You are Welcome:
Immigrant Integration through the Courtyard Typology

by

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Contents

Abstract

This thesis addresses the architectural and social issues of immigrant populations relocating to foreign lands. The primary factor of immigrant integration is the availability of appropriate housing. Immigrant housing must be integrated into receiving communities in a symbiotic way, rather than siloed or ghettoized. As a building form type, the courtyard provides a supportive community framework for newcomers. This thesis takes the position that community integrated courtyard housing can be supportive to both immigrants and receiving communities.

The site is in the Metrotown area of Burnaby, British Columbia. Burnaby is undergoing large-scale high-rise residential developments. This project seeks to provide a model for the Missing Middle Housing (MMH), which is medium to high density developments that are street oriented. The design intervention provides immigrant housing and public amenities to engage with the surrounding community. All spaces relate to variously scaled courtyards, from public gathering courtyards to individual living unit courtyards.

Acknowledgements

Chapter 1: Introduction

As global migration accelerates, migrant integration has become an acute issue because it is associated with different religions, cultures, and races. Global migration has raised new questions to architects, such as what will a city that accommodates different cultures look like? How can newcomers retain the sense of their identity while they are socially integrated into host societies? This thesis investigates the courtyard typology to formulate a community integrated courtyard housing which will be supportive to newcomers as well as existing communities.
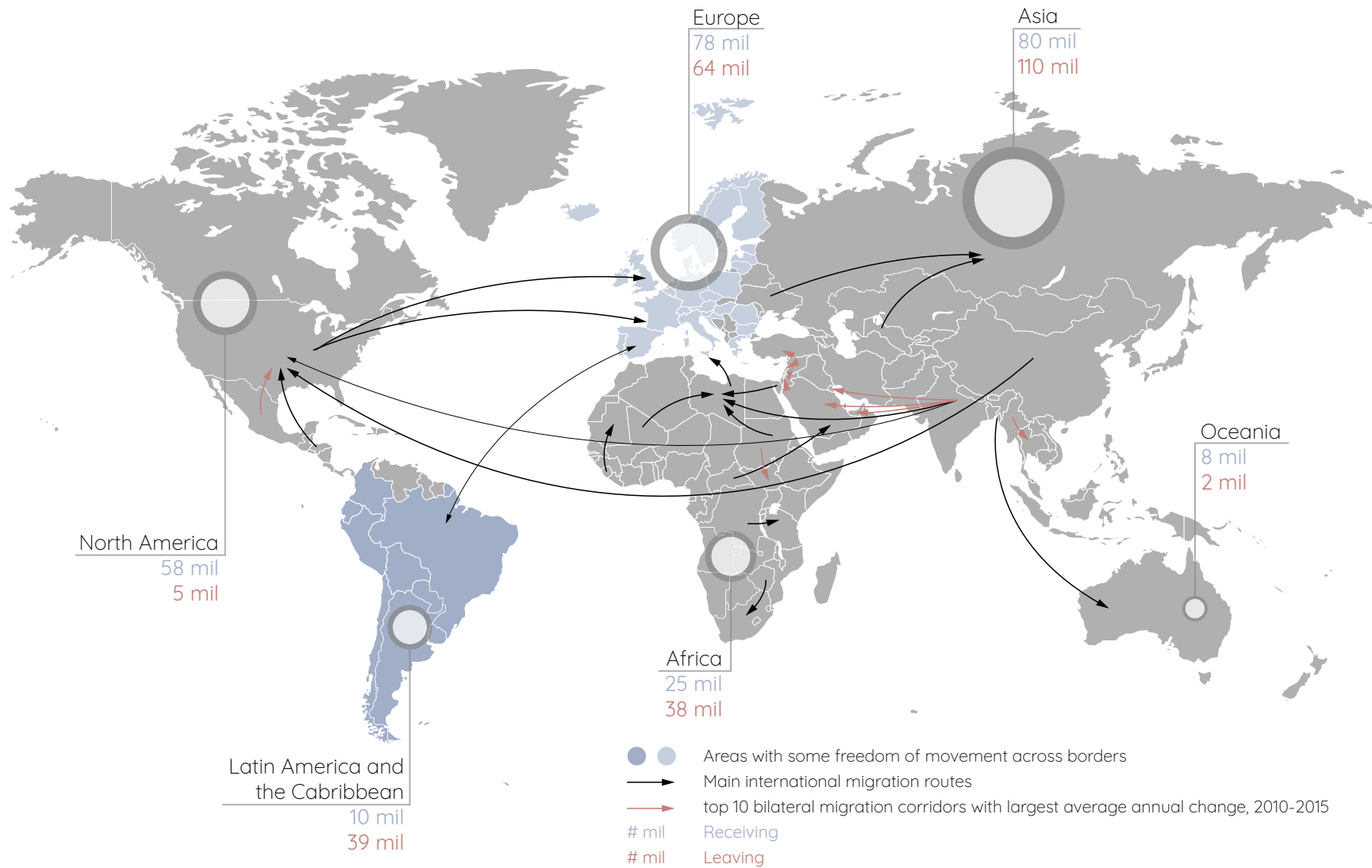
Migration is a global trend, and as communication and transportation advance, the mobility of humans has increased remarkably (Göksel 2014, 8). Generally, people move nationally or internationally to seek better economic opportunities or to avoid environmental disasters, prosecutions, and conflicts (World Economic Forum 2017, 14). The international migration population was approximately 272 million in 2019, about 3.5% of the global population, which was higher than expected (IOM 2020, 50). The migrant population will continue to rise because of the low fertility rates, the labour demand in the West (Göksel 2014, 8-9) and the increased frequency of natural disasters. Some key causes of forced migration prevalent in the past two years include the 6.7 million displaced people from the Syrian Arab Republic in 2018 due to conflicts, and the 1.4 million new displacements from the Philippines in 2019, due to the Typhoon Kammuri (IOM 2020, 4; iDMC n.d.).

In order to successfully settle in a new society, immigrants should be able to access basic needs such as housing, education, employment, healthcare, utilities, transportation,
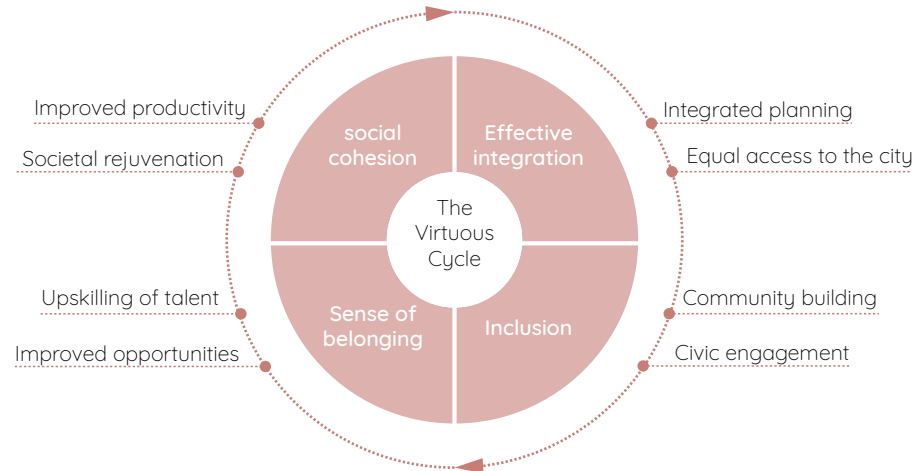
and civic engagements (World Economic Forum 2017), with housing being the most important factor (Teixeira and Li 2009, 221-227). For some cities, immigrants are the main driver of population growth, and thus increases the demand for expansion of urban infrastructure and services. Urban facilities should be improved or adjusted to accommodate the everyone's needs (World Economic Forum 2017, 32).

Immigrants can bring cultural and social-economical benefits to both the origin and destination countries (IOM 2020, 170-172). However, ethnocultural diversity has led to complicated issues of race, religion, and culture. Some political parties and media have negatively portrayed migrants as potential hazards to national identity, social cohesion, and social security (IOM 2020, 185-186). Several cities in Europe have difficulties integrating their immigrants (World Economic Forum 2017, 30). Hate crimes are prone to happen if different races or ethnicities do not understand each other; for example, the recent coronavirus has triggered anti-Asian sentiments and xenophobia across the globe (Human Rights Watch 2020).

Social integration is a mutual adaptation process for immigrants and host societies, and it is only feasible when immigrants are accepted as members of the society (Laurentsyeva and Venturini 2017). This thesis explores the questions: how can a community be supportive for newcomers as well as receiving communities, and more importantly, how can a platform for cross-cultural communication, where different cultures can be understood and accepted, be created?

Europe
78 mil
64 mil

Asia
80 mil
110 mil

North America
58 mil
5 mil

Oceania
8 mil
2 mil

Latin America and
the Cabribbean
10 mil
39 mil

Africa
25 mil
38 mil

Areas with some freedom of movement across borders

Main international migration routes

top 10 bilateral migration corridors with largest average annual change, 2010-2015

mil   Receiving
mil   Leaving

General routes of international migration (illustration based on World Economic Forum 2017; IOM 2018)

3

The Virtuous Cycle

- Improved productivity
- Societal rejuvenation
- Upskilling of talent
- Improved opportunities

social cohesion

Effective integration

The Virtuous Cycle

Sense of belonging

Inclusion

- Integrated planning
- Equal access to the city
- Community building
- Civic engagement

Key Influencers ?
Community engagement, Policy reforms
Urban planning, Leadership

The Vicious Cycle

- Xenophobia, hate crimes and violence
- Formation of segregated community clusters

Radicalization & intolerance

Poor integration

The Vicious Cycle

Alienation

Exclusion

- Increased restrictions for city services
- Marginalization with limited / no civic engagement
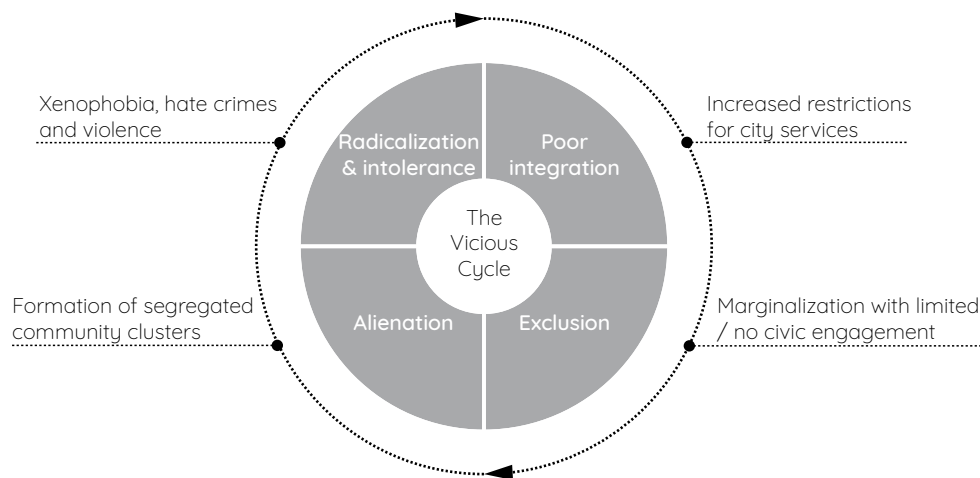
The Virtuous Cycle vs. The Vicious Cycle (illustration based on World Economic Forum 2017)

Chapter Two uses Canada as a case to examine the issue of immigrant integration. Statistics of appropriate housing and income distribution, and social cohesion are discussed. Even though Canada has welcoming policies toward immigrants, they still face difficulties finding appropriate housing, and experience income inequality and spatial segregation from the host societies.

Chapter Three introduces the urban strategy of the Missing Middle Housing (MMH) as an alternative to high-rise

buildings. The MMH has several benefits for immigrants and existing communities, including increasing housing density, increasing housing diversity, and improving walkability of streets. The courtyard housing is part of the MMH, and it aids in establishing sense of community.

Chapter Four studies the courtyard typology. It first studies the five main attributes of the courtyard typology, then analyzes three case studies of vernacular courtyard housing, along with one case study of modern courtyard housing.

Chapter Five provides background information of the tested site in Burnaby, BC and explains the design strategy of the community courtyard housing. Courtyards are used in various scales, and community programs are integrated into the housing to encourage social interactions within and around the building.

Chapter 2: Immigration in Canada

Canada is selected as a case to examine the issue of migrant integration because of its long history of immigration, its welcoming policy of immigrants since the late 20th century, and its high proportion of visible minority of immigrants. This chapter will start with a general history of immigration in relation to Canada, followed by an examination of immigration integration in four aspects: appropriate and affordable housing, employment, education, and social integration.

Before diving into more details of migrants in Canada, terms like 'immigrants,' 'refugees,' and 'migrants' require further clarification as they can refer to different populations defined by different organizations. According to Canadian Council for Refugees, immigrants refer to people voluntarily moving to another country and refugees refer to people forced to flee from their origin country to another (Canadian Council for Refugees 2010). Recent immigrants refer to those who have arrived in Canada within the last five years with a given census year (StatCan 2017). Migrants may or may not include refugees (IOM 2020, 294) and it can generally refer to the people who move nationally or internationally to a new place. This thesis aims to address social issues of immigrant populations relocating to foreign lands regardless of the migration reasons, therefore 'immigrants' or 'newcomers' have a more inclusive definition.

Immigration Policy and History in Canada

Canada has been a country created from the processes of immigration, as all Canadians, with the exception of the native peoples, are either immigrants or generations of

migrants (Whitaker 1991,3). Canada's immigration policy was not always as welcoming as the current approach. After the Canadian Confederation, most of the immigrants were from European countries, as Chinese migrants were restricted from entering the country unless they paid the "head tax" from 1885 to the 1940s. The Immigration Act of 1919 forbade "certain groups from entering the country, including Communists, Mennonites, Doukhobors and other groups with religious practices, and also nationalities whose countries had fought against Canada during the First World War" (Dirks 2017). Because of the demand of labours and the shifting of social attitudes, Canada eliminated racial discrimination in the immigration system in 1962 (Dirks 2017). A point system was introduced in 1967 to select potential immigrants, who were evaluated based on their skills, education level, and language proficiency (Dirks 2017). In 1971, Canada adopted a multicultural policy, which acknowledged the value of all cultures and encouraged them to thrive in Canada (Jedwab 2020). Even in 1971, 28.3% of immigrants were from the United Kingdom and 51.4% were from other European countries (StatCan 2016a). In 1978, Canada defined refugees as a distinct group of immigrants and the government would fulfill its obligations to refugees under the Convention Relating to the Status of Refugees, a United Nations treaty that identifies who are refugees and what rights they have (Dirks 2017).

Migration has been the main driver of population growth in Canada; in 2016, immigrants were 21.9% of the total population (StatCan 2016b). The ethnic origins of immigrants have increased in diversity, and since 2006, the immigrant population has shifted to be primarily of Asian origins, from

the prior prevalence of European ancestry (Demography Division 2016, 36-37).
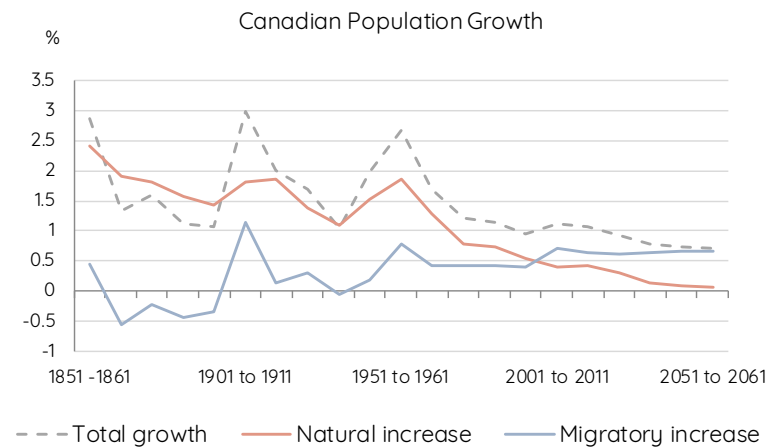
Projected population growth of Canada (StatCan 2012)

Immigrant Integration in Canada
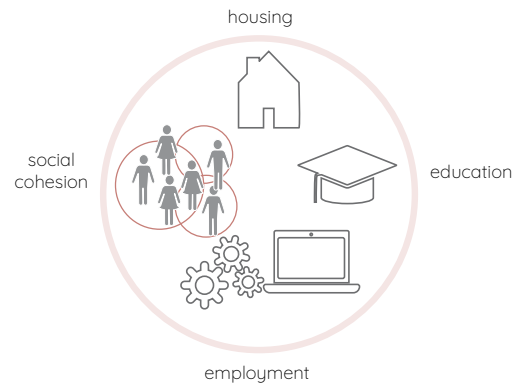
The basic needs of immigrants

According to Carlo Teixeira and Wei Li, there are four basic needs for immigrants to successfully socially and economically integrate into Canadian societies: 1) access to affordable housing in a hospitable community; 2) employment and an adequate source of income; 3) access to the education system and 4) an adequate level of social knowledge and engagement with their new societies (Teixeira and Li 2009, 221-227). Statistics and literatures of these four aspects are presented to evaluate social integration of immigrants in Canada. Most of the immigrants

reside in metropolitan areas, with 51.5% in Ontario, 17.1% in British Columbia, 14.5% in Quebec and 11.2% in Alberta (StatCan 2016b), thus most statistics are from urbanized cities of these provinces.
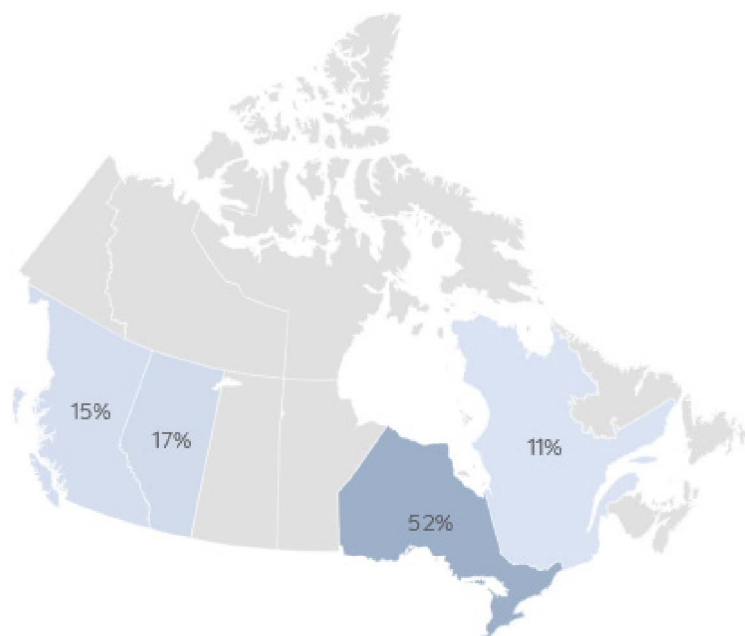

Provincial distribution of immigrants (StatCan 2016b)

Appropriate Housing

Suitability and affordability, a part of the criteria of core housing need are used to determine whether people can access 'appropriate' housing. A household is identified to be of core housing need if its housing meets one of the three criteria: 1) adequacy – the housing requires major repairs; 2) affordability – shelter costs 30% or more of total before-tax household income, and 3) suitability – housing has enough bedrooms for occupants according to National Occupancy Standard requirements (CMHC 2018). There is little data regarding housing adequacy for immigrants, thus only statistic of suitability and affordability are discussed.

