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An examination of the household characteristics of high-density neighbourhoods in

Halifax, Canada

By
Ruji Rajbhandari

A Thesis Submitted to
Saint Mary's University, Halifax, Nova Scotia
in Partial Fulfillment of the Requirements for
the Degree of Master of Arts in Geography.

December, 2021, Halifax, Nova Scotia

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Dr. Ren Thomas
External Examiner

Date: December, 2021

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Abstract

In recent decades planning policies have promoted population growth in downtown neighbourhoods, including Halifax, Canada (Grant & Gregory, 2016). These developments are commonly associated with inner-city renewal, gentrification, spatial segregation, and displacement; however, most research on the topic limits major metropolitan areas such as Toronto and Vancouver, with a limited study on high-density development in mid-sized cities. Much of the existing literature also focuses on the urban core, neglecting to look at suburban and exurban high-density developments. This study uncovers the population characteristics of high-density residential areas and the impact of new developments on existing neighborhoods in Halifax, a mid-sized Canadian city. It employs census data at the Dissemination Area (DA) level across the entire metropolitan region using two methods: The first summarizes households' demographic and socio-economic characteristics in the DAs categorized as high-density (HD) for the study purpose. The second analysis focuses on the same variables as the first method but applies to the DAs with high-density dwelling construction between 2011 and 2016. Results show a significant concentration of working-age population in HD DAs and the prominence of smaller households suggesting future demand for smaller and diverse living spaces to accommodate changing household structure. In addition, HD households have significantly lower median household income, more low-income households, and a higher shelter-to-income ratio than the Halifax Census Metropolitan Area (CMA). Between 2006 and 2016, HD DAs gained more recent immigrants, visible minorities, and non-permanent residents. Results also indicate high pedestrian and public transit activity in HD areas, mainly in the Peninsula and parts of Mainland Halifax. While the rest of the suburban Halifax is car-dependent, the high pedestrian and public transit activity does not seem to result from a high-density lifestyle but rather a neighbourhood structure and household socioeconomics. Rising housing costs and the prevalence of lower median income in HD increase the concern of gentrification and affordability issues in urban parts of Halifax. As Halifax aims at strategic growth and population increase for the next 30 years, there is a great need for planning policies to address housing issues for at-risk households struggling to find accommodation, and middle-class households who are increasingly unable to secure housing within their budget.

December, 2021

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1 Introduction

Many cities across North America are experiencing urban redevelopment spurred by growing populations and shifts in housing demand. Once such shift in the years leading up to the global pandemic of 2020/21 was the switching of consumer preference from low-density single-family homes in automobile-dependent suburbs to high-density housing in the urban core (Hertzberg, 2021; Hogue, 2020; Lerner, 2021; Rosen & Walks, 2013). As of the writing of this thesis the pandemic is still ongoing, and the long-lasting implications are still to be determined. That said, there may be a change once again in demand as people trade in the busy streets and cramped living quarters of the downtown for the empty spaces and larger homes found in the suburbs and small towns.

Condominiums and rentals comprise much of the housing stock in high density arrangements found in the urban cores of cities large and small. In 2011, 1 in 8 households lived in a condominium dwelling mostly located in Census Metropolitan Areas (CMA) (Statistics Canada, 2013), with condo development now well-established as a feature of the largest Canadian CMAs such as Montreal, Toronto, and Vancouver. Between 2011 and 2016, the proportion of households living in condominiums grew by 16.6% in CMA's and 11.9% in non-CMAs of Canada. Likewise, one-third of the dwellings built between 2011 and 2016 were condominium buildings (Statistics Canada, 2017). Between 2015 and 2016, purpose-built rental construction grew by 1.6%, causing a slight increase in vacancy rate as there was a higher supply of apartment units throughout Canada's 34 largest centers (CMHC, 2016b). In addition, higher international migration between 2015 and 2016 also increased rental occupancy as newcomers are the

major occupants of rental housing after moving to Canada (Agrawal, 2010; CMHC, 2016b).

While the benefits of high-density residential development are often cited, including inner-city renewal, increasing density and the associated environmental benefits, and economic growth, it is also associated with gentrification, spatial segregation, and displacement (Ley, 1986; Rosen & Walks, 2013). Those critical of neoliberalism's role in the urban development process argue that government policies channeled huge capital investments and fostered the rapid expansion of inner-city development (Lehrer & Wieditz, 2009; Rosen & Walks, 2015). Growth in inner cities due to capital reinvestment has implications that we cannot negate, such as displacing existing population, services, and jobs due to the arrival of more affluent households; yet many policymakers and planners see the capital reinvestment process as a positive tool for urban development, revitalization, and socio-economic upgrading of neighbourhoods (Lehrer & Wieditz, 2009).

Demographic conditions such as aging baby boomers, fluid family composition, and immigration, along with socio-economic issues associated with a distaste for bland suburban neighbourhoods, rising fuel costs, accessibility, and changing overall housing taste, are encouraging ongoing inner-city change in Canadian cities (Grant & Filion, 2015; Moos, 2015; Rosen & Walks, 2013; Townshend & Walker, 2015). Changing inner-city urban forms are attributable to policy and market dynamics that favor high-density living (Grant & Filion, 2015). As such, some scholars describe the new inner-city

development as urban transformation and a new way of urban life' (Florida, 2005; Moos, 2016; Rosen & Walks, 2013).

According to The Halifax Housing Need Assessment, the city has an increasingly aging population needing smaller housing options for those downsizing and affordable options for seniors with low-income (HRM, 2015). In 2016, the aging population and empty nesters 65 years and older occupied about 22.6% of the households in Halifax CMA (Statistics Canada, 2016). Also, 11.3% of the households in the Halifax CMA belong to immigrant households (including non-permanent residents) (Statistics Canada, 2016). The immigrant population is an integral part of Nova Scotia's growth, and the provincial nominee program plays an important role in refugee and immigrant settlement. In addition, the growth policy has brought in an influx of international skilled workers and students, increasing housing demand for non-permanent and permanent residents (Grant & Kronstal, 2013).

1.1   Focus and Scope

While we typically associate high-density housing with the urban core, it is also commonly found throughout all city regions, including the suburbs (Novak, 2019). Due to the geographical constraint of the Halifax Peninsula, new high-density development is spreading into mostly working-class neighbourhoods of the North End and off of the Peninsula (McLean, 2018). Between 1970 and 2016, developers built about 290 condominiums projects in Halifax, and about 43% of the apartment-style condos are in the Halifax Peninsula (Werle, 2017).

Over the last few decades, planning policies promoted population growth and density increases in Halifax's downtown neighbourhoods (Grant & Gregory, 2016). Influenced by the new theories of sustainable development, New Urbanism, and Smart Growth, the 'Center Plan'[1] encourages high density and mixed-use development in the urban core. The 'Centre Plan' aims to add about 18,000 housing units to the urban core by 2031 with enhanced policies and guidelines to increase density and provide needed amenities for the growing population in the Peninsula and Dartmouth downtown (HRM, 2021c). Planning policies and consumer demand appear to be uniting, resulting in a dramatically altered urban landscape, with that 27 new mixed-use multi-story buildings are coming in Halifax's skyline (Boon & Corbett, 2016; Ziafati & Munro, 2016). Still more are planned for the downtown and surrounding areas of Dartmouth.

Recent research on Halifax shows that high-density condominiums are spread across the metropolitan area and do not concentrate in an urban center like larger cities (Novak, 2019). High-density developments are understood mostly as a segment of growing housing construction in metropolitan areas, while authors such as Rosen & Walks(2013) and Townshend & Walker (2015) express these trends as urban transformation occurring due to life course changes and new urban lifestyle. This study aims to determine who is living in the high-density development and whether urban change occurs due to changing life courses and lifestyles in high-density households.

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[1] The Centre Plan is the planning process for the Regional Centre or HRM's urban core that includes Halifax Peninsula and Dartmouth within the Circumferential Highway. This plan will replace four separate plans and land use By-laws for the Regional Centre, which some of them have been in use since 1970s. It is ebing developed in two phases; Package A was approved in September 2019 and Package B is currently under review (HRM, 2021b)

1.2   Research Questions and Objectives

A large volume of scholarship is available on housing and urban redevelopment, focusing mostly on Canada's largest cities of Toronto, Vancouver, and Montreal (Kern, 2010b; Lehrer & Wieditz, 2009; Moos & Skaburskis, 2010; Prouse et al., 2014; Rosen & Walks, 2013). These studies focus on the ideologies of gentrification and neo-liberalism and their association with spatial segregation and displacement in the inner cities by high-density construction (Grant & Filion, 2015; Lehrer & Wieditz, 2009; Rosen & Walks, 2015). Lippert & Steckle (2016) suggest much of inner-city growth literature focuses on gentrification and policy governance and does not fully capture the constituents and features of 'condo-isation'. Moreover, a very limited study is present on high-density development in mid-sized cities such as Halifax (Kaida et al., 2020). Harris & Rose (2019) emphasize that although high rise and condominiums are prominent features of suburbs and mid-sized cities, the research on their development and variability is understudied. Thus, this study aims to address the gap in the literature with studies on the occupants, issues, and opportunities pertinent to high-density dwellings, specifically in urban and suburban areas of a mid-sized city.

The research builds on earlier studies on Halifax by(Prouse et al., 2014a), focusing on income inequality and neighbourhood change. However, the scope is limited to residents of high-density condominium and rental buildings, leaving social housing and other tenures for future work. This study looks at the high-density development patterns between the census 2006 and 2016 and derives answers by analyzing demographic variables and housing consumption. Considering these recent changes in high-density developments and planning policy in the Halifax CMA, this research examines the spatial

and demographic patterns associated with high-density residential development between 2006 and 2016. First, the study investigates who are living in the high-density developments by tracking demographic trends as recorded in the census.

An understanding of the characteristics of occupants of these high-density dwellings is important for several reasons. First, it is essential to examine the demand for high-density in different parts of the city. Investigating the attributes of high-density residents' in different geographic level provides insight on residents' housing needs throughout the region and within regions. As our communities are becoming more socially and culturally diverse, this study will assist planner and policy makers in developing programs, planning infrastructure, and public services according to the social and cultural needs of the community. It will also aid in forecasting and planning future high-density development in urban and suburban areas. Hence, I pose the following research questions:

1. Where are the high-density Dissemination Areas across Halifax (more than 70% of dwellers residing in high density)?
2. Who is living in the high-density Dissemination Areas, and what are their household characteristics? Do they differ between the urban regions and the overall CMA?
3. Are the population characteristics changing over time, and is there a recognizable pattern?
4. What are the demographic and socio-economic impacts of new high-density developments on existing neighbourhoods?

The research draws upon several theoretical areas regarding the role of housing in urban transformation. Perhaps the most well-known of the theories is gentrification, whereby once-working class neighbourhoods see rounds of investment that change the socio-economic conditions of the area and push existing residents out largely through the removal of affordable rental units (Smith, 1982). More recent work on gentrification expands the topic beyond this classic model, looking to new-build gentrification in non-traditional areas such as on the downtown and urban fringes (Davidson & Lees, 2005; Lehrer & Wieditz, 2009; Moos et al., 2018; Slater, 2011). 'Youthification', the altering of neighbourhoods through the rise of working age young professionals not just incomes, hints at additional broadening of the traditional definition of gentrification, demonstrating the role of population characteristics in the understanding the processes of neighbourhood change (Moos, 2015).

Taking this broader view of gentrification and the associated processes of neighbourhood change through evolving population characteristics provides a theoretical basis for this research. Moreover, I am not limiting the analysis of neighbourhood change in traditional inner-city areas typically found in existing research. Rather, I am looking at high-density residential development's role in neighbourhood change across the metropolitan region, uncovering how these developments compare with the overall demographics of the city and differences between the regions.

1.3 Thesis Outline

The thesis contains six chapters: Following this introductory chapter offering a brief review of the high-density development in Canadian cities and posing the questions and objectives comes a review of the existing literature on residential development trends in North America and Halifax. The review focuses on high-density development, highlighting relevant theories associated with inner-city development, such as gentrification, neighbourhood change, housing, and life course. Chapter three details the methods employed, providing an overview of the study area and detailed descriptions of the data sources, collection process, and analyses.

Chapter four illustrates the results and findings from the two types of analysis. This section summarizes demographic and socio-economic characteristics of households in the dissemination areas categorized as a high density (HD) for the study purpose. The discussion section in Chapter five provides an interpretation of the major findings, including the potential implications of the results under four major relevant topics: demography and life course, affordability and immigration, high-density development, and planning policies and commuting patterns. Finally, chapter six outlines the study's implications for urban management, limitations of the research, and recommendation for future study.

2 Literature Review

This literature review covers five major topics concerning housing development in the city: The first section provides an overview of North America's residential development from the mid-nineteenth century through today. The second section gives an overview of residential development trends focused on Halifax. The third section reviews contemporary literature on gentrification, focusing on evolving terms and processes in inner cities. The fourth section examines the life course and changing housing choices, household types, and demographics. Finally, the last section discusses the core concepts of neighbourhood change and the theoretical causes of neighbourhoods to change, including an overview of the subjective and objective variables representing characteristics of a community and the process involving change.

2.1 Residential Development Trends in North America

2.1.1 Pre-war city center (1850- 1945)

A significant change in urban growth and city living in North America occurred during the mid-nineteenth century owing to the growth of industrial production. The industrial revolution caused an immense social change in North America as the population shifted from rural to urban, resulting in large urban centers, such as Boston and New York (Library of Congress, n.d.). Innovation in transportation in this period saw the advance of electric streetcars, railroads, and steam-powered ships. The railroad and ships connected the heavily industrialized middle Atlantic region with the West and South, allowing labour movement and goods and resources trading (Brooks, 2018; Kelly, 2019). Streetcars and commuter rail systems allowed people to live farther than walking distance

and near streetcar stops; the convenience in commute between suburbs and central development areas promoted residential expansion away from the city center (El-Geneidy et al., 2015; Keating, 2015; Millward, 1981; Warner, 1962). Commuter rail systems linked downtowns in major cities such as Boston, New York, and Chicago with expanding exurban communities, while nearly all cities and even many modestly sized towns had streetcars systems connecting residential suburbs with the central business districts. Streetcars allowed outward development as the upper and middle-class households moved away from the industrial city centers (Nilsen, 2006; Warner, 1962). Despite the common stereotype of suburbs as affluent, working-class or industrial suburbs also existed in the outskirts of urban core where industrial working families lived (Harris & Larkham, 2003).

The industrial revolution also caused massive in-migration of workers to cities giving rise to social issues among the new working poor, including child labour and lack of quality housing, exacerbated by poor working conditions and low wages (Brooks, 2018). Workers settled near the factories creating a high demand for rental housing. As housing needs grew, single-family homes were rapidly sub-divided into poorly constructed multiple units to maximize density leading to urban slums and tenements (Gish, 2006). Due to a lack of proper building code, these tenements were poorly built, lacked windows, adequate ventilation, overcrowding, and inadequate maintenance, which increased health and safety hazards by alarming government authorities (Gish, 2006).

Intending to address rundown housing and urban blight, the US government started slum clearance projects in the city centers before World War II. However, in many

cities, the government cleared land for commercial and institutional purposes instead of

public housing. When the government built public housing, it did not address the

displayed communities' needs and quickly became problematic. Despite the relocation

and replacement programs in place, the housing conditions worsened as housing projects

could not fulfill the demand for low rent housing (Keating, 2015).

Canada went through urban reform movement before WWI as a municipal and

citizens group initiative against the corruption and inefficiency of city governments of

urban management and to improve urban lives (Grant, 2006; Weaver, 2006). Commission

of Conservation, established in 1909, played a major role during the reform by advising

scientific information regarding planning programs and governance of the municipal

authority to the Canadian governments (Grant, 2006; Smith, 2006). Concerns about

public health, lack of proper planning, population growth, and housing issues, the

commission played a key role in promoting and developing building codes in Canada.

Thomas Adams, a planning advisor to the commission, pushed for provincial planning

acts to strengthen the municipal planning agencies to implement planning policies,

promote town planning and designed community plans through out Canada (Grant, 2006;

Rutherford, 1971; Weaver, 2006).

2.1.2   Post-war Suburbanization (1945-1975)

After WW-II, the government promoted suburban development to cope with housing

shortages caused by the post-war baby boom and drive the post-war economy for

returning veterans (Jackson, 1985; Nicolaides & Wiese, 2017). Various authors have

labeled suburbs as a source of "urban dispersion" or "urban sprawl," a radical change that

resulted in shifting the metropolitan focus from the central city to satellite towns as it entailed the scattering of urban amenities into low-density settlement facilitated by the automobile (Bain, 2015; El-Geneidy et al., 2015). Governments played a crucial role in post-war suburban development through economic policies, subsidies, and large infrastructure projects (Bourne, 1981; El-Geneidy et al., 2015; Jackson, 1985).

Following the fundamentals of Fordism, mass production industries and housing projects created a demand for blue-collar jobs, while mortgage subsidies and job security encouraged families to own new homes, new cars and aspire to a middle-class consumerist lifestyle (El-Geneidy et al., 2015; Lewis, 2006). Highways and expressways promoted car-oriented suburbs' outward development, giving rise to dispersed suburban towns with shopping malls, business parks, self-standing retail, fast food outlets, and the drive-in culture (Bourne, 1981; Ford, 1994; Jackson, 1985).

2.1.3   Fall of Inner-city

With the mass adoption of private automobiles, streetcars and commuter rails were out of fashion in many North American cities. The expansion of inter-city highways caused once walkable cities and towns to be car-dependent, and long journeys became part of the daily commute (Keating, 2015). Middle and upper-class families followed by retailers, industry, and corporate offices shifted to suburbs resulting in urban job loss, unemployment and poverty in the inner cities, and a decline in the quality of life in the older neighbourhoods (Ford, 1994; Lewis, 2006; Nicolaides & Wiese, 2017). Traditional downtown retailers and other businesses moved to regional indoor shopping malls and civic centers, resulting in low tax revenue and service cuts in the city centers (Nicolaides

& Wiese, 2017). To combat urban issues, the government initiated another round of slum clearance projects beginning in 1954 in inner cities with a new term "urban renewal" to replace deteriorating old neighbourhoods with public housing and private developments (Keating, 2015). The renewal process brought back significant downtown office buildings, plazas, underground shopping discourses, and downtown shopping malls, transforming the central city's built environment (Bain, 2015).

Cities in Canada went through urban renewal to offset the national housing shortage during WWII. Following the National Housing Act amendment of 1954 encouraged municipalities to go through large-scale developments in central business districts with financial support from the federal government. It enabled municipalities to clear residential land defined as "slum" and replaced them with public housing or municipal redevelopment plans (Bunting & Filion, 2006; Grant, 2006; Roth & Grant, 2015). Before the 1950s, municipalities barely adopted planning regulations and policy, but with the urban renewal program with its financial incentives, municipalities in Canada started including planning processes in their governance (Roth & Grant, 2015).

2.1.4   Late 20th Century and the Knowledge-based economy

The attitude towards suburban housing started to change in the early 1970s. Rising gasoline prices and the recession in 1973 challenged the ideals of a suburban lifestyle. Communities began to protest public sector-sponsored urban renewal projects and the construction of urban expressways (Filion & Bunting, 2015). Community uprising against large-scale highway and slum clearance led to closing urban renewal projects in sensitive inner-city neighbourhoods, such as the famous case of Jane Jacobs leading

protest against expressways in Manhattan and later Toronto (Keating, 2015). This era also led to many middle-class households moving back to the inner city and stimulated inner-city redevelopment (Ley, 1996; Lees et al., 2008; Filion & Bunting, 2015). Lees, Slater, & Wyly (2008) explain it as the 'back to city' movement when young, white, and well-educated middle-class households or 'urban pioneers' moved back into older neighbourhoods stirring urban renaissance by renewal, renovation, and revitalization of older homes.

During the late 20th century, governments changed their urban development strategies and transferred the responsibility of building urban infrastructure to private developers under neoliberalism's influence (Kobayashi & Preston, 2015). Cities promoted urban intensification and provided incentives for innovative planning and design practices such as multi-use buildings, mixed housing, redevelopment of brownfield sites. As a result, huge capital investment poured into fostering rapid expansion of inner-city neighbourhoods (Lehrer & Wieditz, 2009). Globalization and manufacturing reduction changed North America's occupational structure, focusing on service industries such as management, health, business, medicine, and health. Scholars have referred to this change from manufacturing to the service industry and the economics of production and consumption as the new economy, the knowledge-based economy, or the creative economy (Wyly, 2012). Scott (2011) summarizes the global economic changes in cities as three waves of urbanization. The first wave reflects the urbanization driven by the nineteenth-century industrial revolution. The second wave relates to the subsequent development after WWII, driven by complex assembly line-based mass production industries such as Ford Automobile. Lastly, the third wave of urbanization was caused by

the expansion of tech industries, sharp social and occupational division, and increasing

consumer society.

The central business districts (CBD) and downtowns showed renewed vibrancy in

the 21st century as corporate offices, IT companies, and other industries clustered

downtown (Ford, 1994; Hutton & Vinodrai, 2015). Central business districts mainly

house the service industries on finance, insurance, and real estate, adding that the rising

creative economy brings creative sectors back to the city centers. Florida (2003) focuses

those creative industries tend to spatially cluster to profit from the concentration of

diverse and mobile talent. He also states that the knowledge economy or the creative class

are attracted to places that provide varieties of lifestyle amenities and concentration of

higher-income consumers supplementing the regional economy (Florida, 2002). Hutton &

Vinodrai (2015) point out that the locational preference shapes the new cultural economy

and clustering of similar business, knowledge sharing, opportunities for collaboration,

and unique built environment to drive the creative forces. In the creative economy the

workplace landscape is moving away from traditional industrial and corporate system.

The post-industrial inner cores are attracting creative and knowledge economy with its

unique mix of heritage buildings, modern high rises, and amenities making it an attractive

setting for creative and innovative minds to explore. Amenities such as galleries,

shopping centers, gyms, and restaurants are produced targeting creative workers. The

concept of living an urban life and staying close to work, transit, entertainment and

shopping is promoting creative professionals move to inner cities (Lehrer & Wieditz,

2009). The changing economic structure and incoming creative class is redefining the

urban housing in inner cities with their attraction to urban lifestyle where the young

highly educated professionals are lured by the concept of 'live, work and play' (Lehrer & Wieditz, 2009).

2.2 Historical Residential Development Trends in Halifax

Halifax, Nova Scotia, follows much of the historical development that is outlined above, with distinct processes of urban concentration owing to industrial development, suburban expansion, and eventual re-centralization in the late twentieth century. Halifax is a port city settled by the British on a large natural Harbor in 1749 (Beck, 1979). During this early period, the local economy relied on port activities, government and military services, and logistical support for resource industries such as forestry, fishing, and petroleum (Grant & Kronstal, 2013). During the 1800s, the city core stretched along the waterfront and was serviced through horsecars making trips between the railway station and downtown Halifax (Gillis, 2007). Most of the North End developments occurred near the industrial areas along the waterfront and rail lines, while elite areas developed south of downtown. After introducing the electric streetcar in 1896, residential development spread west on the Peninsula. By the 1920s, the streetcar lines extended to Northwest Arm, allowing growth in the West End, considered one of the city's first contemporary suburbs (Gillis, 2007; Millward, 1981). The electric streetcar expansion facilitated residential growth beyond the city center, and most developments within walking distance (400m) of streetcar lines except parts of the North End (Gillis, 2007; Grant et al., 2019; Millward, 1981).

The Halifax explosion in 1917 caused extensive damage to the North End of Halifax and Dartmouth (Millward, 2002). The federal government planned a significant

redevelopment project in the aftermath of the explosion for the displaced families. The resulting neighbourhood is an example of a Garden City plan designed by Thomas Adams and George Rush to replace the explosion's rental housing (Shutlak, 1994; Soward et al., 2008). This district is known as "The Hydrostone" for its fire-resistant building material using crushed stone or concrete blocks, allowing rapid rebuilding following the explosion (Shutlak, 1994).

Halifax was one of the major ports for goods and soldier movement during World War II. High activity in the naval shipyards boosted the economy and increased population during the war; however, all the activity created a housing crisis and construction boom in Halifax, resulting in the demand for temporary and affordable accommodations provided by the division of large houses into flats and rooms and temporary additions (Millward, 1981). Halifax also went through rapid population growth from veterans returning home and expanding families like other North American cities. The North End was becoming overcrowded, causing the middle and upper-middle class to leave the dense inner-city and move out to the suburbs. Concerns increased in the city with a housing shortage, deteriorating housing conditions, and growing working-class slums. In response to the housing crisis, the city adopted its first comprehensive Halifax Master Plan in 1945 (predecessor 1939 Nova Scotia Town Planning Act) (Millward, 1981; Roth & Grant, 2015). The plan focused on vehicular transportation improvement, zoning bylaws, and development schemes for working-class neighbourhoods based on the neighbourhood unit principle

The land constraints in the Peninsula drove the housing expansion further west of

the city center towards Spryfield, Fairview, Clayton Park, and across the Harbor (see

Figure 1). With increasing vehicular use and lack of transit coverage to new suburban

developments, the bus system replaced the streetcars stopping its running in 1949

(Cunningham, 2009). After the Macdonald bridge's construction in 1955, the rapid

suburban development spread to Dartmouth and became a city in 1961 after annexing

surrounding areas (Millward, 2002). Similarly, the construction of circumferential

highway, McKay Bridge in 1969, and the first two provincially and federally assisted

moderately priced satellite communities of Sackville lakes, and Forest Hills allowed

further spread of residential developments to eastern Dartmouth and Cole Harbour

(Millward, 2002).

2.2.1 Urban Renewal and Slum Clearance

Urban renewal projects started in Halifax following the National Housing Act (NHA)

amendment in 1954 (Roth & Grant, 2015). The city of Halifax used a federal grant to hire

Gordon Stephenson, a professor of planning at The University of Toronto, to conduct a

housing and redevelopment study of the inner core. His research identified slum and

hazard areas in the North End. It recommended clearing downtown and redeveloping

commercial, high-density residential complexes, and car-centric access and parking. By

1963, the city acquired and cleared downtown neighbourhoods to make space for the new

developments. Due to the neighbourhood's clearing, many residents moved out of

downtown to the suburbs resulting in a decline of commercial activity along Gottingen

street (Roth & Grant, 2015). Shopping and office complexes such as Scotia Square and high-density residential buildings replaced the residential neighbourhoods downtown.

The Cogswell Interchange is another example of urban renewal, built as part of a proposed freeway to connect the downtown with the suburbs. Due to public concern over heritage conservation, the city halted the project after completing its first phase. While most office buildings in the inner city, downtown, lost their vibrancy to automobile-oriented suburban lifestyles and indoor shopping malls. After the population loss, the city identified the need to stop further deterioration and intensify the city core. In the 1970s, the Canadian government developed the Neighbourhood Improvement Program (NIP) to improve vulnerable older neighbourhoods (Grant & Gregory, 2016). With the new program in place, the city started promoting inner-city redevelopment and allowed high-density developments and mixed-use development in the Peninsula.

