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The Causes and Consequences of School Closures in Inner-City Calgary

Abstract During the early decades of the 2000s, eleven schools closed in Calgary's established neighbourhoods, due to declining enrolment or outdated infrastructure. The loss of a school is often devastating to a community and can lead to further population decline. A research project was commissioned by the government to investigate the causes and consequences of school closures and to make recommendations, particularly related to urban form, to address the issues. Analysis of the 500 sq km study area included historic evolution of urban form, schools mapping and data analysis, development of a typology of school buildings and grounds, mapping of school inter-relationships and closures, review of school board practices and policies, and precedent studies. A case study of the catchment area of one high school included historic evolution of urban form factors, mapping of the network of feeder schools, analysis of neighbourhood and schools socio-demographics, and a review of school program changes. The causes of school closures relate to a combination of city development processes, neighbourhood lifecycles, neighbourhood types, infill and densification processes, housing types, school sizes and building types, socio-demographic factors influencing school choice, and school board policies, and the consequences affect neighbourhoods and communities.

Keywords Schools, School closures, Neighbourhood types, Urban adaptation and evolution.

Introduction

The loss of a school is often devastating to a community. During the early decades of the 2000s, eleven schools closed in the city of Calgary's established neighbourhoods, due to declining enrolment or outdated infrastructure, and the Calgary Board of Education recently announced planned closures of another twenty-two over the next decade (Ferguson 2022).

Schools are both an educational institution and a community resource; they are much more than bricks and mortar. They provide space for extra-curricular activities, sports and physical recreation; form an important part of the urban structure and identity (Lynch 1981; Jacobs 1961) and can be seen as indicators of community vitality and sustainability as they influence where families choose to live and invest their taxes (Lytton 2011). Other recent research on health and the built environment (Saelens et al. 2003; Sandalack, Alaniz Uribe 2011, Trapp et al. 2012) suggests that neighbourhood schools, among other community services and amenities, provide needed opportunities for physical activity, especially walking and biking, for school-aged children. Perhaps no other institution functions so well as a community hub than the local school and it is therefore understandable why school closures can often be disturbing to communities, families and students, and divisive to society.

Background

The city of Calgary, located in western Canada, currently has a population of just over 1.3 million, and is served by public (245), private (71), separate/Catholic (118), charter (9), francophone (8) and provincial (2) schools and administered by Boards, all of which fall under the jurisdiction of the Government of Alberta's Ministry of Education. Figure 1 shows school locations as of 2017. The system of Calgary schools had a total capacity of 124,502 students and an enrolment of 100,225, or 81% at the time of this research. The Ministry of Education considers schools with enrolments under 85% as not fully utilized and because the funding model for education in Alberta is based on student numbers, any school below threshold is scrutinized by the Boards, as they manage a finite system with finite resources.

Boards cannot wait for a neighbourhood population to rebound, or for new developments to add additional population, so schools may be closed or modified according to current and short-term projections, rather than longer term urban processes Figure 2 shows the locations of school closures as of 2017. Once a school is closed,

it is then difficult to attract a supportive population and to re-open. (Note: schools data and census information is replicated in this paper from the 232 page full report (Sandalack, Alaniz Uribe 2017); the complete list of individual specific references, data and mapping is contained in that document and is too lengthy to be included here).

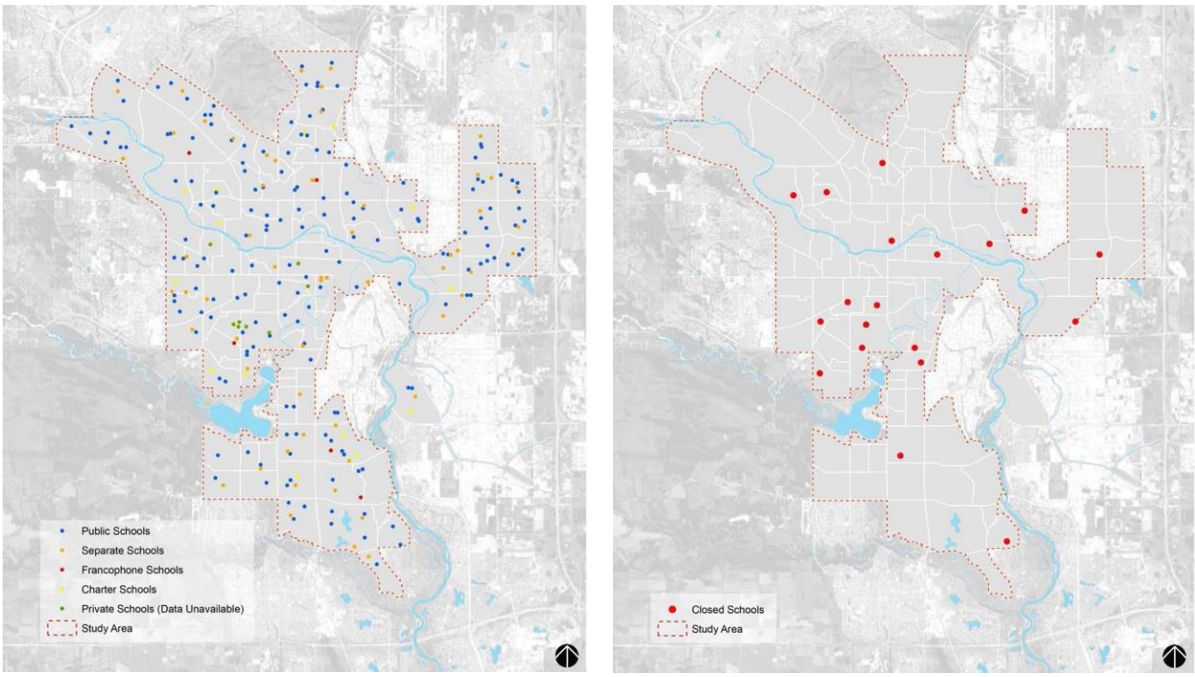

Figure 1. All Calgary schools and **Figure 2**. All school closures show the distribution throughout the city (2017)
Source : author's own work.

