The Conversion of Under-used Industrial Buildings to Affordable Housing: The Significance of the Urban Context

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BACKGROUND

A number of recent socio-demographic changes have contributed to a shift in housing accommodation away from the traditional North American single-family detached home. Smaller households (down from an average of 4.2 persons in 1961 to 2.7 in 1986), the proliferation of the non-traditional family type (traditional families of working father and stay-at-home mother represented only 17% of all families in 1989 as opposed to 27% in 1980), and an increase in the population of citizens over 65 years old (from 8% of the population in 1976 to a projected 17% by 2011) have created the demand for a housing unit that in many cases is no larger than 1,000 square feet (Poitras and Duff 1988; CMHC 1990). Diminished expectations as well as decreased practical requirements have not altogether eradicated the need for the type of large house that many middle-class North Americans took for granted in their youths, but now these new social conditions have certainly led to a concentration of attention on the part of policy-makers, developers and architects on a type of housing that reflects the changed requirements for a unit that is both smaller and more efficient.

The restructuring of the North American economy away from resource-based activities and labor-intensive manufacturing industries has resulted not only in a greater population concentration around urban centers whose economies are primarily service- and information-based but in the collapse of a crucial segment of commercial power (CMHC 1990). The shrinking prices of the commercial real estate market are projected to continue falling due to an over-supply of urban office space. Property taxes in industrial areas of municipalities on the periphery of large cities are sometimes half the amount as those in major downtown centers, which further exacerbates the situation of industry abandoning the cores of big cities (Fromstein 1994). Not only are new buildings remaining empty, but buildings constructed before 1960 are imperilled since they are becoming increasingly inefficient and expensive to operative as they age and deteriorate. The higher the proportion of unleased space in older buildings, the greater is the likelihood that they will remainunrenovated, which results in a linked pattern of neglect and abandonment which further accelerates the downward spiral of degradation and disuse. With the present economy in stagnation, this dismal state of events seems unlikely to improve over the coming few years.

The ramifications of the current economic situation are experienced in the residential as well as in the commercial realm. Vulnerable purchasing groups such as low- to moderate-income families and first-time home buyers are subject to an affordability gap, a phenomenon whereby the rate of increase of median new house prices has surpassed the rate of increase of median family incomes. Land and infrastructure costs alone had increased to 24% of the total price of a new home in 1982 from 11% in 1949 (U.S. League 1983). Affordability is a major problem for most people considering their first purchase of a house, especially in times of economic uncertainty when lack of job security forces earners to regard their personal financial situations as precarious at best.

Another feature of the changed economic landscape involves the work-at-home phenomenon where mounting numbers of people have opted to transform their homes into working environments and themselves into home-office telecommuters. It is estimated that eleven million Americans already work out of their homes and that one in five major firms participate in such a scheme. The availability, affordability and accessibility of personal computers, software, fax machines and modems have, for many people, outweighed the expense of rented office space; by working from home, a person economizes on office costs which can be channeled directly into business-related resources (Friedman 1994). The benefits of such a manner of working have effects not only on the design of the home environment but on the demand for office space in the already-depressed urban core.

With the relocation of a substantial portion of the residential population to the suburbs, many North American cities have succumbed to urban depression following the exodus from the central residential neighborhoods. With greater numbers of inhabitants on the fringes of cities and fewer

numbers actually living within the cities themselves, the downtown areas experience reduced retail activity, increased crime levels, and a general diminishment in the vibrancy and quality of city life. A strong residential presence downtown is also important in maintaining tax-base requirements. In order to support the essential services of a large city, a solid base of property tax-paying citizens is crucial. When the population drops and the tax base follows, civic upkeep and maintenance suffer, and when the civic quality suffers, even more people are inclined to depart: such a cycle is to be avoided by the active encouragement of sound and affordable neighborhoods in the city centre. When older buildings are reclaimed for residential purposes, not only are people housed satisfactorily in desirable parts of town, but the city's architectural heritage is conserved. Old buildings may be tom down and their sites used for new construction, but the buildings themselves are never truly replaced; once a viable and potentially useful portion of the city's history is demolished, it is gone forever.

As society becomes more aware of the depletion of the earth's natural resources, building practices which use resources efficiently both in the construction and operational phases and which respond favorably to basic design principles to create pleasant and environmentally-sound living spaces can become an essential strategy at all phases of design and planning. If the environmental cycle is viewed in a comprehensive manner which takes into consideration more than simply the energy that a building consumes, and the waste and consumption involved in the demolition of old buildings and the construction of new ones is acknowledged, then one can begin to appreciate the savings to be achieved in energy and resources when older buildings are renovated for extended use and the construction of a new building is avoided altogether. Additionally, savings in infrastructure costs are to be gained by mixing industrial and residential use within the same existing building. A single structure which utilizes sewers and roads for primarily industrial purposes by day and for residential purposes by evening is a building which makes maximum use of available infrastructure. Rather than construct, at added expense, an entirely separate infrastructure to accommodate a solely residential new community, by creating a mixed-use complex in a building which was formerly exclusively industrial, we take advantage of services and amenities already in place and eliminate the need to erect new and otherwise avoidable infrastructure systems.

The idea of renovating and reusing existing older buildings and adapting them for mixed residential and commercial use is not a new one, although most conversions of this type have so far been made in the development of condominiums: a decidedly expensive housing option. This paper, which is based on a report researching the conversion to mixed use of an under-used eleven-story building in the Fur District of downtown Montreal, takes a new and different approach. The authors suggest that two crucial objectives can be combined in this strategy: 1) the reuse of the current oversupply of industrial/commercial buildings in the downtown areas of large cities, and 2) the accommodation of increasing numbers of potential buyers eager to enter the housing market and who want to live close to the urban center. The distinguishing features of such a strategy are the concepts of affordability and of mixed industrial and residential use. Prior to choosing a suitable building for conversion, a proper understanding of the urban fabric is essential.

URBAN FACTORS INFLUENCING CONVERSION

Conversion of industrial or commercial buildings to residential use cannot be regarded as a purely architectural exercise only. The urban context which determines the livability and viability of the project must also be considered. The introduction of a new use to an existing district therefore requires careful analysis of the various related urban factors. A mixed-use district where industrial, commercial and residential uses coexist must respond to the need of cities for an intricate diversity of uses that provide each other with constant mutual support, both economically and socially (Jacobs 1961).