2.2.2   Downtown Development and New Planning Ideals

In 1975, the first Halifax- Dartmouth Regional Plan was produced, promoting planned satellite communities aiming at suburban and exurban growth (Millward, 2002). The city adopted the 1978 Municipal Development Plan MDP), directing residential development in the Peninsula and Mainland North and encouraged preserving the existing neighbourhood character while allowing limited redevelopment of high density (Gregory, 2014). In 1981, the Halifax council introduced planning areas such as South End, Peninsula Center, Central Business District, and Spring Garden Road Commercial Area; allowing non-family multi-unit dwellings (households members with economic or social

relationships such as a roommate or unrelated (Statistics Canada, 2017c)) while continuing building low-density single-family neighbourhoods (Gregory, 2014).

The city planned the Spring Garden commercial area for the highest density residential activities, the Central Business District for mixed-use residential and commercial uses, including the waterfront development to bring after-hours life into Halifax downtowns. During the 1990s, the Spring Garden Road transformed into an upscale shopping district with offices and luxury condominiums; meanwhile, the CBD struggled as the commercial businesses were increasing in the suburbs (Grant & Gregory, 2016). Halifax's education and health sector expanded during the 1990s, increasing student enrollment, which led to increased multi-unit housing in the South End to accommodate growing demand.

A major municipal event occurred in 1996; Halifax Regional Municipality (HRM) formed after amalgamating the independent entities within Halifax County. After the amalgamation, some amendments were made to the Peninsula planning area boundaries, highlighting South End's importance as the inner-city neighbourhood with a mix of family and non-family uses. The HRM council adopted a new Municipal Planning Strategy (MPS) in 2009 for the downtown core, commonly known as 'HRM by Design,' based on urban design principles of residential intensification (Gregory, 2014). The plan encouraged downtown residential growth while promoting high-density development, walkability, and transit-oriented neighbourhoods. With the growth policies in place, public investment in construction projects near the Halifax Common and waterfront

attracted affluent residents, mainly in large-scale apartment towers (Grant & Gregory, 2016).

The Peninsula within the Halifax Regional Municipality (HRM) contains the most diverse income census tracts, and high-income census tracts are increasing over the years (Prouse et al., 2014a). This diversity is most prominent in the city's North End focused along Gottingen Street, which saw population growth following the municipality's "return to the city" movement and neighbourhood improvement projects. Roth & Grant (2015) show that between the 1830s and 2010, Gottingen Street transitioned from a residential street to a commercial hub and from an area marked as dangerous to a revitalizing mixed-use commercial street. From the first quarter of 2010 to the first quarter of 2011, North End condominium prices increased by 18% compared to a 5.4% increase in South End (Prouse et al., 2014a). The entire North End sees more infill and large-scale development while becoming more desirable for white-collar workers with smaller households to live close to the urban core.

Although North End and Gottingen areas show signs of gentrification, both the rise and fall relate to government policies' implementation before and after the 1970s. The slum clearance and large social housing projects in the 70s instigated the downgrade of the neighbourhood, and the new guidelines are bringing in new social and commercial trends leading to a positive transition. Grant & Gregory (2016) found that since the 1980s, planning policy encouraged population growth and residential activity in downtown making neighbourhoods such as Spring Garden, Commons, and Cogswell more affluent

except Inglis street area with a high concentration of students in decreasing the income level.

The city is currently developing 'The Centre Plan' for Halifax's urban core aiming to accommodate up to 40% of the total regional growth in the urban core (HRM, 2021c). The City of Halifax plans to develop a regional center on the Peninsula and areas within the circumferential highway in Dartmouth by adding about 18,000 new residential units over the next 10-15 years following four fundamental concepts of strategic growth, complete communities, pedestrian-focused design, and human scale. This plan will replace four older plans and land use By-lays for the Regional Centre. The first phase of the plan, Package A, received approval in September 2019, and Package B was adopted November 2021 (HRM, 2021b).

2.3   Gentrification

The term 'gentrification' generally describes the process of increasingly wealthy residents moving into low-income neighbourhoods resulting in displacement of the existing residents along with social and physical transformation of the area (Rérat et al., 2010). More recently, the classical concept of gentrification has moved to new areas and identified as new forms of social upgrading (Lehrer & Wieditz, 2009; Moos et al., 2018; Slater, 2011). More modern forms are growing in the inner cities, such as 'New-build-gentrification' (Davidson & Lees, 2005), 'Studentification' (Smith, 2005), 'Youthification' (Moos, 2015), 'Condofication' (Lehrer & Wieditz, 2009), and 'Rental gentrification' (Van Criekingen, 2010). The scope of gentrification has also extended beyond a residential neighbourhood to high-status development projects and big-budget development projects

with bigger footprints such as brownfield regeneration, reconstruction of existing residential areas, and refurbishing older buildings in the light of sustainable projects (Rérat et al., 2010).

Although the idea of gentrification has mutated into different types, they share a common concept of the socio-economic and cultural transformation of the new middle class's landscape and involvement (Lees et al., 2008). In 1996, Neil Smith put forward a new definition of gentrification, arguing it has changed over time, becoming broader in context (Lees et al., 2008). It is no more just about the displacement of the low-income housing in the city centers by the incoming middle class, but it has grown larger in scale, referring to new condominium towers, waterfront developments, boutique amenities, and high rise office buildings in downtowns that are becoming the identity of the central urban landscape (Lees et al., 2008; Smith, 1996).

David Ley (1986) argues that with the rise of service industries, a new privileged middle class moved away from the suburban lifestyle and expanded their consumption, taste, and aesthetics outlook in city housing and living. He also identified four significant explanations for inner-city gentrification: demographic change, housing market dynamics, urban amenities, and economic structure (Ley, 1986). Authors such as Rose (1984) and Kern (2011) emphasize that women's changing role in the households, growth of women employment, and increasing single mothers formed gendered social geography in the city condominium ownership. Women in larger cities own a high proportion of condominiums; the security and service features are highly marketed mainly to females (Kern, 2010b; Rérat et al., 2010).

Marxist and other theories critical of Neo-liberalism suggest that inner-city growth results from the policy-level intervention that fosters capitalistic interests, promoting more profit-oriented high-density developments through zoning and flexible planning (Lehrer & Wieditz, 2009). Hackworth & Smith (2001) described the trend as the "third wave gentrification" happening in inner and outer cities where government-supported developments profited the pro-gentrification households, while the resistance from the working-class is decreasing. From a policymaker's perspective, high-density development is a mechanism for urbanizing existing built-up areas, intensifying declining neighbourhoods, and reducing sprawl (Rosen & Walks, 2013).

Some scholars are looking into blended theories moving away from the cultural and economic ideas on city-centered high-density development. For example, Boddy (2007) highlights inner-city development occurs from a combined effort of capital investment and government policy to promote city living and overcome the declining population in the city center. Other researchers suggest that although capital investment is a big part of the construct, the driving force for high-density development is the resident's preference of urban and city living and changing demographics of a higher number of singles and empty nesters (Butler, 2007). Rosen & Walks (2013) described this type of inner-city development or condo-ism as representing a new "structured coherence" of groups with similar political, economic, and socio-cultural interests. It represents a juncture of public and private interests, corresponding to financial structures, government agendas, urban policies, and demographic groups corresponding to tenure shift and lifestyle preference, all coming together to restructure the inner city through real estate development (Rosen & Walks, 2015).

The 'new-build' development in the inner cities is an emerging debate among scholars about whether it is gentrifying or remaking a new class of 'generationed' households with various social, lifestyle, and income groups. Can such developments serve better when termed credentialization or re-urbanization as the new inner-city builds do not always follow the classical concept of the lower-income working class's displacement by the new middle class (Davidson & Lees, 2005)? Lambert and Boddy (as cited on Lees et al., 2008) argue that the latest build developments in the UK (London's Docklands) represent new geographies of urban settlers who have a distinct preference for an urban lifestyle and describing new builds as gentrification overstretches the core meaning of gentrification. Davidson & Lees (2005) reason that the new builds (referring to London's Riverside) are indeed gentrification. The core values include reinvestment of capital, social upgrading by incoming high-income groups, landscape changes, and direct or indirect displacement of low-income groups. The authors add that the displacement could occur in brownfield development; the direct effect might not be visible on-site but is likely to affect adjacent neighbourhoods indirectly.

The discussion on the form of new build development is expanding beyond classical regeneration projects. New-build projects do not always focus on reclaimed brownfields or infill developments or reconstruction of existing residential buildings; new hybrid forms are still evolving, such as Fairview Slopes in Vancouver and Newcastle, United Kingdom(Lees et al., 2008).

2.3.1 Gentrification in Halifax

In the 1980s parts of Halifax experienced gentrification, mostly the Peninsula neighbourhoods south and areas west of the Citadel (Bunting & Millward, 1998; Ley, 1986; Millward & Davis, 1986). At the time, scholars identified gentrification resulting from residential renovations in Halifax; the South End experienced owner-occupied renovations as a result of high mobility, educational change and highly sought after area for professionals , while the north end experienced incumbent renovations encouraged by the local government (Hilton, 1991; Millward & Davis, 1986). After a period of commercial and residential decline between the 1970s and 1990s, Gottingen street area went through revitalization and gentrification in the 2000s accompanied by rapid population growth and housing price increase between 2001 and 2011 (Roth & Grant, 2015). While Gottingen street area went through a significant transition and redevelopment after 2000, there was little evidence of gentrification induced displacement of services or residents (Roth, 2013).

Grant & Gregory (2016) examined change between 1981 and 2011 in four census tracts in central Halifax. The study found between the years; most census tracts lost population but gained more affluent and educated residents in the Peninsula. Luxury high-rises replaced smaller buildings near education and health services and waterfront areas, with the exception being a census tract near the universities and hospital changed from an affluent residential neighbourhood to a prominent rental neighbourhood. Recent studies on neighbourhood change in Halifax show occurrences of neighbourhood change and gentrification in the northern part of the Peninsula and areas of Dartmouth downtown (Prouse et al., 2014a; Prouse et al., 2015; Ramos et al., 2020). The rise of high-end

purpose-built rentals and luxury condominiums in downtown Halifax and Dartmouth indicates new-build gentrification in Halifax (Ramos et al., 2020). Apart from urban growth in Halifax, the planning policies in Halifax drove most of the high-density residential activities in the city core (Grant & Gregory, 2016; Ramos et al., 2020).

While there is evidence of gentrification in Halifax, pockets with varying economic housing groups such as social housing, co-op, and high income co-exist in the same area (Devet, 2019; Ramos et al., 2020; Ramos & MacNabb, 2018). Unlike Toronto, income inequality, polarization and gentrification do not appear extreme in Halifax (Prouse et al., 2014a). The growth is much slower, and the median income is much lower than the CMA, ultimately leading to the lack of clustering of lower-income areas. Unlike in the larger cities of Canada, income inequality and polarization is dispersed, making "hotspots" of lower-income areas throughout Halifax (Kaida et al., 2020; Prouse et al., 2014a; Ramos & MacNabb, 2018).

While most of the focus is on the high-density development in the downtown area and North End, ongoing change in other places of lower-income hot spots throughout Halifax like Fairview, Spryfield, North Dartmouth, Woodside, and parts of downtown Dartmouth are not getting needed attention (CMHC, 2018a; Devet, 2019; Ramos & MacNabb, 2018; Woodford, 2019). Ramos & MacNabb (2018) highlight the most vulnerable households in these hotspots are mostly renting, with lower education, families with children, and lower income. While the supply of rental units increases with new builds, they are high-end and more expensive than average rentals (CMHC, 2019). Emerging new rental buildings around the hotspots such as Fairview, West end, Spryfield

indicate increasing residential activity and possible socio-economic change, giving rise to a larger questions of affordability and gentrification in the existing community (CMHC, 2019; Devet, 2019; Stoodley, 2019). Housing affordability is becoming a major issue in the city, reaching a flashpoint in the summer of 2021 after both rents and house prices raised dramatically throughout the pandemic.

2.4 Housing and Life Course

Moos (2015) explains that throughout the aging process, our needs for housing and services change. As we move through generations, our social values, consumer preferences, and living arrangements also change. Miron (1993) suggests demographic changes contribute to the emergence of new residential geographies such as urban growth, car-dependent suburbanization, high-rise residences, senior citizens housing, and other purpose-built housing. Different cohorts have different ideas about where to live, what type of workplace to choose, what mode of transport to use, and what kind of lifestyle to live. As the demand for new spaces emerges, new urban forms become available (Moos, 2015).

Significant demographic change is occurring in North America due to major changes in fertility, conjugal relationships, migration, and longevity (Bourne, 1981; Moos, 2015; Rose & Villeneuve, 2006; Townshend & Walker, 2015). One major post-WWII demographic event is the "baby boomers," the most significant cohort of children born post-war. Over the life course, this largest cohort has impacted everyday systems from school, jobs, and housing to consumer preference. The aging baby boomers and declining fertility rate in North American cities are causing an imbalance in the

population pyramid; a prominent bulge of baby boomers is moving upwards in the population pyramid while the new generation is shrinking (Townshend & Walker, 2015). In other words, there are not enough younger cohorts to support the aging population.

Clark & Dieleman (1996) suggests a relationship between life course events and housing choices; as individuals move through different life stages from birth to old age, they are likely to move and change housing consumption. In a traditional life cycle stage, children live with their parents when young. As they grow older, they leave the parental home for higher education, enter the labour force, get into a marital relationship, buy a house, have children, and eventually retire. The timing of such life course events has changed; transition to adulthood is getting longer, young adults stay longer, and young adults live with parents longer. In addition, they are entering the labour force much later, delaying conjugal unions and childbirth and retiring much later in life (Clark, 2007; Townshend & Walker, 2015).

Similarly, households are becoming much smaller and moving away from a traditional single-family. As fertility rates decline and non-traditional household structures emerge, alternative family forms such as single-parent families and common-law families with or without children become significant households. Nevertheless, there is a strong relationship between life course and mobility; young households are more likely to move than an older household, and renters are more likely than the owners as they get tied by the property (Hall & Barrett, 2018). There is a growing presence of young adults in the metropolitan areas, and reflect people tend to move to neighbourhoods with similar age people, and as they age, they again change their location(Moos, 2016). The

changes are partly related to extending single adult life and delayed childbearing; the household structure and life course choices connect to the age factor (Moos, 2015). The residential moves can be voluntary (from property demolition or eviction) or involuntary from changes in lifestyle, economic changes, and the decision to change caused by housing stress and dissatisfaction over actual and desired housing characteristics (Hall & Barrett, 2018).

The robust job market, fast lifestyle, and urban amenities attract many young adults, working-age populations, and working-class immigrants to large metropolitan areas (Moos, 2015, 2016). The growing diversity in the life course and residential housing consumption leads to the subsequent growth of apartments, condominium ownership, and niche communities(Townshend & Walker, 2015). In inner cities of larger metros like Toronto and Vancouver, condominiums are distinctive means of homeownership and seen as a form of housing for urban, single, young adults and empty nesters as well as the newcomers (R. Harris & Rose, 2019; Lehrer & Wieditz, 2009; Moos, 2014; Rosen & Walks, 2013). Changing household characteristics such as small family households, aging baby boomers, empty n esters, single working women, and youths primarily identify as consumers of high-density housing in large cities (Kobayashi & Preston, 2015; Ley, 1986; Moos, 2016; Rosen & Walks, 2013; Skaburskis, 1988).

Immigration plays another important role in understanding housing patterns, especially in a country like Canada with high immigration rates accompanied by low natural population growth. The government of Canada is promoting planned immigration to address declining fertility and stabilize population growth, not to mention the positive

economic growth spurred by immigrant communities. According to Kobayashi & Preston (2015), international migration is a socially structured life course event where people move across countries searching for better jobs, education, and lifestyle. In Canada, most immigrants settle in Montreal, Toronto, and Vancouver, as many immigrants choose to live close to their social contacts (Kobayashi & Preston, 2015; Preston et al., 2009). Most newcomers rely on their social network and friends for housing upon arrival (Agrawal, 2010). Akbari & Harrington (2007) suggests recent immigrants mostly settle in areas with a higher proportion of immigrants, yet the initial location of immigrants depends on the location of their sponsors, whether it is a relative or the province. As housing affordability and information are crucial during the first six months of arrival, many settle in high-density housing as their initial option before moving to homeownership (Agrawal, 2010; Moos, 2016; Preston et al., 2009). Immigrant's housing choice also depends on their immigration class, finances, social and economic advancement, and length of stay (Agrawal, 2010).

Smaller cites like Halifax have struggled to attract and retain immigrants despite having policies and programs promoting in-migration and immigration (Akbari & Harrington, 2007; Grant & Kronstal, 2010, 2013; Ramos et al., 2020; Teixeira, 2009). Krahn et al. (2005), in their study of second and third-tier Canadian cities, found that employment and education advancement were two major factors for immigrants to decide whether to move or stay in their arrival cities. While immigration occurs under different classes. Grant & Kronstal (2010) study on skilled immigrant workers in Halifax revealed carrier choice and employment as the most significant variables for making housing choices among immigrants. The authors also highlighted that in Halifax, immigrants from

some job markets experience difficulty finding suitable jobs, but the reasonable housing cost, easy pace of life, and diversity attract the newcomers (Grant & Kronstal, 2010, 2013).

Many studies focus on consumers of high-density housing in large metros of Canada, and very few studies are found on mid-sized cities such as Halifax. Mid-sized cities like Halifax do not follow the settlement pattern of large CMAs, and the urban settlements make up a mix of urban and low-density rural communities with suburbs and rural towns (Ramos et al., 2020). Novak (2019) found in Halifax; the high-density developments do not spatially concentrate in city centers; their location disperses throughout the city and the suburbs. Grant & Gregory (2016) found between 1981 and 2011, the central census tracts in the Peninsula changed from primarily single-family homes to luxury condominiums and high-rise apartments. The authors also highlight that as the health sector and education sector flourished in central Halifax, it attracted smaller families with few children and a labour force near commercial, health, and educational services. Similar to the larger cities of Canada, the demographics of the Halifax city center is becoming a zone for young adults, aging population, smaller households, working women, and immigrants partially due to policies encouraging high density and partially due to its local to service industries and CBD (Grant & Gregory, 2016; Grant & Kronstal, 2010; Ramos et al., 2020)

2.5   Understanding Neighbourhood Change

Lupton & Power (2004) define the neighbourhood as a physical space connected to existing physical characters representing housing, transport, and environment, which might change over time. Spatially a neighbourhood is defined by residents and physical demarcations such as major roads or administrative boundaries and can vary from a few hundred residents in a suburb to thousands in dense urban core based on the density(Schulze Bäing, 2014). Residents' attitudes and values also represent the neighbourhood's changing characteristics; thus, in understanding change within an area, one must analyze the difference in the residents' physical and social attributes and the social relationship between the residents (Lupton & Power, 2004). In addition, knowing the demographics of the residents provides an insight into the neighbourhood, which helps identify areas of concern, issues, and opportunities in terms of planning and providing services (Akbari & Harrington, 2007; Ramos & MacNabb, 2018; Teixeira, 2009).

2.5.1   Concepts and Models of Neighbourhood Change

Schulze Bäing (2014) defines neighbourhood change as a process of physical and socio-economic change within neighbourhoods and over time. The traditional neighbourhood change and decline concept employs three approaches: human ecology, subcultural, and political economy. These models explain changes due to aging and the filtering of housing stock, strong neighbourhood attachment and social bonds, or significant economic and social transformation (Beckhoven et al., 2005). While the above theories focus on change caused by a single variable, Grigsby's (1987) model defines various

social and economic variables that drive neighbourhood change, resulting in a shift in in a neighbourhood's occupants (Megbolugbe et al., 1996).

Grigsby's model identified two primary factors that influence neighbourhood change; firstly, exogenous factors such as demographic changes, economic changes, and governmental interventions. For example, a single factor like changes in household age, size, and family composition can work separately to influence housing choice, location, tenure, and changing housing preferences and buying capacity. Secondly, endogenous factors relate to the behavior of the residents that could initiate the process of change. Negative situations such as racism and crime can lead to the area's physical and social deterioration (Beckhoven et al., 2005; Megbolugbe et al., 1996).

Discussions on neighbourhood change are vague as they include both objective and subjective variables such as development styles, infrastructure, demographic characteristics, class status, amenities, and local significance (Prouse et al., 2015). Bourne (1981) suggests that new housing trends that evolved since World War II in the form of freeways, satellite towns, suburbs, the apartment building boom, revitalization of the urban center, and decentralization of jobs have added variety and complexity to the traditional concept of neighbourhood pattern. Bourne (1981) lists both physical and social attributes of the neighbourhood: dwelling type, construction activity, population density, household and family structure, class, social status and income, migration, and mobility symbolizes the identity of the neighbourhood as they go through their life cycle. Thus, the significant housing variables go through a series of alterations for a neighbourhood to

change. During the process, housing works as both cause and a ramification of neighbourhood change (Bourne, 1981).

While neighbourhoods go through a life cycle of change and evolve, the economic and social factors vary by geographical region and community. The change process is slower in smaller cities, as the growth is slower due to a mostly less diverse economy and lower inequality in income distribution (Bourne, 2011; Bunting et al., 2007; Prouse et al., 2015). Besides, Lupton & Power (2004) highlights the relative importance of population movements in neighbourhood change, suggesting that residents' migration in and out allows demographic and social changes in a neighbourhood. International migration and immigration policies create new settlements, bring in new socio-cultural values, and form a unique population mix (Carter, 2005; Hackworth & Rekers, 2005; Lupton & Power, 2004).

2.5.2   Measuring Neighbourhood Change

Neighbourhoods can be complicated ideas to understand, from their boundaries to their social and economic characteristics, to their place attachment of residents and visitors. As a result of their multi-faceted nature, Nicotera (2007) discusses the difficulty in analyzing neighbourhoods through a single lens, subjective or objective. Theoretically, it is ideal to look at both subjective and objective measures, but practically it is not straightforward as neighbourhoods are multi-dimensional spatial units; the relation between their characteristics and even how neighbourhoods are defined varies based on the focus of the study conducted. For example, while analyzing a children's park in a neighbourhood, the structural measurement might be to look at the condition of the

infrastructure, its usage, location, proximity to the residential neighbourhood, while a subjective measurement from a residents' perceptions might look at the presence of households with children and without, race, ethnicity, density. Therefore, it is essential to identify the indicators and methods and their representation of the neighbourhood's physical, social, or other characteristics while measuring the change process (Cohen & Pettit, 2019; Lupton & Power, 2004; Nicotera, 2007; Schulze Bäing, 2014). Nicotera (2007) provides a valuable list of subjective and objective variables in Table 2.1; the variables further divide into four categories: social, economic, social processes, and physical composition/resources.

Neighbourhood change can be measured qualitatively using interviews, observation, or local questionnaire surveys for specific conditions and individual areas. Quantitatively, change can be measured using statistical data from official and demographic sources and study change over a period or perform a comparison (Schulze Bäing, 2014). In addition, many researchers use Census and other administrative data and integrate statistical models to perform quantitative analysis on neighbourhood studies (Ley et al., 2002; Moos & Skaburskis, 2010; Rosen & Walks, 2013, 2015; Skaburskis, 1988).

Table 2.1: Categories and Related Variable of Neighbourhood

Source: Nicotera (2007, page 31)

Social Composition	Economic Composition	Social processes	Physical Composition/ Resource
• Age • Race/ ethnicity • Nativity • Residential mobility • Density of children • Percent of female-headed households • Percent of elderly • Percent of single parents	• Percent affluent neighbors • Poverty • Employment • Percent white-collar workers • Percent managerial/ professional workers • Education • Public housing • Homeownership • Proximity to affluent neighbourhoods	• Organizational participation • Unsupervised teens • Neighboring • Crime • Value consensus • Community monitoring • Social capital/ social networks • Civic participation	• Condition of housing • Trash/ litter • Graffiti • Traffic, street, and parking conditions • Playgrounds/ parks • Proximity to employment and public transportation • Community centers • Schools • Bars, grocery stores, retail shops, cafes • Libraries • Abandoned homes and Vacant lots • Crowding • Architecture

One of the most widely known neighbourhood change ideas comes from Hulchanski (2010), who employs demographic analysis in studying inequality in three cities within Toronto. Similarly, Prouse et al. (2015) apply Hulchanki's "Three cities model" to examine Halifax's income trends using average individual income at census tract level relative to the Halifax Census Metropolitan Area average. Skaburskis (1988)

applies Principal component analysis to identify the critical submarket of condominium occupants and uses survey data of condominium occupants from 1983 by Canada Mortgage and Housing Corporation (CMHC) to examine the probable effects of an increase in condominium demand on urban density profiles and characteristics of inner-city neighbourhoods around the 1980s. Similarly, Meligrana (1993) applies the descriptive model as the methodology to find the difference between the determinant factor of first-time homebuyers and buyers who have previously owned.

Demographic data can be incorporated into Geographic Information Systems (GIS), allowing for mapping neighbourhood characteristics for visual interpretation and spatial analysis. Census data and other administrative data can be integrated and managed using geoprocessing tools available in ArcGIS. Similarly, geoprocessing tools allow performing a range of spatial analyses, from simple visualizations to more complex spatial correlations and regressions. These tools enable the user to summarize attributes, identify statically significant spatial clusters such as public housing or retail concentration, and explore spatial relationships such as group features with similar characteristics or geographic distribution patterns (ESRI, 2018). Other statistical analyses such as multivariate analysis and location-based interpolation tools can perform complex location-oriented geographic analysis to find patterns, assess changes, and compare variables. Overall, GIS tools allow researchers to process, store, manage, analyze, and map demographic, socio-economic, and geographic data.

2.6 Summary

The overview of residential development trends in North America relates emerging urban forms with socio-economic changes and technological advances in production and transportation. Planning policies and models are likewise influential in directing growth, as demonstrated by the slum clearances of the 20th century and revitalization and intensification ideologies of the 21st. The literature review suggests that high-density developments drive urban and city living in larger cities, making them highly attractive for the knowledge economy due to proximity to the amenities, entertainment, culture, and transportation and services. Moving through the age cohorts our social values, consumer preferences and living arrangements change contributing to emergence of new residential geographies such as suburban single-family homes, high-rise residences, senior-citizen housing, purpose built rentals (Miron, 1993; Moos, 2015). And as we move through life course events our housing consumption also changes. Migration and international immigration play a crucial role in housing as people move in search for better job and lifestyle. As the provincial government invites more immigrants to Canada, understanding their needs and providing social services, housing becomes crucial for urban and housing policy planning (Akbari & Harrington, 2007; Carter, 2005).

Understandably then, high-density buildings are becoming the identity of the city cores with large condominium towers, waterfront development, boutique amenities, and high-rise office buildings; however, these developments are associated with gentrification and displacement of existing residents (Lees et al., 2008; Ley, 1986; Smith, 1996). At the same time, some scholars have argued that not all the inner-city developments can be

classified as new-build gentrification but rather are relatively new developing urban forms with their high density rental and condominium residential buildings (Boddy, 2007; Lees et al., 2008; Rosen & Walks, 2013). Numerous studies are available focusing on gentrification and neighbourhood change in major cities of Canada, while a handful of studies focus on cities similar in size to Halifax. For example, Grant & Gregory (2016), Prouse et al. (2015), and Ramos & MacNabb (2018) found evidence of gentrification in different parts of Halifax, and Ramos et al. (2020) noticed new-build gentrification occurring as a result of rising purpose built rentals and luxury condominiums.

