

A proposal for a public space system for the downtown area of
Milwaukee, Wisconsin

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Signatures have been redacted for privacy

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CHAPTER 1. INTRODUCTION

The term 'public space' is as old as the term 'city.' Cities provide, and have always provided, facilities for both realms: public and private. People gather together for their basic needs: trade, social interaction, and protection. Over the centuries, cities have undergone natural transformations dictated by social needs. Apparently, these transformations determined the changes in the public realm.

But what is the public realm, what are the principles of public space? Hannah Arendt, in *The Public Realm: The Common*, describes the term 'public' as a space where everything can be seen and heard by others. Secondly, 'public' is common for all of us and is distinguished from 'private.' Roger Scruton, in *Public Space and Classical Vernacular*, defines the 'public' as "a sphere of broad and largely unplanned encounter" where individuals have to subordinate themselves to the existing rules. A 'space,' according to Scruton's definition, refers to the "perceived boundaries, created by human labor," open to public uses.

Physically, public open space would, in general, be identified with urban void; however, the changes which occurred in cities during this century transformed this notion.

Today's cities are criticized by a growing number of city planners. Leon Krier, in his *Outline for a Charta* talks about total destruction of the post-industrial city,

blaming industrial production and “unlimited technical progress,” which have “destroyed in less than two hundred years, those cities and landscapes which had been the result of thousands of years of human labor and intelligence of culture.”

Roger Trancik, in his *Finding Lost Space*, points out that huge areas of underutilized land in contemporary American cities emerged as a result of disorganized development dictated by economic speculation rather than social needs.

Technological advances, especially individual transportation and zoning, resulted in the territorial sprawl of our cities. The interrelation between urban void and urban solid is not balanced anymore. By that lack of balance we have lost one of the prime purposes of architecture, which supposes to ‘heighten the drama of living’ as pointed out by Edmund Bacon in his book *Design of Cities*.

One of the results of such a sprawl is a very high level of energy consumption. Despite technological advances, today’s cities are based on the easiest available energy sources, which, unfortunately, are not renewable. Predictions for the future show that energy policy should be changed. Don Hedley in *World Energy: the Facts and the Future* states that, considering an annual 2.7 per cent increase of world energy demand and proven reserves, by the year 2023 our resources will be gone. The most drastic situation concerns fossil fuel reserves, 80 per cent of which will be consumed by the year 2000. Obviously, the cost of energy, especially that of oil, will rise, while ‘the world’s energy tank’ will run out of its reserves. Individual cars, no longer affordable will have to be supplemented by more efficient, new public transportation systems. The present sprawling trend of our cities will be reversed. The density of cities will increase, particularly within walking distance of

transportation routes. Elimination of great numbers of cars from our streets will result in the changes of inhabitants' needs, their way of life, and further, the shape of cities. We will have to reconstruct our cities, we will need to infill and carefully develop selected open spaces which we lost in the 'automobile age.' There is a good chance for increased social interaction on the new pedestrian streets, squares and plazas. City planners will have to redesign cities to provide spaces that meet peoples' expectations. Roger Trancik, in his earlier mentioned book *Finding Lost Space*, suggests that we have to "reorient our thinking toward centralization rather than dispersion; integration rather than separation." Also, William Whyte, in *City - Rediscovering the Center*, calls for reconstruction of today's downtown, which is supposed to be, as it always has been, a place of significance, a meeting place, and a vital area of social interaction.

Purpose of the Thesis

The purpose of this thesis is to begin the preliminary stages of the process of city planning. In particular this work will investigate the circumstances under which a system of public spaces can be introduced in downtown Milwaukee. There are examples of these attempts in other cities. However, in these examples pedestrianization was usually accomplished by the conversion of existing streets, often the most significant ones, into pedestrian zones; pedestrian circulation itself was not considered as a system. This thesis proposes pedestrian space in downtown areas as a system, using Milwaukee as a case in point, The system will build up the network of streets and squares which, according to Leon Krier's *Outline for a*

Charta, were “verified from millenary culture.” Squares in this system will provide open space for social interaction and entertainment. The streets will communicate with those squares, linking them together into an appropriate network system. Further, it is the purpose of this thesis to analyze the conditions under which the model, outlined above, can be implemented.

Scope of the Thesis

Since critics complain about dying activities in today’s city downtowns the area of this investigation will be the central part of Milwaukee. The process of proposed changes initiated there will be reinforced by already existing activities, a sizeable working population, and historical significance of the area. A system, by its definition, should be expandable; hence possible growing demand for open urban spaces beyond the city center boundaries will be met.

Method

First, the historical transformation of urban space will be examined. The spatial implication of these changes will be investigated and analyzed with regard to social, economic, and cultural issues. Subsequently, several cities will be analyzed as case studies, in order to understand proposed solutions possible. Then, Milwaukee’s circumstances will be introduced and compared with those of case studies. A comparison will facilitate establishment of goals to be achieved by pedestrianization. Proposed solutions, following the future scenario of changes in urban life will be the next stage of this method. The first model will represent a

street level pedestrian grid which will distribute open urban spaces throughout downtown Milwaukee in a rational way. Selected streets will be converted into pedestrian precincts. An intersection of each of those precincts will be a square or plaza. A similar, rational solution will be introduced as a second model. However, the pedestrian streets in this model will be designed in mid-block areas and squares will emerge in the center of the blocks. The third model will develop Olmsted's project for downtown Milwaukee, reinforcing and maintaining existing uses along the streets. Those streets will be converted into pedestrian precincts. The fourth model will be a combination of street level pedestrian system and off-grade circulation network. It is assumed that the existing downtown Milwaukee skywalk system will be extended. Thus the introduction of pedestrian precincts will have to be integrated with skywalks in order to provide multi-level public space. Finally, all generated models will be evaluated according to an earlier established set of goals. Conclusions and recommendations for further studies will end this thesis.

CHAPTER 2. AN URBAN VOID - HISTORICAL CONTEXT

The first cities, defined as communities “of substantial size and population density” (Sjoberg, 1973), arose some 5,500 years ago in Mesopotamia. These cities did not provide a space for the public realm. Later cities in both India and Egypt, erected consciously as a collective and integrated action, did not have in their structure anything resembling a square-like area. The courts attached to temples cannot be considered as public spaces because they were designed as an extension for the religious celebration, and inhabitants had very limited access to those areas. The other spaces adjacent to the houses were private rather than public.

The real squares, understood as such in western civilization, appeared only after 500 B.C. in Greece.

Antiquity: Greece and Rome

Ancient Greek civilization was the first to develop political, social, and sociological conditions for the creation of public spaces.

The Acropolis, originally a fortified place of refuge, later transformed to a seat of rulers, and finally to a sacred place where people gathered together, was the first element of public realm. The irregularly designed area, for reasons of defense rather than aesthetics, became a publicly perceived space, especially later on in the

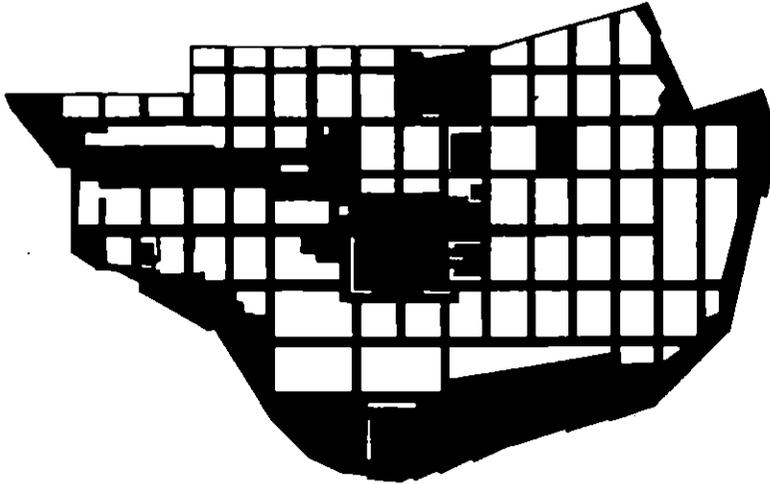


Figure 2.1: Priene in ancient Greece, plan

Hellenistic era.

The agora may be considered a first public domain, a void in the urban fabric or 'a square.' Originally a broad spot on the main street, the agora underwent many transformations according to changes in both the political and economic spheres of life, from trading place at the beginning, to location of public buildings and temples, and finally to the area of civic and political meetings.

Greek squares did not have a sense of a consciously designed space as a whole. They were enclosed areas with discontinuous elevations, broken by incoming streets. The facades of buildings adjacent to agoras were always in relation to the human scale.

Once the first public squares were consciously created in ancient Greece, the next step was to connect them together. The Panathenaic Way played this role. Linking together the most important public spaces in Athens - Acropolis, market place, and Agora - the Panathenaic Way was not only the most significant street in the city, but also represented the first pedestrian system consisting of streets and squares (Bacon, 1974).

The historical roots of the Roman city lead to the Roman castrum. Originally a military camp, it served later as a base for the development of many cities surrounding the Mediterranean Sea. Usually compass oriented, the Roman castrum had some principal elements. Firstly, Decumanas and Cardo were two main streets. Secondly, an urban void at their intersection, a small quadrangular area, was a place where the Principia, the main military buildings, were located. Finally, the iron-grid system of other streets had an angle of 90 degrees.

The further development of Roman towns followed the castrum scheme, as shown in Figure 2.2; however, the influence of Greek cultural heritage was very visible. The fora played the same role in Roman cities as agoras did in Greece. The shapes of fora were more diverse: squares, circles, ellipses, etc. In order to unify the space, Romans used colonnades, which completely surrounded the square. The way the Romans created their cities reflected their sense of hierarchy (Crouch, 1981). The public, commercial, and governmental buildings, located behind the colonnades, were designed on a superhuman scale, to signify the power of the Roman Empire.

Also, the important streets were furnished with continuous rows of columns,

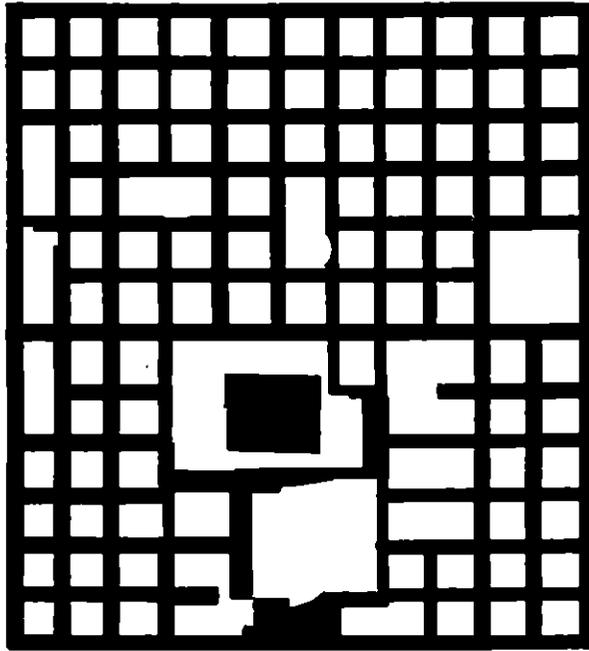


Figure 2.2: Timgad of Roman Empire, plan

and additionally, on the main intersection, by triumphal arches and fountains.

The Roman Empire in its Golden Age was economically successful, which allowed Romans about 180 holidays a year (Crouch, 1981). Taking part in public life was a social obligation for citizens of Rome. In addition to this, the mild Mediterranean climate promoted outdoor activity almost all through the year. All these factors determined the construction of theaters, stadia, baths, libraries and other leisure facilities. All of them were linked by a system of streets much more developed and richer than that in Greece.

Ancient cities of Greece created, for the first time, a public space system consisting of streets and squares providing facilities for vital public life. Romans developed this system according to their needs and their vision of urban design.

Medieval Towns and their Public Spaces

The fall of the Roman Empire froze for centuries the development of cities. In northern Europe most people lived in rural areas. Only in the beginning of the twelfth century did trade begin to flourish among the towns. Richer and richer settlements rose in population. Also, a great number of new towns were founded.

The new function of cities and new way of living had a tremendous influence on urban voids. The huge, superhuman open spaces of the Roman Empire became a network of relatively narrow and small squares, as shown in Figure 2.3.

Each square in the medieval town had a different function: commercial, religious, or defensive. Multi-functional systems of squares became the center of the city and the dominant element of the whole grid. The main interest of medieval

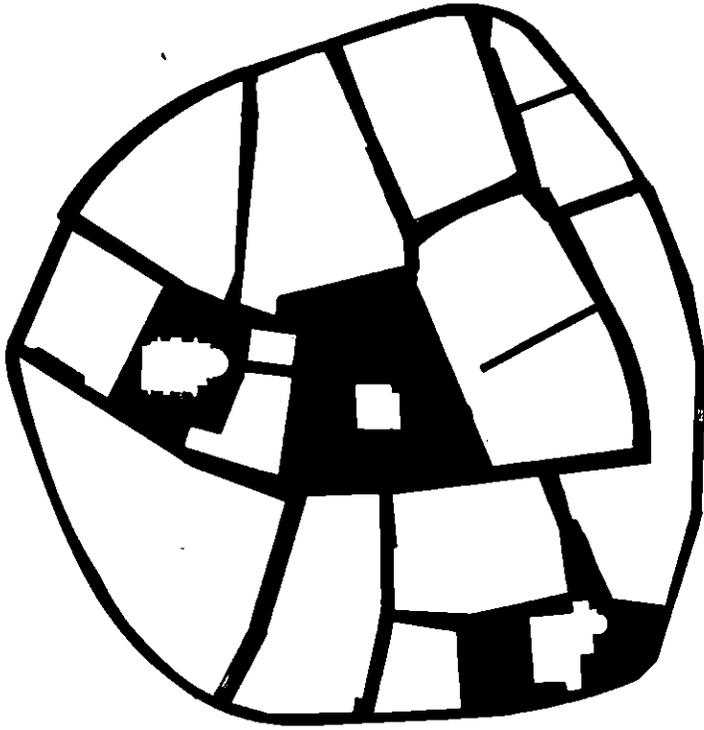


Figure 2.3: Medieval Unicorn, Czechoslovakia, plan

society concerned God, so public life was very connected with the church. Newly founded cathedrals became the central point or parvis, a square in front of the church, where people gathered frequently for religious celebration. The other squares-markets, were used mainly for trade and exchange, civic festivals, dissemination of news, and public punishments.

Apparently, these squares were connected by an appropriate system of streets, which, because of their dimensions, played the role of transportation facilities. Public realm flourished on squares, which were furnished with arcades, steps, staircases and, especially in southern Europe, fountains.

Renaissance Squares and Streets

The beginning of the fifteenth century brought significant changes in Europe. The people, especially artists, began to be more interested in human needs. Ideas and artistic expression came from the study of ancient culture, nature, and science. An entirely new approach to city planning took place at that time. Theoretical thinking considering aesthetic elements led to totally new architectural forms. Now, as shown in Figure 2.4, the cities became more structural and more disciplined (Zucker, 1959).

Leon Baptista Alberti, with his treatises, began conscious city planning. Streets and squares were parts of a system more than ever before. In the center of the city, a square as a focal point was planned. The other squares regularly appeared in the other parts of the town, connected to the main one by a network of perpendicular or radial streets. This shows how strongly the units of a town plan

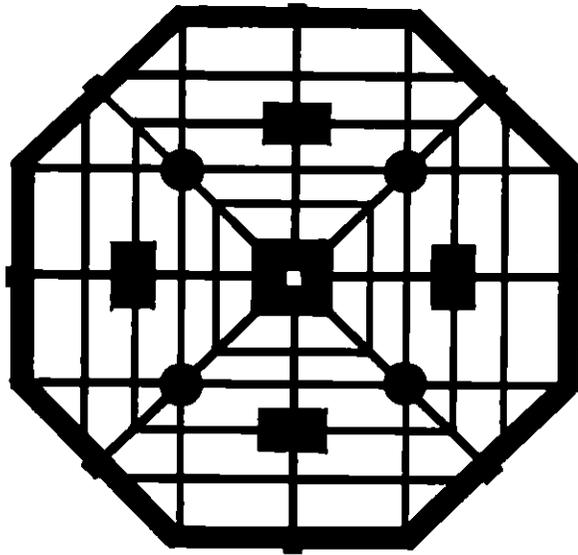


Figure 2.4: Plan for an ideal city by Vasari

were subordinated to the spatial order, how the hierarchy was important in city planning at that time.

The great development of sciences in the Renaissance, especially geometry and mathematics, were important factors in the study of proportion in both town planning and architectural design. Alberti in his treatise gives exact proportions for the square and the height of its surrounding houses.

Very sensitive to beauty, the Renaissance architects furnished squares with such elements as arcades, monuments, and fountains in order to organize the space. The street, which did not have as strong articulation of space as a square, was designed as a volume, linked by rows of heterogeneous, unified buildings. According to Alberti's treatise buildings should be equal in size and their elevations subordinated to similar geometrical subdivisions. The urban void system in the Renaissance was not equal; the streets were in the shadow of squares.

The public space, which in the fifteenth and sixteenth centuries, was a geometrically supported system, obtained a new value: aesthetic consideration.

Development of Urban Open Space during the Seventeenth and Eighteenth Centuries

Few cities were erected during the Renaissance according to an 'ideal plan.' The majority of European cities evolved from their earlier, basically medieval, origin. Quickly growing in population, cities limited in size by defensive walls, very soon became overcrowded, labyrinth-like organisms. In many of them, during the seventeenth and eighteenth centuries, large scale reconstruction works were carried

out, the goal of which was to set up an axial orientation system. These large scale reconstructions helped to create diversified public spaces, providing facilities for a flourishing public life within the city.

In Rome seven votive churches were founded. In order to facilitate numerous pilgrimages to the seat of the papacy and those churches, a new axial system was created. It included some pre-existing streets, as well as newly created ones.

Paris, which had a higher population and density than any other European city, set up its most prominent axis from the Louvre Palace through the Tuileries gardens, through the Place de la Concorde, through the Place de l'Etoile, to the countryside, visually disappearing over the horizon - in infinity. Once the idea of exploding the city and breaking the wall had been implemented, axes and extensions were added.

The most significant urban innovation during the seventeenth and eighteenth centuries in Rome, Paris, and many other European cities, was the implementation of the multiaxial system of streets and boulevards connecting the network of public and royal squares, palaces, and other important buildings and, also, for the first time, parks. Town planning and landscaping became, especially in Paris, very interrelated (Zucker, 1959).

During the Baroque and Classicist periods rose the role of streets, particularly of axial boulevards and parks, as new elements of urban void.

While furnishing the public space, architects used the following: fountains (Fontana di Trevi, Rome), stairs (Spanish Steps, Rome), arcades, obelisks, statues, arches (The Triumphal Arch), and for the first time, trees. Trees can be found from

the seventeenth century on streets and squares as elements of decorative composition. The axes, newly created in the cities, were often lined by rows of trees.

The axial order of main boulevards was in opposition, especially later on in Baroque and Rococo, to the dynamic composition of squares (see Figure 2.5). Looking like accidental settings, they were consciously designed in order to bring an effect of dramatization (Zucker, 1959).

Influence of the Industrial Revolution

From the beginning of the nineteenth century, technical progress caused rapid growth of cities. New factories needed workers, giving an opportunity for a better life to peasants living in overcrowded rural areas. Thus began the period in history called the Industrial Revolution.

