elsewhere as well, streetcars were commonly built by land owners as a means to promote development in rural areas outside the city limits.

Although the streetcar allowed for cities to comfortably stretch into their rural surroundings, streetcar suburbs still remained generally quite compact, as cars were not yet commonplace. Often, some of the more expensive suburbs took cues from Garden City models of Ebenezer Howard or Raymond Unwin. Garden Suburbs are distinguished by non-mixed zoning, ample green space, setbacks, and curvilinear street patters that break from the traditional gird.

Suburban growth was slowed during the wars and the depression. However, in the prosperous years following the Second World War, suburban development in Canada radically changed the Canadian urban landscape. The 1950s saw the rise of the large-scale land developer which gave form to the typical Canadian suburb that continue to be built to this day. A number of forces enabled this shift. Clearly the rise of the automobile and spread of the highway system allowed for low-density growth far from the urban centre. Demographically, the baby boomers returning from the war desired a healthy, suburban lifestyle to raise families. Due to the federal creation of the Dominion Housing Act (1949), later called the National Housing Act, lenders could lend homebuyers larger mortgages over longer terms. Newly adopted municipal zoning, building, and subdivision regulations made incremental piecemeal home construction by homeowners more prohibitive. Land development rules favoured large-scale development, unable to be undertaken by individuals. Models of this pattern of development appeared in United States as well, where William Levitt famously streamlined the suburban house building process for large scale manufacturing of suburban houses. This model gave municipalities stronger authority to guide and shape development in cities. For planners and government officials, the suburb became a way to create orderly, efficient cities through normative means. In the homogenous landscapes, families could assert their social standings by their new household commodities, from automobiles, to electrical appliances, to sanitation devices. After years of war, the suburbs provided ample opportunity to spark consumerism and drive the economy forward.

The form of the postwar suburb has clear influences from past models, such as Clarence Perry's Neighbourhood Unit mode, which provided guidelines on form and function (Perry, 1929).

Figure 3 – Perry's Neighbourhood Unit concept

The model emphasized a hierarchy of streets where the low density residential units were sheltered in the interior of the unit, with commercial areas and denser residential areas being placed near the larger arterial streets

surrounding the unit. These suburbs, generally designed for the middle class, allowed homeowners to buy into a lifestyle that had been previously available only to the upper middle class. After World War II, land development on the urban periphery took a new form. Rather than homes being built by small builders or homeowners, the concept of developers purchasing and developing large plots of land emerged. This so called 'Corporate Suburb', as described by Richard Harris, was highlighted by the development of Don Mills, on the outskirts of Toronto, Ontario. With clear inspirations from the success of the mass-produced Levittown, New York, Don Mills set a precedent for large-scale suburban development in Canada. Over the period of five years, businessman E.P. Taylor purchased parcels of adjoining land for which he envisioned a 2,063 acre master planned community where residents could live, work, and shop. Upon completion, the mixed-use neighbourhood will be composed of 8,121 dwellings in a mixture of apartments, town houses, and single-family dwellings. Across Canada, other communities were being shaped by corporate developers, such as in the West Island and Laval in Montreal, Quebec, in Lethbridge, Alberta, in Richmond, British Columbia, and in Calgary's first corporate suburb, Thorncliffe Heights, although these communities were not built to the same extent in terms of scale, architecture, and amenities. Don Mills did set a precedent for Canadian suburbs. The plan focused on the community aspect of the neighbourhood, and included central focal points, such as a shopping centre, schools, and churches. Later suburbs became even larger. They became primarily inward focused, often centered on main transportation axis. Street patterns are often curvilinear with cul-de-sacs, referred to as a 'loops and lollipops' design by Southworth and Owens (1993)

The Canadian post war suburb is reflective of modern values of the era. After the war, planners in Canada aimed to create orderly, efficient cities through positivist measures such as zoning bylaws, which became common tools for shaping the growth and form of urban areas. Federal mortgage and housing legislation and stronger municipal subdivision controls also impeded the incremental piecemeal expansion of the suburbs. Governments favoured stable development with full utilities, something that could best be provided by larger land development companies. Not only did scientific city planning principles give governments strong control over city growth, and concentrate wealth and power among large developers, but the new homogenous, single-use suburbs were also much loved by their residents. The new suburban form seemed to benefit everyone, except for the marginalized lower-income bracket who did not have access to an automobile or the means to purchase into a neighbourhood.

1.2. CANADIAN SUBURBS – COMPARED AND CONTRASTED

Despite their apparent homogeneity, Canadian suburbs are diverse, and differ themselves not only from each other, but from American suburbs as well. On average, Canadian suburbs tend to be less sprawling than American suburbs. The central business district in Canadian cities tends to be stronger and more concentrated. In the United States, features of the central business district tend to be more dispersed, with less attractive central locations (Bunting and Fillion 1999). This results in Canada having a higher concentration of employment downtown, with greater controls on suburban growth. Of the top ten most populated cities in Canada in 1950, all are continuing to increase in population. Of the top ten largest cities in United States in 1950, only two, New York and Los Angeles, have a current population higher than the 1950 population. American cities, which had denser inner city populations and more

manufacturing earlier than Canadian cities, have experienced a greater loss of residents and employment to outer municipalities. Canadian cities now tend to have higher densities, fewer single-family housing, and younger buildings. Public transportation ridership in Canada is also higher, and the freeway network is less extensive. American suburbs are also more likely to be politically divided by municipal boundaries of edge cities, resulting in inconsistent growth regional growth policies and patterns (Bourne, 1987).

Fragmentation of suburbs among various municipalities has effects on sprawl in Canada as well. The most pronounced low-density outward expansion seen in Canadian cities most commonly occurs in three types of cities. Cities that are agglomerations, small metropolitan centres, or have a manufacturing-oriented economy are more dispersed (Bunting and Fillion 1999). A good example is the region of Kitchener-Waterloo, which is composed of three separate municipal entities: Kitchener, Waterloo, and Cambridge. Historically, Kitchener was a manufacturing and industrial town. As this sector declined, high-tech industry became more important in Waterloo, which increased its regional relevance. There is no one distinct central business district for the region. This dispersion of population and jobs has resulted in the expansion of low-density single-family housing.

Calgary too may appear to be a typical sprawling Canadian city. At 825.29 km^2, Calgary is Canada's largest city by area. (Statcan, 2011). Low-density, single-family housing is still the dominant building form on the city's fringes. However, upon closer examination, factors creating sprawl in Calgary are often different from those elsewhere in Canada. For example, the City of Calgary is one municipal entity, not an agglomeration. Much of its land is composed of open fields and forests surrounding the city. Its economy is not manufacturing oriented. Although it has also been shown that higher inner city densities correspond to higher rates of suburbanization, Calgary never had high inner city densities. High inner city house ownership rates discourage suburbanization, but Calgary's early inner city had high house ownership rates. These factors encourage a closer analysis of development in Calgary to better understand what created its particular suburban form.

Calgary is, and has always been, a predominantly suburban city. The majority of its growth has occurred since World War 2. Before the war, the population of Calgary was less than 100,000. Since then, one million people have been added to that figure. This rapid growth coincided with the rise of the automobile and the era suburbanization seen across North America. However, looking beyond its expanding suburbs and networks of arterial roads, there is a greater depth to the evolution of the suburban landscape in Calgary, and it is important to understand this evolution to be able to better guide future development.

1.3. PREWAR SUBURBAN GROWTH IN CALGARY

Calgary is a young city. The first development in the area did not occur until 1875 when the Northwest Mounted Police established Fort Calgary, a remote outpost located at the confluence of the Elbow and Bow rivers, 80 km east of the Rocky Mountains. In 1881, the urban form of Calgary consisted of the fort, and a handful of log houses and teepees.

Figure 4 - Fort Calgary, c. 1881, located at the confluence of the Bow and Elbow Rivers

Settlers first arrived to the area in 1883 when the Canadian Pacific Railway was extended through the area. This brought the first wave of ranchers to the area that came to raise cattle. These ranchers were the first investors into the town, which they used as their main node for trade. However, the first true sense of urban form did not occur until the CPR decided to build the western prairie's main train maintenance facility in Calgary. From this, the original building form, tents, were replaced by more substantial wood-frame buildings. Two years after being incorporated as a city in 1884, a fire destroyed the majority of the city's wooden building stock. After the fire, sandstone, a bedrock common in the area, became the choice material for important buildings. Beige sandstone blocks created Calgary's first identifiable design vernacular (Foran, 1978). Although sandstone is no longer used in construction today, original sandstone buildings that remain today are being preserved, and new construction often uses materials that reflect this style. The sandstone gave an impressive form to the early buildings in the small community. With rising wheat and cattle prices, Calgary became more of an important economic hub in Western Canada. From its incorporation in 1884 to 1891, the population grew from just over 500 residents to nearly 4 000. However, in the Canadian context, Calgary was still a young city. By 1891, Montreal's population was 217 000, Toronto's population was 181 000, and even Vancouver's population was 19 000, and all had urban forms which were considerably more established.

Figure 5. Stephen Avenue (8th Avenue South), c. 1890. Stephen Avenue has always been the heart of Calgary's downtown.

1.3.1. CONTEXT: LANDSCAPE AND ECOLOGY

Early urban form in Calgary was strongly moderated by topography. Calgary is located in the ecotone of two distinct landscapes, with the prairie landscape to the east and the forested foothills of the Rocky Mountains to the west. Its topography is characterized by river valleys, escarpments, plateaus, hills, and open plains.

Figure 6 - An early scene showing Calgary's unique landscape, c. 1882

Early development took place on low-lying flat land south of the Bow River. Development north of the river was limited by expensive bridge crossings and steep terrain. Manufacturing and industry were located east of the Elbow River, near the CPR maintenance plant, downriver and downwind from the central urban area. Limited water pressure meant that basic early water lines and sewers could not service houses at higher elevations on hills, so development was limited to lower areas. In fact, no buildings at high elevations could be serviced by water and sewer until the Bearspaw Dam was constructed in the late 1950s. This especially limited growth in northern and western portions of the city (Foran, 2009).

1.3.2. STREET LAYOUT

The initial shaping of urban form in Calgary came from the Dominion Land Survey, a one-mile square grid used to divide much of the land in Western Canada for agricultural and regulation purpose. Having vital importance in Western Canada, the CPR also created a separate township grid of thirty six square miles, subdivided also into square mile tracts. The CPR owned the majority of land south of the rail line through town, and acted as Calgary's first planner. Calgary's initial grid was laid out parallel to the rail line and latitudinal township lines by the CPR, with blocks of approximately 175m by 100m. Vast tracts of land in Western Canada had been given to the CPR by the federal government to encourage growth in the West. The CPR had developed a standard grid for town development, so many cities and towns in the prairies have the same basic grid format.

Although similar, the CPR township grid was slightly skewed from that of the Dominion Land Survey. This irregularity can be seen in 17th Avenue South, which follows the Dominion Land Survey grid rather than the township grid, and makes a slightly diagonal cut across the regularly spaced downtown grid (see Figure 8). The heart of Calgary's early development occurred on Stephen Avenue (now 8th Avenue South), parallel to the rail lines, which run between 9th and 10th Avenues South, and along Atlantic Avenue (now 9th Avenue) in Inglewood, near the CPR maintenance yards. Houses were built on the grid network encircling these areas.

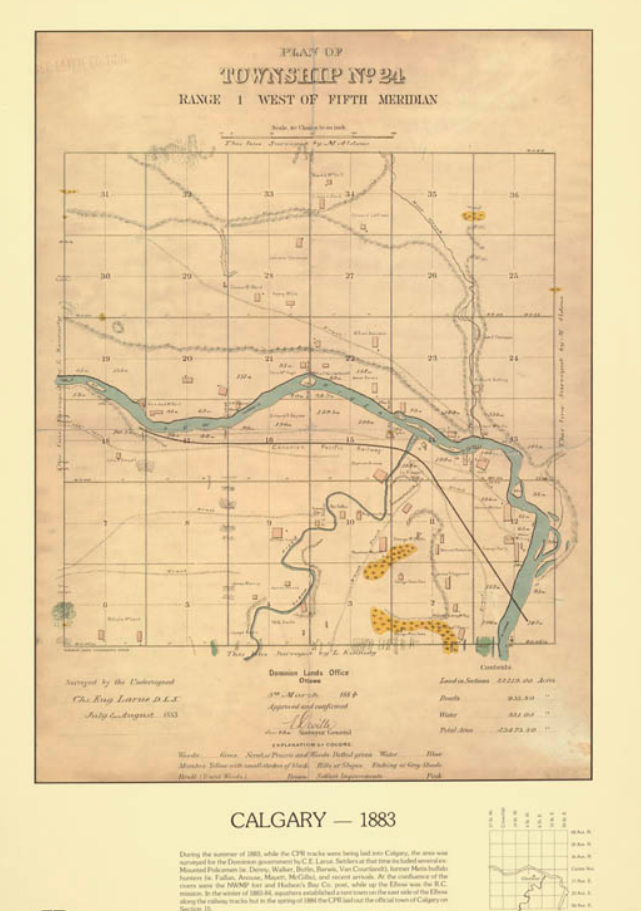


Figure 7 - Dominion Land Survey, showing the early division of prairie land, c. 1884. Major roads can still be found running along these grid lines today.

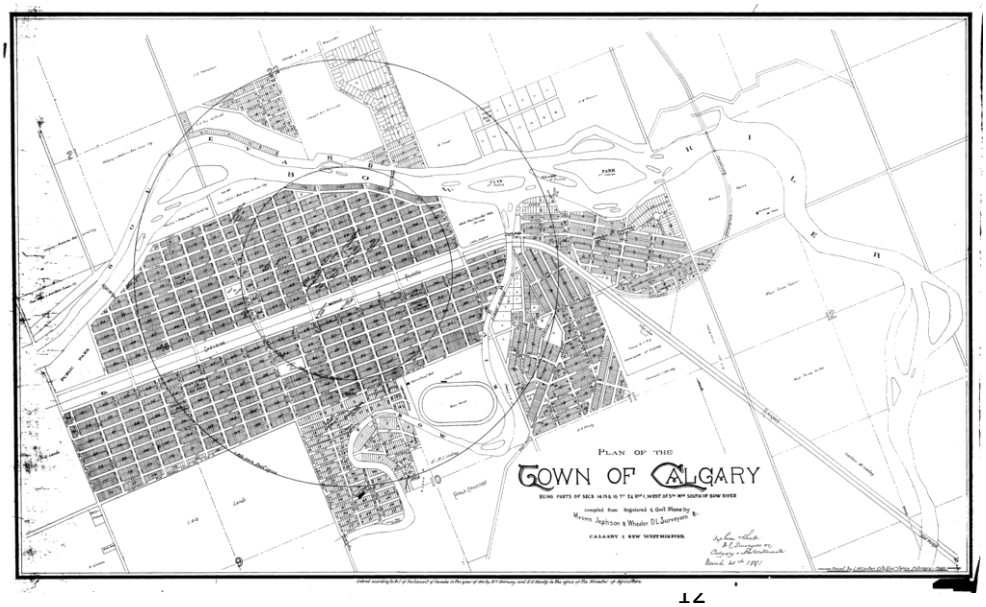


Figure 8 - Town of Calgary map, c. 1891. The train line runs directly through the centre of the city. Overlapping grids create irregularities, as seen in blocks in the SW corner. One of these sliver blocks is Tompkins Park today.

1.3.3. HOUSING TYPOLOGY

Calgary's first houses were built by their owners, which created a varied urban fabric and mixture of building types and uses (Sandalack & Nicolai, 2006). Early settlers in Calgary had experience with physical labour and construction, and were easily able to build houses for themselves. Some owners built homes using techniques and styles that were familiar to them, but many others chose to build their houses from pre-fabricated housing plans. With ample space and cheap land, most homeowners chose to build single-family dwellings.

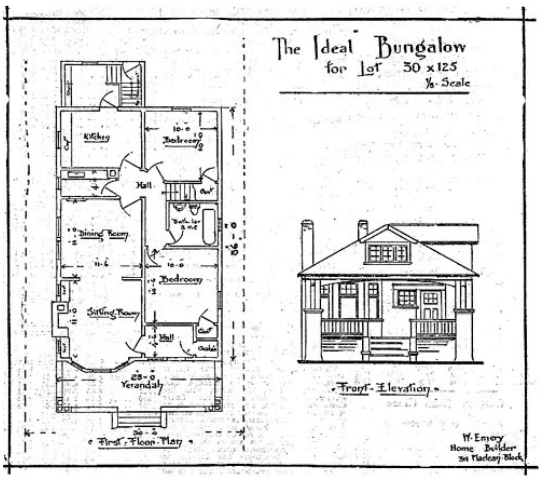


Figure 9 - Plan and elevation of a typical bungalow in Calgary, Alberta. c. 1912

Apartment and tenement houses in early Calgary were rare. Most early houses were made from wood, but more luxurious houses used sandstone and brick as well. Most houses were two stories, and sited close to the road on the deep and narrow lots. All early streets featured alleys, where garages and outbuildings were accessed. Utility companies favoured the alleyway system because sewers were cheaper to repair when located under dirt roads. Calgary's early streets were never particularly wide. Most were ten meters wide. The first residential lots were subdivided by the CPR and measured 25 feet wide. Narrow lots on the grid system created a walkable, compact early city, but by no means was limited space a concern in Calgary. In 1911, Calgary had the same area as Toronto, but only a tenth the population (Sandalack, 2006).

The first identifiable large breaks in the grid were seen in hilly areas which became choice suburbs for bourgeois development. The garden suburbs of Mount Royal and Scarboro were built on hills overlooking the city from the Southwest. When subdividing the land of Mount Royal, the CPR consulted the plans in detail with the Olmsted Brothers, sons of Frederic Law Olmsted and renowned landscape architects. The CPR broke from its strict planning guidelines when developing Mount Royal, and instead created curvilinear streets which followed the contours of the hill. Lots were varied in size, but all were larger than 7.6 m (25') wide, the standard in the urban grid (Sandalack & Nicolai, 2006). Extensive trees and vegetation were planted along the road by the CPR to create a park-like setting. The CPR continued a strong tradition of tree planting in Calgary in efforts to create a beautiful city that would attract potential settlers.

Figure 10 - Hope Street, in Mount Royal, c.1910 – 1925

Figure 11 - Hope Street Today

1.3.4. EARLY PLANS

The early twentieth century saw the arrival of many ambitious people looking for opportunities in the west, and from this Calgary benefited economically. Further investment in the city arrived in 1914, when oil was discovered near Turner Valley, a small ranching community 40 km south of Calgary. The discovery brought oil and gas investors to the city. The Turner Valley deposit was small, but in 1947, when Alberta's first major deposit of crude oil was discovered near Edmonton in Leduc, the business stayed in Calgary largely due to the oil and gas base that had previously been created. The oil and gas industry would be inextricably linked to Calgary's growth. By 1912, the Town Planning Committee was organized to manage growth in the city. This body still exists today as the Calgary Planning Commission.

The Town Planning Committee had high ambitions for Calgary. One of its key members, William Pearce, helped create planning legacies that last to this day, especially in terms of parks and open space. He was also behind the City's first attempt at creating a future vision for the urbanization of Calgary, and Calgary's first foray into urban design. With lofty ambitions, the City hired Thomas Mawson in 1913 for $6 000 to create a plan for the city. This made Calgary the first city in Western Canada to hire a town planner. The Scottish landscape architect had gained recognition for his projects in Europe, fulfilled his promise to create a plan for a Calgary that would one day house one million people with the Mawson Plan, a thoughtful and detailed master plan accompanied by artfully created drawings for the city. The plan envisioned Calgary as the "Vienna on the Bow", and was heavily influenced by the City Beautiful and Garden City movements (Joyce Morow, 1979).

Figure 12 – An early rendering of the Mawson's envisioned plan for Calgary, with obvious City Beautiful influences, c. 1912.

The plan was, in essence, using urban design as a marketing tool. The City Beautiful-inspired plazas, flanked by stately civic buildings, on grand boulevards on Fourth Street and Centre Street were used to attract business to the city. Understanding urban design principles, Mawson emphasized the importance of landmarks and activity nodes to improve legibility of the city and assist in orientation. The creation of formal parks, open spaces, and vegetated public realm was used to create a calm, orderly garden city for residents, who would be housed far from any industrial areas. Mawson encouraged the city to buy all land that was unsuitable for development to be used for parks, especially land near the rivers. Parks were recommended to be part of a larger system, and they were seen as essential because they could be used by ordinary people, and not just the wealthy.

Likewise, Mawson envisioned a city of mixed neighbourhoods where people from all races and incomes could live together. To help achieve this vision, he discouraged placing schools and community centres in suburbs and away from any church or religious establishment.

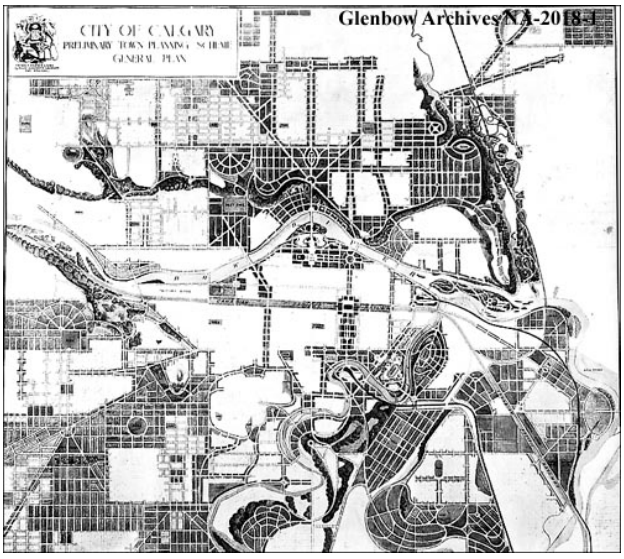


Figure 13 – Mawson's envisioned plan for Calgary.

The Mawson Plan also focused in detail on traffic and road layout. The plan emphasized that streets must benefit both pedestrians and cars, occasionally exclusively, and therefore should be wider and more pleasant for both. Diagonal roads and roads with geometric curves were recommended to be placed throughout the urban landscape. These would better increase accessibility and provide both city and mountain views in key locations. More bridges were envisioned to cross the rivers and improve access to the north and east. The original design for the Centre Street Bridge even included an automobile elevator to address the considerable elevation gain on the north side (Waymark, 2009).

Mawson's plan took a positivist, scientific approach to urban design. He envisioned that the urban form could not only attract business and wealth, but could even create a better society. Ultimately, his plans would not come to light. Implementing his vision would cost ten million dollars, equivalent to four billion dollars today. Even though the city was booming, the cost was prohibitive. The plan also arrived at the wrong time. The plan was submitted months before Canada entered World War One. The economy plummeted and visionary plans to create a Parisian prairie metropolis were cancelled (University of Calgary, 2012).

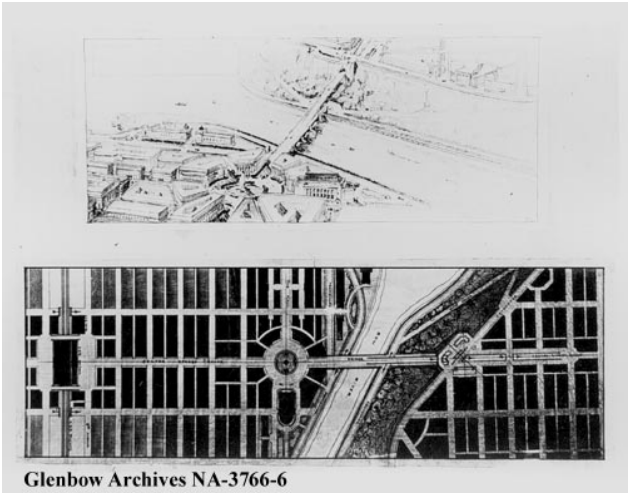


Figure 14 – Early plans for the Centre Street Bridge include an automobile elevator.

Despite the adversities, elements of the plan did make it into Calgary. Most importantly, the city has actively maintained the riverfront as public space, years after being recommended by the plan. Parks have been conserved and created, and worked into a large network. To conserve valuable park space by the river, Mawson suggested moving the Mewata Armoury to its current site at Eleventh Street and Eighth Avenue S.W. This siting also creates a stimulating visual terminus of Eighth Avenue. To improve the public realm and improve traffic flow, Mawson proposed widening streets to building fronts, and carving out pedestrian arcades in the main floor of buildings. The owners of The Bay, who had attended the presentation, decided to implement this vision. A block of arcade remains along First Street and Stephen Avenue on The Bay building to this day. Although the Centre Street Bridge lacks an automobile elevator, it was built for two layers of traffic and the neoclassic architecture commands a monumental presence. Due to its decline in elevation, both cars and pedestrians who enter downtown on it are rewarded with impressive city, river, and mountain views. Pedestrians further

benefit from wide, protected sidewalks and platforms for viewing and resting. Mawson's plans of a street grid interrupted by diagonals and geometric curves never occurred either. Years later, however, Mawson-inspired geometrically curving streets were built in the inner city suburb of Renfrew (see Figure 12).

Figure 15 - Mawson Inspired street patterns in the community of Renfrew

1.3.4. TRANSPORTATION

Like most North American cities, transportation routes were also instrumental in defining urban form in Calgary. Calgary's very existence is linked to the construction of the railway by the CPR, which brought other rail companies and investment to the city. At a local scale, streetcars were central factors in shaping Calgary's residential form. McCann (1999) even suggests that early streetcar systems in Canada had social implications for providing city dwellers the opportunity to achieve their desire to move to the suburbs. He also suggests that early streetcar networks created diversity in suburban neighbourhoods because although land speculators may have marketed a suburb as being for an upper-income bracket, frequent busts often reverted unsold lots back to the city who would sell them off for cheap, allowing poorer-income residents to make homes among the wealthy (McCann, 2006). However, unlike many cities across Canada whose early streetcar systems were privately financed, Calgary's first streetcar system was built and operated by the City. The first line opened in 1907 and ran three blocks along Eighth Avenue, from First Street S.W. to Second Street S.E. (now Macleod Trail).

Figure 16 – Streetcar along Fourth Street SW

Seeing the value in streetcar access to residential areas, developers made agreements with the City to extend the lines into developed areas in all directions from downtown. Some developers built their own connecting lines into undeveloped land on speculation that the streetcar would create demand for development. It often did, and the developers would donate the lines to the city once they had made their profit. Unfortunately, this pattern of development encouraged the first form of sprawl in Calgary, as developments were often unplanned, poorly located, and lacking utilities (Sandalack & Nicolai, 2006).

Figure 17 - Early streetcar in unserviced neighbourhood c 1912-1914

Because they were built relatively soon after the city was incorporated, there was never a need for densification of the inner residential areas. Early streetcar suburbs in Calgary include Tuxedo Park, Pleasant Heights, Killarney, Elbow Park, Kensington, Capitol Hill, Sunalta and South Calgary, as well as outer communities such as Ogden and Bowness, which was still a separate small municipality at the time. Streetcars effectively concentrated development along their routes, and allowed for commercial areas to move out of the downtown core.

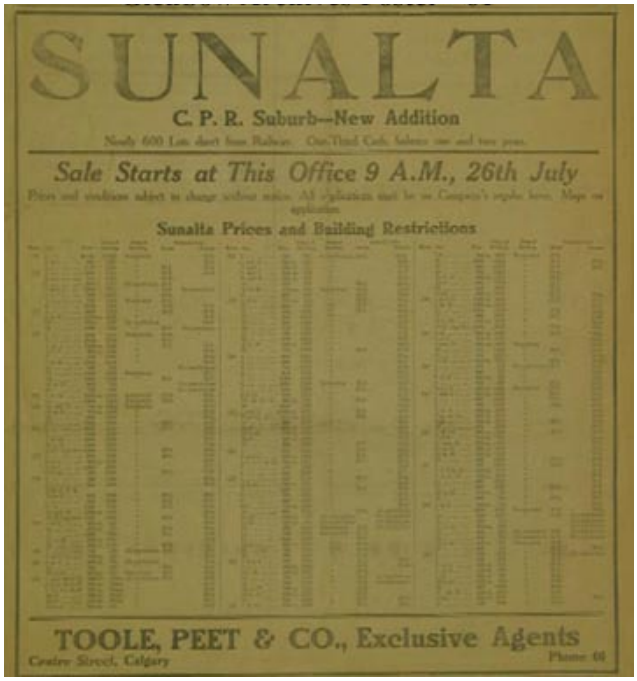


Figure 18 - Advertisement for CPR Suburb of Sunalta, 1910

Several of the routes continue to be Calgary's best commercial streets, such as 4th Street S., 17th Avenue S.W., Kensington Street N.W., and 9th Avenue S.E. In less than a decade after the initial construction, streetcars provided service to the majority of Calgary's neighbourhoods.

Development of the streetcar system was stopped upon the arrival of World War 1, and never gained the same traction after the war when the country went into depression. All development slowed in Calgary after the war, and the city entered a conservative era with a cautious approach to growth. While many North American cities experienced booms during the 1920s, growth in Calgary was slower, with the only notable suburban development happening in the Tuxedo Park/Mount Pleasant area. Immigration to the city also slowed considerably, resulting in far fewer housing starts. In search of more affordable land, people started building homes for themselves outside city limits, where they did not have to pay municipal taxes or follow stricter building code. This resulted in haphazard, poor quality development, and was problematic for the City, which was struggling economically. From this emerged Calgary's first compact growth strategy, and set the stage for future policies that would guide suburban development in Calgary to this day. To curb outward growth, Calgary put strict measures on streetcar expansion being built by land speculators outside the city limits by limiting placement of streetcar lines within the city and refusing to provide utility connections outside city limits, thereby cutting off the dominant means of access to the outer suburbs. For fear of outer municipalities being created and taking away from the tax base, Calgary enforced regulations that prevented residential development outside the city, and created incentives for people with land outside the city to return to the city (Sandalack & Nicolai, 2006). Calgary continues to actively pursue similar model of growth controls by continually annexing land to encourage a 'uni-city' model where one municipality makes up the entire metropolitan region.