Considering the recent increase in high-density housing construction in Halifax (CMHC, 2019), and building on the aforementioned local studies, my research aims to examine the residents living in high-density dwellings in Halifax. I look into household demographics, socio-economics, and implications of high-density occupants in urban and suburban areas of Halifax. Results add to the existing scholarship as very few studies focus on consumers of high-density dwellings in the mid-sized city of Halifax. Moreover, most research neglects to look across the region, instead focusing on traditional areas of gentrification. I compare districts found in both urban and suburban areas with each other and the CMA.

Thus, I take the more recent, and more expansive view of gentrification and its associated processes of neighbourhood change. I expand the lens beyond the inner-city to see how high-density developments are shaping the urban landscape throughout the metropolitan area of Halifax. New-build gentrification is especially pertinent to this research as I focus on large-scale housing developments rather than the piecemeal

upgrading of existing units. I also take gentrification as more broadly defined than just economic change, looking at how neighbourhoods are changing across a host of social, economic, and demographic characteristics. These tie in with much existing work, as outlined above, regarding the changing household characteristics resulting from evolving conjugal relationships, fertility, longevity, migration, and immigration (Bourne, 1981; Moos, 2015; Rose & Villeneuve, 2006; Townshend & Walker, 2015). Ultimately, I compare high-density neighbourhoods with the CMA as a whole across a variety of variables obtained through the census as outlined in the next chapter.

3   Methodology

3.1   Study Area

This study focuses on the high-density developments in Halifax's urban core (see Figure 3.1). With a population of 403,131, Halifax is the largest metropolitan area in Atlantic Canada and the region's economic and cultural center (Statistics Canada, 2016). Halifax, Dartmouth, Bedford, and Halifax County amalgamated to form Halifax Regional Municipality (HRM) in 1996. As the amalgamation brought all lands together across the former Halifax County, most of today's municipality consists of sparsely populated areas, with relatively small suburban and exurban communities located around the urban core, which contains about 78% of the city's population. While much of the municipality is rural, the suburbs conform to low-density development interspersed with medium and high-density nodes. Peninsular Halifax, meanwhile, sees the highest density, with many mid and high-rise structures and almost no undeveloped lands.   Due to the dispersed nature of Halifax's high-density developments, the study area comprises different regions in Halifax's urban core, i.e., The Peninsula, Mainland Halifax, Dartmouth, and Bedford. The study boundary follows the HRM's designated community boundary (see Figure 3.2).

Halifax Peninsula is the central city core and houses older, residential and mixed-use neighbourhoods and the central business district. The Mainland Halifax region extends from the Peninsula, including Fairview, Clayton Park, Rockingham to the North and Armdale, and Spryfield neighbourhoods to the south. This region includes Bayer's Lake business park and the newer developed residential areas along Larry Uteck Boulevard in the Royale Hemlocks. Bedford is a suburban community located on the

northwest end of the Bedford Basin. It consists of primarily residential neighbourhoods

with pockets of commercial centers such as Atlantic Acers industrial park and high-

density retirement communities along the basin. The Dartmouth region is a former city

and suburb located across the bay from Halifax Peninsula connected via the Angus L.

Macdonald Bridge and the A. Murray MacKay Bridge. It consists of its urban community

with newer high-density developments facing the basin. Simultaneously, most older

neighbourhoods are located inland, such as Woodlawn, Westphal, Bel Ayr Park,

Commodore Park, and Ellendale, which expanded after the construction of Angus L.

Macdonald Bridge in 1955 (Millward, 1981). Additionally, this region has one of the

largest industrial parks in the Burnside area, with more than 2000 enterprises (HRM,

2020).

Neighbourhood Map of the Study Area, Halifax

Lower Sackville

Bedford

Hammonds Plains

Larry Utek

Bedford Basin

Burnside

Dartmouth

Woodlawn

Clayton Park

North End

Portland Estates

Downtown Dartmouth

Fairview

Bayers Lake

West End

Peninsula

Downtown

Woodside

Mainland Halifax

Beechville

South End

Shearwater

Cowie Hill

Spryfield

N

— Highway
— Major Roads
☐ Study Boundary

■ Parks
■ Water bodies

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD1983 UTM Zone 20N

0 0.5 1   2   3   4 Kms

Figure 3.1 Neighbourhood Map of the Study Area, Halifax

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High Density Dissemination Areas within the Study Boundary, 2016

Legend:
- Bedford - 2 HD DAs
- Dartmouth - 27 HD DAs
- Mainland Halifax - 35 HD DAs
- Peninsula - 40 HD DAs
- Other DAs

- Study Boundary
- Major Roads

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
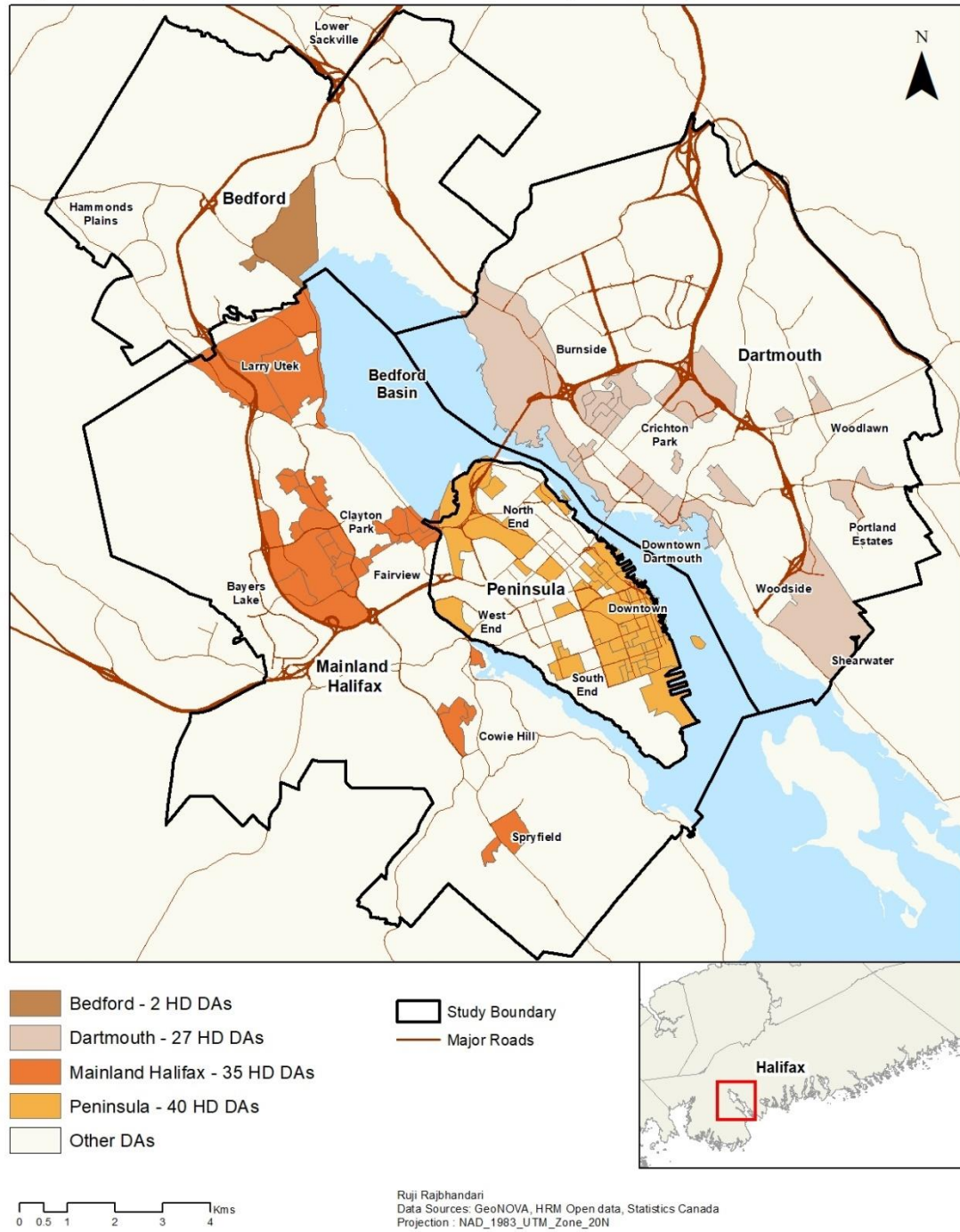
Figure 3.2 High-density DAs Within the Study Area, 2016

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3.2 Data Collection

I collected data from three primary sources for this study. First, I retrieved the census data

for 2006 and 2016 from the Canadian Census Analyser, an online database maintained by

Computing in the Humanities and Social Sciences (CHASS) at the University of Toronto

(CHASS, 2019)[2]. Secondly, I obtained a dataset compiled by Werle (2017)[3] for his

Honour's thesis at SMU containing the listing of condominium developments in Halifax

Regional Municipality between 1972 to 2016. Thirdly, I retrieved the commercial

property dataset containing all rental buildings for Nova Scotia from dataZONE[4], an

online database maintained by Property Valuation and Services Corporation (datazONE,

2019). I supplemented these three primary data sources with GIS data in Shapefile

format from the Halifax Regional Municipality's data portal (opendata_HRM, 2019)[5] and

geographic boundary files from Statistics Canada (Statistics Canada, 2020)[6]. The

following sections explain in detail the data collection process associated with respective

sources.

3.2.1   Census Data

The Census counts people based on their usual place of residence and includes not only

Canadian citizens but also landed immigrants (permanent residents) and non-permanent

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[2] CHASS. (2019). Canadian Census Analyzer.
http://dc1.chass.utoronto.ca.library.smu.ca:2048/census/index.html
[3] Werle, C. K. (2017). Mapping the development of condominiums in Halifax, NS 1972-2016. 72.
[4] datazONE. (2019). Commercial Building Characteristics | DatazONE |.
https://www.thedatazone.ca/Assessment/Commercial-Building-Characteristics/9ac6-zg6i
[5] opendata_HRM. (2019). Halifax Regional Municipality. https://catalogue-hrm.opendata.arcgis.com/
[6] Statistics Canada. (2020, November 18). Census Subdivision Boundary File.
https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-eng.cfm

residents (people studying or on a work permit or a refugee) along with their families

living in Canada (Statistics Canada, 2017b). It also counts citizens and landed immigrants

temporarily residing outside Canada or working outside Canada (Statistics Canada,

2017b). I used the 2016 census data as it is the latest dataset available during the study

and released by Statistics Canada in 2017 and the next census will not be collected until

2021. Employing the 2006 census allows for tracking changes over time. I used the 2006

census data rather than 2011 due to data collection issues with the 2011 Census

(Hulchanski et al., 2013). The 2011 Census asked fewer questions than the previous

Census, and voluntary National Household Survey replaced the mandatory long-form

receiving a much lower response in many smaller cities and non-urban areas and

sampling bias due to the voluntary reporting mechanism (Hulchanski et al., 2013; Prouse

et al., 2014a).

I chose to use Dissemination Areas rather than Census Tracts as the aggregation

unit for my data. A dissemination area is a smaller geographic unit than the census tracts,

composing one or more dissemination blocks (smallest census geographic area) with an

average population of 400 to 700 persons (Statistics Canada, 2016). Prouse et al. (2014)

suggest that a DA level analysis better reflects neighbourhood change in smaller cities

like Halifax, where low income and high-income concentration is relatively small and not

isolated to perform a Census tract-level study. Unfortunately, finer resolution data at the

Census Block level was unavailable due to the sensitivity of the data. The 2006 Census

contains 570 DAs in Halifax CMA and increased by 29 to 599 by the 2016 Census.

Among the total DAs in the CMA, a total of 348 DA fall inside the study boundary. From

the 2006 and 2016 Census, I obtained a wide range of Census data, including the raw

library of census variables and attributes listed in various columns representing each DA. For example, income data divides into multiple groups: income for private households, before tax, after-tax, low-income cut-off, Low-income measure, and median household income after tax (also, all variables subdivide by income range). The raw data also contained many variables that were not significant to the study and required a great deal of data cleaning while maintaining its integrity.

3.2.1.1 Cleaning and Processing Census Data.

The data tables download from CHASS come in raw CSV format requiring processing and cleaning. The Census provides a wide variety of data, but the library is so extensive that it needs filtering to extract relevant data. I selected ten Census Profiles for a detailed overview of the HD DAs' population characteristics: "Aboriginals and Visible Minorites',' Age and sex,' 'Education,' 'Families, households and marital status,' 'Housing,' 'Immigration,' 'Income,' 'Journey to work,' 'Population and dwellings' and 'Dwelling.'

Often variables in the 2006 and 2016 Census were not divided in the same fashion; therefore, I consolidated many variables and included only the key indicators. For example, Census 2006 distributes population by Age group every five years (i.e., 0-4, 5-9, etc.). In contrast, the Census 2016 population divides by age groups, e.g., 0 to 14, 15 to 64, and smaller groups and separate divisions by Sex and Age. The Age and Sex data in the 2016 Census came in percentage format, so there was no need to calculate the age groups' percent. I found the 2016 Census classification of variables more useful; therefore, I recalculated 2006 data into three age groups to fit the 2016 Census format.

After careful recalculating and summarizing variables, I narrowed down the data to twenty-two variables to answer my research question listed as follows: 'Total population,' Male to female ratio,' 'Children population (0 to 14yrs), 'Working-age population (15 to 64yrs)', 'Senior population (65+)', 'Proportion of single-detached dwellings,' 'Proportion of apartment-style dwelling more than or equal to five-story,' 'Average household size,' 'Single person household as a percentage of the total dwellings),' 'Median household income,' 'Prevalence of low income - Low-income cut-off (LICO),' 'Shelter cost to income ratio,' 'Highest level of education,' 'Lowest level of education,' 'Immigrants population (% of the total population),' 'Recent immigrant population (% of the immigrant population),' 'Non-permanent resident population (% of the total population),' 'Visible minority,' 'Mode of commute- Car,' 'Mode of commute – Public transit,' 'Mode of commute- walk' and 'Commute duration less than 30 minutes. I calculated all the variables as the percentage of the total population except median household income, male to female ratio, average household size, and total population.

I cleaned, edited, and processed raw data and converted them to a workable table format using MS Excel. Once cleaned, I used ArcGIS to join the attributes of Census variables with the Dissemination Area Shapefile obtained from Statistics Canada. I converted all the cleaned Census variable files into a geodatabase for both years. Dissemination Area identification number (DAUID) is the common factor used to join all the data sets. I used spatial join (ArcGIS tool) to link each DA with its Census attributes geographically. I spatially joined the three data sets in ArcGIS to include point Rental and Condominium data and the Census variables. This process allowed me to sum up the total count of rental and condominium dwellings in a DA. Finally, I created a composite

of all the individually chosen variables, rental, and condominium data in spatial format or

Geodatabase for 2016 and 2006 data. All the original and processed data will retain with

my supervisor and me after completing this study.

3.2.1.2 Data Limitations

The Census is very reliable secondary data, but I noticed missing or null data in some

DAs during my visual observation. A good example is in the DA covering Shubenacadie

and Sable Island. Both DAs have the total population, but the remaining data related to

income, dwelling, demographics, etc., are missing from the raw data. Such incidences of

null data can result in errors or inconsistent values while calculating in ArcGIS. Thus, I

removed DA#12090716 (Shubenacadie) and DA#12090845 (Sable Island) from spatial

data but included the overall CMA calculation as both DAs had some data.

The two primary tenures for high-density housing are rentals and condominiums,

and the latter is strictly a form of homeownership most often associated with towers in the

urban core (D. C. Harris, 2011). Other tenures, such as co-operatives, are much less

common in Canada. There is some difference in reporting style on condominium data

between Census 2006 and 2016. Census 2006 does not report condominium status in

dwellings, unlike the 2016 Census. The reporting style difference does not allow for

straightforward data comparison of condominium dwellings between the years. Therefore

I collected condominium and rental data from Werle (2017) and datazONE. While

working with the income variable, I noticed that the 2006 Census divides the shelter to

income ratio into rental and owned.

In contrast, the 2016 Census does not divide income by ownership, so I summed them into one category for 2006. Similarly, the 2016 Census categorizes low-income prevalence into low-income cut-offs or low-income measures, but the 2006 census does not distinguish. I choose LICO as the measure for this study based on Statistics Canada (2012), which explains that academics mostly use the low-income measure (LIM) to measure the income threshold on spending during international comparisons' while low-income cut-off (LICO) is an estimate of an average family's income threshold to spend on basic necessities.

3.2.2   Condominium Data

I obtained the condominium listing dataset in Shapefile format, including condominium development information from 1972 to 2016. It included condo corporation number, civic address, parcel identification no (PID), registration date, building type, number of units, and stories. As part of his Honours thesis, Werle (2017) obtained the condominium data before October 2010 from a previous master's independent study and updated the remaining data till mid-2016. The condominium property data, such as the total number of units, registration date, civic address, condominium corporation number, and the parcel identification number (PID), were obtained manually from land registration records at Nova Scotia Land Registry Office in Dartmouth, Nova Scotia. Additional attributes such as old house conversion, commercial component, number of stories, and low/high-rise (for apartments) were added to the dataset using Google Maps- street view. Since the condominium data aligned with the most recent census year (i.e., 2016), I did not have to update the file for more contemporary developments.

3.2.3 Rental Data

I retrieved rental property data from datazONE, the open database maintained by Property Valuation and Services Corporation (datazONE, 2019). This dataset contains location, address, and property characteristics such as a civic address, year built, number of units, etc., for improved commercial properties in Nova Scotia. I cleaned, sorted, and filtered irrelevant data such as hotels, retirement homes, nursing homes to reflect only commercial rental properties in the Halifax CMA. Each record on the dataset included civic addresses and X and Y coordinates. I used the X and Y coordinates to add this data into the ArcGIS map (Projected Coordinate System: NAD_1983_UTM_Zone_20N, Geographic Coordinate System: GCS_North_American_1983). I visually checked the geo-location of sample data records using aerial imagery in ArcGIS, also manually checked the civic addresses on Google maps. Finally, I compiled the condominium data and spatially joined it to the DA boundary data for further analysis.

3.3 Classifying High-Density DAs

I classified each DA into high density or not based on the Census 2006 and 2016 datasets. A DA consists of 400 to 700 persons; thus, a DA could have a single high-density building or a mix of high-rise and single-family homes or only single-family homes in a suburban landscape (Statistics Canada, 2016b). Population, dwelling, floor area ratio, or other characteristics can measure density to demonstrate the given population's influence on a unit area (Hess et al., 2007; Ruzycky, 2009).

For this study, a DA is high density if the sum of rental and condominium dwellings is more than 70% of its Census dwellings. To classify each DA, I compared the number of units in the condominium listing and rental dwelling databases with the Census dwelling counts. I used only rental and only condominium HD DAs as two other parameters to select high-density DAs with predominantly rental or predominantly condominium dwellings. To be predominantly rental, a DA must have more than 70% of its total dwellings (Census dwellings) of rental units. Similarly, to be considered primarily a condominium, a DA must have more than 70% of its total dwellings (Census dwellings) made up of condominium units. I used the same parameters to select sample DAs for Census 2006. The calculation mentioned above is as follows:

Table 3.1: High-density Parameters

a.	High Density (HD) =	(Total Rental Units + Total Condo Units)/ Total Dwellings * 100
b.	Condominium Predominantly HD =	(Total Condo Units / Total Dwellings) * 100
c.	Rental Predominantly HD =	(Total Rental Units / Total Dwellings) * 100

The result of this work classified 104 out of 601 DAs as HD DAs in the Halifax x in 2016 (see Table 3.2). To break down the totals further, 8 HD DAs are predominantly condominiums, and 71 are predominantly rental. Using the same criteria, I outlined 98 DAs out of 570 as HD DAs in 2006. When broken down by condominium and rental, there were seven predominantly condominium DAs and 70 predominantly rental DAs in 2006. The High-Density category includes a summation of smaller proportions both

condominium and rental; therefore, it does not add up to predominantly rental or condominium HD DA. The table below shows the total number of DA distribution in the two Census years and type of ownership.

Table 3.2: High-density (HD) Dissemination Areas (DAs) by Category for Census Years 2006 and 2016

Census Year	HD	Predominantly Condo	Predominantly Rental	Total DAs
2006	98	7	70	570
2016	104	8	71	601

During the initial phase of the study, I divided the DAs with more than 70% HD into four categories based on density levels within the HD category. Category 1 includes HD DAs equal to or above 100%. Category 2 includes HD DAs between 90 to 99%, and Category 3 includes 80 to 89%. Finally, Category 4 includes DAs between 70 to 79% high density. I compared household characters between the HD DAs and their neighbors for each category to see any noteworthy trend occurring among the HD classes and their immediate neighbours. The purpose of this analysis was to ensure whether there is a need to analyze the four categories. The findings did not show significant differences in demographic, immigration, education, and commute patterns between HD and their neighbours. Although, variables such as income and dwellings in all categories were significantly different compared to their neighbours. (See Results section) Overall, the variables showed similar demographic and socio-economic trends between different density levels. Thus, moving forward, I performed all the data analysis without sub-categorizing HD DAs by different density levels and used 70% as a baseline to designate high density to each DA.

I applied the sample selection parameters from (Table 3.1) to further perform overall HD and region-wise HD analysis. Once I assigned the high-density designation to the DAs, I did a spatial extraction using ArcGIS to study the distribution of high-density dwellings in the study boundary and within each region and compare the regions' HD characteristics.

Table 3.3: HD DAs Distribution by Region for Census Years 2006 and 2016.

Census Year	Bedford	Dartmouth	Mainland	Peninsula	Total
2006	2	22	36	38	98
2016	2	27	35	40	104

For the second analysis method, I selected target DAs with new construction between 2011 and 2016 to identify demographic and socio-economic change due to new construction (see Figure 3.3). First, I picked all the rental and condominiums built between 2011 and 2016 with at least fifty units, then used these to cross-reference and select the DAs for the study using ArcGIS. As the focus is to access possible changes in the neighbourhood by new high-density construction, including single-family housing development could skew the Census data. Therefore, I manually unselected the DAs with other major housing construction such as single-family homes as tracked on the satellite image obtained through Google Earth. Then, I used the selected DAs with recent construction in the second method of data analysis.

Table 3.4: Distribution of DAs with Recent Construction by Region for Census Years 2006 and 2016

Census Year	Bedford	Dartmouth	Mainland	Peninsula	Total
2006	1	5	4	7	17
2016	1	5	4	8	18

Dissemination Areas with New Construction between 2011-16

Legend:
- Bedford - 1 DA
- Dartmouth - 5 DAs
- Mainland Halifax - 4 DAs
- Peninsula - 8 DAs
- Other DAs

- Study Boundary
- Major Roads

Halifax

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
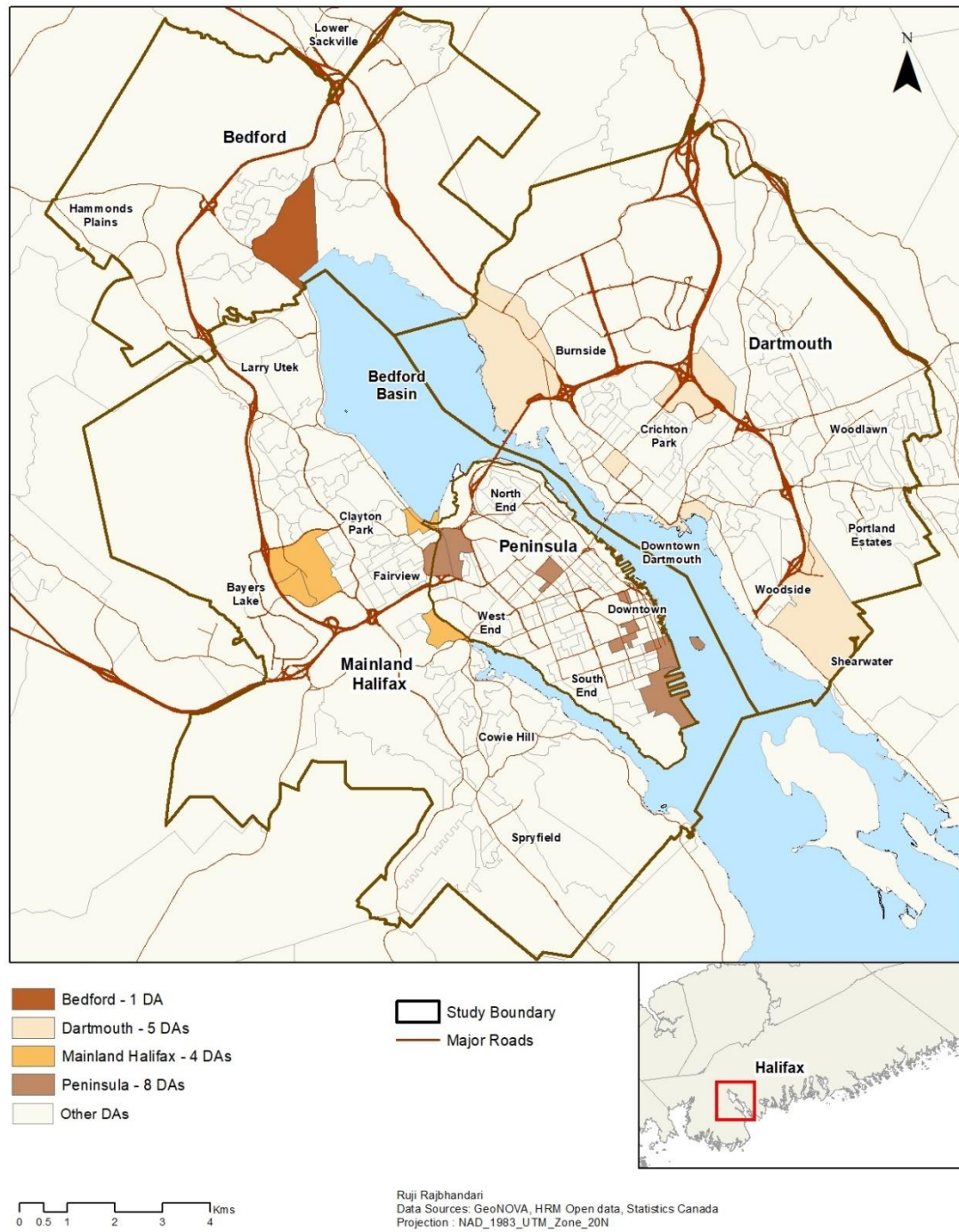
Figure 3.3 Halifax Dissemination Areas with Recent High-density Construction Between 2011-16

3.4   Data Analysis

I employed two primary analysis methods outlined below. In the first method I performed descriptive statistics of the sample data to summarize household characteristics such as demographics, income, dwelling, immigration, commute, etc., of the sample high-density DAs. I utilized one of the broadly used central tendency measures or the sample's mean (arithmetic mean or average) to estimate the population characteristics (McGrew & Monroe, 2000). To answer my first research question, I compared all the twenty-two census variables of high-density DAs with the overall CMA and compared 2006 data with the 2016 data to examine the change and trend among the variables (see Section 4.1 for results). The socioeconomic maps showing census variables indexed to the CMA average for 2016. I used the interval pattern adopted in (Prouse 2013; Prouse et al., 2014a) to interpret DA variables' changes instead of default ArcGIS data ranges.

