IMPROVING THE LAND TRANSPORT INFRASTRUCTURES IN THE VICINITY OF MONTRÉAL-TRUDEAU AIRPORT

Environmental Impact Assessment presented to the Minister of the Environment

EXECUTIVE SUMMARY

August 31, 2004

DAA project: 34114H

MTQ file no.: 6-02-01/ 9674
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Daniel Arbour & Associés en collaboration avec CIMA / SNC·LAVALIN
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INTRODUCTION

The project for improving the land transport infrastructures in the vicinity of Pierre Elliot Trudeau International Airport (Montréal-Trudeau) consists in redesigning the Dorval interchange and creating a rail line right-of-way to provide rail shuttle service between the airport and downtown Montréal. This project, which is receiving financial support from the federal government, has been developed by the Ministère des Transports du Québec (MTQ) in collaboration with Aéroports de Montréal (ADM) and the City of Montreal, with the support of the Sociéte de transport de Montréal (STM), VIA rail and the Agence métropolitaine de transport (ATM). The project is being submitted to the Ministère de l'Environnement du Québec for the purpose of obtaining a certificate of authorization.

This document, which was drawn up in accordance with provincial and federal procedures governing environmental assessments following the submission in 1998 of a project notification form to the Ministère de l'Environnement (MENV), provides a summary of the environmental impact assessment that was conducted between March and August 2004.

This summary accordingly presents a description of the project and the territory of its implementation, along with an evaluation of the project's impacts. It also describes the measures proposed by the sponsor for attenuating negative impacts as well as the emergency measures and environmental follow-up proposed by the MTQ for application upon completion of the project.

A major opportunity study conducted before the impact assessment pointed to the urgent need for action in this matter. It identified the land transport needs in the vicinity of Montréal-Trudeau and the most effective solution for achieving the operational objectives being of the sponsor. The opportunity study also incorporated the results of a major perception survey carried out by the Centre de consultation et de concertation (CCC) to identify the needs and the solutions that would best meet the expectations of users of the land transport systems near Montréal-Trudeau, as well as those of residents and organizations in the area. The results of this technical analysis have led to the development of an optimally integrated and socially acceptable solution.

1. THE PROJECT: CONTEXT, ISSUES AND RATIONALE

Since the mid-nineteenth century, the area surrounding the present-day Dorval interchange has undergone numerous changes to meet the continually evolving needs in road and rail transport. Today, it is being required once again to adapt in keeping with its major functions, in particular its roles as the route required for getting passengers and freight to Montréal-Trudeau and as the only link between the northern and southern parts of Dorval. It also serves to connect highways 20 and 520 of the Montreal highway system.

The work under the project, as announced at the Québec Socio-Economic Summit of 1996 and identified as a priority at the Montreal Summit of 2002, is eligible for assistance under the Canada-Québec Infrastructure Works Program. Through this program, the federal government and the provincial government (represented by the Ministère des Transports du Québec- MTQ) are each contributing a third of the project's costs, with the remaining third to be assumed by the City of Montreal and Aéroports de Montréal (ADM), according to an agreement between these two organizations.

The impact assessment study was conducted by the MTQ, with assistance from the urban consulting firm Daniel Arbour et Associés S.E.N.C. and the engineering firm CIMA +.

Local Concerns

The Centre de consultation et de concertation (CCC) conducted a survey[1] of users, residents and interest groups to learn about their needs and solutions regarding the improvement of the land transport infrastructures near the Montréal-Dorval International Airport. This was a participatory approach which allowed persons and groups affected by the project (residents, users, and local and regional organizations) to give their views on the existing problems, to indicate the relative importance they placed on each problem, to define their needs and to identify solutions.

The results of this survey facilitated the definition and understanding of the issues and helped guide the work in finding solutions.

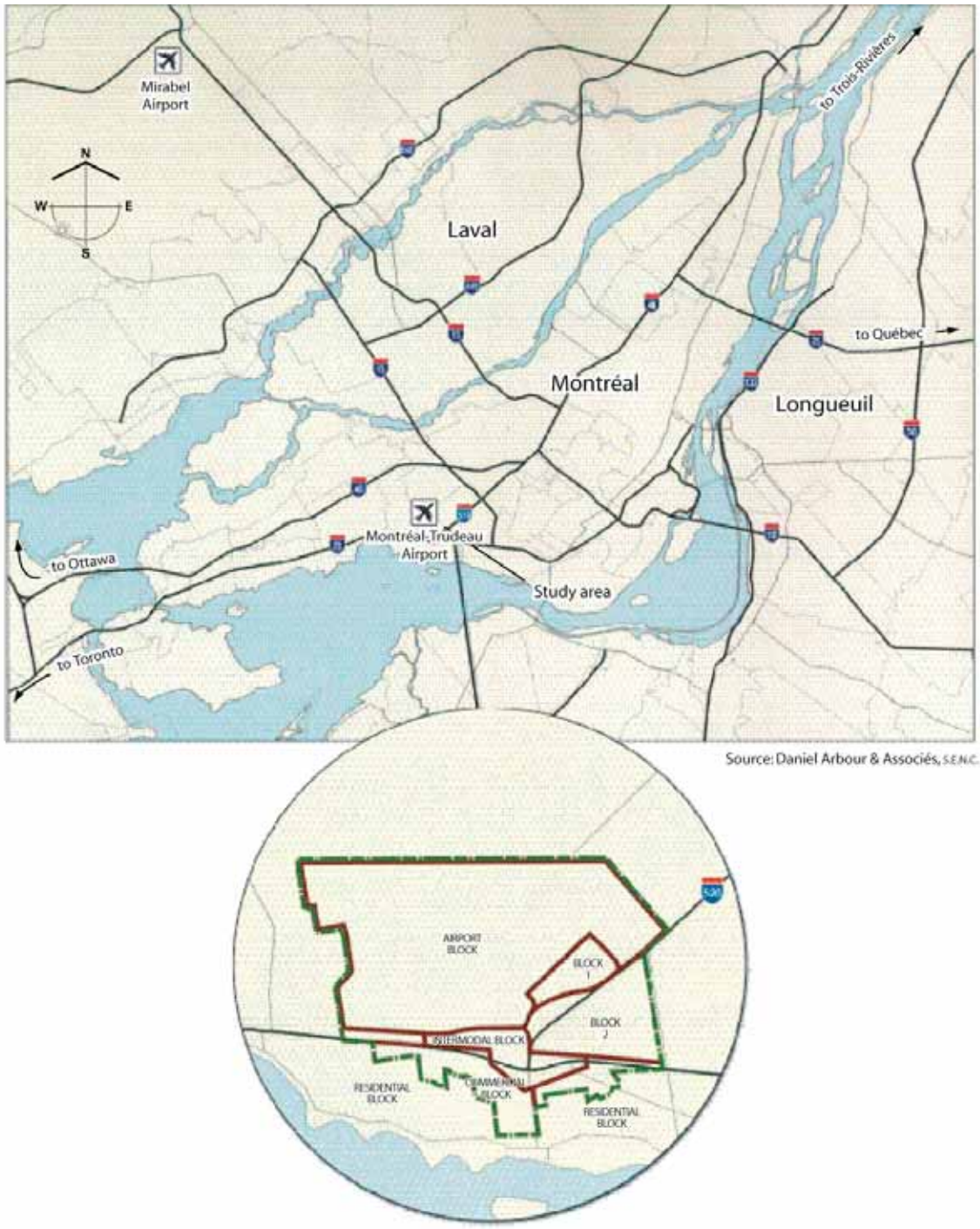
[1] Centre de consultation et de concertation (CCC), "Amélioration des infrastructures de transport terrestre près de l'Aéroport International de Montréal-Dorval: Étude sur les perceptions des besoins et des solutions – Rapport final," October 2003, 88 pages.

1.1 TRANSPORT PROBLEMS IN THE PROJECT AREA

The area for the project under study is located in the western part of the Island of Montreal, 20 km from downtown Montreal. More specifically, it is located in the heart of the district of Dorval/l'Île-Dorval, at the interchange linking highways 20 and 520, which is a strategic local and regional interchange point for the west of the island. The area under study covers approximately 1,860,000 m^2 in the southern part of the district, with its perimeter ensuring a corridor of about 300 m on either side of the planned axes of development. The study area thus encompasses the Dorval interchange, and it is bounded on the north by a section of airport land, on the east by Avenue Orly, on the south by Avenue Carson and on the west by Boulevard Stuart Graham.

Figure 1.1 presents the location of the study area in relation to the highway system in Montreal.

Figure 1.1 Location of the Study Zone



Source: Daniel Arbour & Associés, S.E.N.C.

The Dorval interchange is made up of the Côte-de-Liesse interchange (north of the rail lines) and the Dorval roundabout (south of the rail lines). It has a complicated geometry due to the concentration of several types of road movement within a limited area and suffers from a severe lack of capacity. This situation means that several of today's geometric standards are not being respected, notably with regard to:

- width of lanes;
- vertical clearance beneath viaducts;
- the presence of interconnecting roads and successive merging points over too short a distance;
- too many road signs over too short a distance led to confusion; safety is thus compromised and the need for drivers to slow down disturbs the flow of traffic throughout the interchange.

The Dorval interchange is the site of many traffic flow problems during and outside of rush hours, particularly in the movement of vehicles to and from Montréal-Trudeau. These chronic traffic jams affect traffic flow on the highway system and are causing vehicle backups, which in the near future will extend to the airport property itself. This situation is harming the reliability of the road/air link and is creating traffic overflows into the local road system in the district of Dorval/L'Île-Dorval.

Emergency vehicles that have to travel between the northern and southern parts of the district can also be caught in this traffic congestion, meaning an increase in their emergency response time and a reduction in their effectiveness.

The smooth functioning of economic activities in this area is also compromised, along with the development of activities with strong economic potential.

Lastly, with the presence of important public transit infrastructures (urban and inter-city) at the very centre of the interchange, any congestion in the road system leads to a significant loss of efficiency in public transit.

The need for intervention thus stems from major problems related to the effectiveness and safety of the land transport infrastructures near Montréal-Trudeau. This need is all the more urgent given the important growth that the airport, a major driving force in Montréal's economy, is undergoing.

In addition to these specific transport problems, other activities of an urban or economic nature confirm the need for better transport service in the area. The most important of these activities are in Dorval's airport, cargo and industrial zones, and in the commercial sector (the hotel industry in particular).

1.2 PROPOSED CONCEPT

Any solution for improving the land transport infrastructures near Montréal-Trudeau must address the lack of capacity of the Dorval roundabout to meet user demand and, at the same time, the configuration of the Côte-de-Liesse interchange, which also does not meet user demand. Both situations need to be addressed together. Priority operational objectives were established to respond to this dual problem, while taking into account the interests and concerns of the population and the groups consulted through the CCC study. These objectives are as follows:

- reduce the lines of vehicles waiting at the airport exit;
- simplify user routes;
- improve safety conditions;
- keep through traffic on the main highways;
- create conditions more favourable to public transport operations.

The proposed concept (Figure 1.2) therefore consists of a solution combining a reconfiguration of the road system (highways and local roads) and creating a rail line right-of-way to provide rail shuttle service between the airport and downtown Montreal. This concept also includes creating conditions for improving public transport. It addresses the majority of the problems that were raised and meets the expectations of partners and the district (residents, businesses, etc.).

Highway Project

Due to the extent of the problems raised, only a complete reconfiguration of the Dorval interchange and the creation of direct highway links will ensure adequate access to the airport, improved traffic flow and safety for the highway network, and a better linkage between the northern and southern parts of the district. The proposed concept calls for the creation of direct, two-directional highway links between:

- the airport and Highway 20 East (towards downtown);
- the airport and Highway 20 West;
- the airport and Highway 520 East;
- Highway 20 West and Highway 520 West.

All of these links would greatly relieve the pressure now being felt by the Dorval roundabout, by taking away a large part of its traffic flow. It would thus regain its local purpose, through its redevelopment into two ordinary intersections on either side of Highway 20 that would facilitate north/south links and improve the overall quality of life in the district.

Rail Project

The creation of a rail link between the airport and downtown Montreal requires a route next to the planned highway route. The project thus proposes implementing a right-of-way for this rail link, along with a retaining wall between the rail line and the parallel highway route. It will also be necessary to build bridges allowing road vehicles to cross the rail line. (The project does not include rail infrastructure such as ballast, tracks and railway signals).

Public Transport

The creation of a rail link between the airport and downtown Montreal, combined with the increased capacity of the Dorval roundabout and improved configuration of the interchange, would greatly improve the conditions in which the public transport authorities must operate. Increasing access to public transport terminals and their park-and-ride lots will also support the efforts being made to increase the use of public transport.

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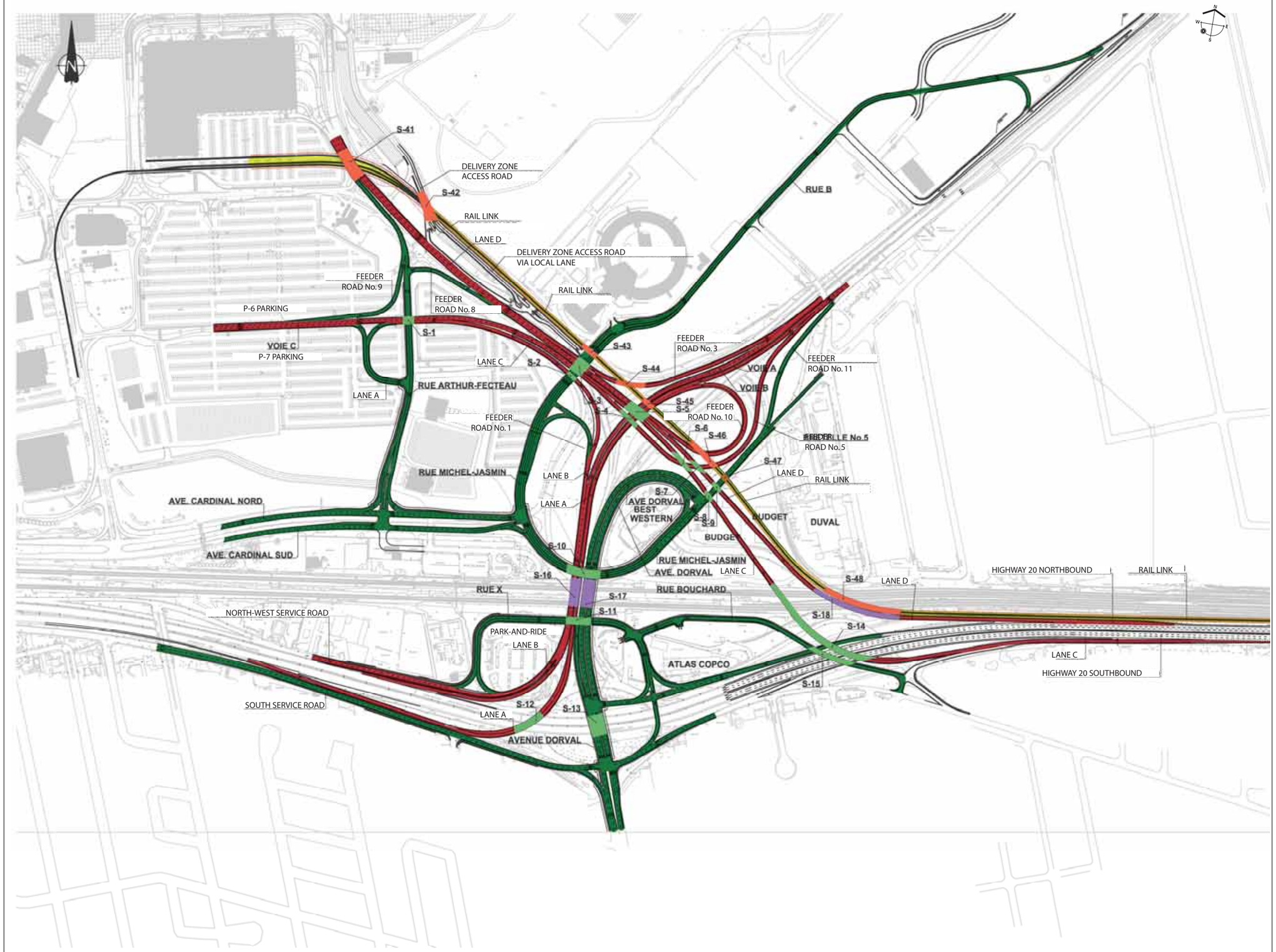
FIGURE 1.2

PROPOSED CONCEPT (2B)



- Highway viaduct
- Railway bridge
- Railway link
- Highway routes (exits for Dorval)
- Local roads
- Rail lines

Not to scale

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2. DESCRIPTION OF THE AREA'S COMPONENTS

2.1 DELIMITATION OF THE STUDY AREA

The study area is fully urban. It constitutes a corridor of approximately 300 m on either side of the planned axes. This area, illustrated in Figure 2.1, encompasses:

- the commercial and industrial sectors within the triangle bounded by highways 20 and 520 and by Rue Orly;
- part of the airport territory, including the terminal, cargo buildings and parking areas, excluding the part of the airport served by Côte-Vertu;
- part of the urban sector located south of Highway 20 (up to Avenue Carson).

The study area was expanded for certain aspects of the assessment to take full account of all analyzed characteristics. Thus, some of the evaluations are based on a regional framework incorporating, for example, the Island of Montreal or the land to the west of it.