New means of communication like the railway and street-train and later, the bus brought territorial expansion of towns. Factories and enterprises appeared in cities in large numbers. A new ring of urban development, usually unplanned, consisting of low-cost housing mixed with railway yards, storage sheds and factories became part of the extended city.

The continuous demand for administrative and commercial buildings in the city center caused a rise in land prices.

The city authorities, in order to control the situation, had to establish a code of building by-laws. The urban void in industrial cities was not a subject of aesthetic planning. The common planning pattern for these cities in both Europe and America was basically a rectangular grid, extremely functional and extremely

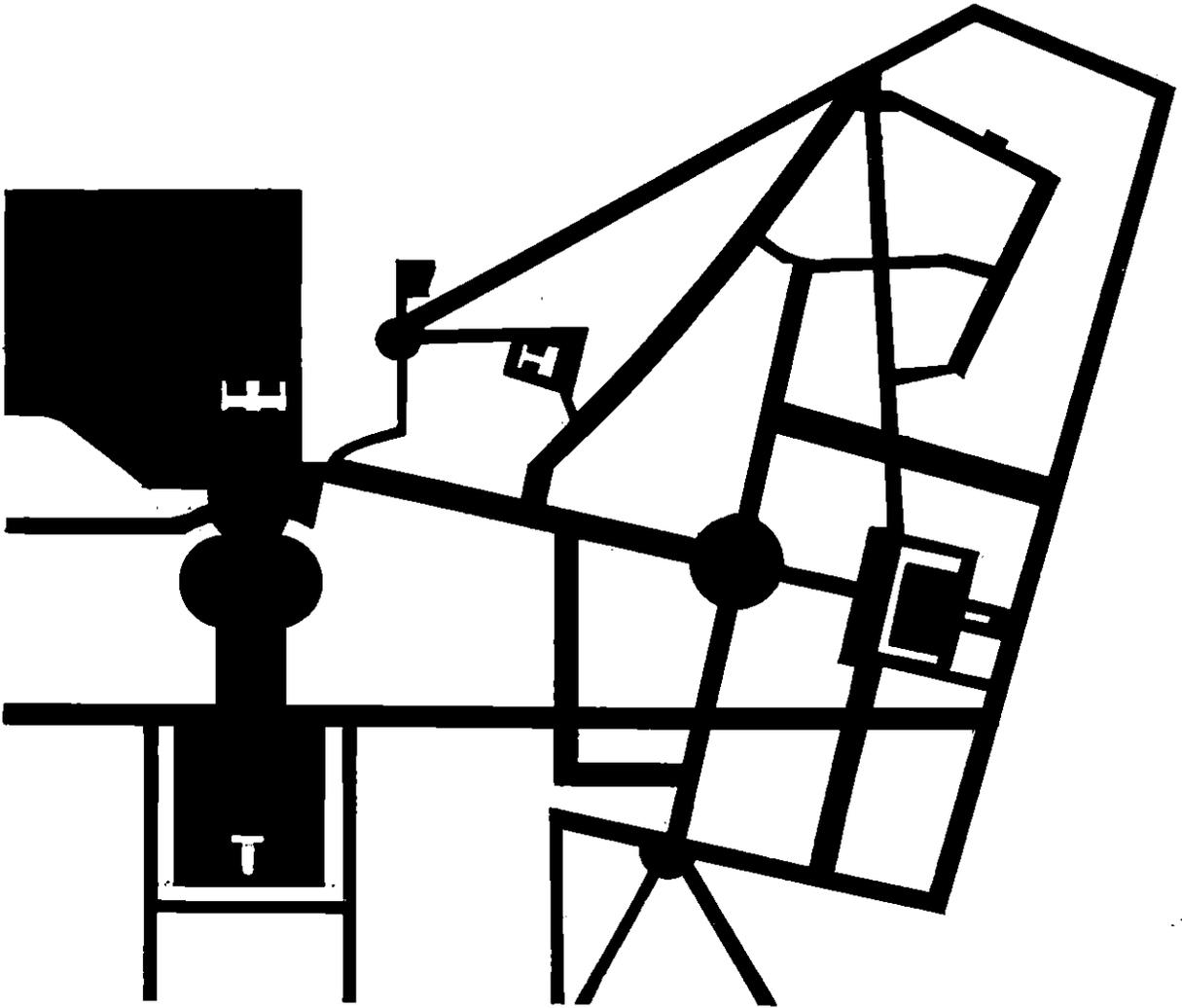


Figure 2.5: Ludwiglust in Germany, plan

regular. The cities lost their hierarchy. Not only were the newly created cities built that way, but the older towns, originally from the Middle Ages or Renaissance, were also extended on the grid pattern to facilitate rapid growth.

The very functional streets became more and more crowded, especially when mass transportation serving commuters was introduced. The furnishing of streets, even very simply, could hardly be found. Squares, because of high land value, were rarely designed.

The only elements of urban void frequently planned in industrial cities were parks. Territorial expansion of cities did not allowed inhabitants to enjoy countryside recreation, which caused a demand for inner green space.

During the Industrial Revolution open urban space started to lose a public life. The streets became a part of the transportation system rather than a place for socializing. Squares were almost nonexistent, except for those of earlier, e.g., medieval, origin and were not 'public' anymore. Only parks, especially on Sundays, were crowded, shifting the social life from urban fabric to recreational areas.

The 'Automobile Age' and Public Space in the Cities

One of the most significant inventions of technical progress was the motor vehicle. Its impact on city development and particularly on urban open spaces was extensive. The car was a factor which caused degeneration and decay not only in the city center but also in the inner ring of communities. The hierarchy of the city fabric existing in towns for thousands of years was lost. Churches and other public edifices became visually submerged by the other buildings representing, according to

L. Krier's *Outline for Charta*, an 'empire of money.' Downtowns were turned into night-time deserts, because nobody lived there anymore (Johnson-Marshall, 1966).

Without doubt the individual motor vehicle won over the pedestrian in the battle of streets. Pedestrians were pushed out to the sidewalks. In older towns the narrow streets became dangerous because of fast traffic, and were usually overcrowded. The new streets, designed wide enough for automobiles, were too wide for pedestrians and did not bring the some sense of contact as sidewalks. In many cities, particularly in the most developed countries, people simply disappeared from the streets. Streets could no longer be a public realm, they became elements of high speed transportation systems. In the twentieth century, freeways and expressways replaced the streets, originally the space of public life.

Squares, seen as a potential distortion of traffic movement, were rarely designed in connection to the streets in this 'automobile age.' Now called 'malls,' squares have been moved to the suburban areas, covered by roofs, and equipped with air conditioning systems, in order to provide a 'controlled environment.'

The high price of land and the factor of 'mobility' reduced the number of parks in cities, especially in downtowns. The easiest and cheapest way to enhance the standard of transportation systems was to convert them into freeways or parking lots.

The same happened, especially in North America, to urban blocks. A great number of them were converted to transportation facilities: ramps, surface lots, and freeways. Downtowns started to lose their historical character as the city center.

This method of city development is widely criticized among urban planners.

Many of them talk about the collapse of urban design (Johnson-Marshall, 1966) and about the loss of public realm (Scruton, 1987).

CHAPTER 3. SELECTED CASE STUDIES

Recently, many cities have turned their attention to pedestrianization, hoping to solve the problems which had arisen as effects of the 'automobile age.' These attempts represent a wide range of approaches, according to local situations, which vary from each other; however, the most common pattern is a conversion of one or more significant street into a pedestrian zone.

For the purpose of this thesis, several examples of pedestrianized city centers have been examined. As case studies, those cities were selected where a pedestrian system as a network was either introduced or designed:

- Leeds, United Kingdom
- The Hague, Netherlands
- Minneapolis, United States
- Santiago, Chile

Some cities in the United States have converted streets to walkways or limited vehicular traffic in the downtown district, but there is no example of a pedestrian system as a network of open public space so far. For the purpose of this thesis a

combination of pedestrian street and system of upper level skywalks in Minneapolis will be examined as it is close to the study model.

Case Study Number One: Pedestrian System in Leeds, United Kingdom

General Information

The city of Leeds is the main part of a central-western conurbation consisting of several British cities, located on the western coast of the island. The current population of the city is 710,000 people. The total area covers 160 sq. km. As is typical of European cities today, the downtown occupies the oldest part of Leeds on an area of 2.5 sq. km. The city center consists of a commercial area with offices in the west and shopping in the east. Industry can be found south of the downtown. The average density in the city is 4,440 person per sq. km.

Traffic Problems in the Downtown Area

Transportation in Leeds, as well as in many other British cities, is based essentially on both the road and the train systems.

Thirteen radial roads, serving commuters from the predominantly residential suburbs and from the outlying regions, are connected by the inner ring surrounding the city center. This system, consisting of buses and mini buses, serves both private cars and public transportation. Despite constant modernization of this network, overloaded roads often produce a traffic jam in the center of the city, especially at peak periods. Shortage of parking space frequently creates serious transportation problems. The newly developed road system is coordinated with car parking

structures, especially in the central area.

Through traffic policy As mentioned before, an inner ring road was introduced at the edge of the city core. This solution, typical of many European cities, was supposed to serve the city center and limit access to the overloaded inner road network. In order to meet through traffic demand, the ring was connected to the national motorway system.

Traffic within downtown The inner ring road is a natural boundary for the central area. It also integrates with the radial streets in order to provide the most efficient connections to the city core. The area within this boundary, especially in the commercial district where the pedestrian system has been introduced, is limited to private car, short stay parkers. Public transport and essential services are allowed to enter this zone only during certain hours.

Parking system An insufficient parking system has been developed, along with a pedestrian network. Near the central retail area, 8,000 short stay parking spaces were introduced. The other 18,000 spaces can be found within the inner ring, mostly in the multi-story structures at walking distance from the pedestrian network.

Public mass-transport Public transport in downtown Leeds, as a major system, carries nearly 70 per cent of every day journeys. In addition to the regular stopping bus service, also operating is an express bus providing non-stop transportation between certain suburbs and the city center. A highly developed train system serves commuters from both the region and the outer suburbs to downtown. Railway and central bus stations in the city core are connected by the

other mini bus system. In low density suburbs, car park interchanges have been established for park-and-ride connections.

The Pedestrian System

The city authorities decided to maintain and preserve the civic character of the city core by improvement, rather than by reconstruction or redevelopment, of existing buildings. This method of intervention required some major changes in the transportation system, not only in the area adjacent to the pedestrian network but also in the whole city.

The streets were progressively converted to pedestrianized precincts in two stages. There are also plans to superimpose another pedestrian system of upper level walkways in order to enhance a city space free from vehicular traffic.

Pedestrianization in this area was seen as a part of the city center's redevelopment. New constructions in this precinct were carefully integrated into the newly created scheme.

Location in the downtown area The pedestrian network in Leeds, called 'Golden Square Mile' is located in the central part of the city core between the city railway station and the main bus station. The core of the system is Commercial Street, an old, curving street which has served as a main shopping area in Leeds for several years now. The other elements of this system are smaller streets located east of the main one. The total length of the whole network is 1.200 meters. Devoted again to pedestrians, the walkways have a width of 9 to 12 meters.

Land use Basically, the pedestrian network is a main shopping area for the

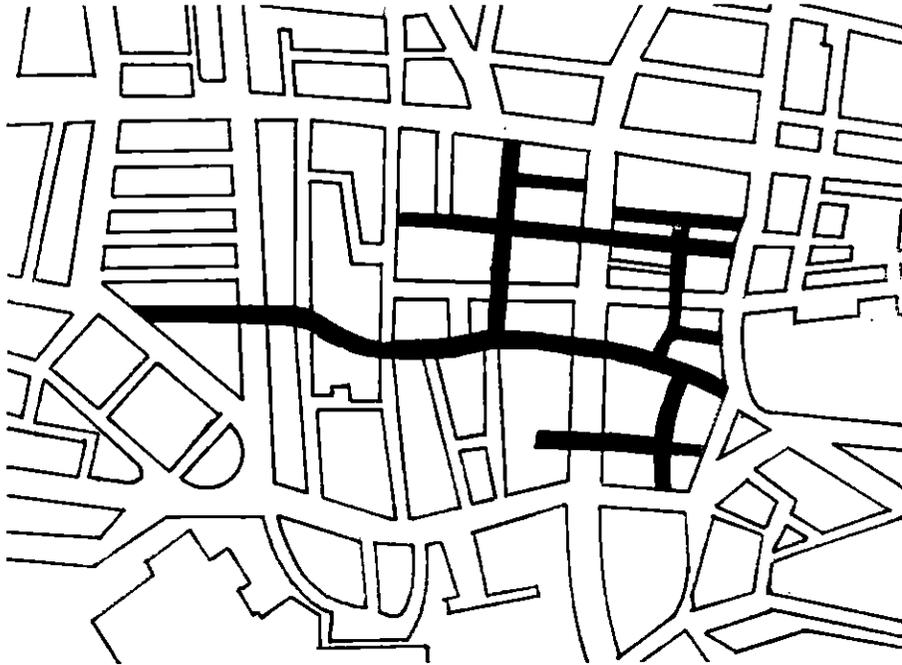


Figure 3.1: The scheme of pedestrianization for Leeds, United Kingdom

city and for the region. The western part touches the business area of the city. Because of the historical heritage of Leeds, several buildings of architectural interest can be found in this part of the city.

The scheme of pedestrianization The original layout of streets, typical for European cities, did not allow complete removal of vehicular traffic from the pedestrian network. Lack of rear access and difficulties with the introduction of such facilities forced the authorities to permit delivery services to use the converted system, but only during the night hours. The scheme of pedestrianization is shown in Figure 3.1.

Problems and opportunities The major problem is still accessibility.

The drivers are continuously looking for space to park, and the parking system introduced seems to be insufficient. Also, delivery vehicles which use the pedestrian system produce frequent collisions with walking people.

However, the introduction of a pedestrian network can be considered successful. There are always people shopping, walking, or sitting on benches. Also successful are the department stores in the precinct, which increased their turnover significantly in comparison to similar places in other parts of the city. There is continuous pressure on the authorities from other traders requesting development of a pedestrian network for an adjoining area.

Discussion

Leeds represents a typical European approach to the problem of pedestrianization for the city center of medieval origin. Very irregular networks of streets, small blocks, and high density urban fabric led to gradually declining possibilities to respond to the growing transportation problems. The decision to convert some of the central downtown streets to pedestrian walkways was made at the time when pedestrianization was considered as the best solution for restructuring overloaded city cores. Conversion of downtown streets back to their original function as pedestrian walkways, which function had dominated for hundreds of years, was easy to apply to the narrow, old streets. Current needs of the city at the time required an appropriate transportation solution which, in the case of Leeds, took the form of a pedestrianization process. An excellent idea was to develop that system between Railway City Station and Central Bus Station.

The chances were, as has proven to be the case, that commuters would rely more and more on the public mass system consisting of train, bus, and mini-bus coursing between those two stations, and passing through the pedestrianized precinct.

A very unusual solution is the creation of a network instead of only the more common pedestrian pattern of one walkway. A network allows for extension of shop frontages and the intensification of downtown use. Also, it facilitates the linkage of public buildings and open places. Thus, the revitalization process can be done on a broader scale resulting in more coherent re-construction of downtown. Condensed functions located within walking distance attract users more, especially tourists, who usually have to rely on public transportation. A network of pedestrian streets as a design pattern causes even more troubles for both designers and city authorities and is also more expensive, but the final result is highly appropriate for such a compact downtown as that in Leeds.

The conversion of streets of previously vehicular traffic to walkways always causes delivery problems for businesses located on these streets. Introduction of another 'delivery system' is very expensive and sometimes even impossible without large scale demolition. The alternative, utilizing limited time access of delivery vehicles, causes pedestrian-vehicular conflict and produces pollution, thus diminishing the advantage of creating a pedestrian precinct.

Considering weather conditions, the decision to develop an upper level of skywalks seems to be controversial. The mild climate of England does not necessitate the movement of pedestrians to covered spaces, even during the months of extreme temperature. The model of pedestrianization introduced here generates

one possible solution for downtown Milwaukee - the conversion of historically significant streets into pedestrian precincts in the form of a system.

Case Study Number Two: Pedestrian System in The Hague, Netherlands

General Information

The city of The Hague is located near the North Sea shore. With its population of 444,000 people and as the main part of a larger agglomeration of 1,000,000 inhabitants, The Hague remains the political center of Holland. In addition to governmental and commercial uses, there are also international offices and the famous International Court. The attractive location close to the water causes a large amount of tourist traffic, especially in the summer. The total area covered by the agglomeration is 100 sq. km., which results in an average density of 10,000 inhabitants per sq. km. The central area of the city, consisting of shops and places of entertainment, is surrounded by a recently finished motorway.

Traffic Problems in the Downtown Area

The population density in The Hague, as well as in many other cities in the Netherlands, is among the highest in Europe. In addition, high ownership of cars and the medieval origins of the city center cause a high level of vehicular congestion, especially during rush hours, a phenomenon very common in larger European cities.

The public transportation system consists of: railway trains, trams, and buses.

Several parking lots are scattered throughout the city center, but the number

is still insufficient.

Through traffic policy A recently finished motorway system surrounding the downtown area protects the inner part from through traffic effectively. Also, this inner ring is connected to the national road system.

Traffic within downtown The inner 'box' of the motorway became a boundary significantly larger in size than that of Leeds. The secondary system of roads was distinguished within the central part of the city, in order to facilitate inner transportation. Most of the streets in downtown, except for these pedestrianized ones, are accessible for individual cars; however, parking there is limited to short stay only.

The central railway station is located in the core of the city and serves commuters from outer suburban areas.

Access to the pedestrian network is limited to emergency vehicles only. Buses and essential delivery cars can enter this zone from midnight until 11 am.

Parking system The streets involved in the pedestrianization process never have been capable of accommodating heavy vehicular traffic. The conversion of those narrow streets of medieval origin to pedestrian zones did not affect traffic flow significantly. Also, the central parking system has not been reduced; however, creation of a new attractive network of pedestrian-only routes required even more parking facilities nearby. The city authorities established as a rule 200 meters walking distance from a parking lot to the nearest point of the pedestrian system. Conforming to this requirement, an appropriate parking system has been designed within a city ring. Some 2,700 parking places support the system in both

multi-story constructions and on-street locations controlled by meters. The other lots can be found in connection with the inner ring road.

Public mass-transport There are three main means of public transportation to serve commuters in The Hague. The inhabitants of the outer parts of the agglomeration travel by train. Within downtown the city authorities developed both a bus and a tram system. Recently, the decision was made to transform and improve the tram service. A new semi-underground network of trams has been designed to avoid traffic congestion. Two major lines will connect the railway station and the city center with the periphery of downtown. An expected effect of this improvement is to diminish the individual car traffic in the center. A faster and non-collision train will be competitive with private transportation.

The Pedestrian System

Until recently the commercial activities had declined in downtown The Hague. More competitive suburban stores attracted more customers than those in the city center. In addition, the difficult transportation within the city core diminished the number of shoppers significantly.

The other objective of the pedestrianization process was to improve the city fabric and environment of the center.

The pedestrianization took place in two stages. New construction accompanying that process, especially those of commercial and entertainment functions, attracted people back to downtown.

Location in downtown The area involved in the process of

pedestrianization consists of a few streets and two squares of the central part of the city core. The total length of the network is 2.7 km. The width of those old streets varies from 6 to 15 meters. The scheme also incorporates three covered arcades from the nineteenth century, serving traditionally as a shopping area.