Based on the Hulchanski (2010) "Three cities" model, the Dalhousie University's research on neighbourhood change in HRM, 1970 to 2010 focuses on examining and identifying socio-spatial polarization in Halifax. The study uses the CMA average as a baseline to interpret the socioeconomic rise and decline within and across Halifax neighbourhoods (Prouse et al., 2014a). Following the same principles, I divided the socio-economic neighbourhood maps into intervals of variables 20% above and below the CMA average. The Halifax study analyzed the change at the census tract level following the model, and considering the smaller geography of Halifax, I used Dissemination Area as the smallest geographic level of study. The five categories of intervals relative to the CMA average are listed below.

- ❖ Very Low – below 60% of the CMA average

- ❖ Low – 60 to 80% of the CMA average

- ❖ Middle – 80 to 120% of the CMA average

- ❖ High – 120 to 140% of the CMA average

- ❖ Very High – over 140% of the CMA average

I also compared the four regions' high-density DA attributes (Bedford, Dartmouth, Mainland, and Peninsula) with the overall CMA to examine the regional characteristics of high-density households (see Section 4.2 for results). Most of the Census data is a count of the population. Whereas I have based my analysis on the variable's presence within the population, I processed and summarized the data variables into percentages because the sample population is not the same in the study regions or does not have the same base value (Statistics Canada, 2015a). The ratio allows me to measure a group's value relative to a bigger group as both samples represent the proportion of their sample population and not actual values (Stephanie, 2016).

To further substantiate the results with statistical analysis, I used ANOVA on the 2016 data. I referenced only the statistically significant variables to perform further analysis. While examining the change and trend between HD DAs and CMA, I reviewed only the variables that were shown statistically significant on 2016 data. I also performed ANOVA on variables across each region with the CMA, here also I focused on variables identified as significantly different to further examine the trend between HD DAs in each region and CMA.

In the second method, I focused on recently constructed high-density dwellings. I selected the DAs with rentals and condominiums built between 2011 and 2016 and at least fifty units. I narrowed down the DA selection by manually checking the aerial imagery to see other major housing construction between 2011 and 2016. If there were no other major construction, I can assume that any changes between census 2011 and 2016 could be attributable to the new high-density construction. I performed descriptive statistics of the sample data. I followed the analysis process as the first method to understand the characteristics of high-density households living in recently constructed dwellings. I compared all the twenty-two census variables of the selected DAs (recent building construction) with their neighbouring DAs throughout the CMA and compared 2006 data with 2016. I performed ANOVA between selected DAs and their neighboring DAs throughout the CMA for 2016 to further substantiate the data. I focused on statistically significant variables in 2016 data to further examine the change and trend between years (see Section 4.3 for results). I compared the four regions' high-density DA variables (Bedford, Dartmouth, Mainland, and Peninsula) with the neighboring DAs to examine any significant regional changes in the neighbourhood due to recent high-density construction. I performed ANOVA between selected DAs and their neighbouring DAs for 2016 to substantiate the results. Like previous sections, I focused on variable statistically significant in 2016 to examine the change between years of selected DAs and their neighbours in a regional context.

3.4.1   Analysis of Variance (ANOVA)

Upon completing the basic descriptive statistics, I employed Analysis of Variance (ANOVA) to identify any significant differences between two sample group means or between a sample group mean and the population mean. ANOVA is a hypothesis testing-based analysis; the first assumption is the null hypothesis stating that the two sample groups come from a common population (Ebdon, 1985; McGrew & Monroe, 2000). The alternative hypothesis is that the samples come from a population with different distribution; thus, there will be substantial differences between the two means (Ebdon, 1985; McGrew & Monroe, 2000). For this research, I found the ANOVA a suitable tool based on the following advantages. Firstly, it allows the analysis of the variability between the sample group means. Secondly, it will enable us to analyze the variability within each group around its group mean. Since the sample mean (high-density DAs) is taken from the same population mean (Halifax CMA), I expect a small variance. Still, if there is a large variability between the groups or within each group, they are likely to represent different populations.

I used the "Anova; Single Factor" data analysis tool found in Excel 365 during this research. To determine whether the variance is significant or not, I used the commonly accepted and widely used confidence level $(1 - α)$ of 95%, assuming a low probability of sampling error (McGrew & Monroe, 2000). Here, the level of significance $(α)$ represents a p-value of .05, i.e., a 5% probability of two groups means supporting or rejecting the null hypothesis. If the p-value is greater than .05, there is no significant difference between the groups, suggesting that each sample has the same underlying distribution. While if the p-value is less than .05, then the two-group means are

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statistically significant, and the underlying probability distributions are not the same for all samples (Mcleod, 2019; Microsoft, 2020).

In the first method, ANOVA was performed only on 2016 data. I did the statistical analysis on each of the twenty-two census variables using the mean values of all high-density DAs compared with all the DAs within the CMA to identify any significant differences. In a regional context, I did ANOVA on twenty-two census variables using the mean values of HD DAs within a region and the mean value of all the DAs within the CMA to determine any significant difference in the means between each region and the CMA (see Table 4.4). I did a separate ANOVA on prominently rental HD DAs and CMA to determine any significant difference between rentals and the CMA in different regions of the study area. Finally, I applied ANOVA on prominently condominium HD DAs and the CMA to determine any significant difference in condominium HD DAs and CMA.

Similar to the first method, I performed ANOVA between selected DAs and their neighbouring DAs on 2016 data to identify significant indicators of changes between the sample DAs and the neighbouring DAs after completing new HD developments. I did the statistical analysis on each of the twenty-two census variables using the mean values of all selected DAs with recent construction and their neighbouring DAs within the CMA to identify any significant differences. In addition, for each region, I did ANOVA on 2016 variables using the mean values of selected DAs and their immediate neighbours within a region to determine any significant difference in the means between them.

4   Results

This chapter summarizes the results of the research, focusing on households' demographic and socio-economic characteristics in the dissemination areas categorized as high density (HD). During the early phase of data analysis, I subdivide the DAs with more than 70% HD into four intervals based on their percentage such as Category 1 - HD DAs equal to or above 100%, Category 2 - HD DAs between 90 to 99%, Category 3 - HD DAs between 80 to 89%, and finally, Category 4- HD DAs between 70 to 79% high density. Next, I compared household characters between the HD DAs and their immediate neighbours, but the findings did not show significant differences between categories; thus, I continued the study taking 70% as a baseline to qualify for high-density (see Table 4.1, 4.2).

The results are in two sections based on the analysis methods used. Section 4.1 gives an overview of the characteristics of households based on the first analysis method looking at DA's with over 70% high-density dwellings, comparing the population characteristics between HD and the overall CMA before looking at the same variables' regional variation. Section 4.3 highlights the results from the second analysis focusing on DAs with recently constructed high-density dwellings. This section also summarizes the characteristics of residents living in DAs with newer high-density developments built between 2011 and 2016.

Table 4.1 Population Characteristics, 2016 (High-density DAs and their Neighbours)

Census Variables	Category 1		Category 2		Category 3		Category 4		CMA
	HD	Neighbors	HD	Neighbors	HD	Neighbors	HD	Neighbors	Overall
Total Population	28,965	89,598	16,241	61,325	24,731	82,210	9,433	64,728	403,390
Male - Female ratio (number of males per 100 females)	96.9	92.5	92.2	93.0	87.0*	93.2	85.0*	92.3	93.9
Children Population (0 to 14 yrs.), %	10.9	12.6	10.5	11.7	10.3	11.4	10.6	12.2	15
Working Age Population (15 to 64 yrs), %	73.9	72.4	74.0	73.7	69.4	72.1	72.1	70.9	69.3
Senior (65 +), %	14.9	15.1	15.7	14.5	20.3	16.5	17.7	16.9	15.7
Single detached dwellings, %	1.6*	26.5	10.7*	26.2	9.7*	26.5	11.7*	25.6	49.9
Apartment style dwellings >=5 storey, %	47.9*	22.9	29.2	22.0	43.2*	19.4	31.1	27.0	12.1
Average Household size, #	1.9*	2.1	1.8*	2.1	1.8*	2.0	1.8*	2.1	2.3
Single Person Household, (% of total dwellings)	46.2*	37.2	49.0*	38.8	46.3*	40.9	47.9*	36.5	29.5
Median Household Income, $	44,430*	$ 59,701	41,384*	$ 64,455	46,063*	$ 58,505	$ 51,192	$ 66,803	$ 69,522
LICO-AT, %	25.2*	17.2	25.5*	16.0	20.3	16.0	16.4	15.7	9.6
Shelter cost to income ratio = > 30%	19.8*	33.9	43.4*	33.8	44.5*	34.5	37.5	32.1	25.0
Highest level of Education (Age group 15 to 64), %	63.4	65.5	62.1*	67.5	64.8	65.1	64.1	67.3	63.9
Lowest Level of Education (Age group 15 to 64), %	11.8	11.3	12.3	10.4	11.0	11.1	12.4	9.9	12.1
Immigrants, % (of total population)	18.6*	14.7	14.1	14.5	12.8	13.7	12.9	16.2	9.4
Recent Immigrants 2011-2016, % (% of immigrant population)	50.9*	27.5	26.1	31.1	42.4*	28.7	24.3	30.2	25.3
Non-Permanent Residents, % (of total population)	9.3*	3.8	5.6	4.0	4.9	3.9	5.0	4.2	2.0
Visible Minority, %	29.8*	19.2	20.3	19.2	18.4	17.5	18.7	20.1	11.4
Mode of Commuting - Car, %	51.4*	68.7	60.1	64.1	62.6	63.3	62.6	69.0	77.7
Mode of Commuting - Public Transit, %	21.2*	16.0	19.6	17.1	19.9	18.5	18.2	15.7	11.8
Mode of Commuting - Walk, %	25.1*	12.7	17.7	15.7	15.0	15.4	16.5	13.2	8.2
Commuting Duration <30 min, %	75.4	71.3	69.4	73.7	73.9	73.2	70.6	73.3	65.7

* *p* <.05 Census 2016 variables are statistically significant than their neighboring DAs

Table 4.2 Population Characteristics, 2006 (High-density DAs and their Neighbours)

Census Variables	Category 1		Category 2		Category 3		Category 4		CMA
	HD	Neighbors	HD	Neighbors	HD	Neighbors	HD	Neighbors	Overall
Total Population	25,206	67,435	9,644	53,617	19,419	80,233	15,553	64,029	372,858
Male - Female ratio (number of males per 100 females)	89.7	89.7	91.4	91.8	80.3	88.5	84.1	89.5	92.2
Children Population (0 to 14 yrs.), %	10.9	13.4	11.1	12.3	9.0	13.9	11.9	12.7	16
Working Age Population (15 to 64 yrs), %	77.8	73.9	77.8	74.8	72.2	71.8	73.1	72.3	71.8
Senior (65 +), %	11.6	12.5	10.8	13.0	18.7	14.2	15.0	14.9	12.1
Single detached dwellings, %	3.8	25.8	11	19.7	8.9	35.3	12.7	28.1	51.6
Apartment style dwellings >=5 storey, %	46.5	15.2	20.3	24.4	26.0	14.8	29.8	19.2	9.5
Average Household size, #	1.9	2.1	1.8	2.0	1.8	2.2	1.8	2.1	2.4
Single Person Household, (% of total dwellings)	45.7	36.4	46.7	40.3	45.7	34.7	45.8	37.2	27.7
Median Household Income, $	$ 35,970	$ 45,905	$ 35,821	$ 44,820	$ 37,811	$ 55,309	$ 36,888	$ 46,564	$ 54,108
LICO, %	26.9	19.4	24.6	20.7	19.1	12.9	23.9	16.7	10.8
Shelter cost to income ratio = > 30%	11.8	10.9	9.6	11.9	9.8	10.8	12.4	10.5	10.5
Highest level of Education (Age group 15 to 64), %	41.8	60.4	43.9	60.8	43.3	64.3	38.6	61.2	59.0
Lowest Level of Education (Age group 15 to 64), %	13.1	15.6	13.8	14.0	15.1	12.8	17.6	14.8	17.2
Immigrants, % (of the total population)	14.0	10.6	11.9	11.7	8.4	11.7	9.9	10.5	7.4
Recent Immigrants 2001-2006, % (% of the immigrant population)	37.3	22.4	23.4	2.1	22.8	1.1	36.8	1.0	18.5
Non Permanent Residents, % (of the total population)	3.7	1.2	2.0	27.8	0.8	21.3	1.8	24.6	0.6
Visible Minority, %	19	12.6	15.3	13.5	8.2	10.8	14.2	10.7	7.5
Mode of Commuting - Car, %	47.8	63.8	52.2	60.1	60.0	69.9	60.0	62.7	75.8
Mode of Commuting - Public Transit, %	18.2	16.4	20.0	16.7	23.5	14.6	20.5	17.0	11.9
Mode of Commuting - Walk, %	31.1	16.5	22.9	20.1	14.0	12.9	15.9	16.6	10.1
Commuting Duration <30 min, %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

4.1 Household Population Characteristics of High- Density Dissemination Areas

4.1.1 Demographics

In 2016, 19.6% (79,370) of Halifax's population lived in high-density DAs (see Table 4.3). Between 2006 and 2016, the population of HD DAs increased by 13.7% compared to the CMA increase of 8.2%. At 72.3%, the proportion of working-age populations in high-density Dissemination Areas (HD DAs) is significantly higher ($p<.05$) than the overall CMA of 69.3% (see Table 4.3). Meanwhile, the proportion of children (10.6%) is significantly lower than the CMA (15%), and the senior proportion is higher in the HD DAs but does not significantly differ from the CMA. The male-to-female ratio is 91.3 in HD DAs (number of males per 100 females), which is not significantly different from the Halifax CMA of 93.9, even though the ratio decreased by 5.4 % in HD DAs compared to the CMA 1.7%. The working-age population and children decreased slightly, whereas the senior population saw a slight increase.

Figure 4.1 indicates limited variation in the working-age population across HD DAs. Most working-age people fall in the 'middle' category, relatively similar to the CMA average of 69.3%. A fairly large proportion of HD DAs with high working-age centered in the south end along the waterfront and a cluster on the North end. A very low proportion of children present in HD DAs except for few spots in North End, Clayton Park, Spryfield, Harbourview, and Burnside on Dartmouth (see Figure 4.2). While the senior population spreads throughout Halifax, pockets of concentration are present in

Spring garden, Clayton Park, Bedford, MicMac Mall, Downtown Dartmouth, and Russel

lake neighbourhoods (see Figure 4.3).

Table 4.3 Population Characteristics, 2006-16 (High-density DAs and CMA)

Census Variables	2006		2016		2006-2016	
	High Density	CMA	High Density	CMA	Change (HD)	Change (CMA)
Total Population	69,822	372,858	79,370	403,390	13.7	8.2
Male - Female ratio (number of males per 100 females)	86.0	92.2	91.3	93.9	5.4	1.7
Children Population (0 to 14 yrs.), %	10.6	16.1	10.6*	15.0	0.0	-1.1
Working Age Population (15 to 64 yrs), %	75.2	71.8	72.3*	69.3	-2.9	-2.5
Senior (65 +), %	14.3	12.1	17.1	15.7	2.8	3.6
Single detached dwellings, %	8.2	51.6	7.3*	49.9	-0.9	-1.6
Apartment style dwellings >=5 storey, %	33.4	9.5	40.5*	12.1	7.1	2.6
Average Household size, #	1.8	2.4	1.8*	2.3	-3.2	-4.2
Single Person Household, (% of total dwellings)	45.9	27.7	47.0*	29.5	1.2	1.8
Median Household Income, $	36,678	54,108	45,201*	69,522	23.2	28.5
LICO-AT, %	23.7	10.8	22.7*	9.6	-1.0	-1.2
Shelter cost to income ratio = > 30%	23.9	10.5	40.8*	25.0	16.9	14.6
Highest level of Education (Age group 15 to 64), %	60.1	59.0	63.6	63.9	3.5	4.8
Lowest Level of Education (Age group 15 to 64), %	14.8	17.2	11.7	12.1	-3.0	-5.1
Immigrants, % (of total population)	11.2	7.4	15.2*	9.4	3.9	1.9
Recent Immigrants 2011-2016, % (% of immigrant population)	32.2	18.5	41.1*	25.3	8.9	6.9
Non Permanent Residents, % (of total population)	2.3	0.6	6.6*	2.0	4.4	1.4
Visible Minority, %	14.5	7.5	22.9*	11.4	8.4	3.9
Mode of Commuting - Car, %	54.5	75.8	58.0*	77.7	3.5	2.0
Mode of Commuting - Public Transit, %	20.5	11.9	20.1*	11.8	-0.3	-0.1
Mode of Commuting - Walk, %	21.8	10.1	19.4*	8.2	-2.5	-1.9
Commuting Duration <30 min, %	0.0	0.0	73.1*	65.7	73.1	65.7

* p <.05 Census 2016 variables are statistically significant than the overall CMA

4.1.2   Dwelling Characteristics

At 1.8, the average household size in high-density DAs is significantly smaller than the

CMA overall (2.3) (see Table 4.3). Household sizes in the middle and low range are

prevalent in HD DAs throughout the CMA (see Figure 4.4). With 47% of all households

being single-person, they comprise a substantially larger household type in the HD DAs

than the CMA, where only 29.5% of households are single-person. Figure 4.5 indicates

the dominance of single-person households in HD DAs except for a few HD DAs in

Larry Uteck, Clayton Park, and Russell lake. Apartment-style dwellings (more than or

equal to five stories) are the most common and significantly higher private dwelling type in the HD DAs (40.5%) compared to 12.1% in the overall CMA (see Figure 4.6). Between 2006 and 2016, the average household size slightly decreased in HD (3.2%) and the CMA overall (4.2%). Single-person households slightly increased by 1.2% as compared to a 1.8% rise in the CMA. Apartment-style dwellings equal to or more than five stories increased by 7.1% between 2006 and 2016 compared to a 2.6% increase in the CMA.

4.1.3 Income

The HD median household income of $45,201 is significantly lower than the overall CMA of $69,522, a difference of 34% (see Table 4.3). More than two-thirds of HD DAs are in the low and very low-income groups. Between 2006 and 2016, HD saw slightly slower growth in median household income of 23.2% compared to an increase of 28% in the CMA overall. Figure 4.7 shows all HD DA fall within the middle to very low-income categories and are spread out evenly throughout the study area. Based on Statistics Canada's measure of Low-Income Cut-Offs After-Tax (LICO-AT) in 2016, HD households have a significantly higher prevalence of low income at 22.7%, over twice that of the overall CMA (9.6%). A cluster pattern of very high LICO-AT% is visible in Peninsula, central Mainland region around Clayton Park, Burnside, and downtown Dartmouth (see Figure 4.8). While pockets of low and very low LICO-AT% are visible in Larry Uteck, Bedford, MicMac Mall, and Portland Hills. The proportion of households in low-income cut-off decreased by 1% compared to the CMA decline of 1.2% between 2006 and 2016 (Table 4.3). Another measure of economic stress is the shelter to income

ratio, which is significantly higher in the HD DAs than in the CMA. At 40.8%, a

significantly higher proportion of the HD residents spend more than or equal to 30% of

their income on housing costs than CMA of 25%. Figure 4.9 indicates clusters of 'very

high' shelter to income ratio in south end Peninsula, central Mainland, and Dartmouth.

Between 2006 - 2016, families spending more than or equal to 30% of their income on

housing cost increased by 16.9% compared to a 14.6% CMA increase.

4.1.4   Education

The proportion of working-age residents in HD DAs between ages of 25 and 64 with the

highest education level equivalent to a post-secondary certificate, diploma, or degree is

not significantly different from the overall CMA (see Table 4.3). Also, the HD DA's

working-age residents with a low education equivalent to no certificate, diploma, or

degree are not significantly different than the overall CMA. Even though the variables are

not significantly different than the CMA, the proportion of working-age residents with

post-secondary credentials increased slightly in HD DAs. At the same time, the low

education decreased slightly between 2006 and 2016.

4.1.5   Immigration and Visible Minorities

High-density DAs have a significantly higher proportion of immigrant populations

(15.2%) than the overall CMA (9.4%) (see Table 4.3). In HD DAs, 41.1% of the

immigrants arrived within the last five years between 2011and 2016, significantly more

than the CMA of 25.3%. Between 2006 and 2016, the immigrant population grew by 3.9

% compared to a 1.9% increase in the CMA. Recent immigrants increased by 8.9% in the

HD DAs, whereas there was a 6.9% increase in the CMA. Figure 4.10 reveals a very high

concentration of immigrants in the Peninsula, Mainland Halifax, and Larry Uteck, while small pockets of very high immigrant presence across the bay in Dartmouth neighbourhoods. At the same time, the recent immigrants spread in small pockets throughout the study area (see Figure 4.11). HD DAs have a significantly higher proportion of non-permanent residents (6.6%) than the CMA (2%). A very high proportion of non-permanent residents are present in Downtown, South End Peninsula, Clayton Park, and Larry Uteck, while their presence is very low in Dartmouth neighbourhoods (see Figure 4.12). The proportion of non-permanent residents increased by 4.4%, whereas CMA saw an increase of 1.4%. HD DAs also have a significantly larger concentration of visible minority populations (22.9%) than the CMA (11.4%), and between 2006-16, the proportion increased by 8.4% compared to the CMA increase of 3.9% (see Table 4.3). Similar to the immigrant population, the visible minority presence is very high in Peninsula, Mainland, and Burnside HD DAs (see Figure 4.13).

4.1.6 Transportation

The automobile is the primary commuting mode among households in the HD DAs at 58% and is significantly lower than the CMA of 77.7% (see Table 4.3). Still, a significantly higher percentage of high-density residents use public transit (20.1%) and walk to work (19.4%) than the overall CMA. Figure 4.14 shows very low to low commuters using cars in the Peninsula, Burnside, and downtown Dartmouth. While two-thirds of the HD DAs have very high public transit users spread evenly throughout the study area (see Figure 4.15). On average, HD DAs have nearly double the proportion of commuters taking public transit and walking compared to the CMA. Likewise, at 73.1%,

a significantly higher proportion of residents live within 30 minutes of commuting to work, whereas 65.7% are in the CMA. Figure 4.16 indicates a very low proportion of commutes less than 30 minutes in Bedford and Burnside, and elsewhere there is an even distribution of middle category HD DAs commute duration less than 30 minutes. Between 2006 and 2016, car commuters increased by 3.5% compared to a 2% increase in the CMA, while walking and public transit users saw a slight decline (Table 4.3).

Working Age Population (15 to 64 yrs) in High Density, Halifax CMA, 2016

Proportion of Working-age (15 to 64yrs) by Dissemination Area
compared to the Halifax CMA average of 69.3%

- Very Low - below 60% (1 HD DA)
- Low - 60 to 80% (7 HD DAs)
- Middle - 80 to 120% (77 HD DAs)
- High - 120 to 140% (19 HD DAs)
- Very High - above 140% (0 HD DA)

Study Boundary
Major Roads

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
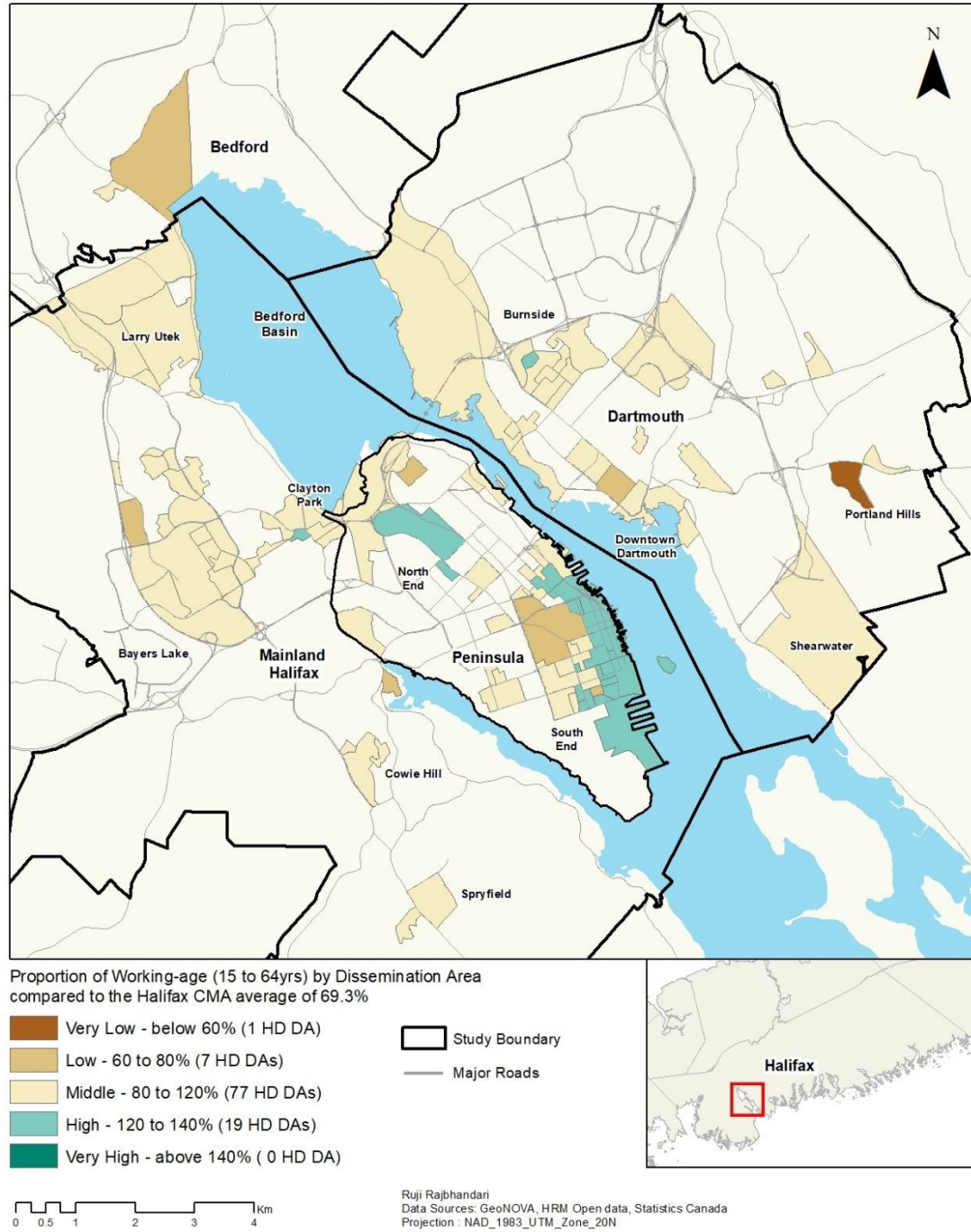
Figure 4.1 Proportion of Working-age Residents (15 to 64 yrs) in High-density DAs, 2016

Children Population (0 to 14 yrs) in High Density, Halifax CMA, 2016

Proportion of Children (0 to 14yrs) by Dissemination Area
compared to the Halifax CMA average of 15%

