Develop the Underground Space with a Master Plan or Incentives

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ABSTRACT

We spoke abundantly during the previous conferences on the construction methods used in the underground as for tunnels. Unfortunately, we little spoke about planning and almost never about the control of its development. This conference will uses the Montreal underground city as an example, because it is one of the oldest (45 years) and maybe the most extensive of all the indoor pedestrian networks in the world, where a pedestrian can walk in it, along its 32 km of corridors, tunnels and shopping centres without going outside. However, the Montreal indoor city has never being subject to a global pre-established master plan, its extension being the result of a series of project approved by the City since 1962. We will see why, in spite of some attempts to adopt an underground city master plan, the indoor city represents a coherent indoor pedestrian network.

1. INTRODUCTION

The Underground city of Montreal extended without ever being driven, since its creation in 1962, by an initial master plan. Of course, we have to consider that in this early period the vast majority of the North American cities never had a master plan. Indeed, the practice of the fifties and the sixties went rather toward a control of the urban development using regulation tools, as the zoning. It is very difficult to claim that with an initial master plan the Underground city of Montreal would have better developed. The approval project by project allowed the development of a huge scale protected pedestrian network which contains remarkable qualities, as a protection against the bad weather, an incentive in favor of the use of the public transport and an attraction for the downtown commercial activity and the tourism. Of course, some mistakes have been done in the past, but they were corrected by a consequent and fast adaptation of the rules and incentive tools used by the City.

2. LEGAL BACKGROUND OF THE UNDERGROUND PROPERTY RIGHTS IN CANADA

Before examining the case of the Montreal indoor pedestrian network, let us look at the meaning of the concepts beyond when we speak about underground property rights. The western authors in land property matters teach us that the property right contains generally the ground level as such, but also the air space overhanging the land and its subterranean space going to the center of the earth. The right to build on private property is however limited on one hand, by the limitations related to mineral resources and archaeological artifacts discovered on a site, which become then property of the State, and by the rules of zoning promulgated by a municipality for the public interest. An investor can thus build there what he want, such as car park or a shopping centre, but being subject to the above rules. We have also a public domain, property of the city, with its streets and parks, and a municipal private domain, with lands acquired on the market. The City can sell on the market those last, as the investors do, and she can rent it by long term lease or the so-called emphyteutic leases. In Montreal, the City can also rent the public domain the same way, as for the space under streets for pedestrian corridors. Like any other landowner, the City can use the land it owns to extend its subway without formalities.
However, the City cannot encroach on private property, whether it is on the surface or underground, without having complied with some formalities stipulated in the expropriation law. As far as the metro is concerned, the law allows the City to dig a tunnel under any private property at a depth of more than 10 meters. As soon as work begins, the City becomes the owner of the volume occupied by the tunnel as well as of a 5 meters thickness surrounding the interior concrete wall of the tunnel, all this without formality or indemnity to the landowner. It also becomes the holder of a legal servitude established in favour of the volume of the tunnel and restricting the stress applied to the upper surface of the volume to 250 kilopascals. If the planned metro station and its tunnels are not located deeper than 10 meters or when the City must go to the surface to build the station access, it must acquire the property right of this land by concluding an agreement with its owner expropriation or, if not possible, by expropriating him.

3. THE CONTROL OF THE URBAN DEVELOPMENT IN CANADA

Municipal planning can be divided mainly into 2 fields, the adoption of a master plan and its implementation by means of zoning bylaws, building permits, etc. The municipal official plan or master plan, as the council and citizens’ guide, describes how land should be used and it gives a direction for planning activities and for public and private initiatives related to the physical environment. The master plan also serves as a framework for regulations and zoning, which have to be written in conformity with the plan. Though, the master plan allows to evaluate the private projects submitted to the planning department and to inform the public about the local planning issues.

The most well known implementation instrument of a master plan in North America is the zoning. A zoning bylaw is a legal document that states exactly which land-uses are permitted in each zone and gives standards for issues like lot size, building height, density, setback from the street, parking places, signage, etc. Unlike the master plan, the zoning-bylaw contains legally enforceable regulations against property owners. Developments that fail to comply with the bylaw are generally not permitted and the construction permits cannot be delivered. In this system, the municipality don’t have choice that to wait for the developer to show up. We often said about the zoning that by wanting to prevent the worst, it often only eliminate the best.

