Montréal

Decoding Density

Created for the drafting of the
Urban and Mobility Plan 2050

DENSITY: WHY?

Document prepared by the firm Fahey et associés, at the request of the Ville de Montréal.

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Continuation of a Trend Toward Densification

For the last several decades, cities, and in particular major urban centres, have been attracting and concentrating an increasing proportion of the population. Cities must adapt to this by offering housing, facilities, infrastructure and services for these new residents, in addition to those already living there. Montréal is no exception; it has been becoming denser for the last several decades. In fact, several sectors have already been redeveloped with more intense land use and functions while in some other areas, the process is beginning. Here, as elsewhere, this trend is becoming more evident and now occurs within an increasingly complex context in which demographic, climate, economic and public health issues are driving a rethinking of ways to live in the city, and therefore to remake it.

Montréal During the Next 30 Years: Indisputable Demographic Growth

Current projections indicate that the population of the Montréal agglomeration will increase from 1.7 million inhabitants in 2016 to more than 2.1 million in 2050.[1] The population of the Montréal Census Metropolitan Area (CMA) was 4.1 million inhabitants in 2016 and is projected to grow overall until 2050 to reach 5.1 million.[2] During this period, the Montréal agglomeration will receive 44% of the demographic growth.[3] However, the city will see its population increase by 25%, which represents more than 182,000 households,[4] while the other agglomeration cities will only grow by 15%.[5]

People aged 65 and older comprised 17% of the total population of the Montréal agglomeration in 2016.[6] In 2050, the agglomeration should include almost 200,000 more seniors than in 2016. With a 62% increase, the 65 and over group will, by far, grow the most by 2050.[7] While very evident, the aging of Montréal's population will be attenuated by the arrival of immigrants and the presence of students.[8]

In this context, it is crucial that Montréal prepare itself to welcome this new growth in a thoughtful way by adapting existing areas including, in particular, facilities, services and employment sectors that will support the quality of life desired by the various population groups.

Quantity, Diversity and Affordability of Housing

In October 2019, CMHC calculated that Montréal's rental housing vacancy rate was 1.6%.[9] Since a 3% vacancy rate is considered balanced, it can be concluded that there is a shortage of rental housing in Montréal. Moreover, the vacancy rate had reached its lowest level in 15 years (at the CMA level).[10]

Access to affordable housing and social diversity within the municipality are also affected by a lack of housing. This leads to an increase in prices and makes it difficult to retain population groups in neighbourhoods and permit new Montrealers to move in. Among the various tools available in Montréal, note that the objective of the By-law for a Diverse Metropolis is to encourage access to suitable housing for everyone, in particular thanks to an increased supply of social, affordable and family housing. Consequently, a general examination of different strategies will permit an appropriate response to people's housing needs (especially in terms of quantity, quality and diversity).

Toward More Ecological Development and Transportation

The island of Montréal is, for the most part, developed and built out. The only undeveloped areas are natural, agricultural and landscaped lands, which have been preserved to maintain local ecological balance. Given the scarcity of land available for development, it is therefore becoming increasingly necessary to opt for the transformation, reclassification and infill of existing areas.

In terms of the effect of development and human activity on the environment, transportation remains the main source of greenhouse gas (GHG) emissions in the agglomeration, accounting for 40% of emissions, while the figures for other activities are generally less than 20%. Although today's vehicles pollute less, there is a greater number of them. Road transportation represented 77.1% of GHG emissions from the transportation sector in the agglomeration in 2015, which was a reduction of less than 1% from 1990.[11]

In order to ensure that Montréal's environment is healthy, but also for broader reasons, it is necessary to make a greater transition and to review both our ways of developing and using the land, and our mobility choices.

A Chance to Do Better

Densification has already begun in the city. However, the challenge facing Montréal is to increase its capacity to allow new construction in areas which are to a great extent already developed. It must achieve this objective while also helping improve the health and quality of life of its residents as well as providing vitality and balance within its neighbourhoods. Cities such as Montréal must be transformed to encourage the adoption of healthier lifestyles and more ecological transportation modes. In addition to providing appropriate housing and transportation infrastructure, this means taking advantage of all opportunities to review the urban fabric and its structure.

Moreover, several positive effects may be generated by approaches to increase density that are combined with other key urban components and strategies. These include opportune locations, mixing uses, public transit, design of public spaces. Densification may be a beneficial practice for the urban ecosystem.

DENSIFY: WHERE AND HOW?

A 2016 study by the Fraser Institute[12] revealed that with 4,916 inhabitants per square kilometre, Montréal was the second densest city in Canada, after the city of Vancouver (5,493 inhabitants/km^2). Despite the relative density of Montréal, population densities vary considerably from one area to another and the city's density is much lower than that of major European capitals. For example, the density of Paris is 21,067 inhabitants per square kilometre. While it occupies one third of the land area of the Island of Montréal, its built density is 4.29 times greater and its population increases by about 500,000 inhabitants each year, without counting its millions of visitors. Its density surpasses even that of megalopolises like Tokyo and New York, with their many skyscrapers. Given this data, it can be concluded that it is possible to build a city that is both dense and attractive.

CANADA	number of inhabitants per square kilometre
Vancouver	5,493
Montréal	4,916
Toronto	4,457

INTERNATIONAL	number of inhabitants per square kilometre
Paris	21,067
Tokyo	14,796
New York	10,935

However, increasing density in an already developed area to respond to current and projected needs is not simply a mathematical calculation. Density is one of the components of a living environment and can only be defined in relation to other elements. Its relationships to the other components jointly define the urban form and neighbourhoods.

[1] Institut de la statistique du Québec, *Scénarios personnalisés pour la Ville de Montréal,* March 16, 2020

[2] Institut de la statistique du Québec, *Scénarios personnalisés pour la Ville de Montréal,* May 5, 2020

[3] Institut de la statistique du Québec, *Scénarios personnalisés pour la Ville de Montréal,* March 16, 2020

[4] Institut de la statistique du Québec, *Scénarios personnalisés pour la Ville de Montréal,* May 5, 2020

[5] Institut de la statistique du Québec, *Scénarios personnalisés pour la Ville de Montréal,* March 16, 2020

[6] CIUSSS du Centre-Sud-de-l'Ile-de-Montréal (2017) *Portrait des aînés de l'île de Montréal* santemontreal.qc.ca/fileadmin/user_upload/Uploads/tx_asssmpublications/pdf/publications/Portrait_aines_ile_de_Montreal_MAJ_janv2019.pdf

[7] Institut de la statistique du Québec (2020) *Scénarios personnalisés pour la Ville de Montréal*

[8] Institut de la Statistique du Québec (2019) *Perspectives démographiques du Québec et des régions*, 2016-2066 www.stat.gouv.qc.ca/statistiques/population-demographie/perspectives/perspectives-2016-2066.pdf

[9] SCHL (2020) *Enquête sur les logements locatifs, centres urbains : taux d'inoccupation* www.cmhc-schl.gc.ca/fr/data-and-research/data-tables/urban-rental-market-survey-data-vacancy-rates

[10] Institut de la statistique du Québec (2020) *Projections de population* www.stat.gouv.qc.ca/statistiques/population-demographie/perspectives/population/index.html

[11] Ville de Montréal. (2019). *Inventaire 2015 des émissions de gaz à effet de serre de la collectivité montréalaise*, une production du Office de la transition écologique et de la résilience ville.montreal.qc.ca/pls/portal/docs/PAGE/ENVIRO_FR/MEDIA/DOCUMENTS/INVENTAIRECOLLECTIVITEGES_2015.PDF

[12] Josef Filipowicz (2016) *Room to Grow: Comparing Urban Density in Canada and Abroad,* www.fraserinstitute.org/sites/default/files/room-to-grow-comparing-urban-density-in-canada-and-abroad.pdf

In order to create dense neighbourhoods that provide benefits for everyone, growth must be supported and managed in an intelligent and sensitive fashion. Depending on context, different approaches to increase density may be chosen for implementation. In particular, the physical specifics and character of areas must be considered when allocating new densities and construction. Therefore, reflections on density must go beyond quantifiable thresholds and standards to take into account the qualitative aspects of existing and proposed components of the city. Several factors need to be considered when making choices related to densification. They include the characteristics of the built environment, surrounding areas and street network; elements of interest (natural and built heritage), the need for public space and green space; the mix of functions; social-economic and cultural diversity.

The consolidation of active mobility networks and the creation of new optimized connections between different areas and neighbourhoods can also influence ways to densify the city. In addition, thoughtful density means adjusting strategies according to the type of setting, the availability of spaces for redevelopment and the capacity of urban infrastructure, facilities and services.

Land densification will increase Montréal's capacity to welcome new populations and will contribute to the creation of all conditions needed to respond to the various needs of its existing and projected population. Future planning and development guidelines will not only govern the evolution of the boroughs, they must also take into account specifics as well as the variety of situations and urban forms present in the 19 boroughs.

In the Context of the COVID-19 Pandemic

Given the social distancing context, it is important to state that many studies confirm that urban density is not in itself a factor that exacerbates the spread of the virus. Several factors present in urban settings are more significant, such as the number of places for social interaction and connection, and the overcrowding of dwelling units.

The pandemic has also led to a radical change in lifestyle. Individual travel has been reduced, while unprecedented increases in teleworking and online shopping have been observed.

In short, city planning in the next few years will become more complex and presupposes an adaptation of our neighbourhoods to better take into account these new issues. Cities must improve their resilience to better face these unknowns.

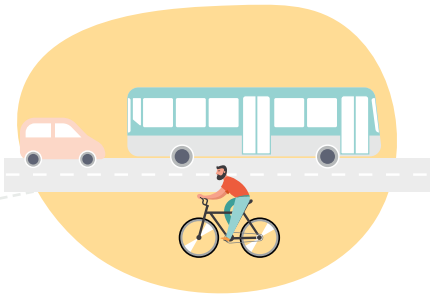
URBAN DENSITY

Social diversity

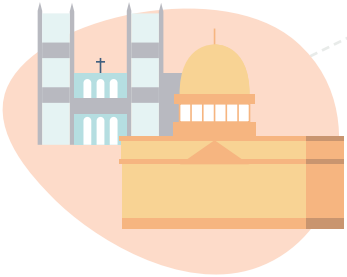
Mix of uses

Public spaces

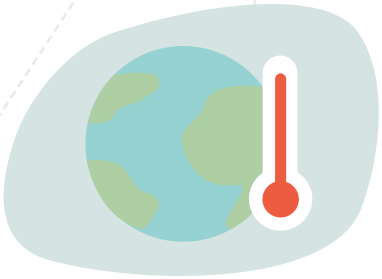
Greening



Mobility



Heritage

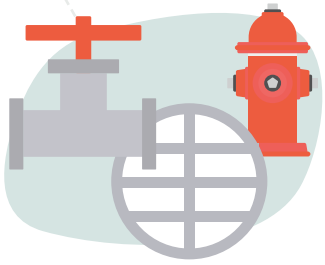


Ecological balance

Urban structure

Built environment

Services and facilities



Urban infrastructure

In the context of the development of the Plan d'urbanisme et de mobilité 2050 (PUM, or Urban and Mobility Plan 2050), the municipal administration is creating tools to better explain certain ideas and to encourage reflection on approaches to densification that it is proposing. That is why the city is presenting this document, *Decoding Density*, which is designed to clarify concepts, feed reflection and aid in the development of the orientations and guidelines of the PUM.

The first chapter of this document, the Density Glossary, addresses terminology, planning tools and other ideas related to urban density. The goal is to establish a shared vocabulary as well as a common basis to facilitate discussions among all stakeholders involved in planning Montréal. Chapter 2 is a Morphological study of expressions of density in the Montréal context. It is designed to illustrate the diversity of urban forms present in Montréal as well as different densification strategies implemented during the last few years. Chapter 3 is comprised of case studies covering a selection of inspiring approaches. They are designed to fuel reflection on new approaches to be explored with regard to increasing density.

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Chapter 1

Density Glossary

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DENSITY OF LAND OCCUPATION: HOW TO DEFINE IT?

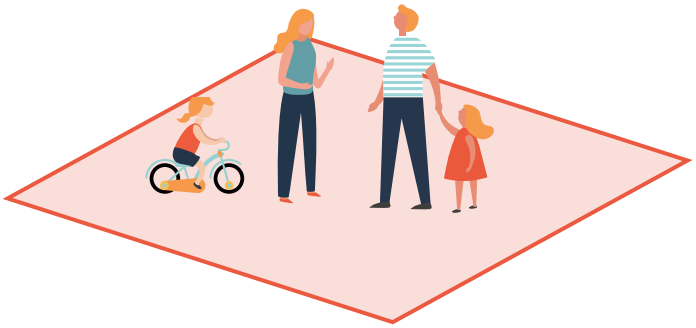
In general, density is an indicator used to measure, plan and guide the development of cities. Several types of density need to be considered and should be differentiated. The purpose of this chapter is to specify the fundamental distinctions between these different indicators, the land areas being studied and the uses that can be made of these different types of density measurements.

Land occupation density can be measured by associating different demographic data (population, number of jobs, etc.) with different land areas (e.g. a parcel, lot, block, neighbourhood, city).

EQUATIONS : AREA OF LAND BEING STUDIED

$$\text{Density} = \frac{\text{Indicator (e.g. inhabitants, floor area)}}{\text{Area of land being studied (e.g. surface area of a site, or a block in } m^2\text{; of a neighbourhood or a city in } km^2 \text{ or hectares)}}$$

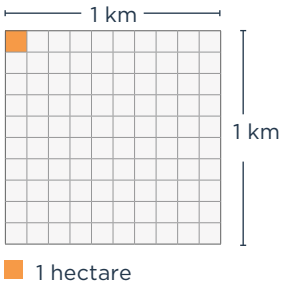
Population Density



Corresponds to the **ratio between the number of inhabitants and the land area being studied.**

$$\text{Population density} = \frac{\text{Number of inhabitants}}{\text{Land area being studied}}$$

1 km² = 100 ha



In geography, population density is often used at the scale of a country or a province, expressed in the number of inhabitants per km².

In urban planning, at a regional, agglomeration, city or borough scale, density is also calculated by counting the **number of inhabitants per hectare**, which is a scale 100 times smaller.

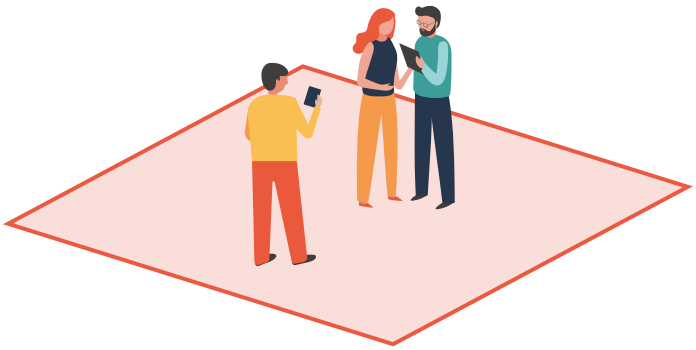
During the last census, in 2016, Plateau-Mont-Royal was Montréal's densest borough in terms of population, while Île-Bizard–Sainte-Geneviève was the least dense.*

$$\text{Population density Plateau Mont-Royal} = \frac{\text{104,000 habitants}}{\text{8.1 km}^2} = \text{12,839 inhabitants/km}^2$$

$$\text{Population density Ile-Bizard-Sainte-Geneviève} = \frac{\text{18,413 habitants}}{\text{23.6 km}^2} = \text{780 inhabitants/km}^2$$

* 2016 Census

Activity Density



Corresponds to the **ratio between the number of people involved,** all activities combined, **and the land area being studied.**

Depending on the case, the number of inhabitants, the number of jobs occupied, the number of students and, sometimes, the number of visitors to take into account tourists, users of a service (or public facility) or people who attend an Institution, are added together.

$$\text{Activity density} = \frac{\text{Number of people (all activities combined)}}{\text{Area of land being studied}}$$

Since a city is not just a place where people live, other types of density must be measured for planning and to ensure appropriate cohabitation among different activities. This indicator makes it possible to evaluate the degree of diversity (and mix) of activities and their intensity in the setting. It can also be used to calculate the need for public transit, both to establish the type of service to offer and its frequency.

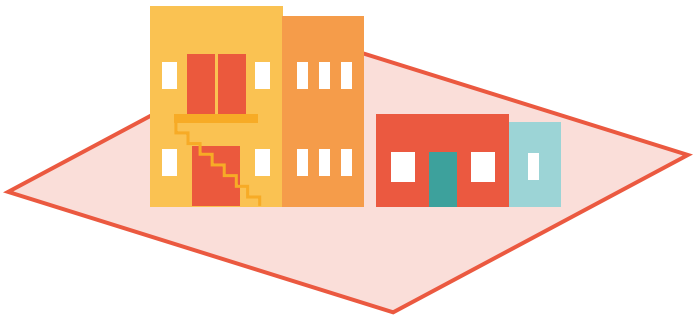
Employment Density

Corresponds to the **ratio between the number of jobs occupied and the land area being studied.** This includes all jobs occupied in various types of companies, organizations and Institutions.

$$\text{Employment density} = \frac{\text{Number of jobs}}{\text{Land area being studied}}$$

$$\text{Employment density Technoparc, Montréal} = \frac{7{,}350 \text{ jobs}}{1.9 \text{ km}^2} = 3{,}868 \text{ jobs/km}^2$$

Residential Density



Corresponds to the **ratio between the number of dwelling units (which differs from the number of inhabitants) and the land area studied.** Once again, the most commonly used reference scale is the square kilometre or the hectare.

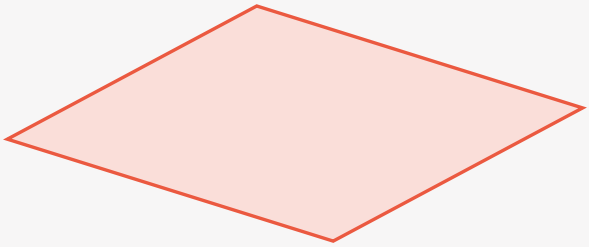
$$\text{Residential density} = \frac{\text{Number of dwelling units}}{\text{Land area being studied}}$$

For example, when the Communauté métropolitaine de Montréal (CMM) adopted its *Plan métropolitain d'aménagement et de développement* (Metropolitan Planning and Development Plan), the reference unit used to plan for future residential density was set at the one-hectare scale. Thus, the set minimum density thresholds today vary from 20 to 120 dwelling units per hectare, depending on the area in the metropolitan region.

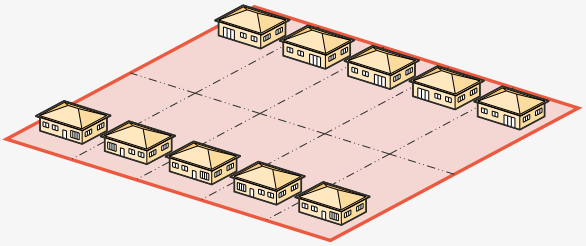
$$\text{Residential density Rosemont–La Petite-Patrie*} = \frac{\text{73,020 dwellings}}{\text{1,590 hectares}} = \text{46 dwelling units/hectare}$$

* 2016 Census

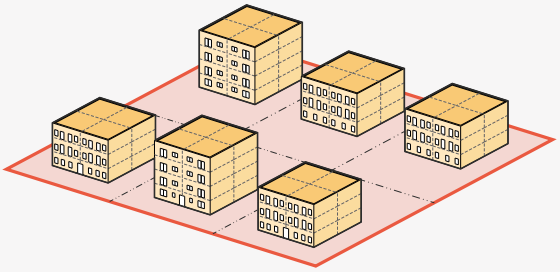
The same space, here 1 hectare, can have various residential densities which translate into different types of housing (the question of housing typologies is discussed on pages 17 to 20).



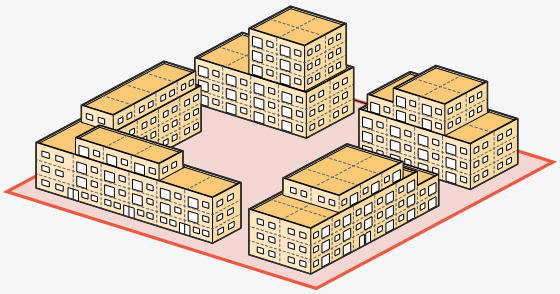
= 1 hectare



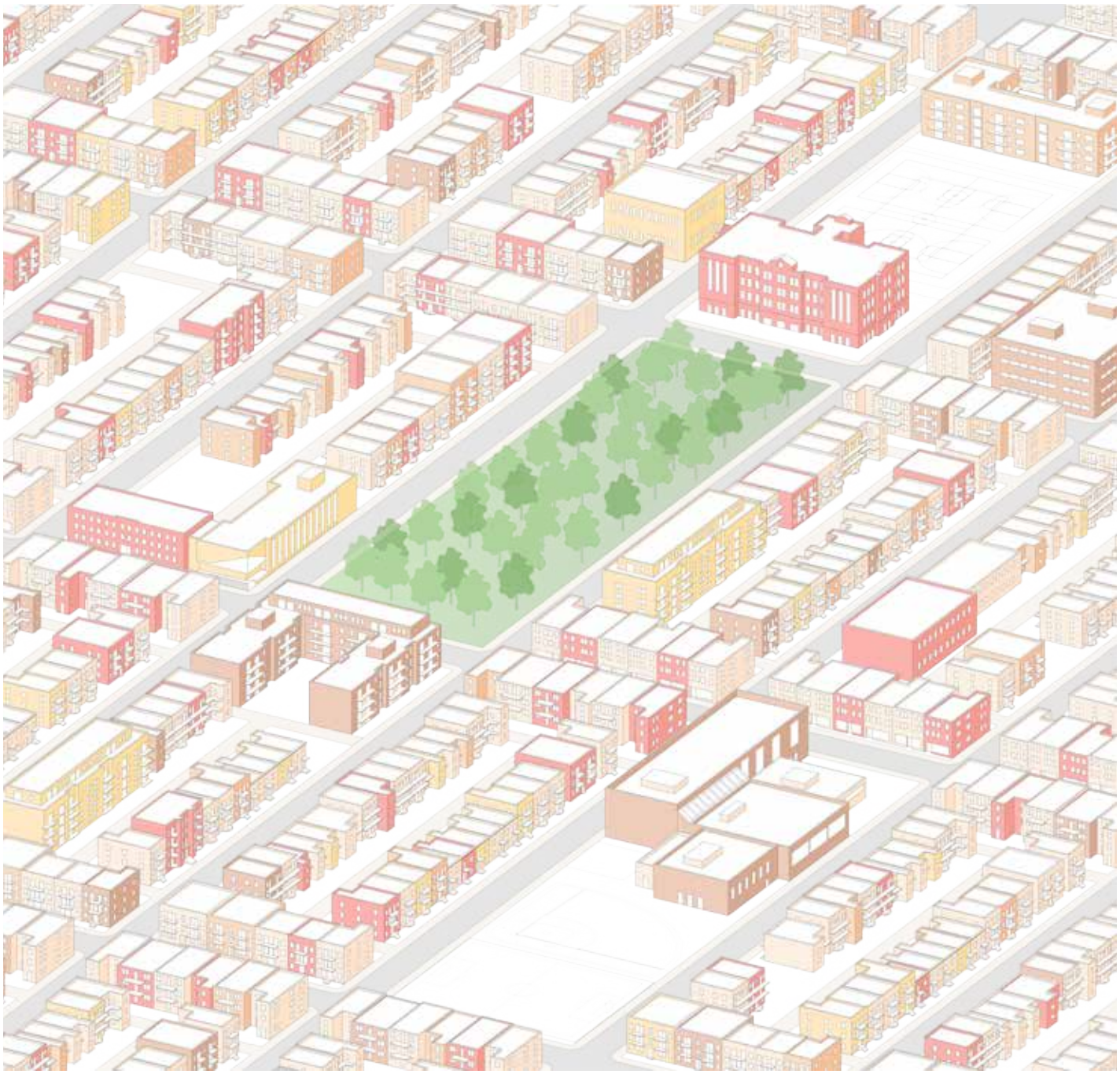
Low density
10 dwelling units
per hectare



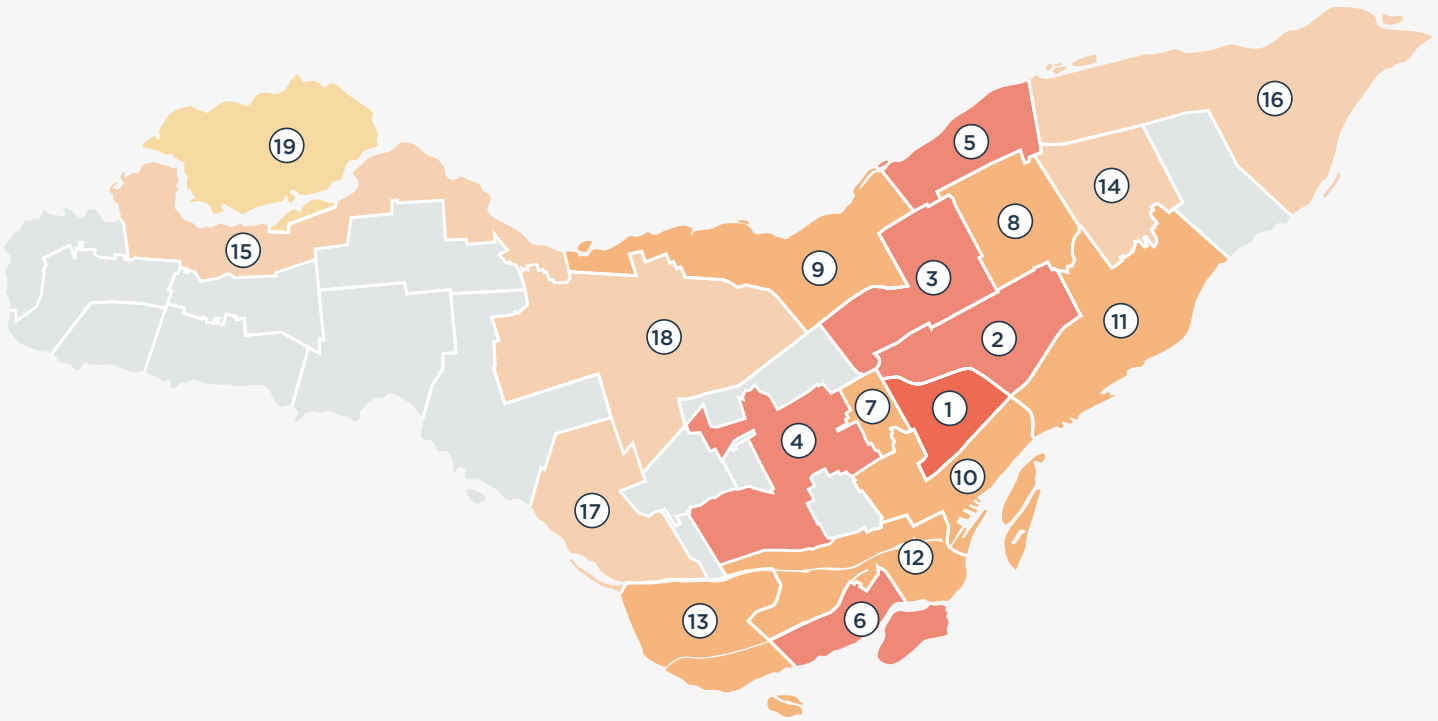
Medium density
80 dwelling units
per hectare



High density
150 dwelling units
per hectare



Population Density of Montréal's 19 Boroughs



Number of inhabitants/km²

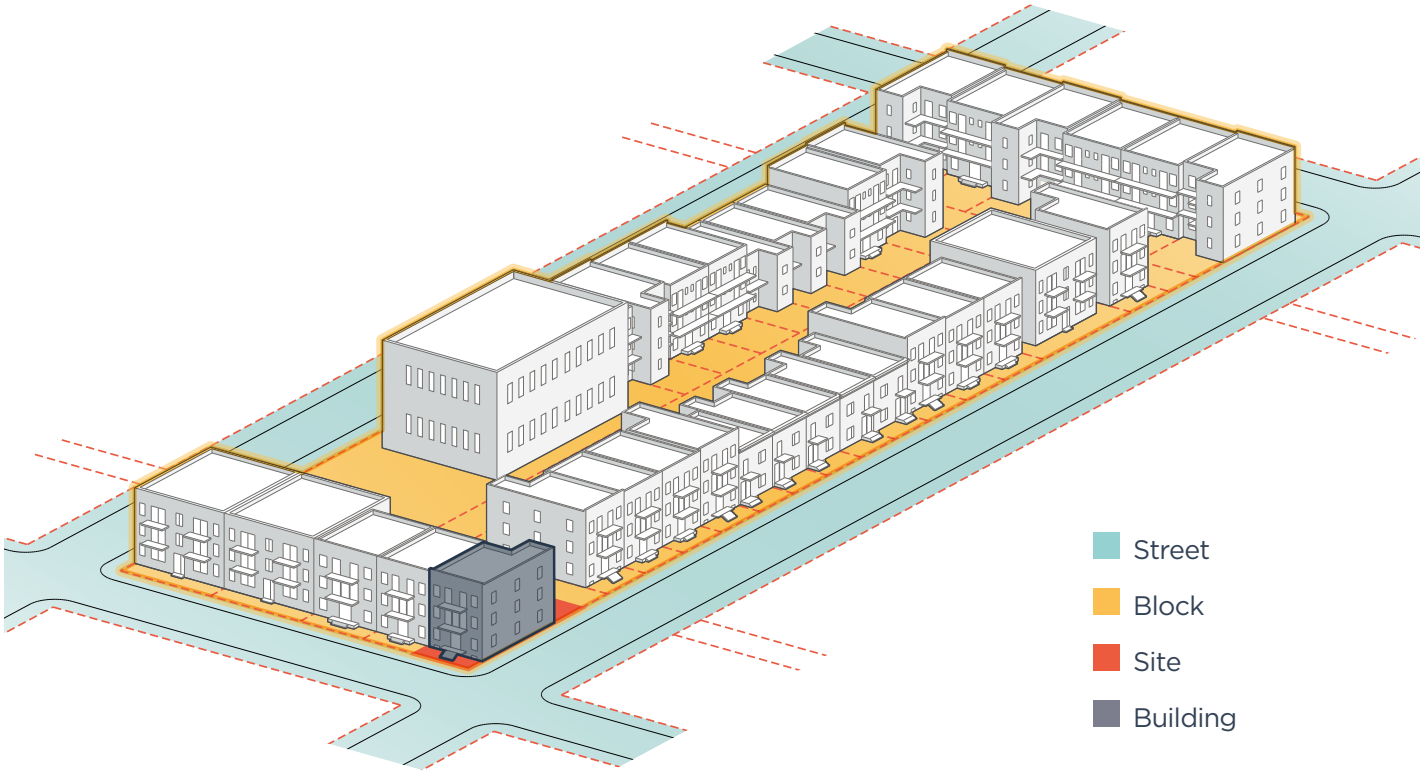
1. Plateau-Mont-Royal : ***12,839.5***
2. Rosemont-La Petite-Patrie : ***8,779.2***
3. Villeray–Saint-Michel-Parc-Extension : ***8,718.4***
4. Côte-des-Neiges–Notre-Dame-de-Grâce : ***7,781.3***
5. Montréal-Nord : ***7,588.6***
6. Verdun : ***7,137.0***
7. Outremont : ***6,142.1***
8. Saint-Léonard : ***5,800.0***
9. Ahuntsic-Cartierville : ***5,547.3***
10. Ville-Marie : ***5,404.2***
11. Mercier–Hochelaga-Maisonneuve : ***5,355.3***
12. Sud-Ouest : ***4,977.8***
13. LaSalle : ***4,714.9***
14. Anjou : ***3,123.8***
15. Pierrefonds-Roxboro : ***2,557.1***
16. Rivière-des-Prairies–Pointe-aux-Trembles : ***2,523.5***
17. Lachine : ***2,513.5***
18. Saint-Laurent : ***2,309.1***
19. Île-Bizard–Sainte-Geneviève : ***780.2***

BUILT DENSITY: HOW TO MEASURE IT?