- Very Low - below 60% (50 HD DAs)
- Low - 60 to 80% (19 HD DAs)
- Middle - 80 to 120% (24 HD DAs)
- High - 120 to 140% (3 HD DAs)
- Very High - above 140% (8 HD DAs)

Study Boundary
Major Roads

Halifax

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
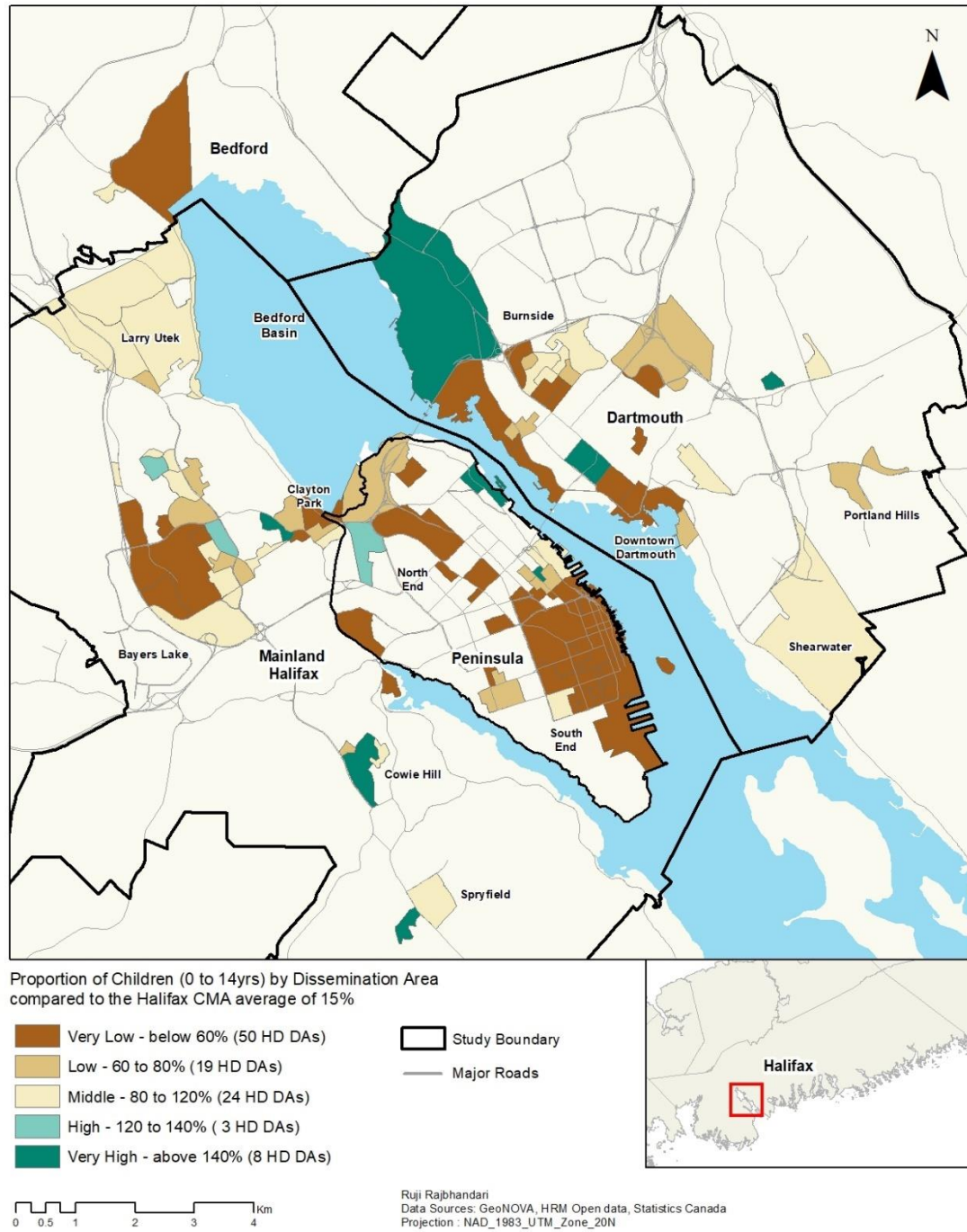
Figure 4.2 Proportion of Children (0 to 14yrs) in High-density DAs, 2016

Senior Population (65 yrs and over) in High Density, Halifax CMA, 2016

Proportion of Senior (65 yrs and over) by Dissemination Area
compared to the Halifax CMA average of 15.7%

- Very Low - below 60% (36 HD DAs)
- Low - 60 to 80% (12 HD DAs)
- Middle - 80 to 120% (27 HD DAs)
- High - 120 to 140% (5 HD DAs)
- Very High - above 140% (24 HD DAs)

Study Boundary
Major Roads

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
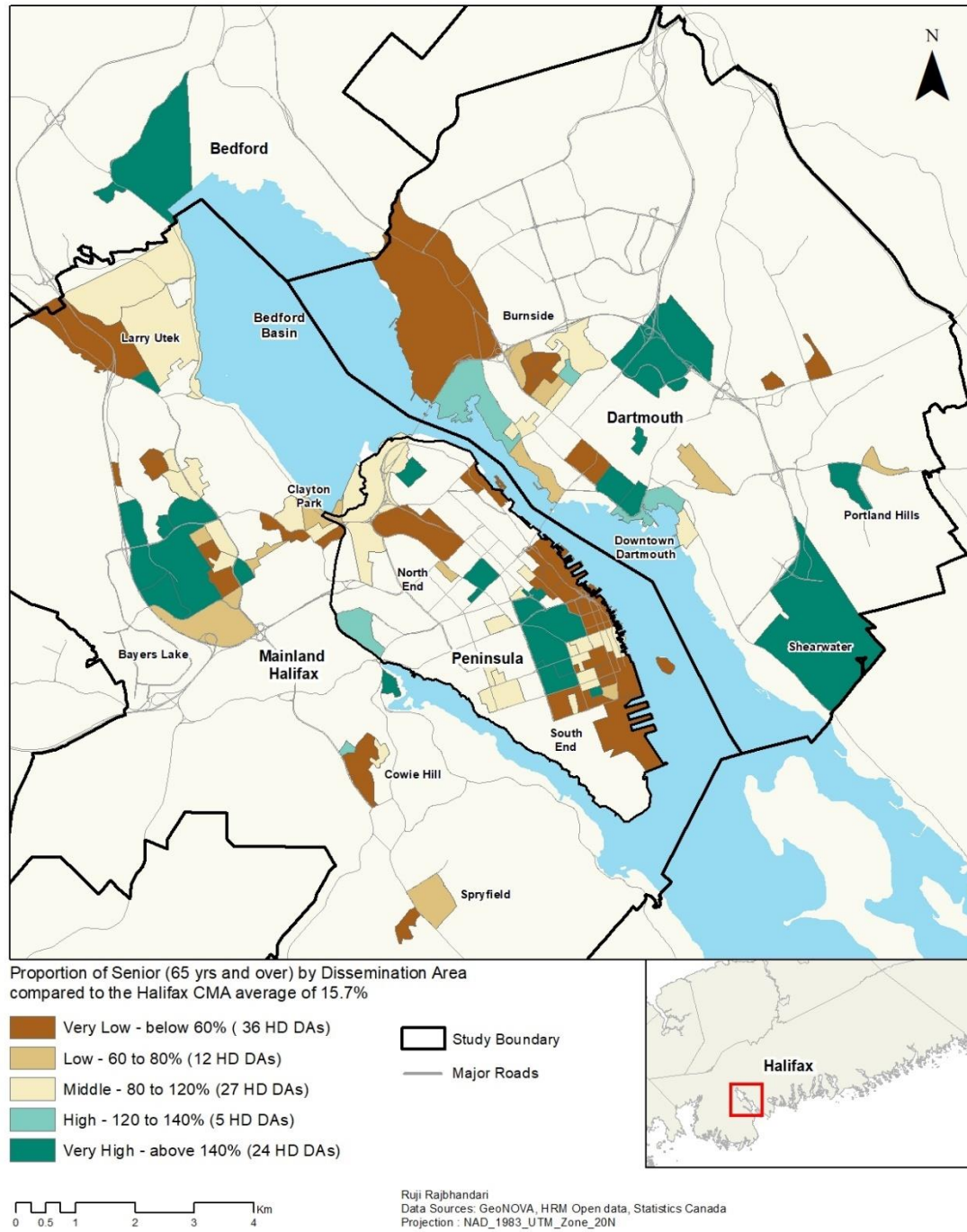
Figure 4.3 Proportion of Seniors (65 yrs and over) in High-density DAs, 2016

Average Household Size in High Density, Halifax CMA, 2016

N

Bedford

Bedford
Basin

Larry Utek

Burnside

Dartmouth

Clayton
Park

North
End

Downtown
Dartmouth

Portland Hills

Bayers Lake

Mainland
Halifax

Peninsula

Shearwater

Cowie Hill

South
End

Spryfield

AverageHousehold size by Dissemination Area
compared to the Halifax CMA average of 2.3

Very Low - below 60% (3 HD DAs)

Low - 60 to 80% (61 HD DAs)

Middle - 80 to 120% (39 HD DAs)

High - 120 to 140% (1 HD DA)

Very High - above 140% (0 HD DA)

Study Boundary

Major Roads

Halifax

Km
0 0.5 1   2   3   4

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N

Figure 4.4 Average Household Size of Dwellings in High-density DAs, 2016

Single Person Households in High Density, Halifax CMA, 2016

Dissemination Area average Single Person household
compared to the Halifax CMA average of 29.5%

- Very Low - below 60% (1 HD DA)
- Low -60 to 80% (3 HD DAs)
- Middle - 80 to 120% (15 HD DAs)
- High - 120 to 140% (9 HD DAs)
- Very High - above 140% (76 HD DAs)

☐ Study Boundary
— Major Roads

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
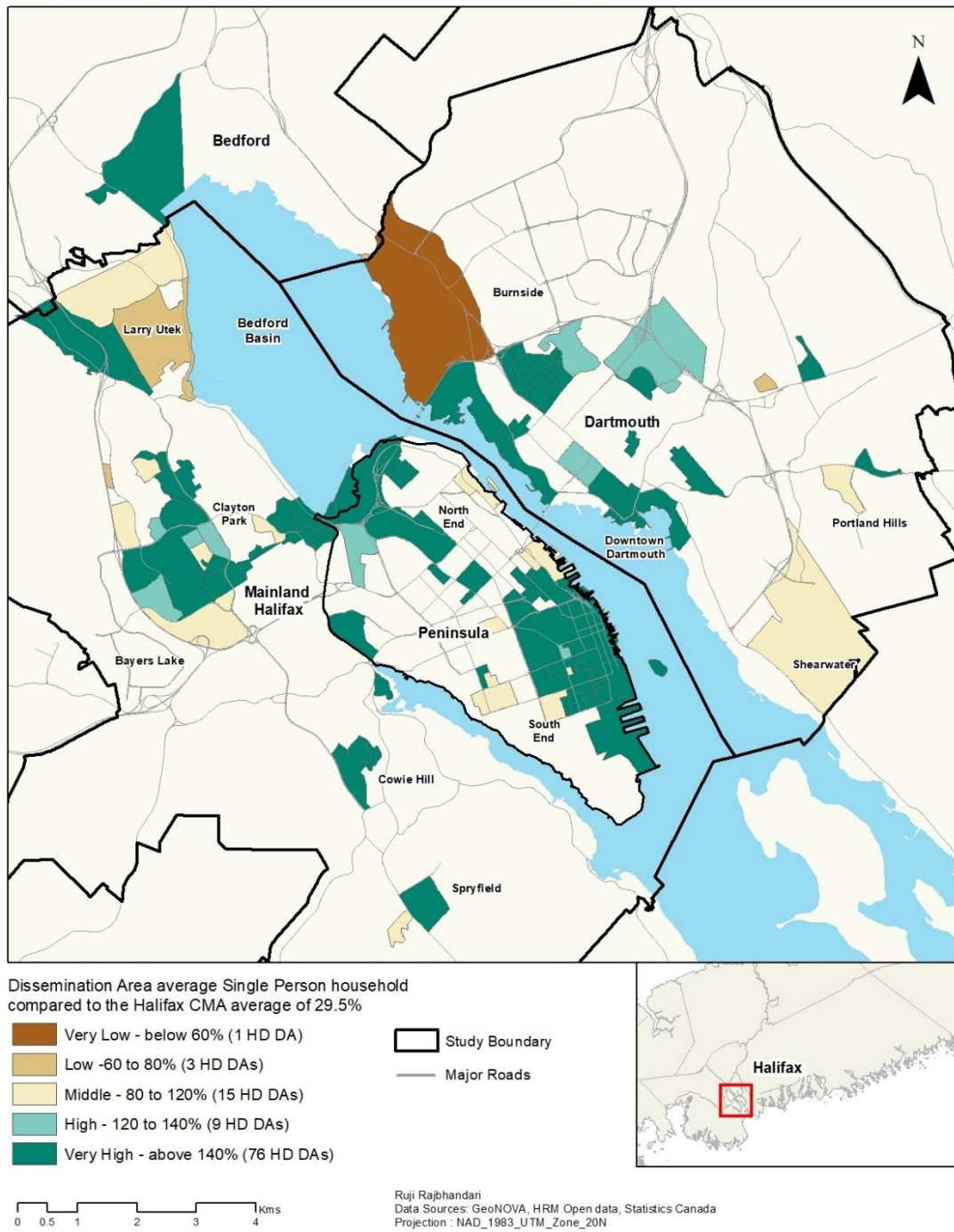
Figure 4.5 Proportion of Single Person Household in High-density DAs, 2016

Apartment-style Dwellings in High Density, Halifax CMA, 2016

Proportion of Apartment-style dwellings by Dissemination Area compared to the Halifax CMA average of 12.1% (>= 5 storey)

- Very Low - below 60% (34 HD DAs)
- Low - 60 to 80% (1 HD DA)
- Middle - 80 to 120% (1 HD DA)
- High - 120 to 140% (2 HD DAs)
- Very High - above 140% (66 HD DAs)

Study Boundary
Major Roads

0 0.5 1 2 3 4 Km

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
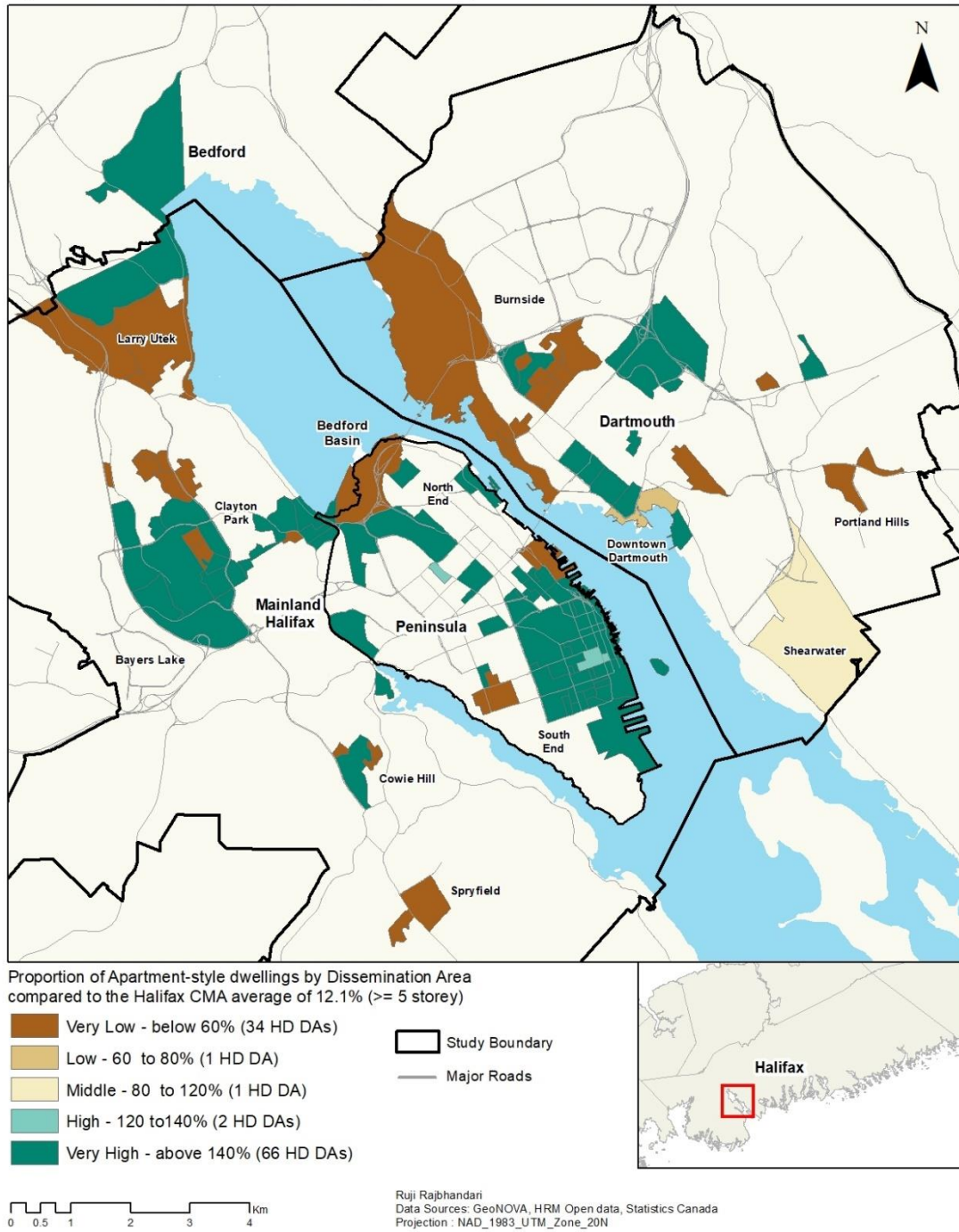
Figure 4.6 Proportion of Apartment Style Dwellings (equal and above five storeys) in High-density DAs, 2016

Median Household Income in High Density, Halifax CMA 2016

Bedford

Larry Utek

Bedford Basin

Burnside

Dartmouth

Clayton Park

North End

Downtown Dartmouth

Portland Hills

Bayers Lake

Mainland Halifax

Peninsula

South End

Shearwater

Cowie Hill

Spryfield

N

Median household Income by Dissemination Area compared to the Halifax CMA average of $69,522.

- Very Low - below 60% (41 HD DAs)
- Low - 60 to 80% (35 HD DAs)
- Middle - 80 to 120% (28 HD DAs)
- High - 120- to 140% (0 HD DA)
- Very High - above 140% (0 HD DA)

Study Boundary

Major Roads

Halifax

Km
0   0.5   1   2   3   4

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N

Figure 4.7 Median Household Income in High-density DAs, 2016

Prevalence of Low Income in High Density, Halifax CMA, 2016

Prevalence of Low Income (LICO-AT%) by Dissemination Area
compared to the Halifax CMA average of 9.6%

- Very Low - below 60% (8 HD DAs)
- Low - 60 to 80% (3 HD DAs)
- Middle - 80 to 120% (13 HD DAs)
- High - 120 to 140% (7 HD DAs)
- Very High - above 140% (73 HD DAs)

Study Boundary
Major Roads

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
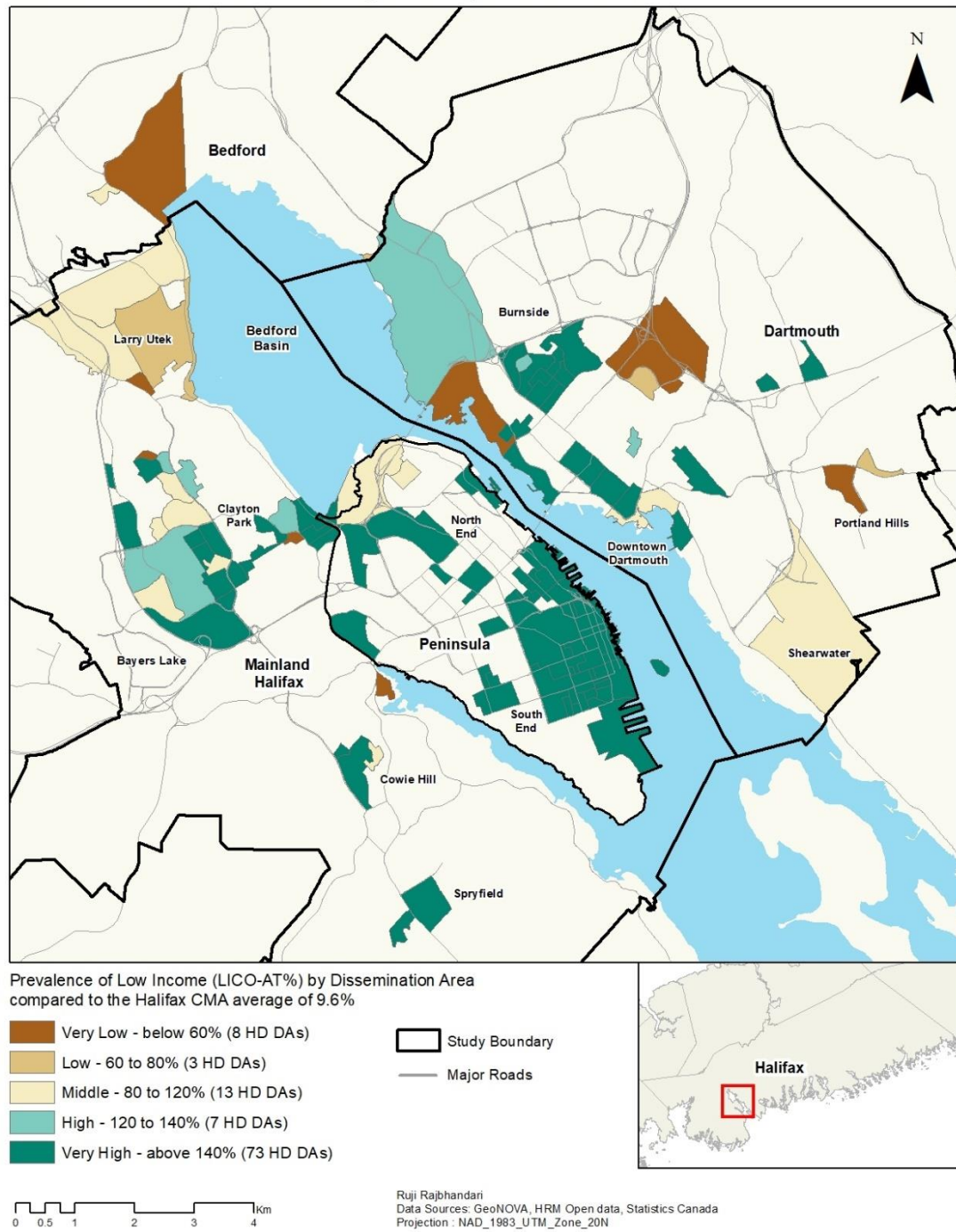
Figure 4.8 Prevalence of Low-income Based on Low-income Cut-off After-tax (LICO_AT%) in High-density DAs, 2016

78

High-Density Shelter Cost to Income Ratio >= to 30%,Halifax CMA, 2016

Proportion of Household Shelter-to-income ratio >= 30% by
Dissemination Area compared to the Halifax CMA average of 25%

- Very Low- below 60% (3 HD DAs)
- Low - 60 to 80% (2 HD DAs)
- Middle - 80 to 120% (21 HD DAs)
- High - 120 to 140% (9 HD DAs)
- Very High - above 140% (69 HD DAs)

- Study Boundary
- Major Roads

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N

Figure 4.9 Proportion of Household Shelter Cost to Income Ratio (more than equal to 30%) in High-density DAs, 2016

Immigrants in High Density, Halifax CMA, 2016

Bedford

Larry Utek

Bedford Basin

Burnside

Dartmouth

Clayton Park

North End

Downtown Dartmouth

Portland Hills

Bayers Lake

Mainland Halifax

Peninsula

Shearwater

South End

Cowie Hill

Spryfield

Proportion of Immigrants byDissemination Area
compared to the Halifax CMA average of 9.4%

- Very Low - belwo 60% (14 HD DAs)
- Low - 60 to 80% (7 HD DAs)
- Middle - 80 to 120% (25 HD DAs)
- High - 120 to 140% (9 HD DAs)
- Very High - above 140% (49 HD DAs)

Study Boundary

Major Roads

Halifax

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N

0   0.5   1   2   3   4 Km

Figure 4.10 Proportion of Immigrants in High-density DAs, 2016

Recent Immigrants in High Density, Halifax CMA, 2016

Proportion of Recent Immigrants by Dissemination Area compared
to the Halifax CMA average of 25.3% of Total Immigrant Population

- Very Low - below 60% (31 HD DAs)
- Low - 60 to 80% (5 HD DAs)
- Middle - 80 to 120% (18 HD DAs)
- High - 120 to 140% (6 HD DAs)
- Very High - above 140% (44 HD DAs)

Study Boundary
Major Roads

Halifax

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
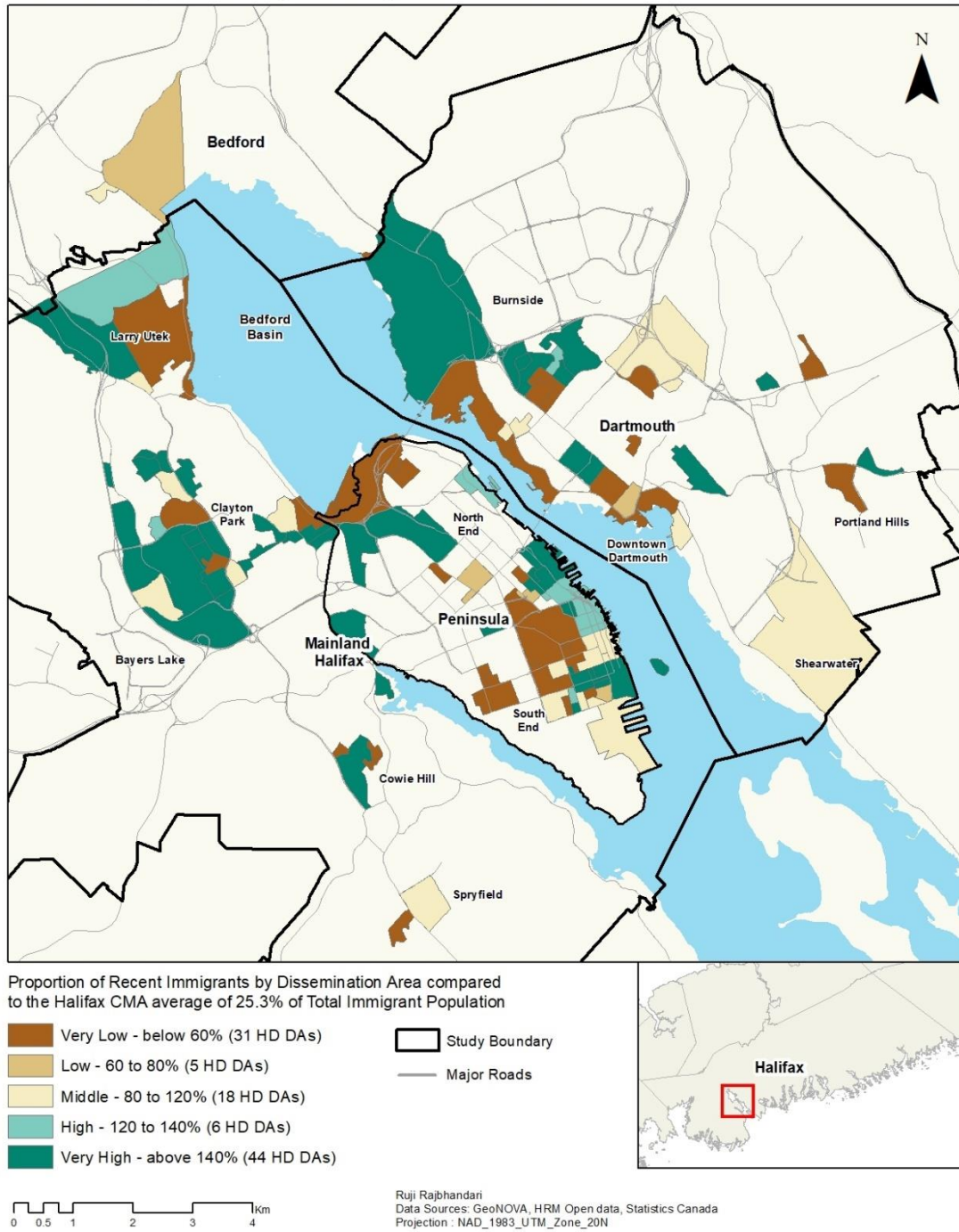
Figure 4.11 Proportion of Recent Immigrants (percent of total immigrant population) in High-density DAs, 2016

Non-Permanent Residents in High Density, Halifax CMA, 2016

Proportion of Non-Permanent Resident by Dissemination Area compared to the Halifax CMA average of 2% of Total Population.

