

THE SPATIAL EFFECTS OF CITY BY-LAWS  
UPON AUTOMOBILE PARKING GARAGES

by

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## ABSTRACT

The aim of this thesis is to examine the spatial effects of city regulations and practices upon one urban function - parking and the parking garage. This follows the conviction that the study of urban structure can be best achieved through a spatial analysis of the individual sites that create urban structure rather than through the creation of generalized urban land use models.

The study is organized around one central hypothesis:

- (1) The external and internal spatial arrangements of automobile parking garages are effectively regulated by city planning decisions and city by-law provisions.

A review of existing city regulatory methods concerning automobile parking garages showed that external site features of parking garages are regulated through zoning by-law provisions, and transportation and redevelopment or renewal planning decisions; that internal site features, in addition to the above, were subjected to city building by-laws; and that both the external and internal site features were indirectly regulated through city approaches to the administrative and financial aspects of a parking program.

The analysis of regulations showed one area in which regulations were particularly stringent. This is the sale of gas-

oline and oil products and the provision of service and repair facilities inside automobile parking garages. Two subsidiary hypotheses were therefore considered:

- (ii) The sale of gasoline and oil products and the provision of automobile service and repair facilities inside automobile parking garages are both a desirable and a safe use of space within these structures.
- (iii) The sale of gasoline and oil products and the provision of automobile service and repair facilities inside automobile parking garages leads to a conflict between actors at the municipal and industrial levels that can only be resolved by the adoption of similar planning goals by city decision-makers.

The analysis of sections of National building and fire codes for Canada and the United States and various city building by-laws revealed that there exists differences between the two countries' national codes as well as differences between building by-laws for various cities. American codes and by-laws permit inside gasoline dispensing units and service and repair facilities within parking garages, whereas Canadian codes and by-laws do not.

All three hypotheses were tested in a case study of Vancouver, B.C. An examination of relevant sections of the building and zoning by-laws revealed that the City has many restrictions on parking garages, specifically in regard to the inside location of gasoline pumps and repair facilities. These regulations create a contentious issue between industry and City officials, because the



industry recognizes that a demand exists for various automobile-oriented products and services, yet the City's building and zoning by-law prohibits many of them. This conflict can only be resolved through availability of common information and continuing dialogue. This study has endeavored to provide this in a systematic form.

A dialogue between municipal and industrial officials may lead to diverse and conflicting regulations, however, the ultimate goal should be the creation of an urban environment which accomodates the variety of requirements of an increasing urbanized population.

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## CHAPTER I

### PARKING IN THE CITY

The study of the urban environment by geographers has largely focused on the creation of generalized urban land use models derived from aggregated social and economic data (i.e. Park et al, 1925) or on the study of retail location, industrial location, and so on (i.e. Berry, 1963). Moreover, these studies have considered the effects of city government decisions upon the urban environment in only a general and in some cases, a theoretical sense. In this thesis, it is however asserted that a better understanding of urban structure can be achieved through understanding the individual sites that create this structure and the effects of city plans and by-laws upon these sites.

The objective of this thesis is to investigate the spatial effects of city regulations and practices upon one urban function and its form within the urban structure -- namely, parking and the parking garage.

By delving into the physical (location, size, design etc.), the political (private versus public interests), and the legal problems faced by various urban governments in regulating the external and internal spatial features of the parking garage, it is hoped to gain a better insight into their existence. City regulations concerning the external and internal spatial features of this structure are investigated for parking garages in general and more



specifically, for an internal site feature and a particular city, with the hope that recommendations can be obtained for future regulations which can enhance the quality of parking garages in the urban environment.

### Parking In Perspective

Parking can no longer be considered as a facility or accessory use to such principal uses as residential, commercial, service, and industrial structures. Due to increased motor vehicle ownership, urban area usage, and city street congestion, parking must now be considered as a rather significant and vital urban land use in its own right. It is a consideration, particularly so, where parking is to be furnished on an off-street basis.

Automobile registrations in the United States have risen 220 percent in the last twenty years (National Petroleum Institute, 1970, p. 38). F. Houston Wynn (1963, p. 1) noted that at the time of the 1960 census "nearly four-fifths of all American families had an automobile for their use".

Between 1953 and 1964, Toronto experienced a 100 percent increase in registered vehicles, compared to a population growth of only 50 percent for the same period (Metropolitan Toronto Planning Board, 1965). The following graph shows the rate of increase in vehicle registration in Vancouver from 1947 to 1968. It shows a 425 percent increase for the period (See Figure 1).

But not only has motor vehicle ownership increased, vehicle use in the urban area has risen as well. Having acquired the automobile, the majority of owners use it for most of their travel, appearing to regard any other travel modes as a poor second choice.

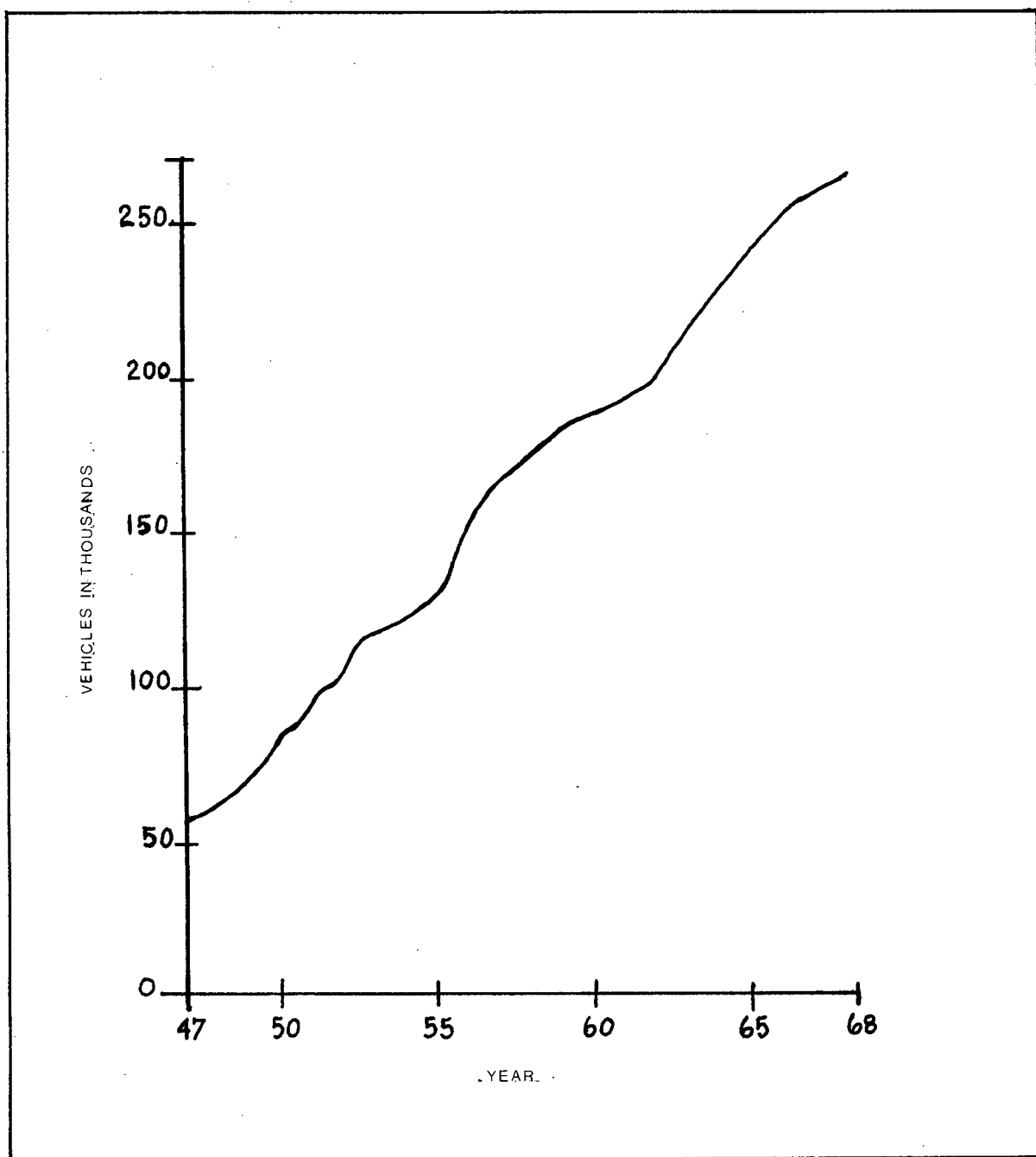


Fig. 1. Motor Vehicles - Vancouver: 1947-1968

Source: City of Vancouver. City of Vancouver Plan: Part 1 - The Issues.  
Vancouver: Planning Department, 1968, p. 40.

When a choice does exist between travel modes, convenience and time saving are the reasons usually given for selection of the automobile.

Simultaneously, there has been a decrease in the use of public transit in major North American cities. Decreases in public transit usage since the Second World War in the cities of Seattle, Detroit, and San Francisco have been noted by the Highway Research Board (1956).

A Consultant's report on transportation in Vancouver (P.B.Q. and D., 1968, p. 7) has shown that although public transit trips to the C.B.D. in that city totals 35 percent of the trips made to there, in the rest of the metro area usage has decreased from a 20 percent share of total trips in 1950 to a 14 percent share in 1968.

The decrease in the use of public transit systems in cities is partially attributed to the convenient method of transportation offered by the automobile. As James Hunnicutt (1964, p. 50), a noted traffic and parking consultant, puts it:

The car is ready to go when its owner wants and where its owner wants and operates strictly on the owner's schedule. On the other hand, transit leaves when it wants and goes where it wants, and runs on its schedule and the rider has to meet that pre-determined by the bus or train.

Hunnicutt goes on to state:

The automobile is considerably more rapid than transit in most cases... the bus averages between 9 and 11 miles per hour on its overall trip. The automobile averages between 15 and 20 miles per hour. The bus takes twice as long to get there, not including transfers.

In terms of cost, it appears that public transit is a much cheaper mode of transportation than the automobile. The motor-vehicle driver must take into account not only his basic travel costs, those of gasoline, oil, tires, and parking, but in addition, the costs of insurance and repairs, costs which seem to increase each year. On the other hand, the bus commuter need only consider his travel fare. Cost-wise, public transit, then, is a much more economical mode of travel than the automobile.

However, the automobile is a phenomenon of an affluent age. Although, it is not the most economical solution to the individual's transportation needs in a great many cases, the automobile is the most convenient and time saving answer for a majority of car-owning citizens who clearly are not seeking the cheapest ride.

Reflecting this rise in motor vehicle ownership and the decline in public transit usage is a steadily increasing demand for parking space on city streets. At the same time, however, growing traffic volumes mean greater demands on the streets for moving vehicles. The result is a "mutually exclusive competition for city street space between moving and standing vehicles (Fordham, 1956, p. 1)", or the "parking problem".

The parking problem originated in the central business district of the city, but in larger metropolises it has expanded on to main streets and into high density residential areas. The fact simply is that streets are not meant to be parking areas. Yet, paradoxically, it can usually be found that up to one-half of the area of streets in traffic-congested areas are used for parking.

The result is that streets are congested for much of the time.

It would logically follow, then, that an automatic increase in the traffic capacity of congested-area streets would result from eliminating curbside parking. The elimination of parking on both sides of a two-lane street, for example, would mean doubling the street's traffic capacity.

Besides increased traffic capacity, there are other benefits to be gained from the elimination of on-street parking. The absence of curbside parking would mean no stalled traffic because of drivers attempting to park. Further, there would be a reduction in the minor but costly accidents that result from the process of parking and unparking.

Studies show that accidents involving parking or parked cars account for approximately one-tenth of all accidents, and half of those involved parked cars. The next highest percentage of parking accidents involves cars moving from the curb. Cars slowing to park, double-parked and backing into curb spaces account for most other accidents (Burrage and Mogren, 1957, p. 9).

Burrage and Mogren go on to note that accident hazards are created by curb parking too near an intersection and by manouvering from an angled stall into the traffic stream. Increased city street congestion created by on-street or curbside parking can thus be very costly in terms of time and dollars to the motor-vehicle operator.

However, the resultants of increasing city street congestion created by on-street parking is not only limited to motor vehicle operators. The business community can be affected as well.

Although it is recognized that "parking affects the competition between downtown business and that in outlying shopping centres or sub-business districts (Burrage and Mogren, 1957, p. 4)", its effects must be kept in a proper perspective. For example, in dealing with urban shopping habits, the Highway Research Board (1956) found that 90 percent of the shoppers interviewed in Columbus, Ohio found parking difficult in the downtown area, 71 percent were concerned about the parking cost, and traffic congestion hampered 81 percent. "Yet less than 10% allowed these impediments to deter them from shopping downtown by automobile (Highway Research Board, 1956, p. 10)". It appears that parking difficulty and traffic congestion does not influence the shopping habits of downtown shoppers.

Further, it has been inferred that the difficulty in parking and the congestion of streets have been primarily responsible for the spatial decentralization of retailing and the surge in suburban retail sales. Writers have hypothesized (See, for example, Ratcliff, 1959, p. 313) and researchers have proven (Highway Research Board, 1953; 1956), however, that an expanded population base and the increased mobility of the auto shopper have prompted the change in retail sales growth and store location, not the problems of parking and congestion.

In perspective, then, traffic congestion and parking difficulty are not responsible for changing shopping habits, increased suburban sales, and new store location. Yet in order to maintain the central business district as a viable economic and functional entity, consideration must be given to urban parking and traffic problems. Correction of a parking deficiency, for example, might enable a

downtown merchant "to lure or lure back those shoppers who will have a shorter overall trip or those to whom a greater selection of goods overshadows any added time it might take them to accomplish their shopping mission (Highway Research Board, 1956, p. 15)" and in addition, to hold those shoppers who already shop in the downtown. Further, a solution to the parking difficulty may help provide the stimulus needed to attract new office or retail developments to the central business district, which because of the parking deficiency, locate elsewhere in the city or even in another city (Smith, 1965, pp. 23-30).

However, should the parking difficulty be corrected but not the problem of congestion created by still permitting on-street parking, one would then be negating most of the positive results to be gained from such a correction. For example, if a downtown shopper had to drive on a congested street on which on-street parking substantially contributed to the congestion, he may soon consider the alternatives to making such a trip. Therefore, the gradual elimination of curbside parking is warranted by the effects of congested city streets to both the automobile driver and the business community.

But the problem is that automobiles must be parked somewhere; and the answer is to provide off-street parking facilities.

There are two basic types of off-street parking facilities: surface lots and multi-deck structures. Parking lots in the central business district or on main streets are usually in areas not occupied by buildings. Some lots were created by the demolition

of out-moded structures. Such lots are interim uses of these lands and as a consequence, have little guarantee of permanency. The enlargement of adjacent buildings or the construction of new buildings often eliminate surface lot facilities. In contrast, parking garages usually represent a permanent structure. They provide considerable capacity in a small area, often in highly congested sections where parking demands and land values are highest.

The parking garage also represents a much greater investment than the parking lot. For commercial parking lots, most of the cost is in the land and operation with minimal cost for development. Land for commercial lots is more often leased than purchased.

Leased land may range in cost from \$25 per space per year to more than \$200, depending on its location, with \$60 - \$75 per space somewhat typical. Annual operation and maintenance costs are also related to location, with high-turnover locations costing more than \$200 per space. Average locations will cost \$100 - \$125 per space (Wynn, 1963, p. 6).

On the other hand, easy entry and exit garages can cost under \$2,000 per space plus the site costs which may range upwards from \$1,500 to \$3,000 per space, depending on location (Smith, 1965, p. 35).

Construction costs range from \$2,000 to \$3,000 for most mechanical garages and up to \$4,000 for underground garages (Wynn, 1963, p. 6)

(See Figure 2). Garage operating costs are higher on the average than costs for parking lot operation, and may run from \$135 to \$180 per space.



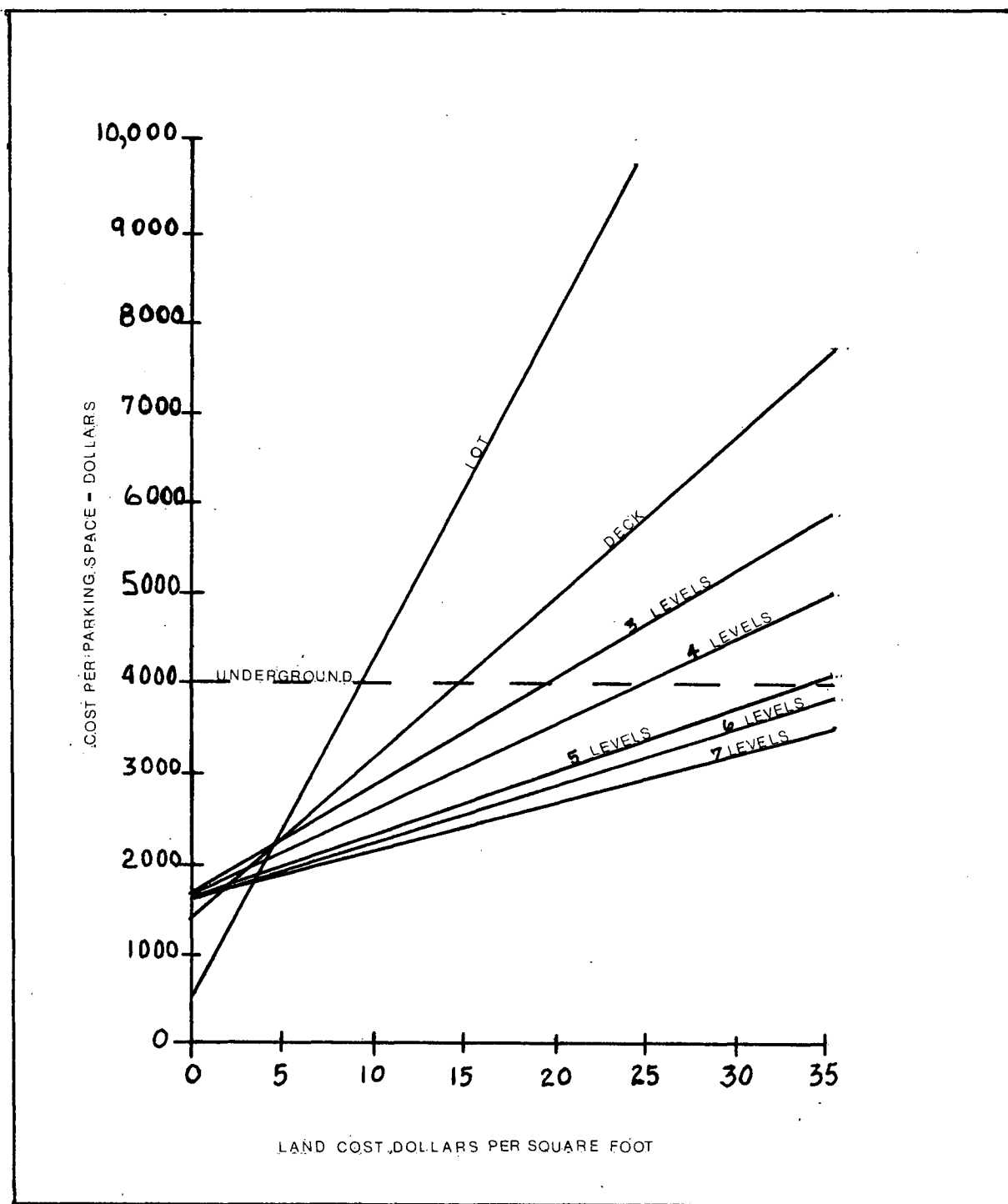


Fig. 2. Parking Space Costs in Relation to Land Values

Source: Wilbur S. Smith & Associates. Parking in the City Center.  
New Haven, Conn.: Author, 1965, p. 36.

However, in larger cities, the cost of land, either by purchase or by lease, coupled with larger and more concentrated parking demands, will usually dictate construction of parking garages at the most centrally located sites. Because parking space must compete for expensive land with multi-storey buildings, parking garages generally account for an increasing share of parking spaces in larger urban centres because they are the most economical parking use of this land. As depicted in Figure 13, urban centres of 100,000 population have approximately 18 percent of the total parking supply along curbs, 67 percent in lots, and 15 percent in garages. In contrast, when urban population rises to one million, garages increase their share of the total spaces to 27 percent while curbspace falls to 8 percent and lots remain static at 65 percent.

Another feature of the parking garage which enhances its construction over the surface lot in urban centres is its ability to be integrated with a primary function or to integrate an accessory function. In congested downtown areas, land economics and convenience have, for example, spawned many multi-use buildings including parking garages. Such buildings provide two basic advantages: "They allow developers to provide parking on sites too expensive for parking alone, and they allow tenants and visitors to reach their destination without going outside (Beach, 1970)".

Examples of integrated parking facilities can be found in most North American cities. In Pittsburgh, a new multi-purpose structure features retail space on the first floor, two floors of office space, a 12 storey apartment, a pedestrian bridge to a department store, and a self-service parking garage with space for 825 cars.

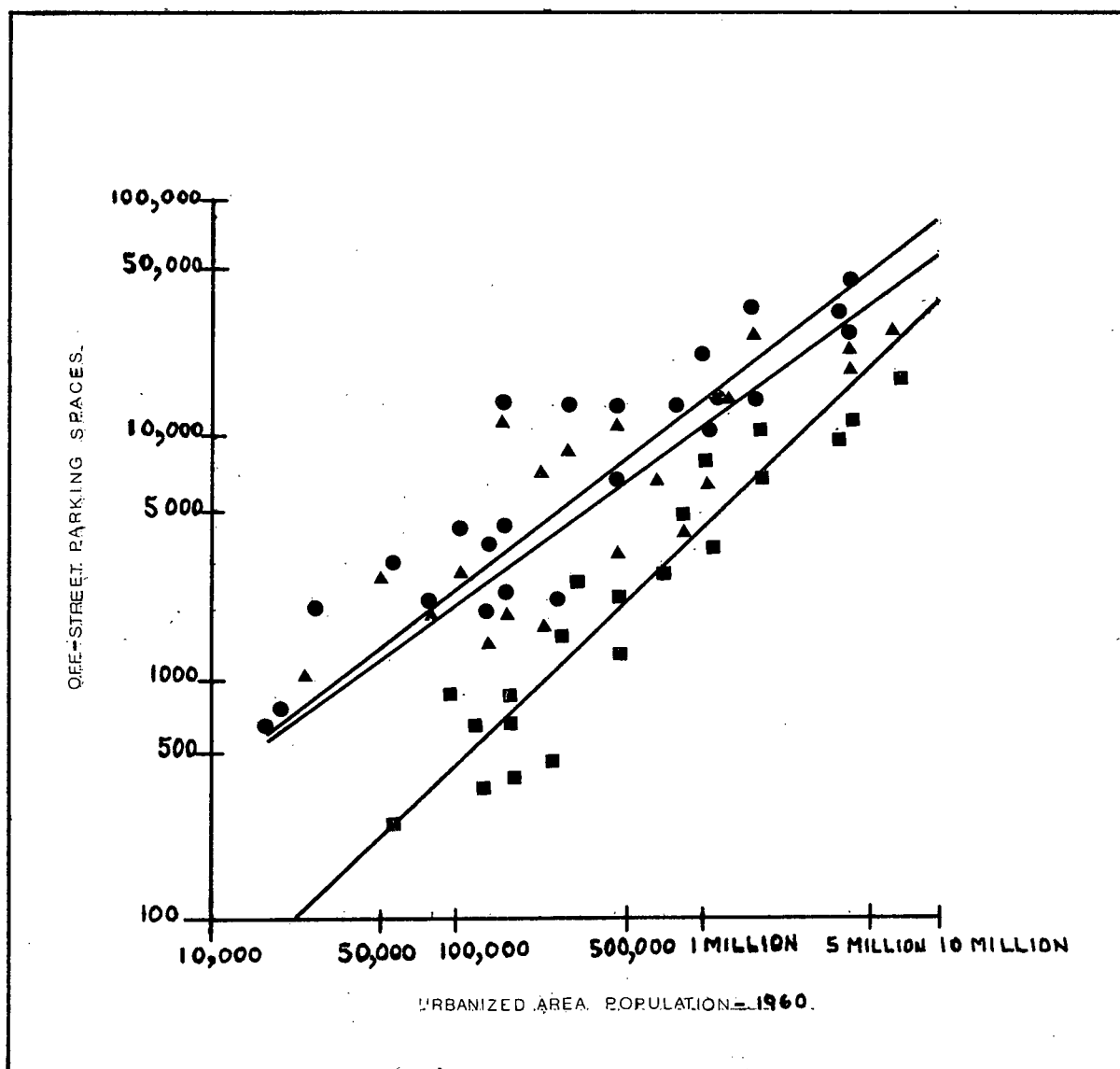


Fig. 3. Off-Street Parking Spaces  
In Relation To Urbanized Area Population

As urban areas increase in size, the number of garage spaces increases at a faster rate than parking lot spaces. Central business districts in urbanized areas of 200,000 or less usually have fewer than 1,000 spaces in parking garages. This number increases substantially as urban areas enlarge; there are about 5,500 garage spaces in urban areas of one million in population. The total off-street spaces averaged 2,800 in urbanized areas of 100,000, 16,000 in areas of one million, and about 28,000 in urbanized areas of two million population.

Source: Wilbur S. Smith & Associates. Parking in the City Center.  
New Haven, Conn.: Author, 1965, p. 7.

Marina City in Chicago which consists of 40 stories of apartments located above 20 floors of parking, which in turn is on top of two floors of shops and office space, is another example. Other examples include a combination motel and garage and theatre and garage. Under construction in New York City is a combined apartment and school building with a garage in between to act as a sound barrier (Martin, 1969, p. 30).

Integrated parking structures can also be found in shopping centres (See Chapter II).

The underground parking garage with a park on top is another type of multi-purpose structure (Klose, 1965). Examples are found in San Francisco (Fisher and Gould, 1953), Los Angeles (Clements, 1953), Pittsburg, Chicago, and Detroit.

Parking below or above freeways is still another example of a multiple use of facilities. For example, a \$10 million garage of the John Hancock Insurance Company will be built astride the Massachusetts Turnpike in Boston (Beach, 1970). Plans in Spokane, Washington are for the creation of 14 blocks of parking under a section of the East-West Freeway.

Scarcity of land in the central business district, and the resulting increase in land values is thus forcing more and more cities to integrate parking facilities with other major building and land developments. Similarly, retail or service facilities which cannot afford or do not wish to purchase or lease land for their establishment in the central business district, but desire to locate

there, are becoming accessory functions to the primary function of the parking garage. Often, the street-level frontage on one side of a parking garage is used to house specialty shopping good stores with items like clothing or furniture and personal service establishments such as loan companies or ticket agencies.

Automobile service facilities, including gasoline pumps , car washes, and repair bays, are another example of accessory uses in parking garages. Where city by-laws permit, these facilities can represent an important source of income for the garage operator as well as convenience for the customer (Burrage and Mogren, 1957, p.281).

Parking has therefore become a vital utility in the city. Because of increased motor vehicle ownership, decreased public transit usage, and intensified city street congestion, parking must be gradually eliminated from the curb, and be replaced by off-street parking facilities. Although, off-street parking can be provided by either the surface lot or the multi-deck structure, the latter is more preferable because of its greater guarantee of permanence, larger amount of investment, better economic use of urban land, and ability to become or include an accessory function. Parking garages are thus becoming significant users of urban land.

#### City Regulation of Parking Garages

Similar to most urban functions and forms, parking and parking garages respectively, are subjected to city planning and control. Spatially, the effects of such practices can be viewed as having external and internal influences upon the activity and the facility concerned. Externally and internally, parking garages can

be regulated through city zoning by-laws, transportation and redevelopment planning, administrative and financial methods, and building and fire by-laws.

Zoning by-laws are considered to be the mechanism by which the city planner puts into effect many of his plans. These by-laws are an application of the police power of urban governments for the protection of the public health, welfare, and safety (Gallion and Eisner, 1963, p. 203). The zoning ordinances divide municipalities into "zones" or districts and prescribes for each of these, "regulations governing land use, building heights and bulks, and lot area that may be occupied by buildings within the zone" (Mogren, 1952, p.12). Through the enforcement of zoning by-laws, control over population density is attained.