Closures typically occur when a school's enrolment falls below a certain threshold or when the school infrastructure is no longer seen to be cost-effective. Although this could be viewed as a simple cause and effect relationship, with a practical and expedient solution, the issue of school closure is much more complex, arising from a constellation of many factors which should be considered in order to understand if current practices and policies need to be modified or replaced.

Most closures occur in mature and established communities, where the schools are a long-standing part of the visual and functional environment, and the impact there can be profound. Older and smaller schools in the inner areas of the city are particularly vulnerable, as demographics shift and as these older schools are not seen to be able to provide the opportunities for contemporary programming that new schools often do. News of an impending school closure promotes anxiety and a strong emotional response, however it may not necessarily be the loss of the school that has the greatest impact, but the loss of the population that precipitated the closure as well as the viability of other community services and amenities and commercial activities (Egelund, Laustsen 2006).

The closure of a school may be a sign of a community in change or decline, or a symptom of a longer-term evolutionary process of a city or region, or it may be a cause of community depopulation. Despite urban planning policies and initiatives to stimulate population growth in mature and established neighbourhoods and increase density through infill and redevelopment, population resurgences are slow and unpredictable. Compounding all of this, household sizes have declined in recent decades and the population may never return to the earlier high point, even with revitalisation.

The Ministry of Education contracted the Urban Lab research group at the University of Calgary to examine the causes and consequences of de-population of urban schools and to propose mitigation strategies and recommendations in order to support the various roles of schools. The project involved research on the urban form factors as well as the administrative and decision-making context regarding schools in the inner-city areas of both Calgary and Edmonton, Alberta's two largest cities; this paper focuses on the urban morphological factors in the Calgary context.

These factors involve topics of neighbourhood process and form (including neighbourhood life cycles, neighbourhood types and various planning practices) and school process and form (including school building life cycles, school building types and opportunities for alternative uses of school buildings).

Other factors such as decision-making and administrative processes and policies (involving the various agencies and organizations involved in school system organization and school closures) and the factors influencing school choice (such as reputation, rankings, location and walking/transportation options), although examined in the project, will only be referred to here in terms of their relevance to the urban form factors.

Methodology

Although there is a growing body of research regarding school closures in the United States (including Burdick-Will et al. 2013; Cohen 2006; Colton, Frelich 1979) and the United Kingdom (Barakat 2015) there has been much less dealing with the Canadian context (some exceptions are Irwin, Seasons 2012; Spencer 2013). The American literature is helpful in some aspects of the work, however there are differences between the economies, bureaucratic structures, school funding models and cultures of Canada and the United States, including their racial and socio-economic situations. As well, few precedents were found of research that combines urban planning, urban process, schools and policies in one comprehensive project.

A multi-disciplinary approach was therefore required, drawing from urban planning, urban design, architecture, policy planning and GIS, and involving multiple methods of analysis and mapping. It also required understanding several social and political systems, including governments at various levels, school boards and communities, as well as the needs of students and their families. Further, as the data was not centrally located and did not include complete historical information, the research involved the assembly of an extensive database from multiple data sets and sources.

Definition of the geographical scope of study

The focus of the research was school closures in the inner, established area of the city, or the neighbourhoods constructed up to approximately the mid 1970s. Calgary's development pattern has generally been one of concentric rings outward from the downtown core. These broad rings reflect various eras that correspond with the economic, social and political context, as well as the prevailing planning practices; each era has characteristic block patterns and spatial organization (described in Sandalack, Nicolai 2006). The early decades of the city's development took the form of expansion on the original grid pattern; this area now comprises what is known as the inner city. Calgary's middle ring of established neighbourhoods consists of a broad band developed during the decades between post World War II 1950s and the mid 1970s, when the city was experiencing one its major expansions and population booms. Beyond this ring is another expanse of neighbourhoods with curvilinear block patterns, a form continuing to the present, but outside the scope of this research. The inner city and the established neighbourhoods constitute the study area, shown in Figure 3.