Residential mobility has left a void in the core of cities as suburbs continue to attract residents and contribute to the decline of the downtown population. But it is not only the massive emigration of residents to the suburbs that has affected the make-up of large North American cities. Since the end of the Second World War, the inner city of Montreal has undergone a progressive deindustrialization (Senecal et al. 1990). A decrease in manufacturing in the core has been counterbalanced by an increase of services. Manufacturing has been in decline since the beginning of the 1970s. The downtown area of Montreal has been particularly affected with a loss of 50% of its manufacturing establishments and jobs over the past 15 years (Ville de Montreal 1992). The service sector, however, has expanded significantly: from 1971 to 1986, its relative share has increased from 63% to 75% (Senecal et al. 1990).

The Fur District of Montreal contains 85% of an industry that has played a significant role in the city's history. Buildings of architectural interest house fashion, clothing and jewelry firms in an industrial section of the Central Business District, occupying the blocks adjacent to Mayor and Saint-Alexandre Streets (Figure 1). The structures range from small three-story stores to large 13-story industrial buildings. The buildings which hold potential for mixed-use development are the eight large industrial buildings which, in sum, have a total of 172,000 square metres of floor space. They were once fully occupied by industrial activity but now have an average vacancy rate of 40% to 50%. All these buildings are of industrial concrete construction and therefore have large load capacities; the number of floors range from six to thirteen. In their golden years, all the buildings in the Fur District were used for the fur industry; now all the remaining manufacturers could occupy one or two buildings (Figure 2).

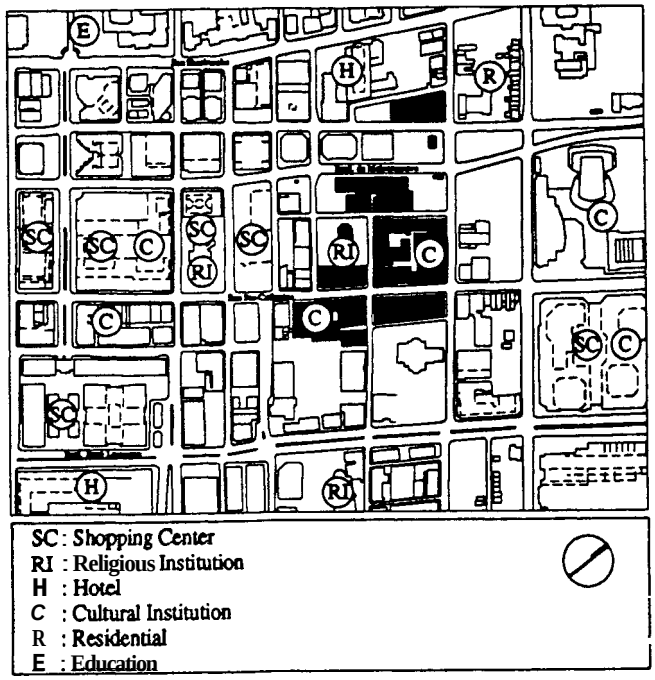

Figure 1: Context Plan of the Fur District
(The shaded areas indicate the designated study area buildings)

The Master Plan for the central area of Montreal (Ville de Montreal 1992) underlines the importance of the Fur District. The Plan states: "Because of real estate development pressure, special measures are needed to incorporate the buildings into their diversified surroundings so that these activities can remain in their present location." The Fur District provides an opportunity to respond to the industrial and residential shifts that Montreal is currently experiencing. Renewing the Fur District for residential and industrial uses will permit the remaining business to survive and will also introduce affordable housing into the core of the city.

Our design objective included the exploration of the urban issues associated with the introduction of residential use in an urban context of a predominantly commercial and industrial nature. The relation between or impact on existing urban structures/systems and their future role in the conversion process was analyzed. The authors questioned how the needs of each use and their consequent urban response affected the quality and nature of the other uses within the urban context. The critical urban components that need to be considered in the conversion process were considered and their relative response to the conversion process identified. The existing conditions of the Fur District in Montreal were studied. A field survey was undertaken, and all the uses as well as the physical characteristics of the buildings and critical urban components of the district were documented graphically and numerically (e.g. circulation, parking, transparency, ground and upper floor use, built and open areas). Two urban strategies were proposed in order to assess the development potential of the district; these strategies were analyzed with respect to the urban components identified in the existing conditions. Conclusions were drawn and general and specific guidelines were suggested.

However well suited a district may be to the needs of industrial establishments, the introduction of residential activity necessitates intervention in order to create an environment where residential, commercial and industrial activities can prosper. Municipal intervention is the first variable in the development of urban strategies. City planning is largely dependent for its success on the quality of the political, social and administrative systems (Holliday 1973). The degree of municipal intervention determines which urban elements will be developed and to what extent. Municipal intervention is necessary in developing aspects related to the public domain such as roads, parks, public parking, public transportation and services. The development of these areas can be viewed as ultimate ends or stages in a development process. However, the city's implication in an urban renewal project such as the Fur District in Montreal is essential: its role may range from simple instigator to planner and coordinator.

The relationship of the Montreal Fur District with the surrounding areas influences the proposals. The deterioration of the adjacent commercial street, Ste. Catherine, with regard to the quality of business and atmosphere that has occurred over the last several years is an issue with which the conversion of the Fur District must reckon. Livability is another factor that governed the proposal of strategies. The goal is to retain industry and at the same time create an environment that is favorable to residential life. The density of the population is an important constituent in achieving this goal. As Jacobs (1961) notes: "The people who live in a district ... form a large share, usually, of the people who use the streets, the parks, and the enterprises of the place. Without help from the concentration of the people who live there, there can be little convenience or diversity where people live, and where they require it." Due to the particular nature of the Fur District, the residential component will most likely form a community of its own. At present, the district is surrounded by commercial activities but very few residential ones. Therefore the density of residents inside the district should be at a level adequate to create a critical mass and a sense of community. The livelinessof a residential area is also significant: it is necessary to produce an environment that has vitality and interest. Safety is another aspect of livability that is to be considered. It is essential to create an environment that discourages crime, i.e., to promote self-surveillance by introducing establishments that attract people at all hours of the day; this would produce a density of people unfavorable to criminal activity. Jacobs (1961) remarks: "A well used city street is apt to be safe. A deserted street is apt to be unsafe." Good lighting is also significant. Sufficient parking and availability of services are also to be considered. Both industry and residences need to have their relevant services available (e.g. stores, grocery, garbage, delivery of goods).