The scheme of pedestrianization As mentioned before, the scheme of pedestrianization consists of a few central streets and two adjacent squares. Each entry to the network provides an excellent facility for resting or for meeting somebody in any of the small coffee shops located nearby. Also, little openings or squares were designed in front of those entries. The walkways have been re-paved and some street furniture was added to fit the different use of the space.

The Hague, like Leeds, was not able to provide a separate delivery system to the department stores facing pedestrian streets. That is why city authorities decided to allow overnight access to necessary services. Also, the total removal of vehicular traffic from some of the central streets caused the higher congestion of cars on nearby streets. The pedestrianization scheme is shown in Figure 3.2.

Results: problems and opportunities Some of the department stores did find difficulties operating in pedestrian zones and had to be replaced by other functions. Finally, this sector was reduced. Also, doubts about extension of the network have been realised after a few years of the systems' operation. But in general, the pedestrianization of the city center can be considered as successful.

The commercial activities in the pedestrian precinct were revitalized. The measure of appropriateness of this decision is constant pressure from other adjacent districts to extend the original system.

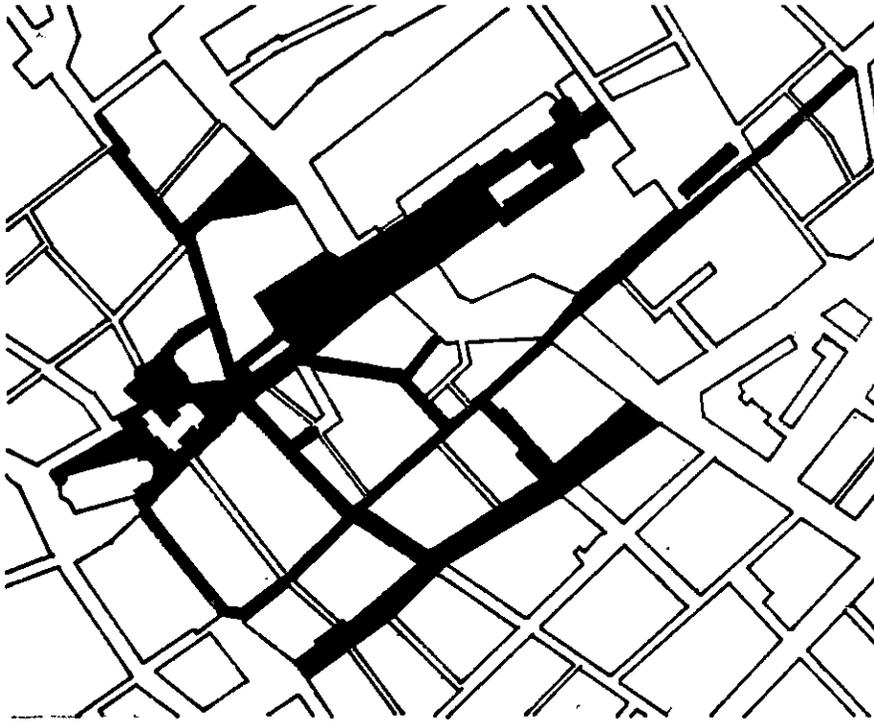


Figure 3.2: Scheme of pedestrianization for The Hague

Capacity of the network seems to be adequate because it is busy on the streets every day from noon until late evening.

The environment has been greatly improved since traffic removal. Flourishing businesses have improved the greater part of the buildings within the pedestrian zone. The new precinct is a visual attraction for both tourists and inhabitants.

Discussion

The city of The Hague represents a solution similar to that of Leeds. The same old European origin of the city, relatively similar political and social order, as well as economical development, all caused typical problems. Also, the solution appeared at the same time. Here, as in Leeds, a carefully selected part of the old town has been converted back to the original function. In terms of physical measures of extremely narrow streets, the decision made in The Hague seems to be even more appropriate. There are obvious differences. The Hague, as well as all of Holland is more densely populated than Leeds and the United Kingdom. The continuous lack of land has been felt by the Dutch people for centuries, resulting in the construction of a huge system of dams, which allowed them to enhance their rural area greatly. The population density in The Hague is approximately three times higher than that of Leeds. Certainly, this is one of the factors determining successful pedestrianization in the Netherlands. Also, high density along with high ownership of cars means that individual transportation is no longer reliable so that a public system is more likely to be accepted.

The urban structure of The Hague differs from that of Leeds. The area within

the inner ring is significantly larger, and more densely inhabited.

The system also suffers from insufficient accessibility of delivery and emergency vehicles, especially in the city core, which problem is exacerbated by the medieval origin of the streets.

The improvement of many buildings and the progressive revitalization of city center activities prove how appropriate has been this decision, made by city authorities. It is certainly one of the most highly rated public open space networks in Europe (Thorne, 1973). The reinforcement of already existing uses along with the conversion of streets into pedestrian precincts as accomplished in The Hague shows another possible method of pedestrianization. It is very appropriate for Milwaukee considering Olmsted's earlier attempts to establish 'functional strips' in the downtown, which will emerge as a multi-functional network of pedestrian precincts.

Case Study Number Three: Two Level Pedestrian System in Minneapolis, Minnesota, United States

There are no examples of pedestrian networks on the street level in the United States. In this country, since the early 1970s, a different pattern for pedestrianization has been utilized. Due to many factors: high dependency on individual transportation, extreme weather conditions, and social and economic determinants, a very common model was developed: an upper level skywalk network crossing the streets above the roofs of cars and penetrating buildings in the mid-block areas. There are also the streets which, in addition to those upper level

systems, were successfully converted to pedestrian zones.

One of those cities, Minneapolis, Minnesota, has been selected as a case study.

General Information about the City

The city of Minneapolis is a part of a bigger agglomeration. Together with its twin city Saint Paul and several smaller towns it has about 2,000,000 inhabitants. The city itself covers an area of 161 sq km and with a population of 434,000 has a relatively low level of density - 2,700 person per sq km. The Minneapolis metropolitan area is one of the largest among midwestern cities. It serves as a center of education, recreation, tourism, finance, and commerce. A recently introduced large and highly developed technology industry is dominating other branches of its economy.

The Mississippi river in the center of the city orients the street pattern. Also, 22 lakes are located within the city limits.

Physically, the city core has a triangular shape and is encircled by three freeways.

Traffic Problems in the Downtown Area

Like most American cities, the system of transportation in Minneapolis is based mainly on roads and streets.

The railway network there is highly developed but, in the last 30 years, has been underutilized. In the past the city served as an important connector in the mid-western region. Some of the main routes are located along the Mississippi

River, between the city core and waterfront. Also, there are two railroad stations.

The bus network covers the whole agglomeration serving commuters of both Minneapolis and St. Paul. There are plans to introduce a new rapid system with subway routes.

But still the individual car remains the major transportation mode in the city. High ownership of cars, traffic congestion, and shortage of parking space represent major problems for the center of Minneapolis.

Through traffic policy The city center is surrounded by an inner ring of freeways, which eliminates heavy through-traffic from downtown. Also, it connects the core of the city with the national network of interstates as well as with the state system of freeways and highways.

Traffic within downtown The central streets of Minneapolis represent a typical midwestern layout. The physical dimensions of transportation corridors are very similar. Unlike in most European cities, there is no hierarchy of streets. One street only, the Nicollet Mall is excluded from vehicular traffic except for buses, taxis, emergency cars, and essential services.

The congestion of traffic in downtown is caused mainly by individual cars, which carry workers to the city center, workplace of about 33 per cent of the total working population in the region. Hence, most of the streets exceed their maximum capacity, especially during peak hours.

Two freeways, one south and the other one west of the inner ring, are extended beyond the expressways - natural city boundaries - in order to provide easier access to the city core.

Parking system The parking system in downtown Minneapolis consists of several multi-story ramps and short stay parking lots controlled by meters. The total number of parking spaces is 55,000, which is still insufficient to meet the constantly growing demand.

Public transportation As in most large American cities the 'home to work trip' is mostly accomplished by private car. This system carries in the central area about 70 per cent of total numbers of commuters; remaining 30 per cent travel by the public transportation system. Bus shelters, in order to provide weather protection, are heated during winter months. The city authorities are discussing the implementation of a rapid transit system which will connect both downtowns of the twin cities, as well as the center of Minneapolis with its outer suburbs. It will be basically a surface rapid train consisting of two axes forming a cross beneath the downtown area. The system is planned to be integrated with existing railway routes.

The Pedestrian Network

As pointed out earlier, no American cities have introduced a pedestrian system as a network by converting the existing streets to walkways. In 28 cities, in both the United States and Canada (Survey of the City of Saint Paul, Minnesota, Department of Planning and Urban Development, 1986), off-grade, separated circulation systems have been created. Minneapolis has built one of them. Hence, pedestrianization in this city will be analyzed as a system consisting of Nicollet Mall and a network of skywalks.

Location in downtown area The whole two-level system is located in the city core. Currently, more than thirty blocks are linked by the network of skywalks. Nicollet Mall seems to be an axis of this network.

The enclosed space nearby IDS Tower, which has direct access from a pedestrian street, serves as a center of the whole system. A multi-story lobby covered by a roof made of transparent plexiglas is an orientation point as well as an intersection of all four directions of the upper system.

Land use The city core, along with several suburban malls, is a main commercial area of the city. There are a number of small retail businesses, coffee shops, bars, hotels, and entertainment enterprises. The skywalk system involves department stores, as well as boutique-type shops, and several offices of both commercial and governmental uses. It is worth mentioning that introduction of the skywalk system affected ground level frontages of the streets. Most of the businesses moved to the upper level, and those streets, except for Nicollet Mall, became abandoned by pedestrians, especially during the extreme temperature seasons (severe winter and hot, humid summer).

The pedestrianization scheme The Nicollet Mall was a central street of Minneapolis, highly congested by both pedestrian and vehicular traffic. According to a master plan, the revitalization of a city center should compact the dispersed elements of metropolitan sprawl by linking them together in a pedestrian system.

The city center was supposed to become a regional center for specialized goods and services, served by an extensive and sophisticated public transportation system that can provide a level of service competitive to the private car (Thorne, 1974).

It was understood that a new rapid transit system can only reduce, not eliminate, the problem of high traffic congestion; therefore at the fringes of the downtown about 20,000 additional parking places were designed to meet the total demand. All of them were connected to the freeway network on the one side and to the skywalk system on the other. An unavoidable shift in vehicular traffic, after excluding the Nicollet Mall, was also anticipated, and a scheme for re-routing the traffic has been prepared.

It is important to underline that city authorities from the very beginning were looking for a balanced system - a proper combination of mass-transportation and individual car.

Currently, pedestrian circulation occupies street level (Nicollet Mall) and second story level (skywalk system). Introduction of a subway is intended to develop an underground level.

The Nicollet Mall is a 25 meter wide street with a meandering carriageway for buses and essential services in the middle. The buildings located along this street represent a wide diversity of scale and architectural value.

The Nicollet scheme was designed by Lawrence Halprin to achieve a high aesthetic effect by using color and light, introducing details perceptible to pedestrians, and curving the transitway. New re-paved walkways have been provided with heating in order to melt snow in the winter.

The skywalk system consists of several bridges and interior mid-block walkways existing on the second floor level. The average width of these inner pedestrian paths is from 6 to 8 meters. Two of the bridges cross Nicollet Mall.

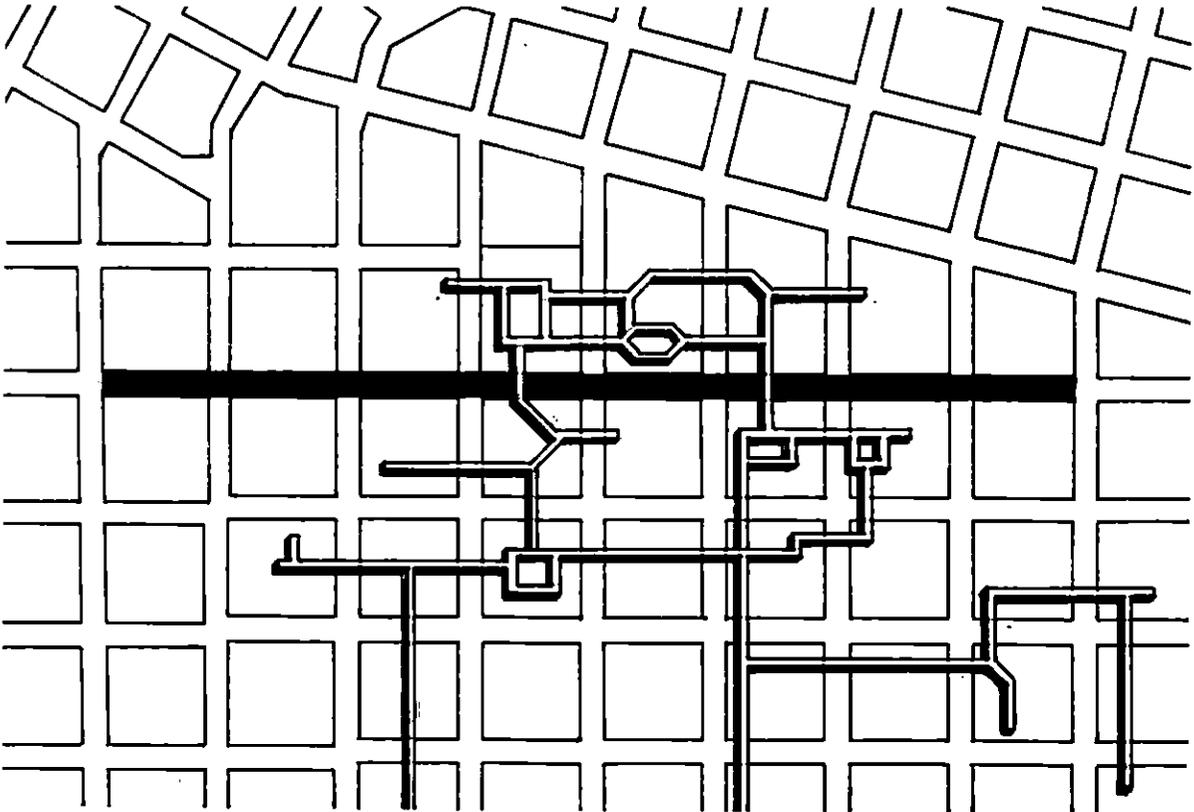


Figure 3.3: Two-level pedestrian system in Minneapolis, Minnesota

The off-grade system is very irregular, which is determined by the different functions of existing mid-block buildings. The scheme of pedestrianization is shown in Figure 3.3.

Problems and opportunities The introduction of both the Nicollet Mall and skywalk system is considered to be one of the most successful of this kind of network in the United States. The changes in traffic congestion have reduced pollution downtown. The dispersing process of central activities has been stopped

partially. Strong linkage between the central blocks, manifested physically by the bridges connecting them, keeps the city center condensed. The nearby streets also improved their standard, waiting to join the main network while the skywalk system is continuously developed. To keep the city alive after work hours, the introduction of housing on a broader scale would be very useful. The delay in providing a public transportation system has resulted in more difficult access to the downtown area than was expected originally.

Discussion

The Minneapolis two-level pedestrian system is a common American approach to the revitalization of city centers; however, the skywalk system alone is the more usual way of solving this problem than that of open public space. To avoid pollution, pedestrian and vehicle collisions, or weather inconvenience, more and more city authorities are introducing second level circulation systems. Unexpectedly, the second floor skywalks are causing new problems. One of them is reduction, or even abandonment, of street level activities.

Minneapolis, mainly because of its Nicollet Mall, is widely regarded as having made a successful transformation of its city center. The streets are recognized as "elegant and urban" and "one of the nicest places in downtown" (Thorne, 1973).

Introduction of rapid transit transportation, which will happen sooner or later, is going to reinforce the whole pedestrian network. It will result in the environment being improved even more than it was by pedestrianization. It will also reduce traffic problems, and, most importantly, increase accessibility to city center

activities.

At this point one issue should be underlined: Minneapolis is among the coldest cities in this country. Despite the relatively low number of days with weather convenient for pedestrians, the Nicollet Mall is visited by people almost every day. It supports the appropriateness of creating open urban spaces in American cities, the lack of which is very visible. The analysis of case study - Minneapolis generates another model for Milwaukee: a combination of open public spaces and skywalks. The skywalk system exists in downtown Milwaukee already. Assuming its further expansion an above ground circulation network will be superimposed on the pedestrian precincts creating multi-level and a multi-functional public space system.

Case Study Number Four: Design of Pedestrian System for Santiago, Chile

Santiago is the governmental, cultural, and industrial center of Chile. This capital of the nation and largest city is inhabited by almost 50 per cent of the country's total population. Since the beginning of the twentieth century, the city has developed very fast. Its current population of 4,700,000 people places the agglomeration of Santiago among the largest cities in South America. The area covered by the Greater Santiago is about 567 sq. km. Hence, the average population density is 8,300 inhabitants per sq. km.

The city, founded in the middle of sixteenth century, was set on a regular, square grid and for years, limited by its natural boundaries, the Mapocho River on

the north, the Canada River on the south, and the Cerro Santa Lucia on the east, was able to extend itself only to the west. From the beginning of the twentieth century, an enormous growth in population, along with the introduction of different modes of transportation, generated problems. In the late 1950s the upper and middle classes started to move from the city center, which was highly congested by vehicular traffic and no longer liveable, to the eastern suburbs. Later, in the 1960s a highway system was constructed along the west edge of downtown. Despite the huge extension of agglomeration, the city core still has "the most pronounced historical character" and retains symbolic importance as the 'mother city' (Halasz and Underhill, 1979).

Traffic Problems in the Downtown Area

Originally, the city of Santiago had been set on a regular square grid. Later this consistent pattern was broken. A radial-concentric, irregular road model was superimposed upon the grid and further development of new suburbs followed these highways.

The city transportation system consists of a street network, underground subway and railway.

Greater Santiago is surrounded by an inner loop, which connects several radial highways. An inner central ring does not exist in Santiago; however, the Norte-Sur highway and the other two streets, one along the Mapocho River and the other one along the Canada River, together play this role for the city core.

Except for private cars, a developed bus system serves commuters in the city,

linking outer suburbs with downtown. Also, several subway routes either exist already or are under construction. Four major lines cross the city center. The train system stays out of the downtown area but is integrated with the subway network. The parking provision in downtown is insufficient and disorganized. Abandonment of the city center by inhabitants and development of a business sector instead has caused high demand for parking lots.

Through traffic policy The city of Santiago, unlike the European examples, did not form an inner ring in order to protect the city center from through traffic. There is a huge ring surrounding almost the whole agglomeration, except for some newly constructed suburban areas and a connecting international airport, but this ring was introduced to avoid heavy traffic through the whole city rather than to protect the city center. Finished in 1965, the Norte-Sur highway became, as mentioned before, a last link of the system, which finally defined and surrounded the city core.

Traffic within downtown The regular grid existing within the central area did not distinguish any particular street as a main traffic corridor. The equal physical dimensions of the streets determined similar capacities to deal with car flow. The slight differences were created by distribution of meaningful buildings and their complexes, but still, the street network is rather even. In general, according to research done by Halasz and Underhill, the busiest are the streets located in the eastern and western parts of the city core, the places of commercial and shopping activities.