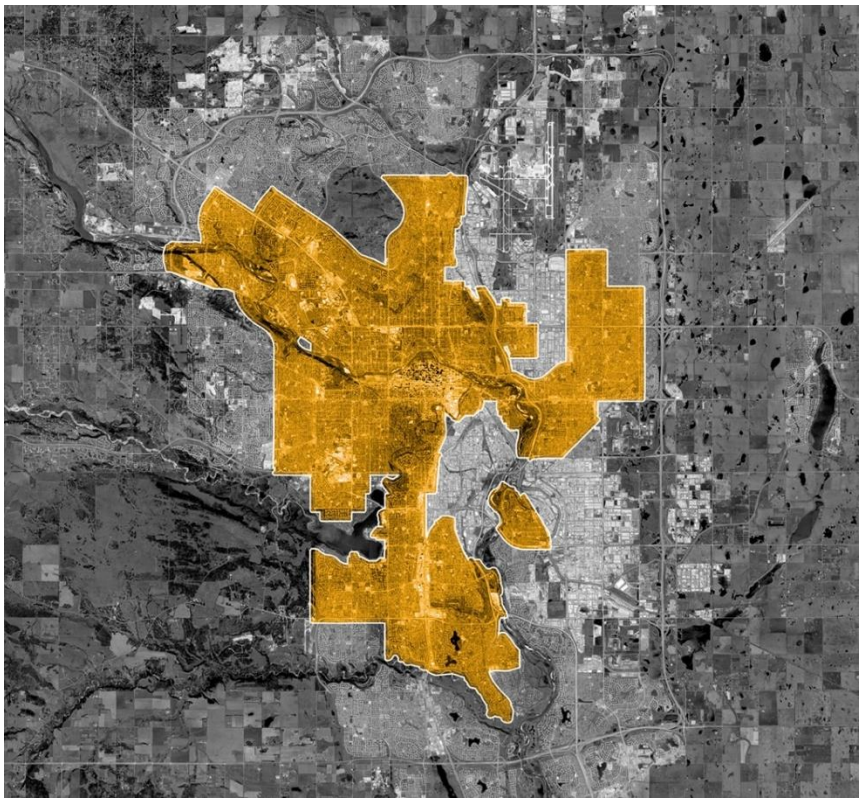

Figure 3. The study area is composed of inner city and established neighbourhoods, an area of 199 sq km. Not included are the more recently constructed neighbourhoods in the outer ring
Source: City of Calgary, 2017.

Multi-scalar analysis

The research involved the simultaneous completion of morphological and spatial studies at various scales and the investigation of various urban form and other factors related to school viability. As the research evolved, the analysis led to a more comprehensive understanding. Three inter-related scales (the study area as a whole, the focus schools catchment area and a case study site) provide a framework for the discussion of the research and for illustrating many of the methods and for discussing the findings and recommendations.

Results and Discussions

The Study Area as a Whole

Analysis of the study area as a whole included historic evolution of urban form, schools mapping and data analysis, mapping of school inter-relationships and closures. One of the main challenges in conducting this research was the assembly of a comprehensive and current database of all schools. The Ministry, various Boards and the Municipalities all maintain their own records, and it took several weeks just to collect and collate those records and to create an inventory geodatabase. The urban schools dataset was geocoded which enabled the schools data and closures to be mapped spatially. The dataset was analyzed in terms of various parameters, including capacity, enrolment, condition, maintenance cost, replacement cost, various demographic measures and median income.

The growth of the city footprint was observed by analysing air photos over time. Schools were mapped as they emerged and were identified by program affiliation (public, separate, charter or private); level (elementary grades K-6, junior high school grades 7–9, senior high school grades 10–12 or a combination). Closures or changes to program or affiliation were noted. Individual maps were generated to illustrate the spatial distribution of the schools, areas where the school systems or catchments overlap, and the relationships between school distribution to population, demographics, income and various urban form factors, such as neighbourhood type. The series of maps was also compiled as a movie in order to present the transformation of the city and the evolution of the schools system as a dynamic graphic.

Neighbourhood design, density and building types can strongly influence a school's viability, desirability and access. Block patterns and neighbourhood planning influence the degree to which a school can serve as a community hub, and also influence how easily accessed a school can be by foot or by bike. With very few exceptions, all Calgary neighbourhoods can be classified as one of the following three types (Sandalack, Nicolai 2006) and are graphically summarized in Figure 4.

Grid Neighbourhoods

This neighbourhood type is characterised by a grid block pattern with 'main street' mixed use commercial streets. These neighbourhoods were produced during the first phase of urban development and now comprise the inner part of the city. The block pattern usually extended and grafted onto the existing grid framework, and the street was considered a public thoroughfare. Many of the land uses (e.g., residential, commercial, office, industry) were mixed, and most neighbourhoods had a commercial main street associated with the streetcar lines and often several corner stores within the neighbourhoods. Parks and open spaces were small scaled, were often associated with schools or churches. Streets usually included treed boulevards and sidewalks on both sides, and no back alleys. Schools in these neighbourhoods often serve as landmarks and as community hubs. Sandalack, Alaniz Uribe and McCormack (2013) calculated the average walkshed of grid neighbourhoods as 3.68 sq km (a walkshed refers to the walkable area available to an individual based, in this case, on an 800 m distance).

Warped Grid Neighbourhoods

This neighbourhood type is characterized by a warped grid (crescents, cul de sacs and curved roads) block pattern with a local shopping centre. They were produced during the second phase of urban development, corresponding to the period of economic growth following World War II and resulting in the 'middle ring' of development. These neighbourhoods consist primarily of single-family housing; many communities were modelled after the neighbourhood unit concept (Perry 1929, reprinted 1998) where the residential area was served by a (typically) central elementary school. Commercial development is in the form of auto-oriented grocery store and strip combinations located at a major intersection. Zoning segregates land uses. The more hierarchical warped grid street pattern was intended to break what had come to be considered as the monotony of the grid, creating a less permeable neighbourhood. Treed boulevards, formerly a typical element of grid street design, were often omitted, so that sidewalks were now directly adjacent to the driving surface, with trees planted on private property and back from the street edge. Although these neighbourhoods were designed with the school at the centre, where it acts as the community focus, there are few other uses nearby this hub area. The average walkshed size was calculated to be 2.93 sq km.