1.3.6 OTHER MUNICIPAL PROJECTS

Besides the move towards controlling growth, the city initiated two more moves in the inter-war period that would have even more significance on shaping urban form. Being located near no large

lakes and having only relatively small rivers as the main source of water, Calgary is constantly forced to carefully managed its water supply. By the late 1920s, the lack of a consistent, safe water supply had become an issue. In 1929, the City initiated the construction of the Glenmore Dam, which would not only allow of the proper management of water, but would also act as a make-work project for Calgarians during the depression. The Glenmore Dam was built 5.5 km southwest of downtown on the Elbow River, and the Glenmore Reservoir became Calgary's first lake (Foran 2009).

Figure 19 - The Glenmore Reservoir and dam in 1950

This project had two major effects in shaping suburban form in Calgary. First, it controlled flooding near the banks of the Elbow River, which allowed for better residential development in the Elbow River valley, which had previously been (and to a lesser extent, continues to be) subject to flooding. The newly created Glenmore Reservoir also created a large natural growth boundary in the Southwestern portion of the city. The second significant action taken by the City in the early 1930s was the introduction of zoning, which distinguished between single family, two family, multiple dwelling, and commercial areas. This acknowledgement of designated residential land was a precursor to the strong push for suburbanization that would later characterize the city. Residential zones are the largest and often most inflexible of zones, and these zones would ensure that suburban form in Calgary could not easily be altered.

Although the interwar period did not see much suburban growth in Calgary, the population continued to increase. Like many other Canadian cities, housing shortages were eased with help from the federal government. The crown corporation Wartime Housing Limited provided housing in cities which had significant contributions to war efforts. The Canadian Army had opened a training facility in Calgary at Currie Barracks, so the city received funding for housing construction. Houses built during this era were typical austere storey-and-a-half frame structures of the sort that proliferated across Canada.

Figure 20 Example of Wartime Housing in Hillhurst

Wartime houses were built in areas such as West Hillhurst and Altadore, and were usually built on the grid block pattern, with occasional exceptions being built on a modified grid pattern (see Figure 21).

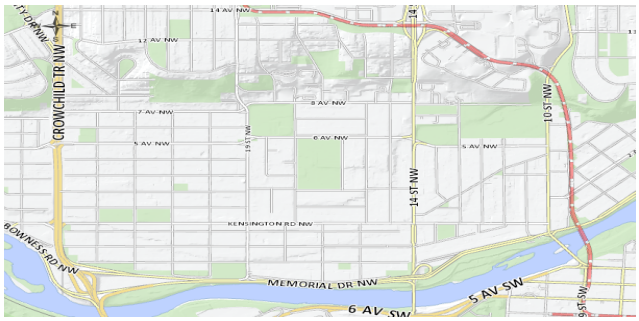


Figure 21 Modified Grid in Wartime housing development in Hillhurst

Besides Federally built houses, private builders also shaped the suburbs at this time. The grid was predominately used in other neighbourhoods, but some traces of the City Beautiful movement, taken from the pages of the Mawson Plan, did become evident in the geometric grid patterns in neighbourhoods such as Mountview and Renfrew.

1.3.7. SUMMARY

Calgary's first suburban form was created during the prewar era. Unlike many North American cities, its growth was mostly controlled, mono-centric, and dominated by low-density residential areas. Suburban expansion was heavily driven by land speculation, and housing construction was done mostly by small-scale builders or homeowners themselves. Through the provision of infrastructure, the shape of the suburb was largely controlled by the municipal government who preferred a typical grid-pattern style of planning, which was the initial pattern set by the Canadian Pacific Railway, the city's first de facto planner. However, in terms of suburban growth, the key precedents for suburban form in Calgary were set in the prewar era. The single-family house became the dominant housing typology early on. Calgary was developed late enough in the era of the streetcar and car that there was never a need for dense inner city housing. With abundant affordable land and skilled immigrants to the city, single-family houses could be easily built by the homeowner. Early Calgary did not have a large industrial sector, and the factories that did exist were isolated from residential areas and located away from the centre. This low-density, single-use pattern of residential development would continue to dominate the suburban landscape. While it may have been possible to efficiently house the 100 000 residents of Calgary of the late 1940's using this suburban form, with an additional million people 60 years later, the suburban form of Calgary is now showing its weaknesses.

Figure 22 - Early housing typology encouraged single-family housing on compact lots and created a quality public realm. Today, these are some of Calgary's most desired neighbourhoods.

1.4. KEY STAKEHOLDERS IN CALGARY'S SUBURBAN GROWTH

Most of Calgary's earliest settlers arrived from Eastern Canada and Europe in the late nineteenth century. They came seeking opportunity in the West, where they had to be skilled and industrious to build a future for themselves. The first economies were strongly tied to the railway and the agriculture sectors, so the first workers were arriving to Calgary were often skilled labourers and mechanics, and able to construct homes for themselves. With no planning authority, street layout was first platted by the Canadian Pacific Railway. Later, as municipal government was formed, the city played a stronger role in shaping the layout of the city, and with the onset of the streetcar, land speculators created housing demand in suburban areas. Small scale house builders soon started being the primary builder of houses, rather than the homeowner. This form of development continued until the postwar era, when the most dramatic shift in land development occurred, when a number of factors lead to the dominance of large-scale developers who could plan, build, and service

large communities. *The private land developer* continues to be the most influential factor in shaping Calgary's growth to this day. However, land development companies are not the only factors influencing the suburbanization process. Max Foran (2009) argues there are four other main stakeholders that have shaped the suburbs of Calgary; the City of Calgary, the Purchaser, the Provincial Government, and The Canada Mortgage and Housing Corporation. The rise of the private developer occurred after the war when the political and economic climate in Calgary worked to favour large-scale development over incremental growth. Calgary's first developers were born from existing construction companies who began to fill the role of both land developer and builder. Two of the largest companies included Carma and Kelwood, which both originated in Calgary, but other companies from elsewhere in Western Canada, such as Qualico, BACM, or Melcor, also invested in Calgary. In the 1970s, land values in Calgary spiked and larger suburban developers entered the Calgary market and agglomerated many of the smaller builder-developers. Major land developer agglomerates included Daon and Genstar. Land developers have continued to hold a strong lobby in Calgary and are strongly influential in suburban development polices. Some of the stronger companies have now survived through generations. Carma remained the largest residential land developer in the city until it was merged with Brookfield Residential Properties in 2011, making it the 6th largest residential property company in North America. It continues to have its headquarters in Calgary, a sign of the strength of the land developer in Calgary. Genstar, created from BACM, also continues to be one of the largest land developers in the city. These companies create the large-scale master planned communities found in Calgary's suburban areas, and nearly every Calgary suburb was created by one of them.

Figure 2 - Billboard advertising the corporate suburb of Glendale, 1958

Many aspects of the suburban form are determined by the land developer. Because of their power, they also have been able to continue developing sprawling suburbs. For example, they have successfully lobbied the City to maintain a three-cycle land supply around the city to best operate their economies of scale. The City actively annexes rural land surrounding the city to meet the demands of outward low-density growth.

In the postwar period, the City took a step back from controlling land development under the theory that the market should best determine where and when development should occur, and what form it should take. It did however continue to support a strong policy of separating zones in the perceived interest of protecting private property values. This was in line with the public's postwar laissez-faire ideologies. The City took on the role of creating an accommodating situation for developers, and it valued maintaining healthy relationships with developers. One of the most influential policies of the City was to maintain the 'Uni-City' concept. City officials worked to avoid the jurisdictional issues affecting cities like Edmonton, which was struggling to balance the needs of independent satellite communities of St. Albert, Spruce Grove, Fort Saskatchewan and Leduc. The City of Calgary felt a more streamlined, modern approach to planning would be achieved through one jurisdictional body. Any outlying communities

were strongly discouraged. The City had a bad experience allowing a developer to build and service the subdivision of Glendale outside the city limits when there were legal problems in determining if the city should repay the developer for utilities when it annexed the area after being built. In order to achieve this control over development, the City took active measures to annex surrounding rural land preemptively. From 1956 to 1961, the City grew in size from 104 km^2 to 391 km^2. Much of the land was in the south of the city, and included the towns of Bowness, Forest Lawn, and Midnapore, small towns that the City feared could become fringe communities. The City continues to take this approach to preventing development beyond city limits. The Uni-City model has had mixed results. Acting as the de facto planning authority gives the City the ability to have greater control to encourage sustainability and enforce smart growth policies in areas under the City's control; however, the majority of the tax base comes from the suburbs, which results in more of a neglected inner city. With few geographical boundaries and plenty of available developable land surrounding the city, the City must take on a more pro-active role in planning and policy than cities which are naturally forced to densify. This is especially critical when considering the fact that since 1998 there has been no true regional planning in Alberta, meaning Calgary has little input on what happens in nearby municipalities, such as Airdrie, Okotoks, Cochrane, Chestemere, or the Municipal District of Rockyview. In 1999, the Calgary Regional Partnership was founded by Calgary and 15 surrounding municipalities, but this has proved to have little effect on regional planning. This lack of planning can have good and bad consequences, depending on which side of the line you are on. For example, when the City refused to approve CrossIron Mills, a sprawling, car-dominated mall on the northern fringe of the city, the Municipal District of Rockyview, which lines north of the city, jumped at the chance to allow the $500 million dollar project within their district due to the potential tax revenue. However, locating a mall far from urbanized area is a sustainability nightmare. It consumed farmland and used water licensed originally designed for farming, and requires every visitor and piece of merchandise to be driven to the site. The closest house in Calgary to mall is over ten kilometers away. Even though the vast majority of the users of the mall will be from Calgary, the City will not receive tax revenues from it. There is logic behind Calgary's annexation. However, what would be more beneficial is stronger regional planning.

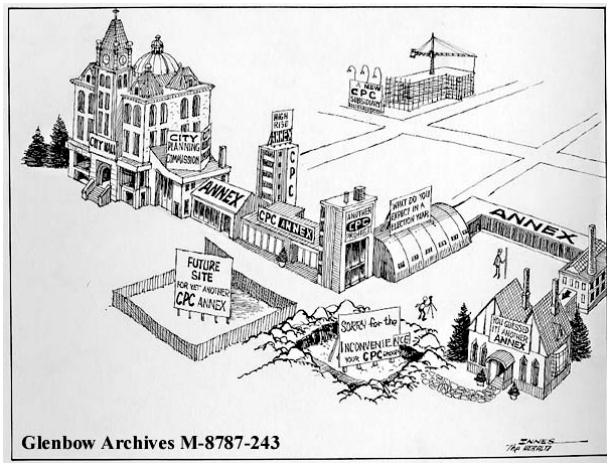


Figure 24 "Bureaucratic proliferation" - Editorial Cartoon from 1975

Within the municipal government, decisions regarding suburban development were ultimately made by City Council, who was able to often act with little influence from other stakeholders such as the Engineering Department, the School Board, the Calgary Planning Commission, or appeals boards. With many competing interests, determining a unified municipal vision was challenging.

Although the relationship between the City and the developer appears to encourage sprawl at the benefit of the private developer, there are benefits of allowing this relationship grow and mature, and the results can be seen in some newer master-

planned communities. Although single-family houses on the suburban periphery is the dominant suburban form, newer communities are better planned and serviced, and are finally tending to emphasize urban design characteristics such as walkability, sense of place, and increased density.

One of the strongest arguments driving suburban growth made by both the City and the developer has been consumer demand for single-family dwellings. Historically, land ownership has been an integral factor in the colonization of Western Canada, and private property rights have tended to be important for Calgarians. With an abundance of space for growth, an efficient road network, acquiring suburban land is simple, and a handful of developers have been able to efficiently build suburban communities to meet this demand. With Calgary's strong economy, many residents have the ability to purchase larger single-family dwellings. Perhaps because single-family houses have always represented the majority of growth in Calgary, the multi-family housing market has never been as well established. While developers argue that single-family housing must be built because Calgary buyers prefer this pattern of development, there is also a valid argument that Calgarians have not had many good examples of well designed, denser communities which they may prefer given the opportunity. Needless to say, the City needs to please the consumers in order to stay in power, and it benefits from the additional tax revenue gained from valuable private property. The City's only sources of income aside from property taxes are user fees at municipal sites and transfers from other levels of government, so the income generated from property taxes is crucial to keeping the city running.

Besides the homebuyer, the provincial and federal governments have also played roles in shaping the suburban form. While the provincial government is not a large factor in creating or curbing sprawl, it does play an urban role in policy creation. In 1912, seven years after becoming a province, Alberta put in place separate acts for towns, villages, rural municipal districts, and improvement districts. By mid-century, growing cities in Alberta were feeling constrained under old provincial laws and the share for provincial and federal money directed to cities had dropped. The various pieces of legislation were rewritten and grouped under the Municipal Government Act in 1967. The Municipal Government Act was heavily revised in the 1990s and incorporated the Planning Act which gives municipalities the role of land use planning and subdivision. From 1955 until 1994, regional planning commissions were created through provincial planning legislations. Originally Calgary acted in accordance with the plan as regional area, but by 1977, the province required municipal plans as well, which wound conform to regional plans (which, in turn, would respond to provincial policy.) Despite the complexity, the system worked well, and it especially supported strong regional planning. However, the regional planning commissions were removed in 1994 due to cost saving measures. In 1955, it was the province who first recommended that Calgary adopt the Uni-City model, as written in the Royal Commission on the Metropolitan Development of Calgary and Edmonton. The Province has also had a role in constraining growth in Calgary through its authority over highways and utility corridors. In 1976 the Province created a Restricted Development Area around the city. This ring of land has effectively served as a growth boundary.

The final major stakeholder in suburban development in Calgary is the federal government acting through the crown corporation Canada Mortgage and Housing Corporation. The CMHC was initially created after World War II to help house soldiers returning from the war, but it has

ultimately had a greater effect shaping Canadian suburbs due to its mortgage lending policies. In Calgary, like many cities across Canada after the war, the CMHC had generous lending policies that were geared towards higher income bracket homebuyers who could afford suburban single-family houses. The policies also often favoured single-family houses. For example, the CMHC allowed for longer amortization periods for single-family houses than were called for in policy. Despite the bias towards single-family dwellings, the CMHC did prefer compact development patterns that limited fringe communities, a policy that the City of Calgary strongly supported as well. To limit the creation of fringe communities, the CMHC refused to mortgage houses without utility extensions, which ensured that communities were built adjacent to existing communities. However, the CMHC favoured growth and often was a strong proponent of annexation, but its motives were driven by profit rather than community building. In the mid-century, the CMHC pushed for annexation of a large area in the Northeast of Calgary. The area was separated from the city by the airport and large industrial zones and the CMHC viewed it as being better suited for low cost development because it lacked the amenities that wealthier residents living in the south would require. Unfortunately, to this day, the Northeast remains one of the city's most isolated, underserviced areas. In Calgary, the CMHC was able to take on other roles of the planner by limiting mortgages. The CMHC created building siting and dimension standards for new residential communities. It took more involved roles in certain cases as well, such as refusing to lend money to a new development in 1958 because of its intersection patterns. In order to maintain residential property values, the CMHC required strictly segregated zoning. In the subdivision of Lynwood, built in 1957, the CMHC would not lend money to any house built within three quarters of a mile of the Imperial Oil Refinery, thus preventing residential development near the industrial area. In hindsight, this was a prudent decision on CMHC's behalf. Although the oil refinery was dismantled in 1975, high levels of hydrocarbons and lead were found in soil surrounding the refinery site in Lynwood in 2001, and Imperial Oil was forced to purchase and destroy 140 dwellings in the area for decontamination.

Figure 25 - Street remnants in Lynwood

1.5. POSTWAR SUBURBAN GROWTH IN CALGARY

Calgary's prewar suburbs are performing well. They are well connected and walkable due to their block pattern and treed boulevards. They usually feature a mixture of housing types and cater to a diversity of income brackets. Because of their proximity to downtown and commercial corridors, they are highly accessible. Gradual transformation in these neighbourhoods is evident. Incremental infilling and redevelopment is happening at a comfortable, healthy pace.

Figure 26 Low-density postwar housing is being replaced by duplexes and multi-family housing.

Calgary must now face the challenge of retrofitting its postwar suburbs, whose form and growth pattern is significantly different from prewar suburbs. Generally, postwar suburbs can be classified into three categories; first, second, and third ring suburbs. Literature suggests that first ring suburbs saw their primary growth adjacent to the primary inner city areas decades ago, and for the most part have been filled out with commercial and residential uses. Second ring suburbs, which were generally built two to three decades ago, were the beginning of a more sprawling growth pattern, which strained city resources and infringed on rural areas. Third ring suburbs, usually built in the last two decades, are strongly infringing on surrounding rural land, and often include inward-focused planned communities, many of which feature amenities such as golf courses or parks and playgrounds (Swanson, 2009). This evaluation holds true for Calgary. First ring suburbs are those that were built in the 1950s and 1960s. The first ring suburbs include communities such as Brentwood, Glendale, Cambrian Heights, Mayland Heights, Mayfair, or Southwood. The second ring suburbs were built from the 1970s to the mid 1990s. These suburbs include communities such as Whitehorn, Edgemont, Strathcona Park, Cedarbrae, or Sundance. Finally, new and developing suburbs are found on the fringes of the city and have been built within the past 15 years. Examples of these suburbs include Tuscany, Harvest Hills, Saddle Ridge, McKenzie Towne, Walden, Evergreen, or Discovery Ridge. Map 1 in the appendix shows the growth and location of the different types of suburbs in Calgary.

1.5.1. THE BEGINNING OF THE BOOM

At the end of the war, Calgary grew dramatically. From 1945 to 1955, the city's population grew by 80%. In order to meet high demand for housing, the City sold suburban lots at extremely reduced cost with the condition that it be used for residential purpose. Developers took the opportunity to purchase large tracts of land at the reduced cost. The low cost land led to a significant shift in Calgary's residential form. Lots were sold subdivided at 25 feet wide. However, because of their low price, developers got a greater return when they combined two lots and resold houses built on 50 foot lots. This became common practice, and by 1954, the 50 foot lot became the standard lot size in Calgary (Foran, 2009). Previously, houses were narrow and extended deep into the lot. After this shift, the house rotated so its long axis runs parallel to the street (see Figure 27).

Figure 27 – Example of a typical prewar house (left) and postwar house (right), showing the rotation of orientation, widening of lot, increase in setback, and lack of green strip between the street and the sidewalk in postwar developments.

Figure 28 – Typical postwar housing style. This example from 1960 is located in the subdivision of Bel-Aire

Figure 29 - Same house as Figure 28 today

The reduced depth allowed for larger front and back yards and lowered neighbourhood density. Street patterns also changed. More than ever before, the suburbs evolved into a shapeable entity which would grow under stricter guidelines.

1.5.2. MUNICIPAL PLANS

Calgary's first true land use plan was created in 1960 and adopted in 1963 as the Calgary General Plan, which was the first statutory municipal plan in Western Canada. The postwar building boom was continuing, and planners saw little reason to regulate growth, and the plan encouraged that the city maintain its current growth pattern of low-density neighbourhood unit type neighbourhoods and did little to guide change (Foran,2009). Although the Plan recognized that low-density sprawl was not healthy, it was assumed that low suburban density would naturally create desirable inner city density. The City at the time remained relatively inactive on taking measures to intensify the suburbs, which the City feared would create a decrease in density in the inner city. It was not until 1960 that the City allowed for townhouses to be built, and even then they had to be separated from single-family residential zones. Calgary's suburban form was further engrained in the 1963 General Plan which clearly indicated that commercial areas should be located in off-street shopping centres and streets should be used for transportation purposes.

Figure 30 Safeway Store in Haysboro, 1959. Example of a typical Neighbourhood Unit strip mall.

Figure 31 - Same site today

Separation of land uses was also evident in the planning of industrial areas. Previously, very little industry existed within the city. To encourage growth, the City created extremely separated industrial parks (see Figure 32). In 1978 a new General Plan was released that envisioned additional density around transit corridors, which was especially pertinent with impending construction of the Light Rail Transit line, but with little guidance on enforcing any density, the plan did little to create strong communities. By the 1990s, however, it was obvious that the uncontrolled, low-density sprawl being created through market forces was not building healthy and sustainable communities. In 1995, the City released the Sustainable Suburbs Study, which was mandated to create more fiscally, socially, and environmentally sustainable communities (The City of Calgary, 1995).

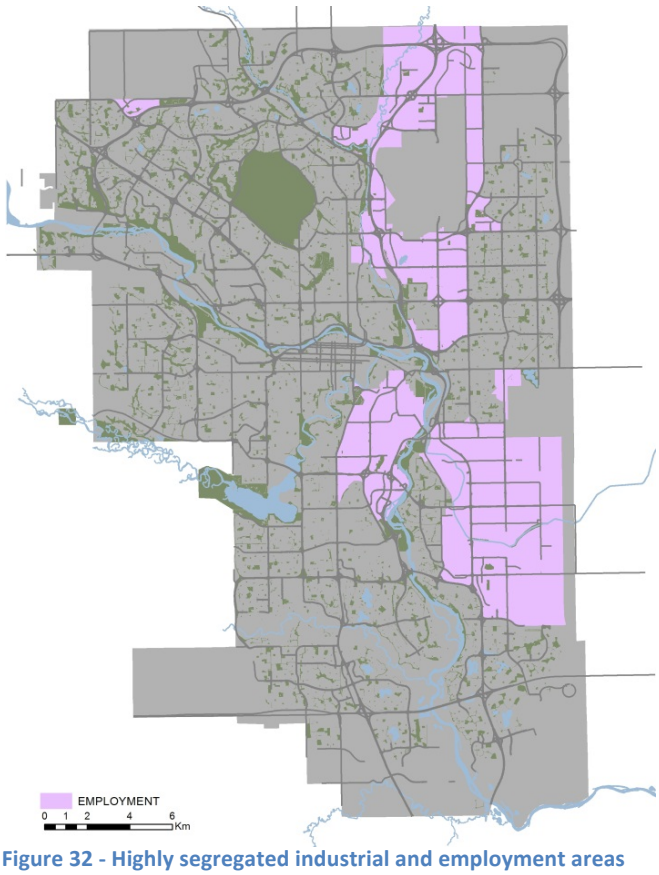


Figure 32 - Highly segregated industrial and employment areas

The report called for reducing the cost of sprawl through more compact urban form, better utilization of services, and less infrastructure. It encouraged a wider selection of housing choice that catered to diverse households and lifestyles, and recommended a mixture of uses within neighbourhoods in order to reduce car dependence. Fewer cars were also recommended for reducing air pollution, and a more compact form worked towards preserving agricultural land and sensitive areas surrounding the city. In terms of neighbourhood layout, the report recommended creating a type of 'urban village'. Characteristics of this include a focal point and recognizable boundaries and entryway a public activity centre, a mixture of uses near the centre, services and parks within walking distance of homes, safe pedestrian and cyclist-friendly streets connecting homes, a variety of housing types and employment opportunities, an efficient public transit system, and protected natural areas with connections to regional pathway systems. Research done through the Department of Environmental Design at the University has shown that the Sustainable Suburbs Study has to some extent led to the development of neighbourhood cores in certain areas, and residential densities and housing type mixtures have been increased. However, densities are not high enough to support a diversity of employment opportunities or strong multi-modal transportation, resulting in the continued dominance of the car as the primary mode of transportation in new communities (Damiani and Tsenkova, 2008).

Although a policy such as the Sustainable Suburbs Study is commendable and did have effects on the ground, it did little to change the overall pattern of development. However, better polices with more teeth have been formed using the ideas of the Sustainable Suburbs Study. Notably, in 2005 the City undertook imagineCalgary, a community visioning project which involved 18 000 Calgarians giving their input on how they envisioned Calgary in the next 100 years. From this, the City created PlanIt Calgary, which aimed to set out a long-term direction for sustainable growth over 60 years that could accommodate another 1.3 million people. At the heart of the plan are smart growth and sustainability principles that focus on creating a compact, accessible city that preserves green space and the environment. From this, Council approved the Calgary Municipal Development Plan and Calgary Transportation Plan in 2009, allowing ideas and policies to turn into actions.

1.5.3. STREET LAYOUT AND SUBURBAN FORM

The first evidence of planning that encouraged a particular form of street layout occurred in 1953 with new policy guidelines that recommended the Neighbourhood Plan concept for suburban growth, modeled after Clarence Perry's Neighbourhood Unit. The street layout took the form of the warped grid, as described by Michael Southworth and Eran Ben-Joseph (Southworth, Ben-Joseph, 1997). In this

pattern, most streets are parallel, but often skewed from the standard 90 degree grid pattern. Crescent streets are common, and there is limited use of the cul-de-sac. Like the Neighbourhood Unit, the plan called for schools, recreational facilities, and more restrictive zoning near the centre. Apartments offered a buffer between single-family houses and commercial and other uses. Commercial zones were placed along arterial streets and intersections of major roads. The zones were strongly car-oriented, with plenty of surface parking between the street and the stores, and often had a supermarket anchor. However, commercial land prices were higher, so more commercial land was zoned than necessary in many instances. Vacant spaces in commercial strips were common. Often, to fill vacant land, the areas were rezoned to allow for gas stations. In many early post war neighbourhoods, it was common to find three or four gas stations on one intersection. With this type of commercial space being unsuccessful, developers later turned towards building larger commercial centres that would serve several neighbourhoods rather than smaller commercial strips built for each community. Many of these underperforming commercial sites still exist today. If there is any silver lining to their failure, it is that they are ideal sites for redeveloping with mixed uses today. Furthermore, they are often located near downtown and other employment centres and have established services and amenities nearby.

By the mid-1970s planners shifted away from the warped grid pattern of the neighbourhood unit. The scale of the planning unit was too small to accommodate certain commercial, recreational and educational facilities. The City shifted to a Sectoral Planning model under the suggestion of the CMHC. A sector houses approximately 20000 to 30000 residents in several units. The sectors are commonly bounded by arterial roads and freeways, and each community within the superblock is often bounded by a smaller arterial roads (see Figure 30). At this scale, planners felt that public services, transportation, and commercial areas could be managed. Near the centre of the sector are major services, such as grocery stores, schools, and recreational facilities. This growth pattern clearly emphasizes the car over the pedestrian.

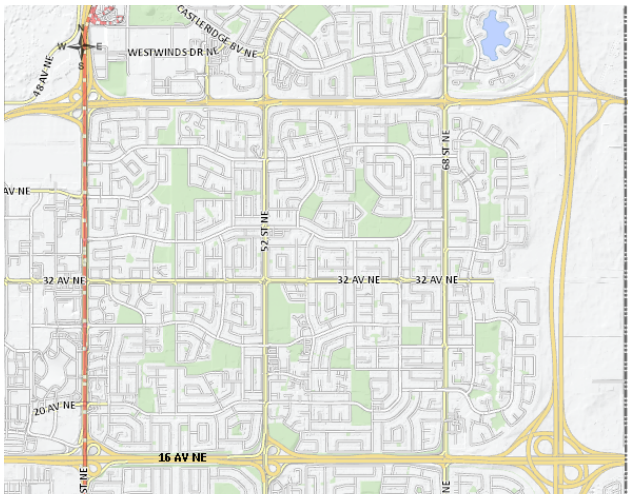


Figure 33 - 'Superblock' development pattern found in the sectoral planning model

Through the 1970s, house and land prices increased dramatically. In response to demand from developers to construct more affordable housing, the City reduced the minimum suburban lot frontage from 50' to 40' (Foran, 2009). This increased suburban density marginally. The City also implemented a minimum density requirement (of 22 people per acre), but with no requirement on the location of this density, developers were able to segregate low-density single-family dwellings from higher density multi-family residences, and by the end of the decade the policy was removed and changed to a flexible discretionary measure.

By the 1980s, the average house had grown, becoming nearly twice the size of the average 1940s modest bungalow in Calgary. Alleyways became less frequent, with garages commonly being located attached to the front of the house, creating a decreasing vibrant public realm. As this trend

continued into the 1990s, streets became increasingly hierarchical, and the sectors became further separated by large tracts of land buffering the houses from the binding freeways or arterial streets. The street pattern in communities built since the 1980s have curvilinear pattern, with poor permeability. The arterial streets and freeways have curves in them as well, creating the effect of a sinuous superblock grid.

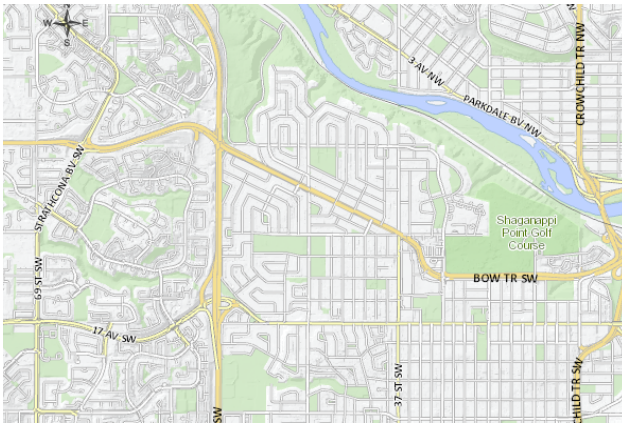


Figure 3 - Three phases of development west of downtown, showing gridded, warped parallel and curvilinear street patterns

The housing built in this era was quite homogenous, with a limited palette of colours, materials, and forms. The apparent uniformity is telling of the economic status of the residents. Because housing footprints are so large, private yard space is reduced compared to most communities built in the 1950s and 1960s. There is a greater emphasis on parks and open spaces within the communities, and some communities are built with green pathways linking its various sectors.

More recently there has been a greater emphasis being placed on urban design in many of Calgary's new suburban neighbourhoods. McKenzie Towne, for example, has applied Urban Design principles by experimented with New Urbanism to create a strong commercial core, complete with a 'main street' (see Figure 35), and a diversity of housing styles and architecture for a range of incomes.

Figure 35 - High Street, in McKenzie Towne

Figure 36 - Although commonplace in many cities, Calgary has very few examples of street-oriented row housing. McKenzie Towne set a new precedent for this pattern of development in the city.

The Urban Land Institute ranked it in the top 26 master-planned communities worldwide. Its street pattern is quite permeable, and most streets feature alleyways, which improves the public realm by placing the garage at the rear of the house. Furthermore, laneway housing is permitted above garages in the rear, which adds hidden density and affordability to the community (see Figure 37).