Parking system As mentioned earlier, the parking system is insufficient in

the downtown area. Most of the parking lots are connected with either governmental edifices, public buildings, or commercial complexes. Some of them are in multi-story structures or in the lower levels of buildings. Cars are allowed to park along some of the central streets, but for a short stay only.

Public mass-transport There are two main means of public transport operating in Santiago. First is the bus system, which has served inhabitants of the whole agglomeration for several years now. Second is the subway system, which is continuously being expanded and developed. Both of the main axes of the network are located beneath the city center.

Two major train stations are located about 2.0 km from the city core. This system, integrated with the subway, also serves commuters from the outer parts of the city.

The Pedestrian System

In 1978 the Catholic University of Chile and city authorities of Santiago invited two American architects, Imre Halasz and Michael Underhill, to conduct a design for the city center, which was suffering from extreme congestion caused by the rapid growth of Santiago. According to the designers' professional credo an intervention in the city core should be neither "surgical nor cosmetic" (Halasz and Underhill 1979). Through observation of how the city center was used by inhabitants and by selection of 'strong points' of the city, they determined a point of departure for the task.

During the nineteenth and twentieth centuries two new urban elements

penetrating mid-block areas appeared in the city core: 'pasajes' and short dead end streets. These enhanced the frontage of quickly growing commercial facilities. The number of 'pasajes' in the city core had grown over the years up to 26 by the year of 1979, when the project was completed. Some of the new design proposals developed 'pasajes' on three levels to multiply commercial frontage.

One of the main objectives of the project was accessibility within the city core. A balance between both pedestrian and vehicular accesses was set up as a rule in order to avoid "over-specialization and economic specialization" (Halasz and Underhill, 1979) in the center.

The pedestrian network was designed in connection with a transformed and developed public transportation system. Bus lines would have been adjusted to the new pedestrian model. Also, the subway system within the city core consisting of three major routes, was to provide convenient access to the designated area.

The main idea of pedestrianization was to connect existing randomly distributed 'pasajes' and develop them in a three dimensional mid-block network. Rows of blocks for this system were selected according to current use, system of public transportation and layout of historically important buildings - landmarks, as well as to location of modern edifices of significant function.

The middle-block space was, according to imposed 'urban grammar', carefully designed for pedestrian perception. Each entry to a block would have a little entry square - a 'joint' which would connect existing pedestrian walkways along the streets and the new superimposed system. Another 'joint' would exist in the center of the block and be connected with the other ones by 'links.'

In order to intensify the use of the city center, three levels are involved in the system:

- underground level - providing basically transportation facilities: parking, subway station, and some commercial uses.
- ground level - pedestrian walkways in connection with bus system and wide range of commercial and entertainment functions.
- above ground level - mainly commercial area.

All of those levels would be connected by a system of vertical transportation located in the 'joints.'

In the newly created public walkways, different green areas were introduced in order to improve the environment.

At the edge of the center a system of parking facilities was provided to avoid high traffic congestion and to increase accessibility.

Location in the downtown area The oldest historical part of the city, now considered as a city core, became a target for the designers. It consists of more than one hundred, more or less regular, square blocks. The streets, approximately equal in size and laid up in a grid pattern, did not create any spatial hierarchy.

The boundaries - green belts of the Mapocho River in the north, the Cerro Santa Lucia in the east and the Canada River wetlands in the south - separate the city center in a very visible way. The Norte-Sur highway, as pointed out earlier, limits the western boundary of the area of design.

The location of commercial, governmental, and cultural facilities determined

the existing pedestrian movement. Also, there are two blocks in the city center, which are public parks.

Today's urban fabric is a mixture of historical buildings - churches, public and governmental edifices, which served in the past as landmarks - and new, modern constructions.

Land use Originally, the city center was predominantly a mixture of housing with different kinds of services. After 1950, when inhabitants from the upper class moved to the suburbs, the city center became very attractive for other uses. It "acted as a magnet for business, commercial, service, and administrative facilities" (Halasz and Underhill, 1979). Since that time more and more high rise buildings have appeared in the historic grid.

The project's goal was to see the reconstructed city serving not only as a main cultural, governmental, and commercial area, but possibly as a residential development, which would initiate re-inhabitation of the greatly improved city core.

The scheme of pedestrianization The system described above was only one of many possible alternatives which served as an illustration of a stimulation process proposed by architects rather than a particular area of design only. The scheme of this alternative is shown in Figure 3.4.

Discussion

The method of reconstructing the city center was not implemented because of many changes on both political and economical scenes, shortly after the design was completed.

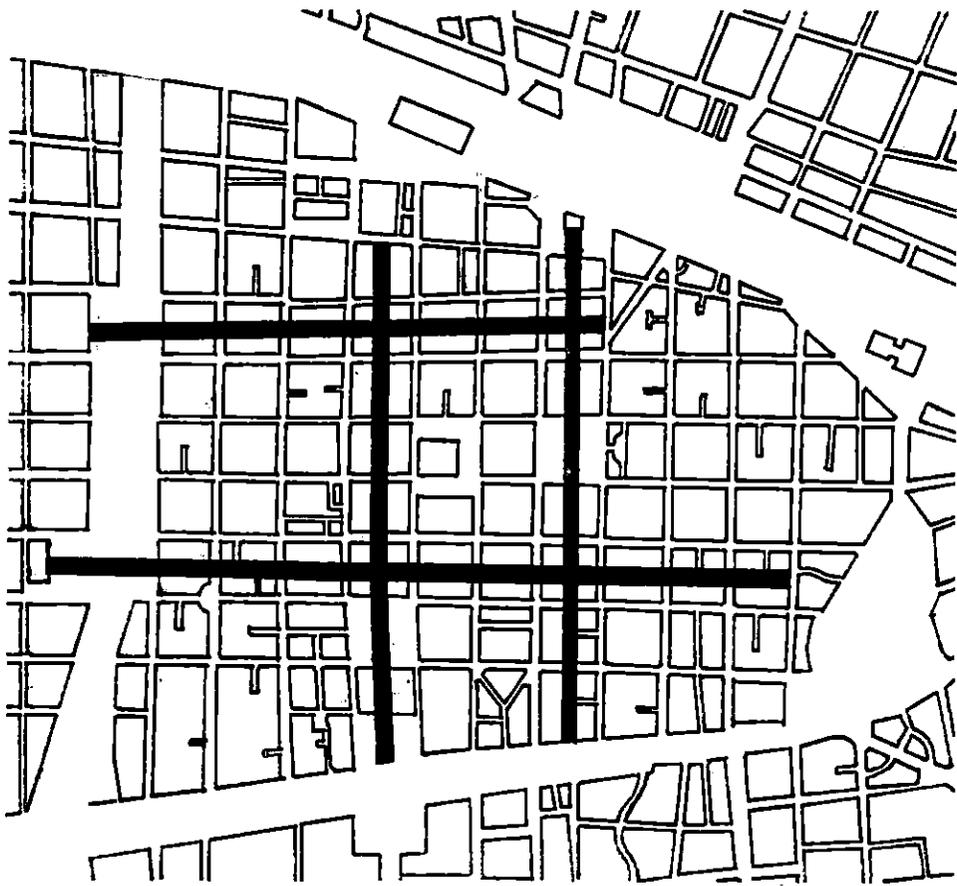


Figure 3.4: Pedestrian network in Santiago, Chile

The 'natural' way of this process: acceptance of what is happening to the city fabric, selection and focus on strong points of development seem to have created a very workable idea.

The proposed introduction of a pedestrian network goes along with existing demand for certain uses, appropriate transportation system, establishment of an implementation procedure, and improved condition for attracting re-inhabitation. According to the designers' motto "drops of water shape the rock, not by force, but by falling frequently," the maximum effect was to be achieved by minimum intervention.

The new level of city life was designed for people, for whom the city was originally created. Unlike in other cities where streets are dominated by cars, and pedestrians are forced to share the transportation corridors unequally with vehicles, the new system in Santiago is almost exclusively devoted to walking people. The human scale of the open urban space clearly separated walkways from vehicular routes and densely developed attractive commercial complexes. All of these objectives certainly would have been a good cure for the existing chaos in the city core. Pedestrianization in Santiago inspires an alternative solution for downtown Milwaukee. The pedestrian precincts would be, similarly to those of Santiago, designed in mid-block areas. Also, the public squares could be designed in the center of the city blocks. The whole system could be linked in the form of a regular grid.

Conclusion

The four cities described as case studies in this chapter were chosen with the knowledge that solutions undertaken there can only be considered as a proximity to Milwaukee's response to similar problems. Any two cities, even of the same size, located in the same country, and in similar geographical locations will differ one from the other. The differences came from several causes, belonging to several spheres of life, i.e., social, political, economic, and geographical, to mention the most important ones only.

However, what is interesting are similarities appropriate to the problem of making city centers liveable. What the case studies have in common is existing or designed pedestrian networks as a system of open urban spaces in the city core. Only Minneapolis did not create such a network, although this example can be described as a combination of both pedestrian street and upper level circulation system. Currently, in the center of Milwaukee, which is the subject of this thesis, there exists a commercial complex based on skywalks, called the Grand Avenue. The central location of those buildings, as well as their successful existence, indicate that they cannot be omitted when the problem of pedestrianization is discussed. Hence, the example of Minneapolis can provide much useful information.

For all of the case studies the departure point was similar: the 'automobile age' caused high congestion in downtowns which no longer could be 'the heart of the city.' Commercial buildings and transportation facilities followed removal of housing complexes. But even such transformed city centers could not provide demanded street capacity and number of parking lots. The businesses, especially

retail, could no longer compete with the growing number of suburban malls. Declining activities in the city core called for reconstruction of downtown. 'When people stop using the center in their everyday life, they sever a connection with their history as well as with the cultural opportunities that cities represent' (Halasz and Underhill, 1979). As Herman Riesco pointed out in his *Foreword* to *Revitalizacion y Estructuracion del Centro de Santiago*, "urban surgery had begun" and later "the time to present proposals and projects had arrived."

The pattern was well known: pedestrian streets introduced in new British cities. The first twenty years of their existence was a good base for evaluation. All of them were successful. The only problem was: can British urban experience be exported to the other countries? Leeds of course, is in Great Britain. The Hague is just across the eastern part of the English Channel and has geographical and socio-economic conditions close to that of Britain. Minneapolis' climate is more severe, but the other conditions are comparable to those of European cities. In Santiago spontaneous mushrooming of 'pasajes' and short pedestrian dead end streets facilitated and supported the idea of implementation of the through-block pedestrian system.

In all four cases the main objective was the same: to revitalize the city core and accommodate life that was or wanted to be there by a pedestrianization process.

The conversion of streets to pedestrian zones requires major changes in transportation. The accessibility of the newly created area is one of the main important issues. Along with the pedestrianization, improvement in mass-transportation and new parking policy, as well as restructuring of major road

networks have to be done.

In all of the cities examined, an inner ring preserving the downtown area from transit traffic was either completed or existing already. All cities greatly improved their public transportation systems. Bus lines, flexible and easy to introduce, were serving in all four places already. Santiago explores three subway routes and is going to develop this network. Minneapolis also plans to introduce a combination of rapid surface train and subway beneath the city center, which would be very useful for this two million people conglomeration. The Hague constructed a semi-underground fast train network adopting existing tram routes, that cooperates with the main railroad system. In Leeds, as well as in the whole United Kingdom, the train traditionally serves a great number of commuters, especially those from outer suburbs and other parts of the urban agglomeration. Mini buses and express buses in the center of the city successfully provide transportation.

A parking system was developed significantly in each of the cases described above: in Santiago as a system nearby the main entries to the pedestrian network, in other cities more randomly. Along the street, parking is everywhere limited to short stay only.

The pedestrianization in both European cities and Minneapolis excluded from their street network some elements primarily devoted to vehicular traffic. Their conversion to pedestrian zones required provision of necessary accesses to businesses located along those streets. The only solution for both European cities was to allow over night access for delivery. In Minneapolis lorries use mid-block accesses and streets for second level skywalks. The most appropriate way to solve this problem

seems to be through a block pedestrian system, designed in Santiago, which does not create any collision with delivery service from the existing streets.

Case studies show that the most applicable functions for revitalization of downtown are those which have traditionally existed there: retail, cultural and commercial.

All introduced pedestrian districts were evaluated as successful. Environmental improvement, flourishing activities, and, more importantly, constant pressure to extend this system indicate the appropriateness of the process. Also, in Santiago, where for political and economic reasons a designed network has not been introduced, the chances are that a project based on natural transformation would be successful.

The following findings conclude the case studies analysis:

1.) Before the decision of conversion can be made, a complex analysis of downtown Milwaukee should take place including:

- calculation of existing and expected density of downtown (number of inhabitants, workers, and tourists)
- determination of land use
- inventory of significant structures and their spatial relation in historical context
- description of existing main pedestrian patterns (including both street level and skywalks)

- estimation of expected demand for public uses (considering the number of potential users)

2.) Pedestrianization as a system in downtown can take the following forms:

- conversion of downtown streets to pedestrian precincts (the selection should be made in relation to current character and historical significance of those streets)
- mid-block pedestrian network
- combination of integrated open spaces and off-grade circulation system (assuming the further extension of skywalk system in downtown Milwaukee)

3.) Major transportation changes should be undertaken simultaneously with a pedestrianization process (development of public transportation system, rearrangement of vehicular traffic - especially freeway system within the downtown area, parking system etc.)

4.) An off-grade pedestrian system should be integrated with street level open public spaces providing facilities for:

- re-inhabitation of the downtown area
- publicness of the city core
- social and spatial recovery of downtown
- reestablishment of hierarchy
- weather protection

- provision of orientation cues for users

All those case studies described above suggest that even now, when the private automobile is still the overwhelmingly dominant mode of transportation, the declining life of downtowns can be improved by a properly implemented pedestrianization process. Our cities should be reconstructed, and destructive elements should be removed from today's city cores. The connection between inhabitants and history, as well as with cultural opportunities, which the city represents, has to be continued (Halasz and Underhill 1979).

CHAPTER 4. DOWNTOWN MILWAUKEE - THE AREA OF REVITALIZATION

The city of Milwaukee, located on the western shore of Lake Michigan north of Chicago, with its 934,000, inhabitants has the twenty-fourth largest urban population in the United States. Also, it is the largest urban area in Wisconsin (20 per cent of the total Wisconsin population inhabits Milwaukee). It serves as the main industrial area of a predominantly agricultural state. Milwaukee has undergone many changes in its boundary transformation. The city arose from a little settlement located nearby a harbor, to a sizable town in 1876 (60.5 sq. km) and finally to a city covering the area of 245 sq. km. in 1980 (Frederic I. Olson 1987, p. 66). Currently, the average density equals 3,812 people per sq. km.

Historical Background

The first permanent settlement in this area was established in 1795 as a fur trading post, the first in the southeastern Wisconsin region. Steadily growing in population the town underwent a rapid increase after completion of the United States Public Land Survey in 1836. New settlers from New England, Germany, Scandinavia and Poland came to the city looking for opportunity. Located on the confluence of Lake Michigan with three rivers, Milwaukee has met the expectation

of its becoming a port of entry for immigrants from abroad and, more importantly, a port for shipment of farm products to both the industrialized East and Europe. Because city authorities of that time expected growth, they developed a railway system to expedite the shipment of agricultural goods from the interior of the state. Also, the road system was improved and extended significantly in the middle of the nineteenth century.

After 1850, when the process of the Industrial Revolution began, many different branches of industry were brought to the city. The new enterprises originally found their location south of the city center and then moved toward the city limits for tax reasons. By the end of the Nineteenth Century the capacity to ship goods by both rail and water had peaked. The authorities decided to encourage businesses, causing a huge industrial complex to arise next to the city limits. Once this happened thousands of workers followed, which resulted in city dispersion and the creation of industrial suburbs. New development began, especially in the western and northern parts of the city. This dynamic growth of the city caused several major public and commercial edifices to be built downtown. Milwaukee became a metropolis.

However, despite the partial removal of heavy industry to the outer parts of the city, downtown still remained a main employment area. Also, it served as a governmental, commercial, cultural, and recreational center.

The appearance of automobiles in Milwaukee and development of a public transportation system based on the streetcar resulted in major public street and highway construction. Easier access to outer suburbs made it possible to establish

several parks and green areas around the city. Also, it increased the 'process of suburbanization.' But the most important factors of this process were the economic boom and increase of automobile ownership. New single-family constructions mushroomed, not only in the green suburbs of Milwaukee, but also on adjacent farmlands. This phenomenon is known as 'exurbanization' - the city's enormous sprawl facilitated by the automobile.

At the same time, the city center underwent significant regress, typical for most American cities of those years. After booming development in the 1920s, and before the depression of 1929, a series of new edifices were constructed downtown, establishing the skyline of the city core for years. However, later in the 1950s, along with the process of 'suburbanization,' the declining role of the city center resulted in an absence of major building construction in this area. The only constructions of that time were those facilitating transportation: parking ramps and expressways.

Incorporated by the city of Milwaukee, small towns, which tended to have their own centers developed in the 1940s, and later, the shopping malls. These malls affected the role of downtown as a main retail area in a most visible way. Along with retailers, who could no longer stand the competition, the other businesses, that earlier had successfully created the 'cultural atmosphere' of the city core, also disappeared: movie palaces, theaters and other entertainment uses.

In the beginning of the 1980s city authorities, in order to promote development, introduced a shopping and entertainment complex in the downtown area linked by a skywalk system known as the Grand Avenue. It changed the downtown environment, especially in its western part. The area between the

Milwaukee River and the Lake Michigan shore, however, is still underutilized as a city core.

Analysis of Downtown

Downtown is almost always associated with the oldest part of a city. Cities have been founded and settled, then some of them have undergone usually radial expansion from the center. When a visitor arrives in a new town he goes downtown looking for buildings, squares, or streets of historic interest. Downtowns of the cities have been a mixture of different land uses: housing, trading, entertainment, culture, and others. Visitors are interested in seeing those reminders of history, those connectors with the old days. Also inhabitants of a city need these uses to achieve a sense of identity with the place in which they are living. The notions 'city core' and 'hierarchy of the city' have been shaped during the last five thousand years of western civilization. The city core was the most important element of this hierarchy linking and subordinating all other parts. Downtown cannot be abandoned without a negative influence on the rest of the city, without destruction of that hierarchy. The role of the city core is still unquestionably important.

Physical Boundary

In Milwaukee, today's city center occupies the oldest, historical part of the original town where, as mentioned before, a fur trading post was established. However, difficulties appear when the boundary of downtown has to be determined. Actually, the central business district never has been clearly defined (Olson, 1987).

Originally, the Lake Michigan shore on the east, two rivers: the Menomonee and the Milwaukee on the south and west, and North Street on the north formed the specific boundaries. Later industrial development (in the beginning of the twentieth century, Milwaukee arose to become the second largest industrial city in the country) expanded downtown westward, along the axis of Wisconsin Avenue. In the 1950s there was another attempt to shape the city hub. A decision was made to surround it by a system of freeways; however, the northern edge never has been completed because of continuous protests by the inhabitants living nearby. The western and, unfortunately, southern part of the freeway system have both been constructed. The southern part, elevated to avoid collision with the existing network of streets, and connected with a bridge crossing the harbor entry, cut off a major part of the historical city core.

Traffic Problems

The transportation system in the city of Milwaukee is based on three modes: a highly developed road network, railways, and, due to geographical location, ships.