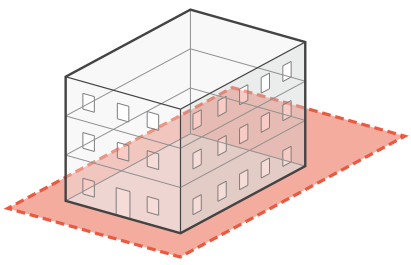
Components of the Urban Fabric and Built Density

At the scale of the neighbourhood, urban project or development project, different types of densities can also be calculated and managed through regulations. They are based on different urban components. The following are the most commonly used.

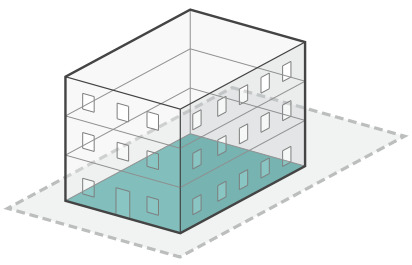
Main components at the city-block scale



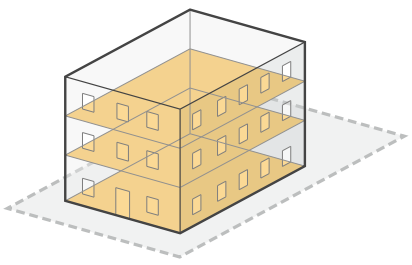
Main components at the site scale



Site area



Building footprint



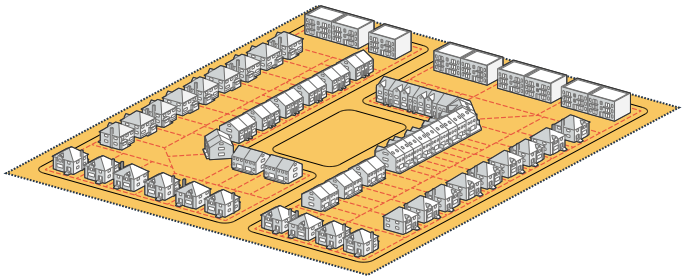
Floor area

Built Density at the Block or Study area Scale

Corresponds to the **ratio between the floor area of all buildings on the land being studied and the land area.**

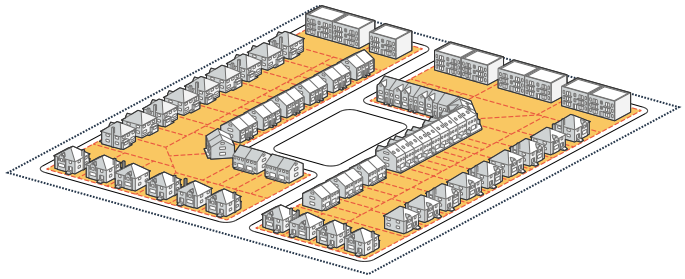
$$\text{Built density} = \frac{\text{Total floor area}}{\text{Land area being studied}}$$

Depending on the objectives, this construction density may be calculated in two ways.



Gross built density

Corresponds to the ratio between the total floor area and the land area being studied. This latter area includes both private and public sites (such as streets, parks and other sites designated for public or Institutionalal uses).



Net built density

Corresponds to the ratio between the total floor area and the surface area of the land being studied. However, the latter area excludes any streets, as well as all other sites designated for public or Institutionalal uses.

Built Density at the Site Scale

Corresponds to the ratio between the areas of different components of the building and the land area of the site on which it is located.

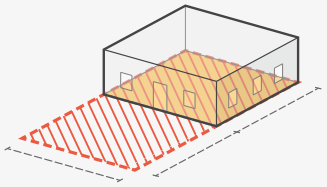
In the current Master Plan (2004), densities are stipulated by areas, while in the zoning regulations, these densities are redeployed at the scale of the zone (smaller than an area). These density standards must be respected in order to obtain authorization to construct a building. They are calculated at the scale of the site on which the project is planned (the site may be comprised of one or several lots).

The two most frequently used ratios are the Floor Area Ratio (F.A.R.) and the Building Site Coverage Ratio (B.S.C.R.)

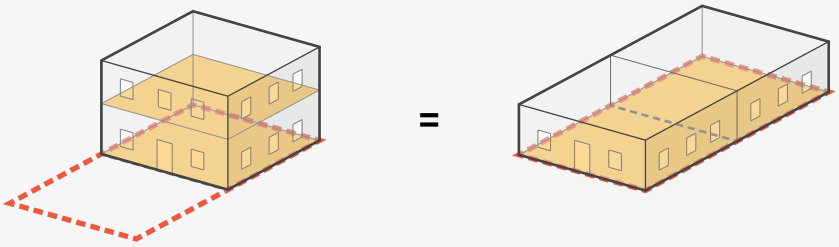
F.A.R.: Floor Area Ratio

Corresponds to the ratio established between the **total area of all storeys** built above grade (excluding exterior spaces such as terraces, patios, loggias or exterior features on roofs) and the l**and area of the site** on which the building is located.

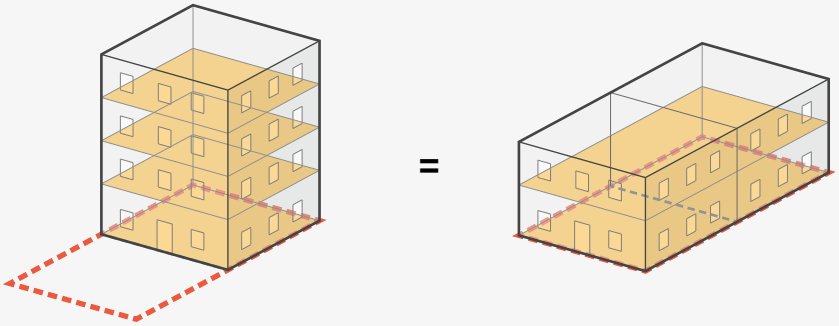
The usual French term is *coefficient d'occupation du sol* (COS), but some municipalities use the term *rapport plancher/terrain*.



$$\text{F.A.R.} = \frac{\text{Floor area}}{\text{Site area}}$$



F.A.R. = 1



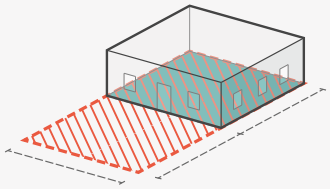
F.A.R. = 2

Most frequently, building density standards are used to establish what portion of a site will be built on and what other portions will be allocated to open space, whether public or private. These standards are part of the tools used to guide the type of development and construction that the city seeks at different scales (e.g. neighbourhoods, districts, certain areas within its jurisdiction.).

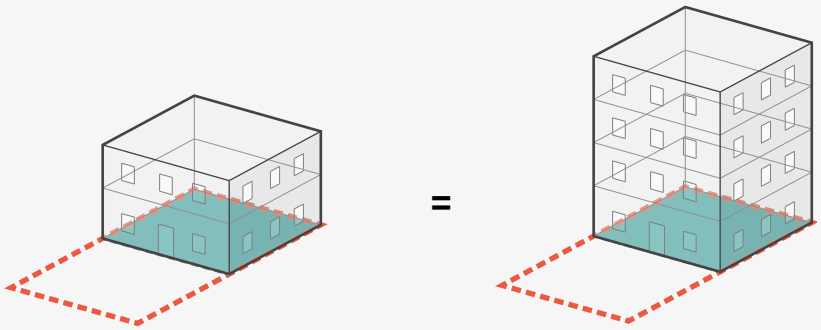
B.S.C.R.: Building Site Coverage Ratio

Corresponds to the ratio between the a**rea of a building's footprint** and the **land area of the site** on which it is located.

This ratio is also called the site coverage ratio, and is sometimes expressed as a percentage. For example, a B.S.C.R. of 0.5 is the equivalent to 50%.



$$\text{B.S.C.R.} = \frac{\text{Building footprint area}}{\text{Site area}}$$



B.S.C.R. = 0.5

B.S.C.R. = 1

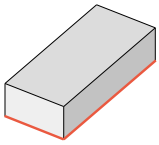
OTHER CONCEPTS RELATED TO DENSITY: WHAT ARE THE CONNECTIONS?

Density and Height

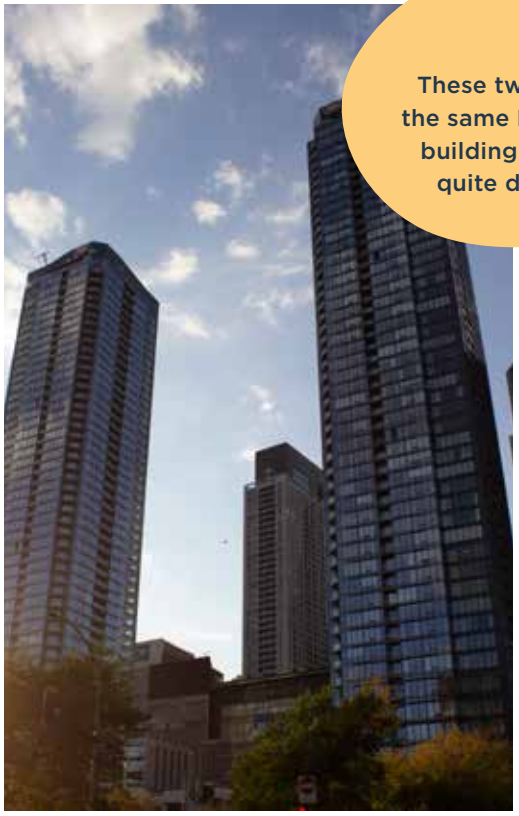
Density is often associated with high-rise buildings. However, density is not inevitably synonymous with height. While high-rise construction allows for concentrated density, density is not always connected to verticality or a specific building type.

The example below, of the Centre Eaton and the Tour des Canadiens located downtown, illustrates this reality. A building might occupy a larger portion of the site on which it is located, thus a shorter building could reach the same density level as a tower that occupies a smaller portion of the site. Boroughs such as Côte-des-Neiges–Notre-Dame-de-Grâce, Le Plateau Mont-Royal and Rosemont–La Petite-Patrie are good examples of relatively high residential densities that include relatively few high-rise buildings.

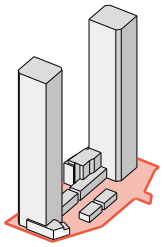
At a neighbourhood or block level, density may be distributed differently in space and deployed using different choices or combinations of building typologies. As illustrated on the adjacent page (p.16), a more concentrated density helps free up ground-level space that can be used for other purposes, in particular, more spacious community or public space.



Centre Eaton



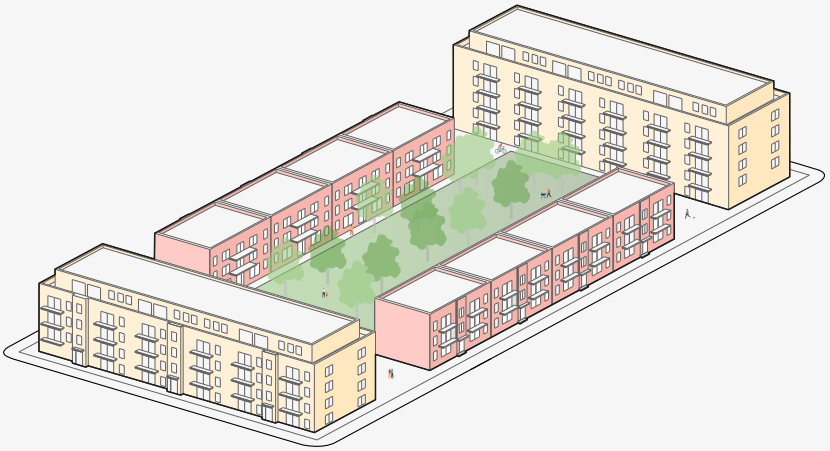
These two sites have the same F.A.R., but the building heights are quite different!



Tour des Canadiens 2 and Tour des Canadiens 3

Three blocks with the same density of 150 dwellings/hectare distributed over different parcel areas and with different heights.

3 to 4 levels



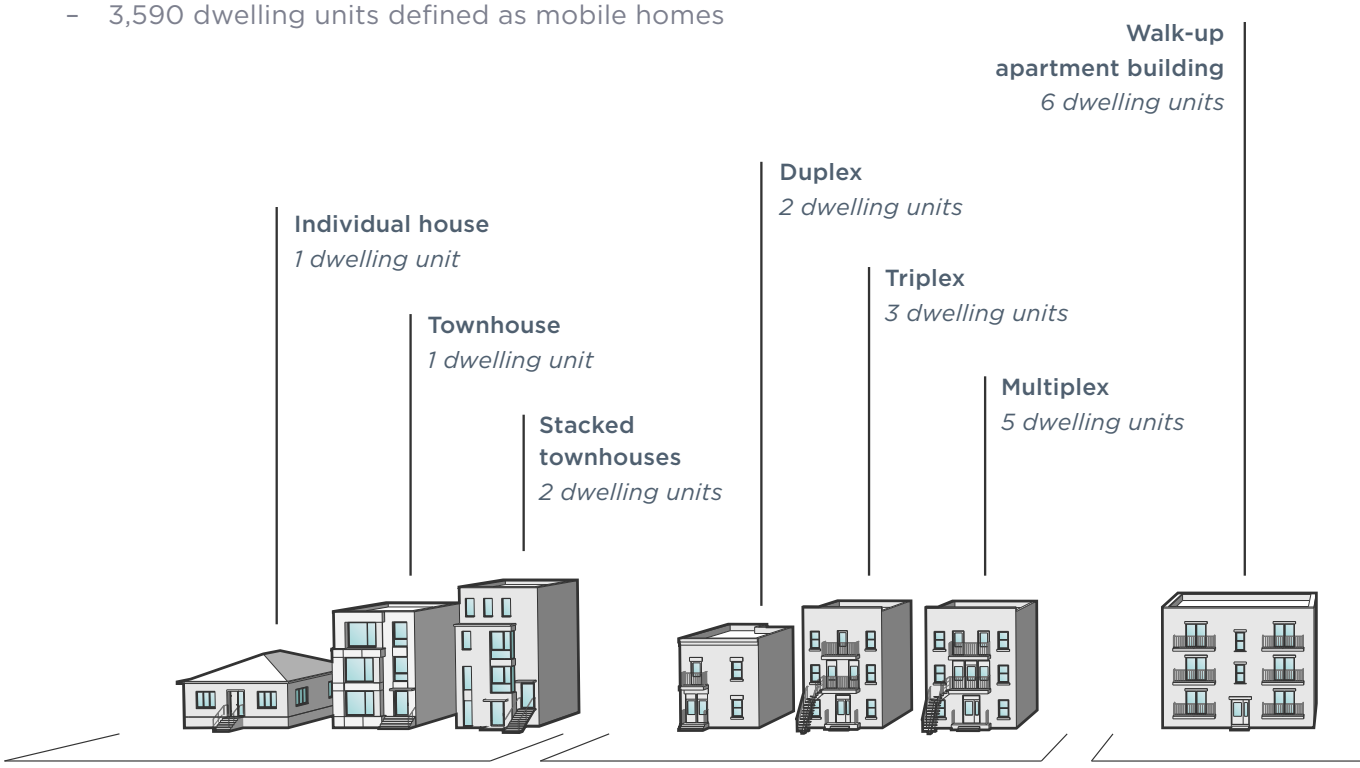
3 to 6 levels

3 to 18 levels

Montréal's Dominant Housing Typologies

Within Montréal city limits, as a whole, 779,795 private dwelling units, of all types combined, were recorded in 2016. The Institut de la statistique du Québec (ISQ) categorizes data related to the types of private dwelling units in the following way:

- 57,115 individual houses
- 51,585 attached houses (including semi-detached houses, rowhouses and other individual houses adjoining another building)
- 109,910 dwelling units in duplexes
- 106,280 dwelling units in buildings of 5 storeys or more
- 451,315 dwelling units in buildings of fewer than 5 storeys
- 3,590 dwelling units defined as mobile homes

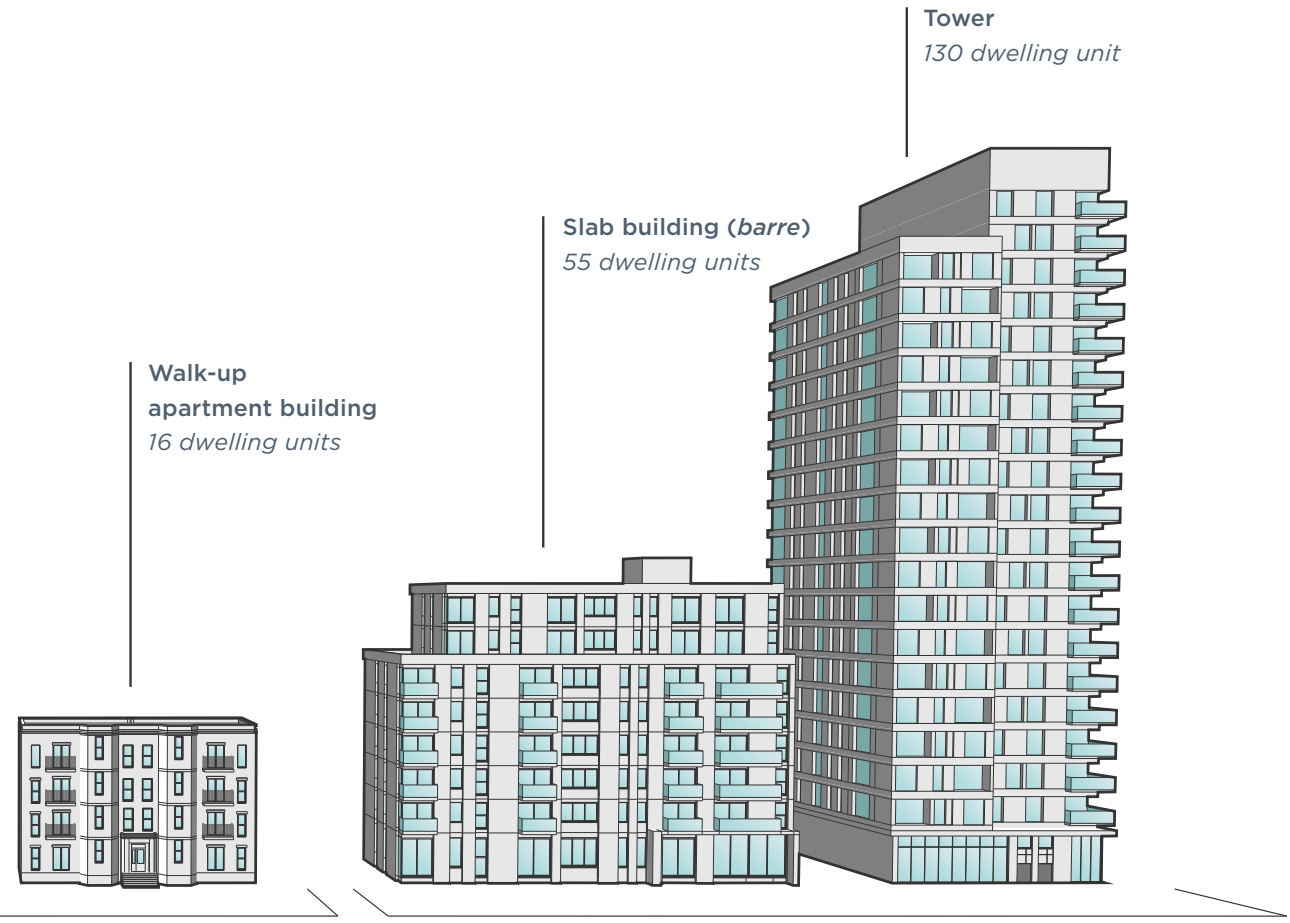


The concept of **house** includes all buildings with only one household and having one or more independent entrances. The **townhouse** usually has a narrower facade and is distributed on 2 to 4 floors. It can be **stacked** above another unit.

The **plex** is the term used for a building composed of two or more dwelling units with independent entrances that lead directly outside, often onto shared balconies or staircases. The duplex is generally stacked but other forms of plexes may include adjacent dwelling units on the same floor.

Source: Institut des statistiques du Québec (2020) *Logements privés occupés selon le type de construction Residentialle, municipalités et TE de Montréal et de Laval et ensemble du Québec*, 2011, www.stat.gouv.qc.ca/statistiques/recensement/2011/recens2011_06/langue_logement/log06.htm

While very interesting, these data combine housing typologies and siting, but do not reflect all the diversity and complexity of Montréal residential built form. The **illustrations below serve to identify and distinguish the main building typologies present within Montréal city limits** (the number of units in the multi-unit buildings is shown are for illustrative purposes). A glossary of typical Montréal housing typologies is presented on pages 19 and 20.



Multi-unit

A **walk-up apartment building** is generally comprised of six or more dwelling units with at least one main entrance connected to an interior common staircase, without an elevator. In the case of larger walk-up apartment buildings, they may include a lobby, and access to the dwelling units may be along interior corridors. They are sometimes referred to simply as “walk-ups” or “apartment buildings”.

In addition to *apartment building*, the term “**multi-unit**” is used to designate buildings with a main entrance attached to common interior circulation corridors. Specifically, a multi-unit building is larger and has more units. The entrance lobby is also larger. Sometimes it contains complementary facilities or shared spaces (outdoor leisure areas, fitness room, swimming pool, meeting room, etc.).

Index of Housing Typologies

Single-Family House

Farmhouses, as well as the houses found in historic neighbourhoods and villages, mansions, cottages, bungalows, townhouses, veterans housing (wartime houses), are all examples of single-family houses. Detached and semi-detached single-family houses as well as rowhouses can be found in all Montréal boroughs, but in quite different proportions and with different siting and characteristics.

The **bungalow** is, without a doubt, the most common house type in North America, due to the explosion of development in the 1960s, the spread of automobile ownership and the low cost of this housing typology. The bungalow is generally a single-storey building (with or without a basement) of wood-frame construction, although, in some cases, additional rooms are located under a pitched roof. It is usually sited on a relatively large lot, with a large front yard that is generally not as deep as the backyard. The **cottage** is a single-family house with two storeys above grade. Its footprint is usually square and its facade narrower than that of the bungalow.

Older than the bungalow is the "shoebox" house—a single-family house characterized by a flat roof above one storey. "*The name was given to them due to their small scale and volume, which resemble those of a shoebox.*"[6] In this type of house, the entrance door is usually situated at the centre of the facade, with two windows arranged symmetrically on each side. While their brick-clad facade is often quite plain, many shoebox houses have a gallery topped by a canopy or a decorative trim. The typical shoebox can be found in central neighbourhoods, often inset between two larger plex buildings. Many shoebox houses are set back further than the general street alignment, creating larger front yards, framed by the adjacent buildings; their backyards may be much smaller, even entirely absent.

[6] Arr. Rosemont- La Petite-Patrie (2020) *Maisons Shoebox*
http://ville.montreal.qc.ca/portal/page?_pageid=7357,143193576&_dad=portal&_schema=PORTAL

Bungalow

Recent townhouses

War-time House

Credit: Centre d'histoire de Montréal

Shoebox

Plex (Duplex to Multiplex)

In Montréal's typomorphological language, the word "plex" is used for a residential building containing two or more attached dwelling units, each of which has its own main entrance and exterior staircase. In Montréal, the plex is rarely more than three or four storeys tall, nor does it contain more than eight residential units, due to its wood structure. Its siting varies greatly, but it is often part of a row with a relatively modest front setback and a larger rear setback giving onto an alley.

The plex is typical worker's housing of the end of the 19th century and beginning of the 20th century. In Montréal, it is generally characterized by balconies and exterior staircases decorated by ironwork. The plex is usually faced in brick, although some buildings have a greystone facade or, more rarely, siding. The plex often occupies a lot of a similar size as that of a single-family house and is aligned with an adjacent building of similar scale and height, with which it often shares a party-wall.

Apartment Building and Multi-Unit Housing

The apartment building is a three or four-storey multi-unit building, generally composed of more than six dwelling units sharing an entrance. This main entrance leads to one or several interior staircases and sometimes to corridors, in the case of larger buildings and when the units do not extend through the length of the building. The volume of the building is sometimes punctuated by balconies. Walk-up apartment buildings can be detached, contiguous, part of a row, or built in a group. Front and side setbacks are of varying dimensions, but the street front alignment is generally maintained. Often rental housing, this type of building is often called a walk-up, due to the absence of an elevator; the more generic term (especially in French) is apartment block.

The multi-unit building is a larger version of an apartment building. It includes several dwelling units accessible through one entrance, common staircases and corridors, but is larger in scale, taller and has one or several elevators. In addition to the walk-up, Montréal has two other types of multi-unit buildings. The apartment block is mid-rise and more imposing. The *barre* (the English equivalent term, slab building, is not often used in Montréal) has a more horizontal form than the high-rise tower.