For non-immigrants, 35% to 44% of population spends more than 30% of their income on rent in Montreal,

Calgary, Ottawa, Vancouver, and Toronto. 55% of Toronto's population spends more than 50% of their income on rent, the highest among the listed cities, but the population living in over-crowed conditions is low, between 4% to 8%. In the same cities, between 38% and 54% of recent immigrants spend more than 30% of their income on rent, which is quite similar to their non-immigrant counterparts. With the exception of Toronto, the immigrant population spending more than 30% of their income on rent is roughly 10% higher than the non-immigrant population. However, there are significantly more recent immigrants (22% - 39%) living in overcrowded conditions than non-immigrants (Canadian Rental Housing Index n.d.). There are two possible reasons why recent immigrants have higher demand on number of bedrooms. Immigrants may live with extended families, or certain groups of immigrants need more privacy. For example, a Muslim household needs separate rooms for female and male children, and a separate room near the entry for guests (Omer 2014).
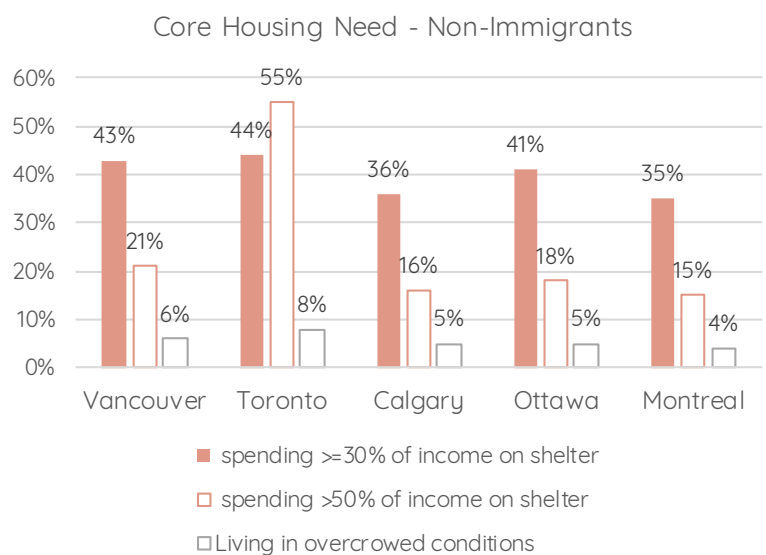
Housing affordability and suitability for non-immigrants
(Canadian Rental Housing Index n.d.)

Core Housing Need - Recnt Immigrants
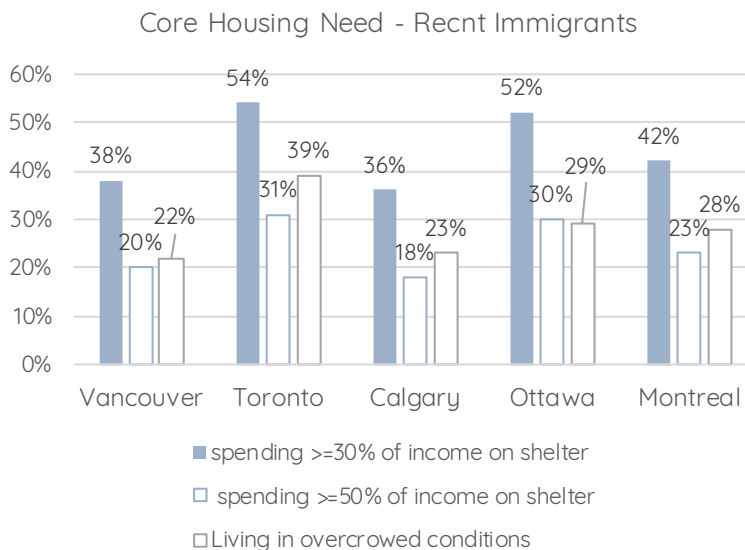
Housing affordability and suitability for recent immigrants
(Canadian Rental Housing Index n.d.)

Lack of affordable housing is a problem affecting both immigrants and non-immigrants, as many of Canada's metropolitan cities have considerable population in core housing need, and the percentages of population in core housing need for immigrants and non-immigrants are roughly the same. However, immigrants have added difficulty to find suitable housing to accommodate their family structures and privacy demand.

Income and Education Level

The low-income rate of recent immigrants is roughly 20% higher than non-immigrants (StatCan 2019a). Statistical records show the income of immigrants improve the longer they remain in Canada. Generally, twenty years after immigration, they will achieve the same rate of low-income as the non-immigrant population (AMSSA 2013).

Undoubtedly, one's skills and education level can affect income; however, in general, immigrant populations have higher education levels, and yet when compared to non-

immigrants with the same level of education, they make less money (MHCC 2019, 11-13). Between 2011 and 2014, 44% of immigrants held a bachelor's degree versus only 20% of non-immigrants (MHCC 2019, 11-13). This could be due to the point-based immigration system primarily selecting candidates of higher skills, language ability, and of course education level. The median annual income of immigrants is at least $6,000 less than non-immigrants, and the maximum difference can reach up to $13,400 for recent immigrants arriving between 2011-2016 (MHCC 2019, 8). The statistics do not indicate whether or not immigrants work in the professions they are trained for, but it is likely that many recent immigrants are overqualified for their work, and are working more menial jobs for survival (MHCC 2019, 11-13). Insufficient language skills could be one of the reasons that immigrants cannot find adequate jobs, but is likely not the main reason as most candidates are selected through the point-based system, meaning they must have a certain level of proficiency of the English language in order to have been accepted into Canada at all.
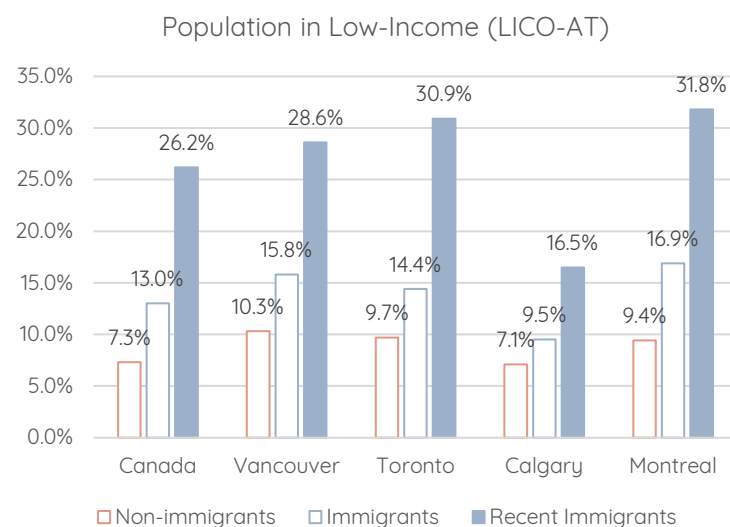
Population in low-income (StatCan 2019a)

Immigrant Population Living in Poverty, by Years in Canada
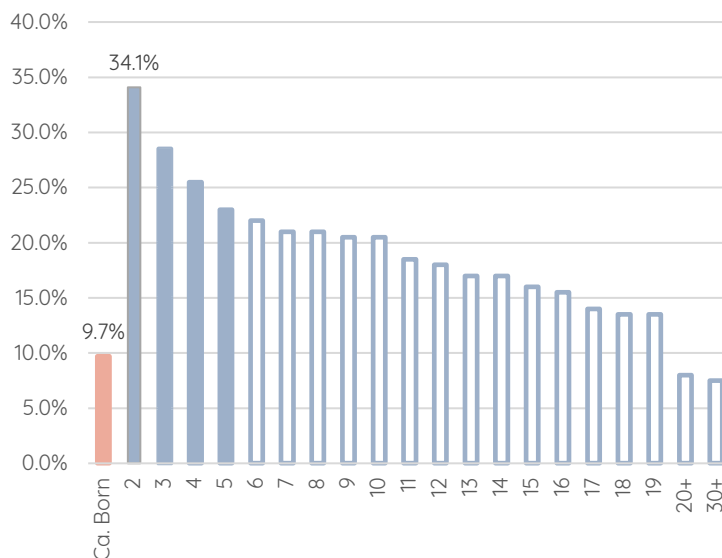
The low-income rate of non-immigrants and immigrants (AMSSA 2013)

Median Employment Income, Full-time, 2016
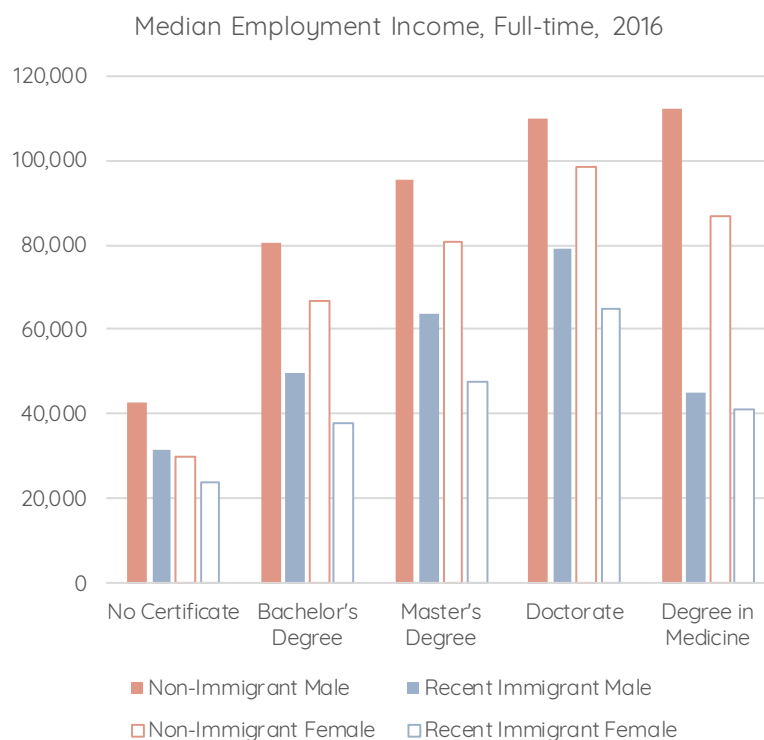
This graph shows the median income difference between non-immigrants and recent immigrants. For every education level, the greatest income disparity is between male non-immigrants and female recent immigrants (StatCan 2019b).

In general, immigrants are more likely to have low income occupations than non-immigrants, because they struggle to find an appropriate job that reflects their education. Poor and unequal employment opportunities prevent immigrants from establishing better lives and self-esteem in Canada. Inadequate income directly affects the quality of life of immigrants, determining where they are able to live, what social activities they can participate in, the type of friends they can make, and how much leisure time they can have. Although Canada has a tolerant attitude toward immigrants, the unequal employment opportunity indicates there is conscious and/or unconscious bias toward immigrants.

Social Integration

Ethnic enclaves are prevalent in Toronto and Vancouver, and there is a long debate whether ethnic enclaves are good or bad for social integration in Canada. An ethnic enclave refers to residential areas concentrated with ethnocultural groups and, especially, visible minority groups (Hiebert 2015,1). Visible minority refers to "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour" defined by the Employment Equity Act (StatCan 2015). 65.1% of immigrant populations are classified as visible minority (StatCan 2018) and newcomers tend to settle in enclaves where they can find similar cultures and speak the same languages. Ethnic enclaves in Canada are not the same as ghettos as ghettos are the extreme cases of segregation, and ethnic enclaves are not necessarily associated with poverty (Hiebert 2015,5).
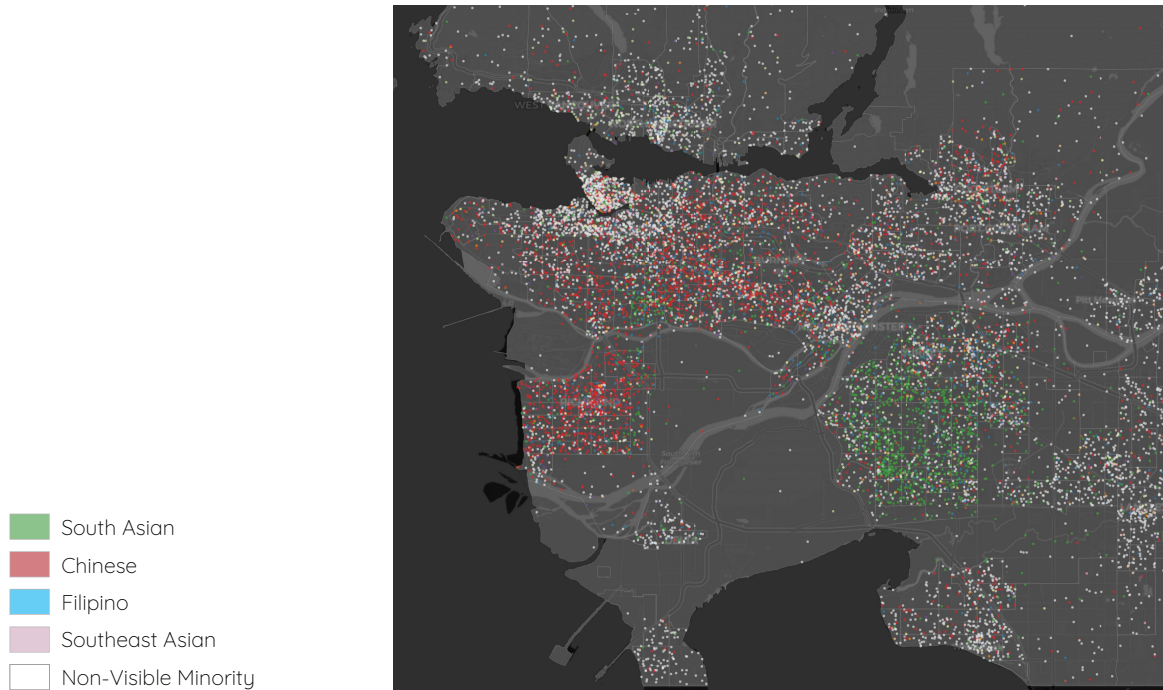
The Chicago School, the leading scholars in urban sociology in the early twentieth century, believe ethnic enclaves are part of the process of integration - that immigrants should

stay in their chosen enclave temporarily and will leave as they become fluent in the host language and have improved their economic situation. Those who choose to stay in ethnic enclaves are considered ineffectively integrated and reluctant to join the host societies. Segregated ethnic enclaves may lead to hate crime and violence, such as the race riots in the United Kingdom and in France (Hiebert 2015, 4).
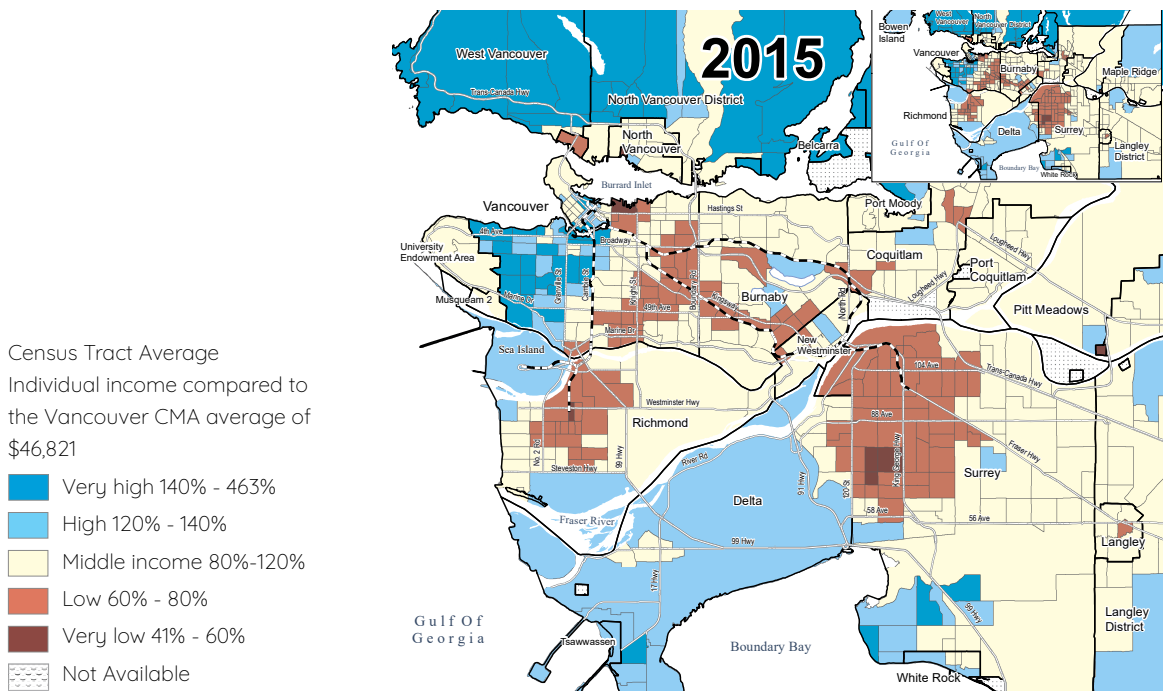
Some commentators believe ethnic enclaves will not impede social cohesion, and immigrants should have the free will to decide whether or not to stay in ethnic enclaves. Immigrants tend to experience cultural shock, identity deconstruction and re-construction altogether in a new place. A place with familiar language, religion, and culture can resemble some sense of their past and make them feel less isolated (Shizha and Ojo 2018, 169-170). The integration process could be very gradual and may take multiple generations; however, immigrants should not feel anxious from assimilating to host societies or feel restricted to the ethnic enclaves (Shizha and Ojo 2018, 172). There are other benefits of ethnic enclaves; for example, lone seniors or single parents can gain more support, and second generations can learn their origin cultures (Qadeer and Kumar 2006, 13).