In relation to parking garages, zoning by-laws extend control over both the external and internal spatial features of these structures. First, through establishing zoning districts and by regulating land uses within these districts, zoning by-laws influence the location of a parking garage. Secondly, by requiring a minimum amount of parking space for every new or redeveloped building, the internal feature of size or capacity of a parking garage is regulated by zoning ordinances.

Regulation of parking garages by an urban government can also be effected by city planning for transportation facilities and renewal or redevelopment projects. Since parking is generally considered to be an important phase of transportation, it would logically follow that any planning for the latter would affect the former. In terms of parking garages, they would be affected by their

placement in relation to the overall transportation system for the city, including freeway routes and interchanges, arterial streets, and directional streets (Smith, 1961). Further, the location of parking garages can be conditioned by rapid transit stops or commuter railroad stations (Smith, 1965, p. 63). The latter condition is created by the need for parking facilities for the automobiles owned by transit users.

The extension of influence of transportation planning over the parking garage can also be viewed for certain internal features of the structure such as the placement of entrances and exits in relation to traffic flow, size or capacity of the garage, and reservoir space (Burrage and Mogren, 1957; Ricker, 1957).

A parking garage can be affected externally by renewal or redevelopment projects undertaken by the city (Smith, 1959; Candeub, 1964). "Current urban renewal and redevelopment programs afford maximum opportunities to develop the most efficient and well-situated garages (Whiteside, 1961, p. 14)". The provision of adequate parking for these projects is essential in attracting new traffic generating activities and as a result in maintaining or increasing the tax base of the area.

On a much larger scale, parking garages can be effectively regulated through a city government's administrative and financial approach to parking in general. The approach taken by a city government towards parking, if one is taken, can dictate the external and internal features of the facilities provided for such an activity. But presuming that parking garages are one of those facilities

provided, an analysis of the administrative approach would center on the type of ownership and operation of the garages. Ownership and operation are of three types: (a) privately owned and operated; (b) publicly owned and privately operated; and (c) publicly owned and operated. The financial approach is concerned with the methods of financing parking garages, of which there are seven modes: (a) general fund appropriations; (b) current budget expenditures; (c) benefited district assessments; (d) parking revenues; (e) general obligation bonds; (f) revenue bonds (g) assessment bonds.

In addition to being regulated through zoning ordinances and influenced by transportation planning, the internal features of parking garages are affected spatially by the building and fire by-laws enacted by a city. These by-laws effect control over such internal features as stall dimensions, travel ramps, floor designs, stairways, elevators, ventilation, building materials, and fire protection. But more importantly, building and fire by-laws regulate the provision of accessory functions, especially automobile-oriented service facilities and retail establishments, inside parking garages.

The sale of gasoline and oil products and the provision of automobile service and repair facilities inside parking structures are credited with being a source of profit to the parking garage operator and convenience to the customer (Burrage and Mogren, 1957, p. 281). In major urban centres, gasoline retail outlets in a downtown setting must be located in a building with a complimentary



threshold<sup>1</sup> in order to remain viable. "In other words, the internal linkages with the retailing outlets must be strong so that the building itself will generate a very high threshold (Claus and Hardwick, 1971, p. 259)". Thus both oil companies and parking managers have recognized that where the rate of return would be inadequate to a downtown gasoline service station on its own, locating in conjunction with a parking garage may provide a sufficient threshold.

Further, because of high land costs and limited space in the downtown, oil companies recognize that a solitary gasoline service station is an uneconomic use of core land. However, at the same time, the oil companies are aware of a demand for gasoline and oil products and automobile services in the downtown area, and thus desire to meet this demand; and the sale of gasoline and oil products and the provision of automobile service and repair facilities as an accessory function in parking garages is one of the best ways to meet this demand.

On the other hand, many cities, particularly those in Canada, through building and fire by-laws, prohibit or restrict the sale of gasoline and oil products and the installation of automobile service and repair facilities inside parking garages. Regulations concerning these facilities are based on the principles of public health, welfare, and safety.

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<sup>1</sup>Threshold is defined as the minimum number of people required to support one establishment of a functional type.

### The Study Problem

Zoning by-laws are one of the tools for implementing a city plan. However, by-laws are often treated as the end-products -- the instituted plan -- rather than the means to attain the product. "A city which unthinkingly enforces by-laws without reference to a plan may be building an unattractive city with limited form and inconvenient urban structure (Claus and Hardwick, 1971, p. 255)".

(Claus and Hardwick (1971, p. 256) go on to state:

Even when goals are similar, there may be conflicts in operation between actors at the municipal level and the industrial level. Most often these conflicts develop because goals have not been explicitly set and the planning sector has no clear direction to follow.

These criticisms of zoning by-laws can be extended to city building and fire by-laws. An example of problems created by the enforcement of certain building and fire by-laws is that concerning a spatial internal feature of parking garages. The sale of gasoline and oil products and the provision of automobile service and repair facilities inside parking garages are recognized by the petroleum and the parking industries as providing an economically viable retail outlet in the downtown section of the city, a source of supply and attraction to and convenience for the customer, and a source of additional income.

However, many Canadian cities have enacted building and fire by-laws prohibiting or restricting the sale of gasoline and oil products and the provision of automobile service and repair facilities

inside parking garages. Cities base this prohibition on the fact that the city fire marshall deems such an outlet as being particularly dangerous to the public health, welfare, and safety. Simultaneously, many city zoning ordinances are designed to eliminate gasoline service stations from urban cores, representing such facilities as uneconomical and unattractive uses of downtown land. However, the city, unlike the petroleum industry, offers no alternatives for relocating gasoline retail outlets elsewhere in the central business district. As noted above, the most logical and feasible alternative is to locate such facilities in conjunction with parking garages, but present city building and fire by-laws prohibit any such linkage.

The result is thus that despite having similar goals, there exists a conflict between actors at the municipal level and the industrial level. It is a conflict that is a result of the dissimilar goals of city zoning by-laws and city building and fire by-laws, and one which can only be resolved when consideration is given to the factors of economic motivation and public health, welfare, and safety.

#### Geographical Perspective

Parking and its spatial manifestations have not been subjected to analysis by urban geographers. Typically, in studies of intra-city retail structure, parking has been considered as a facility for various retail units which make up this structure (See for example, Proudfoot, 1937; Berry, 1963; Simmons, 1964; Leigh, 1966; Horton, 1968). Murphy, Vance, and Epstein (1955) and

Horwood and Boyce (1959) in their respective studies of the central business district have however discussed parking as being an important part in the structure of the C.B.D.. In a later publication, Murphy (1966) has considered parking in terms of it being a rather significant user of commercial land in the city. In fact, Murphy goes on to ask: "What research can the geographer do with respect to parking?".

Murphy (1966, p. 251) suggests that the geographer may be interested in studies of the adequacy of parking in a city or in studies of the parking resources of downtown areas. However, Murphy asserts that when such a study is attempted, one runs into the problem of adding the different types of parking in order to give a significant and meaningful total of parking space. But the real importance of Murphy's question lies in the fact that it acknowledges the notion that research on parking may be done within Geography.

Research on parking by geographers can also include on a more minute scale the study of its spatial manifestations, including surface lots and multi-deck structures. Although parking consultants and traffic engineers have considered some of the locational aspects of these facilities (See, for example, Le Craw and Smith, 1948; Burrage and Mogren, 1957; Whiteside, 1961), there are still numerous areas of research open to geographers in the study of parking facilities..

One area of study which has not been thoroughly researched is the examination of the spatial effects of city plans and by-laws upon the external and internal spatial features of parking garages. The importance of studying internal and external site features by geographers has been demonstrated by Claus (1969) and Rothwell (1970)

and further discussed by Claus and Rothwell (1970) for gasoline service stations. Moreover, the importance of research by the geographer on the spatial effects of city planning decisions and by-law provisions has been pointed out by Claus and Hardwick (1971) in their examination of automobile-oriented retailing, of which the parking garage is an example.

The geographical perspective of this thesis, therefore, lies in the study of the spatial effects of city planning decisions and city by-law provisions upon the external and internal site features of automobile parking garages.

### Hypotheses

It has been generally agreed upon by geographers and planners that parking is a necessary and fundamental element in the urban environment. Arthur Gallion and Simon Eisner (1963, p. 216) have taken the view that:

The road system upon which these vehicles circulate is a major element in the general plan of the city. A component of this element is the accomodation of these vehicles at their destination.

In a report prepared by Wilbur Smith and Associates (1965, p. 70), it was noted that:

Parking can be an important element in the total downtown plan...

Thus, greater functional and visual integration of parking into over-all site planning should be encouraged, with a consequent improvement in parking aesthetics....

However, Edmund Ricker (1957) asserts that parking must not only be discussed with reference to its place in an urban setting, but it must also be considered in terms of location and design of its facilities particularly in respect to their layout, operation, and safety.

In recognition of the fact that parking facilities must be considered with respect to both site and situation, urban governments have introduced legislation concerning the regulation of these facilities. It is thus hypothesized for this study that:

The external and internal spatial arrangements of automobile parking garages are effectively regulated by city planning decisions and city by-law provisions.

Further, as introduced earlier in this chapter, where city building and fire by-laws permit, the sale of gasoline and oil products and the provision of automobile service and repair facilities inside parking garages may provide a profit margin for the garage operator and a source of convenience to the garage customer. However, permission for allowing such activities inside parking structures is heavily contingent upon the degree to which the city considers them to be dangerous to the public health, welfare, and safety. Thus a second hypothesis is that:

The sale of gasoline and oil products and the provision of automobile service and repair facilities inside automobile parking garages are both a desirable and a safe use of space within these structures.

Finally, it was previously recognized that despite having similar goals, there can exist a conflict between actors at the municipal level and the industrial level. Further, this conflict can be a result of a conflict created by the setting of dissimilar goals by city decision-makers. In the case of automobile service functions inside parking garages, there exists a conflict between city officials and the oil companies and parking garage managers which has resulted from a further conflict, that created by the dissimilar goals of city zoning by-laws and city building and fire by-laws. The latter conflict can only be resolved when consideration is given to both the factors of economic motivation and public health, welfare, and safety. Thus the study's third hypothesis is that:

The sale of gasoline and oil products and the provision of automobile service and repair facilities inside parking garages leads to a conflict between actors at the municipal and industrial levels that can only be resolved by the adoption of similar planning goals by city decision-makers.

The validity of the study hypotheses is discussed in the final chapter.

#### Approach and Scope of Study

The approach taken in this study is that of analytic-description. In other words, city regulation and practices and their spatial effects upon the external and internal features of parking garages will be described and analyzed with the hope of gaining a better insight into their existence and obtaining recommendations for future regulations.

The investigation is intended to provide information for use in Western Canada, therefore sources from western Canadian examples have been used as much as possible. However, since much information from outside sources is available, the scope of this thesis includes examples from the United States, England and other European countries. The scope is further defined by the methods used in the study: a review of the literature, questionnaires, and personal interviews.

No attempt has been made in this study to classify and investigate the full range of problems in city regulations of parking garages nor their implementation and enforcement in city governments.

The method of investigation imposes a limitation upon the study, particularly in the questions asked in the interviews and the questionnaires, the availability of literature for review, and the specific and particular problems of various cities.

#### Organization of the Thesis

The introductory chapter is an attempt to establish through a documentation of the literature, the problems resulting from increased automobile ownership and urban area usage, and intensified city street congestion and their effects upon the city and its functions. The introduction of the parking problem within the city leads to an increased awareness of the need for off-street parking facilities, of which the parking garage as one type, is emphasized. Further emphasis is placed upon outlining some of the spatial effects of city regulations and planning upon the external



and internal features of parking garages, and the problems resulting from such controls and decisions. Chapter Two discusses city structure and site typology, centering on site and city retail structure and suggesting a spatial typology of parking garages. The following chapter is devoted to existing city government external and internal site regulation methods and practices for parking garages. Chapter Four analyzes a specific example of internal site regulation and its effects for the case of western Canadian cities and some western American cities. An examination of the external and internal site regulations for parking garages in the city of Vancouver provides the basis for Chapter Five. The last chapter of the thesis offers a review of the study, recommendations for better site regulations for parking garages, an appraisal of the hypotheses, as well as recommendations for further research on the subject of parking by geographers.

## CHAPTER II

### CITY STRUCTURE AND SITE TYPOLOGY

#### City Structure

City plans and by-laws are primarily designed to determine the structure of the city. The urban structure, in turn, is made up of small functional units of space called sites. It then seems only reasonable that in order to better understand the effects of city planning decisions and city by-law provisions upon the structure of the city, one must first understand their effects upon these small functional units that make up city structure.

Urban geography has not been greatly concerned with the analysis of either individual sites or the effects of city legislation upon these sites. Instead, geographers have tended to aggregate their data rather than to examine the characteristics of these smaller functional units and the effects of city government decisions upon these units. The former approach to urban structure has led to the setting up of models that spatially organize generalized forms of urban environment (See, for example, Park et al, 1925; Hoyt, 1939; Harris and Ullman, 1945). As a result, little work has been done on the analysis of individual sites themselves and on the effects of city plans and by-laws upon these sites, despite the fact that the principles for such an analysis have at some time all been mentioned in urban geographic literature and thus are somewhat familiar to geographers.

The concept of site has been a basic element in urban geography for nearly fifty years. Through these years geographers have enlarged the definition of site while they have simultaneously reduced the scale of the term. Hanchard, in 1922, who distinguished between general elements of situation and particular characteristics of site, remarked that the site factors were "purely local traits of the landscape (Berry and Horton, 1970, p. 15)". Thirty years later, Max Sorre, who was mainly concerned with situation factors in urban development, noted that the important elements of site were certain topographical features which afforded protection for a city. Similarly, Robert E. Dickinson (1959, p. 12) wrote that "...site embraces the precise features of the terrain on which the settlement began and over which it has spread". In the same vein, Arthur Smailes (1966, p. 40) has written, a site "may be defined as the ground upon which a town stands, the area of the earth it actually occupies".

As might be inferred from the previous definitions, in the early writings there appears to be a bias of treating sites only on a large scale i.e. a city-wide scale. In addition, "site" is usually defined as a purely physical element, while situation refers to the human element.

The situation is usually taken to mean the physical conditions (as for the site) over a much wider area around the settlement. But of equal importance are the human characteristics of the surrounding country, since these affect the character and fortunes of the urban settlement (Dickinson, 1959, p. 12).

Broek (1965, p. 30), however, offers a somewhat less restrictive

definition of site than previous ones: "Site...means the location of a given place with its local internal features or resources".

Kevin Lynch (1962, p.6) is even less restrictive than Brook in defining site: "It consists, not just of buildings and streets, but of a whole complex of structures, natural forms, climates, texture, and detail, above, below, and at the surface".

In contemporary urban geographic literature, especially in that dealing with urban land economics and retail location (See for example, Berry, 1963; Simmons, 1964; Garner, 1966; Murphy, 1966; Berry and Horton, 1970), "site" commonly refers to land areas of a much smaller size than a city. In this context, site usually refers to the size of a building lot and/or the building itself. Garner (1966, pp.100-101), for example, asserts that site includes such features as shape, size, topography, lighting, landscaping and so on, plus "capital committed in the form of buildings". Similarly, the literature of retail site selection (See for example, Proudfoot, 1937; Canoyer, 1946; Kelley, 1955; Nelson, 1958) regards the building as an inherent element of the site. Site has thus come to mean both a specific area of land and also, the buildings or structures erected upon that land.

In this new context, usage of the term site demands the realization that "a city...is divided into many parcels of land, each of which may be called a "site". Most of these sites have structural improvements designed for some particular use" (Lowry, 1970, p.499).

Site must now be considered as a basic part of the urban

whole. The spatial arrangement of these parts is called the structure of the city. Such parts or sites are by no means isolated from one another and are more or less linked together by transportation and communication. Mitchell and Rapkin(1954, p.111) define linkage as "... a relationship between establishments characterized by continuing or frequently recurring interaction. It is associated with the movement of persons and goods between the linked establishments and generates a tendency on the part of linked establishments to seek proximate locations". Howard J. Nelson (1969, p.200) goes a step further and suggests that "urban transportation not only laces the urban structure together, but it also profoundly affects the arrangement and function of elements in the structure of the city".

The shape of and the structures upon the site itself contribute to the form of the city. Form is generally defined in terms of the size, layout, build, and style of the buildings and lots that create individual sites. Interestingly, sites having different forms may perform the same functions. For example, a parking lot and a parking garage are of different forms, but basically have the same function.

Further, the structure and in turn, the form of the city are subject to city government decisions and controls. In fact, as suggested earlier in this chapter, the structure of the city may be determined by city planning decisions and city by-laws provisions. Structure, in turn, can determine form. For example, in San

Francisco, recently, a zoning by-law was used to limit the height of the United States Steel Corporation Building, to be built in a particular downtown area near the waterfront.

In summary, the concept of site has been re-interpreted by geographers in order to mean both the natural and human landscape. Simultaneously, the scale of the term has been reduced somewhat, so that a site is presently considered to be only one parcel of land within a city. Further, with recent reductions in the scale of the term "site", geographers are becoming increasingly concerned for the smaller units within the urban structure, and therefore, it appears that traditional definitions of "site" must become more precise. However, as every site is unique, some degree of commonality must be established among them in order to conduct a meaningful study of sites. The usual method is to examine individual sites under the three categories of site type, quality, and network. Further, an examination of type, quality, and network of site also provides a basis for an understanding of the effects of city planning decisions and city by-law provisions upon individual sites and in turn, upon city structures.

#### Site Type

There exists a sizeable proportion of geographic literature concerning the classification of urban sites by type. Such classification is especially notable for retail sites, where the practice has been to amass all business sites into one type

according to their spatial position within the urban structure.

The earliest statement by a geographer on the typing of retail sites was made by Proudfoot (1937). Proudfoot differentiated five types of retail structure, and (1) central business district; (2) outlying business center; (3) principal business thoroughfare; (4) neighborhood business street; and (5) isolated store cluster. Explicit in his classification of retail types is the class of commodities sold, concentration or dispersion of outlets, and character of customer tributary areas; and implicit in his categorization, is the mode of transportation used to reach an establishment.

Canoyer (1946) made explicit use of mode of transportation in suggesting five types of retail locations, similar to those of Proudfoot: (1) central shopping district; (2) sub-centres; (3) string-streets; (4) neighbourhoods; (5) isolated stores.

In a study published in 1949, Richard Ratcliff also confirms the broad structural outlines sketched by Proudfoot. Ratcliff states that the focal point of every city is the central business district, which has the most intense retail activity at the convergence of all traffic and transportation routes. Beyond the C B D, the pattern of retail structure consists of combinations and variations of two basic conformations: (1) String street developments or business thoroughfares which consist of "the retail use of property abutting a traffic artery, stretching out along its length,

and rarely sprouting off down intersecting streets" (Ratcliff, 1949, p.388). The nature of uses along the string street development depends upon the extent to which the street is a main automobile artery and the degree to which it is the core of a residential area. And (2) Business nucleations or a clustering of retail uses, which appear at important intersections and creates a pyramiding of land values to peaks at the intersection. The nucleation may vary in nature from isolated stores and neighbourhood facility combinations to major retail sub-centres.

A classification by Kelley (1955;1956), while employing threshold size, range, and transportation to provide a description of retail structure, is primarily based on the idea of cost minimization or minimum of transfer costs. Cost minimization involves the notion that a retail facility should be located on a site at which transfer costs will be minimized for the largest number of customers. Customer transfer costs involve the expenditure of money, time, and physical and nervous energy that must be made in order to purchase a good. Kelley's extensive classification is thus: (1) CBD; (2) main business thoroughfares; (3) secondary commercial sub-centres or controlled secondary commercial sub-centres; (4) neighbourhood business streets; (5) small store clusters and scattered individual stores; and (6) controlled regional shopping centres.

Nelson (1958) has classified locations in a slightly different way: (1) generative location, to which the customer is



directly attracted from his place of residence, and (2) susipient location, to which the customer is impulsively or coincidentally attracted while on a trip where primary purpose is anything other than shopping. At the basis of Nelson's classifications is the idea of some form of linkage between different sites, whether it be a drugstore in a medical-dental building or a newstand at an airport.

One of the most unique typologies of retail structure has been suggested by John Mertes (1964). Mertes (1964, p.26) argues that "modern retail store locations should be studied on the basis of a classification that considers the traffic circulatory system". On such a basis he classifies retail sites as: (1) internal, a location within the CBD of the city; (2) axial, a strip development along the major traffic thoroughfare leading out of the CBD toward the residential areas; (3) pivotal, a site which occurs at the confluence of two or more principal thoroughfares; (4) Peripherhal, those in outer reaches of a community or those adjacent to the interchanges or access roads of community circumferential freeways; and (5) external, one along a high-volume traffic artery in the hinterland between communities. The factors of population and transportation are assumed to be organic to the spatial positioning of retailing.

Finally, a fairly recent and well-developed classification of retail structure which makes implicit use of mode of transportation has been suggested by Duncan and Phillips (1967): (1) older central shopping district; (2) older secondary shopping districts; (3) newer shopping centres; (4) large free-standing stores (i.e. discount houses or department stores); (5) neighbourhood business streets; and

(6) small clusters and isolated stores.

In all probability, the best known work on the classification of the elements of retail structure has come from the Chicago school led by Brian Berry (see Berry, 1967; Simmons, 1964; 1966). Using the basis of Christaller's central place theory, which focuses upon locational and hierarchal systems of urban places, Berry applies similar ideas to the intra-retail structure of urban areas. However, because central place theory is inadequate to explain highway-oriented ribbons and specialized functional areas, Berry has had to deviate from the theory in order to fit these types into his structure (Figure 4).

Of particular importance to Berry's retail hierarchy, are the ideas of the range of a good and the threshold. Range is defined as the distance that a consumer is willing to travel in order to purchase a good at a business centre. The range of a good offered from a retail outlet has an upper limit beyond which the outlet is unable to attract customers for the good and a lower limit which encloses the threshold purchasing power needed for the good to be offered. Threshold is defined as the minimum sales volume area necessary for the conditions of entry of different retail functions. One of the basic assumptions of the model is that all business types are considered to lie along a continuum of threshold size, and "all establishments of a given business type are considered to operate at the same threshold level" (Garner, 1966, p.115). Thus, it follows that such establishments are serving an identical or homogenous

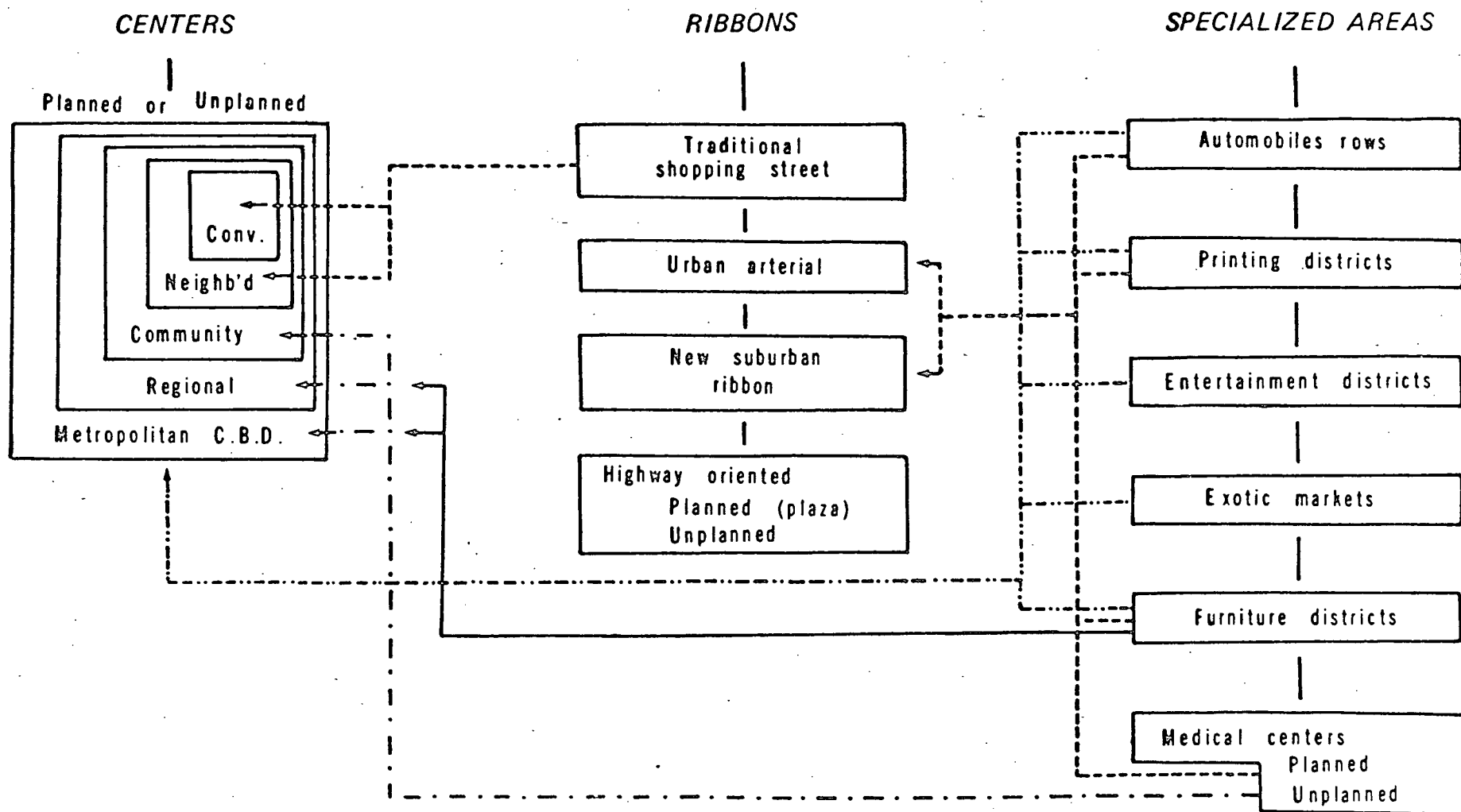


Fig. 4. The Structure of Intra-Urban Business and Commerce

Source: B.J.L. Berry & F.E. Horton. Geographic Perspectives on Urban Systems. Englewood Cliffs, N.J.: Prentice-Hall, 1970, p. 457.

urban market.

However, Garner (1966, p.115) goes on to point out that the urban market does not comprise a simple set of consumer demands; but rather "it consists of a complex pattern of different tastes, needs, and preferences which stem directly from the differences in available amounts of disposable income". Using the example of bars, whose character ranges from the chic cocktail lounge to the impeccably dreary "joint", Garner (1966, p.116) asserts that the differences between various bars would be related to the level of consumer preference serviced.

Rather than grouping all bars into one class of business type under the available system of classification it would be more realistic to consider them as offering different goods and consequently comprising different business types. A similar argument can be extended to include the classification of all other business types in the retail nucleation (p. 116).....

.....  
Once the assumptions of homogeneity of establishments within any business type is relaxed to include the notion of product differentiation, it is apparent that a simple ranking of business types by threshold size is no longer possible. Thus for a given business type, each establishment will be associated with a different threshold level (p.118).

Product differentiation can also be brought about by a variety of factors including patents, trade marks, "snob appeal", peculiarities of packaging, singularity of product, design, color, and style, and qualities of a site. The importance of product differentiation in retail sites has been noted by Kelley (1955, p.415), who points out that there are some recognized differences

between customers shopping downtown and in regional centres.

It would appear, that based upon the above criticisms that a more befitting typology of intra-city retail sites would be one which concerned individual retail functions. In other words, a classification might be made for restaurant sites, dry-cleaner sites, motel sites, and so on. As suggested by previous typologies and by Garner's criticisms it would appear that this typology should be based on the dominant form and structure of transportation that is used to reach a site and the kind and size of threshold of a site.