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FIGURE 2.1

DELMITATION OF THE STUDY AREA

Study perimeter

Limits of the airport territory inside the study perimeter

Approx. scale
1 : 10 000

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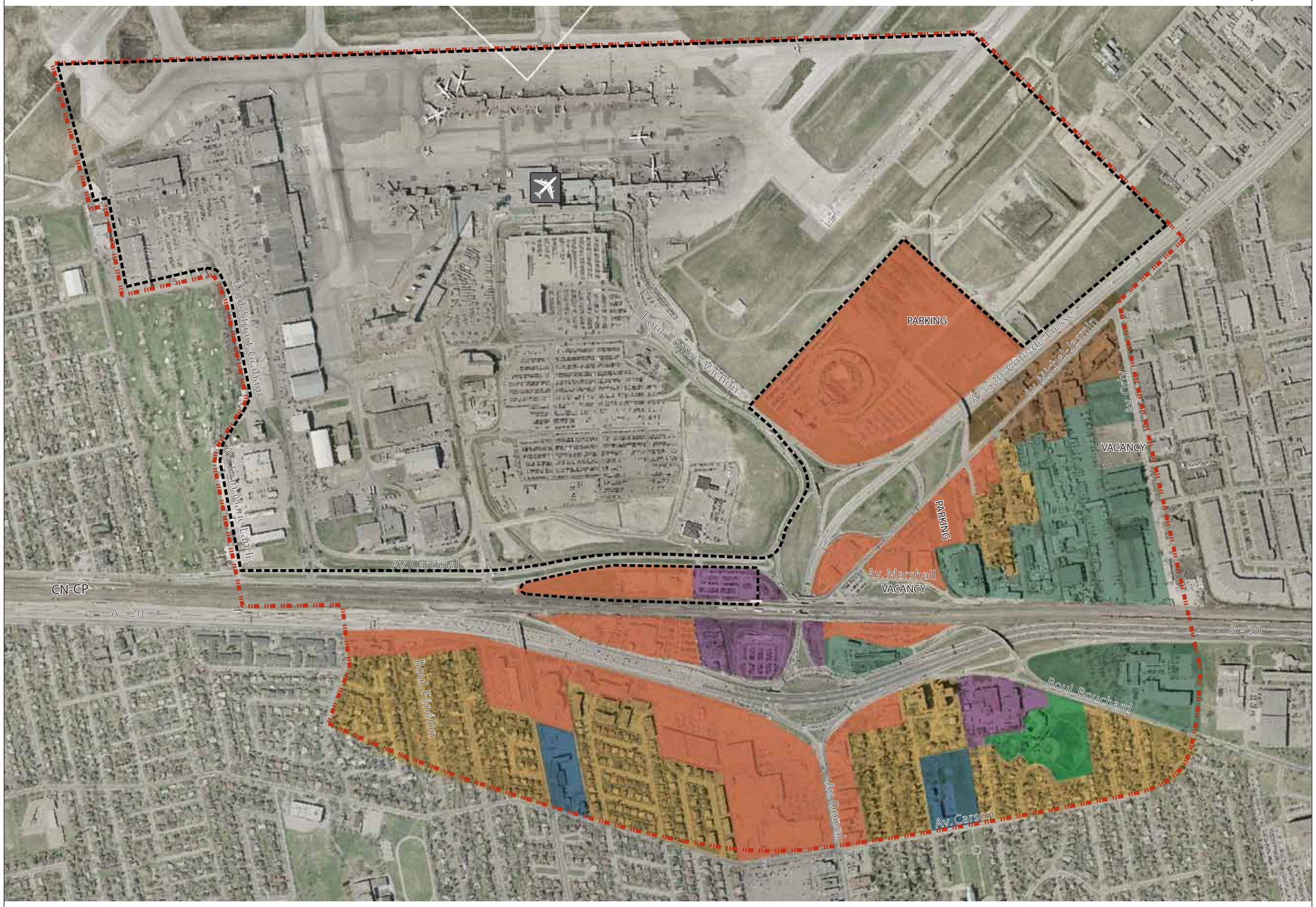
2.2 LAND USE DEVELOPMENT

2.2.1 Land Use and Distribution of Activities in the Area

Land use (Figure 2.2) in the area of the Dorval interchange is dominated by industrial and commercial activities, although there are also some residences on Rue Marshall and Rue O'Connel in the eastern part of the study area. The commercial typology in the sector is strongly influenced by the presence of the airport, as seen in the large number of hotels and car rental services. Some enterprises in the area have chosen their current locations and spatial arrangements because of their access to the major road nexus.

Another important characteristic of the area is the convergence of several forms of transportation, i.e., road (local and regional – cars, trucks and buses) and rail (suburban and long distance). Also, there are important infrastructures (Hydro-Québec transmission lines, fibre optic cable lines) that crisscross the sector and restrict certain movements.

More specifically, the organization of space is characterized by highly different land uses in the northern and southern parts of the study zone delimited by the Canadian National and Canadian Pacific rail lines. There is a high concentration of airport and industrial activities north of the rail lines, while a commercial hub and a large residential area are located to the south.



Projet :34114 Fichier : 2-2_ang_utilisation du sol.ai

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FIGURE 2.2

LAND USE

- Study perimeter
- Limits of the airport territory inside the study perimeter
- Residential
- Commercial
- Industrial
- Mixed (industrial/commercial)
- Public
- Institutional/administrative
- Public park

Approx. scale
1 : 10 000

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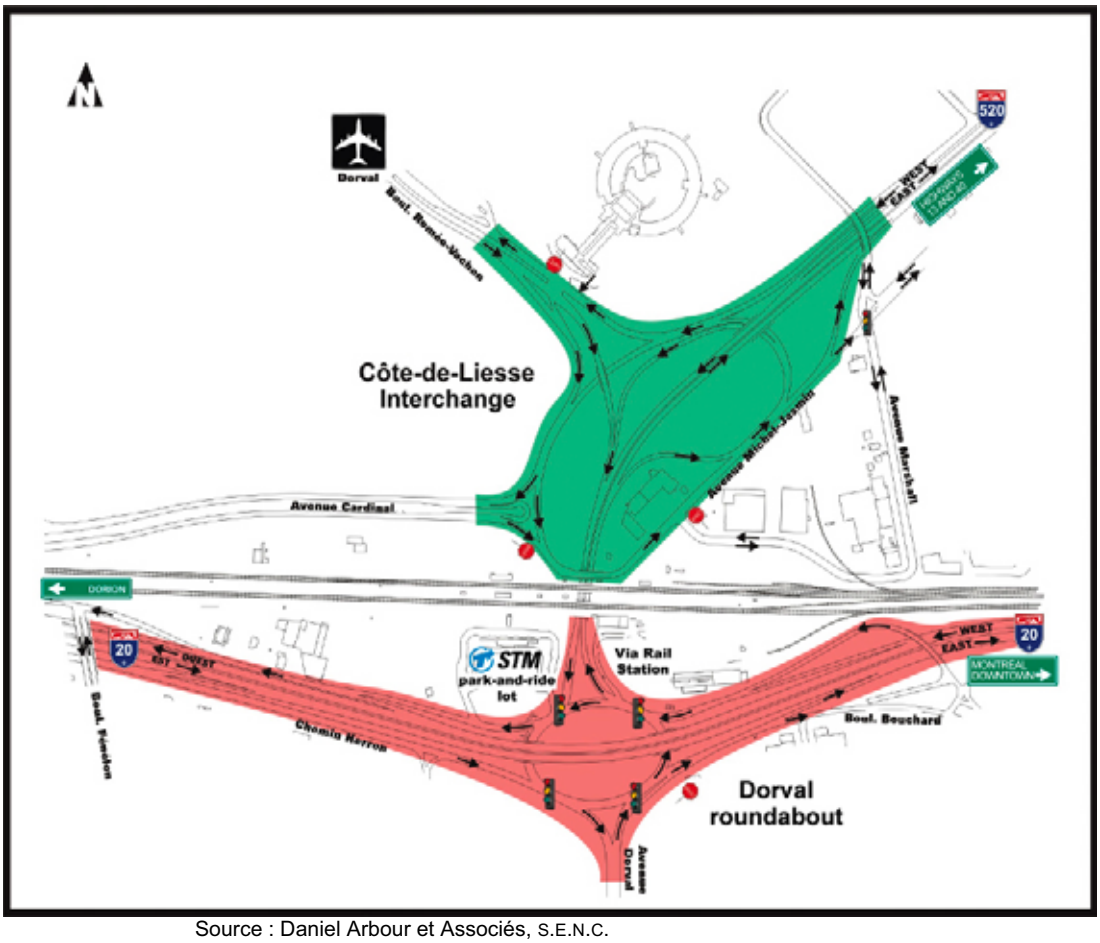
2.2.2 The Road Network

The Dorval interchange, located at the junction of highways 20 and 520, is a major road nexus for the Island of Montreal. Drivers must use it to get to Montréal-Trudeau. Every day, it serves a large number of residents in the district of Dorval/Île-Dorval, as well as vehicles coming from the West Island. It thus plays an important role at both the regional and the local level.

The Dorval interchange is strategically located. It links the areas north and south of the rail lines that run along Highway 20. This area is divided by two major road systems, namely the Côte-de-Liesse interchange to the north of the rail lines and the Dorval roundabout to the south of the rail lines (see Figure 2.3).

North of the rail lines, these main arteries are also connected with Highway 520 and its numerous feeder roads.

Figure 2.3 Dorval Interchange



Source : Daniel Arbour et Associés, S.E.N.C.

2.2.3 The Public Transport Network

The Dorval interchange is the hub for public transit in the west of Montreal. Once the terminal point for the island, today it is a major transfer point from which public transit users can go in all directions. It includes:

- The suburban train station: Located in the north-west quadrant of the Dorval roundabout at the intersection of highways 20 and 520, it is one of the stops of the train linking Rigaud to Central Station in downtown Montreal.

- The STM bus terminal: This terminal is located in the north-west quadrant of the Dorval roundabout, south of the suburban train station. It is one of the three major stops, along with Roxboro Station and Fairview Mall, in the STM's system for the West Island of Montreal.

- Via Rail Canada train station: This station, located in the north-west quadrant of the Dorval roundabout, offers interurban service to passengers in the district of Dorval. It forms part of the important Québec City/Windsor corridor.

Montréal-Trudeau is served by public transport, bus shuttles and taxi service. The route used most often to get from downtown Montreal to the airport necessarily includes the Côte-de-Liesse interchange and the Dorval roundabout.

2.2.4 Emergency Services

Dorval's main fire station is located inside the study area, on Boulevard Bouchard, just south of Highway 20 and the Bouchard viaduct. The station responds to approximately 1,000 calls a year and for nearly 85% of these responses, fire trucks use the Bouchard viaduct and the Dorval roundabout.

The frequent congestion at the Dorval roundabout and its approaches can increase response times by about three minutes. The level of congestion at the time the fire engines leave the station is the factor that the officer-in-charge takes into considerationwhen making a decision to use a detour when an emergency response is required in the north-east area of Dorval. That detour, 55th Avenue, is also frequently congested.

2.2.5 Pedestrian and Bicycle Networks

The pedestrian system works in conjunction with the public transport system. Passengers must use it each time they get on or off the public transport system. The pedestrian system must therefore provide access to the public transport system and at the same time allow passengers to walk safely alongside the local road network.

The pedestrian system south of the rail lines is very well structured, and its quality and safety have been improved thanks to the construction of the public transport station in the north-west quadrant of the Dorval roundabout.

Pedestrian infrastructures north of the rail lines are not as developed as those to the south. Some of them have not been well maintained and are in poor condition today.

Furthermore, there are very few pedestrian infrastructures that serve destinations north of the Côte-de-Liesse interchange. A visit to the site confirmed a need for improvements in this regard, as seen in the unofficial paths created by the repeated use of pedestrians, to get them from Highway 520 to Avenue Cardinal, and from the Best Western Hotel to the stairs north of the rail lines.

There is no bicycle path linking Montréal-Trudeau with either of the two stations in Dorval. Cyclists who want to get through the Dorval roundabout must use the pedestrian infrastructures that serve the AMT terminus and the Dorval station, and they must walk their bicycles up the stairs. Vélo Québec considers the Dorval interchange as an obstacle making it practically unusable for cyclists.

2.2.6 Public Service, Communications and Energy Networks

The study area enjoys a full range of public services, including sewer and waterworks systems, which are found throughout the area. There are no particular problems related to the operations of these services.

There are also several communications systems near the Dorval interchange, because of the presence of the airport and of rail line rights-of-way linking Montreal and Toronto, which constitute important axes for communications and the transport of energy.

A Hydro-Québec transformer station is located between the rail line and Highway 20, west of the Dorval roundabout.

The system of gas distribution lines is located north of the rail line, in the industrial sector. This system serves the Hilton Hotel. South of Highway 20, secondary lines are fed by a main line located in the axis of Highway 20.

2.2.7 Major Land Use Designations and Planning Instruments

Our analysis of major land use designations and of planning instruments takes into account several organizations and their planning tools, including in particular:

- Vision 2025 : Cap sur le monde – Communauté métropolitaine de Montréal (CMM).
- The plans of the former Communauté Urbaine de Montréal, which are still in effect.
- Planning instruments, development framework and government policy for Greater Montreal of the Ministère des Affaires municipales et de la Métropole.
- The mandate of the Ministère des Transports du Québec (MTQ), which manages the main highway system.
- The urban development plan of the City of Dorval, which was developed in 1990.
- The preliminary version of the urban development plan of the City of Montreal, produced in 2004 – this plan incorporates Dorval/Île-Dorval into the city's overall strategic orientations.

- The 2003-2023 master plan of Aéroports de Montréal (ADM).

- The Greater Montréal Strategic Transport Development Plan of the Agence Métropolitaine de Transport (AMT).

- Infrastructure planning and management tools of such organizations as Hydro-Québec (Maisonneuve Region), Société de Transport de Montréal (STM), Via Rail, Canadian National, and Saint Lawrence and Hudson (Canadian Pacific).

Our study of these strategic planning and development documents indicates that they are seeking to achieve the following objectives:

- Carry out actions that support the competitiveness of the region's and the province's economy.

- Reinforce and update existing transport systems.

- Foster the prosperity of Montreal's economy and at the same time foster social equality for communities now and in the future.

- Ensure recognition of Montréal's six economic poles, one of which is Saint-Laurent/Dorval.

- Ensure recognition of the Montréal-Trudeau airport as an entry point and the major role it has to play in the development of Montreal's economy.

- Develop Montréal-Trudeau to preserve its status as an international airport. In this regard, the ADM has completed half of an ambitious project to develop the airport's role as a transborder and international finger, thereby making it one of the most modern airports in North America by 2005.

Urban regulations now in effect support the majority of these strategic objectives through their allocation of land for commercial and industrial uses in the area of the Dorval interchange and the airport.

2.2.8 Urban Development and Projections

The study area is divided into six blocks. Following are descriptions of projects, existing or under study, in each block (see Figure 2.4 for the locations of these blocks).

Airport Block

A number of recent investments are related to airline liberalization, as announced by the ADM (i.e., passenger, airline and cargo services). Recent accomplishments here include:

- The Aeroterm cargo facility, built at a cost of $12 million to allow for local cargo transfer from Mirabel Airport where cargo activities took place until 1997.
- Expansion of IMP Groupe (Execair) at its facilities on Rue Ryan in Dorval in order to centralize its aircraft maintenance operations there.
- Hertz decided to update its vehicle rental facilities before the announcement of the new liberalization policy. This project was accompanied by an expansion following the announcement.
- Construction of a new transborder finger in 2003, followed by the construction of a new arrival level in 2004 and an international finger in 2005.
- The north-east expansion of the airport, which began in 2002.

A hotel project in this block is slated for 2008. It will be developed at the site of the Montréal-Trudeau terminal, west of the multi-level parking garage.

Block 1 – North of Highway 520

The block north of highway 520 is currently occupied by the Hilton Hotel, which generates 246 jobs, and by a parking lot on private property (the company FBT). The only project ADM is considering for this block is a 2,940-space parking lot for employees, located between Avenue English and Highway 520. The job growth being forecast between now and 2016 is thus low for Block 1; only the parking lot for employees is counted here.

Block 2 – South of Highway 520

Limited employment growth is being forecast for this block. Significant irritants are hampering efforts to develop it to its full potential. The presence of numerous residential lots and of streets inappropriate for industry makes its short-term development more difficult. Any concrete actions are unlikely between now and 2016 due to the required investments and the scope of the work that would be involved. Thus, low employment growth is being forecast between now and 2016. However, the urban development plan now being prepared calls for detailed planning accompanied by an employment intervention strategy.

Intermodal Nexus Block

This block contains several infrastructures and facilities related to the transport of goods and persons, and owned by various organizations including CN and CP. No major project is being planned for this sector over the next several years, apart from the study regarding the rail link between the airport and downtown Montreal, which is being conducted in collaboration with the ADM and VIA Rail.

Commercial Block – South of Highway 20

Due to the relative stability of demographic variables for Dorval/Île-Dorval, the presence of similar commercial facilities in neighbouring districts, and the absence of vacant lots in Dorval/Île-Dorval, the employment growth being forecast until 2016 is low. No major project is being planned for this sector. Activities, current and future, focus on the consolidation of existing commercial operations and on improving the overall physical organization of the sector.

Residential Block – South of Highway 20

This block may see a slight increase in the number of residents over the next few years given the probable construction of new housing units. A project for 600 new units is being planned for Boulevard Bouchard south of Highway 20. This project could be accompanied by a new concentration of nearby commercial operations and support services.