Historically, a combination of water and road transportation played a key role in the economic development of the city. Later on, during the Industrial Revolution, the railway was introduced, quickly expanded, and became the predominant mode of transportation. After the year 1950, due to increasing production of automobiles and oil, the road system essentially changed the existing modal split of transport. The role of ships sharply decreased, trains carried fewer and fewer products and goods every year, while the car overwhelmingly became a main transportation tool.

The city of Milwaukee was established before the decision to superimpose a mile square grid on the western country settlements. Thus the street network in the oldest part of the city, oriented to the Milwaukee River, deviates slightly from the later superimposed compass oriented grid. The boundary of this shift is established by Juneau Avenue from the north, the Milwaukee River from the south and west, and Lake Michigan from the east. However, traffic flow is not affected by the differently oriented streets. The shift enhances the physical appeal of this part of the city by producing many architectural enclosures.

In the road system of Milwaukee, two elements can be distinguished: consistent grid-iron, and radial streets converging on downtown, - a fragment of the past before the decision to establish the grid was made. Selected streets of both systems have been reconstructed and serve now as freeways, connecting strategically important points.

The railway network within the city is very developed. There are ten main routes connecting Milwaukee with other cities of the region: Chicago, Madison, and Minneapolis. All of them in the past provided service to commuters, as well as harbor shipment. Hence, the rail network has a direct access to the fringes of the downtown area. Currently, only four trips daily connect Chicago and Milwaukee, while in 1950 there were fifty of them every day. The train station is located between the Menomonee River and the downtown southern freeway. The train system in Milwaukee is definitely underutilized. Some of the routes are totally abandoned (Mayer, 1987, p. 372-382).

In the past, commuters within downtown were served by another

transportation mode - the streetcar. In 1860, the first horsecar line was initiated; twenty years later the electric trolley came into general use. A developed tram system operated for several years, up to 1956, when the last line was abandoned.

Milwaukee was established due to a favorable water system - Lake Michigan and the rivers. Due to a close connection to the Midwest - American heartland, the city was supposed to be a port of entry for thousands of new settlers who wanted to colonize the interior. Later on, the harbor, which is the southern boundary of the city center, served as a main point of an agricultural trade system.

Along with the development of the city, a new transportation mode was introduced: a railroad ferry. It served commuters, as well as shipment of goods and products, for several years. Eventually, new technological advances caused the decline in use of this mode. Currently, the ferry does not operate in Milwaukee. The only line across Lake Michigan remaining in service now connects Kewaunee, Wisconsin and Ludington, Michigan.

Milwaukee has several road connections with Chicago, Madison, Minneapolis-St. Paul, and other regional centers. The traffic through the city, due to this highly developed industry and high ownership of automobiles, is very heavy. The main directions of transportation: Chicago - Milwaukee - Minneapolis and Chicago - Milwaukee - Madison pass the outer suburbs. There is not a fully completed inner ring outlining the city core, if the unsuccessful attempt described above is not counted. The freeways cutting through the historical city core were supposed to provide quick access and to eliminate through traffic from the downtown area the south-north direction.

Through Traffic Policy

Downtown Milwaukee is a workplace of 75,000 people. There are also several enterprises, cultural facilities, and places of tourist interest. All those factors cause a high congestion on the streets, especially during the peak hours.

The street network, as mentioned earlier, does not have a hierarchy; however, Wisconsin Avenue and Kilbourn Avenue are definitely the main streets in this system, not only because of their physical dimensions, but also due to the location of significant buildings. The eastern boundary of the downtown blocks establishes Prospect Avenue. This street follows the curving and sloping top edge of a Lake Michigan cliff and opens a unique perspective toward the water. Prospect Avenue and Lincoln Memorial Drive carry the traffic along the waterfront. The Milwaukee River meanders through the city center, but there is no street that has the character of a waterfront boulevard.

Within the downtown area ten bridges facilitate the connection between eastern and western parts of the city core.

Parking System

The parking system in downtown Milwaukee consists of numerous surface lots and multi-story parking structures.

Surface lots are scattered randomly throughout the district. Some blocks torn down in the past have become parking areas. The largest concentration of surface lots, except those described above, are along the southern freeway and Lake Michigan shore next to the War Memorial. Also, the area north of Kilbourn

Avenue is occupied almost 50 per cent by parking facilities.

Several lots are available along selected central streets, but they are restricted to short stay only.

Parking ramps can be found nearby commercial buildings (Grand Avenue), or office complexes.

Public Transportation

As mentioned before, in Milwaukee there operated in the past a highly developed public transportation system. Many factors determined that, today, only buses are in use. There are 65 different bus routes, most of them passing through downtown. Wisconsin Avenue, served by six lines, is definitely the busiest central west-east axis of the system, while 1st Street in the north-south direction, has the highest congestion of operating lines. The routes are set up on every second street of the grid, which allows walking distance between stops of about 150 meters. In the outer suburbs this rises to 600 meters. The bus system connects directly downtown with the most important spots in the city: both airports, shopping centers, parks, and others.

Land Use

Land use and development patterns in downtown Milwaukee have evolved over the years. Today's appeal of this district reflects several public and private decisions made in the past. Also, it has to be recognized that development trends are constantly changing, so the current land use distribution described below may

differ significantly in a few years.

Milwaukee's Department of City Development completed a report in 1985, *Planning and Zoning Concepts for Downtown Milwaukee*. Data from this material concerning current land use have been utilized for the present analysis.

Milwaukee's city center is a mixture of several functions. There are eight different districts in downtown, as far as land use is concerned.

Major retail area Wisconsin Avenue west of the Milwaukee River is a main retail core of downtown. There are located Grand Avenue, Marshal Fields, Boston stores, and several smaller retailers. Also, in this area a skywalk system has been developed to ease circulation in difficult weather condition. In the front of the main entry to the Grand Avenue a very small plaza is located. The shopping complex is served by a parking structure adjacent to the stores.

There are two main goals of the city authorities in this district: to re-inhabit this area and to retain old buildings of architectural interest. Also, they are concerned about development of street level activities.

High density residential area The northern part of downtown next to the Lake Michigan shore consists of a variety of housing facilities: modern high-rise apartment buildings, older hotels converted into condominiums, and even single family houses, or duplexes. This area still retains the possibility of potential new housing development due to several vacant large parcels located there. The most prominent is the Park East freeway corridor, the protested area, where new housing construction has begun already.

The Planning Commission encourages a high density housing development in

this part of the city; however, architecturally significant buildings should be protected.

Neighborhood retail area In the northern part of downtown, the Juneau Village shopping center has been constructed to facilitate everyday shopping for inhabitants of nearby housing complexes. Location on the edge of this residential area allows the inhabitants to walk to the grocery stores. It is expected that this district will be developed in order to support commercial services.

Offices and services area The area between the east-west freeway, the lake, the Milwaukee River, and Kilbourn Avenue is considered a main office district in the city; however, except for numerous skyscrapers, several diverse uses (mostly services: bus terminal, churches, restaurants and coffee shops), can be found in this area. Nearby the office buildings, some plazas and setback areas are located to serve workers of this district during lunch breaks. Also, two public parks can be found there. Numerous surface parking lots, introduced after the removal of old buildings, are potential areas of further development. Structures and edifices there represent a wide range of height, (from one-story structures to a forty-five story building which is the tallest building in the state), as well as of architectural value. The city suggests maintaining a mixture of major commercial and supporting service uses. This part of downtown forms the skyline of the city center.

Civic activity area Around the turn of the century Frederic Law Olmsted, well known landscape architect and planner, designed a civic corridor along Kilbourn Avenue, expanded from City Hall to the County Courthouse. Unfortunately, the street has not been completely converted to this planned vision;

however, some of the elements introduced still determine the civic character of this street: major cultural facilities and a boulevard-like physical structure. Also, in this part of the city a network of prestigious hotels has been constructed.

The planning concept for this area encourages maintaining the civic and recreational activities. Open spaces around newly constructed edifices are expected. Some retail development will also be very welcomed.

Residential and specialty use area In the middle of the northern part of downtown, west of the Milwaukee River, the next district is located. This part consists mainly of old houses, the majority of which need rehabilitation. Also, warehousing and light manufacturing diversify the land use here. Several surface parking lots make this area highly developable. The city suggests intensifying existing activities, which will result in a cohesive, multi-functional profile in this area. Further housing development in this district, located next to the edge of the older neighborhood, is expected by the city Planning Commission.

Mixed activity area Two separate portions, one in the northern part of the downtown site, east of the Milwaukee River, and the other - the city center cut off by the elevated, southern freeway - are classified as mixed activity areas.

The northern one is an underutilized part of the city consisting of warehouses, light manufacturing, restaurants, and vacant lots. Most of the buildings there are in bad condition.

The southern area, called the Old Third Ward, located next to the central industrial district of Milwaukee, consists mainly of old structures, built in the era of flourishing economic development near the turn of the century. This large

concentration of still operating manufactures, warehouses, small offices and even housing suffers from the unfortunate decision of downtown subdivision. A great part of the structures and lots is vacant. Attractive, close to the lakefront and city center location, it is a good base for re-investment and rehabilitation, encouraged by city authorities for both southern and northern parts of this area.

Skywalk System

In the western part of downtown an off-grade pedestrian system connects nine blocks. The Grand Avenue, the main retail complex, is the center of the skywalk network. It consists of many shops, bars, cafeterias and other uses. Some of them, especially the department stores which were originally accessible from the street level, were reorganized facing a covered galleria. Thus the street level activities located next to Grand Avenue are declining. The other functions: entertainment, offices, hotels, and parking complex also can be found there. Currently, substantial extension of this system is considered by the city authorities. The potential area of this development is located east of the Milwaukee River. The first bridge crossing the water has been constructed already and connects the existing system with a commercial building. Studies of skywalks in both the United States and Canada show that the commercial district of downtowns is a potential area to be linked by such systems. Therefore, the eastward direction of extension is the most appropriate one. According to research published by the Department of Planning and Economic Development of the City of Saint Paul, Minnesota, *A survey of Downtown Grade - Separated Pedestrian Circulation System in North America*,

skywalks in Milwaukee are appreciated during cold and rainy days, and neglected during good weather.

Summary

Milwaukee, during its 150 years of existence, has undergone significant changes. A little trading post at the beginning, it became, seventy years later, the second largest American industrial center during its years of greatest prosperity. Rapidly growing Chicago greatly diminished Milwaukee's role in the region later in the twentieth century. Today's city is no longer placed among the biggest industrial centers, but still remains well known throughout the country as a prosperous city.

Milwaukee is both typical and unique at the same time. It represents similar problems to other American cities, especially those located near lakes, e.g., Baltimore, Buffalo, Cleveland. On the other hand, the city has its own, still recognizable, character, expressed in the beautiful location of downtown, numerous architecturally interesting buildings, and green areas along rivers and creeks. The city center might particularly be considered in terms of aesthetics as the most attractive part of the metropolitan area.

The city core, however, needs reshaping. In the past, lack of planning caused many problems and several mistakes to occur. Most of them were very typical and can be found in many other cities, not only American.

Traffic problems originated from the same, common background: high car ownership, insufficient capability of dealing with growing vehicular traffic network of streets designed for different use, and limited accessibility. All of the four case

studies were in the same situation before the decision about pedestrianization was made. Milwaukee, like other cities, was trying to introduce an inner ring, in order to protect downtown from heavy through traffic. This project was probably unfortunate in the long run. Constructing a west-east freeway physically cut off a part of the traditional center, condemning the southern area to a decline and obscuring visual contact between them. The partially completed freeway system did not facilitate transportation to the expected level.

Public transportation seems to be sufficient for today's needs; however, a city of this population and in such a location should introduce a more efficient system. Parking facilities are consuming a great part of the available space in the city core, which could become an area of further development.

The direction of revitalization was expressed in the introduction of a new grade-separated circulation for pedestrians called the Grand Avenue, which is a common pattern for American cities. Successful functioning of this central mall during bad weather conditions but partial abandonment during the rest of the year suggest that peoples' expectations were not fulfilled completely.

Land use analysis shows that the original core of the city has been subdivided. This subdivision is determined by natural rivers and artificial freeways boundaries. It is a result of zoning policies consistently limiting different uses and ignoring experiences of the past. The Lake Michigan shore devoted for recreational purposes, is well designed and maintained, while both riverfronts almost exclusively serve industrial use. The problems and opportunities of the city of Milwaukee analyzed in this chapter show similarities to the four case studies earlier described.

Findings of all five cities prove the theory about destruction of modern cities, particularly of the city centers. The situation encourages planned action toward revitalization of downtowns. City authorities, architects, urban planners, and even public opinion are now more confident about it than ever. Frederic Olson in his essay about Milwaukee, *City expansion and Suburban Spread* says, "Change will undoubtedly come, as it has in the past, but we cannot now clearly predict what form it will take."

CHAPTER 5. PROPOSED SOLUTION

More and more architects and city planners are expressing the necessity of urban renewal of city centers. William Whyte, in his book *City - Rediscovering the Center*, says that, despite the loss of many functions of today's city ("manufacturing has moved toward the periphery; the back offices are on the way, the computers are already there"), the city core is still the most appropriate place for social interaction, entertainment, "a place where people come together, face-to-face." Roger Trancik advocates for American cities "the establishment of hierarchies of public spaces and rules for connecting," proposing three methods as an urban renewal tool.

Instead of waiting for unavoidable changes, the architects should utilize their time, knowledge, and experience toward building a new strategy for the revitalization of our cities. This strategy should be established by using all possible manner of architectural expression including design, publication, exposition, and other forms of experience exchange. There are good examples of similar actions. Every year several books and magazine articles discussing the problems of today's cities appear in bookstores. Also, international competitions are organized in order to explore these issues. The International Union of Architects is sponsoring a series of world-wide competitions to facilitate the exchange of ideas. Undoubtedly, one of the most valuable events in recent years is the International Exhibition- Berlin.

Architects and city planners from both Europe and America are competing, discussing and supervising new constructions in an old, neglected neighborhood in West Berlin - Kreuzberg. Kreuzberg has become an international forum of discussion and idea exchange.

Most of the city design attempts are related to relatively small site plans. That is because architects after the advent of the Industrial Revolution, lost their control over the process of city development as a whole. New methods introduced later, like master plan or zoning, either did not meet designers expectations, or became city authorities' tools for functional regulation rather than intellectual stimulation in the process of creation.

The city center of Milwaukee will be taken under the scope of this thesis as a potential area of revitalization, re-inhabitation and re-creation of a city core, which is expected to play a meaningful role in the hierarchy of the city in the future.

Prerequisite - Outline for Future Scenario

The method proposed in this thesis, a pedestrian system as a network that revitalizes the city center, can be used under certain circumstances only. An attempt to implement it for today's Milwaukee undoubtedly will fail, being a waste of money and human energy. It must be understood that a certain complex of prerequisites has to occur first. Only then can the described method be introduced.

The main issue of this complex is energy. Our cities were designed since the Industrial Revolution in such a way that an enormous amount of energy was being used to satisfy the needs of inhabitants. As pointed out earlier, in today's situation

the automobile has had the biggest impact. Its invention was a main cause of restructuring the city and capturing 75 to 80 per cent (Los Angeles, Detroit) of total land use for storage and traffic facilities for cars. Also, automobiles brought a dispersing of city functions. Commuting from home to work to home consumes a very large amount of fossil fuel - the basic energy source used for transportation.

Since the energy crisis of the mid 1970s, any single building designed by an architect has to fulfill energy saving requirements. A city as a whole, or a designed part of it, however, still does not have to! Trancik, in *Finding Lost Space*, describes the necessity of reorienting our cities toward renewable resources: "What the present situation seems to indicate is that countries throughout the Western World have undergone a major transition from an area of seemingly limitless resources for new construction to an area of scarcer resources and slower construction". Also, L. Krier in his *Outline for Charta* calls for an "intelligent energy consumption policy" and proposes to integrate "the main urban functions into urban quarters of limited territorial size." According to his theory, suburbs, as areas of greatest energy consumption, should be converted back to agricultural uses and city densities should be heightened within quarters, defined as areas not exceeding 35 hectares and inhabited by about 15,000 people. A city would be a federation of these quarters.

His way of thinking, called by many architects idealistic or sentimental, can be verified by life sooner than his opponents and critics would imagine. Today's availability of fossil fuel resources determines its high production and relatively low price; however, according to D. Hedley's findings introduced in the first chapter of this thesis, the energy market may soon change. In ten years, when 80 per cent of

world fossil fuel resources are gone, the prices undoubtedly will rise. The higher cost of energy will have a great impact on the affordability of living in expensive suburbs for a great part of society. Most people will need to live closer to their work, possibly within walking distance, which will cause a massive movement toward the areas where jobs will be offered. Probably one of them will be a city center, traditionally serving as the main employment district. Hence, re-inhabitation of the city core can very likely happen. The most important role of architects at this point will be to control this process of change and to fulfill all expectations of people living in the center. The chances are that, according to L. Krier's model, a federation of city districts can be implemented as a hierarchical body, where the city core will play the same central role as it has played for the last two thousand years.

Some scientists suggest that fossil fuels may be substituted by other, alternative energy sources: alcohol, nuclear, or electrical power. Applicability of still dangerous nuclear energy for individual cars has not been proven yet. The other sources: electricity or alcohol were tested, but demonstrated much higher cost of exploration, than that of gasoline. All currently known alternative sources are not competitive with fossil fuel, not only because of the economic aspect, but also due to technical imperfection. Lack of a substantial substitute for fossil fuel in the near future, along with the running out of its reserves, proves the theory of rising energy prices in the next ten years. Thus, the city sprawl would likely be reversed in response to these problems.

Comparison of Milwaukee's Condition to those Analyzed in Four Case Studies

Each of the cities analyzed earlier had a different set of natural and artificial conditions, and many problems were of a similar nature: vehicular traffic level on the verge of street capacity, unhealthy environment caused primarily by automobile pollution, and declining activities of downtowns, to mention only the most important ones. Milwaukee also suffers from these problems, however, to a lesser extent.

The projects for the four case studies were completed from ten to fifteen years ago, in response to existing conditions at that time. Milwaukee will first have to be affected by a complex of changes described above before any proposed solution could be implemented. Basic similarities and differences of the case studies will be compared with those of Milwaukee.

The geo-political location of Milwaukee is apparently the most comparable to that of Minneapolis, which is also an American, midwestern city, located only 300 kilometers north-west of Wisconsin's metropolis. Leeds and The Hague are socio-politically close to both American cities. The mild European climate means less severe weather conditions in these towns, although both are located further north than Milwaukee. Santiago is the only city that significantly differs from all others, as far as climate is concerned, being closer to the Equator. Also, Chile is considered an undeveloped third world country. Its political conditions have changed dramatically in the last twenty years, and except for a short period of time, it has never been a, so-called, western democracy.

The level of population in Milwaukee is somewhere in the middle between those of the selected case studies. Its density is closer to that of both European cities and Minneapolis rather than to the overcrowded capital of Chile.

The size of Milwaukee places it second, after Santiago. The area covered by its downtown is 1.36 sq. km.

The physical boundaries limit the downtown area of these cities; however, their nature is different. In both Leeds and The Hague the inner ring roads outline the city cores. In the Dutch town there exists a riverfront, but the river cutting through the center does not create a boundary. Also, downtown Minneapolis is outlined by freeways. The edges of the city core in both Milwaukee and Santiago are limited by natural boundaries: in Wisconsin's metropolis the Lake Michigan frontage and the Milwaukee River; in the Chilean capital the Mapocho River, the wetlands of the Canada River, and Cerro Santa Lucia.

