Executive Summary

The Namur–De la Savane (NDLS) sector is entering a period of substantial transformation, moving from a predominantly low-density commercial and industrial sector to a higher-density residential and mixed-use community. The planned and ongoing redevelopment and zoning changes within the sector could result in approximately 45,000 new residents and more than 400,000 m^2 of commercial and retail space over the next 15 years. In its current state, the sector is ill-prepared to accommodate this projected growth. Existing transport networks and land use patterns have created a fragmented area that prioritizes private automobile use, fosters unpleasant conditions for residents and visitors alike and will provide inadequate social amenities, such as schools and parks, for tens of thousands of new residents. The sector's physical fragmentation is a concrete manifestation of historical planning and political decisions and divisions that render a new, coordinated planning approach crucial to ensure that the scale and pace of new developments meet the current and future needs, visions and aspirations of diverse communities.

We prepared a Coordinated Concept Plan (CCP), with a unified vision and guiding principles which can serve as a tool to encourage future dialogue and collaboration between the sector's multiple stakeholders. The CCP includes strategies to address the challenges posed by both transportation and land use issues, with detailed interventions, informed by real-world case studies, presented as examples showcasing the impact of these strategies.

The city of Montreal's objective for prioritizing active transportation and creating a mixed-use complete neighbourhood with a significant social and affordable housing component at the Namur-Hippodrome site are commendable. We are encouraged by the ongoing public consultation and planning initiatives by the City of Montreal for the Namur-Hippodrome sector and areas beyond, including the Namur metro station. Providing better active and public transport links between this critical transportation asset and the Hippodrome site is essential. However, given the large-scale changes in the surrounding areas including the RoyalMount development among others, the city should also prioritize stakeholder and jurisdictional collaboration with neighbouring municipalities and other private and public actors. This regional perspective will support the city's strategies for the Namur-Hippodrome sector, while also benefiting residents, workers and visitors to other areas within the NDLS sector. This approach will require new tools for collective decision-making that would benefit the entire NDLS sector instead of the prevalent pattern of individual enclaves of development in the area.

We would like to present a brief synopsis of five key strategies or recommendations which would benefit the Namur-Hippodrome sector planning process. These strategies would benefit the Namur-Hippodrome planning initiative while expanding its focus within the larger context of the NDLS sector.

Active green network – a continuous network with multiple axis and uses to support active transportation and biodiversity that can improve environmental quality and connect upcoming developments within and beyond the NDLS sector.

Electric-based transportation network – a cost-effective and aesthetic option that will create a unique identity and character for the sector, while also improving public transit service and access, concentrating and promoting economic development along growth corridors.

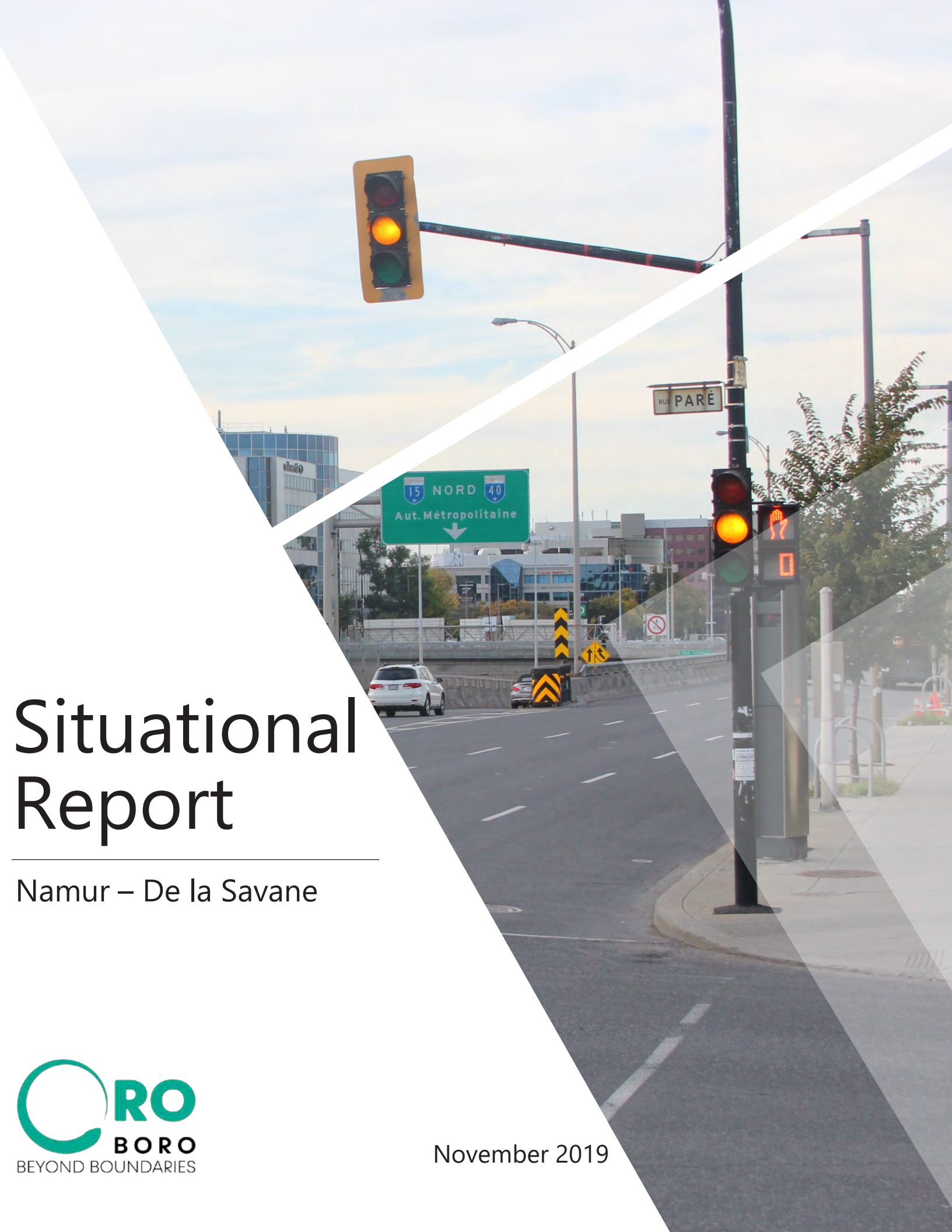
Social Infrastructure – securing land, infrastructure, and funding for schools, parks, and community centres before NDLS land values increase.

Permeability across large barriers – A series of underpasses along the A-40 and the CP train tracks connecting active transport networks and creating more inviting public spaces in underutilized areas by repurposing existing infrastructure.

Decking over Décarie – creating a 'roof' over a portion of the expressway to mitigate noise and air pollution, improve safety and aesthetics, and provide new green and public space.

About Oroboro:

Oroboro consists of nine second-year urban planning graduate students at McGill University. Combining our wide range of cultural, educational and professional backgrounds, we completed a detailed analysis of transportation and land use trends and presented a Coordinated Concept Plan for the NDLS sector to the City of Côte Saint-Luc and the borough of Saint-Laurent, who were our clients as part of a studio project between September to December 2019.



Situational Report

Namur – De la Savane

BORO
BEYOND BOUNDARIES

November 2019

November 8, 2019

Attn: Ms. Tanya Abramovitch
City Manager
City of Côte Saint-Luc
5801 Cavendish Blvd
Côte Saint-Luc, QC
H4W 3C3

Attn: Mr. Rafik Salama
Conseiller en planification
Borough of Saint-Laurent
777 Marcel-Laurin Blvd
Saint-Laurent, QC
H4M 2M7

Subject: Submission of the Namur – De la Savane Situational Report

Dear Ms. Abramovitch & Mr. Salama:

In accordance with the terms of our mandate, the Oroboro team is pleased to present the Situational Report of the Namur – De la Savane sector.

The report is based on a thorough examination of previous studies conducted for the sector and the many projects that are set to shape its future. We also assessed the sector's land-use and transportation challenges by analyzing multiple sources of data and the respective administrations' policies and bylaws. Finally, we visited the sector on multiple occasions to conduct a series of public consultations, collect field data, and carry out on-site observations.

We complemented our findings with preliminary concept visions for the future of the sector and the key challenges that will need to be addressed. To show how these visions might be implemented, we conclude by presenting case studies that illustrate relevant best practices in urban development and planning.

The situational report will be the foundation on which we will build the coordinated concept plan for the sector. Further discussions with you and the sector's other stakeholders will enable us to develop a long-range planning vision that unifies the interests of all concerned parties.

We look forward to discussing with you about the further details of these visions that will ensure sustainable vitality for the Namur – De la Savane sector. Please do not hesitate to reach out if you have any questions.

Sincerely,

The Oroboro team

BORO

BEYOND BOUNDARIES

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(Oroboro)

Executive Summary

The situational report prepared by Oroboro provides an analysis and assessment of the current state of land use and transportation within the Namur-De la Savane (NDLS) sector and the potential impacts of proposed projects within and in close proximity to the area. In addition to important contextual information, the report highlights key challenges that will need to be addressed to ensure that future projects do not lead to worsened conditions and, instead, foster a sector of high-quality, distinct communities that are well-integrated via a sustainable transportation network.

Key Challenges

- **An unattractive and fragmented environment** – Barriers and underutilized spaces as a result of car-centric planning have led to an unpleasant environment that lacks coherence.

- **Isolated enclaves and social disparity** – A mismatch between the needs of existing residents and what is being offered by upcoming developments could result in the further isolation or displacement of vulnerable populations.

- **A potential hard and soft infrastructure deficit** – Services and facilities within the sector are inadequate for the current population and predicting the needs of incoming populations is a challenge without clear target demographics for planned developments.

- **Disjointed transportation networks** – Previous industrial uses and railway infrastructure have created barriers and led to gaps in active transport facilities, poorly linked public transit, a lack of street grid, and break in Cavendish Boulevard.

- **Auto-dominant mode share** – As 80% of trips to the area are made by car, this results in high levels of vehicular traffic, poor neighbourhood connectivity, and increased threats to safety.

- **Inadequate active transportation infrastructure** – Despite the presence of facilities just beyond the sector, there is a lack of pedestrian-friendly spaces and cycling/micromobility infrastructure within the sector, which discourages the adoption of these modes.

- **High-risk areas for different modes** – Different road segments pose particular risks to drivers, cyclists, and pedestrians and will require different interventions to improve overall safety in the area.

These challenges have informed the following eleven potential land use and transportation policies and interventions. Upon receiving feedback and confirmation from the clients, some of these interventions are to be further explored within a Coordinated Concept Plan (CCP). The CCP will then serve as a tool to encourage inter-jurisdictional collaboration and as an important step in the development of coherent vision for the sector.

Proposed Interventions

1. Decking over the A-15 – Constructing a "roof" over the below-grade sections of the expressway. While logistical and financial considerations would need to be addressed, potential benefits of this option include:

- Mitigating the noise and air pollution generated by vehicles on the autoroute, creating a safer, more comfortable, and aesthetically-pleasing east-west pedestrian connection across Décarie Boulevard.

- Creation of new sites for public and green spaces, which are currently sparse within the sector.

2. Landscape-Based Eco-District – A continuous green network or 'green corridor' to:

- Support active mobility and biodiversity.

- Complement upcoming developments in the area.

3. Application of Form-Based Codes – Zoning tools aimed at regulating the character of property development rather than the use.

While it is crucial to identify how such policies would interact with existing policies at the municipal and provincial levels, form-based codes could provide the following benefits:

- Supporting mixed compatible uses, including retail shops, residential spaces, restaurants, and other low-impact services, while ensuring that non-compatible uses are excluded.

- Unlike design guidelines, developers would be legally bound to incorporate form-based standards into their projects.

4. Micro-scale electrified transport network to fill public transit gaps – Emerging technologies offer a cost-effective blend of the aesthetic and performance-related attributes of tramways with the lower capital costs and greater flexibility of traditional buses. Potential benefits include:

- Providing high-quality local transit options within the sector.

- Generating a unifying sector identity and promoting real-estate development.

- Enhancing connections with other modes of transit (including the REM) for trips to and from the sector.

5. Transportation policy for a connected network of active transit – Following the example of cities who have successfully used transportation policies to reclaim the city's streets as enjoyable and healthy places to walk, creative means to improve pedestrian comfort could be explored, such as:

- Limiting vehicle access to single-lane streets around a cluster of blocks (the 'Superblock' strategy).

- Designing new public spaces in intersections and pedestrianized streets.

6. Transit- & Pedestrian- Oriented Developments (TOD & POD) – Policies that encourage ongoing and future developments to integrate higher densities and mix of uses close to transit stops, or focus on pedestrians as a primary transportation orientation.

This option could include an investigation into case studies and policies that:

- Incorporate important traffic-calming measures and making walking an easy, safe and pleasant option to discourage private vehicle use.

- Require buildings to be placed close to the streets and ensuring that zoning allows a mix of uses.

7. Cavendish Green Transit Way – The Cavendish Extension presents a significant opportunity to improve mobility within the isolated western reaches of the study area, but could also serve to perpetuate car-centred transportation.

While the impacts on other traffic congestion reduction initiatives in the area will need to be evaluated, prohibiting passenger car use of the extension should be considered, either in the form of:

- Public transit and active-mode exclusive access; or

- Public transit, active, as well as commercial delivery access.

8. Underpasses beneath the A-40 – A major obstacle to north-south movement, the only links beneath the A-40 do not invite foot traffic.

Creating more inviting spaces beneath the autoroute—e.g. widened sidewalks and active transit paths, attractive lighting, street furniture and public art, and physical or visual separation from cars—could serve as relatively inexpensive yet effective interventions to:

- Reconnect neighbourhoods fragmented by the highway.
- Create new parks and public spaces.
- Better integrate the sector into broader active transit networks.
- Use the presence of nearby developments to leverage public-private partnerships that can help cover the costs of underpass revitalization.

9. Extending shared and micromobility options – Both vehicle-based services (Communauto and Car2go) and micromobility solutions (BIXI, Lime, Jump) can reduce reliance on private vehicles by closing gaps in the current public transportation network.

However, the advantages offered by these services require that adequate access be provided to residents and visitors within the sector. While the pros and cons of such services will have to be carefully weighed, options that could be explored include:

- Adopting small-scale pilot projects in currently unserved areas.
- Look into design options that could allow operators to make their service more suited to the local context within underserved areas.
- Allowing users of car-sharing services to park in resident-only zones.

10. Eliminating parking minimums, 'unbundling', and carshare – With many new large-scale developments underway, the amount of parking required with existing regulation may lead to an even greater surplus in parking supply. An **overabundance** of parking is contradictory to a vision of sustainable transportation as it encourages driving, acts as a barrier for cyclists and pedestrians, occupies valuable land, as well as contributing to the urban heat island effect. Some solutions to consider include:

- Tightening parking maximums for new apartment and condominium complexes near mass transit, and eliminating minimum parking requirements.
- 'Unbundling' the cost of parking from rent and purchase prices, making housing more affordable for those who do not want or need a parking space.

- Requiring developers to reserve a certain percentage of spaces provided for carshare services.

- Implementing parking time limits and paid on-street parking as strategies to encourage parking turnover.

11. Sustainable 'last mile' freight systems – Growth in the e-commerce sector has led to demand for delivery of smaller amounts of goods with higher frequency, resulting in a substantial increase in number of delivery vehicles on city streets, and new development in the sector will further this demand. The following options should be considered to reduce traffic congestion and emissions from 'last mile' delivery:

- Expanding Montreal's electric cargo bike delivery pilot project.

- Using recent technological innovations to decongest residential neighbourhood deliveries.

Introduction

The Namur-De la Savane (NDLS) sector sits at a crossroads. Located at the heart of the Island of Montréal, where autoroutes 15 and 40 meet [***Figure 1***], NDLS is on the brink of a wholesale transformation. Major proposed developments are poised to shift the sector along the heavily trafficked Décarie Boulevard from predominantly low-density commercial and light industrial uses to higher density residential and retail mixed uses. The scale and speed of the transition—including the potential addition of more than 40,000 residents—pose serious challenges related to land use, urban design, and transportation. They also present a once-in-a-generation opportunity to reshape a centrally located area of the metropole.

Given the breadth of the projected changes, the City of Côte Saint-Luc (CSL) and the Borough of Saint-Laurent engaged Oroboro to devise a coordinated concept plan to outline directions for the future redevelopment of the NDLS sector. Major physical barriers—including highways, boulevards and railroad tracks—and multiple jurisdictional boundaries divide and isolate NDLS, underscoring the central importance of a coordinated, unifying vision. Based on an analysis of current and future conditions, this situational report takes the first step toward the elaboration of this vision by articulating a series of broad principles, strategies, and potential interventions. The aim of this preliminary report is to spark conversation and invite feedback.

This report starts by assessing the sector's history, context, and the relevant development projects that will shape its future. Oroboro's land use and transportation teams performed various analyses to develop an understanding of current and future demands, as well as the sector's capacity to answer local and regional needs. We conducted these baseline analyses at three different scales—the sector-level, the level of adjacent jurisdictions and planned projects, and a 5 km radius—to help reveal intra- and inter-area patterns and differences and to situate NDLS within its broader context [***Figure 2***].

Consultation with stakeholders and a series of public engagement sessions were also conducted to support the assessment of current challenges and visions for the sector.

Within the report, a series of case studies and brief precedents are presented to identify feasible interventions

Figure 1 The Namur-De la Savane sector encompasses the heavily-trafficked Décarie Boulevard, occupying a seven-square kilometre space to the southwest of the intersection of autoroutes 15 and 40, and includes portions of the City of Côte Saint-Luc, Borough of Saint-Laurent, Town of Mont-Royal and Côte-des-Neiges-Notre-Dame-de-Grâce.

that follow contemporary best practices in the land use and transportation fields. These interventions will guide the development of the upcoming coordinated concept plan (CCP) that will enable stakeholders to follow a shared vision to reach their common goals.

At the heart of Oroboro's approach lies the goal of ensuring that new developments are well-integrated into the existing urban fabric and provide effective sustainable transportation solutions. We encourage officials and other stakeholders from the NDLS municipalities and boroughs to review these initial possibilities as "conversation starters." Based on feedback, we will select two to three of these orientations and their associated components in greater depth during the next phase of this project.

The principles which we invite stakeholders to reflect on include:

- Respecting and emphasizing the unique built and natural landscapes within the sector and its relationship to surrounding areas.

- Planning for long term redevelopment and densification within a regional context, while addressing the needs of current and future populations.

- Encouraging new models of partnership between public and private sector actors and diverse stakeholders.

- Prioritizing public space development and infrastructure enhancement to improve connections between isolated and fragmented areas.

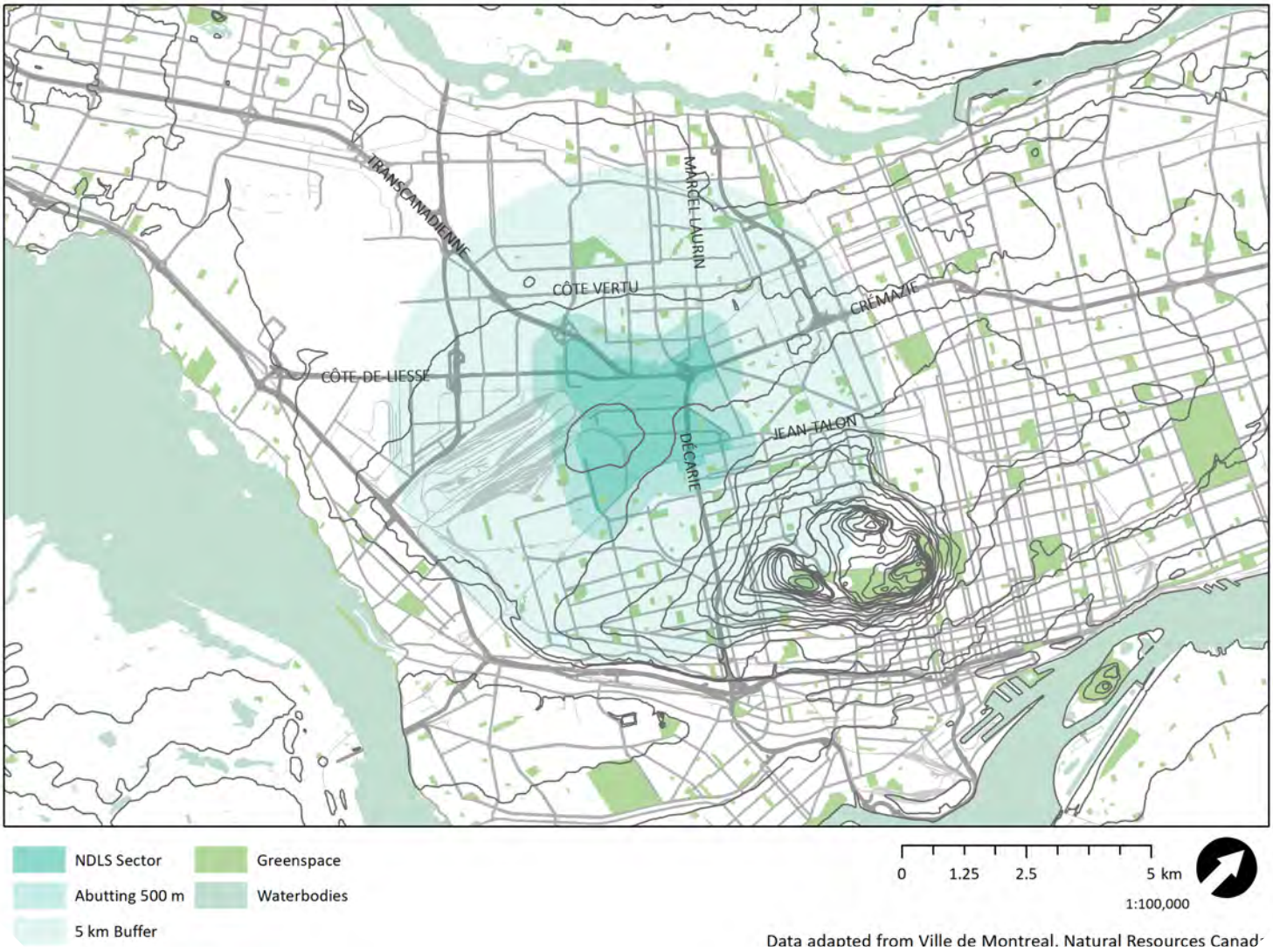


Figure 2 The NDLS sector in relation to the surrounding areas and the Island of Montreal.

Figure 3 Historical evolution of the sector with the modern-day autoroutes 15 and 40 overlayed. From left to right, the Island of Montreal in

Evolution of Namur-De la Savane

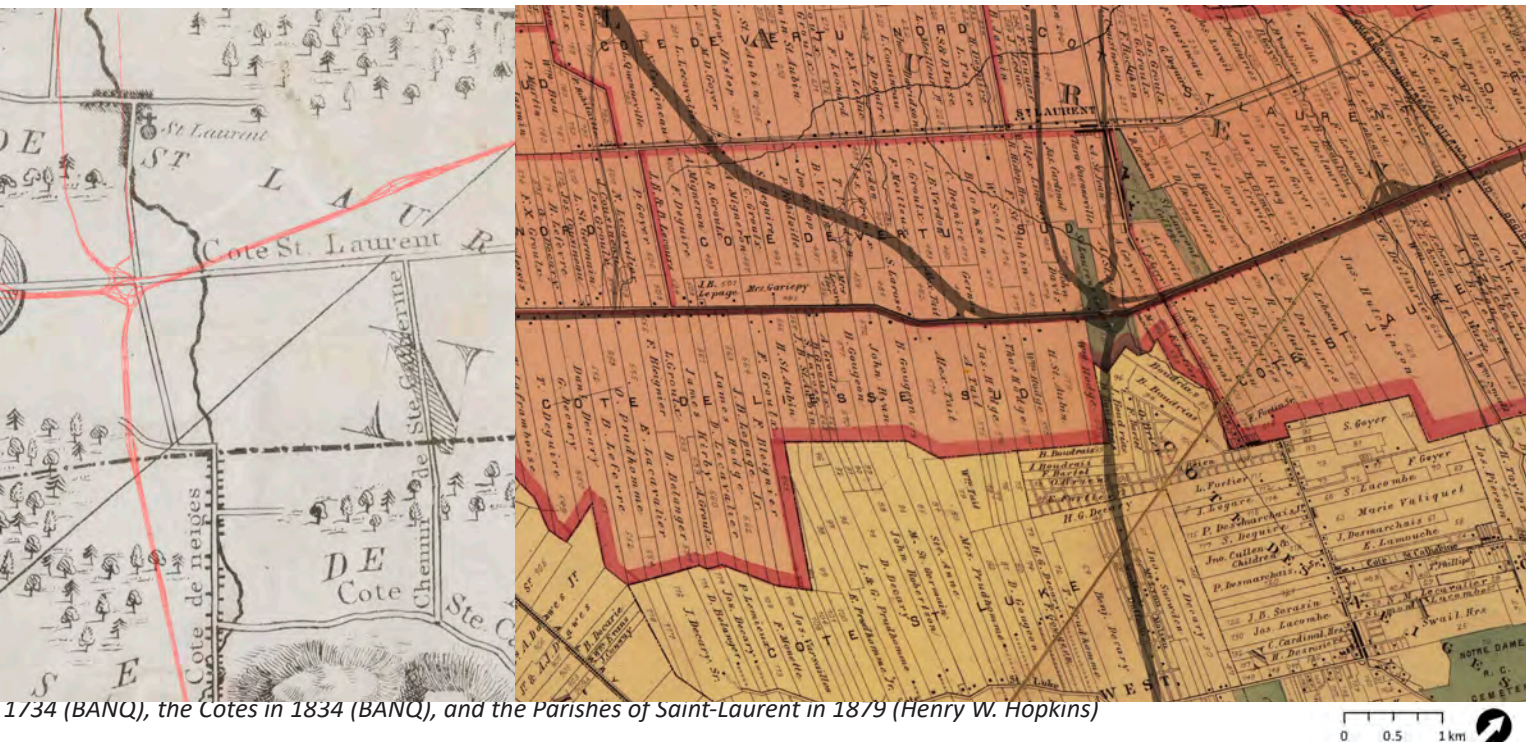
History of the NDLS Sector

Seigneuries and Agricultural Uses

During the 17th century, the land on which the NDLS sector is presently located was organized and divided into the first seigneuries on the Island of Montréal. Those divisions were based on the parcours-mère (first routes) and natural streams. Most of these divisions can still be seen today; Côte Notre-Dame-de-Liesse, Côte Ste-Catherine, Côte Saint-Laurent (now corresponds to the Autoroute 40) and Ruisseau Raimbault (now De la Savane Street). The NDLS sector is situated at the intersection of threeformer seigneuries. The leftover space in between these seignuries is now occupied by The Triangle. These seigneuries were expanded and merged together to become parishes. On the Island of Montréal, two different parishes were established: the Parish of Saint-Laurent and the Parish of Montréal. These parishes included independent towns and villages such as Côte Saint-Laurent, Côte Vertu, and Côte-de-Liesse in the Parish of Saint-Laurent and Côte Saint-Luc, Notre-Dame-de-Grâce and Côte-des-Neiges in the Parish of Montréal. They were divided by what is now the Décarie Interchange at the intersection of the autoroutes 15 and 40 [***Figure 3***].

The First Suburbs and the Beginning of Urbanization

During the 18th and 19th centuries, the site and its surrounding areas were used as agricultural land. As this practice declined, the first suburbs were developed in the sector alongside the construction of the new railway (Union Jacques Cartier Railway and Ontario & Québec Railway) and tramway tracks [***Figure 4***]. The Blue Bonnets Hippodrome race track was built in 1907 in coordination with the construction of the new tramway.



1734 (BANQ), the Côtes in 1834 (BANQ), and the Parishes of Saint-Laurent in 1879 (Henry W. Hopkins)

In 1940, the City of Montréal absorbed Côte-des-Neiges, Mount Royal, and Notre-Dame-de-Grâce, while Saint-Laurent remained an independent city and Côte Saint-Luc a village. Urbanization pressures from the city led to the urban development of Notre-Dame-de-Grâce and Côte-des-Neiges, which adopted a street grid pattern and higher-density building typologies. These changes also led to the development of the City of Hampstead and of Côte Saint-Luc as suburbs. Most of this redevelopment was completed in the 1950s [***Figure 5***]. In the Town of Mount Royal, the land that was not developed as part of town's Model City plan was subdivided into large blocks for industrial and commercial use [industrial and commercial uses represented in purple and red, respectively in ***Figure 6***. The completion of the sorting yard in CSL (1950) further fragmented the sector into jurisdictional and physical enclaves by separating it from the other cities.

The Rise of the Personal Vehicle

While the tramway and rail enabled rapid expansion of suburban development, the proliferation of private vehicles in the 1950s guided the form of future of development in the area. The decommissioning of the tramway and Montréal's preparations for Expo 67, the World's Fair, led to large public investments in a regional automobile-oriented transportation network. Décarie Boulevard, built as a small road linking Côte-des-Neiges to Saint-Jacques Street in the late 17th century, evolved into a key corridor for access to the northern part of the island.

To solidify its role as a main artery, the boulevard was converted into an expressway just in time for the launch of Expo 67. Additional transportation projects, including the Autoroute Métropolitaine as well as the Turcot and Décarie Interchanges, were completed at the same time. The multiple land expropriations required for these infrastructure projects and their negative environmental impacts were contested by community-based movements such as the Société pour vaincre la pollution (SVP), who in the early 1970s fought for a reduction in the number of vehicles within cities, more green spaces, and additional public transportation options.

Figure 4 Land uses in 1940. Agricultural lands in light green. (Underwriters Survey Bureau Limited)

Figure 5 Urbanization of the landscape in 1958 (Ville de Montréal)

Figure 6 Industrial and commercial uses represented in purple and red, respectively, in this 1970s land-use map. (Underwriters Survey Bureau Limited.)

The 1976 Montréal Summer Olympics generated another round of public sector investments in large scale transportation infrastructure. The metro, which was first launched in preparation for Expo 67, was expanded, with the Orange Line extended to reach the sector in the early 1980s. By the mid-80s, the first stations of the Blue Line opened and by 1988 the line was completed, reaching the western arm of the Orange Line.

Today, the sector is still dominated by private vehicles. Traffic analyses conducted in the last decade all show that the road network has become saturated and that the future of transportation in the sector will need to be supplemented by active and public transport.

At an intersection of distinct political entities, the sector has faced many jurisdictional changes over time that have shaped both hard and soft infrastructure in the area as well as its inter- and intra- region connections (or lack thereof). The current built environment reflects these tensions with the distinct visions adopted by the different boroughs, municipalities, and stakeholders.

Political and Jurisdictional Boundaries

Regional and Local Government

The sector is divided among three municipalities (TMR, CSL and the City of Montréal) and two boroughs within the City of Montréal (Saint-Laurent and CDN-NDG). The multiplicity of local governments and jurisdictions within the sector have made it difficult to coordinate planning initiatives and develop a cohesive vision for the area. Some of these governance issues have been a result of political changes and multi-scalar jurisdictions and planning bodies that have evolved over the past 20 years. The changes briefly discussed below, while meant to encourage cooperation and streamlined decision making, have resulted in fragmentation and intra-regional competition for private and public sector investments in development.

The Communauté métropolitaine de Montréal (CMM) is a metropolitan level government body, created in 2001 by the provincial government, responsible for planning, coordinating, and funding regional growth within the larger region that includes 82 municipalities. The Plan métropolitain d'aménagement et de développement (PMAD) is a regional growth plan prepared by the CMM to coordinate regional scale urban development. One of the key planning directions of this plan targets 40% of future housing growth around transit stations as part of Transit Oriented Development (TOD). Areas within a one-kilometer radius surrounding the Namur and De la Savane metro stations have minimum targets of 80 residential units per hectare to be realized within a 2031 planning horizon. The PMAD also seeks to consolidate economic poles to intensify employment. The Saint-Laurent employment pole, adjacent to the study sector, is the second largest in the region and is also targeted as an area for business intensification and job growth.

The Montréal agglomeration council (MA) is a regional level of government created in 2006 with jurisdiction over the City of Montréal and the 16 reconstituted municipalities covering the Island of Montréal. The MA council has 31 representatives composed of elected officials from each municipal jurisdiction in the area. This governing body is responsible for establishing property taxes and service rates along with delivering key services and establishing by-laws that span the entire island. The City of Montréal has overarching decision-making authority within the MA council.

An attempt by the provincial government in 2001 to merge all the municipalities on the Island of Montréal into the City of Montréal eventually resulted in the separation and reconstitution of 16 independent municipalities, including CSL and TMR. However, the former City of Saint-Laurent remained within the jurisdictional boundaries of the City of Montréal and is one of the two boroughs within the sector along with CDN-NDG. While CSL and TMR have recently updated their city-wide master plans (2017), the City of Montréal's master plan has not been revised since 2004.

The sector also includes multiple organizations and actors that are regulated under the provincial or federal governments. Transportation companies and authorities occupy and govern a significant portion of land within the sector and are important actors in the realisation of future developments in the area. The Canadian National (CN) and Canadian Pacific (CP) railways own and operate over 400 ha of land within the boundaries of CSL and the borough of Saint-Laurent, including several tracks that create hard boundaries and fragment neighbourhoods in the area. Railway companies in Canada are regulated by the federal government, exempting them from municipal by-laws and regulations. This has made it particularly difficult for local governments to negotiate right of way agreements for over or underpasses to allow pedestrian or vehicular access across railway tracks in urban centres across Montréal.

The sector requires new models of inter-municipal planning and collaboration. The Programme particulier d'urbanisme (PPU), a legal instrument for special planning within complex areas, only applies to individual municipalities.

The Namur – De la Savane Working Group is a recent example of a concerted effort at collaborative planning. The report published by this group in May 2019 identifies inter-jurisdictional collaboration as a key strategy for successful implementation of its recommendations. One of the recommendations for unified planning in the sector involves creating a special committee or body that would plan the growth and development of sector under the leadership of the Québec Minister of Transportation for Montréal and the Mayor of Montréal. However, the Association of Suburban Municipalities (ASM), comprised of the 15 independent municipalities on the Island of Montréal, do not support the call for a new regulatory authority to manage growth in the sector. The ASM is concerned about maintaining the autonomy of local governments in order to permit diversified regional growth outside of the City of Montréal.

BORO

BEYOND BOUNDARIES

Population and Land Use: Today and Tomorrow

Today, light-industrial and commercial uses predominate in most the NDLS sector, translating into relatively lower population densities and some limitations on the amenities available to existing residents. This is expected to change significantly as major developments progress throughout the area. The current urban fabric and upcoming projects in response to the needs of current and future populations is of primary concern when it comes to land use patterns and trends in the NDLS sector. The isolated and disjointed nature of developments proposed will exacerbate this mismatch. This subsection summarizes current and projected growth and land use patterns, broken down into the following analyses: (1) current population composition and growth at different scales, (2) built environment and land use patterns, (3) ongoing and upcoming development projects, and (4) key land use-related challenges.

This section provides an overview of key socio-demographic trends of current residents and employees in the sector. Information about the current population, income and employment, as well as immigration status was collected from Statistics Canada based on the 2016 census and other supplementary sources to contextualize local patterns within the larger regional context.

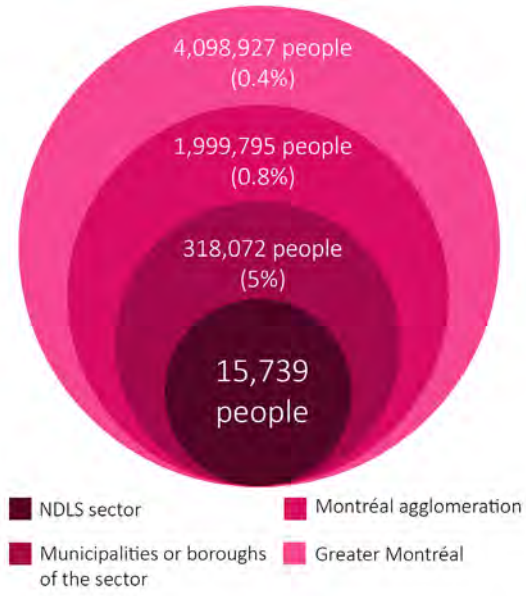


Figure 7 NDLS population in larger contexts (2016)

Population Poised for Growth

As an area designated for strategic development, the NDLS sector is to undergo massive changes as industrial zones are repurposed for residential and commercial activities. It is therefore imperative to identify proposed developments, how they will integrate into the existing urban fabric, and their potential positive and negative impacts on the sector. This section will summarize all the recently developed and proposed projects in Table 1 below. The new developments, if completed, will significantly increase population and density.

Current Population and Density

According to 2016 statistics, there are approximately 15,739 people in the sector – representing just 5% of the total population of the four municipalities or boroughs in the sector. Population in the sector was already on the rise, experiencing 17% growth since 2011 – a significantly higher growth rate compared to the four municipalities and boroughs as a whole (2%) and Montréal agglomeration (3%). At a current gross density of 22 people per hectare, the sector is more sparsely populated than the four adjoining municipalities and boroughs (40 people per ha) and the Montréal agglomeration (39 people per ha).

The allocation of sector population among jurisdictions will change as well. Today, most of the residential population of the sector resides in CSL (42%), though CSL

PROJECT NAME	RESIDENTIAL UNITS	ESTIMATED NUMBER OF RESIDENTS
Hippodrome site	5,000	10,750
Décarie Square	700	1,505
Westbury	660	1,419
The Triangle	3,300	7,095
5196-5200 de la Savane	432	929
TOD Hodge	2,500	5,375
Royalmount	6,000	12,900
Smart Urban	1,000	2,150
Midtown City	800	1,720
Mitchell Site	1,000	2,150
Bourdon	150	323
Cavendish Mall	451	970
TOTAL	**21,993**	**47,285**

Table 1 Upcoming projects' influence on housing units and population.

accounts for only 12% of the total land. TMR, on the other hand, has the smallest proportion of the current population (7%) and the largest land area (32%), dedicated primarily to industrial purposes. The area within CSL is mostly zoned as residential and is mostly developed, which would make it harder to redevelop, whereas it is easier to convert zones within TMR into mixed or residential uses.

New Developments: Population and Density

Based on the current population, the number of people in the sector could reach 27,416 people in 2031 and 30,635 people in 2034 (when doubling the 2016 population). However, major upcoming development projects will highly influence the future population as well.

Assuming that all the proposed projects will be realized within the next 15 years, the upcoming developments are estimated to add 22,000 dwelling units in the sector [*Table 1*]. Based on the current average household composition within the NDLS sector (i.e. 2.15 people per household), the projects could add an additional 47,285 residents to the sector. The CMM has projected an additional population growth of 227,000 new residents (or 2,226,795 total residents) within the Montreal agglomeration by 2031. The Institut de la statistique du Québec (ISQ) projects the population of the Montréal agglomeration to reach 2,321,900 total residents by 2034. The NDLS sector could potentially absorb a significant amount of these new residents projected for the Montréal agglomeration – where new residents within the NDLS sector could compose 21% of the population growth within the Montréal agglomeration in 2031.

Summary of projects composition

PROJECTS	THE TRIANGLE	HIPPODROME	ROYALMOUNT	SMART URBAN	WESTBURY	BOURDON	CAVENDISH MALL	DÉCARIE SQUARE
LOCATION	Côte-des Neiges-Notre Dame-de- Grâce	Côte-des Neiges-Notre Dame-de- Grâce	Town of Mount Royal	Saint-Laurent	Côte-des Neiges-Notre Dame-de- Grâce	Saint-Laurent	Côte Saint-Luc	Côte Saint-Luc
TOTAL RESIDENTIAL UNITS **PROJECT COMPONENTS**	- 3, 300 units -New park -School or community centre -Active transportation -Commercial spaces	-5,000 - 8,000 units -Green spaces -Urban agriculture and ecological spaces -Active Transportation -Commercial spaces	-6,000 units -Hotels -Waterpark -Office towers -Commercial spaces	-1,000 units -250,000 ft² for office buildings, -50,000 ft² commercial -a linear park	-660 units -service shops-restaurants, -modern recreational facilities, -park	-150 units	-451 units	- 700 units - senior residence - medical centre - shopping mall
TIME FRAME	Long	Long	Short	Short	Short	Short	Medium	Short
BUILT/ UNBUILT	Partially Built	Unbuilt	Unbuilt	Unbuilt	Partially Built	Unbuilt	Under consideration	Under consideration
ADVANTAGES OF PROJECT	-New housing developments -Increase in green spaces - Economic growth -Reduced surface parking spaces	-New homes for families -Possible increase in affordable and social housing in the sector (2,500 units) -Reductions in carbon foot print in the neighbourhood-Increase access to food -Extension of the Cavendish boulevard	-Potential tourism opportnities for the Montréal region -New homes for people -Possible foreign investment in Montréal - Innovative and technological spaces	-New homes for people -Increase in green space cover -Possible economic development	-Increase in green space cover in the sector -Economic development with new businesses and a hotel industry -New housing	-New housing	- Additional housing	-Senior-focused services -New housing -Economic development -Improved health care delivery
NEGATIVE IMPACTS (ON OTHER PROJECTS, BOROUGH, OTHER BUSINESSES AND THE CITY)	-Limited affordability -Absence of some basic facilities such as schools and community centres -Some economic pressure on existing businesses -Little/ no emphasis on creating employment.	-Possible economic pressure on existing businesses may arise -Increase in metro usage which may lead to congestion. -Little/no emphasis on creating new employment opportunities -Possible congestion on existing services	-Economic pressure on existing businesses in both neighbouring boroughs and the city at large. -Increased traffic flow in the sector -No emphasis on providing employment opportunities for local people. -Housing developments not necessarily affordable	-Possible economic pressure on existing services and businesses -Increased traffic flow with new residents -No emphasis on creating local employment opportunities	- Primarily targeted at high to a middle-income population) -Absence of basic services, thus heavy reliance on existing facilities. -No emphasis on providing local employment opportunities.	-Possible contribution to traffic congestion in the sector. -Possible pressure on existing facilities.	-Possible increase in traffic flow -May cause congestion on existing facilities	-Limited affordability -May increase traffic congestion -No emphasis on creating local employment opportunities -Possible pressure on existing facilities.

PROJECT COMPATIBILITY

These proposed and newly constructed projects are in close proximity. These projects all aim at developing mixed- use residential and commercial spaces. However, the provision of services and creation of employment opportunities must be considered. For instance, the Hippodrome, Westbury and Décarie square developments include commercial spaces in their developments. But their close proximity may lead to an overproduction of commercial spaces that would either draw off businesses from downtown or remain vacant. Similarly, resources could be geared towards providing basic services and communal spaces to bridge the potential infrastructural gap that the realisation of these projects would generate.

The current gross population density of the sector is 22 people per hectare and based on the normal estimated growth, the population density could reach 38 people per hectare by 2031 and 55 people per hectare in 2041. However, if the upcoming projects successfully attract all potential residents into the sector, the population density could potentially reach almost 90 people per hectare.

Socio-Demographic Profile of Current Residents

The sector's massive projected growth will not occur in a vacuum and the needs of current residents and workers must shape how development unfolds.

Age and Gender

Currently, the sector's population trends older, with a smaller proportion of working-age residents—61% are between 15 and 64 years old—and a higher proportion of elderly residents—65 and over—particularly in CSL. Women make up 53% of the population.

Household Size and Tenancy

The sector includes a total of 10,780 households and the average household size is estimated at 2.15 people per household which is slightly lower than the Montréal agglomeration average at 2.2 persons per household. This is because, although there is a comparable balance of single-occupant and couple households, families with children are not as well represented in the sector compared to the rest of the Island of Montréal.