Figure 37 -Laneway housing adds hidden density and increases range of affordability options

However, it is not without its faults. Apart from the shops and services located within its boundaries,

the community is completely car dependent. It was built on a greenfield site, largely isolated from existing residential areas or commercial and recreational services.

Eventually, the Light Rail Transit will extend to the community, but no dates have been set for when. The cost of creating such a long line to a low density area is too much for the City to be able to afford currently.

Since the release of the Municipal Development Plan in 2007, new communities are built with greater adherence to good planning principles through the guidance of Area Structure Plans (ASPs) which outline the vision and form of new communities. This allows for a greater degree of cooperation between City and developer in planning new communities. Communities such as Seton and Tuscany have been planned through this mechanism, which is working to regulate greenfield expansion. Regulations are especially being improved with regard to density. Previously, the City did not permit housing densities greater than twenty units per hectare in low density residential areas. This cap has since been lifted, and denser residential communities are being built. For example, the community of Mahogany, south of McKenzie Towne, has been approved for 30 units per hectare. In the Keystone Hills project, a massive development containing 15 new communities, housing 60 000 residents, and employing 18 000 people, the goal is to have increased density as well. Although the plan itself is strong, showing good planning principles such as mixed use, walkability, access to rapid transit, green infrastructure, and good building and streetscape design policies, the site is located in a greenfield far from the urban core. Understandably, not all growth will be able to take place through intensification of existing suburbs. However, perhaps surrounding the suburbs with a new ring of denser, better developed suburbs will provide the extra stimulus needed to intensify existing underperforming suburbs located between the inner city and the well-designed outer suburbs.

Although growth is primarily occurring in greenfield sites, there has recently been an emergence of suburban intensification in existing suburbs. The two best examples are Garrison Woods and The Bridges. Garrison Woods was created through the repurposing of non-used army barracks into a diverse, dense, mixed-use community. It has quickly become a thriving community and desirable address in the city. The Bridges is Calgary' s first official Transit Oriented Development, which was built on the site of a decommissioned hospital. Both sites provide successful precedents of suburban intensification, and will be further examined later in the paper.

1.6. PARKS AND ECOLOGY IN CALGARY'S SUBURBAN LANDSCAPE

Parks and open spaces provide a natural contrast to the glass and concrete built environment surrounding them, and they become a cherished part of a city's urban form. Besides the sense of place they provide, parks and open spaces benefit cities in several ways. Studies have shown that proximity to a large public open space increases levels of walking by fifty percent (Giles-Corti, 2005) and can increase land value in adjacent residential areas by three times (Geoghegan, 2002). Even the presence of trees in residential areas increased the perception of safety in the area (Kuo, 1998). The importance of parks and open space has been well noted in Calgary since its early days when the CPR planted trees to create a park like setting unlike the prairie surroundings that would attract new residents and investors to the city. The early residential public realm was enhanced by green boulevard buffers between the sidewalk and the roads. Trees were planted along this boulevard. To

further encourage the creation of an urban forest, residents were given free saplings to plant on their properties. Many of the early trees planted by the city were American Elms which provide a highly imageable canopy over residential streets.

Figure 4 – Canopy of elm trees over 11A Street N.W.

Across North America, Dutch elm disease has decimated large populations of these trees, and being isolated from other populations, Calgary is now home to one of the largest healthy stands of the elm in the world (Bryan, 2012). To this day, many of Calgary's suburbs are surprisingly forested. The city is home to more than 445 000 trees, 40% of which are planted along streets (City of Calgary, 2012). Unfortunately, planting trees in new developments is no longer taken for granted. While more expensive developments are well vegetated, affordable communities are lacking any sort of green. In prewar Calgary, the City planted trees between the sidewalk and the road in the grid-pattern neighbourhoods. These trees have since matured, and in many cases, elm trees have created beautiful canopies that have enclosed suburban residential streets. After the war, when the warped grid became the dominant pattern of development, the City, who no longer developed residential streets, made no requirements for developers to include treed boulevards along residential streets. However, during this era, lot sizes were generally large and most suburban developments had alleyway where garages were kept. The spacious front yards in these communities allow for the planting of trees and other vegetation, which have since grown large. Although the streets are generally too wide and the trees too recessed to form a canopy over the road, there does exist a sense of enclosure to the green suburban landscape. Furthermore, in the post war era, it became more popular to plant coniferous trees, especially spruce and fir trees. Even in the winter these trees serve to enclose the streets and add variety and legibility to the landscape as one walks long the paths of the suburbs. However, in the newer curvilinear subdivisions, alleyways have mostly been removed and garages are located at the front of the house. Lots have become much narrower, and consequently the driveway often takes up the majority of the front yard. This leaves little room for trees and vegetation, thus enhancing the monotony of the suburban landscape, and creating less imageable paths through them.

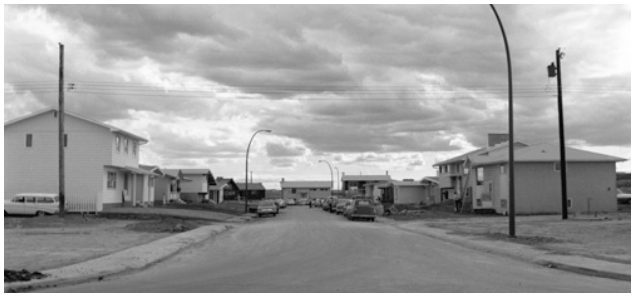


Figure 39 - Vauxhall Crescent, c. 1964

Figure 40 - Vauxhall Crescent, in its current greener state.

Figure 41 - Cardiff Drive and Cardiff Place, c. 1956

Figure 42 - Cardiff Drive and Cardiff Place

The park system is well used, expansive, and connected. Much of the credit for this can be given to William Pearce, an employee of the CPR who envisioned that Calgary's form should be based around natural features. Some of the city's earliest parks, such as Central Memorial Park, were created by him. The Mawson Plan echoed the importance Pearce placed on parks and a connected river system. The vision that the river system should be public natural space has survived to this day, although not without trial. The downtown waterfront was a mixture of rail lands, light industry, and unused open space. In the 1960s, plans were in place to build a freeway and rail line along the river, but luckily were put aside and not revisited (see Figure 43). However, by 1994, the City adopted the Calgary Urban Parks Master Plan which created the river pathway system, a network of green space along the rivers connecting more than 550 km of pathway.

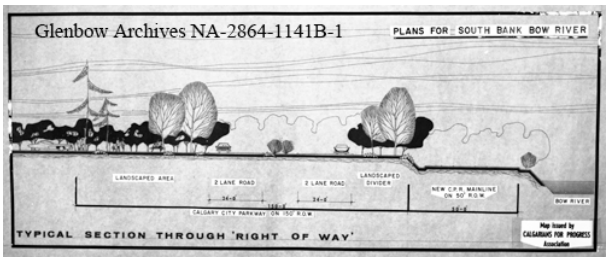


Figure 43 - Proposed plan for highway and rail line along river

The natural environment is an integral part of the suburban realm as well. The origin of suburbs, after all, can be traced back to Howard's garden cities that blend the health and well-being found in the countryside with the jobs and services provided by the city. Calgary's first suburban parks were created by the City. However, after the growth in popularity of large-scale suburban development in the postwar era, the City transferred a majority of the creation of park space to developers. Early park development by suburban land developers did not always result in quality parks. While the Province of Alberta sets guidelines that state that 10% of suburban development be devoted to park space, often the 10% least developable land was designated park in suburban areas. Furthermore, developers often were able to pay the City in lieu of creating park space, or able to transfer park space from one development to another, resulting in uneven, poor quality park space. By 1960 the City introduced its own regulations that required that 10% of the development be classified as *reserve,* which included parks, schools, and public spaces. Undevelopable land could be classified as reserve land, but must be counted as additional to the 10%, not included within it. However, this amount could be reduced if arterial roads needed more space in the development. The City further encouraged sprawl and reduced the amount of quality green space in suburban developments by allowing buffers between land uses to be counted on a two to one ratio as reserves. Not only does this segregate and spread land uses, but it also allows for developers to use buffer zones, often strips

between arterial streets and neighbourhoods, as community green spaces. Public space was further limited in suburban areas by developers arguing that in more upscale subdivisions, residents preferred to have larger private yards rather than more public space, which became more prevalent after developers started building wider lots with houses placed lengthwise across them.

Despite many examples of poor quality public space in suburban developments, unique examples of incorporating park and open space, both private and public, into Calgary suburban form have emerged. Suburbs taking cues from Clarence Stein's Radburn were built in experiment. The federal government provided the City with money to build the suburb of Dover to be used as affordable housing modeled in the Radburn style, where houses fronted onto a common sidewalk rather than a street, and vehicle access was restricted to the alley behind the house.

Figure 44 - Radburn-style development in the community of Dover

Developers also proposed this idea in the suburb of Varsity Acres, where they envisioned walkable pathways connecting residents to commercial areas. Although traffic engineers discouraged the development of the pathways, some pathways were built behind the houses instead of alleyways. This rear system of pathways has regained traction in some newer communities as well, including Tuscany, Cranston, and Evergreen.

Figure 45 - Rear pathways in the community of Varsity Acres

One of the most notable suburban forms based around park space that is common in Calgary and rare elsewhere are the communities built around man-made lakes. There has been some initiative to orient communities around artificial lakes in Canada, notably in dry cities such as Edmonton, Winnipeg, Regina, or Lethbridge, but no other place has adopted the form so strongly. Canada's first suburban community built around a man-made lake was Lake Bonavista, built in the city's Southeast in 1967. Built on a flat plain, the developer carved out a lake and with the fill created a hill and an artificial waterfall to circulate water.

Figure 46 - Lake Bonaventure, with Lake Bonavista in the background, c. 1984.

The lake is suitable for swimming in the summer and is equipped with a beach. In the winter, it is plowed for skating. Planners felt that this pattern of development was useful because it meant residents would be located closer to recreational facilities, and the developer and the City benefited from the

increased lot value and property taxes created by desirable waterfront living (Foran, 2009). However, lakes take up space, and Lake Bonavista has one of the lowest densities of any Calgary neighbourhood. Despite this, lake-oriented communities are still highly desirable, and Calgary is now home to over a dozen of them, with more planned for the future.

PART 2 – ANALYSIS: OPTIMISING SUBURBAN LANDSCAPES

2.1. HOW SHOULD SUBURBAN LANDSCAPES OPERATE?

Planned suburbs have long been thought of as normative endeavours, and despite occasional failures, have been designed to improve a certain condition or way of life. Euclidean zoning first sought to separate uses within an urban area to protect residents from dirty industries in the city. Historically, we can look to planning models such as Howard's Garden City, which also aimed to relieve people from the dirtiness and congestion of urban life by creating utopian cities that merged the services, jobs, and amenities of cities with the healthy qualities of the rural landscape. Perry's Neighbourhood Unit attempted to create self-contained neighbourhoods where adults would be close to city conveniences by children would be protected from traffic and the dangers of the large cities and isolated in relatively homogenous neighbourhoods. Some of the most influential critiques of planning models based around segregated land uses came from Jane Jacobs (1961), who famously rejected low-density, segregated, homogenous neighbourhoods. More current models, such as New Urbanism, blend aspects of the garden city ideal and of Jane Jacobs and attempt to solve problems by making the suburban landscape operate in a certain way that encourages walkablity, values nature and sustainable design, and emphasizes a diversity of land uses and housing choices. Each model of suburban development addresses certain existing problems. However, no one model is perfect, and as such, there is no one metric that can assess how a suburban landscape is performing. The suburbs are not simply a part of the urban landscape, but are also a cultural landscape, and their form and role is highly reflective of the communities living within them. In

assessing performance, however, Kevin Lynch (1981) explains that although the quality of place is intricately connected to both place and society, there are certain universal regularities linking society and form. While these regularities cannot be used to set standards of performance, such as absolute truths, they can be used to assess performance dimensions, which Lynch describes as 'certain identifiable characteristics of the performance of cities which are due primarily to their spatial qualities and which are measurable scales, along which different groups will prefer to achieve different positions' (Lynch, 1981, 111). With a solid understanding of Calgary's suburban form, performance dimensions can be used to assess how its suburbs are operating. There is no one measure that can successfully assess the performance of the suburbs, so it is more meaningful to measure the performance through various lenses.

A sample of two diverse sets of performance dimensions will be used to analyze suburban growth. The first set of criteria, as proposed by Soule (2006), identifies characteristics of sprawl that limit sustainable performance. The second set of criteria, as proposed by Bentley et al. (1985), is more of a measure of urban design and the responsiveness of an urban landscape to work well with its users. It is a positive measure, analyzing how 'good' a place is, and due to its scale allows for a closer analysis of Calgary's suburbs and particular nature.

2.1.1. CRITIQUE OF 'SPRAWL'

Of the many arguments against suburban sprawl, Soule has identified that the majority can be classified into five general categories (Soule, 2006):

1) Cost
2) Aesthetic
3) Public Health
4) Traffic
5) Exclusionary principles

1) Cost – Expansive, low-density growth is expensive, and requires greater publicly funded infrastructure per person. Through analytical studies, Burchell (2005) has shown the costs and benefits of sprawl compared to compact development. Using 172 Economic Areas, which encompass the entire United States, an individual study was conducted to compare the two patterns of growth over 25 years. The results show that developing a compact growth pattern can save 1.6 million ha of land that could be used instead for agriculture, forestry, or preservation. The cost of developing residential areas in a compact manner would save a staggering $420 billon. This also results in a savings of $126 billion dollars due to reduced infrastructure costs for water, sewer, and roads. This is an 11% savings over the sprawl scenario, and is equivalent to a $2,250 savings per house being built (Burchell, 2005, Cohen, 2007). In Calgary, due to the particularities of the development industry and the rapid outwards growth of the suburban area, each new house costs approximately $10 000 to $15 000 more in infrastructure and servicing costs than the City can recoup on property taxes. The City is essentially subsidizing sprawl, and has reached a point where suburban development is clearly not economically feasible, and it makes more sense to build compact, complete communities in areas that have existing services and infrastructure. Recently, there has been more recognition in City Hall of the cost of suburban growth. Council has started exploring options for development charges, or what the City refers to as a Standard Development Agreement. Previously, developers paid for approximately one quarter of the true cost of suburban growth. In May, 2011, the City negotiated for higher development charges that would equal one half of the true cost of suburban development. Although this is a move in the right direction to support

compact growth, development charges could be higher. This agreement highlighted the tension between municipalities and developers. The mayor of Calgary was pushing for much higher charges, but only able to negotiate a much smaller increase than desired due to the pressure of the developers and the population eager to buy more affordable suburban houses. Building compact, complete communities is an ideal concept, but in practice it faces challenges. Urban planners and urban designers have overarching preoccupations of creating better spaces, but in order to do so, they also must recognize the larger systems working around them, and be able to work within them.

2) Aesthetic Quality - The mundane repetition of architecturally uninteresting single-family dwellings of most suburbs lacks the classic appeal of the diversity of housing types and characters found in inner cities. In *Rural by Design,* Randall Arendt explains that the loss of aesthetic appeal in suburbia can often be attributed to the lack of emulating traditional town characteristics, such as layout, design, structure, mix of uses, and densities (Arendt, 1994). Many of these characteristics are in fact not allowed in many land-use regulations. (Rhees, 1995) However, it has been proved that well designed communities are much more resilient and sustainable than residential developments in which design has been largely ignored. Cases in point include Radburn, New Jersey, or Chatham Village in Pittsburgh, Pennsylvania. Psychological studies have also been conducted which reveal that there is a strong common preference for the aesthetic of conventional, compact development, with narrow, tree-lined streets, shallow setbacks, traditional architecture, and landscaping. In Calgary, there has been a move towards this type of development, with the best examples being found in the communities of Garrison Woods, Quarry Park, and McKenzie Towne.

Figure 47 – Pedestrian-oriented streetscape in the community of Garrison Woods. With minimal setbacks, no garages, mature vegetation, and many windows, the street becomes a more comfortable, human-scaled space.

Figure 48 - An automobile-oriented streetscape in the community of Taradale. The Victorian streetlight does little to animate the scene.

3) Public Health – In some cases, suburbs have negatively impacted human health. Researchers at the United States Centre for Disease Control and Prevention have linked suburban residents with sedentary lifestyles, which are triggering obesity, heart disease, and diabetes. (Dunham-Jones, 2010) Due to their dependence on the automobile, suburbs can have a negative impact on air quality. In United States, vehicles account for approximately 30% of hydrocarbon emissions and 30% of nitrogen oxide emissions. In suburban areas, however, these numbers are found to be much higher, up to 47% and 58% respectively. Urban residents have 1/3 of the carbon footprint that suburban dwellers have. This is because of the increased transportation required to service the suburbs, and because the majority of houses are single, detached units, and therefore have much more exposed outdoor surface area, requiring much more heating and air-

conditioning energy (Dunham-Jones, 2010). Suburban automobile culture also creates more traffic fatalities. The automobile fatality rate in denser cities with strong public transit is much lower than sprawling, auto-dependent cities. For example, the fatality rate per 100,000 persons in San Francisco is 2.45, in New York it is 2.30 and 3.21 in Portland. This contrasts with cities such as Tampa, at 16.15, Atlanta, at 12.72, or Dallas, at 11.35. Environmentally the suburbs create problems as well. Natural water runoff into rivers and streams is approximately 4%, but this number is raised to approximately 15% in the suburbs due to non-porous surfaces. The suburbs are affecting our mental health as well. Studies show that high traffic volume and travel distance are the greatest contributing factors to stress-induced road rage, which increased over 50% over a five year period in the 1990s. (Frumkin, 2002). The suburbs are also eroding our social capital. Robert Putnam, author of *Bowling Alone,* estimates that every additional ten minutes of commute time predicts a 10% decrease in civic involvement

Calgary has seen benefits of creating walkable neighbourhoods. Since 1995, following the policies of the 1995 Calgary Transportation Plan, over 500 km of pathways have been added to the pathway system, most of which are in the suburbs. In the seven years following the completion of the additional pathway, pathway usage increased 55%. However, many communities are still not conducive to walking. Many, especially newer communities, only have sidewalks on one side of the road. Often there is nowhere meaningful to go within a comfortable walking distance besides low density housing. Furthermore, arriving at useful destinations often involves crossing busy streets, which further discourages walking.

4) Traffic - Evidence supports the logical conclusion that people living in compact communities will drive shorter distances and take public transit more often than their counterparts living in car-oriented suburbs. In *Stuck in Traffic,* and his follow-up *Still Stuck in Traffic,* Anthony Downs point to behavioral patterns caused by physical and social structures of growing cities in America as the main cause of congestion. (Downs, 1992) Based on research from 2000, Downs also estimates that congestion costs each American $505 per year, compared to a scenario with no congestion. A more recent estimate pegs Canada's economic loss due to gridlock to be $5 billion. In 1982, the average length of congested periods of the day totaled two to three hours. By the mid-1990s, this had increased to five to six hours. In dense cities such as New York and San Francisco, this type of congestion is expected simply because of the high density land-use. However, suburban congestion is due to factors directly relating to land-use, such as low density development and decentralized employment, as well as shifting consumption patterns and market restructuring (Downs, 2004). Interestingly, Downs argues that congestion can be viewed as a necessity to the American lifestyle because congestion is considered to be a "balancing mechanism that allows Americans to pursue certain goal they strongly desire – goals other than rapid movement during peak hour." These goals include the ability to have a broad range of choices of where to work and live, and allow for the ability of live in low-density developments which are distanced from neighbourhoods where lower income residents live. Congestion allows us to run individual trip errands, and allows for the use of private automobile. In one sense, it can be concluded that congestion is therefore not a problem, but a solution to moderating the real problem, which is the desire to expand outwards in typical suburban fashion.

Despite Calgary's sprawl, average commutes to work are similar to other Canadian cities. In 2010,

the average commute to work in Calgary was 26 minutes, which lies mid-pack, above Edmonton's 23 minutes, but below 27 minutes in Ottawa, 30 minutes in Vancouver, 31 minutes in Montreal, and 33 minutes in Toronto (Statistics Canada, 2012). However, there is evidence that car dependence is dropping. From 2001 to 2006, the proportion of workers who drove to work dropped from 71.8% to 69.1% and public transit usage increased to 15.6%, up from 12.6% just ten years earlier. This increase is the largest among Canada's major metropolitan areas. This is primarily due to the extension of the Light Rail Transit system deeper into Calgary's suburbs.

5) Exclusionary Principles - Several factors combine to create the exclusionary aspect of the suburbs. The availability of inexpensive land on the urban fringe and pro-growth policies create large-scale housing developments. With such low density, mass transit is not available and the suburbs become car dependent, restricting home ownership to those with cars. Large-scale suburban housing developers tend to build and price houses of a similar character, again targeting a distinct sector of the population. This model creates homogeneity within neighbourhoods and inequality across an urban area (Putnam, 1995). In Canada, a country whose growth rate is dependent upon immigrants, the suburbs are not evenly fostering integration of immigrants into cities. Across Canada, studies show that recent immigrants are far more likely to settle in mid- to high-density areas (Statcan, 2008). This holds true in Calgary, as well, but due to the lack of mid- to high-density areas, immigrants also tend to congregate in certain low-density neighbourhoods. Approximately 21% of Calgary's population is made up of immigrants, giving it the fourth largest immigrant population in Canada, which is similar to its total population ranking. Within Calgary, patterns of urban form and immigrant densities are apparent. In the downtown core, 39% of residents are immigrants, holding true to the pattern of immigrants locating in dense areas. In the western half of the city, immigration percentages are roughly on par with the city-wide rate of 21%, with new immigrants making four to five percent of the population. However, the eastern half of the city is more polarized.

The Northeast quadrant of the city in the area bounded roughly by 16th Ave. N.E. to the south, the airport and 36th St. N.E. to the west, and the Stoney Trail Restricted Development Area to the north and east has the highest rates of immigration and is home to the three census districts with the highest rates of immigration in Calgary outside of downtown, at 46%, 42%, and 38%. Recall that this was the area that was annexed in the early 1960s by the City under the recommendation of the CMHC who suggested it be used for low-cost development because it lacked the amenities that people living in the west require. The hills in the west tend to attract higher priced developments, but the east is located on the flattest part of the city, and there is an extreme lack of access to natural spaces in the areas. Developers perhaps attempted to mask the lack of topographical and natural features by ironically naming communities after nearby mountains, such as Temple, Rundle or Whitehorn, or by simply using the word 'ridge' as a suffix in the community name, such as Pineridge, Falconridge, Castleridge, and Saddle Ridge. Although this area is Calgary's most ethnically diverse, the houses here are nearly exclusively single-family dwellings in many of the communities.

Figure 49 - Single-family houses in Saddle Ridge

The area started to build up in the 1960s and has continued to do so to this day. To create affordability in new districts, lots and houses tend to be smaller, there are fewer sidewalks, there is less vegetation planted, and fewer amenities. In Calgary, the average number of public amenities, such as police stations, libraries, recreation and sporting facilities, parks or playgrounds, per 1000 persons per community is 4.3. In the Northeast, many communities have far fewer, with especially low values of 2.4 in Martindale, 2.2 in Whitehorn, 2.1 in Falconridge, 1.8 in Saddle Ridge, and 1.5 in Taradale. Not a single community in the area has a value higher than the average value for Calgary. While some of this can be attributed to these communities having households with a higher average number of family members, proportionally people in the Northeast are underserviced. Due to the airport and industrial parks to the west, the area is also highly segregated from the rest of the City. Housing diversity in this area is low as well. The Simpson's Diversity Index of housing mix measures the diversity of housing types in an area, where the highest score of 1 represents no diversity of housing mix, and the lowest score of 0.33 represents an even mix of single-family housing, ground oriented condos, and multi-family units. In Calgary, the average score is 0.62. However, in several communities in the Northeast, this number is surprisingly high, at 0.95 in Coral Springs, 0.90 in Martindale, 0.82 in Saddle Ridge, 0.69 in Castleridge, 0.66 in Taradale, and 0.65 in Whitehorn. There are some variations, Pineridge is diverse with a value of 0.38, but as a whole there are few housing options in the Northeast other than single-family dwellings. Despite the higher than average rate of single-family dwellings, residential density in these neighbourhoods are among the highest in the city, again indicative of the higher number of inhabitants per household in the area. The area is reasonably well served by transit because there is a leg of the Light Rail Transit system that runs through the area, but it is located on the western fringe of the residential areas. West of the transit line is large-grain land uses such as shopping centres and industrial parks. This provides planners with ample opportunity to improve this area of the city. Clearly, instead of being surrounded by parking lots for shopping centres, the train stations should have intensified development. The additional property tax dollars gained from development could be used to provide services and amenities to the area, which are especially crucial in areas where new immigrants need to make connections and have opportunities and services that assist them in their transition to a new country. The development would also add a greater mixture of housing types to the area. An increase in rental apartments would be beneficial for those who are in transition stages of their lives and would better integrate cultures. Non-immigrants who have no need for a single-family dwelling could move to the area, and immigrants who arrived to the area for the initial network would not be as forced into purchasing a single-family dwelling that ties them to the area.

The demographics of the Southeast of the city, especially east of the Bow River, are markedly different than the Northeast. This area is home to new communities such as Douglasdale, McKenzie Lake, McKenzie Towne, New Brighton, Copperfield, Auburn Bay, Cranston, Seton, and Mahogany, some of which are still being built. The area is highly segregated from the city, separated by the Bow River Valley to the west and industrial parks to the north, and linked to downtown by a 20 km drive down Deerfoot Trail, Calgary's largest freeway. It too is very suburban, but is home to the three Calgary census districts with the fewest immigrants, at 16%, 16%, and 15%, and only 2% of the population is new immigrants, making it Calgary's least diverse area. Unlike the Northeast, this area boarders the river valley, giving its residents good

access to natural features. Even with its proximity to the river valley, which is a provincial park and preserved from development, several of the communities feature man-made lakes. The houses are larger and more expensive, and also generally are not diverse in their housing typologies. An exception to this is McKenzie Towne, which was purposely built as a New Urbanist development. It features one of Calgary's lowest housing mix values on the Simpson's Diversity index[1] (a low value meaning high diversity) at 0.42. In contrast, Douglasdale has a value of 0.89 and McKenzie Lake has a value of 0.84. With no Light Rail Transit line, these communities are highly car dependent. It is good to see that developers are taking chances and building new types of communities in this area. McKenzie Towne has been a well-received New Urbanist development. Seton, which is still in the early stages of development, is attempting to create an urban centre in suburban Calgary. Its main anchor, the South Calgary Hospital, in nearing completion. The development is billeted as one of the most comprehensive mixed-use developments in North America. The 148 hectare site is expected to have over 230 000 m^2 of office and retail space and 1300 multi-family houses. It will also feature a 6.5 ha park, and public services including a recreation centre, a library, and schools. Also in the early development phase in Mahogany, which is a more conventional suburban neighbourhood, but it distinguishes itself by its plans to have a strong diversity of housing type, and well as affordable, social, and special needs housing interspersed throughout the community. It will also feature a commercial core and be built around a reconstructed wetland. Despite attempts to create well designed, mixed use communities, which by many metrics, especially in the case of McKenzie Towne has been achieved, these areas are still serving a homogenous group of residents. With no Light Rail Transit line, somewhat higher than average house prices, and no network of services, this area remains exclusionary to many Calgarians.

When measured through criteria such as cost, aesthetic value, public health, traffic and exclusionary principles, much of the current pattern of suburban development is not performing well. This assessment can be measured through various quantitative measures. However, just because these criteria are met does not simply create good spaces. Place also has a sensorial aspect, and the following performance dimensions offer another way of evaluating urban design in the suburbs.

2.1.2. PERFORMANCE DIMENSIONS IN CALGARY SUBURBS

The design of urban space matters because it largely affects the choices people are able to make. It is important to analyze the design of suburban space at all scales, from the layout of an entire neighbourhood to the smallest details that reflect the unique residents. Performance dimensions can be used to understand how various mechanisms, principles, qualities, and scales of design can affect an urban space and the user experience within it. Bentley et al. (1985) provide seven performance dimensions:

1. *Permeability:* designing the overall layout of routes and development blocks;
2. *Variety:* Locating uses on the site;
3. *Legibility:* designing the massing of the buildings and the enclosure of public space;
4. *Robustness:* designing spatial constructional arrangement of individual buildings and outdoor places
5. *Visual appropriateness:* designing the external image

[1] The Simpson's Diversity index analyses how many different types exist in a dataset and how evenly the individual entities are distributed among the different types. Maximum diversity is achieved when each type is populated equally.

6. *Richness:* developing the design for sensory choice
7. *Personalization:* making the design encourage people to put their own mark in the places where they live and work.

These seven concepts can be used to explain how environments are responsive to the user. Like Lynch (Lynch, 1960), the concepts can better explain how the legibility of an environment can affect its sense of place on a user.

Because the concepts presented relate to different scales, they are often results of actions taken on by various parties. The first, *permeability*, is often taken on by land developers, transit planners, or civil engineers. The next two, *variety* and *legibility* are in the realm of the urban planner. The fourth, *robustness*, starts to deal with the building as it sits in space, which is more typically the role of the urban designer, but is often taken on by the developer and builder in a suburban setting. The next level, *visual appropriateness*, relates the detail of the building to the context, making it seem a role of both the architect and the urban designer. The sixth role, *richness*, (materials, construction techniques, etc...) is done by the architect, and personalization, the seventh role, in a suburban landscape, often belongs to the homeowner. The seven qualities also appear at various scales. Generally, the list starts at the scale of a neighbourhood, and works down to the scale of a building or small site. The following analysis will consider postwar suburban form, which have the greatest potential for retrofitting and intensifying.