- Very Low - below 60% (35 HD DAs)
- Low - 60 to 80% (6 HD DAs)
- Middle - 80 to 120% (9 HD DAs)
- High - 120 to 140% (3 HD DAs)
- Very High - above 140% (51 HD DAs)

Study Boundary
Major Roads

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N

Figure 4.12 Proportion of Non-Permanent Residents in High-density DAs, 2016

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Visible Minorities in High Density, Halifax CMA, 2016

Proportion of Visible Minorities by Dissemination Area compared to the Halifax CMA average of 11.4%

- Very Low - below 60% (10 HD DAs)
- Low - 60 to 80% (6 HD DAs)
- Middle - 80 to 120% (12 HD DAs)
- High - 120 to 140% (6 HD DAs)
- Very high - above 140% (70 HD DAs)

Study Boundary
Major Roads

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
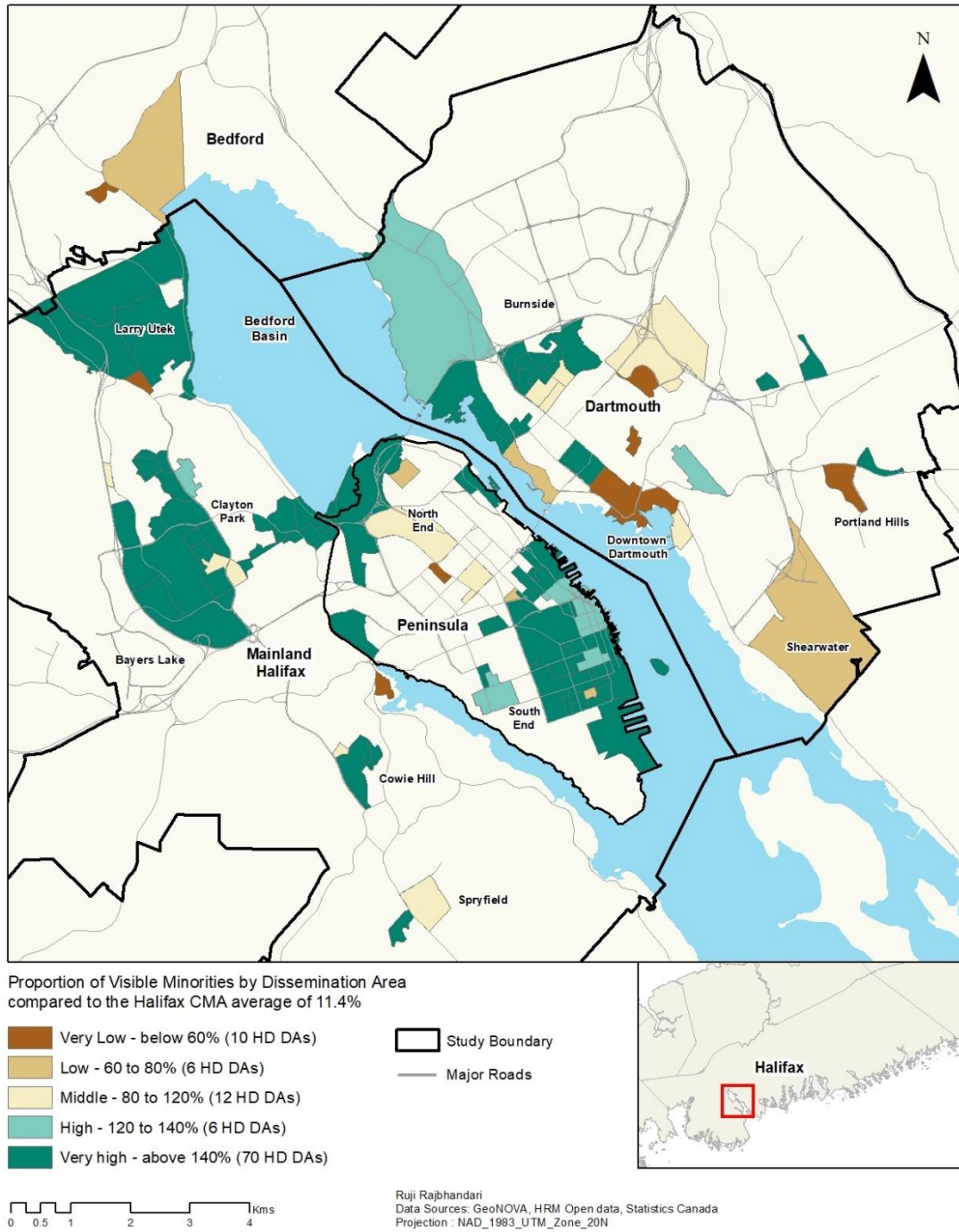
Figure 4.13 Proportion of Visible Minorities in High-density DAs, 2016

Automobile Commuters in High Density, Halifax CMA, 2016

Bedford

Larry Utek

Bedford Basin

Burnside

Dartmouth

Clayton Park

North End

Downtown Dartmouth

Portland Hills

Bayers Lake

Mainland Halifax

Peninsula

South End

Shearwater

Cowie Hill

Spryfield

N

Proportion of Automobile Commuter Households by Dissemination
Area compared to the Halifax CMA average of 77.7%

- Very Low - below 60% (33 HD DAs)
- Low - 60 to 80% (27 HD DAs)
- Middle - 80 to 120% (44 HD DAs)
- High - 120 to 140% (0 HD DA)
- Very High - above 140% (0 HD DA)

Study Boundary
Major Roads

Halifax

0 0.5 1   2   3   4 Km

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N

Figure 4.14 Proportion of Car Commuters in High-density DAs, 2016

Commute via Public Transit in High Density, Halifax CMA, 2016

Bedford

Larry Utek

Bedford
Basin

Burnside

Dartmouth

Clayton
Park

North
End

Downtown
Dartmouth

Portland Hills

Bayers Lake

Mainland
Halifax

Peninsula

Shearwater

South
End

Cowie Hill

Spryfield

Proportion of Public Transit Commuter Household by Dissemination
Area compared to the Halifax CMA average of 11.8%

■ Very Low - below 60% (7 HD DAs)
■ Low - 60 to 80% (5 HD DAs)
■ Middle - 80 to 120% (13 HD DAs)
■ High - 120 to 140% (7 HD DAs)
■ Very High - above 140% (72 HD DAs)

☐ Study Boundary
— Major Roads

Halifax

N

0 0.5 1   2   3   4   Kms

Figure 4.15 Proportion of Public Transit Users in High-density DAs, 2016

Household Commute Duration less than 30 mins in High Density, Halifax CMA, 2016

Proportion of Household Commute Duration Less than 30 min by
Dissemination Area compared to the Halifax CMA average of 65.7%

- Very Low - below 60% (1 HD DA)
- Low - 60 to 80% (1 HD DA)
- Middle - 80 to 120% (73 HD DAs)
- High - 120 to 140% (27 HD DAs)
- Very High - above 140% (2 HD DAs)

- Study Boundary
- Major Roads
- High Density DA

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N

Figure 4.16 Proportion of Commuters Living within 30 mins Drivetime in High-density DAs,
2016

4.2 Household Characteristics of High-Density Dissemination Areas by Urban Regions of Halifax

In this section, the household characteristics of high-density residents are illustrated based on the geographic region: Bedford, Dartmouth, Mainland Halifax, and Peninsula (see Figure 3.2). Then, it looks at changes in the regional trends between 2006 and 2016 (see Table 4.6). In addition, the section compares high-density residents living in predominantly rental and condominium DAs (see Table 4.7).

4.2.1 Demographics

The Mainland Halifax region has a significantly higher proportion of females, whereas the Peninsula has significantly higher male residents in the HD DAs when compared to the CMA (see Table 4.4). The Peninsula also has a significantly lower proportion of children and a greater working-age population than the CMA. Bedford has a significantly higher proportion of seniors and a low proportion of the working-age population. Between 2006 and 2016, the male-to-female ratio increased by 10.5 in Peninsula compared to 1.7 in the CMA. The working-age population declined in the Bedford region 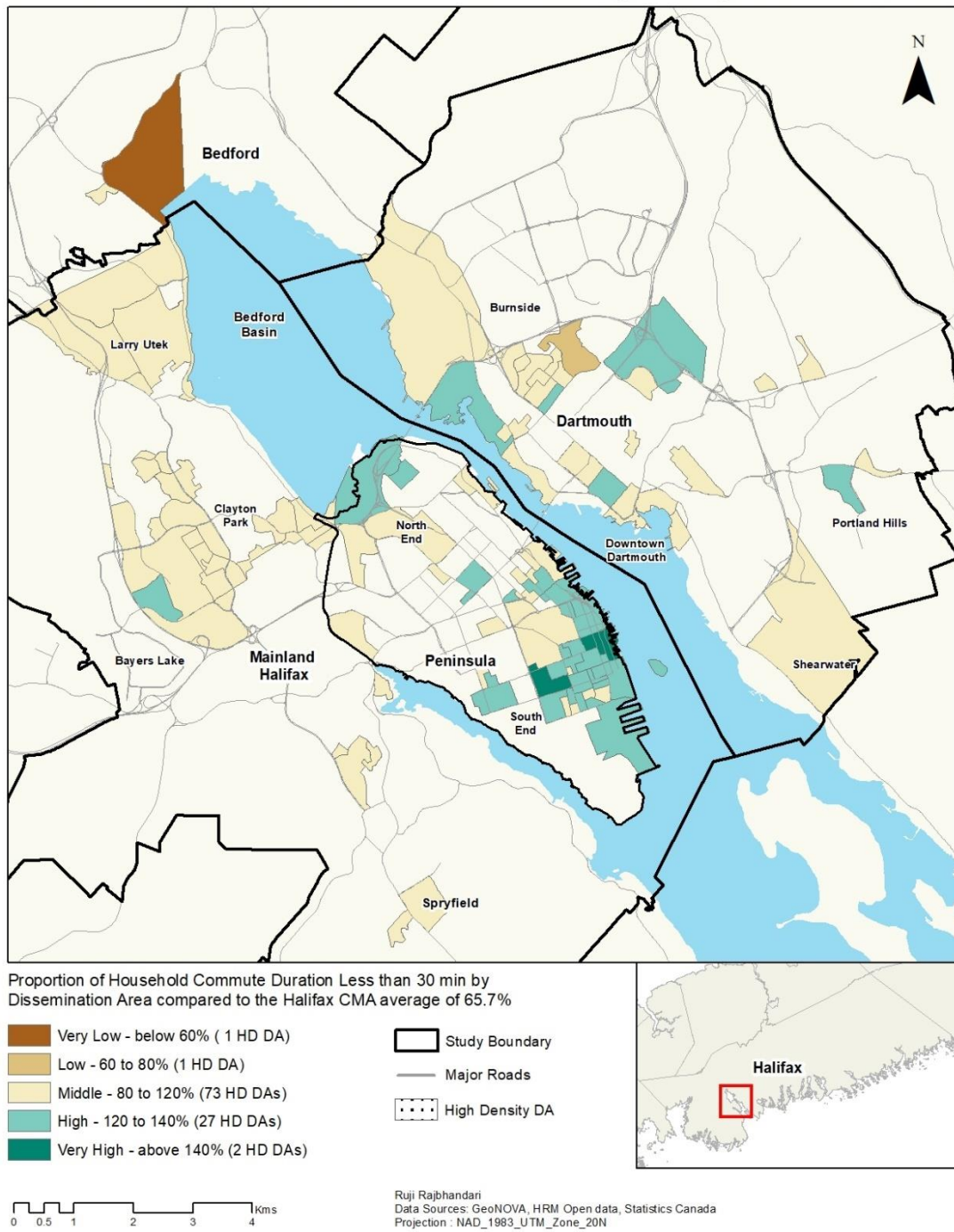while children and seniors grew (see Table 4.6). Comparing predominantly condominium and rental DAs separately with the CMA reveals that Bedford has a significantly lower proportion of working age and a higher proportion of seniors residing in its condominium dominant DAs. The Peninsula has a significantly higher proportion of male residents in prevalently rental DAs and a lower proportion of children in both condominium and dominant rental DAs than the CMA (see Table 4.7). Rental prevalent DAs in this region also have a significantly higher proportion of working-age (78.3%) than CMA (69.3%).

The predominantly condominium DAs in Mainland has a significantly lower male to female ratio of 69.4 males per 100 females compared to CMA of 93.9.

Table 4.4 Population Characteristics, 2016 (Region wise High-density DAs and CMA)

Census Variables	Bedford HD	Dartmouth HD	Mainland HFX HD	Peninsula HD	CMA Overall
Total Population	1,114	18,987	31,456	27,813	403,390
Male - Female ratio (number of males per 100 females)	75.6	88.1	86.4*	100.4*	93.9
Children Population (0 to 14 yrs.), %	9.8	11.5*	13	6.6*	15
Working Age Population (15 to 64 yrs.), %	53.0*	70.7	70.0	78.0*	69.3
Senior (65 +), %	36.9*	17.6	17.1	15.3	15.7
Single detached dwellings, %	5.9*	10.4*	8.3*	4.3*	49.9
Apartment style dwellings >= 5 storey, %	51.3*	16.8	37.6*	58.7*	12.1
Average Household size, #	1.8	1.8*	2.0*	1.7*	2.3
Single Person Household, % (% of the total dwellings)	45.0	48.7*	41.2*	51.8*	29.5
Median Household Income, $	69,952	41,884*	49,251*	42,658*	69,522
LICO-AT, %	8.15	19.8*	16.7*	29.6*	9.6
Shelter cost to income ratio => 30%	26.4	40.3*	34.2*	48.2*	25.0
Highest level of Education (Age group 15 to 64), %	76.4	54.2*	62.6	70.9*	63.9
Lowest Level of Education (Age group 15 to 64), %	8.1	16.5*	13.0	7.1*	12.1
Immigrants, % (of total population)	11.3	8.3	19.8*	14.9*	9.4
Recent Immigrants 2011-2016 (% of immigrant population)	20.8	36.5*	43.7*	39.5*	25.3
Non Permanent Residents, % (of total population)	0.0	0.7	3.7*	14.5*	2.0
Visible Minority, %	7.5	13.6	23.6*	29.3*	11.4
Mode of Commuting - Car, %	85.1	67.1*	72.7	35.3*	77.7
Mode of Commuting - Public Transit, %	11.9	22.8*	20.1*	18.6*	11.8
Mode of Commuting - Walk, %	0.0	7.8	5.4	42.9*	8.2
Commuting Duration <30 min, %	50.7	72.3	66.7	81.3*	65.7

* $p < .05$ Census 2016 variables are statistically significant than the overall CMA

4.2.2 Dwelling

The Peninsula, Dartmouth, and Mainland Halifax have significantly smaller households than the CMA (see Table 4.4). The Peninsula has the most significant share of single-person households (51.8%) compared to CMA (29.5%). Peninsula (1.7), Dartmouth (1.8), and Mainland (2.0) have significantly smaller household size than the CMA (2.3). Bedford, Mainland, and Peninsula regions have a significantly higher proportion of apartment-style dwellings in the HD DAs and a low proportion of single-family-style detached homes than the overall CMA. The average household size and single-person household remained steady over the years. The Mainland region saw an increase of 17%

in apartment-style dwellings, compared to a 2.6% increase across the CMA; other areas remained stable (see Table 4.6). Comparing condominiums and rental prevalent DAs separately with the CMA, single-person households are the primary household type in both groups and are significantly higher than the CMA (see Table 4.7). Single-person households are most extensive in the Peninsula region, comprising more than 50% of all rental and condo DAs households. Households are significantly smaller in predominantly rental DAs than the CMA. Apartment-style dwellings in buildings above five stories are increasing in primarily rental HD DAs of Peninsula and Mainland, whereas this style of housing is decreasing in predominantly condominium DAs of both regions (see Table 4.9)

Table 4.5 Population Characteristics, 2006 (Region wise High-density DAs and CMA)

Census Variables	Bedford HD	Dartmouth HD	Mainland HFX HD	Peninsula HD	CMA Overall
Total Population	1,059	14,899	30,239	23,625	372,858
Male - Female ratio (number of males per 100 females)	73.8	85.0	83.9	89.9	92.2
Children Population (0 to 14 yrs.), %	5.2	13.2	12	6.9	16
Working Age Population (15 to 64 yrs.), %	59.4	73.5	73.2	79.6	71.8
Senior (65 +), %	34.9	13.0	14.3	14.0	12.1
Single detached dwellings, %	6.4	8.0	11.3	4.9	51.6
Apartment style dwellings >= 5 storey, %	49.5	17.2	20.7	56.5	9.5
Average Household size, #	1.8	1.8	2.0	1.7	2.4
Single Person Household, % (% fo the total dwellings)	41.3	47.7	38.8	52.6	27.7
Median Household Income, $	56,311	31,060	42,826	32,824	54,108
LICO-AT, %	8.05	25.6	17.0	29.9	10.8
Shelter cost to income ratio = > 30%	11.9	12.4	11.9	9.3	10.5
Highest level of Education (Age group 15 to 64), %	67.4	49.2	60.1	66.3	59.0
Lowest Level of Education (Age group 15 to 64), %	12.4	24.4	15.9	7.7	17.2
Immigrants, % (of total population)	9.6	5.5	13.8	11.5	7.4
Recent Immigrants 2001-2006 (% of immigrant population)	15.8	15.2	35.2	33.3	18.5
Non Permanent Residents, % (of total population)	1.0	0.5	1.1	5.0	0.6
Visible Minority, %	3.0	10.5	14.9	17.1	7.5
Mode of Commuting - Car, %	85.5	57.4	71.8	29.1	75.8
Mode of Commuting - Public Transit, %	10.5	29.6	20.3	15.5	11.9
Mode of Commuting - Walk, %	5.3	10.3	5.9	50.2	10.1
Commuting Duration <30 min, %	-	-	-	-	-

Table 4.6 Population Change, 2006-16 (Region wise High-density DAs and CMA)

Census Variables	% Change (2006-2016)				
	Bedford	Dartmouth	Mainland HFX	Peninsula	CMA
Total Population	5.2	27.4	4.0	17.7	8.2
Male - Female ratio (number of males per 100 females)	1.8	3.1	2.5	10.5	1.7
Children Population (0 to 14 yrs.), %	4.6	-1.7	0.7	-0.3	-1.1
Working Age Population (15 to 64 yrs.), %	-6.5	-2.8	-3.1	-1.6	-2.5
Senior (65 +), %	2.0	4.6	2.8	1.3	3.6
Single detached dwellings, %	-0.5	2.3	-3.0	-0.5	-1.6
Apartment style dwellings >= 5 storey, %	1.7	-0.4	17.0	2.2	2.6
Average Household size, #	-2.8	-2.9	-1.3	0.5	-4.2
Single Person Household, % (% fo the total dwellings)	3.7	1.0	2.3	-0.8	1.8
Median Household Income, $	24.2	34.8	15.0	30.0	28.5
LICO-AT, %	0.1	-5.9	-0.3	-0.3	-1.2
Shelter cost to income ratio = > 30%	14.5	27.9	22.3	38.9	14.6
Highest level of Education (Age group 15 to 64), %	9.0	5.0	2.6	4.6	4.8
Lowest Level of Education (Age group 15 to 64), %	-4.3	-7.9	-2.9	-0.7	-5.1
Immigrants, % (of total population)	1.7	2.8	6.0	3.3	1.9
Recent Immigrants 2011-2016 (% of immigrant population)	5.0	21.3	8.6	6.3	6.9
Non Permanent Residents, % (of total population)	-1.0	0.2	2.6	9.5	1.4
Visible Minority, %	4.4	3.1	8.7	12.2	3.9
Mode of Commuting - Car, %	-0.5	9.7	0.9	6.1	2.0
Mode of Commuting - Public Transit, %	1.4	-6.9	-0.2	3.2	-0.1
Mode of Commuting - Walk, %	-5.3	-2.5	-0.5	-7.3	-1.9
Commuting Duration <30 min, %	NA	NA	NA	NA	NA

4.2.3 Income

The median household income in Dartmouth, Peninsula, and Mainland HDs is
significantly lower than the CMA (see Table 4.4). The median household income is
lowest in the Dartmouth ($ 41,884) and Peninsula region ($ 42,658), about 40% lower
than the overall CMA ($69,522). Similarly, the percentage of LICO-AT households in
HD DAs in Dartmouth, Peninsula, and Mainland is significantly higher than the CMA.
Paralleling this trend, a substantially higher proportion of Dartmouth, Peninsula, and
Mainland residents pay more than or equal to 30% of their household income in shelter
cost than the CMA. The Peninsula is the least affordable region, with 48.2% of its HD
dwellers paying more on housing costs, whereas only 25% do so for the CMA. Median
household income increased throughout the regions between 2006 and 2016 (see Table

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4.6). Dartmouth saw the highest increase at 34.8%, and Mainland Halifax saw the lowest increase at 15%, compared to an overall increase of 28.5% across the CMA. LICO-AT remained stable throughout the regions, except decreasing in the Dartmouth region by 5.9%. The shelter-to-income ratio increased by an average of 20% in all areas except the Peninsula, where it skyrocketed by 38.9% compared to the CMA increase of 14.6% (see Table 4.6). Predominantly rental DA's have significantly lower median household income, higher LICO %, and a higher proportion of residents paying more than 30% in shelter cost than the CMA (Table 4.9).

4.2.4 Education

Compared to the CMA, the Peninsula region has a significantly higher proportion of working-age residents (between 25 to 64 years old) with high education and a low proportion of low education than CMA. In contrast, the Dartmouth region has a significantly lower proportion of highly educated and a significantly higher proportion of low-educated working-age residents than the CMA (see Table 4.4, 4.7). Between 2006 and 2016, the proportion of highly educated working-age residents increased slightly in Dartmouth and Peninsula. Meanwhile, the percentage of low educated decreased slightly in the Dartmouth region as it did for the CMA, but the proportion remained stable for the rest of the areas (see Table 4.6). Between prominently condominium and rental DAs, the highly educated working age has a significant presence in the condominium DAs of Peninsula (see Table 4.7). And there is a significantly lower presence of residents with high education and low education in prominently rental DAs of Dartmouth (see Table 4.7).

4.2.5 Immigration and Visible Minorities

The Mainland Halifax and Peninsula have a significantly higher immigrant population, with more than 40% being recent immigrants who arrived in Canada between 2011 and 2016 (see Table 4.4). The Peninsula has a substantial proportion of non-permanent residents (14.5%), significantly higher than the CMA (2%). Both Mainland and Peninsula regions have a significantly higher proportion of visible minorities, notably in the prominent rental DAs. Mainland Halifax has a significantly higher immigrant population, including recent immigrants in predominantly condominium DAs (see Table 4.7). Between 2006 and 2016, the immigrant population grew by 6 % in Mainland HD DAs compared to the CMA increase of 1.9% (Table 4.6). Meanwhile, the Dartmouth region saw high growth in recent immigrants (21.3%) than the CMA increase of 6.9%. Also, Peninsula and Mainland saw the highest increase in visible minority proportion of 12.2% and 8.7%, respectively, compared to a 3.9% increase in the CMA (see Table 4.6).

4.2.6 Transportation

Among the regions, the Peninsula has a significantly lower proportion of car commuters (35.3%) and has a significantly higher proportion of residents walking to work (42.9%) and residents who use public transit (18.6%) than the CMA (see Table 4.4). About 81.3% of the Peninsula residents commute less than 30 minutes, significantly higher than 65.7% in the CMA. Likewise, Dartmouth and Mainland HD residents have significantly higher public transit users than the CMA. A significantly higher proportion of public transit users resides in predominantly rental DAs of the regions except Bedford. (See Table 4.7). Between 2006 and 2016, the car commuters in Dartmouth saw the highest increase of

9.7% compared to CMA of 2%, while public transit users decreased by 6.9% compared to

the CMA decrease of 0.1% (see Table 4.6). Similarly, commuters who walk to work in

the Peninsula slightly reduced by 7.3% compared to the CMA decrease of 1.9% (see

Table 4.6).