The distribution of owners versus renters within the

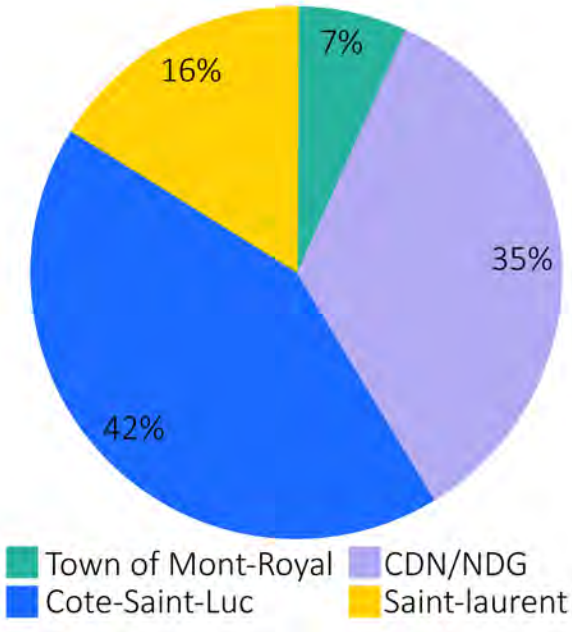


Figure 8 NDLS population distribution based on municipalities or boroughs (2016)

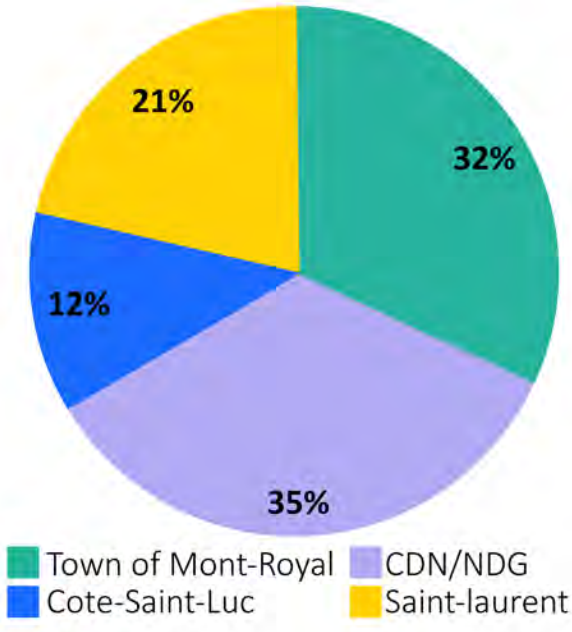


Figure 9 NDLS land coverage distribution based on municipalities or boroughs (2016)

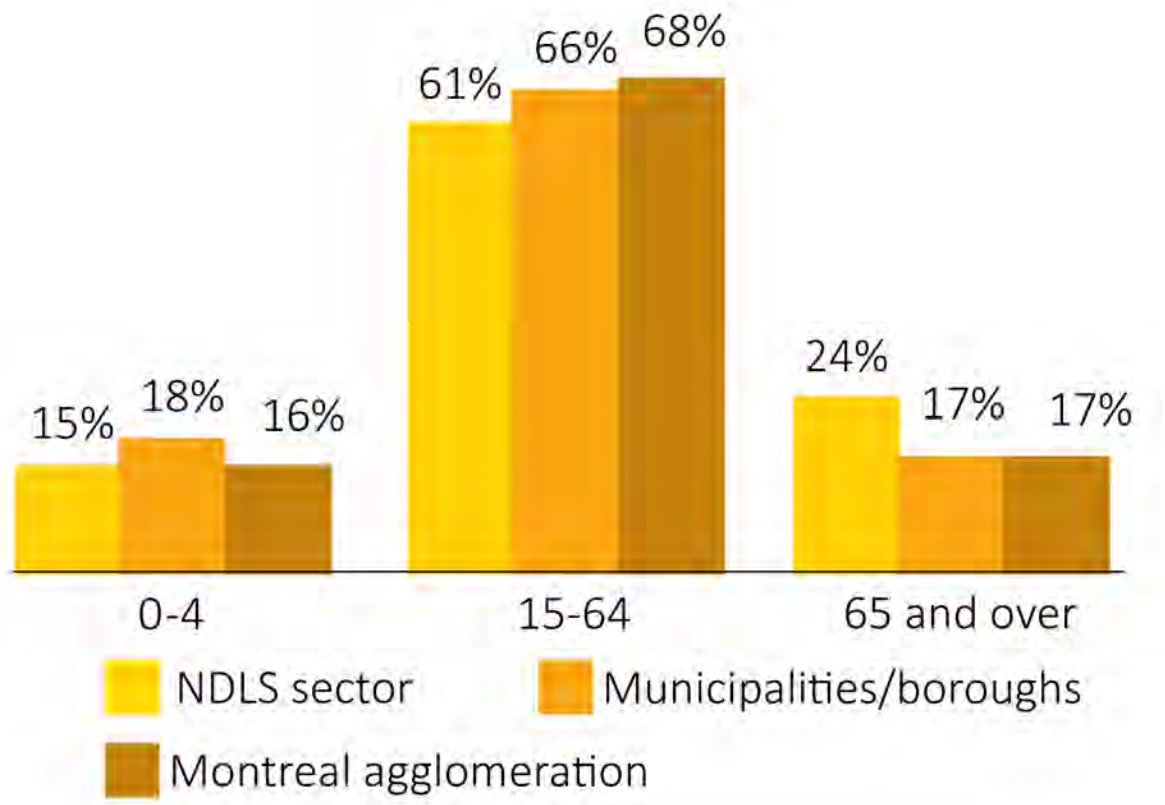


Figure 10 Age based population distribution - comparision between NDLS, four municipalities/boroughs, and Montréal agglomeration (2016)

sector is balanced, with 51% owners and 49% renters. The sector has a higher percentage of owners compared to the average for the Montréal agglomeration (39%). Home ownership rates amongst TMR, CSL, and the borough of Saint-Laurent are higher in comparison to CDN-NDG, which has a higher proportion of renters (60%). To see the distribution of owners and renters within individual DAs refer to the Appendix.

Similar to the proportions of owners and renters, the proportion of condominiums to non-condominiums is balanced (50:50). The proportions of condominiums in TMR, CSL, and Saint-Laurent are more than 50% whereas in CDN-NDG they represent less than 50% of units.

There are only 7% of tenant households that reside in subsidized housing. TMR and CSL do not contain any subsidized housing, while Saint-Laurent provides subsidized housing for 12% of tenant households and CDN-NDG provides for 13% of tenant households. To see the proportion of subsidized housing in each DA, refer to Appendix, Socio-Demographics at a Glance.

Based on the 2016 census data, 64% of total households in the sector spend less than 30% of their income on shelter costs. The distribution is similar within each city or borough (within a range of 60% to 70%), as well as within each DA (more than 50%). However, a higher percentage of renters are spending more than

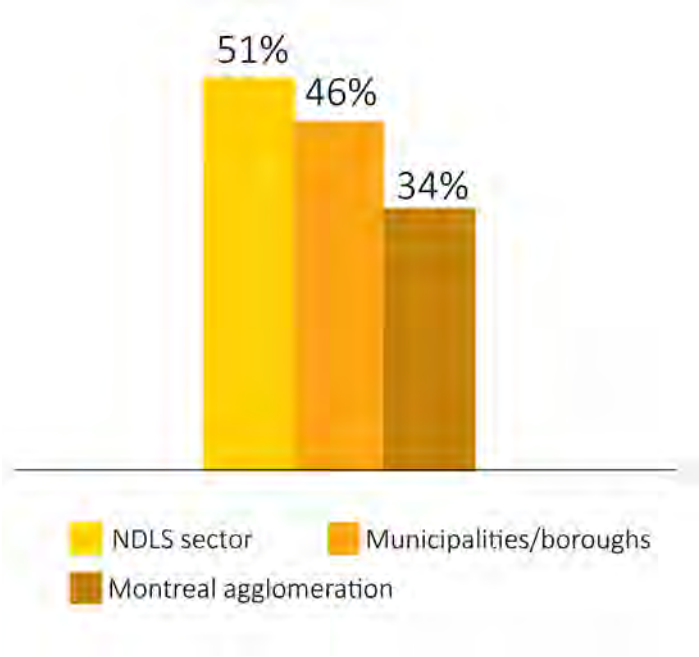


Figure 11 Percent of area populations consisting of immigrants. (Statistics Canada, 2016). The NDLS sector has a higher proportion of immigrants than the surrounding jurisdictions and the Island of Montreal as a whole. Given the potential social vulnerability of immigrant populations, officials will need to consider the risk of displacement.

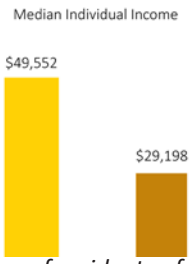


Figure 12 Median income of residents of the sector. (Statistics Canada, 2016)

30% of income on shelter costs compared to owners. Although owners in each DA have a greater ability to cover shelter costs, there is an indication that renters spend a greater proportion of their pay on shelter costs. This trend exists across multiple DAs, where more than 50% of renters spent 30% more of their income on housing.

Education

Forty percent of the total population aged 15 and over have a bachelor's degree (or above) – which is higher than the population of Montréal agglomeration. But at least 12% of the population has less education and could face potential limitations to employment opportunities and lower paying jobs.

Immigration and Migration

Approximately 51% of the population in the sector are immigrants (i.e. persons who have been granted the legal right to live in Canada permanently) and 3% are non-permanent residents. The population of immigrants is higher than that of the four municipalities and boroughs (46%) and the Montréal agglomeration (34%). Within the sector's boundaries, CSL has the fewest immigrants compared to other municipalities and boroughs (47%), whereas CDN-NDG has the highest number of immigrants (57%). However, the migration pattern of residents into the sector is relatively stable compared to the Island of Montréal, with 94% of residents living in the same location for the past five years.

Income and Employment

The median income of the sector's population is $49,552, which is significantly higher than that of Montréal agglomeration ($29,198). But there is significant variation at the household and individual level, suggesting income disparity within the sector, with concentrated pockets of higher- and lower-income residents. Within the sector, 16% of the population are living in low-income households – which is similar to the proportion of the Montréal agglomeration (17%). Among the low-income population, 64% are adults (age 18 to 64), 18% are children (age 0 to 17), and 16% are seniors (age 65 and over). CDN-NDG has a larger population of low-income residents compared to other municipalities or boroughs in the sector.

The sector has lower employment and labour-force participation rates than the surrounding municipali-

ties and the Island as a whole, mostly because of the significant senior population. [xi] CDN-NDG has the highest employment rate and CSL has the lowest. Almost 50% of the workers in the sector are employed within four economic sectors: (1) professional, scientific, and technical (13.5%); (2) health care and social assistance (12%); (3) retail trade (11%); and (4) manufacturing (10.5%). Similar employment distributions in the four economic sectors exist for the Montréal agglomeration.

Key Takeaways

Overall, the population in the sector has achieved a higher level of education and receives a higher income compared to the four municipalities and boroughs and the Montréal agglomeration. However, income disparities and isolated pockets of vulnerable populations are of concern.

The high proportion of immigrants in the sector requires particular attention – especially those with lower-income and less education, along with those who are not currently participating in the labour force. These groups could face additional disadvantages, isolation, and competition with the arrival of new developments and residents.

The current housing trends in the area reveal that the average household sizes are slightly smaller than the regional average, which indicates that new housing supply in projects like The Triangle do not cater to families with children.

Apartment buildings are the most common form of housing, which indicates social acceptance of higher density building typologies which are usually more contentious in single-family suburban neighbourhoods. While the current percentage of vulnerable groups (low-income and unemployed) is low, the influx of higher income residents could place upward pressure on living costs for existing residents, further isolating or displacing them from the sector.

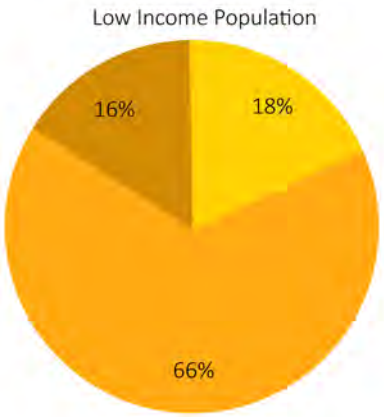


Figure 13 Low-Income population distribution based on age groups in NDLS (2016)

Figure 14 Comparision of low-income population in NDLS and Montréal agglomeration (2016)

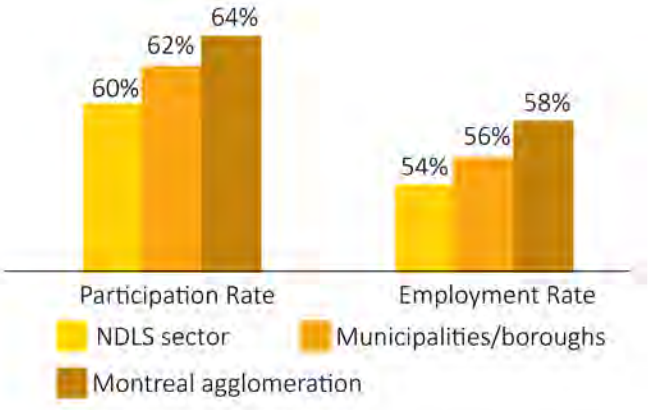


Figure 15 Participation and employment rate comparisons between NDLS population, four municipalities/boroughs, and Montréal agglomeration (2016)

Land Use and Environment

Most of the uses authorized within the area are oriented towards employment, diversified activities, and mixed-uses. These categories, respectively, include activities for economic development (industries, commercial uses, offices, institutional buildings), residential uses if well-served by public transit and not 'disturbed by nuisances' (light industry, commercial uses, office, institutional and housing), and a mixed offering of commercial (including office space), institutional activities, and housing. The blue zones on the map [***Figure 18***], making up most of the study area, cannot accommodate housing units. This poses another challenge fragmenting the area into distinct enclaves. Note: The different cities and boroughs have different ways of zoning land. For ease of comprehension, they have been represented within the framework and categories used by the City of Montréal. Under this framework, commercial uses in TMR have been represented under the category of 'diversified uses', which includes commercial and office uses.

Thanks to its light-industrial and commercial uses, the sector is a significant employment hub, drawing a daily influx of workers. There are approximately 22,500 jobs in the sector with an additional 15,000 located in the immediate area (within 500 m of the sector's boundaries) [***see Appendix***].

Existing Land Use

The actual land uses within the study area are completely different than the uses in the surrounding area. Within the sector, the main uses are industrial, commercial, and office space – except in CSL where the main uses are residential and institutional. During multiple site visits we noticed numerous 'For Rent' signs dispersed throughout the whole area, but particularly along Décarie and within the employment and activity sector of TMR. Both the assessment of land use maps and vacant spaces and the site visits suggest an underutilization of land. This could be for a number of reasons including the 'unattractiveness' of the built environment as a result of accessibility and permeability issues.

Changing Land Use

Due to the housing development pressure coming from downtown and the low occupancy rates of industrial and commercial lots, a significant number of projects have been suggested in the area by the different cities and boroughs over the past few years. As a consequence, the authorized and existing uses in the sector have recently undergone significant changes. Industrially zoned land is being converted into mixed-use neighbourhoods and, to make the area more attractive for development projects, a few vacant lots have been converted into green spaces or parks throughout the area. Comparing land use maps from 2012 to 2016, we can see these zoning changes in The Triangle (in CDN-NDG) as well as east of the Décarie Interchange in TMR. Behind big box stores (Provigo, etc), an apartment complex with different housing typologies ranging from townhouses to condos was built [***Figure 20***].

Built Environment

Warehouses and big box stores, vacant brownfields, and parking lots are dominant features in the landscape of the sector. Most buildings are also one storey-high and occupy significant space within superblocks in the area [***Figure 21***]. Fragmentation of the area by major transportation infrastructure and these vast, residual spaces make the sector less attractive for businesses, residents, and visitors.

The predominant typologies are low density and spread across large lots, creating a hostile environment for pedestrians. The most common building typology within the sector consists of one-storey warehouses that are common for both industrial and commercial uses. They are prevalent west of the Autoroute 15 and south of the Autoroute 40. Low-density is another factor reflecting the car-centric design of the first suburbs. Detached and semi-detached housing is the

predominant residential typology within the City of Hampstead and the neighbourhood north of Autoroute 40 in Saint-Laurent and TMR. The only area close to the sector that does not feature any lower-density type of housing is the borough of CDN-NDG which is well served by public transit. In addition, the borough of CSL features an interesting mix of densities ranging from high-density towers to courtyard townhouses and low-density detached houses [*see Appendix*].

Greenspace for some areas of the sector is limited. There are four official parks within the sector and three of them are in CSL. The other one is in CDN-NDG near The Triangle. The main 'green' spaces are tree buffers along the railway tracks, the Hippodrome race track, and brownfield sites. With anticipated population growth in the sector, there is a need for additional green and public spaces within the area. Both the vacant and grey spaces (parking lots) provide opportunities for creating new public or green spaces that could be connected to the biodiversity corridors in the borough of Saint-Laurent.

There are major differences in residential typologies across the jurisdictions that comprise the sector. The majority (83%) of private dwellings in the sector consist of apartment buildings, with 59% of units located in buildings with five or more storeys. Some 64% of single-detached houses, 46% of semi-detached houses and

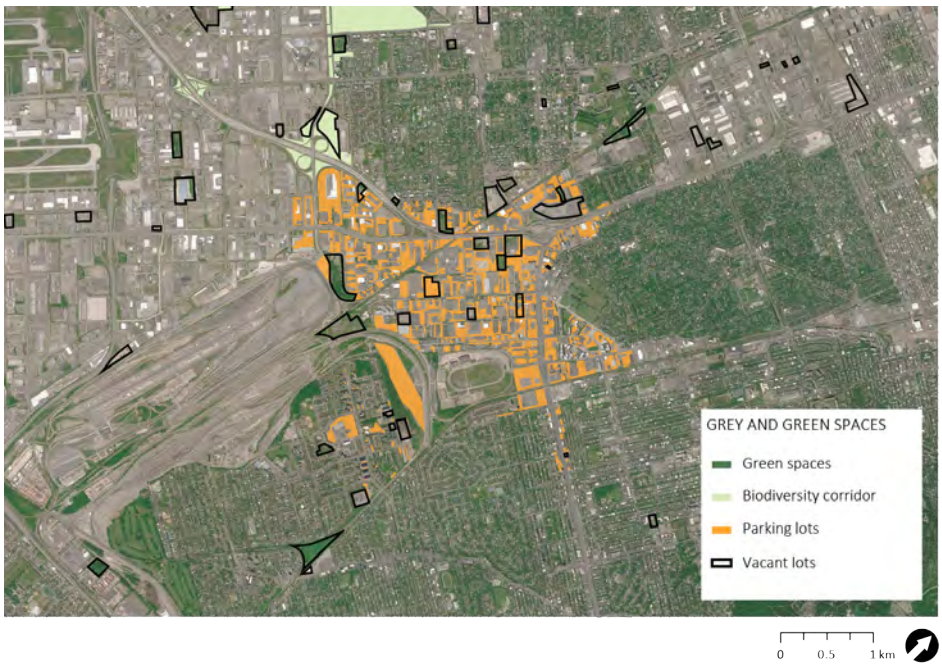


Figure 16 Green and grey spaces, and vacant lots (Google Earth)

82% of row houses are located in CSL. In comparison, CDN-NDG has 50% of apartments with five or fewer storeys. The housing stock in Saint-Laurent is primarily comprised of apartments or flats in a duplex (55%). To see the distribution of types of dwellings in the area, please refer to the Appendix.

The distribution of unit sizes within the existing housing stock based on the 2016 census data, shows that 30% of private dwelling units are one bedroom, 43% have two bedrooms, and 27% have three or more bedrooms. This distribution of unit sizes is similar to the average for the Island of Montréal, except that the sector contains a higher percentage of two-bedroom units (43% versus 34% for the island). Within the sector, CDN-NDG has the highest proportion of one-bedroom units (42%). To see the distribution of number of bedrooms in each DA, refer to Figure 69 in the Appendix.

Key Takeaways

Current building typologies and land use, height, and density regulations as well as actual uses, densities and the built environment reflect the car-centric development patterns of the 1950s. This predominance of car-centric design is even present within recent developments and in the expectations of residents, creating tensions between drivers and pedestrians. Those tensions need to be considered when developing new neighbourhoods from previous vacant or industrial sites to create a coherent

Figure 17 Building Coverage (Communauté Métropolitaine de Montréal (CMM))

vision for the sector. These patterns highlight the importance of coordinating transportation and land use changes to foster the behavioral changes needed to integrate a more sustainable approach to housing, employment centres, and transportation.

Social Infrastructure

There is a lack of social infrastructure (e.g. education services, community supports, sports and recreation) available within the sector boundaries because the current population is limited and the dominant uses are industrial and commercial. The social infrastructure is located near current residential uses on the periphery of the sector. Future plans to add more than 22,000 new dwelling units (more than 47,000 new residents) within the sector will require new and additional services for the new residents. The current plans for many upcoming private development projects do not disclose their target population which creates difficulties estimating the type of services needed in the sector.

Assuming that the 20-20-20 housing policy currently proposed by the City of Montréal becomes applicable to all upcoming private developments in the sector (except those that have indicated otherwise), there could be an additional 3,000 new family households in the sector which would represent 6.2% of the total family households in the Montréal agglomeration. There has been significant growth in family households both in the sector and the Montréal agglomeration. To cater to these new households, the sector will need additional services such as daycares and schools. The high potential for additional family housing units within the Hippodrome site could encourage the provision of schools and daycares in close walking proximity to the site.

Similarly, the provision of sports and recreational centres (e.g. community centres, sport centres, libraries) in the sector are sparse – even on the periphery or outside the sector's boundaries. With over 40,000 new potential residents in the sector, it is important to ensure that the population can easily access services. In providing new social infrastructure, there are several considerations: (1) type of services – current infrastructure mostly serves specific groups (e.g. seniors, children, religious groups) which indicate a need to provide services that can be accessible to the general population; (2) major transportation infrastructure as barriers – most of the existing facilities cannot be accessed from the centre of the sector, where the majority of new residents would be located, due to railways and highways that divide the area; (3) type of incoming residents –

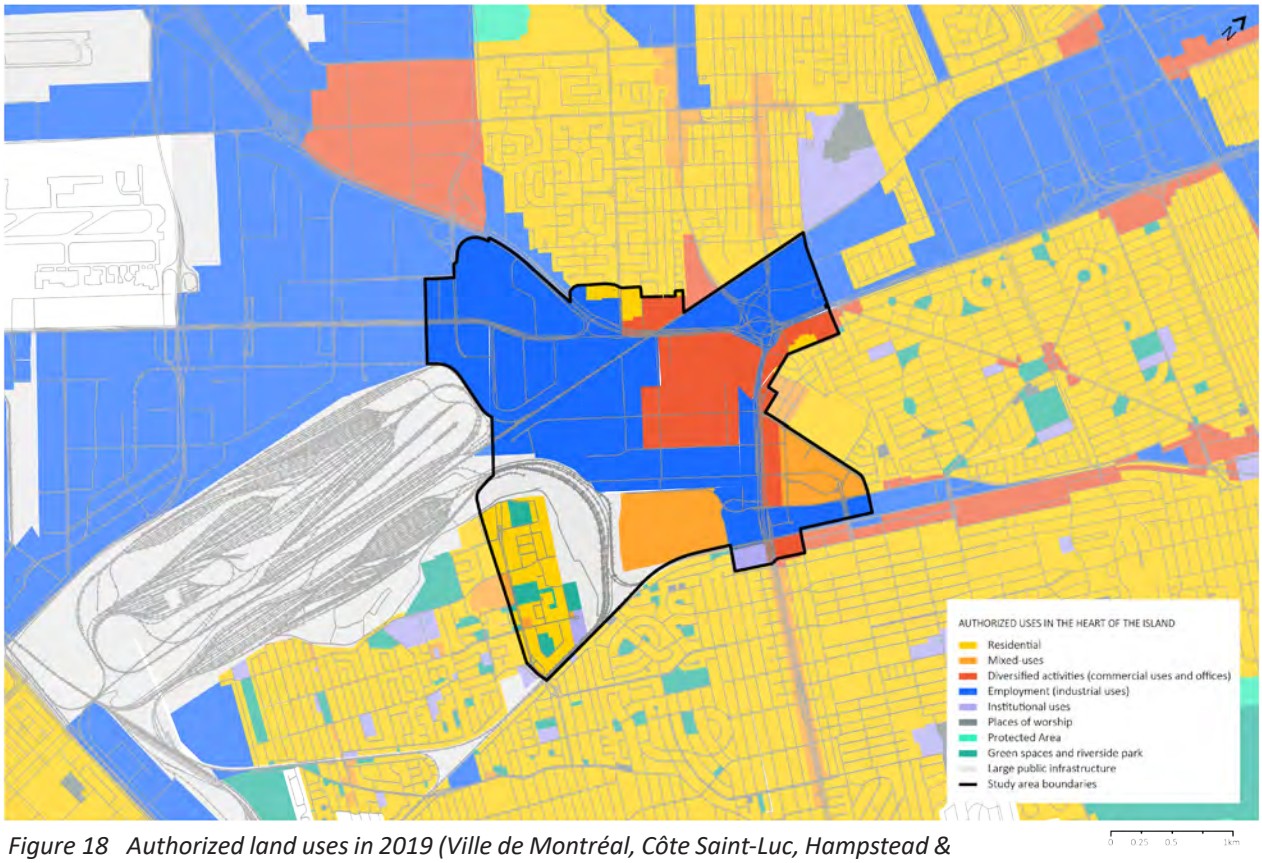


Figure 18 Authorized land uses in 2019 (Ville de Montréal, Côte Saint-Luc, Hampstead & Town of Mount Royal)

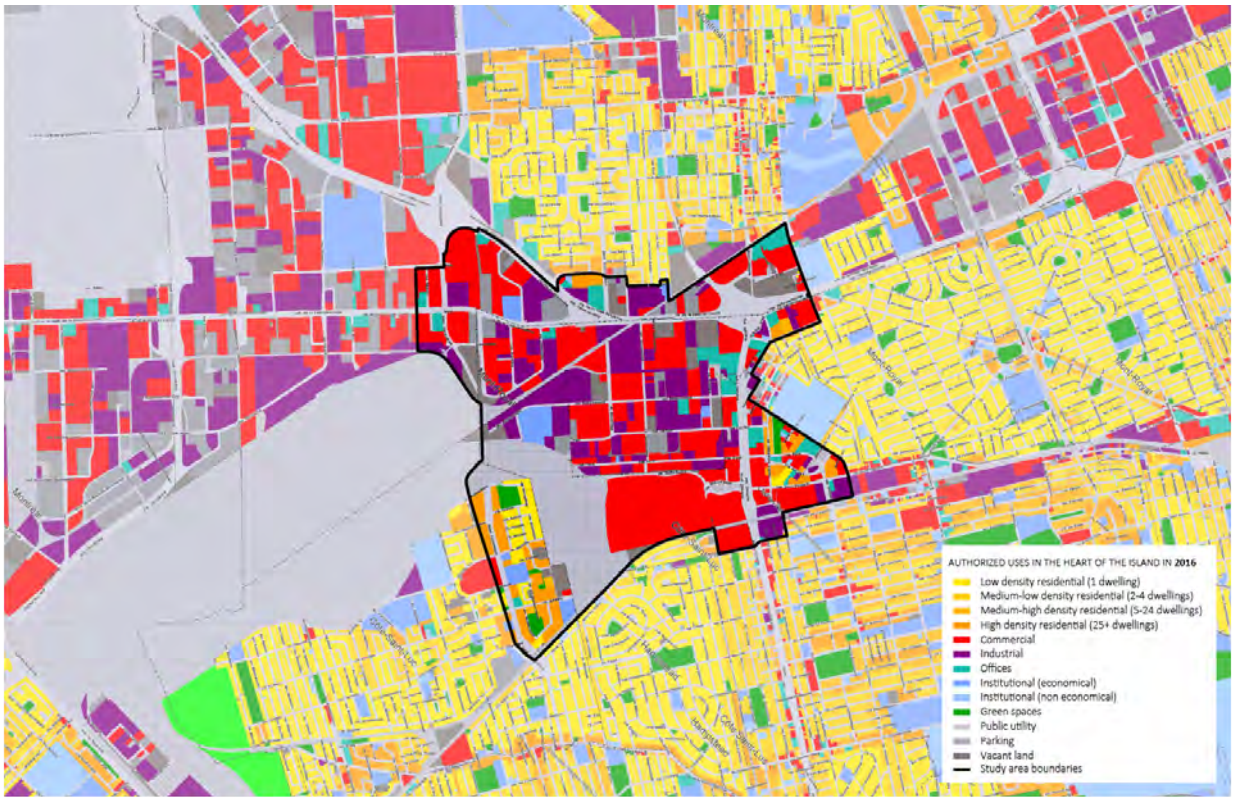


Figure 19 Existing land uses in 2016 (CMM)

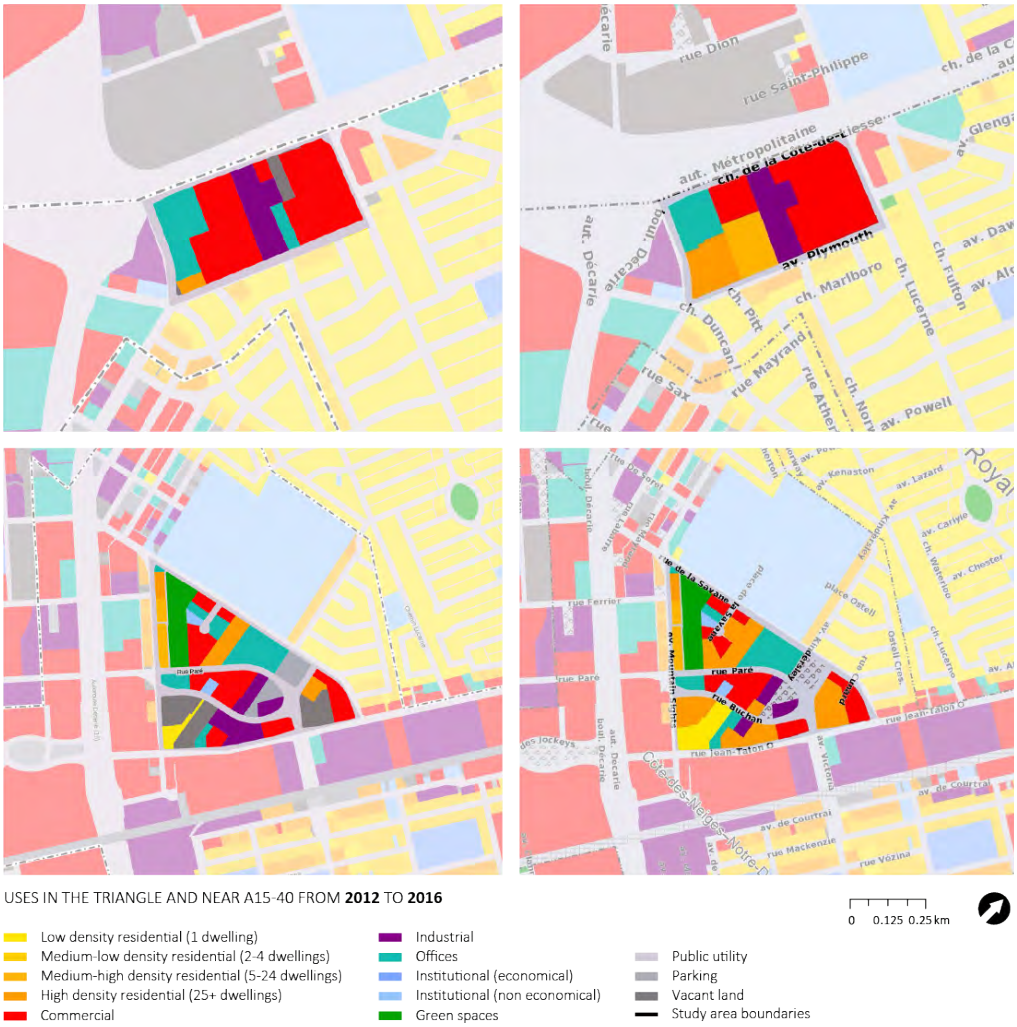


Figure 20 Land use changes in TMR and in the Triangle from 2012 to 2016 (CMM)

several development projects provide amenities and services within the buildings and these higher-end residential developments are likely targeting middle- to higher-income residents.

Similar to the monthly cost of owned and rented dwellings, the value of dwellings also varies in each DA within different cities or boroughs. The lowest median value of housing can be found in Saint-Laurent at $239,986 while the highest can be found in CSL at $900,236. Even housing values within the same city or borough can vary greatly between DAs. For example, in CSL we can find dwellings from median value of $300,000 to $900,000. For a detailed distribution of median dwelling values for each DA, refer to the Appendix.

Diagnosis of the NDLS sector

This section summarizes the key land use challenges identified above. These challenges will be the focus of proposed strategies and interventions developed for the concept plan to be delivered during the next stage of this project.

Unattractive and Fragmented Environment

Several underutilized areas in the sector are not proposed for development even with high housing demand in the area. This is because these particular sites are ill-suited for residential development given their location alongside highway and rail infrastructure. Air and noise pollution, dead ends, enclaves, and the absence of sidewalks, intersections, and bike paths as well as a general lack of public and green spaces are recurrent issues along transportation corridors. The sector requires public space and infrastructure upgrades including additions to the street grid, water and sewer connections as well as parks and public spaces that would create attractive environments for all uses and optimize the potential for future development.

Transportation infrastructure in the area serves as the primary barriers currently fragmentating the landscape and communities. Underutilized, vacant, and grey spaces dot these linear barriers. As this infrastructure is managed by private or public (federal and provincial) entities and spans multiple jurisdic-

tional boundaries, the transformation of these corridors and their edges into attractive and permeable living environments faces jurisdictional and collaborative challenges. There is a need to overcome these physical and political obstacles to establish a coherent sector where people can live and work across political boundaries.

Enclaves and Disparity

The economic differences in terms of income disparities and housing costs between the cities and boroughs are creating distinct land use and development patterns that are incoherent at a regional scale. The majority of proposed housing developments (except for the Hippodrome site) are condominiums that include premium amenities and services. The prices of these units are rapidly rising (8% appreciation in the last 12 months) and are increasingly becoming inaccessible for lower-income groups. Jobs and employment opportunities in the sector are primarily in the service and industrial industries which have lower-than-average salaries. With rising housing costs, an increasing number of employees in these job sectors will not be able to afford housing in the area.

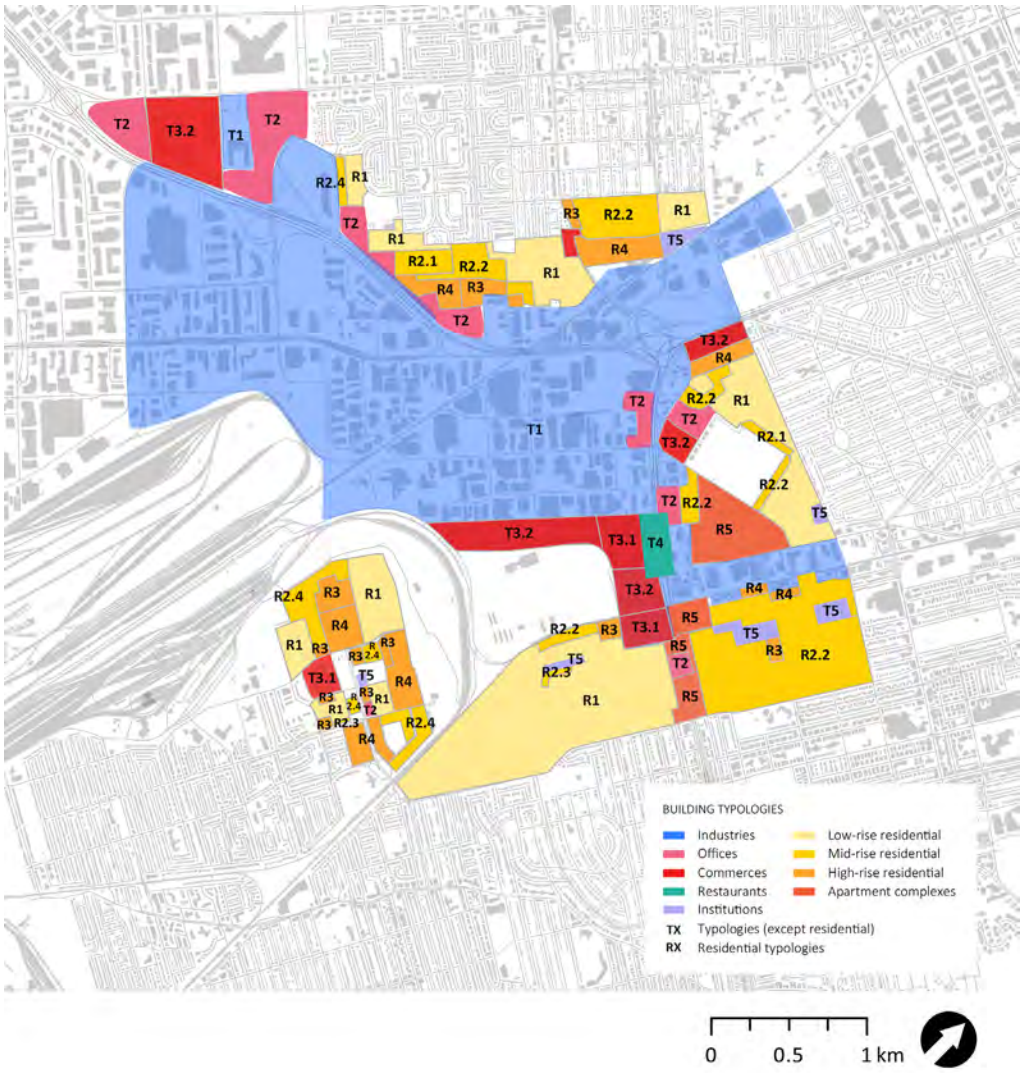


Figure 21 Dominant building typologies in 2019 (Google Street View, Ville de Montréal, Côte Saint-Luc, Hampstead & Town of Mount Royal)

Potential Infrastructure Deficit

Assuming that the upcoming projects will be completed within 15 years, bringing more than 40,000 new residents to the area, resulting in a local population of over 60,000 residents and density of almost 90 people per ha in 2031. The projected population will be four times larger than the current population which will present challenges related to densification, intensification of uses, congestion, and the capacity of current public infrastructure and amenities. The new projects are mostly located in areas where current uses are commercial and industrial and, therefore, do not provide the level of infrastructure needed to cater for residential purposes, such as schools, daycares, libraries, sports facilities, community centres, etc. This challenge will need to be taken into consideration when planning the sector in coordination and collaboration between municipal bodies.

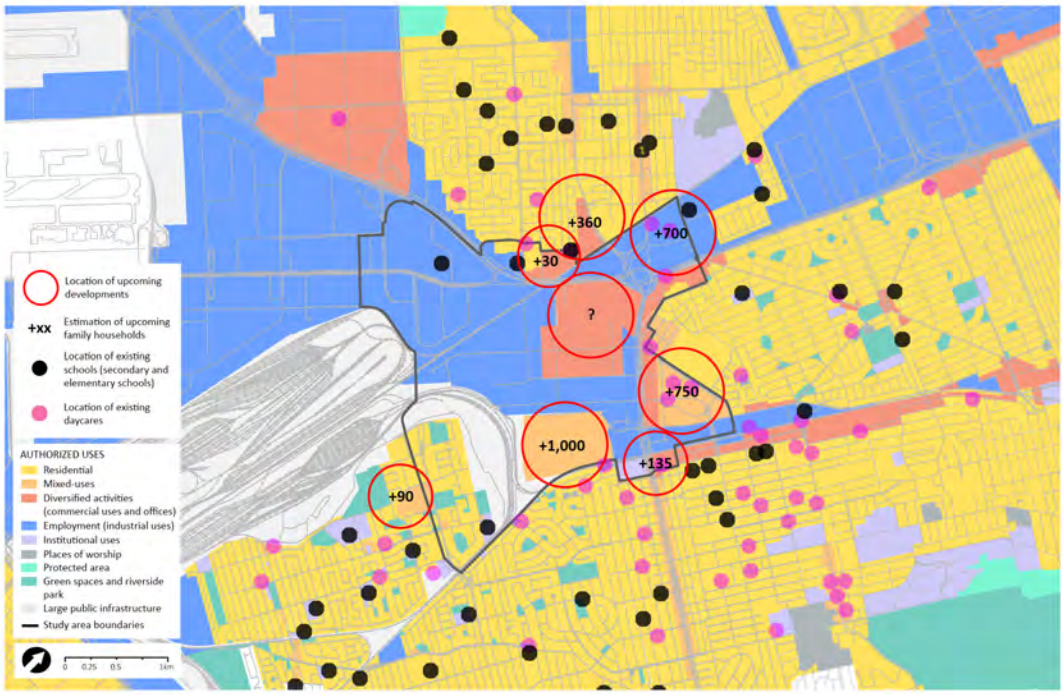


Figure 23 Existing community centres, sports facilities and potential new residents in the Sector (2016)

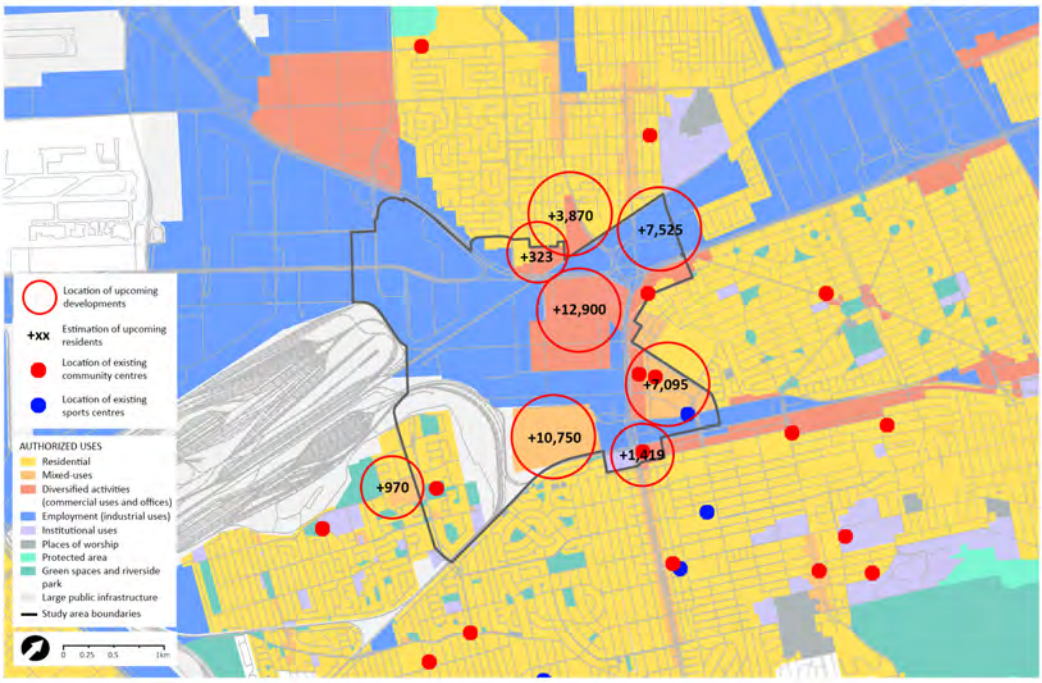


Figure 22 Existing schools and daycares and potential new family households in the sector (2016)

Figure 24 Aerial view of Hippodrome with Décarie and TMR in the background (BANQ)

Figure 25 Shared pedestrian and cyclist path along Décarie underpass (Oroboro)

NDLS' TRANSPORT TODAY

From disjointed and overtaxed transportation infrastructure to inadequate public transit service to meet future needs, transportation in the NDLS sector represents a series of challenges. Renewed and intensifying interest in the area renders it essential to address them. This section documents baseline observations about the sector's existing transportation network and services, identifies key challenges and then summarizes studies completed and projects underway. The first subsection outlines existing travel patterns and transport conditions. These are broken down into several topics: (1) mobility patterns within and across the study area; (2) existing transport networks and systems that serve the sector and nearby locations; (3) current and future planned transport projects that will affect the area; and (4) identifying key transport-related challenges.

Current Context

Sector Mobility

The most popular destinations for trips originating in the NDLS sector are primarily within the sector or downtown. According to 2013 origin-destination data collected by the Agence métropolitaine de transport (AMT), the top five destinations are CDN-NDG, Saint-Laurent, CSL, Downtown Montréal, and the Downtown periphery [***Table 2***]. Most trips to the sec-

RANK	2013 AMT DESTINATION	MTL TRAJET 2017 DESTINATION
1	Montréal: Côte-des-Neiges	Montréal: Côte-des-Neiges
2	Montréal: Saint-Laurent	Montréal: Saint-Laurent
3	Côte Saint-Luc	Montréal: Villeray
4	Montréal: Centre-ville	Town of Mount Royal
5	Montréal: Centre-ville périphérique	Montréal: Centre-ville périphérique
6	Town of Mount Royal	Montréal: Ahuntsic
7	Montréal: Notre-Dame-de-Grâce	Montréal: Centre-ville
8	Montréal: Ahuntsic	Montréal: Plateau Mont-Royal
9	Montréal: Villeray	Montréal: Notre-Dame-de-Grâce
10	Westmount	Côte Saint-Luc

RANK	2013 AMT ORIGIN	MTL TRAJET 2017 ORIGIN
1	Montréal: Côte-des-Neiges	Montréal: Côte-des-Neiges
2	Montréal: Saint-Laurent	Montréal: Saint-Laurent
3	Côte Saint-Luc	Montréal: Villeray
4	Town of Mount Royal	Town of Mount Royal
5	Montréal: Villeray	Montréal: Ahuntsic
6	Montréal: Ahuntsic	Montréal: Plateau Mont-Royal
7	Montréal: Notre-Dame-de-Grâce	Montréal: Sud-Ouest
8	Laval: Chomedey	Montréal: Centre-ville
9	Dollard-Des Ormeaux	Montréal: Notre-Dame-de-Grâce
10	Montréal: Pierrefonds	Montréal: Centre-ville périphérique

Table 2 Top-ten destinations from the sector and top-ten origins coming to the sector. (AMT, 2013; Mtl Trajet)

tor originate from one of the surrounding neighbourhoods, with the top five areas people are coming from being CDN-NDG, Saint-Laurent, CSL, TMR, and Villeray [*Table 2*].