Curvilinear Neighbourhoods

This neighbourhood type is characterized by a curvilinear 'loops and lollipops' block pattern with infrequent strip convenience stores and services. They comprise the broad outer ring of suburbs constructed from approximately the mid-1970s into the present. New neighbourhoods are marketed on some aspect of uniqueness, and this distinction is emphasized by the edges of most new suburbs, which are defined by high-volume collector roads, with huge land buffers on either side. The street patterns result in highly impermeable systems. Sidewalks are often missing from one or both sides of the street. Most do not have back lanes, therefore garages are accessed from the front.

Driveways occupy much of the front lots, resulting in less available space for tree planting. Most schools in these neighborhoods are large structures with broad catchment areas often beyond the local neighbourhoods. The average walkshed size was calculated as 2.15 sq km (almost half that of the average grid neighbourhood walkshed). The study area for this research comprised grid and warped grid neighbourhoods, with only a few anomalies.

Figure 4. Calgary neighbourhoods can be classified (with very few exceptions) into these three types: grid (example shown is Killarney), warped grid (example is Marlborough, and curvilinear (example is Hawkwood). Major roads are shown in bold white, schools in black and school grounds in red
Source: City of Calgary digital base maps, 2017.

Neighbourhood lifecycles

Neighbourhood lifecycles are related to school enrolment patterns; developing neighbourhoods for a single demographic that will mature and age as one cohort means that neighbourhoods will experience more-or-less predictable patterns of establishment, growth, maturation and decline or revitalization (City of Edmonton 2016).

Warped grid neighbourhoods, such as those which will be discussed in the case study below, are particularly vulnerable. They satisfied the demands of the growing population of the post-war era and became havens for families with children. That population has aged, and does not have the same needs, however the neighbourhood form has not evolved along with those changing needs. The schools, parks and open spaces of the original neighbourhoods were designed for families and children and now may not serve the changing demographics.

Residents moving into the neighbourhoods have different expectations regarding house size and type, urban qualities and desirable services and amenities than the original population. This process is occurring in mature and established neighbourhoods and will also ultimately occur in the evolving city edge as those neighbourhoods go through their lifecycles. It is important to attract a demographically mixed population to populate the local schools (and other services and amenities that make neighbourhoods viable and appealing) and to ensure as much as possible that school enrolments do not experience decline once a generation matures.

Many neighbourhoods eventually experience a revitalization however family/household size has declined in recent decades, and the neighbourhood population will never attain the previous level as long as house types remain constant. Although there is a mix of housing types in the grid neighbourhoods, single family housing accounts for most of the land use in the warped grid neighbourhoods. The City of Calgary (2017) aims to add population to established areas to balance the growth in the outer suburbs and improve the viability of institutions such as schools, churches, libraries, stores and other services and amenities. Some of this is to occur through the process of infill, a process by which secondary units in various forms are added to an existing dwelling, increasing density and providing income for the homeowner.

This is a challenge for many reasons. Higher densities are often perceived negatively by residents. Current typical house/lot configurations (where the house is placed in the centre of the lot) make it difficult to add secondary units without demolishing the existing dwelling, and therefore the costs of infill often make these properties less affordable, especially for young families, which is unfortunate since infill needs to happen in a family-friendly way to affect potential school populations. Even when people are attracted to neighbourhoods within the inner

city or established areas, current property prices make this prohibitive as the more affordable houses are located on the evolving city edges, a process that feeds suburban growth.

This research reviewed a typology (City of Calgary 2008) that illustrated, in three dimensions, various infill types, their configuration on the lot, their street presence and other urban form qualities and their effect on population and demographics. All housing types, including, and particularly, multi-family dwellings, should be oriented towards the street and include outdoor spaces suitable for children. This can encourage positive density increases, while accommodating multiple household types.

School Building Typology

School buildings influence the ways teaching and learning take place and they also vary in their physical role within the neighbourhood and in their ability to incorporate alternate uses. School building types as well as building location on the property can impact not only school viability but also the ability to repurpose the building to other uses. Site planning determines the orientation of the school building to the street and the neighbourhood and affects how the school contributes to neighbourhood form, urban quality and walkability.

Every era of Calgary's urban development, in addition to producing distinct neighbourhood types, also has characteristic school buildings and grounds that reflect the planning paradigms as well as the educational philosophies of the period. Not all school types are necessarily suitable for today's standards and expectations (that currently include sustainability, access to natural light and fresh air, access to the outdoors for physical activity and connection to the community). Previous research (e.g. Baker 2012) documented the evolution of school buildings in the United States, and evaluated them in terms of environmental criteria, however there was no comparable study of the Canadian context. A typology was developed for this project and is shown in Figure 5 that considered school building type as well as site planning and urban design factors. Calgary school types were classified according to various parameters and discussed in terms of their potential for repurposing.

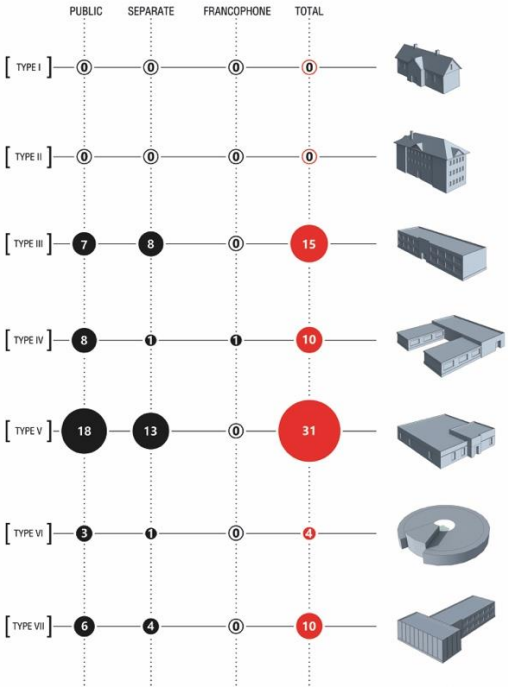

Figure 5. Schools in Calgary correspond to seven types, and their prevalence is indicated by school program. The schools in the study area are only types I – V. Types VI and VII are common in more recent developments
Source : author's own work.