Duplex

Walk-up apartment building

Credit: Prével

Multi-unit building

Residential tower

Mix of Uses and the Idea of a Complete Neighbourhood

Density is often associated with a mix of uses, i.e. a setting which brings together different kinds of uses such as retail, offices and housing. This mix of uses can be found at the scale of a neighbourhood, a block or even within one building.

A single-use (or segregated) area is part of an environment in which each function is within its own distinct group. Since the different functions are separated, and often at a distance from one another, these areas often require the use of an automobile. In contrast, a mixed-use environment provides access to different resources (retail, services, Institutionals, community facilities, places of worship, etc.) to respond to one's needs by using an active transportation mode (walking, bicycling, etc.). In addition to reducing the time to travel to these resources, proximity and cohabitation of various uses reduces the ecological footprint of residents. Moreover, these short, local trips mean that citizens are more active, come across each other more frequently and spend more time with one another in their neighbourhood.

A study done in Paris,[5] where density is high, demonstrated that the general environment of a neighbourhood, including in particular the services available to residents, plays a significant role in their appreciation of the density experienced day-to-day.

The mix of uses can be expressed horizontally, i.e. by locating several functions on the same street, on the same block or even at a larger scale (neighbourhood). It can also be integrated vertically, i.e. by allowing several uses in the same building.

However, the needs of residents change and the advent of certain technologies, in particular related to transportation, has an influence on lifestyle and travelling. In order to encourage a mix of uses over time and ensure the vitality of neighbourhoods, it is possible to design versatile spaces that can be adapted to future needs. The functional flexibility of construction can be ensured in particular through urban planning regulation.

Services
and facilities

Residential use

Office use

Commercial use

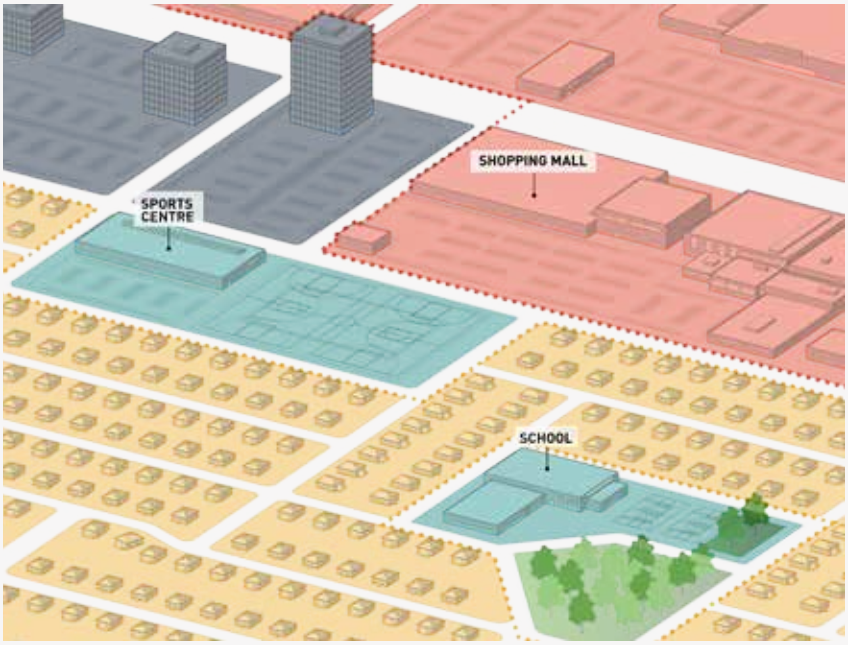
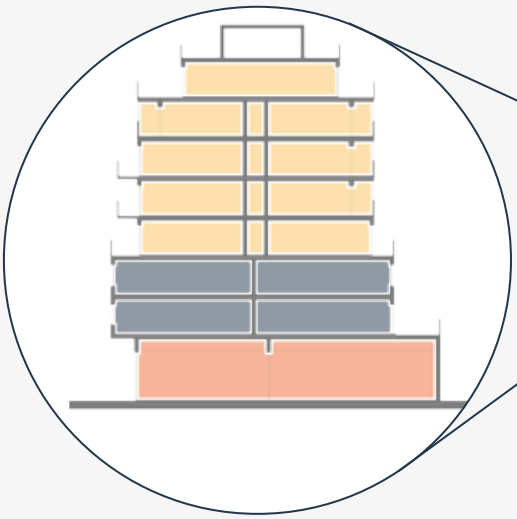


Illustration of an area with a mix of uses at the neighbourhood scale, but where each use is on a block or a group of separate lots. This area is characterized by a weak horizontal mix of uses.



Mix of uses within one building

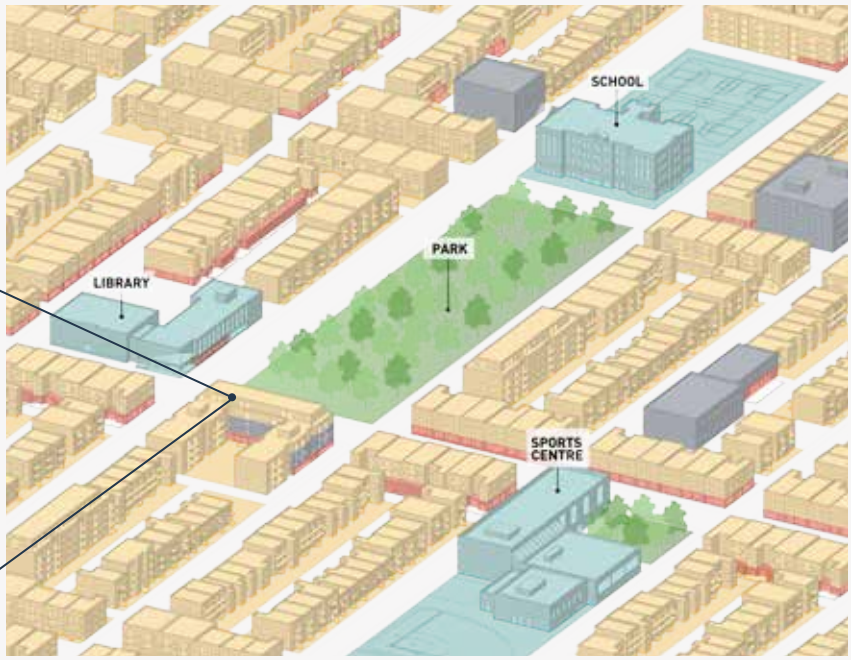


Illustration of an area with a mix of uses at the scale of the building, the lot and the neighbourhood. This area is characterized by a relatively strong horizontal and vertical mix of uses.

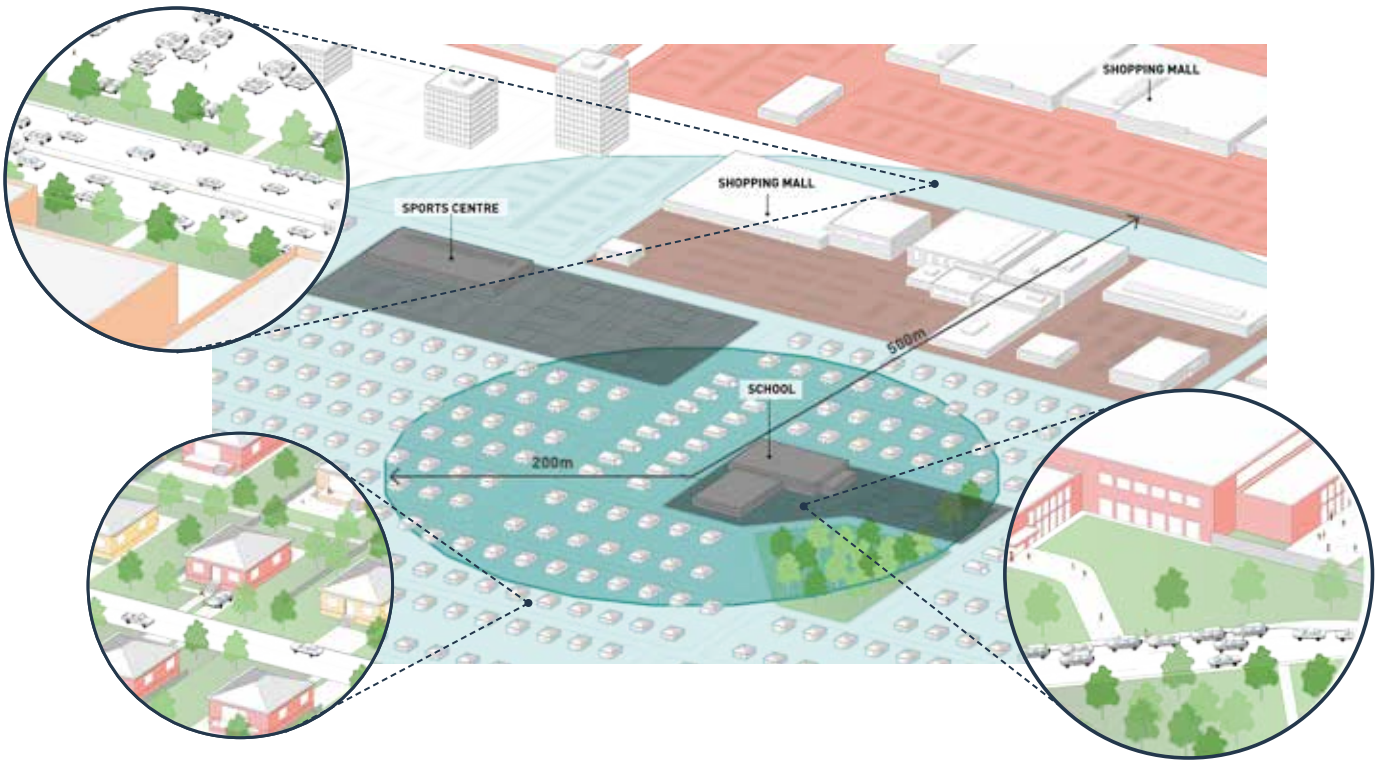
Sprawl, Compactness and the Idea of a Compact City

Different terminologies are used to describe the organization of the components of a city at the neighbourhood and urban project scales. Urban sprawl refers to low-density urban development models in which the proportion of non-built space is generally larger than that of built spaces. The unbuilt areas are primarily occupied by private outdoor spaces, but can also be relatively large public spaces, such as streets of very wide dimensions. In most types of sprawling cities, the various types of activities are isolated and distanced from each other, meaning that the use of motorized transportation is needed to respond to the majority of needs.

Regarding compactness, it is important to distinguish measurable compactness from the concept of the "compact city". The first is used in urban planning to describe the ratio between filled and empty, or more concretely, built/unbuilt. Thus, it refers both to the density of construction and to the degree of proximity or distance between different built components of the urban setting. It includes all built and unbuilt spaces, on both on public and private land.

While perceptible to the eye, compactness is rarely measured and regulated, principally because the people responsible for the development of public and private spaces are not the same, except in the case of major urban revitalization projects. However, mathematically, the indicator of urban compactness corresponds to the gross built density of an area (see page 12).

Sprawling neighbourhood



The term compact city is used to describe a planning approach designed to be more sustainable. It is based on the idea that urban space is a limited (or rare) resource and there is a need to establish policies and guidelines so as to use it in a more optimal, unwasteful manner. Because these strategies bring together activities and people, they also have an influence on mobility (distances travelled and modal choices), as well as the energy consumption of cities. This land-use model also means savings in infrastructure and services, since their dimensions are reduced (fewer kilometres to cover), while serving the same, or more, number of people. In this context, the compact city model is prioritized when interactions among citizens are to be encouraged.

Different strategies that permit this type of saving of space include: the concentration of dwelling units, mix of uses, conversion of underused spaces, more compact construction, sharing of streets, and the reduction of spaces allocated to surface parking. A compact city cannot be created through implementation of one specific standard. This must be done through a combination of guidelines related to private and public property for everyone involved in the planning and development of Montréal.

This concept is also part of other urbanization models that are becoming more widespread, such as eco-neighbourhoods, Transit-Oriented Development (TOD), or the most recently coined term, the city of short distances. The compact city concept is a sought-after type of intelligent density that guides the development of an increasing number of cities.

Compact neighbourhood

PERCEPTION OF DENSITIES: WHAT INFLUENCES IT?

How a city is perceived, including human and built density, is influenced by a range of factors. Identifying these different factors will better clarify the vision and increase the understanding of the complexity of contemporary development projects.

Surrounding Environment

Taking into account the history of a site when designing a new building, including where it is located on a site, and limiting its impacts on the surrounding area are examples of tools to consider in order to integrate a building into its context. Despite the range of possible strategies, a certain consensus has been established on the idea that for a development project to provide a positive contribution to the urban landscape, what is needed is an examination and good understanding of the specifics of the site and the existing components of the area where it will be built.

The characteristics of the setting can vary greatly. They may be key components to be enhanced, both for heritage considerations and for the project itself. The topography and urban silhouette at the scale of the neighbourhood or the street may be taken into account to ensure the infill is harmonious. Visual perspectives of an element of interest, such as Mount Royal, or the St. Lawrence River, are also to be taken into account in order to contribute to their enhancement.

Just as with the major components of the landscape, the dominant characteristics of the existing built form will result in a new building that either complements or clashes with its surroundings. For example, a 30-storey tower on a small lot downtown is considered acceptable, in particular due to the fact that the existing built scale is similar. The same tower, in the middle of a residential area where buildings are no more than four storeys tall, may appear inappropriate.

At the site scale, intrinsic characteristics of the site (such as the size, form of the lot, topography, existing components, etc.), as well as those of neighbouring sites, are also specific infill conditions for the new construction. “Constraints”, i.e. conditions useful to shape real estate and infrastructure projects, and the quality of their integration have an impact on whether citizens react positively. This has an impact on perceptions of density.

New infill development constructed at different heights and varying building typologies to integrate into the context.

Articulation of built volumes to take advantage of the topographic situation.

Availability and Conviviality of Public Space

A park, a generous sidewalk, complete with vegetation and benches, an alley, a bike path, a sports facility, physical and visual access to the river; these are all examples of public spaces that help anchor neighbourhood life and help create a sense of belonging. Being able to feel comfortable in (i.e. appropriating) various places in your neighbourhood, developing the habit of spending time there and creating memories will have the effect of enlarging the notion of "home" to a larger scale, which generates numerous benefits.

Having access to high-quality, user-friendly and safe public spaces also provides an opportunity for socializing and the creation of connections that facilitate social cohesion. In a setting in which diverse individuals live near each other, public spaces are considered to be important places for mediation between different social groups. Moreover, for some people, such living community spaces can become essential elements to break a sense of isolation.

Therefore, the availability, quality and friendliness of community elements contribute greatly to improving the daily life of citizens. It is essential to offer spaces that are appropriate both in quantity and quality, so as to allow different communities and generations to feel comfortable because all of this will inevitably colour their perceptions of their environment.

Credit: Creative commons, Dean Bare

Convivial public spaces.

Density, Diversity and Intensity of Urban Activities

The more densely built an area, the greater its capacity to house a density of activities and the more it can be expected to respond to a range of needs. With the exception of unused spaces, built density is generally associated with a concentration of people and diversity of activities.

The presence and movement of residents, workers and visitors generate natural dynamism in neighbourhoods and other living environments. The compactness of an area, as well as the diversity and quality of human-scaled public spaces, encourage its use and help contribute to its vitality. Additionally, the more activities are diversified, the more the settings are lively and considered attractive. Moreover, when an area is relatively dense and has a mix of activities, it tends to attract more new initiatives and will be considered resilient when faced with the unknown. For example, a commercial street often combines these characteristics and is generally livelier than the perimeter of a shopping mall, designed more for automobiles.

The perception of a neighbourhood as vibrant, with an interesting vitality and diversity, often appears to be the result of a happy combination of circumstances. In fact, it is due to meticulous planning efforts, including adjustments of many urban components and involving many public and private participants. The establishment of regulatory requirements for density, quality of construction and the development of facilities are just a few examples of elements planned with the aim of creating living environments likely to welcome a strategic quantity of people and a diversity of activities that achieve the proper balancing.

Cohabitation of Uses and Citizens

The concentration and intensity of activities in an area can also have fewer desirable effects and alter quality of life, which as a result can affect perceptions of this environment. Noise pollution, such as the noise caused by many delivery trucks, or a large number of visitors to the city's tourist nodes can influence the perception of these areas. Building maintenance and the cleanliness of public and private outdoor spaces, also play a significant role for a healthy cohabitation of uses and population groups.

Various approaches can be used to attenuate the impacts that are generally more concentrated in dense areas. The strategic location of mechanical and other equipment, the management of delivery schedules, the soundproofing of buildings and the use of materials with better acoustic properties are some examples of solutions to improve quality of life in dense settings.

Relationship Between the Private and Public Realms

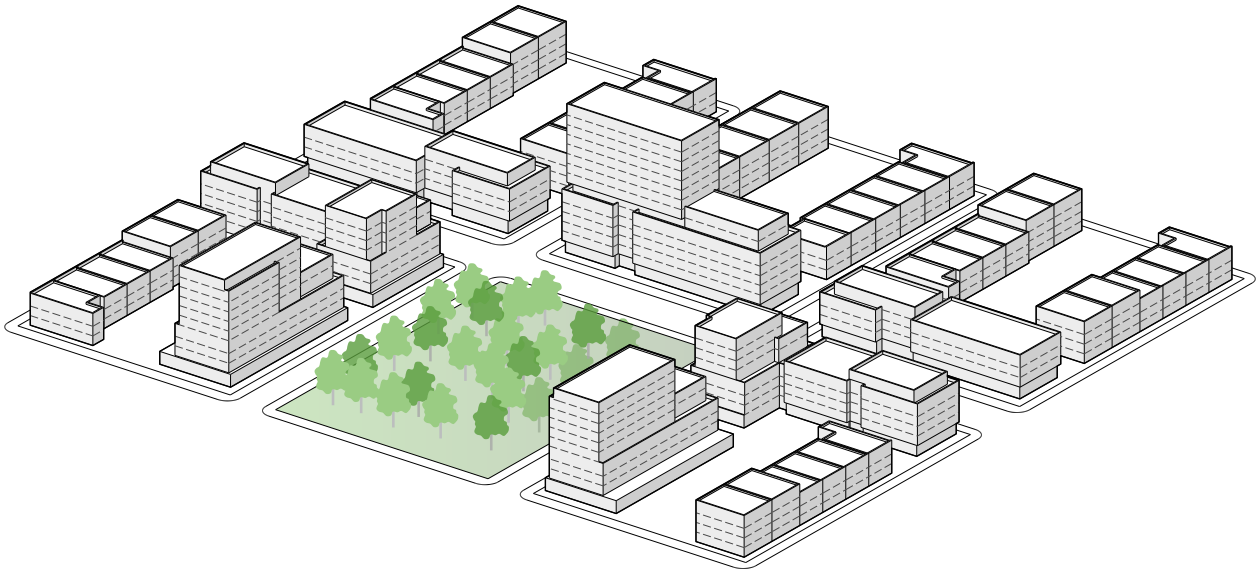
Setbacks from Neighbouring Sites

Significant building setbacks are good examples of such arrangements which facilitate the siting of denser projects without damaging the integrity of the area. For example, a substantially sized park or green space surrounding a building (private or public) can create a break in a continuous built context. In particular, setbacks allow the integration of larger or taller buildings, without creating a narrowing effect, or the shading of public space and adjacent buildings.

Large buildings located around generous plazas or parks can even be desirable, since they help to improve the framing of the open space, facilitate the perception of its boundaries and allow a maximum number of people to have access to high-quality views. Properties located near open spaces are highly prized for these reasons and their land values are generally increased as a result.

In contrast, a series of small buildings with large setbacks does not contribute to animating a street, because they are too distant. Instead, such buildings create a loosening effect on the urban fabric and tend to give an impression that the framing of the street is deficient. Properties with large parking lots in front of the building are obvious examples. Moreover, this type of open space is often paired with a very open street layout (with very little planting or street furniture), which prompts motorists to drive more quickly.

Thus, opening up urban spaces not only influences the perception of an area, but also the behaviour of people moving through the spaces.

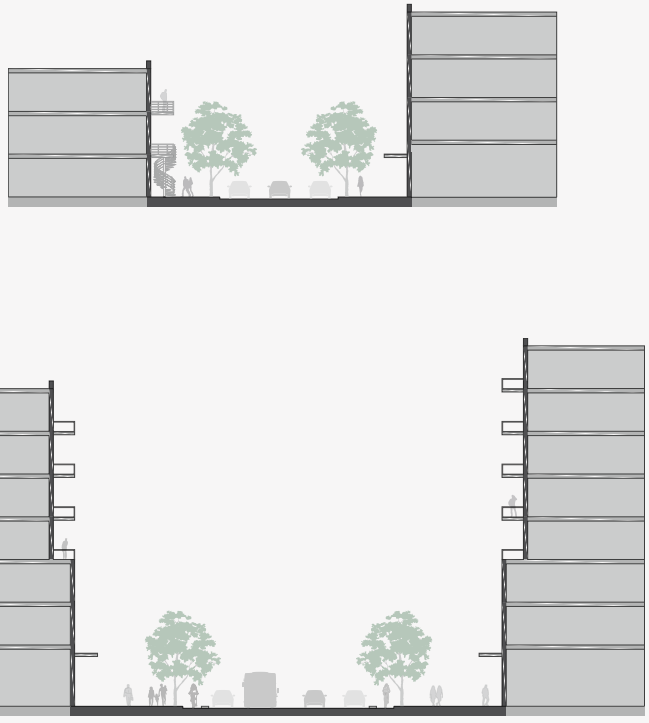


Street Right-of-Ways

The street right-of-way includes the roadway, sidewalks, bicycle paths and, often, planting strips. The proportions of these public space components can vary. This has an impact on the comfort of different types of users and their perception of the built form. Of course, a pedestrian feels more at ease on a wide sidewalk flanked by trees than on a narrow sidewalk, especially if vehicles pass close-by.

In addition to the proportions of the street right-of-way itself, the allocation of different parts of the street among the different users and the presence of complementary components can modify users' perceptions.

As illustrated below, the scale, height and volumes of a building can be established in direct relation to the width of the street right-of-way. In more densely constructed areas, such as downtown, the proportional relationship is often very different. A variety of proportional relationships between the street and buildings may be considered desirable by the city, depending on the functions, framing and ambience desired.



Cross-sectional views of a street showing buildings of different scales, for which the height is established in relation to the width of public and private open spaces (i.e. between buildings).

Architecture and Exterior Envelope

Generally, architecture can provide a positive contribution to the perception of living environments and their density through intrinsic qualities of buildings and/or by helping to enhance the urban landscape.

More specifically, architecture can change the visibility of some components. A balanced articulation of facades, heights and the relationship with the street will modulate the perception of the building. This is particularly true for tall buildings and those with large footprints. Variations in volumes, forms and facades help break the monotony and a monolithic or dominating effect that such buildings can have.

The design of a building can also takes into account pedestrian scale, which will contribute to the quality of interfaces between built spaces and streets. Combining podiums (called basilaires) with taller components set back from the property line is an interesting approach to modulate density and facilitate the integration of the buildings, in particular in areas with a diversity of building scales and heights.

Similarly, the choice of cladding materials used (quality, textures, patterns and effects created) also contributes to building perception and attractiveness, as well as to the rhythm of the facade and integration into the environment.

Densification projects in which some elements are set back while others project to provide facade articulation (rhythm). In the example on the left, the projections and setbacks attenuate the monolithic effect of this former industrial building. On the right, the volumetric variations draw attention and reduce perception of the overall volume of the building, which is of a larger scale than the older buildings of the area in which it has been inserted.

Monolithic buildings, with relatively little fenestration and minimal relationship with the public space; street right-of-way is wide and with few features. The space is also characterized by the presence of a surface parking lot.

Buildings with volumetric variations (setbacks and projecting components, a podium), as well as fenestration on all sides and optimized on the ground level. This encourages an interaction with public space. The building volumes shown in this second illustration reinforce the framing of the public domain while lessening the general impact of the buildings, despite having similar densities and heights. The quality of design elements in the public and private domains (furniture, plantings, generous sidewalks, etc.), also helps modify the perception of density.

Facade and Interface With Public Space

As mentioned above, setbacks play a significant role in the perception of spaces. In this respect, in addition to the scale of open space and road right-of-ways, the siting of buildings, in particular the front facades, contribute to the framing or opening of public space. Different degrees of openness and closeness may be desirable and reinforced by the arrangement of the facades, depending on what activities and ambience are desired.

A building sited at the front property line will make the space seem tight. This effect is increased if the sidewalk or the street is narrow. This type of urban form may be appreciated in a residential context where a certain closeness is desirable. For a commercial street, it is generally preferable to provide a relatively large front open space to allow for the creation of terraces, display stands or simply to enhance a shop window or entranceway. Generous fenestration on the ground floor, which makes interior activities visible, is another ingredient that helps create lively and attractive environments where people will tend to linger. Contrast this with a blind wall (without windows), which will appear more massive and less reassuring.

These elements enhance feelings of comfort and safety on the street, and, more generally, in a living environment. They may therefore influence the perception of a dense environment.

Private, landscaped interface between buildings and public domain.

Layout of interior spaces

A sense of comfort or discomfort can also be associated with the scale and configuration of dwelling units. A well-designed and light-filled dwelling will encourage a feeling of ease in the space, while a poorly divided apartment with little natural light may create a sense of crowding.

In addition, the availability of complementary services and spaces for residents within a building can provide a positive perception of density. For example, if residents have access to private or common leisure spaces (terraces, balconies, yards) or services (such as a gym, community room, swimming pool), they may feel that their home is not limited to the walls of their respective dwelling units.

However, the way in which common spaces are used and occupied may limit the possibility of their use, appropriation and appreciation. As with public spaces, the landscaping elements in private spaces, including plants, furniture, paths, vegetable gardens or green walls, will also transform the relationship with the neighbourhood and the perception of comfort. For example, an open space with vegetation allows air and light to circulate into the dwelling units. In contrast, the inclusion of several secondary or accessory structures (such as garages, sheds or other storage units) in yards tends to create an overcrowding effect and increases the perception that the environment is suffocating.

In conclusion, because all these components can make a space more attractive and comfortable, they influence the perception of buildings, density, and, therefore, living environments.

Landscaped interior yards.

Open backyards can play a role simillar to interior courtyards, especially when associated with green alleys.

DENSIFICATION STRATEGIES AND PRACTICES: HOW TO DENSIFY?

Today, the scarcity of buildable space and land values leads to real estate projects that are denser than in the past. Environmental issues and housing demand are additional factors that lead to acceleration of development of a denser, more compact city. However, several strategies exist to implement this densification at different scales, involving project developers (public and private) and municipal authorities that manage development. The purpose of this section is to explain, at three different scales, the principal approaches used today in cities like Montréal.

Consolidation of Sites, Blocks and Sectors

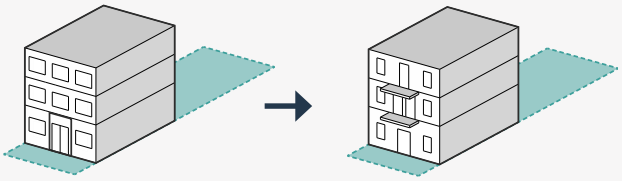
There are two major types of intervention for consolidation. The first, called soft densification, consists of preserving and acting on existing components, without major modification of the existing environment. Soft densification approaches include the subdivision or enlargement of existing buildings and the addition of new autonomous construction in a setting that is generally already built up. The replacement of a building with another, if the latter is of a similar or slightly larger scale than the scale of the existing buildings.

The second consolidation approach, generally realized at a larger scale, is often in the context of a more comprehensive revitalization. It includes fundamental actions that significantly modify the urban fabric. In this case, the substitution consists of the demolition of one or more buildings and the construction of components considerably more imposing than those demolished.

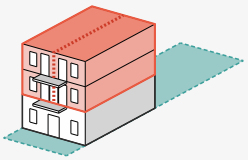
Addition of a floor onto an existing building.

Densification with conservation and adaptive reuse of existing buildings.

Adaptive Reuse of an Existing Building
Recycling or conversion to allow for a new use. For example, former Institutional properties such as schools, hospitals, religious establishments and industrial buildings have been subject to reclassification for residential purposes.