Within the sector, automobile use accounts for three out of five trips to work, significantly higher than the car mode share for residents of Island of Montréal as a whole. Public transit is the second most popular mode of commute for the sector, representing one-third of trips to work for NDLS residents. Active transport represents only six percent of trips to work for sector residents, twice as low as the active transport mode share for the Island of Montréal. Within active transport, biking is a particularly uncommon mode choice in the sector, with less than 1% of sector residents cycling as their main mode of commute to work. In comparison, residents on the Island of Montréal as a whole are six times more likely to bike to work.

Morning commute times tend to be slightly later for sector residents than in the rest of Montréal, with nearly one-third of commuters living within NDLS leaving for work between 9 and 10 am, compared with less than a quarter of Montréal residents leaving for work at this time. Similarly, only 13% of NDLS residents leave for work between 5 am and 7 am, compared with 18% for Island of Montréal as a whole.

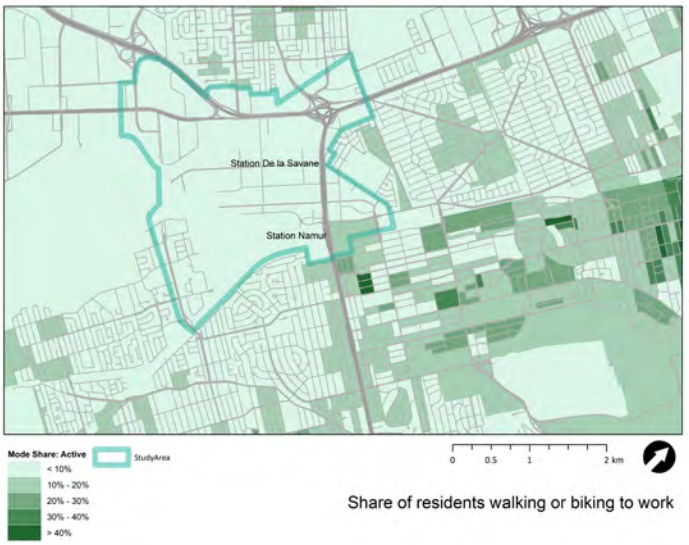


Figure 26 Active mode share.

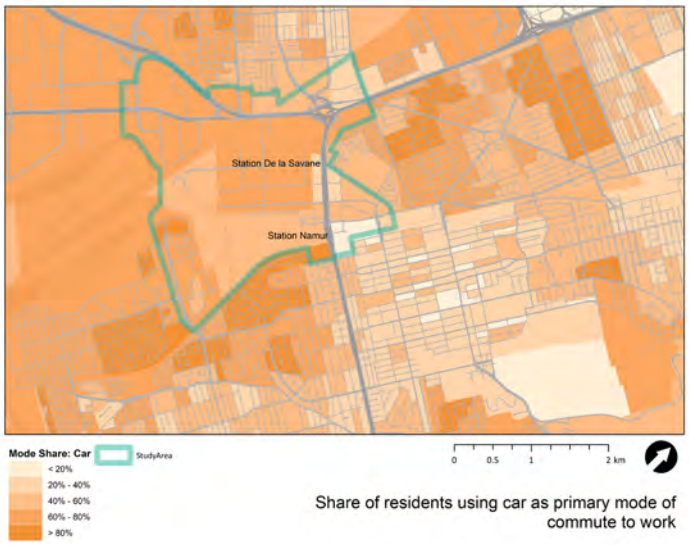


Figure 27 Private-vehicle mode share.

Figure 28 Public-transit mode share.

Transport Network and System

Public Transportation Service and Use

The sector is well served on its eastern edge by two Orange Line metro stations, though pedestrian access to these stations from the west is unpleasant and potentially dangerous because of limited opportunities for crossing Décarie Boulevard. The sector is surround-

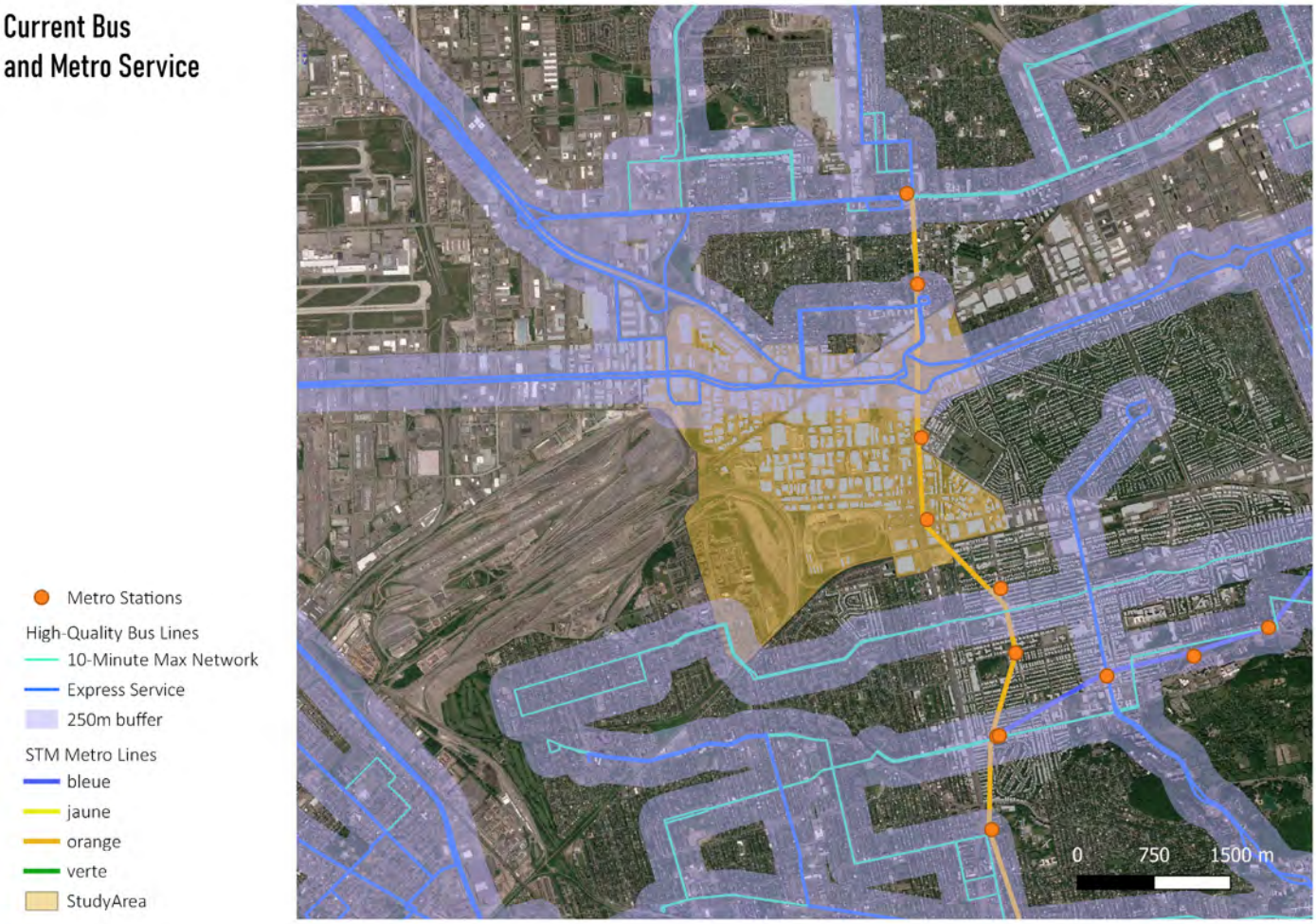


Figure 29 Most areas of the NDLS sector fall outside walking distance of existing high-frequency or express bus services. (STM, Google Earth)

ed by commuter rail and high-quality bus service—lines with express routes or maximum 10-minute wait times between buses. However, there is limited direct access to these facilities. Large portions of the sector are further than 250 m from the nearest bus stops with high-quality service, reducing the likelihood of public transit use. [***Figure 29].*** The current public transit network and service schedules result in reduced regional public-transit accessibility to jobs for some portions of the sector. Regional transit accessibility—the number of opportunities such as jobs that can be reached in a certain amount of time—is generally lower in the western areas of the sector. The areas with reduced accessibility are characterized by higher automobile use.

Active Transportation Networks and Use

The challenges to pedestrian and cyclist mobility are reflected in the very low mode share of active transit in the sector compared with the rest of the Island of Montréal [***see Appendix***]. The distance between links across the highways are increased as a result of significant detours required to traverse what could otherwise cover relatively short distances. West of Décarie, the only active transit link between Saint-Laurent and TMR is the railway crossing, where Authier Street and Devonshire Road intersect with Côte-de-Liesse. The only other passage within the sector that connects neighbourhoods to the north and south of the Autoroute 40 is over one kilometre to the east, at the

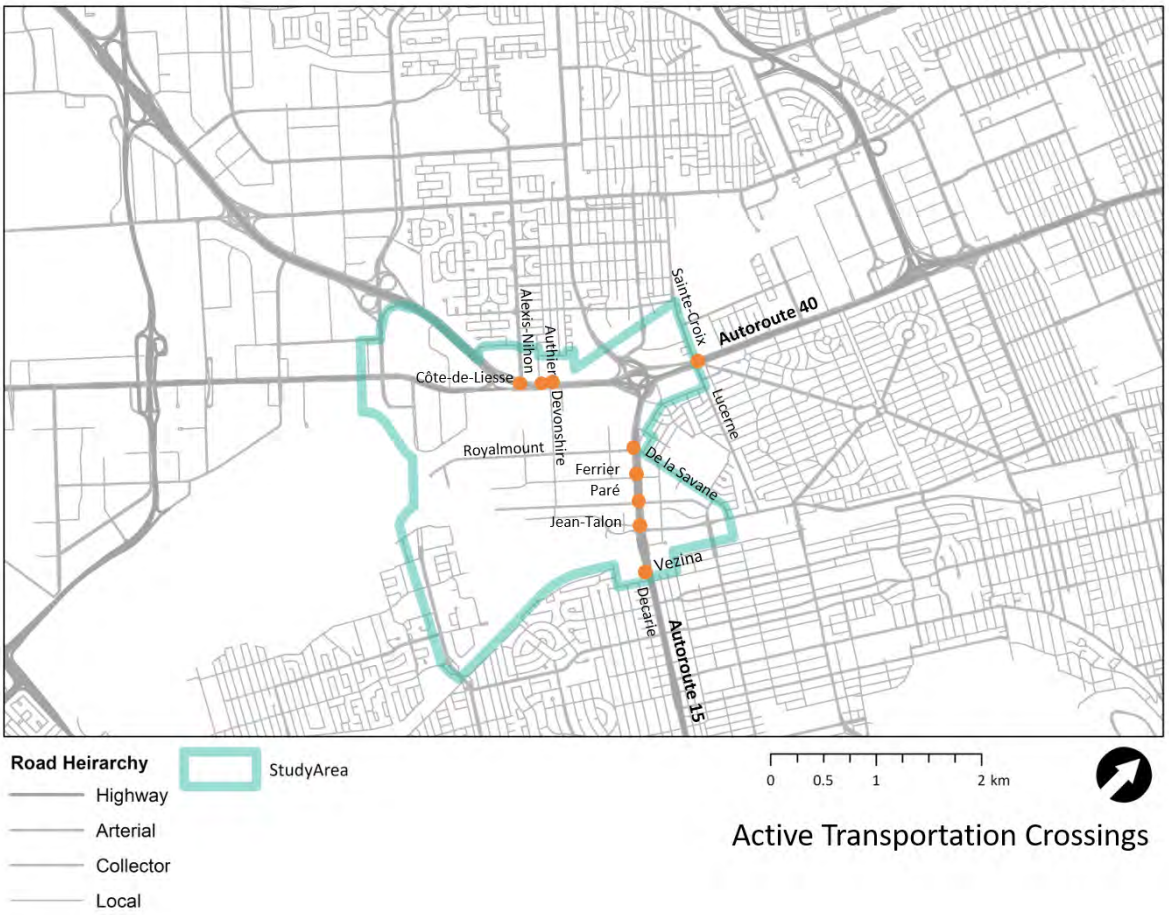


Figure 30 Road-network hierarchy and active transport crossings.

underpass on Lucerne Street and Sainte-Croix Avenue at the perimeter of the sector. Two additional underpasses beneath the Autoroute 40 exist closer to the Authier/Devonshire crossings, but these only connect to the small portion of Saint-Laurent bound by the railway to the north-west and Marcel-Laurin Boulevard to the east.

East-west pedestrian crossings over Décarie are accessible at the De la Savane, Ferrier, Paré, Jean-Talon, and Vézina cross-streets. An additional overpass exists between Jean-Talon and Vézina, beside the railway, but this does not connect east. As a result, the distance between Jean-Talon and Vézina, roughly half a kilometre, is the largest gap between Décarie crossings south of Royalmount Avenue and De la Savane Street.

Each of these crossings require traversing two segments of a wide highway with little sensory or physical separation from the typically heavy traffic. While these crossings include sidewalks on both sides, none have designated bike lanes.

The lack of pedestrian-friendly spaces and bike lanes further discourages active transit. The sector as a whole is a large gap within the larger regional active transit networks. Designated bike lanes and bike-friendly roads are almost non-existent, although there are several key bike lanes just beyond the sector perimeter. Within the sector, a handful of bike paths were recently built on the perimeter and inside of the Triangle development. These short bike paths are currently not well-connected with the Montréal bike network, although they are only a couple blocks north of the Plamondon/Bentley bike lanes that connect to eastern CDN-NDG. At the northeast end of the sector, a bike lane begins at the Lucerne / Sainte-Croix underpass and continues north on Sainte-Croix as a separated bike path. However, this is not a convenient link because

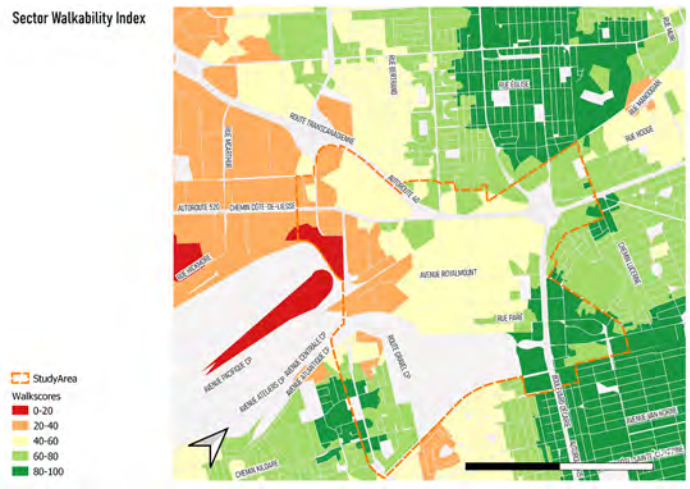


Figure 31 Sector walkability

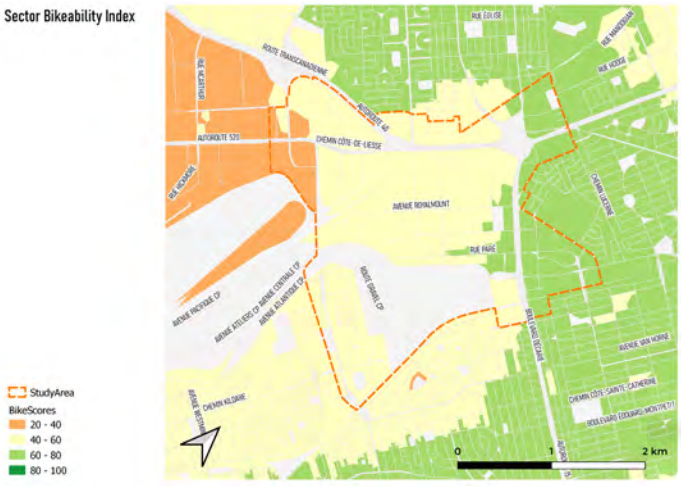


Figure 32 Sector bikeability.

accessing the Lucerne / Sainte-Croix underpass from within the sector is not easy, particularly for cyclists. To the northwest of the sector, the separated bike lanes on Alexis-Nihon Boulevard begin just a block outside the sector boundary, representing a second link north into Saint-Laurent with multiple east-west bike lane connections.

BIXI, Montréal's most popular bike sharing service and only docked bike sharing program, made its first appearance around the NDLS sector in April and May of 2019, with three stations within the sector and two more within walking distance [***see Appendix***]. These stations have so far demonstrated relatively low ridership rates compared with stations across Montréal, likely a result of the above-mentioned deficiency in bike networks. The lack of BIXI stations in several intersecting and surrounding neighbourhoods, including Côte Saint-Luc, Hampstead, and the Town of Mount Royal, further reduces the utility and convenience of the BIXI service for riders. The low ridership rates are also probably influenced by how recently the stations in the sector have appeared, as it takes time for people to learn about the existence of a new service and become accustomed to incorporating this new mode as part of their transit routine.

Figure 31 and ***Figure 28*** show walkability and bikeability rankings from WalkScore (using data as current as of October 15, 2019). The walk score index measures walkability based on walking routes to destinations such as grocery stores, schools, parks, restaurants, and retail, and the bike score index measures bike accessibility based on bike infrastructure, topography, destinations, and road connectivity.

Following the above analysis, the bulk of the NDLS sector has a relatively low walk and bike score, with the portion flanking Décarie south of De la Savane Street ranking the highest. The portion of Côte Saint-Luc in the NDLS sector also ranks high for walkability, but not for bike accessibility. The north-west portion of the site ranks lowest for both metrics.

Parking Requirements

Parking requirements vary between municipal and borough jurisdictions within the sector. Most jurisdictions have some form of minimum and maximum parking requirements as well as minimums for bicycle parking, with the exception of CSL which only has parking minimums.

However, single family homes and duplexes in TMR, as well as commercial use in Saint-Laurent, also lack parking space maximums. TMR, CDN-NDG, and Saint-Laurent permit substantial reductions in parking requirements for uses within proximity to metro or suburban train station; in these situations, parking requirements in CDN-NDG can be reduced by 50%, and in TMR parking minimums become maximums. Saint-Laurent offers up to 40% reductions. In addition, parking lots with more than 25 spaces in TMR are required to reserve one space for carsharing for every 25 spaces and

NAME	USE	DATE SURVEYED	TIME SURVEYED	ACCESSIBLE SUPPLY	TOTAL SUPPLY	OCCUPANCY
Décarie Square	Commercial	October 16th (Weekday)	3:30 pm	26	572	72%
Quartier Cavendish	Commercial	October 19th (Weekend)	2:00 pm	6	551	63%
Namur Park and Ride (behind the station)	Park and Ride	October 16th (Weekday)	2:20 pm	3	229	**105%**
Namur Park and Ride (near Décarie)	Park and Ride	October 16th (Weekday)	2:40 pm	2	64	**100%**
Namur Park and Ride (adjacent to Hippodrome)	Park and Ride	October 16th (Weekday)	3:00 pm	0	185	**109%**

Table 3 Parking availability and utilization in the sector. (Oroboro)

include a minimum of one electric charging station.

On-Street Parking in New Developments

An on-street supply and occupancy survey was conducted for this report on a small sample of streets in order to gauge the impacts of high-density residential developments on on-street parking demand in the sector. The survey was conducted in the heart of The Triangle along Mountain Sights, Paré, and Jean-Talon. On-street parking in this area is free of charge. Occupancy along Mountain Sights and Jean-Talon towards Décarie was above 85%, or practical capacity, on a weekday afternoon in October. This may indicate insufficient supply and/or demand management and may lead to traffic generated from drivers cruising for parking in the sector. Further away from Décarie, occupancy rates were fairly low on Paré (35%) and Jean-Talon (58%). This may indicate that high-density residential development alone may not generate a surplus of parking demand, which is a concern raised in previous reports, suggesting that other uses in proximity to new development may have a greater impact on parking demand. However, more studies conducted at different time periods is recommended. A more in-depth parking study of on-street supply and demand has been requested by previous reports and is needed for the sector. Vehicle traffic demand generated by new development may exacerbate any existing parking issues in the area unless careful planning of alternative solutions is undertaken.

Commercial Parking

A similar parking supply and occupancy survey was conducted for this report to examine off-street parking at the two indoor shopping centres in the sector: Quartier Cavendish and Décarie Square. Both offer free customer parking, with Quartier Cavendish providing 551 surface parking spots and Décarie Square offering 572 spaces between its surface parking lot and indoor garage. The lots were surveyed to assess parking demand generated by commercial uses in the sector. It was found that parking occupancy at both shopping centres was fairly low [***Table 3***], with best practice establishing optimum capacity for parking lots at 95% so that users can still locate a spot while the lot is well-utilized. This may indicate that there is likely an oversupply of off-street commercial parking in the area which should be considered when establishing parking minimums for new commercial and mixed-use developments.

Namur Park and Ride

There are three surface parking lots in proximity to the Namur metro station that serve as park and ride facilities. When surveyed on a weekday afternoon in October, these lots were either at or above maximum capacity [***Table 3]*** indicating that the 478 spaces provided between them are not currently serving the demand for such facilities. Parking in the lots is currently free and there was no indication that permits or proof of transfer were required when the lot was surveyed. This may result in nearby employees or customers using the lots instead of those intending to transfer onto public transit.

These lots are to close soon leading to a further parking deficit for those transfering onto public transit.

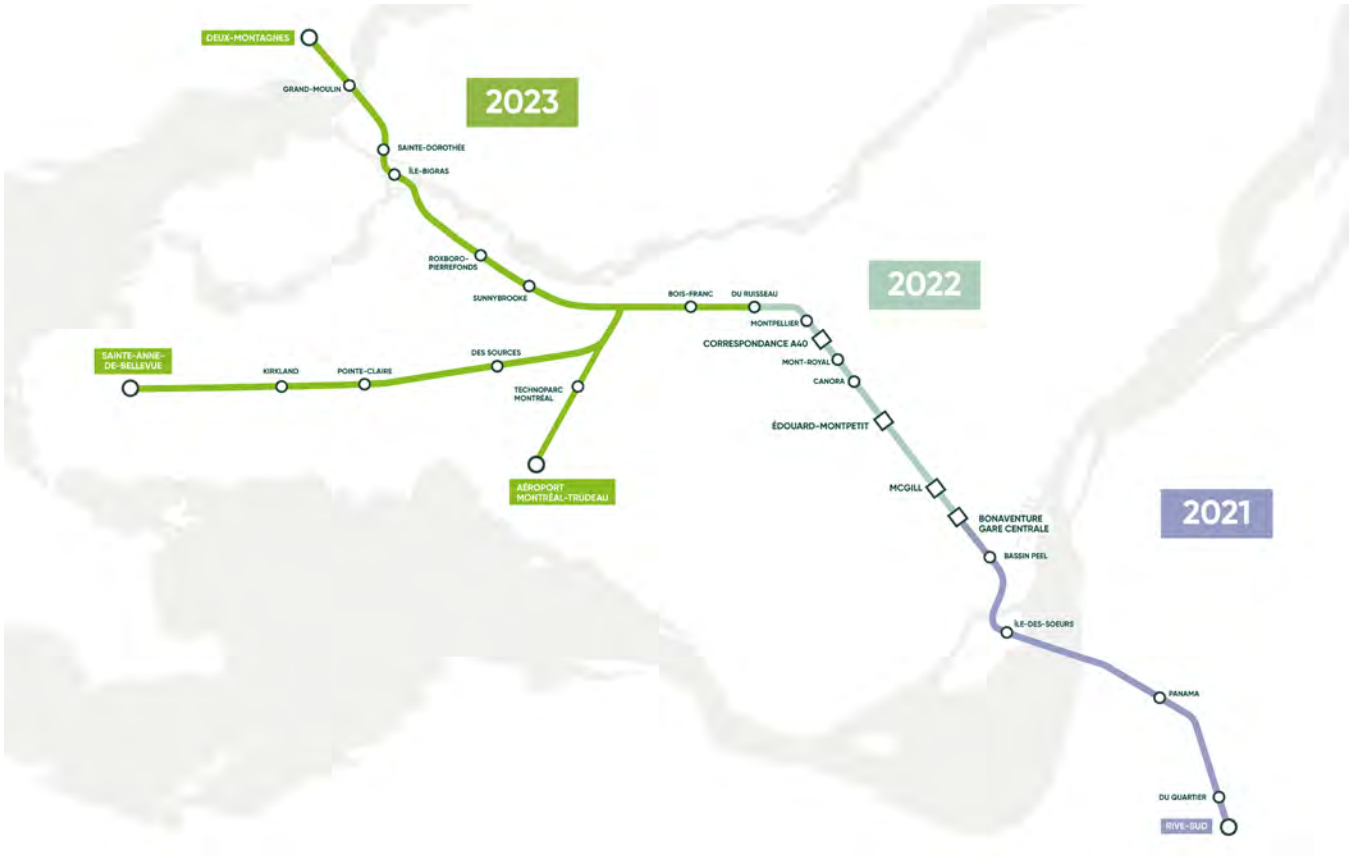


Figure 33 The REM high-speed lightrail network is currently under construction. Though the lines will pass through nearby areas, residents and visitors to the sector will still lack direct access. (REM)

Existing and Impending Transportation Projects

Over the coming year, numerous transportation projects will unfold within and near the NDLS sector. While this is expected to help current residents and visitors get around more easily in the greater Montréal area, future residential, commercial, and industrial development projects will add to local demand. The following section gives us an overview of how we can expect circulation in an area to evolve in the next few years.

Réseau Express Métropolitain (REM)

The REM is the new light-rail transit system that is being developed by the Caisse de Dépôt et de Placement du Québec (CDPQ) with the help of the provincial and federal governments. [***Figure 33].*** This automated electric train system will operate 20 hours a day on a rail network that spans 67 km and will include 26 universally-accessible stations. Some of them will be linked to Montréal's public transit system (bus or metro) and other mobility services (such as BIXI, Car2go, Communauto, etc.).

Construction of the network started in summer 2018 and the first segments will become operational in 2020. The full network is expected to be completed in 2023.

The REM will link the South Shore, the airport, and the cities of Deux-Montagnes and Sainte-Anne-de-Bellevue to Montréal's downtown. While the network will not feature stations that fall directly in our study

area, three of them will be under 3 km away (Canora, Mont-Royal, and Correspondance A40 stations).

These stations, which are expected to become operational as early as 2022, will take passengers to downtown Montréal in under 10 minutes (in comparison to at least 20 minutes using the metro), with a train frequency of 2.5 minutes during peak hours, and 5 minutes during off-peak hours.

With a capacity of 600 passengers in a rush hour four-car train (half of that during off-peak hours), the REM will become an important public transit option to take people from and to the sector.

As the three stations located the closest to our study area will not offer car parking spaces, it is important to explore multimodal ways for people to access the REM network.

Orange Line Garage

In order to increase service frequency on the metro's Orange Line, the STM launched a project to add a maintenance garage at the Côte-Vertu station in 2018. When completed in 2022, the garage will make it possible to run more trains on the Orange Line, reducing the maximum frequency during rush hour from 2 minutes 30 seconds down to only 2 minutes, which translates to a 25% increase in ridership capacity. This represents an opportunity to entice people that come to the site to make use of the metro's enhanced service.The completion of the Orange Line garage also creates an opportunity to extend the metro line further to the north to reach the REM's Bois-Franc station and its surrounding ongoing developments that aim to incorporate as many TOD principles as possible. This would also add connections to Saint-Laurent's important employment node, the second biggest in Montréal after Ville-Marie. The new Orange Line garage will be located around 1.2 km away from the Bois-Franc station. A significant portion of the costs required to connect to the nearest REM station have already been covered by this project.

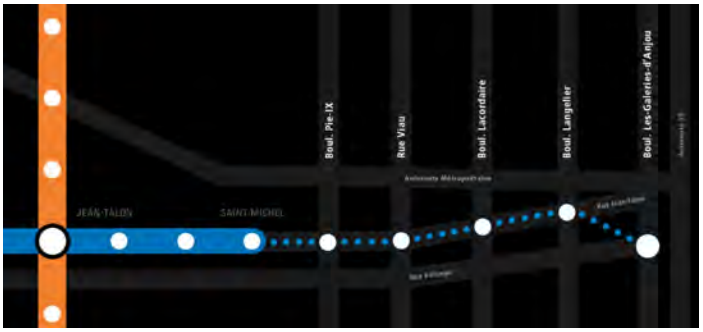


Figure 34 STM's Blue-Line extension to the east may draw more riders toward the sector. (STM)

The connection would give commuters more choices and offer an immediately available alternative in the event of a service interruption on the REM's central segment. On the other hand, the connection could siphon the REM's ridership or spur crowding on the Orange Line. The most recent figures indicate that the Orange Line's western arm currently operates at 68% of its capacity during peak hours. With the upcoming development projects in or in proximity to the sector, as well as the extension of the Blue Line, we can expect Orange Line ridership numbers to increase. While the new garage will increase capacity on the line, additional options to further increase capacity will be limited.

Blue Line Extension

In spring 2020, the STM will start preparatory work to extend the metro's Blue Line further to the east by 5.8 km. By 2026, five new stations will be added to the metro network and the line will then reach the Boulevard Les-Galeries-d'Anjou, where a 1,200-place underground car parking lot will be constructed. Preliminary estimates by the STM indicate that 25,600 passengers will travel through one of the new stations during peak hours, with around 87,000 passengers per day. This would help remove around 5,300 vehicles from Montréal's streets. The extension will turn the Blue Line into a more significant east-west public transportation corridor that is also to connect to the REM. As its west end is near the sector, we believe this reinforces the need to consider multimodal links to the metro network to alleviate the car congestion observed on the Metropolitan Highway that runs parallel to the Blue Line.

STM Bus Network

The STM has yet to announce any important changes to its bus network in our study area. The implementation of bus preferential measures (BPM) on Côte-de-Liesse Road has been confirmed since 2016. By looking at recent STM tendering notices, we find that more BPM are currently being studied for CSL. Such measures aim to provide faster and more regular bus service by creating reserved bus lanes and implementing traffic signals that prioritize bus departures at intersections.

The entire Cavendish Boulevard in CSL will integrate BPM, as well as Côte Saint-Luc Road between Hudson Avenue and Décarie Boulevard. Kildare Road is also targeted between Einstein Avenue and Cavendish Boulevard.

Autoroute 40 Renovation

Autoroute 40 was completed at the beginning of the 1960s and has since never been subject of massive renovations. The highway has become the backbone of Montréal's transportation network and the most used highway in the province with around 200,000 trips per day. Half a century since its opening, the highway's elevated structures have reached the end of their lifecycle and will need to be replaced. In the next decade, massive construction work will make traffic on the highway even more difficult for several years, during which new developments will continue to be completed in our study area. While details of the new highway design have yet to be revealed, the current provincial government says that no major changes to the highway are planned. During construction, public transport will be heavily solicited, and this might be an opportunity to instill new, lasting transportation habits among commuters.

Cavendish Boulevard Extension

Linking Saint-Laurent's portion of Cavendish Boulevard with CSL's is a project that has been in the works for decades. With the number of upcoming development projects in our study area, we can expect that formal details about the extension project will soon be made public. Once completed, the project will link Cavendish Boulevard with Royalmount Avenue in TMR, as well as the Jean-Talon West Street near the Hippodrome which is currently only accessible from Décarie Boulevard.

The project will then make it possible to pass through the current barrier that is created by the CN and CP rail tracks. While the completion of this link, now estimated for 2027, is not expected to significantly decrease the amount of traffic on Décarie Boulevard, it will create a highly desirable north-south connection that will be especially beneficial for the industries in the sector. This new axis will also be an opportunity to create a robust active and public transport corridor to answer the demand generated by upcoming developments in the area.

Car-Sharing Services

Montrealers have access to two different car-sharing services: Car2go and Communauto. While 2019 was marked by bad news for Car2go, who pulled out of five North American cities, Communauto's financially sustainable model attracted Investissement Québec who purchased a 24% stake in the company to accelerate its local and international growth. Near our study area, both services offer near-identical coverage of one-way parking areas where customers can drop-off a vehicle. Communauto's coverage was extended at the beginning of summer to offer two new one-way-trip parking zones in Saint-Laurent. While CSL and TMR do not offer such parking zones, they do have a few round-trip stations where users can schedule to pick up a car and return it at the same location. The NDLS sector features a first for Communauto's expanding network: Devmont, the developer behind The Triangle's Rouge condominiums, collaborated with the car-sharing service to offer owners the possibility of foregoing the purchase of an indoor parking space and benefit from a discounted subscription to

Figure 35 Carsharing is common in some areas on the Island of Montreal, but much of the NDLS sector falls outside Car2Go's service area. (Oroboro)

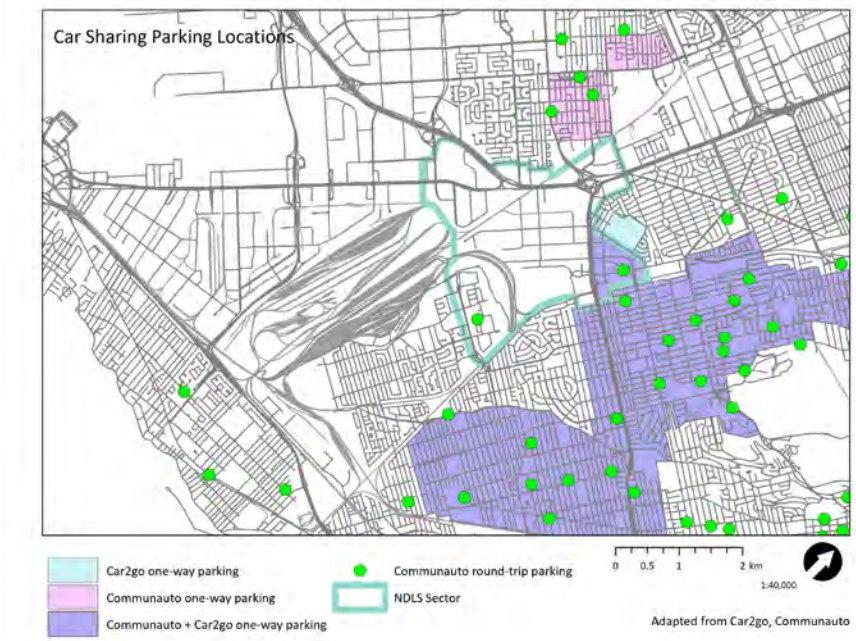


Figure 36 Carsharing parking locations.

Communauto's service. A minimum of two Communauto vehicles are available at all times for Rouge residents.

Bike Network

Montréal's central administration revealed in 2019 the first phase of its upcoming Réseau Express Vélo (REV), a project aimed at increasing the number of bike users year-round by providing features such as protected bike lanes and bike boxes at intersections. Such measures will make biking a faster, more convenient, and safer transportation option. The REV will become the focal point of Montréal's investments in biking infrastructure in the near future. While the first phase of the REV will not feature measures specific to our study area, Cavendish Boulevard and an east-west corridor linking the Hippodrome site to the east side of Montréal are among the planned future phases. Oroboro sees the REV as an important step forward to developing a bike culture in the greater Montréal area and the jurisdictions of our study area should work with the central administration to coordinate interventions in bike infrastructure.

Figure 37 Micromobility solutions, such as scooters, recently arrived in Montreal. (Lime)

Micromobility Services

New mobility services such Lime and Bird e-scooters recently appeared in a growing number of cities across the world. Absent in most transportation plans of just a few years past, the popularity, operational challenges, and opportunities offered by such services are yet to be fully understood. Recently, the CDPQ's growing interest in the transportation industry resulted in a 50M$ USD investment in Bird. To avoid the problems found in cities that were caught off-guard with the arrival of such services, Montréal took a precautionary approach by launching a pilot project with strict rules to see if this transportation mode could become a permanent fixture across the city.

Users are subject to fines for operating e-scooters on sidewalks, riding without a helmet, or for leaving a scooter outside one of the 200+ designated parking spaces created by the city. Combined, Bird and Lime operated around 700 vehicles during the 2019 pilot project.

In our study area, only CDN-NDG participated in the pilot project by offering 84 dedicated parking spaces. While the results of the pilot project will dictate the future of these services in Montréal, municipalities within the sector will have the final word on whether they allow e-scooters to become a transportation option.

Vision Zero Road Safety Approach

Starting in 2019, Montréal's strategy to road safety follows the principles put forward by Sweden since 1997 in their Vision Zero approach. The aim is to bring a change in road user attitudes by recognizing that safety is a shared concern between users and decision makers that requires coordinated efforts.

Montréal pledges to focus its road-safety efforts on lowering speed limits, additional bike lines, and timed pedestrian crossings as well as targeted interventions around school zones.

Key Opportunities

Many of the transportation projects outlined above will both enhance the attractiveness and heighten the necessity of public and active modes of transport. In crafting a coherent plan for the NDLS sector, the following opportunities presented by transportation projects should be considered:

- The REM and extension of the Blue Line metro will offer important new public transit options for trips to and from the area. As the nearest planned REM stations lie outside the NDLS sector and will not offer car parking spaces, planning public and active transit links to this network will be essential.

- The construction of the Orange Line garage will create the possibility of extending the metro line further north to connect with the REM, providing commuters with additional public transit options.

- Autoroute 40's renovation will temporarily result in heightened urgency for improving public and alternative transit options in the area.

- While the planned Cavendish Boulevard extension is not expected to decrease traffic within the sector, it will help knit together the broader transport networks and create opportunities for new active and public transport infrastructure.

- Emerging micromobility options, including car and e-scooter sharing services, could help fill in the sector's public transit gaps by serving as a link to transit network services.

- Plans for adding biking infrastructure in future phases of the REV will improve connections with the broader active transit network if they are appropriately linked to the NDLS sector.

- Montréal's pledge to support road safety in its Vision Zero approach presents opportunities to improve walkability and bikeability.

(Orobora)

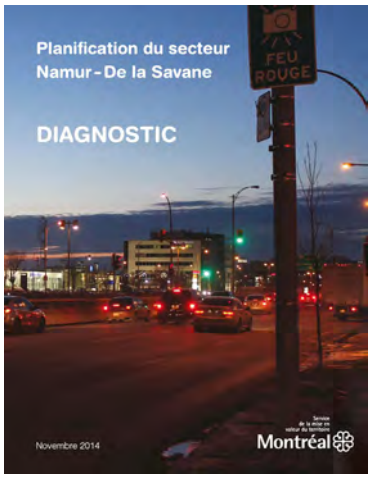


Figure 38 Planification du secteur NDLS. (Ville de Montréal, 2014)

Figure 39 Étude des besoins en transport et identification de pistes de solution pour améliorer les déplacements dans NDLS. (AECOM, 2018)

Figure 40 Le Royalmount : Étude d'impact sur les déplacements (WSP, 2018)

Overview of previous transportation studies

The sector has been the subject of intense interest because of its importance to the region's broader transportation network, the escalating challenges it faces, and the immense opportunity its transformation represents. This section will provide a brief overview of the most significant reports on the area and their findings. Providing a general context, these set the stage for further progress along the lines of the mandate to improve integration of isolated areas by promoting active and public transport connections.

Planification du secteur Namur – De la Savane: Diagnostic (Ville de Montréal, 2014)

This study was led by the City of Montréal and completed in conjunction with the administrations of the boroughs and municipalities within the sector. While the document presents many issues found in the area, most of them relate to transportation challenges. However, the study does not try to seek solutions or illustrate best practices implemented elsewhere.

Using the AMT's 2008 Origin-Destination study, the report illustrates how the sector mainly generates work-related trips (59%). To a lesser extent, the area also generates entertainment and shopping related trips, in a similar proportion to what is found in downtown Montréal. Eighty-percent of these trips rely on vehicles, a higher proportion than places that do not have subway access, such as the West Island or Anjou.

Most work trips to the sector originate from the CDN-NDG borough and from the island's most populated central neighbourhoods, while leisure and shopping trips originate mostly from TMR, Saint-Laurent, and CDN-NDG.

The document also presents the main findings of a transportation study conducted in 2011 by Genivar that estimated the number of trips on autoroutes 40 and 15 (175,000 vehicles each, daily). Décarie Boulevard carries around 40,000 vehicles daily in both directions between Royalmount and Jean-Talon West. Active and public transportation are considered hampered by infrastructure that acts as barriers and creates a generally dangerous and unpleasant environment for pedestrians and cyclists.

Étude des besoins en transport et identification de pistes de solution pour améliorer les déplacements dans le secteur Namur-De la Savane et ses abords (AECOM, 2018)

The AECOM report was commissioned by CSL to study the transportation needs of the sector and to identify priority solutions compatible with Montréal's guiding principles. Using the 2013 Origin-Destination study, the report confirms the finding that private vehicles (80%) are by far the most popular transportation mode to reach the area and that most visitors come for work or shopping purposes.

Again, transportation infrastructure is cited as a barrier to active transportation and the study considers the level of bus service to be inadequate. Intersections with a higher risk of collisions are identified and the study also looks to the future to see how upcoming developments will increase pressure on the transportation network.

The second phase of the report presents 84 interventions to solve the transportation issues identified. Some of the interventions have already been suggested in Saint-Laurent's Plan local des déplacements (2017) or in WSP's Royalmount (2018) impact study. The interventions are categorized under 6 different groups: active transportation and safety, transit, shared mobility, parking and sustainable transport, car traffic, and commercial transport.

Le Royalmount : Étude d'impact sur les déplacements (WSP, 2018)

In 2015, Carbonleo hired WSP to conduct a series of studies on the impacts of the Royalmount project on traffic. Multiple simulations were created to account for changes made to the project and the effects of the mitigation measures proposed. The City also asked for an updated study that considers the completion of the Cavendish Boulevard extension project and development on the Hippodrome site.

WSP's final scenario considers that, with mitigation measures in place, 127,000 trips will be made daily to and from the Royalmount site and estimates that 29% of those trips would be made using public transport. The project is expected to add 20,000 additional car trips in the area daily.

As Royalmount and the surrounding developments are bound to increase vehicular demand on a network that is already saturated, WSP recognizes that important mitigation measures must be put in place. They recommend that Royalmount incentivizes the use of public transport—for example, by making the access to metro De la Savane easier by implementing a walkway over the Décarie Highway and a network of dedicated shuttles in partnership with the STM. The project's parking design must also limit the flow of vehicles to minimize their effect on the existing network. Finally, WSP considers that the impacts of the project could be mitigated by encouraging people to arrive or leave the site outside peak hours.

With these measures in place, WSP claims that commuters in the area will see their current trip be extended, on average, by only 2 minutes.

WSP also considers that people travelling to or from Royalmount will not particularly benefit from the extension of the Cavendish boulevard. The preliminary extension design that they worked with has a limited vehicular capacity, and WSP estimates that about 40 cars/per hour coming from the west would use it.

Figure 41 Plan local de déplacements (Arrondissement de Saint-Laurent, 2017)

Plan local de déplacements (Arrondissement de Saint-Laurent, 2017)

This document explains Saint-Laurent's orientations on topics such as large transportation projects, active and public transport, safety and quality of life, the road network, and commercial transportation.

Saint-Laurent's vision for transportation is centred around reducing reliance on private vehicles. To do so, the borough aims to facilitate the use of different modes of transportation for every commuter and by investing in innovative technologies.

For each topic, general objectives and specific interventions that are either already being implemented or suggested are presented. Interventions range from very broad measures to very local, specific ones. A list of indicators is suggested for each topic to gauge the progress done toward attaining the stated goals. A summary of the transportation interventions carried out between 2009 and 2016 is also included.

(Oroboro)

Key Transportation Challenges

This section lists the key transportation challenges we aim to address as part of our mandate.