Ethnic enclaves can quickly help immigrants find sense of belonging. However, it builds invisible boundaries of different ethnic groups in cities, and thus, it decreases communication between different cultures in the long term. As mentioned previously, immigrants tend to have low income and higher level of struggle to find skillful jobs compared to non-immigrants. Immigrants in enclaves may not be able to build networks in the wider communities and improve their language skills, both of which are important to

secure adequate jobs. Some people choose to stay in ethnic enclaves because they want to retain their original culture and identity (Hiebert 2015, 8), but some do so because they cannot afford to live elsewhere.

South Asian
Chinese
Filipino
Southeast Asian
Non-Visible Minority

Visible Minority Map in Greater Vancouver (Censusmapper 2017)

Census Tract Average Individual income compared to the Vancouver CMA average of $46,821

Very high 140% - 463%
High 120% - 140%
Middle income 80%-120%
Low 60% - 80%
Very low 41% - 60%
Not Available

Average Individual income, Vancouver census metropolitan area, 2015 (Neighbourhood Change 2017)

The income mapping produced by the Neighbourhood Change Research Partnership and the University of Toronto (Neighbourhood Change 2017) indicates that the pattern of low-income (compared based on average individual income) matches the distribution of visible minorities, or ethnic enclaves, in Greater Vancouver (Censusmapper 2017, based on StatCan 2016). The income disparity has contributed to spatial segregation of different ethnics.

The tension of housing supply, the insufficient communication between cultures, and the income disparity could gradually boil up negative sentiments between immigrants and host societies. This issue needs to be addressed timely by policy makers, sociologists, urban planners, and architects in different scales. From the perspective of architecture, the city structure has remained unchanged or has been passively shaped by income distribution and segregated ethnic enclaves, which has no meeting point for cross-cultural understanding. Housing solutions like rapid development of high-rise buildings address the housing demand but neglect the social and racial issue that is faced with global migration. Some points that require to rethink concerning immigrant integration are as follows:
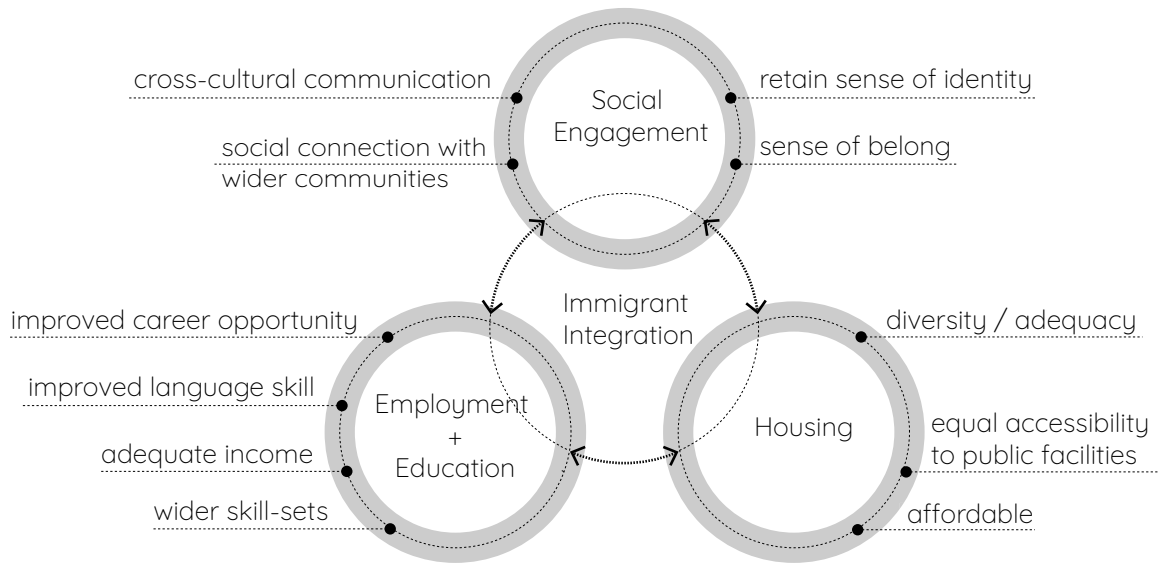
1. Ethnic enclaves prevent newcomers integrating into host communities to some degree, but they also help immigrants establish sense of belonging, and stimulate culture diversity and economic growth. It is important to recognize we need to achieve a balance between assimilation and multiculturalism – accommodating different cultures while building social cohesion to form a unified Canada. The goal is to make both receiving communities and immigrants happy in order to achieve mutual adaptation. This requires learning, understanding, and tolerance from both parties.

2. Cities have done little to encourage social integration of immigrants at the local scale. Having access to housing, the education system, and employment opportunity do not naturally result in social cohesion because those basic needs only help immigrants "survive," but not thrive in Canada. Policy makers should address social integration at the local scale with active attitudes. Urban planners and architects should reimagine how cities and housing will look like in the age of migration, as it is only likely to escalate in this increasingly globalized world.

3. A welcoming immigration policy, which is driven by economic need and imbalanced age groups, does not necessarily mean the public welcomes different ethnic groups and cultures. Immigrants do not have the same employment opportunity as non-immigrants, which directly affects the life quality of immigrants. There is still much unconscious bias or underlying anti-immigration sentiment toward immigrants. It is hard to eliminate unconscious bias due to its very definition that people themselves may not even notice the bias.

Social integration of immigrants is as essential as providing basic needs because it relates to many aspects of the immigrants' lives, and this integration process influences the overall social cohesion and stability of the whole society. Since housing is the most urgent need for all parties in urbanized areas, this thesis proposes community integrated housing, which accommodates non-immigrants and immigrants as a social setting between different cultures. This approach aims to enhance social interactions between different ethnic groups on a daily basis to reduce unconscious bias. Community integrated housing provides an opportunity for receiving communities and immigrants to

participate in the mutual adaptation process, rather than a rigid assimilation process.

cross-cultural communication

retain sense of identity

Social Engagement

social connection with wider communities

sense of belong

improved career opportunity

Immigrant Integration

diversity / adequacy

improved language skill

Employment + Education

Housing

equal accessibility to public facilities

adequate income

wider skill-sets

affordable

Immigrant integration diagram

Chapter 3: The Missing Middle Housing

The Missing Middle Housing (MMH) is explored as an alternative to high-rise buildings, to increase housing density and diversity, and to enhance social interaction in communities. The MMH refers to a range of medium-scale and street-oriented buildings. As part of the MMH, the courtyard housing creates the sense of community, which is not provided by the dominant housing types of single detached houses and high-rise buildings in metropolitan cities of Canada. This chapter provides an overview of the MMH and its advantages for immigrants and existing communities.
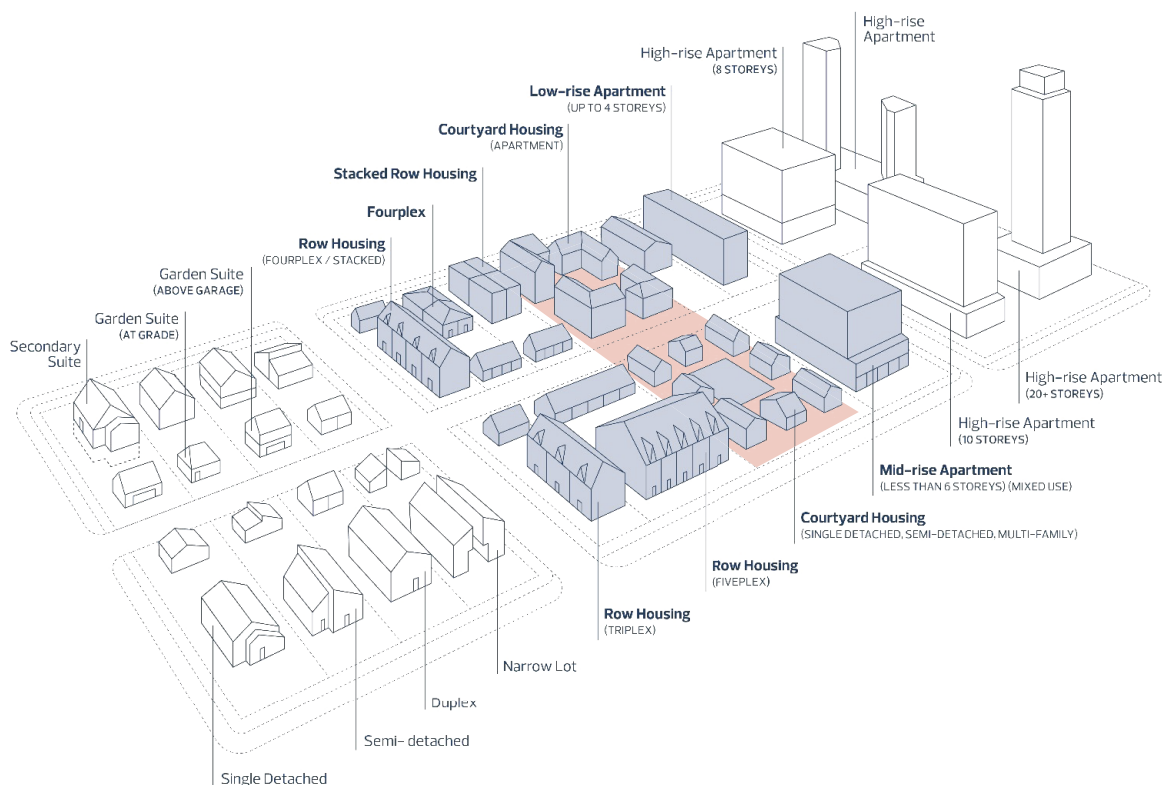
The Missing Middle Housing (City of Edmonton n.d.)

Architect Daniel Parolek has proposed the MMH as a transformative solution to the growing demand of walkable

urban living and the shifting of demographic in North America (Parolek 2012). The MMH refers to a range of buildings that has been missing since the 1940s between single detached house and the mid to high-rise buildings in terms of form and scale. It aims to create compact and walkable urban living with accessible amenities (Opticos Design n.d.). The MMH includes duplexes, fourplexes, bungalow courts, townhouses, live-work units, and courtyard apartments (Opticos Design n.d.). In Canada's context, cities like Toronto and Edmonton consider mid-rise apartment buildings as the MMH because mid-rise apartments have the same intent as the MMH, promoting walkability and increasing housing diversity in low to medium density neighbours (Canadian Urban Institute and Evergreen 2018, 5; City of Edmonton n.d.).

Increase of Housing Density and Urban Walkability

The MMH can increase the density of low-density neighbourhoods with a compatible form and scale (Parolek 2012). Generally, the dominant housing type in Canada is the single detached house, and the MMH requires the change of zoning if it is built in low-density zoning. Compactness creates more walkable urban living because recreational facilities, public transportation, restaurants, and various shops can be distributed in walkable distance within a neighbourhood (Parolek 2012). Lively urban streets encourage social interaction on the street level, where residents can then easily participate, either physically or visually, in all sorts of public events. Such neighbourhood provides proximity and a relaxed platform for different cultures to intersect. Walkable urban living is not a new idea. In the early 1960s, architect Christopher Alexander already criticized modern

buildings as out of human-scale, and commented modern architecture and telecommunications in preventing humans from having true communication between each other (Alexander and Chermayeff 1963, 76). Architect Jan Gehl, whose works focus on improving the quality of urban life, describes the fifth floor as the "threshold" of multi-storey buildings because residents living above the fifth floor do not have eye contact with street life (Gehl 2010, 40). However, high-rise buildings (more than 5 storeys) in Toronto have become the most dominant housing type (Canadian Urban Institute and Evergreen 2018, 8) and a series of high-rise developments are happening in Greater Vancouver.
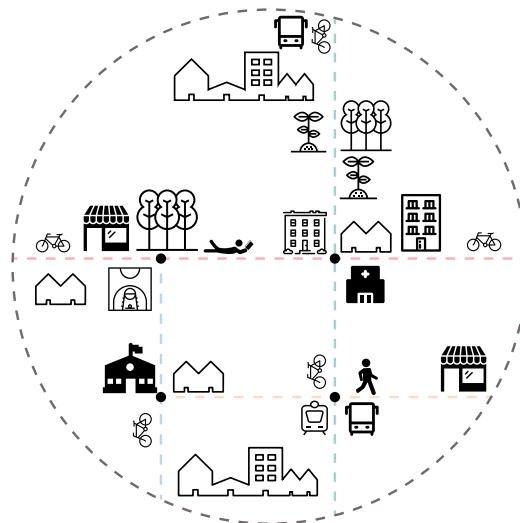

Walkable neighborhoods

## Increase of Housing Diversity

The MMH provides more housing options to accommodate the diversity of immigrants. Renting a detached house is not affordable for low to middle-income families, and most apartment/ condo buildings only offer units with one to three bedrooms. While single people and seniors need smaller units and may want to live in apartments or collective

housing for security, nuclear families and extended families require different number of bedrooms at an affordable price.
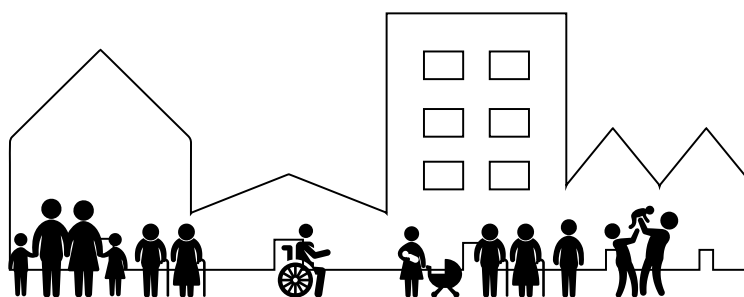
More housing options for needs of different families.

Create Sense of Community
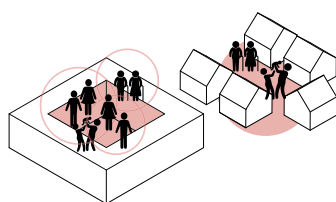
The courtyard housing creates a sense of community.

The courtyard apartment and the bungalow court can create a sense of community through the shared communal space (Parolek 2012). Detached houses can be grouped to form a large communal court at the center in low to medium density zones (Opticos Design n.d.). Medium-scale courtyard apartments can be placed in high-density zoning, usually between commercial and residential areas as a transitional type. According to Dr. Reinhard Goethert, a professor at MIT dedicated to physical planning and upgrading of low-income settlements, "the courtyard is more than a physical arrangement of space, however, offering a communal frame supportive of family situations and advantageous for city management in sustainable land use and planning practice" (Goethert 2010, 173). There are several advantages of the courtyard configuration to newcomers in an unfamiliar urban situation, including how it provides a private living place as well as a protected social place. The configuration allows for flexible settings where living and working are interchangeable. Additionally, rental rooms can be incorporated to bring extra income without compromising the privacy of hosts for low-income families (Goethert 2010, 173-185).