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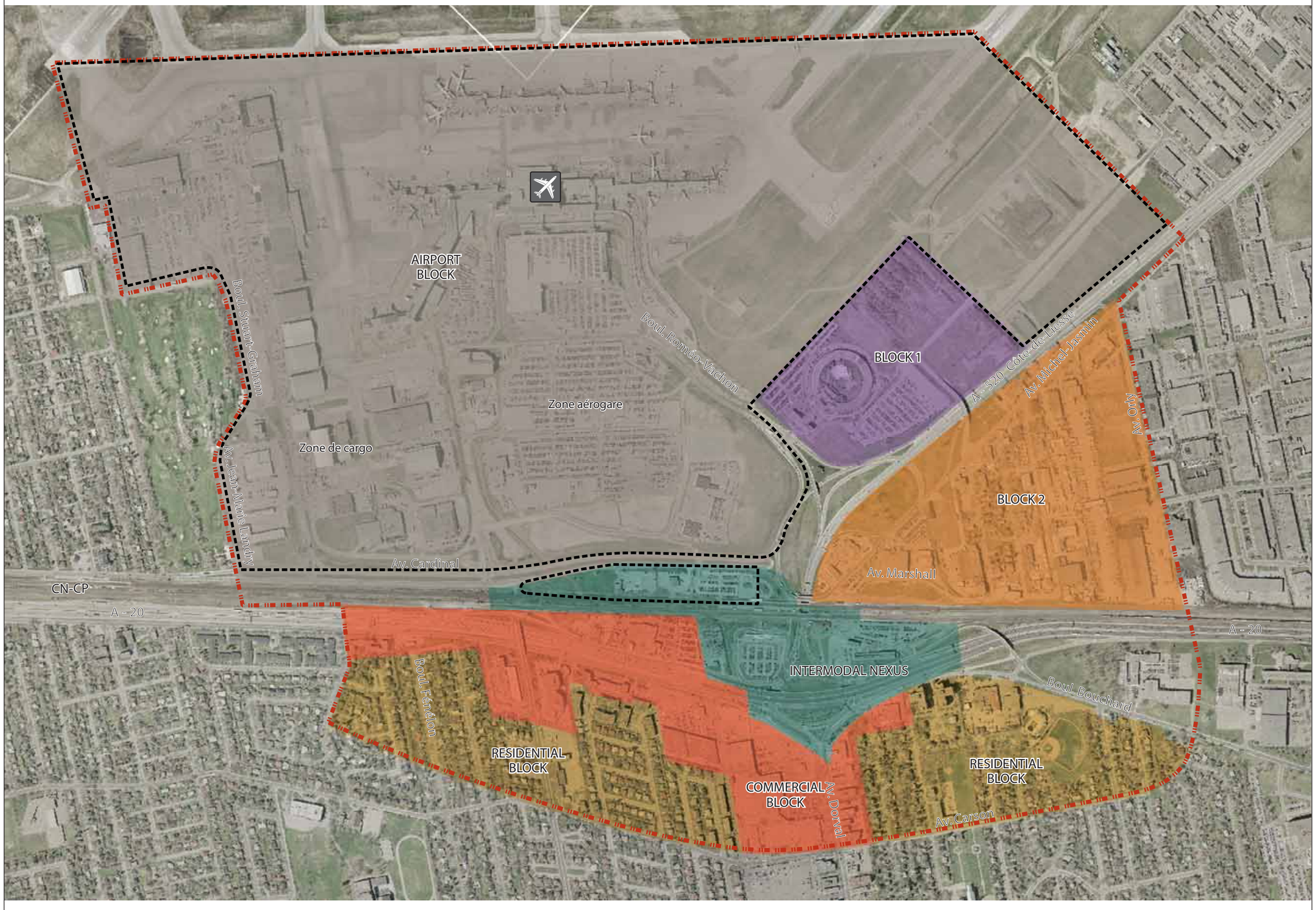
FIGURE 2.4

FUTURE DEVELOPMENT AND EMPLOYMENT



- Study perimeter
- Limits of the airport territory inside the study perimeter
- Block 1
- Block 2
- Airport block
- Intermodal nexus
- Commercial block
- Residential Block

Approx. scale
1 : 10 000

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2.3 SOCIO-ECONOMIC PROFILE OF THE POPULATION

A review of the demographic evolution of Dorval shows the following:

- Dorval's population has been relatively stable since 1981. Between 1996 and 2001, the number of households increased by 3.2%. Dorval is a well-developed district, unlike several other parts of Montreal–West, which are undergoing significant development today.
- The population in Montreal–West has grown at a much faster rate than the Island of Montreal overall.
- According to MTQ demographic forecasts, we can expect to see the population of Montreal–West continue to grow, but at a rate lower than in previous decades.
- Dorval's population and number of households will remain relatively stable, with increases of just 2.0% and 3.6% respectively between 2001 and 2016. Montreal–West districts north of Highway 40[2] will see a slightly higher population growth than in districts to the south. It is forecast that the population of the northern districts will increase by 2.9%, while the population of southern districts will increase by 2.3%.

2.3.1 Economic Activity in the Study Area

The study area is divided into four main sectors:

1) Sector South of Highway 20

This sector is primarily commercial. In the western part, there are businesses along the service road, with close to 430 jobs. In the centre there is a large mall (Les Jardins Dorval) and a nearby strip mall for businesses, giving a total of 70 enterprises and some 900 jobs. Lastly, there is a commercial block grouping together businesses at the district's entrance point south of Highway 20. This area has a high proportion of professional offices. There are no vacant lots here and there is nothing in the forecast to suggest any significant growth for it between now and 2016.

[2] The Montreal West districts north of Highway 40 are: Dollard-des-Ormeaux, Kirkland, Pierrefonds, Roxboro, Senneville, Ste-Anne-de-Bellevue, Ste-Geneviève and St-Raphaël-de-l'île-Bizard. Those south of the highway are: Baie-d'Urfé, Beaconsfield, Dorval and Pointe-Claire.

2) Sector North of Highway 20

North of Highway 20, there are various commercial operations near the airport, with some 250 jobs. North of the rail line are car rental businesses, the Best Western Hotel (with 108 rooms and about 40 jobs) and the Hilton Dorval (with 486 rooms and nearly 250 jobs). Recently, a Park-and-Fly parking lot with 2,000 spaces was built.

3) Industrial Sector

The study area here encompasses nearly 40 enterprises, which are engaged in a wide variety of activities. Close to 12 are involved in transport, storage, and wholesale operations. The others work mainly in light industry or business services. In all, some 700 persons work for industrial companies in this sector.

4) Airport Sector

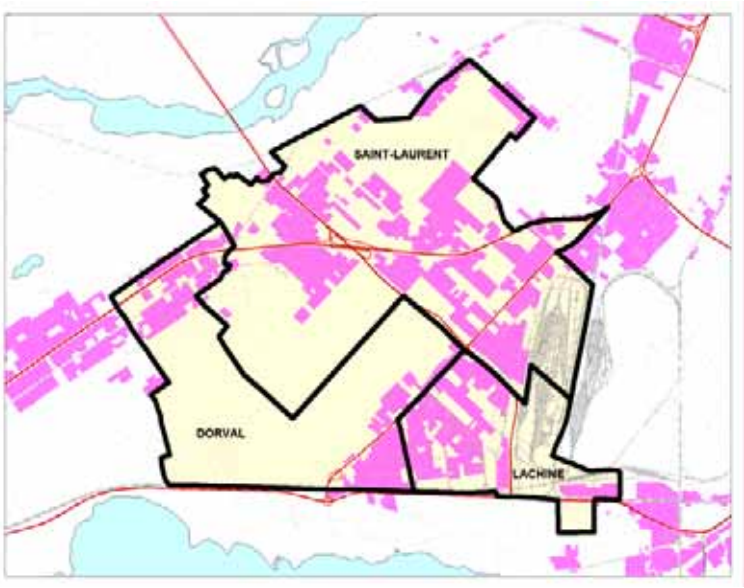
Significant activity is generated by the presence of Montréal-Trudeau. In addition to the passengers it serves, it provides jobs for thousands of persons working there for airlines or companies that do business with the airlines.

ADM statistics show that close to 24,000 persons work at the airport site (full-time and part-time combined). Of that number, more than 11,000 persons (49%) work in aircraft manufacturing or for aeronautical support services. More than 8,000 (36%) work for air transporters, which includes aviation in general and maintenance.

2.3.2 Economic Activity in the Expanded Study Area

There are many important industrial zones in the west of the island. Those near the study area include the industrial zones of Saint-Laurent, Dorval and Lachine. They are presented in Figure 2.5.

Figure 2.5 Expanded Study Area



There are approximately 36,330 jobs in Dorval's industrial zone. Manufacturing, transport, storage, and wholesale activities are highly developed, and together they account for 74% of these jobs. These activities also predominate in the industrial zones of Lachine and Saint-Laurent.

It is difficult to establish an exact link between each type of industrial activity and truck movements linked to the work of enterprises in a specific industrial category. But one thing is certain – Dorval's industrial zone has a large number of companies working in transport, storage and the wholesale trade, all of which are responsible for a high volume of trucking operations. These companies also maintain close links with the airport, the cargo zone in particular. Indeed, most of the cargo received at Montréal–Trudeau is first handled by transport companies and taken to their warehouses, often via the Dorval interchange.

Portrait of the Situation to 2016

Economic development is influenced by numerous factors. The economic situation at the national and international levels exerts an influence that can be either favourable or harmful to the development of enterprises in Greater Montreal. At the regional level, companies' levels of activity and their choices of location combine to promote the development of certain industrial zones ahead of others. It is thus risky to try to predict the level of activity in specific industrial sectors over a period beyond ten years.

Current Projections

Employment growth scenarios for the Island of Montréal have been prepared. One of the most recent of these is the one carried out by Fernand Martin as part of the work of the Commission sur l'amélioration de la mobilité entre Montréal et la Rive-Sud.

This scenario forecasts that employment growth in the industrial zones of Dorval, Saint-Laurent and Lachine will be much the same as for the Island of Montreal overall. It predicts the creation of 10,000 new jobs in the three industrial zones covered by the study area. About 3,500 of these jobs will be in manufacturing, while 2,500 will be in transport and storage.

Projection of Previous Trends

These projections have been calculated using a model created by the MTQ's Service de la modélisation des systèmes de transport (transport systems modelling division), which is used to forecast transportation movements of persons between now and 2016.

This model shows that if previous trends continue, the eastern and western parts of the city will make gains in transportation movements at the expense of downtown Montreal. Although going to work in the downtown area accounted for 30% of all transportation movements in 1998, its share could go down to 28% by 2016. On the other hand, the proportion of travel to the western parts of Montreal will increase from 9% in 1998 to 12% in 2016. During this same period, the total number of movements by workers to the City of Montreal will increase by 11%, i.e., from 606,235 to 671,451. Thus, according to this model, the West Island will remain a very strong economic pole. Furthermore, the development of the peripheral areas of Greater Montreal means these areas should not see a drop in their numbers of workers.

Assessment of Development Potential

There is almost no unoccupied industrial land in Dorval. A section of its industrial zone is particularly run-down and is occupied in part by residences and enterprises with activities providing little added value. Given its strategic location near the highways and the airport, this zone could be redeveloped in order to attract businesses that would be able to get maximum benefit from their location. Considering the eventual creation of a rapid rail link between the airport and downtown, this sector could also become home to office buildings with enterprises offering services to businesses in the West Island and to business travellers.

Our assessment of the total area that could be redeveloped here suggests that it could provide 6,000 jobs.[3] If this development is to occur, it will be necessary for the district of Dorval to be rezoned so that new buildings can be constructed. This is only a possibility for the long-term, but it could bring significant benefits.

The land available for development in Ville Saint-Laurent is concentrated primarily in the high technology park. About 30% (8.7 million square feet) of the park's total area of 38 million square feet is still available. The park should soon be filled to capacity. At present, more than 4,000 persons work there.[4] Ville St-Laurent also has other land available for development, but lots are limited in size and are spread out among various industrial areas.

2.4 AIR QUALITY

The existing air quality has been analyzed according to:

- sources that could affect air quality in the study area;
- a study of the data on the quality of ambient air in the transport systems;
- sampling done in the City of Montreal in 2002;
- benzene and $PM_{2.5}$ measurements in the study area;
- modeling of pollutant concentrations.

It is important to note that CO and NO_2 were not analyzed in depth because the maximum concentrations simulated for them in the entire study zone were 50% lower than the allowable amounts according to their respective criteria. Thus, only the most critical pollutants, i.e., fine particulates and benzene, were subjected to a more in-depth analysis (modeling). The main conclusions of the analysis are given in the following table.

[3] Hypothesis: 14.5 ha (gross) and 12.3 ha (net) are available for services. The land use coefficient is 0.81 jobs/17 m^2 = 5 750 jobs. For industry, 14.9 ha (gross) and 12.7 ha (net) are available, with 76 jobs/net ha = 950 jobs. This is an approximate assessment for the potential of this area if it is fully developed. Some of these new jobs would replace jobs in companies now located in the sector.

[4] Source: Québec PME

Table 2-1 – Analysis of Fine Particulates and Benzene in the Study Area, 2002

Sector	Fine Particulates	Benzene
South-east	The maximum concentration (including background) modeled for a limited number of residences near Highway 20 was higher than the minimum amount allowed by nation-wide criteria.	The maximum concentration (including background) modeled was lower in the entire sector than the amounts allowed by MENV criteria.
South-west	The maximum concentration (including background) modeled for a limited number of residences near Highway 20 was higher than the minimum amount allowed by nation-wide criteria.	Concentrations were lower than the amounts allowed by MENV criteria.
North	The maximum concentration (including background) was lower than the minimum amount allowed by nation-wide criteria.	Concentrations in the entire sector were lower than the amounts allowed by MENV criteria.

Rail Network

Emissions from rail traffic were also analyzed. It was seen that CO, HC and $PM_{2.5}$ emissions from locomotives were much lower than those from road vehicles. But they did show a significant enough concentration of NO_x (20.4%). However, it should be noted that emissions from trains in the study area account for less than 20.4% of emissions from all sources, including airport and industrial activities.

2.5 NOISE ENVIRONMENT

The main sources of noise identified in the study area are aircraft, highway traffic and rail traffic.

The study area was divided into three main sectors to analyze the noise environment:

- The south-east sector, located south of Highway 20 and east of Avenue Dorval. This sector is mainly residential.

- The south-west sector, located south of highway 20 and west of Avenue Dorval (primarily residential).

- The north sector, located north of Highway 20. Airport and industrial activities predominate in this sector. The area east of the interchange is occupied mainly by industries and businesses. There are also about 20 residential units in this sector.

Simulations showed that a part of the sensitive zone (residential) is disturbed by road noise levels ranging from low to average to high (e.g., Leq 24 hours > 55 dBA). The most strongly affected residences are located in the first and second streets back from Highway 20, in the south-west sector.

The contribution of rail traffic to the current noise environment in the study area was assessed by comparing the results of the road noise simulation (current situation) with rail noise. These comparisons were made for three residential units near the rail lines and Highway 20, which were considered representative of the worst-case scenario for comparing rail noise levels to road noise levels.

- **South-west Sector**

Road and aircraft traffic are the main sources contributing to the noise environment in this part of the study area. The parts of this sector that are most affected by road noise (Leq 24 hours $\geq$ 65 dBA) are located near Highway 20 and are occupied by businesses and a small number of residences.

There is significant aircraft noise (overhead planes landing or taking off) in this sector.

A 24-hour assessment of rail noise showed that it contributes little to the noise environment in this sector.

- **South-east Sector**

Road traffic is the main source of noise in this part of the study area. The highest levels for residential zones are found near the roundabout. But this area is not severely affected by noise levels, nor are any other inhabited areas in this sector.

- **North Sector**

In the southern part of this sector, the two main sources of noise are rail and road traffic (Highway 20). In the northern part, road noise from Highway 520 is predominant.

No area in this sector is highly disturbed by noise. The level in the residential zones is lower than 60 dBA. Road and aircraft traffic contribute to the noise environment in this sector.

2.6 ARCHAEOLOGICAL HERITAGE

According to the official instrument of the Ministère de la Culture et des Communications, namely the Inventaire des Sites Archéologiques du Québec, there are no archaeological sites in the study area. However, a professional study (insert footnote) was conducted showing that there may be some archaeological sites that would have to be inventoried. These sites are described as follows:

Prehistoric Archaeology

- The eastern slope of a stream that flows from the north-west to the south-east and bypasses the Bouchard stream.

Historical Archaeology

- Former agricultural areas along the pioneer frontier that includes residences on Chemin de la Côte-de-Liesse.

- Areas used by transport infrastructures.

2.7 URBAN HERITAGE

The analysis of the sector shows that there are several heritage sites dating from various phases in the urban development of Dorval. But most of these sites are outside the study area (i.e., they are in the southern part of Dorval, within the original village site). Only two sites in the study area are recognized as being of urban interest (but without heritage value). They are in the residential district south of Highway 20, bounded by the quadrant formed by Rue Dawson, Rue Lepage, 6th Avenue and Rue Roy, and by the quadrant formed by Rue Allard, Rue Carson, Rue Parkwood and Chemin Herron.

Overall, the analysis shows that the study area does not contain any building or sector of significant heritage interest. But, as work gets underway in the project, attention should be given to the sites of interest within the study area and to buildings of interest near the study area.

2.8 LANDSCAPE QUALITY

The landscape in the study area is an urban one defined by few physiographical and natural elements. The rail lines and Highway 20 divide the territory into its northern and southern parts. The landscape in the north (airport facilities) is vastly different from that in the south (urban part of Dorval). Highway 20 is the main axis of visual penetration in the area, and the airport serves as the main gateway to Montreal for Canadian and international tourists.

Two main types of landscape users are present in the study area: people travelling through (including public transport users and tourists) and people staying in the area (residents, tourists, other travellers).

A wide variety of landscape means an equally wide range of interests in landscape quality. Residents (i.e., the local population) form the category most affected by the visual quality of the landscape. But we must also consider the large number of tourists who come to the area. For most of them, the airport constitutes the first and last landscape they will see during their stay.

For landscape assessment purposes, the study area was divided into five homogenous landscape units defined mainly according to land use, spatial organization of the various urban elements, types of visual lines, vegetation, and land relief.

The first unit described here is the airport unit (A) made up of Montréal-Trudeau and its facilities. This unit occupies the largest surface of land in the study area. It is characterized by vast flat spaces covered by grassy or hard surfaces, interrupted by buildings that form points of reference because of their large size. The sub-units in the airport unit are:

- multi-level parking garages (A1)
- administrative offices of Transport Canada (A2)
- Hilton Hotel (A3)
- level parking lots and vacant spaces (A4)

The views obtained from sub-units A1, A2 and A3 are closed, filtered or open, as determined by the buildings that dominate their landscapes. The views from sub-unit A4 are mostly open due to its vast stretches of parking lots and vacant land.

It is important to mention that unit A in its entirety is the first and last landscape of the region seen by tourists who use the airport.

The mixed unit (M) formed by the tract of land between Highway 520 and the rail lines – this unit is characterized by a mix of activities and a wide variety of buildings of different sizes. Three sub-units are present in this landscape unit:

- commercial (M1)
- industrial (M2)
- residential (M3)

Sub-unit M1 includes the Best Western Hotel and the land used by Budget Rent-a-Car. It is surrounded by transport infrastructures that interrupt the view. Sub-unit M2, an entirely industrialized area located along the rail lines, forms a visual screen to the south, thereby limiting the views from this area. The small sizes of the housing in sub-unit M3 form a sharp contrast with the surrounding commercial and industrial buildings.

The urban unit (U) is located south of Highway 20. It includes the commercial and residential build-up in Dorval and is made up of two sub-units. The first of these, a commercial sub-unit (U1), is characterized by buildings with medium to very large surface areas (shopping centre at the intersection of the Dorval roundabout and Avenue Dorval). These buildings have been built there for maximum visibility from the highways. The second sub-unit is a residential area (residential sub-unit U2).

The highway/public unit (HP) is formed by highways 20 and 520, access roads, rail lines, and businesses and public buildings within these transport infrastructures. This unit is divided into four sub-units:

- Dorval interchange and Highway 20 (HP1)
- the nexus formed by the access roads for the airport road and the highways (HP2)
- the rail lines (HP3)
- businesses and public services inside these transport infrastructures (HP4)

The rail lines form the backbone of this landscape unit, which presents little visual coherence. Sub-units HP1 and HP2 offer extensive open views due to the highly developed highway network. The sub-unit formed by the rail lines (HP3) is characterized by strong linear views which are open to the surrounding landscape. The presence of electrical transmission towers and highway fixtures parallel to the rail lines increases this linear effect. Lastly, the views from sub-unit HP4 are generally unobstructed.