The minimum and maximum potential plans are representations of strategies that introduce residential use into the

	Height in floors	Structure	Facade Material	Vacancy (%)
1	3	Steel	Brick	0
2	4	Concrete	Stone	0
3	3	Concrete	Stone	20
4*	10	Steel	Brick Stone	30
5*	6	Steel	Brick	50
6	7	Steel	Steel	30
7	3	Concrete	Brick	20
8	3	Concrete	Bridt	20
9	3	Concrete	Brick	0
10	3	Concrete	Brick Stone	0
11	3	Concrete	Stone	0
12	3	Concrete	Bridt	20
13*	10	Steel	Brick	50
14	3-5	Steel	Steel	0
15	5	Steel	Stone	20
16	4	Concrete	Brick	20
17*	10	Concrete	Brick	60
18*	12-13	Steel	Bridt	40
19	12	Steel	Brick Stone	30
20	6	Concrete	Brick Stone	20
21	3	Concrete	Stone	50
22*	12	Concrete	Stone	30
23*	11	Concrete	Brick Stone	50

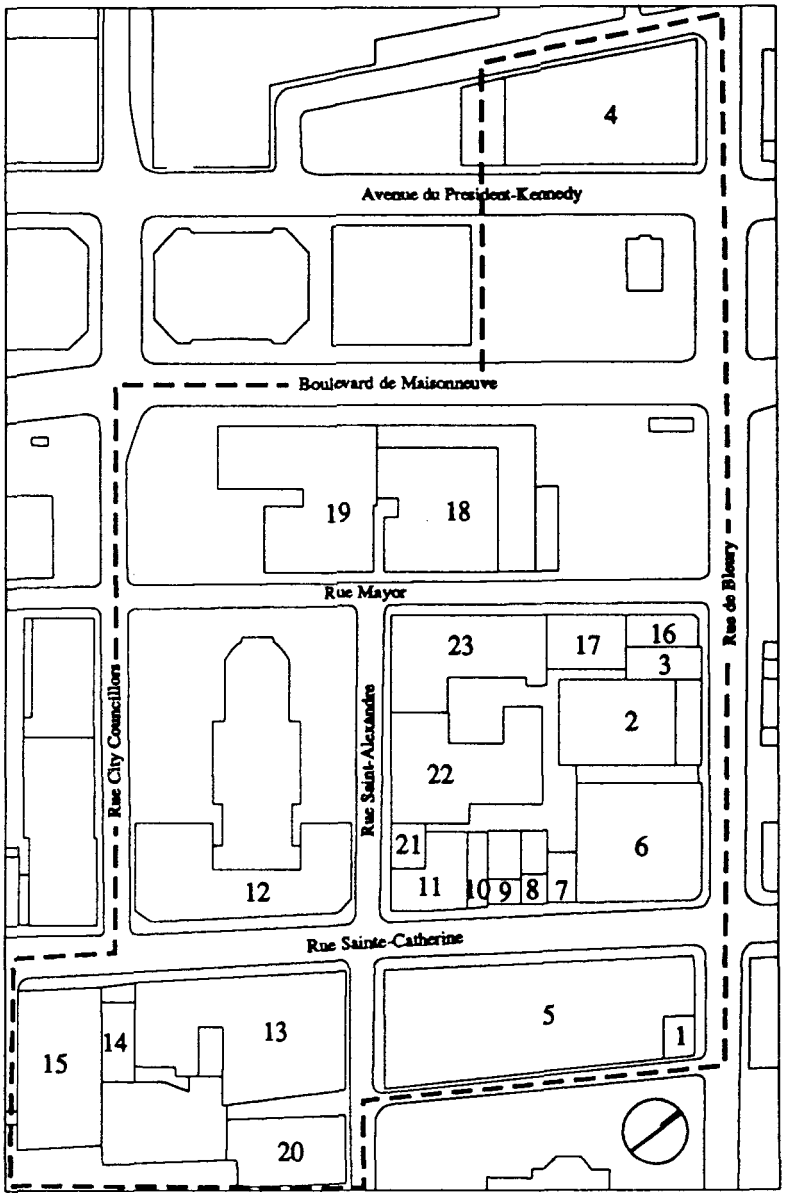

Figure 2
Left: Description of the Buildings in the Fur District
The (*) indicates under-used buildings that hold potential for mixed-use development.
Right: Site Plan of the Fur District
(The dotted line indicates the designated study area)

Fur District. The minimum potential plan, involving the least amount of municipal intervention, is the minimum development on the urban scale required for the introduction of housing in the Fur District (Figure 3). The maximum potential plan, requiring the municipality's involvement in the development process, demonstrates the full possibilities of the district in the development of a mixed-use area (Figure 4). These two plans can be seen as stages in a long development plan or as ends in themselves. Both of them, however, regard the urban context in light of the considerations stated above. In the following paragraphs, the authors discuss the minimum and maximum potential plans and analyze their components.