Chapter 4: Understanding the Courtyard Typology

The courtyard typology is studied to develop the design methodology of community integrated housing, which will be an example of the MMH. The courtyard typology has an introverted form defined by a central open court. It is a vernacular housing type of the Mediterranean region, East Asia, Central America, South America, and Africa, and it has been modified in modern architecture in order to spread further to North America. Firstly, this chapter will study the attributes of the courtyard typology. Secondly, examples of the vernacular and modern courtyard housing are analyzed in terms of their urban and environmental context and private dwellings. Finally, the learnings of the courtyard typology are summarized at the end of this chapter.

Attributes of Courtyard Houses

Amos Rapoport's article "The Nature of the Courtyard House: a Conceptual Analysis" (2007) is the primary reference to study the principles of the courtyard typology. Rapoport discusses vernacular courtyard houses with worldwide examples, and concludes five attributes of courtyard houses: privacy, courtyard as settings, courtyard as a means of access, efficiency of land use and climatic efficiency. The five attributes are a set of criteria to conceptually understand the courtyard. A courtyard house may not possess all the attributes, and some houses are considered as a courtyard based on the criteria even though it does not resemble the prototypical courtyard house (Rapoport 2007, 57). These attributes are discussed according to their dominance to the courtyard typology.

The Privacy Mechanism

A courtyard house provides better privacy than other detached houses because it uses physical walls rather than a setback distance to separate the public and the private realms. Rapoport describes such privacy mechanism as a "lock" (Rapoport 2007, 58), and a courtyard house retains its form if there is a lock between the public and the private regardless of its geometries. There are no windows, or only small windows, on the exterior walls, and the elevation facing the interior courtyard is considered the main elevation of the house. Courtyard houses in the Mediterranean region and East Asia, for example, the Roman domus and the Chinese siheyuan, individual rooms form the perimeter wall of a courtyard house. Some courtyard houses in Taiwan and Mexico have three sides of inhabitable walls and one side of low to medium height wall.

Even though the privacy mechanism is the most dominant attribute of courtyard houses, some do not fully comply with this attribute. The Hakka (also refers to the people living inside) in China which has an enclosed circular form is occupied by a community. The "lock" of a courtyard house is somewhat retained, but the central court becomes a more public place because it is shared by many families. Alternatively, the courtyards of pueblo (village) of Taos in New Mexico are not fully enclosed (Rapoport 2007, 62).

Courtyard as Settings

The courtyard is a setting for specific domestic programs and for an urban system. "The courtyard itself provides a critically important setting or subsystem of settings, within which specific activities occur as part of a larger system of activities, within a layer system of settings (which is

dwelling)" (Rapoport 2007, 58-59). The courtyard is an outdoor living room with proper settings (e.g., trees, decorations, temporary roofs, and wells) that catalyzes specific activities (e.g., dining, washing, and gardening) happening within. To put it simply, the courtyard is a place in a house. Courtyard houses can be developed into an urban fabric as they can fit into a larger system, such as a street, a block or a neighbourhood (Rapoport 2007, 58-59). Therefore, courtyard houses are always associated with high-density housing.

Courtyard as a Means of Access

A courtyard is "the central place that provides access to other places" (Rapoport 2007, 59). Usually, there is a threshold element such as steps, extended eaves or verandas between a courtyard and private rooms.

Efficiency in Land Use

Although modern courtyard houses cannot be as dense as vernacular settlements like in Old Beijing and the old town in Morocco, with the considerations of transportation and sunlight, it still has higher efficiency in land use than stand-alone houses or row houses. Without the consideration of sunlight, the courtyard type has the highest built potential (ratio of the floor area of the built form to the site area) compared to the slab and the tower given that all the types have the same depth, the same width of interspace, and the same height (Martin and March 1972, 36). The perimeter wall eliminates the need for a front yard, and all the green space is incorporated into an inner courtyard. It can be further densified by eliminating side yards without compromising the privacy. A courtyard house could take just one half of the land required by a conventional detached

house (Schoenauer and Seeman 1962, 115). However, this will require modification of zoning and building codes in order to eliminate setback distances.
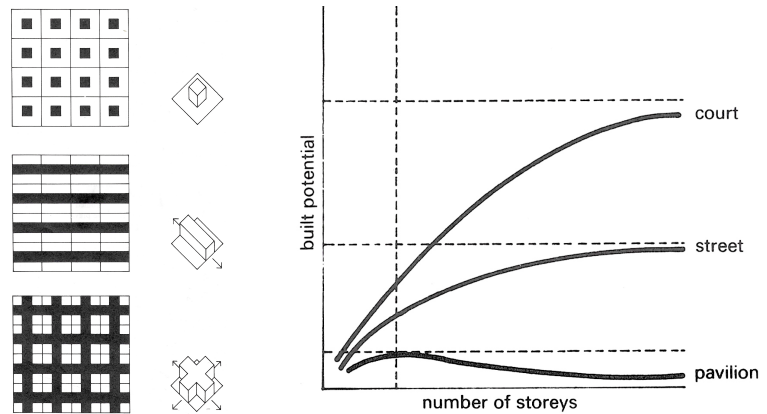
Built potential in relation to number of storeys (Martin and March 1972, 36)
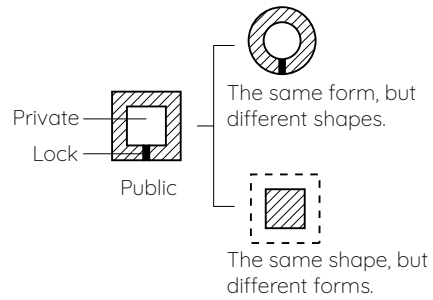
Climatic Efficiency

A courtyard house is most efficient in hot and arid environments. A microclimate within a courtyard is created by natural ventilation, siting, and natural elements. In a hot and humid climate, the size of a courtyard is small with two to three-storey height to provide shading and improve ventilation within the court, as exemplified in Tianjing, Southern China (Knapp 2005, 22-51). Courtyard houses in Iran and China have north-south orientation to maximize sun exposure. Trees and pools make the courtyard cooler than outside temperature through transpiration cooling and evaporation (Soflaei, Shokouhian and Zhu 2017, 1165-1166).
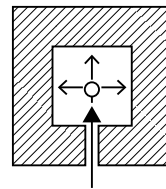
Climatic efficiency is a minor attribute of courtyard houses because it is a characteristic of vernacular architecture that buildings must be climatically efficient with restraints of technology, material, and resources (Rapoport 2007, 59-62). In Rapoport's opinion, social and cultural factors are more influential than physical factors like climate, landscape, and

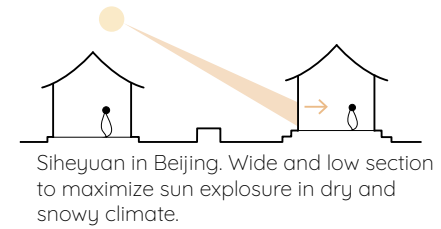resources in vernacular housing form (Rapoport 1969, 18-20, 58-60).
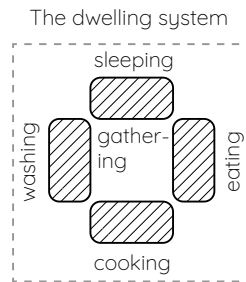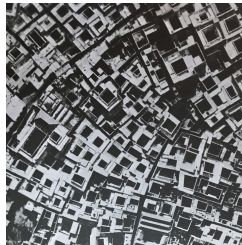
❶ The Privacy Mechanism

Private
Lock
Public

The same form, but different shapes.

The same shape, but different forms.

❷ Courtyard as Settings for Dwelling System and Urban System

The dwelling system

sleeping

washing

gather-ing

eating

cooking

The urban system

Marrakesh, Morocco

❸ A Means of Access

❹ Efficiency in Land

Conventional detached - 60 ft x 100 ft
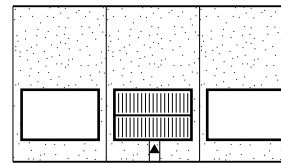
Street

Courtyard - 60 ft x 50 ft

❺ Climatic Efficiency

Siheyuan in Beijing. Wide and low section to maximize sun explosure in dry and snowy climate.
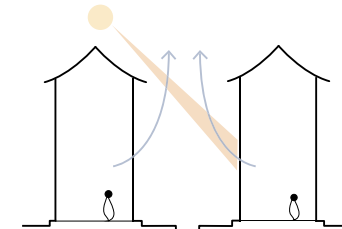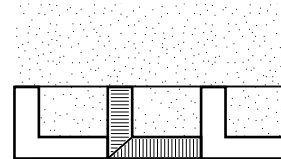
Tianjing in Anhui, China. Narrow and tall section for better ventilation in hot and humid climate.

Five attributes of a courtyard house (illustration partially based on Rapoport 2007; Schoenauer and Seeman 1962; photo: Rudofsky 1964)

Case Studies of Courtyard Housing

Three vernacular case studies and one modern case study of the courtyard typology are studied to understand the variations of the typology, and the social significance of the central court in the domestic realm. The vernacular case studies Shabono, Vicinato and Siheyuan are analyzed from the urban scale to the individual dwelling scale. The modern case study is Familistère, a multi-storey building with a large central court. They are different in aggregation patterns, geographic locations, and scales. Shabono is a circular settlement unit of the Yanoama, who has lived near the boundary of Brazil and Venezuela, and it accommodates a community. Vicinato is a courtyard shared by several families in Matera of Italy. Siheyuan is a private courtyard house for a multi-generational family in Beijing of China.

Vernacular courtyard examples are discussed more thoroughly than the modern example because the urban structure of vernacular architecture is organic, with everything being intertwined, and is influenced by culture and environment. Thus, larger contexts are present under the specific vernacular example.
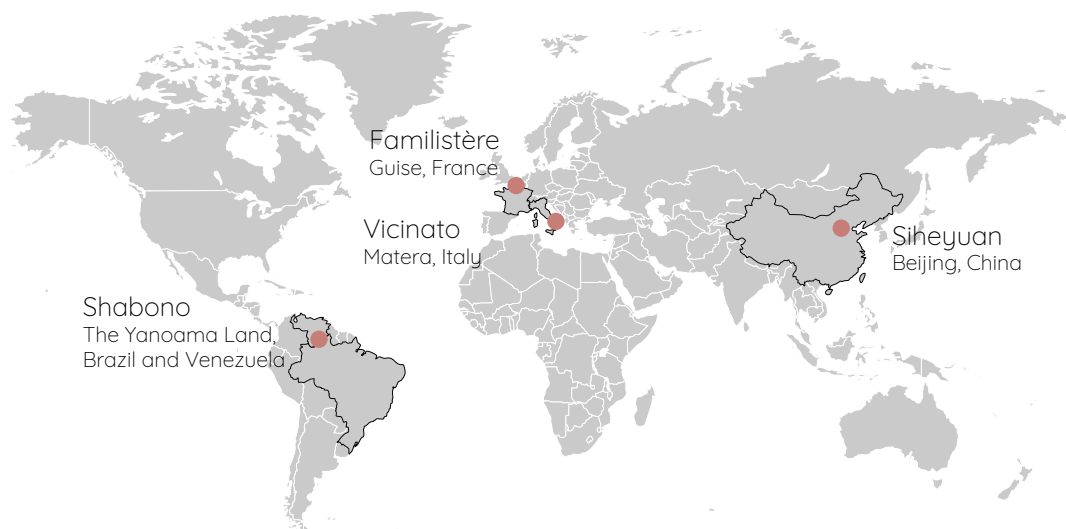
Location map of case studies

Shabono of the Yanoama People

Shabono is the circular basic settlement unit of the Yanoama (also known as Yanomami), and it refers to the settlement unit or the central court. The Yanoama are the aboriginal people living in the rainforests and mountains of Venezuela and Brazil. They live collectively and their livelihood remains original as they are isolated from other cultures.

Site and Settlement

The shabono settlement; photograph by Lars Løvold (ArchEyes 2016)

The Yanoama understands the spatial dimension based on the environmental features and the context of shabono. Each teri (literally means "people," but can also refer to a territory) has its respective territorial base, which includes shabono, gardens, streams, and hunting grounds. Shabonos are built in clusters if they belong to trusted relatives. The territory is usually bound by mountains and streams. The trails between places of living, planting, collecting, and hunting form a network of the circulatory system. Trails tend to directly link two places, rather than be aligned with contour lines. The Yanoama can travel days for hunting and visiting, but they are not nomadic because they consider shabono as their constant home in the forest (Smole 1976, 76-83).

The Shabono – A Community Courtyard

Shabonos are semi-permanent structures built of wooden posts and thatched palm leaves. The Yanoama build a new shabono every one to two years, after it gets worn out, or if it becomes too small to accommodate new family members. The size of a shabono can vary drastically. The average diameter of a shabono is about 30 meters and it can house 65 to 80 people. Each household is responsible to build their own nano (house), a part of the entire shabono structure.

The hearth fire at the back is the focus of each household. Hammocks are hung closely near the hearth, so everyone can access heat and be close to each other (Smole 1976, 55-71).
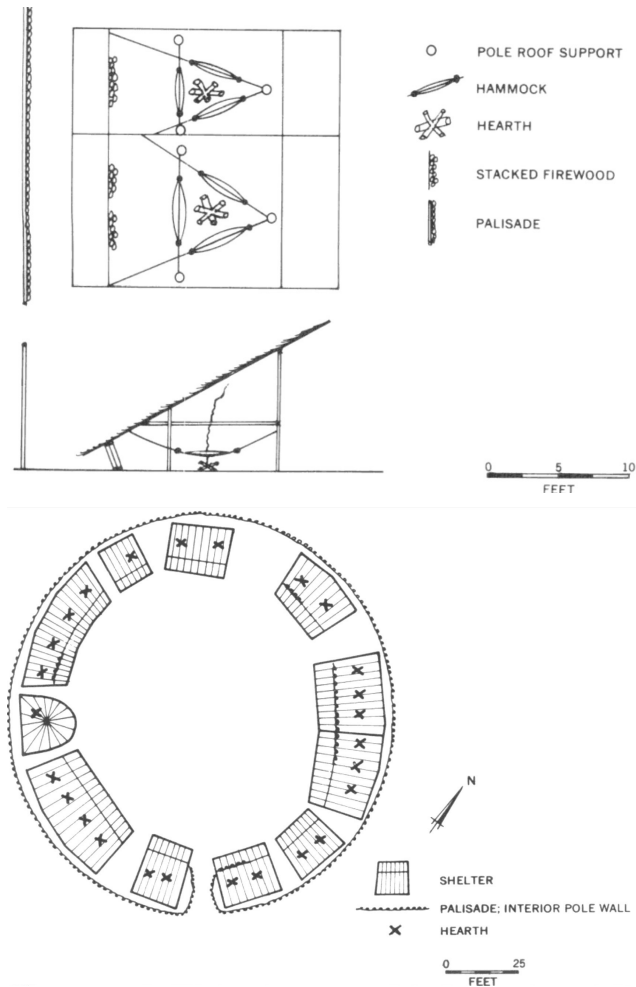
Plan and section of a nano, and plan of a shabono (Smole 1976)

The Shabono symbolizes unification and one family. People from other territories are not welcomed unless they are invited. The most celebrated events in the court are reajo (mortuary ritual) and showao (a feast). Reajo is a funeral that honors the dead, and showao celebrates the abundance of food, particularly a good supply of plantains. Each ceremony requires enormous amount of food, so reajo and showao are sometimes held together. People from other territories

may be invited and people would share news and exchange gifts (Smole 1976).

Inside the shabono, 2000; photograph by Rogério do Pateo (Povos Indígenas no Brasil n.d.)

The shabono orients the home of each teri in the forest and provides a physical and spiritual protection to the Yanoama. The shabono is an example of community courtyard housing. The internalized form of a large courtyard can create sense of protection and community to people. Incorporated with community programs and celebrated events, a community courtyard housing can help newcomers anchor themselves and build connections in a new society.

## Vicinato of the Sassi of Matera

Vicinato before evacuation, 1950; photograph by Enzo Viti (Toxey 2010)

> Such spatial concept is essentially based on excavation, on carving a solid structure, and skillfully and economically using the excavated material. Here everything is consistent, continuous, uninterrupted, almost natural ad man-made are blurred in an indistinct unity. Everything is permeated by an instinctive view of collective space as a system of voids connecting the houses that, rather than merely unoccupied areas, have a precise social and economic function.(Frediani 2012, 7)

A vicinato is a medium-scale courtyard shared by four to six families in Matera, in the Basilicata region of southern Italy.

The Sassi (stone) is the historical town of Matera, where buildings were made by carving rocks from the earth. The earliest settlement started during the Paleolithic era, and it has been continuously inhabited and built upon, so the existing urban fabric is a conglomerate of different periods. The Sassi was evacuated in the 1950s because of overpopulation, poor hygienic conditions, and lack of resources (Frediani 2012,12; Gizzi et al. 2015, 3). Preservation and reprogramming have taken place in Matera to reactivate the city since it became a World Heritage Site in 1993.