In their search for flexibility to deal with developers, municipalities have found another solution, the so called restrictive zoning. This means low density or lower building height, resulting in the quasi-impossibility of profitable developments in a zone. To get a piece of land and thus making possible a development, an investor has to apply for a zoning amendment. That is the point where there are benefits for the municipality who may decide to change the zoning in compensation of some improvements given by the investor to its project. The result is that the municipality is more independent but the developer may go to another municipality to try to sell his project.

Finally, another development control tool, and maybe the most interesting one, because municipalities can negotiate more freely with investors, is the project easement or development agreement. Municipalities can thus get from the investors some projects improvements for the community, in exchange of extra building height helping the developer to realise a more profitable development. It is how the Montreal Underground City has been developed since 1972. A condition for this kind of “city - developer partnership” is that the increases in height or density must be permitted by considering all its negative and positive impacts, and that the project been approved by the municipal council.

4. THE FIRST PLANNING ATTEMPTS OF THE UNDERGROUND IN MONTREAL

Some attempts to adopt real master plans for the pedestrian network have been made at various periods of its development. It is during the second half of the 50s that the contemporary era of the Montreal downtown really begins. The Canadian National Railways (CNR), the owner of the Central Station decided, in 1958, to go ahead with the realization of the Place Ville-Marie, to be located also on the top of the railway trench, just north of the Central Station. This 3 ha real-estate complex, inaugurated in 1962, will become the most spectacular feature of the new city center, giving birth to
the underground city thanks to the construction of two tunnels, under a large boulevard, connecting
the building to the Central Station. This germ of indoor city will be the work of the Chinese architect
Ieoh Ming Pei and the American city planner Vincent Ponte.

The multiple levels city developed by Ponte will be so convincing that the investors will quickly
imitate it. This concept will be also retains, in 1964, by the property owner of most of the land to the
North of the Place Ville-Marie, who will give to Ponte the mandate to realize the master plan of this 7
ha area. Although realized for a private investor, Ponte will prepare this underground city master plan
in close collaboration with the Planning department of the City. The contents of this master plan will
be however theoretical, developed around a new central avenue lined with buildings interconnected by
indoor walkways at several levels over a distance of 10 km, connecting department stores, hotels,
restaurants, cinemas and shopping malls of the city center. The network would be fed by the clientele
coming from the subway stations, the railway stations and the interurban buses. To be realized in a
horizon of more or less ten years, it will not however be realized entirety in due time, and
nevertheless, the configuration of the indoor city will eventually be quite similar with years.

5. THE LAND USE RIGHTS OF THE METRO AND THE FIRST INCENTIVES

Although the Place Ville-Marie is at the origin of the indoor city, the decision of the City to build its
subway will be the real release mechanism of its development. The City will then begin to use its
conditional incentive measures for the indoor city and build up a real public-private partnership with
the investors. These measures, among five, are the emphyteutic leases, the permission to occupy the
public domain, the transfer of unused lanes, the bonus of density and the development agreement.

5.1 Long term leases

The first incentive used by the City is the leases of the excess land expropriated for the subway. Taking
advantage of the inexpensive purchasing costs, the City had acquired more land than required, both side
of the tunnel, with a view to eliminating slums and to locate a future boulevard on top of the tunnel. In
1964, the construction drawings of the stations were completed and the City, in charge of the Metro,
began to market the excess land around the stations with long-term leases of 63 years. The granting of
the aerial rights, by public tenders, to the best proposal was advantageous to the City and to the
developers. Indeed, the City was assured that the projects would be respectful of the call for tender’s
content, as concerning the minimum and maximum height of the building, the floor area ratio, the need
for construction of a direct access to the Metro station, as well as an entrance from the street and a bus
bay located near this entrance.

The City will require also a public right of way, into the building of the applicant in order to obtain a
protected access from the subway station to the street level. On the other side, the developers were
committed to paying a simple monthly rent for the duration of the long-term lease, without having to
spend a fortune for buying a prime location land. The City sought bids on 11 different sites and in order
to insure a sound coordination of the bidding process, the City set up a coordination committee,
involving its planners, engineers and architects, the Metro operator, the public utilities operators but also
the policeman, the fireman and the lawyers.