Circulation

Circulation must provide the residents (both commercial and residential) with easy access to the district. It is important, as well, to consider how vehicles could affect the outdoor spaces with regard to noise, smell and pedestrian activity. The specific needs of industrial, commercial and residential vehicles must also be considered. Delivery of goods and residential circulation must not interfere with each other. The minimum potential plan proposes changes to the circulation of the district that will enhance its outdoor public nature as well as its accessibility (Figure 5.2). Mayor Street becomes a two-way street which would allow vehicles to enter the district from both Bleury and City Councilors, thereby admit-

Suggested Interventions

1.Change street surface material
2.Assume a new 8-story building on the corner of Mayor and City Councillors pending market conditions
3Encourage leisure-related activities on pound floor
4.Upgrade landscape around church
5.Turn Mayor into a two- way street

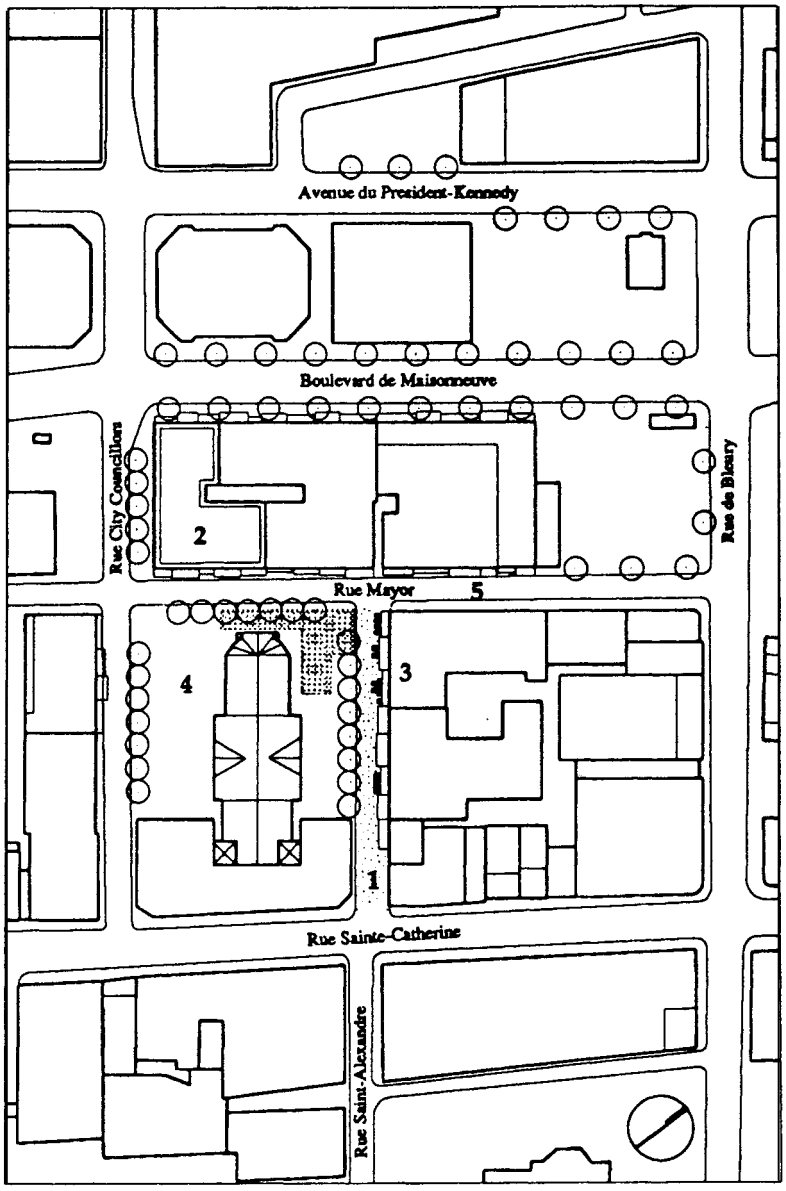

Figure 3: Minimum Potential Plan

ting vehicles from Ste. Catherine Street to the district. At present, the district is only accessible from Bleury which is a one-way street going south. This relatively simple intervention permits the urban integration of the district and the improvement of its functionality. The maximum potential plan proposes turning Mayor into a two-way street, as well as incorporating the existing subway access ways into the new buildings along Bleury (Figure 5.3).

Parking

Parking is a crucial consideration when a large number of residential units are introduced into a certain district. The Master Plan for the downtown area of Montreal (Ville de Montreal 1992) proposes several objectives with respect to downtown parking: eliminate surface parking, limit long-term parking to encourage the use of public transportation, and make parking more available to residents. The present standard for residential parking in downtown Montreal for buildings housing more than three units and with a floor area of more than 50 square metres is a minimum of one space per two units with a maximum of one and a half spaces per unit. One parking place per residential unit would be sufficient due to the fact that the Fur District is located in the downtown core where there is access to public transportation. Furthermore, parking must accommodate both commercial and industrial needs. Shared parking is a solution where extra parking spaces in a building can be rented to the public or to other buildings in the surrounding area. In this way, daytime and nighttime activities can use the same parking spaces. This strategy will ease the parking restraints for other downtown visitors. Access to parking must also abide by circulation patterns and be aesthetically pleasing. Therefore, underground parking is

Suggested interventions

1.Demolish the structure in front of St.James Church
2.Create a square around the Church fully accesible from rue Sainte-Catherine
3.Develop an outdoor park around the church
4.Change street surface material
5.Assume new buildings on the c o r m of Mayor and City Councillors, Mayor and Bleury, Maisonneuve and Bleury, pending market conditions
6.Encourage leisure ground related commercial activities along Mayor and St-Alexandre
7.Create a square on the corner of Maisonneuve and De la Concorde