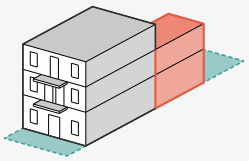


Subdivision of Existing Buildings
Densification of the population and/or activity on a site through the subdivision of one or more existing units.

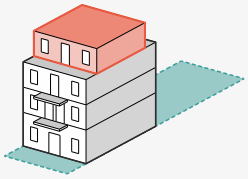


Expansion

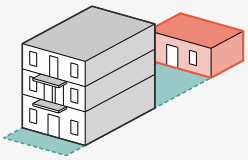
Horizontal
Addition of an extension, attached to one of the walls of an existing building.



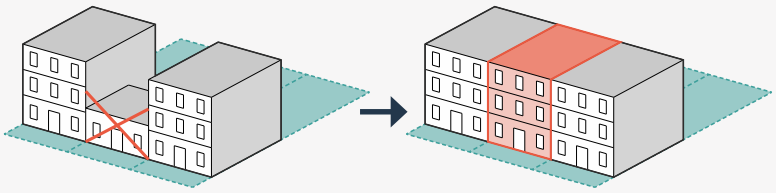
Vertical
Addition of a floor, partial or full, above or below (underground) an existing structure.



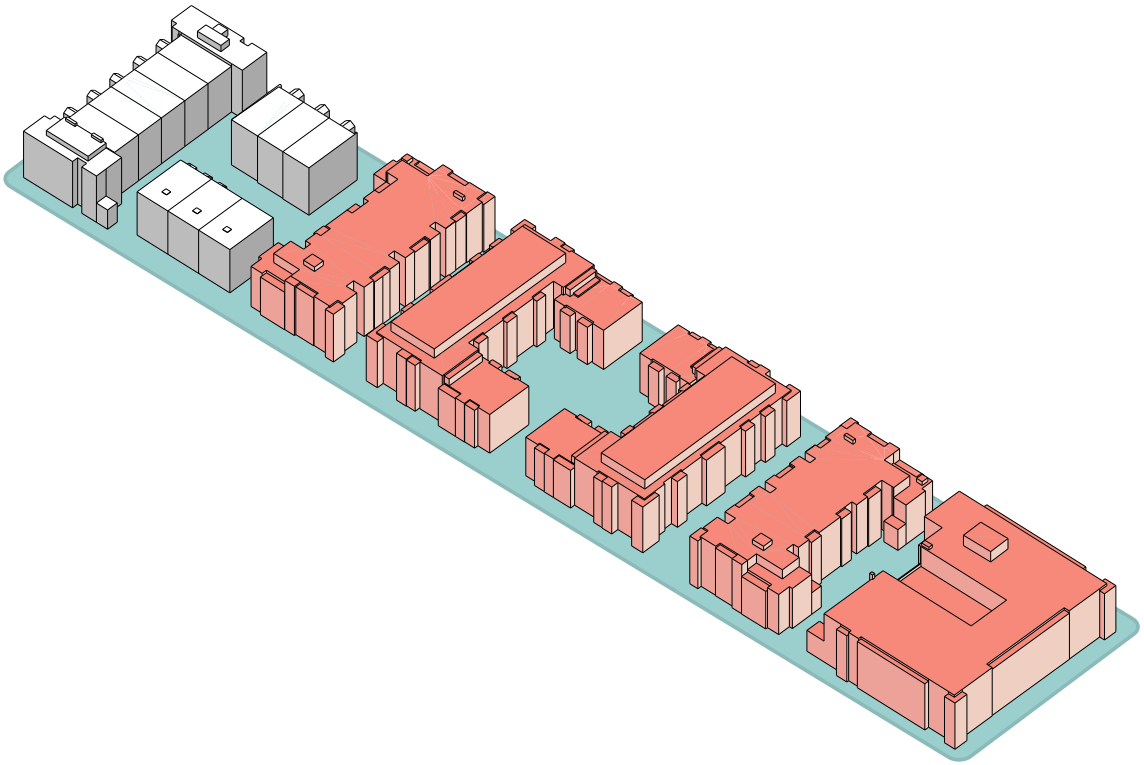
Infill
Addition of a new building on an underused or vacant portion of a site.



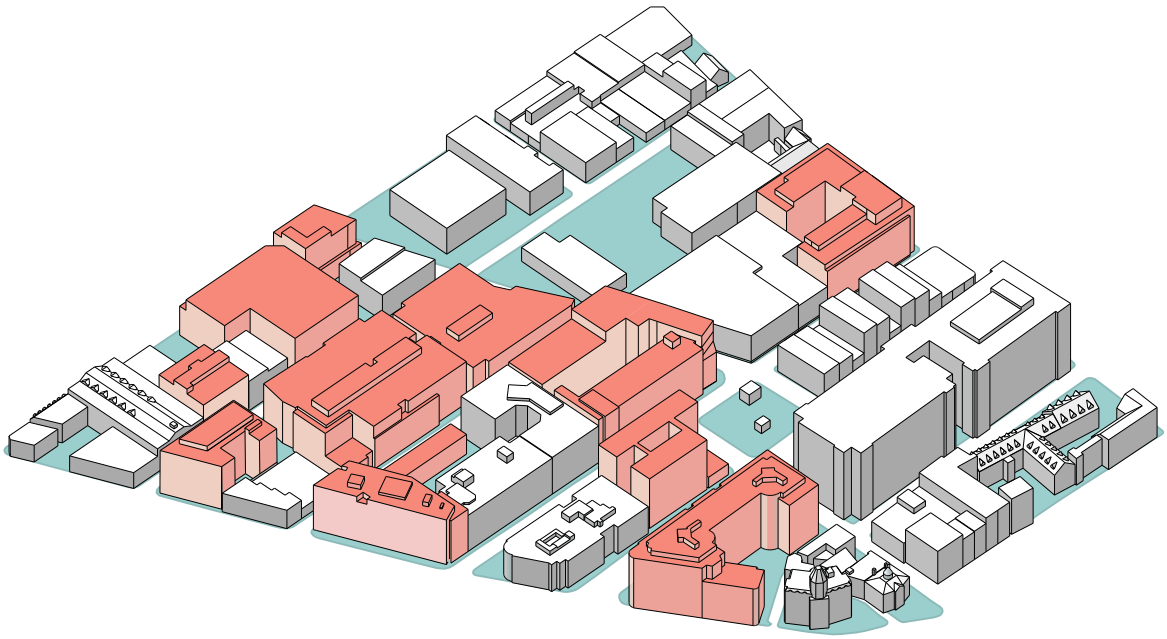
Substitution
Replacement of a property by another, denser one (involves demolition of the previous structure)



Densification at the city-block scale through construction on empty lots and the replacement of less dense buildings.



Densification at the neighbourhood scale through construction on empty lots, the replacement of obsolete buildings, the conversion and expansion of other buildings.



Consolidation of Neighbourhoods and Sectors Through the Development of Unbuilt and Underused Sites

At the neighbourhood and sector scales, densification has been realized through the construction of buildings on vacant sites for a relatively long time. Examples include industrial brownfields (e.g. MIL Montréal), Institutionalal sites (e.g. former municipal workshops) and underused spaces such as parking lots surrounding shopping centres. Their scope can vary greatly (at the scale of one or several lots) and can also include adaptive reuse and the redevelopment of a heritage or otherwise significant component as well as the demolition of certain other existing components.

Densification in Relation to Public Transit

For the Communauté métropolitaine de Montréal (CMM),[1] Transit-Oriented Development (TOD) "*is a real estate development project of medium to high density, structured around a high-capacity public transit station, such as a train station, metro station, light rail transit (LRT) station or a bus stop.*" Concretely, a TOD area is located within a maximum radius of one kilometre from a transit access point. According to this model, sites located near major public transit network stations (e.g. subway or bus rapid transit) are usually the spaces where most activities and built density are concentrated. With the intention of promoting alternative transportation modes, space occupied by automobiles is reduced to a minimum and off-street parking areas are favoured.

When a new public transit facility is installed in an area that is partially or completely unbuilt, this kind of a neighbourhood can be created all at once. In Montréal, most areas within a one-kilometre radius of a metro or train station overlap with one another. They constitute large corridors in which very little vacant space remains available.

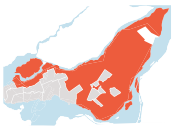
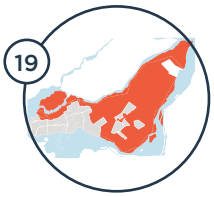
Among the various conceivable urban models, the important principles to retain behind the approach for densification are: recognition of the fundamental relationship between urban densities, mix of uses, social diversity, and sustainable, efficient and accessible mobility. Another principle is the allocation of space for the pedestrian, in particular through the creation of public spaces and travel corridors that are human-scaled, safe and of high quality. While it is more complex to do so in an existing neighbourhood, these principles can also be applied to Montréal by applying them to redevelopment, transformation and consolidation projects.

[1] Density is addressed in land-use planning at the Québec-wide, regional and Montréal agglomeration levels. Compliance with such planning falls within the parameters to be considered in the preparation of the PUM. Subsequently, the Urban and Mobility Plan will guide the boroughs, which will develop standards at the site, block and neighbourhood levels. (see Appendix A of the Glossary for more detail on the different levels of planning).

Chapter 1

Density glossary

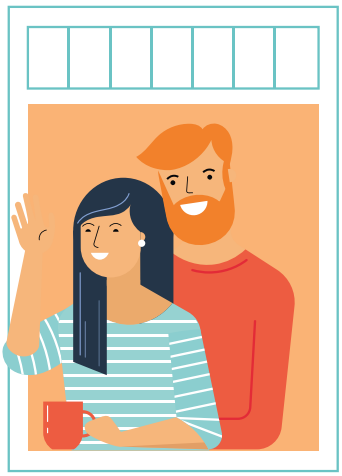
Appendix A

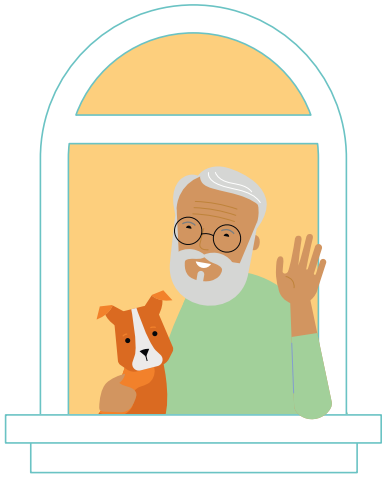
	Level of Government	Density Planning
	**Gouvernement du Québec (province)**	
	— Planning Framework and Government Orientations — Montréal metropolitan region Montréa	— Densification in a polycentric urban form
	**Communauté métropolitaine de Montréal**	
	— Metropolitan Planning and Development Plan (PMAD)	— Urbanization boundary — TOD areas with a minimum density threshold
	**Montréal agglomeration**	
	— Land Use and Development Plan (Schéma)	— Minimum residential density thresholds — Areas to be constructed or transformed
	**Ville de Montréal (municipal)**	
	— Master Plan (2004) /Urban and Mobility Plan 2050	— General construction density by area
	**Montréal 19 boroughs (municipal)**	
	— Planning by-laws special urban planning program	— Height in metres and storeys — Building Site Coverage Ratio (B.S.C.R.) — Setback margins — Floor Area Ratio (F.A.R.) — Other local standards and provisions

Chapter 2

Morphological Study of Expressions of Density in the Montréal Context

Table of contents





Document prepared by the firm Fahey et associés, at the request of the Ville de Montréal.

Credits
(in alphabetical order)

Ville de Montréal
Service de l'urbanisme et de la mobilité –
Division des plans et des politiques

Fahey et associés
Andréa Nicolas-Cloutier
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François Rioux
Geneviève Tremblay
Jean-Michel Trottier
Mario Talluto

MORPHOLOGICAL STUDY

This morphological study is based on the concepts addressed and defined in the *Density Glossary (Chapter 1)*. The objectives of this study are to:

- present types of density in different areas of Montréal, at the lot, block and neighbourhood scale;
- provide a better understanding of Montréal's past and current densification trends of the past and today.

Typologies of Montréal Neighbourhoods

Selection criteria for Study Areas :

The goal of the study of types of density in the Montréal context is to provide a representative selection of urban fabric typologies observed in the city. It is designed to present the settings in which densification projects occur, and to identify a reference framework for the different forms that density and densification can take on. For this purpose, this section presents areas considered "typical", developed prior to the turn of this century, as well as areas developed more recently. The criteria below were used to make the selections.

Density thresholds

The examples chosen are organized according to different dwelling-per-hectare density ranges, inspired by the density thresholds established by the Communauté métropolitaine de Montréal (CMM) in its Plan métropolitain d'aménagement et de développement (PMAD, Metropolitan Land Use and Development Plan). In order to illustrate all realities that exist within Montréal city limits, certain supplementary density thresholds were selected and presented. These include densities below 40 dwelling units per hectare (du/ha) and those above 150 du/ha.

Types of urban settings

The city is in constant evolution. However, the different areas of the city are not being transformed at the same pace and do not embody the same development phases.

The purpose of the case studies was to highlight this diversity. They illustrate the evolution of different urban settings, including those that were established decades ago, those recently developed and those undergoing transformation:

— **Established areas** are those where the urban structure and buildings have generally remained unchanged for several decades (such as a number of central Montréal neighborhoods , in particular in the Verdun and Le Plateau-Mont-Royal boroughs);

— **Areas undergoing transformation** include neighbourhoods that have been subject to changes in land use, such as industrial areas currently being re-purposed (e.g. Griffintown in the Sud-Ouest borough, and the areas around the Canadian Pacific Railway tracks, in Mercier-Hochalega-Maisonneuve and Notre-Dame-de-Grâce);

— **Areas recently developed or to be developed** primarily include large areas of vacant or underused urban land as identified in the 2004 Master Plan. For the purposes of this study, this typology will be identified as "recently developed" (such as the Bois-Franc area in the Saint-Laurent borough, and the Faubourg Contrecœur area in the Mercier–Hochelaga-Maisonneuve borough).

Montréal urban fabric typologies and diversity of central and peripheral neighbourhoods

The areas chosen for this study present a variety of types of urban fabric, both in central and peripheral neighborhoods. The purpose was to take into account the diversity of living environments within Montréal city limits. Thus, several types of urban settings and forms are presented, including a peripheral neighbourhood, relatively recently developed according to a suburban model, as well as a 19th-century working-class suburb transformed through urban renewal in the 1970s.

In order to be able to compare data and identify significant findings regarding relationships between urban form and density, the area used for analysis is, in all cases, about 10 hectares.

Characteristics of Study Areas

The characteristics analyzed are based on the main concepts presented in the Density Glossary. The calculations presented in summary form are an application of the principles presented. They provide a better understanding of the potential effect that increasing certain density thresholds would have on existing areas and their compositions. Each Study Area data sheet covers the following themes: density (dwelling density and built density), mix of uses, and diversity of construction typologies. They also document other major elements that help define the urban form, in particular regarding the urban network and the presence of green space and vegetation. The following data were used.

Demographic data

Number of individuals: This data comes from the Statistics Canada Census dissemination blocks (2016 Census).

Average number of individuals per dwelling: This data comes from the Statistics Canada Census dissemination blocks (2016 Census).

Area data

Number of dwelling units and **dimensions of private lots in the area:** This data comes from the city's open data source (donnees.montreal.ca/ville-de-montreal/unites-evaluation-fonciere)

Building footprints for all buildings: These calculations are based on municipal base maps.

Floor areas for all buildings: These calculations are the result of estimates made by Fahey on the basis of available data and observations (via Google Streetview). Underground levels are excluded, but semi-basement levels visible from the public street are included.

Vegetation cover index (gross): Ratio of the total area of the tree canopy for the study area (from the digitized canopy maps created in 2015 for the Montréal agglomeration) to the total area of the study area.

Land uses

Location of uses: Land uses were inventoried in a general fashion by the Fahey team starting from information available on Google Streetview.

Degree of land use mix: Ratio of the total floor area associated with a given use and the total floor area of buildings in the area. This calculation provides a measurement and illustration of the amount of land use mix observed in a area.

Residential: Includes all residential functions located in a typical residential building or in another type of structure, such as a former factory or church, that has been repurposed for residential use.

Commercial: Includes all commercial functions, retail and service, whether on the ground floor of a predominantly residential building, or a building without other uses.

Offices: Includes all office space, small workshops and commercial lofts.

Institutional: Includes all Institutional facilities such as cultural, health care and educational establishments; places of worship and community organizations.

Industrial: Includes all industrial and storage functions, as well as heavy commercial such as garages and other mechanical shops.

Typologies

Degree of diversity of building typologies: Ratio of the total floor area associated with each type and the total floor area of buildings in the area. This calculation provides an illustration of the composition of different building typologies that help form the density present in the area.

Housing typologies: These were inventoried by the Fahey team based on photographs taken during site visits and information available on Google Streetview. Please refer to the *Density Glossary* for more details on the distinctions among the different types of housing.

Commercial and industrial typologies: Since this study focuses primarily on residential density, commercial and industrial typologies are not analyzed in depth. Consequently, the different typologies of these functions are grouped in two main categories: buildings grouped as “commercial and office”, and “industrial” typologies.

« Commercial and office » typologies: This category includes all buildings traditionally occupied purely by commercial or office uses. Buildings of this type can include stores and buildings with individual small and large-scale offices.

« Industrial » typologies: This category includes all industrial-type buildings, without distinctions made, ranging from small mechanic shops and garages, warehouses and former factories as well as industrial “megablock” buildings. Since the repurposing of buildings is relatively common nowadays, functions associated with buildings included in this category are not necessarily industrial. Many industrial-type buildings now contain residential, Institutional or office functions.

Standard data sheet for study areas

The area datasheets are illustrated on two pages and present a variety of information related to geographic context, urban form, density statistics, mix of uses and diversity of building typologies.

Location map
- Study area boundaries
- Landmarks and other structuring elements

Ground plan
- Building configuration
- Vegetation
- Photo locations

Isometric
- Massing
- Functional program

Photo survey
- Building typologies and other important elements

Street cross-section
- General ambience of the study area

Statistics
- Density
- Mix of uses
- Diversity of typologies

Typologies of Recent Montréal Projects

Project selection criteria

The purpose of the review of recent densification projects in Montréal is to present developments at different scales and of varying types occurring in different settings. The aim, as with the analysis at the study-area scale, is to offer real-world illustrations of the different levels of density and types of morphology. Projects were also chosen to illustrate different ways to increase density that respect the areas in which they were inserted.

Scales of intervention

Urban projects are implemented at different scales. From an individual renovation project consisting of the addition of a storey onto an existing building, to the development of a new neighbourhood according to a master design concept: all such interventions contribute to urban densification. The projects selected were at one of the following scales:

- The site (an infill project);
- The city block (a part of a neighbourhood consolidation project);
- Several blocks (an urban consolidation project, or creation of an urban complex).

Types of intervention

The specific attributes of densification projects depend in particular on the conditions inherent to the site on which they are built. Elements such as the unusual shape of a lot, the presence of architectural or natural components of heritage interest, and proximity to major public transit or active transportation infrastructure can all influence the form of a project. This section presents specific details and explains in what ways a project was able to benefit from, or enhance, these characteristics to create added value for the setting in which it is located.

Representativeness of types of settings and boroughs

The densification projects selected represent several types of settings, both in central and peripheral neighbourhoods. In order to illustrate projects in areas with a variety of opportunities and needs, projects were selected to represent Montréal boroughs.

Standard data sheet for Montréal projects

The project datasheets are illustrated on a half page or full page, depending on the scale. They include a photo survey, and provide information related to the physical context of the project, density statistics and the typologies present in the study projects.

Overview
- Location and landmarks
- Massing
- Key elements of the project

Statistics
- Dwelling density
- Building density
- Average density of surrounding area

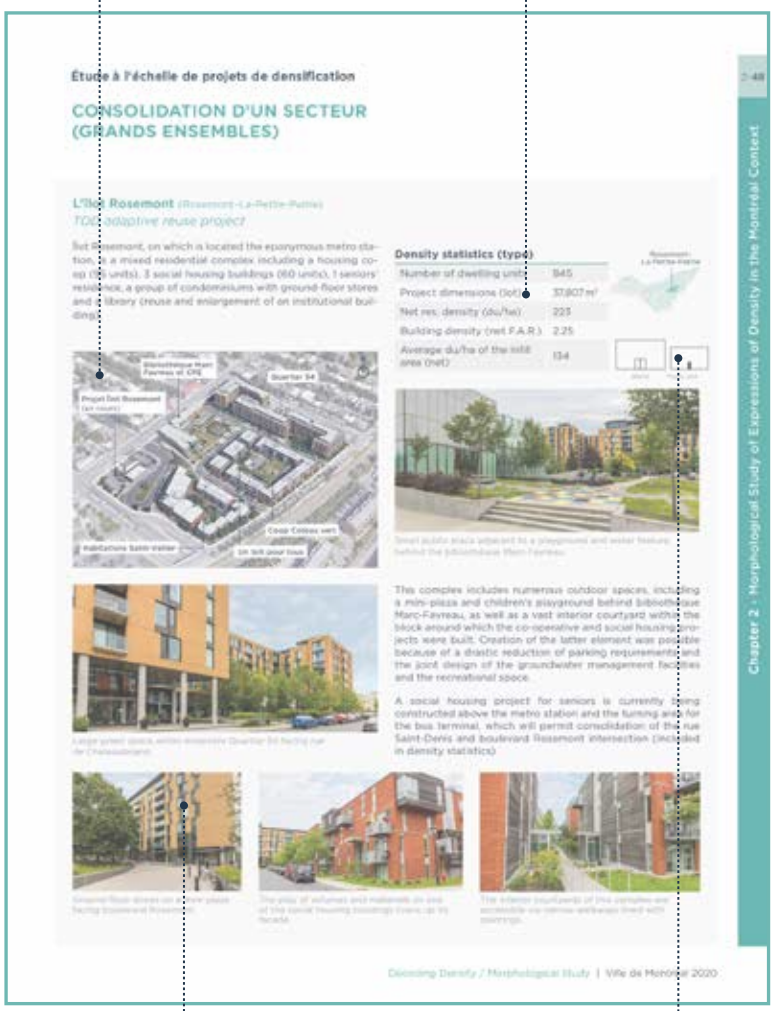
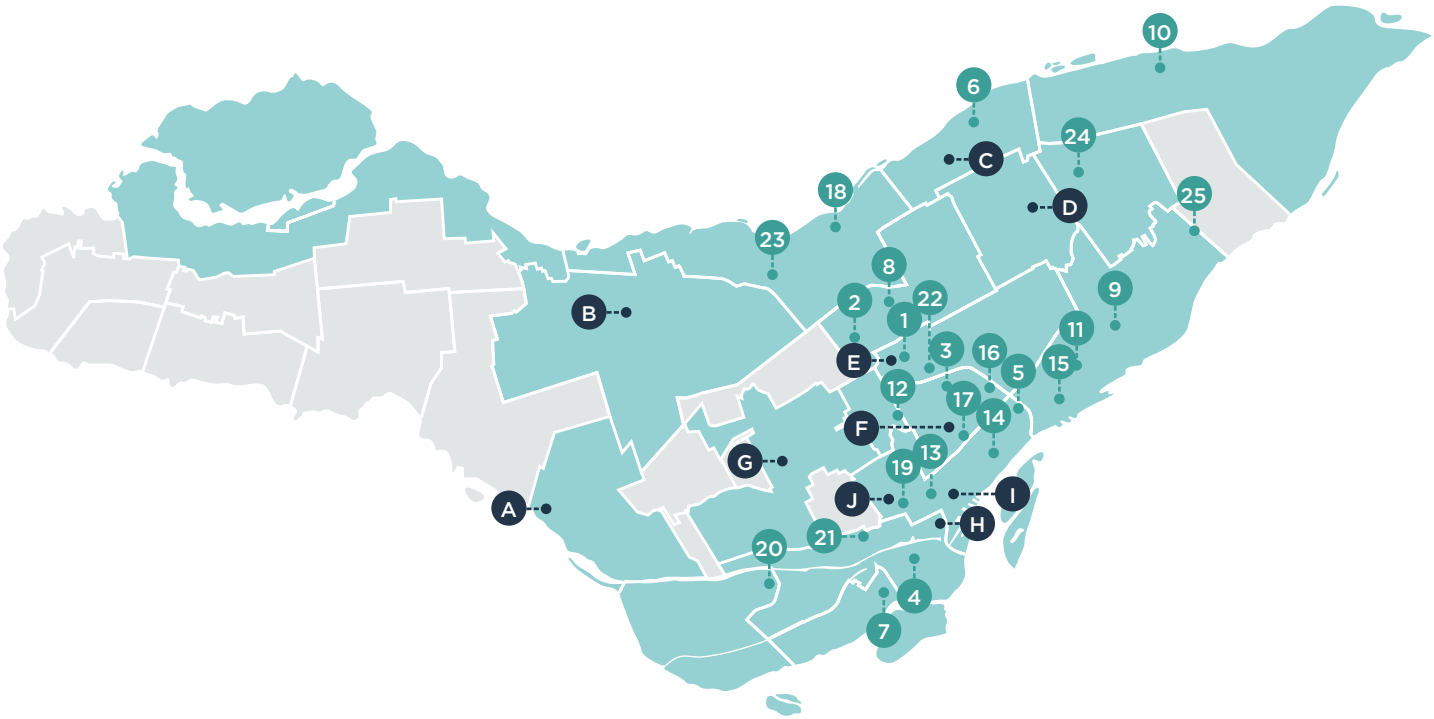


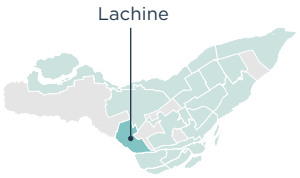
Photo survey
- Building types
- Public spaces and other key elements

Typologies
- Project building types

Location of Study Areas and Projects



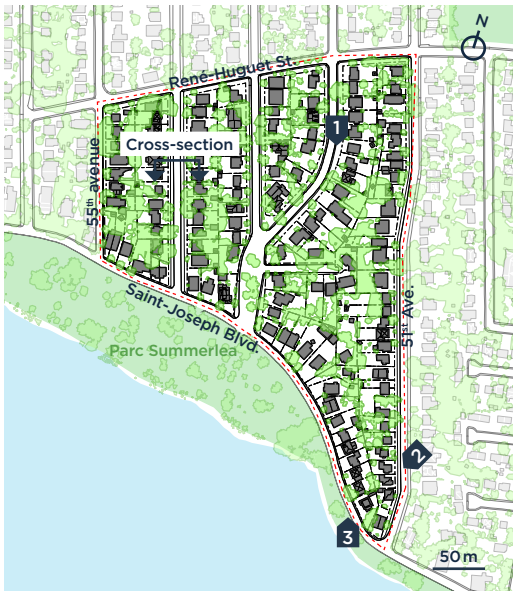
Studies Areas (10-hectare scale)



SUMMERLEA

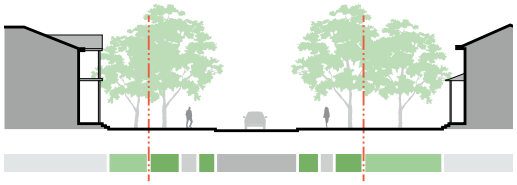
Borough of Lachine

(less than 20 du/ha)



The Summerlea area is a low-density residential area located in the Lachine borough, near the St. Lawrence River. It was developed primarily from 1900 to the 1950s. Located near the Lachine station of the Exo suburban train line (800 m away), the area is also served by a bus line and bicycle paths along rue Victoria, boulevard Saint-Joseph and parc Summerlea. The area has a relatively low housing density (16 du/ha) and building density (overall net F.A.R. of 0.53). It has a very high percentage of vegetation cover (39.2%).

Cross-section



Typical detached single-family houses of the area.

Side expansion integrating with the architectural style of the area.

The building form of the area is mainly comprised of post-War, detached single-family homes (91%), with deep front and rear yards. In general, buildings in the area have two floors.

Building densification in this area is generally in the form of an expansion of an existing building. The building in the centre of the photo above illustrates a type of lateral expansion of a single-family house that respects the original architectural composition and the scale of adjacent buildings.