Site and the Settlement
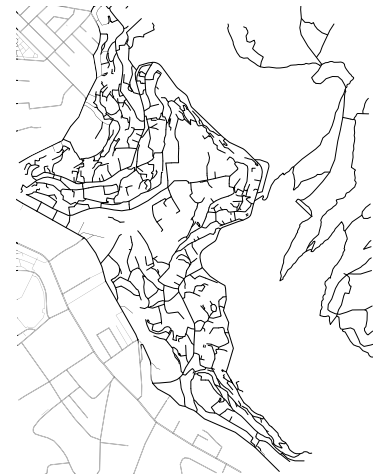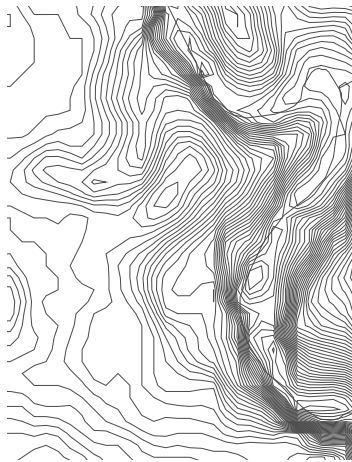
Topography, buildings, streets (base map from Cadmapper n.d.)

The Sassi was built in response to the geology, climate, and topography with limited technology. The distinctive topography determines the social-class zoning, street orientation, and water collection system. The topography naturally divides the Sassi into three zones: Sasso Barisano, Sasso Caveoso, and Civita. Sasso Caveoso at the south of the Sassi was historically occupied by peasant class, and Civita on the central high land was occupied by noble families and religious buildings (Toxey 2016, 294-297).

The deep ravine between the two zones was a landscape boundary dividing the peasants and the nobles. Main streets and buildings were built along the contours to manage the steep slopes, which were continuously connected by stairs, ramps, and terraces (Frediani 2012, 12). Water was collected by directing rainwater from roofs of houses and shallow channels on the ground to underground cisterns by gravity.
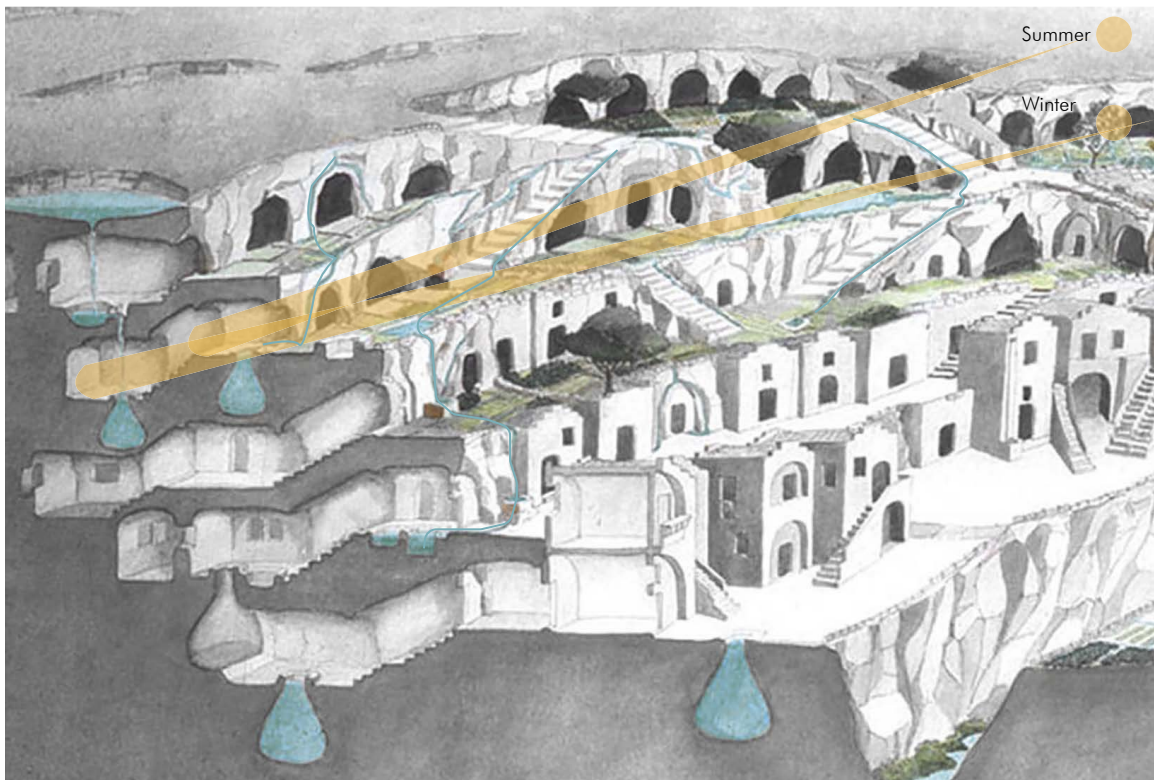
Most of the units in Matera are stepped down to allow light to penetrate deeper into the room in the winter. Gravity was used to collect water (reworked based on Laureano 1993).

Vicinato - A Neighborhood Courtyard

Vicinato (neighbourhood) is a communal space shared by a cluster of cave houses with an entrance open to the street. The division of public and private is achieved by the winding paths and steps between a vicinato and a street. Vicinati also usually have exterior stairs and a well. Cave houses have little sunlight, so most daily activities were done in the

vicinato. It is an outdoor living room shared by neighbours and it was the "symbolic core" of the families that neighbours could work and socialize together (Frediani 2012, 11-12).
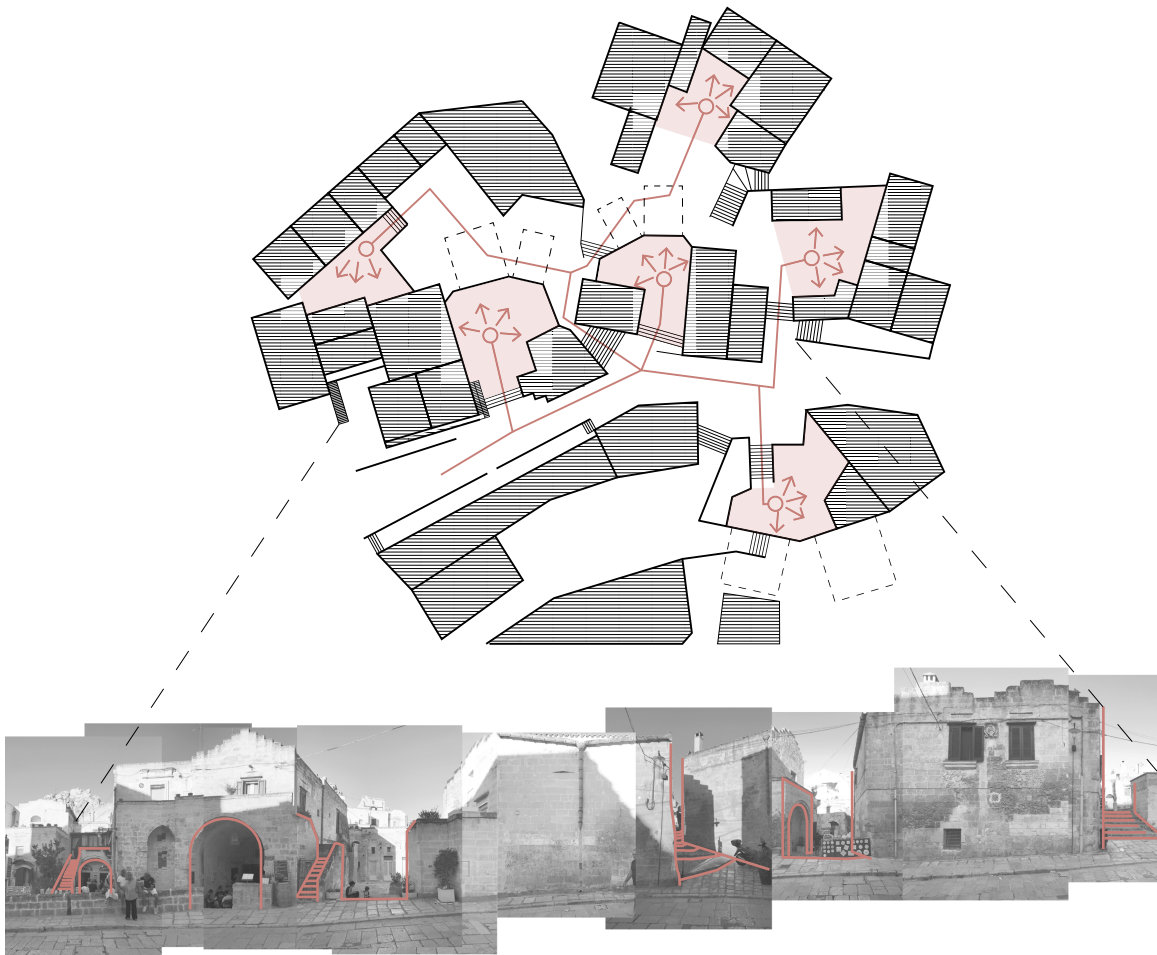
Plan and street elevation on Via Bruno Buozzi (base map from Google Maps n.d.). Vicinato is a setting for social activities as well as a means of access between neighbours.

Vicinato is not like a conventional courtyard as privacy is not the major concern. As a setting of social activities and as a threshold were the prior functions of vicinato. The open vicinato and the staggered buildings allowed neighbours to have vertical (between roofs and vicinati) and horizontal (between streets and vicinati) visual connections. Vicinato provided access to the cave houses on the ground level

and the houses on upper levels. The domestic and the public realm seemed to intermingle because of the semi-opened courtyard and its compactness. The dual function of a courtyard as a thoroughfare as well as a gathering hub enables both informal and formal social encounters between neighbours.

a = living - bedroom
b = kitchen
c = cistern /well
d = handloom
e = straw bed for donkey
g = storeroom
h = granary
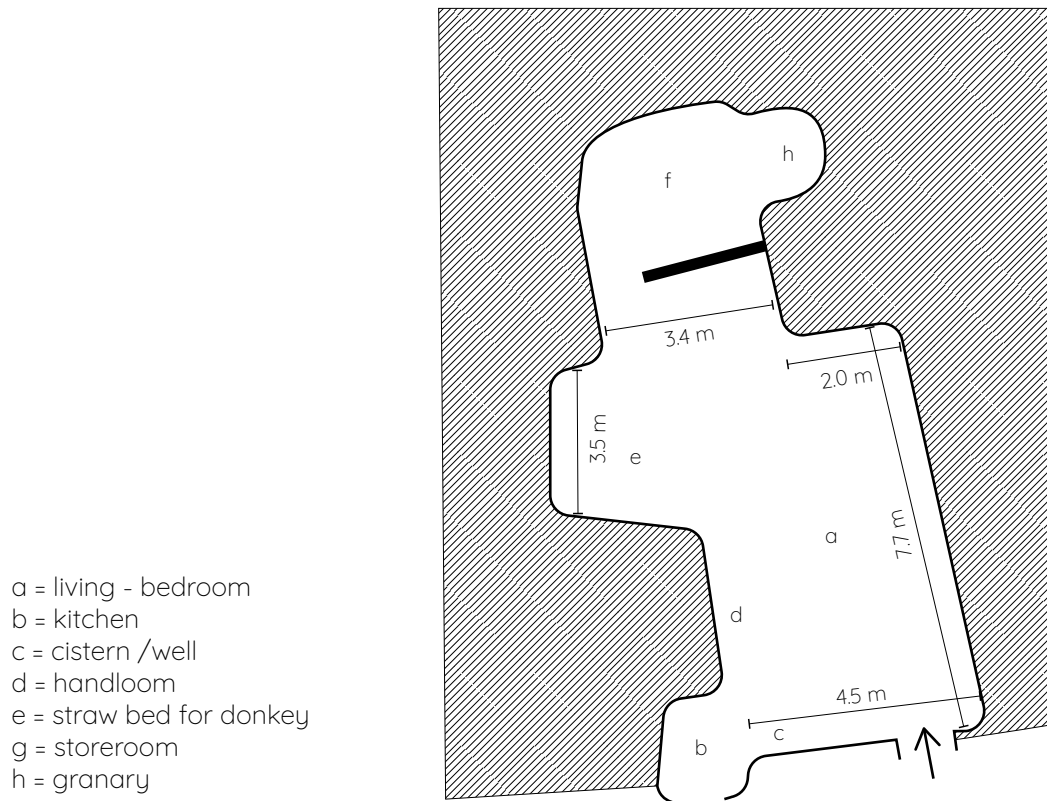
A typical cave house includes one large room with small recessions dug into rocks. It is about 5 meters wide and 10 meters deep, housing an averaged size family of eight people (illustration based on Plan of Cave House n.d.).

Siheyuan in Beijing, China

Courtyard houses in China have deep philosophical and cultural meanings. According to Chinese cosmology and philosophy, the courtyard links Heaven (sky), Earth (houses), and a human body. The Chinese consider Heaven and Earth as a macrocosm, and the courtyard as a microcosm to reflect a human in the universe (Zhang 2017, 38-40). Courtyard

houses are adjusted to suit different regions across China while still retaining the same fundamental design principles - symmetry, modularity, social hierarchy, and the fengshui theory (Chan and Xiong 2005, 6-7). Siheyuan in Beijing is the most representative example to show these design principles.
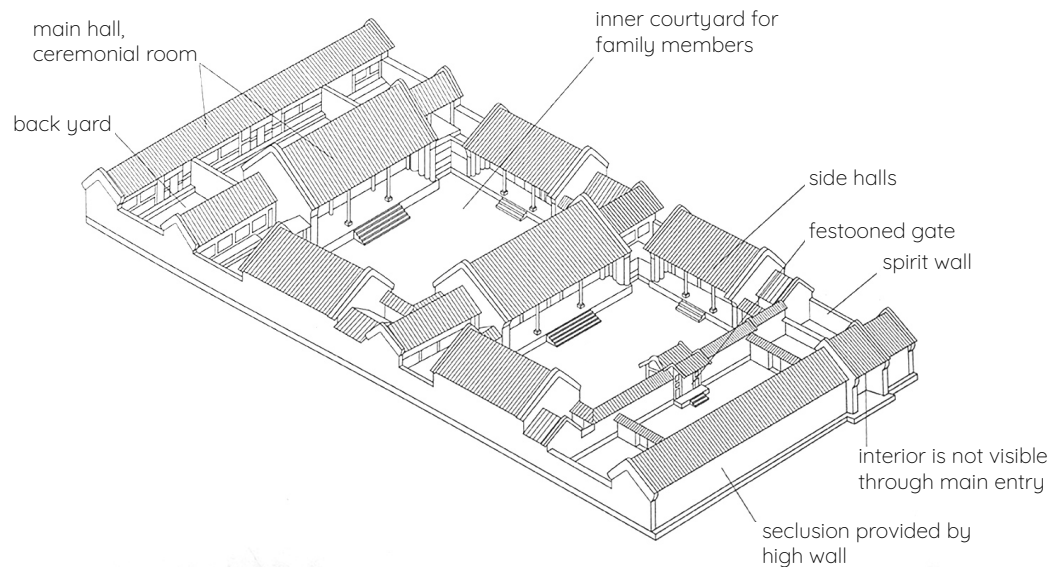
Site and Settlement
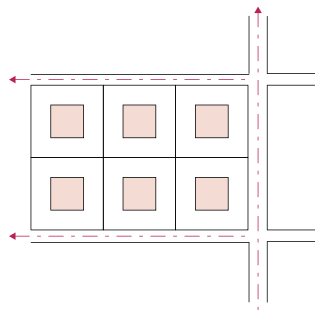
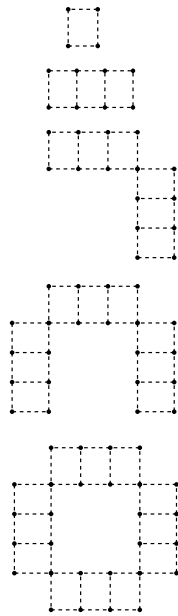Fish-bone street structure (illustration based on Wu 1999)

Situating and siting are ecological strategies that create microclimates within a village or a house. They are part of the fengshui theory, a body of ancient Chinese knowledge which aims to create a harmony between nature, humans, and buildings (Mark and Ng 2009, 130). Individually, situating refers to the relationship between a building and the natural environment, and siting refers to the relationship between a building and its site (Knapp 2005, 56). Settlements built between mountains and water is considered 'good fengshui' in China because mountains can divert prevailing winds, and the water can be the thermal mass to preserve heat in winter and cool down temperature in summer (Knapp 2005, 56, Zheng et al. 2018, 9).

Urban planning and houses of Beijing follows the fengshui theory. Beijing was built on low and flat land surrounded by mountains in the northwest, where the prevailing wind comes during winter. The main streets divide the city into blocks, and the hutong (east-west lane) subdivides the blocks and provides access to individual courtyard houses (Wu 1999, 75-78). Siheyuan usually has a southern entrance because it improves the ventilation with southeast wind in the summer and maximizes sun exposure for the main hall. If a siheyuan is on the south of a hutong, then the entrance is at the northwest corner (Zhang 2015, 50).