The industrial unit (I) is formed primarily of airport-related industries. Bounded on the west by a golf course, it presents a homogenous built-up morphology. The views from different points in this sub-unit are either closed due to buildings, or open due to vast traffic spaces. Figure 2-6 presents the locations of all the above units and sub-units.

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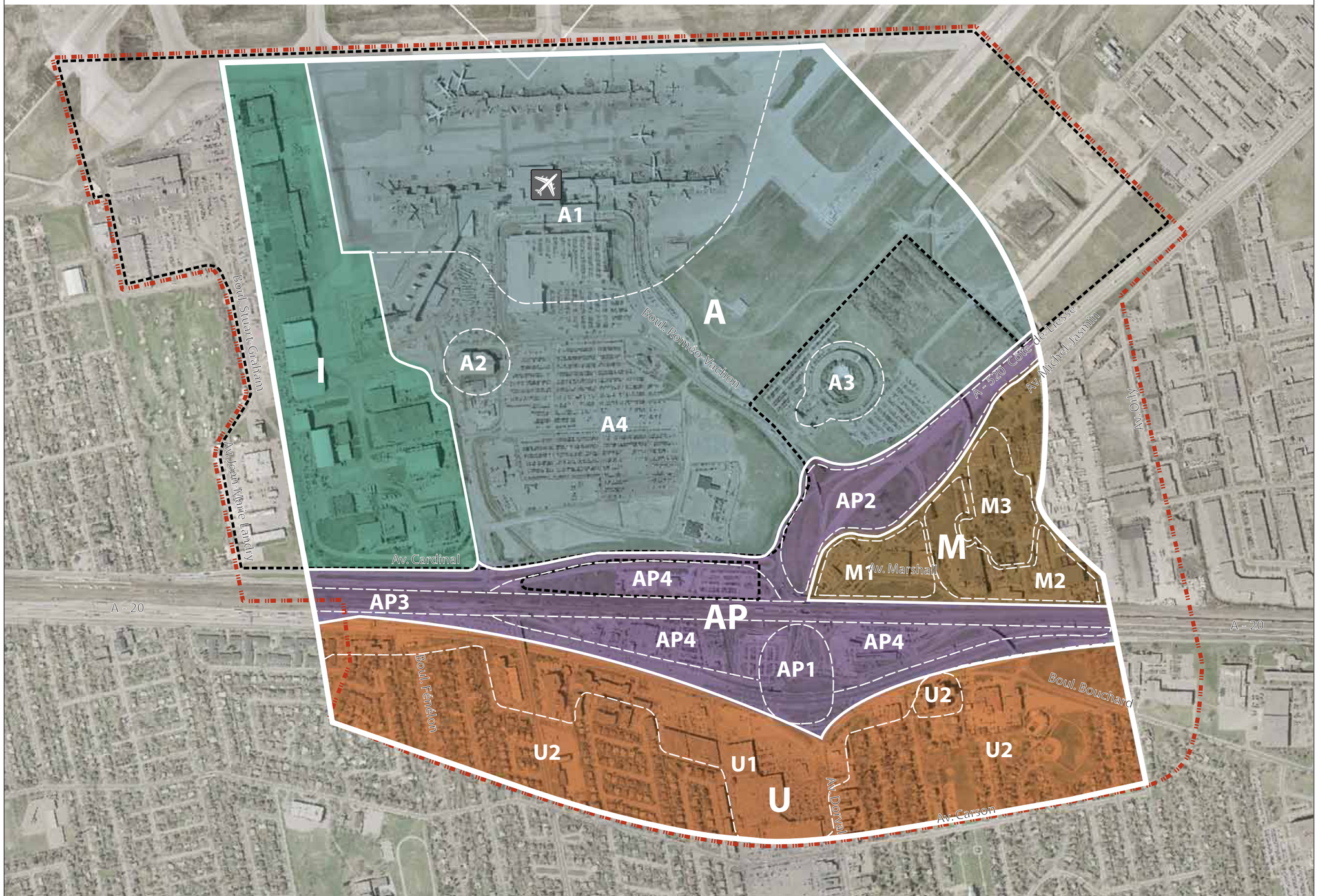
FIGURE 2.6

LANDSCAPE UNITS



- Study perimeter
- Limits of the airport territory inside the study perimeter
- Limits of the landscape study zone
- Landscape unit limits
- Sub-unit limits
- I — Industrial landscape unit
- A — Airport landscape unit
- U — Urban landscape unit
- AP — Highway/public landscape unit
- M — Mixed landscape unit

Approx. scale
1 : 10 000

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On the basis of the above portrait of the visual characteristics in the different geographical sectors of the study area, we determined the levels of visual resistance to the project as follows:

- There is no sector presenting strong resistance in the study area.
- There is no sector presenting zero or extremely low resistance.
- The airport, urban and highway/public units all present average resistance.
- The mixed and industrial units present low resistance.

To summarize, the urban landscape is highly sensitive to any kind of highway infrastructure development. It will thus be very important for the project to integrate harmoniously with the landscape.

2.9 NATURAL ENVIRONMENTS

Nine potentially natural sites were identified, in addition to two sites that were established by the Centre de données du patrimoine naturel du Québec (CDPNQ). Several plant species have been introduced to these sites, but there are few areas, other than uncultivated land, that show characteristics of natural environments. These sites consist of a public park, wooded strips, the Bouchard stream and the Smith ditch. The main tree species found in them are: willow, red ash, silver maple, American elm, box elder, and sumac. The are no wooded areas, maple syrup operations or agriculture.

None of the endangered plant species identified by the CDPNQ are found in the study area.

The areas that the Bouchard stream runs through present no natural characteristics that could justify an in-depth study. The steep slopes do not allow colonization by aquatic plant species fulfilling roles in filtration or erosion control. Nor is there any habitat for aquatic species such as fish. The poor quality of the water, which is highly turbid, and the presence of micro-organisms (gelatinous filaments) make this a habitat difficult for fish to survive in.

The study area does not present any natural site that remains undeveloped or that has not been subject to major disturbances. These sites do not present any interest in terms of recreational use, aesthetics, history, education, biology, or ecology.

2.10 WATER AND SOIL CHARACTERISTICS

Soil Characteristics (Contamination, Bearing Capacity, Vibration)

According to *Surficial Geology – Montréal Island* (Map 1426-A), published by the Geological Survey of Canada, the natural surface soils in the study area are made up primarily of four types of deposited materials: sand with some gravel, clay and loam with limestone, clay till, sandy limestone, and glacio-lacustrine deposits with clay and loam.

The thickness of the natural soils in the study area was found to vary from 6-12 metres (20-40 feet) before hitting rock.

Evaluation and Characterization of Soils and Groundwater

(SEA – Phase I)

In 1998, the first phase of a Site Environmental Assessment (SEA) was conducted in the study area by the consulting firm Enviroconseil. It identified 22 sites as being potential sources of contamination in the study area.

(SEA – Phase II)

The firm Qualitas Laboratoire de Béton Ltée carried out the work to characterize the environment in the study area. The purpose here was to conduct a preliminary and exploratory assessment of the environmental quality of the soils and groundwater in the projected excavation areas, in order to allow planning for adequate environmental management of the excavated soils.

Soil samples used for chemical analysis were taken from backfill layers and natural soil deposits. The survey for the characterization studies showed that the soils in the project site generally consisted of backfill covered by natural deposits of sand, silty clay and till.

Sampling was done at sites specifically chosen to check the environmental quality of the soil and groundwater at areas identified by Phase 1 of the SEA study as being potential sources of contamination. Sites throughout the area in which excavation work is being planned were also sampled.

Chemical Analyses

The parameters chosen for the analyses take into account the potential contamination sources identified by Phase 1 of the SEA, as well as worksite observations and substances frequently found in urban settings. The full analysis is presented in the following table:

Table 2-2 – Analysis Parameters

Analysis Parameters	Number of Samples				
	Soil	Duplicata (Soil)	Water	Duplicata (Water)	Total
Metals – soil (Cd, Cr, Cu, Ni, Pb and Zn)	30	6	-	-	36
Metals – soil (Ag, As, Ba, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Se, Sn and Zn)	44	0	-	-	44
Metals – water (Ag, Al, As, Ba, Cd, Co, Cr VI, Cu, Hg, Mo, Ni, Pb, Se and Zn)	-	-	11	0	11
Petroleum hydrocarbons (HP C_{10}-C_{50})	74	6	0	0	80
Total oil and grease	-	-	7	0	7
Monocyclic aromatic hydrocarbons (MAH)	47	-	7	0	54
Chlorinated aliphatic hydrocarbons (HAC)	42	-	6	0	48
Polycyclic aromatic hydrocarbons (PAH)	73	6	7	0	86
Phenolic compounds	43	0	5	0	48

The results of chemical analyses conducted on 136 soil samples selected to study their characteristics in 2001 and 2004 indicate that:

- three samples from three different surveys show a contamination level greater than criterion ‘C’;
- three samples from 3 other surveys show a maximum contamination level between criteria ‘B’ and ‘C’;
- all other samples show, with regard to the analyzed parameters, concentrations between ‘A’ and ‘B,’ concentrations lower than ‘A,’ or hardly detectable concentrations.

These results show that decontamination could be required if construction work were to be carried out in the sectors with concentrations greater than those established by criterion ‘C.’ Soil management would have to follow the recommendations in the MENV’s contaminated soils management grid.

Following are the results of the analysis of 11 groundwater samples:

- Concentrations of barium and total oil/grease greater than those allowed by Regulation no. 87 of the CMM were found in two study wells.

- Three groundwater samples showed a zinc concentration higher than the allowable amount indicated in the Policy on Groundwater Seepage or Infiltration of Sewers.

For seven of the 11 groundwater samples, the concentrations obtained for all analyzed parameters were lower than those set by the above regulation and policy.

3. DESCRIPTION OF PROJECT VARIANTS

3.1 DETERMINATION OF VARIANTS

Apart from the status quo, numerous variants were studied and grouped into three major solutions according to the needs they sought to meet:

- Solution 1: This 'full' solution meets all the needs identified for the road system plan and includes construction of a railway right-of-way to provide rail shuttle service between the airport and downtown Montreal.

- Solution 2: This partial solution involves meeting needs for improved access to the airport terminal and includes construction of a railway right-of-way for rail shuttle service between the airport and downtown Montreal.

- Solution 3: This solution entails interventions for correcting only the main drawbacks in the geometry and safety of the Dorval interchange, without modifying its configuration or the capacity of the roundabout. This solution did not include the possibility of creating a rail line right-of-way for a rail shuttle service between the airport and downtown Montreal.

Only the variants for solutions 1 and 2 are presented below. When the solutions were studied (step 2 in the opportunity study), it was determined that the status quo and the variants making up solution 3 did not satisfactorily meet operational objectives and did not constitute genuine solutions to the problems identified in the needs assessment and confirmed by the perception study. The possibility of creating a rail line right-of-way for a rail shuttle service was a determining factor for the selection of solutions 1 and 2.

Table 3-1 – Analyzed Solutions and Variants

SOLUTION	VARIANTS
1	N1P2 2A 2B
2	N1P1 2C

3.1.1 SOLUTION 1 AND ITS VARIANTS

Solution 1 combines all interchange variants, i.e., those that permit traffic flow without stop signs or traffic lights for eight major movements, those linking the road network to Montréal-Trudeau (6 movements) and those providing links between highways 20 and 520 (2 movements).

Variant N1P2

The objective of variant N1P2 is to minimize the number of structures going underneath the current CP and CN rail lines at right angles. This variant also includes preserving the continuity of Avenue Dorval between the south side of the rail lines and the road that is planned to run alongside the Hilton Hotel. Figure 3.1 presents this variant.

The proposed rail route was identified in the technical feasibility study carried out for the ADM in 2002. Here, the rail link is placed between lanes C and D linking Highway 20 East to the airport and running parallel to the rail link profile, a few metres away. The rail line route is entirely sunken, with support walls ranging in height from 7 m to 12 m. Lastly, the Dorval roundabout is replaced by two traditional intersections with four branches.

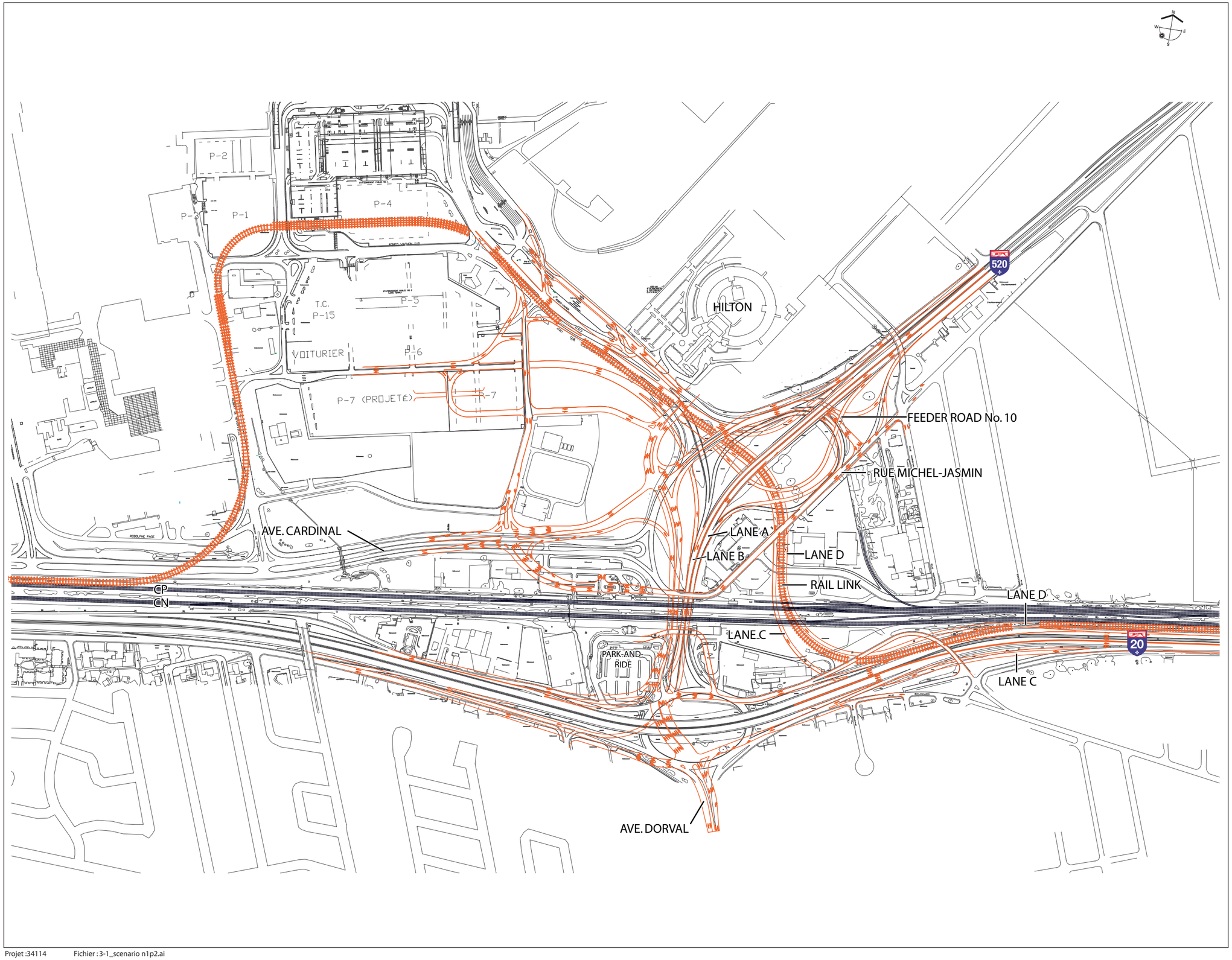

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FIGURE 3.1

VARIANT N1P2 - PLAN VIEW

Proposed route

Existing rail road

Proposed rail road

Not to scale

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Variants 2A and 2B

Variants 2A and 2B, presented in figures 3.2 and 3.3, possess the same fluidity characteristics concerning the eight major movements. They differ from variants N1P1 and N1P2 primarily with regard to the route of lanes C and D. Their main characteristics are as follows:

- Lane C, the route leading from the airport to downtown, has an embankment profile starting at Avenue Michel-Jasmin.

- Lane D, which leads from Highway 20 East to the airport terminal, goes under the rail lines before joining the embankment profile of lane C at Avenue Michel-Jasmin, as this latter now exists.

- The routes of lanes C and D have slight curves in their design speed. This configuration does not require a maximum transversal slope for curves, which provides a benefit in terms of safety. However, the route requires the expropriation of the land now being used by Budget Rent-a-Car.

- The rail route in variant 2A is located east of lane D. The profile of the rail link is sunken (6 to 8 metres).

- For local traffic, there is no lane giving direct continuous access to Avenue Dorval. North of the rail lines, this avenue ends at a T-intersection at Avenue Michel-Jasmin.

- The Dorval roundabout is replaced by two traditional intersections with four branches.

Variants 2B and 2A are very similar. They are identical north of the CN and CP rail lines and in the eastern part of the connection to Highway 20 East. The main difference is to the west. In variant 2B, lanes A and B join Highway 20 West at the natural ground level south of the CN/CP rail lines, meaning that the tunnels called for by 2A are not required. However, this configuration means the interruption of the west service lane for Highway 20. Traffic from this lane is thus diverted to a new local street running along the rail lines.