Density statistics

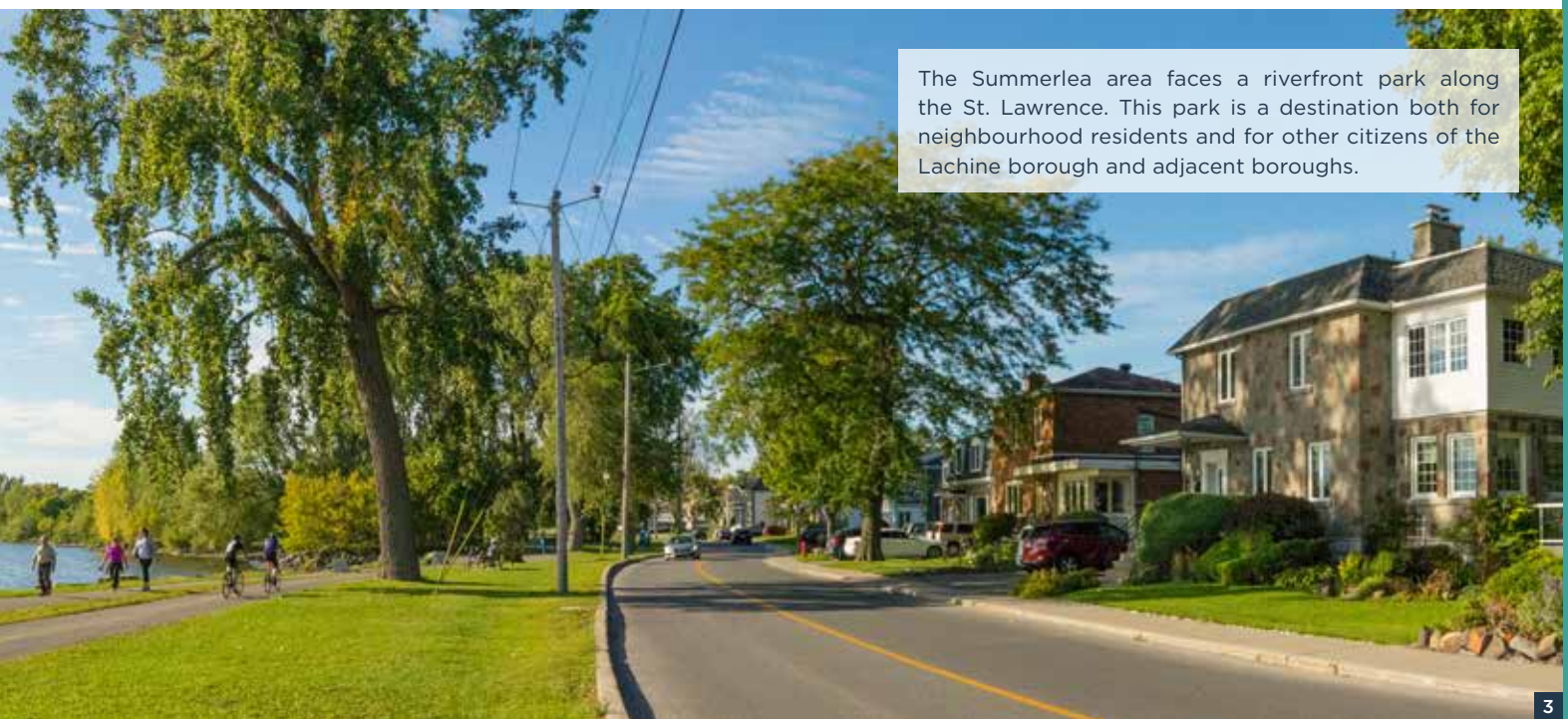
Total dwelling units	1,62
Gross residential density (du/ha)	16
Average number of people per dwelling	2.43
Building density (net F.A.R.)	0.53
Site coverage (net B.S.C.R.)	0.24
Vegetation cover index (gross)	39.2 %

Mix of uses

100 %	Residential
0 %	Commercial
0 %	Office
0 %	Institutional
0 %	Industrial

Diversity of building typologies

0 %	Residential tower	7 %	Duplex
0 %	Barre	2 %	Townhouse
0 %	Multi-unit	91 %	Detached house
0 %	Multiplex	0 %	Industrial
0 %	Triplex	0 %	Commercial



The Summerlea area faces a riverfront park along the St. Lawrence. This park is a destination both for neighbourhood residents and for other citizens of the Lachine borough and adjacent boroughs.

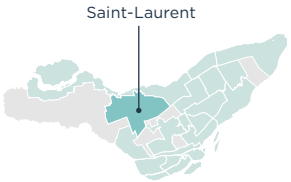
3

Studies Areas (10-hectare scale)

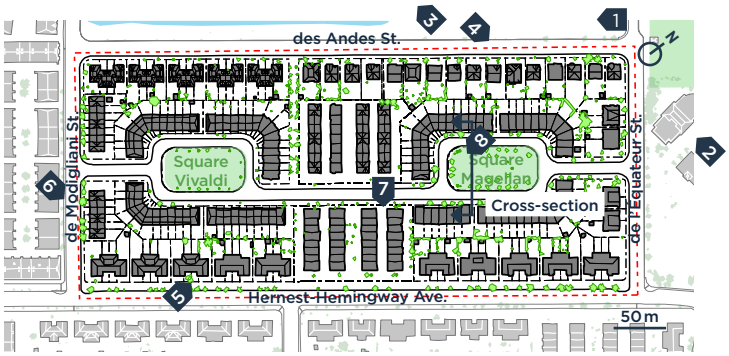
BOIS-FRANC

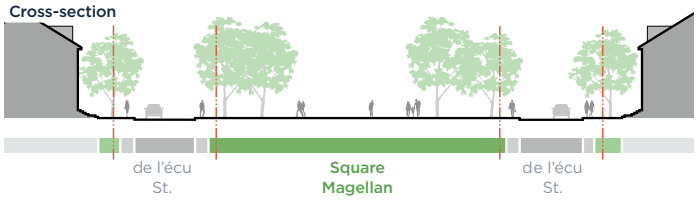
Borough of Saint-Laurent

(20 to 30 du/ha)



The Bois-Franc area, located in the Saint-Laurent borough, is an area principally comprised of residential use. Its first development phases began at the turn of this century. The area was served by the Agence métropolitain de transport (AMT) suburban train at the time, and will soon be served by the new Bois-Franc station of the Réseau express métropolitain (REM), less than 1 km away. Bike paths and multipurpose paths also run through the area.





Its gross residential density is rather low (27 du/ha), despite a built density that is relatively high (overall net F.A.R. of 1.24). This can be explained by the large dimensions of the homes, generally designed for families (on average 3.4 people per dwelling).

Parc Bois-Franc entrance.

Place des Nations.

Parc Bois-Franc water feature.

Grouping of single-family houses.

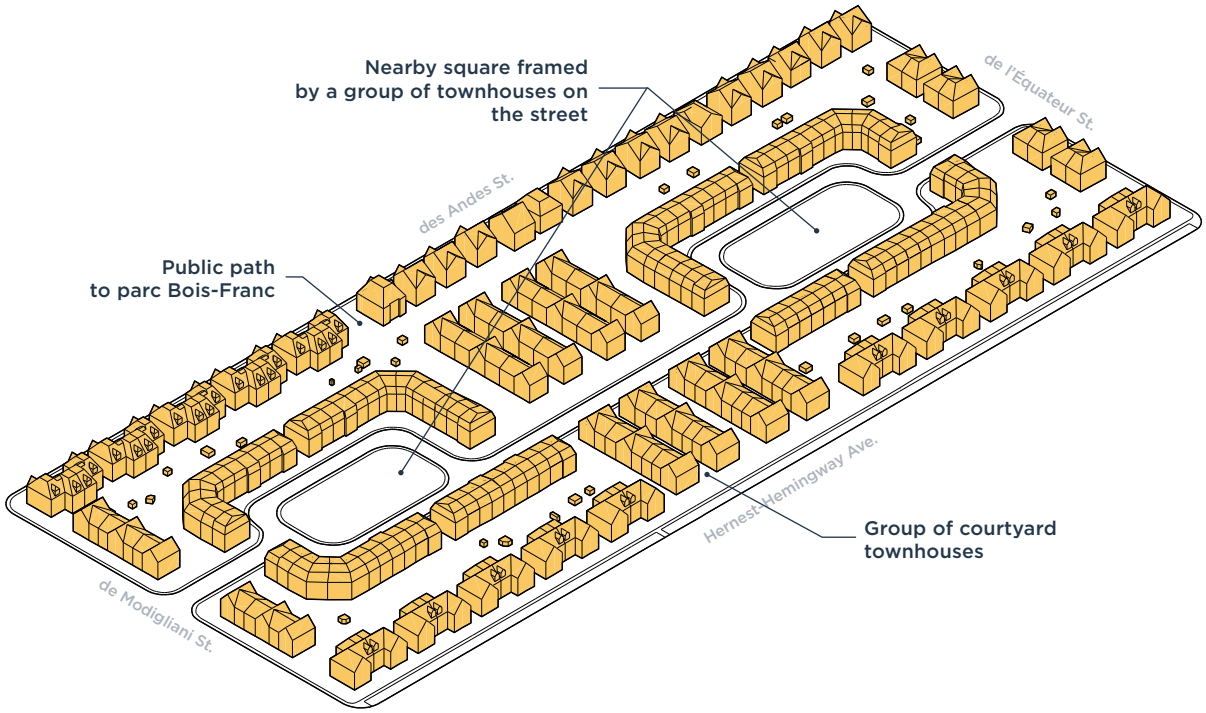
Grouping of semi-detached houses.

Row of townhouses.

Courtyard grouping.

Following the principles of the "New Urbanism" an important and structuring place is given to green space and public space in the area. However, major parks were excluded from the study area; the relatively large street right-of-ways and the fact the plantings are recent limits the vegetation cover evaluated.

In terms of housing typologies, the area is mainly comprised of townhouses (90%) and detached houses (10%) arranged around interior courtyards (common or private), with public plazas nearby or facing the street.



Density statistics

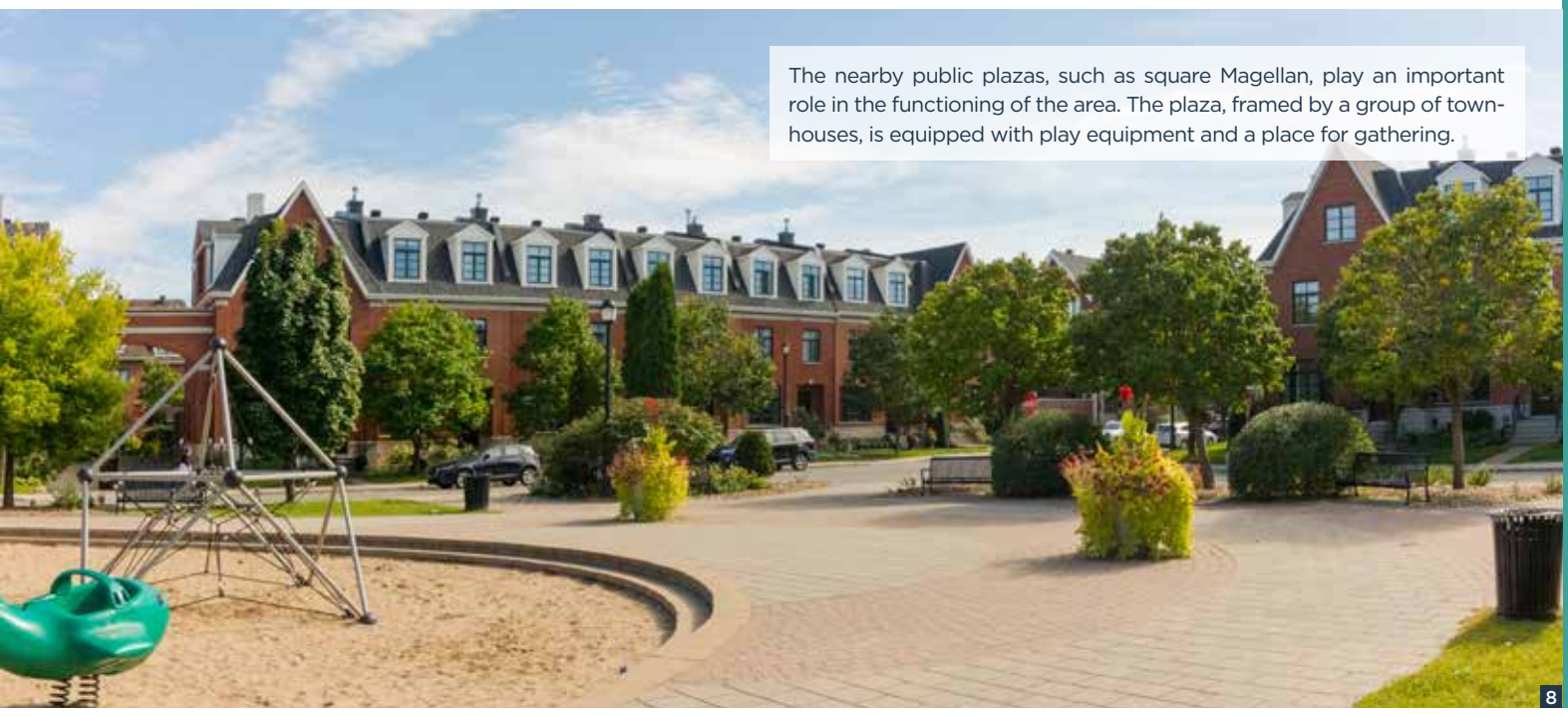
Total dwelling units	256
Gross residential density (du/ha)	27
Average number of people per dwelling	3.4
Building density (net F.A.R.)	1.24
Site coverage (net B.S.C.R.)	0.32
Vegetation cover index (gross)	3.2 %

Mix of uses

100 %	Residential
0 %	Commercial
0 %	Office
0 %	Institutional
0 %	Industrial

Diversity of building typologies

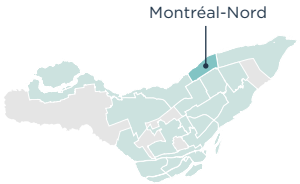
0 %	Residential tower	0 %	Duplex
0 %	Barre	90 %	Townhouse
0 %	Multi-unit	10 %	Detached house
0 %	Multiplex	0 %	Industrial
0 %	Triplex	0 %	Commercial



The nearby public plazas, such as square Magellan, play an important role in the functioning of the area. The plaza, framed by a group of townhouses, is equipped with play equipment and a place for gathering.

8

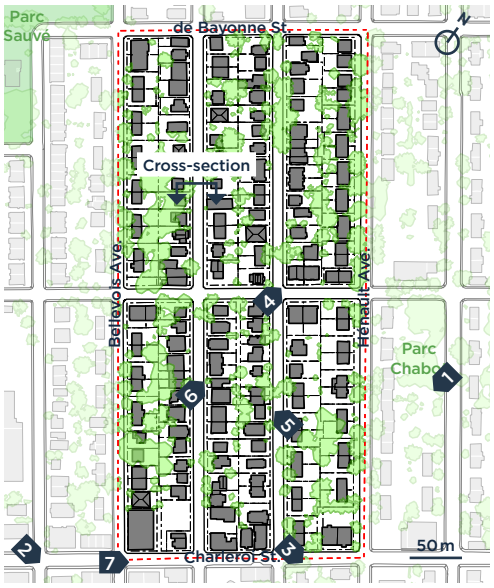
Studies Areas (10-hectare scale)



RUE CHARLEROI AREA

Montréal-Nord borough

(30 to 40 du/ha)



The Rue Charleroi area is located near boulevard Henri-Bourassa in the Montréal-Nord borough. This built-out area was primarily developed during the 1950s–1970s. The area is served by a bus network running on the main arteries as well as bicycle paths on rue Éthier and rue Castille.

While housing density is medium (40 du/ha), the built density is relatively low (overall F.A.R. = 0.79). It has a high percentage of vegetation cover (25.4%).

Parc Chabot, a playground and a local meeting place.

Newly constructed group of townhouses.

Bibliothèque Yves-Ryan.

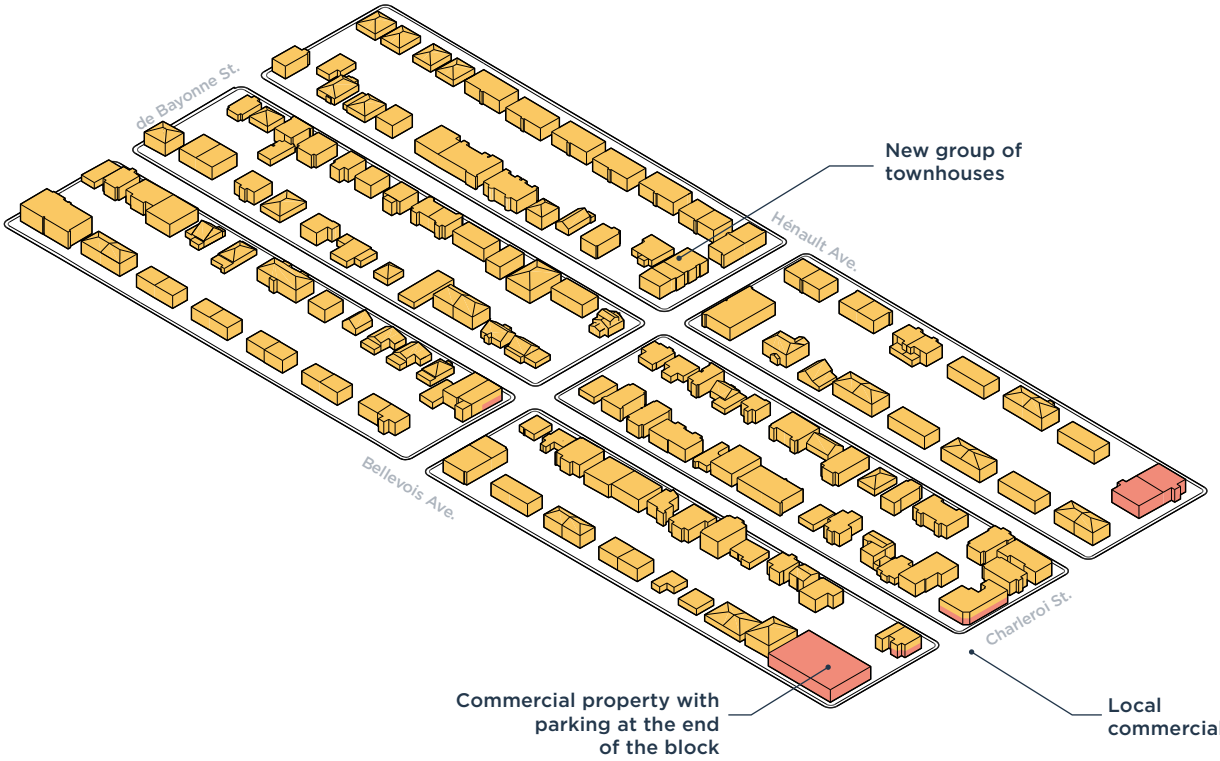
L'Archevêque interim mini-plaza.

Plex group.

«Shoebox» adjacent to a multiplex.

Buildings are primarily duplexes (32%) and triplexes (19%) of the modern period. Slightly denser recent development projects help consolidate the urban fabric of the area. The group of townhouses shown in photo no. 4) is an example that integrates well into the surroundings.

The large size of the houses does not contribute significantly to densifying the area in terms of number of dwelling units, but still means increased density of construction and population. The average number of people per dwelling is not much greater than the citywide number (2.36 per dwelling, compared to 2.1).



Density statistics

Total dwelling units	413
Gross residential density (du/ha)	40
Average number of people per dwelling	2.36
Building density (net F.A.R.)	0.79
Site coverage (net B.S.C.R.)	0.29
Vegetation cover index (gross)	25.4 %

Mix of uses

97 %	Residential
3 %	Commercial
0 %	Office
0 %	Institutional
0 %	Industrial

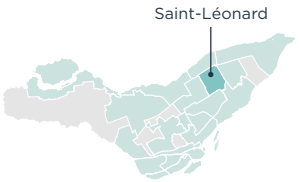
Diversity of building typologies

0 %	Residential tower	32 %	Duplex
0 %	Barre	2 %	Townhouse
16 %	Multi-unit	19 %	Detached house
9 %	Multiplex	0 %	Industrial
19 %	Triplex	3 %	Commercial

Charleroi is a commercial street that provides structure to the study area. Distinctive street furniture and well-marked crosswalks create a safe, high-quality local artery. However, this is interrupted by parking lots at the ends of blocks, which weaken the framing of the street.

7

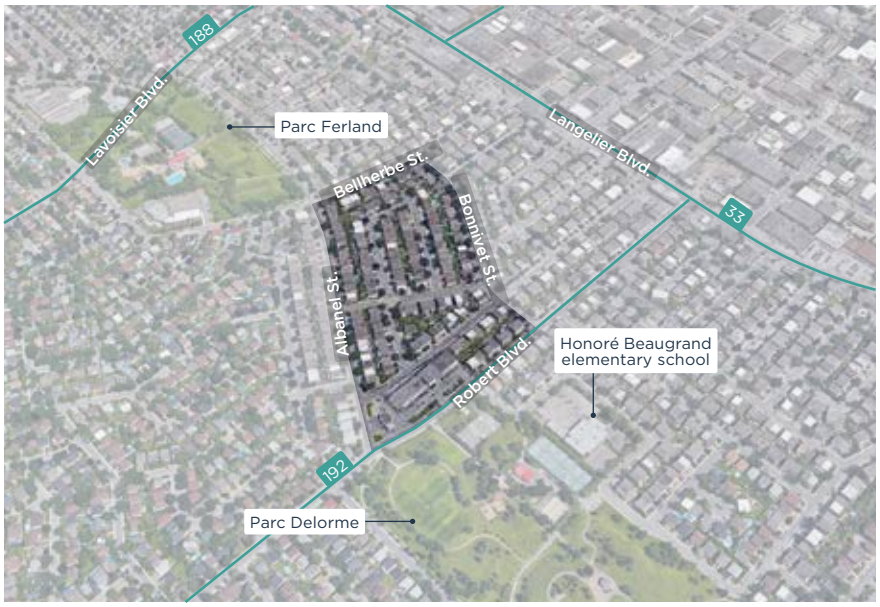
Studies Areas (10-hectare scale)

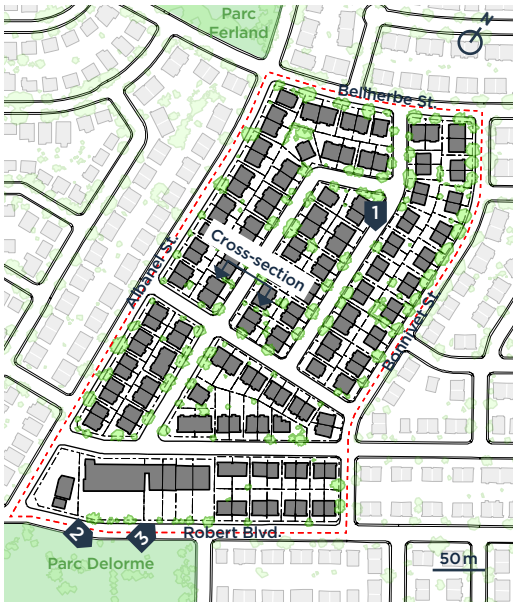


BOULEVARD ROBERT AREA

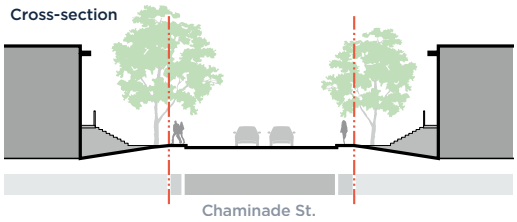
Saint-Léonard borough

(40 to 60 du/ha)





The Boulevard Robert area is located near boulevard Langelier, north of Autoroute 40, in the Saint-Léonard borough primarily developed during the 1950s-1970s, this built-out area, like adjacent areas, has an irregular street grid that directs through traffic toward the major arteries. Bus routes and bike paths are also located on the arteries. The winding and irregular streets sometimes make orientation difficult for visitors and may lengthen walking distances to bus stops, stores and services. The area's residential density and built area are moderate (47 du/ha and overall F.A.R. = 1.0).

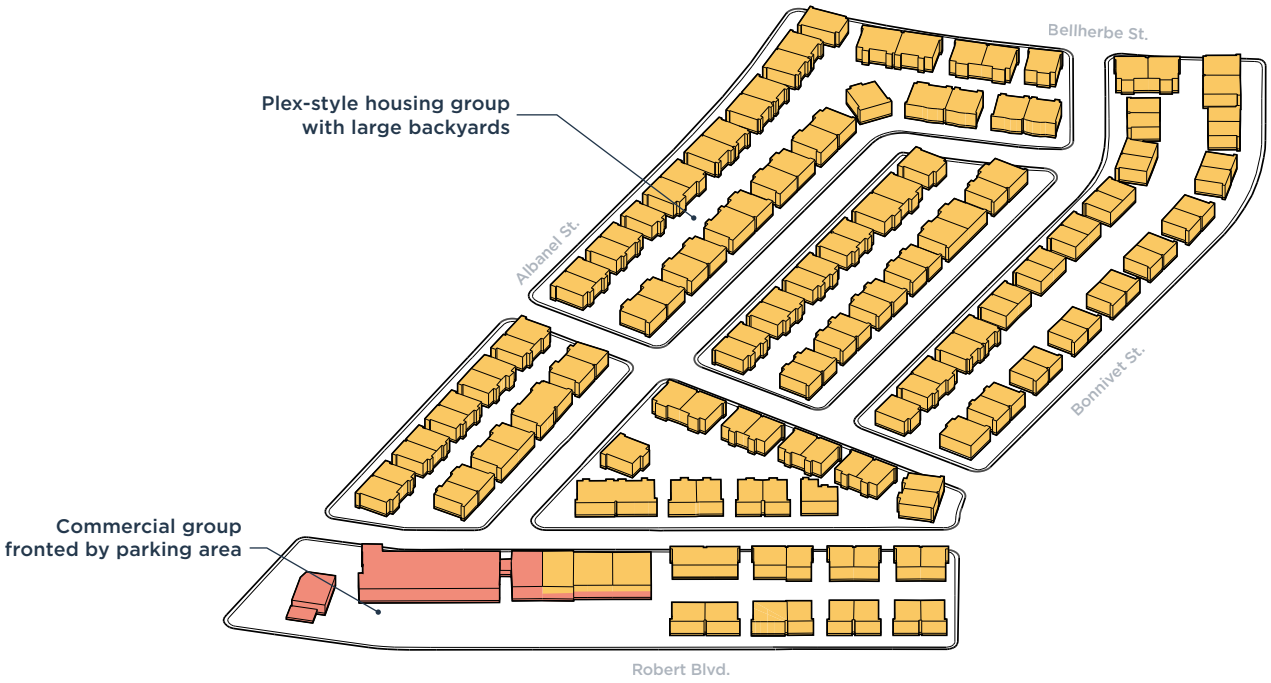


Attached plexes with semi-basement parking.

Parc Delorme plays a determinative role in the area.

The area's built form is relatively homogeneous. A great majority of buildings is plex-type housing (between 2 and 5 dwelling units), with interior parking below grade. This type of plex has facades that are generally larger than those of the plexes of the beginning of the 20th century. They are faced in brick or white stucco, which is very common in the Saint-Léonard borough, but also present in several other areas of Montréal.

The urban structure of Saint-Léonard borough is supported by large civic nodes made up of parks and community institutions, including a complex offering sport, cultural and institutional facilities. In particular, parc Delorme, located along boulevard Robert, which includes a skate park, basketball courts and Honoré-Mercier elementary school.



Density statistics

Total dwelling units	485
Gross residential density (du/ha)	48
Average number of people per dwelling	2.43
Building density (net F.A.R.)	1.00
Site coverage (net B.S.C.R.)	0.35
Vegetation cover index (gross)	8.4 %

Mix of uses

96 % Residential
4 % Commercial
0 % Office
0 % Institutional
0 % Industrial

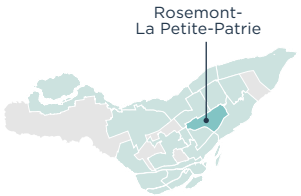
Diversity of building typologies

0 %	Residential tower	22 %	Duplex
0 %	Barre	0 %	Townhouse
2 %	Multi-unit	0 %	Detached house
42 %	Multiplex	0 %	Industrial
29 %	Triplex	5 %	Commercial

The street network in the area is traversed by major arteries. This includes boulevard Robert on which is located a commercial strip, a designated bike lane as well as a bus line.