There are several factors affecting how readily school buildings can be repurposed: length of time vacant (long vacancies tend to require more funding to reactivate), condition of roofs and mechanical systems, health of the neighbourhood real estate market, location of the school and its ease of access and visibility, size of the building (the most success is with buildings of approximately 400 sq m, and the greatest difficulty is with buildings over 1000 sq m), and the type of the building (older buildings with their wide hallways and large atria are more conducive to renovation than those from the 1970s and later).

As neighbourhoods age, demand for local schools typically decreases as school-age populations drop, until some form of revitalization occurs. Having the ability to repurpose the school building into another facility for the

community will not only help with the revitalization process but will also keep the site viable for future school needs. Expanding the role of the school beyond the educational needs of children to include other age groups, such as adults and seniors, will add value to the community and could potentially encourage life-long learning.

There are a number of community uses that could be incorporated into schools, such as seniors' housing, social housing and homeless shelters, churches and other religious uses, offices, arts centre, community centre, day-care or technology centres; an extensive precedent study is included in the 2017 report. These alternative uses could be temporary and could help to maintain the school/community hub until the neighbourhood population and school enrolment reach a target level. This could help to address the issue of closures occurring at a low but temporary ebb in the local population.

While there may be some economies of scale with larger schools and with school consolidation, and the ability to offer more courses and specializations than smaller schools, there are also some disadvantages (see Gershenson, Langbein 2015 for a review of the literature, focusing on American schools). Larger schools may lead to a feeling of anonymity in students, and a lack of a sense of belonging. Some research suggests that smaller schools may promote greater academic achievement, especially reading in the elementary levels (Zoda et al. 2011) and that academic achievement tends to decrease as school populations exceed 900. Small schools also tend to have a greater sense of community among the students, parents, and teachers.

Otherwise, determining an optimum school size is difficult as it involves many factors including costs, community support, student needs and contextual issues. The optimum school size in particular circumstances may be more possible to estimate, for example school size between 500 and 900 is believed to be optimum in the Edmonton Catholic School system (Tarulli 2010), however there was no similar estimate provided by the Calgary school boards.

School redevelopment or consolidation plans that are integrated with strong urban design guidelines will help to ensure that school design and site planning contribute to the public realm and have a strong relationship to the street and to the neighbourhood through a legible and accessible entrance, through hard and soft landscape, and through inclusion of windows and other visual permeability. This project also identified many school sites that could be redesigned for more optimum use and ecological performance. If a school is maintained through its maximum lifecycle, then it is possible to plan for its inevitable obsolescence, while keeping it as an important part of the neighbourhood structure and identity.

Focus Schools Catchment Area and the Neighbourhood Scale

A more focused study was done on a representative area and tracing the evolution of the high schools and their catchments, using air photos, city plans, historic fire insurance maps, Calgary Board of Education documents and Alberta Ministry of Education and Alberta Infrastructure documents. The study began with Calgary's first schools Central High and Western Canada High School and their associated Junior High Schools and Elementary Schools in the Public School System and then focused on the catchment area of Viscount Bennett Senior High School as the city expanded. This allowed us to document the origins of the Calgary school system as a smaller centralized system and its transition to a multi-school system serving a wedge-shaped area extending outward from the city core. A similar case study was done with St. Mary's High School for the Catholic Schools within the same geographic area as Central/Western Canada/Viscount Bennett High Schools. Figure 6 shows a tree of the public schools and their relationships.

This part of the analysis also included historic evolution of urban form factors using multiple sources, including air photos, fire insurance and other maps and reports. The network of feeder schools was mapped and was correlated with neighbourhood and schools socio-demographics, school closures, program or affiliation changes and also considered together with major urban developments or road changes.