1. Permeability – The way people move through suburban areas is highly dependent on the neighbourhood's street pattern. Calgary's suburbs have increasingly become less permeable (refer to Map 3 in the appendix). Through each of Calgary's three sequential phases of block layout (grid, warped grid, and curvilinear), each subsequent pattern is less permeable than the last. Studies have shown that the grid pattern is the most permeable type of block layout with the highest average walkshed. This refers to the total area able to be reached from a certain distance from a point. With far greater opportunities for varying paths in the grid pattern than the curvilinear pattern, the walkshed of grid neighbourhoods is larger. In Calgary, the average walkshed for a gird neighbourhood Is 3.68 km^2, compared to 2.93 km^2 for neighbourhoods with the warped grid and 2.15 km^2 in curvilinear neighbourhoods. Conversely, as walkability decreases, car dependence increases. The average Vehicle Kilometers Travelled (VKT) in Calgary's grid neighbourhoods is 17319.6 km compared to 21664.7 km for warped grid neighbourhoods, and 23344.9 km for curvilinear neighbourhoods (Sandalack, 2011). The data show that new suburbs are not meeting the performance standards that were set by older neighbourhoods. Planners should make stronger requirements for developers to increase permeability in new neighbourhoods, as well as attempting to find ways to increase permeability in existing neighbourhoods. This could be achieved by purchasing land to create pathways connecting streets, or diminishing the impact of barriers such as arterial streets by adding crosswalks or pedestrian bridges. Notably, the future community of Saddlestone, which is to be built in the City's Northeast, will be the first example of a master planned community based on the fused grid in Canada[2]. This street layout puts a higher priority on neighbourhood walkability and connects people to green spaces and services more directly.

[2] A fused grid, supported largely by the CMHC, is a neighbourhood layout that uses the basic grid-geometries of a traditional neighbourhood while incorporating elements designed for perceived safety and security found in postwar neighbourhood layouts (CMHC, 2012).

A second aspect of suburban environments that affects their permeability is the definition of the public and private realms. Generally, the private and public realms are two separate entities in the suburbs, with fences demarcating lot lines between private properties. Public spaces include streets, sidewalks, and often large fields containing schools or playgrounds. However, good urban spaces often have blurred boundaries between private and public realms. For example, a café might place tables and chairs in a plaza or wide sidewalk in front of the shop. A residence may be located above the café. Regardless of who owns which part of the space, it is clear that the space can be entered and used by any member of the public. This concept should be transferred to the suburb, and is well suited to nodes of intensification within neighbourhoods than mix land uses and draw a variety of people.

2. Variety - Permeability is of little use if there are not a variety of land uses that can be accessed. The variety of an urban space is often dependent on the grain of the space. Lynch (1981) refers to grain as the ways that the different elements of the urban landscape are mixed together. Calgary's suburban landscape would best be described as a coarse grain, with similar elements being grouped together in the same location. In a finer grain landscape, elements would be better mixed among non-similar elements. In other words, buildings and land-uses would be varied. Mixed land uses was notably one of Jane Jacobs' four tenets of a successful city (the others being aged buildings, higher densities, and short blocks) (Jacobs, 1961). The Municipal Development Plan (MDP) and Calgary Transportation Plan (CTP) list Mixed Land Use as one of the fourteen core indicators for Land Use and Mobility, which uses an equation to assess diversity. When last measured in 2008, the land use mix diversity index was 0.53, but the City has set the 60 year target to be 0.7. Variety in residential form is even less diverse, at only 0.19. The 60 year target for this is 0.4. Furthermore, in 2006 18% of all population was located within Major and Community Activity Centres, and 600m of Urban and Neighbourhood Corridors. The City aims to increase this to 30% in 60 years (The City of Calgary, 2012). It is good to see that the City has acknowledged that a variety of land uses leads to better urban design, and has set targets to better achieve this goal. Generally, Calgary's newer suburbs have less of a mixture of land uses than Calgary's older suburbs. For example, in the new, curvilinear community of Cranston, the average number of amenities, such as shops, restaurants, schools or banks that can be reached within a range of one kilometer is 21. In Southwood, a warped grid community built in the late 1950s and early 1960s, the number of amenities rises to 35. In an inner city suburb, such as Hillhurst, which was built mostly during the 1910s, the average number of amenities located within one kilometer increases to over 140 (Walkscore, 2012). Because of its increased density, Hillhurst has many more amenities. However, even when measured proportionally, Hillhurst still comes out the winner, with 6.7 amenities per 1000 people compared to 5.5 amenities per 1000 people in Southwood and 2.4 amenities per 1000 people in Cranston (Calgary Herald, 2012). A way to attract a diversity of services is by attracting a diversity of users. Suburbs are often demographically homogenous, but by building a variety of building types which cater to a diverse population, the neighbourhood will be able to support a wider variety of services as well.

3. Legibility - Legibility refers to how well a place and a layout can be understood though the qualities of form and spatial enclosure. Often the concept of legibility is understood through the work of Kevin Lynch, who theorizes that legibility is achieved through combinations of paths, edges, districts, nodes, and landmarks. While these are often

apparent in inner city areas, they are often lacking in the suburbs. There is a certain banality to some of Calgary's new suburbs, and the monotony of the repeated house patterns with a limited colour palette does little to create a legible landscape. However, this is in a great effect due to vegetation, which has not yet created a sense of surprise or comfort along the sidewalks like it has in many older communities.

Districts are apparent in Calgary, as communities are well defined. Edges of districts are apparent, and often marked by boundaries between two distinct areas, such as popular 17th Avenue South between bourgeois Mount Royal and the apartments of Beltline. However, new districts have edges that are barriers. Wide roads and buffers separate districts and serve no meaningful purpose other than movement.

Landmarks and nodes are far more apparent and well-loved in older suburbs as well. Cherished meeting places such as Riley Park, Peter's Drive-In, or The Ship and Anchor are found in the inner suburbs. Rarely does new development have defining factors. Landmarks such as the clock tower in Kincora are certainly unique, but not particularly useful or cherished because no one can easily access them in their daily routine, and no one willfully wants to either. New developments need to be proper memorable destinations.

Recently, however, there has been a move towards a more legible, traditional form in new communities. Several inner city developments display these principles, such as The Bridges, Garrison Woods, Currie Barracks, and to an extent, Quarry Park. These neighbourhoods feature a variety of housing and architectural styles, and often preserve many of the larger trees from previous development. Plazas, parks, boulevards, and shops add diversity to the landscape, making them much more legible. They have proven to be successful, and similar trends are beginning in far suburban developments as well. McKenzie Towne, for example, is an attempt at a New Urbanist-style community that has a variety of residential forms and a walkable community centre for shops and services. Notably, in many new communities, including McKenzie Towne, developers are creating more legible streets by reintroducing the alleyway and improving the public realm of the street and front yard. Many models of houses feature porches and have a variety of architectural styles, which creates a more neighbourhood-like feel and adds to the legibility of the street.

Figure 50 - Single-family dwellings are the most predominant type of housing in Calgary. They should be built in a way that improves the character and legibility of a neighbourhood.

Furthermore, some new neighbourhoods, such as Walden or McKenzie Towne, are returning to more of a formal street layout that is similar to a warped grid, but with improved permeability.

4. Robustness - Robustness is a quality of a place that makes it adaptable for different purposes rather than being limited to a single use. Robustness is important because different users will use spaces in different ways. Furthermore, users change over time, and spaces should be able to adapt to changing owners and demographics. Often robustness is examined at a building level, the outdoor level, and the building/outdoor interface level, but it can also be applied to neighbourhoods. To a greater degree, prewar inner city suburbs are better performing than their postwar counterparts in terms of robustness. Conventional postwar planning has strongly encouraged the separation of

land uses, but proximity to work is one of the key benefits of inner city living. Recently, the City is experimenting with live/work units, which serve dual purposes, acting both as a home and an operating office or workspace for the homeowner. Calgary's first example of a live/work space is found in The Bridges, an inner-city Transit–Oriented Development that was recently built (see Figure 51). Due to the success of the project, more live/work spaces are being built. However, they tend to remain in the inner-city suburbs. Calgary's Land-Use bylaw allows for live/work units in most Commercial and Multi-Residential zones, but not in Low-Density Residential zones. There is therefore potential for live/work units in the suburbs, as long as they are found in low-density residential areas.

Figure 51 – 'The Olive', a Live / Work development in The Bridges. This trial concept has proven to be successful.

Why live/work units are not appearing in the suburbs is partially due to suburban form. In inner-city suburbs, commercial areas are often in buildings along streets that can be comfortably used for residential or commercial purposes. However, commercial buildings in the suburbs are most often located in a strip-mall type setting – hardly a comfortable living environment in their current state. Multi-unit residential buildings are often built on larger sites in clusters, with no street front access, something required for the survival of business. However, this is increasing potential for live/work space in Calgary. Within Calgary's developed suburbs from 2000 to 2010, there has been a 5.7% drop in the number of single detached dwelling, a housing form not suitable for adding robustness to place. However, there has been a 21.4% increase in the number of multi-unit dwellings, a typology that does allow for live/work space, and an even more important increase of 40.8% in ground-oriented dwellings, (City of Calgary, 2010). This type of dwelling, which is also known as a townhouse, is best suited for adaptable space because it most often provides street front access. Within developing communities, planners can ensure that this pattern of development is strategically located within the neighbourhood. A good example can be found in the new community of Walden, which like many new communities, has one main entrance. The main boulevard entering the community is treed and well-landscaped, making it comfortable for residential purposes, which are located on one side of the street in the form of ground-oriented residential development. On the other side of the street is a more conventional suburban shopping complex. While the this pattern of development does little to add to a quality urban realm, the ground-oriented development across the street benefits from being located in a higher traffic area near other shopping and services, but can be used for residential purposes as well (see Figure 52).

Figure 52 - Townhouse development in the community of Walden

Robustness does not only refer to private spaces. The suburban public realm should also be able to support a range of activities. Again, this is occurring

more naturally in prewar, inner city neighbourhoods, where streets are commonly shut down to traffic to hold pedestrian fairs. Although the City does issues permits to close residential suburban streets for block parties, suburban communities rarely have the density to make much of a showing at a community block party. Designing streets that balance vehicle and pedestrian needs is an important aspect of robustness. Plazas, wide sidewalks, benches, and traffic calming encourages people to walk the streets rather than drive them. A recent trend being supported by the City is the creation of community gardens in suburban communities. With the proper requirements in place, communities are eligible to receive up to $5000 from the City to assist with the creation of the park. This brings people to the park who might not normally use it otherwise for a purpose that is not common in parks.

5. Visual Appropriateness - Visual appropriateness refers to the details of the visual design of a place which affects how people interpret the place and give it meaning. A visually appropriate space better enables concepts such as variety, legibility or robustness. Contextual visual cues support legibility by integrating or contrasting a space from its surroundings. Use cues provide an insight into the various functional choices offered by a space. For example, a cul-de-sac containing nearly identical homes suggests the space is a private, non-permeable space that is designed for a homogenous population. Different groups of people will have different definitions of what makes good design, and will feel comfortable and safe in different settings. Bland, repetitive suburban development does not reflect the diversity of the Canadian society. Brand new suburban developments have a tendency to appear very formulaic and bland, especially when there are only a handful of builders in a community using few housing templates repeatedly. Recently, there has been more of an effort in new suburban developments in Calgary to use architectural design guidelines. These design codes do little to create unique suburban spaces, and often only serve to preserve the monotony of the neighbourhood by ensuring consistency and predictability within the neighbourhood. There are however, certain exceptions, and it appears developers today are taking a more active role in making new neighbourhoods more visually stimulating. For example, the architectural guidelines in the new community of Walden discourage oversized garages, and in some cases front garages altogether, and encourage a diversity of modern and traditional architectural styles. The guidelines also encourage architects and designers to 'pursue unique and creative solutions to express the visionary design quest that is foreseen for Walden' (Genstar, 2011). Despite being a car-dependent suburban development, it sets good precedents for new suburban design.

6. Richness - Like Visual Appropriateness, richness is the sensory quality of the details of a place. Often this richness is due to the visual and non-visual atmosphere of a place that is created through years of evolution, and therefore it is hard to instill a sense of richness into a suburb. However, a development that has successfully created an atmosphere of history and sensory-excitement is Garrison Woods, which reuses former wartime barracks as housing. New houses and townhouses have superb attention to detail. The community is far denser than the Calgary average, at 25 dwelling units per hectare. As a comparison, many of Calgary's postwar neighbourhoods have a density as low as 10 dwelling units per hectare. It also features a mixture of uses, locating residential units above commercial units that front onto a street. Due to the preservation of older buildings, mixture of uses, and diversity and amount of detail in the design, this example of suburban intensification sets strong precedents of how to create richness.

Richness is further gained through the use of contrasting elements. By building with different textures, materials, and at different scales, a space becomes visually richer. With contrasting elements viewed at different scales, the visual experience becomes unique at different locations. The repetitive order found in new subdivisions takes away from this sense of richness, and creates a very linear experience for the user. However, contrast and variation on a building or in a space will create a more complex, responsive space.

7. Personalization - Personalization refers to the ability for users of a space to interact with the place and leave a mark. However, most residents of Calgary suburbs live in spaces designed by other people. In new subdivisions the homeowner often has some chance to make minor adjustments to the interior of the home, the external qualities are largely left to the builder or developer. However, neighbourhoods can be personalized to an extent. This usually happens on a very local level. It is much easier to personalize private space, which one might do with props such as a flag, landscaping, or porch. However, it can take place in the public realm as well. One example of this found in Calgary is the 'Paint the Pavement' program (see Figure 53). The transportation department authorizes the closure of intersections in communities so that residents can literally paint the pavement. Not only does this brighten the neighbourhood and foster community engagement, but it reclaims a space that is otherwise dominated by the automobile.

Figure 53 - Pavement Painting in Southwood

Recently, Calgary began placing pianos on sidewalks where people tend to mill about. Anyone is free to sit down and play a song, and it creates a unique interaction between the user and the environment through sound. City Council is also in the process of responding to the need for better public spaces through the use of temporary street parks, or 'S-Parks'. This kind of park would allow for spaces that would be used in unique ways throughout time, and it plays with the idea of a duality of space and how different uses would experience the space differently.

2.2. SUBURBAN INTENSIFICATION

Curbing sprawl through effective land-use and transportation measures requires two major hurdles. One major challenge is slowing the growth of suburbia. The other challenge is retrofitting current suburban lands through intensification. Intensification of urban lands refers to the process of converting low-density, underused urbanized land to more compact, higher density, mixed use land uses. The City of Calgary is highly suburbanized, with 88% of new houses built in low-density suburban areas (Statcan, 2008). The city plan calls for growth to be 50% greenfield and 50% intensified in existing suburban areas, and lists 'achieve a balance of growth between established and greenfield development' as the first key direction for land-use and mobility in the Municipal

Development Plan (The City of Calgary, 2007). Ellen Dunham-Jones and June Williamson, two experts in intensifying suburbs, advocate for a change in conventional suburban zoning codes which create strict separation of land-uses and hierarchical road networks which lead to unsustainable automobile dependency. (Dunham-Jones, Williamson, 2009) Intensification refers not only to increasing density, but also to increasing accessibility, sustainability, and livability of an underperforming site. Areas that are prime targets for retrofitting include dead malls, strip malls, unused industrial parks, and low-density residential areas adjacent to transit stops. It is an ideal time to start retrofitting our suburbs. Climate change caused in part by our auto-dependent society and rising oil prices are key factors urging this change, but demographically, North America is much more diverse now than at the birth of suburbia. Baby boomers are aging, with some living at home, some with family, and some in retirement centres. Many more people are marrying later, or not marrying at all. Immigration rates are higher and fertility rates are lower. This diversity requires a new urban pattern that is not intrinsically based on homogeneity. The City of Calgary has strongly acknowledged the need for intensification. The Municipal Development Plan is based on eleven sustainable principles for land use and mobility. The seventh principle speaks directly to the need for intensification, stating the City must 'strategically direct and manage redevelopment opportunities within existing areas' (The City of Calgary, 2007). Other principles can be strongly supported by suburban intensification as well, including:

- Create a range of housing choices and opportunities ;
- Create walkable environments;
- Foster distinct, attractive communities with a strong sense of place;
- Provide a variety of transportation options;
- Mix land uses; and
- Support compact development.

2.2.1. CONSERVING CULTURAL LANDSCAPES

Two key factors that nurture vitality in neighbourhoods are the right level of density and walkability, two traits of many successful urban neighbourhoods. There is strong evidence that the clustering of activities increases cultural and economic growth, and that not only are walkable neighbourhoods healthier, but they also lead to higher levels of innovation, education, and happiness (Florida, 2008). However, a major challenge in suburban intensification is ensuring that the good qualities of the suburbs are not lost. After all, the suburbs are serving many good purposes and are a strong part of Canadian's cultural landscape and heritage (Vachon, Luka, & Lacroix, 2004, Fortin, A., Després, C., & Vachon, G. 2001). A cultural landscape refers to the interaction of people and place. Humans derive meaning from the places they inhabit (Groth, 1997). For many Canadians, a suburban neighbourhood is an integral component of a shared identity. While a suburban split-level may not be the most emblematic example of a heritage building, it does have a strong significance for many Canadians who grew up or raised families in such a house in the suburbs. However, despite their cultural significance, they are neither environmentally nor economically sustainable. Suburban intensification must therefore preserve well-functioning aspects of the suburbs, while introducing new strengths. As Fowler (2007) points out, districts can only become sustainable when new uses are able to weave themselves into the existing fabric without disrupting the way of life for many Canadians. Therefore it is important to know what components of the suburbs should be preserved. In a study conducted by Fillion and Bunting (1999), the authors surveyed Canadians living in both suburban and urban areas to determine what about a

neighbourhood was most sought after. The highest ranked qualities, which were more than 50% of residents sought, were 'low noise level', 'low traffic level', 'place to be outside with privacy', 'large dwelling unit', 'high energy efficiency', and 'high resale value'. The lowest ranking sought after quality was 'part of town where cars can be used a lot'. New intensification can be built in ways that preserve these qualities. When intensifying, densifying and improving walkability of suburban neighbourhoods, it should be done in a way that preserves the original qualities of the neighbourhood.

2.2.2. ADDRESSING BIG QUESTIONS

As mentioned, there are many aspects of the suburbs which are important for our cultural values and way of life, but there is also a strong acknowledgement that suburban sprawl has severe economic and environmental consequences. However, the focus of building better communities cannot be only on new communities. It is important that when new communities are built, they are built in a manner that allows for a mixture of uses, has walkable streets, has a variety of housing types and densities, and has ecological systems that ensure sustainable growth from the initial development of the community. Building better new communities is not an excuse for not revitalizing underperforming existing communities, and retrofitting suburbs is becoming a much more relevant task. Ellen Dunham-Jones and June Williamson give insight into the reasoning behind this new form of transformation. Notably, an abundance of sites, such as strip malls, industrial sites, or parking lots are becoming available for redevelopment. Many of these sites are relics of the postwar suburban building boom that have outlived their life-cycle and are no longer a functional part of the landscape. Smaller stores once found in strip malls have been taken over by large corporations. The post-industrial society no longer has use of old factories. In many cases, even neighbours prefer development on these sites rather than the existing blight. The fast, expansive growth of edge cities and suburban agglomerations has created an abundance of highways and traffic, and there is a stronger desire to avoid this traffic by moving closer to the city. Inner suburbs, which used to be single-use bedroom communities, are now diversifying and becoming stronger economic entities, pulling services and residents towards them. Demographics are much different now compared to the postwar baby boom years. People from this demographic have much different needs than new families. Furthermore, there is a much greater acknowledgement of smart growth and its accompanying practices and policies, and how and why they need to be part of the planning process.

2.2.3. PRECEDENTS

There exist many different types of suburban intensification that take place on a variety of land-uses, including residential, commercial, industrial, institutional, or park and green spaces. It can happen at a wide variety of scales, for the reuse of a single-family dwelling to redevelopment of multiple blocks of land. At a broad scale, suburban intensification can be classified into two general categories; *re-inhabitation* and *redevelopment* (Dunham-Jones & Williamson, 2011). Re-inhabitation refers to the adaptive reuse of existing structures. This practice is especially pertinent in post-industrial cities, where an economic shift away from industry and manufacturing has provided opportunities for factories and other buildings to be repurposed. Canadian sites with examples of this type of re-inhabitation include Granville Island in Vancouver, the Distillery District in Toronto, or the Lachine Canal in Montreal. Similar to *re-inhabitation* is the concept of *reurbanization*. Reurbanization can be understood as a series of

phases that exhibit the growth and decline and regrowth of the urbanized areas. This is evident in many North American cities, especially large agglomerations in the Midwest, Northeast, and Great Lakes regions of United States whose inner cities faced considerable population decline. Rather than building new infrastructure and development on the edge of the city, existing space in the inner city can be re-used. Bourne (1992, 1993, 1996) has contributed significantly to research on reurbanization in Canada, and has shown that reurbanization has benefits that include improved environmental quality, conservation of land, social equity, and improved business and social climates. Calgary has only experienced the reurbanization cycle to a minimal extent. Nearly all of Calgary's growth happened from the 1900s onward. There was never a need to densify the inner core because there has always been some form of transportation including streetcars, busses, cars, and light rail transit available to access adjacent suburban areas,. Industry and manufacturing have also always been separated from the inner city as well, so downtown has not suffered from the dirty image that tarnished the inner city image of many early industrial cities. Although early housing north of the railway tracks running through downtown has disappeared, apartments have continually been increasing the density of areas adjacent to downtown. Inner city suburbs have seen declines in their population, mostly due to natural cycles corresponding to the aging of families. This being said, there is still plenty of opportunity to densify areas of Calgary so that new development benefits from existing infrastructure. Even though Calgary is not a strong example of reurbanization, its attributes can all be applied to Calgary under better policies of prioritizing land for development. The City, however, must take a more aggressive approach to encouraging new growth within developed areas.

The second category of suburban intensification is *redevelopment.* Redevelopment refers to the replacement of existing buildings or parking lots with new structures with the purpose of creating a more walkable, mixed-use, and sustainable site. This transformation can occur on brownfield sites, such as industrial sites or gas stations, on greyfield sites, such as parking lots or shopping centres, and even on other types of sites such as utility corridors or underused park and school space.

Given Calgary's particular suburban patterns, there are certain types of intensification through redevelopment that are more useful in revitalizing existing neighbourhoods and equipping them for future growth. The Municipal Development Plan highlights two broad areas where development should be concentrated; activity centres and activity corridors. Activity centres are further broken down into Major Activity Centres (MAC), Community Activity Centres (CAC), and Neighbourhood Activity Centres (CAC). A major activity centre is an area that provides the highest number of jobs and population outside the city centre, and is a large area of land. Examples include the Chinook Centre Shopping Centre or the University of Calgary and adjacent mixed-use area. The community activity centre provides a concentration of jobs and population that serves several communities. Neighbourhood Activity Centers provide opportunities for residential intensification and local jobs and services at a neighbourhood scale. Corridors are divided into urban corridors and neighbourhood corridors. Urban corridors are large transportation arteries flanked by large retail sites, such as car dealerships and big box stores. Examples include Macleod Trail (see Figure 54) or 16th Avenue North (the Trans-Canada Highway).

Figure 54 - Macleod Trail corridor c. 1983. Although intensification has happened along this corridor in the past 30 years, it is still highly automobile dependent and serves large-scale big-box development.

Neighbourhood corridors are along important transit corridors, but have a 'main street' type feel. Examples include 17th Avenue S.W. and Kensington Avenue N.W. With backing from the Municipal Development Plan, suburban intensification happening in these areas seems poised for success. Greyfield, brownfield, and other intensification sites exist within these contexts.

Calgary's brownfield industrial areas are nearly all confined to industrial parks in the east of the city. The majority of the land is not suitable for redevelopment because it is too isolated from services required for residential areas. There is some opportunity for the gradual accretion of residential land at the edges of industrial areas, but there is greater benefit in strengthening existing neighbourhoods rather than creating new ones. However, it would be useful to prioritize development in industrial areas immediately surrounding transit stations, similar to the development of the London Condos at Heritage Station. The South and Northeast lines of the Light Rail Transit system run parallel to industrial parks, so there are several opportunities to intensify the areas surrounding stations on these lines. There is also potential for intensification on previously contaminated brownfield sites. In many postwar suburbs, a disproportionally high number of gas stations were built due to loopholes in bylaws that gave developers high returns on building gas stations on inexpensive land. It is common that intersections of major streets and arteries in the city have two or three gas stations. Many of the gas stations in the postwar suburbs have been closed down, but the sites are sitting empty, often in a process of remediation.

Opportunities to intensify greyfield sites in Calgary are abundant, both in activity centres and in corridors. Although Calgary has transportation corridors which quickly move cars around the city, it has struggling urban and neighbourhood corridors, which combine movement and retail. Recently the City created an Area Redevelopment Plan (ARP) to redevelop the 16th Avenue North corridor. Previously it was a wide thoroughfare with large big box stores on the side. Traffic volume was heavy with many transport trucks. The plan called for an improvement to the sidewalks and central boulevard, a mixture of uses, nodes of high density, and building placements closer to the street. There have also been many design improvements to the streetscape such as treed boulevards and improved sidewalks. Some highway traffic has been rerouted through a ring road to the north. Although the entire redevelopment process will take several more decades, there are positive signs of good redevelopment happening along the corridor, such as the surprisingly street-oriented Home Depot (see Figure 55).

Figure 55 - Big-box store on 16th Avenue N. Although still automobile oriented, an effort has been made to create a more walkable corridor. This sidewalk is not bad, considering it is on the Trans-Canada Highway.

Macleod Trail should also see a similar fate. Through highway traffic has been diverted to Deerfoot Trail rather than being sent up Macleod Trail. The proximity of the South LRT line is beneficial for intensification purposes. Despite the current proximity of the LRT, few shoppers seem to be using this mode of transit. However, redeveloping the corridor to offer attractive residential options will be a challenge.

Despite the challenges faced in redeveloping Calgary's corridors, there is significant potential for quality intensification of activity centres. The postwar suburbs, especially those built in the neighbourhood unit style from the 1950s to the 1970s often have underperforming commercial sites. When constructed, commercial land was more valuable for developers, and often the size of the commercial space was too large for the low-density neighbourhood. Furthermore, with high rates of car ownership, regional commercial complexes became the norm, and made the neighbourhood strip mall even more redundant. Generally, the neighbourhood unit commercial complexes range in size from 1000 m^2, such as a small shop or gas station, to 40000 m^2 for a more robust site with an anchor store. The building stock is most often single story, but some complexes have an additional floor used for processional offices. The buildings are usually set back deep into the site, with ample parking between the road and the shop, which opens to the outside. Cluttering the front of the site are often multiple signs advertising the various stores, however, due to strengthening of the signage bylaw, the visual clutter caused by multiple signs has been lessened. These sites provide excellent opportunities for redevelopment. Because they are located on arterial streets, there is transit service easily available, and because they are located on the periphery of neighbourhoods, there is less opposition than would be faced if densification efforts took place within the heart of the community. Certainly intensification projects are not often met with immediate strong support from the nearby residents, but studies have shown that tension can be alleviated through design treatments and visual quality improvements. For example, residents have been shown to have overall positive views on commercial redevelopment projects that have significant landscaping improvements, and are even willing to pay more than 8% more for goods in the shops (Wolf, 2008).

2.2.3.1. GARRISON WOODS

Certain sites in Calgary are currently undergoing forms of intensification or will likely soon start to be intensified. Arguably the best example of a large-scale, long-term site redevelopment in Calgary is being undertaken by the Canada Lands Company on the former site of Calgary Canadian Forces Base, which is located in the Southwest quadrant of the city. It opened in 1933 and decommissioned in 1998. The project included the redevelopment of three sites in phases. The first site, Garrison Woods, was completed in 2004. The second site, Garrison Green, was completed in 2006, and the final site, Currie Barracks, is currently under construction.

Garrison Woods is a 63 hectare site designed using the principles of New Urbanism. It includes a mixture of uses and housing types, and has proved to be one of Calgary's most popular new neighbourhoods. In total, it added more than 1600 housing units to the area, of which over 60% are multi-family dwellings in the form of townhouses, duplexes, and four-storey condos. Due to its popularity, surrounding areas have seen in increase in intensification as well. It also features residential being built above commercial on a traditional style 'Main Street' (see Figure56).

Figure 56 - Main Street type development in Garrison Woods

This type of built form is not common in Calgary. For years, suburban development has strongly favoured a big-box style approach. Few developers in the City have attempted other commercial strategies that could be economic risks, and they can easily claim that Calgarians prefer the big-box style as seen by their success. However, for those who prefer a more traditional 'Main Street' type shopping experience, there are extremely few choices, limited mainly to inner city neighbourhoods like Hillhurst/Sunnyside or Inglewood. The Canada Lands Company, with its solid financial backing and outsider's approach to development, has demonstrated that this type of mixed-use development can be highly successful in Calgary, and it is a worthy alternative to suburban style big-box development. The site is almost a victim of its own success. Although meant to provide smaller, affordable homes attainable to a variety of incomes, the site has become so popular it has become far too expensive for many. However, this shows the strong demand for this type of development in the city.

Garrison Green, the second phase of Canada Land Company's redevelopment, is a smaller (32 hectare), more conventional suburban neighbourhood, featuring over 1000 houses. It is still built according to New Urbanist principles, however, there is no commercial component to the neighbourhood and is more car-dependent. It was designed specifically for families and is quite insular, with only one road access point. Although it is most similar to common postwar suburbs, certain features distinguish this neighbourhood. For one, it is highly focused on creating several usable parks for the neighbourhood children, and priority has been given to the pedestrian experience. It is also much denser, with compact lots and multi-family housing. Similar to Garrison Woods, one of the most interesting features is its adaptive reuse of old wartime housing that was on the site. The houses have been preserved, refurbished, and relocated on site to maximize density (see Figure 57).

Figure 57 - Refurbished and relocated wartime housing in Garrison Green

The site was designed to create a safe community for families, and it has the distinction of being the community in Calgary with the lowest crime rate. It also has the distinction of being the community with the most evenly balanced housing mix, with one third of houses being single-family dwellings, one third being ground-oriented dwellings, and one third being multi-family housing. Finally, it also has the distinction of being the community in Calgary with the highest percentage of teenagers. The final phase of the development is Currie Barracks, which will feature over 3200 houses and nearly 50 000 square meters of commercial and offices space. It is Canada's first neighbourhood to be certified Gold LEED-ND.

Figure 58 – 'Victoria Cross Townhouses' featuring xeriscaped front lawns in Currie Barracks

It features a variety of housing types, and similar to Garrison Woods, it features small apartments above garages in rear yards, referred to as Carriage House by the City (see Figure 59). They are considered legal rental units, and being located next to Mount Royal University, they will especially be beneficial to students.