3

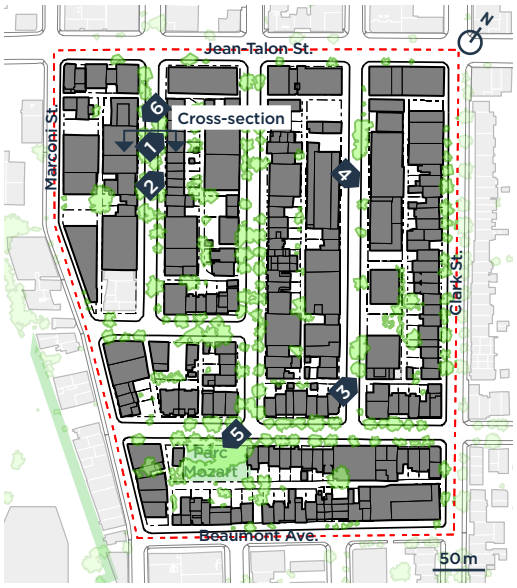
Studies Areas (10-hectare scale)



MARCONI-ALEXANDRA

Rosemont–La Petite-Patrie Borough

(60 to 80 du/ha)



The portion of the Marconi-Alexandra area studied is located south of rue Jean-Talon, near parc Jarry and the de Castelnau metro station. It is a former industrial district with high density and some mix of uses. For about 10 years, the area has seen many repurposing and urban redevelopment projects. Despite the presence of several uses, this area has relatively high residential and building densities (69 du/ha and overall F.A.R. = 1.87). Transformation of the area is still occurring, the number of dwelling units per hectare will increase in the short or medium term.

Row of traditional plexes.

Contemporary infill.

Addition to an industrial building.

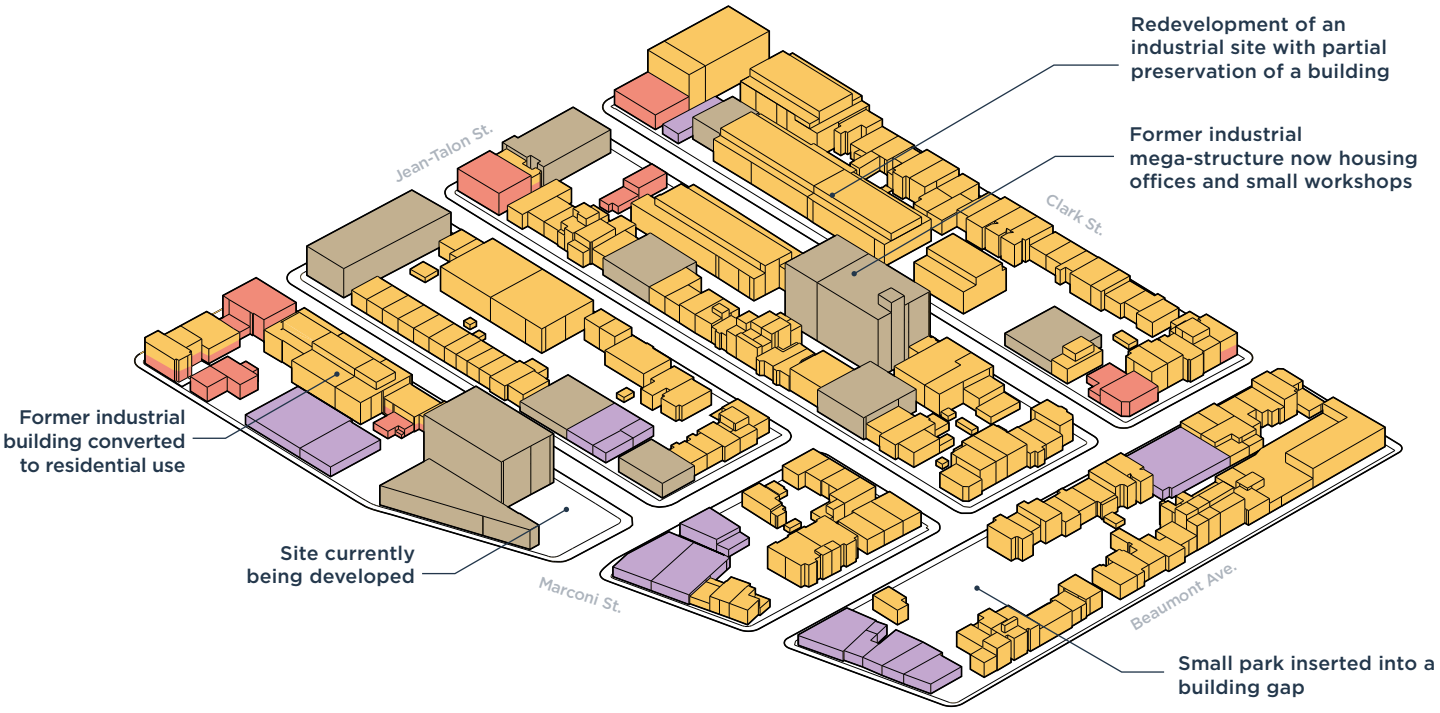
New residential redevelopment.

The area's built form is diverse in terms of scale and typology due to the variety of uses located there, and the different construction periods. The heterogeneous nature is also reinforced by more recent architectural experimentation.

Parc Mozart, inserted into a building gap.

Industrial buildings comprise 37% of the area, but many of them have already been converted into offices or dwelling units. Multi-unit and plex buildings make up 21% and 26%, respectively, of the floor area in the area.

Several recent and planned urban projects will progressively provide the area and its surroundings with new public spaces, currently rare. This is the case of the redevelopment of avenue Shamrock, located near marché Jean-Talon, and the future parc des Gorilles, south of rue Saint-Zotique.



Density statistics

Total dwelling units	638
Gross residential density (du/ha)	69
Average number of people per dwelling	1.72
Building density (net F.A.R.)	1.87
Site coverage (net B.S.C.R.)	0.67
Vegetation cover index (gross)	11.6 %

Mix of uses

66 % Residential
4 % Commercial
26 % Office
0 % Institutional
4 % Industrial

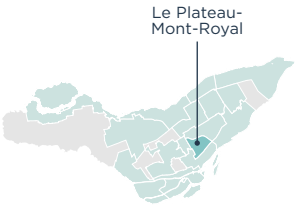
Diversity of building typologies

0 %	Residential tower	13 %	Duplex
0 %	Barre	5 %	Townhouse
21 %	Multi-unit	0 %	Detached house
6 %	Multiplex	37 %	Industrial
7 %	Triplex	10 %	Commercial

Several former factories have been transformed into residential properties. This property, on rue Alexandra, presents a combination of the repurposing of a building and construction of a new volume in modern style.

6

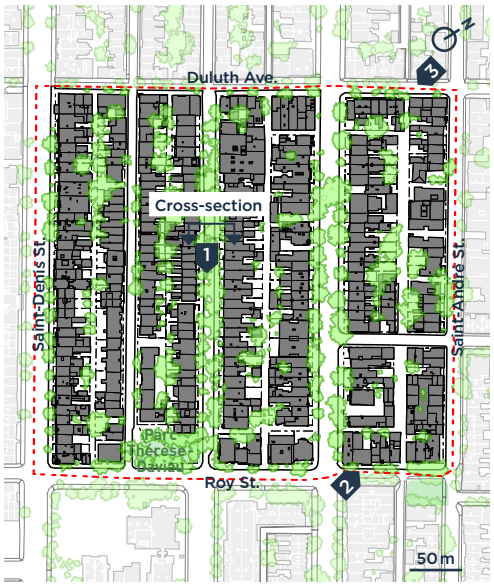
Studies Areas (10-hectare scale)



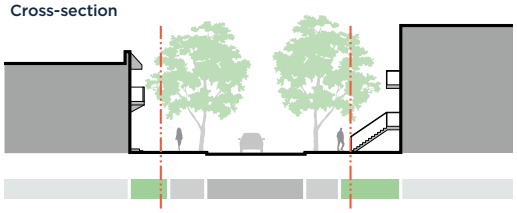
RUE ROY AREA

Borough of Plateau-Mont-Royal

(80 to 100 du/ha)



Cross-section



Berri St.

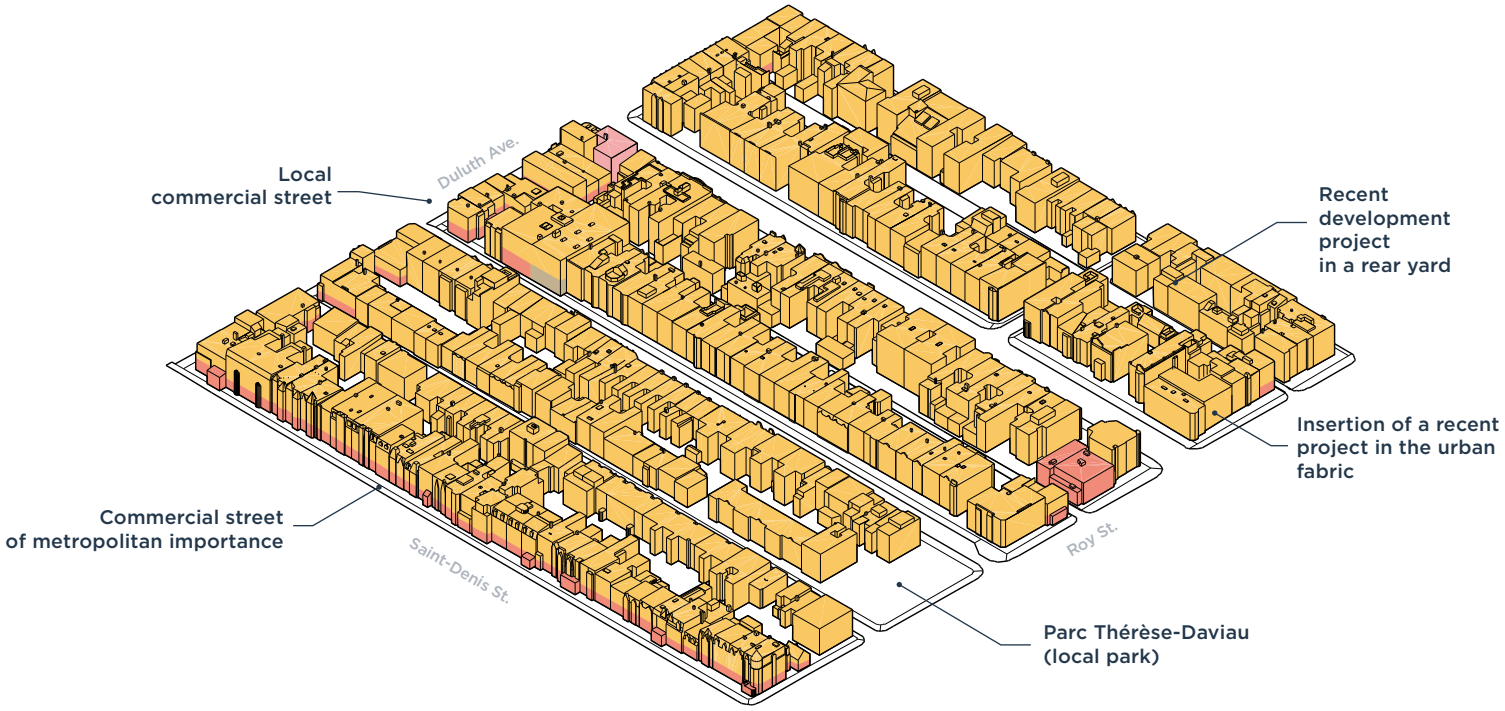
The rue Roy area is located near parc Lafontaine, north of rue Sherbrooke, in the Plateau-Mont-Royal borough. It is an established area, with high residential density (89 du/ha) distributed on a regular street plan consisting of typical Montréal rectangular blocks that results from the original agricultural subdivision. The area is served by Sherbrooke and Mont-Royal metro stations as well as a major network of buses and bicycle paths. It is composed primarily of residential use as well as some commercial, primarily concentrated on rue Saint-Denis and avenue Duluth.

Rue Berri, between Duluth and Roy.

New residential infill on rue Roy.

Buildings in the area are primarily two and three-storey duplexes (11%) and triplexes (44%) typical of the end of the 19th and the beginning of the 20th century. Generally, the buildings have exterior staircases, brick envelopes and narrow front setbacks. Streets in the area have rows of mature trees planted on the public domain, creating an abundant canopy offering shaded areas for pedestrians.

The photo above shows a new type of multi-unit residential building, inserted between two older buildings in a manner that is respectful of their scale. In general, the new building respects the arrangement of windows and doors of the facades of the plex-type buildings that make of the majority of buildings in the area.



Density statistics

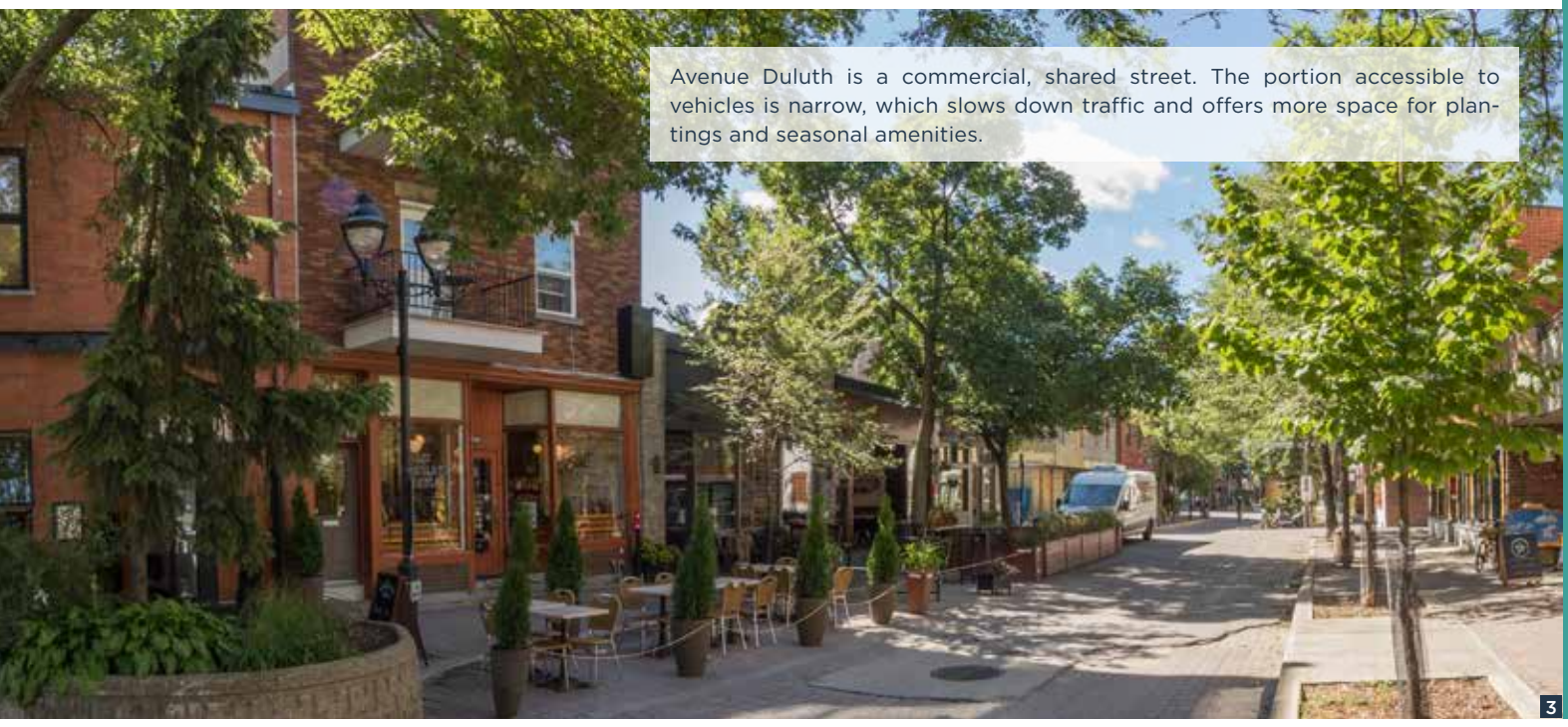
Total dwelling units	1,015
Gross residential density (du/ha)	100
Average number of people per dwelling	1.59
Building density (net F.A.R.)	2.02
Site coverage (net B.S.C.R.)	0.66
Vegetation cover index (gross)	19.2 %

Mix of uses

92 %	Residential
8 %	Commercial
<1 %	Hotel
<1 %	Office
0 %	Institutional
0 %	Industrial

Diversity of building typologies

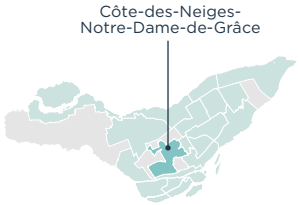
0 %	Residential tower		11 %	Duplex	
0 %	Barre		1 %	Townhouse	
19 %	Multi-unit		0 %	Detached house	
21 %	Multiplex		2 %	Industrial	
44 %	Triplex		2 %	Commercial	



Avenue Duluth is a commercial, shared street. The portion accessible to vehicles is narrow, which slows down traffic and offers more space for plantings and seasonal amenities.

3

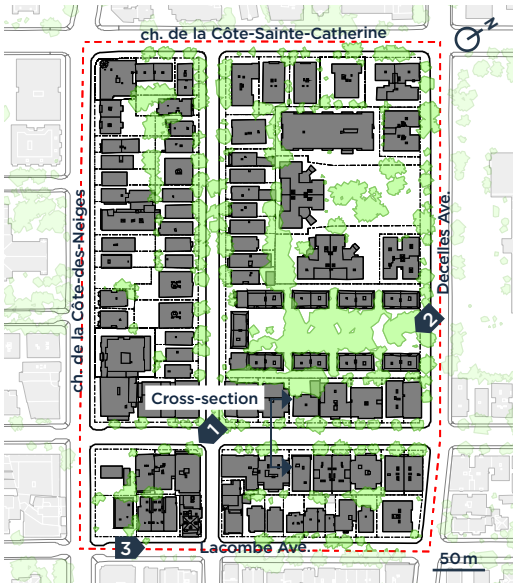
Studies Areas (10-hectare scale)



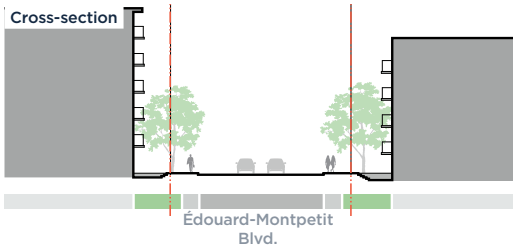
AVENUE DECELLES AREA

Borough of Côte-des-Neiges–Notre-Dame-de-Grâce

(100 to 150 du/ha)



The avenue Decelles area is an established, predominantly residential area, with offering some mix of uses. The largest concentration of commercial use is on chemin de la Côte-des-Neiges, is also where the eponymous metro station is located. The stores, metro station and buses running on this artery serve a clientele of a larger area than the area alone. Moreover, proximity to several institutional buildings, such as those occupied by Université de Montréal and CHU Sainte-Justine attract a large portion of people to the area. The density of the study area is relatively high (145 du/ha and F.A.R. = 2.02).

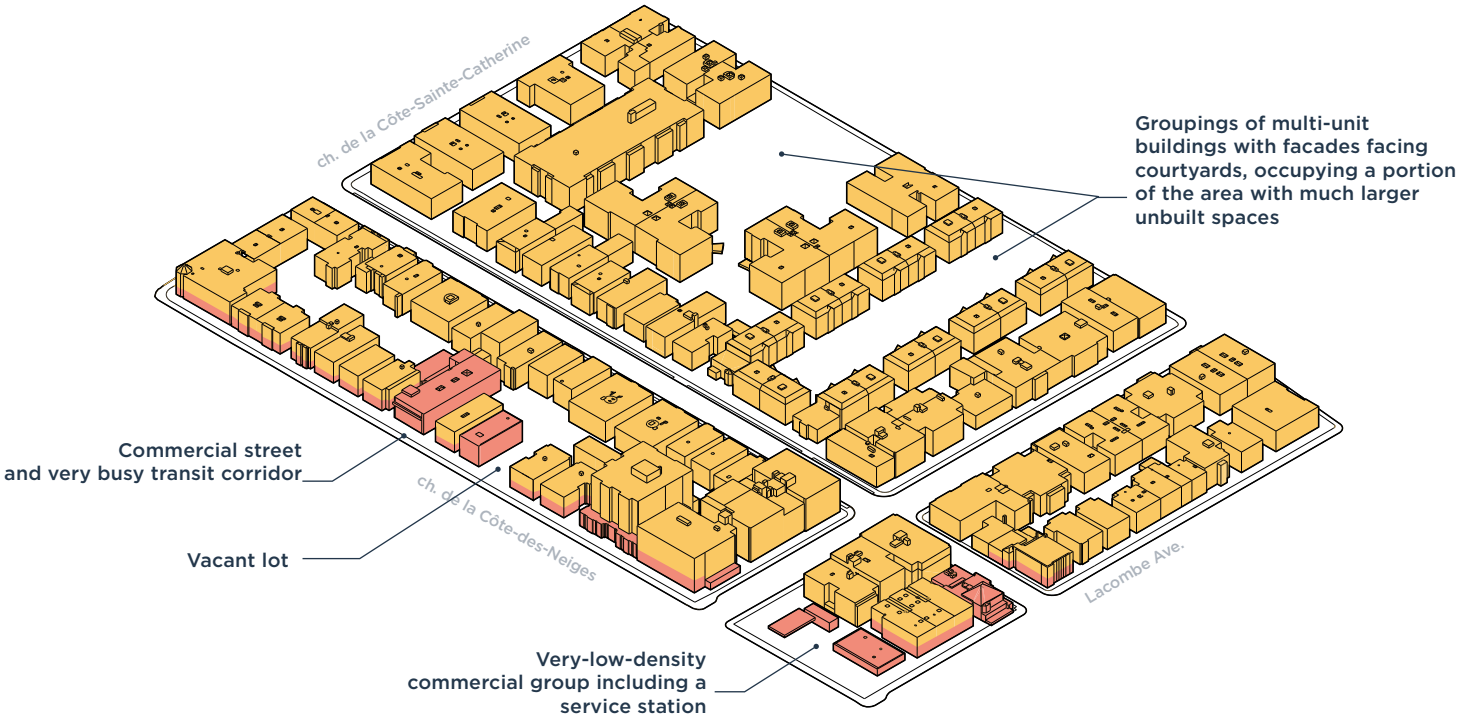


Multi-unit on boul. Édouard-Montpetit.

Jardins des Saules, a group of multi-unit buildings organized around a courtyard.

The area developed over several decades, starting in the 1930s. Despite the presence of several plexes (almost 4% of the structures) and *barres* (13%), the majority of buildings are moderately-scaled walk-up apartments and multi-unit buildings (81%). In many cases, the buildings occupy more than 80% of their lot. Often the unbuilt spaces are occupied by driveways leading to underground parking.

Two residential groups around courtyards off rue Decelles stand out for their less intensive use of land. They help significantly reduce the B.S.C.R. of the area. The vegetation cover of the area is 18%, which places it fourth among the ten areas studied, after some areas with higher B.S.C.R.s (rue Roy area). This is explained, in particular, by the wide street right-of-ways. While they are not all planted, the institutional and private setbacks mitigate the effect this built density might otherwise have if the area were more compact.



Density statistics

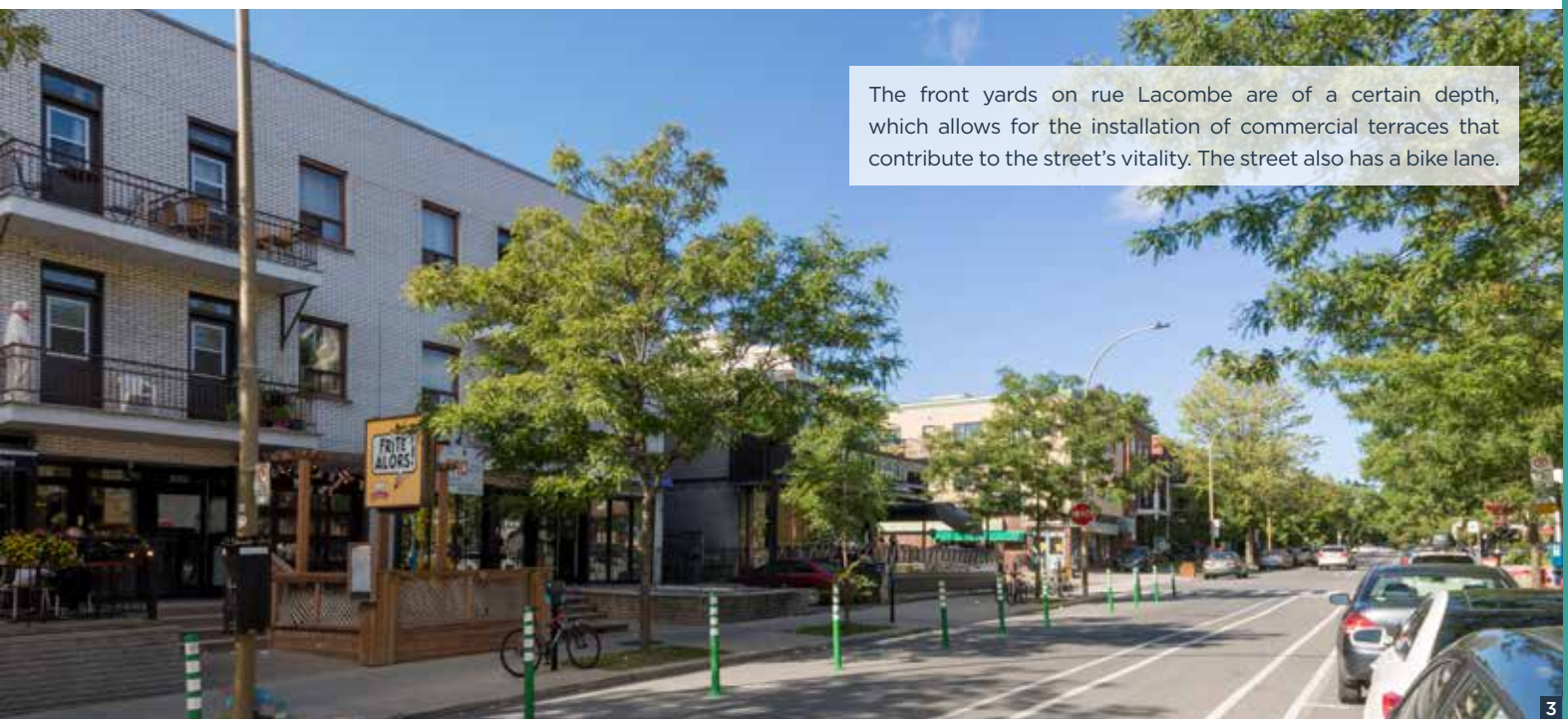
Total dwelling units	1,442
Gross residential density (du/ha)	145
Average number of people per dwelling	1.52
Building density (net F.A.R.)	2.02
Site coverage (net B.S.C.R.)	0.49
Vegetation cover index (gross)	18.0 %

Mix of uses

92 % Residential
8 % Commercial
0 % Office
0 % Institutional
0 % Industrial

Diversity of building typologies

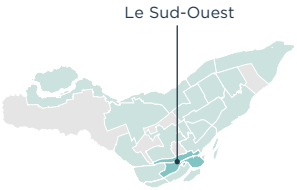
0 %	Residential tower	0 %	Duplex
13 %	Barre	0 %	Townhouse
81 %	Multi-unit	0 %	Detached house
4 %	Multiplex	0 %	Industrial
<1 %	Triplex	3 %	Commercial



The front yards on rue Lacombe are of a certain depth, which allows for the installation of commercial terraces that contribute to the street's vitality. The street also has a bike lane.