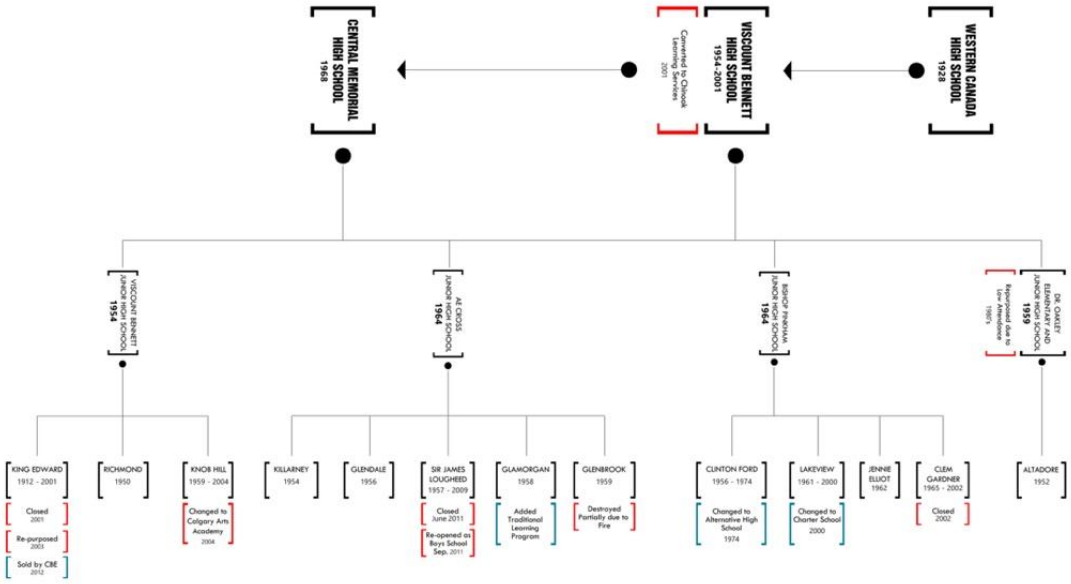

Figure 6. Several elementary schools (grades 1–6) (bottom row) feed into a smaller number of junior high schools (grades 7–9) middle row, which feed into a few high schools (top row). Schools that have been closed are shown in red brackets and schools that have been repurposed are shown in blue
Source : author's own work.

Case Study Redevelopment Scenario

A smaller case study area within the catchment area of these high schools was explored in more detail, shown in Figure 7. It also investigated some possible development scenarios and the effects these might have on population and on potential school enrolment.

The Richmond Road Main Street Corridor was selected for this part of the study. It has been identified by the City of Calgary Main Streets Program (2017) as one of the priority intensification corridors. The City has a goal of achieving a density of 100 people and jobs per hectare for Richmond Road. This is greater than the existing density (62 people and jobs per hectare), and slightly less than existing zoning permits (109 people and jobs per hectare). This emphasis on people as well as jobs is important, as simple increases in population or building coverage do not directly lead to the improvements in urban form or in quality of life. Density goals need to be combined with urban design improvements to lead to higher quality neighbourhoods along with population increases.

Contained within the case study area are several schools. Glamorgan School was studied in more detail. Part of the public school system, Glamorgan was originally built for grades 1–6 to serve the Glamorgan neighbourhood which was planned according to the neighbourhood unit model, with the school at the centre of the predominantly single-family residential community and built between 1958–59. Glamorgan School was fully occupied over the next decades, then experienced declining enrolment as the area went through expected life cycle changes. Glamorgan's enrolment was bolstered by kids from nearby Signal Hill, a new suburb to the west, until that neighbourhood got its own school. Enrolment declined until a traditional K-8 learning program was added around 2010 that enlarged its catchment and increased enrolment.

St. Andrew Elementary Separate School (grades 1–6), located directly beside Glamorgan School, has many duplicate facilities and sports fields. The Glamorgan Community Centre and its sports fields are located directly adjacent to the two schools. There is considerable redundancy and a lack of an overall plan for the three entities and a comprehensive plan that involves sharing facilities was recommended in this study.

This case study scenario also proposed redevelopment of current Municipal Reserve land (MR) in west Glamorgan. This MR site was originally intended as a school site, but was never built on and its current use is as six baseball diamonds. Other uses could be explored for all or part of this land that would serve the community and potentially add population which would subsequently benefit the schools.

In addition to Richmond Road of intensification, we also examined the effects of densification along two other streets (37th Street and 46th Avenue SW), to augment the Richmond Road Main Streets plan. This was intended to provide a more comprehensive approach of encouraging more land use diversity, encompassing the catchment areas of more schools and adjacent neighbourhoods. These scenarios showed that with the introduction

of appropriate building types and urban design, the area could transition from almost exclusively single-family housing to a medium density mixed-use area that would support local services, amenities and commercial development and be more resilient. These developments could increase the longer-term viability of the local schools and make the neighbourhoods more attractive as places to live.