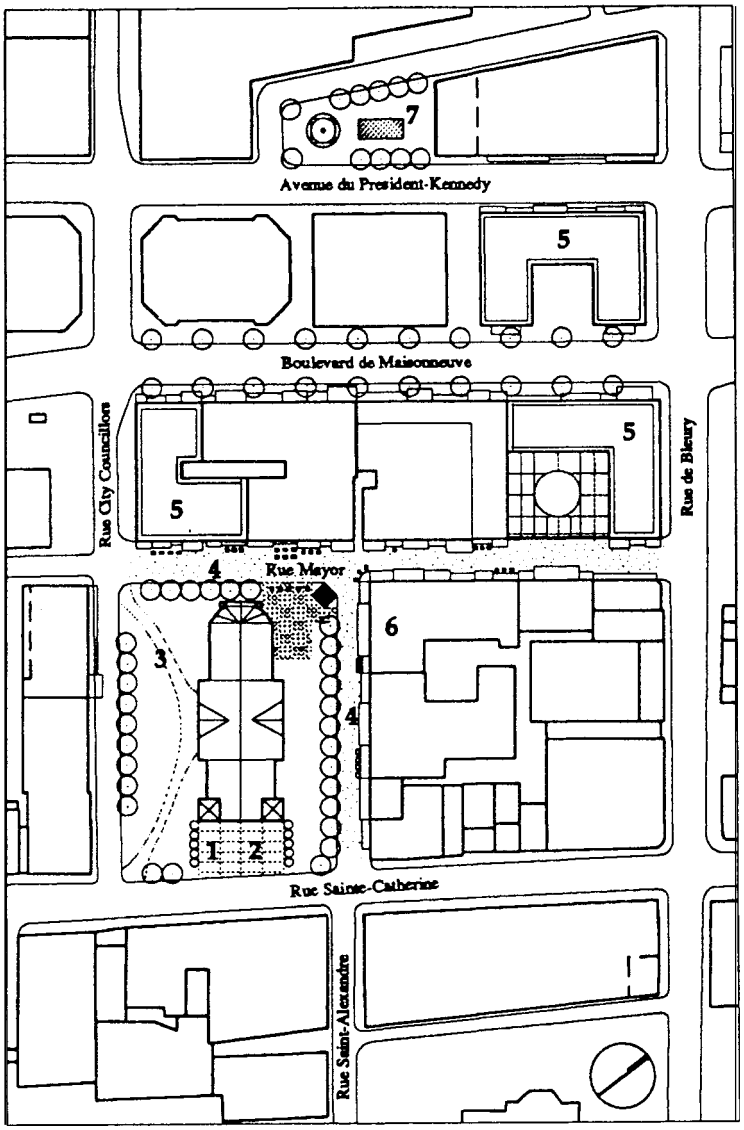

Figure 4: Maximum Potential Plan

favored over above-ground parkmg where valuable potential public or buildable space is taken up. Nevertheless, it is necessary to ensure residential parking by zoning parkmg for residents for certain hours of the day.

The minimum potential plan proposes the elimination of the adjacent church parking lot in favor of outdoor public spaces. Street parking will be limited to residents only at certain hours on St. Alexandre and the north side of Mayor, enforced by street permit parking. The future structure on the comer of Mayor and City Councilors will have an underground parking garage with a minimum of three floors. In all, an estimated 1300 parking spots will be available in the district, representing an increase of 50 spots when compared with the present number. The maximum potential plan proposes limiting parkmg on both Mayor and St. Alexandre to residents only at certain hours, enforced by street permit parking. Underground parking is proposed beneath the streets surrounding the church. This lot would be owned by the city and could therefore accommodate several types of users (i.e., residents, visitors). All new structures would have underground parking and shared use would be encouraged. These proposals for parking would increase the parking capacity by approximately 500 spots.

Access and Ground Floor Use

In order to renew and revitalize the Fur District – to create a sense of neighborhood—it is recommended that initiatives be undertaken to encourage and stimulate pedestrian activity and social interaction. Existing public space must be enhanced through thoughtful landscape and streetscape design. New enterprises and institutions that encourage social activity and provide essential services must also be introduced. Both minimum and maximum potential plans propose to increase the ground floor presence of the buildings by increasing their transparency (Figures 6.2 and 6.3); by doing so, the public spaces are, in essence, expanded to include the ground floors

o **Circulation**

Minimum Plan

- **Turn Mayor into a 2-way street**

Maximum Plan

- **Turn Mayor into2-way street**
- **Incorporate the existing Metro access ways into the new buildings along Bleury**