3

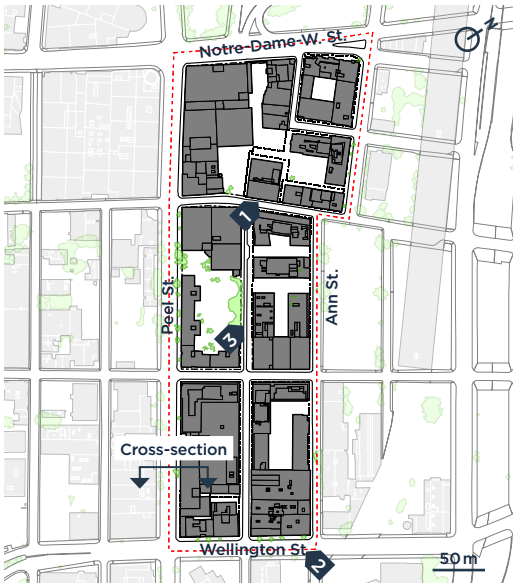
Studies Areas (10-hectare scale)



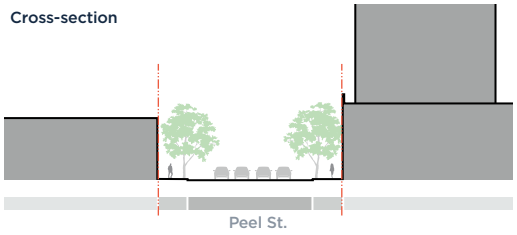
GRIFFINTOWN

Sud-Ouest borough

(150 to 300 du/ha)



This portion of Griffintown, located west of boulevard Bonaventure and north of bassin Peel in the Sud-Ouest borough, is a former industrial zone currently being transformed. It has a very high residential density (294 du/ha). Despite the residential predominance, it provides a significant mix of uses, due to the commercial ground floors. The area is composed of an irregular street pattern due to the presence of heavy infrastructure such as the Canadian National Railway lines.

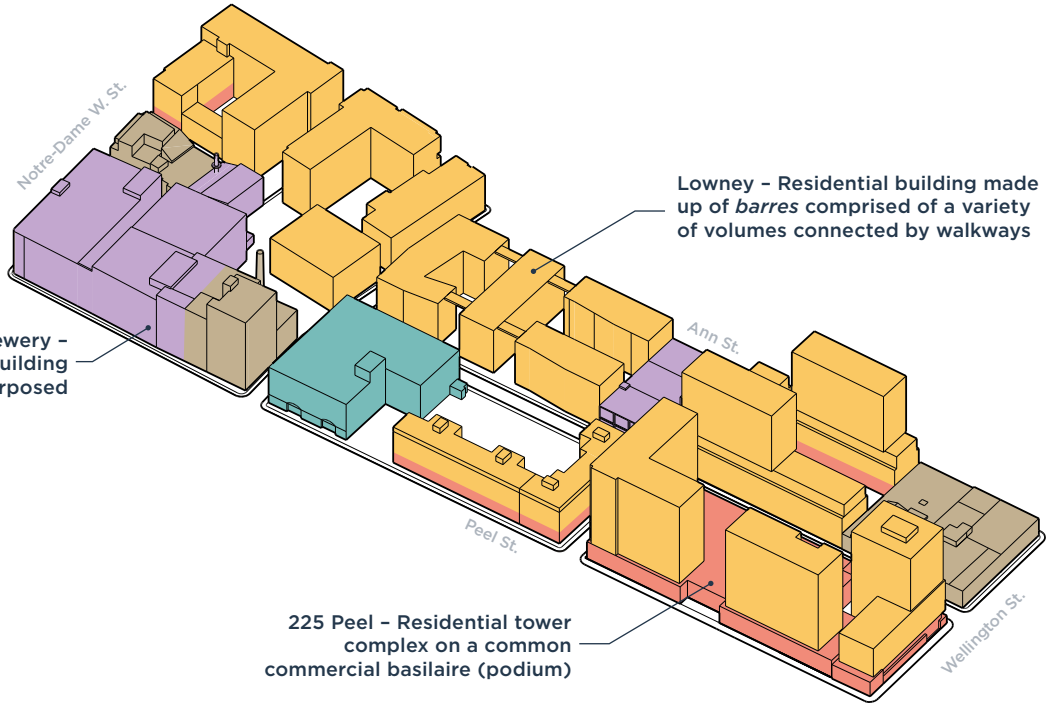


Le Lowney, a former industrial building converted into residential.

Projects to convert former industrial factories are common in Griffintown and have led to a substantial densification of the area, both in terms of the number of dwelling units and of built areas. By their very nature, they have led to a transformation of the urban form. The new buildings respect the original street pattern, and like the industrial buildings they replaced, have large footprints and do not have front setbacks.

Buildings of different volumes, seen from rue Wellington.

Their greater height and size accentuate the impression of a narrow corridor on several streets. The very modest vegetative coverage also accentuates the monolithic effect of some structures and the aridity of the area. This is expected to be improved through the design projects planned for public domain.



Density statistics

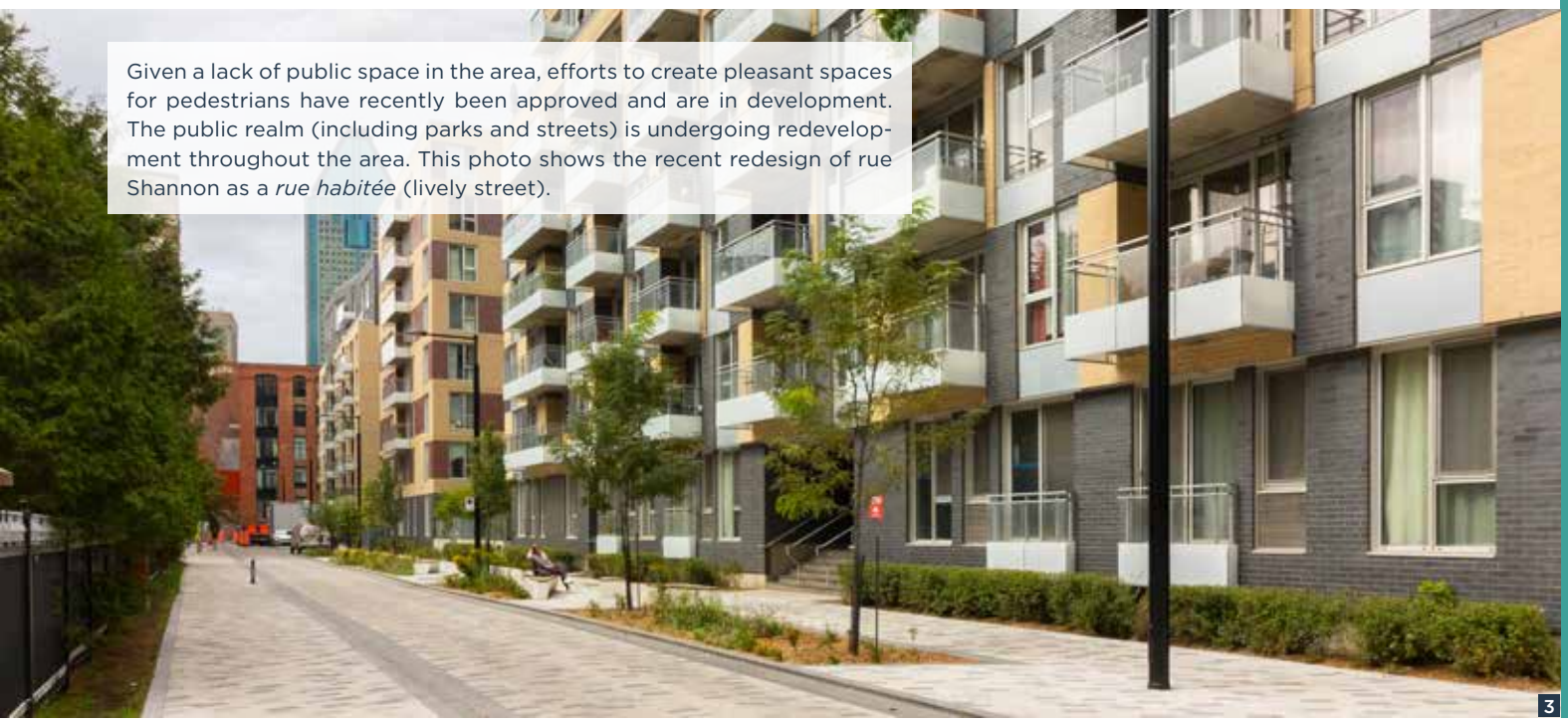
Total dwelling units	2,414
Gross residential density (du/ha)	294
Average number of people per dwelling	1.35
Building density (net F.A.R.)	5.10
Site coverage (net B.S.C.R.)	0.72
Vegetation cover index (gross)	1.6 %

Mix of uses

78 %	Residential
6 %	Commercial
3 %	Office
4 %	Institutional
9 %	Industrial

Diversity of building typologies

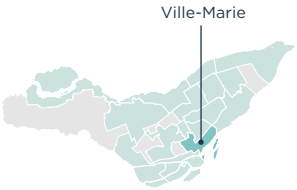
39 %	Residential tower	0 %	Duplex
32 %	Barre	0 %	Townhouse
0 %	Multi-unit	0 %	Detached house
0 %	Multiplex	21 %	Industrial
0 %	Triplex	8 %	Commercial



Given a lack of public space in the area, efforts to create pleasant spaces for pedestrians have recently been approved and are in development. The public realm (including parks and streets) is undergoing redevelopment throughout the area. This photo shows the recent redesign of rue Shannon as a *rue habitée* (lively street).

3

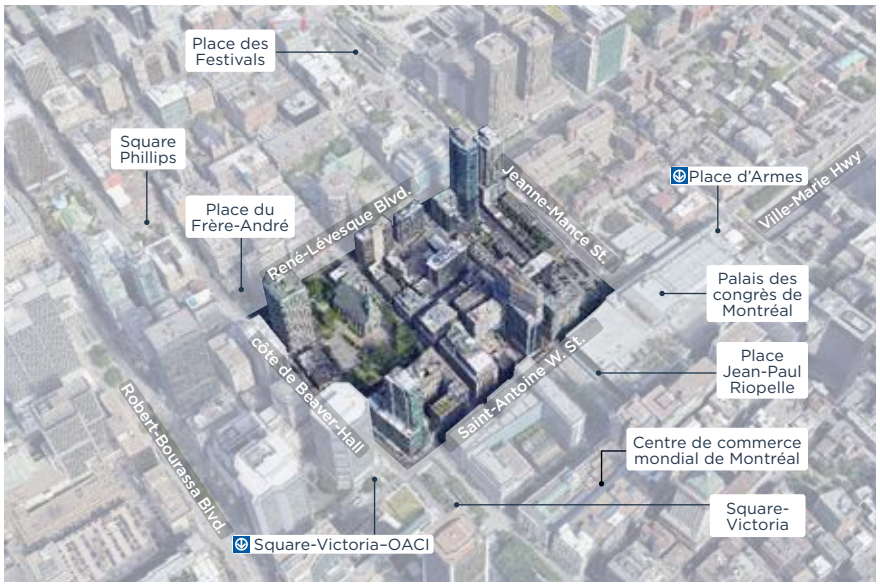
Studies Areas (10-hectare scale)

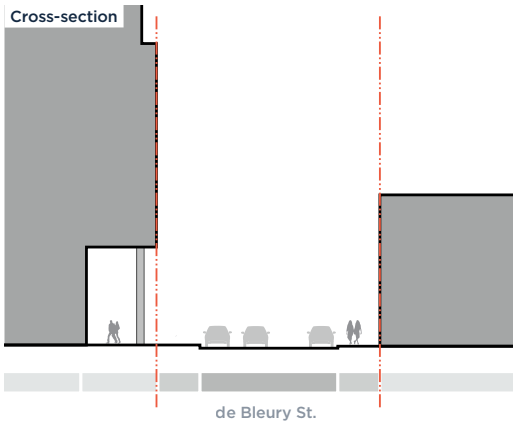


QUARTIER INTERNATIONAL (PAPER HILL)

Ville-Marie Borough

(150 to 300 du/ha)





The Paper Hill area is located adjacent to the quartier International. In the past, it was the site of many industrial plants and office buildings, constructed beginning in the early 20th century. It has seen several housing development and adaptive reuse projects. The area, previously marked by the presence of offices, now has a greater mix of uses and a relatively high residential density: 197 du/ha.

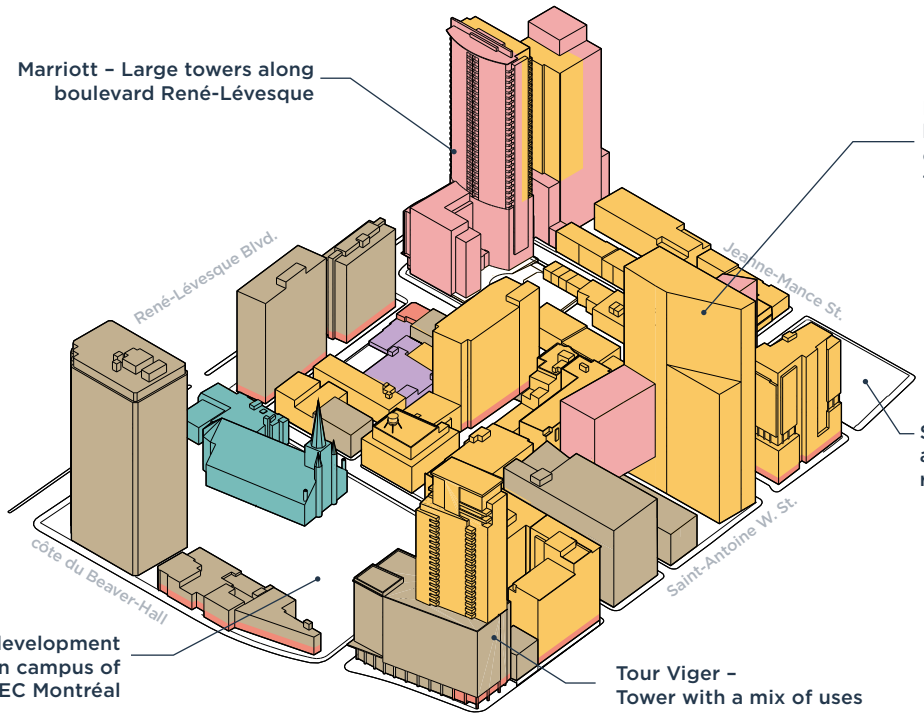
Unity Building.

Brix MONTRÉAL located on rue de Bleury.

Tour Viger, at the corner of côte du Beaver-Hall.

Tours Marriott, including accommodations and residences.

The area is noteworthy for a significant diversity of building types. Several former factories have been transformed into residential properties or office space. This is the case of the Unity Building on rue De La Gauchetière, classified as a historic monument by the Québec government and as a building of exceptional heritage value by the city. New, more imposing residential buildings (towers and *barres*) now stand beside older commercial and industrial buildings that make this portion of the borough unique. Often faced in glass, without setbacks, and with little play of volumes in their high-rise portions, the new buildings contrast with the older buildings, whose shapes and architectural language are much more ornate.



Density statistics

Total dwelling units	1,438
Gross residential density (du/ha)	197
Average number of people per dwelling	1.05
Building density (net F.A.R.)	6.83
Site coverage (net B.S.C.R.)	0.61
Vegetation cover index (gross)	6.2 %

Mix of uses

49 %	Residential
3 %	Commercial
17 %	Hotel
29 %	Office
3 %	Institutional
<1 %	Industrial

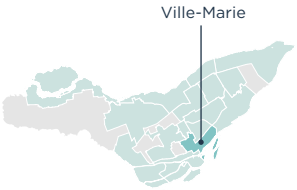
Diversity of building typologies

21 %	Residential tower	<1 %	Duplex
21 %	Barre	0 %	Townhouse
3 %	Multi-unit	0 %	Detached house
0 %	Multiplex	16 %	Industrial
<1 %	Triplex	9 %	Commercial
		23 %	Commercial Tower

The côte de Beaver-Hall streetscape is being fully transformed with the construction of the new downtown HEC Montréal campus on the large spaces available beside St. Patrick's basilica.

5

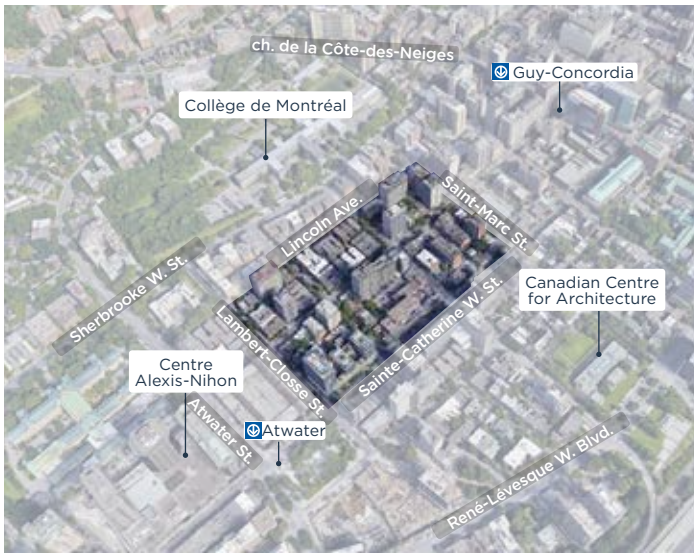
Studies Areas (10-hectare scale)

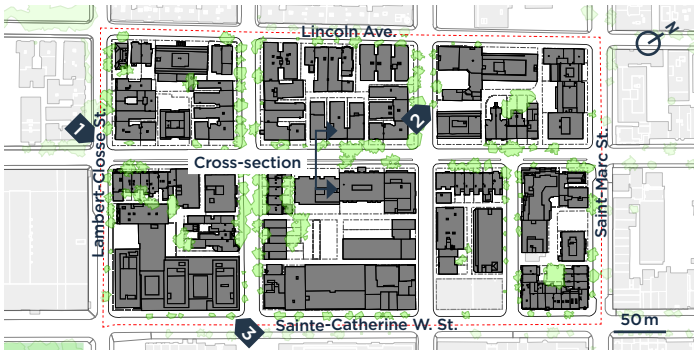


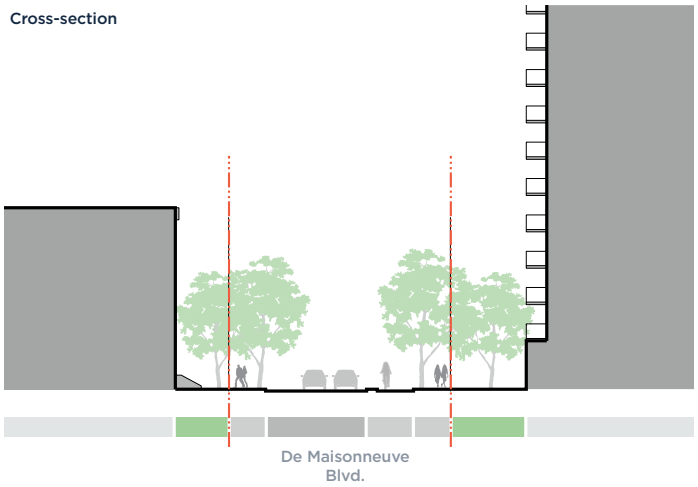
SHAUGHNESSY VILLAGE

Ville-Marie Borough

(300 du/ha and greater)







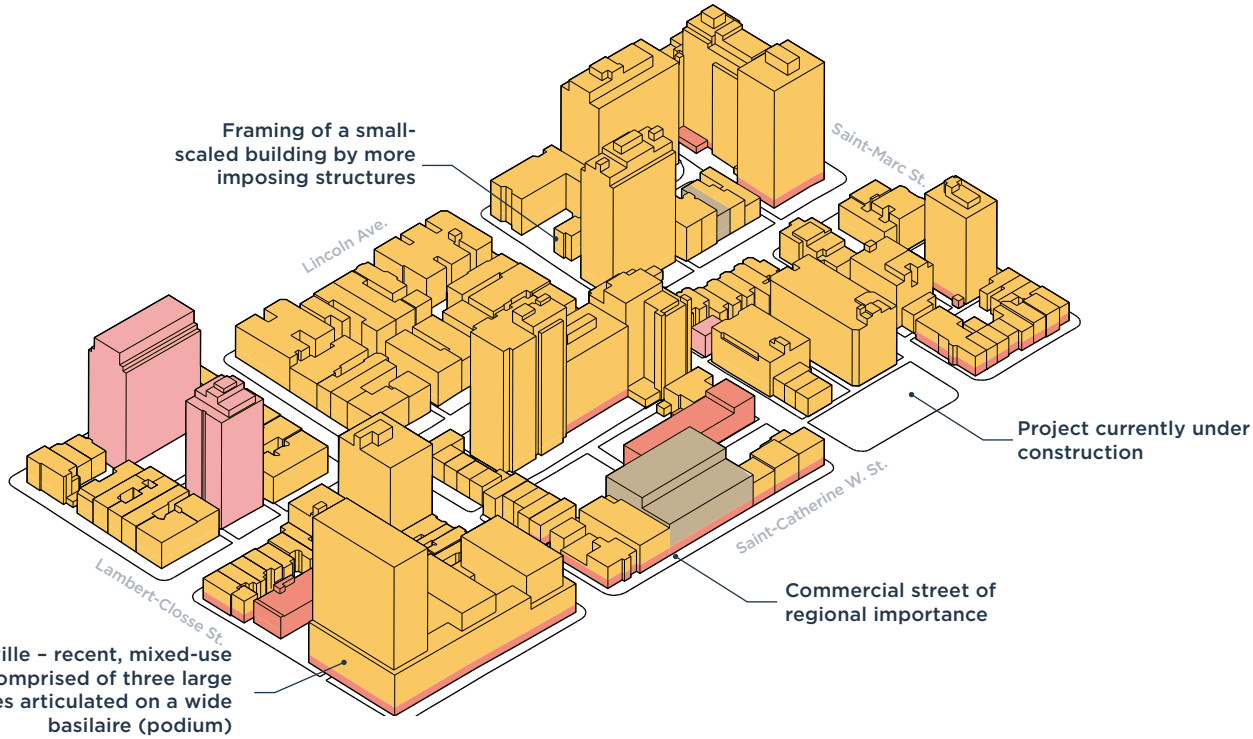
The Shaughnessy Village area is located along rue Saint-Catherine Ouest to the east of avenue Atwater, in the Ville-Marie borough. This 19th-century neighbourhood was significantly transformed during the urban renewal era of the 1970s. Its residential density is very high (416 du/ha) and it displays some mix of uses, particularly due to the presence of stores, for the most part concentrated in the ground-floor space of buildings on rue Sainte-Catherine.

Boul. De Maisonneuve, and its variety of building sizes.

Small plex dating from the 1930s surrounded by larger buildings.

Because of their imposing scale, the building density of the area is principally a result of the large residential towers of the modern era, which represent 58% of the floor area of the area. Large modern high-rises are omnipresent as a backdrop to the Shaughnessy Village landscape.

However, multi-unitdwelling buildings (19%) such as walk-ups and plexes (4%) dominate the view at street level. While the latter do not comprise a significant portion of the area's F.A.R., they represent a large percentage of the site coverage.



Density statistics

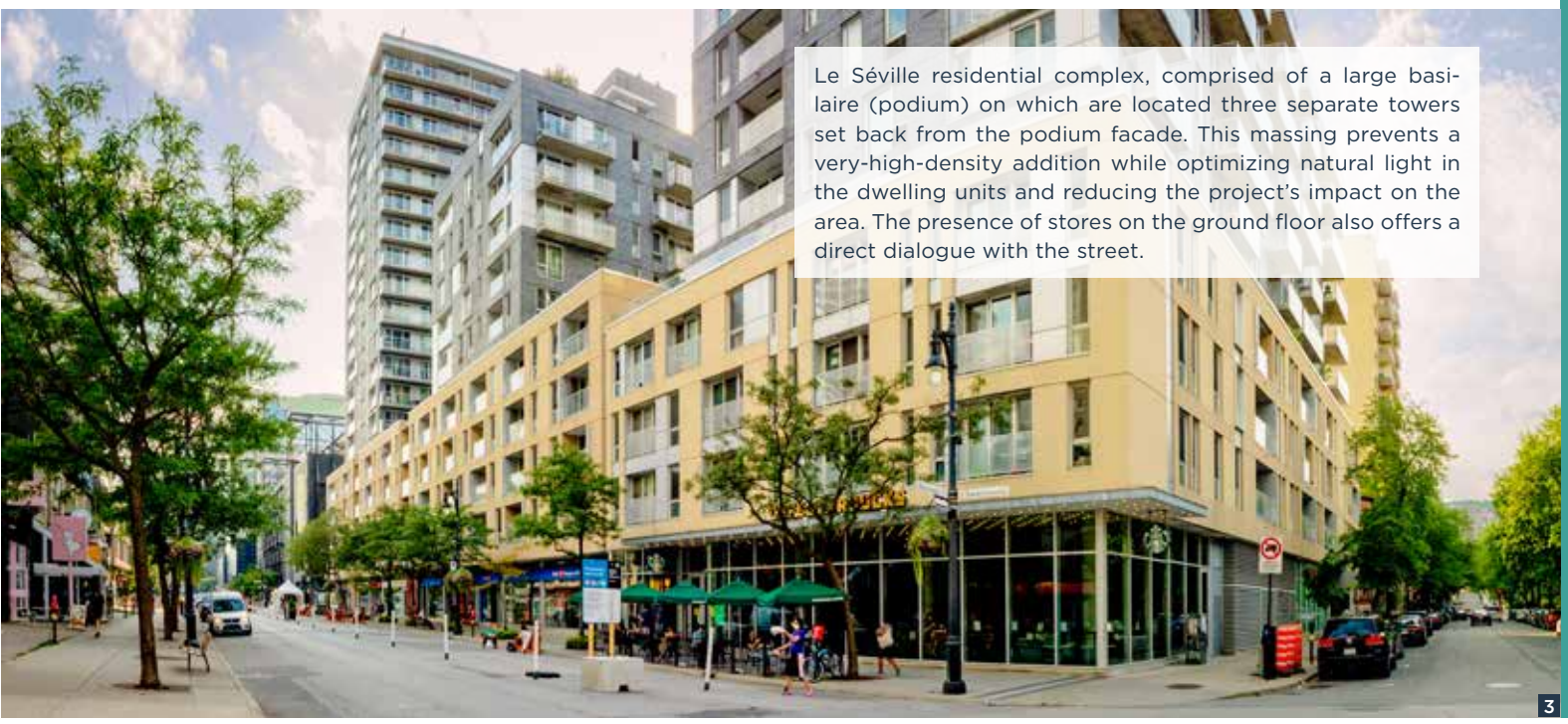
Total dwelling units	3,632
Gross residential density (du/ha)	416
Average number of people per dwelling	1.34
Building density (net F.A.R.)	5.30
Site coverage (net B.S.C.R.)	0.70
Vegetation cover index (gross)	8.3 %

Mix of uses

85 %	Residential
4 %	Commercial
9 %	Hotel
2 %	Office
<1 %	Institutional
0 %	Industrial

Diversity of building typologies

48 %	Residential tower	1 %	Duplex
13 %	Barre	2 %	Townhouse
19 %	Multi-unit	0 %	Detached house
2 %	Multiplex	0 %	Industrial
1 %	Triplex	4 %	Commercial
		10 %	Commercial Tower



Le Séville residential complex, comprised of a large basilaire (podium) on which are located three separate towers set back from the podium facade. This massing prevents a very-high-density addition while optimizing natural light in the dwelling units and reducing the project's impact on the area. The presence of stores on the ground floor also offers a direct dialogue with the street.

3

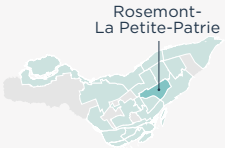
INFILL OR CONSOLIDATION OF A SMALL SITE (PARCEL)

House on Alma (Rosemont-La Petite-Patrie)

Expansion of 6558 rue Alma to add a storey onto a "shoe-box" type house with a setback and in a contemporary style. This project increases the built density of the property while maintaining the architectural integrity of the original building and respecting the scale of the adjacent buildings.

Density statistics (type)

Number of dwelling units	1
Project dimensions (lot)	167 m²
Net res. density (du/ha)	60
Building density (net F.A.R.)	1.06
Average du/ha of the infill area (net)	148



Single family row house

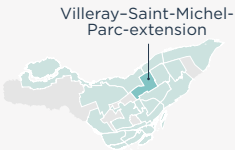
Aerial view of the building with its new setback second storey.