Figure 59 - Attractive laneway housing

Overall, the Canada Lands Company redevelopment of the CFB Calgary site has not only proven to be profitable for the company, but has provided a strong precedent for various intensification mechanisms that can take place in Calgary. Unfortunately, Calgary's rigid zoning and land use bylaws that are not specifically designed to accommodate mixed-use developments and atypical setbacks have made it far more difficult to develop a community of this type than a typical suburban neighbourhood.

2.2.3.2. TRANSIT-ORIENTED DEVELOPMENT

One type of suburban intensification that has proved to be particularly successful in achieving smart growth goals in the Canadian political, economic, and value environment is the expansion of high-density, transit-oriented compact urban realm into the ambient low-density car-dependent dispersed realm (Fillion, 2003). This is commonly referred to as Transit-Oriented Development (TOD).

Major findings by the Transportation Research Board (2008) on TOD research have shown the strong value of TODs. Notable findings include:

- In zones where TODs have been built, transit ridership to work has increased.
- People living in TOD areas own roughly half as many cars as similar counterparts living outside TOD area.
- The strongest attraction factors for TODs are neighbourhood design, housing prices, and proximity to transit.
- Firms which hire creative class workers are more likely to be easily accessible to rapid transit.

The City of Calgary first approved TOD guidelines in 2004, and since then has been strongly encouraging this form of development. TOD development in Calgary follows seven key practices; ensuring the correct balance of land uses, promoting density, creating pedestrian connections, ensuring good urban design, creating compact development patterns, managing parking, and making each station a 'place' (City of Calgary, 2004).

The most comprehensive TOD in Calgary is The Bridges project, which is a land redevelopment project that is owned and operated by the City, but developed by individual companies.

Figure 60 - General Avenue in The Bridges, featuring ground floor retail with housing above.

Acting in the role of a developer, the City required that development follow the triple bottom line approach that ensured that the project balances the merits of being sustainably, socially, and financially sound. In terms of sustainability, some highlights of the project include increased density, pedestrian oriented design, live-work units, solar orientation, and low maintenance vegetation. In order to provide affordable housing, the City purchased 58 of 160 units of one building to provide as rental properties. The remaining units of the buildings are sold through a non-profit organization that sells units at 70% of market price. Should the buyer wish to sell at a profit, the remaining 30% must be repaid to the non-profit organization, which will be reinvested in other affordable housing projects. To ensure that the project remained financially successful while being in accordance with the City's vision for the site, the City created a specialized agreement of purchase and sale which included non-negotiable qualifications required for development. The proposals were then evaluated on price (45 %), financial capability of the developer (20 %), experience and expertise (20 %), and proposed project description (15 %).

The Bridges project has so far added 1500 residential units to a twelve hectare site adjacent to the Bridgeland/Memorial LRT station. Commercial, institutional, live/work, and green spaces are mixed within the development. The urban fabric of the existing neighbourhood was maintained through density gradients and preservation of the grid network.

The Bridges site was previously the Calgary General Hospital, which was demolished in 1998 due to provincial government cost-reduction policies. Within the community (and city) there was a sense of anger than a hospital was destroyed so that condos could be built. In response, the footprint of the hospital building has been converted into a large public park. Development has only occurred in the parking lots and land surrounding the hospital.

Other TOD projects in Calgary include densification at SAIT/ACAD/Jubilee, Brentwood, Lion's Gate Station, and Heritage stations, and there are further plans for development at Anderson, Banff Trail, Chinook, Hillhurst/Sunnyside, and Fish Creek/Lacombe stations.

Figure 61 - TOD Development at Lion's Park Station

Upon completion of the West LRT, there will be further studies for stations along the line, especially at Westbrook Station which will see much

intensification at retrofitted mall site. All the current and future studies of TOD focus on the South and Northwest LRT lines. None focus on the Northeast line, which serves some of Calgary's communities that are most ethnically diverse, affordable, and predominately single use. These stations would be excellent candidate sites for TODs. Developing TODs in Calgary is a highly worthwhile practice, and Calgary has opportunities for this type of development that many other cities do not have. This can be attributed to Calgary's pattern of suburban form development and the policies in place when the LRT lines were first built. Near LRT stations there is often plenty of vacant land. The South line was run parallel to the CP tracks in a narrow industrial and commercial corridor. In the Northeast, the line was run along coarse grained industrial and commercial sites as well. While current transit development practices today do not suggest locating transit stations in low-density, primarily non-residential areas, it does mean today there are many opportunities for redevelopment around transit stations. Because the stations are often separated from residential areas, there is less resistance from local residents concerned about density, traffic, and social change. In the Northwest, due to the clear pattern of the sectoral model of development, stations are located at the far corners of communities in areas dominated by wide arterial buffers along Crowchild Trail and commercial centres. Again, these sites are excellent locations for intensification because they can add density to neighbourhoods without a perception of the neighbourhood character being changed and traffic not being added to the interior streets. Conveniently, the City has had a policy of creating oversized parking lots at the terminus station of each line to catch all the commuters who arrive by car from the extremities of the city. As the LRT lines grow incrementally, large parking lots are built at the end of each extension. For example, on the South line, non-terminus stations such as 39th Avenue, Canyon Meadows, or Chinook have few stalls, with 279, 260, and 320 respectively. Past and current terminus station such as Anderson (1981 terminus), Fish Creek (2001 terminus), and Somerset/Bridlewood (current terminus) have 1750, 1130, and 913 stalls respectively. This same pattern exists on the Northeast and Northwest lines as well. The underused parking lots at several stations are ideal for intensification. Non-terminus stations with large parking lots currently include Whitehorn, Brentwood, and Dalhousie Stations, and with the planned LRT extensions, Crowfoot, McKnight/Westwinds, and Somerset/Bridlewood stations will soon fall into the same category. There is therefore significant relevance to creating plans for intensification on these sites (see Figure 62).

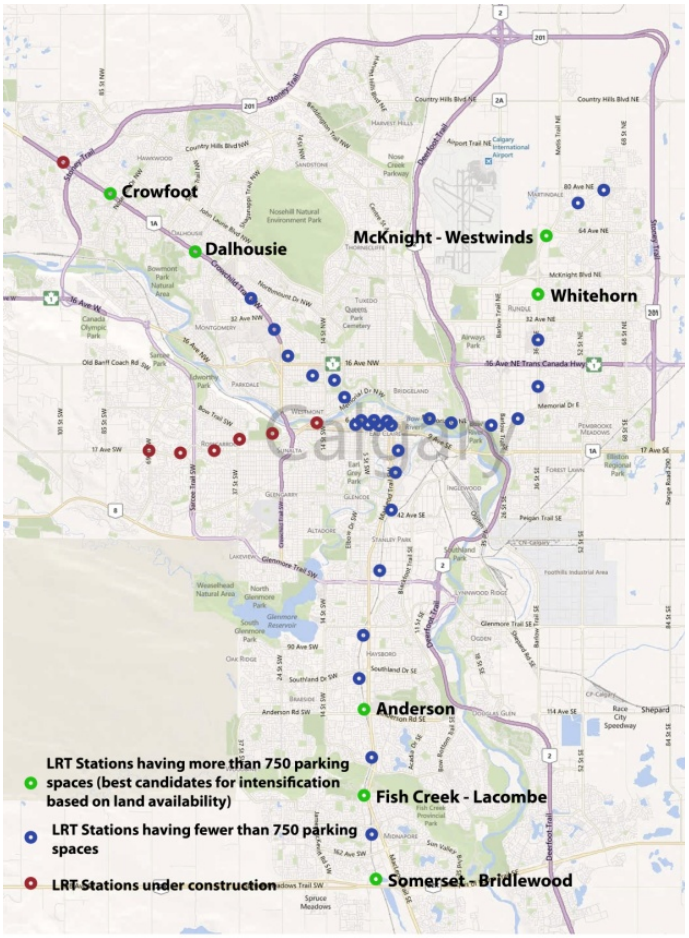


Figure 62 – LRT Stations with parking that could be converted to better uses.

2.3. TOOLS

The following section examines tools that planners can use to promote suburban intensification.

2.3.1. FINANCING INTENSIFICATION

One of Calgary's most recently acquired tools that used for site-specific suburban intensification is the Community Revitalization Levy (CRL), known outside of Alberta as Tax Increment Financing. Calgary is Canada's first city to employ tax increment financing, although it has been used often in the United States for over fifty years. Amendments to provincial law were required to give municipalities the ability to implement the levy because property taxes are composed of municipal and school taxes which go do different levels of government. In 2005 the Municipal Government Act was amended to include the levy (Province of Alberta, 2005). The Community Revitalization Levy is essentially a debt shared by the city and province. It allocates future property tax revenues on a defined site to pay for initial improvements on that site, such as preparing the land and improving infrastructure. The land is then sold to developers. Whatever money the City invests into preparing a site, it will make back once development is complete through taxes. In the United States, it has been used only within areas with the presence of blight conditions, and in the initial studies assumed these criteria, but once implemented in Alberta's Municipal Governance Act, no clause speaks to the nature of the area being redeveloped under the CRL (Province of Alberta, 2005). A challenge therefore is to ensure that land being revitalized though the debt should not be land that would otherwise be revitalized under natural market forces. Without scrutiny, the CRL could easily become a way for the city to fund preferred developers with taxpayer dollars, and it has experienced fiscal, legal, and political controversies (Klemanski, 1990). For example, tax revenues from the development go back to repaying the CRL instead of to the general revenue, and the City has to provide services in the development while the CRL is being repaid, which also burdens taxpayers outside the development. There must therefore be adequate recognition that any redevelopment using the CRL is beneficial to the entire city. There also must be certainty that the development will be successful and able to recuperate its debt. If not, the City will be at a loss.

Figure 63 - CMLC Rendering of Calgary's East Village.

The City's first experimentation with the tool is in the East Village. The East Village is a redevelopment project in an area of approximately 15 blocks adjacent to Calgary's downtown. The site had been declining, and being bound by rail lines and the river, was surprisingly inaccessible for an inner city location. When Calgary's new city hall was built in 1985 over two city blocks, it ostensibly turned its back on the site and further cut it off from downtown. For years, the City has been trying to spur development on the site. To oversee the project, the City created the Calgary Municipal Lands Corporation (CMLC) to act as an arm's length developer wholly owned by the City, and a plan has been agreed upon that requires the use of the Community Revitalization Levy. In order to add infrastructure and prepare the brownfield site for development, the City will have to take on a $75 million debt which it will pay back, along with $40 million dollars interest, over the next 20 years

(Financial Post, 2012). If the plan succeeds, the neighbourhood could be an excellent model for future neighbourhood sustainability and innovation with a strong character, mixed-use and diversity, land-use flexibility, well-planned transportation flows, and quality urban realm. Some of the highlights of the site will include Calgary's new central public library and the National Music Centre. Several other prominent condo and hotel developers have already began plans for development within the site as well.

The first real test of the Community Revitalization Levy will be seeing how it performs in The East Village redevelopment. Because this is a relatively untested tool in the Canadian landscape, there is no guarantee that it will be successful. However, with the new legislation and a promising start in the East Village, the Community Revitalization Levy may successfully expedite suburban intensification. Suburban intensification has benefits for the entire city, such as creating the opportunity for more services closer to residents, less costly infrastructure needs, increased access to transit, and stronger community building. It is therefore in the City's best interest to use the Community Revitalization Levy to target areas for intensification. There have been several successful suburban intensification projects in the United States which have been funded through this tool, such as conversions from department stores to mixed-use and transit-oriented developments in Chicago, Minneapolis, and Denver. Conversely, there have also been examples of houses being torn down, only to be replaced by strip malls; however, when used responsibly it can prove to be beneficial (Bay Area Economics and Urban College, Inc., 2005). Market forces alone have let Calgary suburbs sprawl unhealthily. Developers are too accustomed to conventional low-density development, and there are few examples of developers retrofitting existing sites in the city. It is time for the City to make a strong commitment to fixing the suburbs, and with cautious use, the CRL is a tool that can be used to do this.

2.3.2. CRITERIA FOR SITE SELECTION

Selecting sites for redevelopment or intensification should be done using carefully-developed criteria. Just because an underperforming parking lot or strip mall exists, it may not necessarily be the most beneficial site to redevelopment. It is useful to have an objective tool that can be used to identify and rank sites that would be best suited for development or infill based on a variety of criteria. The need for such a tool has not gone unnoticed by planners and council members in the City of Calgary. In 2007, City Council approved a review and update of the Municipal Development Plan with the goal of creating a more sustainable city within a more holistic long-range planning framework. City-wide policies of the new Municipal Development Plan addressed issues such as *urban design* and *creating a more compact urban form,* and responded to the three pillars of sustainability (social, economic, environmental) through policies such as *creating great communities, creating a prosperous community,* and *greening the city.* Acknowledging that policies are weak when acting outside a larger context, an entire section of the Municipal Development Plan is dedicated to the *Framework for growth and change.* This section is used to provide Council with the support to make decisions on when, where, and how the city should evolve. It takes a practical approach to implementing policies in practice. Urban design theories are necessary to guide growth, but are rendered irrelevant if there is no legal or fiscal framework to that can be used to apply them. This binding framework is useful for creating a methodological approach to urban design. The City of Calgary has traditionally taken a conservative approach to planning and holds itself highly

accountable to Calgarians. It is also strongly opposed to any form of corruption. Any urban planning or urban design project that is passed through Council must have credibility to ensure it will achieve its desired outcome. This can put urban design initiative at a disadvantage compared to other more evidence-based practices because urban design often has highly sensory benefits. It is difficult, for example, to quantify the benefit of improving the legibility of a landscape, or to calculate the tax revenue generated by building complete communities.

Currently, the prioritization of projects is evaluated independently by different business units within the City. This lack of co-ordination between different groups has negative results, such as restricted development, inconsistent servicing, and expensive investment. To address issues of directing growth in a more engaging, transparent, and equitable manner, the City of Calgary is working on a prioritization tool that is based on an Analytic Hierarchy Process that empirically supports smart growth and creates compact, complete communities. Although the tool is still in its nascent phase and as not yet been fully developed or approved by Council, it does provide an interesting case study for understanding the methods of implementation of redevelopment through an evidence-based practice. The tool weighs various criteria of potential areas for growth within developed and non-developed areas to prioritize the most strategic areas for growth. The criteria for this tool were developed in partnership through city administration, City council, and key stakeholders, and it responds to the Municipal Development Plan's requirement for a framework for growth and change.

Because this tool is still in the process of being created, its strengths and weaknesses cannot be fully examined. However, early precedents of this type of model have proved to be successful when used correctly. In evaluating a multi-criteria framework as a decision support system for urban grown management, Anselin and Arias (1982) conclude that *'its potential strengths rest in incorporating explicitly the analytic parts of a design process, in the integration of soft and hard approaches to policy analysis, in structuring the process in a consistent fashion, in its flexibility and visual representation of changes in value judgements at different stages in the process, and in its dynamic nature'*. Although it is not fully complete, the framework being developed in Calgary is still useful to examine the implications of the tool as a methodology for redevelopment. The City of Calgary is relatively unique for a large North American city in the sense that the entire metropolitan urban area is composed of one city, and with minor exceptions, has grown as one city. Part of the argument supporting this form of growth is that the City has stronger controls over the consistent development and service of infrastructure across the entire city. Infrastructure has always played an important role in defining the urban form of Calgary, and being a young city, development has always been accompanied with provision of utilities. All expressways, interchanges, major water pipes, major sewer pipes, libraries, police stations, recreational facilities and emergency response facilities are funded by the City of Calgary through the collection of property taxes, development levies, utility fees, and other nominal user fees. Private land developers build local streets, sidewalks, local water mains, local sewer pipes, local parks and playgrounds, and resident association facilities. These costs are funded through the sale of houses and buildings and the resale of land to private parties. Despite this contribution by developers, the City has to invest large amounts of money in infrastructure that is required to services new peripheral communities, at the expense of millions of dollars per year.

The basic structure of the tool is outlined in this five step process:

1. Identify candidate areas from new and existing growth areas
2. Collect data for the criteria metrics on each candidate area
3. Score each area by individual criterion, using the metrics
4. Apply the criteria weighting to the individual criterion scores within each growth area, to produce an overall growth score for each candidate area,
5. Create the priority list by comparing the scores of each growth area.

In other words, first, criteria are defined. Then the alternatives are defined. The alternatives are the different plots of land available to be developed or redeveloped in Calgary. The criteria are then weighed. In the tool, the criteria were given the following weightings:

- 15% - capacity of infrastructure, access to transit, readiness to proceed and city-funded costs;
- 10% - community services in place, employment opportunities and land supply;
- 5% - contiguous growth and innovation.

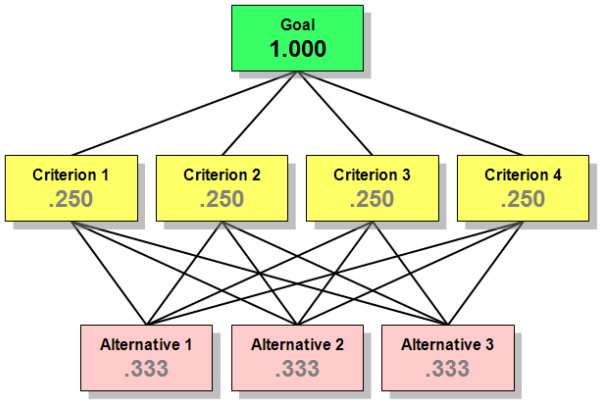


Figure 64 - Example of weighting factors in an analytic hierarchy process

The final step of the analytic hierarchy process is to compare and rank the alternatives. Because the metrics used in calculating the criteria are quantitative and derived from GIS data, geodemographic data, and transit data, the ranking can be calculated through equitable and transparent measures. To consider the final rankings using a single scale, potential development areas are ranked in comparison to each other within each criterion, and put on a visual scale using circular icons corresponding to the range from 'lowest alignment to criteria', shown by empty circles, to 'highest alignment to criteria', shown by complete circles (see Figure 65).

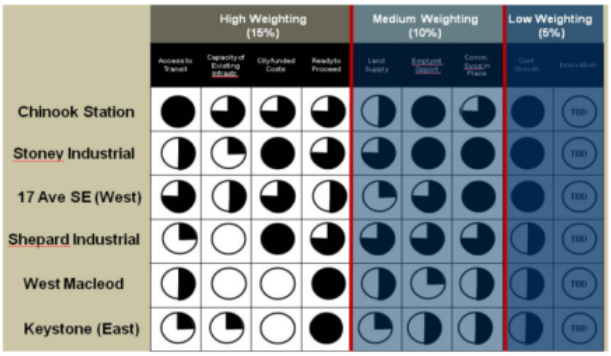


Figure 65 - Example visual best-option table

Using this tool, divergent opinions concerning development can converge to visually demonstrate the most transparent and equitable group consensus. If this tool is successful, it would be advantageous for the City to evaluate its portability to other areas of planning and development. However, there is a broader implication of this strategy, which assumes that complex or 'wicked' planning problems can be scientifically explained. Empirically derived results from this tool can provide suggested alternatives for prioritizing land development. These suggestions are only valid under narrow parameters and with a precise goal. The tool will show good suggestions for immediate solutions based largely on the premise of conserving money through infrastructure related costs. A site that ranks highly is not necessarily the best site to develop when looking at long-range goals for urban development. Nevertheless, this

policy is a practical and useful tool to guide urban development. Assuming the political and development climate in Calgary remains consistent, the next phase of this plan will look into additional funding and financing mechanisms for infrastructure and develop a stronger land supply strategy. By 2017, the project should be complete. This approach to determining site potential is not especially new, and has been tested in several other settings. For example, the Congress for the New Urbanism (Fleissig & Jacobsen, 2002) takes this tool a step further and has created a scorecard that measures not only location, but also attributes of the finished site. Along with proximity to infrastructure, access to transit choices, and compactness, it adds qualities such as mix and balance of uses, fine-grained block, park and pedestrian network, and diversity. Other municipalities using similar scorecards include New Westminster, BC, Austin, TX, Charlotte, SC, and Mobile AL.

2.4. SITES AND SITUATIONS SUITABLE FOR INTENSIFICATION

Opportunities for suburban intensification are abundant in Calgary's suburbs. The following section presents conditions for intensification variety of settings and at a variety of scales.

At the smallest scale, one of the most simple and least intrusive mechanisms for adding hidden density to the suburbs is through secondary suites. Unfortunately, due largely to backlash from suburban residents who fear property values will fall if secondary suites are legalized within their neighbourhoods, a major legal reform was cancelled in 2011. However, new developments are now required to permit secondary suites. Also, certain areas of the city are approved for secondary suites, and through the Calgary Secondary Suites Grant Program, the City can cover up to $25 000 to develop or upgrade a secondary suite.

Another form of hidden density is laneway housing. Calgary's land use bylaw allows for "secondary suite - detached garage" and "secondary suite - detached garden," which are two forms housing located in back yards. This type of development is permitted in established areas of the City. If landowners prefer, instead of building a suite in the back yard, they are also permitted to replace their house with a semi-detached dwelling. Currently, there are over 30 000 parcels of land in the City where this type of development is permitted. It has already proved to be popular in communities such as McKenzie Towne, Garrison Woods, Garrison Green, and Currie Barracks.

Due to Calgary's particular suburban form, strip mall sites are abundant and are one of the strongest candidates for intensification The Neighbourhood-Unit layout of the postwar suburbs means the sites are often located on the intersections of arterial streets that surround communities. These streets are usually well serviced by public transit, but are calm enough to be able to be used for residential purposes, unlike larger freeways and corridors (such as Deerfoot Trail, Crowchild Trail, or Glenmore Trail) that are too busy for residential development. Within the postwar first ring suburbs alone, approximately 150 major intersections exist that could support increased density. Many sites were previously gas stations, and now sit vacant. Although many more exist, the following non-exhaustive list of candidate sites has been selected because all the sites are located within a roughly ten minute walk of an LRT station, and are similar in size and character to the Southwood Corners case study. Apart from the following sites, virtually all suburban LRT stations are located on or near large parking lots. Often, they are located around large regional shopping centres, such as Crowfoot Village, Shawnessy Shopping Centre, or the entire strip of 36th Avenue NE from Memorial Drive to 39th Avenue, NE (see

Figure 66 for geographical reference). These sites are also suitable for intensification; however they have not been discussed in this paper.

Northwest LRT Line

- Spring Hill Village, Nose Hill Drive and Silver Springs Blvd, NW.
- Ranchlands Village, Nose Hill Drive and Ranchlands Blvd, NW
- Crowfoot Square Plaza, Varsity Estates Drive and 53rd Street NW

Northeast LRT Line

- East Radisson, Memorial Drive and 28th Street SE

South LRT Line

- Macleod Trail and 39th Avenue SW
- YMCA, Heritage Drive and Haddon Road, SW

West LRT Line (Future)

- Mallopoly Strip Mall, 37th Street and 17th Avenue, SW
- AMA Site, and adjacent, 45th Street and 17th Avenue, SW
- West Market Square, Sirocco Drive and 17th Avenue, SW

In terms of Transit Oriented Development, there have already been several studies and proposals on the Northwest, Northeast, South, and future West lines. However, the Northeast line has several strong candidate sites as well, including Whitehorn Station, Marlborough Station, and Rundle Station.

Intensifying public or quasi-public sites, such as parks, schools, or hospitals can be a sensitive issue. However, as cities evolve, these spaces may be converted into something more beneficial. The development of The Bridges has proven that this sensitive issue can be managed responsibly. Currently, there is much controversy over the redevelopment of the Shawnee Golf Course. Understandably, residents whose homes back on the course are upset that potential development will decrease house values, increase traffic, and ruin views, and they argue that the space should be kept green. Being located beside Fish Creek Provincial Park, converting the golf course into a second adjacent public park is likely an unsuitable use for the area. There are also no regulations that state private golf courses must remain golf courses. The current redevelopment proposal does preserve most of the trees on the site and creates a denser village centre near the eastern side of the site, close to the Fish Creek LRT station. While this is a form of suburban intensification, the current plan does not show an appropriate form of intensification. Most of the land is being converted into low density single-family housing. A more appropriate plan would be to concentrate even more density near the LRT station using models such as The Bridges or Garrison Woods that would provide services and benefit the existing community, and find better ways to preserve green space on the western edge of the site. If done well, this golf course redevelopment can set a precedent for future redevelopment of its kind. The Highland Golf Course, located in the north of the city, will likely be redeveloped as well, and will present another opportunity to responsibly intensify suburban Calgary.

Besides green space, schools are often potentially sensitive but possible sites for intensification that when done properly, can have benefits for the communities and the city. As communities age, few students populate the neighbourhood school, as new families tend to move to the farther suburbs. Recently, two suburban elementary schools have closed; R.B. Bennett in Bowness and the Holy Redeemer in Forest Heights. These schools were built in the postwar era and designed for student capacities that reflected the homogenous demographics of new communities that had higher than average numbers of families. A better

balanced neighbouhood would not see such waves of young population, and therefore not require such large schools, which could be better incorporated into mixed-use developments. However, elementary schools are often located in the interior of low density residential communities in Calgary. Therefore, intensification must be more moderate than other sites that can handle the increase in density. These sites must be especially context sensitive.

Infrastructure sites also can provide opportunities for intensification. In Calgary, a good example of such a site is the 50th Avenue S.W. utility corridor. The four block linear site forms the edge between two moderately distinct communities, and connects the Britannia Plaza neighbourhood commercial centre to the Macleod Trail major activity corridor. It is a very suitable site for a moderate increase of services and residential uses.

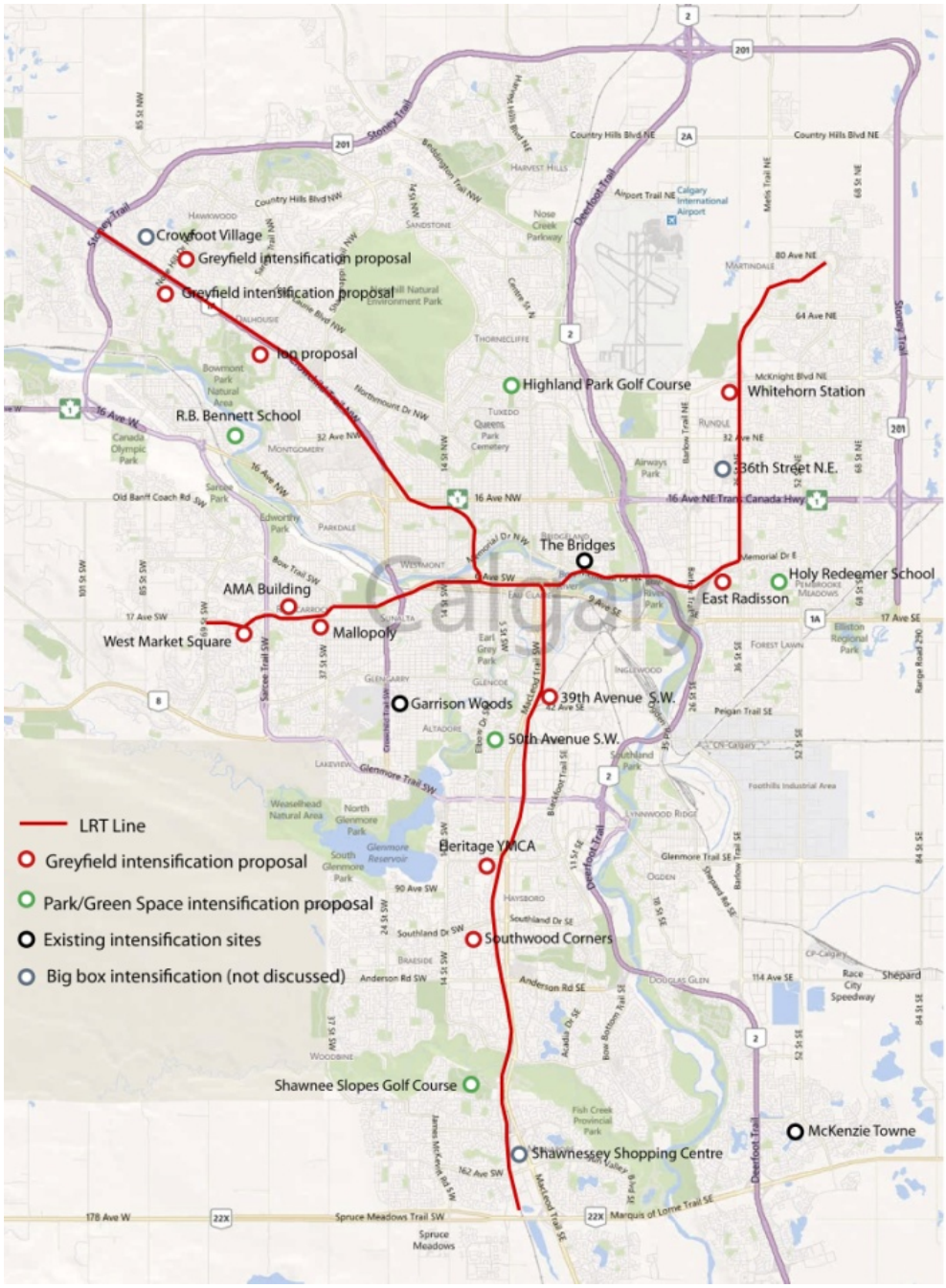


Figure 66 – Map showing some potential sites for intensification.

PART 3 – SITE PLANS FOR MORE RESILIENT SUBURBS

Part 3 of this paper outlines two case studies that demonstrate appropriate ways for Calgary to grow that adhere to smart growth principles, increase accessibility within existing neighbourhoods, and make better use of underperforming land. Both are context sensitive, and manage density in different ways. Density alone is not a solution for urban intensification. Rather, mediated density that works within a mixture of land uses and within a structure of good urban design is most beneficial. The first case study examines a strip mall intensification strategy in the community of Southwood, in Calgary's Southwest quadrant. This medium density project envisions a better use of the strip mall that can be repurposed to better serve current residents and can add vitality to the site without altering the neighbouring character. The second site is located in Calgary's Northeast quadrant, adjacent to the Whitehorn LRT Station. This case study provides a concept of greater intensity and higher densities. Because it is located directly at an LRT station and there is less of an impact on neighbouring low density residential, this plan allows for a development that can host a greater range of activities, larger building styles, and more permanent residents.