5.2 Occupation of the public domain:

The second incentive used to favor the linkage of buildings to the subway is the permission, given to a
developer, to occupy the public domain with a tunnel in return of an annual rent. The City had to adopt
a special by-law, allowing the Public Works Department to prepare a contract with the developer, and
in which is described in detail the occupation of the public domain. This authorization to occupy the
public domain under sidewalks, streets, lanes or parks cannot be transferred to another owner without
the express agreement of the City. The rent is established accordingly to the market value of the
surrounding lands. It may start to $ 1, for an essential linkage to the Metro and when no commercial
space is located inside the tunnel, and reach a rent usually fixed at 10 % of the surface land value. The
applicant must assume the entire responsibility for any damages that could result from the existence or
maintenance of the tunnel he intends to dig. This contract contains a long list of technical and financial obligations to the developer, as relocating the public utilities and repairing the streets and sidewalks, as the cost of maintenance of its tunnel for the whole duration of the agreement. Finally, the City requires from the applicant a public right of way into its (private) building in order to gain an access to the subway station during its hours of operation, from 6 AM to 1 AM. The right-of-way at each level of the proposed building has to be precisely indicated in the construction drawings and annexed to the contract. In counterpart, the applicant will really benefit from the pedestrian flux coming from and to the subway stations, representing potential consumers and of course, profits.

5.3 Granting of laneways

A third type of incentive, used in the past, was the selling of unused laneways, mainly for a reallocation required for the construction of large real estate complexes. In that case, all the adjacent owners of such a lane had to agree first to its closing, allowing him to ask for a municipal by-law enabling the City to transfer the lane from its public to the private domain. Only after, a sale to the developer can be done by the City, the first having an obligation to build a tunnel to the Underground City, and give a public right of way into its future building. This incentive is not used today as the downtown area is almost fully developed and no more unused lane is available.

5.4 Floor area bonus

Until 1990, date of the adoption of our first Master plan, the City never calculated the floor area under the ground level in the FAR of a new project, even if those basements were planned to be fully used for commercial activities. It's worked well in favor of the expansion of the Underground city, acting as a floor area bonus for developers.

5.5 Development agreement

The last and the most powerful tool used by the City to stimulate the expansion of its Underground city is the development agreement, allowing to the developers some softening to the zoning rules. That kind of zoning derogations was offered in return of improvements to their projects, and among them, providing indoor public space and a direct linkage to a Metro station or to an already connected building. The development agreement is usually linked with an occupation of the public domain and a right of way, allowing the Metro users to pass through its buildings. The development agreement is based on reciprocation, and the negotiations between the parties take form of a By-law adopted by the City Council. All the major projects in downtown have been approved by this way.

6. THE LATEST PLANNING ATTEMPTS OF THE UNDERGROUND CITY

6.1 The 1984 indoor city master plan

We will have to wait more than 20 years after the Ponte master plan so that the City begins a planning exercise for its indoor city. The document, prepared in 1984 by the staff of the Planning Department of the City, will be much more concrete than the Ponte master plan, based on the objectives of linking together by pedestrian corridors the subway stations, but also to socio-cultural equipments, to major commercial streets and to large potential vacant sites. The ultimate vision of this master plan was a continuous buckle which would form the central network, around which will extend ramifications towards the surrounding buildings.

Unfortunately, this master plan will not be submitted to the City Council, being not itself framed with a city-wide master plan that the City had not still been undertaken. Its recommendations will be dedicated to the municipal authorities who could use it as reference frame to orientate the future extensions of the network and give to the investors’ clearer orientations. Nevertheless, some extensions of the network will be done afterward, in accordance with these guiding principles. It will be the case while both lines of subway will be connected between them by a pedestrian link between
the Eaton Centre and the Place Ville-Marie in 1993, with of the link of the pavilions of the University of Quebec and the University Concordia to the subway stations, and more recently in 2004, with the almost completion of the South part of the buckle, in the International District.