Disjointed Transportation Networks

Both automobile and active transport modes in the sector are severely impeded by heavy infrastructure that divides the area.

These barriers include the Autoroute 40 (dividing the north and south portions of the sector), Décarie (which presents a challenge to east-west mobility south of the Autoroute 40), and the railways which ring the sector.

While multiple bike lanes approach the sector from the north and east, the limited existing bicycle facilities within the sector are poorly connected with Montréal's active transport network.

Auto Dominance

The Namur-De la Savane sector is located at the intersection of the two major highways of regional scale. In addition to the through traffic from the metropolitan region, the area accommodates industrial and commercial activities which contribute to the large overall volume of trips.

The traffic load catered by Décarie, Autoroute 40, and adjacent service roads averages approximately 360,000 cars and trucks per day, causing congestion for about 13 hours per day. Additionally, the sector generates about 95,000 trips per day. This heavy vehicular movement

Figure 42 The Current bike network in NDLS is limited and disjointed, creating difficulties for crossing the sector.

results in the Décarie Interchange being one of the worst bottlenecks in Canada. The high traffic volume, congestion, and auto-oriented development discourages walking and cycling.

Streets within the sector (excluding residential areas on the periphery), have virtually no restrictions on the circulation of heavy trucks [see Figure X]. Trucks are one of the major occupants of the road in the area, due to the heavy industrial presence in the Saint-Laurent-Dorval region, Anjou-Saint-Léonard, and Saint-Denis/Saint-Laurent Boulevards. More than 4,500 trucks travel through the area every day.

Traffic Safety

Over 3,900 traffic incidents have been reported within the sector and immediate area (500 m radius) in the past five years, with nearly 600 incidents reported in 2018 alone. A total of 29 incidents resulted in death or serious injury in the last five years. Areas of primary concern are along Décarie between Ferrier and Jean-Talon, particularly at the intersections at Paré and Jean-Talon, and between Kildare and Mackle.

Cyclists were involved in 65 reported incidents while pedestrians were involved in 145 during the past five years. Areas of main concern for cyclists are along Sainte-Croix north of Du Collège street and along Jean-Talon, Ferrier, Mackenzie, and Plamondon.

Most incidents involving pedestrians occurred along Cavendish south of the railway and Décarie between Vézina and Plamondon, as well as between Ferrier and Des Jockeys [***Figure 45***].

Figure 43 Debris from car crashes frequently lines Décarie Boulevard. (Oroboro).

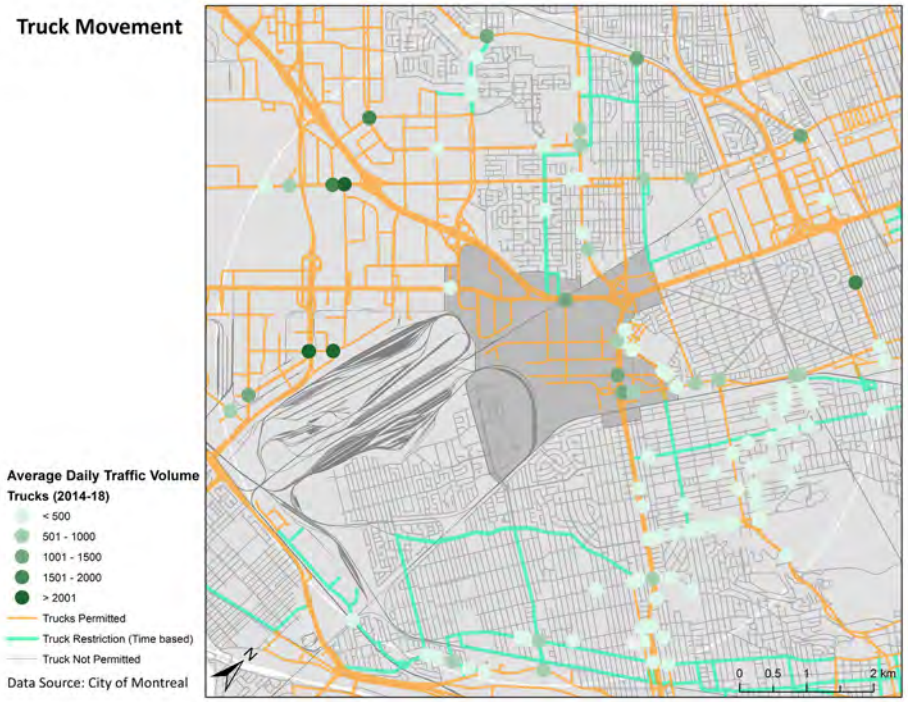


Figure 44 Truck movement in and around the sector.

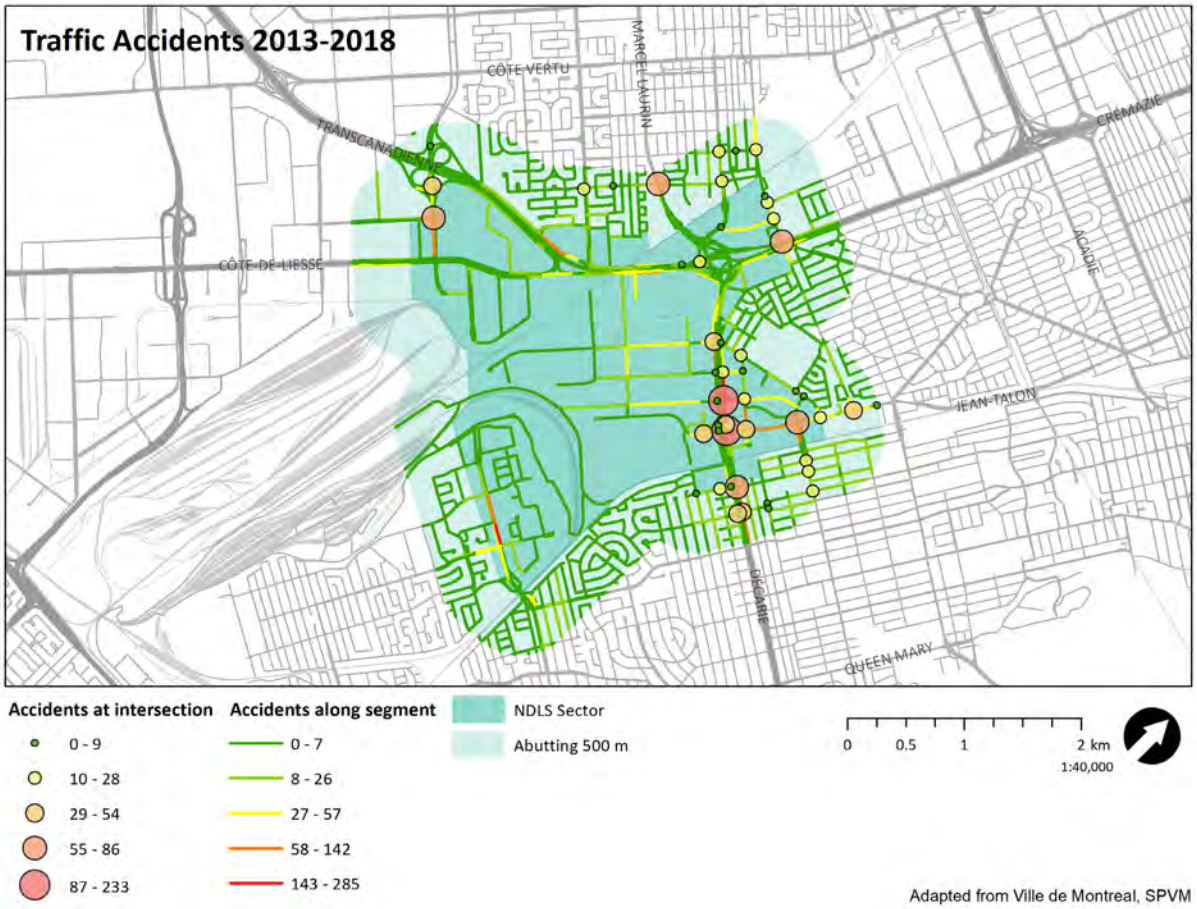


Figure 45 Traffic incidents.

(Oroboro)

Public Engagement Results

Oroboro conducted preliminary consultations with the public at different locations throughout the NDLS sector. At each location, a public engagement station was set up where willing participants could anonymously write comments on post-it notes about things they liked, did not like, and wanted to see changed in the area. Participants could then place their comments in the areas they were addressing on a large map of the sector. In total, Oroboro interacted with 30 people. A majority of comments received were concerning transportation in the area (51 comments) followed by quality of life (18 comments), housing (13 comments), and employment/commerce (6 comments). A table with the results of these consultations is included in the appendices. It should be noted that people were generally receptive and appreciative that public consultations were being done. More in-depth consultations should be planned for in future to get a better gauge on the public's opinion and vision of the sector.

Feedback on Transportation

Most of the feedback received about transportation in the NDLS sector concerned personal vehicle travel, with the most popular comments being against the Cavendish extension, asking for improvements to traffic along Décarie, concerns about traffic generated by Royalmount, and responses in favour of the Cavendish extension. Participants were also quite vocal about the quality of public transit service in the area, asking for more and improved bus routes and amenities as well as better links between buses and the metro. People were divided when it came to cycling in the sector. Participants around Cavendish Mall were not in favour of adding more cycling infrastructure, whereas those interviewed at Décarie Square were in favour of more bike lanes and were concerned about cyclist safety. Safety was also a concern for pedestrians, with participants asking for more infrastructure to help cross the railway and highways.

Feedback on Quality of Life, Housing, and Employment/ Commerce

Most of the participants wanted to see more greenspace in the sector. Those interviewed around Décarie Square and Namur Station would also like to see more schools, more space and services for children, and more community recreation facilities. In terms of housing, some participants were worried about too much residential growth as well as a decline in property values as a result of the Cavendish extension.

However, most wanted to see more low-income, affordable, mixed-income, and better-quality family housing in the sector, particularly in new and planned developments like The Triangle and Hippodrome. Participants were in favour of developing vacant land in the area, however there were concerns about the addition of more retail space in a dying market and larger developments, like Royalmount, competing with existing retail.

Future Orientations

This section presents a host of potential approaches for seizing the opportunities presented by the NDLS sector transformation. These strategies have been developed in accordance with the guiding principles and preliminary vision we have articulated. The preliminary vision, strategies, and specific initiatives described here should be considered "conversation starters." Each strategy possesses advantages and disadvantages and will require additional research and analysis to varying degrees. The clients' feedback will determine which options are to be pursued in greater detail as part of the final project deliverable.

Given their interrelated nature, coordinated land use and transportation planning is essential for unlocking the growth and development potential of the sector. Sustainable land use and transportation strategies are described in separate subsections below, however, they have been developed in a complementary manner. The current approach to site- or jurisdiction-based planning would have a limited impact, benefitting localized stakeholders while exacerbating existing problems throughout the sector. A cohesive vision is required to build a shared platform of objectives and strategies that will ensure the successful redevelopment of the sector. This vision would depend on close coordination between diverse actors and stakeholders, creating new opportunities for collaboration.

Figure 46 Klyde Warren Park, Dallas (Wikimedia)

The land use and transportation strategies described below are based on the following four principles:

- Respecting and emphasizing the unique built and natural landscapes within the sector and its relationship to surrounding areas.
- Planning for long term redevelopment and densification within a regional context, while addressing the needs of current and future populations.
- Encouraging new models of partnership between public and private sector actors and diverse stakeholders.
- Prioritizing public space development and infrastructure enhancement to support improved connections between isolated and fragmented areas.

Land Use

Changing land use patterns across the sector presents a unique opportunity to transform an auto-dependent inner-city landscape, fragmented by large scale infrastructure into a series of well-connected and high-quality living environments with increased population and employment density. A range of strategies is presented below that is to lead to a discussion that will inform the development of a concept plan and key interventions.

Managing Autoroute 15

An ambitious option is to deck over the autoroute. This would require constructing a “roof” over the below-grade sections of the expressway, creating a new usable space on top. Parks are one of the most desirable land uses for this type of new space, provid-

Figure 47 Vauban Village (Making Lewes)

Figure 48 Vauban Map (freiburg-vauban.de)

ing environmental, economic, and community benefits. They are also the most cost-effective land use option for this type of project. Park-on-decks can increase the provision of green spaces in areas that are lacking or highly developed. Creating a walkable public space also reduces pedestrian-vehicular contact and conflict, while also mitigating the noise and air pollution generated by vehicles on the autoroute.

As an example, the construction of the Klyde Warren Park in Dallas provided five acres of parks and public spaces and is now considered a destination. A similar intervention could be considered in the NDLS sector to create a safer, more comfortable, and aesthetically-pleasing east-west pedestrian connection across Décarie Boulevard. Similar ideas have been proposed and circulated within the sector. Therefore, this option is likely to be supported by the local communities.

Key Considerations

The idea of decking the Autoroute 15 is not new: Richard Bergeron's team studied the idea in 2009 and additional studies have been conducted recently to assess the project's technical and financial feasibility. This recommendation has a high level of complexity and cost due to its size and the physical structures required. However, it would provide considerable benefits to the sector if executed well. There are multiple considerations that need to be considered with a project of this nature:

- Is it reasonable to expect the high level of collaboration required between jurisdictions to implement the park-on-deck?

- Would there be sufficient funding for the construction and maintenance of the project? Would public-private partnership or other funding sources be necessary?

- How should the park be designed and what facilities and/or programming should be offered to guarantee its use year-round? Who would be responsible for park maintenance and programming?

Landscape-Based Eco-District

As the NDLS sector is highly fragmented, we propose landscape connectivity as a strategy that could increase permeability throughout the sector. This would entail a continuous green network to support ease of movement and biodiversity throughout the area.

As landscape connectivity is a concept that has roots in landscape ecology, urban design, and transportation planning, it provides significant benefits for humans and their well-being.

Oroboro believes such a strategy would complement upcoming developments in the area, including the sustainable housing project the City of Montréal has envisioned for the Hippodrome site.

Sustainable development projects in Canada and Québec have recently become more common. For instance, at least five are currently being planned in the CMM.

Oroboro decided to look at one German and one Canadian example. Both consist of previous industrial sites that were transformed into eco-districts, integrating the principles of connectivity and permeability within and outside the neighbourhood, resulting in significant benefits for the communities.

In Vauban, Germany, greenery is at the center of the project. Biodiversity corridors follow the river and penetrate the site between buildings to create a 'natural' and healthy playscape for families.

The Olympic Village site in Vancouver was built to house athletes participating in the 2010 Winter Olympics and the condominium buildings were later sold. As part of the project, public and green spaces were created along the waterfront by reintroducing indigenous plants and rehabilitating natural waterfront habitats.

The railway edges that criss-cross the sector can be used to create green corridors that facilitate connectivity. There are also local examples within the City of Montréal where railway edges have been used to increase landscape connectivity and social interactions.

Key Considerations

While eco-districts and landscape connectivity are endeavors that are generating a lot of interest, especially for the Hippodrome site, the concepts need to be carefully planned to maximum benefits. An assessment of best practices when integrating similar concepts into development projects must be conducted prior to implementation. Before proceeding with this type of assessment, the following questions need to be addressed:

- What are the community needs that would inform the type of ecological design for green and public spaces and infrastructure?

- Is there social acceptance and interest in changing travel and behavioural patterns towards more active habits and lifestyles?

- What are potential barriers and opportunities to expand the main axis and connections along the green network (within and outside the sector)?

- Do green infrastructure and eco-district interventions provide cost-effective strategies for addressing existing and future social, economic, and environmental challenges?

Application of Form-Based Code

Form-based codes are zoning tools aimed at regulating the form of property development rather than the use as practiced in traditional zoning. Thus, form-based codes focus on the relationship between building frontages and public spaces, their structure, and the massing of buildings in reference to each other, the scale of development, and block types. It is a regulation plan that prioritizes the character of a property rather than its usage. In addition, the application of form-based codes emphasizes mixing compatible uses, including retail shops, residential spaces, restaurants, and other low-impact services, while ensuring that non-compatible uses are excluded.

This zoning tool shares similarities with design guidelines. However, unlike design guidelines, form-based codes are not advisory and developers do not have the luxury to refuse to incorporate form-based standards into their projects as they are legally bound and regulated. Due to the legal implications of a form-based approach, it is crucial to identify how this policy would interact and coexist with existing policies at both the municipal and provincial levels.

If form-based codes are to be adopted within the NDLS sector, the cities and boroughs should work in close collaboration to determine the type of form-based code to implement. There are six types, which include building form standards, building type standards, building frontage standards, civic space standards, block and subdivision standards, and regulating plans.

All these codes can be adopted or they can be selected to suit the priorities of each jurisdiction. It is also important to note that the form-based zoning must be context-specific, therefore requiring detailed planning and extensive public consultation to gather community feedback.

Key Considerations

Considering the legality and contextual application of form-based codes, it is important to understand the concept and its potential implications of where and how it should be applied. Prior to the implementation of this policy, the following questions must be considered:

- Is a uniform form-based code for the entire sector more effective, rather than varied regulations between jurisdictions?
- What types of form-based codes among the six types mentioned above would have the most impact on the mixed-use developments that are proposed for the sector?
- How to apply or enforce regulatory compliance for existing buildings within form-based code policies?
- What are successful examples of form-based code applications within a Québec and/or Canadian context that can help with the formulation of local policies?

Transportation

The NDLS sector is served by a dated and inefficient transportation network, that with the arrival of new developments, will likely exacerbate existing traffic congestion and barriers to active and sustainable. Implementing the right solutions may be able to mitigate these challenges and improve the effectiveness of a multimodal network in the area. This section builds upon analyses and recommendations from previous reports, in addition to our own, to provide several potential orientations for the future network. Our common goal is to knit together a collection of distinct neighborhoods, offering seamless interconnectivity while preserving unique community identities. Oroboro invites the client to select and provide feedback on the

Figure 49 Brussel's tramway incorporates elements such as trees and grassed trackbeds to create more inviting environment for active modes, including walking and biking. Similar elements could be employed along Cavendish Boulevard or elsewhere in the sector.

following proposals to determine which should be explored in greater detail for the final concept plan.

Based on our mandate, we suggest that proposals be evaluated with several key criteria in mind, including whether they:

- Serve to unlock the study area by improving links within and around it.
- Improve public, active, and alternative transportation.
- Improve access to employment hubs in Saint-Laurent, Côte-des-Neiges–Notre-Dame-de-Grâce, and the Town of Mount Royal.
- Facilitate social, economic, and physical cohesion between the neighbourhoods intersecting the NDLS sector.

Plugging in the Area

The sector and its immediate surroundings are criss-crossed by transport infrastructure that links distant destinations but erects significant barriers to movement within and across NDLS. We recommend a micro-scale electrified transport network to fill current gaps and serve the needs of the over 40,000 new residents who could call the area home in the coming decades. This transit network would facilitate the sector's integration with existing and proposed active-transport networks.

Emerging technologies are blurring the line between traditional buses and urban rail systems, potentially offering a cost-effective blend of the aesthetic and performance-related attributes of tramways with the lower capital costs and greater flexibility of rubber-tire systems. Properly designed, the routes could serve multiple purposes, including:

Figure 50 CRRC's "trackless tram" in Zhuzhou, China) blends bus and rail technologies. (Wikimedia).

- Providing high-quality local transit options within the sector

- Generating a unifying sector identity and promoting real-estate development

- Enhancing connections with other modes of transit, including the REM, for people traveling to and from the sector. (The connections could also provide an important alternative to the REM by enabling better connections to the metro, similar to the proposed Orange Line extension to Bois-Franc).

Two approaches to potentially consider are (1) "trackless" autonomous trams operating on rubber tires or (2) recently developed "very light rail" trams, which are expected to use smaller, lightweight tracks, and onboard battery power to remove the need for expensive or unsightly catenary wires. Examples of these might include:

- The CRRC "trackless tram" (Zhuzhou, China) – This optically-guided bus system mimics many of the attributes of traditional light rail without the costly infrastructure. Different types of vehicle-mounted cameras direct the articulated vehicle along painted "tracks". Other possible guidance systems could include kerb- or magnetic-guided steering. The ride is reportedly smoother than a traditional bus because of the rail-like suspension and under-car equipment. Its aesthetic is also similar to that of a light rail or tram. Its makers suggest the trackless tram could be deployed for less than half the capital cost per kilometer than traditional light

rail.

- Coventry, UK, "Very Light Rail" – Though still under development, the Coventry Very Light Rail system is intended to pilot the use of smaller, lighter self-contained rolling stock on specially adapted tracks that don't require relocating under-street utilities. The trams will be battery powered, with station-based quick charging, and are intended to be autonomous, reducing the most significant operating costs. The developers, which include the University of Warwick, intend to offer a vehicle and track system at a fraction of the cost of traditional light rail, which can often render business cases impossible. At the same time, the form factor and permanence of the installed infrastructure could be leveraged to direct and foster development in appropriate areas.

Key Considerations

Saint-Laurent has already proposed a tram system consisting of two axes linking Cavendish Boulevard, the Namur Orange Line metro station, and the Pierre-Elliot Trudeau International Airport. To our knowledge, researchers have not elaborated a comprehensive business case. Given the costs of traditional light-rail and tram technology, careful consideration would have to be given to questions of return on investment, ridership, and political feasibility. If this general approach is selected for further study, the following research questions would need to be addressed:

- What are the infrastructure and maintenance requirements and associated financial implications under different route and technology scenarios?

- What are the ridership projections and land-use changes required to sufficiently increase usage?

- How does route alignment decisions impact sector demographics and physical infrastructure, such as street width and grade?

- What is the level of political acceptability and support amongst different stakeholders?

Human-Scale Network of Active Transport

In addition to the presence of numerous physical barriers, additional challenges to active mobility in the NDLS sector include automobile-oriented streets and an unpleasant built environment. Active trips are limited in numbers and are confined to a small portion of the area. With incoming residential and mixed-use developments, it is imperative to improve the quality and connectivity of the active transport network to make it more conducive for human-scale mobility.

The city of Barcelona overcame issues of congestion, pollution, and lack of green spaces by focusing on transportation policies that reclaimed city streets, transforming them into enjoyable places to walk. [***Figure 52***]. Barcelona's goal was to reducing car and moped use by 21%.

Their 'superblock' strategy included pedestrianizing groups of three-by-three city blocks, limiting motorized access to single-lane streets around their perimeters. Proactive communication with residents and businesses as well as investment in new public spaces at former intersections and roads proved successful for the city.

Key Considerations

Pedestrian and bike networks are expected to be safe, comfortable, and enjoyable. In order to meet the existing and future demand for active transport in the area, it will be necessary to increase the permeability of the sector for active trips. A comprehensive human-scale network that allows safe and continuous movement for pedestrians and cyclists would need to consider the following:

- Which locations would best serve as connected bike and pedestrian networks, given existing and future facility supply and demand?

Figure 51 GWL-Terrein, Amsterdam. (rainproof.nl)

- What are best practices to make active transit corridors accessible, comfortable, safe, and integrated with the surrounding area?

Transit- & Pedestrian- Oriented Developments (TOD & POD)

Developers nowadays routinely use transit-oriented development (TOD) as a marketing tool, describing how their project makes it possible for buyers to live a car-free lifestyle. The CMM describes a TOD as a development of medium- to high-density built within walking distance to a high-frequency transit node. A mix of land uses are also characteristic of these developments.

Other neighbourhoods claim to integrate Pedestrian-Oriented Development (POD) principles. These developments are oriented towards active transportation connections between commercial and residential uses inside and adjacent to a neighbourhood. This means incorporating important traffic-calming measures and making walking an easy, safe and pleasant option to discourage private vehicle use. This also requires buildings to be placed close to the streets and ensuring that zoning allows for a mix of uses. POD principles can be implemented where there is an absence of an important public transit node.

New Hampshire's model zoning ordinance for pedestrian-oriented areas suggest interventions such as a minimum 5-foot vegetated buffer between the street edge and a sidewalk as well as parking space maximums. Other PODs can go as far as to outlaw private vehicles. This was done, for example, in Cologne's

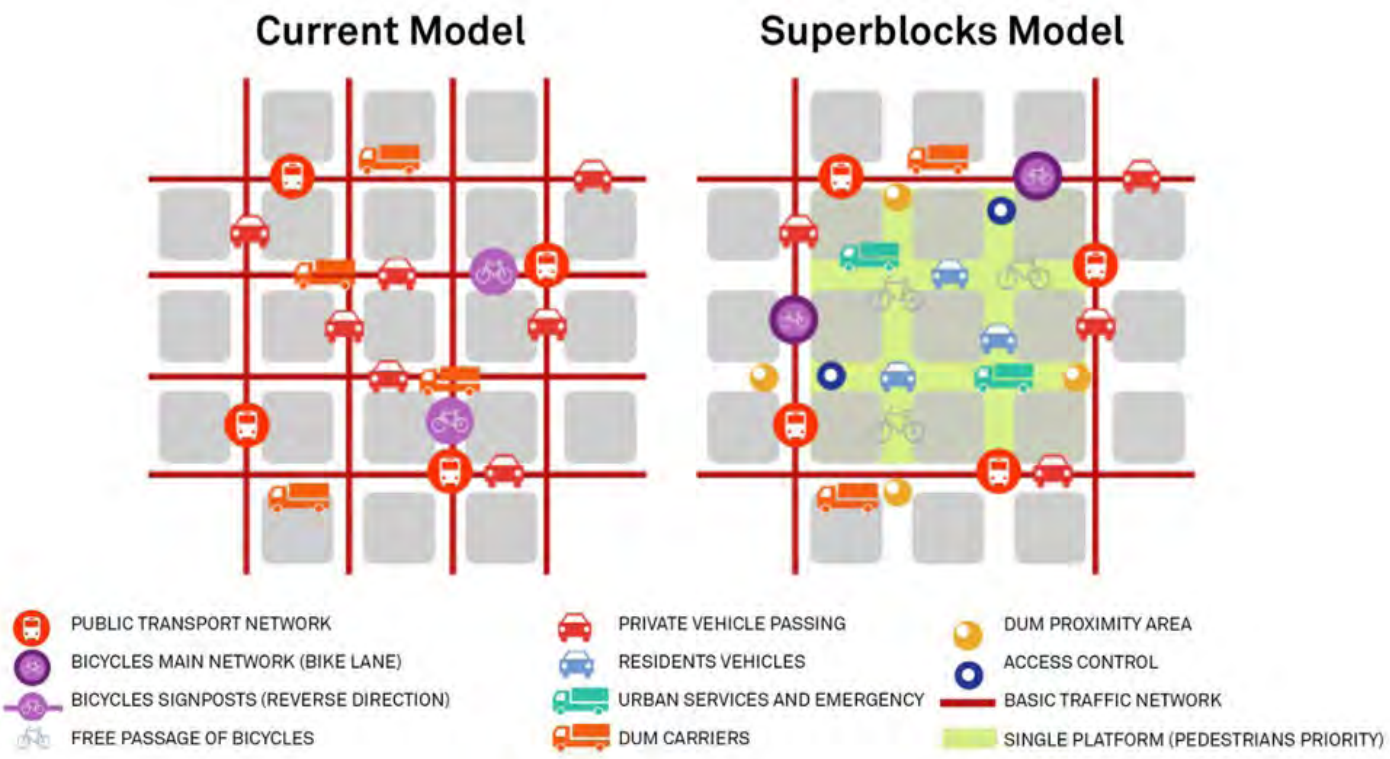


Figure 52 Barcelona's superblock model. (Urban Mobility Plan for Barcelona 2013-2014)

Stellwerk 60 and Amsterdam's GWL-Terrein projects where residents must park their private vehicles on the neighbourhood's outer edge. In Malmö, Sweden, the Bo01 neighbourhood made its streets car free by limiting parking to underground spaces. Here, Saint-Laurent's Bois-Franc and the upcoming Cité Mid-Town projects are branding themselves as PODs for providing commercial spaces that are accessible via a comprehensive pedestrian network.

Key Considerations

While TOD/POD projects are generating a lot of interest, they do pose challenges. A careful assessment of the successes and hurdles faced by such developments must be made before implementing TOD policies. Issues such as the followings will require addressing:

- What are the land uses and populations that would require vehicle access within TOD/POD designed areas?
- How can the needs of groups with limited mobility challenges be addressed while creating active and public oriented transportation networks?
- Is there a market for retail and commercial development that provides little or no parking facilities?

Cavendish Green Transit Way

Proposed connections to the northern and southern portions of Cavendish Boulevard across the CP Railyard in CSL has been discussed for decades. Now, as development presses forward in the area, city and local officials have described the link as necessary and inevitable. The link presents a significant opportunity to improve mobility within the isolated western reaches of the study area. At the same time, the extension could represent a significant alteration in the traffic

Figure 53 Skating rink beneath the Gardiner Expressway in Toronto (BlogTO)

patterns to which residents have grown accustomed and could easily perpetuate car-centric transportation. To capture the full range of benefits associated with the proposed extension while avoiding some of the risks, we suggest exploring a range of designs prioritising active and public transit.

To that end, it may be useful to consider prohibiting passenger car use of the extension. Instead, city and local officials could consider either (1) transit and active-mode exclusive access or (2) transit, active and commercial delivery access.

New York City recently restricted passenger vehicle traffic on the busy east-west 14th street corridor in Manhattan. Buses and commercial traffic are permitted. Initial reviews are positive, with interviews in daily newspapers suggesting that people feel safer when walking and shopping and bus speeds have increased.

New Orleans has pioneered the use of green infrastructure to manage stormwater and other sources of flooding. One outcome has been the preservation or creation of open space areas. In the case of the Lafitte Greenway, city officials used the 2.6-mile stretch to provide active-transport connections linking neighborhoods. This model, with amendments to accommodate public or even commercial transit could be considered for the Cavendish Extension.

Numerous cities around the world have incorporated green tram and transitways into surroundings that

are conducive to active and other alternative forms of transport.

Some leading examples include: Toulouse, France, which boasts completely grassed track beds; Brussels, Belgium, where trees line either side of some tram routes, providing shade and muting the impact of traffic on surrounding streets; and New Orleans' historic St. Charles line trolleys, which operate at lower speeds on center-aligned naturalized track beds.

Key Considerations

Among the questions to be considered regarding these possibilities are:

- How could restricting or prohibiting private vehicular traffic on the future Cavendish Extension impact other traffic congestion reduction initiatives in the study area?

- What strategies are required to ensure that active-transport infrastructure remains inviting and compatible with other uses, including transit or commercial delivery?

- How to design active-transport solutions that can remain operational for all-season use?

Improving Active Connections Beneath Transportation Corridors

Micromobility and active transit within and beyond the sector is limited by infrastructure which acts as barriers for active modes, such as Autoroute 40 which is a major obstacle to north-south movement. Currently the CN railway line crossing and the Lucerne Street/Sainte-Croix Avenue underpass are the only links accessible for cyclists and pedestrians. However, even these spaces that do not invite foot traffic, a problem faced by many underpass links that tend to be poorly lit, dirty, and lacking signage and other wayfinding elements. Creating more inviting spaces beneath the autoroute could serve as relatively modest yet effective intervention to knit the neighbourhoods on either side of the highway together, in addition to creating new public spaces.

The 'lost space' underneath expressways is created as

Figure 54 Houston Underpass (Curbed)

a consequence of the shape and design of these major physical structures. Cities across North America face similar problems, where neighbourhoods are fragmented by heavy infrastructure built in the 1960s and 70s that dominates the landscape. Lacking the time and capital for such major overhauls as burying freeways, many municipalities have experienced a recent wave of interest in turning transit underpasses into public parks. Broadened sidewalks and active transit paths, attractive lighting, and physical or visual separation from cars can convert the spaces beneath freeway underpasses into inviting public spaces and pedestrian thoroughfares. These types of interventions use existing infrastructure in an unexpected way, resulting in low-cost ways to reconnect neighbourhoods long fragmented by urban highways. The lost space underneath Autoroute 40 could be repurposed to create walkable north-south connections, thus reducing the existing barriers and connecting communities from both sides of the expressway.

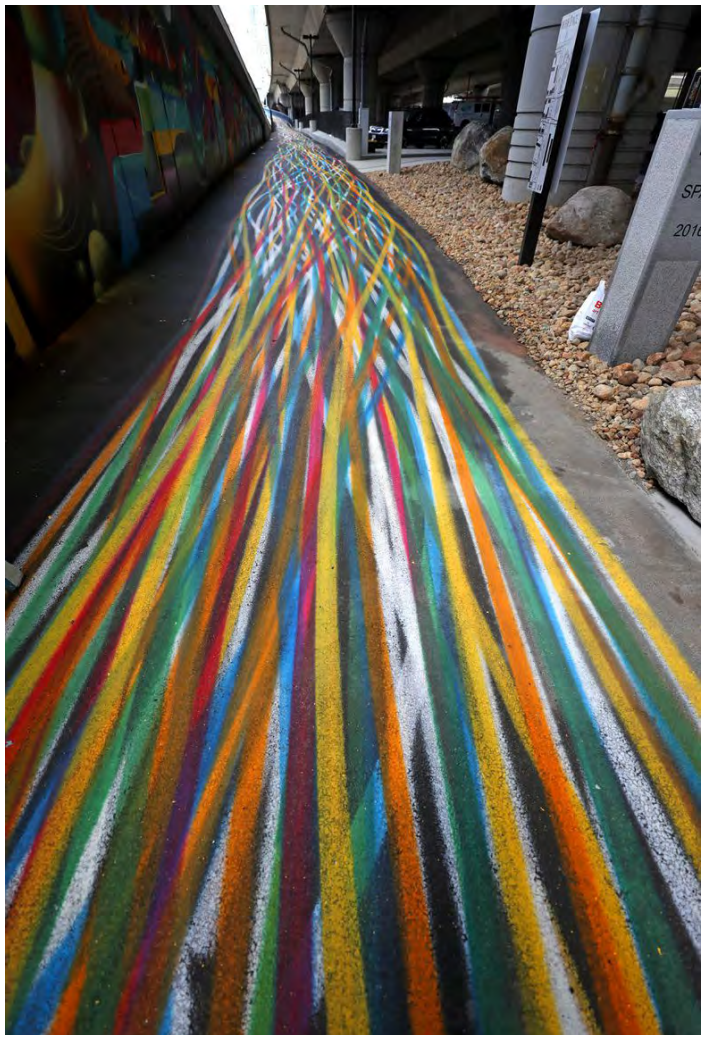


Figure 55 Underpass park in Boston (Boston Globe)

In one recent example, Toronto's new underpass stateink [***Figure 53***] marks the first phase of the Bentway, another underpass park. The project is planned to eventually encompass over a kilometer of bike and pedestrian trails and public art installations. The portion that opened last year offers skate rentals, live music, and pop-up curling. This reconnected seven neighbourhoods by offering various activities year-round to ensure the livability of this new space.

In many of these cases, interventions were funded or managed by developers of nearby projects who were adding residential units in areas of the city with little existing park space. As one simple but effective intervention in Vancouver, a local artist designed a giant LED-lit chandelier that hangs below the Granville Bridge. The public art piece provides lighting and unexpected ambiance for pedestrians traversing this underpass and was paid for by the developer undertaking new project construction nearby.

In another example of public-private partnership, a Boston developer signed a deal to manage a new underpass park, the Underground at Ink Block. This includes managing 175 parking spaces, providing round-the-clock security, and consistent programming such as fitness classes and beer gardens. Located between two neighbourhoods, the 8-acre park beneath the I-83 includes a dog park and murals from street artists recruited from across the country [***Figure 55***]. In addition to new destinations for recreation, these underpasses also function to provide comfortable connections, stitching together different sides of the highway.

Key Considerations

If improving underpass connections are pursued as part of a concept plan for the sector, an analysis of the

following challenges would be necessary:

- Which existing underpass sites present maximum opportunities for increasing recreational usage and north-south connections through targeted interventions?

- What are some of the best design practices for safe and accessible movement of pedestrians, cyclists and automobile traffic?

- How can public-private partnerships be leveraged to cover costs of underpass revitalization?

Extending Shared and Micromobility Options

As private vehicles already dominate the sector and the street network has reached saturation level, shared mobility options will play a crucial role in ensuring a sustainable transportation options in the future. Both vehicle-based options (such as Communauto and Car2go) and micromobility solutions (such as BIXI, Lime, and Jump) can effectively reduce people's reliance on private vehicles by closing gaps in the current public transportation network. However, the advantages offered by these services require that adequate access be provided to residents and visitors within the sector. As it stands, the sector is not adequately covered by services such as Communauto and BIXI (see Appendix for maps and analysis of BIXI coverage). It will be necessary to enable operators to extend their service area as future development projects are built. This will require collaboration between operators and area stakeholders.

For vehicle-based options such as Communauto, TMR and CSL may want to explore the possibility of having users of this service park in resident-only zones, such as what is possible throughout CDN-NDG.

As for active transportation options, TMR already features a couple BIXI stations within its boundaries, while CSL has yet to welcome them. As more developments are completed and as Montréal's bike network expands, establishing partnerships with micromobility operators that record sustained growth of their services will give residents and visitors more choices.

Key Considerations

Communauto and BIXI have been available in Montréal for many years. They have proven their popularity and their financial sustainability. Cities and boroughs that have yet to welcome them on their territory have certainly weighed the pros and cons of these options. Given that the reliance on private vehicles will exacerbate congestion problems, we will need to identify ways to reconcile diverging visions by answering the following questions:

- Are there political or economic barriers that make the extension of these services difficult or impossible?

- Would adopting small-scale pilot projects in unserved areas be possible?

- Are there design options that fleet operators could look into to make their service more attractive or more suited to the local context within underserved areas?

Figure 56 Docked electric scooters. (Swiftmile)

Eliminating Parking Minimums, 'Unbundling', and Carshare

There is currently an abundance of surface parking lots and free on-street parking in the NDLS Sector. With many new large-scale developments proposed, the amount of additional parking required under existing by-laws may lead to an even greater surplus in parking supply. An overabundance of parking in the area is contradictory to a vision of sustainable transportation as it encourages driving, acts as a barrier for cyclists and pedestrians, occupies valuable land, while also acting as a contributor to the urban heat island effect.

As many of the proposed residential and commercial developments will be in close proximity to mass public transit, it is recommended that a similar approach to parking requirements in San Diego be adopted. The city council recently voted to eliminate parking minimums for new apartment and condominium complexes near mass transit, instead imposing a new parking maximum of one space per unit. While a study found that only 2 percent of a 40 percent reduction in residential parking supply in London, UK can be attributed to parking maximums imposed in 2004, it was determined that eliminating parking minimums without imposing maximums resulted in an oversupply of parking in areas where it was profitable for developers to provide parking (often in high density areas near mass transit). Most jurisdictions within the NDLS sector have already implemented some form of parking maximum, although it currently often exceeds one space per unit. It is, therefore, recommended that parking maximums be implemented in TOD areas, if not across the sector, together with eliminating minimum parking requirements.

The City of San Diego is also now requiring that developers 'unbundle' the cost of parking from rent and purchase prices. This would make housing more affordable in the sector for those who do not want or need a parking space. In addition, requiring developers to reserve a certain percentage of spaces provided for carshare services, similar to TMR's by-law, has been proven to reduce vehicle ownership and parking demand at the building level. It is recommended that both policies be implemented within the sector.

These approaches need to be in conjunction with additions and improvements to public and active transportation in the area in order to accommodate a shift from driving culture and reduce the need for vehicle ownership. Prior to implementation, new parking policies should be evaluated alongside a thorough study of current and future parking supply and demand in the area under current conditions and by-laws. Planners and policymakers must be careful to implement these measures in a way that is feasible and with minimal disruption to resident quality of life.

Key Considerations

- Is there a large enough market for housing units without a parking space in the sector?
- Would plans for future developments and sustainable alternatives to personal vehicles be enough to reduce the need for driving and parking in the sector?
- In terms of regulating parking supply and time limits, would the area benefit from more long-term (e.g. employee, residential) or short-term (e.g. commercial) parking?
- What is the level of political support and interest in implementing paid on-street parking as a strategy to encourage parking turnover in commercial areas?

The Last Mile

With changing consumption patterns in urban areas, people are spending less time in brick-and-mortar stores and online shopping. Growth in the e-commerce sector has brought almost everything to our doorstep. People increasingly order smaller amounts of goods with higher frequency. This change behaviour

Figure 57 Changing technologies are altering the way people send and receive packages. (Atlas of the Future.org)

has led to a substantial increase in number of delivery vehicles (box trucks, smaller vans, and cars) on city streets. It is expected that new development in the NDLS sector is going to generate considerable increase in trips attributed to delivery vehicles. For example, every person in the U.S. generates demand for two to three truck loads of freight each year, according to the 2016 National Capital Region Transportation Planning Board. Under these assumptions, the population of NDLS in 2030 will generate demand for 400 to 500 truck loads per day. This truck traffic may not necessarily move through the sector, but a considerable fraction of the volume distributed by smaller delivery vehicles will further contribute to negative externalities (e.g. traffic congestion, air pollution, accidents, noise) in the area. Therefore, it is advised that the current mobility infrastructure also consider movements of trucks and smaller delivery vehicles when planning for the future.

In order to test new methods that provide better last mile delivery issues, the City of Montréal has been testing the potential of cargo bikes for the last mile delivery as of 2019. A pilot was launched called Project Colibri that has turned an abandoned bus depot into a consolidation center, where goods from larger trucks get transferred to electric cargo bikes. The project is expected to reduce the negative externalities (e.g.

traffic congestion, emissions) from last mile delivery in downtown Montréal.

Key Considerations

With the objective of a safe, convenient, and sustainable freight system that respects the natural and urban environment, meets the needs of residents, and contributes to a higher quality of life for the sector, the following concerns need to be addressed:

- Can future delivery vehicles be designed to integrate within active-transportation networks?
- How can technological developments be used to create new solutions for residential neighbourhood delivery schedules?

The potential strategies presented here are intended to suggest possible pathways to a more connected, human-scale and sustainable transportation system, capable of meeting the sector's future needs. The list is not intended to be either definitive or exhaustive. Instead, we offer these notions to facilitate a conversation about the transportation goals, objectives, and—ultimately—initiatives Saint-Laurent and CSL wish to pursue. Indeed, many of these strategies will require significant additional analysis to determine whether they are truly appropriate or justifiable. Following client consultations, we look forward to investigating a few of these options in greater detail.

Summary and Next Steps

The scale and speed of the multiple developments planned within and in close proximity to the NDLS sector have the potential to exacerbate existing issues, or alternatively, could provide an opportunity to transform the sector into thriving, high-density, mixed-use communities connected via active and sustainable transportation. Analyzing existing documents, studies, and data, a SWOT table was created to highlight trends and patterns that could potentially help or hinder new development in the sector.

The objective of this report is to provide sufficient context of the NDLS sector to inform and guide the development of a cohesive vision in the next project phase in the form of a coordinated concept plan (CCP) for the heart of the island. The SWOT analysis may assist in identifying the strategies that are most likely to succeeed during this transition.

The success of this transformation is dependent on how these future developments are executed: maintaining the status quo or adopting integrated and innovative solutions to local issues.

Oroboro has offered here a few preliminary options to be explored within the context of the NDLS sector upon receiving feedback from the client. Once you have identified the options you wish to retain, we will conduct the appropriate analyses and proceed to the development of a CCP.

STRENGTHS	WEAKNESSES
• Strong public and private sector interest to invest in sector development. • Proximity to Downtown Montréal, Airport and mass rapid transit (two metro stations and REM). • Major economic pole, attracting large employers. • Includes a large publicly-owned site, the Hippodrome, conducive to a coordinated planning strategy that serves the needs of the area. • Presence of the Orange Julip, a regional attraction and Modern heritage sites. • Effort towards coordination and dialogue between government bodies, embodied in the NDLS working group. • Presence of diverse socio-economic populations. • Availability of ridesharing services, such as Uber, in the area.	• Diverging interests and needs of residents and municipalities. • High vacancy of commercial buildings. • Prevalence of grey spaces, particularly surface parking lots, exaggerates urban heat island impact. • Poor environmental quality (noise and air pollution), alongside a lack of green and public spaces. • Large transportation infrastructures (e.g. highways and railways) isolate neighbourhoods and fragment the area. • Lack of permeability for active transit and public transportation access. • Conflict points along particular road segments between active and vehicular transport. • Traffic congestion and limited public transit access to job poles. • Insufficient and poorly managed park-and-ride facilities. • Delayed improvements to transportation infrastructure.
OPPORTUNITIES	**THREATS**
• Underutilized and vacant land with high redevelopment potential, creating opportunities to increase social and affordable housing supply. • Currently vacant or underdeveloped superblocks will allow for the implementation of a human-scale street grid that improves permeability. • With ongoing and planned development projects, new businesses and destinations will bring expanded job opportunities. • Future growth can influence new policy and planning regulations. • Opportunities for new active and public transit infrastructure. • Underused metro stations with capacity to support future development. • Potential new transit options with the upcoming REM development. • The mismatch between authorized and actual building heights not utilizing the site's full potential	• Lack of collaboration and communication between stakeholders could result in further fragmentation and inadequately coordinated transportation planning. • Future development catering to higher-income households create conflict and displace existing residents and businesses. Fragmented new developments in the sector risk creating enclaves. • Potential mismatch between new employment opportunities and housing supply. • Development of the sector could result in an oversupply of local commercial, retail and office space and compete with downtown Montréal. • Traffic congestion and parking demand could be exacerbated by new developments. • Divergent public opinion on cycling infrastructure.