On Top (Villeray–Saint-Michel-Parc-Extension)

The project at 7782 avenue de L'Épée involved the construction of an additional storey with no setback (1 dwelling unit added). In order to respect the design of the original building, the project borrows some architectural characteristics of the beginning of the modern period, while incorporating openings in contemporary style.

Density statistics (type)

Number of dwelling units	4
Project dimensions (lot)	179 m²
Net res. density (du/ha)	223
Building density (net F.A.R.)	1.50
Average du/ha of the infill area (net)	159



Plex

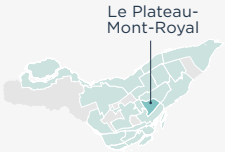
Aerial view with the new storey constructed to the building alignment.

Multi-unit on Berri (Le Plateau-Mont-Royal)

The project at 5283 rue Berri involved the construction of a three-storey plex-type accessory dwelling unit (ADU) in the rear yard (four dwelling units), i.e. on the same lot as another building occupying the front of the lot (three dwelling units). This type of project increases both built density and dwelling density, by optimizing the occupation of previously underused spaces.

Density statistics (type)

Number of dwelling units	7
Project dimensions (lot)	286 m²
Net res. density (du/ha)	245
Building density (net F.A.R.)	1.95
Average du/ha of the infill area (net)	197




Multi-unit

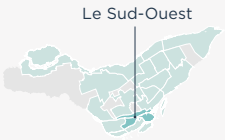
Aerial view of the original building on rue Berri and the new multi-unit on the rue Resther side.

Maison productive House Châteauguay (Le Sud-Ouest)

The project at 2432 rue Châteauguay is a “productive house”. It included the restoration of the original building as well as the addition of a set back upper storey, and an extension into the backyard, thereby increasing the building and dwelling densities, while being integrated into the surrounding network. In addition, the project includes spaces for ecological facilities for food production.

Density statistics (type)

Number of dwelling units	9
Project dimensions (lot)	479 m²
Net res. density (du/ha)	167
Building density (net F.A.R.)	1.79
Average du/ha of the infill area (net)	104




Multi-unit

Aerial view of the original building and its backyard expansion.

Food production facilities in the backyard.

Credit: Produktif Studio

Studies at the Densification Project scale

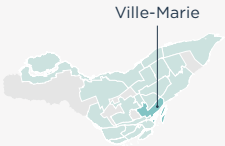
INFILL OR CONSOLIDATION OF A SMALL SITE (PARCEL)

Wurtele (Ville-Marie)

The infill project located at 2531 rue Wurtele is an insertion of a plex-type building, with two full storeys and a third set back from the street, respecting the scale of surrounding buildings. The infill project design on a previously vacant space permitted the addition of four units instead of the one or two dwelling units found on other lots of comparable size in the area.

Density statistics (type)

Number of dwelling units	4
Project dimensions (lot)	182 m²
Net res. density (du/ha)	220
Building density (net F.A.R.)	2.0
Average du/ha of the infill area (net)	123



Multi-unit

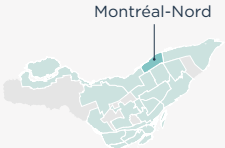
Aerial view of the plex inserted into the urban fabric.

Habitations Joseph-Le Caron (Montréal-Nord)

The project at 4861 boul. Léger is a multi-unit property that fully occupies the pointed portion of the lot. The simple and modern lines of this building managed by the Office municipal d'habitation de Montréal (OMHM) present a new image for social housing. The rear parking lot is accessible through a porte-cochère-type driveway.

Density statistics (type)

Number of dwelling units	19
Project dimensions (lot)	1,500 m²
Net res. density (du/ha)	127
Building density (net F.A.R.)	1.24
Average du/ha of the infill area (net)	59



Multi-unit

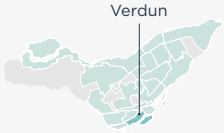
Aerial view of the multi-unit building and its rear parking lot.

Abondance Montréal - Le Soleil et La Terre
(Verdun)

Comprised of several residential addresses and a commercial space, this complex has solar panels, geothermal systems, and a greywater recovery system. It fully occupies the tip of this irregular lot. Due to the expansive fenestration of its commercial ground floor, it establishes a dialogue with the neighbouring public space, helping to frame and consolidate the intersection and network.

Density statistics (type)

Number of dwelling units	19
Superficie du projet (lots)	845 m²
Net res. density (du/ha)	225
Building density (net F.A.R.)	2.75
Average du/ha of the infill area (net)	118




Multi-unit

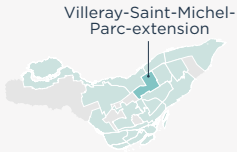
Aerial view of the multi-unit building on its triangular lot.

Louis de Villeray
(Villeray–Saint-Michel-Parc-Extension)

The project at 555 rue Jarry replaced a commercial parking lot at the end of a block with a mixed-use, four-storey building. The top level is set back from the lower levels. It helps consolidate the commercial street by re-establishing the building alignment at the sidewalk. The large windows of the commercial ground floor help bring vitality to the street.

Density statistics (type)

Number of dwelling units	20
Project dimensions (lot)	778 m²
Net res. density (du/ha)	257
Building density (net F.A.R.)	3.29
Average du/ha of the infill area (net)	142




Multi-unit

Aerial view of the mixed-use, multi-unit building extending to the end of a block, occupying its entire lot.


Before construction of the project, a parking lot was at the end of the block.

Studies at the Densification Project scale

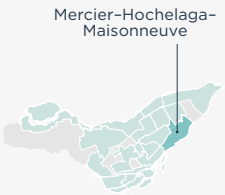
INFILL OR CONSOLIDATION OF A SMALL SITE (PARCEL)

Bossuet (Mercier–Hochelaga-Maisonneuve)

The multi-unit infill housing project located at 2800 rue Bossuet, is constructed within a built-out area, and taking advantage of the unusual depth of the block. A courtyard arrangement creates a different relationship with the street compared to those of surrounding buildings. The project respects the scale of the area, and the facades on rue Bossuet provide visual integration with the other buildings on the street.

Density statistics (type)

Number of dwelling units	69
Superficie du projet (lots)	6,564 m²
Net res. density (du/ha)	105
Densité bâtie (COS)	1.0
Average du/ha of the infill area (net)	91




Multi-unit

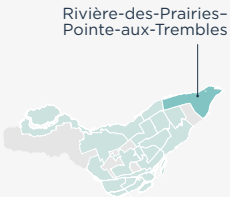

View of the entrance to a multi-unit courtyard grouping, accessible from rue Bossuet

Perras (Rivière-des-Prairies–Pointe-aux-Trembles)

This complex of stacked townhouses, at 8890 boulevard Perras, is sited at an angle from the street line. The three groups of buildings, each with its own setback, give the impression that it is three buildings, not one. The arrangement is similar to that of the buildings across the street, which means the project integrates in a dynamic way into its setting, where building siting varies.

Density statistics (type)

Number of dwelling units	26
Superficie du projet (lots)	3,472 m²
Net res. density (du/ha)	75
Building density (net F.A.R.)	0.97
Average du/ha of the infill area (net)	39




Townhouse

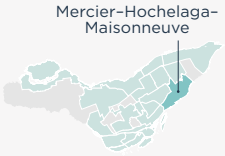

Group of townhouses, viewed from boulevard Perras.

Station No. 1 (Mercier–Hochelaga-Maisonneuve)
Former Shawinigan Water and Power Company station

Station No. 1 is a conversion of a former electric station into a housing co-operative. The complex preserves several original components and now houses 74 dwelling units which front either Promenade Luc-L'Arrivée, or a large light-filled interior courtyard located in the heart of the original building (used for parking only in the winter).

Density statistics (type)

Number of dwelling units	74
Project dimensions (lot)	3 291 m²
Net res. density (du/ha)	225
Building density (net F.A.R.)	2,11
Average du/ha of the infill area (net)	175



Remodelled facade of Station No.1, viewed from avenue d'Orléans.

Interior courtyard created in the centre of the station.

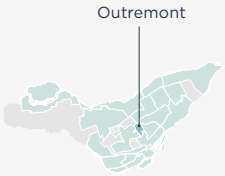
Maisons Outremont (Outremont)
Former mother house of the Sœurs missionnaires de l'Immaculée-Conception

Credit: Demonfort

This convent site adaptive reuse project included the construction of new buildings, which increased both the building density and the dwelling density of the area. The new volumes differ from the old construction, in particular due to their abundant windows. While more imposing than the other buildings in the area, the regular arrangement and the facade treatment create a complex that respects the rhythm and scale of surrounding buildings.

Density statistics (type)

Number of dwelling units	68
Project dimensions (lot)	11, 372 m²
Net res. density (du/ha)	60
Building density (net F.A.R.)	1.13
Average du/ha of the infill area (net)	17



Original building and new volumes, from côte du Vésinet.

Studies at the Densification Project scale

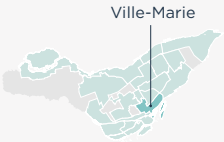
INFILL OR CONSOLIDATION OF A SMALL SITE (PARCEL)

L'Avenue (Ville-Marie)

L'Avenue is a 50-storey tower atop a basilaire (podium) with varying volumes and heights. It offers a significant mix of uses. The first levels of the building are occupied by commercial activities, including a supermarket (2 storeys, 10%). Offices occupy the rest of the podium (5 storeys, 20%), and dwelling units are located in the tower (42 étages, 70%). Glass panels allow passersby to see activity indoors; they reflect other buildings as well as the sky. Coupled with the building's variety of volumes, from the street the glass reduces the perception of density.

Density statistics (type)

Number of dwelling units	306
Superficie du projet (lots)	2,983 m²
Net res. density (du/ha)	1,026
Building density (net F.A.R.)	11.44
Average du/ha of the infill area (net)	N/A



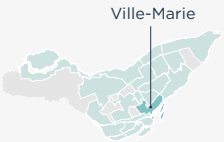
Tower podium containing commercial space, seen from rue Drummond.

Le Montcalm (Ville-Marie)

Located at 1170 Montcalm St., this complex comprised of a residential *barre* accompanied by townhouses arranged so as to leave the edge of the lot for a local park. Mature trees were protected during construction of the property. The public space provides a connection between two parks: Aristide Beauregard-Champagne and Miville-Couture.

Density statistics (type)

Number of dwelling units	116
Project dimensions (lot)	2,041 m²
Net res. density (du/ha)	529
Building density (net F.A.R.)	5.11
Average du/ha of the infill area (net)	186



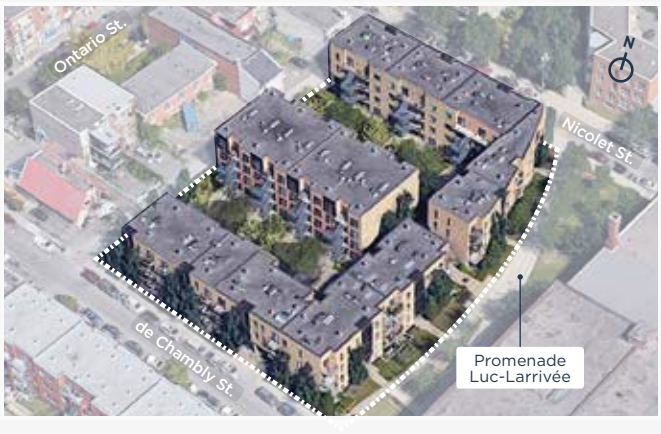
Trees along the facade reduce the perception of density.

Local mini-park at the head of the block.

Studies at the Densification Project scale

CONSOLIDATION OF PART OF A STUDY AREA NEIGHBOURHOOD (BLOCK)

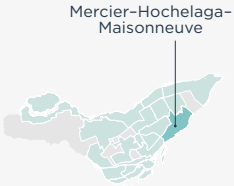
N.O.V.O. (Mercier–Hochelaga-Maisonneuve)



N.O.V.O. is a residential complex comprised of multi-unit buildings built around a courtyard and along the street. It is located on a former industrial site in the Lavo area. Common spaces between the buildings are accessible from four points on the street as well as from the dwelling units. The buildings on the south portion of the project engage in close dialogue with promenade Luc-Larivée (a public multipurpose path) which is located on the historic railway line that once ran through the area.

Density statistics (type)

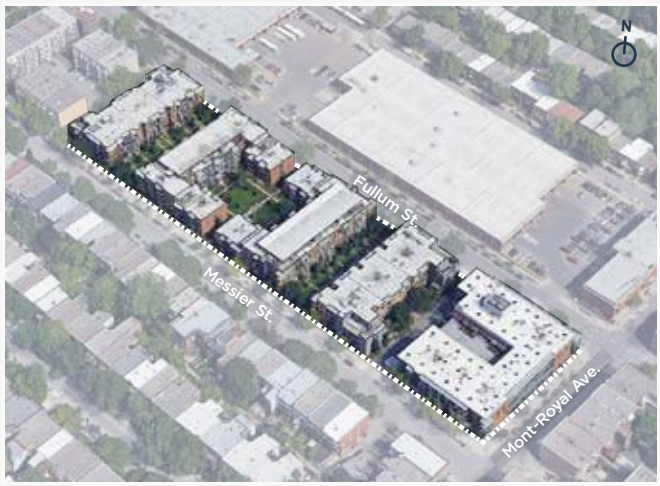
Number of dwelling units	93
Project dimensions (lot)	4,555 m²
Net res. density (du/ha)	204
Building density (net F.A.R.)	1.85
Average du/ha of the infill area (net)	145




Multi-unit


The design of the facades along the promenade is similar to that of the street-front facades. This segment of the promenade is like a park, since it is rather wide and is landscaped with vegetation.

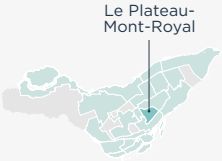
Platopolis (Le Plateau-Mont-Royal)



Platopolis is a residential group of four *barre*-style multi-unit buildings sited around a courtyard, with one mixed-use building at the end of the block. The latter contains a supermarket on the ground floor and dwelling units (part of a housing co-op) on the upper storeys.

Density statistics (type)

Number of dwelling units	236
Project dimensions (lot)	14,186 m²
Net res. density (du/ha)	178
Building density (net F.A.R.)	2.23
Average du/ha of the infill area (net)	176




Multi-unit


The different volumes are interrupted by the green canopy of interior courtyards.

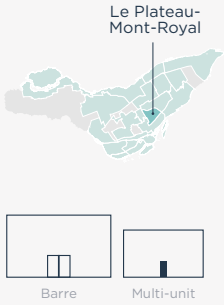

Buildings are accessible via large courtyards landscaped with vegetation.

333 Sherbrooke (Le Plateau-Mont-Royal)

Residential complex including two *barres* linked by a passageway leading to rue Sherbrooke and a series of multi-unit buildings around a plaza. The opening in the building facade offers visual permeability, while the continuity of the structures provides uniform framing for the public plaza (place Gilles-Carle).

Density statistics (type)

Number of dwelling units	188
Project dimensions (lot)	7,432 m²
Net res. density (du/ha)	253
Building density (net F.A.R.)	4.24
Average du/ha of the infill area (net)	146



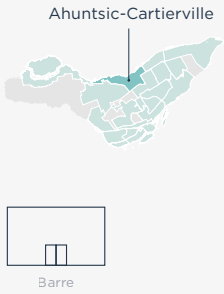
View from Place Gilles-Carle, framed by the buildings of the complex. The large opening between the volumes of the building on rue Sherbrooke invites passersby to walk through it.

Henri-Bourassa (Ahuntsic-Cartierville)

This project is comprised of a group of two *barre* buildings including housing, and a seniors' residence. The ground-floor levels of the buildings are occupied by commercial operations on boulevard Henri-Bourassa and avenue Millen, including a supermarket, medical clinic and restaurants. Part of the land-use pattern around the Henri-Bourassa metro station, located nearby, they establish a dialogue with the central median on avenue Millen, designed as a pedestrian walkway.

Density statistics (type)

Number of dwelling units	400
Project dimensions (lot)	11,001 m²
Net res. density (du/ha)	364
Building density (net F.A.R.)	3.55
Average du/ha of the infill area (net)	96



The siting and volume of the building give it a strong presence on boul. Henri-Bourrassa.

Vegetation along the walkway on avenue Millen complements the project.

Studies at the Densification Project scale

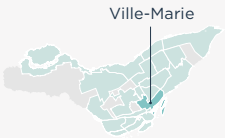
CONSOLIDATION OF PART OF A STUDY AREA NEIGHBOURHOOD (BLOCK)

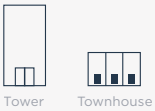
YUL Centre-ville (Ville-Marie)

This mixed-use residential complex on the edge of the central business district is comprised of a hotel tower and two 38-storey residential towers connected by *barres*. It is lined on the southwest by a row of townhouses, which face rue Overdale and an interior courtyard. With its towers along boulevard René-Lévesque and more than 800 dwelling units, the project integrates with the context of downtown, but also with the scale of the older buildings to the south and east.

Density statistics (type)

Number of dwelling units	846
Project dimensions (lot)	13,160 m²
Net res. density (du/ha)	643
Building density (net F.A.R.)	7.52
Average du/ha of the infill area (net)	N/A





The townhouses on avenue Overdale create a gradation in the scale of buildings in the complex.

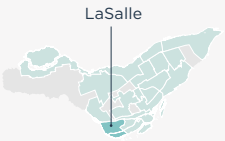
View of the YUL towers from boulevard René-Lévesque.

EQ 8 + Areve (LaSalle)

L'EQ 8 is a high-density residential complex located in the TOD area around the Angrignon metro station, facing the shopping centre of the same name. The generous ground-floor fenestration and the setbacks along boulevard Newman create an opening and an interesting connection to the public spaces that line the project. An interior courtyard provides more private space for residents.

Density statistics (type)

Number of dwelling units	717
Project dimensions (lot)	18,400m²
Net res. density (du/ha)	388
Building density (net F.A.R.)	3.78
Average du/ha of the infill area (net)	125



View of the articulation of volumes and commercial windows from boulevard Newman.

The lot comes to a point, where two building volumes connect to form a V shape.

CONSOLIDATION OF A NEIGHBOURHOOD (LARGE AREA)

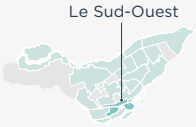
Imperial Tobacco (Le Sud-Ouest)

Heritage adaptive reuse project

This residential complex combines the conversion of former Imperial Tobacco factories with the construction of new residential *barres*. An employment component is also located near the project, with one building housing some of the offices of Imperial Tobacco Canada Limited, which remained in the area, as well as municipal office space.

Density statistics (type)

Number of dwelling units	439
Project dimensions (lot)	12,947 m²
Net res. density (du/ha)	339
Building density (net F.A.R.)	2.45
Average du/ha of the infill area (net)	174



New office building preserves employment opportunities in the area.

One of the Imperial Tobacco properties was converted into housing. A row of trees planted after completion of the conversion project improves the building's relationship with the street.

The residential components include both condominiums and co-operatives. The scale of the new buildings provides a gradation between those of the imposing industrial plants and the fine-grained residential scale of the area, comprised of plex buildings.

Different residential groups were developed on distinct blocks, which benefit from large landscaped shared interior courtyards as well as rooftop terraces, including a green roof.

Construction of a new volume provides gradation between the industrial buildings and typical Montréal plexes.

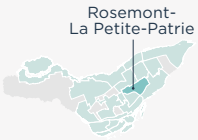
L'îlot Rosemont (Rosemont–La-Petite-Patrie)

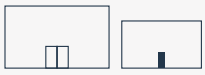
TOD adaptive reuse project

Îlot Rosemont, on which is located the eponymous metro station, is a mixed residential complex including a housing co-op (95 units), 3 social housing buildings (60 units), 1 seniors' residence, a group of condominiums with ground-floor stores and a library (reuse and enlargement of an institutional building).

Density statistics (type)

Number of dwelling units	845
Project dimensions (lot)	37,807 m²
Net res. density (du/ha)	223
Building density (net F.A.R.)	2.25
Average du/ha of the infill area (net)	134





Small public plaza adjacent to a playground and water feature, behind the bibliothèque Marc-Favreau.

Large green space within ensemble Quartier 54 facing rue de Chateaubriand.

This complex includes numerous outdoor spaces, including a mini-plaza and children's playground behind bibliothèque Marc-Favreau, as well as a vast interior courtyard within the block around which the co-operative and social housing projects were built. Creation of the latter element was possible because of a drastic reduction of parking requirements and the joint design of the groundwater management facilities and the recreational space.

A social housing project for seniors is currently being constructed above the metro station and the turning area for the bus terminal, which will permit consolidation of the rue Saint-Denis and boulevard Rosemont intersection (included in density statistics).

Ground-floor stores on a mini-plaza facing boulevard Rosemont.

The play of volumes and materials on one of the social housing buildings livens up its facade.

The interior courtyards of this complex are accessible via narrow walkways lined with plantings.

Studies at the Densification Project scale

CONSOLIDATION OF A NEIGHBOURHOOD (LARGE AREA)

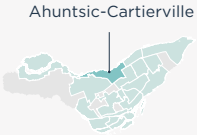
Place de l'Acadie (Ahuntsic-Cartierville)

Urban redevelopment project

Place de l'Acadie is a mixed-used development complex comprised of residential *barres* bordered by boulevard Henri-Bourassa, boulevard de l'Acadie and Autoroute des Laurentides. These buildings include condominium-type dwelling units as well as social housing, arranged around two central public spaces. Parc Roland-Giguère is made up of a small public plaza and a children's playground.

Density statistics (type)

Number of dwelling units	975
Project dimensions (lot)	35,282 m²
Net res. density (du/ha)	276
Building density (net F.A.R.)	2.62
Average du/ha of the infill area (net)	177



Convenience stores located on the ground floors of residential buildings serve residents of the area.

Parc Roland-Giguère located in the centre of the project offers green space, children's play equipment and a water feature.

Convenience stores as well as a childcare centre are located on the ground floor of some of the buildings in the complex. A local employment centre is situated on the edge of the site. Note that this complex, repossessed from negligent landlords, was the subject of a major public project that included the complete demolition of the original buildings and their reconstruction.

The large sidewalks and impressive tree canopy allow for safe and pleasant movement by pedestrians.

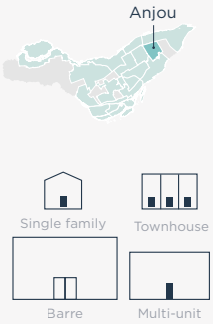
Anjou-sur-le-Lac (Anjou)

Development project in a natural setting

Anjou-sur-le-Lac is a recent residential complex bordering ruisseau De Montigny. The area benefits from natural components in its immediate surroundings, which create a high-quality neighbourhood. It offers several green spaces, parks and paths to encourage walking. The buildings of the area are of various typologies, such as single-family houses, townhouses, multi-unit buildings and residential *barres*.

Density statistics (type)

Number of dwelling units	737
Project dimensions (lot)	13,300m²
Net res. density (du/ha)	55
Building density (net F.A.R.)	0.96
Average du/ha of the infill area (net)	N/A



This driveway toward rear yard parking is lined by a group of townhouses and a row of trees.

Large-scaled buildings are located near expansive green spaces.

Development of this residential area between two large industrial zones, benefited from–and enhanced–natural spaces, protecting them from externalities often linked to industrial activities.

Semi-detached townhouses and detached cottages are located along boulevard des Galeries-d'Anjou and on la Promenade des Riverains.

Studies at the Densification Project scale

CONSOLIDATION OF A NEIGHBOURHOOD (LARGE AREA)

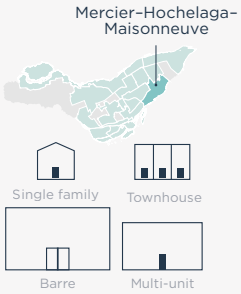
Faubourg Contrecoeur (Mercier–Hochelaga-Maisonneuve)

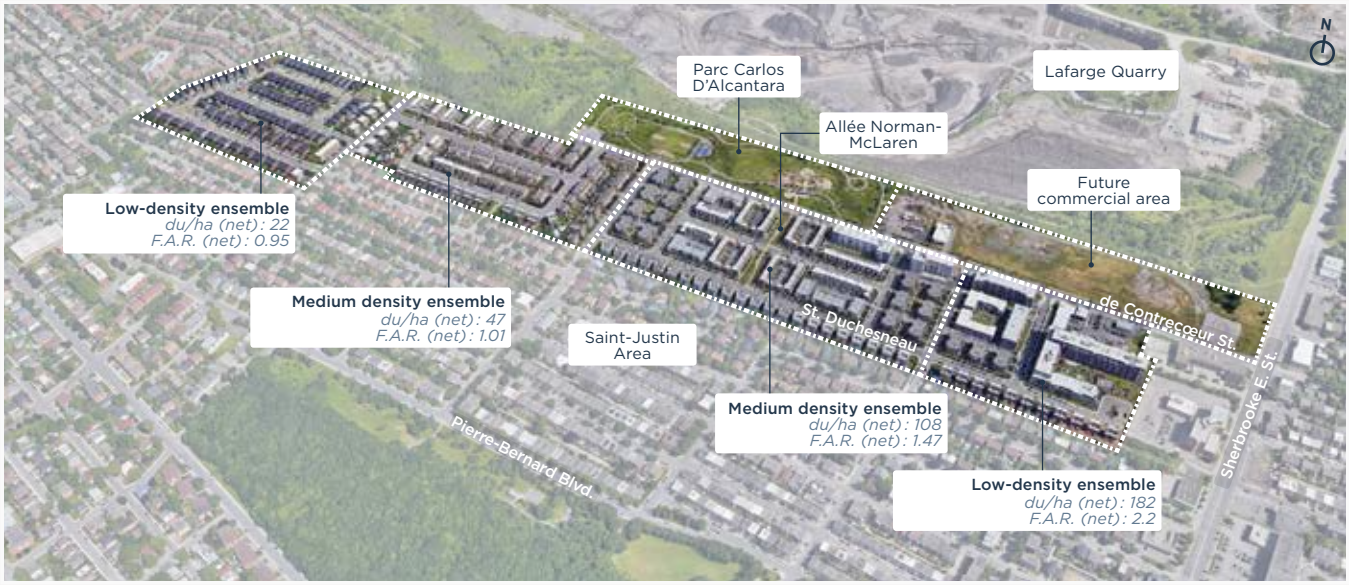
Large-scale urban development project

Faubourg Contrecœur is a major development project with a wide variety of residential typologies that progressively increased in density through its development phases. Construction of the first buildings in the area started on the portion closest to the Anjou borough border. They were mainly detached houses and groups of low-to-medium density townhouses.

Density statistics (type)

Number of dwelling units	1,725
Project dimensions (lot)	201 m²
Net res. density (du/ha)	86
Building density (net F.A.R.)	1.3
Average du/ha of the infill area (net)	49





The average dwelling density of the area increases progressively closer to rue Sherbrooke Est, as shown by the data indicated above for the four subareas.

Detached single-family homes comprise most of the low-density group constructed during the first phase.

A series of semi-detached townhouses occupy the entire interface between faubourg Contrecœur and the existing Saint-Justin area, to the west.

This group of multiplex has two facades, facing both the street and the courtyard.

Access to the interior courtyards is provided by a series of landscaped pedestrian walkways.

Development of the southern part of the site was comprised of multi-unit buildings and high-density *barres*. They include a combination of housing co-operatives, affordable condominiums and a seniors' residence. Amenities include a large public park with a children's playground, sporting facilities, pedestrian walkways between buildings, landscaped promenades and large interior courtyards that add to the permeability of the area and facilitate active modes of transportation.

Allée Norman-McLaren is a public walkway that provides opportunities for meetings and conversations. It is framed by several multiplexes facing the interior courtyard.

Coopérative Cœur du Paradis faces parc Carlos-D'Alcantara.

A residential *barre* is beside a smaller-scaled group.

Residential buildings next to parc Carlos-D'Alcantara.

The introduction of this new density into the urban fabric also provides support for the addition of services and commercial activity. Stores are located on the ground floors of some buildings and a childcare centre is under construction beside parc Carlos-D'Alcantara. In addition, a primarily commercial block is planned in the near future, at the intersection of Sherbrooke East and Contrecœur.

Buildings of varying densities are sited on the blocks closer to rue Sherbrooke Est. They include dwelling units, a seniors' residence, stores and other services.

Parc Carlos-D'Alcantara acts as a buffer between the area and the Lafarge Canada quarry.