.

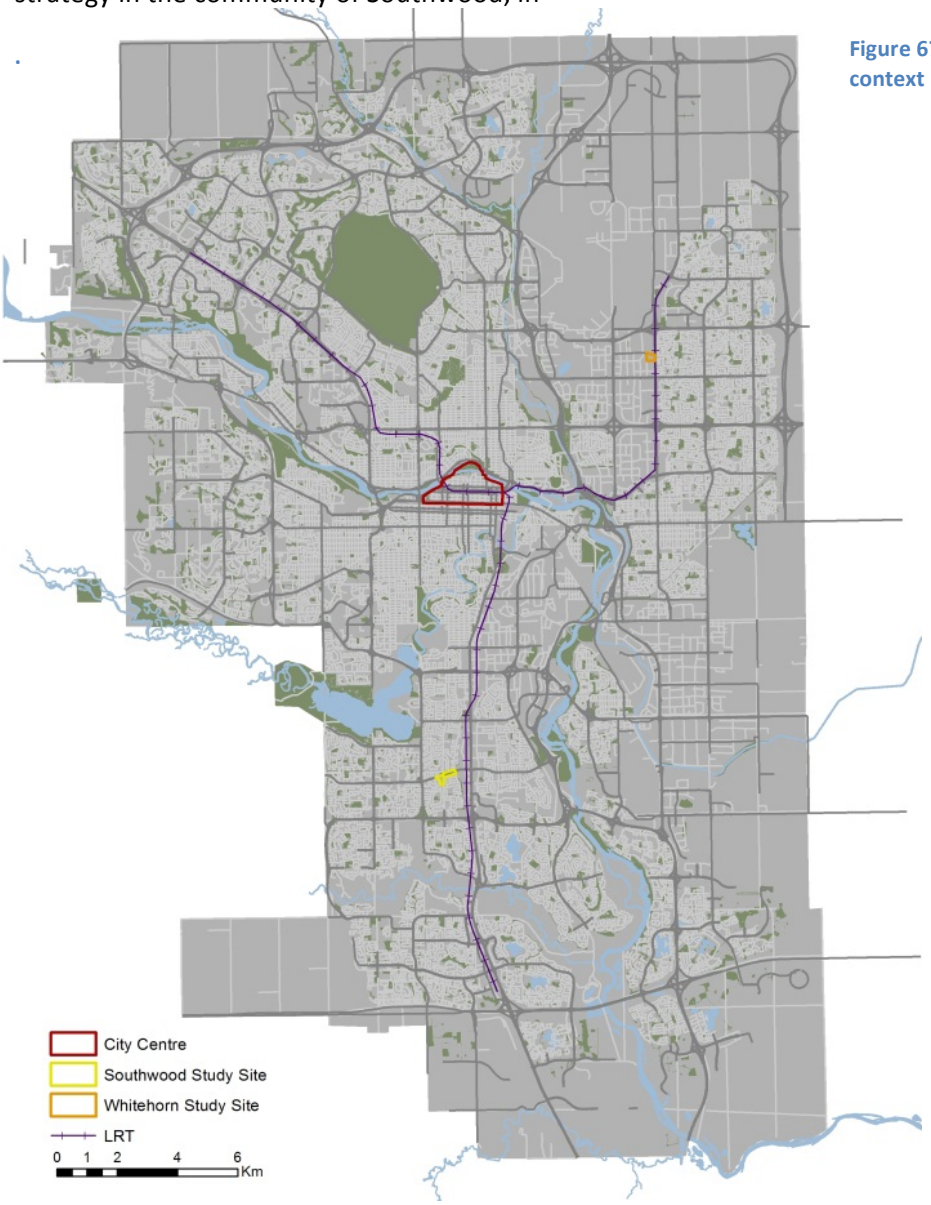


Figure 67 - Location of two case studies within Calgary context

3.1. CASE 1 - SOUTHWOOD CORNERS

The community of Southwood is located in Calgary's Southwest quadrant. It is roughly bounded by Southland Drive, Macleod Trail, Anderson Road, and 14th Street. It is highly characteristic of the Neighbourhood Unit pattern of development that was commonly built during Calgary's postwar building boom. Initially constructed in 1959, it reached final built out in the mid-1960s. Since then, the community has been stable, with a population hovering around 6000. However, the City of Calgary Geodemographic department suggests that within 65 years, the population could more than double. The current population density is 2,795 people per square kilometer, making it denser than approximately 35% of Calgary communities (Calgary Herald, 2012). The area is well suited for intensification. The strongest candidate site for the intensification (apart from the Anderson Station TOD already being studied by the City) is located around the intersection of Elbow Drive and Southland Drive. Already in the area is a strip mall featuring approximately 32 retail outlets, a library, two gas stations, two vacant lots, and single-family and multi-family housing. The strip mall has an area of approximately 3 ha, which makes it a fairly large strip mall by Calgary standards. 500 m from the intersection is the Southland LRT station. The area surrounding the site is mostly composed of single-family housing on quiet, tree-lined streets.

Figure 68 - Snowdon Crescent, adjacent to shopping centre. Surrounding the site is low-density, single-family houses with very well developed vegetation and tree cover.

Figure 69 - Existing site plan of Southwood Corners shopping centre.

Figure 70 - Figure ground study, showing context of residential surroundings. Redevelopment should take place on the site of the current shopping centre, as well as the strip from the site to the LRT Station, located between the fine and coarse grain land uses to the east. The large footprints south of the site are community services such as schools, community centres, and churches.

Figure 71 - The Sanderson Farm, in 1909, what is currently the community of Southwood.

Figure 72 - View of the Southwood Corners shopping centre in 1978, from Southland Drive.

Figure 73 - Current view of Southwood Corners shopping centre.

3.1.1. SWOT ANALYSIS

STRENGTHS

The location of Southwood Corners makes it well suited for intensification. It is close to the LRT and on a busy bus line that goes directly downtown frequently. At peak service times, travel time from the site to downtown including the walk to the LRT station is approximately 25 minutes.

Figure 74 - Southland LRT Station

The site is close to on-street and pathway cycling routes to downtown as well. There is minimal traffic congestion in the area currently. Although Elbow Drive leads directly downtown, it acts more as a treed urban boulevard, as opposed to the high-capacity arterial roads to the east and west, Macleod Trail and 14th Street, which handle the majority of traffic going to downtown. No more major development can take place to the south along Elbow Drive, which ends in Fish Creek Park, or along Southland Drive, which stretches from Southland Park to the Tsuu T'ina First Nation land. Therefore, congestion will likely not increase significantly. The sidewalks in the area are not especially wide, but are set back from the roads and often shaded by large trees.

The site is well serviced. Within a ten minute walk, two elementary schools and a junior high school can be reached. Due to the aging demographics of the area, these schools are under-populated and rely on bussing children from other districts to populate them. Across the street from the site is the Southwood Public Library.

Figure 75 - Southwood Public Library, c. 1967

Figure 76 - Southwood Public Library

One grocery store, a Planet Organic, currently exists on the site. Safeway and Superstore are located within one kilometer. Also, within one two kilometers is the Southport office complex, which contains the largest number of offices outside of downtown in Calgary, so there is a lot of employment in the area.

The community has a diverse population with people from a wide range of income brackets, and the neighbourhood even features a woman's transition house. Unlike many communities in Calgary, Southwood has a wide range of housing types, including apartments, duplexes, fourplexes, and townhouses. It also caters to a wide range of incomes, with houses currently selling for $130 000 to $600 000. This sets it apart from many communities which are much more homogenous. The site is also located on a sloping hill. The terrain adds pleasant texture to the community, and allows for views from the site of downtown. Although the existing shopping centre does not have an attractive façade, it is surrounded by a strip of green space that is populated by mature trees and vegetation. The Bank of Montreal on the Northeast corner of the shopping centre is well sited, and is able to anchor the corner of intersection well.

Figure 77 - The Bank of Montreal is well sited

WEAKNESSES

Although the site is close to the LRT, the link along Southland Drive between the LRT and the site needs improvement. There are no eyes on the street, and the entire south block is a long sound retaining wall.

Figure 78 - A long, monotonous block connects the site to the LRT

The northern side of the street runs parallel to an alley with decaying garages.

Figure 79 - Ugly streetscape along Southland Drive.

Furthermore, the length of the trip is exaggerated due to the fact that the entire length of the block is a long hill. Few people choose to walk along this stretch. The connection to the bike path needs improvement as well. A bike path runs along a green strip parallel to 14th Street South that connects to the river pathway system. The path is not part of the official network, but it works well and it makes for a pleasant cycle into downtown. However, accessing this path is currently difficult on a bike and is better suited for pedestrians.

The area adjacent to the train station is not well populated, and has a tendency to attract loiterers. This is not necessarily a weakness, but certainly some people may feel uneasy walking alone in the night near the train station. The sound barrier also hides a back alley near the train station and creates an unsafe feeling alley.

OPPORTUNITIES

The wide right-of-ways, green boulevards, and central medians make for lots of room available to fix some urban design issues. A large, unused parking lot on the site has strong potential for redevelopment.

Figure 80 - Ample parking on site

Recently a pedestrian bridge was constructed that creates a better link to the office park, the LRT station, and the community. However, it does not appear to be heavily used.

Housing redevelopment in Calgary originated in the inner city districts, and has been slowly expanding outwards into the suburbs. Just north of the site, the community of Haysboro has started to show signs of redevelopment, so if the pattern continues, Southwood will see new investment and development soon. This would coincide well with intensification of the site. However, land in the area is still less than the Calgary average, making it a good time for a developer to purchase affordable land.

One of the strongest opportunities comes from current city policy and politics. The Planning Director and ward alderman are strong advocates of suburban intensification and smart growth.

THREATS

There is limited awareness of the site and the area within the city. Many residents are familiar with the surrounding communities, but have never heard of Southwood. The aging buildings on the site could create a negative perception as well. The last renovation of the shopping centre took place 20 years ago, and the shops were built with a Southwest American motif with fading peach stucco.

Figure 81 - Unattractive, dated design

The perception of the site could be further negatively influenced by the recent opening of a

liquor store and discount grocery and household items store.

Macleod Trail, approximately one kilometer to the east of the site, is a major commercial corridor which supports many large chains and restaurants. The site could likely not support major retailers or restaurants which predominately are located along Macleod Trail.

If an agreement is ever reached on the long battle over the Southwest ring road, traffic along Southland Drive may increase. Not only will it make the street noisier, but the morning drive-through line at Tim Horton's would likely shut down traffic circulation throughout the entire area.

3.1.2. INTENSIFICATION PROPOSALS

Outlined in this section are three proposals showing varying degrees of intensification on the site of the current Southwood Corners shopping centre. The site currently has 11 365 m^2 (122 334 ft^2) of leasable commercial space on a 3.5 ha (8.6 acre) site. The shopping mall was first built in 1965, soon after the surrounding neighbourhood. At the time the site featured an anchor grocery store (the current Planet Organic, Fabricland, and Giant Tiger site) and a row of smaller shops adjoined to the north. A small row of shops was also located at the Southland and Elbow Drive intersection at grade. In 1992, a major redevelopment removed the shops near the intersection, divided the anchor into smaller components, and developed the northern portion of the site, adding a strip commercial building, two free standing restaurants, and an island of small offices, shops, and a bank. The units are usually rented, but it is not uncommon for shops to sit vacant. The entire site is one story and has 495 parking spaces, which is far more than sufficient.

All three proposals are compatible to the current community context. The current land use zoning on the site is C-C2f.32h15, or a large community commercial district with a floor area ratio modifier of 0.32 and a maximum height modifier of 15. Residential buildings are neither permitted nor discretionary land uses within this zoning, so any of the proposed intensification options would require a zoning amendment. Calgary has no one land use designation for mixed-use areas. Rather, mixed-use sites tend to be divided into smaller sections, often with each building treated individually. When possible, an existing land use designation will be applied to a building or small area, and individual Direct Control Districts are applied to remaining buildings or small areas. Due to a land use bylaw that was designed around land use segregation, Calgary's Land Use Bylaw is not well equipped to encourage the creation of any mixed-use development. Certainly a Form-Based Code approach could be more appropriate for situations like this, but with the Mission Road Form-Based Code experiment not receiving further approval in council, it may be awhile before the City tests this form of zoning again. Therefore, a mixture of existing and direct control land use districts would be the likely outcome for the following proposals for the redevelopment of Southwood Corners. The southernmost portion of the land that is entirely residential would likely become a Multi-Residential - Contextual Medium Profile District (M-C2) or Multi-Residential – Contextual Grade-Oriented District (M-CG), while redevelopment of the mixed use portion would require a Direct Control District (DC). Some commercial area on the areas of the site fronting Southland and Elbow Drive could continue using the C-C2 zoning.

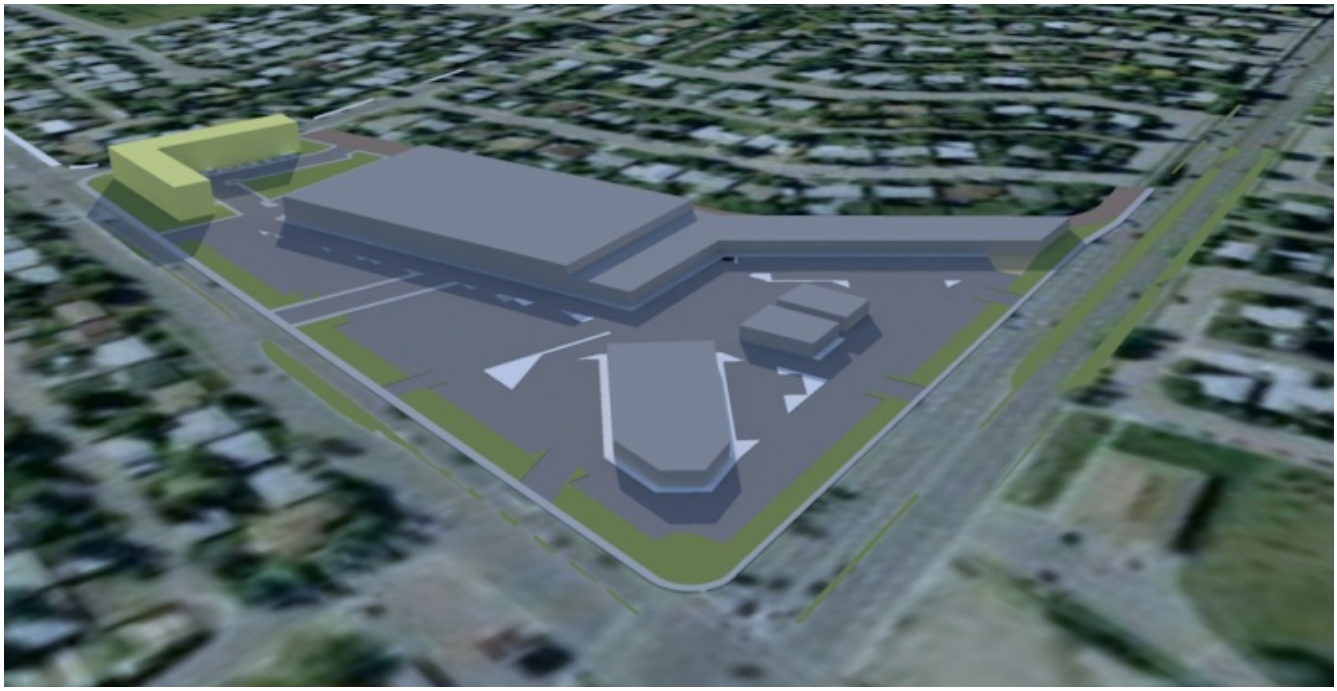
The intensification proposed in each scenario is mainly residential, except when a large increase in population justifies addition of some commercial because the site is already well serviced by shops,

services, and public amenities. However, each proposal takes into consideration the importance of 'place-making' and design features that can best adapt into the community context and create meaningful places on the site. Each proposal preserves the green space and well developed trees that surround the site, which act as a nice natural buffer between the commercial area and the houses along Elbow Drive. No proposal suggests heights of over four stories in order to better blend into the surrounding area. A better place for tall residential buildings would be near the train station, which is surrounded by tall buildings already, and could be part of a more comprehensive Transit Oriented Development. Because the distance threshold for TODs is usually development occurring at a maximum of 400 to 600 m from a station, this site redevelopment is not likely a strong TOD candidate because the distance from site to station ranges from 500 m to 800 m.

OPTION 1 – Townhouse Style Residential Intensification

This option describes the simplest form of intensification in which the parking lot on the south end of the site is converted into a townhouse style development. It does require the removal of the gas station on the corner of Elbow Drive and Southampton Drive, but no alterations are made to the buildings of the existing shopping centre. The

Figure 82 - Option 1 adds residential to the parking lot in the southern portion of the site.



total area to be intensified is approximately 70 m by 85 m. The proposal calls for an 'L'-shaped residential development that fronts both Elbow Drive and Southampton Drive. As such, it is better able to adapt to the context of the neighbourhood. A small green space can be created in the interior of the site. Preferably they would be ground oriented with a door towards the street. As shown in the site plan, the building over three stories could fit 18 family-sized townhouses (approximately 2000 square feet each). Parking would be at grade, either built into the first floor as a garage, or as separate garages in lieu of the green space behind the building. Precedents for this pattern of development include 'Arrive' at SkyView Ranch, featuring built-in garages, or 'Victoria Cross Townhouses' in Currie Barracks, featuring rear garages. Alternatively, this development could features live/work units such as 'The Olive' in The Bridges.

Figure 83 - Massing model, looking southwest, showing proposed residential development in yellow.

Figure 84 - View of site from Southampton Drive.

Figure 85 - View of site with potential intensification

OPTION 2 – Townhouse style redevelopment and Big-Box Retrofit

The second option includes the residential intensification described in the first scenario, and adds density to the central section of the site. This option retrofits the original big box store that was built on the site in the 1960s. The big box store will be converted into a four story building, with shops in the front of the first story and parking in the rear portion of the building, or underground.

Figure 86 - Option 2, showing residential intensification in yellow and commercial intensification in orange.

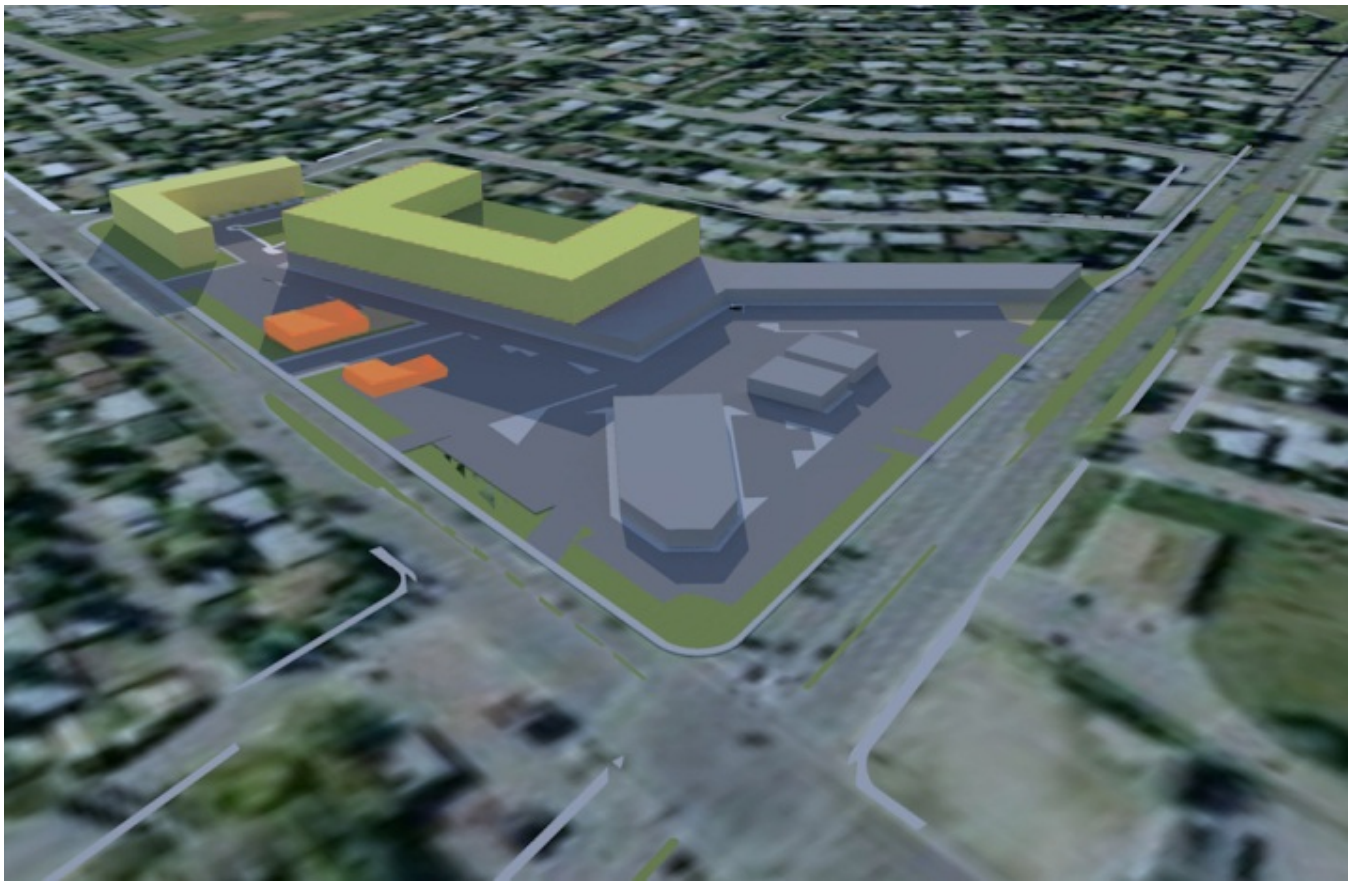


Figure 87 - Option 2 includes commercial intensification, as well as big-box retrofitting.

The second, third, and fourth stories will be residential units in a 'U' shape, facing a central courtyard which would be the roof of the first story. Clearly there is an abrupt transition from single-family dwellings located on Snowdon Crescent behind the development to the four story mixed use block. However, due to the grading of the site, the single-family houses are situated approximately 1.5 stories higher than the ground floor of the mixed-use block. This minimizes the impact of a tall development. Furthermore, the houses have large backyards and are blocked by large trees, so there is a good buffer between the existing and future development.

Figure 88 - Houses backing onto the site are buffered by a grade difference and vegetation.

In front of the mixed-use building, a restaurant or pub could be constructed in the parking lot facing the structure. This would create a more enclosed frontage to the structure, and make it feel more like

a street than a parking lot, which is especially important for residents in the front of the building. Also, due to the slope of the site, residents facing North and East will have views of downtown.

This option would add approximately 9300 m^2 (100 000 ft^2) of residential space, or 100 units with an average size of 1000 m^2, in addition to the 18 large townhouses as described in Option 1. Approximately 350 m^2 of commercial space would be added. However, if parking were to remain at grade behind shops on the first floor and under the residential units, approximately 2500 m^2 of the 6100 existing square meters of commercial space would be sacrificed.

The nearest example of similar development is found in Saanich, British Columbia at Tuscany Village, which has a similar, 'U'-shaped residential building over a grocery store. It also fronts onto a central parking lot, but the parking lot is populated by plazas, restaurants, and shops, giving it more of a 'Main Street' type feel. It has partial at grade parking and partial below grade parking.

Figure 89 - Tuscany Village, in Saanich, BC. This precedent is a similar mixed-use site with ground floor retail and above grade residential and office space.

Figure 90 - Tuscany Village, in Saanich, BC. Here, residential space is located over a grocery store. This building is similar to the big box conversion suggested.

OPTION 3 – Total redevelopment of site

Figure 91 - Option 3 site plan, featuring a fully redeveloped site.

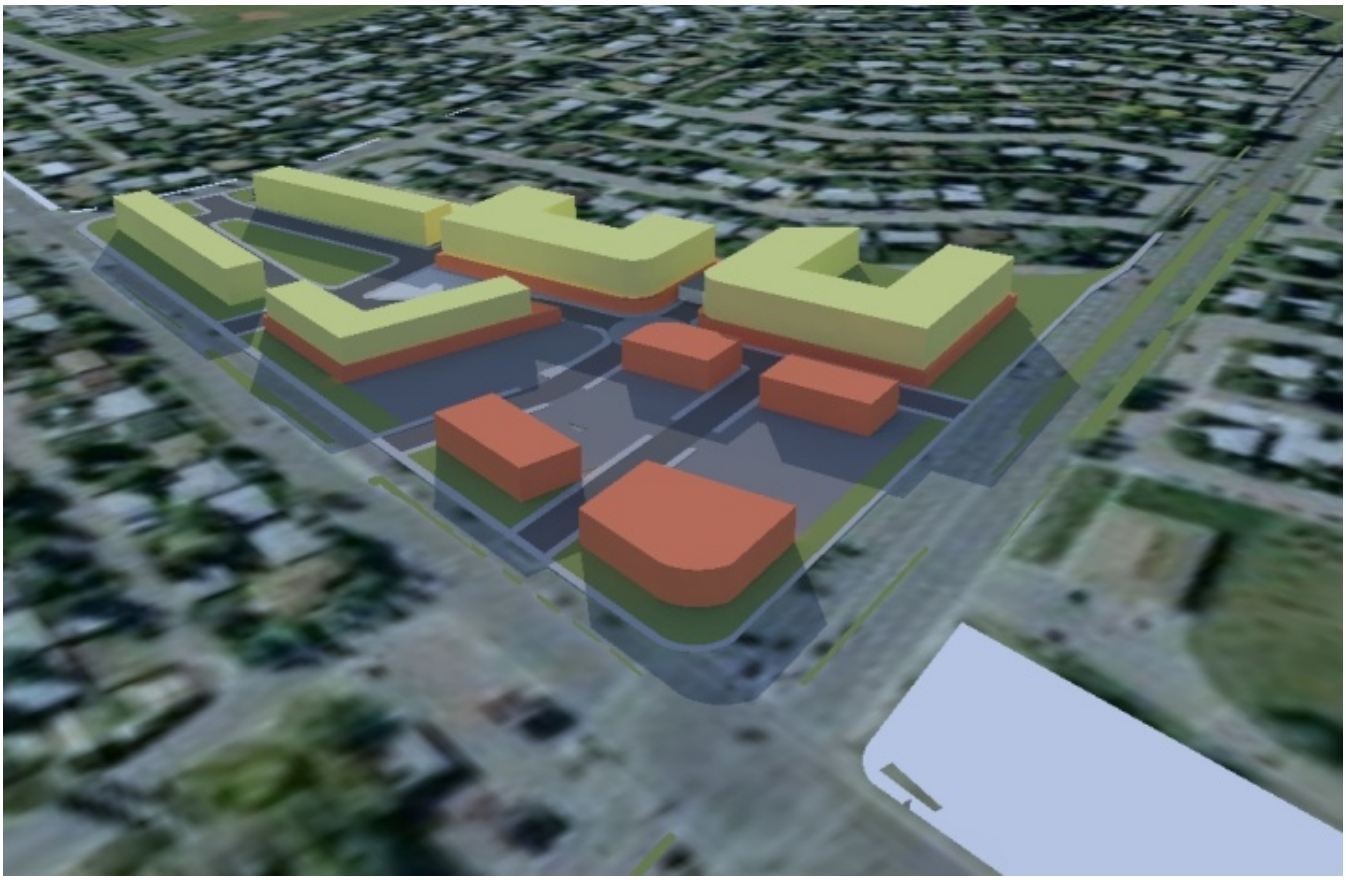


Figure 92 - Option three creates distinct spaces on the site. While uses are mixed, residential spaces are located away from the intersection.

The third option proposes a total redevelopment of the site. It reintroduces a grid-like street pattern to the site and would require underground parking. The main residential area is once again to the south of the site, where it is better integrated into the existing neighbourhood and away from the intersection of Elbow Drive and Southland Drive, which is better suited for commercial uses. The residential area is located around a green space and a plaza. Buildings 1 and 2 would be townhouse style developments. Building 1 could have laned garages featuring carriage houses to further increase density in non-intrusive ways. The 'Main-Street' running north to south in the development is somewhat kinked in this section to discourage shoppers from cutting through the residential district and instead use more appropriate exits onto main streets instead of surrounding residential streets. Buildings 3 and 4 enclose the square to the north around a plaza that features first floor commercial with three stories of residential above. Buildings 4 and 5 are both similar to the development described in Option 2. Buildings 6, 7, 8, and 9 are two-story commercial and office buildings, centered on parking for shoppers making quick stops, which acknowledges the fact that most people in suburban Calgary drive to stores.

In total, this proposal creates approximately 10 700 m^2 (115 000 ft^2) of commercial space and 21 800 m^2 (235 000 ft^2) of residential space, or approximately 177 units with an average of 93 m^2 (1000 ft^2) and 28 units with an average of 185 m^2 (2000 ft^2).

3.1.3. MOVEMENT

Although intensification on the site will add more traffic to the area, it will not affect residential streets, and due to the proximity to Macleod Trail and 14th Street, two major arterials, traffic gain due to this redevelopment will be minimal. Furthermore, active transportation will be encouraged on the site. A better connection should be made to bike paths, one running parallel to 14th Street and one running along Sacramento Drive and Haddon Road, roughly parallel to the LRT tracks. Widening of the sidewalk along Southland Drive could easily connect these two paths. The most crucial site improvement is the connection to the LRT. Because it is 500 m away, it is on the maximum range of distance that most walkers will walk when commuting. However, the walk along Southland Drive to the LRT station from the site is not pleasant, and it feels unsafe. Both sides of Southland Drive are flanked by back alleys of streets running parallel to Southland Drive. The south side features a sound barrier running between the

Figure 93 - Redevelopment along Southland Drive reanimates the street by adding moderate density and improving the streetscape.

Figure 94 - Elevation, looking west up Southland Drive.

sidewalk and the alley for nearly half a kilometer. The sidewalk is long, dark, and repetitive. If people are going to walk from the site to the LRT, the approach needs to be improved.