Table 4 Summary SWOT analysis of NDLS

Appendices

Public Consultation Results

Table 5 Public Consultation Feedback: Transportation

TRANSPORTATION FEEDBACK	LUCERNE MALL	DÉCARIE SQUARE	NAMUR STATION	CAVENDISH MALL	TOTAL
Number of people consulted	7	11	4	8	30
TRANSPORT					**51**
Happy with ridesharing availability				1	1
Getting to bus stops a challenge for the elderly				1	1
Enough bus shelters already in the area				1	1
Need better bus shelters (for winter)	1			1	2
More frequent buses (138 & 104)	1			1	2
Improve/add more public transit (particularly in winter)	1	2		2	5
Adding buses won't help				1	1
Extend the metro to laval			1		1
Orange line capacity is high	1				1
More accessible public transit		1			1
Need better links to metro	2	1			3
Worried about traffic generated by Royalmount				3	3
Keep car access				1	1
Improve road conditions				1	1
More entrances onto Décarie		1			1
Too many accidents on A-15		1			
Improve traffic on Decarie in both directions (too much though traffic)	3	2		1	6
Cavendish is dead after 5pm				1	1
Against Cavendish extension (will bring crime, speeding already, will bring more through traffic, deteriorate air quality)	1			6	7
Extend Cavendish (due to traffic on Décarie)	1			1	2
Lucerne dangerous for biking		1			1
Employee parking discourages biking				1	1
More bike lanes		2			2
No more bike lanes (due to winter, emotions, bikes not being viable)				3	3
Crossing the highway difficult for kids			1		1
Not enough pedestrian infrastructure (e.g. need pedestrian bridge over/under rail)		2			2

Table 6 Public Consultation Feedback: Land Use

LAND USE FEEDBACK	LUCERNE MALL	DÉCARIE SQUARE	NAMUR STATION	CAVENDISH MALL	TOTAL
Number of people consulted	7	11	4	8	30
QUALITY OF LIFE					**19**
Happy that consultations are happening				1	1
Another dog park in CSL				1	1
Dogs should be allowed in parks				1	1
Not enough greenspace	2	3	1	1	7
Enough greenspace				1	1
The new Triangle development is good for kids	1				1
Worried about noise from REM	1				1
It's perfect			1		1
Not enough schools nearby		1	1		2
Not enough health services for children nearby		1			1
More places for kids, recreation, and community	1	1			2
EMPLOYMENT/COMMERCE					**7**
Too much retail/underutilized retail space				2	2
Happy with more development/use of vacant land				2	2
Worried that Royalmount will compete with other businesses	1				1
Would like a pub	1				1
More jobs		1			1
HOUSING					**13**
Not enough low-income housing				1	1
Not enough young people				1	1
Want mixed-income development				1	1
Better quality family housing				1	1
Difficult for residents of Le Vicomte to get out				1	1
Property values will drop with Cavendish extension				1	1
Control residential growth (too much demand)	1				1
More social housing	1				1
Worried about gentrification	1				1
More affodable/social housing in the Triangle (only 40 units public housing)		1	1		2
Want social and affordable housing on the Hippodrome site		2			2

Land Use: Building Typologies

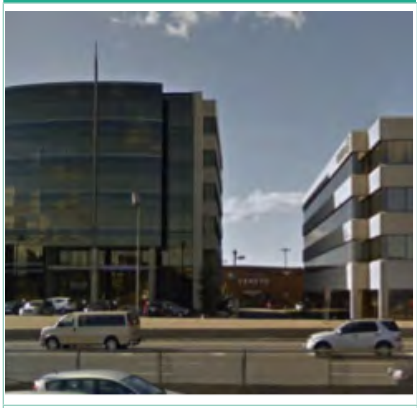
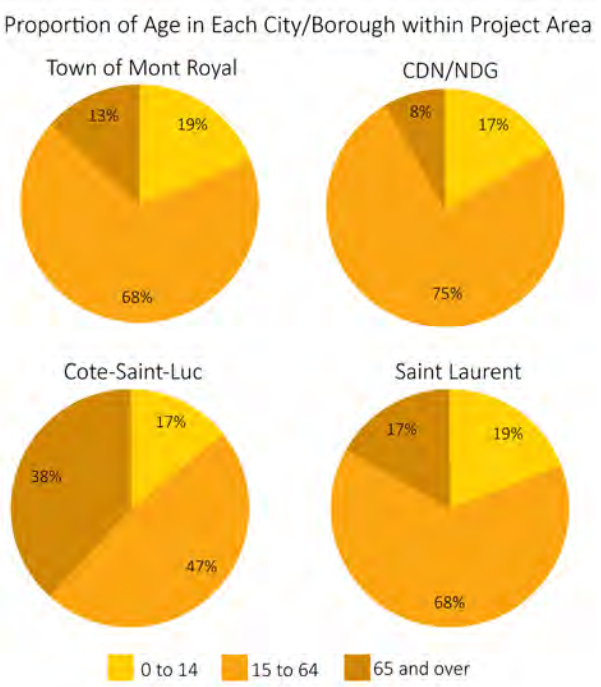
T1. INDUSTRIAL BUILDINGS	T3. COMMERCIAL BUILDINGS T3.1 STRIP MALL	T4. RESTAURANTS
		
Height: 1 storey Standardized architecture, primarily warehouses Large surface parking lots Presence of containers or vacant lots	Height: 1 storey Big-box stores, strip malls, and large shopping malls Present in every borough and city within the sector	Height: 1 storey Main typology: drive-thru Mainly present along Décarie with some cafés present in the Triangle Primarily chain stores with some modern heritage in the case of Orange Julep
T2. OFFICE BUILDINGS	**T3.2 BIG BOX STORE**	**T5. INSTITUTIONAL BUILDING**
		
Height: 4-6 storeys Mostly located within the industrial sectors or along the highways and Décarie	Height: Usually 1 storey Very common near Décarie and in the industrial zones. Car-oriented layout of its commercial and service buildings.	Height: Usually 1-5 storey Includes schools (École Vanguard, technical schools), federal institutions, city buildings and offices

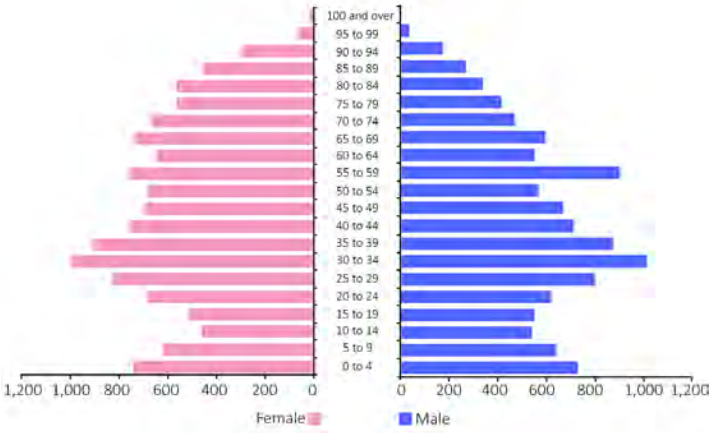
Table 7 Industrial building typologies (Google Street View)

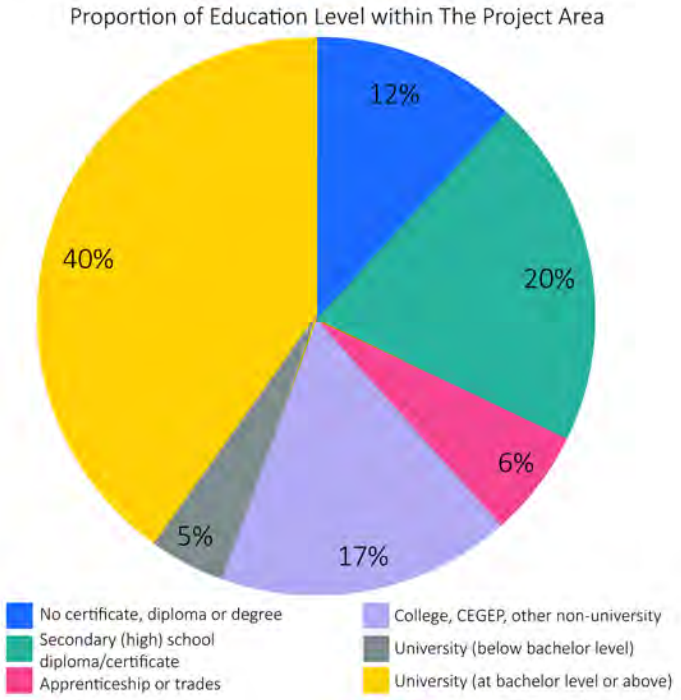
R1. LOW-RISE RESIDENTIAL BUILDINGS	R2.2. MID-RISE APARTMENT BUILDINGS	2.4 COURTYARD TOWNHOUSES
		
Detached house Height: 1-2 storeys Dominant typology in the residential portion of TMR, in Hampstead, in Côte Saint-Luc near the railway tracks and in Saint-Laurent north of the study area.	Height: 2-5 storeys Present in Côte Saint-Luc, Côte-des-Neiges and Saint-Laurent Dominant typology east of Décarie (CDN)	Within the sector, common only in Côte Saint-Luc
R2. MID-RISE RESIDENTIAL BUILDINGS R2.1. SEMI-DETACHED AND DETACHED DUPLEXES	**R2.3 TOWNHOUSES**	**R3. HIGH-RISE APARTMENT BUILDINGS**
		
Highly present in Saint-Laurent and in CDN; buffer between the industries and the railway tracks, and the detached houses.	Common in recent developments in s in the Town of Mount-Royal, Côte Saint-Luc as well as in Saint-Laurent.	Height: 6-20+ storeys Includes, senior housing, social housing, and condominium towers In CSL, this typology mainly consists of senior and social housing, whereas in The Triangle, it mostly consists of condos. There are also some towers north and south of the A-40 and near the A-15 in Saint-Laurent and TMR.
R4. APARTMENT COMPLEXES		
	Apartment complexes can be found in Saint-Laurent north of the industrial zones, in Côte Saint-Luc along Cavendish and in recent development projects such as Triangle and TMR's development near Provigo.	

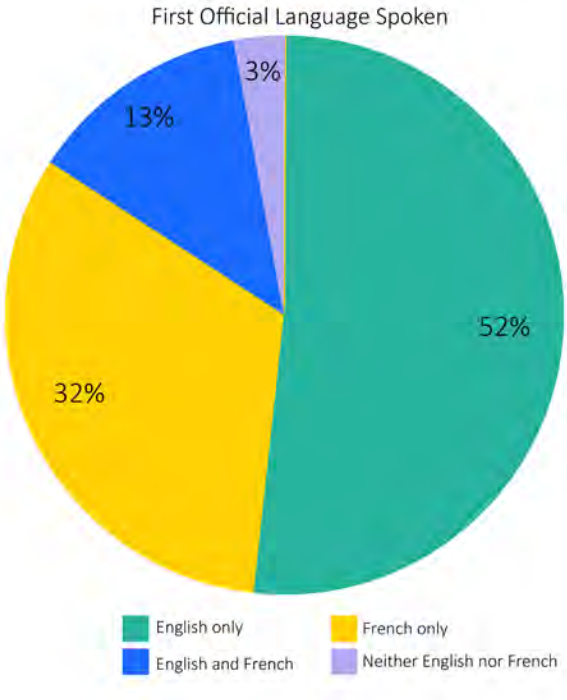
Table 8 Residential building typologies (Google Street View)

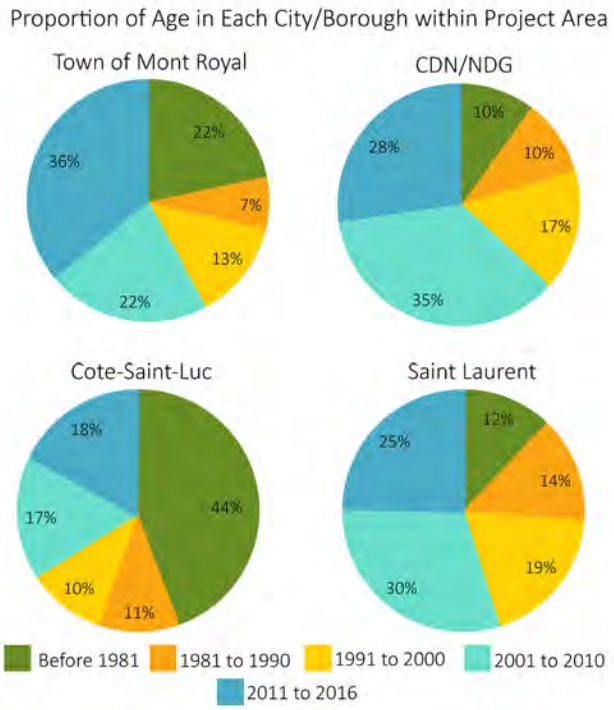
Socio-Demographic Characteristics at a Glance

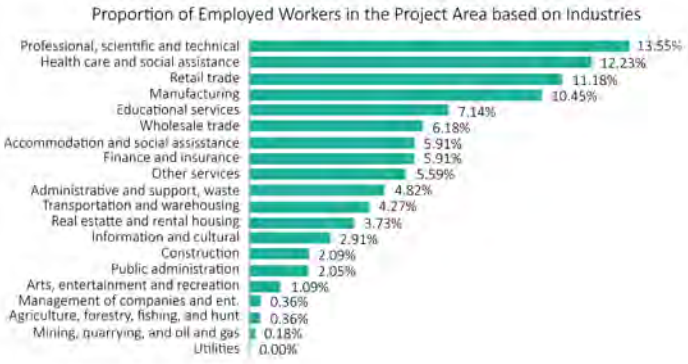


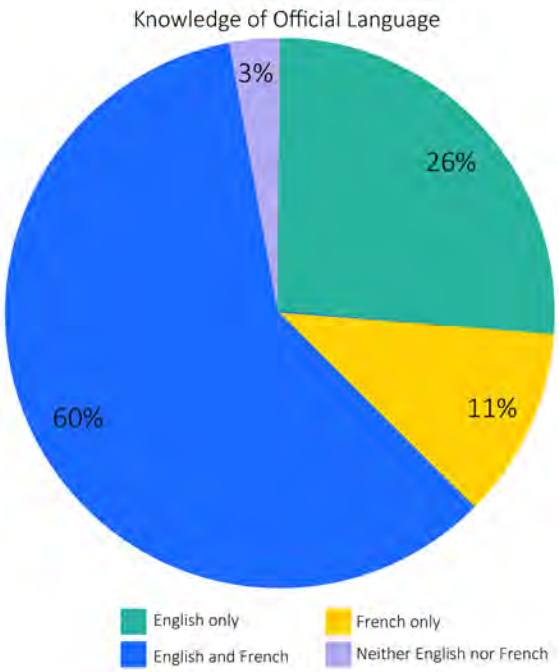


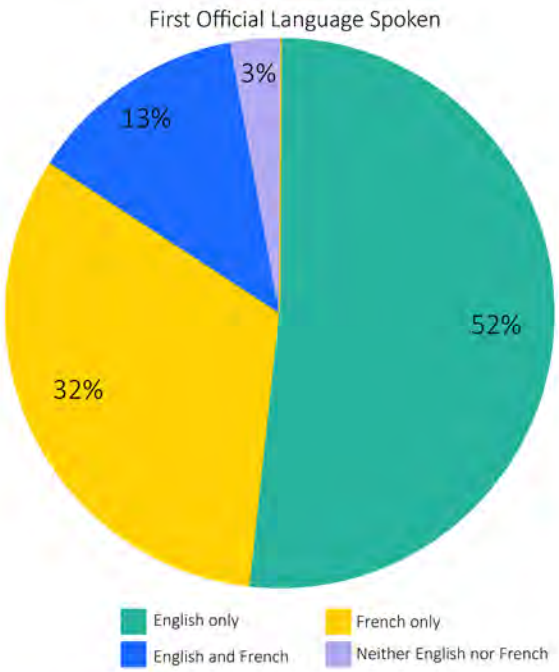


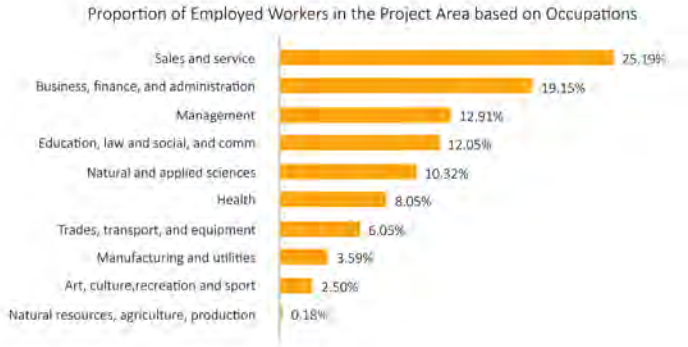


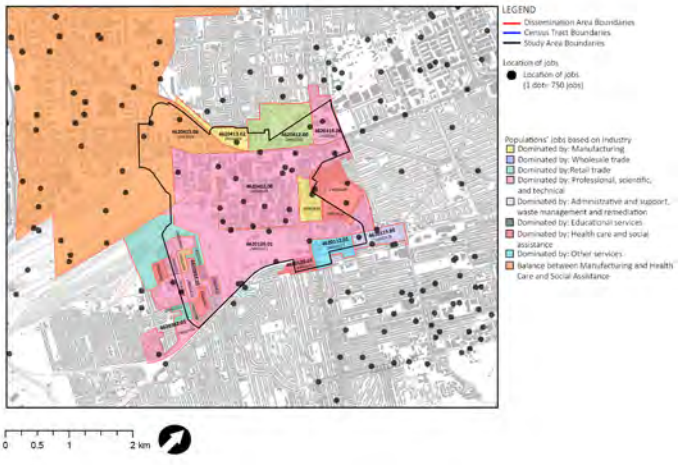

Proportion of Age in Each City/Borough within Project Area
Town of Mont Royal
22%
7%
13%
22%
36%
CDN/NDG
10%
10%
17%
35%
28%
Cote-Saint-Luc
44%
11%
10%
17%
18%
Saint Laurent
12%
14%
19%
30%
25%
Before 1981
1981 to 1990
1991 to 2000
2001 to 2010
2011 to 2016

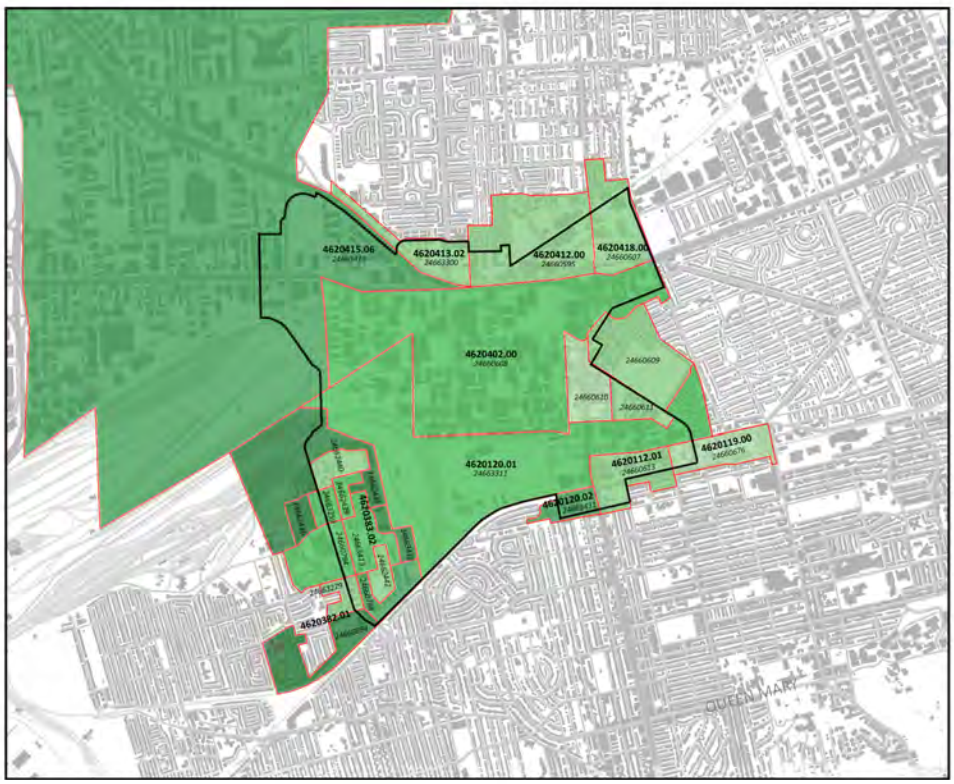

Proportion of Employed Workers in the Project Area based on Industries
Professional, scientific and technical 13.55%
Health care and social assistance 12.23%
Retail trade 11.18%
Manufacturing 10.45%
Educational services 7.14%
Wholesale trade 6.18%
Accommodation and social assisstance 5.91%
Finance and insurance 5.91%
Other services 5.59%
Administrative and support, waste 4.82%
Transportation and warehousing 4.27%
Real estatte and rental housing 3.73%
Information and cultural 2.91%
Construction 2.09%
Public administration 2.05%
Arts, entertainment and recreation 1.09%
Management of companies and ent. 0.36%
Agriculture, forestry, fishing, and hunt 0.36%
Mining, quarrying, and oil and gas 0.18%
Utilities 0.00%


Knowledge of Official Language
3%
26%
60%
11%
English only
French only
English and French
Neither English nor French


First Official Language Spoken
3%
13%
52%
32%
English only
French only
English and French
Neither English nor French


Proportion of Employed Workers in the Project Area based on Occupations
Sales and service
25.19%
Business, finance, and administration
19.15%
Management
12.91%
Education, law and social, and comm
12.05%
Natural and applied sciences
10.32%
Health
8.05%
Trades, transport, and equipment
6.05%
Manufacturing and utilities
3.59%
Art, culture,recreation and sport
2.50%
Natural resources, agriculture, production
0.18%


LEGEND
Dissemination Area Boundaries
Census Tract Boundaries
Study Area Boundaries
Location of jobs
Location of jobs
(1 dot= 750 jobs)
Populations' jobs based on industry
Dominated by: Manufacturing
Dominated by: Wholesale trade
Dominated by:Retail trade
Dominated by: Professional, scientific, and technical
Dominated by: Administrative and support, waste management and remediation
Dominated by: Educational services
Dominated by: Health care and social assistance
Dominated by: Other services
Balance between Manufacturing and Health Care and Social Assistance
0
0.5
1
2 km



LEGEND

Dissemination Area Boundaries

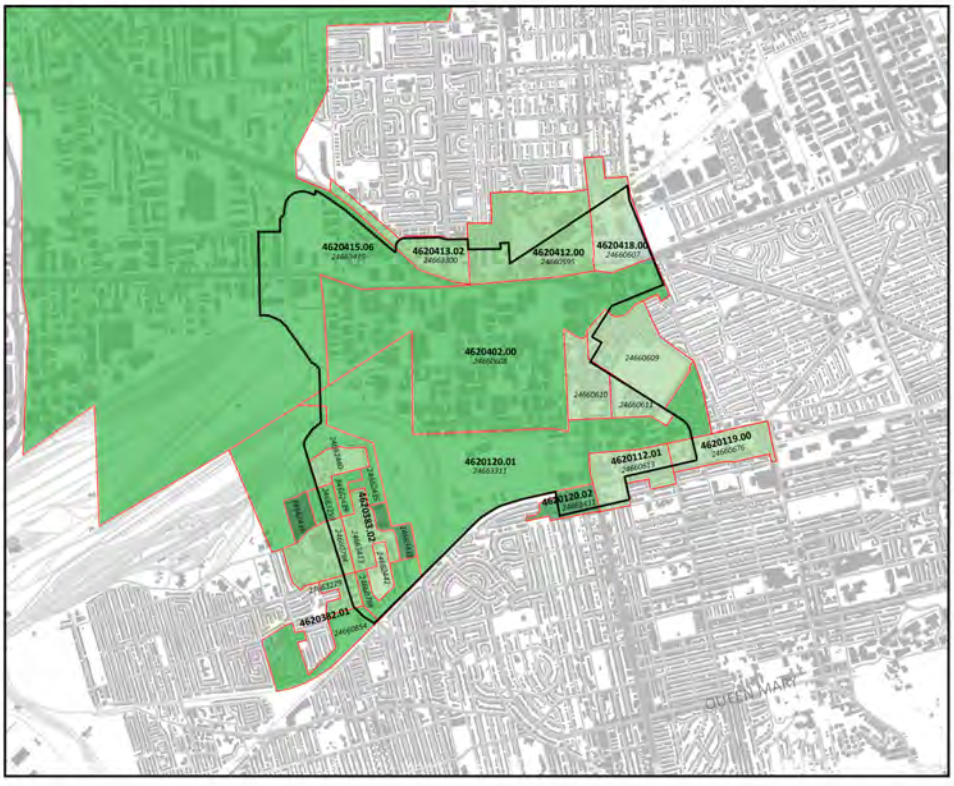
Study Area Boundaries

Households Median Income

- $25,000- $39,999
- $40,000- $54,999
- $55,000- $69,999
- $70,000- $84,999
- $85,000- over

Dissemination Areas: Median // Average Household Income

24660608 :	62,720	//	78,976
24663311 :	64,051	//	71,283
24660610 :	32,512	//	37,930
24660611 :	50,987	//	56,531
24660609 :	42,368	//	61,663
24660613 :	46,592	//	50,469
24660676 :	26,112	//	33,199
24663431 :	80,213	//	147,223
24662435 :	93,504	//	128,373
24662439 :	59,840	//	99,511
24663259 :	62,976	//	96,855
24662436 :	195,584	//	207,417
24662440 :	46,912	//	74,186
24663412 :	90,368	//	146,188
24663413 :	55,296	//	114,384
24660794 :	55,552	//	96,941
24660788 :	71,936	//	92,165
24662442 :	42,624	//	57,041
24663279 :	48,043	//	71,072
24660854 :	132,608	//	179,886
24663419 :	80,896	//	109,403
24663300 :	45,696	//	55,303



LEGEND

Dissemination Area Boundaries

Study Area Boundaries

Households Median Income

- $15,000- $25,000
- $25,999- $35,000
- $35,999- $45,000
- $45,999- $55,000
- $59,999 and over

Dissemination Areas: Median // Average Individual Income

24660608 :	37,077	//	53,585
24663311 :	36,075	//	44,949
24660610 :	19,488	//	22,729
24660611 :	25,984	//	32,516
24660609 :	24,032	//	35,939
24660613 :	22,800	//	27,127
24660676 :	17,344	//	18,213
24663431 :	46,976	//	92,397
24662435 :	40,864	//	56,576
24662439 :	36,864	//	60,946
24663259 :	36,838	//	57,412
24662436 :	60,544	//	80,890
24662440 :	30,016	//	47,678
24663412 :	56,320	//	80,449
24663413 :	30,720	//	69,656
24660794 :	31,275	//	56,275
24660788 :	36,864	//	50,919
24662442 :	24,256	//	34,290
24663279 :	27,216	//	43,019
24660854 :	43,008	//	77,721
24663419 :	43,072	//	59,439
24663300 :	28,800	//	35,406
24660595 :	28,139	//	35,300
24660607 :	25,344	//	35,067

0 0.5 1 2 km

Land Use Analysis

Population

Gender and age- The population age 15 to 64 have an even proportion between male and female, while there is a slightly larger population of male children age 0 to 14, while the majority of seniors age 65 and over are female. Among the population of children in the sector, the subset predominates age 0 to 4 (6% of total population).

Immigration status, language, and minority population

Half of immigrants in Saint-Laurent and 60% of immigrants in CDN-NDG are more recent immigrants (arriving in Canada since 2001). In contrast, TMR and particularly CSL have a higher proportion of immigrants who have arrived before 1981.

Half of immigrants in the NDLS sector are between the age of 25 and 44, and most are first-generation immigrants. First-generation immigrants make up the majority of immigrants in all jurisdictions, but CSL has the highest proportion of second-generation immigrants. Only 17% of immigrants are not Canadian citizens.

Language- The high proportion of immigrants in the sector may explain why the majority of first languages are not English, French, or an aboriginal language. CSL is the only exception, where English is the mother tongue for a majority of the population. However, 60

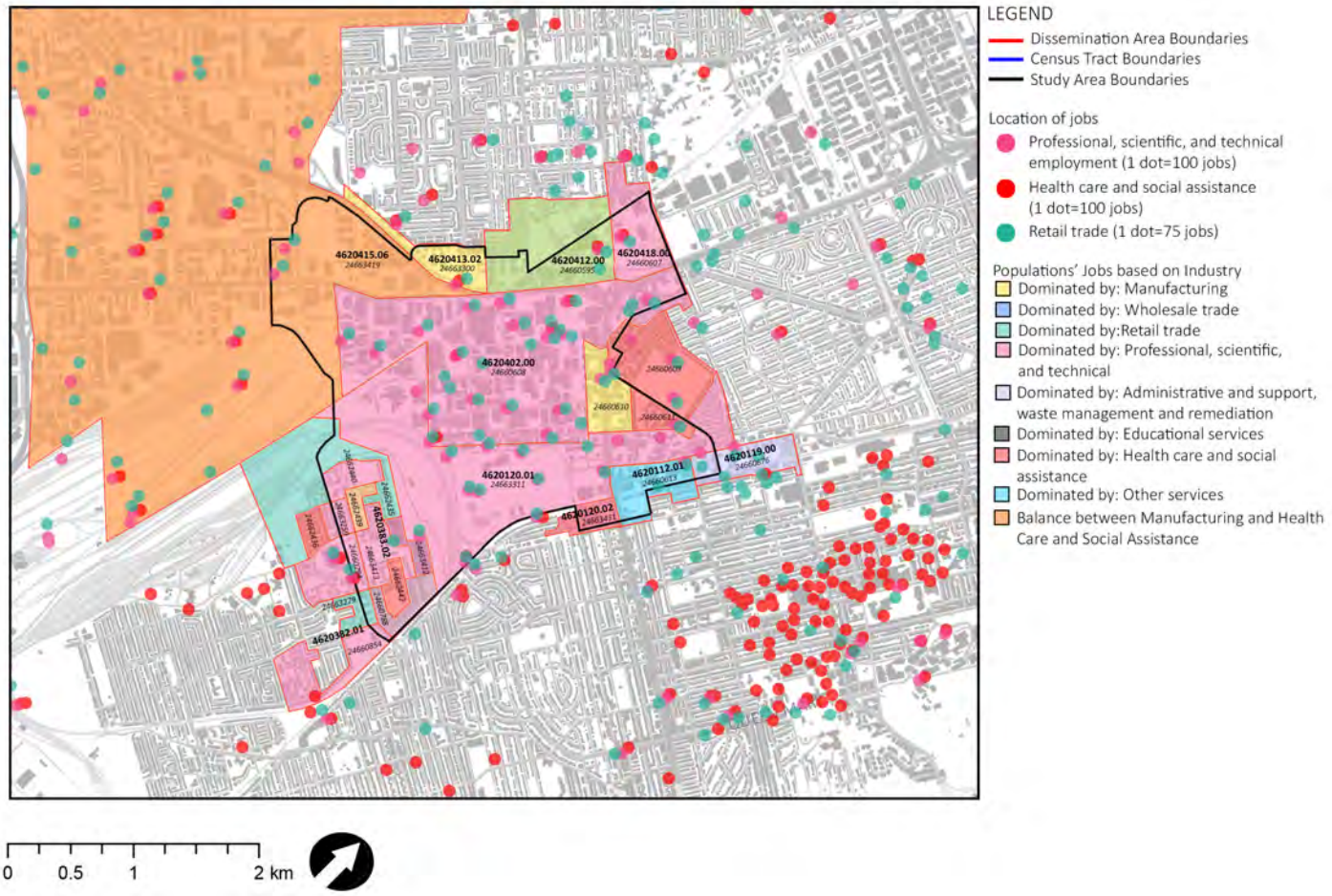


Figure 58 Location of jobs within the study area.

% of the sector speaks both English and French, with a greater percentage using English as their primary language than French.

Minority population –Visible minorities make up 38% of the NDLS population and over 50% of the population in both CDN-NDG and Saint-Laurent.

Built environment and land use patterns

Authorized and actual building heights

Areas of high building heights and densities are mainly concentrated in new development projects, in existing mixed-use areas (such as CDN-NDG) and along main transportation arteries (Décarie and Cavendish). In Figure 45, the color of the land shows the authorized height and the color of the building illustrates its actual height. Overall the actual heights tend to be lower than the maximum authorized heights, and in most of the area, they are even lower than the current minimum heights authorized.

This mismatch between the authorized and actual heights shows how the site is not used to its full potential.

To optimize its potential and the distribution of development projects, some areas might need to be rezoned for higher (or lower) density and height to better answer population needs and housing demand.

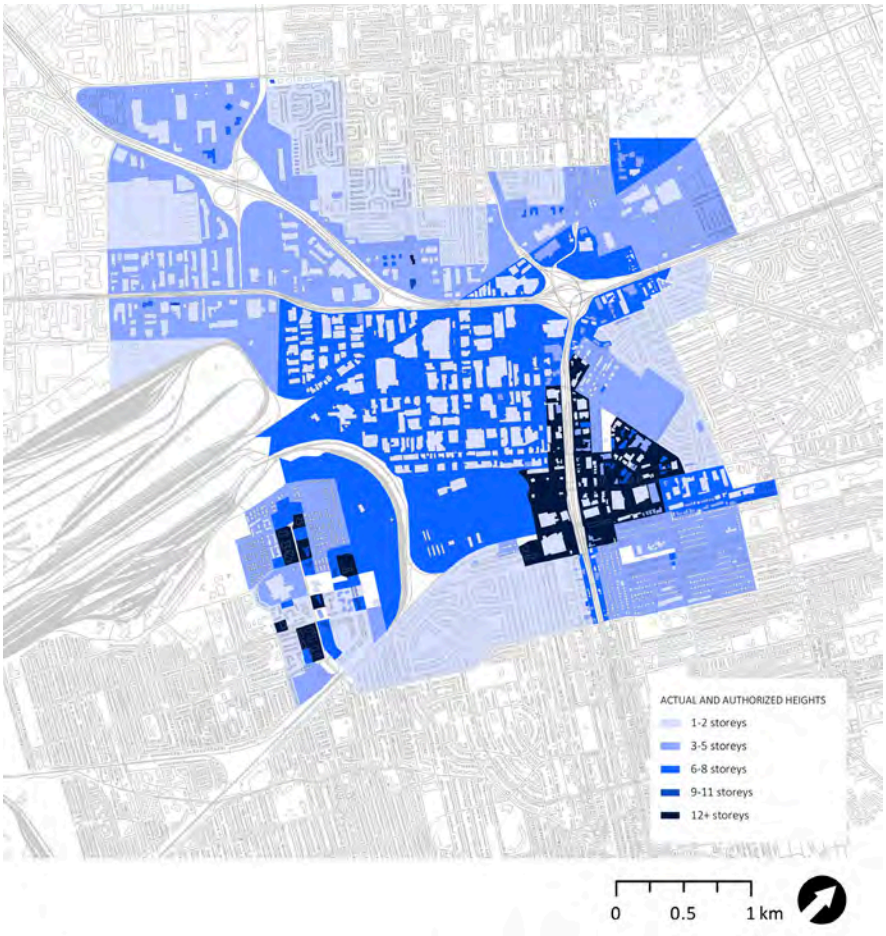


Figure 59 Authorized and actual building heights.

Transportation Analysis

Mode Share Analysis

Data from the 2016 Canadian Census at the Dissemination Area (DA) level was aggregated to find overall mode shares for the NDLS sector using uniform areal interpolation. (This assumes that the population is spread evenly throughout each DA, so that if half of a DA's area falls within the sector, half of its population does as well.) Using this method, car trips were found to account for 59.8% of the commuter mode share for the NDLS sector—a higher share than Montréeal (53.0%), but less than the driver mode share for Saint-Laurent (61.2%) or Côte Saint-Luc (73.3%).

Public transit is the next most common mode of commute to work for residents of the sector (33.9%), similar proportionally to Saint-Laurent (33.0%) and Montréal island (34.5%) but much higher than the public transit share for CSL residents (21.3%)..

Active transit as the main mode of commute is nearly twice as common in Montréal as a whole (11.6% walking or biking as the primary commute mode) as it is for residents living within the NDLS sector (6.0%). However, a greater proportion of residents within the sector walk to work (5.4%) than residents of the borough of Saint-Laurent (4.4%) or the City of Côte Saint-Luc (3.9%). Within the sector, proportionally only one-sixth as many residents used cycling as their main mode of commute (0.6%) as did residents of Montréal island as a whole (3.6%). In this way, the NDLS sector is similar in terms of its low cycling mode share to Saint-Laurent (0.7%) and Côte Saint-Luc (0.4%).

Traffic Flows Analysis

Commute Time and Duration

Data from the 2016 Census was aggregated to find commute times and duration for residents within the NDLS sector (again using uniform areal interpolation of dissemination areas). Rush hour within the sector is most concentrated between 8 am and 9 am, with 31.3% of residents leaving for work within this time, compared to 24.5% for Montréal island. On the whole, commute times seem to be later in the sector than the rest of Montréal: 13.2% of residents in the sector leave for work between 5-7am, and 16.8% leave between 9 am to noon, whereas 18.1% of Montréal island residents leave for work between 5-7 am and 14.0% leave between 9am and noon. The commute time distribution for Saint-Laurent and Côte Saint-Luc falls in between the earlier Montréal commute concentration and the later sector commute times.

Length of commute to work tends to be marginally shorter for residents within the NDLS sector than for

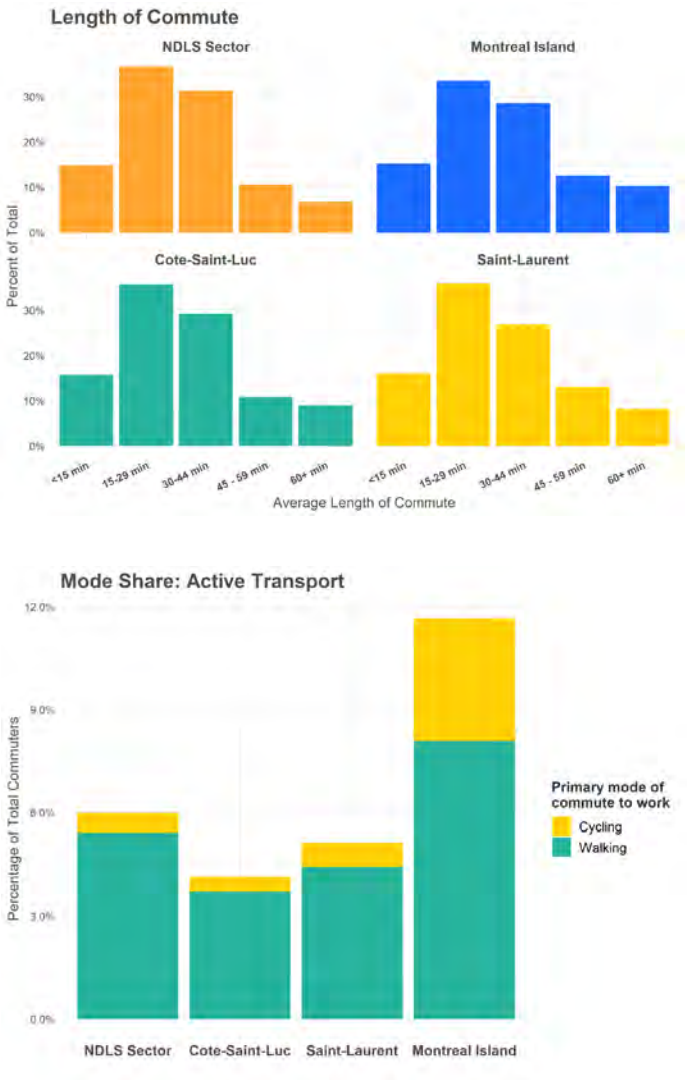


Figure 60 Length of commute and acrive mode share breakdown.

TOP BIXI ORIGINS / DESTINATION REGIONS: APRIL-SEPTEMBER 2019

RANK	JURISDICTION	RIDES FROM NDLS	RIDES TO NDLS
1	Côte-des-Neiges	2727	2120
2	Saint-Laurent	1259	1462
3	Plateau Mont-Royal	459	461
4	Villeray	390	391
5	NDG	382	370

Montréal as a whole: There is a slightly higher proportion of residents within the sector who travel under 30 minutes to work (51.5%) than for Montréal island as a whole (48.7%). Similarly, 22.8% of Montréal island residents travel at least 45 minutes to work, whereas only 17.4% of the NDLS residents spend this much time commuting to work. The fact that commute lengths for those living within the sector are slightly shorter than the rest of Montréal despite the frequent congestion in the area can likely be attributed to the number of employment centers nearby; the likelihood of working near one's residence may be slightly higher for those living within the NDLS. The same is unlikely apply to those working within the sector but living elsewhere.

Bikesharing

For the first time in 2019, three Bixi stations were built within the NDLS sector boundaries, as well as the two Bixi stations within 300m from the sector boundaries (300m being an accepted standard of how long people are generally willing to walk to access a docked bike-sharing service). Four of these Bixi stations accessible from the sector opened in April 2019, and the remaining one was accessible for the first time in May. In "Figure 61 Bixi service in 2019, showing limited service within the sector." on page 83, one can see the the extent to which the sector still has limited service to Bixi—a buffer of 300m is draws around each Bixi station, so that any area not covered by a Bixi station buffer in the map is not within reasonable walking distance to a Bixi station.

the top origin and destination regions for Bixi users are shown below. They were calculated based on the total number of rides in 2019 originating and ending in the NDLS sector. Côte-des-Neiges was the site of the most origins and destination trips to and from the sector, accounting for 41% of all trips--nearly as much as all other trips combined. Saint Laurent is the next most frequent origin and destination area (23% of all trips), followed by the Plateau (8%), Villeray (7%), and NDG (6%). This hierarchy is likely quite distorted from the demanded origins and destinations for active transit to and from the sector because the municipalities of Côte Saint-Luc and Hampstead do not have any Bixi stations, and the Town of Mount Royal contains only two stations as of 2019. A probable result of having few stations nearby is that the stations near the sector have so far demonstrated relatively low ridership rates; Bixi stations have an average ridership of 48 start trips per day throughout Montréal, while Bixi stations accessible from NDLS have 5-9 start trips on average per day.