Explicitly or implicitly, transportation mode has been used in the previously discussed site typologies of Proudfoot (1937), Canoyer (1946), Ratcliff (1949), Kelley (1956), Nelson (1958), Mertes (1964), and to some extent, Berry (1963) and Simmons (1964). Rannells (1956, p.48) asserts that the type and location of every establishment within the urban structure is determined by the availability and mode of transportation. On the one hand, it is then sensible to type retail sites by mode of transportation used to reach the site. On the other hand, a typology of retail sites must also include the kind and size of threshold of a site. Although the role of threshold in type of site is uncertain, it appears that there exists some definite relationship. Rothwell (1970) has suggested that perhaps it is mode of transportation that determines the threshold of a site, although this has not been empirically tested.

One of the better classifications of site by types has been developed by the oil industry. Distinguishable on the basis of

transportation and threshold, are the industry's five types of service stations: downtown, main street, neighbourhood, shopping centre, and freeway (Claus and Rothwell, 1970, p.23). Service stations are distinguished by transportation due to the fact that they are designed to accomodate a particular kind of traffic flow and transportation artery. The placement, layout, and facilities of a downtown station, for example, would differ from that of a freeway station.

Although all service stations sell gasoline, they may be different in the type of service or function performed and as a result in their sources of income. The downtown station, for example, may have the same threshold size as the freeway station, but usually receives a sizable portion of its income from parking and servicing and repairing automobiles. The freeway station, however, receives most of its income from the sale of gasoline and related products. Generally, kind of threshold differs for all types of gasoline service station sites.

Types of urban retail sites are, in addition, subject to city regulations and control. City zoning by-laws, for example, may not permit a service station to be located in the downtown area of a city. Thus, one type of retail site is eliminated from an urban setting. However, much more work still needs to be done on the effects of city legislation upon types of urban retail sites.

It would appear that a more suitable method of typing urban retail sites, using form and structure of transportation and

kind and size of threshold, has thus been developed. Although, more work still needs to be done on the refinements of differentiations of business types in the retail structure, it is hoped that such can be accomplished through using the method of typing sites according to transportation and threshold.

### Site Quality

One of the more important features of a site, is its quality. As Claus and Rothwell (1970, p.26) point out, the importance of site quality rests on the fact that it can determine the degree to which a retail establishment performs its function. In other words, sites performing the same function and maintaining the same size and kind of threshold are not unlikely to do the same volume of business, because of qualitative differences between sites.

Literature dealing with retailing, or more specifically store location, frequently discusses the effects of quality upon site performance. Applebaum (1968, p.49), for example, writes:

Where different firms offer a similar choice of goods, prices, and service - as is typically the case with supermarkets - and where two or more firms compete in approximately similar locations for the same source of trade, the stores that offer the best retailing facilities can expect to outperform their inferior competitors.

Other writers (See for example, Canoyer, 1946; Brown and Davidson, 1953; Duncan and Phillips, 1967) have also made mention of the importance of having superior site facilities. Nelson (1958, p.141), for example, writes that, "location is not the only

factor determining the success of the operation or the business volume". He notes that other factors such as attractiveness of the decor, character of service, accessibility, reputation, availability of parking, and so on are also important to the performance of a site. Martineau (1958, p.55) asserts that such qualitative attributes as store atmosphere, status, personnel and other customers can project an image of the establishment in the consumer's mind, which in turn can affect the store's sales volume.

Huff (1966) has criticized the use of mathematical models in approximating optimum retail locations on the basis that such models fail to consider the qualitative aspects of retail site.

Mathematical models are not infallible...Therefore decision makers should be aware that there are variables other than those specified in the model that affect the sales of a retail firm. The reputation of a firm, the newness of the store, the merchandise it carries, the service it offers, etc. are but a few examples of additional variables... Furthermore, the model does not consider important questions pertaining to the site at a potential location. It is obvious that there are a number of important factors related to the site itself that can influence the volume of sales that can be expected from a given location. Visibility and accessibility, as well as the nature and condition of adjacent property, have a bearing on the sales that can be expected (pp. 302-303).

Garner (1966) has also noted the importance of the "physical quality" of a site. He (1966, p.10) asserts that before a site is developed physical quality "refers to the 'fixity of investment', the capital committed in the form of buildings".



Until such development, site productivity is variable, and is fixed predominantly by external factors, principally location. Once developed, however, site productivity is relatively fixed and permanent, and subject to internal site variation. The latter is in the form of buildings committed on the site..... (p. 101).

Garner (1966, p.116) also states that:

Establishments are not exactly similar but are differentiated from each other in many subtle ways. Qualitative differences whether real or fancied in the eyes of the consumer, arise from a combination of (a) differences in the product sold, and (b) differences in the condition surrounding its sale.

Qualitative differences arising out of the character of conditions surrounding the sale of the good include such features as the general tone of the store, seller's reputation, personal service, personal attractiveness of the surroundings, etc. as well as the location of the establishment.

As suggested by the literature, it seems reasonable to conclude that sites of highest quality attain the best performance in the market place. In recognition of such a conclusion, Claus and Rothwell (1970, p.86) define site quality as the ability of a retail site to perform its function for which it is designed, measured in terms of facilities and layout of the site itself.

As hypothesized for this study, the facilities and layout or the internal features of a site could however be subject to effective regulation by city planning decisions and city by-law

provisions. If this is true, it would then follow that site quality could be effectively controlled by city legislation. For example, if the function of a downtown parking garage was to provide automobile parking and automobile servicing, but city fire by-laws only permitted part of the latter function, one could then say that because of the site's inability to perform its function due to city legislation, site quality was low.

There appears, however, to be a lack of work done on the effects of city legislation on site quality. If we are to come to a fuller understanding of the structure of the urban environment, we must learn about the effects of governmental decisions and regulations upon the component parts - the individual sites.

#### Site Network

The study of networks of retail sites by geographers began with Christaller's (1933) work on central place theory, and is being currently pursued by those interested in marketing geography (See for example, Applebaum and Cohen, 1961a; 1961b; Berry, 1967). In terms of the nature of geographic research on the network retail type, work has been mainly concerned with the delineation of trade areas for various retail outlets or the appraisal of the spatial attributes of competitive sites.

Canoyer (1946), for example, regards location, amount, and quality of competition as one of the most important factors to consider in the selection of a retail location. In the case of gasoline service station site selection, she considers competition

to be second only in importance to traffic density.

Kelley (1955) also mentions the importance of the quantitative and qualitative effects of competitive retail sites upon the potential site. Kornbleau and Baker (1968, p.129) state a similar point of view in saying that "the quantity, quality, and location of competition (present and prospective) affect the performance of existing stores and plans for improving their performance".

Brown and Davidson's (1953) remarks on selecting a city in which to locate a particular retail activity, apply equally as well to the selection of a particular site within a city.

Although it is desirable to select a city in which the amount of existing competition may be judged less than adequate to meet fully the demands of the public, it does not follow that the presence of a large number of similar stores is necessarily discouraging. If local merchants in a given line of business have become lethargic, are operating with obsolete physical facilities, and generally are out of tune with the times, there still may be an excellent opportunity for a qualified manager to establish a modern store based upon up-to-date merchandising methods. (p.72)

The writers also point out that chain store organizations very rarely stay out of a city because of excessive competition, especially, if they feel that they can do a better merchandising job than existing competitors, provided that they are able to obtain a desirable specific site upon reasonable occupancy terms.

In developing a paradigm of retail competition, Alderson

and Shapiro (1964) have suggested that when considering a new retail site, management has a choice between two alternatives: optimal site selection or optimal network expansion. Of concern here is the latter alternative, which is viewed as a move by a firm to place a network of sites throughout a whole market area. Such a practice is typical of certain types of chain stores, who wish to make a more effective use of such widespread merchandising facilities as newspaper advertising and credit cards. Ideally, all prospective customers exposed to such facilities would find a unit of the chain within an acceptable shopping range.

As suggested by the literature, network can then be defined as an integrated pattern of a particular retail type over a market area (Claus and Rothwell, 1970, p.86). Such a pattern may be, however, subject to governmental regulations. For example, the placement of a particular type of gasoline service station on the landscape in order to complete a firm's network of sites with which it will cover a whole market area may be prohibited by a zoning by-law. In addition, the location, amount, and quality of competitive sites may be also subject to city regulations.

Research on the subject of site networks and city regulations by geographers is however lacking; but if we are to better understand urban structure, research into this topic must be carried out.

### A Spatial Typology of Parking Garages

In the literature dealing with parking (See especially, Ricker, 1957; Burrage and Mogren, 1957; Whiteside, 1961), it is suggested that there are three basis typologies of parking garages. The first classifies parking structures according to architectural design and operation: a) ramp garages and b) mechanical parking devices. A second types garages in terms of ownership and operation: a) privately owned and operated, b) publicly owned, privately operated, and c) publicly owned and operated. Finally a third classification categorizes parking garages according to who parks the automobiles: a) attendant parking and b) self-service parking. There are, however, no existing typologies which classify parking structures according to their location or surrounding environment. Yet, a classification of this type is needed, especially if one is to examine parking garages in a geographical perspective.

Claus and Rothwell (1970, p.87) have defined type of site as a "classification according to the primary function in association with the surrounding environment". On the basis of this definition, the writer has developed a spatial typology of automobile parking garages: a) downtown, b) main street, c) residential district, d) shopping centre, and e) specialized functional area.

Downtown In most large cities, there can be found four types of parking garages in the downtown area. These types are: a) retail store, b) office-employee, c) central core, and d) hotel. In

addition, there may be combinations of each type.

The retail store parking garage is primarily linked to a large department store, i.e. Macy's, Bon Marche in Seattle, The Bay, and Eaton's, that is located in the downtown area of a city. The primary function of this type of garage is to provide parking for the store's customers. In addition, department store garages quite often provide space at the ground level for accessory functions such as for retail or service establishments.

In some cities, where permitted, department stores have placed automobile service facilities, such as for the sale of gasoline and oil products and minor repairs, inside their parking garages. This accessory function can be both an additional source of income for the store and convenience for the customer.

The retail store garage is usually located adjacent to the store, either on the same lot or across the street. If the garage is located on the opposite side of the street, it is quite often linked to the store by a skywalk.

The number of storeys of the garage varies, but on the average the garage is usually five or six storeys in height. The number of spaces within the garage varies also, with 1,000 being an average number (Smith, 1965, p.29).

Parking fees are generally charged on an hourly basis. With the rate increasing each hour parked, the store manages to discourage long term parking in order to generate a greater turnover in customers and thus, a higher income for both the garage and the

store. Also, the operating time of the garage is based on the opening and closing times of the department store. Thus, when the store closes, the garage closes.

The office-employee parking garage is generally linked with a large office complex. The primary function of this garage is to offer facilities for company-owned cars, for visitor's cars, and for employees' cars. Often where a number of businesses occupy an office building, parking space is allotted to each business according to number of personnel. In other cases, employees rent parking spaces on an individual basis.

The parking garage may be erected on a site adjacent to the main building, being connected to the latter by a pedestrian bridge or a subway, i.e. the administration building and the parking garage of the Humble Oil Company in Houston, Texas (McGonigle, 1963). But the garage may also become an integral part of one and the same building. "In the case of the Tiseman Building at Los Angeles, California, the parking facilities are, together with a general traffic concourse, accommodated with a low building, forming the base of the office tower" (Klose, 1965, p.50). Other office complexes have their parking facilities underground, beneath the building.

For this type of garage, both the number of storeys and spaces vary according to the size of the office building or complex.

Rate structure is determined by type of parker. For example, a short-term parker is charged on an hourly rate, whereas a long-term parker may pay either a daily charge or a monthly charge.

Further, when the office complex closes, so does the parking garage.

A central core parking garage has no formal link with either a department store or an office building. Its only link is with the functions of downtown in general. In other words, its primary function is to serve the parking needs of drivers who use the downtown either on a short-term basis, such as the salesman or the customer, or on a long-term basis, such as the worker.

In addition, this type of parking garage provides parking for those who wish to partake of the downtown "nightlife", such as theatres, restaurants, nightclubs, etc.

Where the city permits, this type of garage may provide limited facilities for pumping gasoline and servicing automobiles, particularly on a one-day basis.

The central core parking garage is located throughout the downtown area of the city. But, primarily, it is found within ten minutes walking distance to the major department stores and office complexes in the downtown.

Size of this type of garage fluctuates between three and five storeys and between 400 and 700 spaces.

Parking rates are charged according to the length of stay. The options available are hourly, daily, and, in some cases, monthly. Generally, after 6:00 p.m., most central core garages charge a set rate, such as fifty cents or one dollar, for the evening.

The hotel parking garage is linked with a large hotel located in the city's downtown. The primary function of this garage is to provide parking for the hotel guests.



Downtown hotels have found it necessary to build multi-storey parking garages in order to try to keep pace with the development of motels on the city's fringes. They create their own parking facilities on adjacent sites or in direct connection with the hotel building.

As this is a service to the guest, no parking fee is directly charged to him. Instead, the fee is included in the total hotel bill.

Main Street This type of parking garage is generally found on a principle business street in a city, especially one on which on-street parking is restricted by space or time.

The main street parking garage is primarily linked with an office building, with the most common example being a medical-dental building (Shuldiner, 1964). The primary function of this garage is to provide a convenient parking area for those who maintain offices within the building and for the office visitors.

The garage is usually located on the same site as the building, and quite often, structurally supports the building. Size of the parking structure is generally limited to two storeys and about 100 spaces.

Parking rates are based on an hourly charge for an office visitor, and a monthly charge for an office lessee.

Residential District The residential parking garage is confined here in meaning to a parking structure which is linked with an

apartment building. Such a garage, usually underground for aesthetic, cost, and area reasons, provides parking for the residents of the apartment block.

However, a two or three storey parking garage can be found in association with various types of residential complexes, such as an apartment-retail complex, an apartment-hotel complex, or an apartment-condominium complex, the function of which is to provide parking for both the resident and the customer or guest.

Parking fees are generally charged according to the type of parker. For example, a resident of an apartment-retail complex would pay a monthly fee, whereas a customer would pay an hourly fee.

Shopping Centre Because of the large acreage of a shopping centre and the vast area given over to surface automobile parking, a parking garage in a shopping centre is a rarity. However, because of increased customer usage and limited acreage, some shopping centre developers have found it necessary to build a garage in order to provide additional parking for their customers. Further, because of limited acreage and high land cost at the outset of some shopping centre projects, developers have had to build parking garages in order to accommodate the projected number of customers (Baker and Funaro, 1951; Welch, 1954; Pearlstone, 1971). Underground parking garages have been built also as a result of a desire on the part of the developer to blend his centre with the surroundings (Fisher,

1951). The Lloyd Centre in Portland, Oregon and the Miltown Plaza in Rochester, New York are examples of a shopping centre where garages have been constructed because of land costs, limited acreage, and aesthetic purposes (Klose, 1965, p.48).

As parking is a prime method of attracting customers to the shopping centre, no parking fee is charged.

Specialized Functional Area This type of parking garage is generally linked with an area complex serving a specialized function, such as a university (The University of Cincinnati), a hospital (The New England Deaconess Hospital), an airport (Los Angeles International Airport), or some other institution (Los Angeles Music Centre for Performing Arts; Cleveland Convention Hall) (Hackman and Martin, 1969, pp. 7-1 - 7-4). The primary function of this garage is to provide parking for both the users and the personnel of the complex.

On-site location widely varies, ranging from underground garages to five or six storey aboveground garages, some a distance away from the area complex.

Fees are charged on an hourly basis, a daily, monthly, or yearly basis, depending on the type of parking.

### CHAPTER III

#### CITY REGULATION OF

#### AUTOMOBILE PARKING GARAGES

City government regulation of automobile parking garages appears to have four areas of emphasis. External site features, including location, are frequently subject to regulation through city zoning by-laws and city transportation and renewal planning. The internal site features of size, layout, and construction are matters of concern for city zoning by-laws, transportation and renewal planning, and building by-laws. In general, both the external and internal features of parking structures are subject to indirect control through a city's approach to the administration and financing of a parking program. Lastly, the emphasis upon standards requiring safe provisions for construction and operation of parking garages appears to reflect a need for protection of the public health, welfare, and safety.

#### Zoning

Zoning is one of the most commonly used legal devices available for implementing the land-use plan of a city. Urban zoning may simply be defined as the division of a municipality or other governmental unit into districts, the basic types of which are residential, commercial, and industrial, and the regulation within those districts of:

- 1). The height and bulk of buildings and other structures;
- 2). The area of a lot which may be occupied and the size of required open spaces;
- 3). The density of population;
- 4). The use of buildings and land for trade, industry, residence, or other purposes (Goodman and Freund, 1968, p. 403).

The close relationship between zoning and planning was noted by the Metropolitan Housing Council of Chicago (Blair, 1964, p.517) in saying, "In discussing problems of zoning, it is essential not to lose sight of the fact that zoning is not an end in itself, but a means of arriving at a systematic and economical pattern of land use as a part of planning for the entire city".

The power to zone, like other regulatory powers, is customarily derived by municipalities from the provincial or state legislature. In Canada, municipal governments are empowered to pass by-laws on all matters, including zoning, within its jurisdiction as set out in the provincial statutes establishing the municipality. The enabling act in British Columbia is the Municipal Act, and gives each municipality the power to plan and control the use of lands by various zoning, subdivisions, and building by-laws (Todd, 1970, p.16-17). Similarly, in the United States, cities and municipalities have only those powers that the state delegates to them, usually through a state planning enabling act (Williams, 1966). The principal regulatory powers employed to carry out planning proposals are 1) the taxing power, 2) the power of eminent domain, and 3) the police power.

The police power is the basis for zoning, subdivision, and building regulations and other planning controls. These regulations must be justified by some considerations of public health, safety, morals, and general welfare. They must also meet the legislative requirements set forth in the state enabling act.

The characteristic feature of the zoning ordinance that distinguishes it from most other regulations is that it differs from district to district, rather than being uniform throughout the city. Thus, a given area might be restricted to single-family residences with height regulations, minimum lot size requirements, and setback provisions appropriate for that kind of structure. In other districts, commercial or industrial development might be permitted, and regulations for those districts would be enacted to control such development. Building or fire code provisions, on the other hand, normally apply to all buildings of a certain type regardless of where they may be located within a city.

Gallion and Elsner (1963, p.265) note that "size, shape, and location of districts reflect the major uses indicated by the Master Plan and should be formed to invite the natural development of neighborhoods". The Master Plan may indicate an area to be appropriate for single-family dwellings, for example, where as the zoning schedule may permit a commercial use within specified limits to be developed as a local shopping centre and a school and a park in order to contribute to the neighborhood quality of the area.

It is also pointed out by Gallion and Elsner (1963, p.266)

that most zoning ordinances provide for different densities of population in different areas of residential and commercial districts. One residential district may only permit single-family houses with a density of five families or twenty per acre, for example, whereas in a multiple dwelling district the density is allowed to reach hundreds of people per acre. These variations in population density must be reflected in other precise plans for the city since they affect the provisions of all community facilities and services including schools, commercial establishments, police and fire protection, and utilities.

Essentially, the underlying purpose of regulating uses in each area of a city is two-fold:

- 1). To prevent the mixing of incompatible uses which may have such deleterious effects on one another as to depreciate property values and desirable environmental features;
- 2). to insure that uses requiring expensive public service facilities such as major utility lines and heavily paved streets are restricted to those areas where the facilities exist or are planned to be installed (Goodman and Freund, 1968, p.426).

In regard to automobile parking garages, city zoning by-laws can effect control over the external and internal site features of these structures in one of two ways: 1) External - parking garages constitute a land use and can be permitted or prohibited in different kinds of zoning districts; or 2). Internal - parking needs of specific land uses should be treated as accessories

to such uses and provision and size or capacity of parking garages be made a requirement in association or major alteration of existing construction.

In the former case, through establishing zoning districts and regulating land uses within these districts, city zoning by-laws can influence the location of a parking garage. In other words, zoning commonly restricts the location of parking garages to certain areas. For instance, a parking garage may be allowed in a general commercial district, but may not be permitted in a local commercial district. Such a restriction is generally based on the need for this structure and on its compatability with surrounding structures in the area. It is obvious that a parking garage is needed in a general commercial district where such uses permitted may include office buildings, television studios, and department stores, whereas it is not needed in an area which only allows certain types of retailing (bakeries; grocery stores) and personal service (barber shops; launderettes) establishments catering to the day-to-day needs of residents of the local neighborhood.<sup>1</sup>

In larger metropolises, certain areas have been zoned exclusively for parking purposes or facilities, including the parking garage. Most often, those areas, usually designated Parking Districts, are found on the fringes of the central business district

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<sup>1</sup>Example taken from City of Vancouver Zoning and Development By-law Number 3575.



of the city in which parking space demand is heavy and supply is difficult. In a city like Milwaukee, no other use may be made of land in this area (Fordham, 1956, p.9), but in Vancouver, British Columbia, a more flexible by-law has been enacted, in that certain types of residential buildings may be permitted in this zone (City of Vancouver, 1969).

A few cities have however established a special district to designate privately-owned property specifically to be used for parking; but as Williams (1966, p.228) points out, the courts have "struck this down as arbitrary and over-restrictive". Williams goes on to state: "If the public desires to regulate property as specifically as that, the public authorities should acquire it" (p.228).

By a different use of the zoning mechanism, most cities require the provision of designated amounts of parking space in connect with new or substantially altered structures or uses according to a ratio determined by the need for parking accommodations. In regard to a parking garage, such an application of the zoning by-law can effectively regulate the internal feature of size or capacity of this structure. An analysis of this by-law for off-street parking facilities in general, will illustrate this point.

Historically, Columbus, Ohio is generally credited with being the first municipality to require that off-street parking areas be provided in connection with certain types of residential structures (Mogren, 1952, p.25). Later, Fresno, California became the first municipality to adopt regulations subjecting hotels and hospitals to similar mandatory parking provisions (Mogren, 1952,

p.25). Mogren further notes that the greatest amount of municipal zoning activity after World War II had been zoning for parking.

In a more recent light, Norman Williams (1966, p.226) asserts that: "Off-street parking requirements are the most important supplementary type of zoning control, and in some situations may be of equal importance with the basic use and bulk regulations". Williams bases his assertion on the notion that: "If no parking is provided on the lot, the cars visiting an establishment will be dumped on the public streets, and will create more congestion there; and so it is reasonable to require new establishments to take care of the parking needs which they themselves have created (p.226)". Further, by not making off-street parking mandatory through a zoning ordinance for each new or altered commercial development and in a quantity which can cope with the parking problems created by commercial enterprises, it will become necessary to develop such facilities as independent ventures. Such ventures, however, are less certain of maintaining a balance between commercial floor space and parking space, although some, like the Merchant Association in Oakland, California (Automotive Safety Foundation, 1955) do maintain a balance. Zoning for parking is thus an important means by which cities can guarantee an adequate amount of off-street parking for new or altered developments.

An actual zoning ordinance requires that there be a certain number of parking spaces per a certain number of units, be it beds (hospitals), seats (theatres; restaurants), rooms (hotels),

or dwellings (apartments), or for a specific amount of floor space, such as for a retail store or an office building. Typical zoning requirements and suggested planning standards can be found in Table 1.

In addition, this type of zoning ordinance can regulate the location of parking space. Some ordinances require the space to be located upon property other than that being improved, whereas others state that the required space be contained within the limits of the lot being improved. For example, in Los Angeles, California, the parking facility must be located within 1,500 feet of the establishment for which it is required.

In regard to a parking garage, this type of zoning by-law can affect the size or capacity of this facility and even the need for it. For instance, if a city zoning by-law requires that for every four seats in a theatre there be one parking space, and that if a new 2,500 seat theatre is located in the downtown area of the city, it seems reasonable to say that the parking facility built to accommodate 625 automobiles would be a parking garage. A case - in - point is the Music Center for Performing Arts in Los Angeles (Hackman and Martin, 1969, p.7-3). However, for a 300 seat cinema located in a suburban shopping center, it is reasonable to say that the patron's automobiles could be accommodated in a parking lot. The erection of a parking garage in the latter case is not needed and further, would be uneconomic.

TABLE 1

TYPICAL ZONING REQUIREMENTS, INDICATED PARKING SPACE  
NEEDS, AND SUGGESTED PLANNING STANDARDS

<u>Land Use</u>	Range In Number Of Parking Spaces Per Indicated Unit			
	<u>Unit</u>	<u>Zoning Requirements</u>	<u>Parking Space Needs</u>	<u>Planning Standards</u>
Single-Family Residence	dwelling	1-2	0.5-2.2	1-2+
Apartment House	dwelling	0.4-0.5 up	0.3-2.0	0.7-2.0
Hospital	bed	0.25-1.40	0.60-1.40	1.0-1.4
Auditorium, Theater, or Stadium	seat	0.08-0.25	0.08-0.50	0.25-0.33
Restaurant	seat	variable	N.A.	0.33-0.50
Retail	1,000 sq. ft. (gross floor area)	1.5-3.0	1.5-8.0	2.0-8.0
Office	1,000 sq. ft.	variable	2.9-4.0	2.0-5.0
Manufacturing-Warehousing	employee	variable	variable	0.33-0.50
College-University	student	variable	0.4-0.6	0.5-0.7
Church	seat	0.10-0.33	N.A.	0.20-0.33

N.A. - Not Available

Source: Wilbur S. Smith & Associates. Parking in the city center.  
New Haven, Conn.: Author, 1965, p. 65.

Further, by establishing a maximum distance standard, a zoning ordinance can regulate the location of the parking garage. As pointed out previously, some cities' by-laws require that the stipulated parking area must be located within a certain distance of the stated establishment. Therefore, if a parking garage is to provide this space, it must adhere to the location requirement.

Zoning by-laws regulating the uses of land in particular areas of the city and requiring the provision of parking space for each new or altered structure can thus effectively regulate the spatial features of location and capacity of a parking garage as well as establish the need for such a facility.

#### Urban Transportation Planning

Parking is an integral part of the automotive transportation system, and it must be treated as such. There are, however, those who "claim that parking is a separate phase of automobile movement and is not basically connected to or a part of the transportation system" (Hunnicut, 1965, p.47). This is not justifiable. For although the driver looks upon freeways or thoroughfares as the primary transport mode by which to reach his destination, they alone, even in ample supply, cannot solve the driver's problem. At the end of his journey, the driver must find a place at which to park his automobile. Parking must thus be considered as the terminal storage of vehicles and as a result, an integral and indispensable part of the transportation system.

Recognition of such a fact, though, was long in coming.

Fenton Jordon (1967, p.16) maintains that:

Federal-aid highway programs, until recently, bypassed the problem by not permitting the funds to be used for building parking facilities. City governments did not always fully understand the importance of providing adequate parking facilities, especially in the central business district; and traffic engineers concerned themselves primarily with the movement of vehicles and left parking to some other agency.

Similarly, the American Automobile Association (1946, p.14) wrote:

In central business districts especially, the terminals part of this system has been seriously neglected, with very detrimental results. In city centers, not even the semblance of proper balance has been maintained between facilities for movement and terminals.

However, there is now widespread recognition and acceptance of parking as being an integral part of the transportation system.

Evidence of this recognition can be witnessed in the coordination of off-street parking facilities with freeway developments. By coordination, it is meant that the location of off-street parking facilities, including parking garages, is often determined by a freeway system and the resulting street pattern.

In many cities, parking garages are located on ramps or along streets which lead directly to freeways. Ramps joining freeways

with parking garages, where they are able to be provided, advantageously minimize surface travel to and from freeways. However, as Smith (1961, pp.230-231) points out, "problems of ramp spacing, geometric design, and cost, especially in central areas, will limit direct connections to major parking structures where adequate reservoir capacity can be provided". Examples of successful coordination via direct ramp connections include a 1,000 - car garage at Detroit's Cobo Mall, and Hartford, Connecticut's Constitution Plaza Garage. An integral part of a comprehensive transportation development in downtown St. Louis, Missouri, is the provision of a massive parking garage linked directly to the two-level Daniel Boone Expressway (Smith, 1961, p.234).