Due to the proximity to the LRT station, this area logically could support higher density rather than single-family dwellings. An intensification strategy that would both improve the pedestrian realm and increase density near transit stations would be to reconfigure this stretch of road and alleyway. The sound barrier should be removed. There are many houses backing onto Southland Drive without one, and there is not enough traffic for it to be useful. The back alleyways should be paved and turned into streets. In place of the single-family dwellings, townhouses should be built. The front of the townhouses could continue to face away from Southland Drive, and would continue to act as the formal entrance, but the rear of the townhouses could be treated more as a living space with balconies on the 'new' street, and would be used for day-to-day access.

Figure 95 - Front of potential townhouses on site. This example is 'Arrive' at Skyview Ranch.

Figure 96 - Rear view of 'Arrive'. Balconies and entryways create eyes on the street.

This would reanimate the alley way, which would be converted into a small street, and create a more comfortable pedestrian realm for pedestrians. With the increase in density, and limited amount of commercial could be added to the easternmost section of the redevelopment, adjacent to the LRT station. This would help bring life towards the LRT station, which is currently surrounded by single-family dwellings that create minimal activity in the area, giving the LRT station an unsafe perception.

3.2. CASE 2 – WHITEHORN LRT STATION

The community of Whitehorn is located in Calgary's Northeast quadrant. The community is bounded by McKnight Boulevard, 52nd Street N.E., 32nd Avenue N.E. and 36th Street N.E. The land in Whitehorn was first annexed by the City in 1961, and development first began in 1973. Whitehorn displays the typical characteristics of communities built using the 'urban village' model of development encouraged by city plans of the 1970s. Somewhat like a neighbourhood unit, an urban village expands the 'neighbourhood' to approximately four neighbourhoods, which as a group are served by larger commercial destinations. This type of 'superblock' development is even more dependent on the automobile. Whitehorn is one of Calgary's most ethnically diverse neighbourhoods, with especially large populations of South and Southeast Asian groups. The population density of Whitehorn is 4,596 people per square kilometer, which places it among top ten percent most dense suburban neighbourhoods in Calgary. The average income in the neighbourhood is lower than average, and the crime rate is higher than average (Calgary Herald, 2012). The housing stock is mostly composed of a mixture of single-family dwellings, townhouses, and duplexes. In 1985, in anticipation of the 1988 Winter Olympics, the Northeast leg of the LRT system was built, and the terminus station was located on Whitehorn's western edge, adjacent to an industrial park. Because Calgary Transit has a policy of creating extra-large 'Park and Ride' facilities at terminus stations to accommodate a wide LRT catchment area, Whitehorn Station has a parking lot with a capacity of 824 parking stalls. The area of the site is approximately 4.8 hectares. Since the Northeast LRT has since been extended as the city has grown, Whitehorn Station is no longer the terminus station, but has a parking lot designed for one. This site is therefore a prime location for encouraging Transit-Oriented Development.

Figure 97 - The Whitehorn intensification site is located between two extremely contrasting land uses.

Figure 98 - Construction of the Peter Lougheed Hospital, c. 1985. The site located in the undeveloped square in the upper left quadrant of the photo.

3.2.1. SWOT ANALYSIS

STRENGTHS

This site has excellent potential for development. It is located directly at an LRT station, which takes 18 minutes to reach downtown. Because the site was once a terminus stop on the LRT line, the parking lot is large, and currently underused.

Figure 99 - Looking Southeast across the site. Although this picture was taken on a weekend, the parking lot is not used to capacity on weekdays.

Besides the LRT, the site is also serviced by frequent buses. There is no current construction on the site beside a parking lot (and a very small electrical substation on the edge). A regional separated bike lane also runs adjacent to the site which connects the site directly to downtown as well as other employment areas such as the airport.

Figure 100 - A regional cycle path runs beside the site.

The site is close to many major employment areas. As mentioned, it is near the airport, and adjacent to a large area of the city used for office parks and industry. The Peter Lougheed Hospital, the Northeast's largest hospital, is 750 m to the south of the site, and just beyond the hospital is Sunridge Mall, a large, enclosed mall. Several grocery stores are located within one kilometer of the site, including Safeways, Sobey's, and Costco.

Generally, housing in the area is more affordable than most Calgary communities.

WEAKNESSES

The area does not tend to have an especially positive perception within the city. It is a poorer area of the city with higher than average crime rates. The LRT station is not in a populated area, and feels threatening. There is an extreme segregation of land use in the area, and the majority of residences are single-family dwellings, leaving few alternative housing choices. There are only 61 multi-family units in the area compared to nearly 3000 single-family dwellings. The townhouses and apartments that do exist in the area tend to be run down. Despite the excellent separated bike pathway in the area, the community has an extremely low ridership rate, with only 0.2% of trips being taken on bicycle.

Despite being located near large employment centres, a hospital, and a mall, there are few other services in the area. There is a very small and unattractive commercial strip across the street from the site that serves the entire community of Whitehorn, which features a pub, a small grocery mart, a liquor store, and two medical offices.

Figure 101 - The area's only neighbourhood style commercial area.

The community certainly lacks any sort of 'third space'. Furthermore, the area is very under-represented by arts and cultural facilities, despite the high ethnic population. The nearest library and sports facility are several kilometers away.

Generally, the site is aesthetically unappealing. It is a large expanse of concrete beside an unattractive street. Unlike Southwood, the trees here are sparse and are not as mature. The site looks desolate and cold.

OPPORTUNITIES

Clearly the vast parking lot on city-owned land beside a LRT station provides ample opportunity for development. However, much of the opportunity for intensification comes from the population of the surrounding area. The community is one of the city's most ethnically diverse. With such a large immigrant population, many new immigrants to the city move to the area for its strong social networks. However, with limited housing options, they are often forced into buying a single-family dwelling. This form of housing is often not ideal for new immigrants with limited money. Affordable condos and townhouses would be very appropriate to build in the area. The area also has higher-than-average percentage of teenagers, who will soon be looking to move out of home. Attractive, convenient, and affordable housing in the area would be a good transition for young adults.

The site also has the opportunity to act as a community hub, which is lacking in the community presently. The community needs more 'third spaces' and cultural spaces, and this would be an excellent area to provide them.

THREATS

Higher than average crime rates, negative perceptions, and disinvestment in the housing stock threaten the area. There is also a disturbing trend of large-scale greenfield development happening in the north-easternmost area of the city. Rather than invest in existing areas, such as Whitehorn and the surrounding communities, new communities are being built in fields to the north. This massive, low density development will further pull services and amenities away from existing Northeast communities, and increase traffic.

3.2.2. INTENSIFICATION PROPOSAL

The redevelopment proposal for the site creates a distinct, vibrant community adjacent to the LRT station. The site has greater capacity to comfortably manage density, which is reflected in the tall apartment and condo buildings. The space is walkable and mixed-use, and is well suited to serve the residents of Whitehorn and new residents. The site is explained in detail in the following section.

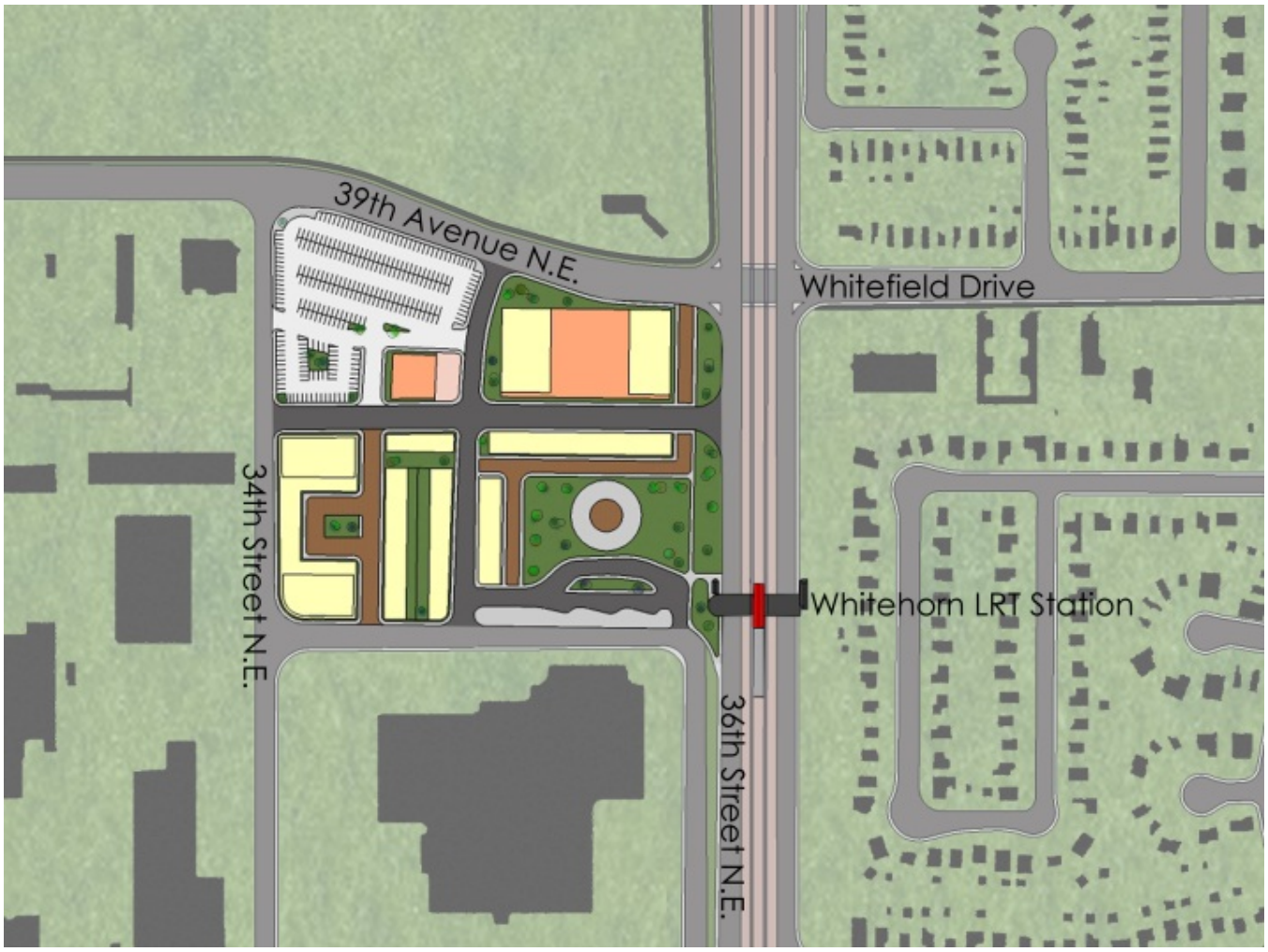


Figure 102 - TOD intensification proposal for site.

Figure 103 - Existing conditions at site, looking Northwest from LRT Station.

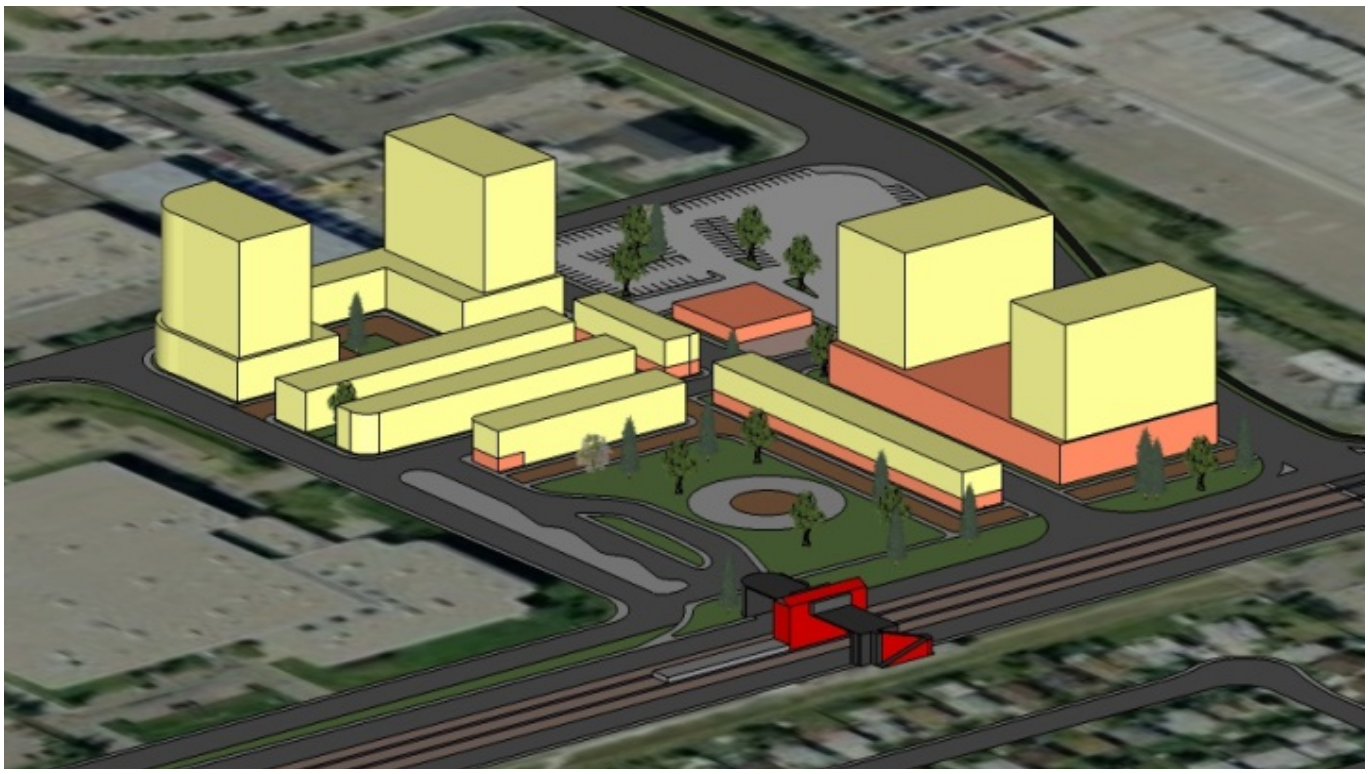


Figure 104 - Intensification proposal - Massing model. Residential areas are shown in yellow, commercial and community uses are shown in orange.

Figure 105 - Rendering showing potential intensification on site

3.2.3 TRANSIT ORIENTED DEVEOPMENT (TOD) GUIDELINES

Intensification on this site should take on characteristics of a Transit Oriented Development. Intensification on this site should follow TOD best practices as proposed by various Calgary policies, as described in the Calgary Municipal Development Plan (2009), the Calgary Transportation Plan (2009), the Transit-Oriented Development Policy Guidelines (2005), the Transit-Oriented Development Best Practices Handbook (2004), the Employment Centre Strategy (1999), the Transit Friendly Design Guide (1995), and the LRT South Corridor Land Use Study (1981).

The following section lists the policies and guidelines described by the City of Calgary Transit-Oriented Development Policy Guidelines document (2005), and describes how the proposed site plan meets polices and guidelines.

TOD Policy – Ensure Transit Supportive Land Uses

TOD Guideline – Transit-supportive land uses

The redeveloped site includes high residential and employee densities, with over 53 000 m^2 of residential space and 14 000 m^2 of commercial and community space being added to the site. Due to the abundance of street level commercial, people are encouraged to walk around the site, and travel to the site at non-peak times. The various types of buildings support a diversity of housing styles, such as, high-rise apartments, townhouses, and walk-up apartments, and a diversity of retail, service, and cultural facilities.

TOD Guideline – Mix land uses

Uses are mixed throughout the site. Most buildings support residential and commercial activities, while the high-rises support residential, commercial, and offices uses in a vertically integrated fashion.

TOD Guideline – Limit non transit-supportive land uses

The site does not support uses such as automotive-oriented retail or services, or big box or warehouse style retail which requires high amounts of surface area and parking. No single-family dwellings are on site.

TOD Policy – Increase Density

TOD Guidelines – Optimize density around each station

The site plan creates density through compact development and height. Buildings 3 and 7 are estimated at 13 stories each. Because the site is close to the airport, there could be limitations to how high builds in the area can be. However, the nearby Peter Lougheed Hospital is approximately 10 stories.

TOD Guideline – Minimize the Impacts of density

Normally the highest density development would be located closest to the LRT station. However, because the site is adjacent to single-family dwellings, some of the tallest buildings have been moved back in the site to minimize the impact. A small park surrounded by street oriented commercial and townhouses creates a more human scaled environment.

TOD Policy – Pedestrian Oriented Design

TOD Guideline – Provide quality pedestrian connections.

The site is built in a grid form, providing easy movement through the site. All sidewalks are large and accommodating. A direct connection is made from the bike path to the train station.

TOD Guideline – Provide a compact development form

The buildings are located close together, creating enclosed, legible 'Main Streets' throughout the site, while allowing for useable green space.

TOD Guideline – Provide integrated public systems

Besides anchoring the site on the LRT station, a bus loop is located on the site as well. Because 36th Street NE is busy and has an LRT running through it, a pedestrian and cycle bridge connects the site to the community across the road. At grade crossings are available as well. There is a quality public plaza and green space next to the LRT station and bus loop. The road south of the site allows for people dropping off passengers in cars to do so easily without driving through the site itself.

TOD Guideline – Locate pedestrian-oriented uses at the ground level.

Buildings 1, 2, 3, 5, 6, and 7 all have various amounts of retail at ground level. Only buildings 3 and 7 have offices that are not at ground level.

TOD Guideline - Human Scaled Architecture

Buildings are designed to provide a 'Main Street' type feel, with windows and doors on the exterior walls. Towers are on podiums to maintain density without creating a sense of 'downtown'.

TOD Guideline – Incorporate all-season design

Because buildings are located close to the sidewalks, they can have canopies to protect from the elements. Trees provide shade in the summer. Acknowledging that many people prefer to drive in the winter, a parking lot is provided in the back corner of the site.

TOD Policy – Make each station area a 'place'

TOD Guideline – Emphasize important buildings

Similar to downtown, the tall buildings should have interesting roof features, which makes them distinctive, and mimics the mountain peaks to the west. The LRT station is painted a bold red, emphasizing its importance on the site.

TOD Guidelines – Street and block layout

The street gird pattern connects the internal streets to the existing streets easily. All blocks have sidewalks on all sides.

TOD Guideline – Use open space creatively.

The central plaza functions both as a green space, but also as a pleasant area to wait for trains or busses. Shops on building 2 could open onto the open space as well. A woonerf-style road improves access through the site, while maintaining a pedestrian-oriented character.

TOD Guidelines – Create a focus for the local community.

There is plenty of room for community gathering spaces such as a library or a community kitchen, especially within buildings 3 and 7. The central plaza will create a visual centre of the community, where residents first arrive home when they disembark the train.

TOD Policy – Manage Parking, Bus, and Vehicle Traffic.

TOD Guideline – Consider reduced parking requirements

A Park n' Ride lot in the Northwest corner allows for people living out of transit service range to drive to the site, park, and take the train. However, this parking could be shared with the shops and services that require it at different times of the day.

TOD Guideline – Place Parking in appropriate places.

The main Park n' Ride lot is easily accessed from the collector roads to decrease traffic within the site. The pedestrian connection from the site to the station is comfortable and pedestrian oriented. On street parallel parking is also available on the main streets, but should not be allowed to be used by commuters.

TOD Guideline – Develop parking forms that complement the pedestrian nature of the area

In order to break up the austerity of a large parking lot, a restaurant has been placed with the site. Within the parking lot, several green islands create a more comfortable, walkable space.

TOD Guideline – Encourage Transportation Demand Management strategies

A car sharing program was recently started in Calgary, and some cars could be parked on site. Commuter shuttles could bring people back and forth between the site and the hospital.

TOD Guideline – Long Term Redevelopment

The parking lot is available to be redeveloped with potential underground parking at a later time should growth demand allow for development.

TOD Policy – Plan in context with local communities

TOD Guideline – Work with local communities, and provide needed community services and amenities

Because amenities are scarce in this area, and there is a high immigrant population, it is likely there are certain amenities that the community could benefit from, such as community centres or libraries. Discussions should take place with the community members to find out the specifics of the site requirements.

TOD Guideline – Built form should complement the local context.

This development blends it surrounding contexts. Smaller townhouses compliment the single-family dwellings nearby, while taller buildings compliment the increased density seen along 36th Street.

CONCLUSION .

Change can be a concept that is difficult to accept, and for years Calgary suburbs have provided a sense of stability and home. However, Calgary is reaching a point where it can no longer grow sustainably outwards. Rather, it must find new ways grow that support public transit, make services easily accessible, and create places that people want to use and visit. Furthermore, it must find ways to develop that are more economically efficient and put less of a burden on suburban infrastructure. There are already many great communities in the city. Rather than racing to build new greenfield communities, the true challenge is in making the existing communities even better.

Through examining Calgary's historical growth, it is evident that each era of development produces a distinct suburban form, each of which creates different scenarios for intensification. Historical accounts of Calgary's built form have been well documented by Sandalack and Nicolai (2006). Inner city suburbs, which follow the grid system, are the densest and liveliest of Calgary's suburbs, and have been gradually intensifying as the market demands. Services and jobs are usually within short walking distance. Due to the efforts to create an urban forest in the Alberta prairie, most of these neighbourhoods are well vegetated and pleasant to wander through, visit, or live. Unlike older cities in Canada, Calgary never developed dense residential areas in the downtown itself. The first houses in the city were built outside of downtown in what would essentially be a suburb. Early adoption of the streetcar further allowed houses to be built in a relatively low density but compact manner. The early economy was based on ranching and the expansion of the railway. As such, Calgary never developed a large industrial or manufacturing sector. These factors set Calgary apart from many cities because it has never dealt with issues such as de-urbanization and re-urbanization of the downtown or adaptive reuse of industrial buildings.

Because Calgary is such a young city, and a city which grows largely during boom cycles, much of the development happened after World War II in the 1950s and 1960s. This occurred during the rise of the 'corporate suburb' in which large tracts of land were developed by a single developer. Foran (2009) has documented much of the postwar pattern of growth in Calgary and forces behind these patterns. This era corresponded to the rise of the automobile, and set the conditions for a sprawling city. Most of the now first-ring suburbs built during this time were built following the 'neighbourhood unit' model, and often feature strip malls. Since the rise of the regional shopping centre, these strip malls are often underused and underperforming. However, they are often located on or very near public transit lines. Also during this era, the 'Uni-City' method of growth was adopted, under which the City annexed vacant land surrounding the city. This has constantly created a land bank around the city and ensured that the City was in control of the entire municipal area of Calgary. In the postwar era, and especially during the 1970s to mid-1990s, the City did not responsibly manage growth, which resulted in low density, poorly serviced, and poorly designed suburban neighbourhoods. Land uses at this time became even more segregated and coarsely grained. The LRT system was created, but stations were often placed far from any forms of residential density. This has, however, created many current opportunities for Transit-Oriented Development today. It has also resulted in a continuous form pattern of suburban growth. Calgary does not face development 'leapfrogging' issues like many other multi-jurisdictional municipalities.

The concept of suburban intensification, best described by Dunham-Jones and Williamson (2011),

provides a favourable option for future growth in suburban Calgary. Today, development in Calgary is starting to take place in a more responsible manner within urbanized areas due to a number of policies that support suburban intensification, including the Calgary Sustainable Suburbs Study, PlanIt Calgary, imagineCalgary, the Calgary Municipal Development Plan, and the Calgary Transportation Plan. Recent developments show excellent precedents for future growth. Some of the best examples of suburban intensification taking place in Calgary following these guidelines include The Bridges, a TOD in the community of Bridgeland, or Garrison Woods, an award-winning mixed-use community on a former Canadian Forces base. These sites are working well because they are characterized by qualities of responsive environments, as described through performance dimensions described by Lynch (1960) and Bentley *et al.* (1985).

Tools for intensification that can be used by the city do exist. The Community Revitalization Levy is a form of Tax Increment Financing that has recently been approved to finance and encourage development in the Downtown East Village. For years the site has sat vacant, but since approving the levy and preparing the site, the site has immediately drawn in developers from across Canada. This is important for Calgary because it brings fresh ideas and development patters to the city. This tool can be successfully applied to other suburban projects as well and be used as a means of intensification. The City is also developing a tool that attempts to prioritize sites for development based on a number of factors, including availability of services and proximity to amenities. This tool is useful for encouraging development at sites where it would be most beneficial, and discourages fringe greenfield development.

Much of Calgary's future growth must take place within the urbanized area. Not only will the city not be able to sustain continual low density greenfield development, but it is also time to start building meaningful places that attract and interest people, and move away from building bland, monotonous suburbs that have no sense of place or identity. Case studies of how this can be done show that sites such as Southwood Corners or the Whitehorn LRT station act as excellent examples of the type of intensification that is needed in Calgary. Not only do these examples highlight ways to increase accessibly to services, reduce dependence on cars, create meaningful community gathering places, and provide a wider range of housing and retail options for Calgary, but they can also be done in a way that is not intrusive to the surrounding context.

Further research is warranted in order to find ways to encourage developers who have built a venerable business model developing low-density residential housing adapt to new forms of development. Construction and development comes with a large price tag, and it is understandable that developers are not comfortable taking risks and venturing far from their proven area of expertise. Restricting conventional development alone will not foster creative new ways of growing. Planners must better find a way to encourage new types of growth, rather than restricting the conventional kind of growth.

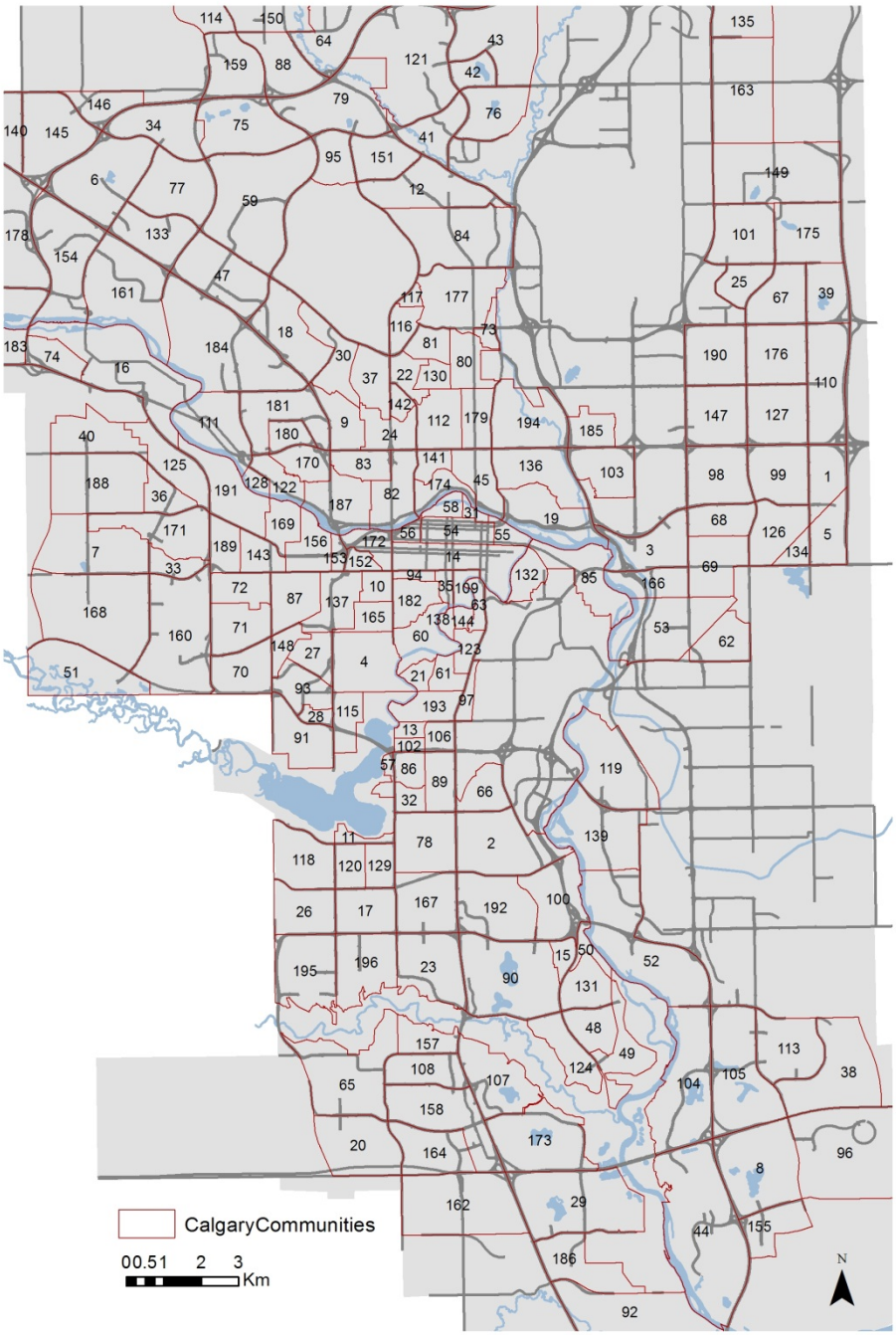
Another area that has been largely ignored in this paper is intensification at different scales of suburban sites. While this paper has focused on sites such as strip malls and parking lots, other sites have received less attention. For example, little research has been done on identifying ways to improve and intensify the existing residential components of postwar suburbs. Should the City purchase properties at ends of cul-de-sacs and crescents to demolish are replace with connections to nearby streets to improve permeability? Is it

worthwhile encouraging intensification by adding structures to the back and front yards of suburban houses, or should low-density neighbourhoods be fully removed and rebuilt from scratch? Other areas that have not been examined include large shopping malls and regional 'power centres' which place large big-box stores around a central parking lot. These sites could be either rebuilt or adaptively repurposed.

There exist numerous factors that could be analyzed concerning the future suburban growth of Calgary. However, one thing for certain is that the time to act on building a better Calgary is now. Calgary is arguably one of the richest cities in one of the richest countries per capita in the world, and it prides itself on its business ambitions and entrepreneurial spirit. It should demonstrate its capacities with forward-thinking, sustainable development. There is no excuse for its typical pattern of growth to be modeled after 1960s era planning principles. The mechanisms and policies are in place, and the current municipal government is largely in favour of more a more compact and sustainable form of suburban development. Existing precedents provide some directions for future development and have shown that better designed neighbourhoods are popular with Calgarians. More importantly, Calgarians are in favour too. In a recent poll, Angus Reid asked Calgarians how they would most prefer commuting to work from their 'ideal' neighbourhood. The top result was 'walking'. Clearly, the auto-oriented mindset of the city is changing. Mixed-use, higher density developments have recently proven to be highly successful and economical, and will meet the needs of the changing population. Like all cities, Calgary must evolve to thrive, and this evolution must take root at home, in the suburbs.