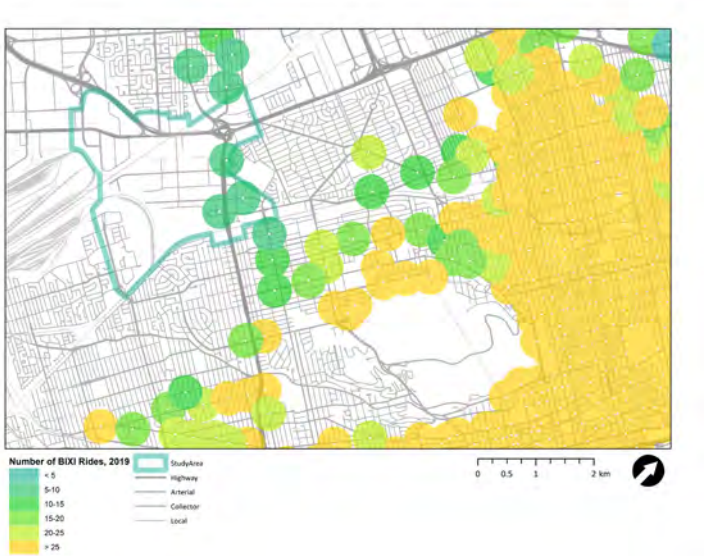
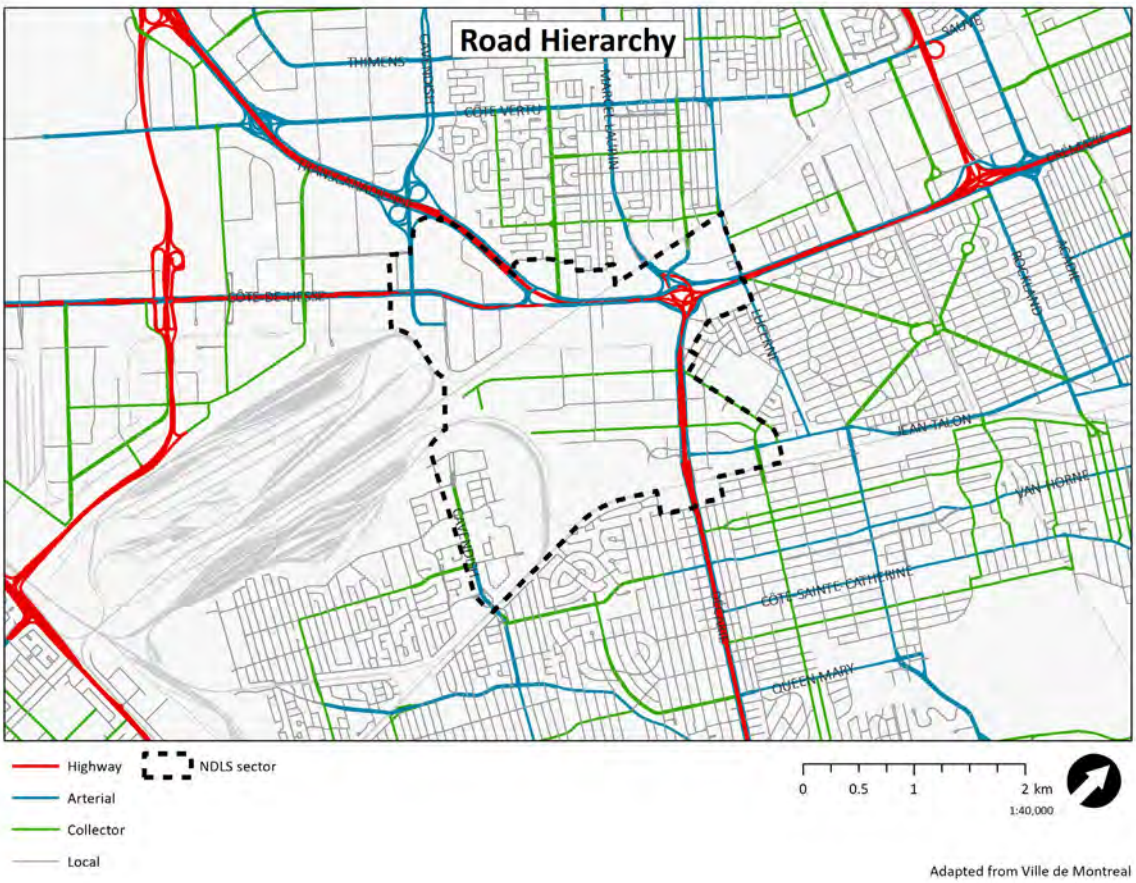


Figure 61 Bixi service in 2019, showing limited service within the sector.

Traffic and Pedestrian Safety



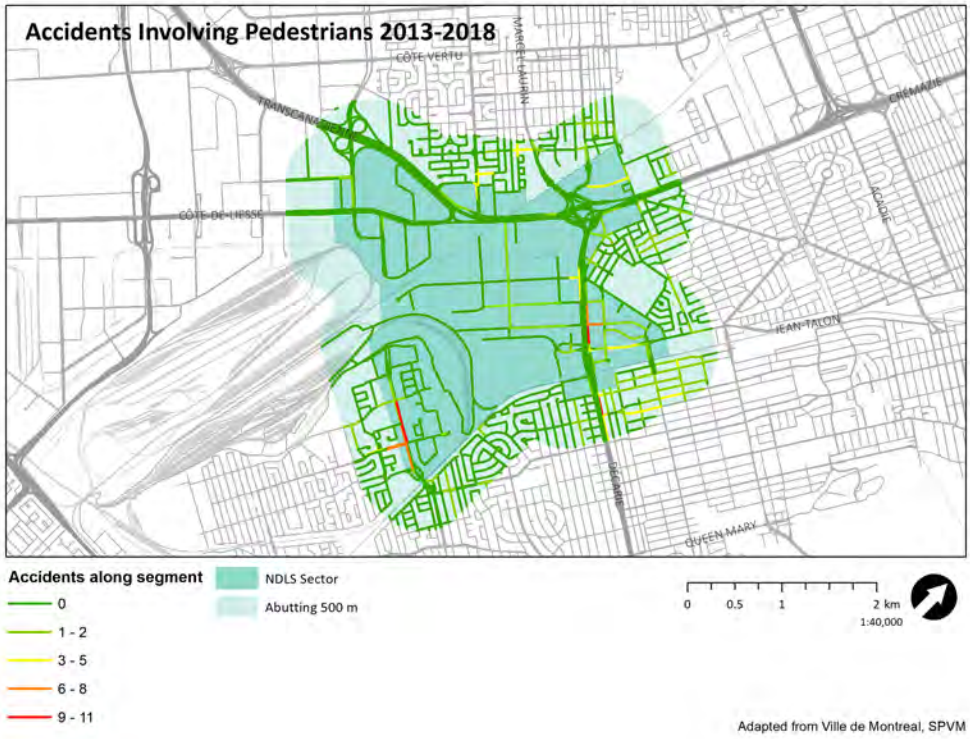


Figure 62 Pedestrian accidents within the study area.

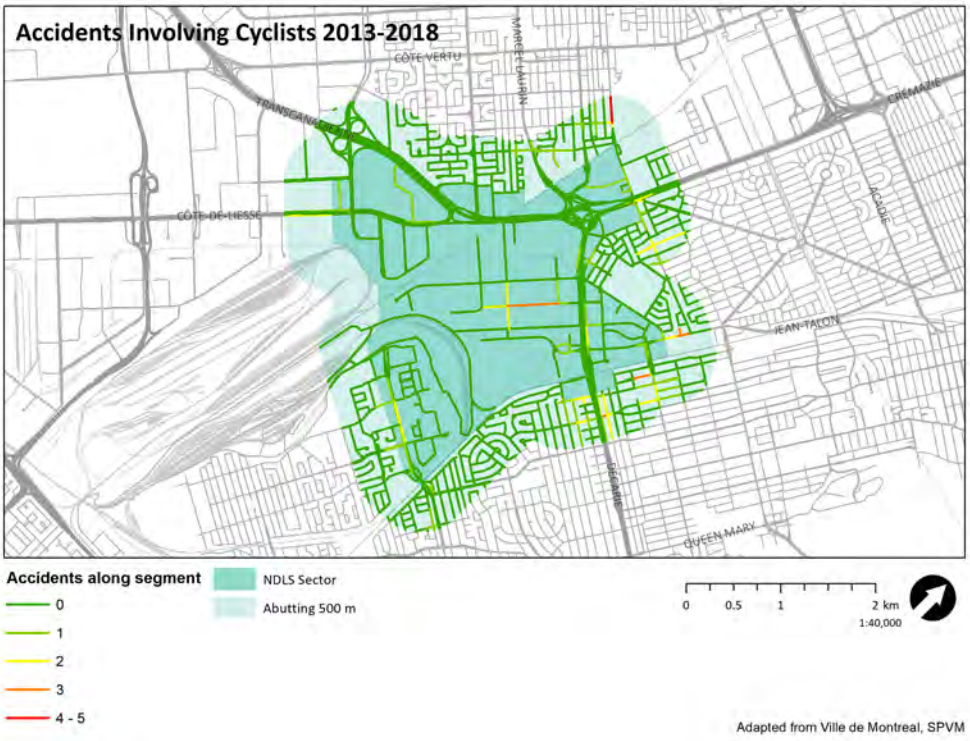
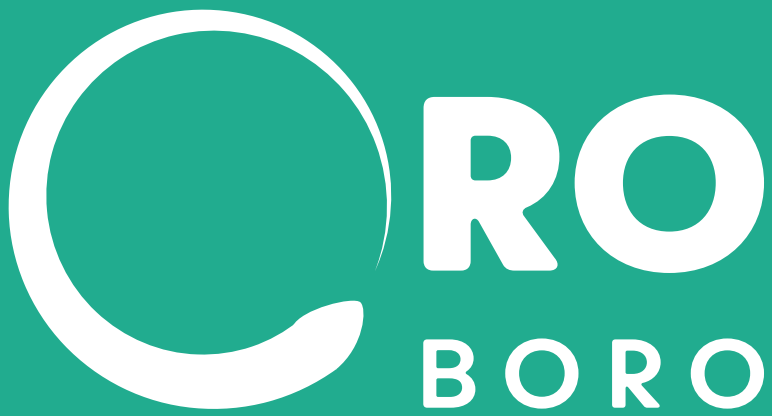


Figure 63 Cyclist accidents within the study area.


BORO
BEYOND BOUNDARIES

NAMUR-DE LA SAVANE

ENVISIONING CHANGE FOR THE HEART OF THE ISLAND

BORO
BEYOND BOUNDARIES

Coordinated Concept Plan | December 2019

December 19, 2019

Attn: Ms. Tanya Abramovitch
City Manager
City of Côte Saint-Luc
5801 Cavendish Blvd
Côte Saint-Luc, QC
H4W 3C3

Attn: Mr. Rafik Salama
Conseiller en planification
Borough of Saint-Laurent
777 Marcel-Laurin Blvd
Saint-Laurent, QC
H4M 2M7

Subject: Submission of the Namur–De la Savane Coordinated Concept Plan

Dear Ms. Abramovitch & Mr. Salama,

The Oroboro team is pleased to submit the Namur–De la Savane Coordinated Concept Plan, the final deliverable of its mandate. The land use and transportation teams have worked closely to deliver a joint plan with strategies and interventions that collectively address the needs of the sector.

This plan provides a vision for the future of the Namur–De la Savane sector to unify the actions of its various stakeholders. It is based on a comprehensive analysis of the sector's current issues and the challenges we anticipate in the medium- to long-term. The several ongoing planning projects within the area are a testament to the vitality and central importance of this sector. We believe that this plan can contribute by highlighting the shared challenges and opportunities that need to be collectively addressed.

Building on the Situational Report presented in November 2019, this plan begins by describing the sector's context and by providing a summary of the background analysis we conducted to inform our work. We then present our vision for the future of the sector and provide strategic orientations to ground it.

We would like to extend our appreciation for your support and your precious suggestions that made it possible for the team to complete its mandate. Oroboro feels privileged to contribute to the future of an important and vital sector for the Montréal agglomeration. We invite you to contact us should you have any further comments or questions regarding this plan.

Sincerely,

The Oroboro team

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A NEW VISION

This Coordinated Concept Plan (CCP) prepared by Oroboro aims to provide a unified vision for the currently fragmented Namur-De la Savane (NDLS) sector.

This vision is to act as a tool to encourage future dialogue and collaboration between the sector's multiple stakeholders. In keeping with this vision, Oroboro proposes several interventions that serve as starting points to address the needs of current and future residents of the sector, which is expected to grow significantly [see [See Figure 1].]:

- **Active green network** – a continuous network to support active transportation and biodiversity, improve environmental quality, and link upcoming developments within the sector.
- **Electric-based transportation network** – a cost-effective and aesthetic option to improve access to public transit, promote property development, and promote sector character and identity.
- **Underpass park for the A-40** – connecting active transport networks and creating more inviting spaces beneath the highway by repurposing existing infrastructure into an all-season public park.
- **Connecting Cavendish and Décarie Square to the Hippodrome** – prioritizing active and public transport on the impending Cavendish extension and creating a new connection on Clanranald Avenue under the CP rail tracks.
- **Decking over Décarie** – creating a 'roof' over a portion of the expressway to mitigate noise and air pollution, improve safety and aesthetics, and provide new green and public space.
- **Tackling a soft infrastructure and public space deficit** – securing land, infrastructure, and funding for schools, parks, and community centres before NDLS land values increase.
- **Future vocations** – ensuring that compatible industrial and commercial uses remain in the sector while making encouraging efficiency in logistics and use of space.
- **Last mile solutions** – reducing traffic congestion and emissions from 'last mile' deliveries by shifting deliveries to off-peak hours with more sustainable modes, in addition to coordinating new routes and distribution hubs.
- **Parking policy** – controlling parking supply and demand in the sector to discourage car use and reduce barriers and underutilized space as a result of excess parking.
- **Adaptable infrastructure** – designing parking facilities to meet current parking needs while anticipating repurposing and retrofitting for other uses as mode preferences change over time.
- **Form-based codes** – implementing legally binding zoning tools that regulate the character of property developments rather than their use

All of these proposals require close collaboration and coordination among the various jurisdictions.

As current legal and jurisdictional frameworks do not provide the necessary tools to address unique scenarios like the NDLS sector, new frameworks will be necessary to ensure that all stakeholder interests are considered in the development of a connected, livable, and future-proof area at the heart of the island.

UNE NOUVELLE VISION

Le Plan conceptuel coordonné (PCC) suivant a été conçu par Oroboro et vise à fournir une vision unifiée pour le secteur Namur-De la Savane (NDLS), aujourd'hui hautement fragmenté. Cette vision agira comme un outil pour encourager le dialogue et la collaboration entre les multiples parties prenantes du secteur. Conformément à cette vision, Oroboro propose plusieurs interventions qui servent de points de départ pour répondre tant aux besoins des résidents actuels que futurs [Voir Figure 1]:

- **Réseau vert actif** - un réseau continu pour soutenir les transports actifs et la biodiversité, améliorer la qualité de l'environnement et connecter les développements futurs du secteur.
- **Réseau de transport électrique** - une option rentable et esthétique pour améliorer l'accès au transport en commun, promouvoir le développement immobilier et promouvoir le caractère et l'identité du secteur.
- **Espace public sous l'autoroute 40 -** relier les réseaux de transport actif et créant des espaces plus accueillants sous l'autoroute en transformant l'espace existant en un parc public toutes saisons.
- **Relier Cavendish et Decarie Square à l'Hippodrome** - prioriser les transports en commun et actifs sur l'extension prochaine du boulevard Cavendish et créer une nouvelle connexion sur l'avenue Clanranald sous les voies ferrées du CP.
- **Recouvrement partiel de Décarie** – créer un espace vert au-dessus d'une partie de l'autoroute pour atténuer le bruit et la pollution atmosphérique, améliorer la sécurité et l'esthétisme du secteur pour fournir un nouvel espace public de rencontre.
- **S'attaquer au manque d'infrastructures et d'espaces publics** – réserver des endroits, des infrastructures et les moyens nécessaires pour doter le secteur d'écoles, de parcs et de centres de transport avant que la valeur des terrains n'explose.
- **Vocations futures** - veiller à ce que des usages industriels et commerciaux compatibles restent dans le secteur tout en favorisant l'utilisation efficace de l'espace.
- **Solutions du « dernier kilomètre »** - réduire la congestion et les émissions provenant des livraisons du « dernier kilomètre » en les effectuant à des heures alternatives avec des modes de livraison plus durables, en plus de développer de nouveaux itinéraires pour les centres de distribution.
- **Politique de stationnement** - contrôler l'offre et la demande de stationnement dans le secteur afin de décourager l'utilisation de la voiture et de réduire les obstacles et les espaces sous-utilisés en raison d'un surplus d'espaces de stationnement.
- **Infrastructures adaptables** – implanter des structures de stationnement pour répondre aux besoins actuels en matière de déplacements automobiles tout en anticipant le réaménagement et pour d'autres usages à mesure que les préférences en matière de mode de transport évoluent.
- **« Form-based code » -** mettre en œuvre des outils de zonage qui réglementent le caractère et la forme du cadre bâti plutôt que son utilisation.

Toutes ces solutions exigent une étroite collaboration entre différents acteurs. Puisque les cadres règlementaires actuels ne fournissent pas les outils nécessaires pour aborder de façon coordonnée la situation actuelles, de nouveaux outils seront nécessaires pour s'assurer que tous les intérêts des parties prenantes sont pris en compte dans la création d'un secteur hautement connecté, habitable et à l'épreuve de l'avenir situé au cœur de l'île.

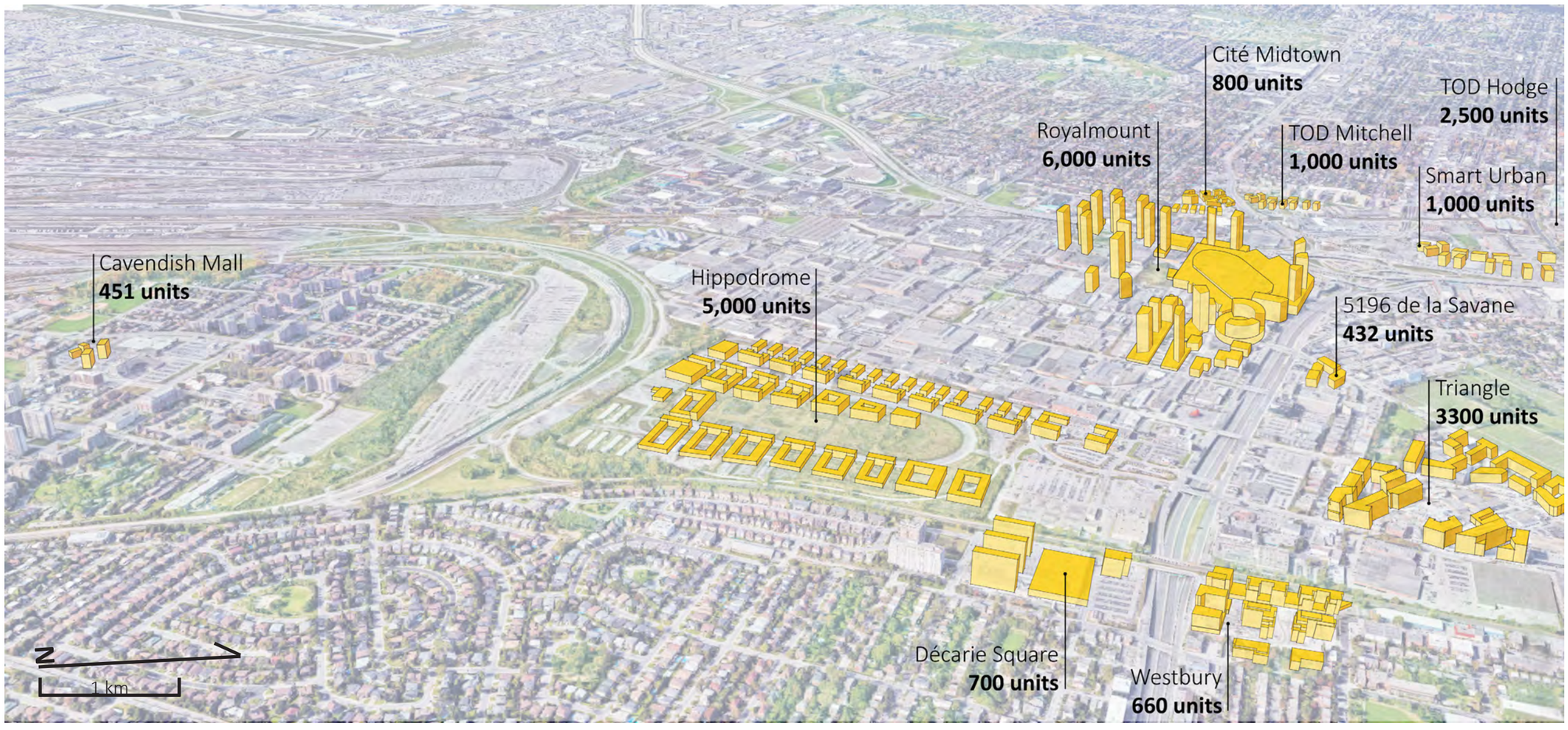

Figure 1 | View of the NDLS sector with ongoing and planned development projects.

A COORDINATED CONCEPT PLAN

Project Understanding

In early September 2019, the City of Côte Saint-Luc and the borough of Saint-Laurent launched a collective request for proposals for a coordinated planning vision that would guide the future of the Namur–De la Savane sector (NDLS).

The area is entering a period of substantial transformation, moving from a predominantly low-density commercial and light industrial sector to higher-density residential and retail mixed use. The proposed developments have the potential to add more than 40,000 new residents along with 600,000 square metres of new commercial, retail and office space which will requalify the sector as a new regional shopping and entertainment pole.

NDLS is one of the six strategic sectors identified in the 2015 Schéma d'aménagement et de développement de l'agglomération de Montréal. As it falls under multiple jurisdictions, the need for a unified and coherent vision is pressing, especially when considering the breadth of the projected changes.

Multiple challenges, such as a saturated road network and disjointed enclaves, need to be addressed in a coordinated way before the redevelopment projects are completed. This wave of redevelopment and private investment presents a unique opportunity for devising a planning vision that addresses questions pertaining to both transportation and land use. This must be done in a way that follows the Schéma's objectives of prioritizing active and public transportation as well as more compact and greener neighbourhoods that enable economic growth.

Mandate

The Oroboro team received a mandate to devise a coordinated concept plan for the redevelopment of the Namur–De la Savane sector. This plan presents strategies to address the challenges posed by both transportation and land use issues. Detailed interventions, informed by real-world case studies, are presented as examples showcasing the impact of these strategies.

Oroboro's approach encompasses both the current and anticipated challenges of the sector. The plan includes strategies that should be implemented in the medium- to long- term.

Methodology

The coordinated concept plan is the result of the following five-step process undertaken conjointly by Oroboro's land use and transportation planning teams.

1. A background and context analysis of the sector and the surrounding region through a careful literature review of various official reports and data sources publicly available and produced within the last 5 years.

2. A consultation process with the public and with diverse stakeholders, as well as on-site field data collection and observations, to identify challenges and opportunities.

3. Synthesizing our findings in a Situational Report shared with our clients.

4. The development of a unifying vision statement that will lead to a framework for collaborative decision-making and a concept plan that showcases interventions to address the needs of current and future residents.

5. The presentation of the vision and concept plan to our clients and the incorporation of their comments and suggestions in this final report.

Report Structure

This report begins by situating the NDLS sector in its wider context, understanding how it came to play a strategic role for the development of Montreal. We then summarize our key findings that were presented in the November 2019 Situational Report by highlighting the sector's key socio-economic characteristics.

This serves as a basis to introduce the main purpose of this report: devising a vision that will overcome the key challenges facing the NDLS sector. A number of specific interventions flowing from this vision are then presented. Finally, the report concludes by giving an overview of the collaborative decision-making approaches that will make it possible to enact this vision.

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What is a Coordinated Concept Plan?

The Coordinated Concept Plan presented here follows closely the objectives of a Programme particulier d'urbanisme (PPU), a legal instrument for special planning of complex areas within a single municipality. As the NDLS sector is shared across multiple boroughs and municipalities, the Oroboro team presents its own version of this tool to encourage inter-jurisdictional collaboration.

As per a PPU, the proposed interventions in this report are accompanied by an approximate estimate of their cost and time requirements. This document seeks to illustrate the potential of the sector and aims to serve as a stepping-stone to reach inter-jurisdictional collaboration. Once the concerned actors agree on which of the proposed interventions they want to pursue, dedicated feasibility analyses and impact assessments will have to be conducted.

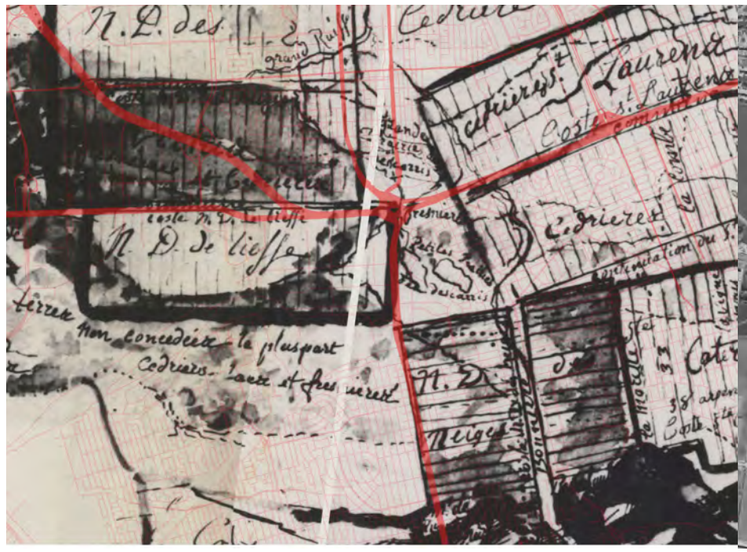


Figure 2 | From left to right, the Montreal in 1734 (BANQ) overlaid in red with the modern day routes of the A-40 and A-15; aerial view of the sector; and Texaco gas station, cite of the current Namur metro station

YESTERDAY + TODAY

A Brief History

This section provides a brief overview of the history of the area which influenced current land use and transportation patterns in the NDLS sector.

Sector beginnings

From the 18th to the early 20th century, the area was predominantly agricultural land. The sector was divided into the long lots as a result of the seigneurial system, as was common across the Island of Montreal at the time. The sector was made up of the individual villages and towns of Côte Saint-Laurent, Côte Vertu, and Côte-de-Liesse in the Parish of Saint-Laurent and Côte Saint-Luc, Notre-Dame-de-Grâce and Côte-des-Neiges in the Parish of Montréal. Many waterways were also covered to create the early road networks in the area.

The Blue Bonnets horse race track, later named the Hippodrome, opened in 1907 and attracted economic development and growth within the sector. This simultaneously led to the addition of a tramway connecting the area to downtown Montreal and resulted in the first suburban residential developments in the area. The tramway remained in service until the 1950s.

Rapid urbanization

The next era of rapid development and transformation in the sector began in the period following World War II. In 1940, the City of Montréal absorbed Côte-des-Neiges and Notre-Dame-de-Grâce, while Saint-Laurent and Côte Saint-Luc remained an independent city and village. Over the course of 15 years, the agricultural lots were subdivided and large buildings were constructed in the industrial zones of Saint-Laurent and the Town of Mount Royal. The surrounding areas saw higher density development and the adoption of street grids as a result urbanization pressures from the City and the Town of Mount Royal's Model City plan.

A car-dominated landscape

During the 1960s, a series of large-scale highways and interchanges were constructed in Montreal in preparation for the Expo 67 World's Fair. This included the Turcot and Décarie Interchanges, Trans-Canada highway, and the Décarie expressway.

This emphasis on major automobile infrastructure had a great impact on the land use patterns and built form of businesses and services in the sector. Restaurants, including Gibeau Orange Julep, were built with large surface parking lots to accommodate vehicles in the area. A portion of this evolution is captured in [see Figure 2].

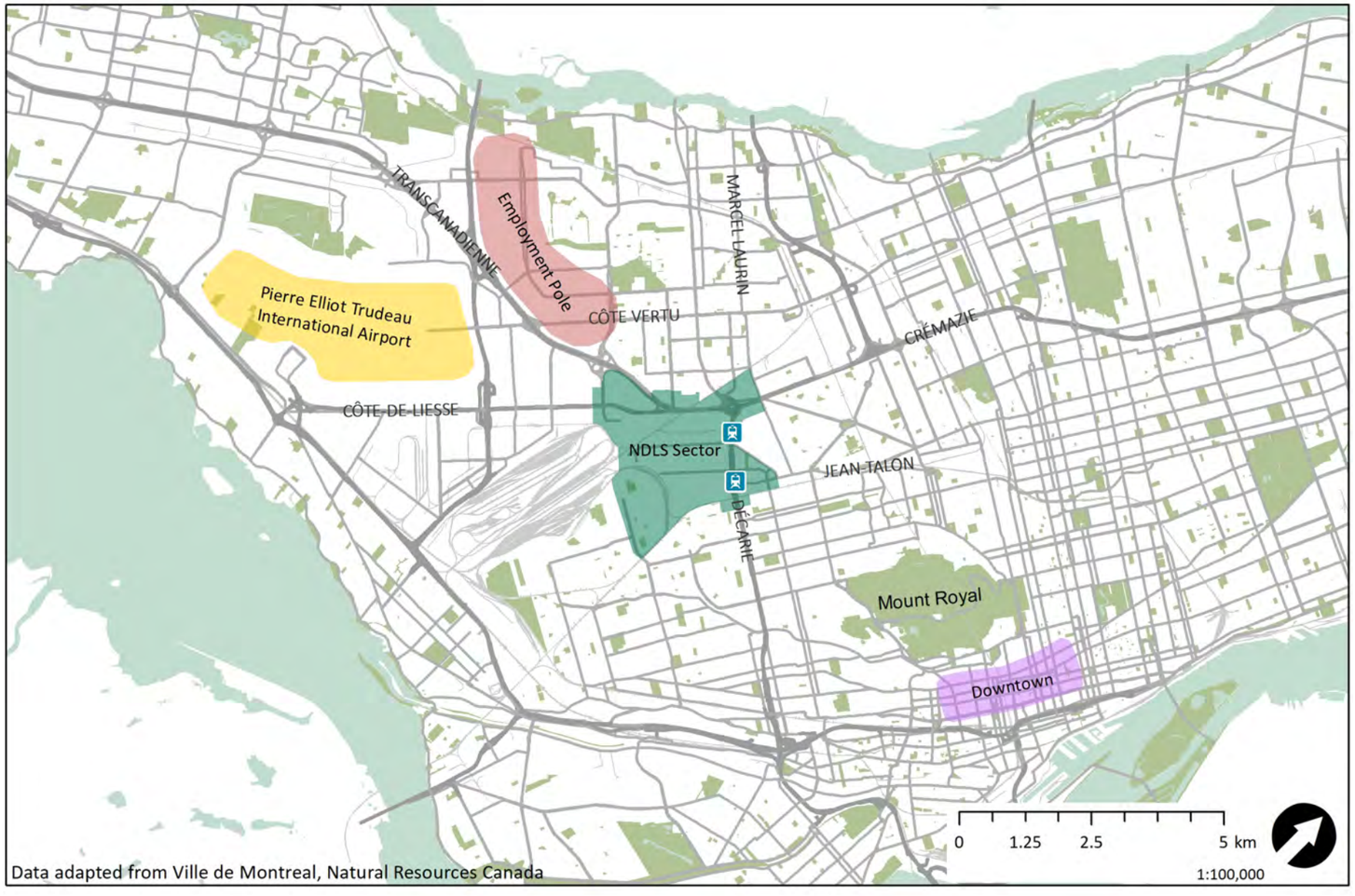


Figure 3 | Regional map situating NDLS sector

Mass rapid transit

The 1976 Montreal Summer Olympics generated another round of public sector investments in large-scale transportation infrastructure. The metro, which was first launched in preparation for Expo 67, was expanded in the 1980s, during which the two stations in the sector first opened: Namur and De la Savane. The site of the Namur metro station was formerly used as a gas station and used car dealership. This change in land use signifies the beginning of a shift in transportation patterns within the sector which have been continued into the present.

Regional Context and NDLS Sector Today

The NDLS sector is strategically located at the heart of the Island of Montreal, between the West Island and Downtown Montreal and in close proximity to the Saint-Laurent economic pole to the west [see Figure 3].

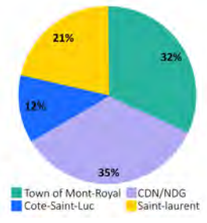
The sector covers an area of 7 square km and is well connected to major shipping and transportation routes including the Pierre Elliot Trudeau International Airport, Canadian National (CN) and Canadian Pacific (CP) intermodal freight terminals and yards, and the Autoroutes 40, (east-west) and 15 (north-south).

Transportation and mobility in the sector is still dominated by private vehicles, although it is served by the Namur and De la Savane metro stations on the Orange Line for which the sector is named.

Traffic analyses conducted in the last decade all show that the road network has become saturated and that the future of transportation in the sector will need to be supplemented by improved active and public transport.

The sector is comprised of three cities, TMR, CSL and the City of Montreal which includes the boroughs of Saint-Laurent and CDN-NDG. The land area governed by each of the jurisdictions breaks down as follows:

- CDN-NDG- 35%
- TMR- 32%
- Saint-Laurent: 21%
- CSL- 12%



At an intersection of distinct political entities, the sector has faced many jurisdictional changes over time that have shaped both hard and soft infrastructure in the area, resulting in a lack of inter- and intra- region connections.

The current built environment reflects these tensions with the distinct visions and projects adopted by the different boroughs, municipalities, and stakeholders.

CHARACTER + CAPACITY

The Oroboro team conducted a thorough background analysis of the NDLS sector to inform the planning interventions suggested in this report. Drawing from the analysis, this section summarizes the key findings presented in the November 2019 Situational Report.

Upcoming Projects

Centrally located on the Island of Montreal with the presence of two metro stations, a significant employment hub, and much underutilized land, the NDLS sector serves as an advantageous site for development. Large developments that have been planned for the sector include Royalmount, The Triangle, Hippodrome, Cavendish mall, Decarie Square and Westbury [see Figure 5].

One common feature among these projects is the provision of higher density residential spaces and commercial spaces with insufficient complementary service areas. With the assumption that all the proposed projects will be realized within the next 15 years, it is estimated that 22,000 dwelling units will be added in the sector [see Figure 4].

Faced with this likely population increase, there is a significant risk that there will be inadequate services and other social infrastructure, schools, community spaces and green spaces; employment opportunities; less pedestrian connectivity. Hence, Oroboro recommends that proportions of the developments be geared towards providing basic services and communal spaces to bridge the potential infrastructural gap that would be generated.

Socio-Demographic Profile

With these upcoming developments, the socio-demographic profile of the NDLS sector is poised to continue experiencing significant change. Planning for the future of the sector must address the needs of the current population and anticipate how it may rapidly evolve.

In 2016, the sector was home to an estimated 15,739 residents, a 17% increase since 2011. This currently represents just 5% of the total population of the four boroughs and municipalities intersecting the area.

Figure 4 Upcoming Projects: Unit and Resident projections

PROJECT NAME	UNITS	ESTIMATED NUMBER OF RESIDENTS
Hippodrome site	5,000	10,750
Décarie Square	700	1,505
Westbury	660	1,419
The Triangle	3,300	7,095
5196-5200 de la Savane	432	929
TOD Hodge	2,500	5,375
Royalmount	6,000	12,900
Smart Urban	1,000	2,150
Midtown City	800	1,720
Mitchell Site	1,000	2,150
Bourdon	150	323
Cavendish Mall	451	970
TOTAL	**21,993**	**47,285**

Based on predicted provincial and regional population growth figures of the Institut de la statistique du Québec, the sector's new developments could become home to 47,285 new residents, representing 21% of population growth in the entire Montreal agglomeration by 2031.

The current average household size within the sector is 2.15 people, which is slightly lower than the agglomeration's average of 2.2 people. There is also a higher proportion of residents above 65 years old (24% in the sector vs. 17% for the agglomeration).

The sector's population has a high level of educational achievement with 40% of current residents holding at least a bachelor's degree, compared with 32% for the agglomeration average. The median income of NDLS households is $49,552, which is similar to the median household income for the entire agglomeration.

A careful assessment of how the population will shift as new residential projects are completed will be necessary to ensure adequate service provision in the upcoming years. In the meantime, the unit composition and marketing material for many of the future residential projects leads us to believe that higher-income earners and smaller households will choose to establish themselves in the sector. The Hippodrome site could be one exception, with the City of Montreal's current focus on social, affordable, and family housing.

Land Use and Built Environment

The current built environment and land use patterns of the sector are oriented for automobile access and employment activities, with industrial, commercial and office uses occupying a majority of the area. However, industrial and commercially zoned lands are undergoing a transformation, with many areas being converted to residential and mixed-use developments.

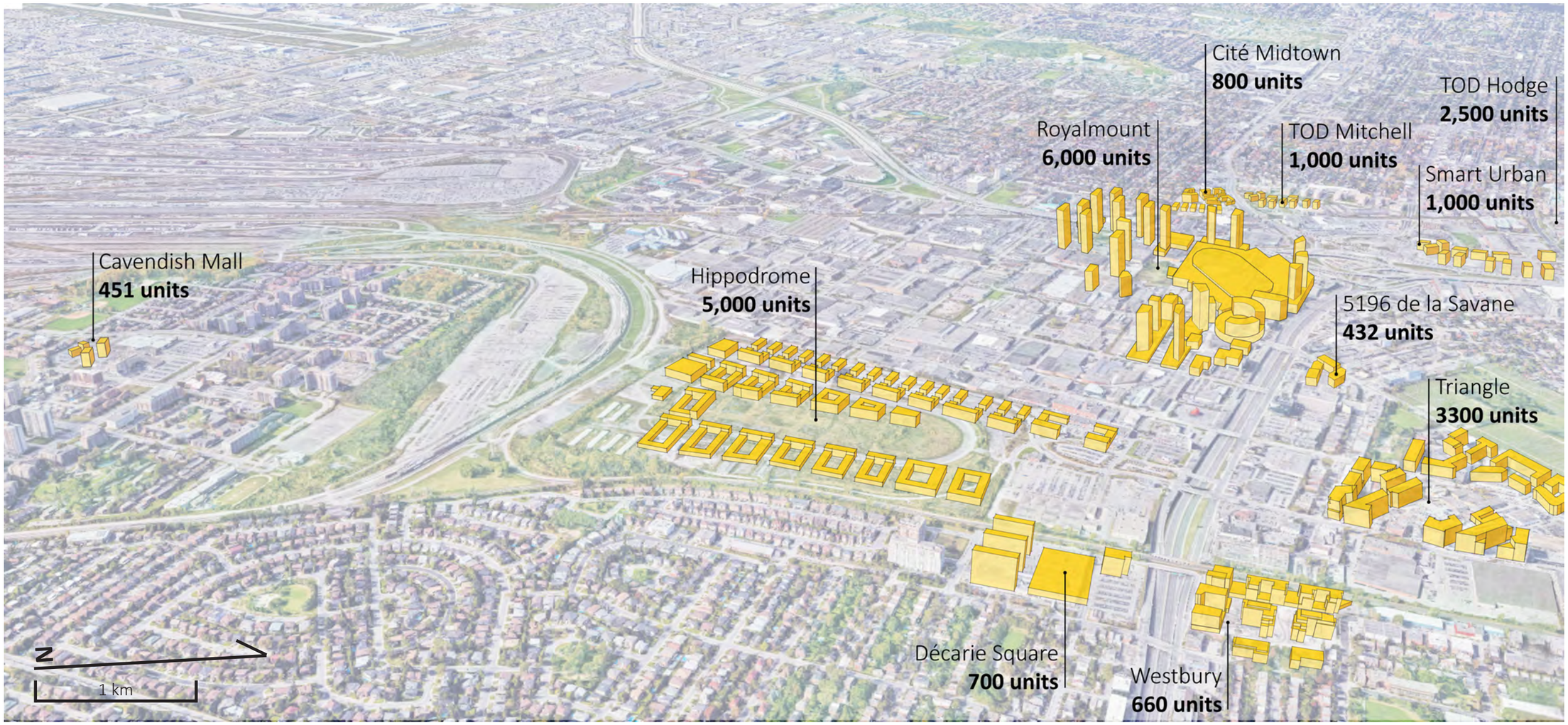


Figure 5 | Map of upcoming residential developments in the NDLS.

As a result of primarily industrial and commercial uses in the sector, there is currently a lack of street grid. Instead, the core of the sector has a large and irregular block pattern with low-density industrial buildings surrounded by abundant surface parking lots.

Currently, residential zones are predominantly located in Côte-Saint-Luc as well as The Triangle development in CDN-NDG. The majority of the housing stock is comprised of apartment buildings less than five storeys in height. However, other building typologies across the sector are diverse, ranging from single-family units to 12-storey apartment buildings. A lack of green space and green cover also characterizes the area, creating one of Montreal's worst heat islands. There are currently only four parks in the area, three of which are located in Côte Saint-Luc. Similarly social services including schools, daycares, medical clinics and community centres are located only on the periphery of the sector.

Changing land use patterns from industrial to mixed-use and residential will create an even more urgent need for new social infrastructure and services, particularly those that serve vulnerable groups, such as children and senior citizens.

Figure 6 | Road hierarchy within and around the NDLS study area.

Transportation Networks

Roadways

The NDLS sector is where the autoroutes 40, 15, and 520 meet. This provides the sector with easy access to Montreal's main corridors, and also results in large volumes of traffic passing through the area. Autoroute 520, or Autoroute Côte-de-Liesse, provides a link to the Pierre Elliot Trudeau International Airport southeast of the sector. The Autoroute 520 also merges with the Autoroute 40, or the Metropolitan Autoroute, which is part of the Trans-Canada Highway that connects Montreal to the rest of Canada and serves as a major route to Ottawa and Quebec City. The 40 and 15 meet at the Décarie Interchange, one of the busiest interchanges in Montreal. The Décarie Interchange also provides access onto Boulevard Marcel Laurin and Décarie Boulevard. Autoroute 15, or the Décarie Expressway, provides a north-south connection towards Montreal's downtown core and is also a primary trade corridor to the United States.

In comparison to surrounding residential areas characterized by local roads and cul-de-sac street patterns, the NDLS sector has a significant proportion of arterial and collector roads [see Figure 6]. This further facilitates travel through the sector while simultaneously discouraging travel within the sector, particularly for pedestrians and cyclists.

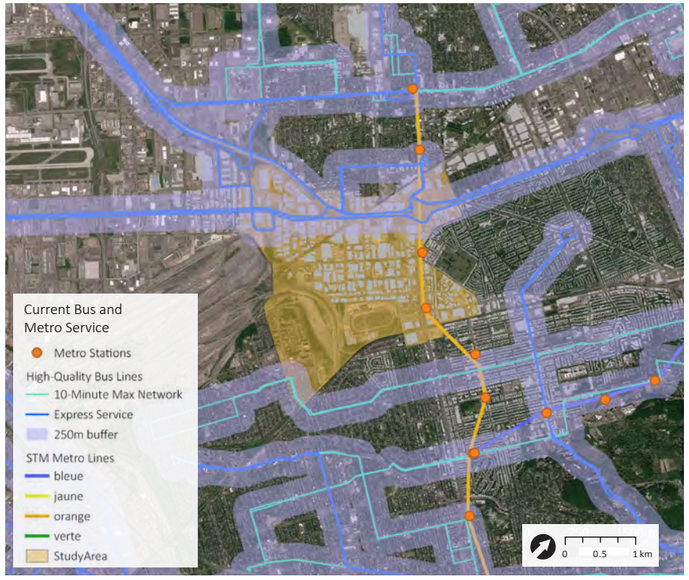


Figure 7 | Public Transit Gap – Large portions of the NDLS sector (orange) are beyond walking distance of existing high-frequency or express bus services (blue). (STM,Google Earth)

Public transportation

The sector is well served on its eastern edge by two Orange Line metro stations, though pedestrian access to these stations from the west is unpleasant and potentially dangerous because of limited opportunities for crossing Décarie Boulevard. The sector is surrounded by commuter rail and high-quality bus service—lines with express routes or maximum 10-minute wait times between buses. However, there is limited direct access to these facilities [see Figure 7].

Large portions of the sector are further than 250 m from the nearest bus stops with high-quality service, reducing the likelihood of public transit use. The current public transit network and service schedules result in reduced regional public-transit accessibility to jobs for some portions of the sector. Regional transit accessibility—the number of opportunities such as jobs that can be reached in a certain amount of time—is generally lower in the western areas of the sector. The areas with reduced accessibility are characterized by higher automobile use.

Active transportation

Active transit within and beyond the sector is limited by:

- Heavy infrastructure including railways, autoroutes, and other arterials. The distance between links across such barriers require significant detours to traverse relatively short distances.
- The lack of pedestrian-friendly spaces. The NDLS sector currently has almost no green infrastructure, such as street trees, parks, or links to other green areas outside the sector.
- Lack of safe bike routes. The sector as a whole represents a large gap within the larger regional active transit networks. Designated bike lanes and bike-friendly roads are almost non-existent, although there are several key bike lanes just beyond the sector border.

The multiple challenges to pedestrian and cyclist mobility are reflected in the very low mode share of active transit in the sector: less than 1% of NDLS residents use cycling as their main mode of commute to work. This marks a strong contrast with the rest of Montréal island, where residents are six times more likely to bike to work [see Figure 8].