Siheyuan – A Private Courtyard

main hall,
ceremonial room

inner courtyard for
family members

back yard

side halls

festooned gate

spirit wall

interior is not visible
through main entry

seclusion provided by
high wall

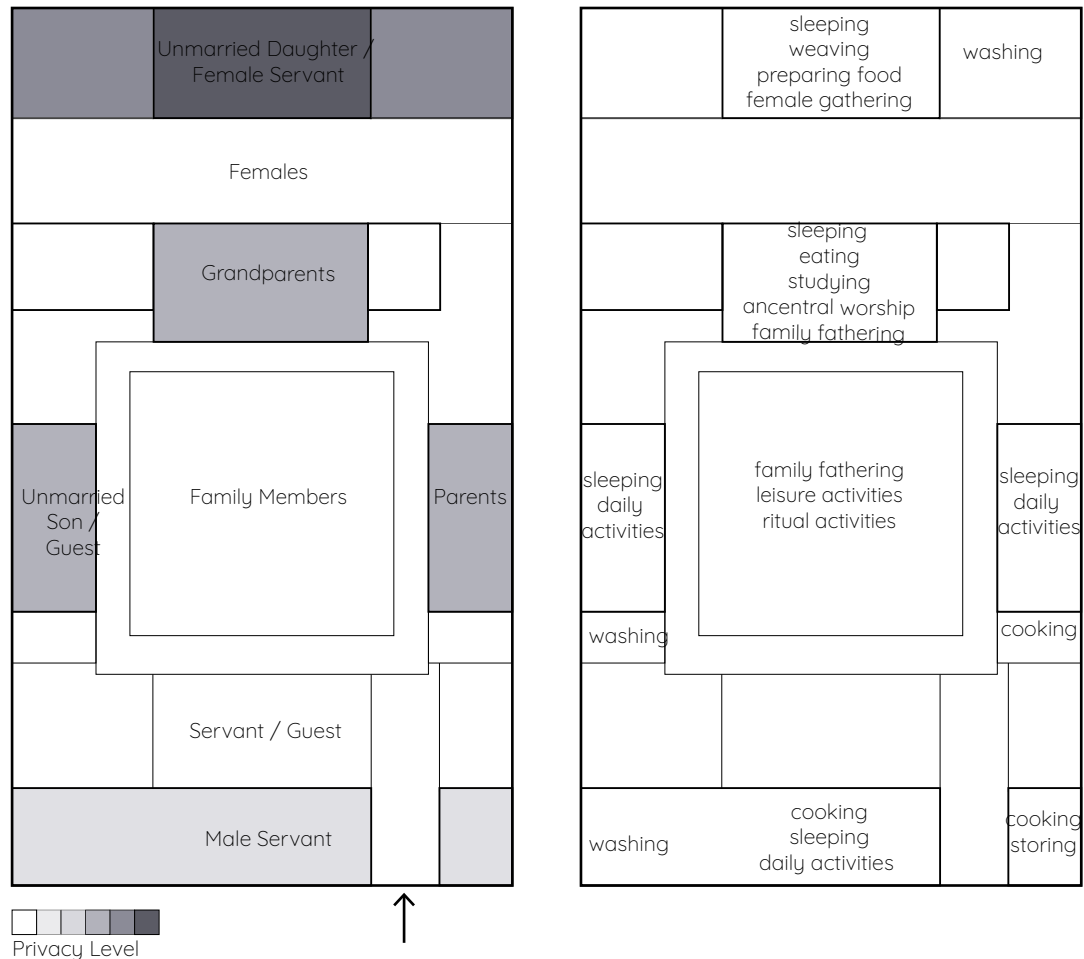Typical layout of a siheyuan in Beijing (Knapp 2005)

Siheyuan is formed through the addition of jian.

Jian is the basic structural bay of siheyuan. The dimension of a jian is about 3.3 meters by 4.8 meters in Northern China and 3.6 meters by 4.8 meters in Southern China (Knapp 2005, 30). The most basic siheyuan is formed by a row of jian on four sides with a central courtyard. The column structure and the modularity make the courtyard house flexible to spatial configuration and future expansion.

The spatial organization of the siheyuan reflects the social hierarchy and privacy gradience within a house. A traditional siheyuan accommodates a multi-generational family, with the better rooms reserved for the higher seniority family members. Male servants work and live in the south hall area, which is close to the entrance and receives the least sunlight. Family members live around the central courtyard, behind the second gate of a house (festooned gate). Seniors live in the main hall, which has the most sunlight and best thermal comfort of a courtyard house. Wives, unmarried

daughters, and female servants live in the north hall areas, the most private area of a siheyuan (Knapp 2005, 68-74; Zhang 2015, 50-59; Chan and Xiong 2005, 3-5).

	Unmarried Daughter / Female Servant	
Females		
	Grandparents	
Unmarried Son / Guest	Family Members	Parents
Servant / Guest		
Male Servant		

Privacy Level

	sleeping weaving preparing food female gathering	washing
	sleeping eating studying ancentral worship family fathering	
sleeping daily activities	family fathering leisure activities ritual activities	sleeping daily activities
washing		cooking
washing	cooking sleeping daily activities	cooking storing

Privacy, occupancy and activities of siheyuan

Siheyuan is usually one storey in height and the outdoor courtyard accounts for 40% of the total area (Knapp 2005, 21). It provides privacy and quietness to a family because there are few or only small openings on exterior walls. A courtyard often contains pomegranate trees, a fish tank, and potted flowers (Sun 2013). The natural elements inside the courtyard help to reduce the heat experienced in the summer, and provide a nice view to occupants inside their rooms. Temporary pavilions were built in a courtyard to provide shade in the summer, or to accommodate more

guests for events (Zhang 2015, 55). Verandas built around a courtyard create another layer of threshold, after the entrance and the festooned gate.

Siheyuan is a typical example of a courtyard house, and it meets all the five attributes of the courtyard typology, with privacy as the most important attribute of siheyuan. There are three levels of privacy, in increasing order: courtyard for servant, courtyard for family members, and finally, courtyard for females. Multiple gates ("lock") and thresholds are placed inside a courtyard house to achieve gradients in levels of privacy.
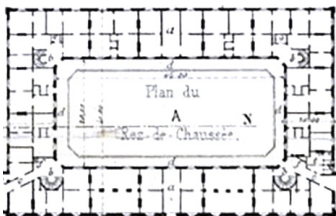
Familistère – A Modern Community Courtyard

Familistère was built between 1859-1877 in Guise, France. The architect Jean-Baptiste André Godin, a manufacturer of cast-iron stoves, was influenced by philosopher Charles Fourier's Phalanstère, a utopian communal living. Godin wanted to create a community where workers could live with their families and easily access recreational and institutional programs adjacent to their home (Le Familistère De Guise 2019).

Labor Day in the central court, 1960; photograph by Roger Foret (Le Familistère Collection of Guise 2019)

Typical floor plan of central pavilion (Le Familistère De Guise 2019)

Familistère consists of three buildings. The central building has 112 apartments and accommodated about 400 people. The building was built with 10-meter wide structural bays, and each bay includes two apartments. The two apartments could be combined into one to accommodate family growth. The central court is 40 by 25 meters, covered with a glass roof (Le Familistère De Guise 2019). It was used to host communal events and as the children's playground. The exterior gallery resembles an elevated street in the air (Leupen 2006, 131-135), which provides horizontal
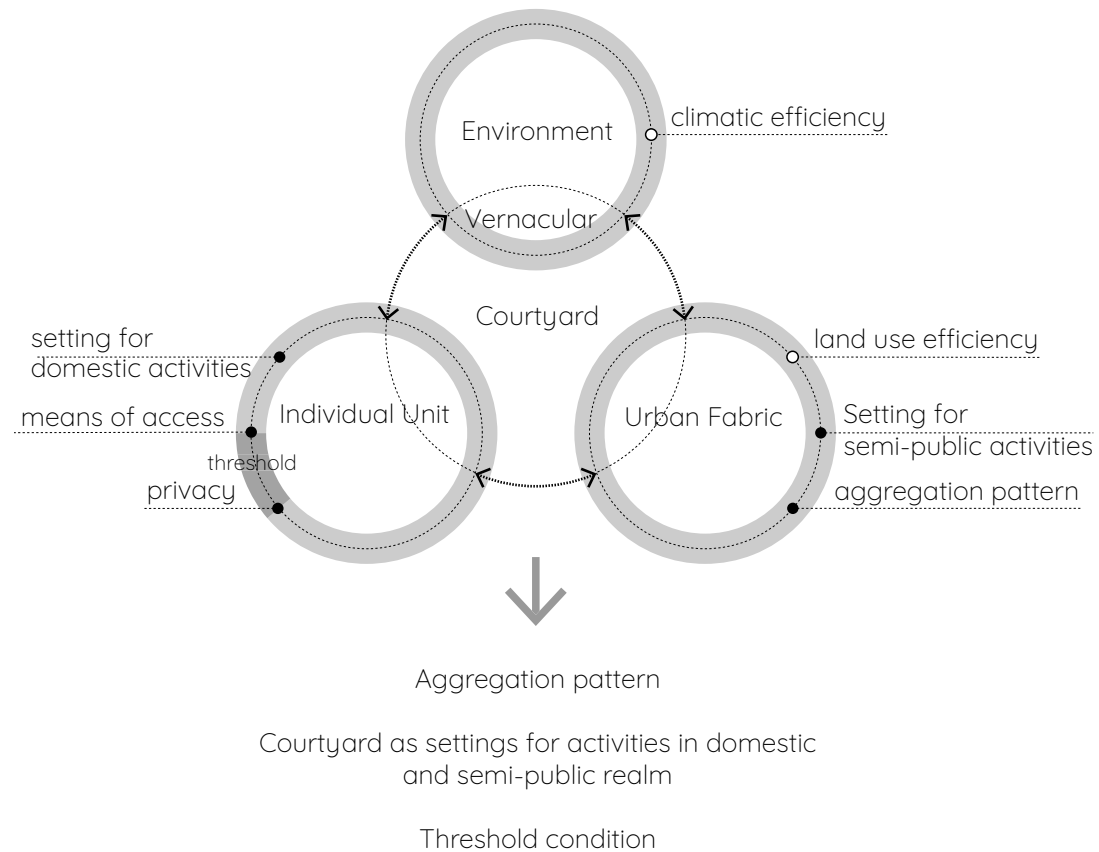
circulation to all the units and enables eye contact and informal social encounters between neighbours.

Summary of Case Studies

Reorganization of the courtyard attributes

The four case studies are compared in these three aspects: aggregation pattern (urban fabric), setting for activities, and threshold condition, which are developed from the five attributes. As a tool for urban systems, a courtyard house inherently covers aspects like land efficiency and aggregation pattern. The privacy mechanism and the means of access describe the unique threshold condition of a courtyard house. Climatic conditions of the case studies are classified with one of the most widely used climate classification, Köppen-Geiger climate classification (Kottek

et al. 2006). However, climatic efficiency is not compared between the cases because only the siheyuan example contributes to this.

The courtyard typology has many variations, and it has continued to evolve in different cultures throughout history. The dominance of the attributes of a courtyard example varies according to their context. Among the case studies, the central courtyard has symbolic and social meanings to their occupants. Siheyuan is a private courtyard house, where privacy and hierarchy are the most important considerations. Locks are inserted before each courtyard to ensure varying privacy for different family members. Vicinato is the setting for neighbours to work and socialize together. Being a room and a threshold, vicinato activates informal and formal social encounters and contributes to land efficiency. The form of vicinato is very different from typical courtyard housing, as it is semi-opened and staggered, which allows it to vertically and horizontally connect to the surroundings. Shabono is a primitive example of courtyard housing, and it emphasizes the value of community. The part-to-whole relationship between the individual and the community is represented in the architecture itself in terms of the form and the construction. Familistère is essentially the same as shabono, in that it is a community courtyard housing. The single loaded building with exterior gallery retains the interaction between the occupants and the central court for multi-storey buildings.

Temperature & Precipitation of the Yanoama Land
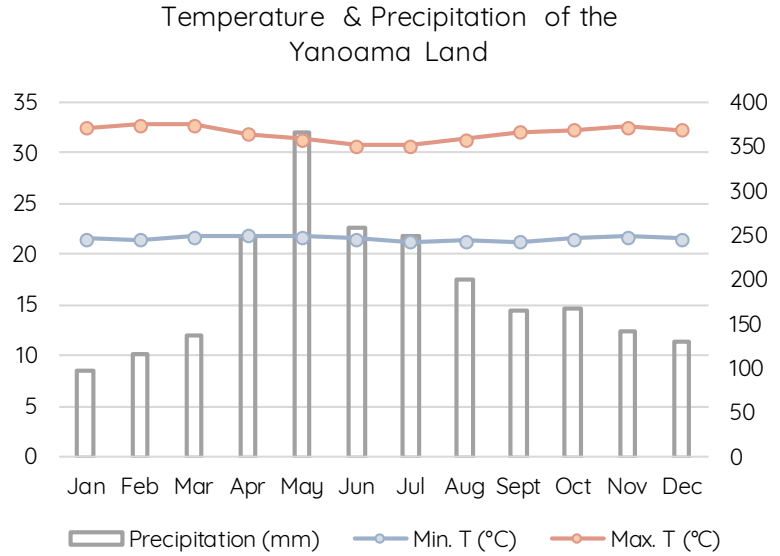
The Yanoama land has the equatorial rainforest, fully humid climate (Af) (Climate-Data n.d.a).

Temperature & Precipitation of Matera
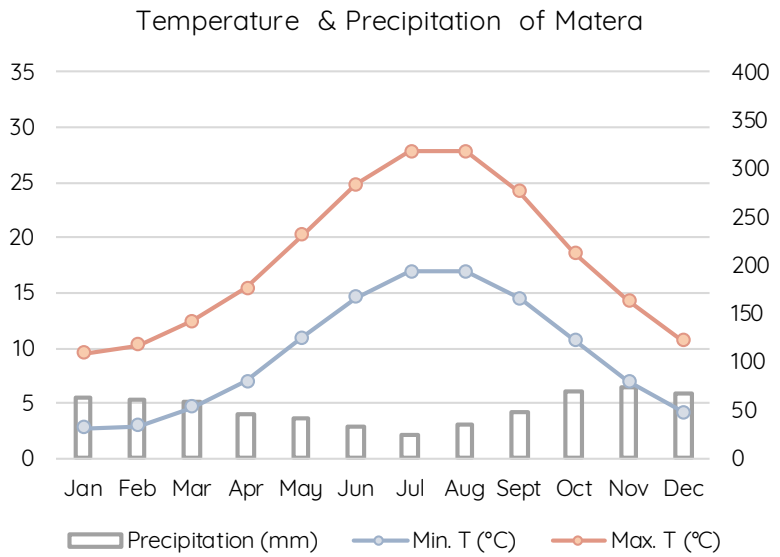
Matera has a warm temperate climate with hot and dry summer (Csa) (Climate-Data n.d.b).

Temperature & Precipitation of Beijing
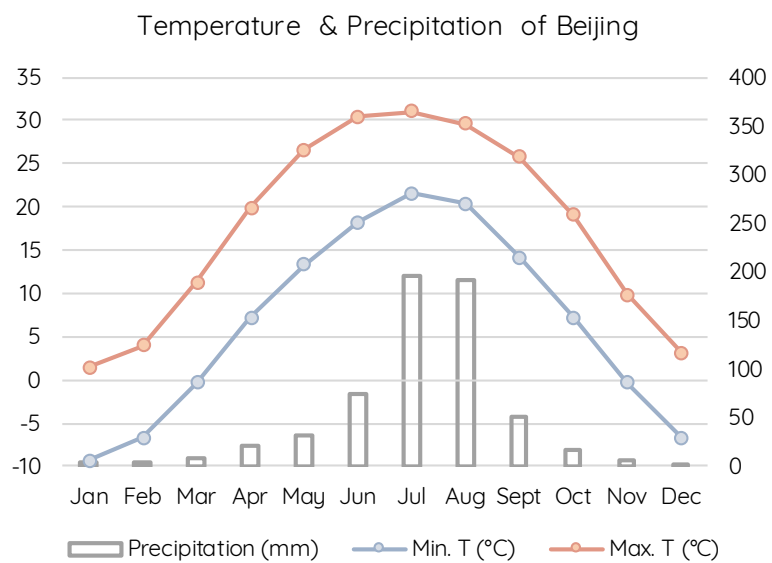
Beijing has a snow climate with dry winter and hot summer (Dwa) (Climate-Data n.d.c). The prevailing wind direction is the northwest in the winter and the southeast in the summer (Weather Spark n.d.a).

Aggregation Setting for Activities Threshold — threshold with a lock
··· threshold without a lock Learnings

Siheyuan
Beijing China

leisure activities
festivals
gardening

servant working/
receiving guests

unmarried females

family members

servant / guest

Vicinato
Matera Italy

working, socializing,
daily activities

Shabono
The Yanoama Land

hunting, socializing,
horticulture

ritual festivals

Familistère
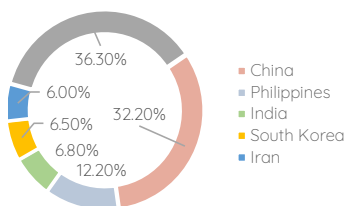Guise, France

parties
children's playground
weddings

The learnings of the courtyard case studies

Chapter 5: Design Proposal of Immigrant Housing

This chapter introduces the testing site of the project, and an explanation of how the courtyard is implemented in three scales: community, middle, and private.