Adjusted city street connections usually involve the improvement of a connecting street between a parking garage and a freeway. The widening of Chicago's Michigan Avenue to provide direct ramp connections to the 2,500 - car Grant Park Garage is an illustrative example (Smith, 1961, p.231).

Downtown renewal planning also offers opportunities to develop new transportation routes and as a consequence, new off-street parking facilities. In New Haven, Connecticut, for example, the downtown redevelopment project has provided for the locating and building of a freeway system and the locating and building of a 1500 - car parking garage in relation to this system.

It is also important that parking facilities be considered in connection with transit facilities. The location of

these parking facilities is determined by the location of transit routes and stops. Although parking for transit-users is usually supplied by a parking lot, in parts of the city where land area is minimal and development costs are high, such parking is provided by a parking garage. But, nevertheless, the location of the parking garage is affected by planning for transit facilities.

Internal features of parking garages also have a close physical relationship with streets, expressways, and other arterials. The entrances and exits of parking garages must be located so as to harmonize incoming and outgoing vehicles with the flow of street traffic. Most engineers agree that entrances and exits should be located so as not to lead into a main arterial where the traffic load is already heavy (See, for example, Ricker, 1957; Whiteside, 1961; Fordham, 1956; Burrage and Mogren, 1957). Instead, they recommend that entrances and exits to and from the parking garage be tied in with a one-way street system or secondary streets. Burrage and Mogren (1957, p.150) suggest that an idea location for a garage is on a block between a pair of one-way streets which will permit cars from either direction to enter and leave without crossing traffic. Access to a rear alley or a back street may accomplish the same purpose.

Further, parking consultants recommend that entrances and exits should be located as far as possible from street intersections. The slow movement of entering and leaving a garage should be removed from the normal congestion of street intersections



(Ricker, 1957, p.47).

The size or capacity of a parking garage is also a function of its location in relation to traffic flow planning. In determining the size of a garage, a parking consultant must always examine and anticipate changes in the traffic pattern resulting from changes in the street system, including one-way streets, and construction of expressways and bridges. An oversize parking structure for a given location can create rather than eliminate traffic congestion. For example, consultants in Toronto recommended that a municipal parking policy should incorporate the following point:

The ultimate capacity of the street system should govern the supply of parking. This provision assumes that there will be an even distribution of traffic on the streets and that traffic operations are maximized (Read et al, 1968, p.133).

A similar point was stressed by planners in Edmonton, Alberta (City of Edmonton, 1965, p.52).

Reservoir space at the entrance and exit of a parking garage for acceptance and delivery of automobiles must be also related to traffic patterns. "Lack of space creates 'back-up' into the street, causing congestion, and the need to turn away potential parkers" (Burrage and Mogren, 1957, p.308). There are no general rules for reservoir space required, but the amount must be in proportion to rate of movement and rate of flow, which varies

between garages (Ricker, 1957, p.50).

Based on the above information and as suggested by the literature, it would thus seem reasonable to conclude that in relation to parking garages, city transportation and traffic planning can influence the external feature of garage location as well as the internal site features of entrance and exit, size, and reservoir space.

### Urban Renewal Planning

Current city planning decisions concerning central business district renewal clearly reflects the growing need to conserve, rehabilitate, or redevelop this urban area. Such a need has been created by declines in the C B D's relative position in retail sales, land values, number of businesses, and additional capital investments. Concurrently, increased congestion and parking deficiencies have made trips downtown less pleasant and more expensive. The results are threats to the socioeconomic health of the downtown district which have come about "in the form of blighted areas, relative reductions in tax income and a general lowering of its relative attractiveness as a place to work, shop, set up a new business, or expand an existing one" (Smith, 1959, p.156).

Although the economic and social climate for renewing urban centres varies among cities, urban renewal usually affords many opportunities for a total downtown design encompassing buildings, open spaces, transit, freeways, streets, and parking.

Parking is an essential part of these downtown renewal plans and may often prompt investment in the project by private enterprise (Candeub, 1964).

Among the types of parking facilities that may be provided in connection with urban renewal projects are street-level parking lots and underground and multi-storey parking garages. Of concern here is the latter type of facility, the garage, which, as Robert Whiteside (1961, p.10) writes, must be "designed as an integral part of the over-all development".

As areas in the central business district suitable for parking garages are limited, spatially and monetarily, downtown renewal projects offer excellent opportunities in which to locate such facilities. Such opportunities are made available through the redesigning of space in specific areas of the downtown. If the renewal project is planned in relation to present or proposed automobile-oriented transportation routes, the project provides further reason for locating terminal facilities within its boundaries. Further, if city officials recognize and take advantage of the opportunities presented by central business district renewal, their decision to locate a parking garage within a project may substantially contribute to relieving downtown traffic congestion and parking deficiency (Smith, 1959). Moreover, the location and integration of parking with other land uses may permit sharing of land costs, and lead to increased business activity and tax revenue, all of which benefits the city as a whole.

Examples of parking garages located within urban renewal projects are numerous. In Rochester, New York, the Midtown Plaza incorporated an 1,800 - space underground garage into an office block-shopping mall redevelopment project. Plans for the Bunker Hill Urban Renewal Project in Los Angeles provide for tower apartments for 6,000 to 8,000 persons, office buildings, and commercial uses for a daytime population of 50,000 people, and related parking structures, on a 136-acre site (Smith, 1965, p.91). The Constitution Plaza redevelopment project, which opened in 1963, in Hartford, Connecticut, has two underground garages providing 1,825 parking spaces. An interesting footnote to this latter project was that the provision of off-street parking was a prerequisite for private investment and a basic requirement for mortgages.

Plans for redevelopment of the Central Area in Edmonton, Alberta also reflect the importance of parking in this type of urban planning (The City of Edmonton, 1965). Within the Central Area, plans for the Civic Centre area call for the building of three major shopper parking structures as well as the building of underground structures. In calling for the development of these garages, planners have recognized the importance of providing parking as an integral part of the commercial, hotel, office or other buildings being constructed for the core area.

Similarly, planning for downtown redevelopment in Calgary, Alberta stressed the importance of integrating parking facilities with a ground level mall, civic plaza and improved

roadway widths (City of Calgary, 1967). Within a four block area, a total of 2,370 parking stalls would be required to cater for projected demands.

These will be provided on three levels and allocated for development on a parcel basis with flexibility to provide for integration as the Scheme is implemented. These facilities are regarded as the responsibility of the developers of each specific parcel (City of Calgary, 1967, p.42).

City planning for renewal or redevelopment of central business districts was thus influential in the location of parking garage developments in these particular cities and in cities in general.

In addition, the type and size of structures located in renewal projects can determine the size or capacity of the garage. Such determinism is exerted through a city zoning ordinance requiring the provision of a certain amount of parking space for each type and size of new or altered structure within the project. A more indepth look at the effects of this ordinance on parking garages has been taken in an earlier section of this chapter.

#### Administrative Practices

Each municipality must make its own decision as to parking need and what kind of parking program is most suitable in order to fill its parking needs. In developing a parking program or programs, a municipality often determines, indirectly, the types of

facilities to provide for such a function. In fact, broadly speaking, one might even say that a municipality's parking program can influence the external and internal features of the facilities provided. For purposes of this thesis, it is the parking garage which is affected by the program.

The various programs available to the municipality have been grouped into three general categories according to type of ownership and operation: (a) privately owned and operated (private enterprise); (b) publicly owned and privately operated; and (c) publicly owned and operated (municipal), with a sub-category of parking authority. Each program is examined in terms of its advantages and disadvantages, limitations, legality, and forms.

Private Enterprise. This type of operation describes the parking facilities developed, owned, and operated by private individuals or companies. As Fordham (1956, p.73) points out, such private development of parking facilities is of three forms:

...(a) commercially developed lots or garages built and operated for profit; (b) special purpose parking facilities developed by non-profit corporations representing various commercial groups, such as retail trade associations; and (c) special purpose parking facilities developed by commercial establishments as an essential accessory use.

The benefits of a parking program developed by private enterprise are numerous. Often, free enterprise encourages strong initiative in the development and operation of off-street parking

facilities since it places these facilities on a competitive basis subject to the price mechanism. The private parking industry also stimulates important structural developments for the parking garage. For example, The Hudson's Bay Company developed the first sloped floor clear span express exit ramp in the world, and also boasted the first pedestrian skywalk, in their Calgary Parkade (Hackman and Martin, 1969, p.1-4). Further, under a private enterprise program, the land on which the facility is sited remains taxable, except in rare cases of tax exemption. Another advantage of the private enterprise approach is that any financial risk in developing off-street facilities is taken by private interest; "the public is not gambling on the financial feasibility of parking facilities" (Fordham, 1956, p.75). Finally, under the private enterprise approach, there is allowance for functional consolidation of parking facilities and commercial uses. An example of integral development is the Carfitz Building in Washington, D.C., which provides parking on the same floors as offices (Baker and Funaro, 1958). Such an arrangement would not however be found in all cities, since many cities' building by-laws either limit accessory commercial facilities to the ground floor of a garage or prohibit them.

There has arisen in the private parking industry a national trade association which is dedicated to the private enterprise cause in the parking business. The National Parking Association (N.P.A.), with headquarters in Washington, D.C., is consistently critical of governmental entry into the parking

business. William Barr, the executive-director of the N.P.A., testified before a United States Senate Subcommittee on Business and Commerce of the Committee on the District of Columbia studying a proposal to establish parking facilities in the District (1966, pp.226-227) that:

Major lending institutions... have publicly stated that they have millions of dollars invested in downtown American cities and are willing to invest millions more for off-street parking to protect that investment; however, they cannot lend money for this purpose where there exists the threat or actual existence of subsidized municipal competition. Lending institutions have discovered that parking can be a profitable business where there exists a proper "climate" for free enterprise. But where subsidized municipal competition is present, not only is private enterprise unable to expand, it is driven off the market.

Reflective of the Association's attitude is the title of a recent publication: The Parking Industry: private enterprise for the public good (Hackman and Martin, 1969).

The major limitation of the private enterprise approach to parking has been the inability to furnish a sufficient quantity of properly located parking space to suit a city's need. It is not uncommon to find instances where a private agency is unable to assemble land for parking because of the price asked for it. Such was the case in Philadelphia, where a merchant's association gave up the thought of expanding their garage because of the high prices asked for the adjacent property (Fordham, 1956, p.76).

In some major North American cities, most of the



parking has been provided by private enterprise. For example, in Houston, Texas, nearly all of the downtown parking has been constructed by private capital, usually in conjunction with the development of major office buildings (McGonigle, 1963), banks, and department stores (Smith, 1965). In Minneapolis, the downtown parking needs are also met by private enterprise. Here, in 1948, leading downtown retailers, including Woolworth's, Kresge's, and Penny's, savings and loan associations, newspapers, and several parking companies formed the Downtown Auto Park Corporation (Wakefield, 1964). Since its inception, the Corporation has constructed and successfully operated two garages and lots. A further eleven multi-deck structures have been developed by private enterprise in this city.

Merchant associations and department stores are other examples of the private enterprise approach to parking. These types of organizations often provide parking as a source of convenience and attraction to shoppers. Well-known examples of merchant's associations participation in parking provision are the "Park and Shop" program in Allentown, Pennsylvania and the Oakland Merchant's Association (Whiteside, 1959). Hackman and Martin (1969) noted in 1966 there were 131 operating "Park and Shop" programs in the United States.

Examples of the participation of department stores in the parking business have been mentioned in Chapter II.

Private and Public cooperation. Off-street parking facilities, including the garage, can be developed and operated through public and private cooperations. Forms of this type of operation range from cities buying or leasing land for parking from private individuals to the exact opposite situation, in which a city-financed multi-storey parking structure is given over to the highest-bidding commercial operation on a long-term lease. "Cooperation may also take the form of tax relief arrangements, urban redevelopment programs, under which land in a redevelopment area is to be developed by private enterprise for parking purposes; and technical services, advice and surveys" (Fordham, 1956, p.79).

This type of program for developing off-street parking combines many of the advantages of private and municipal undertakings. For example, the land for the parking facility remains on city tax rolls with no drain on public funds. Furthermore, city participation often means that parking facilities developed by private concerns can be placed in a desirable location. Another advantage that results from this arrangement is that in having private capital finance the building of a facility on public land, and then having the facility become the property of the city at a specified date, it removes the financial risk of such an undertaking from the city. Simultaneously, a permanent facility in an ideal location is assured. This type of arrangement was the case in Los Angeles and San Francisco, where the Pershing Square and Union Square underground garages, respectively, were built on city-owned land by private

capital (Smith, 1965). Under the arrangement, these facilities are due to become the property of the city in fifty years; but in the interim, the city is paid a rental or a percentage of net profits.

The major disadvantage of this approach comes not from the program itself, but from trying to initiate it. In some instances, it is difficult to obtain workable agreements between private individuals and city governments, and in others, few cities have suitable land for parking in their downtown area to entice private investment. However, in such major cities as San Francisco,

Baltimore, Pittsburg, and Chicago, private and public cooperation has provided them with a complete parking program.

Municipal. The promotion and protection of public health, welfare, and safety are some of the basic purposes of city government. If a parking problem persists in a city, it may become the responsibility of the civic government to take whatever steps are required to alleviate this problem. Thus, if private enterprise fails to supply the parking needed, local government should consider its responsibility in the matter.

Recognizing their responsibility, cities in increasing numbers are providing and operating off-street parking facilities. The administration of such a program has been done through (a) regular public officials, (b) boards, or (c) parking authorities.

Programs administered by regular public officials include those carried out by a municipal official or department to whom or to which the responsibility is delegated. Culp (1967, p.44)

maintains that the placing of responsibility for the development of off-street parking facilities in an existing city department has the potential advantages of:

...(a) making the community's parking system including curb spaces, more efficient; (b) facilitating proper integration of parking with other highway transportation elements; (c) permitting maximum utilization of the municipality's powers, equipment and technical personnel; (d) keeping parking fees lower because no taxes or profits need be included; and (e) facilitating the regulation and enforcement of parking lot and garage operation, fee pattern, and usage.

The board approach differs from the regular city official in that a parking board or commission is created to encourage and organize the development of the city's off-street parking facilities. The function of the board is that of advising, especially during the formative stages of the program. The advantage of a parking board is that its members are often people who are closely related to the parking problem through their occupation. The main disadvantages of such a board is that much of its authority rests with the mayor and that sometimes it becomes a body more interested in gaining public recognition than in service (Burrage and Mogren, 1957, p.211).

Parking authorities are discussed later.

The legality of municipal development of off-street parking facilities is provided through a variety of powers. In the United States, this right may be provided through home-rule powers (the municipal charter), state enabling legislation, or implied

powers. In Canada, legality for the provision of off-street parking facilities by municipal governments is established by the Provincial legislature through a municipal act. But in either country, the designated powers should include the ability

...(a) to plan for a coordinated system of off-street parking facilities, well-located and functionally designed, and in connection with such planning to conduct surveys; (b) to assemble land for parking facilities at desired locations; (c) to finance in any desired manner; (d) to construct facilities or to contract for construction; and (e) to operate and maintain facilities or to enter into arrangements with others for operation and maintenance (Culp, 1967, p.33).

Principal opposition to municipal entry into an off-street parking program is usually based on the contention that it represents unfair governmental competition with private enterprise. Further, the opposition contends that municipal parking facilities may also involve removal of land from the tax roll (Hackman and Martin, 1969), "although as an offsetting consideration, parking improvements often contribute to an increase in the tax revenues from nearby properties" (Culp, 1967, p.44). Generally, private enterprise asserts that professional private parking interests can do a more efficient job of developing and operating parking lots and garages, and that a municipal agency is wrought with political interests. However, the decision to choose either approach, and the advantages of each, must be based on the situation in individual municipalities.

**Parking Authorities:** Because of delays sometimes experienced as a result of divided administrative responsibility and authority, many cities have turned the establishment of a parking authority to administer their parking program. The authority is a special purpose, public benefit corporation. "Created by the city, it combines public responsibility of government with business initiative and the efficiency of private enterprise" (Burrage and Mogren, 1957, p.212).

Fordham (1956, p.87) has suggested that, generally, there are three identifying characteristics of parking authorities:

...(a) it is separated from the regular departments of government sufficiently to provide autonomy of operation, with sufficient corporate powers; (b) it is controlled by a governing body functioning in the manner of a board of directors; (c) it has powers to acquire, construct and operate parking projects and to issue revenue bonds for the purpose - but is not empowered to levy taxes as such.

The purpose of parking authorities seem to outline a development of logical action for a good off-street parking agency.

Culp (1967, p.45) defines some of these purposes as:

...(a) to conduct research and maintain current data essential to establishment of parking facilities; (b) to prepare a master plan of off-street parking facilities to meet present and anticipated future needs; (c) to plan, design, and locate facilities; (d) to program construction; (e) to purchase, lease or condemn property; (f) to construct, improve and maintain facilities; (g) to fix and alter rates, fees,

charges, or rentals for use of facilities; and (h) to lease for operation.

There are some obvious advantages of authority administration in the provision of off-street parking facilities. According to Culp (1967, p.48) some of them are:

...(a) the centralization of extensive authority and responsibility for the parking program in a single agency; (b) relative freedom from political pressures; (c) the avoidance of certain governmental process and other delays; and (d) the payment of costs, as a rule, from users of the facilities, with usually no direct effects on the regular municipal budget or tax program.

Mogren (1953, p.17) cites other advantages of authorities as: (a) the ability of the agency to initiate parking relief measures on a scale commensurate with the magnitude and importance of the problem; (b) the use of powers broad enough "to permit the authority to deal effectively with the local problem but sufficiently restricted to prevent misuse"; (c) the ability to plan and pursue the most advantageous course in providing municipal parking; and (d) the provision of an incentive to develop high management and personnel efficiency.

On the other hand, parking authorities are not without their disadvantages. These disadvantages, as again suggested by Mogren (1953, p.18), include:

1. The powers granted authorities and necessary to their effectiveness places their operation beyond immediate public control.

2. Separation of authority operation from the governmental structure leads to duplication of effort and activities now contained in some existing city department.

3. Because they are dependent upon their own earning and can in no way rely on the financial support of general city credit, parking authority debt service charges are often appreciably higher than those found in city improvements financed by general obligation bonds.

Whether the advantages of authority management for city off-street parking outweigh the disadvantages must be determined for individual cities. There are, however, a number of cities which have successfully implemented the authority form of municipal off-street parking management. In San Francisco, for example, a parking authority has been in operation since 1949 (Fisher, 1950). The outstanding feature of the San Francisco Authority's program is its cooperation with private enterprise. In fact, the Authority actually sought to stimulate private enterprise "to acquire sites, finance, and construct all the facilities included in the off-street program" (Culp, 1967, p.50). Only whenever private participation could not be obtained, did the Authority activate the mechanism by which it could develop off-street facilities. Under an agreement with private enterprise, the Authority has since built several open-air parking garages plus six underground garages in the central business district of San Francisco.

Parking authorities are also in evidence in Pittsburg (Froelich, 1953), Baltimore (Ewald, 1950), Boston (Culp, 1967), and



Toronto (Bundy, 1970).

As the parking problem continues to grow in seriousness, many cities will continue to consider it of public importance to the continued growth and health of the city and direct threat to the downtown section of the city. The provision of off-street parking facilities must be the concern of both city authorities and private operators, but each city must decide on its own program. Indirectly the program decided upon by a city can affect the external and internal spatial features of the planned or constructed parking facilities, including parking garages, in that city.

#### Financial Practices

Similar to having to make a decision on a parking program, each municipality must decide on how to finance it. If a municipality decides that private enterprise or private - public cooperation will provide off-street parking facilities, then financing for private enterprise facilities and for the must part, private-public cooperation facilities will be provided from private capital sources (Automotive Safety Foundation, 1952). However, should the municipality decide that off-street parking will be a municipal operation, then it must make a decision on what method or methods of financing to adopt.

There are many methods available for the municipal financing of parking facilities. Unless facilities are provided by gift, they are paid for ultimately by the public as a whole or by a

special class thereof, either through direct use of revenue derived by various methods or by borrowing. The chief means of obtaining funds fall into two general classes: (a) direct revenue and (b) borrowed capital.

Direct Revenue Sources. Revenues that may be used for direct financing include general fund appropriations, current budget expenditures, benefited assessments, and parking revenues. A municipality may utilize any one or all of these various sources, where legally permissible, for deriving funds to finance its parking facilities.

General Fund Appropriations: One method which cities use to finance parking facilities without the necessity of borrowing is termed general fund appropriations. Using this approach, the local government spreads the costs over the entire city and no interest charges are involved. If a surplus does not exist in the city treasury and this method is adopted, new sources of general revenues may have to be found or otherwise an increase in assessed valuations may be required.

Current Budget Expenditures: This method has been often used to acquire and develop off-street parking facilities. Its use was particularly popular nearly two decades ago, during the early days of municipal activity in the parking field. Much of the early city participatory efforts in furnishing off-street parking were modest,

designed to meet the growing need for parking space in the city after World War II; and financing for these projects usually could be met through the city's budget.

Today, however, municipal parking program costs run into the hundreds of thousands of dollars. The magnitude of developments required to even minimally supply the parking need in most cities almost excludes the possibility of current budget financing.

The only exceptions to this generality occur when lands suitable for parking developments are already under city ownership or can be reasonably acquired by the city. In such cases, less money is required to develop parking facilities, and the total investment may come from the city's general fund.

Benefited District Assessment: This method of financing "attempts to spread pro rata over all properties in a previously determined benefited district the cost of the parking development" (Mogren, 1951, p.434). The theory behind this method is that owners of business property in close proximity to parking facilities enjoy a greater proportion of the benefit occurring from the facility than property owners farther away or in the rest of the city. It is argued that parking facilities attract customers, thereby increasing the business activity of nearby sites and ultimately enhancing their value. Consequently, it is held that these property owners should bear a large portion of the cost, if not the total cost, of establishing parking facilities near their sites.

The major problem of this approach is in deriving an equitable method of determining relative benefits. Culp (1967, p.15) states that benefits may be based on:

(a) assessed valuation of property for tax purposes, (b) front footage of property fronting on streets in the assessment district, (c) floor area of business establishments, (d) the volume of business, as determined by gross or net receipts or other measures, or (e) any other desired method or any combination of methods.

Culp further notes that another method is by dividing the benefit district into zones of benefit and apportioning the costs to the designated zones according to their proximity to the parking facility. The cost assigned to each zone is then distributed to each internal property by one of the previously mentioned methods.

The major problem of this approach to financing parking facilities has arisen as a result of trying to determine an equitable assessment. However, the decisions from the courts uphold the right of a city to assess property owners according to the expectant benefits received from the proximity of parking facilities (Culp, 1967, p.18).

Parking Revenue: Many cities are attempting to meet the growing need for off-street parking by financing such facilities through parking revenues, the funds accumulated from the operation of other on-street and off-street parking accommodations. Based on the belief that parking is a business that can "pay its own way", the net

revenues or a fixed percentage of the gross revenues of all curb parking meters and existing off-street parking facilities are earmarked for the further development of off-street parking facilities. Further, the belief is that the parking fees exacted from those enjoying the most direct benefits from the convenience provided, may constitute significant sums for financing parking facilities (Culp, 1967).

Often, cities integrate curb and municipal off-street parking facilities into a unified whole, controlled, operated, and financed as a single unit. In such a system, the revenues from both types of facilities are placed in a common fund for the use, as needed, by any part of the system. Culp (1967, p.17) notes that the benefits to be derived from such a system are:

- (a) revenue bonds may be sold more easily and at a lower interest rate when secured by the combined revenues of curb and off-street facilities and may be liquidated more quickly;
- (b) off-street facilities that may not be completely self-liquidating but are an essential part of the program; if combined with financially successful facilities may be continued in operation to serve a particular need, supported in part by more prosperous members of the system;
- and (c) the rate structures for curb and off-street facilities may be brought more easily into a reasonable relation with each other.

There are, however, disadvantages to financing by parking revenues. One such disadvantage occurs as a result of local government policy, in that a number of cities will not develop off-street sites until parking receipts available are sufficient for

complete financing of these facilities (Mogren, 1951). The weakness here is the time required to accumulate funds before the actual program can start. Such a delay may lead to public aggravation towards the city's role in providing and financing off-street parking facilities. A second disadvantage is that this method of financing is not practical for small local units with limited general revenues (The American City, 1970).

Generally, however, this method is popular in cities where revenues are used to finance bond issues, in most cases revenue bonds (Mogren, 1951; Culp, 1967; The American City, 1970).

Borrowed Capital. The borrowing of funds for parking facilities generally involves the issuance of bonds payable from property taxes or from special revenues. The three most common types of bonds used to finance parking facilities are general obligation bonds, revenue bonds, and assessment bonds.

General-Obligation Bonds: This type of bond is generally supported by the full faith and credit of the entire city. Such bonds may be primarily or collaterally payable from "ad valorem"<sup>2</sup> taxes, from special assessments, or from any desired city revenues, including revenue from off-street parking facilities, parking meters, or benefited assessment in a parking district.

General-obligation bonds are usually issued within legal debt and tax limits and usually require approval of the electorate

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<sup>2</sup>Ad Valorem is defined as: "According to value".

unless specifically exempted from these requirements by law (Culp, 1967, p.19). These requirements alone may serve as deterrents to this method of financing; for example, in many instances, legal debt limits may already have been reached, or the legal debts limits have not been sufficiently high to finance more than a limited parking program (Mogren, 1951; Culp, 1967).

The chief advantages of general-obligation bonds are low interest rates because they are backed by the faith, credit, and taxing power of the city, and the ease in marketing an issue.

The voters in many cities have approved large issues of general-obligation bonds for parking. However, in some cases this method has been rejected as unfair. The basis for this rejection is that some voters feel that commercial interests in the downtown receive benefits out of proportion with the tax burden they assume; and that these voters believe that they do not receive a benefit commensurate with their tax burden (Mogren, 1956, p.431).

Although these bonds were very attractive in the past, with today's tight money market, high interest rates, and the pending threat of making municipals taxable, general-obligation bonds have become less appealing and saleable (The American City, 1970, p.92).

Revenue Bonds: These types of bonds have become the most popular financing source. By this method, the revenues from the parking facilities financed by the proceeds from such bonds are pledged to retire the bonds. Revenue bonds are usually more

difficult to market than general-obligation bonds, and because of the element of risk, require a higher interest rate.

To lower the interest rate, however, and to insure redemption and increase the marketability of revenue bonds, additional support from other sources is usually needed. Generally, the additional security required to support a sale of revenue bonds has been received from mortgaging parking property, on-street and off-street parking revenue, automobile service facilities including the sale of gasoline and oil products and repair facilities inside parking garages, and non-automobile-oriented commercial establishments inside garages.

Unlike general-obligation bonds, revenue bonds can be issued outside legal debt limits, and the approval of the electorate is not required. However, the bond issue may be limited by authorization to the amount required for a particular project or to the aggregate amount for a number of projects for an entire parking program. In some cases where the parking program is extensive, the authorization may be open-ended, thereby permitting the issuance of additional revenue bonds as long as specified requirements are met.

Revenue bonds have also proved particularly desirable in financing the programs of municipal parking authorities (Mogren, 1953). These authorities are usually confined to the self-liquidating revenue bond for financing their operations as they lack the support of the city's legal borrowing power.

As Burrage and Mogren (1957, p.217) have pointed out,



the revenue bond has grown in popularity because of its flexibility and adaptability for placing the responsibility for financing on those directly aided by the parking improvement.

Assessment Bonds: This type of bond is supported by the funds derived from the assessment of the total or a part of the cost of providing the needed parking facilities in a particular business area. The costs are allocated to the property in the area in proportion to the direct and indirect benefits from increased business activity in the area and increased land values, which may result from the parking improvement (Fordham, 1956, p.48).

Generally, assessment bonds are limited obligation bonds. The collection of assessments may however be anticipated by general-obligation bonds and assessments may bolster revenue bonds. Interest rates on assessment bonds are higher than those on general-obligation bonds.