The medieval origin of both European cities is manifested in the irregular network of streets, while all three American cities are set up on regular quadrangular grid-iron, squarish in Santiago and Minneapolis and rectangular in Milwaukee. The cities founded on grid-iron tend not have a spatial hierarchy of streets in the center. Only the irregular, medieval origin of European cities distinguished some important streets, creating, in this way, a structure of significance.

All these cities suffer from high, vehicular congestion, but their downtowns are protected by surrounding freeways or highways.

The centers of all the cities are served by railways, but their level of utilization differs significantly. Especially in the United States, all rail networks are

underutilized.

Public transportation, emergency vehicles, and essential services are allowed to enter pedestrian zones during night hours, except for Santiago, where "pasajes" are totally devoted to walking people. (Milwaukee has not yet created any open air pedestrian precincts.)

Parking problems are among the most difficult tasks for city authorities. Year after year, the dramatic growth of automobile ownership creates more difficulties. In the the most highly motorized American cities as much as 80 per cent of total land use is devoted to vehicular transportation systems and still those cities cannot satisfy demand (Trancik, 1986). In all the analyzed case studies, as well as in Milwaukee, parking networks consist of more or less randomly scattered parking ramps and surface lots constructed for the most part after the removal of old buildings.

The cities are served by different transportation modes, although buses operate in all of them. In Leeds, The Hague, and Santiago trains connect the downtown with the outer suburbs. A subway system integrated with a train network serves commuters in the Chilean capital. In The Hague, where a surface tram operates, a new semi-underground network based on this mode is under construction. Minneapolis and Milwaukee, typical of American cities, where public transportation is not a common way of commuting, did not introduce an alternative system to buses; however, the authorities of Minnesota's major city are discussing the implementation of a subway. Transportation situations in all cities are shown in Figure 5.2.

Land use distribution in all the city centers is comparable. It consists, more or less, of a mixture of commercial, light manufacturing, governmental, retail and entertainment functions. Residential sectors exist in all described downtowns including Milwaukee; however, the level of inhabitation is different. Both American cities are more affected by a lack of permanent residents, than are the other cities. Zoning, a widely utilized means of development control all around the world, results everywhere in functional segregation of different uses. City density, downtown housing, and income per capita for all examined cities are shown in Figure 5.1. The downtowns, described in the last two chapters, are subdivided into several districts, in which one or more functions are predominant. This segregation is extreme in Milwaukee and Minneapolis, where "suburbanization" has had the most significant impact on their city cores.

Pedestrian movement, before the process of pedestrianization, was distributed along the streets on walkways. In Santiago, as described earlier, an additional network of 'pasajes' served mainly shoppers in mid-block areas. In both American cities an off-grade pedestrian circulation system has existed since the early 1980s.

Open public space is expressed in the form of streets, squares, and plazas. In Milwaukee and Minneapolis roofed, enclosed spaces - centers of walkway systems - were constructed, but limited time accessibility of these places does not allow them to be considered public. As was expected, comparability of Milwaukee and the four case study conditions is limited, though sufficient to estimate the chances for successful pedestrianization of Wisconsin's metropolis. Also, a comparison points out what kind of preliminary actions were introduced to a wider extent, than in the

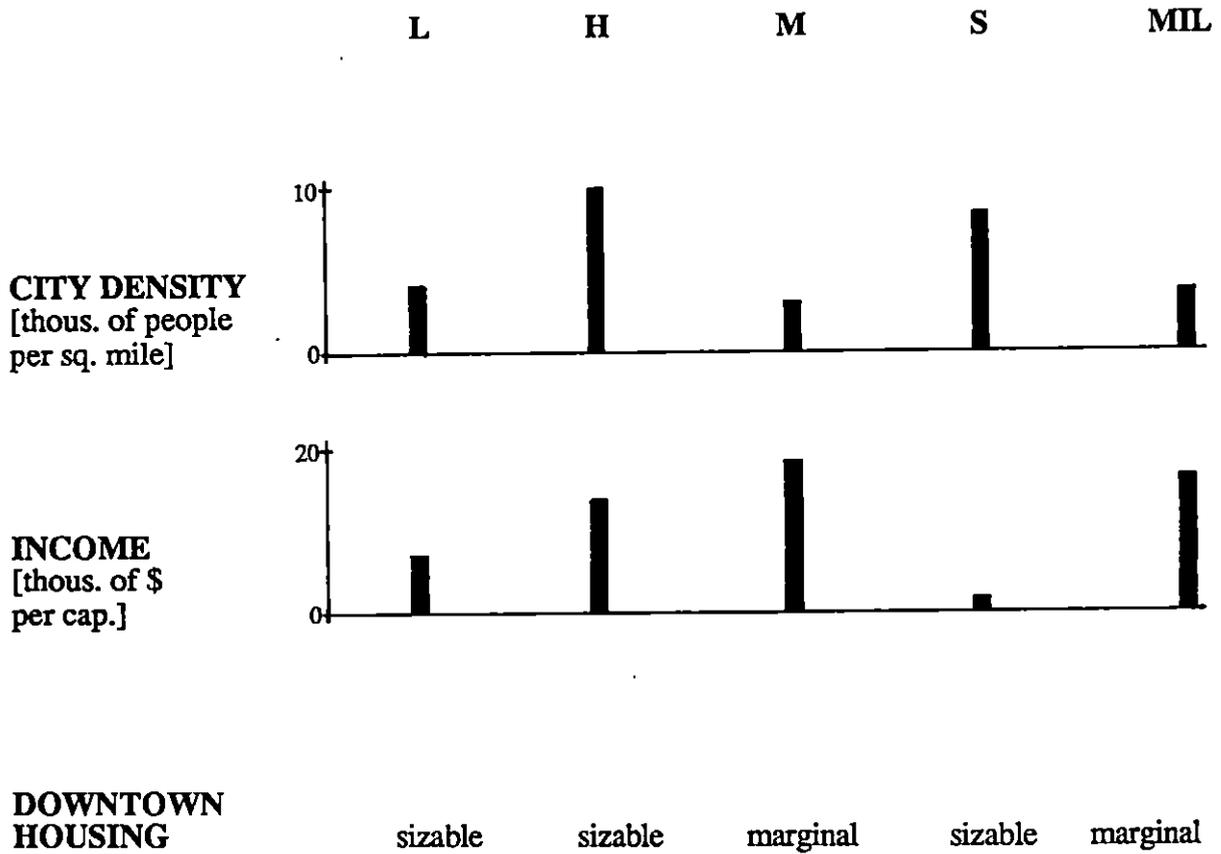
other cities.

Goals of the Proposed Solution

Revitalization of the city core, as mentioned before, is a primary consideration of this thesis. Downtown, as pointed out by J. Kupfer in his paper, *Nowhere - in the Mall*, has an identity. "We can identify with it and this thereby helps define and enrich our own identities." He stresses the significance of places in downtown, their role in our memories as history, proving the existence of socio-psychological reasons behind coming back to the city core.

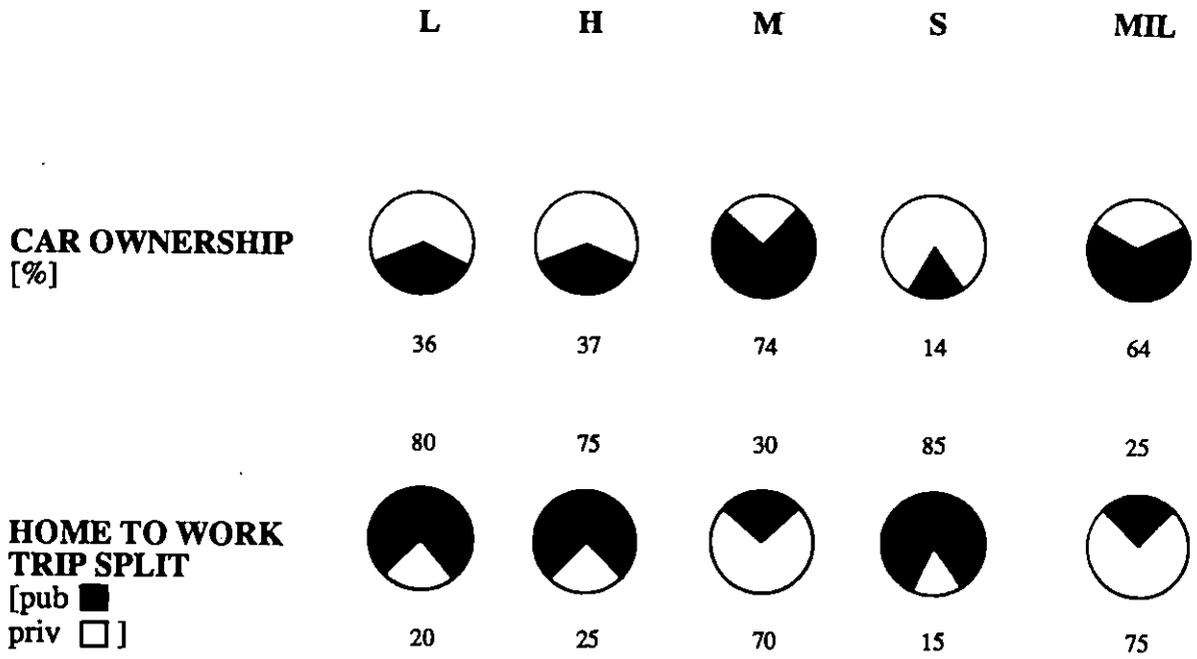
The research done on case studies, the city of Milwaukee, other projects concerning the city planning process, and a literature review are an adequate base to define the complex of goals of the models described below. Later, the following ten issues will be discussed as an appropriate platform for evaluation of introduced solutions.

- Revitalization of the city center
- Habitability - introduction of neighborhoods defined by 'walking distance'
- Reestablishment of hierarchy
- Improvement of environment
- Major shift in transportation (from individual to public)
- Social recovery of downtown
- Increase of publicness



[L - Leeds, H - The Hague, M - Minneapolis, S - Santiago, MIL - Milwaukee]

Figure 5.1: Cities density and income per capita



[L - Leeds, H - The Hague, M - Minneapolis, S - Santiago, MIL - Milwaukee]

Figure 5.2: Transportation situation

- Adjustment of the city fabric to pedestrian perception
- Co-existence of new and old (especially significant) structures
- Ability to respond to expected demand and composition of introduced uses and flexibility of system

Certainly, revitalization of downtown is the main goal to be achieved. The other goals, if achieved, will be a measure of success of the city core transformation.

Undoubtedly, re-inhabitation of the downtown area will be caused, as expected by many planners, by unavoidable energy cost increase, however, it will not happen, though advocated by many architects, until economic changes occur. Residents' coming back to city centers will require adaptation of whole districts to new functions. It cannot be a simple return to the pre-automobile era. Different circumstances call for different solutions. High car ownership has to be recognized and considered in future studies. The solutions proposed in this thesis will endeavor to limit the use of private cars by providing alternative systems of transportation and to create favorable conditions for re-inhabitation of downtown through the distribution of different functions of urban life within walking distance. Thus, revitalization of Milwaukee's city core will be the main goal. All other goals will be realized as a result of that major goal.

Re-inhabitation, as one of them, will be a result of changes in the energy source market. It will affect downtowns significantly. New housing complexes will be introduced; existing buildings will be reconstructed and adapted to new functions.

The future pedestrian circulation system is under the scope of this thesis. In new, densely inhabited downtowns, a walk will be competitive with other forms of

transportation, especially for short distances. Therefore, pedestrian facilities in the future cities should be developed to a higher extent than they are in today's downtowns. In order to meet future circulation demand, walkways should be parts of a system rather than a network of central streets converted to pedestrian precincts, limited in size.

Reshaping of the cities will give the opportunity to re-create hierarchy, a lack of which in today's cities is so widely criticized. "American cities need the establishment of hierarchies of public spaces and rules for connecting them" (Trancik, 1986 p. 230). Downtowns, to which all other parts of the city will be subordinated, can regain their significance, present there from the very beginning. The city core should be a place of flourishing multi-functional activities. The successful pedestrianization of the examined case studies and the necessity of using walkways in future densely populated cities predict a good chance of achieving this goal. Re-inhabitation of the city center brings demand for several functions and services which existed before: every day shopping, entertainment, and education. Downtowns are supposed to be a mixture of those and other uses, which in Milwaukee are now segregated in certain districts instead of covering the city according to demand. Currently abandoned after office hours, the city core will be alive, full of people living there and visitors looking for entertainment and social interaction. A measure of the success cannot be the profitability of shops and restaurants in the precinct only; rather it should be the level of revitalization sought in the integration and co-operation of downtown with the other parts of the city.

Re-inhabitation of the city center, especially the introduction of high density

housing, will bring some problems that also have to be solved in this stage of design: provision of an appropriate quality of life, a healthy environment, recreational facilities, and the possibility of commuting not only within the downtown area, but also to other parts of the city. Design must include green corridors: open spaces, parks, recreational complexes, and landscapes, ventilating the urban fabric, the lack of which is suffered by many industrialized and still densely populated European cities (Manchester, United Kingdom; Koln, Germany; Lodz, Poland). Milwaukee's location near the Lake Michigan shore will greatly facilitate such features. Environmental improvement is also expected. Reduction in vehicular traffic congestion and a substantial public transportation service will result in cleaner air in the cities.

The most drastic impact of the "automobile age" and suburbanization was a shift in the social life of downtowns. This sphere can also be recovered. Inhabitants, visitors, and people searching for social interaction will create a new, socially healthier, atmosphere. The city center should no longer be the domain of criminals, homeless and roaming people only, from early evening until late night taking over the empty streets of many American downtowns affected by similar social problems.

Each part of the city needs inhabitants who will take care of it. Now, the only city center occupants are workers, clerks, and owners of businesses, but they stay there only temporarily. The process of suburbanization brought a lack of interest in the public realm. Presently, people are more concerned about their private physical environment - house, yard, garden - but not about street, corner plaza, or city

center square. This shift in social life was underlined in Trancik's book, *Finding Lost Space*, as one of the five major causes of city center destruction.

Re-inhabitation of downtown will re-create a significance of public domain. High density housing reduces the number of private yards or gardens; these can only be shared collectively as public parks or plazas. This sense of commonness, shared either within communities, downtown, or the whole city, is what has been lost in our cities and what can be and should be revitalized, when anticipated changes occur.

It can be expected that inhabitants will be more concerned about the appearance of their downtowns than current business people and workers are. New construction in the city core is basically a matter of discussion between three persons: an owner, an architect, and a representative of city authorities. Only a very important project has to be discussed more publicly. The owners and developers express their interest about profit they can make on construction rather than about aesthetic creation of space. People living in downtown will be more active in the discussion about their environment, the place of their permanent residency. If an architect can satisfy their expectations, it will reinforce his position in the battle for a creative architecture in cities.

The complex of goals, if achieved, is going to change our cities significantly. Future towns should respond more to inhabitants' needs and expectations rather than be a place of speculative encounters of developers. As L. Krier insists, urban planners should follow the wisdom of the past, "of human labor and intelligence, of culture." Only those experiences can promote successful reconstruction of today's cities.

Alternative Models for Open Public Space System in Downtown Milwaukee

Directives

Since the domination of cars over pedestrians has been recognized as a problem, several design approaches have been suggested toward appropriate solutions. Some of them did not work out after their introduction, while other ones were successful. All case studies and professional publications (both Kriers, Trancik, Whyte) point out many factors that have to be considered during the process of design. The major ones are: sociological analysis, public demand, accessibility, existing pedestrian patterns, land use distribution, and attractiveness of proposed solution.

Sociological analysis Certainly, an analysis of the existing and the future social life of downtown provides key determinants in the process of its recover. Do people use this street, square, plaza every day? Do they find something significant there? These questions contribute to the historical importance of those places. The places associated with the history of the city have to be reinforced. Fifth Avenue in New York City, Pennsylvania Avenue in Washington D.C., the Louvre in Paris, or Piccadily Circus in London are well known far beyond the boundaries of the cities in which they are located. Incorporation of significant public spaces into new pedestrian systems will undoubtedly benefit the process of pedestrianization.

The social life of squares and streets was very vital in the past. If future conditions will promote reincarnation of social activities in downtown, if publicness and privacy in the city are re-defined in the original sense, the chances are that

pedestrianization will contribute toward city core revitalization. The shift in social behavior is the result of the 'automobile age.' According to the assumption of future shortages of fossil fuel, an individual car will no longer play the role of basic transportation mode. Once this happens a new social shift will occur. However, as stressed in R. Findlay's paper, "Privatization of the Public Domain of the City Centers," designers and city planners should acknowledge that design in the public space not only responds to often narrow and particular clients' needs, but affects society as a whole. Planners' primary consideration should be based on human behavior, needs and expectations rather than on economic or aesthetic values.

Public demand The transformation of cities is a long process that has to be conducted over several years. Conversion of the relatively small district of the Hague to a pedestrian precinct had to be done in two different stages which took more than ten years.

Another problem is the extent of changes. Studying the same Dutch city, its transformation provides the information that the originally designed area was too large to meet public demand for the proposed facilities and later the decision was made to reduce some functions in the precinct.

Expected changes in the social sphere of life in the city should be a matter of careful, continuous investigation, and the proposed pedestrianization process should respond to public demand.

Depending on the level of pedestrianization demand, Milwaukee can be reshaped in several stages. Undoubtedly, the area where the process will be initiated is the oldest part of the city between Lake Michigan, the Milwaukee River,

and Juneau Avenue. Increasing demand will cause transformation of the western part of the city core located across the Milwaukee River. If the energy crisis occurs to the extent described in *World Energy: the Facts and the Future* (Hedley, 1976), chances are that the whole city center will be reshaped in a relatively short period of time, involving successive rings of neighborhoods surrounding the city core. These changes will bring the reverse of city dispersion described earlier, infill and modification of existing city fabric toward a new hierarchical model of Milwaukee.

Accessibility The transportation issue should be one of the major ones in the proposed solution. All cities examined dealt with this problem simultaneously with the process of pedestrianization. Transformation of selected streets to pedestrian precincts will reduce the role of the major transportation mode - the individual car. The newly introduced system not only proposes to fill this gap, but also should be competitive, more attractive, and efficient. Both Milwaukee's freeways limiting the downtown area from north and south should be removed, as they subdivide the city center and do not improve the transportation system. Also, the other freeways should be either removed or replaced under the surface of the ground to avoid collision with pedestrian traffic.

Milwaukee has very favorable conditions for introducing a subway as the basic transportation mode cooperating with the bus system. Population numbers, existing routes of underutilized trains, and its location between Chicago and Madison, the capital of Wisconsin, promote this efficient way of serving commuters in the city. Observed effects on the urban fabric along the routes after the introduction of a subway system, especially around the stops, are tremendous. In

rapidly growing areas the pedestrianization process should be introduced and continuously controlled. Superimposition of an open public spaces system on the existing fabric of Milwaukee should be integrated with subway routes.

Existing pedestrian patterns Recently declining life of downtown Milwaukee essentially reduced the level of pedestrian movement. The shift in social behavior of society, mentioned before, caused walkways in Milwaukee to be emptier than ever before. People can be found in the Grand Avenue complex, in the recreational areas nearby the shore of Lake Michigan, but seldomly walking on the streets. A brief look at the photographs made before the "automobile age" shows that the streets of Milwaukee were very busy. Wisconsin Avenue and Kilbourn Avenue, especially, gathered people for different kind of activities. Also, the other streets were full of pedestrians shopping, looking for entertainment, or just interacting with their friends.