Site Context

Source countries of recent immigrants (census 2016 as cited in NewToBC 2018)

Artistic rendering of the Brentwood development; SHAPE Properties (Chan 2017a)

Artistic rendering of Southgate City in Burnaby; City of Burnaby (Chan 2017b)
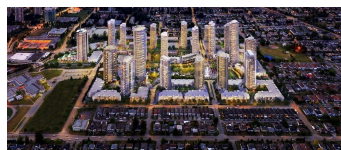
The project is set in Burnaby, BC, which is the geographic center of Greater Vancouver. Burnaby is projected to accommodate 125,000 additional people by 2041 through the Metro Vancouver Regional Growth Strategy (City of Burnaby 2016, 41). Immigrants consist of 50.0% of the municipality's population, and the primary countries of origin are China, Philippines, and India (NewToBC 2018). Four large high-rise developments are proposed at intersections of skytrain lines and commercial centers of Metrotown, Brentwood, Lougheed, and Edmonds (City of Burnaby 2016, 41-42). As of July 2016, 76% of under-construction projects were high-rise buildings (> 4 storey) (City of Burnaby 2016, 110). These developments are dramatic to Burnaby because the predominant housing type are detached houses. The city explains "building up and /or densifying lands through redevelopment is the only option" because Burnaby is bound by civic and natural boundaries (City of Burnaby 2016, 41). The high-rise developments give a quick solution to the current housing demand, but it ignores the social demand of humans and the issue of immigrant integration. High-rise buildings create social isolation rather than social interaction (Dominguez n.d.).

Brendwood

Lougheed

Metrotown

Edmonds

0   100m

┄┄ Site Map Area

■ Residential High-Rise Apartment

■ Residential Low-Rise Apartment

■ Residential Townhouse

── Skytrain Transit Line

■ Mixed Use Retail + High-Rise Apartment

■ Mixed Use Retail + Low-Rise Apartment

☐ Commercial

Map of Burnaby

The site is in the Metrotown neighbourhood of Burnaby. It is bound by a main thoroughfare (Beresford Street) and a residential street (Sussex Ave). The dominant housing type of the block is low-rise apartment buildings, with several of them having been replaced with high-rise buildings in the past few years. The project is proposed here to set a model of the MMH and as a counter example to the recently built high-rise buildings.

This neighbourhood has a variety of civic facilities including schools, community centers, and a library. It is close to a plethora of public transportation routes, bus stations, a skytrain line, and the urban trail (for pedestrians and cyclist). Beresford Street is envisioned as an "art walk that hosts a variety of public art," according to the Metrotown Master Plan (City of Burnaby 2017, 76).
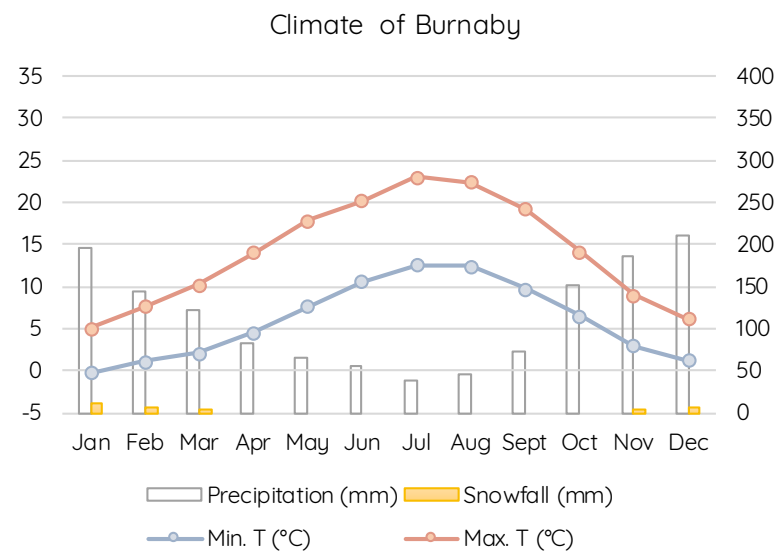
Burnaby has a warm temperate climate with dry summer (Csb), where the average yearly temperature ranges from 2°C to 18°C with small amount of snowfall from November to March (Climate-Data n.d.d and Weather Spark n.d.b).

15-min walking

0   500 m

Site (Beresford St and Sussex Ave)

Residential High-Rise

Residential Low-Rise

Residential Single Detached / Duplex

Skytrain Transit Line

Commercial

Skytrain stations

Urban trails for pedestrians and bikes

Bikelanes

Art walk

Park

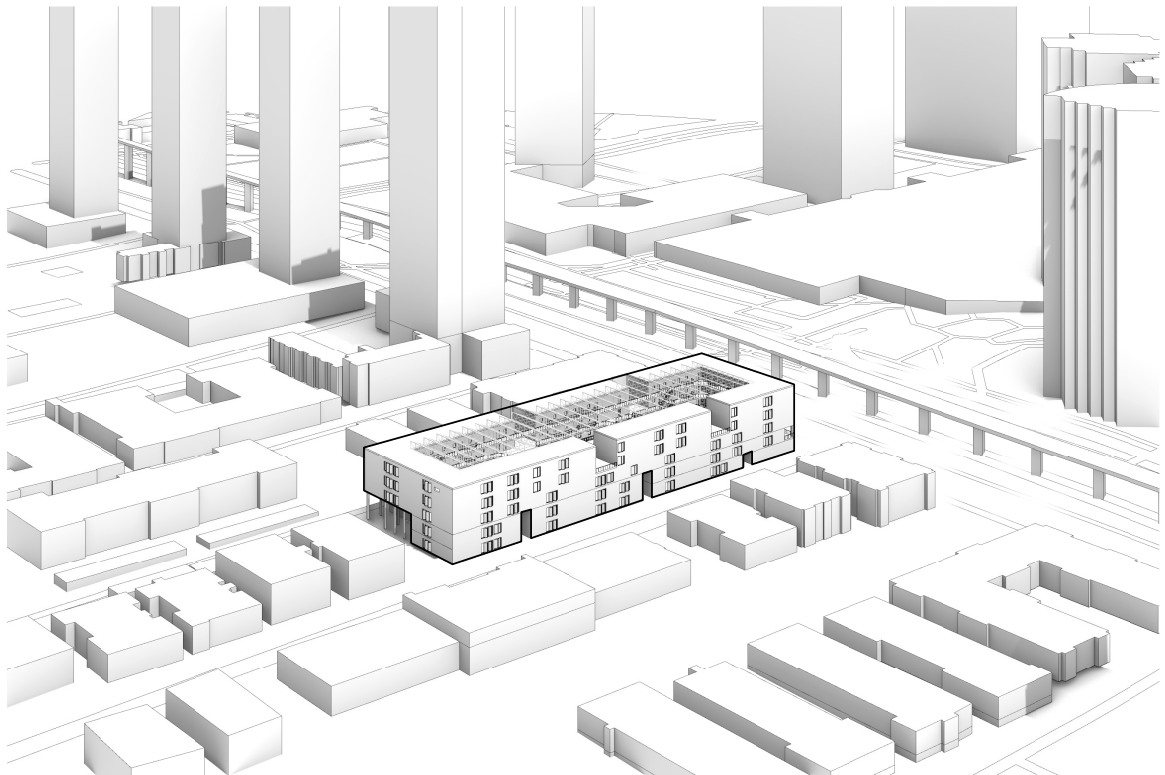Cemetary

Recreational Facilities

Education

Industrial

Housing types, transportation and land use

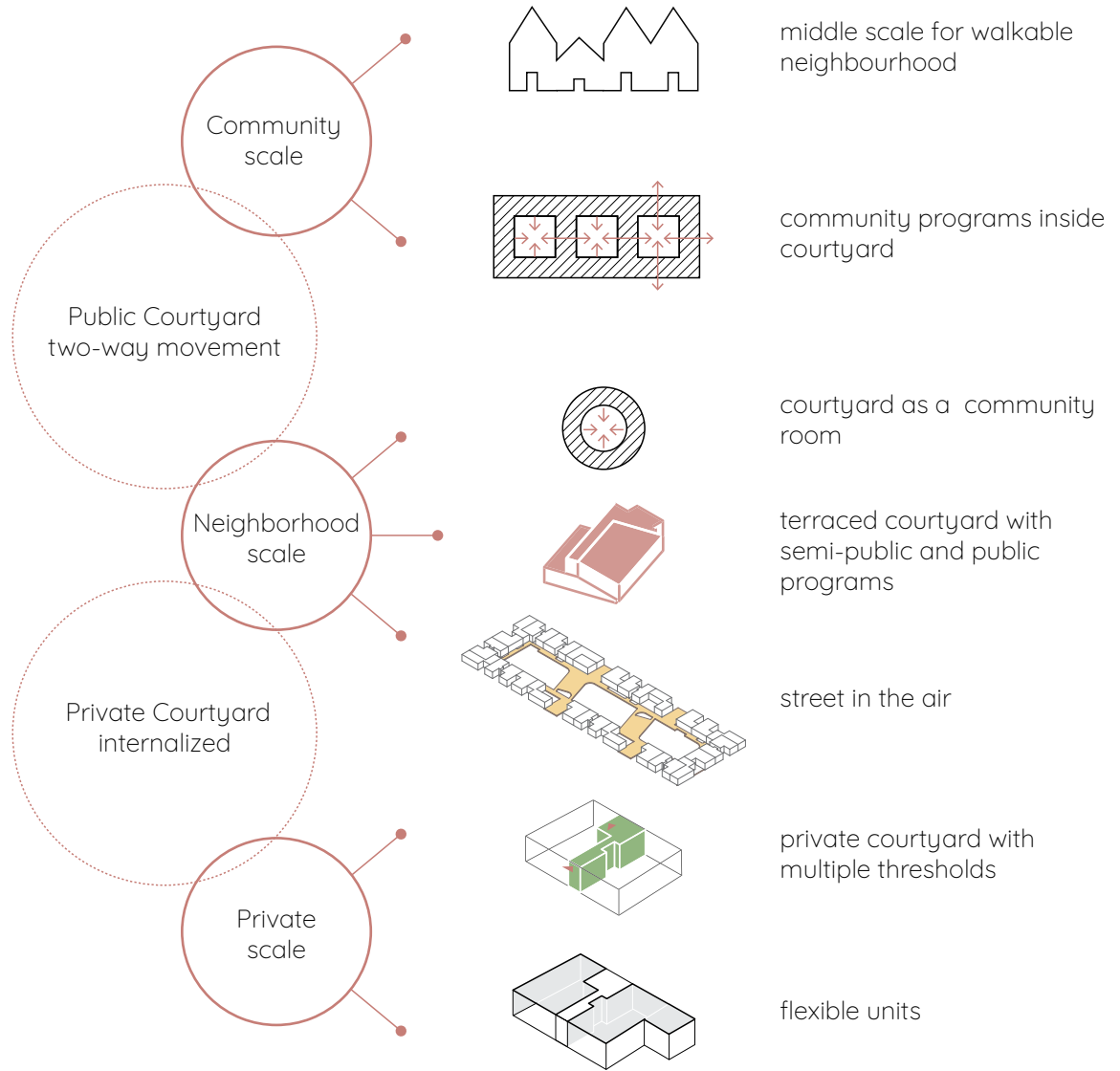## Design Proposal of Community Courtyard Housing

The community courtyard housing will be a rental housing building that accommodates the existing community, with a certain percentage of the units reserved to low-income recent immigrants and families. To encourage newcomers to interact with new communities, community programs and immigrant supportive programs are integrated into the housing. The courtyard is implemented in three scales: community, middle, and private.

Street elevation of the site

Perspective view of the site

middle scale for walkable neighbourhood

Community scale

Public Courtyard two-way movement

community programs inside courtyard

courtyard as a community room

Neighborhood scale

terraced courtyard with semi-public and public programs

Private Courtyard internalized

street in the air

private courtyard with multiple thresholds
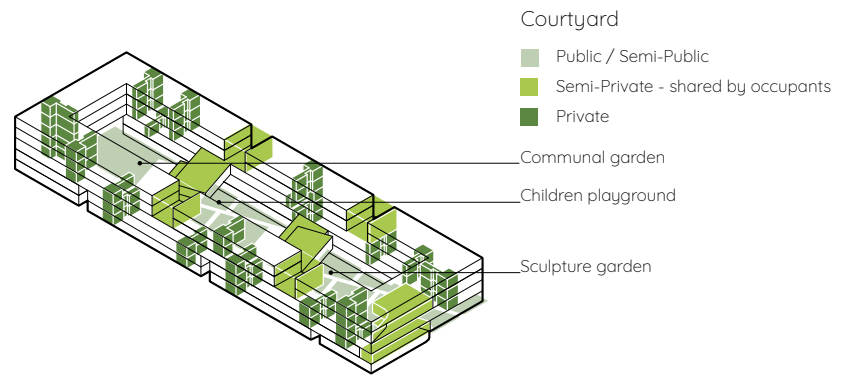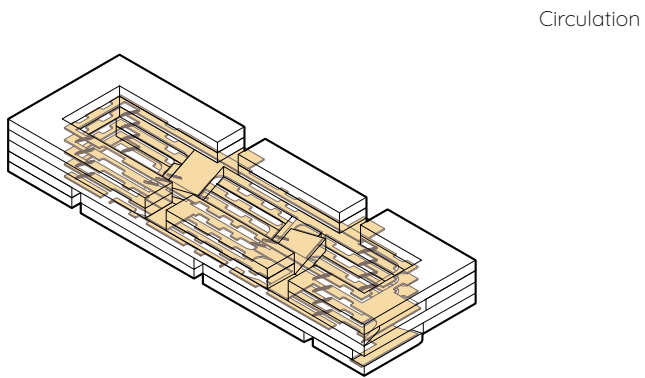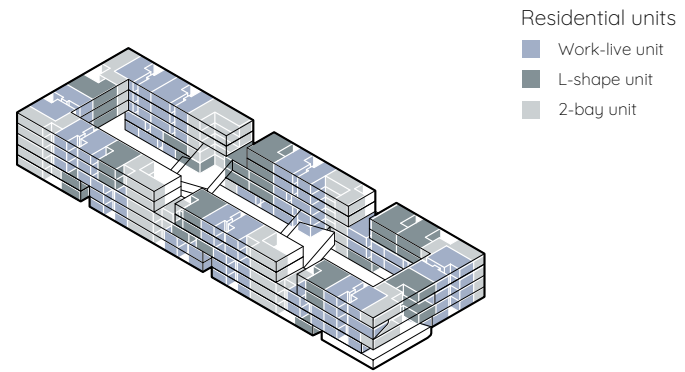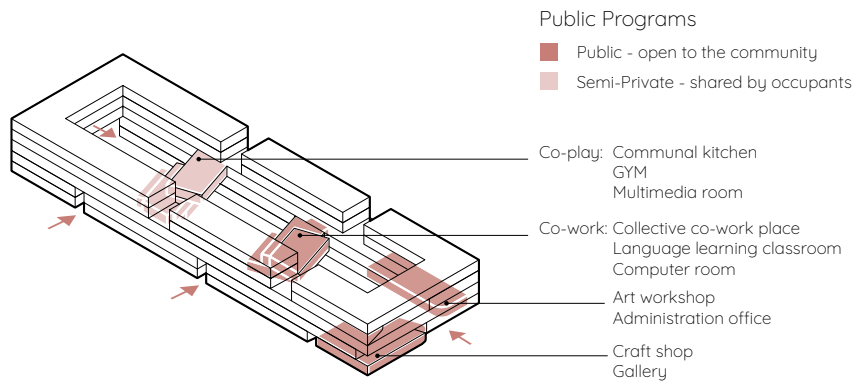
Private scale

flexible units

Design methodology

Community Courtyard and Programs

There are three large courtyards: a sculpture garden, a playground, and communal garden. The sculpture garden adjacent to Beresford Street is open to the public; the playground and the communal garden are semi-public and shared by the occupants. The communal garden can also be available to other communities if there are unoccupied garden beds.

Public program art workshop and gallery are placed on the ground level on the Beresford Street. The two central wings include a co-work and a co-play place. The co-work wing includes offices, a language learning center, and computer rooms, which are open to the community. This wing provides the opportunity for immigrants to expand their skillsets and to build networks in professional fields. The co-play wing includes shared entertainment programs, a communal kitchen and gym on the ground level, and a multi-media room on upper levels. The communal kitchen can potentially open to the community to host cooking classes to promote different cuisines. A bicycle rental shop located at the end of the building allows occupants to explore the city with a small fee, which is a more sustainable and economical transportation option compared to public transit. The administration office is located on the ground level, and officers can provide newcomers with informational help, such as understanding how the transportation system works, and where to apply for a care card. The community courtyard housing does not aim to create a one-stop service for immigrants. Rather, it provides a setting for newcomers and receiving communities to understand other cultures in terms of living, socializing, and working.

Public Programs

- ▇ Public - open to the community
- ▇ Semi-Private - shared by occupants

Co-play: Communal kitchen
GYM
Multimedia room

Co-work: Collective co-work place
Language learning classroom
Computer room

Art workshop
Administration office

Craft shop
Gallery

Residential units

- ▇ Work-live unit
- ▇ L-shape unit
- ▇ 2-bay unit

Circulation

Courtyard

- ▇ Public / Semi-Public
- ▇ Semi-Private - shared by occupants
- ▇ Private

Communal garden

Children playground

Sculpture garden

Public programs, residential units, circulation and courtyard distribution

Middle-Scale Courtyard

Middle-scale courtyards are placed in various locations on the upper levels of the building. The gallery separates the private and the semi-public areas, while also linking all the units to the shared programs. The gallery switches from circulation to a patio as one approaches the co-work and co-play bays. These middle-scale courtyards activate informal and formal encounters within the building.