Economic Situation

The sector has a high concentration of jobs in the manufacturing and trade sectors, which is a testament to the historic vocation and stra-

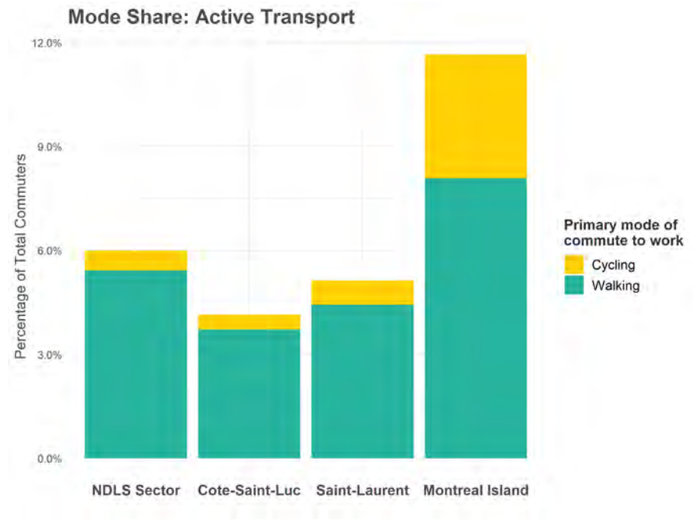


Figure 8 | Active Transit Gap – Compared with Montreal Island as a whole, NDLS has a small proportion of commuters who walk to work and an extremely small proportion who bike to work

tegic location of the sector along major transportation corridors with large industrial lots. However, these employment industries have lower average wages compared to more knowledge-based industries. There has also been a decline in overall NDLS jobs as more industrial and manufacturing jobs are moved off Montreal island or overseas. A few employment statistics listed below highlight the distribution of jobs and business locations within the area:

- The area currently serves as a significant employment hub with approximately 23,000 jobs; an additional 15,000 jobs are located within a 500-meter radius of the sector. Kraft, Dollarama and Erickson are three of the largest anchor employers in the area, each with over 1,000 employees.

- Manufacturing jobs and industries employ 30% of workers, with 80% of businesses clustered in the Town of Mount-Royal industrial park and the City Scientific.

- Business services (professional and technical) accounts for 27% of employment, with higher concentrations of businesses located along Decarie and the Town of Mount-Royal industrial park.

- Whole-sale and retail trade accounts for 26% of jobs, with employment locations concentrated along Decarie and the Town of Mount-Royal industrial park.

Several large (up to 2,300 m2) office and commercial spaces are vacant or available for rent around Decarie. These vacancies could be a result of the redevelopment, traffic congestion, and lack of services and amenities for employees in the area, limiting the competitive advantage of rental spaces.

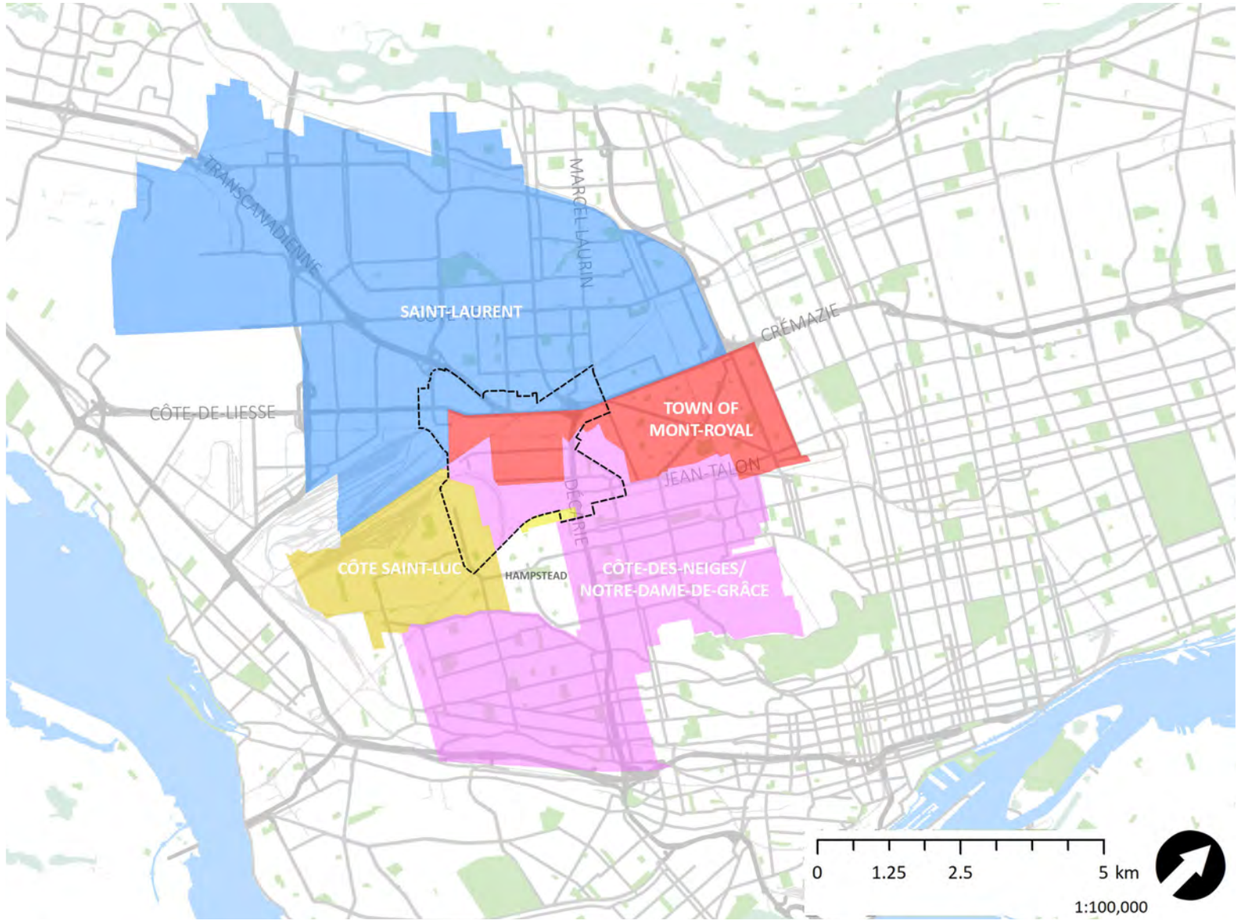


Figure 10 | Municipal boundaries with the NDLS sector.

Regulatory Context

Jurisdictional fragmentation is another key feature of the sector. The land is divided amongst three municipalities (TMR, CSL and the City of Montréal), the latter further divided into two boroughs (Saint-Laurent and CDN-NDG) [see Figure 10]. The multiplicity of local governments within the sector, each with their own civic priorities, public infrastructure, regulations and decision-making mechanisms have made it difficult to coordinate planning initiatives and develop a cohesive vision for the area. Some of these governance issues have been a result of top-down political changes and the evolution of multi-scalar jurisdictional and planning bodies that have evolved over the past 20 years.

More recently, land use planning and urban growth is guided at the regional level through the Communauté métropolitaine de Montréal (CMM), responsible for the Plan métropolitain d'aménagement et de développement (PMAD). The Montreal agglomeration council (MA) is another level of regional government, with jurisdiction for planning initiatives across the entire Island of Montreal. However, both these planning bodies lack the explicit statutory authority for regulating site-specific zoning ordinances, or the ability to initiate multi-jurisdictional planning reviews for areas of strategic regional importance such as the NDLS sector.

Adding to this complexity, the area includes a range of physical spaces owned or operated by private and public entities that are regulated by the provincial or federal government, and therefore fall outside the purview of municipal governments.

All of these factors have resulted in isolated decision-making by the various municipalities and entities in the area.

KEY CHALLENGES

Our background analysis, supplemented with public and numerous stakeholder discussions, has led us to identify the following three broad challenges that will need to be addressed through future planning interventions in NDLS. Additional background materials can be found in our earlier situational report : Situational Report - Namur-De la Savane (Nov. 2019).

A Fragmented Sector

The NDLS sector is physically fragmented by a series of physical barriers that limit the sector's permeability and discourage active transport. This situation is the result of important planning decisions made in the past, when planning priority was given to the personal vehicle, leading to the creation of the highways that today impede circulation through the sector [see Figure 11].

While the railways played an important role in the economic development of the sector, they today limit circulation and will be a strong nuisance for future residents. Railways also restrict nearby land uses as long as they are being used to carry dangerous goods.These physical barriers have resulted in clearly-divided areas dominated by a single land use, such as light-industrial or residential. Residents tend to resort to personal vehicles to safely cross these barriers.

The industries at the heart of our sector occupy large and impermeable lots, creating an additional set of barriers. These factors translate into reduced attractiveness for the sector's employers, who are already struggling with a labour shortage.

Social Infrastructure and Public-Space Deficit

There is currently a scarcity of social services and green spaces within the NDLS sector. As the historic dominance of light-industrial use in the area will soon be juxtaposed with a growing residential sector, this deficit will need to be addressed to answer the needs of future residents [see Figure 12].

While the residential areas surrounding our sector are dotted by a large number of services and green spaces, they are only designed to meet the needs of current residents. It is not possible to rely on these to serve a growing and changing population. In combination with the existing physical barriers that isolate the sector from its surroundings, the need to ensure adequate service provision inside the sector becomes even more pressing.

A Congested and Dangerous Sector

Bordered by the province's busiest highways, accessibility to NDLS is severely limited, and upcoming developments will only exacerbate the situation. Constant congestion reduces the sector's attractiveness for individuals and industries increasing the stress level of commuters and generating a heavy level of pollution [see Figure 13].

The intensive automobile use in the sector also creates a dangerous situation for road users, with 3,900 reported traffic incidents in the past 5 years, further discouraging the use of active transportation. In that period, 65 reported accidents involved cyclists and 145 involved pedestrians. With the anticipated population growth in the area, there is a clear need to reframe the role played by personal vehicles and reach the Schéma's goals of improving public and active transportation usage [see Figure 14].

Figure 11 | Key challenges 1 - Sector fragmentation by autoroute and railway infrastructure

Figure 12 | Key challenges 2 - The current social infrastructure and public space deficit within NDLS will be heightened with residential growth from future developments

Figure 13 | Key challenges 3 - Road accident map – Areas of particularly high traffic incidents are found along portions of Décarie. Cavendish Boulevard is another major area of concern for pedestrians, while most accidents involving cyclists occurred on Sainte-Croix

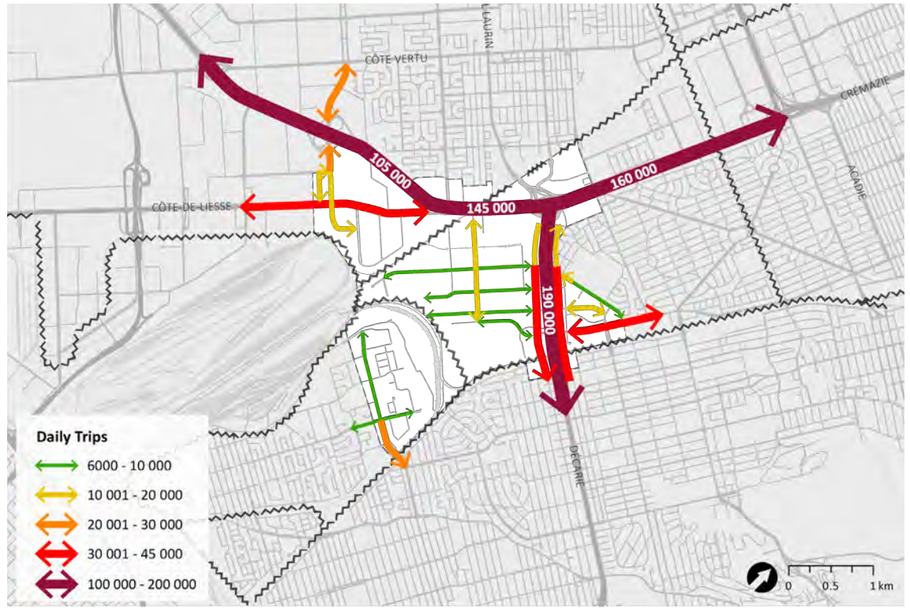


Figure 14 | Key challenges 3 - NDLS is characterized by constant heavy traffic congestion, particularly along major autoroutes that pass through the sector. Absent major reforms to shift from car-centric transportation, congestion will worsen with residential growth.

‘A CONNECTED, LIVABLE + FUTURE-PROOF AREA AT THE HEART OF THE ISLAND’

In an effort to address key challenges within a fragmented sector, Oroboro has formulated a unified vision for the area. This vision is to act as a framework for guiding collaboration between stakeholders in the development of a coherent, long-term development strategy: 'A connected, livable and future-proof area at the heart of the island'

Our vision is based on 3 guiding principles:

A connected sector both physically and politically, linking different actors and different areas of the NDLS sector. The goal is to increase the flow of ideas and communication as well as people across the sector.

Livability for all by emphasizing human-scale environments that are inclusive of diverse needs. This requires balancing economic development and quality of life through mixed uses with pleasant public spaces and employment opportunities.

Future-proofing the sector to be capable of meeting expected and unexpected future demands. This means having flexible and adaptive plans, policies, and infrastructure that can respond to future social needs, threats posed by climate change, changes in travel behaviour, and differences in stakeholder interests.

The following proposed interventions are derived from these principles. They are designed to serve as a starting point for future discussions and decisions surrounding policies and plans for the sector, helping find common goals between stakeholders and ensuring a cohesive environment.

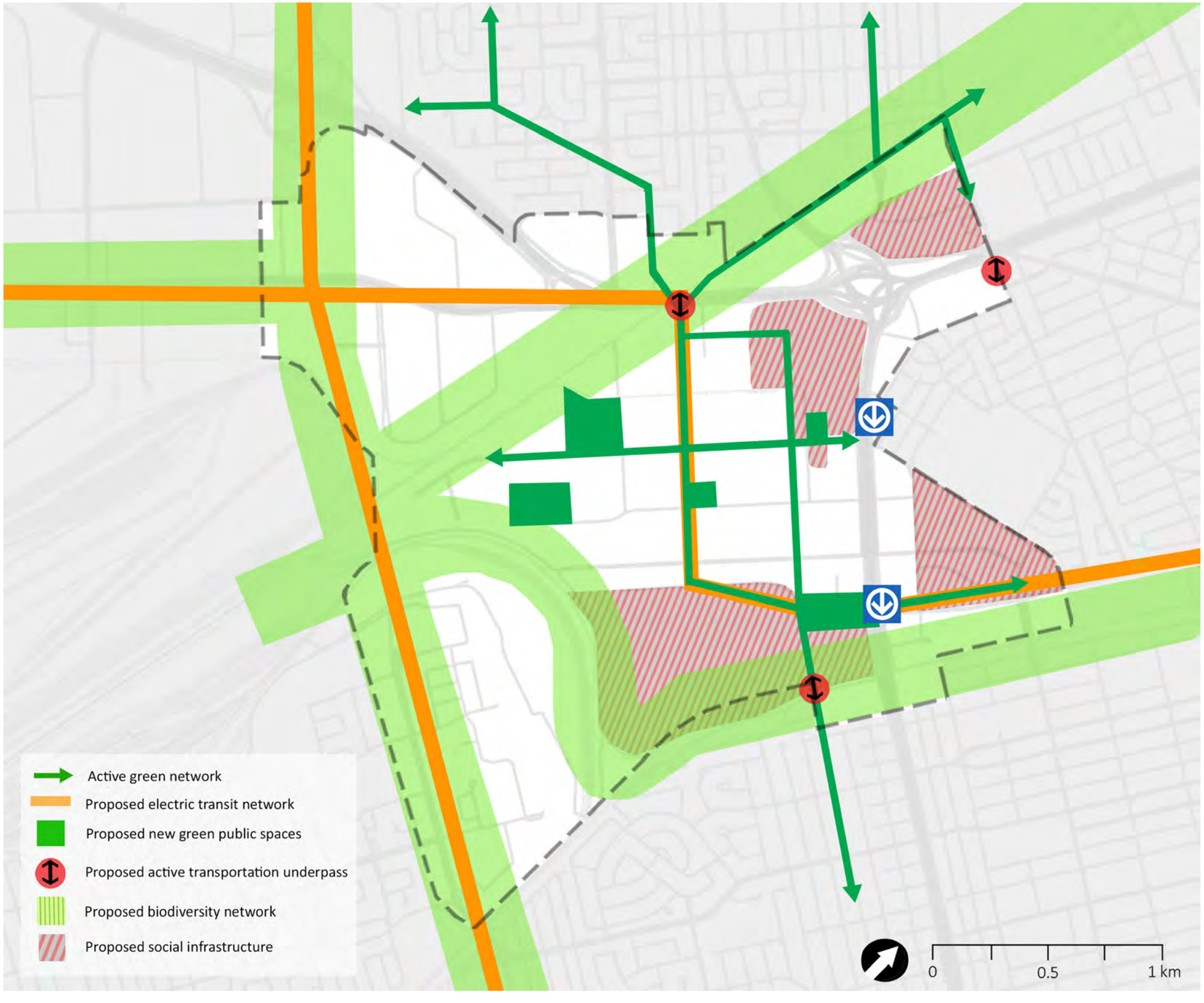


Figure 15 | The concept plan for NDLS includes new public spaces and social infrastructure, as well as proposed active green network and electric transit route to link these services with upcoming developments.

Figure 16 | Concept plan breakdown from left to right: (a) connectivity strategies; (b) layering of new parks, biodiversity corridors, and other greenspaces; (c) final concept plan showing locations for additional social infrastructure.

Coordinated Concept Plan

Our analysis of the sector's context and its key challenges allowed us to develop a concept plan to help guide medium- to long-term actions in a concerted way. The goal of this plan is to illustrate where and how interventions are required to enact a collaborative vision for the future of the sector [see Figure 15].

The concept plan emphasizes the need to increase permeability throughout the sector and connect it in new ways to its surroundings. As well, it is meant to offer new shared spaces that will enhance the public realm and answer the needs of the sector's future residents and visitors. The interventions that will make this possible are further detailed in the following comprehensive vision plans.

A Comprehensive Vision

Connected

Our plan to increase connectivity combines interventions that have already been envisioned with new elements that aim to fill the transportation gaps of the sector [see Figure 16].

- The orange color illustrate the potential route of a new, environmentally-friendly public transit option that would become the backbone of the sector's transportation network.

- The green arrows represent the location of the proposed active green network that will provide a safe and pleasant way to circulate on foot within NDLS, linking future developments with services and public transportation nodes. It will also create links to existing bike paths and biodiversity corridors beyond the sector.

- The red dots show where infrastructure barriers could be redesigned to allow safe and pleasant crossings for active transit.

- The black arrows demonstrate the possibilities offered by extending the Cavendish boulevard across the railways, reconnecting it to the existing road network and improving active and public transportation networks.

Livable for all

We aim to make the sector livable for all by providing extensive greenery throughout the area and other spaces with opportunity for social interaction. Providing easy access to natural amenities will make the sector a more desirable and healthy place to live, work and play.

The green corridors illustrate where natural amenities are needed to enhance the public realm and to create a buffer from conflicting uses. A series of green public spaces are suggested on the lots that are currently vacant or under-utilized.

Future proof

Finally, we can ensure that NDLS will meet future needs by ensuring that the right infrastructure and land uses are implemented in the right locations. This means ensuring that services, employment and commercial destinations are close to where we can expect the greatest population density increases. It also entails locating amenities along active and public transportation corridors to reduce reliance on private vehicles, and ensuring that proper links connect populations with services across existing barriers. Such planning tools will support complete neighbourhoods which encourage social interaction and economic revitalisation.

AN ACTIVE GREEN NETWORK

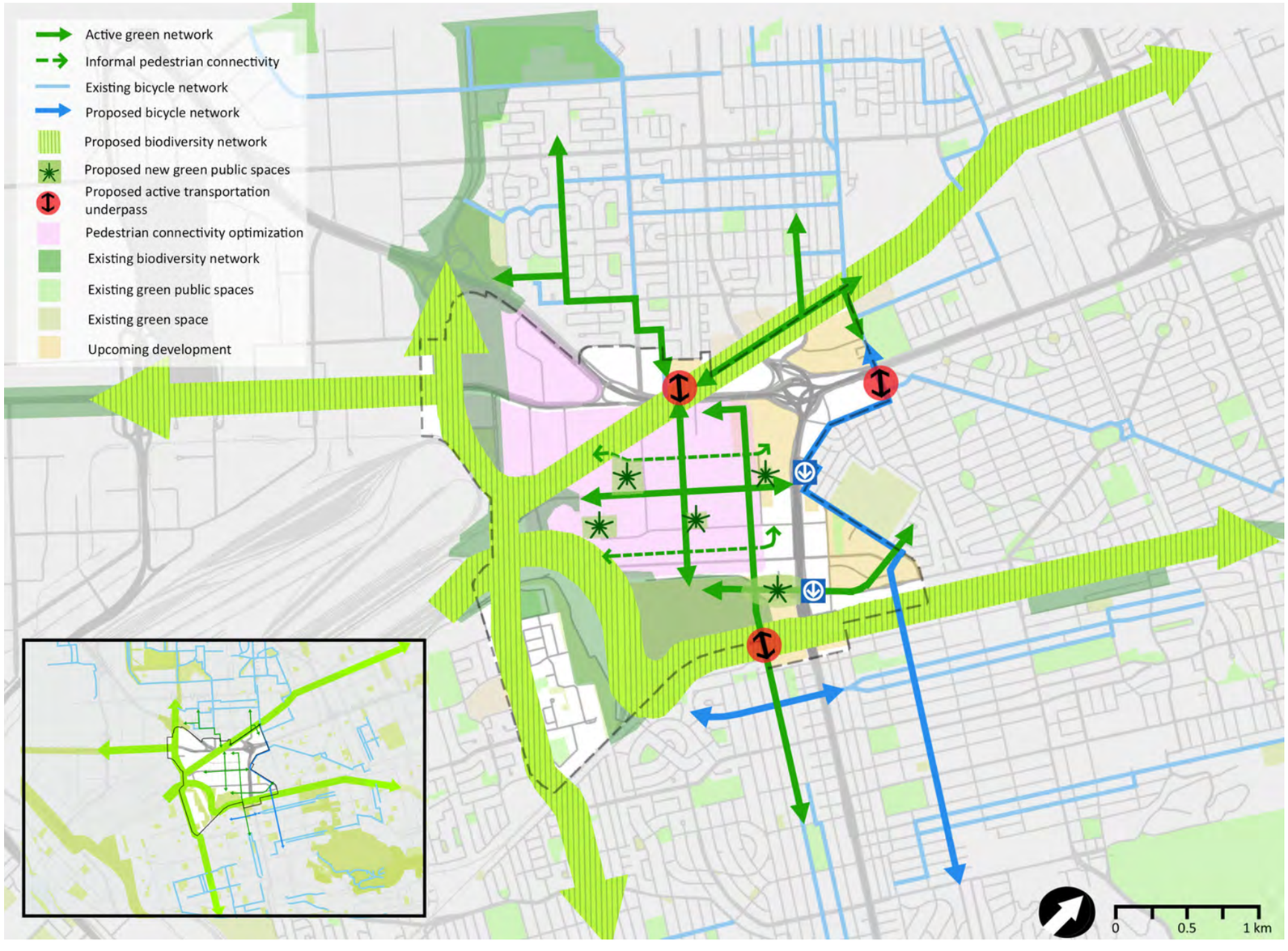


Figure 17 | An active green network is essential to addressing a number of the area's key challenges, including pedestrian safety, car dependency, and the public space deficit.

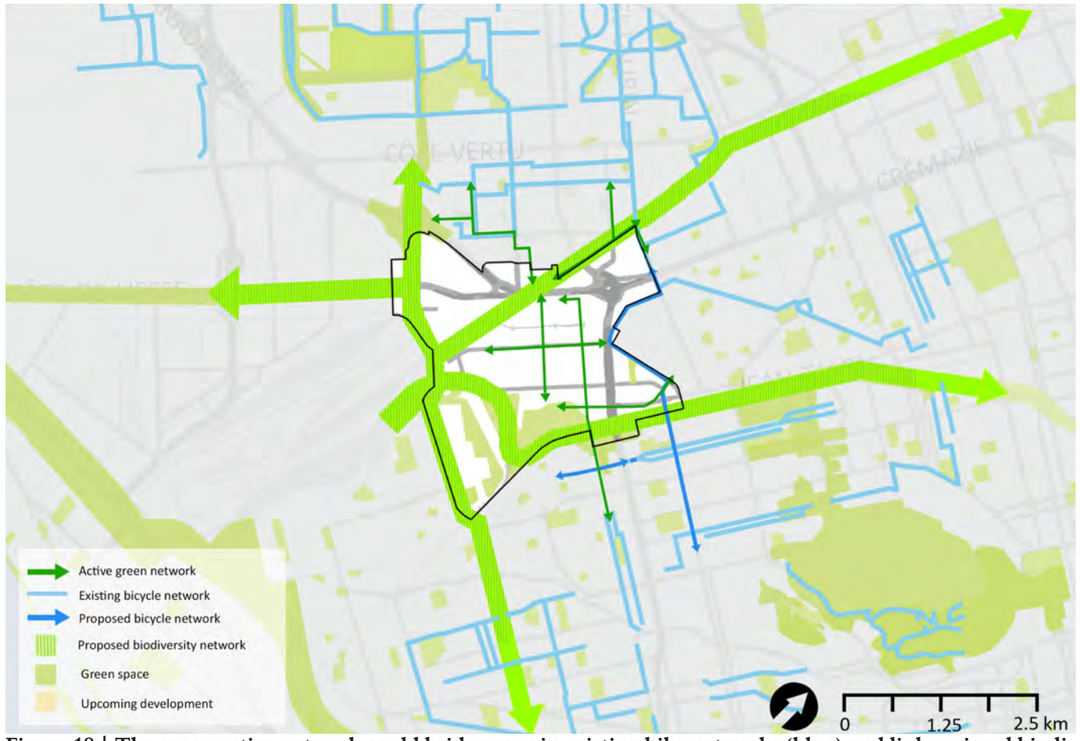


Figure 18 | The green active network could bridge gaps in existing bike networks (blue) and link regional biodiversity corridors (pale green).

Given the highly fragmented nature of NDLS, we propose landscape connectivity as a strategy that could increase permeability throughout the sector. This would entail a continuous green network to support ease of movement and biodiversity. An active green network could provide the following benefits to the area:

- Create new parks that repurpose vacant or underutilized spaces in NDLS. These parks will help address the public space deficit made more urgent with the future influx of residents. Improved access to green spaces is also linked to a number of health benefits.

- Improve safety and quality of life through visual, auditory, and physical protection from traffic.

- Support urban and migrating wildlife

- Help mitigate the heat island effect, improve rainwater drainage, and address other environmental concerns.

- Help knit together fragmented neighbourhoods by creating pleasant walkable connections. Three North-South connections along the network will increase permeability between key areas within the sector.

- Connect public spaces, services and transit nodes. Creating links to bike lanes and public transit networks that extend beyond NDLS will reduce car dependency. This includes connecting existing and future developments in the area with a total of six metro stations along the orange line, encouraging intermodal transit.

The active green network presented will require different interventions along different segments [see Figure 17].

Some streets will only need small retrofitting, such as widened sidewalks, street trees, and designated bike lanes to safely link the site with broader active networks. This includes a tree-lined boulevard along Côte-de-Liesse Street in conjunction with the proposed tram network.

Other axes will benefit from fully separated active transit lanes that replace a current parking lane or car lane. These separated lanes should incorporate greenery, street furniture, and other infrastructure that helps create a physical and visual separation from car traffic [see Figure 18].

Along the railway, we suggest implementing a biodiversity corridor accessible only to pedestrians and cyclists, which can serve as both a linear park and as a refuge for migrating species. There are already several examples within Montréal where railway edges have been used as a biodiversity corridor or as active transit network. Notable projects include the Darlington biodiversity corridor developed by the Université de Montréal, as well as the popular Réseau-Vert that stretches 3 kilometers along the south border of Rosemont-La Petite-Patrie.

Both of these projects almost intersect, and run alongside the same CP railway that bisects the NDLS sector, suggesting that an extended biodiversity corridor and active network along the railways could connect the NDLS active green network all the way to south-eastern Rosemont with minimal new infrastructure.

The NDLS network could also serve to link these projects with the planned Saint-Laurent biodiversity corridor to the north [see Figure 20].

NDLS jurisdictions should work with the CMM and with the City of Montreal to coordinate interventions in active transit infrastructure with broader plans. For example, the proposed NDLS active green network should complement future phases of the Réseau Express Vélo (REV), which includes plans for Cavendish Boulevard and an east-west corridor linking the Hippodrome site to the east side of Montréal.

Stakeholders: CSL, TMR, Hampstead, the City of Montreal, the boroughs of Saint-Laurent, CDN-NDG, Outremont and Rosemont, CP, CN, the CMM, MA, and MTQ

Suggested Route

While additional studies and analysis must be undertaken to determine precise routing details, we present here an example of how an active green network would improve walkability within NDLS as well as linking to broader cycling networks, public transit networks, and green spaces outside the sector [see Figure 19].

- Where the CN railway that runs north-east through the sector crosses Autoroute-40 at Authier and Devonshire (1), measures should be taken to improve safety and comfort for pedestrians and bikers in the underpass (see Focus Area #1).

- North of the underpass, the green network should continue along Authier street and link west to Alexis-Nihon Boulevard (2), which currently has separated bike lanes beginning just beyond the NDLS sector, linking north to Saint-Laurent.

- Several blocks north of the NDLS boundary, the green network could be extended west from Alexis-Nihon along Saint Louis and North along Bertrand Street to link with the Alexis-Nihon Park (3).

- From here, the green network will branch west to Saint-Laurent's planned Cavendish-Laurin-Liesse green corridor (4) and north towards Marcel-Laurin Park.

- Branching north-west from the Authier/Devonshire underpass, the green corridor should be extended along the railway, providing a link to the Cite Midtown development, Mitchell TOD, Hodge TOD, and connecting to the designated bike lanes along Sainte-Croix (5). These bike lanes represent a second preexisting link to active transit routes further north in Saint-Laurent, as well as linking back South to the NDLS sector.

- At the railway overpasses that crosses Decarie Boulevard, infrastructure should be provided to extend the green corridor north to reach Beaudet Park and the Du College metro station (6).

- The bike lanes along Saint Croix currently extend just to the Saint-Croix/Lucerne underpass beneath the A-40 (7). This underpass should also be upgraded to improve safety and attractiveness.

- Currently there are no designated bike lanes south of A-40 linking to paths that begin at the underpass, forcing bikers in lanes with cars along Lucerne, one of the most dangerous road segments in the sector. To provide a safer link, the underpass bike lanes should be extended to Graham Boulevard (8), where one again, bike lanes currently begin just beyond the NDLS boundary, stretching into TMR (past Glengary Avenue).

- New bike lanes should be provided to connect west from Graham, crossing Lucerne to Plymouth Avenue and turning south along Bougainville Street to connect with the De la Savane metro station (9) and continue south to link with the existing bike lanes along De la Savane street north of The Triangle (10). These lanes should also be connected west across the De la Savane overpass above the A-15 and along Royalmount Avenue (11), providing access points to the green network for future development.

- South of The Triangle, existing bike lanes along Victoria avenue should be extended further south to Queen Mary Road, connecting with the Plamondon, Côte-Sainte-Catherine, and Snowdon metro stations. This extended bike path along Victoria will also link the new active network to the Darlington biodiversity corridor (12), the Nelson Mandela Park (13), and the both Barclay / Plamondon shared bike lanes (14) and the Edouard-Monpetit / Lacombe designated bike lanes (15) that each connect with eastern CDN-NDG.

- While the Barclay / Plamondon bike lanes just south of NDLS currently end at Westbury Ave, they should be extended west along Plamondon to provide an additional active transit link on a A-15 overpass (16) and link with Rosemary-Brown Park (17).

- On the south perimeter of The Triangle, a new active green corridor along Jean-Talon West could link The Triangle and Namur metro station with the future Hippodrome development. Where Jean-Talon crosses the A-15 (18), an overpass park should be considered to create currently sparse public space, as well as providing a visual and auditory barrier from the heavy traffic below (see Focus Area #3).

- From the Hippodrome development, the green network should continue north along Devonshire Street (19) to connect with the east-west green network axis at Royalmount Avenue / de la Savane Street (11), and further north, to Authier/ Devonshire underpass (1), which in turn provides links with the railway green corridor and bike lanes north into Saint-Laurent.

- A second north-south active green network axis will stretch from active transit routes within the new Royalmount development, along Royden street (20), which should be extended south to create a more continuous street grid, intersecting with the east-west green corridor axes along Royalmount (11) and Jean Talon (18), continuing behind Decarie Square to a new underpass beneath the railway (21), and connecting with Clanranald Avenue. The green network should continue south along Clanranald to link with MacDonald Park and the bike lanes that begin at Clanranald and McLynn (22).

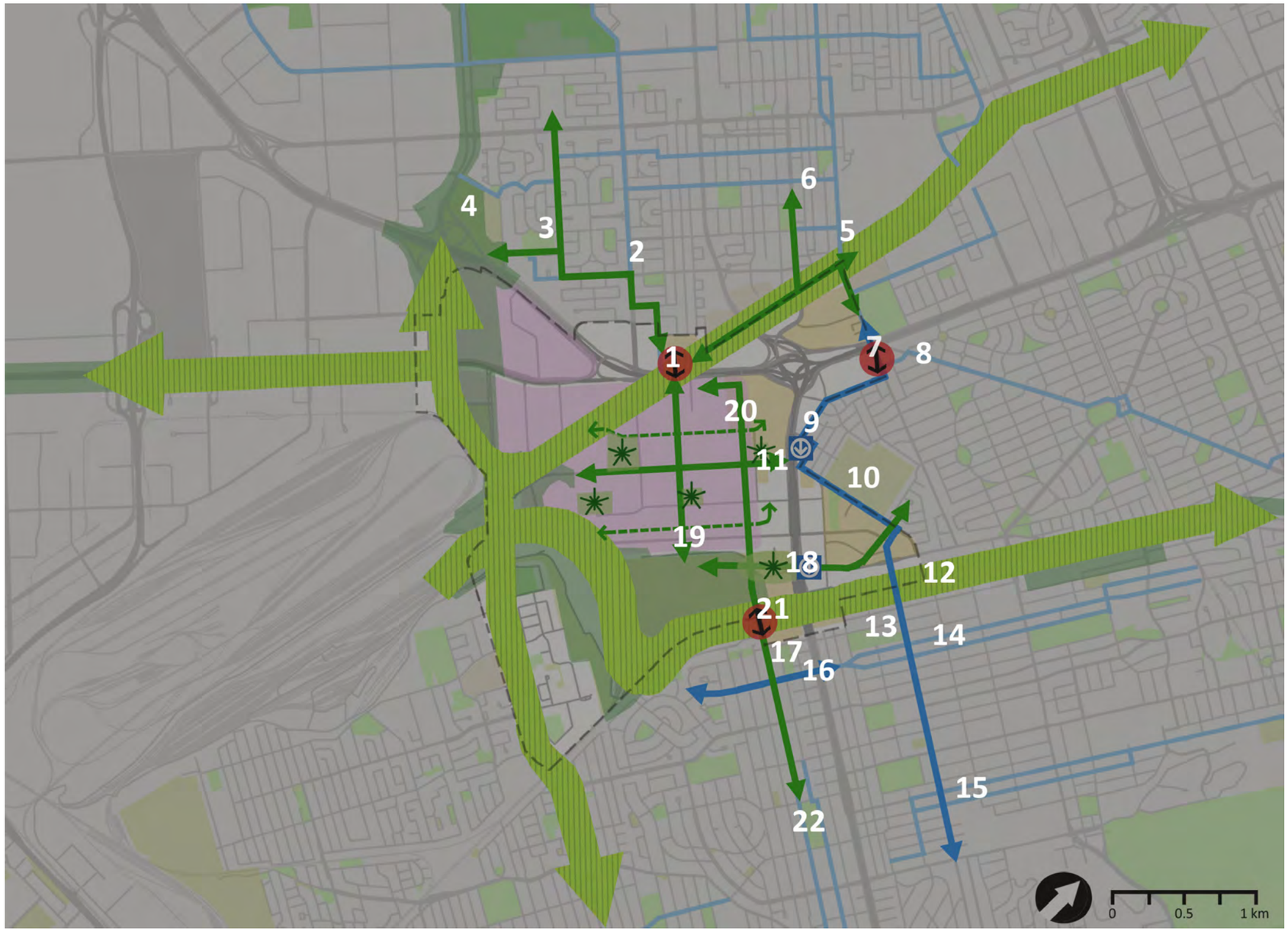


Figure 19 | Active green network suggested route.
See p. 24 for descriptions.

Greater Biodiversity Networks | Island of Montréal

The following map shows how the biodiversity corridors suggested in this concept plan could be connected to other existing or planned corridors.

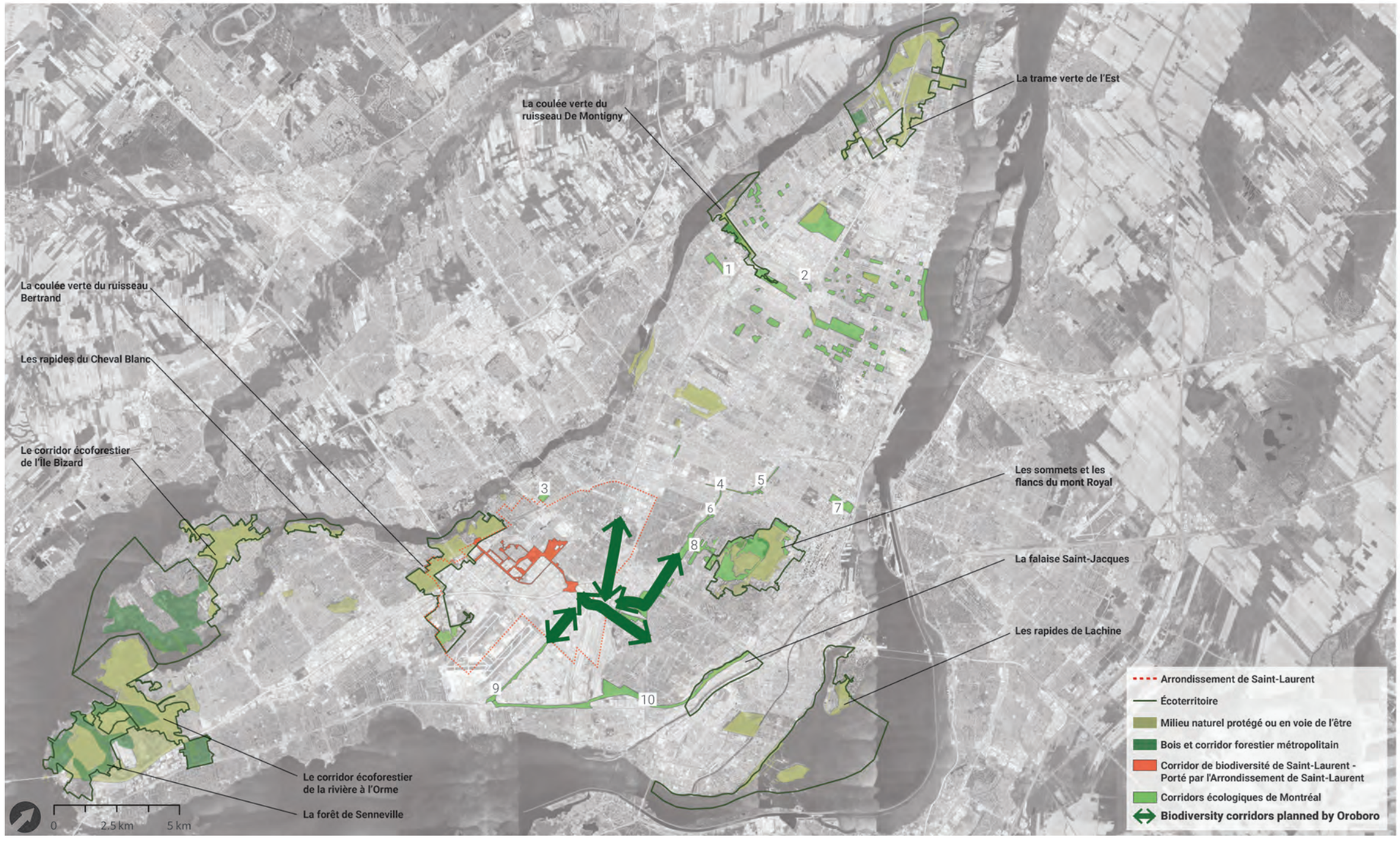


Figure 20 | Existing and planned biodiversity corridors (Table Architecture, LAND Italia, civiliti, Biodiversité Conseil)

Case Study | Arbutus Greenway

The ***Arbutus Greenway*** in Vancouver represents an encouraging precedent [see Figure 21].The City of Vancouver purchased the land, a former railway and streetcar route, from CP in 2016. The city held over 50 different events and had more than 7,000 interactions with stakeholders and public consultation to inform a design that answers the needs of the community. The final design consisted of a nine-kilometre active transportation and public space corridor with pathways, social spaces for community gathering, edible landscapes and 'wild' natural spaces. The Greenway serves as a connective spine between diverse neighbourhoods, with eight "character zones" along the route to meet the needs of different locales. A future streetcar route is also planned. The Greenway was constructed in phases to accommodate funding strategies and other shifting circumstances, and was integrated with a number of broader green infrastructure and ecological plans pursued by the city.

Figure 21 | Rendering of the Arbutus Greenway in Vancouver, BC. (City of Vancouver)

PLUGGING IN | AN ALL-ELECTRIC TRANSIT NETWORK

Just as yesterday's largely car-centric transportation infrastructure and planning gave rise to the NDLS sector as we know it today, the choices we make now will shape its continued evolution well into the future. Currently, the area is served by a dated and inefficient transportation network that, with the arrival of new developments, will likely exacerbate existing traffic congestion and barriers to active and sustainable mobility. Indeed, the area is crisscrossed by transport infrastructure that links distant destinations but erects significant barriers to movement within and across NDLS.

To address these challenges and "plug the sector in," we propose a small-scale, fully electrified structural public transport network to fill current gaps and serve the needs of the over 40,000 new residents who could call the area home in the coming decades. The electric transit network expands and refines proposals already advanced by Saint-Laurent and CSL. It is intentionally conceived of as more than a transportation project designed to serve current or near-term needs, as the existing low density of residential and commercial uses would not likely justify the financial investment. Rather, this electric network has been proposed to direct and orient future growth

Properly conceived, this transit network would also facilitate the sector's integration with existing and proposed active-transport networks to support a full suite of mobility options for residents, workers and visitors. These systems would:

- Provide high-quality local transit options within the sector.
- Generate a unifying sector identity and promote real-estate development.
- Enhance connections with other modes of transit, including the REM, for people traveling to and from the sector. The connections could also provide an important alternative to the REM by enabling better connections to the metro, similar to the proposed Orange Line extension to Bois-Franc.

Proposed Route

The accompanying figure shows a potential core alignment with several additional options. These are preliminary alignments in areas where we anticipate the greatest need. But there are trade-offs, including the loss of vehicular access (Devonshire) or the need to acquire land. For purposes of this report, we have analyzed an approximately 26.5 kilometer network consisting of two axes with station spacing of approimately 800 metres.

- East to west from the future Canora REM station to the Dorval VIA station, largely along Jean-Talon Boulevard and the Côte-de-Liesse Autoroute.
- North to south from the future REM station at Autoroute 13 to Montreal West, mostly along Cavendish Boulevard and its planned extension.

A two-level station located near the intersection of the future Cavendish Boulevard extension and the Cote-de-Liesse Highway would allow transfer between the two axes.

These axes were selected to:

- Fill essential gaps in the existing transit network and connect proposed developments, including the Royalmount and the Hippodrome, enhancing job and service accessibility for residents and workers in areas that could be densified.
- Link all parts of the study area to larger transportation projects unfolding beyond the sector's borders, such as the REM at at least two points, the Metro and commuter rail at Montreal West.

Elements of the proposed alignment were also selected to advance various urban design objectives. In particular, segments adjacent to existing highways are proposed to help address challenges associated with the existing road network. Stations along these highways would support and justify the construction of new cross-barrier connections with elevated, at-grade, or underground walkways. Moreover, the trackways, when paired with landscaping, could be used to create screening barriers for new residential and commercial developments [see Figure 22].