This method of financing parking facilities has however proved to be unpopular, on the one hand, because of the general opposition of property owners who would be subjected to assessment, and on the other, because of the higher interest rate required compared with the rate for general-obligation bonds (Fordham, 1956; Culp, 1967).

#### Building Codes

Briefly defined, "a building code is a legal document which sets forth requirements to protect the public health, safety

and welfare as they relate to the construction and occupancy of buildings and structures" (Sanderson, 1969, p.13). A typical building code regulates, in general, the construction, alternation, maintenance, repair, and demolition of buildings and structures. More specifically, though, it covers such factors as lighting, ventilation, heating, sanitation, plumbing, electrical work, types of building materials, and fire prevention and protection.

Building codes are usually classified as being specification codes or performance codes. Sanderson (1969, p.15) defines the specification codes as that code describing "in detail exactly what materials are to be used, the size and spacing of units, and the methods of assembly". The performance code, on the other hand, perscribes the objective to be accomplished.

Building codes devote considerable attention to fire safety requirements. For example, many building codes provide for the establishment of fire limits within which only buildings of certain types of construction may be erected. "The object of establishing fire limits is to restrict the spread of fire to limited areas within a city" (Sanderson, 1969, p.16).

Another fire safety requirement within the building code is the limitation of the maximum heights and areas of buildings depending on the type of construction and occupancy. The purpose of such a regulation is to equalize the fire risk to a community for all use groups and all types of construction.

Occupancy or use classifications in building codes are

established according to the inherent fire hazard of the use. A city in establishing such classifications must take into consideration the factors of numbers of people, conditions of occupancy or confined space, amounts and kinds of materials, and equipment utilized.

The protection or safety provided by the several common construction methods can be used to offset the hazards of the various use groups. These are grouped into types of construction according to their proven capacity to resist fire. Types of construction are further distinguished by the combustibility or noncombustibility of permitted materials. Types of construction are classified "combustibile" if the materials permitted are combustible, thereby contributing fuel to the fire. On the other hand, those types wherein noncombustibile materials are required so that the elements of the structure will not contribute fuel to the fire are classified as "noncombustibile".

Building codes are however not without fault. For example, building codes or by-laws in some cities are excessively restrictive and require material of a quality beyond what is reasonably adequate, resulting in high building costs. More common, however, such codes lag behind the times. Thus, building codes fail to allow modern building techniques and installations because they are not kept up to date (Elair, 1964, p.514).

In regard to automobile parking garages, city building codes or by-laws can effectively regulate the internal features of

these structures, including construction materials, exterior walls, heat and light, ventilation, bumpers, sanitation, floor loadings, screening, stairways, elevators, and exitways. Building codes also provide for the necessary maintenance and housekeeping of these garages. Moreover, building codes regulate the use or occupancy of the garage. Such regulation includes the provision of accessory commercial functions, in particular, facilities for the sale of gasoline and oil products and the servicing and repairing of automobiles, and non-automobile oriented activities. Similar to other city by-laws concerning parking garages, building codes are based upon the principle of the protection and promotion of the public health, welfare, and safety.

### Summary

The analysis of city government controls upon automobile parking garages leads to the conclusion that cities have at their disposal a wide range of practices and controls with which to regulate the external and internal site features of these structures.

One such control is the city's zoning by-law, which regulates the external spatial feature of location of a parking garage and the internal spatial feature of size or capacity through land use controls and parking space requirements respectively.

Further regulation of parking garages by a city government can be effected by city planning for transportation

facilities and redevelopment or renewal projects. As parking is considered to be an integral part of the urban automotive transportation system, planning for the latter also includes planning for the external and internal features of location, entrances and exits, and size of facilities for the former activity. Parking garages are also being designed as integral parts of urban renewal or redevelopment projects.

On a much broader scale, parking garages are being regulated through a city's administrative and financial approach to parking in general. The analysis of a city's administrative approach centered on the available choices of parking programs including: (a) private enterprise, (b) private-public cooperation, or (c) municipal. An analysis of the financial approach concerned itself with the choices available for municipal financing of parking programs.

In regard to automobile parking garages, city building codes or by-laws also effectively regulate internal features of these structures including the placement of accessory commercial facilities within them. But not unlike other regulatory methods, city building codes are designed for the protection and promotion of the public health, welfare and safety.

## CHAPTER IV

### AN EXAMPLE OF INTERNAL SITE REGULATION

#### Introduction

The proceeding chapter was concerned with a general analysis of the spatial effects of city legislation and practices upon the external and internal site features of automobile parking garages. This examination did not however provide an indepth study of the problems that arise due to city regulation of parking structures. In order to delineate the problems and effects arising from city regulation of garages, a particular example of internal site regulation has been chosen for analysis.

The example chosen is that of the regulation by cities of the sale of gasoline and oil products and the installation of automobile service and repair facilities inside parking garages. This example of internal site regulation is chosen primarily because it exhibits facets of the problems arising out of the differing formulation and varying interpretations of city legislation. Secondly, it is chosen because an analysis of the effects of this regulation provides an interesting insight into a conflict between actors at the industrial and at the municipal level. Further, the analysis also offers an insight into the effects of a conflict created as a result of the setting of dissimilar goals by city decision-makers.

In analyzing the effects of city legislation, the

current analysis must recognise that these effects are, however, dependent on the present situation within each community. But, in general terms, the effects of such legislation can be examined in terms of considering community and private needs and promoting the public health, welfare and safety.

Generally, in formulating legislation, the problems that are legal and administrative in nature may be grouped into three areas of conflict: custom, interpretation of words and phrases, and draftsmanship.

Custom. The customary recognized situation has precedent, but has shown that the need for its regulation or prohibition will prove too difficult to legislate against. For example, the roof-sign, which in the past has been a common occurrence, has been recently prohibited in certain areas of the city of Vancouver.

Interpretation of words and phrases. The selection of words and phrases used in a by-law must be chosen carefully, so that interpretation is consistent. The rule "one word for one meaning" applies especially in relation to parking garages. In spelling out the definition of garages, it is of the utmost interest that the regulations are clearly aimed at a specific classification of garage type. This becomes quite evident when sections of the by-law permit or prohibit specific types of facilities in certain types of garages.

Draftsmanship. The interpretation of words and phrases is dependent upon the wording of the ordinance. Thus, the by-law, if drafted according to rules, should be "tight" and generally able to be upheld

in courts of law. One of the problems in regulating the installation of certain facilities inside parking garages is the drafting of the ordinance.

### The Example

The sale of gasoline and oil products and the installation of automobile service and repair facilities inside parking garages has been recognized by writers on the subject of parking, (Burrage and Mogren, 1957; Ricker, 1957; Whiteside, 1961) as being both a source of income to the garage operator and a source of convenience to the garage customer. Culp (1967), while examining the legality of the provision of these facilities by municipalities, has also recognized the economic importance of them. But the provision of these facilities inside parking garages goes beyond economic need and customer convenience and reaches into the area of public health, welfare, and safety, which, in effect, determines or, in some instances, is determined by city building and fire by-laws.

The provisions of city building and fire by-laws, however, sometimes clash with the policies set by private concerns, and as well, with other city ordinances, whose purpose is also that of protecting the public health, welfare and safety. The latter type of conflict is usually created by the setting of dissimilar goals by city decision-makers. The result of these conflicts is a questioning of the rationality of the concerned by-laws.

For this example, relevant sections of the building



by-laws of selected cities in both western Canada and including Winnipeg, Regina, Saskatoon, Calgary, and Victoria, and the western United States, including Los Angeles, San Francisco, Portland, and Seattle, were chosen for analysis. They prove to be varied in interpretation and technique with regard to the regulation of the sale of gasoline and oil products and the installation of automobile service and repair facilities inside parking garages. Secondly, a more specific analysis is made of pertinent sections of the building by-law for the city of Vancouver, as they have effectively created a conflict between actors at the municipal level and the industrial level and an internal conflict again at the municipal level.

#### The Case of Western Canadian Cities.

On a national scale, the National Building Code and the National Fire Code are recognized and accepted as the model codes which form the basis of Canada's code system. These codes are formulated by the Associate Committee on National Building Codes and the Associate Committee on National Fire Codes, both under the auspices of the National Research Council in Ottawa. Of the utmost concern for these codes, is the protection of public health, safety, and general welfare.

With regard to automobile garages, open-air parking or other, The National Codes recommend standards which invariably influence internal site features of these structures. These standards are generally prescribed according to garage type. Part I

of Appendix A lists the definitions of the various garages as stated by the National Building Code (1970) and should be reviewed before continuing.

As the National Building and Fire Codes prescribe standards concerning the internal site features of garages, they are also recommending the requirements to be adopted by municipalities with regard to the sale of gasoline and oil products and the provision of automobile service and repair facilities inside the parking garage. Prior to 1970, the National Building Code (1965, p.70) and the National Fire Code (1963, p.113) stated that:

The dispensing of gasoline shall not take place inside buildings or the facilities for dispensing shall not be installed in any building.

As is noted by the definitions in Part I of Appendix A, the Codes classified all types of garages as buildings.

However, in the recently released edition of the National Building Code (1970), the previously rigid standards regarding the installation of facilities for dispensing gasoline inside buildings are somewhat relaxed; and the Code now contains the article:

Facilities for dispensing gasoline shall not be installed in any building except in buildings of Group F occupancy when approved (N.B.C., 1970, Article 3.3.7.8, p.116).

Within Group F occupancy are repair garages, storage garages, and

open-air parking garages.

Building inspectors have viewed this change in the Code as a realization of the fact, by those who write the Code, that "it is impossible to anticipate all possible cases, and rather than have a rigid blanket ruling covering all cases, they have left the door ajar"<sup>1</sup>.

What they are saying in fact is: "We do not think you should dispense gasoline in any building at all, but a situation might arise somewhere somehow where it is unavoidable, in which case play it by ear"<sup>2</sup>.

One building inspector however views this change as an appeasement to Ontario buildings officials who were desirous of having the inside location of pumps so as to overcome any legal difficulties which might arise over the dispensing of gasoline to new automobiles inside motor vehicle manufacturing plants, rather than as an outright change of viewpoint by the national committee<sup>3</sup>.

The standards set down by the National Building Code (1970) in regard to the installation of automobile service and repair facilities inside parking garages have been more propitious than those concerning gasoline dispensing facilities. The previous and the present National Building Codes clearly state that facilities

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<sup>1</sup>Letter from A. James, City of Victoria Building Inspector, February 17, 1971.

<sup>2</sup>Ibid.

<sup>3</sup>Interview with R. Montador, City of Vancouver Building Inspector, April 13, 1971.

for the servicing and repairing of automobiles may be permitted inside garages. However, the Code carefully points out that once facilities are provided for servicing and repairing automobiles inside a garage, the garage becomes a repair garage. The Code (1970, p.116) further notes that the repair garage must be separated from other occupancies by at least a two-hour fire separation. A parking area for automobiles is considered to be another occupancy. Thus, although automobile service and repair facilities are not permitted within the parking area itself, they are allowed to occupy the same building as the latter type of occupancy, provided that the building contains certain structural elements.

In regard to open-air parking garages, the National Building Code (1965, p.23) recommends that: "Automobile repair work and the servicing of automobiles shall not be permitted in open-air parking garages". However, should any part of this type of garage be used for another occupancy including automobile service and repair areas, the garage is then designated a storage garage. This change in classification leads to the previous recommendation that facilities for the servicing and repairing of automobiles be permitted inside the same building as a storage garage, but separated by two-hour fire resistive construction, plus other recommended construction standards.

The degree of adoption by western Canadian cities of the recommended standards set down in the National Building and Fire Codes with regard to both the installation of gasoline

dispensing and automobile service and repair facilities inside parking garages has varied. The City of Calgary, for example, since 1958, has permitted the dispensing of gasoline inside parking structures.

Dispensing Pumps shall not be installed in any garage or building area, but may be installed in Parking Structures (City of Calgary Fire Code By-law No. 5220).

A parking structure is defined as "a building or structure designed for parking automobiles"<sup>4</sup>. Prior to 1960, the City of Saskatoon also permitted the placement of gasoline dispensing facilities inside parking garages, but has since adopted the National Building Code, thereby prohibiting their installation<sup>5</sup>. Similarly, the City of Winnipeg permitted dispensing facilities for gasoline inside garages until 1961, when it enacted By-law Number 18600:

In no case may dispensing devices for gasoline be installed inside a building (City of Winnipeg By-law No. 18600, Section 13).

The City of Regina and the City of Victoria have, however, consistently prohibited the installation of facilities for dispensing gasoline inside parking garages in accordance with recommended standards in the National Building Code.

In western Canadian cities, the building by-laws

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<sup>4</sup>Letter from City Calgary Planning Department, March 1, 1971.

<sup>5</sup>Letter from R. Burdyny, City of Saskatoon Architectural Assistant, February 19, 1971.

concerning the installation of automobile service and repair facilities inside parking garages have deviated little from the standards prescribed in the National Building Code. For example, the cities of Calgary, Regina, and Victoria have permitted the installation of these facilities inside parking garages under the specifications set down by the National Building Code, whereas the City of Saskatoon has prohibited their inside location.

The City of Winnipeg has however enacted the most permissive regulations of any western Canadian city. The Metropolitan Corporation of Greater Winnipeg By-law Number 711, Article 3.3.7.3, enacted in October 1965, states that "minor automobile repair work and servicing may be permitted" inside an open-air parking garage, "provided"

- (a) that there is no dispensing of gasoline within the building, and
- (b) that, that portion of the building be enclosed within a two-hour fire separation.

As suggested by the above review of by-laws it would thus appear that various cities in western Canada have differinglly adopted the standards recommended in the National Building and Fire Codes, concerning the sale of gasoline and oil products and the provision of service and repair facilities inside automobile parking garages.

#### The Case of Western United States Cities.

In the United States, recommended standards concerning

the sale of gasoline and oil products and the provision of service and repair facilities inside automobile parking garages as set down by national agencies greatly differ from those suggested by Canadian agencies.

Similar to Canada, there are national agencies which develop and publish standards concerning building and fire codes, which act as the foundations for the United States code system. Two standards issuing agencies deserve special attention since the standards they issue constitute the bulk of those found in that part of cities' building codes concerning automobile parking garages. These agencies are the National Fire Protection Association and the Building Officials' Conference of America.

The National Fire Protection Association (N.F.P.A.) with headquarters in Boston, develops and publishes fire protection, fire prevention, and fire safety standards. The purpose of the Building Officials Conference of America (BOCA), on the other hand, is "to promote the improvement of building regulations and the administrative organization, techniques and methods of their enforcement by local governments" (Sanderson, 1963, p.83). The BOCA also publishes a model building code. However, the program and work of both agencies is similar, in that both are dedicated to the protection and promotion of public health, welfare and safety.

In regard to all types of automobile garages, including that of parking, these agencies are similar to those in Canada, in that they recommend standards which, in effect, regulate the internal

features of these structures. Furthermore, the standards recommended by the American agencies are also prescribed in terms of garage type. A list of the definitions of the various types of garages, as stated by the NFPA and the BOCA are found in Part II of Appendix A.

Codes developed by the American agencies concerning automobile garages contain provisions dealing with the installation of gasoline dispensing and automobile service and repair facilities inside these structures. For example, in the volume dealing with occupancy standards and process hazards within the National Fire Code, as set down by the NFPA (1969), are contained several references in regard to the inside location of gasoline dispensing units. However, unlike the National Building and Fire Codes of Canada, the United States National Fire Code is much more permissive in the matter concerning their inside location.

Inside location including Open Air Parking  
Garages: Approved dispensing units may be  
location inside garages upon specific approval  
of the authority having jurisdiction (NFPA,  
1969, Article 2423, p.88-21).

The BOCA Building Code (1969) contains similar standards concerning the installation of gasoline dispensing facilities inside parking garages. In the definition of the parking garage (See Appendix A, Part II), it is noted that "gasoline, oil and similar products may be dispensed for the servicing of (passenger) vehicles" inside this structure.

In regard to the placement of automobile service and



repair facilities inside parking garages, the two codes differ from the Canadian codes as well as between themselves. The National Fire Protection Association recommends that facilities for servicing automobiles be permitted inside all types of garages, including the enclosed parking garage and the open-air parking garage (See Appendix A, Part II). The agency's code further acknowledges that repair shops may be placed inside parking garages without an appropriate fire separation (See Appendix A, Part II). It appears that the only restrictions placed on the installation of repair facilities in garages are that:

Repairing of motor vehicles shall be restricted to the areas specifically provided for such purposes in repair garages. Repairing of motor vehicles on floors located below grade level is undesirable (NFPA, 1969, Article 2311, p.88-15).

The Building Code as proposed by the Building Officials Conference of America (1969), on the other hand, recommends that facilities for the service and repair of automobiles be permitted only in public garages. The BOCA code suggests that no provisions for the repairing of automobiles should be made inside open-air parking structures (See Appendix A, Part II).

The degree of adoption of recommended standards developed by the NFPA and the BOCA by particular cities of the western United States has differed. However, it would appear that all large Pacific Coast American metropolises have enacted the recommendations found in the National Fire Code, as set down by the National Fire Protection Association, concerning the inside location of gasoline

dispensing units in parking garages. Typical by-laws thus read:

Sec.7.06 (b) Where an outside installation of dispensing devices is impractical or impossible, the installation of a dispensing device, approved for inside use, may be permitted by the Chief of Division above ground level within a garage or other building (City of San Francisco Fire Code, Article 7, p.6).

Sec.14-1506 (e) Dispensing devices may be installed inside buildings or structures upon specific approval of the Fire Marshall as near the entrance or exit as practical, but not below the first floor or adjacent to a ramp or other opening to a level below the first floor (City of Portland Fire Code, Article 15).

Sec.8.15.370 (a) 1. INSIDE LOCATION. Approved dispensing units may be located inside garages upon specific approval of the Fire Chief (City of Seattle Fire Code, p.1151).

Further, in the city of Seattle, there can be found numerous examples of parking garages in which gasoline dispensing units have been installed. For example, gasoline dispensers have been located inside the University Properties Garage, which occupies three levels of the 20-storey Washington Building, located in the City's downtown area. Another example is the Olympic Hotel Garage, also in downtown Seattle, in which dispensers are located on the street level and on the first level above the street.

In the city of Los Angeles is also found examples of automobile parking garages inside which are found gasoline dispensing units. For example, gasoline dispensing pumps are found inside the Pershing Square Underground Parking Garage (Klose, 1965).

Similarly, facilities for the dispensing of gasoline are located inside the Union Square Underground Parking Garage in San Francisco.

Acceptance and adoption of the practices recommended by the NFPA in the National Fire Code, concerning the installation of automobile service and repair facilities inside parking garages appears to be unanimous in western American cities, including Los Angeles, San Francisco, Portland, and Seattle. However, for Los Angeles, the fire code further states that:

Sec.57.100.31. Repairs involving motor overhauling, open flame, automobile fueling system, or the use of flammable liquids in any form are prohibited in any basement or sub-basement garage (City of Los Angeles, Fire Code, p.357).

The cities of Los Angeles, San Francisco, Portland, and Seattle have thus adopted building and fire regulations based on the standards recommended by the National Fire Protection Association and the Building Officials Conference of America. In adopting these recommended standards these western American cities have been much more permissive than their counterparts north of the 49th parallel in matters concerning the sale of gasoline and oil products and the provision of service and repair facilities inside automobile parking garages. Further, these recommendations have been adopted by these cities and incorporated in their building and fire by-laws, still in recognition of the need for the protection of public health, welfare, and safety.

The Case of Vancouver.

City building by-laws concerning the regulation or the prohibition of the sale of gasoline and oil products and the provision of service and repair facilities inside automobile parking garages reflect an adherence by the City of Vancouver to the standards concerning these garages recommended in the Canadian National Building and Fire Codes. These by-laws state atypically (See Appendix B, Part II):

(i) Storage Garages

Where a storage garage and one or more major occupancies are contained within the same building such building and the storage of automobiles shall conform to the following requirements:

(B) No servicing or repairs to automobiles shall be undertaken, nor shall any gasoline other than that contained in the tanks of the automobiles, be stored, used, or sold in any such building nor shall facilities for dispensing gasoline be installed in any such building (City of Vancouver Building By-law No. 4193, Sec. 3.12, Article 3.12.7.4., p.31).

Similarly, for open-air parking garages, the by-law states:

No servicing or repairs to automobiles shall be undertaken, nor shall any gasoline other than that contained in the tanks of the automobiles, be stored, used, or sold in any open-air parking garage nor shall facilities for dispensing gasoline be installed in any open-air parking garage (City of Vancouver Building By-law No. 4193, Sec. 3.12, Article 3.12.7.5., p.32).

In regard to repair garages, the City in adhering to the National Building Code, allows for their placement inside a parking

garage, provided that the repair area is separated from the parking area by certain structural requirements including a two-hour fire separation and a 1.5 hour self-closing fire door at every opening between the two areas and that no gasoline is dispensed inside the garage.

As suggested by these by-laws, it would thus seem reasonable that the City of Vancouver has rigorously prohibited the inside location of gasoline dispensing units and has somewhat restricted the installation of automobile service and repair facilities within parking garages.

To the petroleum industry, the sale of gasoline and oil products and the provision of automobile service and repair facilities inside parking garages is an important source of monetary income and customer attraction. The industry bases their outlook on the fact that the high cost of land continues to make it more and more difficult to provide normal service station facilities in the downtown area of the city of Vancouver. Yet, simultaneously, the industry realizes that there exists a demand for gasoline and oil products and automobile servicing and repairing in the downtown and is thus desirous to profitably meet this demand. Further, the industry recognizes that the most economically feasible as well as profitable method of meeting this need is to integrate automobile retailing and servicing activities with parking operations, specifically parking garages.

However, as noted previously, the City's building by-

laws prohibit any such integration, on account that it is considered by the fire marshall and building inspectors, to be too dangerous to the public health, welfare and safety. But, at the same time, Vancouver's zoning legislation prohibits the future building of gasoline service stations in the downtown section of the city (See City of Vancouver Zoning and Development by-law No. 3575). Thus, because of the restrictiveness of both City zoning and building by-laws, the City can offer no alternative to the petroleum industry for a economically feasible location or relocation of their retail outlets within the downtown area. As a result of these policies set by the City and the desires of the industry, a conflict is created between decision-makers at the municipal level and those at the industrial level, which is further heightened by a conflict between the dissimilar goals of City zoning by-laws and city building by-laws.

Beginning in 1964, the local decision-makers for the petroleum industry have tried to resolve the conflict through attempts to have the by-law restrictions concerning the installation of gasoline dispensing units and automobile service and repair facilities inside parking garages somewhat eased. Highlighting these attempts was a comprehensive brief presented to City Council, covering the location of gasoline storage tanks, gasoline dispensing pumps "inside" or "under" buildings and service or repair work and other occupancies in parking garages, of which only the two latter topics are of concern here.

The Petroleum Industry Committee (PIC), a permanent body of representatives of the larger oil companies operating in British Columbia, presented the brief, in 1965, in the belief that regulations concerning the installation of dispensing equipment were "unnecessarily restrictive, thus constituting a hindrance to development" (Petroleum Industry Committee, 1965, p.1). The brief went on to state:

The Petroleum Industry has taken a very responsible and positive position in other major cities with regard to the development of parking structures, in some cases incorporated with office buildings or hotels and involving the sale of gasoline. Their role in Vancouver has been negligible because of the unnecessarily strict regulations which lead to the uneconomic development of the site including the retailing of gasoline.

The brief continued:

In the public interest it is desirable and necessary that such services be available in the downtown area and over the past several years, we have witnessed a trend toward their rapid elimination. This trend can only be stemmed by a relaxation of the Fire Regulations to permit more intensive integrated development with appropriate emphasis on safety standards (Petroleum Industry Committee, 1965, p.1).

In regard to the installation of gasoline dispensing pumps inside garages, the Brief noted that by their interpretation of the National Building Code, the City Building Department prohibited their inside location. It further observed that this ban "even extended to the condition of pumps under an overhang of a building".

The Committee (1965, p.1) asserted that the "blanket rejection of such installations does not appear to be justified because with properly engineered design and layout it is possible to make such an installation without creating any public hazard". Alternatively, the Committee recommended that the City adopt the Flammable and Combustible Liquids Code of the National Fire Protection Association. The Code, as mentioned previously, permitted such installations to be located inside garages "upon specific approval of the authority having jurisdiction" (See Appendix A, Part II).

To counter arguments dealing with the hazards of the inside location of gasoline dispensing units, the Petroleum Industry Committee presented the results of particular tests conducted by the Fire Prevention Bureau of Los Angeles, to determine the extent of flammable vapors in connection with dispensing and unloading of gasoline at service stations and in closed rooms housing pumps. One of the conclusions drawn from these tests was:

When dispensing gasoline into an automobile tank, a hazardous atmosphere is likely to exist only within a few inches of the fill pipe opening, even in still air. In the case of a minor gasoline spill, a hazardous atmosphere is likely to exist only in the area directly above the liquid spill, even in still air (American Petroleum Institute, 1962, p.2).

Regarding the gasoline dispenser itself, the conclusions reached were:

a) A hazardous atmosphere does not exist in an area adjacent to the dispenser during normal operation (A.P.I., 1962, p.3).



(b) A hazardous atmosphere is not likely to exist because of a pump operating within a closed room even when a minor leak is present (A.P.I., 1965, p.4).

The Committee thus asserted that based on the conclusions reached from these tests, the installation of gasoline dispensing pumps inside parking garages does not endanger public health, welfare, and safety, and therefore, should be permitted inside these structures.

A section of the Brief was devoted to that part of the City Building By-law which concerned the regulation of automobile service and repair work in a parking garage. The Petroleum Industry Committee (1965, p.9) acknowledged the fact that the existing building by-law did not appear to prohibit repair work in a parking garage. However, the Committee (1965, p.10) did point out that the by-law further stated that "if the parking garage includes another occupancy, repairs and gasoline sales are prohibited" inside these structures. The Committee asserted that as there was nothing in the Fire Code as put forth by the National Fire Protection Association to prevent repairs and gasoline sales in a parking garage even if that garage was under floors used for other occupancy such as offices, hotels, apartment etc., then the City should adopt a by-law providing for this type of development, while continuing to permit other occupancies over parking garages.

The Brief concluded:

In summary, it would appear that the above restrictive regulations, many of which are

long standing, are based on fear arising from a lack of knowledge of the behavior of flammable liquids and gases at the time they were instituted. They allow no room for the development of sound engineering, which can control and eliminate the supposed hazards on which the regulations were based (Petroleum Industry Committee, 1965, p.10).

Further actions by the Petroleum Industry Committee in attempting to have the by-laws liberalized would appear to indicate that despite the facts and arguments presented by the Committee, the Brief fell on unsympathetic ears. In fact, based on present City Building By-laws, it would appear that the City has restricted rather than liberalized the by-laws concerning the installation of gasoline dispensing units and automobile service and repair facilities inside garages. It would however be unjustifiable and unreasonable to say that the City has not given some ground with regard to permitting such installations. Evidence of such a move can be found in the present City Zoning and Development By-law (1969, p.165) specifically in those by-laws concerning a Parking District:

(d) In the case of a Parking Area (Public) or Parking Garage (Public) which provides parking spaces for not less than 40 vehicles the sale of gasoline shall be permitted by the installation of not more than two pumps may be inside any Parking Garage (Public).

(e) Where a Parking Garage (Public) provides parking spaces for not less than 40 vehicles the sale of lubricants, minor tire repairs, and the washing and polishing and greasing of vehicles shall be permitted inside the garage.

Although this by-law was enacted in 1957, the fact that it has not

been rescinded in recent years gives support to the notion that the City has somewhat yielded to pressure from the petroleum industry. The legal grounds of this zoning by-law in relation to the building by-law has yet to be tested in a court of law.

There currently exists only one Parking District in downtown Vancouver. The District, one acre in size, is presently occupied by a Public Parking Area. However, because of the dimensions of the zone and the nature of the streets bordering it, it would seem unlikely that a parking garage could be built on the lot (See Figure 5).