Private Dwelling

The private dwellings are designed to be flexible in order to accommodate different family structures. As rental housing, it is expected that a unit will have new occupants every few years. There are three unit types: L-shape unit, 2-bay unit, and work-live unit.

The L-shape unit is developed to manage the sunlight condition at the corners. The 2-bay unit is required because the overall structure requires units in odd and even numbers.

The work-live unit separates the public rooms from the sleeping rooms with a private courtyard, which allows for flexible use of the unit. For example, the living spaces can be used for work, or one of the bedrooms can be rented out without compromising the privacy of the host family. Pocket doors are placed between a public room (kitchen or living room) and a bedroom of two different units. Thus, a bedroom can be accessed from either side of the units, either through the pocket door or the private courtyard. Such configuration allows for nearly infinite variation of the unit layout. The private courtyard is narrowed at the middle to provide privacy for the courtyard at the back. As previously mentioned, Muslim houses require different entrances for

guest and owners. The private courtyard prepares two entrances to the public side. Guests can enter the unit from the entrance close to the gallery and family members can enter through the courtyard at the back. A folding door can be placed outside the private courtyard to have complete privacy if desired by some families.

L-shape + Work-live unit I (for corners)   Work-live unit II   2-Bay unit
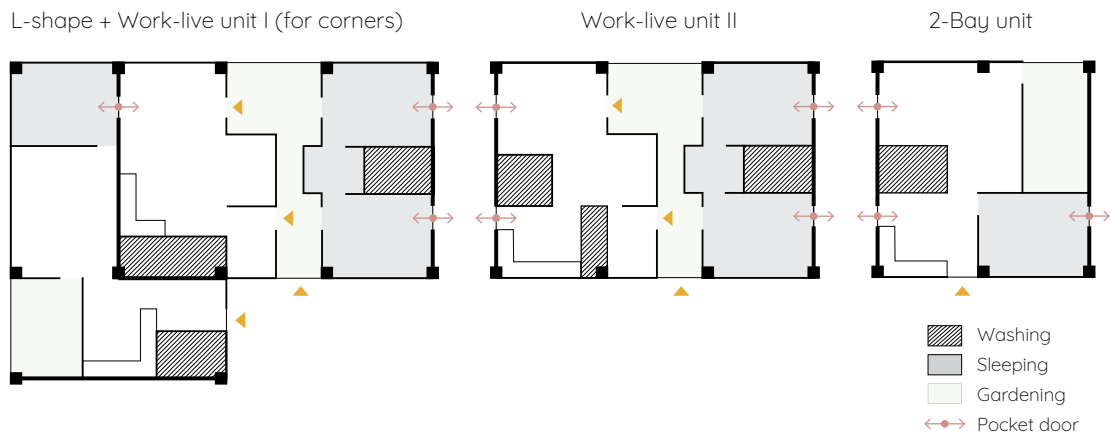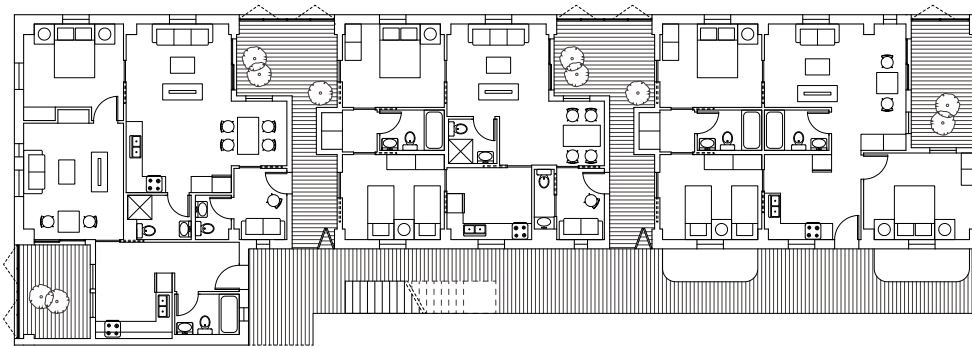

Washing
Sleeping
Gardening
Pocket door

Diagram of unit types

Example of a combination of the unit types

Diagram of possible unit variations

Legend:
- 0 - bedroom
- 1 - bedroom
- 2 - bedroom
- 3 - bedroom
- 4 - bedroom
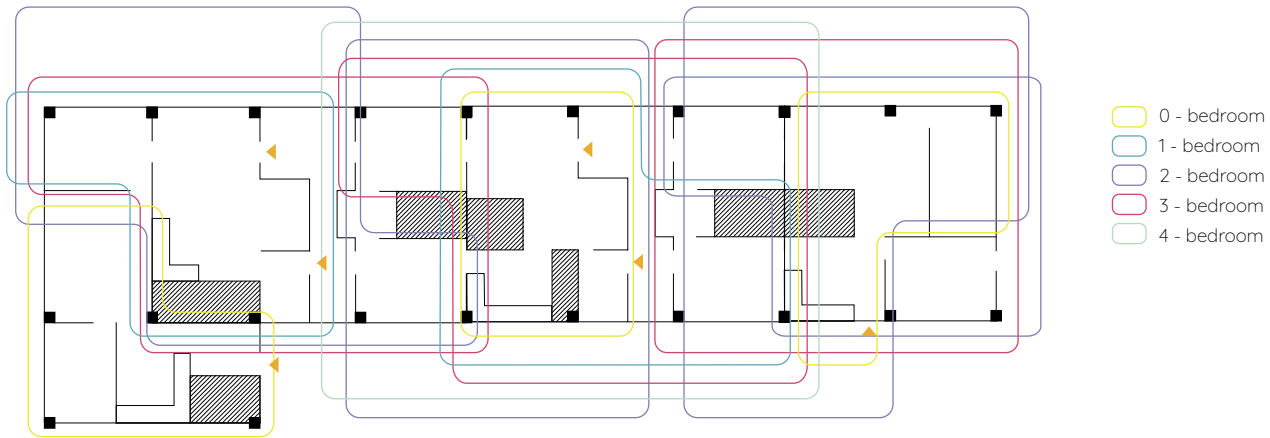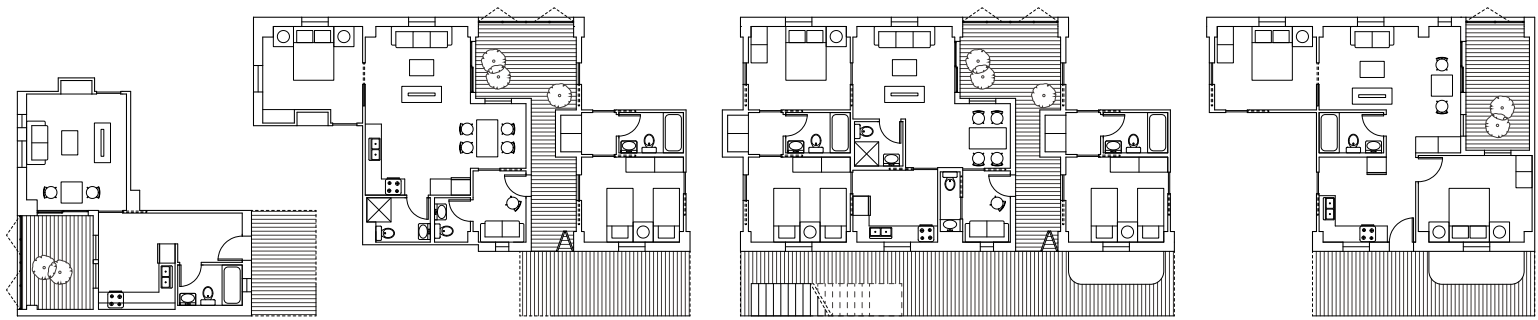

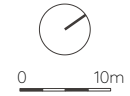L-shape -> Bachelor   Work-live unit -> 2-bedroom   Work-live unit -> 3-bedroom   2-bay unit -> 2-bedroom
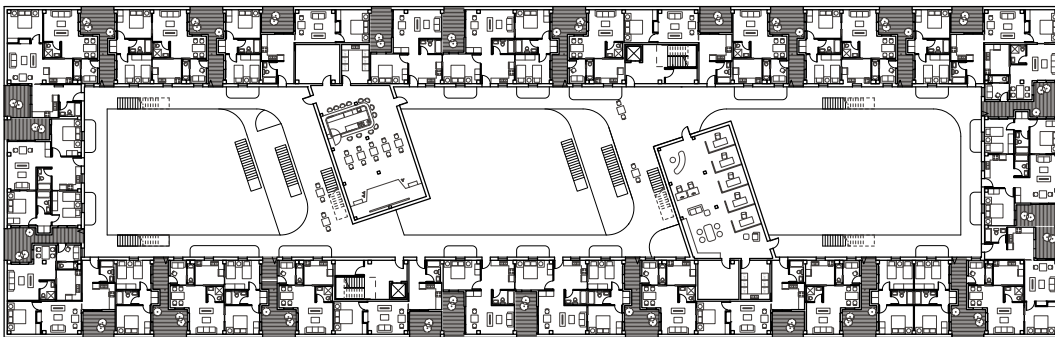
Examples of variations of unit layouts

Ground level floor plan

0   10m
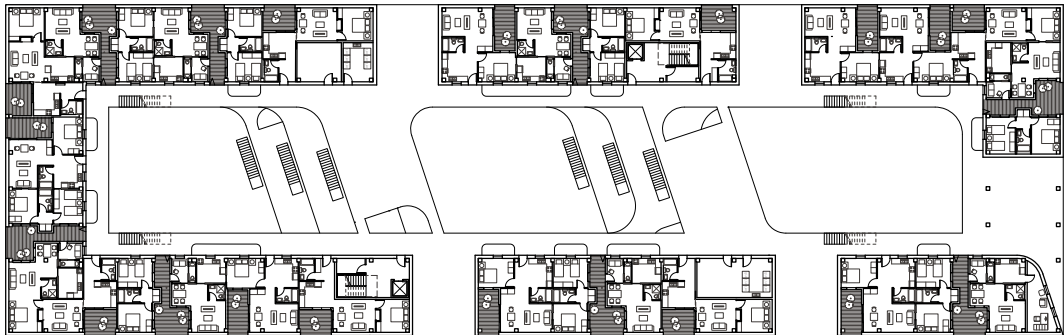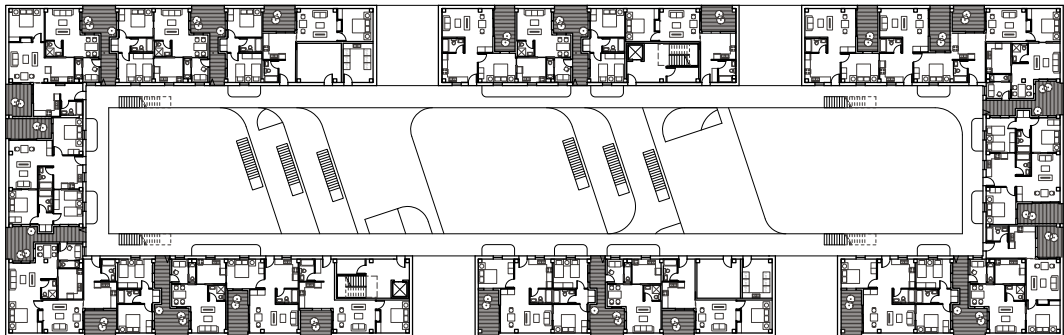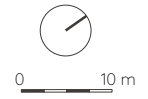
2n floor
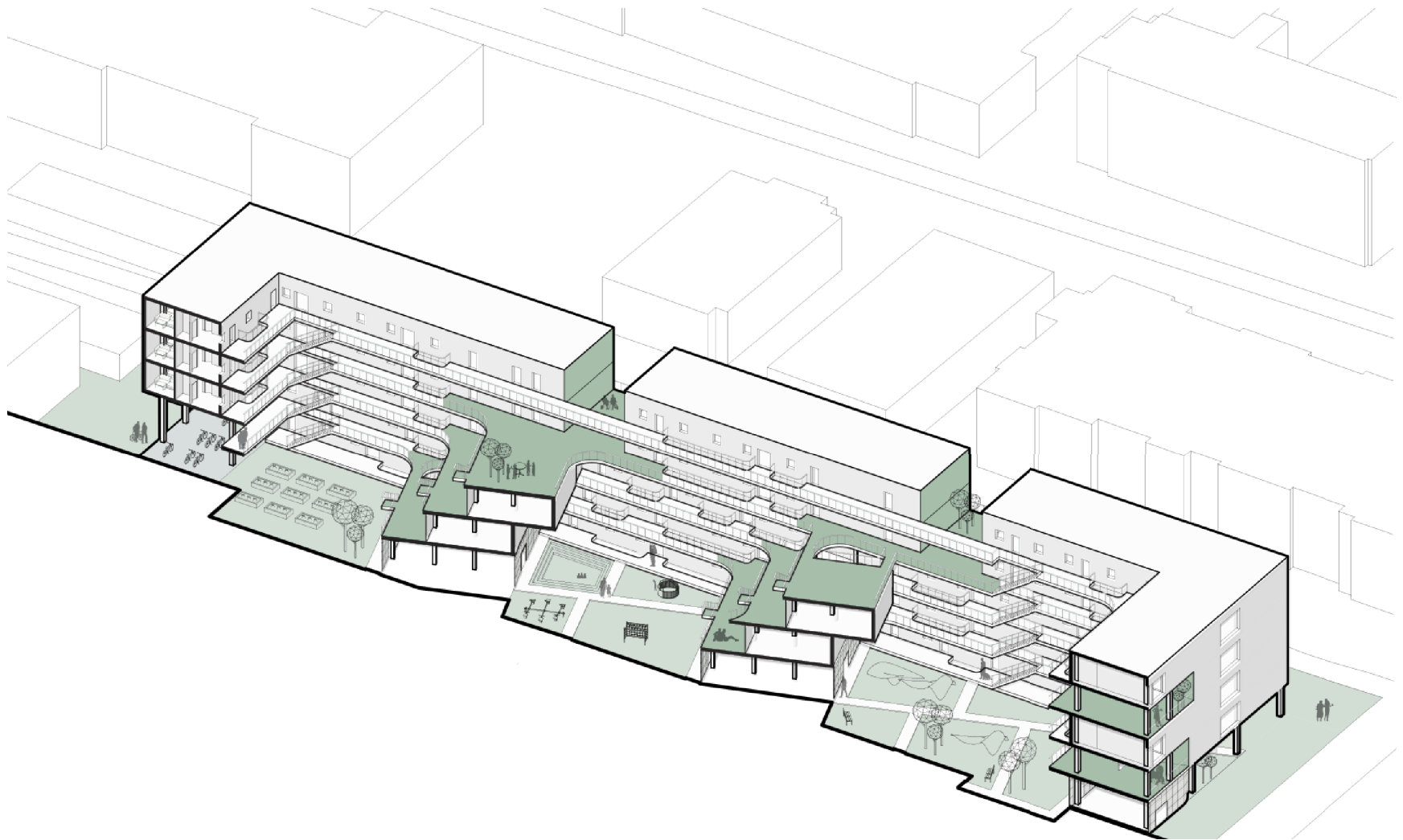
3rd floor

2nd and 3rd level floor plan

4th floor

5th floor

0   10 m

4th and 5th level floor plan

Perspective section showing courtyards in different scales

Rendered image of the community courtyard

Rendered image of the middle courtyard, on the 4th level

Rendered image of the private courtyard

Chapter 6: Conclusion

Many other countries consider Canada to have successful immigrant integration, as it has developed a point system to select talented candidates and has inclusive laws and acts to accommodate cultural diversity. To achieve socially cohesive community, both immigrants and non-immigrants should develop a set of common values and have equal opportunities to thrive in the society. However, immigrants experience the difficulty of finding appropriate housing, unequal employment opportunity, and spatial segregation from host societies. Immigrant integration is a mutual adaptation process, which requires both parties to understand and to tolerate different cultures.

Community integrated courtyard housing proposes various programs shared by a community or occupants within the courtyard, which transforms the inherently private and internalized courtyard to a bilateral courtyard. The housing welcomes everyone and reserves a percentage of units to low-income recent immigrants. The courtyard housing creates a sense of community to newcomers and provides a social setting for different cultures to intersect. Courtyards in various scales are placed in the building to encourage formal and informal social encounters and tries to build a tight-knit neighborhood for occupants as learned in the vernacular courtyard examples. As immigration has accelerated and source countries have become diverse, housing should be flexible to adapt the need of different families and cultures. Units are designed flexible enough to expand and shrink over time. For example, a 2-bedroom unit can gain two extra bedrooms from the adjacent units.

This project can be the prototype of immigrant housing that helps newcomers settle into various communities. It architecturally addresses the social issue of immigrant integration, and collaboration between cities and policy makers is required to enable it. The pressing demand of housing has triggered cities to make up new housing policies. The City of Vancouver has continued to improve the zoning policy of laneway housing to increase residential density (City of Vancouver n.d.), which could be a response to the strategy of the Missing Middle Housing. The City of Burnaby approves the new rental policy that rental-only zones will be created across the city and it requires a minimum of 20% rental housing in all new developments to protect rental property (Nasimi 2019). Considering immigrants account for 50% of the population in Burnaby, and they are more likely to be low-income, it is reasonable to propose a housing policy for recent immigrants that acknowledges the low-income status. Such policy can be developed into a comprehensive strategy of immigrant integration, which provides housing and social integration opportunities for immigrants.

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