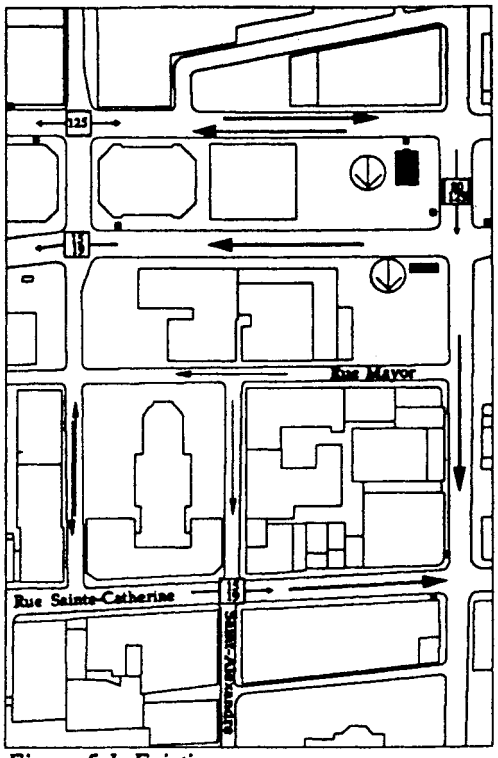

Figure 5.1 Existing

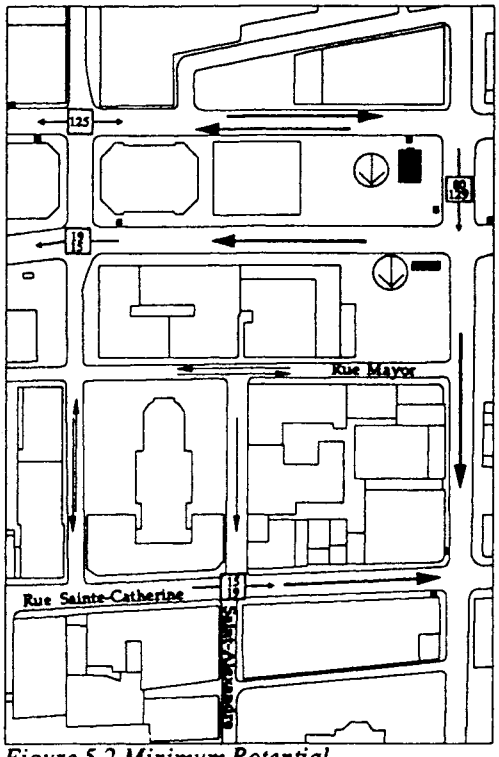

Figure 5.2 Minimum Potential

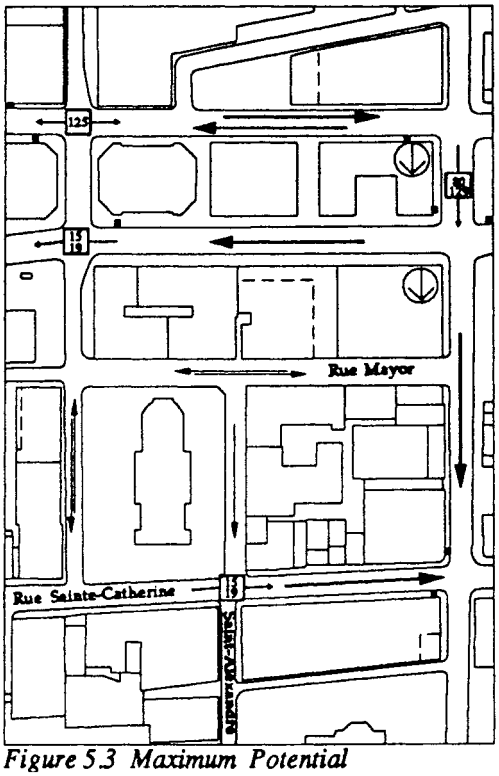

Figure 5.3 Maximum Potential

Bus Line and Route #
Bus Stop
Metro Access
High Traffic
Low Traffic

Figure 5: Circulation

o Access

Minimum and Maximum Plans

- **Introduce openings for commercial activities in the buildings surrounding the church**

- **Encourage pedestrian circulation patterns through the new and existing buildings**

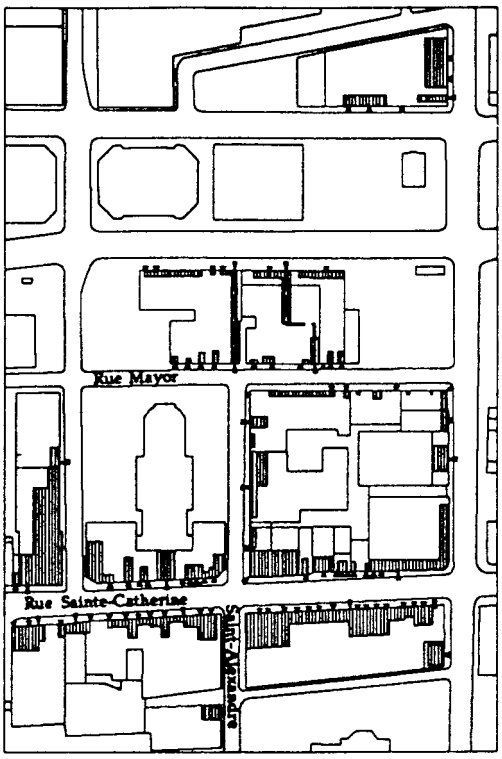

Figure 6.1: Existing

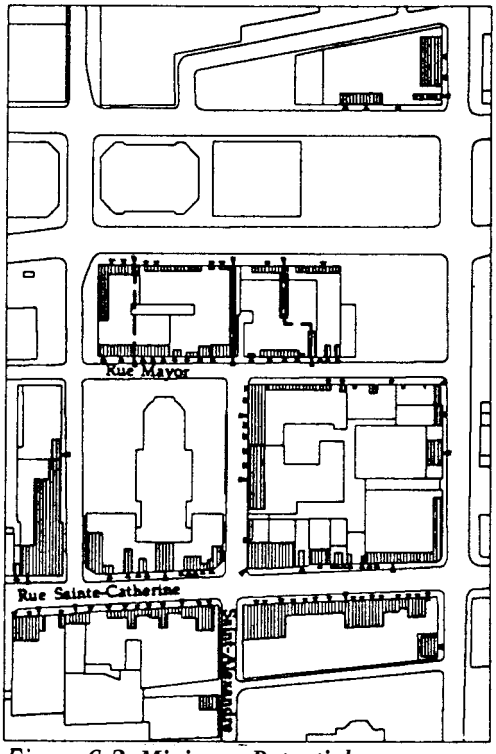

Figure 6.2: Minimum Potential

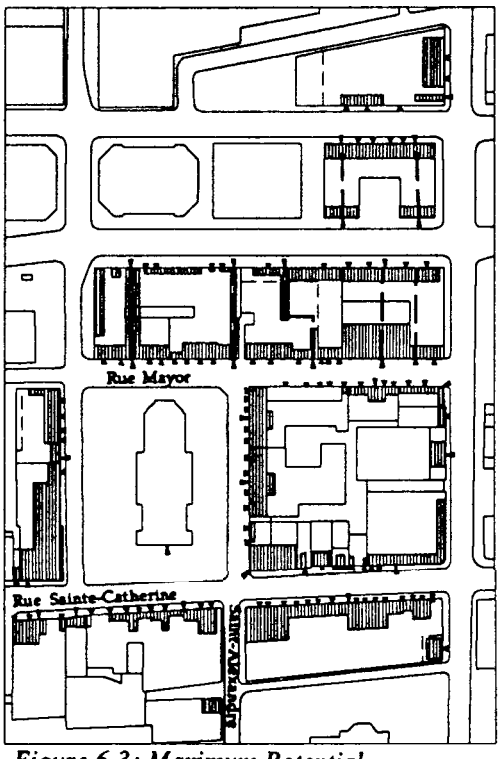

Figure 6.3: Maximum Potential

Entrances, principal and secondary

Transparency

Pedestrian passage way

Figure 6: Access

of the buildings. To stimulate more pedestrian traffic through the district, pedestrian passageways connecting Mayor and de Maisonneuve to the north should be created between the buildings. A minimum of three such passageways are proposed. The perception that the pedestrian will have of a neighborhood such as the Fur District will be strongly influenced by what they are able to see and experience. In order to create a neighborhood that will be perceived as being both interesting and lively, the ground floor spaces must be occupied by activities and functions of a public nature (i.e., restaurants, cafes, boutiques). They must relate to the street in such a way that those in the street can be aware of and, if desired, become an integral part of the activity. Consequently, it is proposed that the ground floors of all the buildings should eventually be occupied by commercial or institutional activities and the upper floors by residential or industrial ones.

Built Area and Upper Floor Use

The Fur District contains four existing lots where potential development could take place. It is therefore important to understand the consequence of building new structures alongside relatively old buildings. It is necessary to conserve the older buildings in the area and not replace them with new buildings, built or renovated. If the district has only new buildings, the enterprises that can exist there are automatically limited to those than can support the high cost of new construction. There must be a mix of old and new buildings for the economic sustainability of the district. The introduction of affordable residential use in an area such as the Fur District would most likely occur in the already-existing buildings where the cost would be lower than that of new construction. Accordingly, any new construction in the Fur District would likely be of a commercial nature unless medium-to-high-cost housing would be needed.