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FIGURE 3.2

VARIANT 2A - PLAN VIEW

- Proposed route
- Existing rail road
- Proposed rail road

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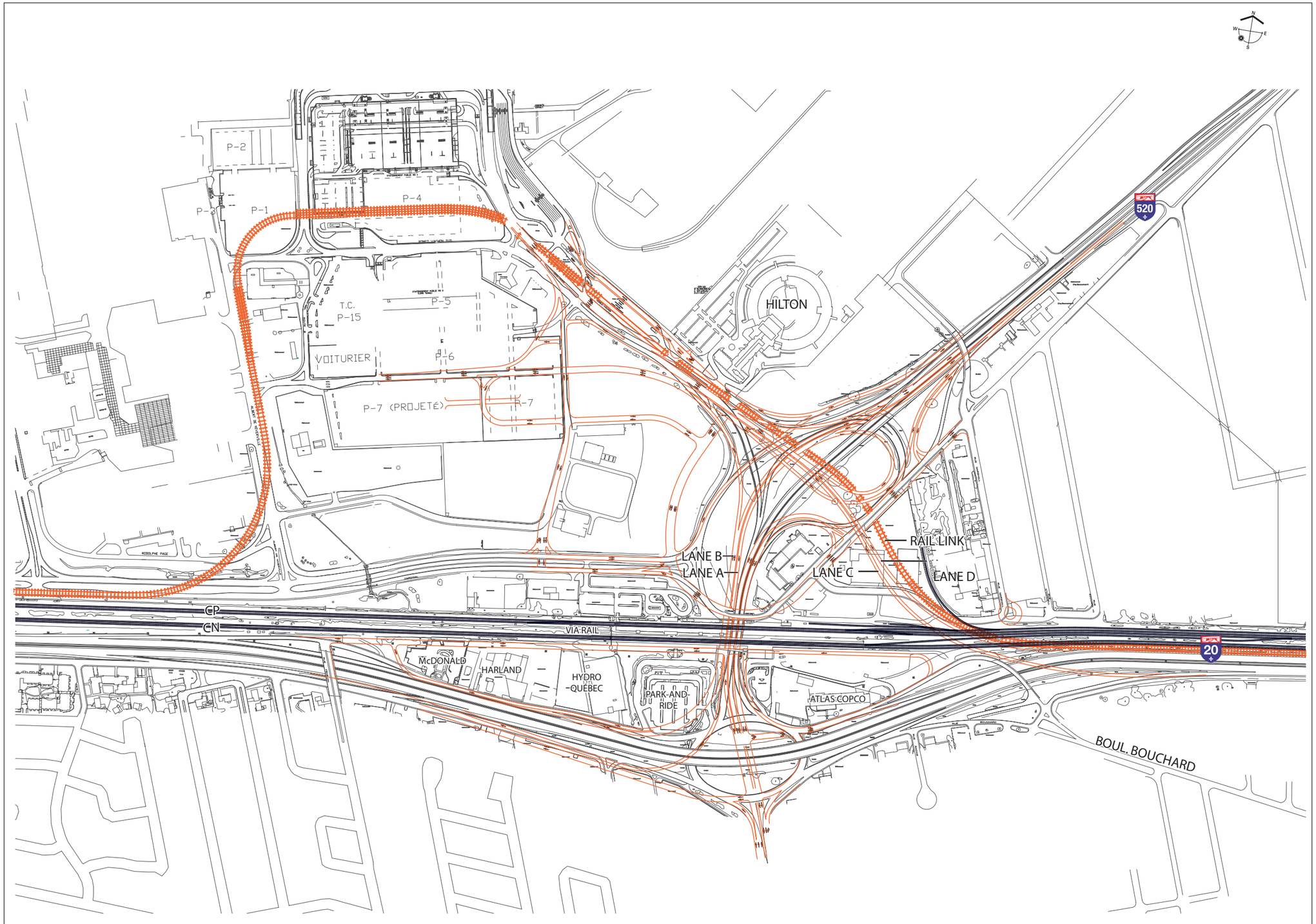
FIGURE 3.3

VARIANT 2B - PLAN VIEW



- Proposed route
- Existing rail road
- Proposed rail road

Not to scale

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3.1.2 Solution 2 and its Variants

The variants in this partial solution for the interchange are intended to allow traffic to move without stop signs or traffic lights in four of the eight major movements (all towards to the airport). It also includes the airport-downtown rail link.

The other movements are not direct because the Dorval roundabout is kept in its present form.

Variant N1P1

Variant N1P1 (see Figure 3.4) keeps lanes C and D, the rail link, and the traffic movements between the airport terminal and Highway 520, all of which are in the complete scenario. No modification of the Dorval roundabout is planned, but the connection between Highway 520 and Avenue Dorval is maintained.

Variant 2C

Variant 2C (see Figure 3.5) can be considered as phase 1 of variant 2A or variant 2B because it could serve as a first step in completing the plans in these variants. It does not call for any modification of the Dorval roundabout, but maintains all development that is planned for north of the rail lines in variants 2A and 2B.

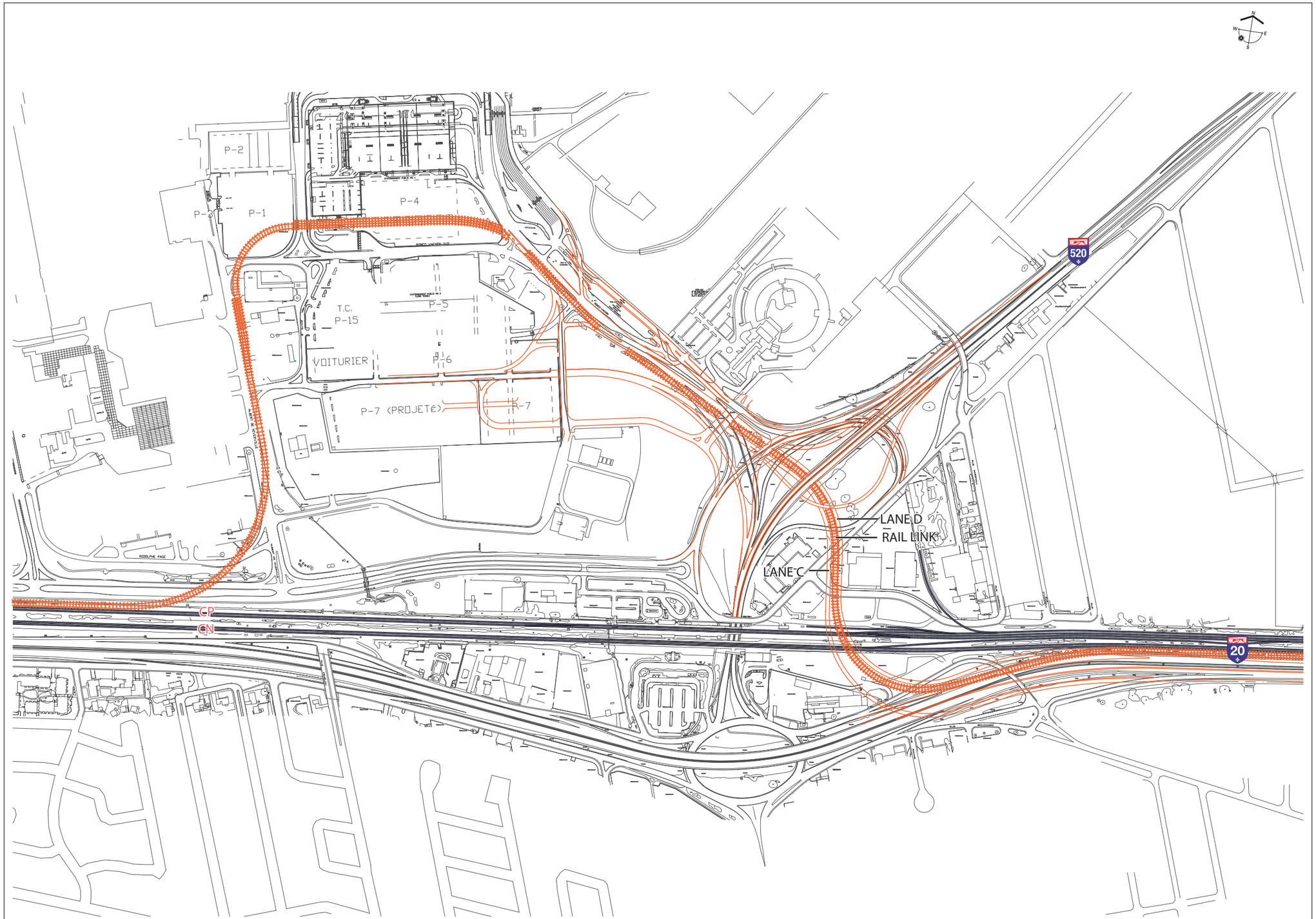

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FIGURE 3.4

VARIANT N1P1 - PLAN VIEW

- Proposed route
- Existing rail road
- Proposed rail road

Not to scale

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FIGURE 3.5

VARIANT 2C - PLAN VIEW

- Proposed route
- Existing rail road
- Proposed rail road

Not to scale

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3.2 VARIANT SELECTED FOR THE PROJECT

To select the variant that would be used to carry out the project, all the variants were compared by means of a multi-criteria analysis covering operational objectives, technical elements, and implementation.

The selection process also took into account the cost of implementing each variant.

The criteria under 'Operational Objectives' were very important compared to the other criteria. This was because operational objectives deemed as priorities would have to be achieved to ensure that needs were properly met. The most important of these needs involved improving access to the airport.

The purpose of the 'Technical' criteria group was to ensure proper performance of the project, once it was completed according to the selected variant. This aspect allowed us to compare the variants according to several criteria, including:urban framework, geometry, maintenance, traffic, safety, rail lines and public transport.

Finally, the 'Implementation' group allowed for a comparison of the variants in terms of how they facilitated construction activities. This made it possible to establish the simplest variants for construction in terms of infrastructure. Doing so was based on two main objectives: meet short deadlines and prevent budget overruns.

I light of the evaluation of the variants, the preference of the sponsors and their partners (City of Montreal, district of Dorval/Île-Dorval, Via Rail, STM and AMT) pointed to variant 2B, for the following reasons:

- The partial solutions (Solution 2) did not adequately meet the objectives.
- The investment for variant 2B is $32.7 million less than for variant 2A.
- The difference in technical benefits between variants 2A and 2B did not justify the added investment necessary for variant 2A.

Variant 2B fully met the operational objectives of Priority 1 (55/55 points) and at a lower cost than variants N1P2 and 2A.

Furthermore, it demonstrated better performance for the technical and implementation criteria.

3.3 DESCRIPTION OF THE SELECTED VARIANT AND ITS IMPLEMENTATION

The selected variant (2B) includes a complete solution for creating direct highway links:

- Highway 20 West/Highway 520 (two-way)
- Airport/Highway 20 East (two-way)
- Airport/Highway 20 West (two-way)
- Highway 520/airport (two-way)

This variant also allows the creation of a rail line right-of-way for a rail shuttle between the airport and downtown Montreal and the creation of favourable conditions for improving public transit.

It integrates well with the surrounding environment and takes into account the existing strategic orientations for urban development. Even though land and building expropriation will be necessary, this variant will not significantly affect the planned use of the sector. Figure 3.6 presents the cadastral limits of the sector and the main lots affected by the project, while Figure 3.7 presents the limits of the properties in the study area. It includes the limits of the MTQ rights-of-way and of those belonging to the district. The limits of the airport lands belonging to Transport Canada are shown in a different colour.

Projet :34114 Fichier :3-6_localisation cadastrale.ai

IMPROVING THE LAND TRANSPORT INFRASTRUCTURES IN THE VICINITY OF MONTRÉAL-TRUDEAU AIRPORT

ENVIRONMENTAL IMPACT ASSESSMENT

Transports Québec

Aéroports de Montréal · Montréal · Transports Canada

FIGURE 3.6

CADASTRAL LOCATIONS

Cadastral limits

Proposed route (solution 2B)

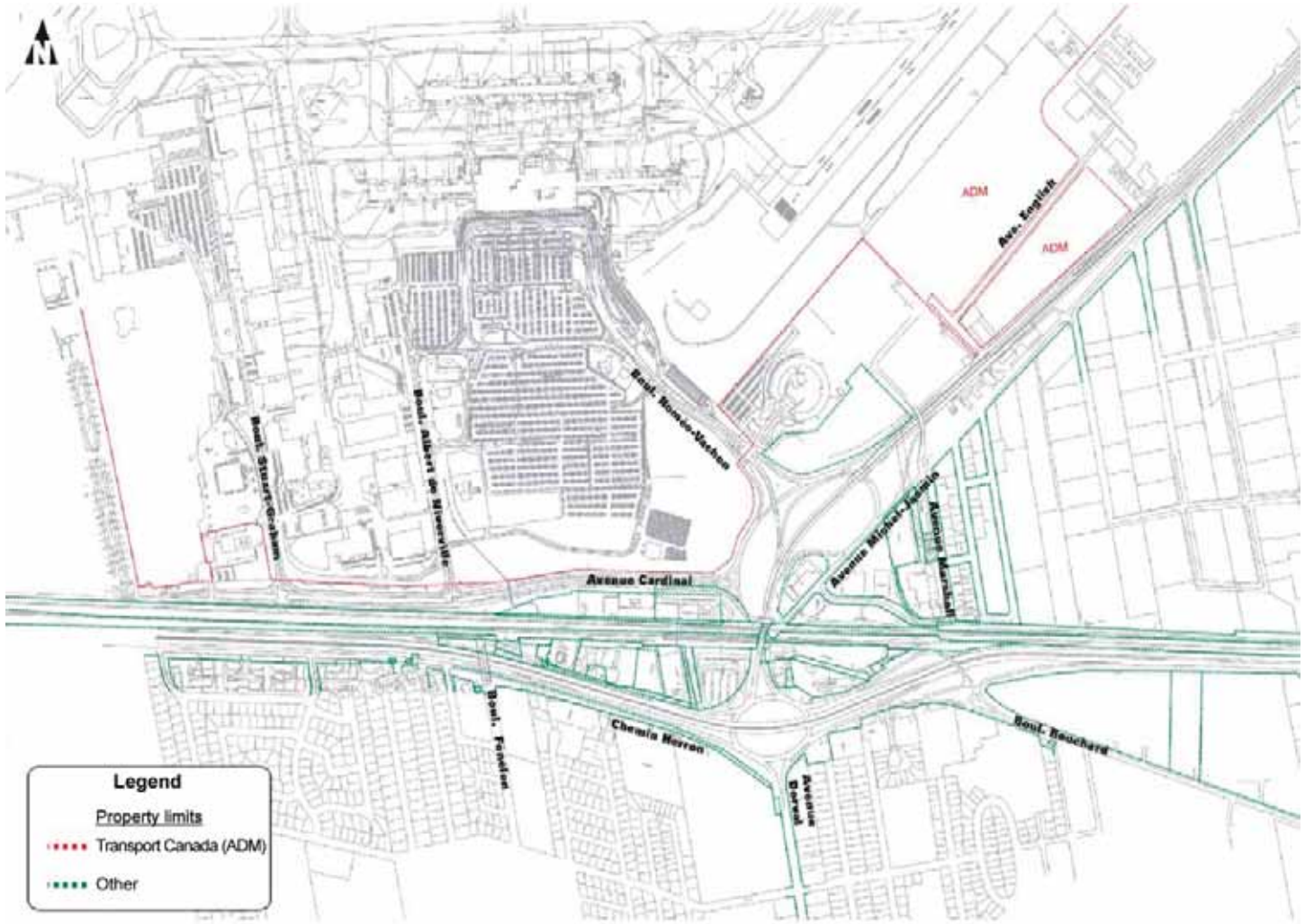
1525401: No. of lots affected by the project

Approx. scale
1 : 5 000

August 2004

Daniel Arbour & Associés
in collaboration with
CIMA · SNC·LAVALIN

Figure 3.7 Property Limits



On the basis of the preliminary plan, construction will last three and a half years. Each year corresponds to one of the four implementation phases, as described below.

Phase 1 (2006)

- Construction of a temporary structure and two temporary rail lines south of the CN rail lines.
- Temporary relocation of the Via Rail station next to the AMT terminal.
- Demolition of the viaduct at Boulevard Bouchard, under Highway 20.
- Replacement of this viaduct south of Highway 20.
- Start of construction of the structures below the rail lines (south and central parts).
- Permanent construction of the roadway for the new service lane for Highway 520 West (street B) and part of the south service lane for Highway 20, west of the Dorval roundabout.
- Construction of various structures for the new interchange.

Phase 2 (2007)

The greatest construction activity during this phase will be in the northern part of the interchange.

- Construction of all remaining structures in the northern part of the interchange, the viaduct for lane C, the new Bouchard viaduct, the Avenue Dorval viaducts beneath Highway 20 West, and certain sections of the route in the southern part of the interchange.
- Completion of the construction on lane C and of the roadway for lane D.
- Completion of construction of the drainage system.
- Completion of construction of the structures beneath the rail lines.

Phase 3 (2008)

Phase 3 will bring several changes to the southern part of the interchange. Regarding construction, priority will be given to the completion of lanes C and D, allowing a direct link between the airport terminal and downtown.

- Demolition of the western part of the Dorval roundabout and the viaduct beneath Highway 520 north of the rail lines.
- Construction of various viaducts (Avenue Dorval and lane A).
- Road construction (including signage and lighting) and opening of lanes in the northern part of the interchange, excluding the link to Avenue Dorval.

Phase 4 (2009)

Phase 4 will begin after the CN rail lines have been re-established in their original location.

- Completion of the reconstruction of the Avenue Dorval tunnel and road work, (including signage and lighting) in the southern part of the interchange.
- Connection of Avenue Dorval to Avenue Michel-Jasmin in the northern part of the interchange.

3.3.1 Traffic Flow Maintenance

In each phase, detours from existing routes will ensure maintenance of road and rail traffic. A number of lanes equivalent to the current number will be maintained.

3.3.2 Excavation and Embankment Material – Transport and Storage

Excavated material will be used mainly as material for the embankments on lanes C and D, north of Avenue Michel-Jasmin and for the road viaduct approaches, particularly for lane C. Non-used excavation materials will be disposed of in accordance with MENV standards.

The main materials storage site for this project will be the land owned by Budget Rent-a-Car, located south of Avenue Michel-Jasmin. The MTQ will have to acquire this land to allow construction of lanes C and D.

3.3.3 Water Run-off and Drainage

To implement variant 2B, the existing retention basins will be modified to ensure respect of drainage and wastewater disposal conditions. The drainage surfaces in the study area have been divided into basins and sub-basins according to their wastewater outlets. Oil and sediment separation structures will be built at various locations in the system to replace the grit removal tank above the existing pumping station.

3.3.4 Waste (Volume, Disposal Method & Location) and Rational Resource & Conservation Measures

To maximize the rational use and conservation of resources, the matter and materials in the development area will be re-used when possible. Debris will be disposed of at an off-site location in accordance with existing environmental codes and regulations.

3.3.5 Maintenance and Operations Procedures

Conventional maintenance programs for transport structures and roadways will be applied by the MTQ for the highway network, by the City of Montréal for the local road network, and by the ADM for road segments on its territory.

3.3.6 Required Labour and Work Calendar for Each Phase

The planning at this stage of the study calls for the division of the construction work into nine lots (i.e., nine contracts). Five lots will be devoted exclusively to implementing structures on the site with access from the road system that will be redeveloped to maintain traffic flow. This work and most of the other required work could be done in the daytime without disturbing traffic very much because it will be on the site itself. Changes in lane configurations as the work proceeds from one phase to the next and certain minor aspects could affect traffic. This work could thus be done at night if necessary.

3.3.7 Project Life Cycle

The life of the new interchange is not determined by just the quality of construction or the regular maintenance program that will be established. At present, roadways are designed for a life cycle of about 25 years, and structures for a life cycle of about 50 years.