Table 4.7 Population Characteristics of Predominantly Condominium and Rental High-density DAs, 2016 (Region wise)

Census Variables	Bedford		Dartmouth		Mainland HFX		Peninsula		CMA
	Condo	Rental	Condo	Rental	Condo	Rental	Condo	Rental	Overall
Total Population	690	-	218	14,510	1,022	20,941	1,655	19,093	403,390
Male - Female ratio (number of males per 100 females)	72.5	-	104.8	89.7	69.4*	89.6	89.7	105.0*	93.9
Children Population (0 to 14 yrs), %	4.3	-	6.8	12.6	13.6	13.9	4.8*	7.0*	15
Working Age Population (15 to 64 yrs), %	43.5*	-	72.7	71.1	68.5	71.3	75.1	78.3*	69.3
Senior (65 +), %	51.4*	-	20.5	16.0	17.3	15.1	20.2	14.7	15.7
Single detached dwellings, %	9.5	-	15.4	9.1*	6.5*	9.1*	0.5*	3.7*	49.9
Apartment style dwellings >= 5 storey, %	40.5	-	0.0	12.0	0.0	33.2*	49.2*	64.2*	12.1
Average Household size, #	1.7	-	1.7	1.8*	1.9	2.0*	1.6*	1.7*	2.3
Single Person Household, (% of total dwellings)	44.6	-	50.0	48.5*	46.3*	40.3*	53.3*	53.0*	29.5
Median Household Income, $	81,152	-	44,352	37,758*	56,085	46,015*	61,099	36,236*	69,522
LICO-AT, %	5.6	-	0.0	24.9*	6.6	19.8*	15.3	34.2*	9.6
Shelter cost to income ratio = > 30% (HH)	25.0	-	0.0	42.2*	27.3	36.1*	35.6	52.9*	25.0
Highest level of Education (Age group 15 to 64), %	78.7	-	58.5	49.3*	65.0	60.0*	81.2*	68.6	63.9
Lowest Level of Education (Age group 15 to 64), %	6.3	-	7.5	18.7*	11.1	15.7*	4.4	8.2	12.1
Immigrants, % (of total population)	12.2	-	5.7	7.5	15.4	22.2*	16.1	16.4*	9.4
Recent Immigrants 2011-2016 (% of immigrant population)	18.8	-	0.0	43.8*	46.9	45.8*	15.4	46.4*	25.3
Non Permanent Residents, % (of total population)	0.0	-	0.0	0.6	2.4	3.7	2.5	17.3*	2.0
Visible Minority, %	8.4	-	16.7	15.0*	16.7	25.8*	16.5	34.3*	11.4
Mode of Commuting - Car, %	77.4	-	86.4	65.6*	74.1	71.4	43.2*	31.0*	77.7
Mode of Commuting - Public Transit, %	16.1	-	9.1	24.5*	18.8	21.2*	14.2	20.6*	11.8
Mode of Commuting - Walk, %	0.0	-	0.0	7.7	5.4	5.7	41.5*	44.9*	8.2
Commuting Duration <30 min, %	38.7	-	86.4	71.9	63.2	64.9	91.3*	79.9*	65.7

$* p < .05$ Census 2016 variables are statistically significant than the overall CMA

No data: prominently rental DAs under High-Density category in Bedford region

Table 4.8 Population Characteristics of Predominantly Condominium and Rental High-density DAs, 2006 (Region wise)

| Census Variables | % Change (2006-2016) | | | | | | | | |
| | Bedford | | Dartmouth | | Mainland HFX | | Peninsula | | CMA |
	Condo	Rental	Condo	Rental	Condo	Rental	Condo	Rental	
Total Population	-	-	-	18.0	-30.1	-10.0	1.7	14.8	8.2
Male - Female ratio (number of males per 100 females)	-	-	-	3.9	-2.3	4.7	-14.0	15.0	1.7
Children Population (0 to 14 yrs.), %	-	-	-	-1.6	3.3	1.2	2.0	-0.2	-1.1
Working Age Population (15 to 64 yrs.), %	-	-	-	-3.1	-5.4	-1.7	3.2	-0.7	-2.5
Senior (65 +), %	-	-	-	4.7	0.2	1.0	-3.9	0.5	3.6
Single detached dwellings, %	-	-	-	2.1	2.2	-3.4	0.5	-0.4	-1.6
Apartment style dwellings >= 5 storey, %	-	-	-	-2.2	-11.8	12.4	-37.1	1.8	2.6
Average Household size, #	-	-	-	-2.3	4.1	-1.6	-3.9	0.0	-4.2
Single Person Household, % (% fo the total dwellings)	-	-	-	1.1	0.3	2.4	-1.6	-0.2	1.8
Median Household Income, $	-	-	-	36.5	23.6	10.9	44.0	25.5	28.5
LICO-AT, %	-	-	-	-4.6	0.8	0.1	-3.2	-1.1	-1.2
Shelter cost to income ratio = > 30%	-	-	-	28.1	20.4	23.8	21.2	43.1	14.6
Highest level of Education (Age group 15 to 64), %	-	-	-	3.8	7.4	1.0	2.6	4.2	4.8
Lowest Level of Education (Age group 15 to 64), %	-	-	-	-7.7	-5.3	-1.7	0.3	-0.4	-5.1
Immigrants, % (of total population)	-	-	-	2.9	2.8	8.5	-3.6	4.6	1.9
Recent Immigrants 2011-2016 (% of immigrant population)	-	-	-	27.0	9.0	9.1	-31.2	10.2	6.9
Non Permanent Residents, % (of total population)	-	-	-	0.2	2.4	2.6	-1.9	11.5	1.4
Visible Minority, %	-	-	-	4.2	4.7	10.5	6.0	14.1	3.9
Mode of Commuting - Car, %	-	-	-	9.6	7.6	1.0	26.8	7.5	2.0
Mode of Commuting - Public Transit, %	-	-	-	-5.2	10.2	-0.3	7.0	5.1	-0.1
Mode of Commuting - Walk, %	-	-	-	-3.7	5.4	-0.4	-27.8	-11.0	-1.9
Commuting Duration <30 min, %	-	-	-	-	-	-	-	-	-

Table 4.9 Population Change Predominantly Condominium and Rental HD, 2006-16

| Census Variables | Bedford | | Dartmouth | | Mainland Hfx | | Peninsula | | CMA |
	Condo	Rental	Condo	Rental	Condo	Rental	Condo	Rental	Overall
Total Population	-	-	-	12,295	1,462	23,257	1,627	16,635	372,858
Male - Female ratio (number of males per 100 females)	-	-	-	85.7	71.8	84.9	103.7	90.0	92.2
Children Population (0 to 14 yrs.), %	-	-	-	14.3	10.3	12.7	2.8	7.1	16.1
Working Age Population (15 to 64 yrs.), %	-	-	-	74.2	73.9	73.0	71.9	79.0	71.8
Senior (65 +), %	-	-	-	11.3	17.2	14.1	24.1	14.2	12.1
Single detached dwellings, %	-	-	-	7.0	4.3	12.5	0.0	4.1	51.6
Apartment style dwellings >= 5 storey, %	-	-	-	14.2	11.8	20.7	86.3	62.4	9.5
Average Household size, #	-	-	-	1.9	1.8	2.1	1.7	1.7	2.4
Single Person Household, % (% fo the total dwellings)	-	-	-	47.4	46.0	37.8	54.9	53.1	27.7
Median Household Income, $	-	-	-	27,653	45,387	41,510	42,422	28,874	54,108
LICO-AT, %	-	-	-	29.5	5.8	19.7	18.5	35.3	10.8
Shelter cost to income ratio = > 30%	-	-	-	14.0	6.9	12.3	14.4	9.8	10.5
Highest level of Education (Age group 15 to 64), %	-	-	-	45.6	57.5	59.0	78.6	64.3	59.0
Lowest Level of Education (Age group 15 to 64), %	-	-	-	26.5	16.4	17.4	4.0	8.6	17.2
Immigrants, % (of total population)	-	-	-	4.6	12.6	13.7	19.7	11.8	7.4
Recent Immigrants 2001-2006 (% of immigrant population)	-	-	-	16.8	37.8	36.7	46.6	36.2	18.5
Non Permanent Residents, % (of total population)	-	-	-	0.4	0.0	1.0	4.4	5.9	0.6
Visible Minority, %	-	-	-	10.8	12.0	15.3	10.5	20.2	7.5
Mode of Commuting - Car, %	-	-	-	56.0	66.5	70.4	16.3	23.5	75.8
Mode of Commuting - Public Transit, %	-	-	-	29.8	8.5	21.5	7.2	15.5	11.9
Mode of Commuting - Walk, %	-	-	-	11.4	0.0	6.1	69.3	55.9	10.1
Commuting Duration <30 min, %	-	-	-	-	-	-	-	-	-

No data: prominently condominium DAs under High-Density category in Bedford and Dartmouth regions

No data: prominently rental DAs under High-Density category in Bedford region

4.3 Demographic Changes in DAs with New High-density Construction Between 2011 and 2016

This section summarizes the findings from the second method of analysis where I analyzed the DAs with recent rental and condominiums construction between 2011 and 2016 (referred to as sample DAs after here). The same socio-economic and demographic variables used in the previous analysis are applied here to track changes in residents living in the DAs between the 2006 and 2016 census. The result compares the population characteristics between sample DAs with newer construction and the neighbouring DAs before turning to the regional variation of the same variables.

4.3.1 Demographics

The sample DAs' demographic variables are not significantly different from their neighbouring DAs (see Table 4.10). Nevertheless, the finding shows that the male to female ratio is slightly higher in neighbouring DAs, and there are fewer children and more seniors in DAs with new construction than their neighbours and the CMA. Between 2006 and 2016, the male-to-female ratio and seniors grew while the working-age population decreased in the sample DAs. While looking at the regional differences, the Bedford region has a significantly lower proportion of children and working-age residents and a higher proportion of seniors than the neighbours. Additionally, the Bedford region has a significantly higher ratio of females than males (72.5) compared to the neighbouring DAs (89.9) (see Table 4.11). The senior proportion in the Bedford region is much higher at 51.4% than its neighbours at 19.4%. Dartmouth, Mainland Halifax, and Peninsula's demographic variables are not statistically different from their neighbours (see Table

4.11). Between 2006 and 2016 in Bedford, the male-to-female ratio and children

remained stable, while the working-age population declined in both sample DAs (8%)

and their neighbors (5%). In Bedford, the seniors increased in both sample DAs and their

neighbours, while the sample DAs saw a higher increment of 11.2% than the neighbours

of 6.5% (see Table 4.13).

Table 4.10 Population Characteristics of DAs with New construction (Sample DA's and Neighbours)

Census Variables	2006		2016		% Change 2006 - 2016	
	Sample DA	NBR	Sample DA	NBR	Sample DA	NBR
Total Population	12,781	67,447	19,754	77,787	54.6	15.3
Male - Female ratio (number of males per 100 females)	85.6	89.1	90.0	91.8	4.4	2.7
Children Population (0 to 14 yrs.), %	9.2	11.8	9.3	11.2	0.1	-0.6
Working Age Population (15 to 64 yrs), %	75.0	72.9	70.1	72.4	-4.9	-0.4
Senior (65 +), %	16.0	15.1	20.6	16.4	4.6	1.3
Single detached dwellings, %	14.5	27.8	10.2*	26.2	-4.3	-1.6
Apartment style dwellings >=5 storey, %	42.4	20.5	55.1*	25.2	12.7	4.7
Average Household size, #	1.89	2.1	1.87	2.0	-1.4	-1.7
Single Person Household, (% of total dwellings)	43.8	38.6	43.5	38.9	-0.4	0.2
Median Household Income, $	44,320	50,201	58,773	61,410	32.6	22.3
LICO-AT, %	20.8	15.5	17.7	15.2	-3.1	-0.3
Shelter cost to income ratio = > 30%	11.0	9.8	39.4*	33.9	28.5	24.1
Highest level of Education (Age group 15 to 64), %	66.2	61.8	68.9	66.7	2.7	4.9
Lowest Level of Education (Age group 15 to 64), %	10.9	13.9	8.9	10.0	-2.0	-4.0
Immigrants, % (of total population)	10.3	10.9	14.7	14.9	4.3	4.0
Recent Immigrants 2011-2016, % (% of immigrant population)	25.7	21.9	35.9	28.3	10.2	6.5
Non Permanent Residents, % (of total population)	3.3	1.0	7.9*	3.7	4.6	2.8
Visible Minority, %	11.1	9.9	21.4*	17.7	10.3	7.7
Mode of Commuting - Car, %	54.4	63.2	61.0	66.7	6.6	3.5
Mode of Commuting - Public Transit, %	17.0	16.1	14.2	16.8	-2.8	0.7
Mode of Commuting - Walk, %	24.8	17.4	21.6	13.9	-3.1	-3.4
Commuting Duration <30 min, %	-	-	77.2	72.9	-	-

* *p* <.05 Census 2016 variables are statistically significant than their neighboring DAs

4.3.2 Dwelling

The dwellings in sample DAs are smaller and have a larger proportion of single-person

households than the neighbours, but the difference is not significant ($p > .05$) (see Table

4.10). Apartments-style dwellings are significantly higher in sample DA (55.1%), while

single-detached dwellings are significantly lower (10.2%) compared to their neighbour

dwelling proportion of 25.2% apartment-style and 26.2% of single-detached dwellings

(see Table 4.10). Over the years, both sample DAs and neighbours saw growth in the proportion of apartment-style buildings; however, there was a considerable increase of 12.7% in sample DAs compared to 4.7% in the neighbours. Between 2006 and 2016, the sample DAs saw a 4.3% decline in single-detached dwellings compared with their neighbours of 1.6%. Between the regions, the Mainland Halifax (67.9%) and Peninsula (69.4%) have a significantly higher proportion of apartment-style dwellings above five stories high than their neighbouring DAs within each region of Mainland (30.9%) and Peninsula (30.7%) (see Table 4.11). This dwelling style increased by 33.9% in Mainland HD compared to 7% in the neighbours. Simultaneously, the Peninsula rose 3.1% in apartment-style dwellings, with neighbouring DAs remaining steady.

4.3.3   Income

The median household income of sample DAs do not significantly differ from their neighbours (see Table 4.10). Similarly, the LICO-AT % is higher, although not statistically significant, in the sample when compared to neighbouring DAs and the CMA. Again not statistically significant, the sample DAs saw a higher median household income increase between 2006 and 2016 than their neighbours. The LICO-AT % declined slightly in sample DAs but remained stable in the neighbouring DAs. Meanwhile, the shelter to income ratio of sample DA of 39.4% remains significantly higher than its neighbours of 33.9% (see Table 4.10). The percentage increased more than 24% in both samples and their neighbours, compared with a 14.6% increased in the CMA. In the regional context, median household income, LICO-AT %, and shelter to income ratio are not statistically significant than their neighbours. Regardless, the Peninsula sample DAs

and its neighbours have the lowest median household income with a high LICO-AT% and shelter to income ratio. Bedford has the highest income and low LICO-AT% and shelter to income ratio in its sample DAs and neighbors within the region.

4.3.4 Education

Education levels of working-age residents do not significantly differ between the sample DAs and their neighbours (see Table 4.10). Between 2006 and 2016, the working-age population saw a slight increase in the highly educated and slightly declined in the low educated proportion. There is no significant difference in the proportion of high and low-educated residents of the sample DAs and their neighbours within the region (see Table 4.11).

4.3.5 Immigration and Visible Minorities

A higher proportion of both immigrants and those immigrating recently (i.e., between 2011 and 2016) live in sample DAs than their neighbours and the CMA; however, these findings are not statistically significant (see Table 4.10). The sample DAs have a significantly higher proportion of visible minority at 21.4% and non-PR residents at 7.9% than their neighbours of 17.7% visible minorities and 3.7% non-PR residents. Between 2006 and 2016, the sample DAs saw a 4.6% increase in non-PR residents, while their neighbours saw an increase of 2.7%. Likewise, sample DAs had a significant increase in the visible minority population of 10.3% compared to 7.7% in the neighbourhood (see Table 4.10). In the regional context, the Peninsula sample DAs have a significantly higher proportion of recent immigrants (44.8%), non-PR residents (17.7%), and visible minorities (34.3%) compared to its neighbours within the region (see Table 4.11). The

recent immigrant proportion in Peninsula increased by 12.6% while staying stable in its neighbours within the region. Meanwhile, the Peninsula sample DAs saw a high increase in non-PR residents of 12.1% compared to its neighbours increase of 5.3%. And visible minority proportion also saw a high rise of 18.6% compared to neighbours increase of 9% within the region (see Table 4.13).

4.3.6 Transportation

The automobile is the primary commute mode among sample DA residents, followed by public transit and walking (see Table 4.10). Although commute data between sample DAs and their neighbours are not statistically significant, they have a higher proportion of walking commuters than their neighbours within the CMA. In regional comparison, the Bedford region has a significantly smaller proportion (38.7%) of residents commuting under 30 minutes drive than its neighbours (66.8%) within the region.

Table 4.11 Population Characteristics of Sample DAs with New construction, 2016 (Region wise Sample DAs and Neighbours)

Census Variables	Bedford		Dartmouth		Mainland Hfx		Peninsula		CMA
	Sample DA	NBR	Sample DA	NBR	Sample DA	NBR	Sample DA	NBR	Overall
Total Population	690	16,167	6,053	20,023	5,072	24,852	7,939	20,499	403,390
Male - Female ratio (number of males per 100 females)	72.5*	89.8	87.8	88.6	83.3	90.9	98.2	99.7	93.9
Children Population (0 to 14 yrs.), %	4.3*	15.0	12.8	11.2	11	13	7.0	9	15
Working Age Population (15 to 64 yrs), %	43.5*	65.5	67.6	69.2	65.7	70.5	77.2	78.9	69.3
Senior (65 +), %	51.4*	19.4	19.6	19.5	24.1	16.4	15.5	12.4	15.7
Single detached dwellings, %	9.5	35.9	18.3	32.4	8.3	20.9	6.1	16.8	49.9
Apartment style dwellings >=5 storey, %	40.5	30.9	23.4	12.2	67.9*	30.9	69.4*	30.7	12.1
Average Household size, #	1.7	2.3	2.1	2.0	1.9	2.1	1.7	1.9	2.3
Single Person Household, (% of total dwellings)	44.6	26.3	33.7	39.8	42.0	39.2	50.7	47.0	29.5
Median Household Income, $	81,152	82,272	64,806	58,784	67,005	57,123	48,088	58,022	69,522
LICO-AT, %	5.6	7.5	9.6	11.4	13.2	14.8	26.6	22.1	9.6
Shelter cost to income ratio => 30%	25.0	27.4	32.5	30.3	34.2	34.0	48.5	42.6	25.0
Highest level of Education (Age group 15 to 64), %	78.7	72.4	63.4	60.3	67.3	65.5	73.3	68.7	63.9
Lowest Level of Education (Age group 15 to 64), %	6.3	7.9	12.1	13.2	9.0	11.0	6.7	8.1	12.1
Immigrants, % (of total population)	12.2	20.2	8.4	8.2	16.3	18.5	18.7	13.6	9.4
Recent Immigrants 2011-2016, % (% of immigrant population)	18.8	25.4	24.0	18.2	29.5	39.3	44.8*	25.4	25.3
Non Permanent Residents, % (of total population)	0.0	2.6	0.7	0.6	2.8	4.7	17.7*	7.8	2.0
Visible Minority, %	8.4	19.6	10.2	9.3	17.2	24.1	34.3*	19.2	11.4
Mode of Commuting - Car, %	77.4	87.3	76.4	70.9	78.6	70.5	38.0	43.3	77.7
Mode of Commuting - Public Transit, %	16.1	7.8	15.2	20.2	11.6	19.7	14.9	18.3	11.8
Mode of Commuting - Walk, %	0.0	3.5	5.4	6.9	7.0	7.6	43.8	34.1	8.2
Commuting Duration <30 min, %	38.7*	66.8	75.6	74.1	75.0	70.2	81.3	78.8	65.7

* *p* <.05 Census 2016 variables are statistically significant than the their neighboring DAs

Table 4.12 Population Characteristics of Sample DAs with New construction, 2006 (Region wise Sample DAs and Neighbours)

Census Variables	Bedford		Dartmouth		Mainland Hfx		Peninsula		CMA
	Sample DA	NBR	Sample DA	NBR	Sample DA	NBR	Sample DA	NBR	Overall
Total Population	661	10,112	3,404	19,067	3,684	23,846	5,032	18,802	372,858
Male - Female ratio (number of males per 100 females)	75.0	91.0	84.3	88.9	85.4	84.1	88.2	95.1	92.2
Children Population (0 to 14 yrs.), %	6.1	16.3	14.5	13.2	9.3	12	6	8	16
Working Age Population (15 to 64 yrs), %	51.5	70.5	69.3	70.6	76.0	70.6	81.2	79.7	71.8
Senior (65 +), %	40.2	13.0	16.2	15.9	15.6	17.1	13.0	12.7	12.1
Single detached dwellings, %	11.1	49.8	29.3	34.5	15.6	23.8	6.5	15.1	51.6
Apartment style dwellings >=5 storey, %	38.1	8.0	7.1	14.0	34.1	23.9	66.3	30.6	9.5
Average Household size, #	1.9	2.4	2.2	2.2	2.0	2.0	1.7	1.9	2.4
Single Person Household, (% of total dwellings)	36.5	25.4	32.7	37.1	38.4	39.6	53.8	46.4	27.7
Median Household Income, $	61,192	70,740	49,322	51,557	48,249	43,023	36,091	48,274	54,108
LICO-AT, %	3.4	9.6	14.7	11.7	18	16.4	29.3	20.9	10.8
Shelter cost to income ratio = > 30%	12.7	11.0	10.9	9.3	23.5	42.9	25.0	29.0	10.5
Highest level of Education (Age group 15 to 64), %	65.2	66.7	56.4	56.5	71.9	61.3	68.1	65.6	59.0
Lowest Level of Education (Age group 15 to 64), %	10.1	12.5	22.8	18.5	7.5	14.2	6.2	9.8	17.2
Immigrants, % (of total population)	10.1	14.6	7.1	8.6	11.3	11.5	11.8	10.4	7.4
Recent Immigrants 2011-2016, % (% of immigrant population)	0.0	21.7	16.7	14.7	25.3	24.9	32.2	26.0	18.5
Non Permanent Residents, % (of total population)	0.0	0.4	0.6	0.2	3.1	0.8	5.6	2.5	0.6
Visible Minority, %	0.0	10.6	7.0	8.2	10.3	10.9	15.8	10.2	7.5
Mode of Commuting - Car, %	86.7	84.8	70.9	67.6	69.4	70.6	31.5	39.4	75.8
Mode of Commuting - Public Transit, %	8.9	8.4	21.6	19.8	21.2	18.9	12.0	15.8	11.9
Mode of Commuting - Walk, %	4.4	5.1	4.2	10.0	7.5	8.1	50.8	39.1	10.1
Commuting Duration <30 min, %	-	-	-	-	-	-	-	-	-

Table 4.13 Population Characteristics Change, 2006-16 (Region wise Sample DAs and Neighbours)

Census Variables	Bedford		Dartmouth		Mainland Hfx		Peninsula		CMA
	Sample DA	NBR	Sample DA	NBR	Sample DA	NBR	Sample DA	NBR	Overall
Total Population	4.4	59.9	77.8	5.0	37.7	4.2	57.8	9.0	8.2
Male - Female ratio (number of males per 100 females)	-2.5	-1.2	3.5	-0.4	-2.1	6.7	10.0	4.6	1.7
Children Population (0 to 14 yrs.), %	-1.8	-1.3	-1.7	-2.0	1.3	1.4	1.2	1.1	-1.1
Working Age Population (15 to 64 yrs), %	-8.0	-5.0	-1.7	-1.3	-10.3	-0.1	-4.0	-0.8	-2.5
Senior (65 +), %	11.2	6.5	3.5	3.6	8.5	-0.8	2.5	-0.3	3.6
Single detached dwellings, %	-1.7	-13.9	-11.0	-2.1	-7.3	-2.9	-0.4	1.8	-1.6
Apartment style dwellings >=5 storey, %	2.4	23.0	16.3	-1.8	33.8	7.0	3.1	0.0	2.6
Average Household size, #	-10.5	-3.8	-4.6	-7.1	-1.3	3.1	4.0	0.9	-4.2
Single Person Household, (% of total dwellings)	8.1	0.9	1.0	2.7	3.5	-0.3	-3.1	0.6	1.8
Median Household Income, $	32.6	16.3	31.4	14.0	38.9	32.8	33.2	20.2	28.5
LICO-AT, %	2.2	-2.1	-5.2	-0.2	-4.8	-1.6	-2.7	1.2	-1.2
Shelter cost to income ratio = > 30%	12.3	16.4	21.6	21.0	10.7	-9.0	23.5	13.6	14.6
Highest level of Education (Age group 15 to 64), %	13.5	5.8	7.0	3.8	-4.7	4.2	5.2	3.1	4.8
Lowest Level of Education (Age group 15 to 64), %	-3.8	-4.6	-10.8	-5.3	1.5	-3.2	0.4	-1.7	-5.1
Immigrants, % (of total population)	2.1	5.6	1.3	-0.4	5.1	7.0	6.9	3.3	1.9
Recent Immigrants 2011-2016, % (% of immigrant population)	18.8	3.7	7.4	3.5	4.2	14.4	12.6	-0.6	6.9
Non Permanent Residents, % (of total population)	0.0	2.2	0.1	0.5	-0.4	4.0	12.1	5.3	1.4
Visible Minority, %	8.4	9.0	3.3	1.1	6.9	13.1	18.6	9.0	3.9
Mode of Commuting - Car, %	-9.2	2.5	5.5	3.2	9.2	-0.1	6.4	3.9	2.0
Mode of Commuting - Public Transit, %	7.2	-0.6	-6.3	0.4	-9.6	0.8	2.9	2.5	-0.1
Mode of Commuting - Walk, %	-4.4	-1.6	1.2	-3.2	-0.5	-0.4	-7.0	-5.0	-1.9
Commuting Duration <30 min, %	-	-	-	-	-	-	-	-	-

5   Discussion

5.1   Demography and Life Course

Examining the demographic composition of high-density DAs in Halifax shows a larger working-age population aged between 15 to 64 years, fewer children below 15 years than the overall CMA (see Figure 4.1). This finding aligns with the popular notion that high-density living conditions found in the urban core have a higher concentration of single, well-educated, and working-age residents who are career-focused with a busy lifestyle and prioritize amenities and accessibility in the housing choices (Grant & Gregory, 2016; Karsten, 2007; Moos, 2014; Townshend & Walker, 2015). The Peninsula is Halifax's heart, containing both the central business district and significant clusters of knowledge-based jobs in educational and health institutions (Grant & Gregory, 2016).   Although the analysis did not break down the ages into finer categories, it follows that many of these educated 15-64 year old residents include students and younger workers, aligning with the knowledge economy and producing specific housing submarket in the urban core of Halifax (Moos et al., 2018).

Meanwhile, the condominiums in the suburbs of Bedford contain a higher proportion of seniors and fewer working-age households. Senior residents may be choosing these high-density lifestyles for their lower maintenance and not needing the space for larger families. The findings indicate a significantly higher proportion of female than males and a high proportion of seniors in DAs with new high-density construction than their neighbouring DAs. Downsizing is common among empty nesters and older households who generally transition from single-family homes to apartment-

style dwellings looking for less maintenance and easy access to public transit (Clark, 2005; Clark & Deurloo, 2006; Ostrovsky, 2004). In downsizing, seniors may wish to stay within the community due to local familial and social networks but choose a different housing format. Seniors in these suburbs also appear to prefer owning over renting; most of them choose serviced condominium-type dwellings (Abramsson & Andersson, 2012; McAuley & Nutty, 1982; Moos, 2015; Ostrovsky, 2004; Rose & Villeneuve, 2006). While we often associate condominiums with downtown, condominium developments spread throughout the city in Halifax, with nearly 60% in the suburbs (Novak, 2019). The findings from this research appear to indicate a sharp division of space by age or 'generationed' space in the HD DAs; where city center HD DAs mostly consist of working-age smaller households and suburban HD DAs consist of seniors living in the urban center near amenities (Grant & Gregory, 2016; Moos, 2014).

With shifting gender roles and increasing diversity in household types and living arrangements, high-density dwellings have become desirable among women in larger cities (Kern, 2010b, 2010a; Rosen & Walks, 2015). Women own a high proportion of condominiums in cities like Toronto and Vancouver, where marketing city-center condo lifestyle targets young professionals by promoting security features and amenities (Kern, 2007, 2010c). Yet, in Halifax, the findings do not show a significantly greater female population in the HD DAs. Nevertheless, a small submarket of females living in predominantly condominium HD DAs is present in the Halifax Mainland region's inner suburbs.