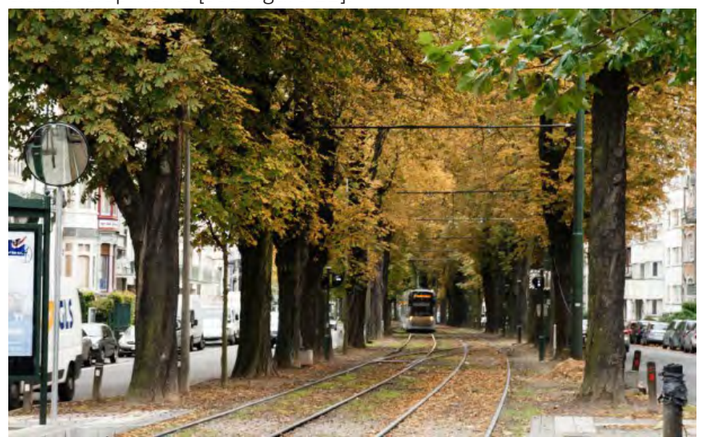


Figure 22 | The Brussels tram operates on a tree-lined path, providing valuable urban greenspace. (Wikipedia)

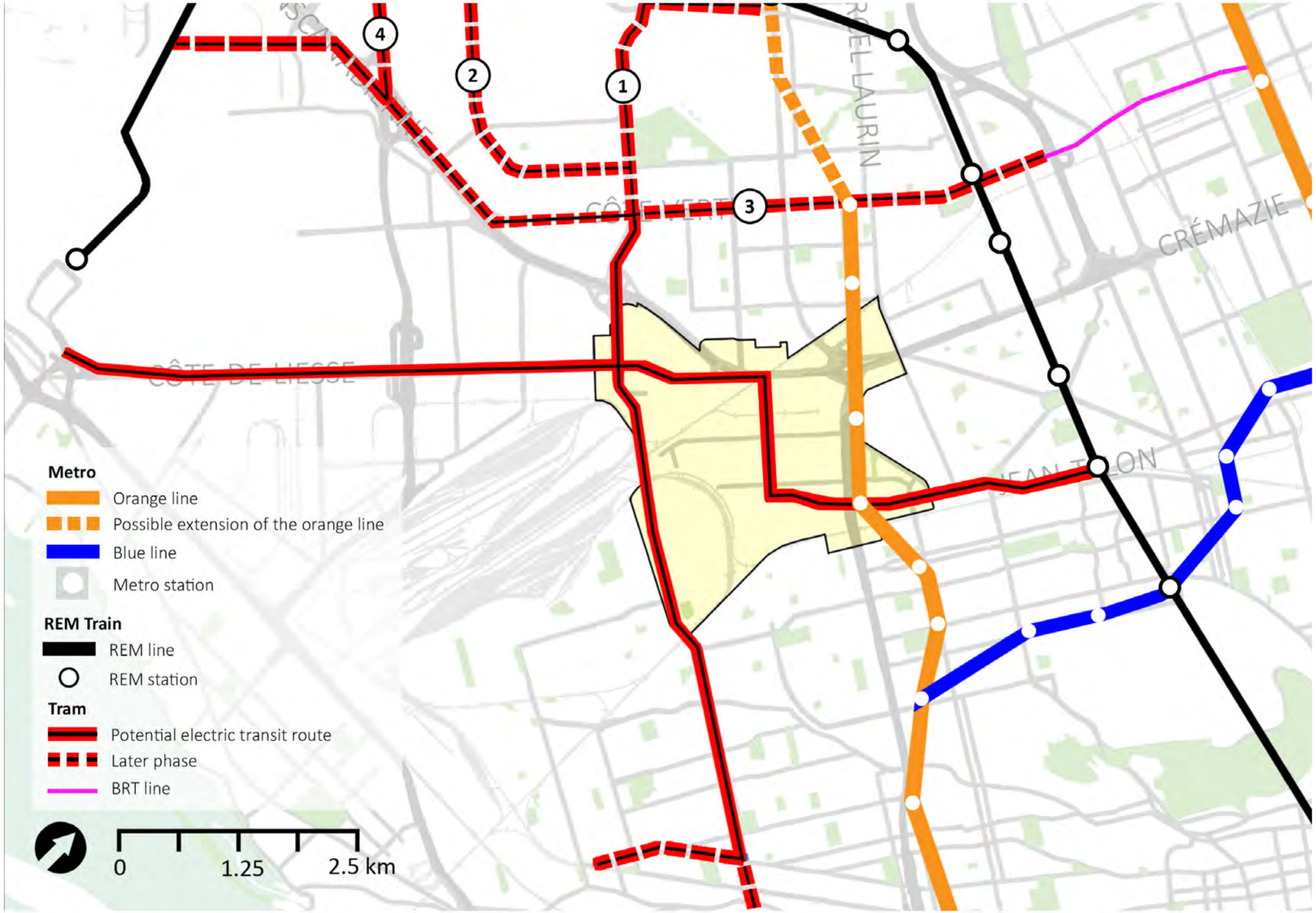


Figure 23 | The proposed electric transit network route would connect residential developments with employment poles, as well as linking NDLS with broader public transit projects.

Figure 24 | Rendering of a trackless tram in Miami-Dade County, Fla. (CityLab)

Figure 25 |CRRC trackless tram operating in China. (Peter Newman/CREATE)

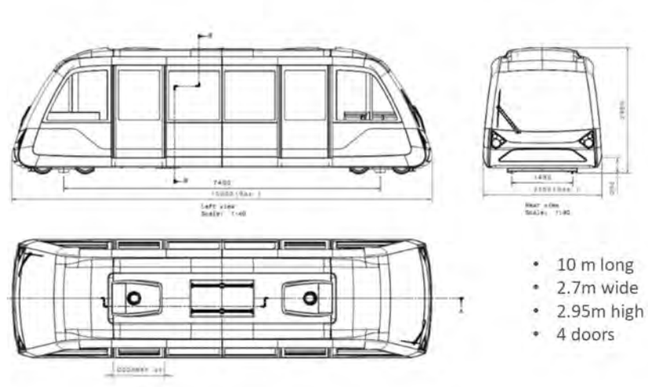


Figure 26 | Artists' rendering and schematic drawings of the rolling stock for Coventry's "very light rail," which is currently in development and slated for testing in 2020 (Transport Design International, UWG, Rail-Technology.com).

Potential Technologies

Emerging technologies are blurring the line between traditional buses and urban rail systems, potentially offering a cost-effective blend of the aesthetic and performance-related attributes of tramways with the lower capital costs and greater flexibility of rubber-tire systems.

These present the opportunity to offer a public transit solution that is more appealing than traditional buses, offering the chance for greater mode shift.

Two technologies to consider are (1) "trackless" autonomous trams operating on rubber tires or (2) recently developed "very light rail" trams, which are expected to use smaller, lightweight tracks, and onboard battery power to remove the need for expensive or unsightly catenary wires. Precedents of these might include:

- The CRRC "trackless tram" (Zhuzhou, China) – This optically-guided bus system mimics many of the attributes of traditional light rail without the costly infrastructure. Different types of vehicle-mounted cameras direct the articulated vehicle along painted "tracks". Other possible guidance systems could include kerb- or magnetic-guided steering. The ride is reportedly smoother than a traditional bus because of the rail-like suspension and under-car equipment. Its aesthetic is also similar to that of a light rail or tram. Its makers suggest the trackless tram could be deployed for less than half the capital cost per kilometer than traditional light rail [see Figure 25].

- "Very Light Rail" (Coventry, UK)– Though still under development, the Coventry Very Light Rail system is intended to pilot the use of smaller, lighter, self-contained rolling stock on specially adapted tracks that don't require relocating under-street utilities. The trams will be battery powered, with station-based quick charging, and are intended to be autonomous, reducing the most significant operating costs. The developers, which include the University of Warwick, intend to offer a vehicle and track system at a fraction of the cost of traditional light rail, which can often render business cases infeasible. At the same time, the form factor and permanence of the installed infrastructure could be leveraged to direct and foster development in appropriate areas [see Figure 26].

Though novel in its application, the VLR system adopts many time-tested technologies from rail, bus and automotive transit, including battery and charging technology.

Indeed, Montreal has already embarked on the electrification of its bus fleet with the pilot of battery-electric vehicles on a downtown route and the construction of the new Bellechasse maintenance facility for the future electric fleet. These ongoing initiatives will help develop and prove the viability of cold-weather battery technology of the sort that could be incorporated into a VLR.

Based on projections for the Coventry VLR system and other projects in Quebec, we have estimated capital costs for the electric network's rail infrastructure and rolling stock of between $9 million to $17.2 per kilometre. These estimates assume projected savings of 70% to 84% over traditional light rail, which requires heavier rails and expensive overhead power-supply systems.

The total-system capital cost would range between $250 million and $600 million. Because the system is not yet in production, operations costs remain unclear. However, costs would likely be similar to or less than those of the battery-electric buses currently being tested in Montreal, particularly because the rolling stock is designed to be capable of autonomous operation.

Although significantly cheaper than other light-rail projects elsewhere in Quebec and Canada, the network would still need to be accompanied by a comprehensive land-use program focused on commercial and residential densification to justify its cost.

Stakeholders: STM, CSL, TMR, Hampstead, the City of Montreal, the boroughs of Saint-Laurent, CDN-NDG, Outremont, the City of Dorval, the CMM, MA, and MTQ

FUTURE PROOF LAND USE, SERVICES, POLICIES + INFRASTRUCTURE PLANS

Land Use Designations

Exsiting proposals for transit-oriented devleopment (TOD) in Saint-Laurent and elsehwere in the NDLS sector are intended to facilitate a transition to more sustainable residential development and transporation patterns. Stakeholders should work closely with regional officials to define and enhance what is meant by these TOD policies to ensure optimal outcomes. To further support the goals and interventions described in this report, we propose additional changes in authorized land uses [see Figure 27]. We also recommended changes to allowable densities and built-form regulations, particularly in the areas surrounding the proposed electric and active green transport networks [see Figure 28].

Tackling Social + Public Space Deficit

The proposed developments will intensify land use within the sector with increased densification of commercial and residential uses. A significant increase in the residential population will require new community amenities and services. The provision of land, infrastructure and funding should be secured in advance to orient development and also to reduce higher future costs. The location of social infrastructure—including daycares, schools, parks and community centres—should meet the socio-cultural needs of heterogeneous populations within the sector. These facilities can also aid the social and functional integration of future populations with the surrounding neighbourhoods. A list of the most urgently needed services include:

- Four new schools, including two elementary and secondary schools, distributed across the Hippodrome site, RoyalMount and Saint-Laurent.

- Five new parks. The locations identified in the concept plan are currently underutilized and vacant lands that are centrally located within the industrial district and could be easily acquired and transformed.

New public and private daycare facilities should be secured either in upcoming redevelopment projects such as the Hippodrome and RoyalMount, or in nearby commercial zones.

A new community centre should be secured in the Hippodrome site. This should include recreational facilities, library and reading rooms, multi-use event spaces, and cultural facilities such as exhibition galleries and performance rooms.

Stakeholders: CSL, TMR, the City of Montreal, CMM, MA, and the boroughs of Saint-Laurent and CDN-NDG.

Future Vocations

As land use patterns in the sector intensify and transform with the addition of higher density residential and mixed-use development, it is crucial to balance and preserve employment opportunities in the area. This could be achieved by:

- Ensuring certain types of industrial activities, such as manufacturing, storage and logistics, become more space-efficient, with the elimination of surface parking lots and single-storey buildings.

- Encouraging newer facilities with vertically stacked strata-titled commercial units to offer subdivided spaces at more competitive ownership or lease rates, attracting smaller businesses to the area.

- Carefully coordinating zoning bylaws and planning policies within and between jurisdictions to ensure that compatible industrial and commercial uses are permitted in proximity to residential developments.

- Identifying and pre-approving light-industrial activities that feature final stage or “clean” manufacturing without generating harmful emissions or creating noise and traffic disturbances.

One example of the latter type of industrial activity is artistic

production – for example, artisanal products with custom onsite manufacturing services. These types of uses are usually classified as live-work. However, in the case of NDLS, work-like facilities with employment or professional services as the primary use of ground floor spaces should be preserved. The Quartier Design, a place-making and employment clustering initiative attracting interior design services and custom manufacturers, is one type of light-industrial and services cluster that could be further expanded in the sector through the work-live mixed-use concept.

To maintain the current industrial employment base in the sector, ground-floor manufacturing with retail services should be considered. This policy has been successfully implemented in Vancouver and San Francisco, where one FAR of ground-floor space in certain neighbourhoods are reserved for light-industrial manufacturing use. Density bonuses or height variations are granted for higher floors to make up for potential loss of income. In these cases, the ground-floor businesses or services also help activate and animate the streetscape, creating a varied and dynamic environment for pedestrians.

Policy incentives or funding sources should be considered to encourage landowners or developers to undertake adaptive reuse or retrofitting of existing large multi-storey commercial and office buildings. For example, spaces such as Decarie and Cavendish Mall could be repurposed as shared co-working spaces with in-house amenities, attracting freelance workers or small companies with growing or seasonal employment patterns. As demolition and construction of new buildings is a significant source of energy consumption and greenhouse gas emissions; maintaining and repurposing existing buildings can serve as a means to limit emissions and maximize use of embedded carbon in older buildings.

Where possible, employment opportunities that provide jobs for locals should be incentivized. Limiting shop frontages and/or commercial unit sizes could encourage services such as affordable grocery stores and professional and personal care services, at the same time as discouraging multi-national chain stores from monopolizing retail spaces. This type of policy will be especially important in the Hippodrome redevelopment, where a larger proportion of families and lower-income residents will be prioritized for new housing units.

The addition of significant retail and commercial services along with

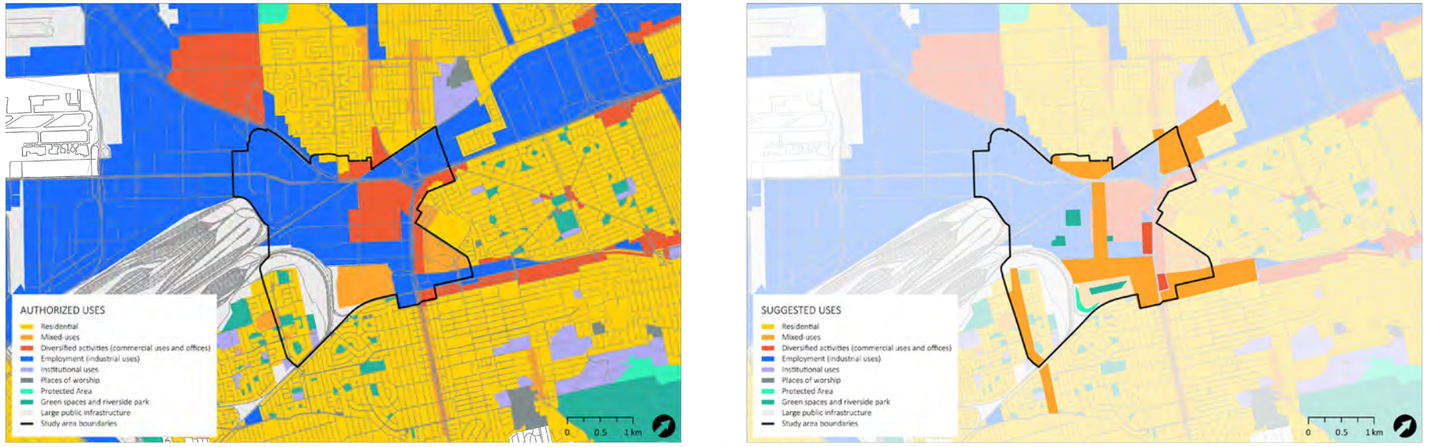


Figure 27 | Existing authorized land uses (left) and proposed changes (right) to support the vision outlined in this report. Changes are in bold colors.

Figure 28 | Actual and authorized building heights (left) and suggested enhancement of heights and density (right).

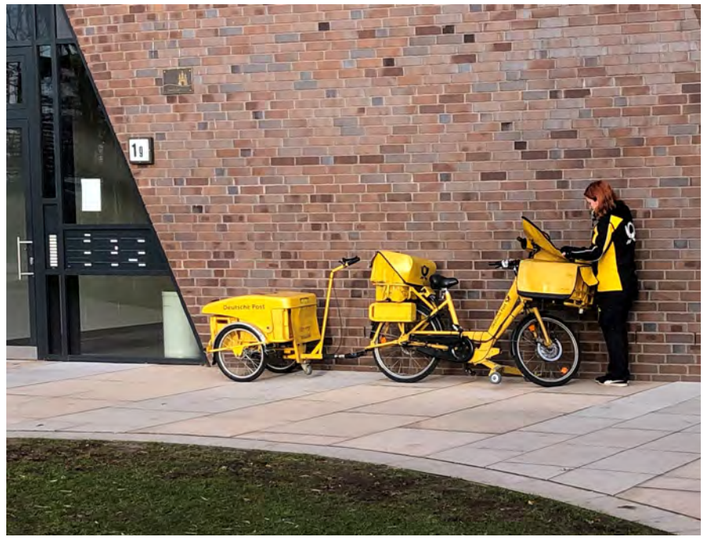


Figure 29 | Modular bikes for the delivery of small packages in Hamburg, Germany. (Oroboro)

Figure 30 | Community parcel distribution centre in Hamburg, Germany. (Oroboro)

Figure 31 | Compact electric parcel-delivery vehicle in Hamburg, Germany. (Oroboro)

entertainment facilities will lead to a significant increase in NDLS service sector jobs.

While the service sector does not provide high-paying jobs, it can provide critical employment access for groups with lower labour force participation rates, facing barriers to employment as a result of language barriers or education levels. If well integrated, the new residential developments can ensure the vitality of commercial and retail services catering to the needs of local residents.

Stakeholders: CSL, TMR, Saint-Laurent, CDN-NDG

Last Mile

Changing consumption patterns alongside growth in the e-commerce sector has brought consumer goods right to the doorstep of urban residents. This has led to a substantial increase in the number of delivery vehicles—box trucks, smaller vans, and cars—on city streets, known as the 'last mile' problem.

It is expected that the new development in the NDLS sector will generate considerable increase in trips attributed to delivery vehicles: based on studies of consumption patterns from other North American cities, the sector could generate demand for 400 to 500 truck loads per day by 2030.

If much of this volume is distributed by smaller delivery vehicles, negative externalities, such as traffic congestion, air pollution, accidents, and noise, will be amplified. It is therefore advised that plans for mobility infrastructure consider movements of trucks and smaller delivery vehicles when planning for the future of NDLS.

In order to test new methods that mitigate delivery-related congestion, the City of Montréal has been testing the potential of cargo bikes for the last mile delivery as of 2019. A pilot was launched called Project Colibri that has turned an abandoned bus depot into a consolidation center, where goods from larger trucks get transferred to electric cargo bikes. The project is expected to reduce the negative externalities from last mile delivery in downtown Montréal.

We propose a similar project be considered for reduced congestion within NDLS. Such an initiative should take into account the following key considerations:

- Shifting a share of medium and large delivery vehicles to off-peak hours
- Improved zoning of all delivery vehicle movement
- Shifting to more sustainable modes of delivery—i.e. electric bikes and electric vehicles
- Interjurisdictional collaboration to allocate distribution hubs

Stakeholders: CSL, TMR, the City of Montreal, CMM, MA, and the boroughs of Saint-Laurent and CDN-NDG.

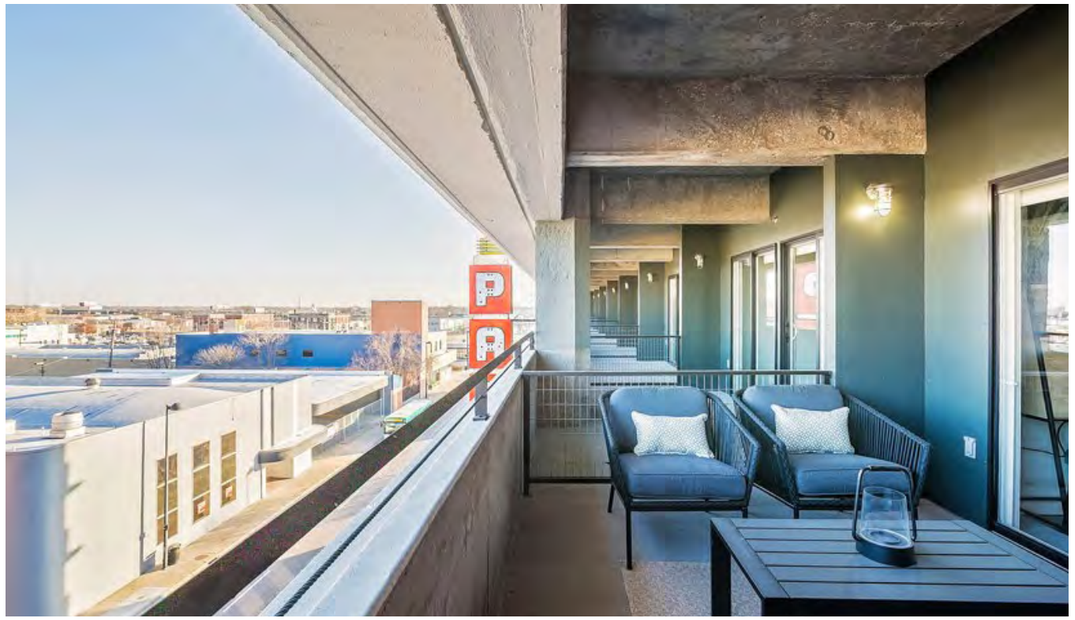


Figure 32 | Broadway Autopark. (Milt Mounts/Essential Images Photography)

Adaptable Infrastructure

Given the current mode share in the sector, the reality is that providing parking may still be a necessity, particularly for office and commercial uses. Where parking is still thought to be a requirement, new parking garages should be designed with the future of the sector in mind. As the need for parking decreases with improved active and public transport in the sector, these valuable spaces can be repurposed for other uses. This can include work and community spaces as well as apartment units for above-ground lots, and urban agriculture, storage, and server farms for underground garages.

The current challenge with repurposing old parking garages is the cost and retrofits typically required to make them livable. They often have low ceilings, sloped floors, and lack the necessary HVAC, wiring, and plumbing. However, successful retrofits have been performed. The Broadway Autopark in Wichita, Kansas was converted into 44 high-end single-bedroom apartments over the course of 2 years and approximately $5 million in retrofits [see Figure 32].

An example of conversion to work and community spaces, one underused parking structure in Brixton was transformed by the organization Make Shift for $6.7 million into studio spaces for artists and small businesses, as well as space for vendors, retailers, and markets.

In anticipation of future changes to parking demand in the sector, new parking garages can be designed with this type of repurposing in mind. Building for future retrofits is likely to be less expensive and more ecologically sustainable than having to retrofit or rebuild later on. Future-proofing the sector by planning for the adaptive reuse of new parking structures can be done by:

- Requiring that new parking structures be designed with more structural reinforcement, level floors, and higher ceilings with either removable ramps or ramps that can be leveled in future.
- Incentivizing developers to make these retrofits through ‘future use’ tax credits that can be funded through local parking revenue
- Ensuring that future parking structures be built to accommodate adaptive reuse through the use of design guidelines or form-based codes

Stakeholders: CSL, TMR, Saint-Laurent, CDN-NDG, Private Developers

Parking Requirements

There is currently an abundance of surface parking lots and free on-street parking in the NDLS sector. With many new large-scale developments proposed, the amount of additional parking required under existing by-laws may lead to an even greater surplus in parking supply. An overabundance of parking in the area is contradictory

Figure 33 | Peckham Levels studio space configuration. (Make Shift)

to a vision of a connected, livable, and future-proof environment as it encourages driving, acts as a barrier for cyclists and pedestrians, occupies valuable land, and contributes to the urban heat island effect. To control parking supply and manage demand in the sector, Oroboro recommends the following changes to parking by-laws and management:

- Reducing parking maximums and minimums for new apartment and condominium complexes near mass transit.
- 'Unbundling' the cost of parking from rent and purchase prices, making housing more attractive and affordable for those who do not want or need a parking space.
- Requiring developers to reserve a certain percentage of spaces for carshare services to discourage vehicle ownership and parking demand at the building level.
- Implementing time limits and paid on-street parking in commercial areas to encourage turnover and generate revenue towards investments in sustainable transport and public space within the sector.

In one recent example, the City of San Diego voted to require that developers 'unbundle' the cost of parking from new units and eliminate parking minimums for TODs, instead imposing a new parking maximum of one space per unit. These types of changes must be implemented in conjunction with improvements to public and active

transportation in the area to reduce the need to drive and own a vehicle. Potential parking policies should be evaluated alongside a thorough parking study to ensure that adjustments are feasible and would lead to minimal disruptions in resident quality of life.

Stakeholders: CSL, TMR, Saint-Laurent, CDN-NDG

Form-Based codes

As previously established, fragmented neighbourhoods and auto dominance are some of the key challenges that characterize the NDLS sector. Considering the extensive development planned for this sector, it is imperative to adapt the urban fabric in order to ensure long-term livability within the sector. This involves not only walking, biking and vehicular accessibility, but also improving how people can relate to and enjoy the neighbourhood in which they live.

To achieve this vision, Oroboro recommends the adoption of Form-Based Codes (FBCs) to regulate the new developments. FBC is a "land development regulation that fosters predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code". There are increasingly common across Canada, with examples across a range of city sizes and locations. One such example is Calgary's East Village, a former warehouse district that is now home to a range of live-work-play amenities [see Figure 34].

The adoption of these codes would not be applied exclusively to the NDLS sector but be applicable to the other areas within each relevant borough/municipality. FBCs have been adopted in various cities in the United States and have filtered their way into Canadian system, already adopted in Ontario, and the city of Candiac, Quebec.

The adoption of FBCs in the sector and across all the municipalities/boroughs could help achieve the following:

- Mixing compatible uses, including retail shops, residential spaces, restaurants, live-work spaces, and other low-impact services.
- Increasing outdoor spaces and enlarging pedestrian walkways.
- Ensuring proportionate scales between building frontages and public spaces to support human-scale development.
- Legally bind developers to adhere to design regulations.

Regarding the implementation of Form-Based Codes, the following should be considered:

- The adoption of FBCs should be taken up by the Bureau d'audiences publiques sur l'environnement (BAPE) to create regulations that all boroughs and municipalities must adhere to, preventing jurisdictional conflicts.
- Municipalities should design their own regulations in order to respond to contextual issues, but these should still be derived from the broader design framework.

Stakeholders: BAPE, CSL, TMR, Saint-Laurent, CDN-NDG, Private Developers

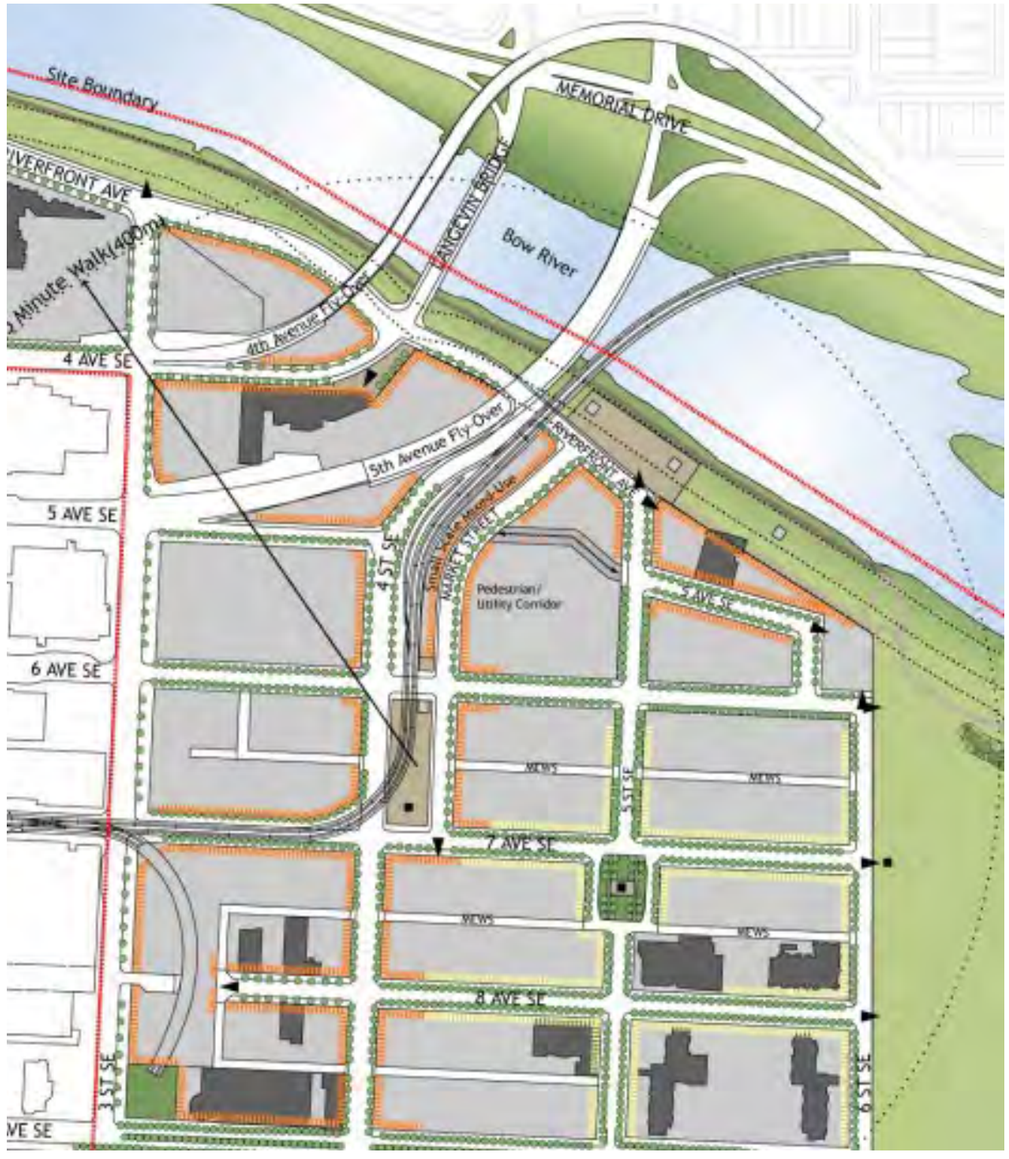
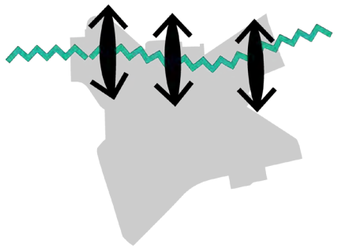


Figure 34 | Calgary's East Village project is an example of a form-based code that has been used to promote a mix of residential, commercial and cultural uses while enhnacing the pedestrian experience. (Placemakers)



“THE NORTHERN BARRIER”

A major obstacle to north-south movement, the only links beneath the A-40 are uninviting to foot traffic [see Figure 38]. Creating safer and more enjoyable spaces beneath the autoroute could serve as relatively inexpensive yet effective intervention to knit together neighbourhoods separated by the A-40, as well as reclaiming underutilized space for public recreation.

Oroboro proposes creating a more inviting underpass at the the CN railway line crossing, where Authier Street and Devonshire Road intersect with Côte-de-Liesse [see Figure 37]. This can be achieved through relatively simple interventions [see Figure 39], including:

- Clearer signage
- Widened sidewalks and bike paths
- Attractive lighting
- Street furniture and public art
- Physical and visual separation from cars

Seasonality should be a key consideration in all plans for the active green network. Adaptable design and programming is required to make these spaces inviting and attractive to a variety of users during all seasons [see Figure 41].

Cities across North America are similarly fragmented by heavy infrastructure built in the 1960s and 70s, so many municipalities are seeing a wave of interest in turning transit underpasses into public parks.

In one recent example, Toronto’s new underpass skaterink marks the first phase of the Bentway, planned to eventually encompass over a kilometer of bike and pedestrian trails and public art installations [see Figure 36]. The park has reconnected the surrounding neighbourhoods by offering various activities year-round to ensure the livability of this new space. The portion that opened last year offers skate rentals, live music, and pop-up curling.

Stakeholders: Saint-Laurent, TMR, MTQ, Private Developers and/ or local Non-Profits

As the A-40 is managed by the Ministère des Transports Québec (MTQ), an interjurisdictional service agreement will need to be reached to redesign and manage the underpasses. The neighbouring municipalities, or perhaps a community organisation representing local populations will need to apply to be able to redesign the space on behalf of nearby residents. The MTQ has an application process in place to integrate works of art on transportation infrastructure.

Public-private partnerships could be leveraged to cover costs and manage the new public spaces.

Precedents of successfully repurposed underpasses often involve funding or management by private developers who were adding residential units in areas of the city with little existing park space. In many examples, cities delegated programming responsibilities for underpass parts to developers or non-profit organisations.

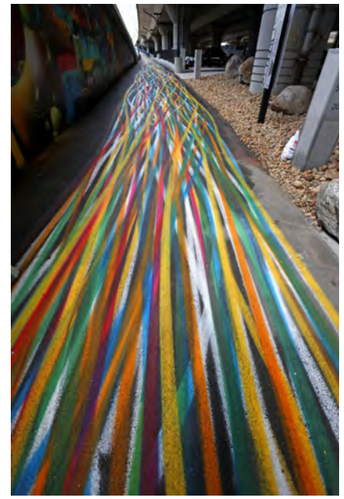


Figure 35 | Underpass park in Boston (Boston Globe)

Figure 36 | Skating rink beneath the Gardiner Expressway in Toronto (BlogTO)

Figure 37 | Key intervention: A40 underpass (Oroboro)

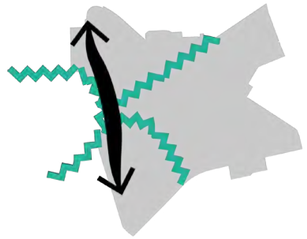
Figure 38 | A40 Underpass (Google Street View)

Figure 40 | Houston Underpass (Curbed)

Figure 42 | Underpass beergarden.

Figure 39 | Visualization of opportunities to inhabit and bring life to underpasses in summer (Oroboro)

Figure 41 | Visualization of opportunities to inhabit and bring life to underpasses in winter (Oroboro)



“THE FRAGEMENTED NEIGHBORHOOD”

Another major barrier that residents of the sector face is created by the railway lines, concentrated in the western part of the area. The railways cut across some of the existing neighbourhoods, limiting the possibility of opening up the sector for future developments.

The creation of links on the following corridors should be prioritized:

- Cavendish Boulevard [see Figure 43].
- Clanranald Avenue [see Figure 44].

Connecting the above axes will help reduce the mobility challenges and build towards a connected sector.

Cavendish Boulevard is currently separated by both the CP and CN train tracks, so rail underpasses or overpasses will be required. Under the terms of the agreement between the province and the City of Montreal for the Hippodrome, the Cavendish extension project must be listed in the City’s capital works budget.

While funding has been allocated to study the project, discussions are underway to acquire the necessary land from CN and CP.

The design of the extension should consider the opportunities that Cavendish extension offers for future-proofing the sector. The link presents a significant opportunity to improve mobility within the isolated western reaches of NDLS.

At the same time, the extension could easily perpetuate car-dominated transportation. To capture the full range of benefits associated with the proposed extension while avoiding some of the risks, active and public transport means should be given highest priority [see Figure 47]. For example, while the project connects with the existing road network on Royalmount and Jean Talon, the space dedicated to cars could be kept as one lane per direction.

While Cavendish extension is unlikely to resolve the congestion problems on Côte-de-Liesse, Autoroute Metropolitaine or Décarie, it does carry the potential to offer dramatically improved active and public transportation for existing and future developments.

Figure 43 | Key intervention: extension of Cavendish Boulevard (Oroboro)

While additional studies will need to analyse options for the most suitable configuration of the project, our preliminary plan shows a possible illustration of Cavendish project [see Figure 48]. Considerations include:

- Prioritization of pedestrians and cyclists
- Dedicated public transport space
- Reduced vehicular movement space
- Increased canopy density
- Alignment with active green network

Figure 44 | Key intervention: underpass connecting Clanranald Avenue (Oroboro)

Another project that would help to address the fragmented western portion of NDLS is the extension of Clanranald Avenue, which is currently divided by the CP train tracks. To the east of the sector, a railway underpass is provided at Victoria Avenue. However, those living on the western portion of NDLS must use Decarie to get to the other side of the tracks, which can represent a long detour. Oroboro recommends the creation of an underpass to connect Clanranald Avenue as an active transportation corridor, linking the future developments of the Hippodrome and Décarie Square with the rest of the area.

Offering a safe and pleasant underpass for movement of pedestrians and cyclists will be essential to promoting active transportation while maintaining vehicular circulation through the area. While underpasses tend to have a bad reputation for attracting unwanted activities, simple but careful design decisions can mitigate many potential issues, such as providing adequate lighting.

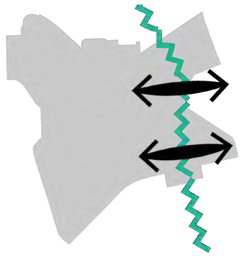
Stakeholders: CSL, Borough of Saint-Laurent, City of Montreal, CMM, MA, CP, CN, and MTQ

Figure 45 | Ammarud Viaduct in the Netherlands before renovation.

Figure 46 | Ammarud Viaduct active underpass after renovation. (Reprogramming the City)

Figure 47 | Current Cavendish cul-de-sac in Côte Saint-Luc (Google Street View)

Figure 48 |Visualization of the extension of Cavendish Boulevard (Oroboro)



“THE EASTERN BARRIER”

Other key challenges within NDLS include the existence of dangerous nodes susceptible to accidents as well as impermeable, large blocks. Although this problem is common along the major routes within the sector, the Decarie Expressway (Autoroute-15) is the site of some of the highest rates of pedestrian and cyclist accidents.

To ensure traffic safety, increase green cover, and encourage active transportation and livability, Oroboro recommends three strategies to be undertaken on and near the A-15:

- Decking over the A-15: constructing a “roof” over a portion of the below-grade section of the expressway, creating a new usable space on top. We propose this stretches from Des Jockey street to Jean-Talon Ouest, creating a direct connection between Namur metro station to the future residential developments in the Hippodrome. To ensure that the project is worth the high costs, we recommend that the surface be converted into a park. The presence of a park over the Autoroute would increase pedestrian safety, increase overall green cover, help address the public space deficit, while providing a barrier from noise and pollutants generated by vehicles [see Figure 53].

- Constructing an elevated pathway towards Royalmount. This is an intervention that has already proposed by Carbonleo that would help provide a safe and pedestrian-friendly environment for nearby residents and visitors accessing the De la Savane metro.

- Implementing a green network along the Hippodrome and its surroundings. This would connect to the A-15 overpass park, increase overall green cover and encourage active usage of public spaces and transport.

One effective example of a city utilizing existing infrastructure in a car-dominated landscape to improve livability and connectivity is Klyde Warren Park in Dallas, Texas. Providing five acres of public space above a highway, Klyde Warren is now considered a destination in itself [see Figure 50].

Stakeholders: CSL, TMR, Hampstead, borough of CDN-NDG, City of Montreal, MTQ, Private Developers

In order to ensure successful implementation, the cost of development of the elevated pathways could be shared by the City of Montreal, the affected jurisdictions, the MTQ, and developers of adjacent real estate projects. As with the proposed A-40 underpass interventions (Focus Area #1), the management of the overpass park and green networks around the Hippodrome could be undertaken by a designated committee or non-profit organisation.

Figure 49 | The site of Klyde Warren Park before it was transformed (Landscape Performance)

Figure 50 | Klyde Warren Park in Dallas, Texas, today (Klydewarren.org/)

Figure 53 | Key intervention: decking over Décarie

Figure 52 | The current intersection of Decarie and Jean-Talon (Google Street View)

Figure 51 | Visualization of a deck over Decarie at Jean-Talon (Oroboro)

PUTTING IT ALL IN MOTION

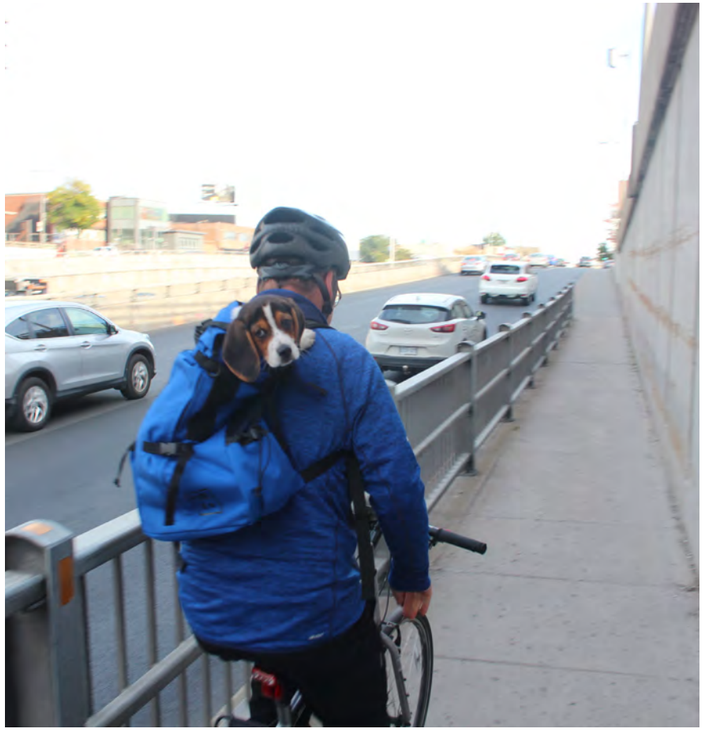
All the proposals above will require close collaboration and coordination among various jurisdiction and stakeholders. The Namur – De la Savane working group seems to have provided an appropriate forum for this purpose, and we welcome the extension of the working group mandate to track the implementation of their recommendations.

New Frameworks

Nevertheless, the current legal and jurisdictional framework does not provide the necessary tools to address unique scenarios like the NDLS sector, where multiple municipalities must work closely. We believe it is necessary for the province to intervene in order to enable tools and legislation for regional decision-making. However, every model will have limitations, the most important of which is the fact that local autonomy will have to be constrained. The demerger process of 2006 has shown that this is an important matter to consider when devising new decision-making mechanisms. We have identified a few ways in which a new jurisdictional framework could be adapted:

- Impose strategic environmental assessment with review of large projects by the BAPE
- Require MA approval for larger projects proposed in close proximity to municipal. boundaries. This could take either the form of a conditional approval (constraint on development) or as a single approval (regional approval).
- Impose a provincial approval requirement for larger projects proposed adjacent to provincial highways.

Oroboro believes the history of development in NDLS illustrates the need for clear guidelines for new projects, including parks, social infrastructure, community amenities, and funding for public transportation infrastructures. It is important for all municipalities to create similar guidelines which would enhance the overall public realm conditions in the sector and prevent developers from placing jurisdictions in antagonistic relationships. These public realm upgrades should be funded upfront in order to avoid delays and prevent developers or other funders from later reneging on promises to fund new infrastructure.



Preliminary Feasibility Assesssment

Based on our analysis and review of background materials, we have prepared the following chart outlining the phasing and feasibility of the proposed initiatives. These should be further refined as stakeholders refine and implement this vision.

INTERVENTIONS	PHASING			IMPACT			COSTS			BARRIER		
	SHORT	MEDIUM	LONG	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	ZONING	PROPERTY	JURISDICTION
Green network			✓			✓		✓		✓	✓	
Underpass	✓			✓			✓					✓
Decking over		✓			✓				✓		✓	✓
Public transit connectivity			✓			✓			✓	✓	✓	✓
Social infrastructure + public spaces	✓					✓			✓		✓	✓
Form based code		✓			✓		✓			✓		✓
Adaptable infrastructure	✓			✓				✓		✓	✓	
Parking policy	✓				✓		✓			✓		✓
Future work and retail strategy		✓			✓		✓				✓	✓
Last mile		✓		✓				✓		✓		✓

Conclusion

The Oroboro team believes that the vision, plans and interventions suggested in this report are key to enhancing the strategic role played by the NDLS sector for the greater Montreal region. By working collaboratively towards a unifying vision, the different jurisdictions and stakeholders will secure long-term prosperity through sustainable means. The opportunities offered by the sector can only be fully grasped through joint effort, communication, and teamwork between all the concerned parties.

The plan outlined in this report offers solutions to fight current problems caused by planning practices of the past: traffic congestion, environmental pressures and an increasingly outdated industrial sector. It is time to break with an era where cities were based around automobile dependency, turning instead toward a planning vision that prioritizes active and public transit, along with new forms of economic activities.

The proposed vision must be conceived as a stepping-stone to guide future decision-making. None of the actors, municipalities or stakeholders in NDLS can single-handedly achieve the proposed interventions. It is therefore imperative that all actors share a collective vision that will guide the future of the NDLS sector. Once a unified vision is achieved, further detailed studies can be performed that will allow for a connected, livable for all and future-proof sector at the heart of the island.

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