3.3.8 Preliminary Project Cost Estimates

The preliminary cost estimate for the project comes to $133 million (based on the preliminary plan), excluding the rail shuttle. This amount thus covers construction and related costs for the road portion of the project.

At this stage of the project's development, costs for the rail line right-of-way are estimated at $60 million. These costs include structures (cuttings, tunnels, viaducts) and exclude rail infrastructures such as ballast, rails and signage.

4. ENVIRONMENTAL IMPACT ASSESSMENT

4.1 ENVIRONMENTAL ASSESSMENT APPROACH

The environmental assessment for the project to improve land transport infrastructures in the vicinity of Montréal-Trudeau is based on a three-step approach:

- technical knowledge of the project – a description of the project facilitates the identificaton of the sources of environmental impact;
- knowledge of the environment in the study area;
- impact assessment and determination of attenuation measures.

The importance of the impact of each project element on the environment is determined according to three criteria: intensity, extent and duration of the impact.

Intensity refers to the level of disturbance, i.e., the scope of modifications made to a biophysical or physical component of the environment in the project study area. This variable also refers to the intrinsic value (sensitivity or vulnerability, uniqueness or rarity, sustainability) and to the social, cultural, economic and aesthetic values that are assigned to the element in question. The more a component is valued by the public, the greater its impact.

Disturbance intensity is categorized as being low, average or high, depending on the scope of the modifications and their effect on the integrity and function of the component affected by the project.

The criterion for intensity is weighted by criteria for the impact's extent and duration. Extent refers to the size of the area affected and/or the population segment that is affected. The area affected can be quite limited, local or regional. It is quite limited if it affects a very small area or very few people. Duration constitutes the temporal dimension of the impact. It involves assessing the period during which the effect will be felt in the environment. Duration can be short, average or long.

An impact's importance is determined by integrating these three criteria (intensity, extent and duration). The effect of the project on an environmental element can be positive (i.e., beneficial), negative or nil. The correlation established between the three criteria allows us to make an overall judgement of the impact's importance as being high, average or low (negligible).

Following assessment of the impacts, attenuation measures for mitigating them are identified. After these measures have been applied, the impacts will be re-assessed to determine what we refer to here as their residual impact for each element in the project.

4.2 ASSESSMENT OF IMPACTS ON THE HUMAN ENVIRONMENT

This section describes the project's impacts on each environmental component that could be affected during the preparation, construction and operational phases. With regard to the assessment of the project's life cycle, we note that structures will remain in place for 50 years and thus beyond the life of the road network. Thus, they will require repairs to ensure the network's safety and functionality. Materials from demolished structures will be used for such repairs.

The construction phase includes the work preparation phase and the implementation phase (worksite activities). The operational phase covers the period when the new infrastructure can be used, i.e., after the completion of the work.

Human Environment

4.2.1 Social Impacts

Construction Phase

The construction phase will have direct impacts on quality of life. Surveying of the area, worksite organization, circulation of vehicles and heavy equipment, and the construction work itself are the main sources that might have a negative impact on the environment.

The residential areas that will be the most affected during construction are south of Highway 20, in particular those near Chemin Herron.

The main impact sources are the expected increase in noise, dust and vibrations at the worksite, along with traffic disruptions and even access to these neighbourhoods. During this period, residents' quality of life could be affected by an increase in road traffic and the complicated detours made necessary by the worksite.

Construction will not significantly increase the disturbance level now present in this sector. **The importance of the impact for this phase is thus assessed at being average**.

It is important to note that the attenuation measures and the method for providing information on them will be chosen by organizations in the area (CLSC, school board, citizens' committee, district, etc.). The proposed attenuation measures are:

- Near the area of the worksite, provide adequate signage that meets MTQ requirements.

- Set vibration intensity limits during construction and monitor compliance with those limits.

- Implement a monitoring program to ensure acceptable levels in air quality and the noise environment, i.e., below the thresholds required by the applicable regulations and policies.

- Ensure that residents and road network users are informed of the construction schedule and the planned modifications (construction info-line, etc.).

- Maintain access to services and businesses in the area around the interchange at all times during construction, and implement certain measures facilitating access to them (adequate signs, simple detours and routes).

- Maintain safe and easy access to residences and businesses, and restore the routes for such access as quickly as possible.

- Minimize the number of access lanes used by heavy equipment.

Despite the application of these measures during the construction phase, the local community will experience certain negative impacts, most of which have been projected as being insignificant.

Operational Phase

Contrary to the construction phase, the impacts here are seen mostly as being positive. As indicated in the CCC report carried out as part of the needs assessment, the population in Dorval/Île-Dorval wants the solution chosen for the project to improve local traffic flow and accessibility to services (public transport, businesses, etc.).

For district residents, developing the system to separate local traffic from regional traffic will improve north/south links in the district, will increase safety and will facilitate access to public transport, businesses and other services. Furthermore, developing sidewalks and a bike path in the northern part of the interchange will greatly improve the life of pedestrians and cyclists. Finally, looking at the southern part of the interchange, redeveloping the roundabout will make it easier for pedestrians and cyclists.

The implementation of the project will improve through traffic and will improve access to the airport through direct, efficient and reliable links. The link to the airport will thus be safer for users and less complicated for drivers (better signage).

4.2.2 Land Use Planning and Urban Development

Construction Phase

No impact on land use planning and urban development during the construction phase is being projected.

Operational Phase

The project does not contravene in any way policies on land use planning and urban development. On the contrary, it is seen that the project integrates very well with this environment and the various land allocations called for by these policies and that it will contribute to the optimal development of the area. Indeed, here the project is considered as bringing only benefits.

4.2.3 Impact on Buildings and Lots

Construction Phase

The construction of networks and their related infrastructures entails impacts affecting current land use and commercial buildings in the study area. The project for improving the land transport infrastructures in the vicinity of Montréal-Trudeau is to be carried out in an already developed urban context, and it will thus require partial and/or total expropriation of some buildings or lands.

In some cases, expropriation is required to create or re-develop infrastructures.

No residential building has to be expropriated for the project.

All of the land belonging to Budget Rent-a-Car, now located at the corner of Rue Marshall and Avenue Michel-Jasmin, must be expropriated to create highway lanes C and D and the rail line right-of-way.

Also, some property must be partially expropriated, in particular the following:

- Best Western Hotel – 13,000 Chemin de la Côte-de-Liesse

The redevelopment of Avenue Dorval will require the expropriation of a parcel of land occupied by the Best Western Hotel, i.e., two sections of land (with a total area of 199.64 $m^{2)}$ facing Avenue Michel-Jasmin.

- Via Rail station and parking lot – 755 Boulevard Montréal-Toronto

Rue Bouchard will be constructed on two lots belonging to CN. The creation of this new street will require the partial expropriation of the parking lot land (13,389 m^2) and the land that the Via Rail station occupies as a tenant (2,085 m^2).

- Corporation Starpark America – 745-749 Boulevard Montréal-Toronto

This land, with an area of 2,736.5 m^2 must be expropriated to make way for the new access road for Highway 20.

- Les Jardins Dorval (shopping centre) – 352 Avenue Dorval

The part of the mall's land affected by the project faces the current Rue Herron. Its area comes to 1,226 m^2.

- Centre commercial Rond-point (shopping centre) – 900-960 Chemin Herron

The strip of land to be expropriated here is located alongside the existing pedestrian path (less than a metre wide), extending up to the grassy surface alongside the highway.

- Hydro-Québec power station and vacant land – 845 Boulevard Montréal-Toronto

The new north-west service road requires the expropriation of 496.5 m^2 of the power station land and all of the 1,051 m^2 of vacant land.

- Harland Pontiac-Buick – 955 Boulevard Montréal-Toronto

A small area of the land facing the current Boulevard Montréal-Toronto must be expropriated following the construction of the north-west service road.

- STM – 825, boulevard Montréal-Toronto

The Park-and-ride lots in front of the STM terminal are affected by the project and must therefore be relocated elsewhere in the site.

For total and partial expropriations alike, property owners will be provided with compensation equivalent to the fair and reasonable price of the land that is acquired. With regard to Budget Rent-a-Car, efforts have already been made in the project's planning to relocate this company to a site similar to the existing site. The construction phase will inevitably affect the operations of businesses and industries near the interchange. But the project provides for measures as follows to ensure the continuity and smooth functioning of these activities:

- Application of worksite management measures to ensure maintenance of adequate operational conditions, taking account of land uses near the project site. These measures will be established by a committee mandated by the MTQ as part of the preparation of plans and specifications to obtain a certificate of authorization from the MENV.

The residual impacts on all lands affected by the construction and operational phases have not yet been determined.

Operational Phase

Commercial Activities

It is projected that there will be few impacts on land use and commercial buildings after the construction work (along with work stemming from the expropriation of certain properties) is completed. All re-allocations of land use and expropriations called for by the project will give owners and tenants a quality of life similar to what they enjoyed before, or fair and reasonable compensation. The land freed up by the acquired rights-of-way and the redevelopment of the network will provide some of the affected businesses and land owners with surface areas similar to those they had before, and with improved access.

Industrial Activities

Overall, the project will not affect many industries during the operational phase. Corporation Starpark America is the only one that will be subject to expropriation (partial). Attenuation measures are being planned to reduce the impacts on industrial activities:

- Corporation Starpark America: Compensation paid to the owner

The impact on the land owned by Corporation Starpark America (loss of surface area) is assessed as low. Nevertheless, a new access road in front of the building will ensure better access. The operational phase of the project will not affect the building or its land in terms of its compliance with municipal regulations.

Public Transport Infrastructures

The operational phase will have little impact on public transport infrastructures. Expropriation will be limited to partial expropriation of STM land.

Attenuation measures will include relocating parking spaces lost due to expropriation. The impact during the operational phase is thus considered to be insignificant.

After the inconveniences caused by expropriation (relocation, construction of new buildings, lost time due to construction, etc.) have passed, the impacts on commercial buildings are quite low overall. Thus, during the operational phase, the project will have either very little or no effect on business operations. In some cases, even the expropriation required by the project will even improve the situation of businesses and industries.

The possible areas for relocating Budget Rent-a-Car could benefit the company following expropriation by making it more accessible.

4.2.4 Economic Impacts

This section presents an assessment of the economic impacts associated with the construction project for the Dorval interchange. The impacts due to the project's construction and operations were assessed using the intersectoral model of the Institut de la statistique du Québec. This model has been used in Québec for several years to estimate economic impacts. It measures those impacts in terms of labour power, salaries, added value, and government revenues.

Construction Phase

The results from the model's assessment shows that the construction of the Dorval interchange at a total cost of $133 million will require 1,040 person-years of direct labour and 617 person-years of indirect labour (total of 1,657). The total payroll will come to $58 million, with $39 million for direct labour and $19 million for indirect labour. The total added value comes to approximately $92 million.

The tax revenues generated for governments in Québec are estimated at $22.5 million and those for the Canadian government at $8.5 million.

During construction of the Dorval interchange, access to the businesses in the sector may be more difficult. However, the project includes measures to ensure the continuity and smooth functioning of these businesses.

Operational Phase

The implementation of the Dorval interchange will bring several economic benefits, made possible by:

- improved road and rail access to Montréal-Trudeau;
- improved road network, leading to a reduction of costs created by traffic congestion for workers and companies;
- better access to Dorval/Île-Dorval;
- increased business for companies south of the interchange, due to separation of the highway and local networks and a reduction of physical barriers;
- better potential for economic development due to various reasons, including expansion of airport activities and the concentration of transport and storage businesses near the cargo sector of the airport;
- increased development of the industrial sector due to improved access.

In summary, residents, businesses and local governments will benefit from the positive impacts associated with the implementation of the Dorval interchange. However, it is difficult to assess the impact in exact monetary terms.

4.2.5 Visual Impact Assessment

Construction Phase

Understandably, most activities during the construction phase itself will have a visual impact on the area, given the presence of the worksite. But the impact level on the various groups (residents, transport network users, visitors, etc.) will vary.

The main group to feel the visual impact of construction will be hotel guests and people living in residential areas near the interchange, along with tourists and visitors. The extended presence of worksites in the visual field of residents and users will lead to deterioration in the landscape quality. This factor must not be overlooked.

The impacts deserve even greater consideration seeing that Montréal-Trudeau is a major gateway to the city. The construction period will thus cause deterioration in the quality of urban life, a reduction in landscape integrity and for visitors difficulty in finding their way around. The level of the impact here is assessed as being average.

Certain attenuation measures can be applied during the construction phase to reduce the impacts on the landscape in the study area. They include:

- Replace destroyed vegetation and provide protection for mature trees before the work begins.
- For each situation, ensure careful arrangement of worksites and deposits of materials to limit direct views of the work zones.
- Close up the worksites to prevent views of the entrance-ways on the part of heavy vehicles and equipment.

Despite the application of these attenuation measures, there will still be an impact to some extent on the visual environment during the construction phase.

Operational Phase

The assessment of the project's visual impact after completion is broken down into three main categories, one for each component of the overall transport infrastructure. These categories are:

- the highway network and the major access route to the airport, which serves as the gateway to Greater Montréal;
- the rail network, which has its own operational parameters and clientele;
- the local road network, which is used mainly by residents and workers in the district, and includes public transport.

The impacts during the operational phase, i.e., after construction is completed, will be felt by users who live or work closest to the structures that will be built under the project. Impacts will also be felt by the creation of the major axis made up of the rail link and airport/highway links that run through several landscape units. These new rail and highway infrastructures will modify the field of vision for each landscape unit to varying degrees.

The project will affect a wide range of user groups, each with its own behaviours, expectations and perceptions. Therefore, the visual impacts have been broken down per infrastructure type in order to identify effective and appropriate corrective measures for each intervention under the project. The main impacts on the landscape have to do with the quality of visual corridors, the loss of a vegetation screen, visual disturbances, and the loss of coherence in the spatial organization of the road network. The majority of visual impacts have been assessed as being average.

Following are the attenuation measures proposed to counter the visual impacts on the landscape:

- Carry out specific actions (trees/vegetation, road fixtures, fringes and sidewalks, lighting) for each component of the transport network to visually reinforce the separation of the regional and local rail/road routes;

- Ensure coherence in the landscaping of this particularly congested and complex sector, in addition to the individual measures for each point of impact;

- Develop a feasible strategy for planting vegetation in the road network, i.e., one that ensures the best possible vegetation growth in such conditions.

These recommendations will serve as the basis for landscape design criteria prior to the development of plans and specifications. Specific attenuation measures are recommended for each point of impact. Following are illustrations of four situations and their appropriate attenuation measures.

1. Visual screen/Buffer zone

Here the creation of a buffer zone will provide an acceptable foreground to offset the effects of visual proximity.

Current

Proposed

2. Visual screen/Enhanced topography

A treed slope will ensure visual closure with an immediate effect. Doing so also limits the impact during all seasons of the year.

Current

Proposed

3. Provide roads with urban features (vegetation, urban fixtures)

Transforming a road into an urban thoroughfare is a visual integration measure that makes it acceptable to users in a highly urbanized setting.

Current

Proposed

4. Massive replanting along roads and at earthfill sites

This measure seeks to establish within a reasonable time a density of plant life that nuances the visual perception in highly urbanized settings. The planting of trees to create a wooded environment will help reach this objective.

Current

Proposed

The impacts of these measures would be as follows:

- 8 situations constituting benefits for the area;
- 4 situations with insignificant impacts;
- 4 situations with low impacts (2 permanent, 2 temporary);
- 3 situations with average impacts (2 permanent, 1 temporary).

The two situations presenting average residual impacts are:

- the overhead crossing of the rail corridor, which presents no opportunity for attenuation;
- the extensive reorganization of the road network in the industrial zone, which would lead to a loss of visual coherence in terms of spatial organization.

4.2.6 Impacts on Archaeological Heritage

The study area does not contain any archaeological site recognized or identified by the Registre de l'inventaire des sites archéologiques du Québec (ISQA). However, the proposed routes for the redevelopment of the road infrastructure have not been investigated for the presence of such sites. To avoid the discovery of any unexpected archaeological sites that could impede the work and harm our knowledge of former human occupation in Québec, the MTQ will conduct an archaeological inventory at the work site areas and in zones containing potential archaeological sites.

4.2.7 Impacts on Heritage Buildings

The analysis shows that the study area and its immediate environment do not contain any cultural property categorized or recognized under the *Cultural Property Act*. The project will thus have no impact on heritage buildings.

4.2.8 Impacts on Traffic Flow

Construction Phase

Impacts on traffic flow during this phase will be minimized because several structures can be built without disrupting the current traffic lanes.

For all phases in the redevelopment of the Dorval roundabout, detours and temporary roads will be built to maintain traffic flow, with the same number of lanes as there are at present. However, the work involved in moving Highway 20 to the south will entail the demolition of the Bouchard viaduct (on Boulevard Bouchard, westbound). This work will take two to three years. Drivers will thus have to use alternate routes.

Emergency vehicles leaving the fire station for the Dorval roundabout frequently use the viaduct on Boulevard Bouchard. An effective alternate route must be found for them.

Construction work will also have an impact on the Via Rail station, which must be demolished to allow for the passage of two temporary rail lines. The temporary train station (to be built just west of the current location) will be accessible following demolition of the current station, in order to avoid interruption of service and thus prevent any significant impact. Finally, regarding the STM terminal, once Phase 2 of the construction begins, the bus operations at the terminal will be affected. The terminal will have to be reorganized during this phase.

Construction will also have an impact on pedestrian movement. Therefore, a north-south pedestrian link beneath the rail lines will be in place during all phases of the work.

Operational Phase

In collaboration with the MTQ's transport system modeling division, a model of the road network of the study sector was created using AIMSUN2 software. This allowed for microscopic simulations of the highway network and the adjacent local road network. Following are the conclusions of these simulation exercises:

- Implementing variant 2B will allow a significant reduction in travel time on the highway and local road networks near the airport.
- The project will make it possible to restore acceptable average speeds for the highway and local road networks near the airport.
- Average delays per vehicle will be greatly reduced for the major routes in the airport sector.

The impact of the project's implementation on regional traffic was assessed using EMME/2 software. The simulations showed that optimal implementation of variant 2B will not modify regional traffic on the highways and main roads adjacent to the new interchange and the airport. The only modification will involve the choice of which route to take for vehicles coming from the west. The project will offer a more direct route to the industrial sector via the new interchange and will free up Avenue 55 and local streets from through traffic.

Public Transport

With the implementation of variant 2B, public transport service will be improved due to the lack of congestion on bus routes. The new routes will also be more efficient than existing ones. Furthermore, the placing of bus-stops in the north-west quadrant of the Dorval roundabout and the relocation of the parking lot to the north will allow full parking services to be maintained, will facilitate users' transfers to other buses, and will improve access by buses to the road network.