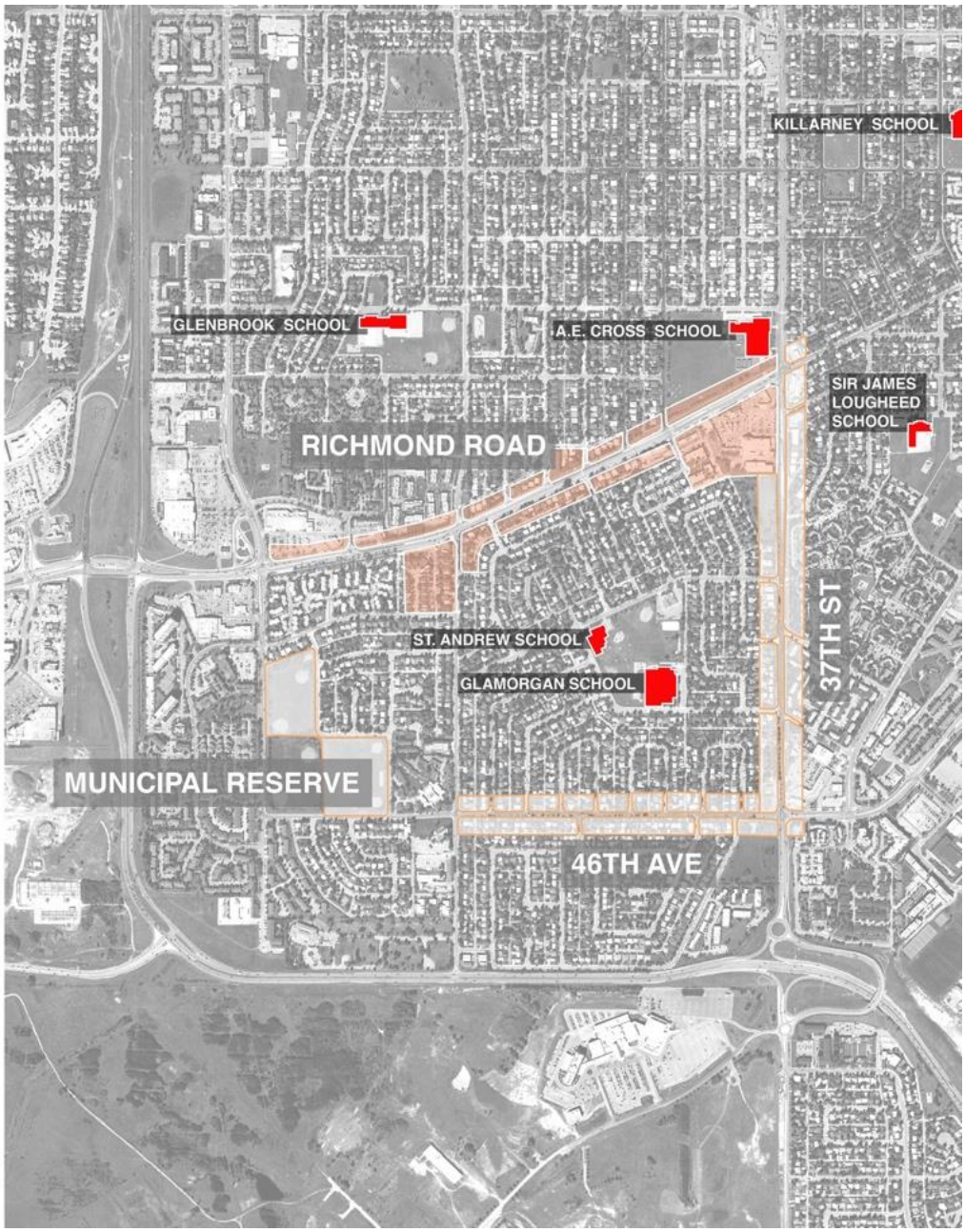

Figure 7. Density increases were proposed for the Richmond Road corridor, 37th Street and 46th Avenue. The Municipal Reserve in the southwest of the case study area is also proposed for a combination of mixed-use and public realm redevelopment. Several schools (shown in red) would benefit from the additional population
Source : author's own work.

Other Findings and Recommendations

The System of Schools

Some of the excess capacity in the current system of schools in Calgary is a factor of school and neighbourhood type and of previous urban planning models. The system of schools was over-built during the post-World War II period, a time when many of the current schools were designed and constructed to respond to a relatively short term population boom, and according to the planning methods of the time. The schools distribution no longer corresponds to neighbourhood density and demographics and should be right-sized, so that the distribution reflects longer-term projections.

The notion of the school as the hub of the community was perhaps strongest during that post-World War II period, so many of the planning principles could still be important. They should also incorporate newer ideas of urban design, including concepts regarding smart growth that advocate for higher densities, mixes of uses, variety of housing type, quality of the public realm and better walkability.

The decisions regarding schools currently do not consider the process of neighbourhood lifecycles, as well as potential redevelopment that could see new population influxes. As well, decisions are made on a school-by-school basis, rather than on a larger district perspective. A larger-scale decision-making model might be able to reflect longer-term urban patterns and allow currently struggling schools to remain open if development proposals indicate that the catchment area population could increase school enrolment to beyond the 85% threshold level. This decision model would require consideration of more than simply enrolment metrics.

There is also a funding priority currently afforded to schools in the developing suburbs of the city. In order to address the growing populations in new neighbourhoods, construction of schools in these areas are typically given higher priority, further disadvantaging mature neighbourhoods whose schools are often in need of modernization. A greater emphasis could be placed on supporting the modernization of schools in mature neighbourhoods through a separate capital fund or prioritizing model, so that mature neighbourhood schools receive comparable funding to developing suburban areas.

Separate School Boards

The Constitution of Canada establishes the right for Protestants or Catholics, whichever is the minority faith population in a community, to establish separate school education. Several provinces have never had separate systems, and others (Manitoba, Quebec, and Newfoundland and Labrador) replaced the original two systems with one secular system. Alberta, Saskatchewan and Ontario still maintain a separate school system, despite having values and populations very different from the time when the separate system was established. Currently in Alberta, it is only Catholics who are recognized to have the right to form a separate system, the only denomination or faith with that right, despite the otherwise multicultural and inclusive nature of Alberta and of Canada.

Alberta's two school jurisdictions operate essentially in parallel and are often in competition for the same students and the same resources. This research highlighted some potential redundancies and overlaps where separate and public schools exist side by side in the same neighbourhoods (for example, Glamorgan School and St. Andrew Elementary described earlier). The current practice of maintaining separate public and Catholic schools, some adjacent to each other with duplicate facilities and grounds, should be reconsidered, an argument made as well by others (Anderson 2017).

Open Boundaries and Choice

There is much variation within the literature in terms of what parents, school boards, students and communities want and need (for example Bell 2007; Finnigan, Lavner 2012; Froese-Germain 2010). There is also a difference between space (the physical geography of community that comes from proximity), and place (the reputation, identity, character and quality of the environment), and differences between the geographically located community (i.e., the neighbourhood) and the community of interest (groups that form around shared interests or associations that may not have physical proximity).