The minimum potential plan proposes a new structure on the comer of Mayor and City Councilors. This new building would add an estimated 1,500 square metres of commercial floor space to the district. Moreover, this building would contribute to the forming of a square and thus emphasize and give structure to the public space around the church. If 30% to 40% of the floor space of the existing buildings is developed for housing, an estimated 250 living units would be introduced into the district (Figure 7.2). The maximum potential plan proposes several new structures to be built on the existing surface parking lots. An estimated 70,000 square metres of floor space would be added to the district; these structures would most likely be for commercial use, but the introduction of housing in these buildings would be a possibility. The maximum number of living units that can be introduced into the existing buildings is estimated at 700 if 50% of the floor space is used for housing and the remainder for commercial/industrial use (Figure 7.3).

Bylaws

The introduction of housing and commerce into the Montreal Fur District requires that certain bylaws be amended so as to permit mixed use. At present, the district is zoned for industrial use only, therefore the bylaws must be changed to allow residential use, commercial use, and community facilities (Figures 8.2 and 8.3).

CONCLUSIONS

The conversion of under-used downtown buildings to residential use is not only a matter of architectural design. The higher the number of older buildings with unleased space in the cores of North American cities, the further the downtown areas become neglected and degraded. In order to maintain population and tax base levels, well-kept and affordable neighborhoods in the city centre contribute to civic upkeep and maintenance. The reclaiming of older downtown buildings for residential purposes not only houses people in desirable parts of town but conserves the city's architectural heritage. The distinguishing features of a sound conversion strategy depend upon the concepts of affordability and of mixed industrial/commercial and residential use. Critical urban components must be considered in the conversion process so that an appropriate district and building are selected: such urban factors include circulation (both vehicular and pedestrian), parking, access and ground floor use, the built area and upper floor use. A field study is recommended, followed by the proposal of urban strategies to assess the development potential of the district and building.

A key variable in the development of an urban conversion strategy is intervention by the city. Municipal involvement is needed to develop aspects related to the public domain, such as roads, parks, public parking, public transportation and services. The city's intervention as instigator, planner or coordinator in an urban renewal project is essential – whether in Montreal's Fur District or in any downtown area of a North American city. The realization of a successful conversion project is also largely dependent on an active collaboration from the outset between a housing authority, a municipality, and a developer: the magnitude and range of relevant considerations (i.e., urban, market, permits, financial) require the formation of a team which will confront and solve the interrelated web of conversion factors. Only when the crucial issues of livability and design, urban context and residential activity are integrated within the conversion process can the transformation from under-used downtown buildings to affordable mixed use successfully take place.

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o Upper Floor Use

Minimum Plan

- **Convert 30%of existing buildings into housing leaving the remainder for commerce and industry**

Maximum Plan

- **Convert 50% of existing buildings into housing leaving the lower floors for commercial and industrial use**
- **New buildings are assumed to be commercial**