In 1969, a proposal by Western Auto Park Limited of Calgary to place gasoline pumps and a service garage inside their new Vancouver parking garage met with austere opposition from the City Building Department. The Company found it necessary to modify their building so as to provide an "open sky" environment above the storage tanks and pumps in order to retail gasoline in agreement with the requirements set down in the City's Building By-law. However, in order to locate a service garage within their structure, Western Auto Park would have found it necessary to once again modify their building. The Company, in resigning from another costly modification, argued that it has not been prevented from installing minor service facilities in their other outlets. "These minor servicing areas have not been classed as dangerous due to the nature of the work that is done, which includes lubrication and tire repairs

with no major mechanical repairs involved"<sup>6</sup>. The Company further argued that there are numerous parkades in Vancouver with service facilities which are not up to the standard and quality of their garage, but which have been built in the past, and presently operate service facilities<sup>7</sup>. Further, C.S. Hyciek, President of Western Auto Park Limited, believes "that the only difference between these facilities, theirs and ours, is the individual interpretation of the building codes which are then applied as interpreted by the individual"<sup>8</sup>. The Company however realizes the fact that due to the City's interpretation of the National Building Code, it is impossible under the present Building By-law to locate a service garage inside their parking garage without incurring the high cost of structural modification.

Based on the case of Western Auto Park, it would thus appear that much of the work done and evidence presented by the Petroleum Industry Committee in 1965 is still unheeded by City decision-makers. Furthermore, due to the City of Vancouver's adherence to and interpretation of the National Building Code, the petroleum industry remains in a conflicting position with City decision-makers in the matter of the sale of gasoline and oil products and the provision of service and repair facilities inside

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<sup>6</sup>Letter from C.S. Hyciek, President of Western Auto Park Limited, January 21, 1971.

<sup>7</sup>Ibid.

<sup>8</sup>Ibid.

automobile parking garages. The position of the industry is further hindered by the dissimilarity of goals as set out in the City's Zoning By-law and in the City's Building By-law.

### General Appraisal

Several significant factors stand out from the analysis of this internal site regulation. All of the interested parties are generally concerned with protection of the public health, welfare, and safety. The municipal level maintains that the installation of gasoline dispensing units inside parking garages is "too dangerous" to public safety, and have thus enacted building by-laws prohibiting such an occupancy<sup>9</sup>. The industrial level, on the other hand, is also concerned with public safety, but argues that through modern and improved engineering techniques and building materials gasoline dispensing inside parking garages presents little hazard to the public.

In regard to the placement of automobile service and repair facilities inside garages, the municipal level has laid down, in the interests of public safety, specific structural requirements for garages containing such facilities. The industrial level appears to adhere, although at times reluctantly, to such regulations.

In attempting to legislate for the public health,

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<sup>9</sup>Interview with R. Montador, April 13, 1971.

welfare and safety, city governments have often created a conflict between their stated goals and the goals set by entrepreneurs. For example, in Vancouver, the petroleum industry recognizes that the sale of gasoline and oil products and the provision of service and repair facilities inside automobile parking garages are not only an additional source of income but they are also a source of convenience and supply to the customer. Further, the industry acknowledges that with present city zoning by-laws and the high cost of land prohibiting the further building of service stations in the downtown section of the city, that the most economically viable retail outlet for petroleum products and service work in the downtown area is in a parking garage. However, existing City building by-laws prohibit or restrict such an installation and thus create a conflict between actors at the industrial level and those at the municipal level. Furthermore, this conflict between the city government and the petroleum industry has been heightened by an additional conflict, that between the dissimilar goals of city zoning by-laws and city building by-laws in matters concerning gasoline retailing in the downtown section of Vancouver. These conflicts can only be resolved through consideration of public health, welfare, and safety.

The regulation of internal site features raises the problems of definition and interpretation. In this example, these problems arise over the word building, commonly used in reference to parking garages. As one building inspector points out:

Most people would agree that a canopy over a gas pump, erected to protect users from the weather, does not constitute a building. Add a wall on one side for some reason and there is some hesitancy, but again the majority will avoid the issue by using the word structure rather than building. Add another wall and most people will come down on the other side of the fence. So we have a sort of sliding-scale definition leading to a variety of interpretations, and all the time, the use or occupancy has not changed; but the hazard probably has<sup>10</sup>.

It would thus appear that in order to alleviate or perhaps, even to eliminate, some of the problems associated with internal site regulation, administrators or building by-laws should transfer their meticulous attention from words like building or structure to consideration of use or occupancy or the actual hazard involved.

The petroleum and the parking industries will continue to lobby against stringent regulations covering the installation of gasoline dispensing units and service and repair facilities inside automobile parking garages. In attempting to have these by-laws changed, the industries will again approach the city building departments and invariably, city councils and commissioners. However, most western Canadian cities in reviewing their by-laws, examine them in light of public health, welfare and safety and nation precedent.

The policy of the City possibly could be changed if fire safety to both life and property has been suitably established by a nationally recognized agency<sup>11</sup>.

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<sup>10</sup>Letter from A. James, February 17, 1971.

<sup>11</sup>Letter from C.N.W. Shewan, City of Winnipeg Fire Chief, March 3, 1971.

In regard to the inside location of gasoline dispensing units, the National Building Code (1970) for Canada permits such an occupancy. However, despite this change in a nationally recognized code, there are cities, particularly Vancouver, who still consider such an installation to be too dangerous to public safety, and thus continue to prohibit this internal site feature<sup>12</sup>. In fact, one city building inspector believes that the national clause permitting the location of gasoline dispensers inside buildings of Group F occupancy will be rescinded in the 1975 edition of the National Building Code<sup>13</sup>. He bases his view on the notion that the committee responsible for writing the Code will find that such a practice is still dangerous because safe engineering techniques are not yet available so as to eliminate the hazard involved in the inside location of gasoline pumps.

Simultaneously, however, there are city officials who believe that gasoline pumps inside garages are not dangerous, and further, that public officials must be willing to accept new ideas and to institute change accordingly. As one building inspector put it:

There will be opposition to gasoline pumps in garages because people still believe that gasoline is dangerous, and you must work uphill to change this belief<sup>14</sup>.

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<sup>12</sup>Interview with R. Montador, April 13, 1971.

<sup>13</sup>Ibid.

<sup>14</sup>Interview with B.M. Boers, City of Nanaimo Building Inspector, December 29, 1971.



On instituting change in public policy, he gives the following view:

A by-law is there for safety, and if you go overboard in safety, you ruin the intent. So if you can prove that it is safe, why not allow it...And just to state that because somebody somewhere thought it was dangerous and you adhere to it without any further research is wrong.

...But it is the politician who has to be convinced that a by-law is in the best interest of the city. If you have convinced the politician, he will change the by-law.

Sometimes it is the building inspector or or the building board who are still the older generation and they are more cautious. If we do not change, we are stale, and that is not right. And if we change, we will find out if we have done the right thing<sup>15</sup>.

City decision-makers must then be prepared and above all, be willing to institute change in policies, if such a change is proven to be safe and desirable. In order to prove such a condition, research must be carried out not only at the municipal level but also at the industrial level. But despite what the outcome may be, local governments must explicitly state their goals in relation to the adopted policy, so that both the public and the private sectors can act accordingly if not in harmony so as to provide a better urban environment through protection and promotion of the public health, welfare, and safety.

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<sup>14</sup>Interview with B.M. Boers, City of Nanaimo Building Inspector, December 29, 1971.

CHAPTER V  
PARKING GARAGES:  
A CASE STUDY OF VANCOUVER

Introduction

The City of Vancouver, British Columbia is not unlike most major cities in regulating external and internal site features of automobile parking garages and thus has been chosen for a case study. Similar to most North American metropolises, the City of Vancouver's regulations concerning these structures appear to have four areas of emphasis. The first is that of regulating external site features through the City's Zoning and Development By-law and City transportation and redevelopment planning. Secondly, internal site features are subject to regulation by once again the City's Zoning and Development By-law and City transportation and redevelopment planning as well as the City's Building By-law. Further, both the external and internal site features of parking garages in Vancouver are subject to indirect regulation by the City's approach to the administration and financing of its parking program. Finally, regulation of the site features of a parking garage reflects the City's concern for the protection and promotion of the public health, welfare, and safety.

The following study thus documents City of Vancouver zoning ordinances, planning proposals and decisions, administrative and financial practices, and building ordinances. Concentration in

this case study is mainly on parking garages in the downtown section of Vancouver.

### The Setting

The third largest city in Canada, Vancouver received its historical impetus for growth with the expansion of the trans-continental railway to a terminus at Coal Harbour in 1886. Located on a peninsula lying north of the Fraser River and south of Burrard Inlet, the City has a population of 413,679 (1966) and serves a hinterland of some 800 square miles with a population of over 1,150,000 people. The City is the location of head offices or branch offices of many of the large corporations in Canada, Federal and Provincial Government agencies, industrial plants with operations in primary and secondary activities including timber, pulp and paper, minerals and food, and increasing tertiary and quaternary activities, including retailing, entertainment, professional and personal services, and tourism. Vancouver is also the center of increasing Canadian transportation and trade activities on the Pacific Rim, as witnessed in the further development of the Burrard Inlet port.

The central business district or downtown section of Vancouver is located on the Burrard Peninsula and consists of an area of some 1350 acres or just over two square miles<sup>1</sup>. The population of this area is estimated to be 48,400 persons in 1970, with 70 per cent of this number living in the high density

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<sup>1</sup>Much of the material on the CBD is taken from Downtown Vancouver Development Concepts (1970).

residential area called the West End. A further 91,000 persons are employed in the main economic functions of the downtown including retailing, office work, service and warehousing, and institutional services. The industrial and warehouse area on the north side of False Creek employs an additional 1,600 people, bringing the total number of persons working Vancouver's downtown district to 92,600. Further, planners estimate that based on major projects already announced and due for construction in the downtown section of the City, employment is expected to rise to a minimum of 133,000 persons or a maximum of 173,000 persons in 1985.

#### The Parking Situation

With approximately 92,600 people employed in the Downtown section of Vancouver and conservative estimates of an additional 40,000 people by 1985 plus an existing residential population of 48,400 people, transportation in the downtown area has become a major concern to City planners. One of the basic and more important components in the downtown automotive transportation system is terminal facilities.

The parking situation in Downtown Vancouver has been the subject of four studies by the City. The first, conducted in 1947, was an inventory and an all-day usage study and concluded that the supply of parking at that time was inadequate (City of Vancouver, 1948). The report led to the formation of the Vancouver Parking Commission and the approval of a one million dollar Local

Improvement By-law to purchase properties for parking. In 1954, City Council authorized an inventory and a peak hour usage study which recommended that a core area be exempted from parking standards in the zoning by-law, customer and worker parking areas be developed around fringes of the high-density core and a further amount of two million dollars for purchasing properties for parking be included in a five-year period of capital expenditures beginning January 1, 1959. (City of Vancouver, 1956). Following this report, two further Local Improvement By-laws were presented to the Downtown property owners, but both were defeated.

Another inventory and peak hour usage study made in 1960, concluded that "the overall parking demand had increased faster than the supply and faster than was forecast in 1954" (City of Vancouver, 1962). However, much doubt was cast on the validity of these conclusions and as a result, City Council authorized yet another Downtown parking study.

The 1962 study however differed from the previous studies in that one of its purposes was to determine the actual locations of demand by interviewing parkers. In addition, the study was undertaken "to clear up misunderstandings and conflicts of opinion regarding existing parking conditions in the Downtown Area, to re-assess future parking requirements and to provide information with which to assess the effectiveness of the present administration and methods of financing further parking" (City of Vancouver, 1962, p.1). One of the most important conclusions

derived from the study is that there exists a "critical area" in the downtown where demand is greater than supply, but that outside the "critical area" demand is being met. The report did however recognize that as employment and residential population in the downtown increased, more facilities for parking would be needed and that as land was limited and costs were high, the best type of facility was the parking garage.

The parking garage has thus spatially manifested itself in the downtown area of Vancouver in two ways. The first is by type (Figure 5). In Downtown Vancouver can be found examples of the retail store parking garage (The Bay; Eaton's; Woodward's), the office-employee garage (Bentall Centre; Guinness Tower), the central core garage (Downtown Parking Corporation garages), and the hotel parking garage (Hotel Vancouver, Elue Horizon Hotel). The West End district of downtown contains numerous examples of residential district parking garages, including those associated with an apartment-retail complex (Denman Place; Columbia Place, Pacific Palisades). Also found in the downtown section of the City is the specialized functional area type of parking garage. Examples of the latter type are found in the Queen Elizabeth Theatre complex and the Vancouver Vocational School.

Secondly, the parking garage spatially manifests itself through its external and internal site features which are subject to regulation by City planning decisions and City by-law provisions; the case of which is subject to the following examination.

## Zoning

The present Zoning and Development By-law was enacted in 1956, superseding the former zoning by-law which originated back in 1928. Similar to most North American cities, Vancouver's zoning by-laws divides the city into zoning districts of which presently there are four: One - Family Dwelling, two - Two Family, four - Multiple Dwelling, seven Commercial, two - Industrial Districts, and three others covering special categories, including parking. Within each district, the permitted uses are divided into two categories, namely, those which are allowed, as of right, provided the development application meets all the specified regulations concerning height, yards, site area, floor space ratio, parking, loading and so on. These are known as outright uses. The other category lists the uses which are permitted subject to prior approval of the Technical Planning Board. "These are known as conditional cases being in the main, borderline cases, which could be allowed provided they do not adversely affect the neighbourhood" (Fountain, 1970, p.403).

For example, a public parking garage is an outright use in a (C-4) Medium Density Commercial District, but it is a conditional use in a (CM-2) High Density Commercial Use District, and is not permitted in the (C-1) Local Commercial District. Some of the conditional uses, such as a gasoline service station in a (C-1) Local Commercial District, also require prior consultation with the Town, Planning Commission, before the Technical Planning Board may

act.

In developing zoning regulations, the City must have due regard to the following considerations:

- (a) The promotion of health, safety, convenience, and welfare of the public;
- (b) The prevention of the overcrowding of land, and the preservation of the amenities peculiar to any zone;
- (c) The securing of adequate light, air and access;
- (d) The value of the land and the nature of its present and prospective use and occupancy;
- (e) The character of each zone, the character of the buildings already erected, and the peculiar suitability of the zone for particular uses;
- (f) The conservation of property values;
- (g) The development of areas to promote greater efficiency and quality (Todd, 1970, p.17).

In regard to automobile parking garages, Vancouver's Zoning and Development By-law exerts control over the external site features by regulating the location of these structures and as well, over the internal site features of size or capacity of the garage as well as establishing the need for such a facility.

The City's Zoning By-law regulates the external site feature of location of the parking garage by restricting the facility to certain district within the city according to outright or conditional land uses (See Appendix B, Part I). For example, a parking garage is permitted in a (C-2) Suburban Commercial District, but it is not allowed in a (M-2) Heavy Industrial District. By-law restrictions on the location of a parking garage are generally necessitated by need for and compatibility of the structure with



the neighbourhood.

In addition, Vancouver has established a district exclusively for parking and its related facilities, including the parking garage (See Appendix B, Part I). The City's only (P-1) Parking District is located near Burrard Street, on the edge of the City's downtown area, and is presently occupied by a Public Parking Area (See Figure 5)).

The location of a parking garage is also regulated by that part of the Zoning By-law specifying a maximum distance at which a parking facility may be located away from a particular building for which such a facility is required to serve. In this instance, Vancouver's Zoning By-law requires that for all dwellings the parking facility be located on the same site as the building itself, which it is required to serve; and for all other uses, it must be located not over 150 feet from the structure except in the case of a project for which collective parking is authorized by City Council, in which case the distance may exceed 150 feet (See Appendix B, Part 1).

Internal site features of parking garages located in Vancouver are also subject to regulation by the City's Zoning and Development By-law. Specifically, the internal site feature of capacity of the garage is regulated by that part of the By-law requiring a certain number of off-street vehicular spaces for any new or substantially altered development. For example, the City's Zoning By-law requires that for every new or altered office building

or retail establishment with a gross floor area exceeding 3,000 square feet, three parking spaces plus one parking space for every additional 500 square feet of gross floor area in excess of 3,000 square feet be provided by the developers. Similarly, for hotels and motels in the City, it is required that the developer provide one parking space for each dwelling unit and one parking space for every two sleeping units. By requiring a minimum amount of space for parking automobiles, the zoning mechanism not only exerts influence over the capacity of a parking garage, but it can also determine the need for it. For instance, the owner of a 25 unit motel is unlikely to build a parking garage to accommodate his customers' automobiles; whereas the developer of a 700 room hotel located in the downtown area of the City would find it to his economic advantage to building a parking garage.

A unique application of the zoning ordinance requiring the provision of designated amounts of parking space in connection with new or substantially altered structures is made in the high-density core of Downtown Vancouver. The parking report submitted in 1956 (City of Vancouver, 1956) in association with a planning report on Downtown Vancouver Development (City of Vancouver, 1956) recommended that a core area bounded by Burrard, Cordova, Main, Pender, Beatty, Robson, Richards, and Nelson Streets be excluded from the zoning regulations requiring a designated amount of off-street parking spaces for certain buildings (Figure 15). By such an exclusion, the Technical Planning Board believed that parking

developments would then not interrupt "the continuity of building frontages". "Instead, parking would occupy the fringe areas in situations convenient to the main building concentrations" (City of Vancouver, 1956, p.3). The Report added that the provisions of parking facilities located on the fringe of the core is a more economical solution than each new building within the core being required to provide for its own needs.

The Board's recommendations were adopted and enacted by City Council in 1957. At present, parking requirements are suspended in three zoning districts, including the (C-5) Amenity Commercial, (CM-1) General Commercial, and (CM-2) High Density Commercial Districts.

In regard to automobile parking garages, these zoning regulations have further restricted the external feature of location and the internal features of height, site area, and floor space area in two of the exempted districts. For the (C-5) and (CM-2) Commercial Districts, the Zoning By-law (City of Vancouver, 1969, p.135 and p.139) states that no parking garage must be located so as to:

- (i) Occupy any portion of the first storey of a building or that part of the basement of a building which projects more than four feet above the building grade established by the City Engineer, to a distance of 50 feet from the building lines fronting or flanking a street.
- (ii) Occupy any portion of a site at street level to a distance of 50 feet from the property lines fronting or flanking a street and extending across the full width and depth

of the site fronting or flanking a street.

- (b) Not more than thirty per cent of the total floor area of a principal building exclusive of the basement, shall be used for the purpose of a parking garage including relevant ramps and access areas.

These regulations not only restrict the internal features of a parking garage but more importantly, they basically prohibit the location of such a facility in these two zones.

Currently, only the (CM-2) High Density Commercial District is found in Downtown Vancouver (Figure 5). The area zoned for this District is however large and in a crucial economic area, that periodically the City has had to rezone certain lots so that a multi-storey parking garage can be built to serve the area. Such was the case in 1966, when Dominion Construction applied and was granted a development permit for a multi-storey garage on Seymour Street near Georgia Street (Figure 5).

However, in 1967, when applying for another development permit to build a second parking garage, at the northwest corner of Pender and Seymour Streets, Dominion Construction found the application to be opposed by City Officials, including the Town Planning Commission. In opposing the seven-level, 240-car garage, a report from City Officials stated: "The applications are correct in stating that there is a parking demand in this area". But the report added:

However, the rezoning of this site to permit a parking structure would run counter to every principle which has been accepted for the core. The most important principle is that the central

part of the downtown area should be kept intact for the development of office buildings and stores. The necessary parking to serve these buildings should be located around the edge of the core or permitted to a limited extent as ancillary to the individual buildings themselves (Elsie, 1967).

Further, City officials were concerned that if this application was approved, they would be flooded with other requests to build garages within the restricted area, thus causing further interruption of the continuity of core development.

However, through gathering considerable support for its application, including the backing of most of the merchants in the area of the proposed garage, Dominion Construction was able to have City Council rezone the area to (CM-1) General Commercial District, thereby permitting the building of the multi-storey garage complete with street-level retail shops.

Zoning in Vancouver has thus been an effective tool for regulating the external and internal site features of parking garages located in the downtown section of the City.

#### City Transportation Planning

Parking facilities are viewed by most cities as being an integral part of the automotive transportation system and Vancouver is no exception.

Recently, future transportation systems for Vancouver have been the subject of three major studies (Lea, 1968; P.B.Q.&D.,

1968; DeLew et al, 1970). One of these studies, the Vancouver Transportation Study, is concerned with a future automotive transportation system for the central part of Vancouver including the Downtown Peninsula. The study involved recommendations essentially dealing with a Waterfront Freeway, a general transportation plan of arterial highways, streets, and other transportation elements in Urban Renewal Areas east of the central business district, and East-West and North-South Freeways.

The report recommended that a Waterfront Freeway be located along Burrard Inlet, and proceed from the Brockton Interchange at Coal Harbour to the vicinity of Abbott Street where it becomes the North-South Freeway. Further, in the vicinity of Georgia Street, "the Georgia Interchange provides connections between the North-South Freeway, the East-West Freeway, the Taylor Expressway, and ramps to and from downtown streets (P.B.Q.&D., 1968, p.iii). The east-west element within the Interchange consisting of the new Georgia Viaduct, connects directly to the East-West Freeway running through East Vancouver.

Important to this thesis, is the fact that the consultant's report has considered parking facilities as integral parts of the plan for transportation systems in Downtown Vancouver. The consultants noted that any "major expansion in the off-street parking capacity of downtown Vancouver, by means of garages directly connected by special ramps to and from the freeway system, would permit relatively large numbers of vehicles to reach downtown without

travelling on the congested grade streets" (P.B.Q.&D., 1968, p.106). Specifically, the report cited the proposed Project 200 Parking Garage, which is designed to serve both Project 200 and the neighboring downtown area. The report recommended that there be direct access from the 3,500-car Garage from the Waterfront Freeway via a two-lane off-ramp beginning at the Georgia Interchange and entering the proposed Garage at its Abbott Street end.

An eastbound one-way on-ramp from the Garage joins the Waterfront Freeway at a gore opposite Homer Street.

An analysis of vehicular traffic did not however recommend a western entrance to the Garage for North Shore traffic, as it is thought that the Garage could be adequately reached from the Brockton Interchange by downtown streets.

In locating the Project 200 Garage in relation to the proposed freeway system, planners have also taken into account the internal site features of the Garage.

It is emphasized that the internal plan, design, and operation of such a garage must be carefully formulated to permit a safe efficient transition between freeway and garage driving conditions. It is especially important that such a garage not engender peak-period back-ups of traffic which could hamper and endanger traffic on the freeway itself or on the ramps connecting the freeway with the garage (P.B.Q.&D., 1968, p.25).

However, consideration of the external and internal site features of parking garages in relation to the downtown freeway system

is only theoretical as the City has yet to decide on its future transportation system. But in presently locating parking garages in terms of the existing street pattern in Downtown Vancouver, parking consultants must place these facilities in relation to the one-way street system which predominates in the central business district of the City. It would appear that most new parking garages in the downtown area are placed so as to catch the inbound vehicles to the CBD on the one-way street system and further, to release these vehicles on to the same arterial streets as well as away from the street intersection. At garages where potential parkers "back-up", a curb lane is usually available for their automobiles so as not to cause further congestion on the streets of Downtown Vancouver.

#### City Redevelopment Planning

Downtown Vancouver is the focus of a number of redevelopment projects. Currently, there are three such major projects under construction in the downtown section of the City and a fourth under study by City officials. The first of the three projects, Pacific Centre, bounded by Howe, Robson, Granville, and Dunsmuir Streets, includes three office buildings, a hotel, a department store, a retail mall of approximately 100 stores, and parking for 1,700 cars (Figure 5). Total value of the project will likely exceed 100 million dollars. The first phase of the project, presently under construction, includes a new Eaton's department



store, of 450,000 square feet, the Toronto-Dominion Bank Tower of 30 storeys and 544,000 square feet and a retail mall of about twenty stores.

A second redevelopment project, the massive Project 200, located on Vancouver's waterfront, covers an area of 23-acres from Howe to Abbott Streets (Figure 5). In general terms the plan provides an urban development in relation to the Port of Vancouver and the expansion and renewal of the downtown district for the following accommodation:

- a). Howe-to-Seymour: Offices, hotels, cultural and hotel uses.
- b). Seymour-to-Cambie: Residential, and recreational.
- c). Cambie-to-Abbott: Department store, and retail.

The plan is oriented towards the development of pedestrian circulation facilities including a series of squares, plazas, malls, promenades, and courtyards, extending from one end of the scheme to the other. Currently under construction within the first phase of the project, Granville Square, is an office tower rising 403 feet above a pedestrian plaza with 28 floors of office space comprising 350,000 square feet, one ground floor of retail shops, and two underground levels of parking accommodating 360 automobiles. When completed the Square will include two office towers connected by a two level retail, banking, and restaurant plaza development.

The third redevelopment scheme under construction in Downtown Vancouver is the Royal Centre. Situated on the city block bounded by Burrard, Georgia, Melville, and Thurlow Streets (Figure 5), the project includes an office tower housing the regional offices of the Royal Bank of Canada as well as an additional 450,000 square feet of leasable office space. Royal Centre will also include a two-storey retail mall, a banking pavilion, and twin cinemas. A unique feature of the project is the inclusion of a 35 storey hotel, a development of Hyatt International. The Vancouver Hyatt House will feature 700 rooms and suites, numerous restaurants and cocktail lounges, as well as a convention centre.

A fourth urban redevelopment project, one which is still under consideration by City planners, is located on the north shore of False Creek. Marathon Realty, the real estate arm of Canadian Pacific Railway, has proposed a residential-commercial-recreational complex for its 120 acres that lie between Granville and Cambie Bridges. The overall plan encompasses a cost of over 200 million dollars and accommodation for 14,000 people within 9,000 living units in apartments and townhouses and 800 units for families with children. Further, the development will contain an elementary school, a community centre, 25 acres of open space for recreational activities, a 500 boat marina, and 10,000 covered parking spaces. The complex will also have its own retail shopping area.

In regard to parking, these projects essentially mean that there will be a greater demand for parking space within their

own boundaries as well as in downtown areas as a whole. An economic study of downtown Vancouver, completed in 1969, estimated that by 1975, developed space requirements for parking would be 13,184,200 square feet, a 1.5 per cent increase over developed space in 1969, and that by 1985, developed demand would be 15,300,300 square feet (Menzies, 1970, p.188). With limited land area and high development costs as well as restrictive zoning practices increases in parking space in the central core of the downtown section of the city is almost prohibitive. However, with the redesign of space within the core by redevelopment projects, including Pacific Centre, Project 200, and Royal Centre, opportunities are provided to develop further parking facilities in this area.

The developers of these projects have however recognized these opportunities, and have made parking an integral part of their developments. For example, the Project 200 redevelopment scheme calls for the provision of 7,000 parking stalls inclusive of an existing 800 spaces in Woodward's Department Store Parkade. The developers assert that the proposed 7,000 spaces represent about 70 percent of the overall demand based on Downtown parking studies by the City Engineer and 10 percent above the supply that the balance of the downtown has been providing to meet the overall demand (City of Vancouver, 1966). Further, in planning for and locating of these spaces, the developers have considered the relationship of their parking facilities, underground garages, with the present and proposed downtown automotive transportation system (P.B.Q.&D., 1968;

Menzies, 1970). Other considerations by the developers have been given to the internal features of their garages, including design and operation as well as to the aesthetics of Project 200.

The Pacific Centre and Royal Centre redevelopment projects have also provided parking space within an underground garage for aesthetic purposes and in accordance to zoning by-law restrictions necessary to meet 60 per cent of the overall demand.

Redevelopment projects have thus provided opportunities to locate parking garages within the downtown section of the City and as a consequence, to help meet the demand for parking space in Downtown Vancouver.

#### City Administrative and Financial Practices

The provision of parking facilities in Downtown Vancouver has been largely the responsibility of private enterprise. Companies such as Imperial Parking, Western Auto Park, and Aide Auto Parks are just a few of the numerous companies with parking facilities in the downtown section of the City. Needless to say, their facilities are financed by private capital.