The ability to choose a school, and the availability of options other than public and separate Board schools, is currently available to families. However, this freedom to choose ultimately affects school enrolment and makes it difficult to predict or to plan. When there was a clear and direct relationship between a school and its geographical catchment area, i.e. when kids went to the school in their neighbourhood, it was possible for schools and Boards to predict enrolments, and also possible for parents and kids to know where they would be attending. There are many disadvantages and negative outcomes involved in attending a school outside the neighbourhood, such as transportation costs, environmental effects in terms of pollution, loss of time to commuting and loss of the ability to walk or bike to school. Families with kids attending multiple schools, in different locations and often with different schedules have additional challenges.

Although students will usually and easily form a community in whatever school they attend, it will not necessarily be linked to their home neighbourhood and there are some losses associated with this. The differences between the sense of community and intimacy afforded by smaller neighbourhood schools and the wider potential range of programs offered by larger but usually more distant, schools need to be assessed in more detail and compared according to some carefully considered metrics and values. It is likely that there is a role for both small neighbourhood schools and larger regional schools, where locational decisions can be made for each type. Understanding what a 'right-sized' system is could be helpful in developing this knowledge.

As long as there is the active concept and practice of open boundaries, choice will continue to be influenced by perceptions, school reputations, staffing, programming and other intangibles, making it more difficult for

neighbourhood schools to maintain their role as community hubs. And as long as the current funding model, where funding follows the students, is in place, the processes will likely remain the same.

Neighbourhood Form and Walkability

Previous research (Sandalack, Alaniz Uribe, McCormack 2013; Alaniz Uribe, Sandalack 2015) analysed every neighbourhood in Calgary (n = 230) in terms of the size of the walkshed (the area that a person can comfortably cover on foot within a given time), as well as the quality of the urban form of that walkshed. This was later expanded to focus on the experience of children and the walkshed size was revised to be the area that a child can comfortably walk in fifteen minutes (Sandalack, Alaniz Uribe 2015).

Walking is the simplest mode of physical activity for most people, especially children, and the degree to which an environment allows or encourages walking can be related to certain health measures, such as obesity, diabetes and cardiovascular disease. The ability to walk or bike to school is affected by neighbourhood form limitations, as well as by the distance from the school. The very possibility of walking or biking to school or the park, something that was taken for granted decades ago, is now a relatively rare phenomenon. Despite the prevalence of busing and the tendency of many parents to choose to drive their kids to school whenever possible, even when they are within walking distance, there has been recent emphasis on child health and walkability and leading to more interest in locating within walking/biking distance of school (see, for example, Hume et al. 2009; Timperio et al. 2006).

As noted earlier, grid neighbourhoods were found to have walksheds almost twice the size of curvilinear neighbourhoods, although more children in Calgary tend to live in the newer curvilinear areas. Municipalities should be encouraged to utilize grid or modified grid block patterns rather than curvilinear patterns in new suburbs (since these new neighbourhoods will ultimately experience the same life cycle patterns and associated issues that mature neighbourhoods do). Minimum walkshed size and quality of the walking environment could be considered as part of neighbourhood and school development or redevelopment plans in order to encourage more active transportation and potentially lead to life-long practices.

The Active and Safe Routes to School Program (described in Thomas 2022) aims to make it easier for kids to walk to school, and over the past four years has made improvements to infrastructure such as sidewalks and crosswalks near twenty-four Calgary schools. Despite this, local schools are challenged, as larger, multi-purpose schools continue to be located in the newer and more outlying neighbourhoods, resulting in buildings that are beyond a reasonable walking or biking distance for many kids.

Conclusions

The causes of school closures relate to a combination of city development processes, neighbourhood lifecycles, neighbourhood types, infill and densification processes, housing types, school sizes and building types, socio-demographic factors influencing school choice and school board policies. The recommendations from this research included system-wide, city, neighbourhood and school-specific scales that may be applicable to other similar cities.

The system of schools in the established area of Calgary was over-built during the post-war period and no longer corresponds to neighbourhood density and demographics, and should be right-sized, so that the distribution of schools responds to a longer-term projection. The current practice of maintaining separate public and Catholic schools, some adjacent to each other with duplicate facilities and grounds should be reconsidered. Alternative uses for schools should be explored, and the current practice of open boundaries for school enrolment should be replaced by neighbourhood-based schools. Some sites should be redesigned for more optimum use and ecological performance.

The consequences of school closures can be highly negative and often devastating to a community. The effects include loss of population as families with children move to better-served neighbourhoods, loss of other services and amenities as there is no longer a threshold population to sustain them, and deterioration of physical and aesthetic aspects of a neighbourhood and of its reputation.

There are many inter-relationships between urban morphology, urban planning and design and school system administration that provide opportunities for improvements. Although many of these relationships can be demonstrated it is ultimately a political decision if a government is going to support the viability of schools in established areas of the city.

A footnote to this project: The research was originally commissioned by the governing Alberta New Democratic Party (NDP), a social democratic party that emphasized education and social issues during its tenure 2015–19, and the report was circulated through the Alberta Ministry of Education in 2017. In 2019, the NDP was defeated by the United Conservative Party (UCP), whose conservative government did not share the previous values and the research and project report did not influence ongoing decisions. In 2023 another election may see a return to social democratic values (current polls suggest that the UCP may be defeated by the NDP), and perhaps a reconsideration of the project findings.

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