Conclusions, after the investigation of the case studies, encourage the reinforcement of either existing or traditional pedestrian patterns. Undoubtedly, the two above-mentioned streets should play an essential role in the new system. Also, a revitalized riverfront will be a subject of pedestrianization, as well as the Lake Michigan shore.

Jane Jacobs noticed that people "are constantly making new, extra paths, for themselves through mid-block lobbies of buildings, block-through stores and banks, even parking lots and alleys." Once pedestrians come back on the streets, they will need more and more open space unpolluted, safe, and designed in a human scale. Thus, a mid-block second circulation system integrated with the basic one should

also be considered as one of the possible solutions.

Land use In recent history the re-distribution of functions followed the social changes of life in downtown Milwaukee. Many businesses disappeared. Some of the buildings were replaced by new uses, basically commercial offices. The other ones were torn down and converted to transportation uses. Computer technology development may no longer make necessary the occupation of the city center by skyscrapers. Those structures may be converted in the future to housing complexes. Parking lots are a potential area of reconstruction. Existing houses and edifices should be modernized and adapted to new uses rather than be torn down. The frontages of streets will be open for the public. Squares and plazas will provide facilities for social interaction.

Attractiveness of design The pedestrianization of the Milwaukee city center is an urban process. Thus, it will result in spatial changes in the city. New open spaces, introduced as a system, will provide an opportunity for a new and different perception of the urban void in the city fabric. Both should fulfill a wide range of human needs, but also a sense of aesthetics. Functional zoning, Floor Area Ratio, and other financial-geometrical instruments can no longer serve as tools for designers. Architecture should be a dialogue between architects offering particular solutions and people, for whom those ideas are directed.

The case studies have shown two approaches:

- 1. maintaining existing streets as corridors of pedestrian traffic, the appropriateness of which has been proved in old European cities,
- 2. creating a new system targeting the perception of walking people: carefully

selected proportions, legible system of orientation, and improvement of environment, as shown in the design for Santiago.

Both approaches will be investigated in the proposed solutions for Milwaukee.

The city cannot be redesigned by one architect, or by one architectural team only. Reconstruction of the city will last several years. It is expected that not only city planners and architects, but possibly a few generations of designers will evolve the urbanity of Milwaukee. Trancik, introducing his three methods of urban renewal, proposes "infill, modification and recycling of existing structures," and advocates "incremental plans and piecemeal intervention" (Trancik, 1986 p. 230). Therefore, the proposed alternative solutions do not pretend to be a design or plan for the future. Rather, they are selected diagrams of possible transformations within the boundary limited by prerequisites. It is assumed that each of the alternatives can be developed and particular blocks and buildings, designed by many architects, will provide the diversity of forms we expect to see in a city.

Proposed Models

The four schemes of pedestrianization to be introduced in this chapter were prepared with the understanding that they do not represent the only possible solutions. They were derived as a combination of analysis of downtown Milwaukee, conclusions drawn from case studies, and the assumption of a future energy crisis. These models were intentionally simplified to establish a basis for evaluation and selection of the design direction.

Model number one - Street level pedestrian grid A departure point for this solution is a European cities conversion of significant streets to pedestrian precincts. The pedestrian grid following the existing streets and consisting of approximately 12 urban blocks was set up as a square, 450m. by 450m. The size of the superimposed grid was derived from the definition of the walking distance. In England, where the pedestrianization process was initiated, as well as in many other countries, the walking distance equals ten minutes of walk - approximately 400 m. Therefore that distance is taken as a base for the models.

Description The streets connecting squares will be redesigned providing, especially on the street level, facilities for pedestrians: shops, cafe-bars, places of entertainment, and others. A double row of trees will be planted along these streets in order to provide shaded areas, to establish boulevard character, and to ventilate denser urban fabric. Two main streets of downtown Milwaukee - Kilbourn Avenue and Wisconsin Avenue - were incorporated into the network. Diversity of uses along their frontages will initiate the conversion of selected streets to pedestrian precincts.

Each intersection of pedestrian boulevards is designed as a square, which can be organized after a demolition of the existing minor buildings. The significant constructions distinguished on the plan as three-dimensional ones are preserved. Each square becomes a center of a neighborhood designed as a mixture of different uses including housing. Thus re-inhabitation of the city center will be facilitated. The squares after the demolition of existing structures will be surrounded by buildings designed on a human scale for every day shopping, culture, and entertainment. Significant edifices existing next to the squares will be adapted.

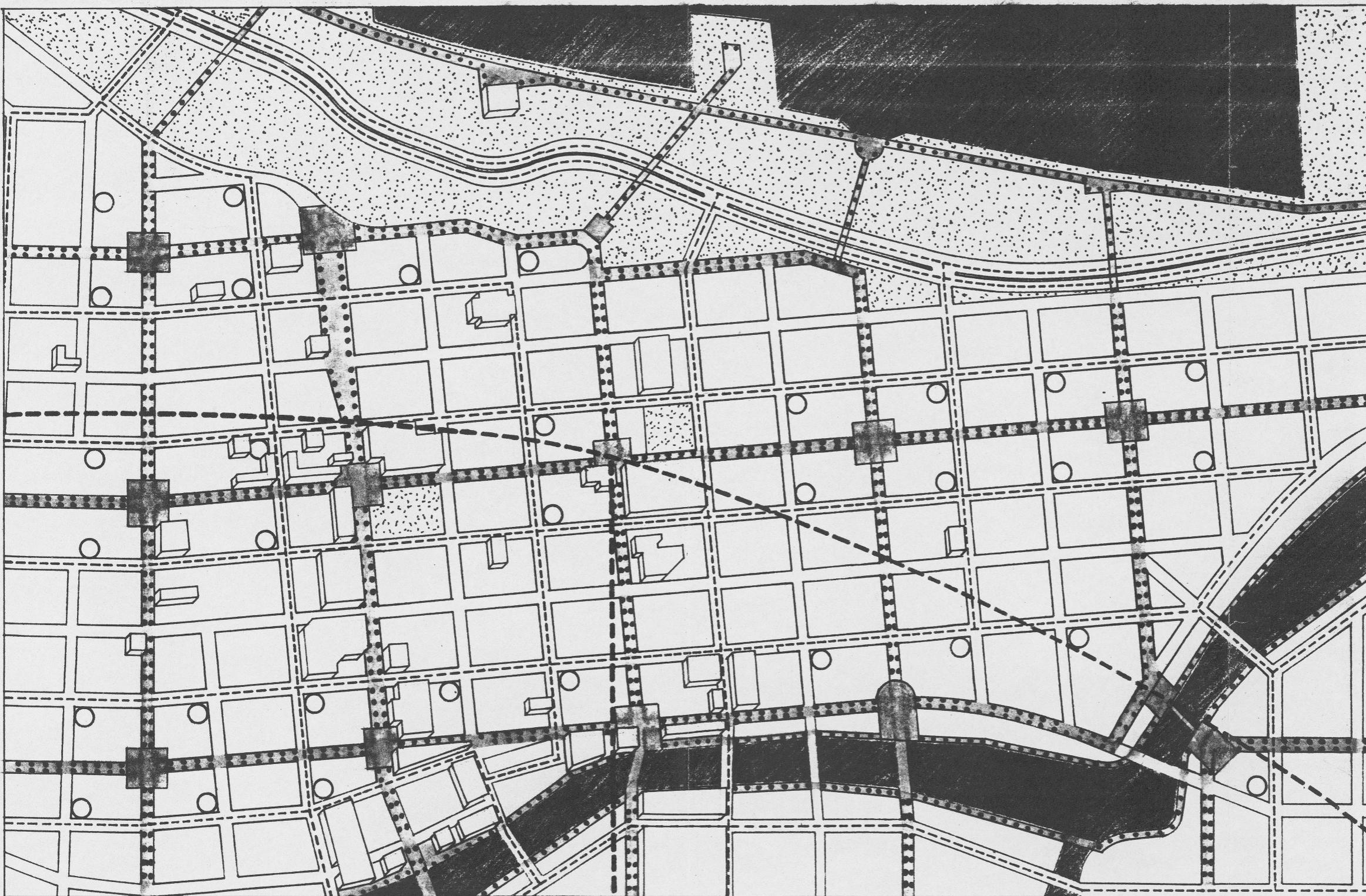
The squares in downtown will play a double role; they will be, as mentioned before, local, neighborhood centers, and also will provide some additional facilities for the whole city and region - city hall, concert hall, theaters, art galleries, and others. Basically, the squares will play the role of an open-air extension of surrounding public buildings. These open spaces will establish and reinforce a sense of community in the central district and will reconstruct the whole downtown as a federation of neighborhoods.

Both riverfronts will be incorporated into the pedestrian network. Along Lake Michigan a pedestrian boulevard is proposed. Both edges of the Milwaukee River will be devoted to pedestrians as walkways after removal of old industrial structures. The waterfronts, a new source of green areas in downtown, will be predominantly used for recreation and entertainment.

The expected higher density urban fabric will be ventilated by the system consisting of green corridors of waterfronts, pedestrian precincts, and parks. The scheme of pedestrianization is shown in Figure 5.3.

Transportation It is expected that simultaneous with the process of pedestrianization the following will have to be done:

- removal of downtown freeways which destroyed homogeneity of downtown while not improving the transportation system
- development of a bus system facilitating availability of all uses within walking distance
- introduction of a new mode of public transportation - light underground train or subway



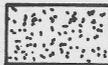
-  pedestrian precincts
-  significant buildings
-  green areas
-  water
-  bus routes
-  subway routes
-  parking structures

Figure 5.3: Street level pedestrian grid - rational distribution of open urban spaces

The heavy transit traffic will be carried by both I-94 and I-141 freeways, which will facilitate an access to the downtown area. Traffic within downtown will be allowed only on the streets which were not converted to pedestrian precincts.

The parking system of limited size, according to the proposed model, will be moved to the underground structures integrated with public uses and houses.

Provision of services to all functions located along the precincts will require that delivery vehicles be allowed to enter the pedestrianized streets.

In the new proposal the existing bus system should be significantly developed. The limitation of the individual car traffic will bring a greater demand for public transportation, especially in downtown. The bus system will not be allowed to enter the pedestrianized precincts. However, the bus route network will provide an access to all urban functions within the walking distance.

The bus system will be integrated with the newly introduced public transportation mode - a fast train. Partially underground, especially in the city center, it will serve commuters of a great part of the city using underutilized or even abandoned rail routes. The light train in Milwaukee is designed as a part of a larger mass-transit system connecting the city with Chicago and Madison. The main subway stop in downtown is located on the intersection of Wisconsin Avenue and Jackson Street.

Discussion The model described above follows the tradition of an American city layout, introducing a "walking distance big grid." This model allows a rational distribution of city functions, legibly defines neighborhoods, and can be easily extended. The even distribution of urban functions and the unification of

neighborhoods make it closest to L. Krier's model of the future city. The conversion of the existing streets to pedestrian zones limits the possibility to adjust widths of precincts and heights of buildings to a human scale without major demolitions. The creation of squares may also cause some problems, especially where existing structures collide with the projected open spaces.

Model number two - Mid-block pedestrian grid This method was derived from the research for Milwaukee as a case study of the International City Design Competition in 1989 and the project for revitalization of downtown Santiago.

Description The 12m. wide gap in the middle of a typical block in downtown Milwaukee, originally designed as an access road to the buildings, facilitates the feasibility of organizing a pedestrian network in the mid-block areas.

The size of a new pedestrian grid is similar to the one introduced earlier and is also based on the 400m. walking distance between a place of residence and the nearest neighborhood center. Squares, as intersections of walkways are designed inside of blocks. They also will play the role of neighborhood centers, evolving the surrounding building functions to public uses. The neighborhoods themselves will be defined in a similar way to those of model number one described earlier, and will also co-exist as a federation.

The mid-block demolition, where the process of pedestrianization will occur, facilitates the adjustment of precincts to a more human spatial scale. In some blocks, where high quality edifices will make the demolition questionable, passages through these buildings will be designed.

In this proposal the main streets of Milwaukee will not be incorporated into

the system. However, the newly created network is understood as a superimposition on the existing city fabric. Therefore those significant streets will play a similar urban role to the one they are playing today. The basic function of the new mid-block precincts is to enhance the level of activities in the city center. See Figure 5.4.

Revitalization of the waterfronts also takes place, converting these areas to recreational green spaces ventilating downtown.

Transportation The introduction of this model requires prerequisites similar to the model described earlier.

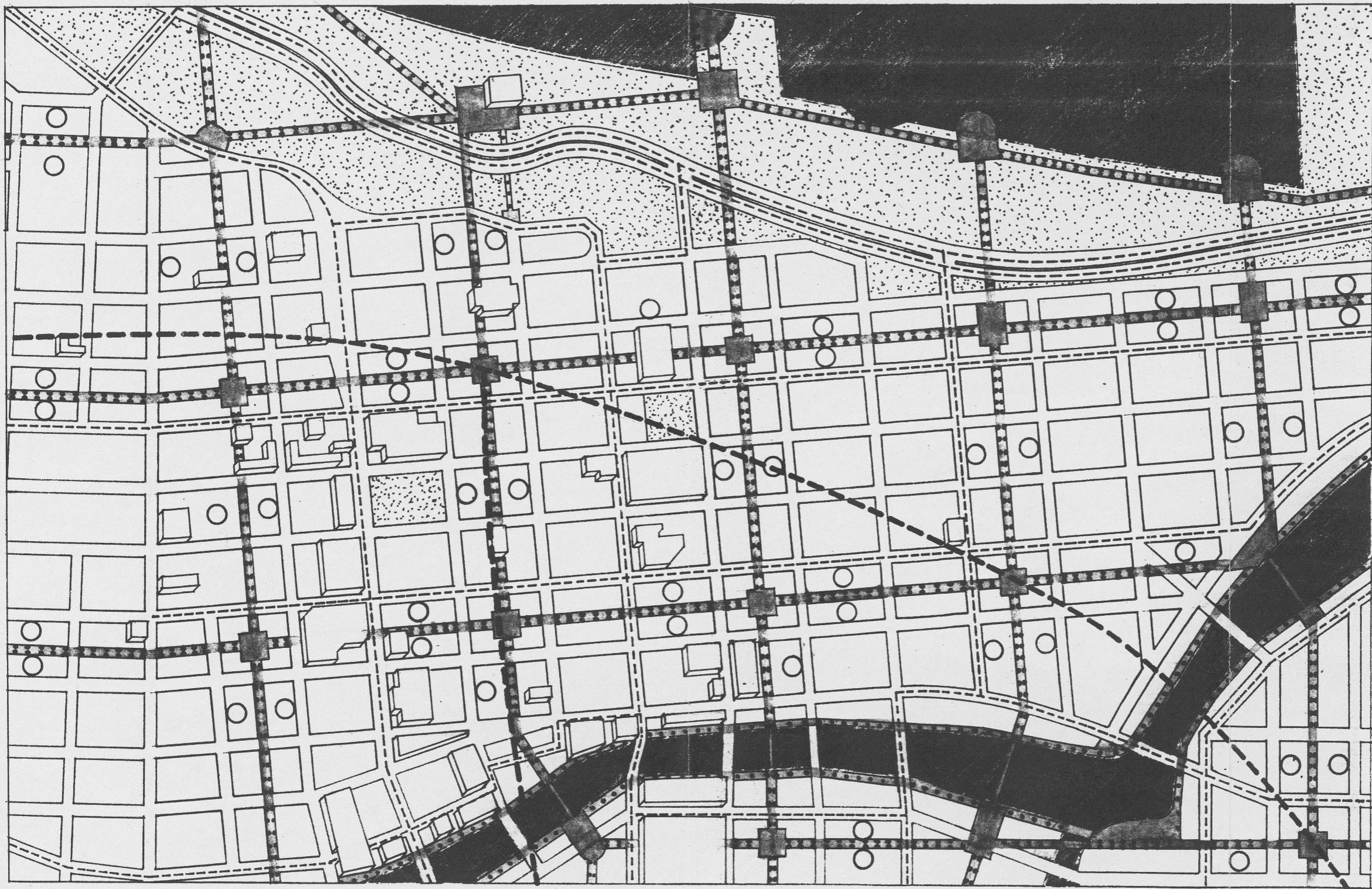
Removal of the downtown freeway will make possible reconstruction of several urban blocks according to the proposal.

The parking system will consist of several, mainly underground, structures adjacent to existing streets.

The delivery service will use the street network and will not collide with the pedestrian system.

The public transportation consists also of integrated bus and fast train systems. Bus routes are designed on the existing streets. Next to each intersection of the pedestrian precinct with a bus line, a bus stop is located, minimizing the walking distance to the neighborhood center. The underground subway system in the area of downtown provides stops connected to the selected squares.

Discussion The model proposed above tests the possibility of introducing the pedestrian walkways in the mid-block areas of downtown Milwaukee. It has to be underlined at this point that this solution does not diminish the role of the



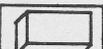
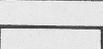
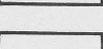
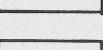
-  pedestrian precincts
-  significant buildings
-  green areas
-  water
-  bus routes
-  subway routes
-  parking structures

Figure 5.4: Mid-block pedestrian grid - intensification of land use

existing streets; it will rather enhance and intensify the use of downtown by co-existence of these 'two layers of urban life.'

This proposal takes into account an important notion of city planning - minimal intervention and maximal effect. Some minor demolition works have to be done. The advantage of designing through-block passages is unquestionable for several reasons: minimal collision of pedestrian and vehicular traffic, preservation of present street capacity, possibility of great enhancement of urban functions, designing of pedestrian precincts on a human scale.

The main obstacles to the introduction of model number two may emerge when some building owners refuse to sell their properties or to allow their conversion to public uses.

As pointed out in the case studies analysis, one of the major prerequisites is to meet the existing demand of public uses. This proposal can be very successful when a major intensification of urban life is expected. Thus it can work also as a second stage of the pedestrianization process after insufficient implementation of a model in which the conversion of streets to pedestrian precincts will not balance the demand for public open spaces.

Model number three - Functional pedestrian grid This model is inspired by the transformation of downtown Milwaukee around the turn of this century done by Frederic Law Olmsted. As described in Chapter Four of this thesis, he converted Kilbourn Avenue to a civic corridor creating a 'functional strip' in downtown. In the 1920s and later, Wisconsin Avenue became the other, commercially oriented strip. Both these streets still maintain their character.

Analysis of downtown land use shows that the city center is divided into several districts, each with the different predominant function. All of these preconditions support the introduction of a 'functional pedestrian grid' consisting of precincts - different 'functional strips' of the network.

Description The model intentionally was designed to maintain and reinforce the existing functions along the streets representing a particular district of downtown. Both Kilbourn Avenue and Wisconsin Avenue were incorporated into the system. Currently, the public buildings are scattered throughout the downtown area. The main goal of this model is to connect these buildings by the new pedestrian precincts, reinforcing the character of their predominant uses. Jackson Street, containing a wide variety of retail businesses and services becomes perpendicular to boulevards mentioned above, axis of downtown. It links two main downtown squares and two parks. At the southern end of Jackson Street a newly designed open public area establishes a central place for the Old Third Ward, the old industrial part of downtown, presently neglected. This square is connected by an obliquely designed axis with a riverfront plaza. The creation of this off-grid axis was possible due to mostly abandoned lots in this part of the city core. Both waterfronts support the network by providing recreational facilities.