In terms of civic government activity in parking, Vancouver has witnessed two such developments. The first is the Vancouver Parking Commission, established by By-law 3124 in 1949, to manage and improve parking areas assigned to it by City Council, to charge and collect fees for these areas, to conduct investigations and to make analyses of existing parking facilities and needs, to

acquire and to lease property on behalf of the city and to conduct less important activities (deWolf, 1965, pp.15-19). By-law 3124 provided that the Chairman of the Commission be elected from its members, but he always has been appointed by the Mayor from City Council.

The second development in City government activities in the parking field embodies a most interesting and unique administrative and financial approach to providing parking facilities in Vancouver. This approach is embodied in the Downtown Parking Corporation (D.P.C.), a quasi-public operation formed by downtown business interests twenty-three years ago. The administrative and financial history of the D.P.C. is worth reviewing as it encompasses much of the historical development of parking facility provision in Downtown Vancouver.

After World War II, many downtown property owners and businessmen found themselves confronted by the problem of retail decentralization. In order to stabilize their position and to even further their sales, these gentlemen formed the Downtown Business Association. The main object of this body was "to promote the economic, commercial, and social welfare of the City of Vancouver as effected by the central business district thereof; to make studies of and advance any project, plan, or improvement designed to the benefit of the City as a whole; and the said district in particular" (As quoted by deWolf, 1951, p.1).

One of the immediate projects appeared to be finding a solution to the parking problem in the downtown area. In late

1946, the Association successfully prevailed upon City Council to make funds available for a study of downtown parking needs. The study began in 1947.

Concurrently, a grade-wise scheme to build an underground garage near Granville and Hastings Street failed, as did a much less pretentious plan for a surface lot on the block now occupied by the main Post Office. Further, with increasing availability and use of automobiles, curb space and limited parking facilities were inadequate to handle these motor vehicles in the downtown area.

The principle conclusion of the report (City of Vancouver, 1948) was that during the five years ending December 31, 1952, the City would require an additional 2,600 off-street parking berths and that these parking areas should be developed initially as "self-parking" lots in which fees would be collected by attendants. The report further recommended that the property for these parking areas be acquired by means of issuance of municipal debentures.

In reality, a local improvement plebescite was placed before downtown property owners which would allow the City to borrow one million dollars on local improvement debentures to be used for the purchase of land for parking purposes. As an enticement to vote for the plebescite, the ratepayers were informed that, if the plebescite passed, after the land had been purchased, it would be leased to a non-profit private corporation for operation and "that all profits over and above operating expenses would be turned back to the City as an additional rent, as well as to defray in part the

annual levy of \$72,500 necessary to service the one million dollars of debentures authorized" (deWolf, 1951, p.2). Further, the City was to appoint a Parking Commission which would be charged with selecting property, setting rates, and generally supervising the parking situation in Vancouver.

The plebescite passed in the general municipal elections of 1948; and soon after the Downtown Parking Corporation was formed in accord with the plebescite. The Company had however presumed that when lots were purchased they would be leased to it automatically, but the then Chairman of the Parking Commission held that for various reasons tenders should be called.

In the latter part of 1949 and in the early months of 1950, tenders for leasing and operating all of the property purchased with by-law funds were submitted to the Parking Commission by the D.P.C. as well as by numerous companies and individuals (The Vancouver Sun, 1949). The tender submitted by the Company was successful; and the first lease, dated July 12, 1950, covered:

Lot 1: 535 Hornby Street

Lot 2: Corner Cambie and Pender Streets.

Lot 3: 535 Richards Street.

The period of the lease was set at 10 years, to August 1, 1960, subject to cancellation of the term of any one or all of the parcels on one year's notice with the City paying the unamortized portion of the monies expended on improvements upon cancellation. The rent was to be 1% of the cost of acquiring the land plus all taxes which would be assessed against the lands if privately

owned, and in addition all net profits arising from the operation. Such profits the City was to place in a special account which would be used from time to time to defray the special levy (deWolf, 1965, p.24).

The lease further stated that the lots should be devoted solely to afford transient parking accommodation on a short term basis and that should the demand for transient parking permit and with the permission of the Parking Commission, the D.P.C. could grant contract parking.

The rates for the D.P.C. lots were set at ten cents for the first hour, fifteen cents for the second hour, and twenty-five cents per hour thereafter for transients, and prevailing rates for contract parkers. These rates were increased in 1969 for the first time since the Company's inception.

As new lots were acquired, the lease was changed and the period of rental extended.

The final lease was made on January 14, 1958, and its expiry date set for December 31, 1982, when the City agreed to the request of the Corporation that some evidence of indebtedness for levies paid be furnished in the form of Tax Refund Notes, which represent profit shares, but would not be paid until all other obligations are met including future expansion. The lease further provided for the continuation of the payment of the \$72,800 annual levy to the City by the downtown property owners until 1969. Property owners have been however relieved of paying this levy for the years 1962, 1963, and 1967 to 1969, as the Corporation has paid



it for them from surplus funds.

The financing of the Downtown Parking Corporation has proven somewhat interesting. From 1948 to 1953, the Corporation, except for indirect funds made available through the 1948 by-law, relied on private capital. Sources of capital have included a \$30,000 loan from P.A. Woodward to clean up costs of improving Lot One and Lot Two, a \$75,000 loan from the Royal Bank of Canada, and a \$15,000 loan from Rupert's Land Trading Company (Hudson's Bay Company) to lease and improve Lot Five at the corner of Georgia and Richards Streets. The Corporation used a repurchasing scheme to finance the construction of a garage, its first permanent structure, at the corner of Homer and Pender Streets. The deal was made with Dominion Construction Company.

The need for additional parking in the Lot Five Area led to the Downtown Parking Corporation becoming a public company. In order to provide the additional parking for this area, the Company was urged to construct a multi-level garage on their site. To finance the proposed garage, the Corporation found it necessary to obtain public financing, and in order to do so, the DPC became a public company.

The capital structure of the public company gave ninety per cent of the shares all the beneficial interest, while the remaining ten per cent had no beneficial interest but maintained management right. The ninety per cent "beneficial" shares were offered to and accepted by the City, while the ten per cent management

shares were issued to the Downtown Business Association as trustee for the property owners subject to the parking levy (de Wolf, 1965, p.23).

Concurrently, the financing of the proposed three level, 280-car garage (Western Business and Industry, 1954) was achieved through the sale of 15-year, six per cent sinking fund debentures due July 15, 1968. The proceeds of this financing were also used to liquidate the bank loan and other liabilities. Through a heavy sinking fund and good management, the Company was able to retire these debentures in full in July 1964.

Since 1950, the Downtown Parking Corporation has serviced over seventeen million automobiles (Ross, 1970) and presently hold four parking lots and five Garages, including a 1,016 stall parking garage on the site of Lot Two. The value of the Corporation properties and facilities now totals some six million dollars, to which the City has clear title.

The operation of the Downtown Parking Corporation has however not been without criticism from private parking operators. Much of this criticism has centered on the fact that by charging low parking rates, the Corporation discourages further development of parking facilities by private enterprise in the downtown area of the City who must charge higher rates if it is to successfully remain in business (The Vancouver Sun, March 5, 1966; Elsie, 1967). In order to remedy the situation, private operators have suggested that the "D.P.C. should not be allowed to further expand or even to enlarge

its existing facilities", and to have the management of all its lots put out to public tender (Elsie, 1967). Alternatively, some City officials have suggested that the Corporation should be taken over by a public parking authority (de Wolf, 1965; Elsie, 1967; Peloquin, 1967).

The latter alternative has been the subject of much study during the mid-1960's (See, for example, de Wolf, 1965). The conclusions of these studies were favorable to the development of a parking authority for Vancouver. Briefly, one of these studies concluded that the authority should be free of city government influence and should operate on a budget derived from a parking occupancy tax and that a parking meter fund, which would be placed under the control of the authority, would be used for capital purposes either in direct payments or as security for capital borrowing (de Wolf, 1965). However, despite this conceivable proposal, the operation of a parking authority has not gone beyond the proposal stage. Perhaps one of the reasons for this situation is that private enterprise has strongly lobbied against such an authority.

The administrative and financial approach to parking in Vancouver has thus included private enterprise operations as well as a quasi-public operation. Through their approaches to parking, each of these operations have indirectly influenced the spatial external and internal features of the facilities, including parking garages, that they have provided for the City.

City Building By-law

In Chapter IV, that part of Vancouver's Building By-law regulating the installation of gasoline dispensing units and service and repair facilities inside automobile parking garages was discussed. The City's Building By-law however regulates not only these internal site features, but it also encompasses regulations which determine all internal site features of parking structures (See Appendix B, Part II). These regulations are prescribed for each type of garage. For most garages, including the storage garage and the repair garage, City building regulations deal with construction, height and areas, separation requirements, heat and light, sanitary facilities, and ventilation. Open-air parking garages have however been considered separately in the Building By-law. Regulations concerning this type of garage include those relating to other types of garages such as construction, height and areas, separation requirements including occupancy separation, heat and light, sanitation, and ventilation, as well as some requirements unique to this type of structure, for example, means of egress, shafts and opening, and fire extinguishing equipment (See Appendix B, Part II).

The power to enforce these regulations has been delegated by City Council to the City Building Inspector. Enforcement by this authority is in compliance to the main purpose of City activity, that of the promotion and protection of the public health, welfare, and safety.

### 1.3.3. By-law Enforcement.

The Building Inspector shall inspect or cause to be inspected all buildings during the course of construction and otherwise, whenever it shall be necessary or advisable for the safety or protection against fire of persons or property or the health of the occupants or of other persons or to ensure that the provisions of this By-law are obeyed or whenever it is otherwise advisable in the opinion of the Building Inspector, and, for the purpose of making such inspections, the Building Inspector and anyone authorized by him may enter any premises at any reasonable time (City of Vancouver Building By-law 4193, 1967, p.8).

Should a particular structure not conform to building standards for the City, the owners are liable to penalties, such as monetary fines and/or prohibition of entry.

The quality of that part of Vancouver's Building By-law regulating the internal features of parking garages appears to be up-to-date, providing for available modern building techniques and materials. However, in some areas, specifically that concerning the inside location of gasoline dispensing units, Vancouver's building regulations in regard to garages are still detrimentally conservative particularly in view of conclusive results of tests dealing with the potential explosion and fire hazard of inside gasoline dispensers as well as existing examples and recommended national and fire codes both for Canada and the United States.

### Summary

Parking is essentially a component of the automotive transportation system serving Downtown Vancouver; but it is a

component largely supplied by the private sector rather than by the public sector with the exception of the Downtown Parking Corporation. With increasing development of the downtown section of the City in the form of redevelopment projects such as Pacific Centre, Project 200, and Royal Centre, there will be, concurrently, an increased demand for parking facilities in the central business district. Because of the high cost of land and a continuing excess demand, the supply of parking for Downtown Vancouver will be furnished by the construction of more multi-storey parking garages, both above and below ground.

The external and internal site features of these garages will be regulated by the City's Zoning By-law and the City's Building By-law in addition to being influenced by the City's consideration for a transportation system as well as for further redevelopment projects. Site features of these structures will be further influenced by the City's approach to the administrative and financial aspects of parking facility provision. Moreover, the City's actions in regard to automobile parking garages reflect its concern for its primary responsibility, that of protecting and promoting the public health, welfare, and safety.

## CHAPTER VI

### CONCLUSIONS AND RECOMMENDATIONS

#### Review of the Study

The introductory chapter of the study was largely devoted to fundamental problems associated with increased automobile ownership and urban area usage, and intensified city street congestion, and their effects upon the city and its functions. One of these problems is that of parking and its provision by certain types of facilities, including the parking garage. An outline of some of the spatial effects of city by-law provisions and planning decisions upon external and internal site features of parking garages is then attempted. City regulation of parking garages is studied in order to outline some of the problems encountered by urban governments in attempting to regulate the external and internal site features of this type of off-street parking facility; problems which can be stated as physical (location, size, design, etc.), political (private versus public interests), administrative, and legal or formulative.

In the following chapter, the elements of city structure are examined to bring city regulation and types of parking garages into an urban geographic focus. Urban site and situation, form and structure, and site type, quality, and network were outlined to provide a better understanding of the effects of city planning

decisions and by-law provisions upon automobile-oriented retailing in the urban environment. A spatial typology of parking garages is presented to place this type of parking facility within a geographic focus. The typology revealed that there are five primary types of automobile parking garages: (a) downtown, (b) main street, (c) residential district, (d) shopping center, and (e) specialized functional area.

The analysis of existing city regulatory methods of automobile parking garages in the third chapter revealed three significant observations. The first was that cities regulate the external site features of parking garages through their zoning by-law provisions and transportation and redevelopment or renewal planning decisions; the second was that internal site features including size, layout, and construction were subjected to regulation by again cities' zoning by-law provisions and transportation and redevelopment or renewal planning decisions as well as cities' building by-law provisions; and the third was that both the external and internal site features were indirectly regulated through cities' approaches to the administrative and financial aspects of their parking program. The regulations affecting the external and internal site features of automobile parking garages and the enforcement of these regulations clearly reflected cities' concern for the protection and the promotion of the public health, welfare and safety.

The analysis of the regulations concerning the sale of



gasoline and oil products and the provision of service and repair facilities inside automobile parking garages focuses on the central problem of the study in that despite the formulation of similar goals by actors at the municipal level and the industrial level, there often results a conflict between these levels which has been created by the adoption of dissimilar internal policies or goals by city decision-makers. Sections of National building and fire codes for Canada and the United States and building by-laws for cities in western Canada and in the western United States with regard to the installation of gasoline dispensing units and automobile service and repair facilities inside parking garages are analysed. The analysis revealed that there exists differences between the two countries' national codes as well as differences between the building by-laws for cities in Canada and those for cities in the United States, in that American codes and by-laws are generally much more permissive than their Canadian counterparts in matters concerning gasoline dispensing and service and repair work inside parking garages. A more specific examination was made of relevant sections of the Building By-law of the City of Vancouver, revealing that the City maintains quite restrictive regulations in regard to the sale of gasoline and oil products and the provision of service and repair facilities inside parking garages. The analysis further disclosed that these regulations created a contentious issue between the petroleum industry and City officials, especially in view of the fact that the City's zoning by-law prohibits the location of

gasoline service stations in area where parking garages are prominent. However, the goals of both the private enterprise level and the City government level appear to have been set according to the individuals' concerns, needs, and problems, thus in some instances, leading to conflicts between and within each level.

The City of Vancouver was again used as a case study to show clearly the spatial effects of city regulatory methods, including the zoning by-laws, transportation and redevelopment planning, administrative and financial practices, and building by-laws, upon automobile parking garages located in the downtown area of the City. The investigation revealed that although the city was similar to other cities in its regulation of the external and internal site features of parking garages, it was a unique application of that part of the City's Zoning By-law requiring a specific number of parking spaces for certain types of occupancies to the core area of Downtown Vancouver; the second was that of the City's participation in the parking field through the Downtown Parking Corporation; and the third was that in most areas of its control, Vancouver's Building By-law was safely progressive, but in matters concerning the installation of gasoline dispensing units and automobile service and repair facilities inside parking garages it was detrimentally conservative. Observations reveal that Vancouver's regulations affecting automobile parking garages were reflective of the City's concern for the protection and the promotion of the public health, welfare, and safety.

### Appraisal of the Hypotheses

#### Hypothesis 1:

To explain the fact that the external and internal site features of automobile parking garages are not determined randomly but rather, intentionally, it was hypothesized for this study that:

The external and internal spatial arrangements of automobile parking garages are effectively regulated by city by-law provisions and city planning decisions.

To be verified, the following observations in the study were noted:

The general analysis of municipal regulations concerning automobile parking garages clearly demonstrates the effects of these controls upon the external and internal site features of these facilities. Moreover, as seen by the case study of Vancouver, British Columbia, it is the intent of city legislation as reflected in the City's zoning, building, and parking by-law provisions and city transportation and redevelopment planning decisions, that the external and internal spatial arrangements of automobile parking garages be regulated in agreement with the city's primary responsibility, that of the protection and promotion of the public health, welfare, and safety.

Based on these observations, it is thus felt that the first hypothesis is reasonable and should be supported. However, effective control of external and internal site features of parking garages cannot be guaranteed by city regulation. There must be

strong, rational, and consistent enforcement as well. Subject to the limitations of the investigation itself, this hypothesis is considered valid, and rational regulation of site and situation features of parking garages should be encouraged in urban areas.

#### Hypothesis 11:

The regulation or restriction of the sale of gasoline and oil products and the provision of service and repair facilities inside automobile parking garages is greatly dependent on the degree to which the city considers them to be dangerous to the public health, welfare, and safety. Thus it was hypothesized that:

The sale of gasoline and oil products and the provision of service and repair facilities inside automobile parking garages are both a desirable and a safe use of space within these structures.

To be verified, the following observations in the study were noted:

The analysis of selected Canadian and American national building and fire codes and western American cities and western Canadian cities' building by-laws demonstrate that there exists differences in their respective regulations concerning the sale of gasoline and oil products and the provision of service and repair facilities inside types of automobile parking garages. However, as evident in the national building and fire codes for the United States and more recently, in those for Canada, and in building by-laws for selected western American cities and for one western

Canadian city, it is the intent of these codes and by-laws to permit the installation of gasoline dispensing units and automobile service and repair facilities inside generally all types of parking garages. Their actions are based on the belief, which is supported by existing evidence, that such facilities are a safe use of space within these structures.

Building ordinances oriented to the above purposes, for certain western Canadian cities are very restrictive. This was observed in the cities of Winnipeg, Regina, Saskatoon, Vancouver, and Victoria. These ordinances are too restrictive in view of recent changes in Canada's National Building Code (1970), to which these cities generally subscribe, availability of safe modern structural designs and materials for parking garages, conclusive results of tests in regard to the explosion hazard created by the dispensing of gasoline inside buildings, and evidence of the safeness of these facilities inside existing parking garages.

In cities such as Vancouver where high land and development costs and city zoning by-laws prohibit the further location of gasoline service stations in certain areas of the city where parking garages are prominent, in particular the downtown district, the use of space within these garages to retail gasoline and oil products and service and repair automobiles is desirable. It is a desirable use of space in that it provides the petroleum industry with an economically viable retail outlet and the means for meeting the demand for automobile-oriented retailing facilities

in the downtown area of a city, as well as a source of customer attraction. The installation of such features inside garages also provides a source of additional income to the parking garage operator and a source of supply for or convenience to the customer.

Subject to the limitations of the analysis itself, the second hypothesis is considered valid, and rational regulation these internal site features of automobile parking garages should be encouraged in concerned urban areas.

#### Hypothesis III:

The suggested explanation of the central problem of the study, as put forth by the third hypothesis, is that:

The sale of gasoline and oil products and the provision of service and repair facilities inside automobile parking garages leads to a conflict between actors at the industrial and municipal levels that can only be resolved by the adoption of similar planning goals by city decision-makers.

To be verified, the following observations were noted:

An analysis of the situation in Vancouver demonstrated that there exists a conflict between actors at the industrial level and the municipal level over by-laws regulating the sale of gasoline and oil products and provision of service and repair facilities inside automobile parking garages. The petroleum industry recognizes the fact that in this major urban center, a solitary gasoline service station is an uneconomic use of downtown land because of high land costs and limited space in this area of the city. However,

the industry realizes that there exists a demand in the downtown district of Vancouver for the products and the services offered by its retail outlets, and thus desires to meet this demand; and the installation of gasoline dispensing units and automobile service and repair facilities inside parking garages is considered by the industry as the best way of doing so.

Ordinances concerning the above purposes have led to private and public differences. The City's Zoning and Development By-law prohibits the further location of gasoline service stations in the downtown section of Vancouver, representing such outlets as an uneconomic and as well, an unattractive use of downtown land. The City's Building By-law, on the other hand, prohibits the inside location of gasoline pumps and restricts the inside location of automobile service and repair facilities in parking garages. The City bases this prohibition and restriction on the fact that the City Fire Marshall with support of the City Building Inspector, deems such locations as being ultra vires to their main responsibility, that of the protection of the public health, welfare, and safety.

The result of these By-law provisions is that the goals of city policy have effectively regulated against the further location of automobile-oriented retailing facilities concerning the sale of gasoline and oil products and the service and repair of automobiles in Downtown Vancouver in conflict with the goals set forth by the petroleum industry. The resultant conflict between the industrial level and the municipal level has arisen because city

officials can offer to the petroleum industry no viable alternative location for their retail outlets in the downtown area of the city as a result of the goals adopted in the City Building By-law concerning the installation of gasoline dispensing units and automobile service and repair facilities inside parking garages. The resolution of this conflict between the industrial level and the municipal level can only be resolved when a change is instituted in either the Building By-law or the Zoning By-law, but preferably the latter, so as to offer to the petroleum industry, an alternative retail outlet in the downtown section of Vancouver. It is thus felt that the third hypothesis is reasonable; and that subject to the limitations of the study itself, the hypothesis considered valid.

### Recommendations

In light of the findings of the study it is presumed that a course of action for formulating rational city legislation concerning parking and its spatial manifestations is possible, to be used for the provision of effective and perhaps, an harmonious urban environment. The achievement of regulation should be based on the collabration of the powers of both the local municipal level and the private enterprise level to achieve meaningful results. Although the goals of both levels often lead to diverse and conflicting regulations, the ultimate goal should be controlling the direction of the developing urban environment by means of rational city regulation. To develop and protect an harmonious



urban area, dialogue must be generated between public and private sectors. The development of an area of intercourse between these sectors can often provide the municipal planner and invariably, the municipal decision-maker with the expertise possessed by private enterprise and needed in order for them to attain their goals through enacting rational by-laws.

In terms of the study, an area of dialogue should be provided for city officials and private enterprise in regard to formulating city legislation concerning parking and the external and internal site features of the facilities provided for this activity. The roles of the public and private levels are expressed below to place the previously observed conflicts with regard to parking and parking facility legislation in their proper context.

#### Local Municipal Level:

Throughout the study, the underlying element has been the protection and promotion of the public health, welfare, and safety. The problem of municipal legislation concerning parking and its facilities, or for that matter, any municipal function and form, must be considered in light of the health, welfare, and safety of the people. In considering these elements, the municipality must adopt a clearly stated and above-all, rational or realistic policy or goal so that these elements can be incorporated in the development of a better environment. The development of a better environment must be for all of the populace, including private

enterprise.

In order to attain its goals the municipal level must enact by-laws which are consistent with these goals and which are easily and consistently interpreted and easily and intelligently controlled by designated municipal officials. Diverse interpretation or misinterpretation of municipal by-laws can only lead to the creation of conflicts between the public and private levels, which in turn leads to an inharmonious and unattractive urban environment.

With regard to the study, municipal planners and decision-makers must adopt clearly enunciated policies or goals in regard to the development and regulation of off-street parking facilities, including the parking garage. Municipal by-laws concerning the external and internal site features of these facilities must thus be rational and be consistently and easily interpreted by municipal agencies. Should there exist a by-law, as in the case of Vancouver's Building By-law regulating the sale of gasoline and oil products and the provision of repair and service facilities inside parking garages, which is irrational or inconsistent with the needs of all or any one of the segments of the populace or with the provision of a more harmonious urban environment which incorporates the element of the protection and promotion of public health, welfare, and safety, then the municipal government should review this by-law and institute the necessary changes in the by-law.

### Private Enterprise Level:

Generally, private enterprise is willing to participate in a program of intercourse with municipal government. Businessmen have realized that the success of this course of action often depends on the amount of time, effort, and money that they invest into it. Private enterprise has further realized that often a dialogue between private and public levels can only be generated through its initiative. Initiation can be through a Board of Trade, a professional group or some community organization.

Once the program is under way, private enterprise can contribute by participating through providing its knowledge and criticism of present or proposed municipal government policies. Through such participation, the specific policies or goals of the municipality can be in part formulated by those who would be affected by them.

In evaluating the municipal government's policy or goal, private enterprise must however think beyond its own specific needs and evaluate in terms of the protection and promotion of the public health, welfare, and safety. For private enterprise to think in these broad terms, would be to take a step closer to providing a better environment for all elements of the populace.

In regard to the study, private enterprise has much to offer to the municipality with regard to aiding the municipal government in formulating its policies and goals concerning parking

and its provisionary facilities. Through its expertise in the parking field, private enterprise can actively participate in the formulation of rational and consistent municipal by-laws regulating the external and internal site features of off-street parking facilities, including the parking garage. Dialogue between the local municipal level and the private enterprise level is thus the key to opening the door to the development and regulation of proper and successful parking facilities for the municipality; facilities which ultimately contribute to a better environment for all segments of the populace.

#### Recommendations for Further Study

The investigation revealed that further study and research is needed in the fields of city regulation and its effects upon the urban retail environment, and parking.

City planning decisions and city by-law provisions have been proved to determine the external and internal site features of automobile parking garages. More studies should be continued along these lines, only with a broadening of the research focus so as to examine the effects, if any, of city legislation upon other retailing activities in the urban environment as well as upon the elements of site type, quality, and network.

Secondly, city regulation of parking garages have proven to be highly diverse and in some instances, inconsistent and conflicting, thus lending support to the notion that cities are

sometimes unclear of what policies or goals should be set and how these policies or goals should be attained. Further study should be made along the lines of investigating the conflicting policies or goals of city governments and the effects of such policies or goals upon the urban retail environment.

Lastly, although much of the subject has been covered here and elsewhere, there always exists numerous areas of research in the subject of parking. For the geographer especially, the areas available for investigation include location-oriented parking feasibility studies, similarly-oriented parking demand studies, and studies of the spatial effects of parking facilities for cities in general and for particular cities.

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## APPENDIX A

## PART I

## EXCERPTS FROM THE NATIONAL BUILDING CODE OF CANADA (1970)

Definitions of Garages

Automobile garages are defined as:

Garage, Repair means a building or part thereof where facilities are provided for the repair or servicing of motor vehicles.

Garage, Storage means a building or part thereof intended for the storage or parking of motor vehicles and which contains no provision for the repair or servicing of such vehicles.

Garage, Open Air Parking means a storage garage situated in a building which contains no other occupancy and which has not less than 50 per cent of the area of two or more sides open at each storey.

Recommendations for Internal Site Features

Recommendations concerning the inside location of gasoline dispensing units and automobile repair and service facilities are:

3.3.7.7(11) A repair garage shall be separated from other occupancies by at least a 2-hr fire separation unless otherwise approved. Openings shall not be permitted in the fire separation between a repair garage and a Group A (Assembly), B (Institutional), C (Residential, and E (Mercantile) occupancy.

3.3.7.7(12) A storage garage shall be separated from other occupancies by at least a  $1\frac{1}{2}$ -hr fire separation, unless otherwise approved.

3.3.7.8. Facilities for dispensing gasoline shall not be installed in any building except in buildings of Group F occupancy (Industrial, including storage garages) when approved.

## APPENDIX A

## PART II

EXCERPTS FROM THE NATIONAL FIRE CODE OF THE  
NATIONAL FIRE PROTECTION ASSOCIATION (1969)Definitions of Garages

Automobile garages are defined as:

Repair Garages are garages devoted to repairs to motor vehicles or to conduct automobile body and fender work. Garages may be with or without space for showrooms and with or without floor space in the building especially reserved for parking purposes. Operations may involve the use of open flame devices, welding and cutting equipment, the use of flammable liquids, and the dispensing of motor fuels.

Enclosed Parking Garages are garages having exterior enclosure walls, used for the parking of motor vehicles. Parking facilities may involve the use of conventional type elevators, attendant operated; mechanical control push-button type elevators; or ramps. Motor vehicles may be parked by garage attendants, the driver, or by mechanical automatic parking facilities by which the garage attendant or operator may or may not be required to leave the grade or ground floor. Dispensing of motor fuels and motor vehicle servicing are commonly provided at these garages.

Open Air Parking Garages are structures having not less than 50 per cent of two sides of the structure open at each storey and used for the parking of motor vehicles. These structure may be of the ramp type in which the motor vehicles are parked by garage attendants or the driver; they may have the mechanical parking facilities as described in the above paragraph. Dispensing of motor fuels and motor vehicle servicing are sometimes provided.