Signage

The modifications to the interchange will reduce confusion of users, in particular those going to the airport. Signage will be simplified.

Access to Properties

Current accesses to all surrounding properties will be maintained during redevelopment of the Dorval interchange. Modifications of accesses are assessed as being low, and the new conditions will ensure greater safety, thus constituting a benefit for the majority of nearby residents.

Airport Access

The project is designed to provide a direct link between Highway 20 and the airport by way of feeder roads. Access to the airport from downtown Montréal using Highway 20 will thus be greatly improved. Travel time from the local road network will be comparable to what it is now, but under safer conditions.

Emergency Services

Travel time for emergency vehicles will be reduced in all situations with one exception – travel time between the fire station and the airport in the morning will increase by about 30 seconds.

Road Safety

Optimal implementation of the project will bring appreciable improvements in safety, compared to the current situation. The design of variant 2B, with direct access roads linking the highway system to the airport, will reduce the number of user conflict zones. The impact of this variant on road safety is thus positive, with improved safety for the interchange.

Pedestrians and Cyclists

The elimination of regional traffic from the local network will reduce user conflicts and ensure safety for pedestrians and cyclists. The project will have a significant positive impact on their movements in the northern part of the interchange. Here, the creation of a local network of sidewalks and bicycle paths will eliminate the unofficial pedestrian paths created due to a lack of infrastructure for non-motorized traffic. Finally, in the southern part of the interchange, the redevelopment of the Dorval roundabout into two ordinary intersections will facilitate pedestrian and bicycle crossings.

Transport of Merchandise and Hazardous Materials

Road safety standards (in particular, viaduct clearance levels) will facilitate the transport of merchandise and will ensure that hazardous materials can be transported without having to use the local road network, which is currently the case.

Residential Traffic

The level of through traffic in residential areas, including Avenue Cardinal, will decrease with the implementation of the project. The new configuration of the road network will improve traffic flow for the highway 20 and 520 links, which will encourage through traffic to remain on the highway network.

4.2.9 Construction Engineering Impacts

Construction will affect rail traffic, will require the dismantling of a Hydro-Québec power line and will have an impact on the Bell Canada communication towers and on water mains and sewers. **These impacts are assessed as low and in some cases nil or positive.**

4.2.10 Impact on Air Quality

Construction Phase

Construction activities will create a significant amount of particulate matter (PM), which will be produced primarily by excavation activities and by the transport and unloading of backfill and debris. The most sensitive areas will be the residential zones south of Highway 20.

To minimize these impacts, the following attenuation measures are planned:

- Use of dust control equipment to minimize PM emissions.
- Periodic checks and maintenance of heavy equipment.
- Cleanup of roads used by trucks and heavy equipment.
- Watering down of concrete structures during their demolition to limit dust build-up.
- Measurement of PM in suspension by means of precise sensing devices will verify compliance with emission-control criteria.

Seeing that little of the work will be done near residential areas and that attenuation measures are planned, the residual impact will be low.

Operational Phase

The information in this component is taken from a report produced by SNC-Lavalin/Environnement.

The projected impacts on air quality due to the redevelopment of the Dorval interchange will stem from variations in traffic flow, changes in the road network geometry, and changes in the average speeds of vehicles. The impacts were assessed for three sectors in residential areas located north, south-east and south-west of the Dorval interchange, which are considered to be the most affected areas.

The pollutants studied were CO, NO_x gases, benzene and $PM_{2.5}$ gases.

Following are the study's conclusions:

- **The project will not have any impact** on concentrations of carbon monoxide (CO), nitrogen dioxide (NO_2) and benzene in the ambient air. The projected concentrations as modeled were seen to be at levels lower than those required by the standards now in effect. Moreover, concentrations projected to 2016 are lower than concentrations in 2004.

- The project will have significant **negative impacts** in the south-west sector with regard to $PM_{2.5}$ emissions. However, this increase is not due to the new routes but rather to the projected increase in traffic (14% between 2004 and 2016). Impacts will be **marginal** in the south-east and northern sectors.

Rail Transport

The redevelopment of rail transport under the project was analyzed in isolation (as was road traffic) to identify its effects on air quality in the area.

Compared to the current situation (i.e., no rail shuttle), the NO_x, CO, HC and $PM_{2,5}$ emissions due to rail transport will increase from 60.0% to 63.0%.

CO and HC emissions from locomotives will remain negligible, compared with emissions from road vehicles, just as they are now.

However, NO_x emissions from locomotives account for 52.8% of total emissions (road vehicles and locomotives combined). This proportional increase in train emissions is the result of a reduction in road transport emissions and an increase in rail traffic.

Despite increased rail traffic, adding a rail shuttle **should not have a significant impact** on the quality of ambient air in the study area.

Tropospheric Ozone

Tropospheric ozone (ground-level ozone) is, along with particulate matter, one of the major components of urban smog. In the city of Montréal, it has been a source of major concern for many years, because its concentration in the ambient air frequently exceeds the minimum levels set by air quality standards. According to the simulation data provided by the MTQ (see Appendix D), the redevelopment of the Dorval interchange will lead to marginal variations, a reduction in NO_x emissions and an increase in COV emissions. The project will thus have **little impact** on the concentration of tropospheric ozone in the study area.

Impacts on Climate Change

We must place this issue in its overall context, since it is planet-wide concern and not a local source of pollution with direct impacts on the health of the population in the study area. In 2002, Canada is responsible for about 2.0% of the world's greenhouse gas emissions (GGEs), according to Environment Canada's Greenhouse Gas Division. This percentage is decreasing due to the increasing contribution of developing countries. Québec produces about 12.5% of Canada's GGEs (Ministère de l'Environnement du Québec, 2002), and thus 0.3% of the world-wide total.

In 2002, transport was responsible for 38% of Québec's GGEs (0.1% of the world-wide total), according to the Ministère de l'Environnement du Québec. This percentage has been going up since 1990 due to the increase in the number of light and heavy vehicles.

It is being projected that the project to redevelop the Dorval interchange will not have a significant impact on GGE emissions in the region. According to simulation data provided by the MTQ, the project will lead to a slight reduction in CO_2 emissions (243 kg) during the morning rush hour.

In considering the total CO_2, emissions produced during the morning rush hour (6,000,000 kg), **the project will not have any direct effect on climate change**.

Impacts on Public Health

The impacts on public health should be **negligible**. The projected transport routes will not bring any major changes in $PM_{2,5}$ concentrations Also, benzene, CO and No_x concentrations will remain below those set by air quality standards.

Attenuation Measures

The projected routes will not have any negative impact on air quality. Furthermore, new Canadian legislation now governing vehicle emissions of gasoline and other pollutants will help reduce the level of pollutants emitted into the atmosphere by road transport.

However, the projected traffic flows (2004-2016) will show an increase of 14%, which cannot be compensated by even the best performing vehicles and cleaner gasoline.

Most atmospheric pollutants do not present problems for air quality. **But particulate matter and tropospheric ozone are a concern, not just for the study area but for the entire island of Montréal**.

No specific attenuation measures can be applied to the project area. Attenuation measures must apply instead to all of Greater Montréal.

- Roadway maintenance program to reduce the concentration of particulate matter produced by the passage of vehicles.

4.2.11 Impact on the Noise Environment

Construction Phase

The noise impacts felt during the construction phase will come directly from the worksites, with activity of machinery and heavy equipment influencing noise level in the study area. It is difficult at this stage of the project to fully specify the noise impacts. It will be necessary first to organize the worksites and draw up a plan for circulation of the construction vehicles.

However, at this point, we can indicate that attenuation measures for other construction projects can be used. They are:

- Use construction equipment that operates at reduced noise levels.
- Equip vehicles with backup warning signals that adjust their noise level according to the ambient noise.
- Install temporary or mobile acoustic screens near the noisiest machinery.

- Organize the work so that noise levels are reduced at night and during the summer (hottest months).

- Carry out monitoring to ensure respect for, and adequate application of, attenuation measures.

- Establish an Info-line allowing the public to register complaints and to obtain information on the worksite and the attenuation measures in place.

Operational Phase

Three sectors were identified for analysis of the noise environment: one north of the rail lines (north sector) and two south of the rail lines and separated by Avenue Dorval (south-east and south-west sectors).

The projected modifications for the Dorval interchange which could influence the current noise environment are:

- The increased traffic flow at the interchange and on the neighbouring highways (20 and 520), which will add to the noise level in the study area.

- The relocation of several traffic lanes, which will lead to local changes in noise levels – one important example is the addition of two new lanes in the eastern part of the northern sector.

We used the MTQ's assessment grid to interpret the results of the analyses and simulations. No impacts were assessed as being high or average. Impacts are thus low or nil for the study area, and in some areas the new configuration will lead to slight improvements.

Noise due to Rail Activity

With the implementation of the proposed rail shuttle between Montréal-Trudeau and downtown Montréal, the noise from rail activity will increase by 0.8 dBA. This low increase, combined with that of road vehicle noise, will not have any significant impacts on the sectors that will be affected. Including rail noise in the analysis of noise impacts over a full 24-hour period does not significantly change the variations obtained with road noise alone.

Aircraft Noise

As noted in previous sections, the project will not have a significant impact on noise levels from rail or road vehicle traffic, taken together or separately.

Projections by Aéroports de Montréal for 1981-2010 show that aircraft noise will decrease over the long term. This trend is the result of the replacement of aircraft built in the 1980s and 1990s by new ones that meet more stringent noise level standards. Depending on the actual amount aircraft noise decreases in the future, there could be an overall decrease in noise levels (including all types of transport) in certain parts of the study area.

Thus, the projected routes will not have a negative impact on the noise perceived by residents. Although noise levels vary from low to high for all noise sources in the study area, the MTQ assessment grid indicates no significant impact (varies from nil to low).

No attenuation measures appear to be necessary for the project. However, if the projected residential development in the south-west sector goes ahead, integrated attenuation measures (anti-noise screens and acoustic soundproofing of buildings) will be necessary.

4.3 ASSESSMENT OF IMPACTS ON THE BIOPHYSICAL ENVIRONMENT

It is very important to note that the project consists in redeveloping road infrastructures and a rail line right-of-way, but without changing the current boundaries of these infrastructures. The components of the biophysical environment that could be affected within this area are thus limited to:

- surface water;
- groundwater;
- soil quality;
- the natural environment.

4.3.1 Impacts on Surface Water

During the construction phase, heavy rains could lead to water accumulation at the bottom of excavations. They could also deposit suspended particulate matter in the surface water. The potential impact on the quality of surface water is assessed as average.

Certain attenuation measures will reduce the projected impacts. The main measures are:

- Pump water out of excavations and send it to sewers provided that doing so respects the environmental standards for water quality set out in Regulation 87 of the CMM.

- Where these standards can not be met, the pumped water will be stored and sent to an authorized treatment site.

- It is recommended that groundwater quality be checked before pumped water is sent into a sewer system.

- Avoid carrying out major work during heavy rain.

- Install a sediment filtration system to limit the deviation of suspended particulate matter into water run-off.

- Dispose of excavation materials at landfill sites in accordance with the regulations in effect (Qualitas report).

- Avoid obstructing ditches and clear away all debris that prevents the natural flow of surface water.

The residual impact is thus assessed as low.

It is projected for the operational phase that there will be an increase in some polluting substances in run-off water, such as metals, abrasives and de-icing salt, caused in large part by vehicle traffic. This increase will not be significant due to the limited increase in road routes, as compared to the current situation.

The impact will be reduced by the implementation of equipment for managing run-off water quality, i.e., a system that continuously separates sediments, heavy metals and oil left by daily traffic. The residual impact of the project should thus be low.

4.3.2 Impacts on Groundwater

During the construction period, excavation work will be the main source of impacts that could change groundwater quality.

Implementation of the rail route and certain road axes will require soil excavations over long distances, ranging from 6 m to 8 m in depth. The water that is found in these excavations will consist of a mixture of groundwater seepage and run-off water. Vehicle traffic is the main potential source for the contamination of run-off water, and there is always the possibility of accidental spills of toxic or hazardous substances.

To keep the bottom of excavations dry, water will be pumped from them and disposed of in the sewers, provided that doing so respects environmental standards for water quality. Pumping could lead to a decrease in the groundwater level near the excavation sites and could modify the flow of groundwater towards the sites. This decrease could in turn produce settling, particularly of clayey soils on nearby lands. However, the temporary nature of the excavations should limit this impact.

It is important to note that, given the low permeability of natural soils on the site, the pumping of water into the drainage network should be limited to the sectors immediately adjacent to the excavations.

The impact is thus assessed as low.

The following measure is planned to attenuate the intensity of the impacts associated with this work:

- The response to any accidental spill of hazardous materials during excavations will be subject to an evaluation plan and emergency recovery measures. The management of recovered substances must meet the requirements of the regulations governing hazardous materials.

The residual impact is thus assessed as low.

Operational Phase

The final configuration of the redeveloped area will not have a negative impact on groundwater quality. Nevertheless, the project includes plans for having structures to separate oil and sediment at various locations in the drainage system.

With regard to groundwater flow, the presence of drainage structures (drains and relatively permeable embankments will create a lowering of groundwater levels near the structures. But as with the pumping that will be done during construction, this lowering will be less and less the further one goes from the excavation sites. These structures will thus modify the direction of groundwater flow towards the transport structures built there.

The projected impacts during the construction phase will also be present during the operational phase (i.e., impact on groundwater management and settling). However, unlike during the construction phase, lower groundwater levels will become permanent. The impact assessment is the same as for the construction phase, apart from settling that could occur due to the permanence of the drainage structures.

The possibility of significant settling depends on several factors, including the geometry of the transport structures and the geo-technical properties of the on-site soil. The data obtained by on-site geo-technical studies indicate, however, that the possibility of settling is low, except where the Via Rail building is located.[5]

Thus, the **potential impact is assessed as low**, and no attenuation measure is planned because the residual impact will also be low.

[5] Laboratoire de Béton ltée., Effet du rabattement de la nappe, Carrefour Dorval, Scénario N-1, Phases I et II, Réf.: B14416-rap-005, August 15, 2001 (Effect of groundwater setting at the Dorval interchange – Scenario N-1, Phases I and II)

4.3.3 Impact on Soil Quality

The construction of new road and rail infrastructures will require major excavation and landfill work, which constitutes a potential contamination risk for the soil near the excavated sites. The impact is assessed as moderate

Certain attenuation measures will considerably reduce the impacts of the construction work on soil quality:

- Compliance with the MENV's contaminated soils management grid (Appendix D), according to which soils categorized lower than 'C' can be re-used on the site, while those above 'C' must be transported away from the site and disposed of in authorized areas or decontaminated on the site for re-use, depending on their contamination level.

- Application of the MENV's *Policy for Protection of Soils and Rehabilitation of Contaminated Lands* and compliance with the requirements in the *Land Protection and Rehabilitation Regulation* governing the environmental quality of soils left in place during the construction phase.

- Compliance with the *Environment Quality Act*, in particular Section IV.2.1, which deals with the expropriation of certain lands. To ensure compliance , a characterization study certified by an expert is required for lands on which a change in use is planned and on which an activity listed in Appendix III of the *Land Protection and Rehabilitation Regulation* has taken place.

Following the application of these measures, the residual impact is assessed as positive.

In the operational phase, there will be very few impacts on soil quality. However, accidental spills could lead to soil contamination. This impact is assessed as low. Following is the attenuation measure for dealing with accidental spills:

- The response to any accidental spill of hazardous materials during excavations will be subject to an evaluation plan and emergency recovery measures. The management of recovered substances must meet the requirements of the regulations governing hazardous materials.

The residual impact is thus considered to be low.

4.3.4 Impact on the Natural Environment

The project area is located in a highly urbanized area with limited natural spaces that have undergone numerous perturbations. This is especially the case with the sector that will be affected by the work. Apart from the few green spaces (which in many cases are developed), the assessment has not found any natural habitat free or almost free of perturbation. Nor are there any wildlife or plant habitats within or near the project area.

The natural environments in the study area no longer perform their intrinsic biological functions. These green urban spaces have lost most of their ecological value and their function now is merely aesthetic and recreational.

There are no endangered or vulnerable species that could be affected by the project.

The only area that could be affected is the Bouchard stream in the north of the study area. But, considering its current biophysical characteristics, the negative impacts on the quality of its water are assessed as low.

Because the study area is largely urbanized, there will be no impact on agriculture and forestry.

4.4 SUMMARY OF IMPACTS

The assessment of the impacts on the various components of the human and biophysical environments shows that most of the major negative impacts created by the project will be felt during the construction phase. Figure 4.1 and Table 4.1 summarize the impacts during the construction and operational phases.

The environmental components affected the most by the construction phase of the project are related to the following:

- human environment;
- visual environment;
- quality of air, soil and surface water;
- traffic flow.

We also note that after attenuation or improvement measures are applied, the project will have very few significant negative impacts. Indeed, the majority of residual impacts will be very low. There are, however, some impacts of average intensity that will be found in the human and visual environments.

During the operational phase, the project will create numerous benefits for several components in the environment, such as:

- traffic flow (public transport, emergency services, transport of merchandise, occasional road network users, and residents);

- the local community;
- the local and regional economy;
- soil quality;
- landscape (in particular at the district's entry point);
- urban planning and development;
- land use.

To summarize, there will be very few negative impacts of the project during the operational phase. The ones that have been identified concern the visual aspect (low to average impact) and the quality of run-off water (low impact).

The impact assessment also shows that during the operational phase the project will bring genuine benefits to the human environment, with very little negative impact on the biophysical environment. Despite these expected benefits, it is important to note that the project's success in protecting and improving the environment during the construction phase will depend in large part on the preparation phase (specifications, worksite organization, traffic flow controls, etc.), which remains to be defined.