The size and shape of this pedestrian grid is very irregular. Thus the neighborhoods will differ one from another. Also the predominant character of main streets will represent a wide variety of different uses.

Because of the existing buildings along the streets, the adjustment of scale for pedestrian perception cannot be done. The scheme of pedestrianization is shown in

Figure 5.5.

Transportation Also in this model the downtown freeway will be removed. Car traffic will not be allowed on the converted pedestrian precincts except for delivery and emergency services.

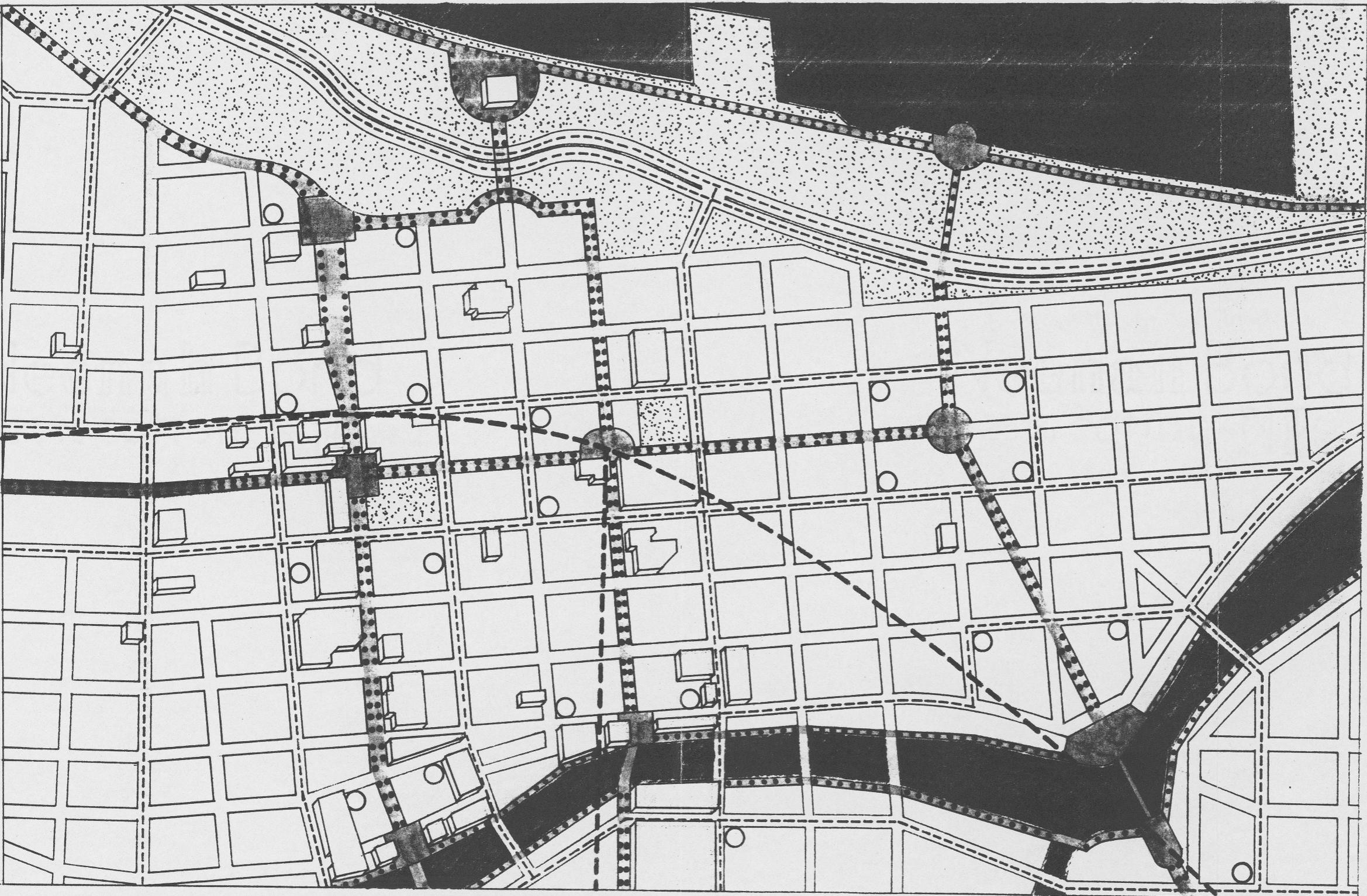
The parking system is located along the minor streets of downtown.

The public transportation consists of a developed bus system and a newly introduced fast train. The bus routes do not cover pedestrianized streets, but bus stops are located close to the neighborhood centers (not exceeding 400m. walking distance). The subway stops are associated with selected major squares of the city.

Discussion This model has taken Olmsted's project for Kilbourn Avenue as a civic corridor and developed the idea. The other 'strips' of introduced network represent either reinforced or new functions of existing streets. It establishes a new hierarchy of the downtown streets as well as downtown itself, which is one of the expected goals of this process.

The conversion of selected downtown streets to a pedestrian network can be associated with the method of pedestrianization in the European case studies. In Milwaukee, as well as in The Hague or Leeds, the uneven distribution of city functions results in irregularly outlined neighborhoods but strongly articulated pedestrian precincts.

The irregular network of boulevards allows flexible additions to the system, or its remodeling; its size and capacity can be easily adjusted by existing demand. According to changing land use this solution can be modified without losing its homogeneity.



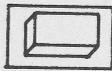
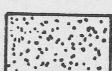
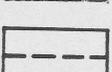
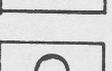
-  pedestrian precincts
-  significant buildings
-  green areas
-  water
-  bus routes
-  subway routes
-  parking structures

Figure 5.5: Functional pedestrian grid - maintenance and reinforcement of existing uses

As with the first introduced model, the structures existing along the streets make a major change in the pedestrian precincts scale more difficult.

Model number four - Two-level system The success of an existing skywalk system in the western part of Milwaukee's downtown predicts its extension towards the oldest part of the city center - an area of this thesis investigation. A brief analysis of Milwaukee's and other American cities skywalks proves that inappropriately managed systems produce several problems: social stratification, lack of orientation for infrequent or first time users, or neglect of ground level activities - to mention the most important ones.

The model introduced below is a combination of both open public space and skywalk systems in downtown Milwaukee.

Description It is assumed that both systems will be introduced and developed simultaneously. The removal of the downtown freeway will make room for designing the main pedestrian boulevard consisting of a mixture of uses. (This solution follows one of the projects given honorable mention in the International City Design Competition for Milwaukee by E. Bramhas and W. Ziesel of Vienna, Austria.) The other streets - Wisconsin Avenue, Kilbourn Avenue, Buffalo Street and Jackson Street - supplement the pedestrian network. Moreover, the intersection of Jackson and the designed main boulevard become a new focal point of the city. The waterfronts, as in all diagrams described earlier, were incorporated into the pedestrian network.

The off-grade pedestrian circulation system will be superimposed on the city fabric constituting the new two-story combination. The major weather-controlled

areas are designed west and east of the newly created central square, protecting users from extreme weather conditions. The most significant public and commercial buildings, except for churches, are linked by off-grade skywalks. Thus both systems, open-air and climate controlled, provide accesses to users.

Integration of both levels, as shown in Figure 5.6, is achieved by provision of visible entries from the open-air places to the off-grade system. The barrier 'in or out' will be softened by a system of spatial continuity forms. Orientation within skywalks as well as open-air precincts will be facilitated by identifiable exterior and interior landmarks.

The new habitable conditions will increase downtown residential population, re-developing urban neighborhoods. The existing multi-functional infrastructure of downtown and the combination of two-level system described above will eventually result in re-establishment of hierarchy in the city core, providing a good base for reconstruction of the whole city.

The fringes of the skywalk system are associated with open-air squares and structures providing vertical transportation. These structures mark the extent of downtown second level public domain.

Transportation The downtown freeway, converted to the main pedestrian boulevard, will be subtracted from the vehicular traffic network. Also, an access to the pedestrian network will be limited to delivery and emergency services.

The parking system will be placed in the structures connected to ground level and off-grade pedestrian circulation systems.

The bus system will be developed in the downtown area and its stops will be

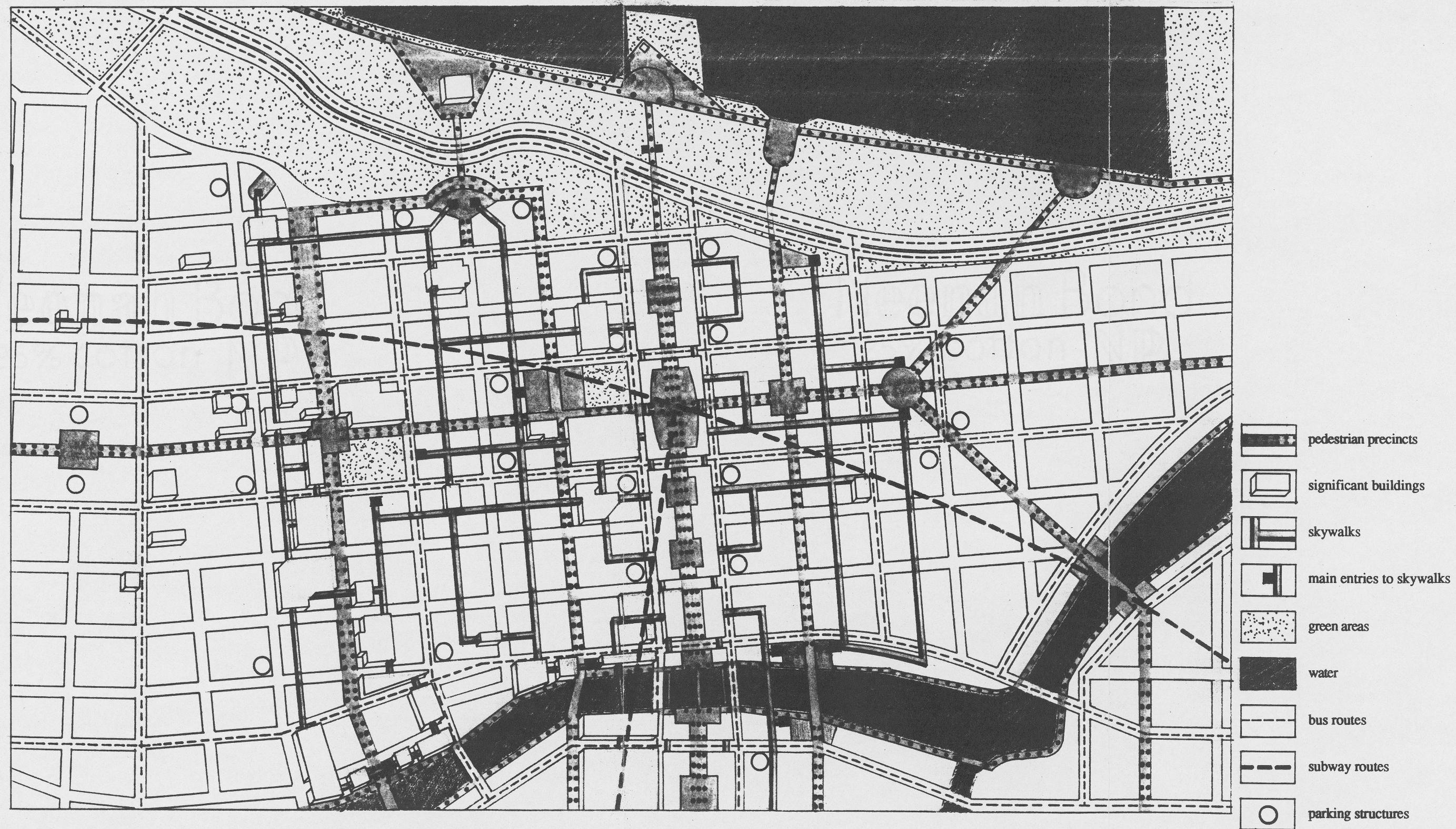


Figure 5.6: Integrated two-level system

located near the entries to skywalks. The fast train will operate downtown beneath the ground level. The main commuter station will be associated with the newly designed central place. The other stops will be established under the selected areas.

Discussion The model introduced above refers partially to the transformation of American cities in the last two decades. In this model, however, the shift of public activities from the street level to the second level climate controlled environment is replaced by an integration of those. Obviously, this integrated system cannot cover the whole city fabric of Milwaukee; rather, it can be associated with downtown and other subcenters of the city. Hence, the boundaries of the skywalks and city revitalization will be based on conversion of streets to pedestrian precincts.

Uneven distribution of the city functions would affect the size of neighborhoods. They will tend to surround the particular square-centers.

The model is very flexible; its parts can be either added or subtracted; however, enhancement of uses may be irrelevant.

Users may find it difficult to perceive streets, originally designed for vehicular and pedestrian traffic, as meant for pedestrian only. Interior skywalks, as non-existing yet, can be adequately designed to fulfill pedestrians' expectations.

Accessibility of majority functions from both levels will support the initial intention of four season activities in downtown Milwaukee.

Evaluation of Proposed Models

Evaluation Base

The basic platform for evaluation of the models described earlier is the complex of goals introduced at the beginning of this chapter. Undoubtedly, all models lead to revitalization of the city center, although the final results may differ one from another. The evaluation of the following issues-goals will be very useful to predict whether the proposed solutions would be successful.

Habitability In both first and second models, newly formed neighborhoods, based on the same walking distance are similar in size. In the two other models the equality in size is not achieved; however, basic every-day shopping can be done within the walking distance.

Hierarchy The even distribution of urban functions resulting in a regular 'big pedestrian grid' in the first two models, in some ways contradicts the sense of hierarchy. To some extent the hierarchy can be achieved by distinction in size and scale of designed elements of the system and their co-existence with old significant public buildings. The solution represented by a double-level system visually underlines the significance of downtown by the creation of two main axes and a major square on their intersection.

Environment In all models the level of vehicular traffic in the city center is reduced, which will improve the environment significantly. The green corridors (precincts and waterfronts) will provide adequate ventilation of the densely inhabited city core.

Transportation Major transportation changes including the removal of the downtown freeway were proposed in all models. The introduction of a new public transportation system - an underground fast train integrated with a developed bus system - will facilitate transportation within the city core, limiting dependence on individual cars. The creation of pedestrian precincts will reduce the capacity of the street network, except in model number two, where a mid-block system does not conflict with vehicular traffic. Also, only this model provides non-collision delivery services to street activities.

Social recovery Re-inhabitation of downtown is assumed in all models. The provision of housing facilities will help to accommodate a more pluralistic society. The only system jeopardized by social stratification, if inappropriately designed, is a skywalk. Proper integration with open public spaces and adequate management will exclude that danger.

Publicness One of the main goals of each model is to enlarge the volume of public spaces. All of these spaces were incorporated to the system of pedestrian circulation. Basically, the systems consist of squares and pedestrian streets-precincts. Model number four, represented by the combination of open public and weather-controlled spaces, provides more spatial diversity.

Perception Model number two represents the highest flexibility to respond to the problem of spatial scale adjustment. The mid-block areas can be redesigned for pedestrian perception with a significantly lower number of building demolitions. Model number four can only partially, in the newly constructed, weather-controlled areas, fulfill the objective of an appropriate scale for walking people.

Co-existence Both models number one and three have the best potential for the successful co-existence of old and newly constructed structures. In the mid-block pedestrian system some changes in entering the buildings, usually oriented to existing streets, will have to be done. Also, the introduction of the skywalk system with its connections between buildings and rearrangement of the second level for more public use, may cause some problems.

Flexibility The rigid network of pedestrian precincts in the first two models represents the lesser flexibility to add or subtract other linkages or change the direction of precinct while maintaining their rational consistency. The greatest responsiveness to changing demand of public uses takes place in models three and four. The most easily extendable is solution number three.

Summary

The above evaluation of the models shows that the expected goals can be achieved to different extents. Some of these goals are achieved in all models, the other ones are fulfilled only partially. Before any single alternative can be selected a hierarchy of objectives should be established.

From today's perspective the most applicable model for the new pedestrian system in downtown will be a combination of model number one - a street level pedestrian grid, and model number four - a multilevel pedestrian system. Higher energy costs will likely reduce car ownership from the current 64 per cent to a level closer to European cities - about 35 per cent (see Figures 5.1 and 5.2 on pages 82 and 83). Thus, the European models may be appropriate for pedestrianization in

Milwaukee, with significant streets of historical interest incorporated in the new pedestrian network. Lack of investment in mid-block areas and the high cost of demolition of the existing urban fabric limits the possibility of implementing model number two. On the other hand, severe weather conditions and a very compact downtown core support an extension of the existing skywalk system.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

Many contemporary critics in the end of the fourth decade of the 'automobile age' in an attempt to evaluate today's 'motorized cities' point out how much we have lost and how little we have gain. Thus, it seems necessary to look forward establishing a new order for cities' development. This thesis advocates a reorientation of the present trend of individual transportation use in downtowns, by going back to the idea of walking people. Densification of downtowns, which will follow energy cost increases, will substantially reinforce the necessity of pedestrianization seen as a system. This system is intended to be understood as an element of the citywide circulation network. The unfortunate transformations of our cities over the last fifty years has been caused by misunderstanding this unbreakable connection. It was believed that subtraction of such an important element of the general circulation complex could successfully be supplemented by the other element - individual transportation. In this thesis the importance of all elements of the transportation network and their balance is strongly encouraged.

The historical analysis of town development shows that open urban spaces were always a tool of shaping the cities. Therefore new pedestrian precincts, advocated in this work, are seen as a way of formgiving, implementing the notion of continuity in the process of cities' transformation. It will also create a public realm,

the lack of which is widely criticized today.

The public space system should be first analyzed and then designed in a broader historical, socio-cultural, and economic context. All problems which emerged during the 'automobile age' when public realm in the cities was greatly diminished, were the result of lack of understanding of multifunctional nature of walkways. Thus any further studies of pedestrianization is encouraged to investigate these issues in a complex way.

Open urban spaces seen as a system will reinforce expected urban decisions leading towards future changes, which again can be concluded from the history of town planning.

Undoubtedly, the process of pedestrianization of today's cities, especially downtowns, is very promising. Many architects and critics have been discussing its appropriateness in the literature. Many cities all over the world have introduced pedestrian zones; however, the pedestrian network as a system rarely emerges as a solution, because of the relatively low level of demand for public uses in today's downtowns and because of the high cost of such an operation. Future changes in the energy market, outlined as prerequisites for the proposed solutions, may increase this demand and necessitate a search for more complex solutions. If this increase takes place, various combinations of the pedestrian systems will be good departure points for the design process. Proposed in this thesis, four of them emerged as a response to the particular set of problems existing today in the city of Milwaukee. The general ideas of these models, however, can be taken under consideration while investigating the pedestrianization in any city of similar size.

Before one of these solutions can be selected to be implemented, the following approach is suggested:

- Analysis of actual complex of problems (those considered here and newly emerging ones)
- Adjustment of proposed models and/or introduction of alternatives
- Reevaluation of solutions
- Selection of the most appropriate models and their development in the further stages of planning process

When all the stages of both planning and design processes are done, pedestrianization can begin. It will take several years before the appropriateness of this method can be evaluated. But the final and the most valid evaluation will be expressed by Milwaukee's inhabitants.

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