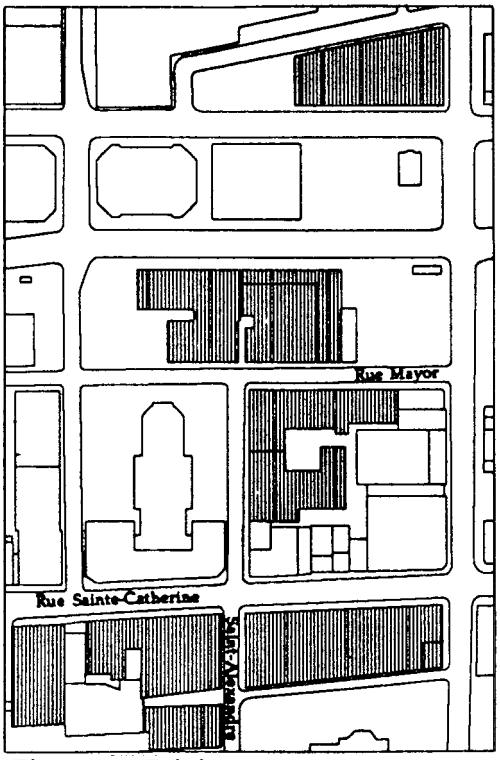

Figure 7.1: Existing

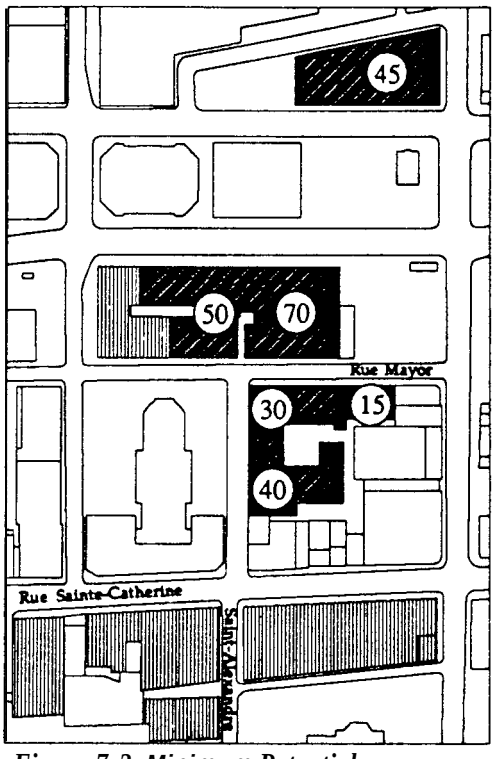

Figure 7.2: Minimum Potential

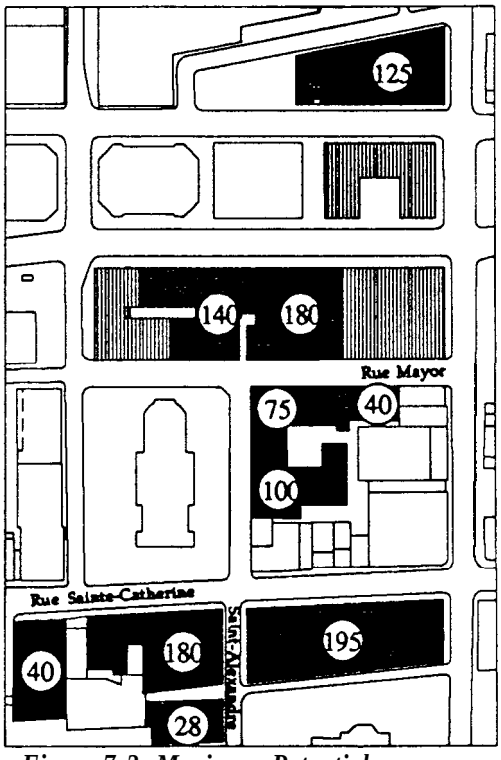

Figure 7.3: Maximum Potential

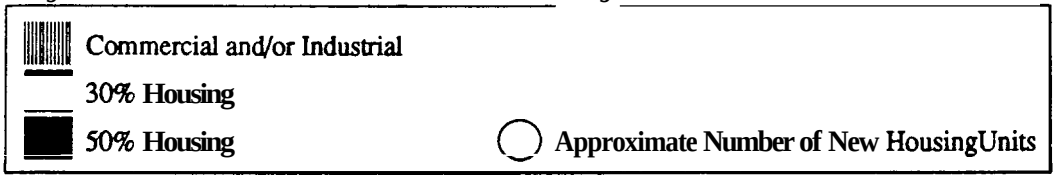

Figure 7: Upper Floor Use

o Bylaws: Use and Heights

Minimum and Maximum Plans

• Change the zoning bylaws to permit mixed use buildings for housing, commerce and industry

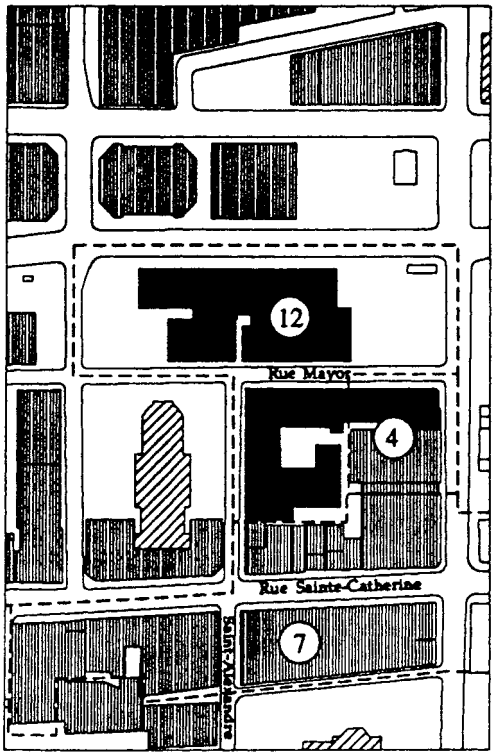

Figure 8.1: Existing

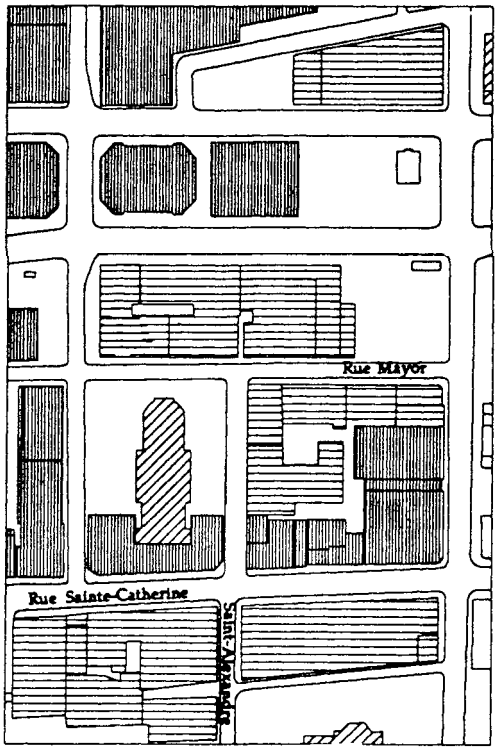

Figure 8.2: Minimum Potential

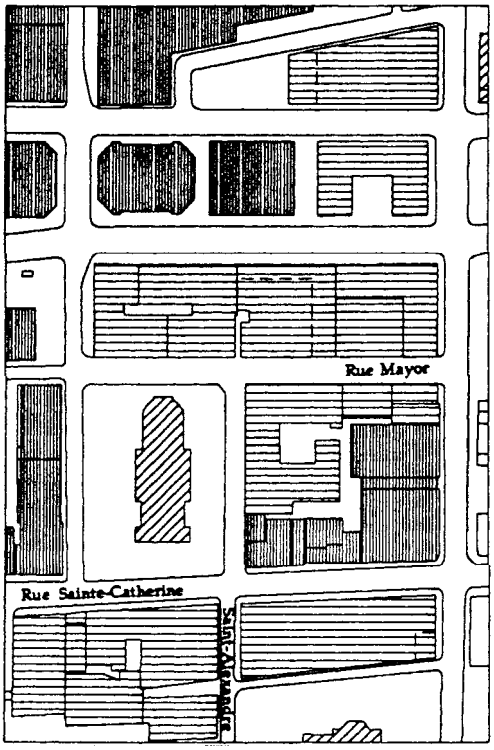

Figure 8.3: Maximum Potential

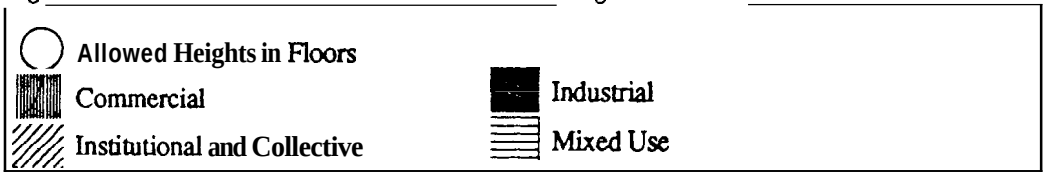

Figure 8: Bylaws: Use and Heights

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