IMPROVING THE LAND TRANSPORT INFRASTRUCTURES IN THE VICINITY OF MONTRÉAL-TRUDEAU AIRPORT

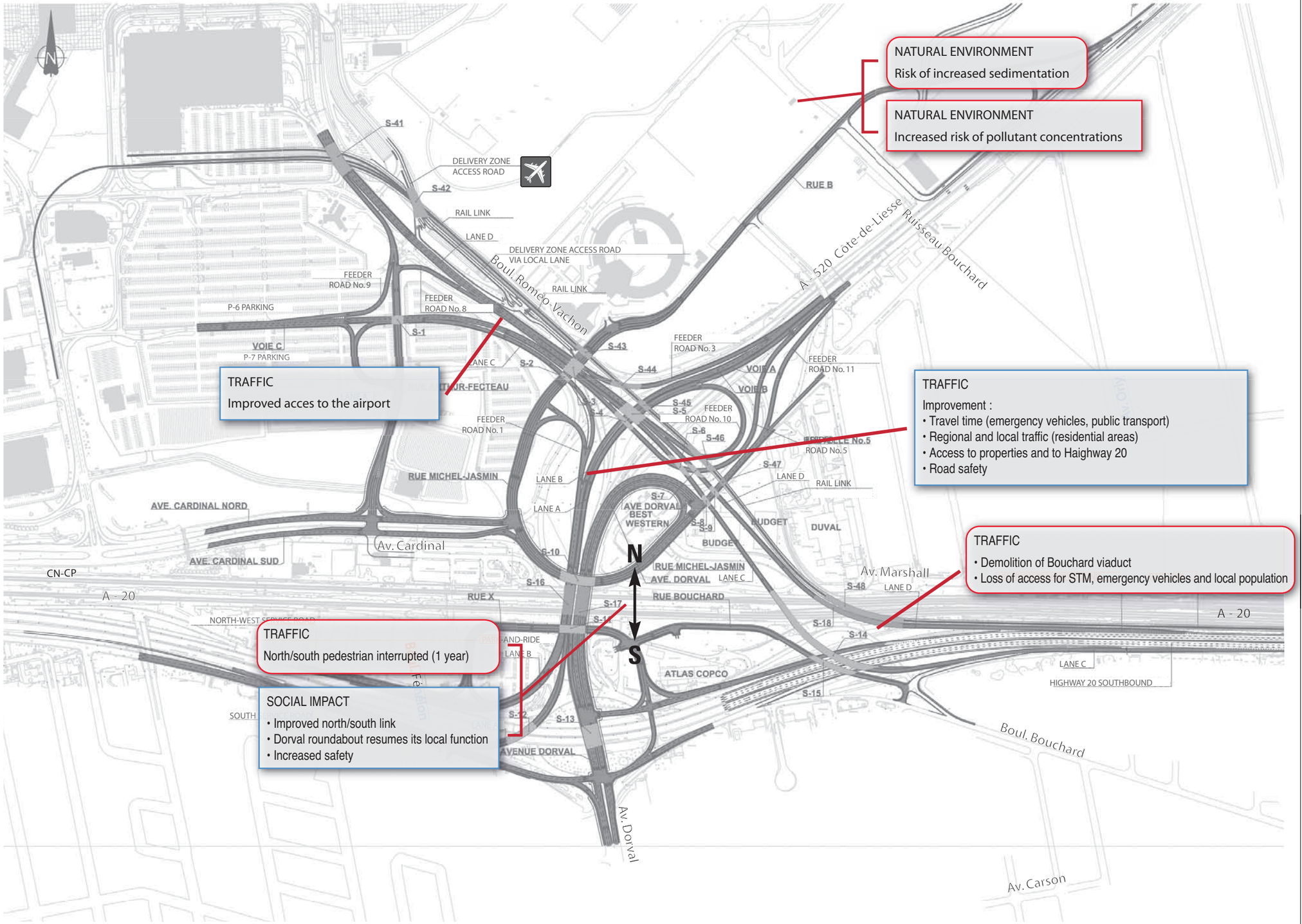
ENVIRONMENTAL IMPACT ASSESSMENT

Transports Québec

AÉROPORTS DE MONTRÉAL · Montréal · Transports Canada

FIGURE 4.1

SUMMARY OF IMPACTS



Construction phase

Operational phase

Impact négatif

Impact positif

Approx. scale
1 : 10 000

August 2004

Daniel Arbour & Associés
in collaboration with
CIMA · SNC·LAVALIN

Projet :34114 Fichier : 4-1_ang_synthese impacts.ai

Tableau 4.1

CONSTRUCTION PHASE			OPERATIONAL PHASE		
SOCIAL IMPACT	ATTENUATION MEASURES	RESIDUAL IMPACT	SOCIAL IMPACT	ATTENUATION MEASURES	RESIDUAL IMPACT
- increased noise, dust, vibrations - disruption of local traffic and increase in network traffic - complex traffic flow	- near the worksites, maintain traffic signs that meet MTQ requirements - establish vibration intensity limits and monitor them during the work - implement a monitoring program to ensure air quality and noise environment levels conform to applicable regulations and legislation - keep residents and road network users informed of the work schedule and modifications -maintain access to services and businesses near the interchange during the entire construction period - maintain safe and easy accesses for residences and businesses - keep the number of access roads used by heavy vehicles to a minimum	Low	**For district residents** - facilitate vehicle movements between the north and south of the district, improving access to services and businesses there - improved safety of users - better access to public transit - improved movements of non-motorized transport (pedestrians and cyclists) **For occasional road system users** - safer and less complicated link to the airport	None	Positive
IMPACT ON BUILDINGS	ATTENUATION MEASURES	RESIDUAL IMPACT	IMPACT ON BUILDINGS	ATTENUATION MEASURES	RESIDUAL IMPACT
- construction will	- implement traffic	N/A	- few impacts on land use and	- compensation paid to owners and	N/A

disrupt access to businesses and industries near the worksite	management and worksite organization measures to ensure maintenance of land use near the project area		commercial buildings after the construction work (and work stemming from the expropriation of certain properties) is completed; all re-allocations of land use and expropriations under the project will give owners and tenants a quality of life similar to what they enjoyed before	tenants - possible exchange of lands	
ECONOMIC IMPACT	ATTENUATION MEASURES	RESIDUAL IMPACT	ECONOMIC IMPACT	ATTENUATION MEASURES	RESIDUAL IMPACT
See page __ of the report	None	N/A	- improved access to Montréal-Trudeau by land and rail - improved road network, leading to a reduction of costs created by traffic congestion for workers and companies - better access to Dorval - increased business for companies located south of the interchange, due to separation of the highway and local road networks and a reduction of physical barriers - better potential for economic development due to various reasons, including expansion of airport activities and the concentration of transport and storage businesses near the cargo sector of the airport - increased development of the industrial sector due to improved access	None	Positive

Tableau 4.1

CONSTRUCTION PHASE			OPREATIONAL PHASE		
VISUAL IMPACT	ATTENUATION MEASURES	RESIDUAL IMPACT	VISUAL IMPACT	ATTENUATION MEASURES	RESIDUAL IMPACT
- impacts due to creation of rail link and airport/highway links crossing several parts of the project area	- replace destroyed vegetation and protect mature trees before start of work - For each situation, ensure careful arrangement of worksites and deposits of materials to limit direct views of the work zones - Close up the worksites to prevent views of the entrance-ways for heavy vehicles and equipment	Average	- for impacts and attenuation measures, see the full report of the environmental impact assessment		N/A
ARCHAEOLOGICAL HERITAGE	ATTENUATION MEASURES	RESIDUAL IMPACT	ARCHAEOLOGICAL HERITAGE	ATTENUATION MEASURES	RESIDUAL IMPACT
- potential archaeological/pre-historical/ historical sites in the project area	- the MTQ will conduct an archaeological inventory at work areas and sites of potential archaeological interest	N/A	None	None	N/A
IMPACT ON TRAFFIC	ATTENUATION MEASURES	RESIDUAL IMPACT	IMPACT ON TRAFFIC	ATTENUATION MEASURES	RESIDUAL IMPACT
- moving Highway 20 will require demolition of the Bouchard viaduct (2-3 years) - demolition of the Via Rail station - STM: construction will affect operations and use of part of the terminal - construction will	- provide adequate detour signs for users - provide an alternate route for fire trucks, as agreed on by fire department authorities - provide an alternate route for buses on the 190/195 routes, as agreed on by the STM - temporary relocation of the station to maintain services - redevelop the terminal in phase 2	Low Low N/A Low	- reduction in regional and district traffic - better access to public transport - better access to airport, properties and highway 20 - shorter travel time for emergency vehicles - improved road safety - improved	None	Positive

require relocation of pedestrian/cyclist paths	and ensure that it is accessible throughout all construction work - provide pedestrians with a north/south link under the rail lines throughout the work		pedestrian/cyclist networks in the entire area		
CONSTRUCTION ENGINEERING IMPACT	ATTENUATION MEASURES	RESIDUAL LINKS		ATTENUATION MEASURES	RESIDUAL IMPACT
- construction will affect rail traffic, Hydro-Québec lines, Bell Canada lines, and the storm water/sewer system	None	Low			

Tableau 4.1

CONSTRUCTION PHASE			OPERATIONAL PHASE		
IMPACT ON AIR QUALITY	ATTENUATION MEASURES	RESIDUAL IMPACT	IMPACT ON AIR QUALITY	ATTENUATION MEASURES	RESIDUAL IMPACT
- construction activities will create large quantities of particulate material (PM), produced mainly by excavation, transport activities, and loading of excavation/embankment materials	- use of dust control equipment to minimize PM emissions - periodic checks and maintenance of heavy equipment - cleanup of roads used by trucks and heavy equipment - Watering down of concrete structures during their demolition to limit dust build-up	Low	- the project will not have any impact on CO, NO_2 and benzene concentrations in ambient air; projected concentrations as modeled are at levels lower than those required by the standards now in effect - maximum $PM_{2.5}$ concentrations will increase by about 2.3 ug/m^3 in the project area - impacts will be marginal in other sectors - building a rail link will have no significant impact on air quality for nearby residences - no significant impact on CO_2 emissions - negligible impacts on health	None Environmental control/follow-up to control pollutant emissions Adequate roadway maintenance None None None None	Nil Low Low Low Positive (slight) Low
IMPACT ON THE NOISE ENVIRONMENT	ATTENUATION MEASURES	RESIDUAL IMPACT	IMPACT ON THE NOISE ENVIRONMENT	ATTENUATION MEASURES	RESIDUAL IMPACT
- use of machinery and heavy equipment will affect the noise	- use construction equipment that operates at reduced noise levels - equip vehicles with backup	N/A	- the projected routes will not have a negative impact on the noise	None	Nil to low

environment in the project area	warning signals that adjust their noise level according to the ambient noise - install temporary or mobile acoustic screens near the noisiest machinery - organize the work so that noise levels are reduced at night and during the summer (hottest months) - carry out monitoring to ensure respect and adequate application of attenuation measures - establish an Info-line allowing the public to register complaints and to obtain information on the worksite and the attenuation measures in place - create 'problem-solving' committees to manage impacts on the sector		perceived by residents; although noise levels vary from low to high, the MTQ assessment grid indicates no significant impact		
IMPACT ON SURFACE WATER	ATTENUATION MEASURES	RESIDUAL IMPACT	IMPACT ON SURFACE WATER	ATTENUATION MEASURES	RESIDUAL IMPACT
- movement of heavy vehicles, excavation and earthfill activities, and the work overall, are the main sources of impacts that could affect surface water quality	- pump water out of excavations and send it to sewers, provided that doing so respects the environmental standards for water quality set out in Regulation 87 of the CMM - where these standards can not be met, the pumped water will be stored and sent to an authorized treatment site - it is recommended that groundwater quality be checked before pumped water is sent into a sewer system - avoid carrying out major work during heavy rain	Low	- creating direct road links and redeveloping the local network will increase the surface area that is already permeable and will thus increase the volume of run-off water	- existing retention basins will be modified to ensure respect fordrainage and wastewater disposal conditions - implementation of a system to manage surface water quality by continuously separating sediments, heavy metals and oil left by daily traffic	Low

	- install a sediment filtration system to limit the deviation of suspended particulate matter into water run-off - dispose of excavation materials at landfill sites in accordance with the regulations in effect - Avoid obstructing ditches and clear away all debris that prevents the natural flow of surface water				

Tableau 4.1

CONSTRUCTION PHASE			OPERATIONAL PHASE		
IMPACT ON GROUNDWATER	ATTENUATION MEASURES	RESIDUAL IMPACT	IMPACT ON GROUND WATER	ATTENUATION MEASURES	RESIDUAL IMPACT
- excavation work will be the main source of impacts that could change groundwater quality	- response to any accidental spill of hazardous materials in excavations will be subject to an evaluation plan and emergency recovery measures; management of recovered substances must meet the requirements of the regulations governing hazardous materials	Low	- permanent lowering of groundwater levels and local change in the direction of groundwater flow	None	Low
IMPACT ON SOIL QUALITY	ATTENUATION MEASURES	RESIDUAL IMPACT	IMPACT ON SOIL QUALITY	ATTENUATION MEASURES	RESIDUAL IMPACT
- construction work will be the main source of impacts that could change soil quality	- compliance with the MENV's contaminated soils management grid - application of the MENV's *Policy for Protection of Soils and Rehabilitation of Contaminated Lands* and respect of the requirements in the *Land Protection and Rehabilitation Regulation* - Compliance with the *Environment Quality Act*, in particular Section IV.2.1, which deals with the expropriation of certain lands	Low	- accidental spills could lead to soil contamination	- response to any accidental spill of hazardous materials in excavations will be subject to an evaluation plan and emergency recovery measures; management of recovered substances must meet the requirements of the regulations governing hazardous materials	Low
IMPACT ON NATURAL ENVIRONMENTS	ATTENUATION MEASURES	RESIDUAL IMPACT	IMPACT ON NATURAL ENVIRONMENTS	ATTENUATION MEASURES	RESIDUAL IMPACT
- contamination risk for the Bouchard stream (sediments and pollutants)	- install a sediment filtration system to limit the deviation of suspended particulate matter into water run-off	Low	- following construction of the route crossing the Bouchard stream, winter maintenance (i.e., use of ice-melting material and abrasives)	- meet MTQ standards for de-icing material and abrasives (Winter Standards for Highway Structures) - response to any accidental spill of hazardous materials in excavations will be subject to an evaluation plan	Low

			and other road pollutants such as accidental toxic substance spills, will add pollutants to the stream, affecting its quality	and emergency recovery measures; management of recovered substances must meet the requirements of the regulations governing hazardous materials	

5. EMERGENCY MEASURES AND PUBLIC SAFETY

An emergency measures plan will be in effect for responding to emergency situations during the construction and operational phases. Several organizations, including the City of Montreal and MTQ's Direction territoriale de l'Île de Montréal, will be involved in the plan.

This MTQ branch, which covers the entire Montreal region, has several instruments and overall intervention methods in place for effectively responding to an emergency situation. Managing the emergency measures for the highway network will be the responsibility of the MTQ during the construction phase and operational phase of the project for improving the land transport infrastructures in the vicinity of the Montreal-Trudeau Airport.

The Departmental Public Security Plan (last updated in March 2004) constitutes a reference document explaining the organizational structure for emergency response. It sets out the coordination of response activities by government partners in the event of a disaster and identifies 22 highway risks, along with a specific intervention strategy for each one. It also includes a telephone directory of inside/outside resources and consultants providing expertise in the various areas of emergency response.

6. MONITORING/FOLLOW-UP PROGRAMS

The project to improve land transport infrastructures in the vicinity of Montréal-Trudeau Airport will include monitoring and follow-up programs to ensure that it runs smoothly and to ensure compliance with legal requirements during both the construction phase and the operational phase (i.e., after creation of the new infrastructures and redevelopment of the area).

6.1 MONITORING PROGRAM

Monitoring of the project to redevelop the Dorval interchange will be carried out in three phases, as follows:

Phase 1: Before construction starts, i.e., when the preliminary and final plans and specifications are drawn up (including the work to obtain the construction authorization certificate and to send out the call for tenders).

During this stage, all attenuation measures set out in the environmental impact assessment report (Chapter 4), along with all specific requirements related to the authorization certificate, are integrated into the plans, specifications, and tender and contractual documents.

Phase 2: Construction Phase

Over the entire construction phase, it will be necessary to ensure that the plans and specifications (contractual clauses) comply with all environmental standards, directives and measures. These clauses will allow for the application of the attenuation measures set out in Chapter 4 of the environmental impact assessment report.

During the construction phase, the following elements will receive special attention:

- Traffic flow and safety
- Archaeological sites
- Keeping the public informed
- Noise environment
- Vibrations
- Air quality
- Excavated soils management
- Management and treatment of drainage water and protection of the Bouchard stream

Phase 3: Operational Phase and Maintenance of the Road Infrastructure

For several years following the completion of the construction work on the interchange, the MTQ will make periodic inspections. If necessary, attenuation measures regarding the use and maintenance of the sector will be developed. Maintenance work will be performed for two years on the landscape redevelopment carried out under the project.

6.2 ENVIRONMENTAL FOLLOW-UP

The main objective of the environmental follow-up program is to confirm the validity and accuracy of the impact assessment carried out in the pre-project phase and to validate the effectiveness of attenuation measures implemented to minimize the real impacts of the project. Even though the project entails few major environmental impacts, three elements will be subject to follow-up: noise environment, air quality and landscape redevelopment.

A preliminary follow-up plan will be developed for these three elements and reports on the activities carried out under them will be submitted to the Ministère de l'Environnement du Québec. These reports will include recommendations and corrective measures, as required.

CONCLUSION

The Ministère des Transports du Québec and its partners – Aéroports de Montréal and the City of Montreal – have developed a project for improving the land transport infrastructures in the vicinity of the Montreal-Trudeau Airport in order to ensure better transport conditions, to foster Montreal's economic development and to support the important efforts being made to help Montréal-Trudeau maintain its status as an international airport.

In addition to these economic and strategic objectives, the project also seeks to:

- ensure environmental protection in the project area;
- promote sustainable development, in particular by creating a right-of-way for a rail link between the airport and downtown Montreal and by implementing measures to promote inter-modal transfer to the public transport system;
- bring about improved safety conditions for all transport modes in the project area (road, pedestrian, bicycle, public transport);
- provide enhanced reliability of the land-air transport link for persons and goods, through the development of efficient interconnections linking the road system, public transport infrastructures and the airport;
- meet citizens', users' and interested socio-economic groups' expectations that were identified by the major perception study conducted as part of the development of the project to ensure that there was broad consensus for the project and that it met with the approval of local residents;
- ensure the appropriate integration of its components into the surrounding urban environment.

The assessment of the impact that the project's components will have on the human and biophysical environments shows that it will not have a high residual impact and that the majority of impacts will be felt only during the construction phase. During the operational phase, despite some negative impacts, the project will create significant benefits for several environmental elements, such as traffic flow, the local and regional economy, the local community and users of the road system.

Moreover, the project's plans and specifications will include all attenuation measures identified by the impact assessment. The application of these measures is necessary to maintain the integrity of the environment and to meet the needs of the local population by improving the quality of life in the district.

The MTQ and its partners are convinced of the project's value and the need for its implementation to promote the well-being of Montreal's residents and the region's development through solutions that meet the wishes of local residents.