6.2 The 1992 City Master Plan and its reduced incentives

It will thus be necessary to wait until 1992 so that the City adopts officially its first city master plan, which will arise from a vast consultation. The Master Plan Consultative Committee recommends to allow any new extension of the indoor network financed by the private sector, but to support that agreement by an impact study so that these extensions being subjected to comfort and safety standards for the users. In the final version of the City Master Plan, the place made for the indoor pedestrian network will not be so important, demonstrating that the City will not see the planning of the network as being a priority action. In fact, only the measure concerning the retail space located in the basements will be adopted. We shall now take into account, in the calculation of the FAR (Floor Area Ratio) of a new project, the commercial surfaces in its basements.

6.3 The International District master plan

The last significant extension of the indoor city goes back up in 2003, within the International District project (QIM). This project allowed the indoor city to gain an important east-west link, according to what foresaw the network master plan of 1984. The QIM (Quartier international de Montréal) was responsible for the management of public and private funds needed to realize the project on and under the public domain for the extension of the indoor pedestrian network. The originality of the QIM lies largely in the involvement of the sector’s property owners, regrouped in an association (ARQIM), supporting the project with a voluntary contribution of $8 million made through a local improvement tax. With this regroupment of the private owners, the formula was fruitfull for all the stakeholders because each of the buildings to be built into the district will benefit (individually) from the easements already negociated and obtained from the City by the QIM for the whole District, including the permission to use the public domain for the underground corridors.

6.4 The second City Master plan of 2002

Ten years after its first master plan, it was time for the City to update its content. With the new city-wide master plan, adopted in 2002, the indoor pedestrian network will now part of a global strategy to favour the pedestrian instead of the individual cars. Guidelines are now built-in in the Master plan but the detailed planning for the network improvement may take of couple of years to be adopted.

7. CONCLUSION

We thus saw that with the years, the City of Montreal tried repeatedly to plan the development of its indoor city, but in fact, that it is the incentive tools she used who allowed its harmonious growth. The projects which were the most successful in term of linkage were in decreasing order, the commercial galleries, the office towers, the universities and colleges, the governmental offices and lastly, far behind, the residential projects. What can we conclude with the Montreal example? At first, that the City was not able to force investors to build their projects unless using incentives and zoning easements; and that she would not been able more with a master plan.

The planning and the regulating of the underground space with sustainable development principles is more than a necessity, and it is not a different than what can be done at the surface. It is necessary on the contrary, as we saw it, to use the same planning and regulation tools as to integrate them, knowing however that what we make in the underground is much more durable than at the surface, where we can enlarge or demolish a building. In the underground, any modification is difficult and the return to the initial state of the sub-soil is almost impossible. Any development plan of the underground space should consist of three elements, the PRI, which are:
• The **Planning** and guiding principles, to orientate the development with a master plan;
• The **Rules** and the standards, to frame the realization of the projects, public or private;
• The **Incentives**, used to favour a harmonious development.

### 7.1 The Planning and the guiding principles

The guiding principles aim at directing into a plan the future development of the basement of the city, while respecting the reference frame fixed by the city master plan. These guiding principles should take on an incentive character rather than coercive as are the rules. Although the following principles are inspired by those of Montreal, the fact remains that they could be applicable elsewhere. They aim at favoring the connection to the subway stations, but also at the major institutional equipments and the hotels and convention facilities.

### 7.2 The Rules and the standards

To apply these principles, it will be necessary to adopt standardized rules for the future underground projects or extensions. So, the new projects, as they are built under a building or under the public domain, should respect a series of minimal standards concerning, as examples, the universal accessibility, the changes of levels (elevators, escalators and ramps), the dimensions of corridors (minimum size), the quality of the design (bring natural light, durable materials,…), the uses (activity allowed or prohibited down there), the signage, the opening hours of the corridors, and of course, the safety measures (surveillance, fire protection, emergency exits, etc).

### 7.3 The Incentives

To summarize, it is necessary to know that beyond the measures intended to clarify the legal status of the underground space, beyond a simple physical planning and the adoption of a consequent rules, the Chinese cities will have to give, sooner or later, favorable conditions or incentive measures to the investors to push them to develop also that space. I am not talking here of the public utilities but of the constructions itself, as shopping centers and car parks. Here is maybe the main challenge of tomorrow, which is to entrust gradually to the private sector that responsibility and to allow the municipalities to gradually be disengaged from these works which bring back profits very often and only to the investors. We could call it the **PRI approach: Plan – Regulate – Incite**.

### REFERENCES


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