Storage Garages are garages used solely for dead storage of motor vehicles.

Basement and Underground Garages are garages located below grade, used solely for parking purposes. Motor vehicles may be parked by a garage attendant or by the driver. A basement garage has occupancies above; an underground garage has no occupancy other than a garage above it.

### Recommendations for Internal Site Features

Recommendations concerning the inside location of gasoline dispensing units and automobile repair and service facilities are:

- 1120. Garages should be limited in height and area, depending upon the type of construction and private fire protection provided, to minimize the possibility of fire of such extent as to jeopardize public safety or to unduly disrupt normal community activities. Excessive heights and large undivided floor areas are undesirable. Garage buildings with numerous accessible exterior openings offer favorable features for fire fighting. Moderate areas are essential to the effective use of hose streams, where reliance is placed on manual fire protection.
- 1130. Enclosed parking garages, open air parking garages, and basement and underground garages shall not be located within or attached to a building used for any other occupancy unless separated by walls and floor and ceiling assemblies having fire resistance ratings appropriate to the type construction, with all openings between such garages and other than garage occupancies protected by approved self-closing fire doors.
- 1140. A repair garage or repair shop shall not be located within or attached to a building used for any occupancy other than garage purposes unless separated by walls and floor and ceiling assemblies having fire resistance ratings appropriate to the type construction. Communications from a repair garage to other than garage occupancies should be of the vestibule or balcony type properly constructed and arranged.
- 2311. Repairing of motor vehicles shall be restricted to the areas specifically provided for such purposes in repair garages. Repairing of motor vehicles on floors located below grade level is undesirable.
- 2423. Inside Location including Open Air Parking Garages: Approved dispensing units may be located inside garages upon specific approval of the authority having jurisdiction. The dispensing area shall be separated from motor vehicle repair areas in a manner approved by the authority having jurisdiction. The dispensing unit and its piping shall be protected against physical damage by vehicles either by mounting on a concrete island or by equivalent means and shall be located in a position where it cannot be struck by a vehicle descending a ramp or other slope out of control. The dispensing area shall be provided with an approved mechanical or gravity ventilation system. When

dispensing units are located below grade only approved mechanical ventilation shall be used and the entire dispensing area shall be protected by an approved automatic sprinkler system. The ventilating systems shall be electrically interlocked with the gasoline dispensing units so that the dispensing units cannot be operated unless the ventilating fan motors are energized.

2424. Emergency Power Cutoff: A clearly identified and easily accessible switch(es) or a circuit breaker(s) shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency.

2425. Dispensing devices located above grade and not subject to mechanical ventilation should be located within twenty feet of an outside door and the floor have a definite downward slope toward the door with a minimum of one inch for each 10 feet.

When dispensing devices are located near a ramp to below grade, ventilation shall be sufficient at all times to prevent accumulation of flammable vapors.

EXCERPTS FROM THE BASIC BUILDING CODE OF THE  
BUILDING OFFICIALS CONFERENCE OF AMERICA(1969)

Definitions of Garages

Automobile garages are defined as:

Garage, Public: a building or structure for the storage, parking, care or repair of five (5) or more motor vehicles not included in the term garage, private. Public garages shall be classified according to their specific use in one (1) of the following groups:

- Group 1: buildings used for parking, storage, repair or painting of passenger or commercial vehicles, trucks or buses, including fleets of motor vehicles, operated by utilities, large businesses, mercantile or similar concerns; and in which gasoline, oil, and similar products may be dispensed for the servicing of such vehicles.
- Group 2: buildings used exclusively for the parking or storing of passenger vehicles that will accomodate not more than nine (9) passengers, and in which gasoline, oil, and similar products may be dispensed for the servicing of such vehicles.

Parking Structure, Open: a structure for the parking of passenger cars wherein two (2) or more sides of such a structure are not less than fifty (50) per cent open on each floor or level for fifty (50) per cent of the distance from the floor to the ceiling and wherein no provision for the repairing of such vehicles is made. Such open parking structures are not classified as public garages.

#### Recommendations for Internal Site Features

Recommendations concerning the inside location of gasoline dispensing units and automobile repair and service facilities are:

415.13 Mixed Occupancy: No public garage shall be located within or attached to a building occupied for any other use, unless separated from such other use by walls or floors complying with recommendations for fireresistance. Such fire division shall be continuous and unpierced by openings; except that door openings equipped with self-closing fire doors shall be permitted.

905.24 Gasoline Dispensing: Areas for dispensing of gasoline in parking structures shall be located on the grade floor.



## APPENDIX B

## PART I

## EXCERPTS FROM THE CITY OF VANCOUVER

## ZONING AND DEVELOPMENT BY-LAW NO. 3575

Definitions of Garages

Automobile parking garages are defined as:

Parking Garage shall mean a building the principal use of which is the parking or storage of vehicles.

Parking Garage (Public) shall mean a building the principal use of which is the parking or storage of vehicles and which is available to the public or as an accomodation to clients or customers or employees.

Regulations for Off-Street Vehicular Parking Facilities

Zoning regulations concerning off-street vehicular parking facilities, especially automobile parking garages, are:

- (1) Required Vehicular Parking Spaces:  
In all districts, except the (C-5), (CM-1) and (CM-2) Commercial Districts, at the time that any development on any site takes place, subject to the provisions of clause (f) below, off-street vehicular parking spaces determined with respect both to the existing land and buildings and also to the proposed development, shall be provided and maintained in accordance with the following requirements:
  - (a) Number of Spaces:  
The number of off-street vehicular parking spaces required for any development shall be as set out in Schedule "B" (See Table 2 to this By-law.
  - (b) Size:  
All off-street parking spaces shall be of sufficient size, satisfactory to the Director of Planning to accomodate the type of vehicles to be parked.  
In the case of all automobiles, parking space shall have a clear length of not less than 18 feet, a clear width of not less than eight feet, and a clear height

of not less than seven feet. When a parking space adjoins a structure over one foot in height beyond a distance of four feet from either end of the parking space, the width of the parking space shall be increased by one foot on the side or sides which abut such structures to enable the opening of vehicular doors.

(c) Access:

Adequate provision shall be made for individual ingress and egress by vehicles to all parking spaces at all times by means of unobstructed manoeuvring aisles. In the case of automobiles the manoeuvring aisles shall be not less than 22 feet in width for right angle parking; for angle parking the manoeuvring aisles may be reduced in width to a standard satisfactory to the Director of Planning.

(d) Location:

Off-street parking facilities shall be located as hereinafter specified; where a distance is specified, such distance shall be measured by accessible street or lane from the nearest point of the parking area to the nearest point of the building that such facility is required to serve:

(i) For all dwellings: on the same site with the building they are required to serve.

(ii) For all other uses: not over 150 feet from the building they are required to serve, except in the case of a project, for collective parking authorized by Council under the provisions of Part 3 of the Local Improvement Procedure By-law as amended, in which case the distance may exceed 150 feet.

(e) Units of Measurement:

Where gross floor area is used as a unit of measurement in computing the parking requirements for apartment buildings, or buildings converted to contain more than two dwelling or housekeeping units or where such are located above C or M premises, the floor area shall be taken as prescribed for the computation of floor space ratio in (RM-3) Districts. In all other cases it shall include the floor area of accessory buildings and basements except where they are used for parking or heating facilities.

(f) Change in Use-Additions and Enlargements:

Where there is a change in use, or alteration or addition to an existing building, the standard of parking hereby required need not be provided until a development occurs at a time when, or as a result

of which:

- (i) The required parking provided on any given site is more than 10 percent deficient, or
- (ii) The floor area is increased in excess of 10 percent over the floor area existing at June 18, 1956.

(g) Mixed Occupancies and Uses Not Specified:

In the case of a use not specifically mentioned in Schedule "B" the requirements for off-street parking facilities shall be the same as for a similar use. In the case of mixed uses, the total requirements for off-street parking facilities shall be the sum of the requirements for the various uses computed separately. Off-street parking facilities for one use shall not be considered as providing required parking facilities for any other use.

(h) Collective Provision:

Except in the case of dwellings located in R Districts nothing in this clause shall be construed to prevent collective provision of off-street parking facilities for two or more buildings or uses, subject to the approval of the Director of Planning, provided that the total of such off-street parking spaces supplied collectively shall be not less than the sum of the requirements for the various uses computed separately.

### Location of Parking Garages

Zoning regulations restrict the location of public automobile parking garages to the following zones:

- (a) (C-1) Commercial District (Local): Subject to approval by the Technical Planning Board.
- (b) (C-2) Commercial District (Suburban): Outright use.
- (c) (C-3) Commercial District (Medium Density): Outright use.
- (d) (C-4) Commercial District (Medium Density): Outright use.
- (e) (C-5) Commercial District (Amenity Commercial): Subject to approval by the Technical Planning Board (see p. 131).
- (f) (CM-1) Commercial District (General): Outright use.
- (g) (CM-2) Commercial District (High Density): Subject to approval by the Technical Planning Board (see p. 131).
- (h) (M-1) Industrial District (Light): Outright use.
- (i) (M-2) Industrial District (Heavy): Outright use.
- (j) (P-1) Parking District: Outright use (see p. 188).

(P-1) Parking District Schedule

## 1. Uses permitted, conditions and regulations:

Subject to all the provisions of this by-law on any site within any district defined, designated or described in this by-law as a (P-1) District the only uses permitted, and the only uses for which development permits may be issued are those contained in Sections 1 and 2 hereof.

## A. Uses:

- (1) Parking Area (Public) subject to the provisions of Sections 11 (12) and 12 (2) (a) of the By-law.
- (2) Parking Garage (Public) subject to the provisions of Section 11 (12) of this By-law.
- (3) A building or use which is customarily accessory to the above principal buildings or uses provided that:
  - (a) No accessory building shall be located in a front yard or in a required side yard.
  - (b) All accessory buildings shall occupy an area not greater than 300 square feet.
  - (c) No accessory building shall exceed one storey or 12 feet in height.
  - (d) In the case of a Parking Area (Public) or Parking Garage (public) which provides parking spaces for not less than 40 vehicles the sale of gasoline shall be permitted by the installation of not more than two pumps; additional pumps may be installed inside any Parking Garage (Public).
  - (e) Where a Parking Garage (Public) provides parking space for not less than 40 vehicles the sale of lubricants, minor tire repairs and the washing, polishing and greasing of vehicles shall be permitted inside the garage.

## B. Front Yard:

A front yard shall be provided not less than ten feet in depth and subject to the provisions of Section 11 (12) of this By-law.

## C. Side Yard:

1. No side yard shall be required except that where the site of a Parking Area (Public) or Parking Garage (Public) adjoins the site of a building designed or erected exclusively for use as an apartment building (but not including buildings converted to such use), or which adjoins or faces any site in an (RM-4) District, a side yard shall be provided of not less than 5 feet in width in the case of a Parking Area (Public) and 10 feet in width in the case of a Parking Garage (Public).

PROVIDED, however, that in the case of a corner site where a side yard adjoins a flenking street the side yard shall be not less than 10 feet in either case. Where a side yard is required, it shall be subject to the provisions of Section 11 (12) of this By-law.

2. Where a side yard in any such district be provided where not required by the provisions of this by-law the said side yard shall be not less than 3 feet in width.

D. Rear Yard:

No rear yard shall be required.

E. Height:

The height of a building shall not exceed 50 feet.

TABLE 2

REQUIRED PARKING SPACES<sup>a</sup>

<u>Use</u>	<u>Required Parking Spaces</u>
Buildings containing three or more dwelling or house-keeping units located in (RM-1) or (RM-2) Multiple Dwelling Districts.	One parking space for every 725 square feet of gross floor area of all floors of the building.
Buildings containing three or more dwelling or house-keeping units located in (RM-3) Multiple Dwelling Districts.	One parking space for every 725 square feet of gross floor area of all floors of the building.
Buildings containing three or more dwelling or house-keeping units located in (RM-4) Multiple Dwelling Districts	One parking space for every 850 square feet of gross floor area of all floors of the building.
Buildings containing three or more dwelling or house-keeping units located in C or M Districts.	One parking space for every 725 square feet of gross floor area of all floors or portions thereof used for residential purposes, provided, however, in C Districts located within District Lot 185 the amount shall be one space for every 850 square feet.
Boarding or rooming houses, fraternity or sorority houses, personal care home, or other similar uses.	One parking space for every 350 square feet of floor area used for sleeping units, exclusive of bathrooms.
Hotels and motels.	One parking space for each dwelling unit and one parking space for every two sleeping units.
Tourist Courts.	One parking space for each dwelling unit or sleeping unit.
Hospitals, or other similar uses.	One parking space for every 1,000 square feet of gross floor area in the building.

TABLE 2 (cont.)

<u>Use</u>	<u>Required Parking Spaces</u>
Institutions of a religious, philanthropic, charitable or philozoic character, or other similar uses.	One parking space for every 1,000 square feet of gross floor area in the building.
School-Public or Private.	Two parking spaces per three teaching areas in elementary schools and one and one-quarter parking spaces per teaching area in secondary schools provided always that in any case where the number of parking spaces required under this By-law as a result of extension to an existing school would diminish the school playground area the amount of parking required under the By-law shall be reduced so as not to affect the playground area adversely.
Schools-Business -up to and including a gross floor area of 3,000 square feet.	One parking space for every 1,000 square feet of gross floor area in the building.
-exceeding a gross floor area of 3,000 square feet.	Three parking spaces, plus one parking space for every additional 500 square feet of gross floor area in excess of 3,000 square feet.
Churches and similar places of public assembly.	For such area as is used for public assembly: One parking space for every 100 square feet of such floor space, provided that the Technical Planning Board shall have regard to the incidence of use, and in cases where there are two or more separate areas of assembly within the site, the Board, if of the opinion that such areas ordinarily would not be used concurrently, may assess the amount of parking spaces required by reference to only one of such areas, in which case, the assessment shall be made by reference to the area which, by itself, requires the greatest number of parking spaces.

TABLE 2. (cont.)

<u>Use</u>	<u>Required Parking Spaces</u>
Arenas, Ice, Roller or Curling Rinks, Riding Rings, Stadiums, Auditoriums, Theatres, Halls, Gymnasiums, Undertaking Establishments, Lodges (Fraternal) Clubs or other similar places of assembly.	For such area is used for public assembly: One parking space for every 100 square feet of such floor space.
Community Centres or other similar places of assembly.	For such area as is used for public assembly: One parking space for every 200 square feet of such floor space.
Bowling Alleys.	Two parking spaces for each alley.
Office Buildings, Retail Establishments, or other similar use; -up to and including a gross floor area of 3,000 square feet.	One parking space for every 1,000 square feet of gross floor area in the building.
-exceeding a gross floor area of 3,000 square feet.	Three parking spaces plus one parking space for every additional 500 square feet of gross floor area in excess of 3,000 square feet.
Restaurants and other similar uses; -up to and including a gross floor area of 1,200 square feet.	One parking space.
-exceeding a gross floor area of 1,200 square feet.	One parking space, plus one parking space for every additional 400 square feet of gross floor area in excess of 1,200 square feet.
Premises licensed as Public Houses (Beer Parlours) and Lounges licensed for the sale and consumption on the premises of alcoholic beverages.	One parking space for every 60 square feet of floor area open to the public within the area of the premises licensed for use as Public House or Lounge, except washrooms.



TABLE 2 (cont.)

<u>Use</u>	<u>Required Parking Spaces</u>
Manufacturing and Industrial Buildings and uses, Wholesale Distribution, Servicing and Repair Establishments, or other similar uses.	One parking space for each five employees on a maximum working shift, or not less than one parking space for each 1,000 square feet of gross floor area in the building, whichever is the greater.
Warehouses, Storage Buildings or Yards, or other similar uses.	One parking space for each 2,000 square feet of gross floor area in the building, or not less than one parking space for each five employees on a maximum working shift, whichever is the greater.
Golf Driving Range.	One parking space for every installed golf driving tee.
Marina.	One parking space for every two-boat mooring berths exclusive of parking spaces required in connection with launching ramps.
Boat Launching Ramps.	The number of required parking spaces shall be as determined by the Technical Planning Board on the basis of the design and anticipated use.

- 
- a) Pursuant to Section 12(1) (Off-Street Vehicular Parking Facilities, see p. 185) of the Zoning By-law, the number of Off-Street Vehicular Parking Spaces required for any development on any site located in any zoning district shall be as set out above; when the number of required parking spaces results in a fractional space, any fraction of one-half or less may be disregarded and any fraction of greater than one-half shall require one additional parking space.

## APPENDIX B

## PART II

## EXCERPTS FROM THE CITY OF VANCOUVER BUILDING BY-LAW NO. 4193

Definitions of Garages

Automobile parking garages are defined as:

Garage, Private means a building or part thereof used or intended to be used for the storage of four or less motor vehicles and in which there are no facilities for repairing or servicing such vehicles.

Garage, Repair means a building or part thereof used or intended to be used where facilities are provided for repairing and servicing of motor vehicles.

Garage, Storage means a building or part thereof other than a private garage, used or intended to be used for the storage of automobiles and which contains no provision for the repair or servicing of such motor vehicles.

Regulations for Automobile Parking Garages

Building and fire regulations concerning the internal site features of automobile parking garages are:

## 3.12.7. Garages

## 3.12.7.1. General

All buildings constructed, or altered to be used or intended to be used as garages for the storage or shelter of automobiles, or for the purpose of servicing, repairing, or painting automobiles, shall conform to the requirements of Sub-section 3.12.7. and where not specifically regulated in Sub-section 3.12.7., shall conform to the other requirements of this By-law.

Automobiles may be stored or displayed in any building if such automobiles contain no gasoline or other volatile liquid.

## 3.12.7.2. Construction

## (a) Fire Limits

Except as provided for open-air parking garages, all buildings regulated by Sub-section 3.12.7., when erected within the districts

or areas defined in this By-law as Fire Limits Nos. 1,2 and 3, shall conform to the requirements in respect to the construction of buildings situated within such Fire Limits.

(b) Fire-resistive Construction

Save as provided for open-air parking garages in article 3.12.7.5., every garage greater than one storey in height shall be of fire-resistive construction. In buildings of fire-resistive construction used exclusively as storage garages the separation of storeys may be waived with respect to vehicular ramps only, provided such ramps are not required exits.

(c) Incombustible Floors

The floor system of any garage shall be of incombustible material.

### 3.12.7.3. Height and Areas

(a) Fire-resistive Construction

Except as provided for open-air parking garages in article 3.12.7.5., all garages constructed of fire-resistive construction shall not exceed the height area limitations set forth in Table 3 except that:

- (i) the limiting area of a building of Type A fire-resistive construction (3-hour rating) may be increased at the discretion of the Building Inspector when used as a storage garage only, and
- (ii) the height of a building of Type B fire resistive construction (2-hour rating) shall be limited to six storeys when used or intended to be used as a repair garage.

(b) Non-fire-resistive Construction

Except as provided for open-air parking garages in article 3.12.7.5., the area of any one storey garage of other than fire-resistive construction shall not exceed 50 per cent of the area limitations permitted for the respective type of construction in Table 3 for Group G, Division 3 occupancy.

### 3.12.7.4. Separation Requirements

(a) Exterior Walls

For the purposes of determining the fire separation of buildings in accordance with Subsection 3.4.6. of this By-law, a fire load of not less than 20 pounds per square feet shall be used for a repair garage and a fire load of not less than 10 pounds per square foot shall be used for a gasoline service station, open-air parking garage, or storage garage not being a private garage.

(b) Occupancy Separation

(i) Storage Garages

Where a storage garage and one or more major occupancies are contained within the same building such building and the storage of automobiles shall conform to the following requirements:

(A) The portion of any such building used for the storage of automobiles shall be of fire-resistive construction and shall be fully separated from the remainder of the building by not less than a Grade 2 construction separation in which all openings are protected by self-closing fire-resistive closures having a fire resistance rating of not less than 2 hours except that where the major occupancy or occupancies contained within the storage garage is a theatre, motion picture theatre, Group A school occupancy, Group C school occupancy, or a Group B occupancy the said separation shall have no openings therein. Except as provided for theatres, motion picture theatres, and school occupancies in the next preceding sentence, where the major occupancy contained within the storage garage is a Group A, C, D, or E major occupancy the said fire-resistive closures shall be normally in the closed position.

(B) No servicing or repairs to automobiles shall be undertaken, nor shall any gasoline, other than that contained in the tanks of the automobiles be stored, used, or sold in any such building nor shall facilities for dispensing gasoline be installed in any such building.

(C) The portion of such building used for the storage of automobiles shall be provided with adequate ventilation to the satisfaction of the Building Inspector.

(ii) Repair Garages

Where a repair garage and one or more major occupancies as permitted by article 3.12.1.2. are contained within the same building such building and the repair of automobiles shall conform to the following requirements:

(A) The portion of any such building used for the repair of automobiles shall be of fire-resistive construction and shall be fully separated from the remainder of the building by not less than a Grade 2 construction separation in which all openings are protected by automatic or self-closing fire-resistive closures having a fire resistance rating of not less than 2 hours.

(B) Facilities for dispensing gasoline shall not be installed in any such building.

(C) The portion of such building used as a repair garage shall be provided with adequate ventilation to the satisfaction of the Building Inspector.

### 3.12.7.5. Open-air Parking Garages

(a) General

For the purpose of Article 3.12.7.5. open-air parking garage means a building which has not less than 50 per cent of the area of two or more sides open at each storey and in which the openings are

dispersed throughout the length of each storey and which is used exclusively for the parking of automobiles. Any open-air parking garage not used exclusively for the parking of automobiles shall be classified as a storage garage.

Open-air parking garages of Unprotected Noncombustible Construction may be erected in the districts or areas defined in this By-law as Fire Limits.

No servicing or repairs to automobiles shall be undertaken, nor shall any gasoline, other than that contained in the tanks of the automobiles, be stored, used, or sold in any open-air parking garage nor shall facilities for dispensing gasoline be installed in any open-air parking garage.

(b) Construction

The following requirements shall apply to the construction of all open-air parking garages:

- (i) all such garages shall be of either fire-resistive construction or of unprotected noncombustible construction. In unprotected noncombustible construction column protection may be omitted from columns which are 15 feet or more from an interior lot line or which face upon a street 20 feet or more in width.
- (ii) the clear headroom on all floors shall be not less than 7'-0" to any point except that clearance to beam soffits may be 6'-6".
- (iii) all openings, including those resulting from the omission of exterior walls, shall be provided with approved curbs and guard rails.
- (iv) no combustible trim, partitions, or finishes shall be permitted in such garages.
- (v) no tarpaulins, glass, or other materials shall be used to close required exterior openings at any time.

(c) Height and Areas

See Table 4.

(d) Area Increases

The limiting areas set forth in the next preceding clause may be increased in accordance with Note a or Note b of Table III provided the walls facing the said streets have not less than 50% of the area of each storey open. Such openings shall be distributed throughout the length of each storey.

(e) Separation Requirements

(i) Exterior Walls

In open-air parking garages the separation requirements of this By-law may be waived for an exterior wall which has not less than 50 per cent of its area open in each storey and which faces upon a street not less than 20 feet in width. Such openings shall be distributed throughout the length of each storey.

In addition to complying with the separation requirements contained elsewhere in this By-law, every exterior wall of an open-

TABLE 3

HEIGHT AND AREA LIMITATIONS OF BUILDINGS  
OF GROUP G, DIVISION 3 OCCUPANCY

Major Occupancy of Building	Unprotected Combustible	Protected Combustible 3/4 hr. rating	Unprotected Noncombustible	Heavy Timber	Protected Noncombustible 1-hr. rating	Protected Noncombustible 2-hr. rating	Protect. Noncomb. 3-hr.rat.
Group G Industrial & Storage Div. 3	(2) 6,000 (1) 15,000	(3) 10,000 (1) 32,000	(4) 10,000 (1) 48,000	(4) 15,000 (1) 48,000	(6) 24,000 (1) 96,000	(UN) 32,000 (1) 96,000	(UN) 48,000 (1) 96,000

UN means "unlimited"

Figures or letters in brackets refer to storey heights and are shown before the maximum permissible areas in square feet.

Source: City of Vancouver. Building By-law No. 4193. Vancouver: Author, 1967, p. 10 (Part 3).

TABLE 4

HEIGHT AND AREA LIMITATIONS FOR  
OPEN-AIR PARKING GARAGES

Type of Construction	Area (square feet)	Height
Fire-resistive, Type A	Unlimited	Unlimited
Fire-resistive, Type B	45,000 per tier	6 storeys, 7 tiers
Fire-resistive, Type C	30,000 per tier	5 storeys, 6 tiers
Unprotected Noncombustible	18,000 per tier	4 storeys, 5 tiers

Source: City of Vancouver. Building By-law No. 4193.  
Vancouver: Author, 1967, p. 33 (part 3).

air parking garage shall be void of openings unless such wall is provided with not less than a Grade 1 space separation.

(ii) Occupancy Separation

(A) Except as permitted in clause (C) hereof open-air parking garages shall not be permitted above, below, or within any other occupancy.

Open-air parking garages attached to a building used for any other occupancy shall be fully separated from such other occupancy by a wall which provides not less than a Grade 2 construction separation in which all openings are protected by self-closing fire-resistive closures having a fire resistance rating of not less than 2 hours except that where such other occupancy is a theatre, motion picture theatre, Group A school occupancy, Group C school occupancy, or a Group B occupancy the said separation shall have no openings therein. Except as provided for theatres, motion picture theatres, and school occupancies in the next preceding sentence, where the occupancy attached to the open-air parking garage is a Group a, C, D, or E major occupancy the said fire-resistive closures shall be normally in the closed position.

(B) For the purpose of sub-clause (A) of this clause automobile repair work, the servicing of automobiles, and the sale or storage of automobile accessories shall be deemed another type of occupancy.

(C) Offices used exclusively in connection with the operation of an open-air parking garage are permitted. Such offices shall be fully separated from the open-air parking garage by not less than a Grade 1 construction separation in which all openings are protected by self-closing fire resistive closures.

(f) Means of Egress

(i) All open-air parking garages in which the public have access to the parking area shall be provided with means of egress as required by Sub-section 3.4.8. and Section 3.14. of this By-law, for which purpose a roof used for parking shall be deemed to be a floor.

(ii) All open-air parking garages in which the public do not have access to the parking area shall be provided with two means of egress on each floor, which means of egress shall be remote the one from the other.

(g) Shafts and Openings

(i) Subject to the requirements of sub-clauses (b) (iii) and (g)

(ii) of this article, floor openings for shafts and vehicular ramps may be unenclosed.

(ii) Elevators installed in open-air parking garages for the

transportation of the public shall be enclosed as required by Subsection 3.4.12. of this By-law.

(iii) Elevators installed in open-air parking garages for the transportation only of automobiles and of employees need not be enclosed but the lift shaft shall be protected at each storey from floor to ceiling with wire mesh, or other similar material, to the approval of the Building Inspector.

(h) Fire Extinguishing Equipment

Dry standpipes, complying with the requirements of Subsection 6.6.4. of this By-law, shall be installed in all open-air parking garages exceeding 50 feet in height. Open-air parking garages not equipped with standpipes shall be provided with hand fire-extinguishing equipment to the approval of the Fire Chief.



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AUTOMOBILE PARKING GARAGES IN THE DOWNTOWN DISTRICT OF VANCOUVER

TYPES OF GARAGES

- DEPARTMENT STORE
- CENTRAL CORE
- OFFICE-EMPLOYEE
- SPECIALIZED FUNCTIONAL
- HOTEL
- RESIDENTIAL
- PUBLICLY-OPERATED
- PRIVATELY-OPERATED
- PRIVATELY-OPERATED WITH INTERNAL GASOLINE PUMPS
- PRIVATELY-OPERATED WITH INTERNAL SERVICE BAYS
- PRIVATELY-OPERATED WITH INTERNAL GASOLINE PUMPS AND SERVICE BAYS
- P PARKING DISTRICT