Over time household size has shrunk throughout Canada, with one or two persons becoming increasingly common due to changing social norms and household composition (Statistics Canada, 2015b; Townshend & Walker, 2015). Rising single-person households result in increasing demand for smaller dwellings and thus brings about subsequent growth to high-density dwellings in the form of condominiums and studio/ one-bedroom dwellings targeted at young adults living alone and older adults downsizing (Moos, 2016; Rose & Villeneuve, 2006). As households get smaller, alternative housing styles such as studio and one-bedroom are being promoted and developed for such target groups (Milan, 2000; Statistics Canada, 2015b). Evolving families such as blended families, same-sex unions, common law, delayed marriage, and fluid relationships give rise to diverse living arrangements. The broadening of socially acceptable structures such as lone parent households, living alone and, families without children likely impacts the demand for a high-density living (Clark & Dieleman, 1996; Rose & Villeneuve, 2006).

In 2016, one-person households were the most common household type, accounting for 28% of all households in Canada (Tang, 2019). The analysis done for this research shows that one-person households are the most common household type in the HD DAs, comprising more than 45% of the households, compared to only 29.5% in the CMA (see Figure 4.5). Also, the HD household size is much smaller at 1.8 compared to the CMA of 2.3 (see Table 4.3, see Figure 4.4). The study results also show a similar trend in DAs with recent construction indicating the prevalence of smaller households and living alone, opposite their neighboring DAs with larger households. The subtle declining family size and increasing residents living alone indicate changing household structure due to shrinking family composition in the high-density dwellings in Halifax (see Table

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4.3). Changes in demographic structure and life course do not occur in isolation; their effects are visible in the built environment and later life stages (Townshend & Walker, 2015). We can see these changes manifest in Halifax's built environment, with densities increasing in the urban core, traditional suburbs, and even exurban areas could relate to increasing demand for smaller dwellings due to changing demographic structure and life course. In mid-size and smaller cities, apartment-style condominiums and rental dwellings spread throughout the metropolitan region (Grant et al., 2019; R. Harris & Rose, 2019; Novak, 2019). All now host high-density residential developments occupied by smaller households.

5.2 Affordability and Immigration

There is a large socio-economic difference between a condominium and rental HD DAs and the CMA overall (see Figure 4.7). At $45,201, the average household income in HD DAs is significantly lower than that for the overall CMA ($69,522). The significant difference may be indicating reasonably priced housing in the high-density dwellings compared to owning a house (Dalton, 2017). In addition, the high presence of single person households could have lowered the average household income in HD DAs. Comparing rental and condominium HD DAs shows that condominium dwellers have a relatively higher income, likely because buying a condominium requires down payments while rentals typically cater to lower-income groups. In 2016, renters accounted for 40% of the total households in the Halifax CMA, a high concentration of renters in the Peninsula (31%) and a northern Mainland (22%) indicate increasing preference of renting in the high-density in these regions (CMHC, 2019).

According to Statistics Canada (2017a), households spending less than 30 % of their before taxes income on housing costs is considered affordable. At 40.8%, significantly more high-density residents direct greater than 30% of their income to housing costs income comparison to only 25% of residents in the rest of the CMA. Apart from Bedford, HD DAs in the rest of the regions have significantly lower median household income, higher LICO-AT presence, and a higher shelter to income ratio than the CMA (see Figures 4.7,4.8,4.9).

People in high-density direct a greater percentage of their income in putting a roof over their heads, and they are more vulnerable to homelessness than other financial struggles. Over the years, unaffordability is increasing rapidly in the HD DAs and their neighbours. Between 2006 - 2016, the whole region saw increasing housing unaffordability by 16.9% (see Table 4.3); however, the increase was astonishing at 38.9% for the HD DAs (see Table 4.6) and in the Peninsula alone compared to the CMA with an increase of 14.6%. Many of the Peninsula's residents are working age and have a household income in the lower-middle range. Yet high-density rental housing is very sought after as it is comparatively cheaper than owning or renting a single-family home in this region.

A recent rental report by CMHC has linked the rapid increase in cost throughout Halifax due to the low supply of student housing and increasing demand for rental housing for students and working-age residents (Woodford, 2019). These trends are especially felt on the Peninsula as it has the greatest demand for high-density living and the most diverse income; the North End has median and low income with pockets of very

low income. The South-End has very high median income and pockets of very low-income DAs consisting mostly of student residences (Grant & Gregory, 2016; Prouse et al., 2014a) (see Figure 5.1). In addition to the students, this region has a substantial proportion of immigrants and non- PR residents due to extensive education and employment providers such as Dalhousie University, Saint Mary's University, King's College, and regional hospitals and businesses downtown.

Halifax's HD DAs also have a significantly higher immigrant population than the overall CMA (see Figure 4.10), with the trend increasing between 2006 and 2016. Apart from the Peninsula, the inner suburbs of Mainland Halifax have a high concentration of immigrant population, particularly recent immigrants, and visible minorities due to proximity to downtown and cheaper and subsidized rentals in the neighbourhoods of Clayton Park, Fairview, and Spryfield (see Figure 4.11, 4.12, 4.13). Upon arrival in Canada, recent immigrants do not have many housing options and settle in transitional housing or short-term accommodations such as high-density dwellings before moving to homeownership (Agrawal, 2010; Moos, 2016; Preston et al., 2009). Moreover, they may be more accustomed to living in the high-density arrangement in their home countries.

Between 2006 and 2016, HD DAs gained more recent immigrants, visible minorities, and non-permanent residents than the CMA. The clustering of recent and old international immigrants in the HD could be due to cheaper housing in the neighborhood or maintaining social ties with those living in high-density dwellings. Kobayashi & Preston (2015) highlight that the low supply of affordable housing in Canada increases the risk of homelessness among immigrants. They typically live in unaffordable,

unsatisfactory, and overcrowded housing. A CMHC rental report from 2016 shows the rental market becoming tighter, decreasing vacancy rates in the CMA due to international migration, and increasing rental occupancy in regions such as Dartmouth, with a history of older and more affordable rental stock (CMHC, 2016c). The findings of this study show, between 2006 and 2016, the Dartmouth region saw a significant increase in recent immigrants. This increase in only recent immigrants in Dartmouth can only be attributable to the availability of below CMA average rent in this region (CMHC, 2016c, 2016c).

The findings suggest that the apartment-style dwellings are growing primarily in rental HD DAs in Mainland and Peninsula regions (see Table 4.9). In addition, new purpose-built rentals are arriving in Fairview and the North End, both areas having a high concentration of low-income groups raising affordability risks (McLean, 2018). Both long-term and newcomer residents face financial challenges in maintaining housing and carrying the risk of vulnerability to homelessness. Moos (2016) noted adults who struggle with housing costs while young are prone to face more financial hardship in later years, potentially impacting their financial independence and homeownership. The high gap in median household income of HD and the CMA and the rising rent prices and decreasing rental vacancy rates are emerging housing issues and affordability challenges for households in the very low-income bracket (below 60% of CMA average household income).

Median Household Income, Halifax CMA 2016

Median Household Income by Dissemination Area compared to the Halifax CMA average of $69,522.

- Very Low - below 60%
- Low - 60 to 80%
- Middle - 80 to 120%
- High - 120 to 140%
- Very High - above 140%

- Study Boundary
- Major Roads
- High Density DA

Ruji Rajbhandari
Data Sources: GeoNOVA, HRM Open data, Statistics Canada
Projection : NAD_1983_UTM_Zone_20N
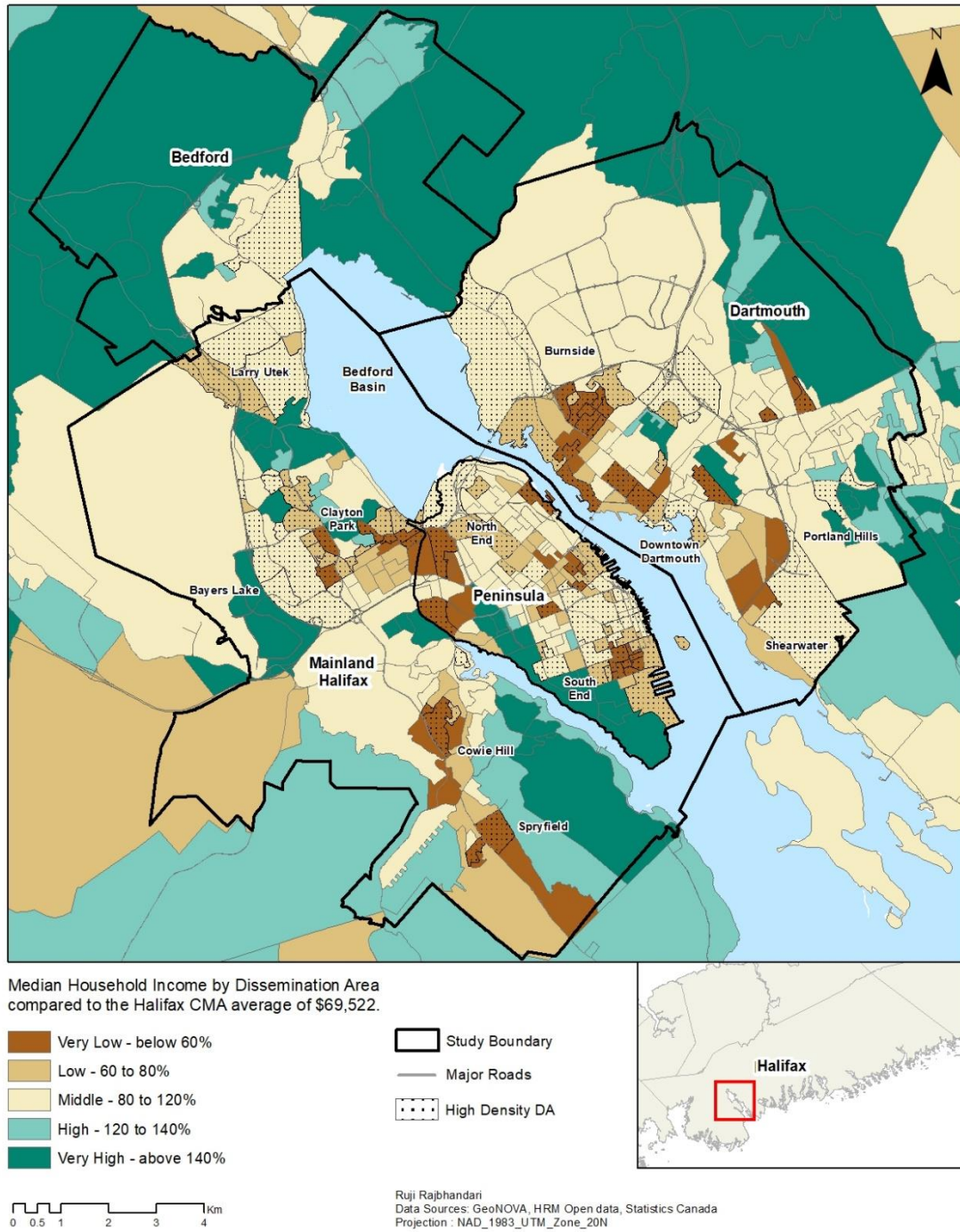
Figure 5.1Median Household Income by DA, 2016

5.3   High-density Development and Planning

Influenced by relatively new theories of sustainable development, New Urbanism, and Smart Growth, current planning principles and policies focus on regional centers and mixed-use development nodes to address the sprawl (Grant & Filion, 2015). Halifax government-led initiatives like the 'Center Plan' encourage high density and mixed-use development in the urban core. The plan follows four fundamental concepts: strategic growth, complete communities, pedestrian-focused design, and human scale to develop a regional center in the Peninsula and Dartmouth downtown. The 'Centre Plan' aims to add 18,000 units by 2031 with enhanced policies and guidelines to increase density and provide needed amenities for the growing population in the Peninsula and Dartmouth downtown (HRM, 2021c).

The findings suggest that HD and the neighbouring DAs show growing apartment-style dwellings and declining existing single-detached houses (see Table 4.3, 4.10). In addition, Table 4.9 indicates increasing apartment-style dwellings in predominantly rental DAs in Peninsula and Mainland Halifax. It also shows a decreasing trend of apartment-style dwellings in predominantly condominium DAs of both Peninsula and Mainland Halifax regions (see Table 4.9). Devet (2020) reports that smaller rundown buildings, commercial units, and affordable rentals are getting demoed to build new multi-story buildings in the city's older parts of Halifax. While analyzing changes in DAs with recent high-density construction (2011 and 2016) and their neighbours, the findings of this study show that in the Mainland Halifax region, apartment style dwellings

increased at 33.9% compared to their neighbouring DAs with increase of just 7% (see Table 4.13).

Spinney et al. (2011) point out changes in household composition (decline of existing low income, low waged, and benefit dependent households), increasing rent or cost of homes, changing the level of active construction compared to formation and deformation of households, in-migration of high-income households as some indicators of gentrification in middle and low-income neighbourhoods. The growing new HD development could be attributable to Halifax's distinct geography, notably the Peninsula and the Mainland, where land for new development is minimal and housing demand is high. The supply of rental units is expanding with new builds, yet the new rental units tend to be more expensive with higher-end amenities and have higher rents than the older housing stocks (CMHC, 2019).

There are indications of a significantly higher shelter to income ratio in sample DAs than their neighbouring DAs, while both groups saw an increment of more than 24% between 2006 and 2016, suggesting housing price increase and decreasing affordability among the households. These findings support the notion that high-density developments are rising in older parts of Halifax increasing concerns of gentrification and displacement of old low-income residents caused by incoming households in the middle and lower-income neighbourhoods. In addition, the sample DAs have a significantly high and increasing proportion of non-permanent residents and visible minorities in recently built high-density dwellings. When analyzing the region-wide changes, increasing recent immigrants, non-permanent residents (temporary foreign residents who are here with

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work permits or student visas), and visible minorities are eminent in the Peninsula region DAs with recent high-density builds.

While analyzing changes in DAs with recent high-density construction and their neighbours, there is increasing apartment-style dwellings and high shelter to income ratio and the rising cost of dwellings indicate occurrence of gentrification due to recent high-density builds (see Table 4.10). However, due to the limitation of the census variables studied here, indications of gentrification and displacement are not clearly visible. Additional research is needed to analyze if the displacement is occurring among low-income and vulnerable households or not.

Although smaller cities do not always follow larger cities' development patterns, the local policy, local cultural values, and market dynamics are vital in emerging new urban forms in smaller towns (Grant & Filion, 2015). For example, a local report by CMHC (2016a) shows that increasing immigrants and the low vacancy rate drive most condominium and rental apartment construction in Halifax, mainly in the Peninsula and adjacent inner suburbs of Mainland and Hammonds Plains areas. As planning often reflects society's market needs and current housing choices, in Halifax, the existing social situation such as increasing immigration and 'youthification' in urban areas could link with the current rise in the new purpose-built rental construction (Grant, 2006; Moos, 2016).

The city has a 'bonus zoning' provision in its Center Plan to provide public benefit for additional development rights. An update on the Affordable Housing Work Plan, 2020 states that when the city receives the public benefit in the form of money-in-lieu as part of

giving 'bonus zoning' to the new development, affordable housing shall get more than 60% of the share (HRM, 2021a). While the Center Plan encourages affordable market housing (rental), the requirement for affordable housing in private and large lot developments (lots larger than one hectare) is still only optional rather than mandatory; thus, many developers do not include affordable units in their projects.

The planning guidelines lack strict enforcement, such as housing quotas for affordable units. Similarly, future growth node areas such as Shannon Park, Penhorn Mall lands, Young street Lands, Dartmouth Cove lands are planned to support mixed-use, compact mid to high rise developments, yet affordable housing provisions are not visible for these planning areas in the Center Plan. While this research did not delve into rental rates, anecdotal evidence points to most new developments priced at the upper end of the market. Since the private market is not producing affordable rental housing, future planning initiatives should include diversity in private housing such as cooperatives and include programs such as tax incentives, public-private partnerships to increase housing units, introduce rental control to reduce eviction of existing residents and promote affordable housing and mixed-income neighborhoods (NMHC, 2021).

5.4 Commuting Pattern

El-Geneidy et al. (2015) indicate that transportation plans in Canadian cities prioritize sustainable accessibility in the wake of environmental impact and climate change, yet automobile-oriented land use still prevails in the transportation system. A commuter trend report of major CMAs in Canada found that city centers have the most high-paying technical jobs and attract workers into the city who mostly use public transit; whereas

manufacturing and retail jobs are shifting towards suburbs, resulting in complex commuting patterns of inter-suburb and city center to suburb commutes (Heisz et al., 2005). Halifax's current built environment shows a similar pattern where the Peninsula contains the dense older city core housing the central business district including FIRE (Finance, Investment and Real estate) and education centers while manufacturing and retail jobs expand into the suburbs of Bedford and Dartmouth. Based on the design principles of Smart Growth and New Urbanism, planners encourage downtown living. They suggest raising density in the city center could reduce infrastructure costs and mitigate traffic congestion by promoting walking and public transport (Grant & Filion, 2015). The research findings support this conjecture, showing a high proportion of HD DA residents use public transit and walk to work; however, the automobile is still the primary mode of commute in HD DAs (see Figure 4.14).

Handy et al. (2002) argues that a neighbourhood's geography influences pedestrian activity rather than a region's structure. The findings indicate that the Peninsula HD residents are more likely to walk to work or use public transit, which is visible in the compact Peninsula neighborhoods, and amenities and services are within walking distance (see Figure 4.15). Furthermore, HD DAs in Dartmouth and Mainland Halifax have significantly higher public transit users, but Bedford does not. This trend is evident in predominantly rental DAs rather than the condominiums found in Bedford. Apart from lifestyle preference, the cost of driving associates to additional household expense, especially for lower-income groups (Axisa et al., 2012; Chen et al., 2008; Crane, 1998).

A high proportion of HD residents have commutes under 30 minutes, with those on the Peninsula having the shortest commutes at 81.5% of HD DA residents commute less than 30 minutes (see Figure 4.16). The DAs with recent high-density construction in Bedford show a significantly smaller proportion (38.7%) of commuters traveling less than 30 minutes, indicating that the commuting times are longer in the suburbs. The households with lower income and recent immigrants are more likely to use public transit and reside in proximity to transportation than the higher income groups due to unaffordability (Heisz et al., 2005; Maoh & Tang, 2012). Suburbs of Dartmouth and Mainland Halifax have high public transit users, likely due to cheaper rental stock in these areas than suburban Bedford, where most commute by car. Heisz & Schellenberg (2004) found that recent immigrants are likely to use more public transit than the Canadian-born regardless of the distance to work. As they live longer in the country, the mode choices gradually change, becoming more like the general population of the CMA.

Studies suggest that if commuters have to travel long distances or do not have easy access to public transit, their first choice would be the automobile as their mode of transport (Chen et al., 2008; Maoh & Tang, 2012). The findings indicate a slight commuter behaviour change in the suburban Dartmouth between 2006 and 2016, where car commuters increased and walking, and public transit users declined. Also, the presence of below-average household income, along with large numbers of immigrant and visible minorities in high-density rentals in the HD, increases a residents' likelihood of using public transit rather than an automobile.

Similar to planning principles in other cities, Halifax's planning policies promote higher-density city centers and convenient transportation choices, including high pedestrian activity in Halifax (HRM, 2021b). The study indicates high pedestrian and public transit activity, mainly in the Peninsula and parts of Mainland Halifax, while the rest of the suburban Halifax is car dependent. Thus, high-density lifestyles do not necessarily result in less automobile use, but neighbourhood structure appears to be at least if not more important. Planners thus must think about entire neighbourhoods when promoting alternative modes of transit over the automobile.

6   Conclusion

The research explored the demographic characteristics of households living in high-density dwellings in the urban areas of Halifax. I investigated two primary questions: who lives in the high-density developments and whether the new developments impact the existing neighbourhood. The study used the descriptive and statistical analysis of 2006 and 2016 Census data for the Halifax CMA at Dissemination Area instead of Census Tract to better reflect the neighbourhood level change in a smaller city like Halifax (Prouse, et al., 2014).

Based on the quantitative analysis of the 2006 and 2016 Census data, the findings suggest a larger concentration of working-age population between 15 to 64 years in the high-density DAs. Larger households, especially those with children, are far lest common in HD DAs. The HD DAs are spread through out the regions. This research appear to indicate that a division of space by age or 'generationed' space exists in the HD DAs; where city center HD DAs mostly consist of working-age smaller households and suburban HD DAs consist of seniors living in the urban center near amenities (Grant & Gregory, 2016; Moos, 2014). HD dwellings are more desirable among women in larger cities, yet the findings do not show a significantly greater female population Halifax HD DAs. However, a small submarket of females is present in the inner suburbs. Changes in demographic structure and household size are visible in high-density, with one-person households comprising more than 45% of the dwellings. In both HD areas and the CMA as a whole, household size is decreasing while single-person households are on the rise; however, these changes are happening more quickly in HD neighbourhoods.

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The concentration of low-income groups and rising housing prices in the Peninsula and Mainland raises housing vulnerability in the high-density residents. In addition, between 2006 and 2016, the high-density DAs gained more recent immigrants, visible minorities, and non-permanent residents than the CMA. The newcomers do not have many housing options upon arrival to Canada except for rental. Yet, the low supply of affordable housing and the high-income gap increases the risk among newcomers who have to adjust to unaffordable, unsatisfactory and overcrowded housing. As international migration continues to grow in Halifax, its influence on private and rental housing, social services, public services, and education would be significant. Understanding the socio-cultural needs and providing appropriate housing and public services becomes crucial for community, urban and policy planning (Agrawal, 2010; Akbari & Harrington, 2007; Carter, 2005).

The results from the study suggest growing apartment-style dwellings and declining existing single detached homes in HD DAs. When looking at the impact of recent high-density construction on the existing neighbourhood, the findings suggest a significant increase in apartment-style dwellings in DAs with recent construction, mainly apparent in Mainland Halifax and Peninsula. In addition, there are indications of rising housing prices in the DAs with recent construction. Furthermore, these DAs have growing non-PR residents and visible minorities, specifically in the Peninsula region. These findings suggest that as the prices are rising and the high-density developments are growing in the older parts of Halifax, concerns of gentrification and displacement by incoming households are increasing for the existing middle and lower income households.

As local governments focus on economic growth and population increase, the rising unaffordability indicates a dire need for affordable housing for the at-risk households who cannot afford high-end purpose-built rentals. Moreover, these population and economic growth ambitions may be limited as residents and businesses look elsewhere due to Halifax's high housing costs and limited availability. Another governance issues, specifically dealing with planning, identified in this research is the higher pedestrian and public transit usage by residents of HD DA's, mainly in the Peninsula and parts of Mainland Halifax, while the rest of the suburban Halifax is car dependent. Yet, the low automobile use among high-density DA residents does not seem to result from a high-density lifestyle but rather neighbourhood structure, household socioeconomics, and transportation system efficiency.

6.1   Limitations

The study uses a quantitative method using Census data at the DA level to analyze the household characteristics due to the limitation of the data. Finer scale data at the Dissemination Block level was not available for public use due to the sensitivity of the data. While DA level data provides information on a smaller scale than the Census Tract, Dissemination Block would have given a finer picture of the high-density developments. While most high-density developments have a large footprint, most DAs have single-family homes in their boundary in Halifax, making it difficult to tell who is living specifically in HD housing type. The DA block level would have given homogeneous HD Census data by excluding single-family households.

Another major limitation is the quantity of the census variables included in the study. The dataset includes twenty-two major demographic and socio-economic census variables that portray the household characteristics of residents living in HD, but there are more significant variables not included in the study. For example, some aspects of the social composition in the literature review are not included in the study. Variables such as residential mobility, unemployment, lone parent family structure, and marital status would have given additional indicators of social aspects representing lower-income households. Other variables like labour status and additional category in the age of 20 to 34 years would further build on to housing characteristics of young adults in HD.

6.2   Future Research

Interpretations and findings from this research provide a further understanding of constituents of HD households in Halifax and changes therein between 2006 and 2016. The variables from this study look into different aspects of households and give valuable insight into the demographic and socio-economic characteristics of HD households. In future work, additional variables indicating the economic status of middle and low-income households (see section 6.1 Limitations) could widen the understanding of social and economic indicators of HD households to reflect better the significance of displacement and gentrification in the neighborhood. The data ends with the 2016 census; however, major high-density housing developments have risen since 2016 in Halifax Mainland and Peninsula (CMHC, 2017). In addition, large population gain from international migrants since 2016 has increase demand for rental dwellings shifting demographic trends in Halifax (CMHC, 2018b). Thus, future research could include

forthcoming 2021 census data to extend the study with the most recent census information. Such findings will be useful for future city planning and research projects on housing.

Furthermore, in limiting its scope to quantitative analysis of Census data, the study lacks the qualitative information and experiences of the high-density residents and their neighbours. Future studies could fruitfully explore this issue further by conducting surveys or interviews and qualitatively analyzing opinions and experiences from residents, developers, planners, and other stakeholders to overcome the disadvantages of using only secondary data. The results raise questions regarding rising housing unaffordability in high-density developments compared to single detached homes in Halifax. Further research is required to investigate the rising housing issues and their impact on vulnerable households through additional qualitative assessment.

Recent events of the COVID-19 pandemic have stirred the housing market worldwide with more than expected housing activity and rising prices. The pandemic opened opportunities for work and study from home for most of the population. Spending more time at home has led many to need that extra workspace is likely one reason for increasing housing activity, especially in single-family homes. Although international migration has been slow due to pandemic travel restrictions, interprovincial migration has triggered ongoing real estate activity in Halifax (CMHC, 2021). Larger Canadian cities like Toronto, Montreal, and Vancouver have seen rent decrease and condo owners keen on moving to larger spaces largely in the suburbs, leading to a surge in condo listings and a decline in price on the open market (Hogue, 2020). Similar patterns are noticeable in a

mid-sized city like Halifax, where out-of-province buyers and upsizing households buy homes with larger living space and big yards. In addition, new housing patterns are rising as city dwellers move into satellite towns and smaller towns for larger living spaces and affordable housing for those who can work remotely and have finances to invest in (Demsas, 2021). In addition, low interest rates and increased disposable income have increased purchasing power in some households (Hogue, 2020).   The analysis of this research is based on the 2016 Census data, but questions emerge over changing demand for high-density living post-pandemic.

Rising housing prices, overvaluation, and increasing rents put small-town, middle-class residents vulnerable and at-risk (Demsas, 2021; Rhodes, 2021; Seguin, 2021). Issues with housing affordability are now at the forefront in Halifax, having reached a breaking point in the summer of 2021. The Covid-19 pandemic has certainly complicated this predicament; however, it is a longer-standing issue than the last two years. Tracking population characteristics in the neighbourhoods fueled by high-density developments is useful to understand housing's role in neighbourhood change, ultimately providing insight into what kinds of housing and where it should go to help satiate current demand and help prevent such affordability issues from reappearing in the future.

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