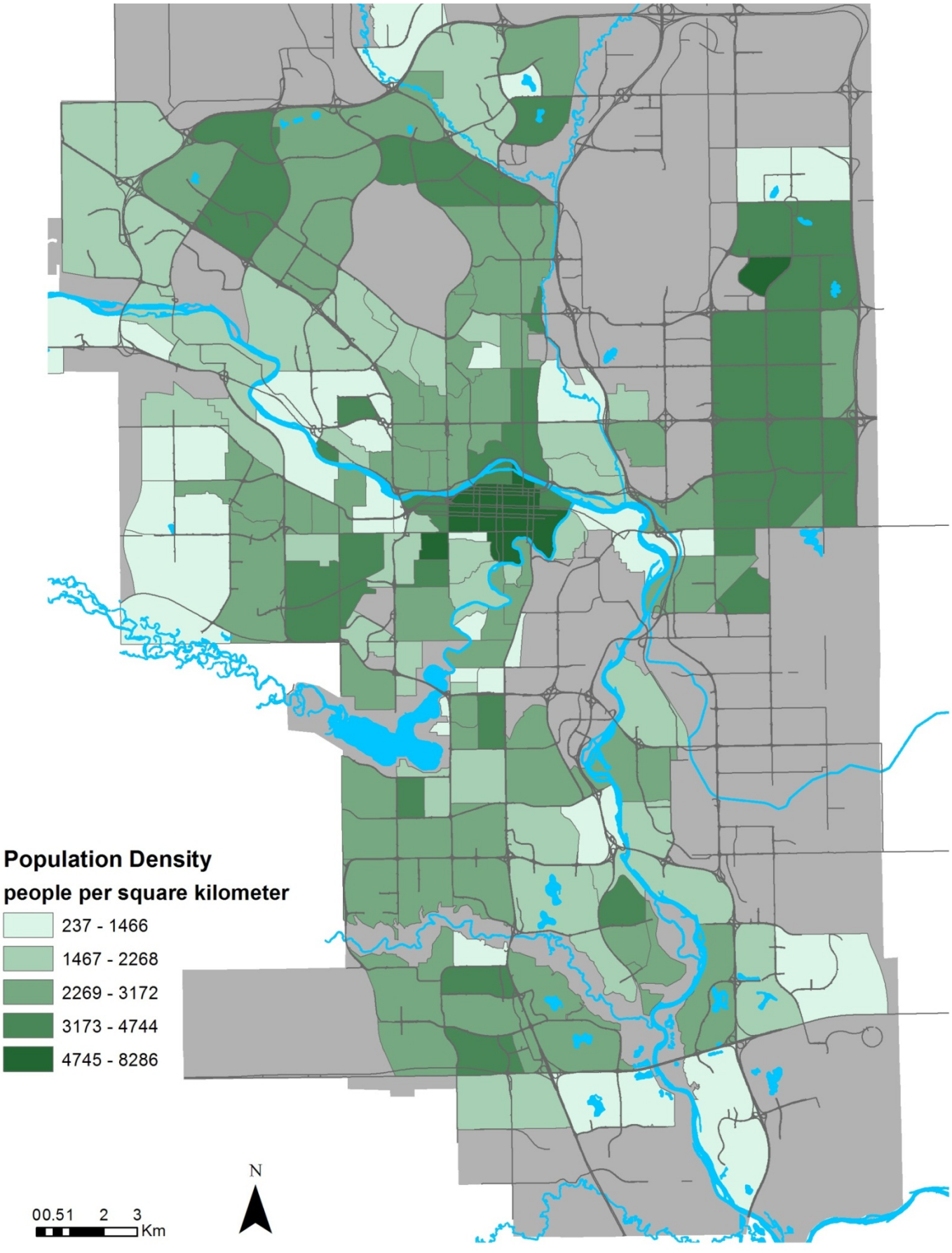
APPENDICIES

A - Calgary Residential Communities

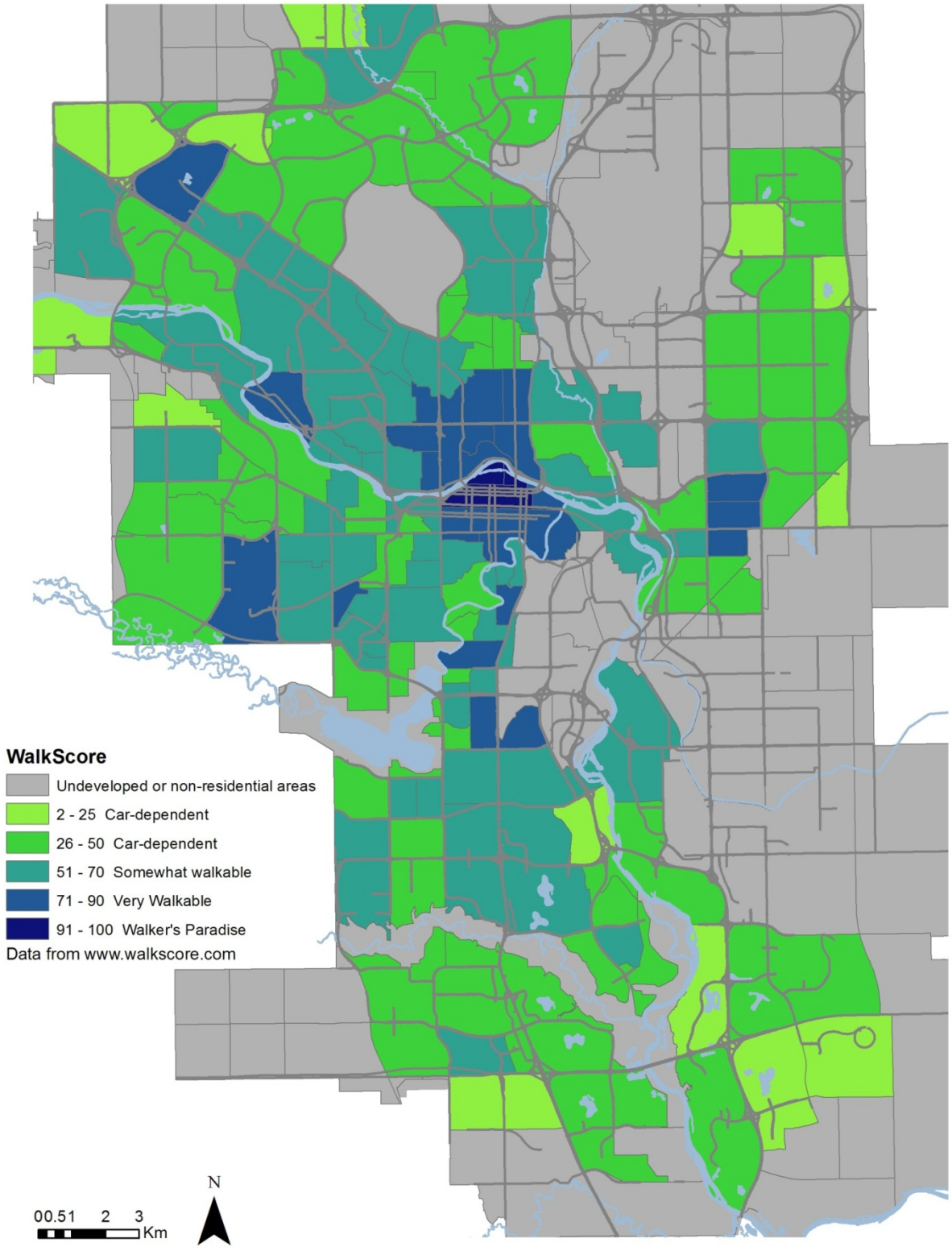


1 Abbeydale
2 Acadia
3 Albert Park/Radisson Heights
4 Altadore
5 Applewood
6 Arbour Lake
7 Aspen Woods
8 Auburn Bay
9 Banff Trail
10 Bankview
11 Bayview
12 Beddington Heights
13 Bel-Aire
14 Beltline
15 Bonavista Downs
16 Bowness
17 Braeside
18 Brentwood
19 Bridgeland/Riverside
20 Bridlewood
21 Britannia
22 Cambrian Heights
23 Canyon Meadows
24 Capitol Hill
25 Castleridge
26 Cedarbrae
27 CFB Currie
28 CFB Lincoln Park PMQ
29 Chaparral
30 Charleswood
31 Chinatown
32 Chinook Park
33 Christie Park
34 Citadel
35 Cliff Bungalow
36 Coach Hill
37 Collingwood
38 Copperfield
39 Coral Springs
40 Cougar Ridge
41 Country Hills
42 Country Hills Village
43 Coventry Hills
44 Cranston
45 Crescent Heights
46 Crestmont
47 Dalhousie
48 Deer Ridge
49 Deer Run
50 Diamond Cove
51 Discovery Ridge
52 Douglasdale/glen Estat
53 Dover
54 Downtown Commercia Core
55 Downtown East Village
56 Downtown West End
57 Eagle Ridge
58 Eau Claire
59 Edgemont
60 Elbow Park
61 Elboya
62 Erin Woods
63 Erlton
64 Evanston
65 Evergreen
67 Falconridge
68 Forest Heights
69 Forest Lawn
70 Glamorgan
71 Glenbrook
72 Glendale
73 Greenview
74 Greenwood/Greenbriar
75 Hamptons
76 Harvest Hills
77 Hawkwood
78 Haysboro
79 Hidden Valley
80 Highland Park
81 Highwood
82 Hillhurst
83 Hounsfield Heights/Briar Hill
84 Huntington Hills
85 Inglewood
86 Kelvin Grove
87 Killarney/Glengarry
88 Kincora
89 Kingsland
90 Lake Bonavista
91 Lakeview
92 Legacy
93 Lincoln Park
94 Lower Mount Royal
95 Macewan Glen
96 Mahogany
97 Manchester
98 Marlborough
99 Marlborough Park
100 Maple Ridge
101 Martindale
102 Mayfair
103 Mayland Heights
104 McKenzie Lake
105 McKenzie Towne
106 Meadowlark Park
107 Midnapore
108 Millrise
109 Mission
110 Monterey Park
111 Montgomery
112 Mount Pleasant
113 New Brighton
114 Nolan Hill
115 North Glenmore Park
116 North Haven
117 North Haven Upper
118 Oakridge
119 Ogden
120 Palliser
121 Panorama Hills
122 Parkdale
123 Parkhill/Stanley Park
124 Parkland
125 Patterson
126 Penbrooke Meadows
127 Pineridge
128 Point Mckay
129 Pump Hill
130 Queens Park Village
131 Queensland
132 Ramsay
135 Redstone
136 Renfrew
137 Richmond
138 Rideau Park
139 Riverbend
140 Rocky Ridge
141 Rosedale
142 Rosemont
143 Rosscarrock
144 Roxboro
145 Royal Oak
146 Royal Vista
147 Rundle
148 Rutland Park
149 Saddle Ridge
150 Sage Hill
151 Sandstone Valley
152 Scarboro
153 Scarboro/Sunalta West
154 Scenic Acres
157 Shawnee Slopes
158 Shawnessy
159 Sherwood
160 Signal Hill
161 Silver Springs
162 Silverado
163 Skyview Ranch
164 Somerset
165 South Calgary
166 Southview
167 Southwood
168 Springbank Hill
169 Spruce Cliff
170 St. Andrews Heights
171 Strathcona Park
172 Sunalta
173 Sundance
174 Sunnyside
175 Taradale
176 Temple
177 Thorncliffe
178 Tuscany
179 Tuxedo Park
180 University Heights
181 University of Calgary
182 Upper Mount Royal
183 Valley Ridge
184 Varsity
185 Vista Heights
186 Walden
187 West Hillhurst
188 West Springs
189 Westgate
190 Whitehorn
191 Wildwood
192 Willow Park
193 Windsor Park
194 Winston Heights/Mountview
195 Woodbine

B. Calgary Residential Densities



C. Walkscore of Calgary Residential Communities



REFERENCES

Alaniz Uribe, F. & Sandalack, B. (2011): Neighbourhood Design and Vehicle Travel. As presented in *18th International Seminar on Urban Form*

Alberta Municipal Affairs. (2012): *The Development of Local Government in Alberta.* The Government of Alberta. Accessed online at http://www.municipalaffairs.alberta.ca/am_The_Development_of_Local_Government_in_Alberta.cfm

Analytic Hierarchy Process Chart. Retrieved online April 24, 2012 at http://upload.wikimedia.org/wikipedia/commons/6/60/AHPHierarchy1.1.png

Anselin, L. & Arias, E. (1982). A multi-criteria framework as a decision support system for urban growth management applications: Central city redevelopment. *European Journal of Operational Research* 13: 300-309

Arendt, R. (1994) *Rural By Design: Maintain Small Town Character*. Chicago: Planners Press

Bablin, T. (2012, January 21): *Community Amenities in Your Neighbourhood.* The Calgary Herald. Accessed online at http://blogs.calgaryherald.com/2012/01/27/how-to-interpret-our-data-about-amenities/

Bay Area Economics & Urban College, Inc. (2005): *Analysis of Incentives to Encourage Investment in Underserved Areas.* Accessed online at http://www.investatlanta.com/econoDev/PartQ-AppendixC.pdf

Bentley, I. Alcock, A. Murrain, P. McGlynn, S. & Smith, G. (1985): Introduction to *Responsive Environments.* London: Architectural Press

Bourne, L. (1987): Evaluating the Aggregate Spatial Structure of Canadian Metropolitan Areas. The Canadian Geographer, 31: 194-208

Bourne, L. (1992): Population turnaround in the Canadian inner city: contextual factors and social consequences. *Canadian Journal of Urban Research, 1*(1), 67-89.

Bourne, L. (1996). *Reurbanization, uneven urban development, and the debate on new urban forms*. Urban Geography. 17:8, 690-713

Bruecknew, J. (2001) *Urban Sprawl: Lessons from Urban Economics.* From Brookings-Wharton Papers on Urban Affiars. Eds. Bruecknew, J, Mills, E., and Kremer, M. Washinton, DC: Brookings Institution Press

Bruegmann, R. (2005): *Sprawl: A Compact History.* Chicago: University of Chicago Press

Bryan, N. (January 11, 2012): *The American Elm.* The Calgary Herald. Accessed online at http://blogs.calgaryherald.com/2012/01/11/wednesday-january-11-2012-the-american-elm/

Bunting, T. & Fillion, P. (1999): Dispersed City Form in Canada: A Kitchener CMA Case Example. Canadian Geographer, 43: 268-287

Burchell, R. (2005): *Sprawl Costs.* Washington DC: Island Press

The Calgary Herald. (February 28, 2009): *Calgary, as the dreamers saw it.* The Calgary Herald. Accessed online at http://www2.canada.com/calgaryherald/news/story.html?id=77ab7b3a-2819-443d-abb3-db9dba5b9bad&p=1

The Calgary Herald. (2012): *Data Centre.* Accessed online at http://www.calgaryherald.com/news/data-centre/index.html

Canada Mortgage and Housing Corporation. (2012). *The Fused Grid: A Neighbourhood and District Layout Model.* Accessed online at http://www.cmhc-schl.gc.ca/en/inpr/su/sucopl/fugr/index.cfm

Carmona, M., Heath, T., Oc, T., & Tiesdell, S. (2003) *Public Places, Urban Spaces: The Dimensions of Urban Design.* Oxford, Burlington: Architecture Press

CBC (2011). *City eyes higher fees for urban sprawl.* Retrieved online April 22, 2012 at http://www.cbc.ca/news/canada/calgary/story/2011/04/15/calgary-development-costs-council.html

CBC (2012). *Calgary Area Growth Exceeds National Average.* Retrieved online April 10 at http://www.cbc.ca/news/canada/calgary/story/2012/02/08/calgary-census-growth-cp.html

Cervero, R. (2004): *Transit-oriented Development in the United States: Experiences, Challenges and Prospects*. TCRP Report 102. Transportation Research Board of the National Academies

The City of Calgary. (2012). *The City of Calgary – Calgary Transportation Plan*. The City of Calgary

The City of Calgary. (2012). *The City of Calgary – Municipal Development Plan*. The City of Calgary

The City of Calgary. (1970). *The City of Calgary General Plan.* The City of Calgary Planning Department

The City of Calgary, (2012). *Community Social Statistics: Southwood.* The City of Calgary

The City of Calgary, (2010). *Developed Areas: Growth and Change.* The City of Calgary

The City of Calgary (2012). Framework for Growth and Change: Prioritization, *Planning, Development & Assessment Department Report to the SPC on Planning and Urban Development.* PUD2012-08. The City of Calgary

The City of Calgary. (2012). Managing Calgary's Trees. *Accessed online at http://www.calgary.ca/CSPS/Parks/Pages/Planning-and-Operations/Tree-Management/Managing-Calgarys-trees.aspx*

The City of Calgary, (2004). *Transit-Oriented DevelopmentBest Practices Handbook*. The City of Calgary

The City of Calgary. (2005). *Transit-Oriented DevelopmentPolicy Guidelines.* The City of Calgary

Cohen, J. (2007). Book Reviews. *Journal of Planning Literature.* 21, 387

Corner, J. (1999): Recovering Landscape : Essays in Contemporary Landscape Architecture. New York, NY: Princeton Architectural Press.

Corner, J. (2006) Terra Fluxus. *The landscape urbanism reader.* Princeton Architectural Press: NewYork: NY

Davies, W.K.D. (1997): Sustainable Development and Urban Policy: Hijacking the Term in Calgary. GeoJournal, 43: 359-369

Damiani,R. & Tsenkova, S. (2008): *Planning Sustainable Suburban Communities in Calgary: Evaluation and Reporting Framework.* Faculty of Environmental Design, University of Calgary.

Downs, A. (1992). *Stuck In Traffic.* Washington, DC: The Brookings Institution

Downs, A. (2004). *Still Stuck in Traffic.* Washington, DC: The Brookings Institution

Dunham-Jones, E. & Williamson, J. (2011): *Retrofitting Suburbia.* Hoboken, NJ: John Wiley & Sons

Evenden, L. J., & Walker, G. E. (1993). From periphery to centre: the changing geography of the suburbs. In L. S. Bourne & D. F. Ley (Eds.), *The changing social geography of Canadian cities* (pp. 234-251). Montréal: McGill-Queen's University Press.

The Financial Post. (2012): *The TIF tiff*. The National Post. Accessed online at http://www.financialpost.com/story.html?id=4b5a53fe-22a3-4301-8720-4099691f369e&k=13585

Fillion, P. (2003): Towards Smart Growth? The difficult implementation of alternatives to urban dispersion. *Canadian Journal of Urban Research*, 12, 1

Flissig, W. & Jacobsen, V. (2002): Smart Scorecard for Development Projects. Congress of the New Urbanism

Florida, R. (2008): *Who's Your City?.* Toronto, ON:Random House.

Foran, M. (1978): *Calgary: An Illustrated History.* Calgary, AB: James Lorimer Ltd.

Foran, M. (2009): *Expansive Discourses: Urban Sprawl in Calgary 1945-1978.* AU Press: Edmonton

Fortin, A., Després, C., $ Vachon, G. (2001): The suburb as heritage: food for thought. *Heritage. 41*(4), 26-28

Fowler, E. (2007): *Heritage in the 'Burbs: how to make suburbs a lasting legacy.* Alternatives Journal. July-August 2007

Frumkin, H. (2002). Urban Sprawl and Public Health. Centers for Disease Control and Prevention. 117. Retrieved from www.cdc.gov/healthyplaces/articles/Urban_Sprawl_and_Public_Health_PHR.pdf

Genstar (2011) *Walden Architectural Guidelines.* Accessed online at http://www.genstar.com/public/documents/48/architectural_guidelines_residential.pdf

Geoghagen, J. (2002): The value of open spaces in residential land use. *Land Use Policy.* 19: 91-98

Giles-Corti, B. (2005): Increasing walking: How important is distance to, attractiveness, and size of public open space?. *American Journal of Preventative Medicine.* 28: 169-176

Gordon, P. & Richardson, H.W. (2001): The sprawl debate: let markets plan. *The Journal of Federalism.* 31(3), 131-149

Groth, P. (1997): Frameworks for Cultural Landscape Study. In (Eds.) Groth, P. & Bressi, T. *Understanding Ordinary Landscapes.* 1-25. Ann Arbour, MI: Edward Brothers, Inc.

Harris, R. (2004): *Creeping Conformity: How Canada Became Suburban 1900 – 1960.* Baltimore: John Hopkins Press

Howard, E. (1965): *Garden Cites of To-morrow.* The M.I.T. Press: Cambridge

Jacobs, J. (1961): *The Death and Life of Great American Cities.* New York, NY: Random House

Johnson, L. (2006): Style Wars: revolution in the suburbs? *Australian Geographer.* 37:2

Joyce Marrow, E. (1979): *Calgary, Many Years Hence*. Calgary, AB: The University of Calgary

Klemanski, (1990): Using Tax Increment Financing for Urban Redevelopment Projects. *Economic Development Quarterly.* 4:1, 23-28

Kuo, F. Bacaicoa, M. & Sullivan, W. (1998) Transforming Inner-City Landscapes : Trees, Sense of Safety, and Perception. *Environment and Behavior.* 30: 20

Lortie, A. (2004). Montréal 1960: the singularities of a metropolitan archetype. In A. Lortie (Ed.), *The 60s: Montréal thinks big* (pp. 75-115). Montréal / Vancouver: Canadian Centre for Architecture / Douglas & McIntyre.

Luka, N., & Trottier, L. (2002). In the burbs: It's time to recognise that suburbia is a real place too. *Alternatives,* 28(3). 37-38

Lynch, K. (1960): *The Image of the City.* The M.I.T. Press: Cambridge, MA

Lynch, K. (1981): Dimensions of Performance. In *Good city form.* The M.I.T. Press: Cambridge, MA

McCann, L. (1999): Suburbs of Desire: The Suburban Landscape of Canadian Cities, c. 1900-1950. In R. Harris and P.J. Larkham (Eds.), *Changing Suburbs: Suburban Foundation, Form and Function* 111-145. London: E. & F.N. Spon

McCann, L. (2006): A regional perspective on Canadian suburbanization: Reflections on Richard Harris' 'Creeping Conformity'. *Urban History Review.* 35(1), 32-45

McGarrigle, C. (April 24, 2008): *Futures Past.* Avenue Magazine. Accessed online at http://www.avenuecalgary.com/articles/page/item/futures-past

McHarg, I. (1969) *Design With Nature.* The Conservation Foundation: Washington, DC

Moudon, A.V. (1997): Urban Morphology as an Emerging Interdisciplinary Field, Urban Morphology, 1:3-10

Nenshi, N. (2010): Better Ideas. Accessed online at http://www.nenshi.ca/new/2010/159

Nenshi, N. (2011). *Paying for growth-Council decides to up development levies*. Retrieved online April 21, 2012 at http://blog.calgarymayor.ca/2011/05/paying-for-growth-council-decides-to-up.html

The New York Times, (2011): *Outside Cleaveland, Snapshots of Poverty's Surge in the Suburbs.* Accessed online at http://www.nytimes.com/2011/10/25/us/suburban-poverty-surge-challenges-communities.html

Perry, C. (1998): *The Neighbourhood Unit from the regional survey of New York and its environs. Volume VII: Neighbourhood and Community Planning* (1929). London: Routledge

Province of Alberta. (2010): *Municipal Government Act: Revised Statutes of Alberta 2000 Chapter M26.* Province of Alberta. Accessed online at http://www.qp.alberta.ca/documents/Acts/m26.pdf

Rhees, S. (1995). Community Design. *Journal of the American Planning Association,* 61(3), 397

Sandalack, B. & Nicolai, A. (2006): *The Calgary Project: urban form/urban life.* Calgary, AB: University of Calgary Press

Soule, D. (2006): *Urban Sprawl: A Comprehensive Reference Guide.* Westport, CT: Greenwood Press

Southworth, M. & Ben-Joseph, E. (1997): *Streets and the Shaping of Towns and Cities.* Washington, DC: Island Press

Southworth, M. & Owens, P. (1993): The Evolving Metropolis. *Journal of the American Planning Association,* 59: 271-287

Statistics Canada. (2012): Population and dwelling counts, for Canada, provinces and territories, and census subdivisions (municipalities), 2011 and 2006 censuses. *Statistics Canada.* Accessed online at http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/hlt-fst/pd-pl/Table-Tableau.cfm?LANG=Eng&T=302&SR=1&S=9&O=D&RPP=9999&PR=48

Swanson, K. (2009): Suburbanization in the US. In Swanson. K, *Kaplan AP Human Geography.* New York, NY: Kaplan Publishing

Talen, E. (1999): Sense of Community and Neighbourhood Form: An Assessment of the Social Doctrine of New Urbansim. *Urban Studies.* 36:8, 1361-1379

Taylor, Z. & Burchfield, M. (2010): *Growing Cites: Comparing urban growth patterns and regional growth policies in Calgary, Toronto and Vancouver.* Toronto, ON: The Neptis Foundation

Transportation Research Board. (2008): TCRP Report 128: Effects of TOD on Housing, Parking and Travel. Washington, DC: Transportation Research Board

Turcotte, M. (2008): *The City/Suburb Contrast: How can we measure it?* Retrieved from http://www.statcan.gc.ca/pub/11-008-x/2008001/article/10459-eng.htm

University of Calgary. *Canadian Architectural Archives – The Mawson Plan.* Accessed online at http://caa.ucalgary.ca/mawsonreportfull

Vachon, G., Luka, N., & Lacroix, D. (2004): Complexity and contradiction in the aging early postwar suburbs of Quebec City. In (Eds.) Stanilov, K., & Case Scheer, B. *Suburban Form: An International Perspective*, 38. New York, NY: Routledge

Walkscore. Accessed online at www.walkscore.com, May 25, 2012

Waymark, J. (2009):*Thomas Mawson: Life, gardens and landscapes.* London: Frances Lincoln Ltd.

Wheeler, S. (2008): The Evolution of Built Landscapes in Metropolitan Regions. Journal of Planning Education and Research, 27: 400-416

White, R. (Jan. 9, 2011): Hidden density seen as good idea. *The Calgary Herald.* www2.canada.com/calgaryherald/news/newcondos/story.html?id=5597fe5e-51e0-4b74-89b8-7307d375f33a

Wolf, K. (2008): *Community Context and Strip Mall Retail.* Transportation Research Record: Journal of the Transportation Research Board. 2060, 95-103

IMAGE CREDITS

1 Patrick Saunders
2 Patrick Saunders
3 urbanlandscapes.info
4 Glenbow Archives - ND-8-252
5 Glenbow Archives - NA-205-1
6 Glenbow Archives - NA-1041-14
7 Glenbow Archives - NA-7-3487-90
8 Glenbow Archives - NA-769-167
9 Glenbow Archives - NA-2032-4
10 Glenbow Archives - NC-50-25
11 Google Street View
12 Glenbow Archives - NA 2018-2
13 Glenbow Archives - NA-3766-4
14 Glenbow Archives - NA-3766-6
15 Calgary.ca
16 Glenbow Archives - NA-5393-6
17 Glenbow Archives - NC-78-101
18 Glenbow Archives - Poster-61
19 Glenbow Archives - NA-2864-459-1
20 Patrick Saunders
21 Calgary.ca
22 Google Street View
23 Glenbow Archives - NA-5093-558
24 Glenbow Archives - M-8787-243
25 Google Maps
26 Google Street View
27 Patrick Saunders
28 NA-2864-1283A-1
29 Google Street View
30 Glenbow Archives - NA-5093-780
31 Google Street View
32 Patrick Saunders
33 Calgary.ca
34 Calgary.ca
35 Google Street View
36 Patrick Saunders
37 Patrick Saunders
38 Patrick Saunders
39 Glenbow Archives - NA-2864-1280-6D-8
40 Patrick Saunders
41 Glenbow Archives - NA-5600-8032b
42 Patrick Saunders
43 Glenbow Archives NA-2864-1141B-1
44 Patrick Saunders
45 Patrick Saunders
46 Glenbow Archives - NA-5654-348
47 Patrick Saunders
48 Google Street View
49 Patrick Saunders
50 Google Street View
51 Patrick Saunders
52 Patrick Saunders
53 goodwillalberta.wordpress.com
54 Glenbow Archives - NA-5654-1
55 Patrick Saunders
56 Patrick Saunders
57 Patrick Saunders
58 Patrick Saunders
59 Patrick Saunders
60 Patrick Saunders
61 Patrick Saunders
62 Patrick Saunders (base map from bing,com)
63 calgaryrealestatereview.com
64 http://upload.wikimedia.org/wikipedia/commons/6/60/AHPHierarchy1.1.png
65 Calgary.ca
66 Patrick Saunders (base map from bing,com)
67 Patrick Saunders
68 Google Street View
69 Patrick Saunders
70 Patrick Saunders
71 Calgary, Now and Then http://www.ourroots.ca/e/toc.aspx?id=1203
72 Calgary, Now and Then http://www.ourroots.ca/e/toc.aspx?id=1203
73 Patrick Saunders
74 Patrick Saunders
75 Glenbow Archives - NA-4476-626
76 Patrick Saunders
77 Patrick Saunders
78 Patrick Saunders
79 Patrick Saunders
80 Patrick Saunders
81 Patrick Saunders
82 Patrick Saunders
83 Patrick Saunders
84 Patrick Saunders
85 Patrick Saunders
86 Patrick Saunders
87 Patrick Saunders
88 Patrick Saunders
89 Cole Birkett
90 Cole Birkett
91 Patrick Saunders
92 Patrick Saunders
93 Patrick Saunders
94 Patrick Saunders
95 Patrick Saunders
96 Patrick Saunders
97 Patrick Saunders
98 Glenbow Museum NA-5654-407
99 Patrick Saunders
100 Patrick Saunders
101 Google Street View
102 Patrick Saunders
103 Patrick Saunders
104 Patrick Saunders
105 Patrick Saunders