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Final Report
December 1977

Volume III.



Technical Report Documentation Page

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16. Abstract This report was produced as part of the Auto Restricted Zone/Multi-User Vehicle Systems Study of the Service and Methods Demonstration Program of the Urban Mass Transportation Administration. The volume presents plans for demonstration auto restricted zones in five U.S. cities: Boston, Massachusetts; Burlington, Vermont; Memphis, Tennessee; Providence, Rhode Island; and Tucson, Arizona.					
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**AUTO RESTRICTED ZONE/
MULTI-USER VEHICLE SYSTEM STUDY**

DOT-TSC-1057

FINAL REPORT

**VOLUME III
AUTO RESTRICTED ZONES:
PLANS FOR FIVE CITIES**

Prepared for
U.S. DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION

By
ALAN M. VOORHEES & ASSOCIATES, INC.
Westgate Research Park
7798 Old Springhouse Road
McLean, Virginia 22101

In Association With
CAMBRIDGE SYSTEMATICS INC.
MOORE-HEDER ARCHITECTS
and
A. T. KEARNEY INC.

December 1977

This report is prepared as part of the Auto Restricted Zone/Multi-User Vehicle System Study for the Urban Mass Transportation Administration of the U.S. Department of Transportation.

The purpose of the study was to (1) investigate existing experience with auto restricted zones and multi-user vehicle systems, (2) evaluate their feasibility as concepts applicable to urban transportation systems, (3) identify and evaluate potential sites for suitable demonstrated projects, and (4) design demonstration and evaluation programs for selected sites.

This particular report documents the investigation of existing experience and evaluation of key factors and overall feasibility of multi-user vehicle systems. The complete listing of final report documents includes:

- Volume I — Auto Restricted Zones: Background and Feasibility
- Volume II — Multi-User Vehicle Systems: Feasibility Assessment
- Volume III — Auto Restricted Zones: Plans for Five Cities
- Volume IV — Demonstration Site Selection
- Boston Auto Restricted Zone: Technical Appendix
- Burlington Auto Restricted Zone: Technical Appendix
- Memphis Auto Restricted Zone: Technical Appendix
- Providence Auto Restricted Zone: Technical Appendix
- Tucson Auto Restricted Zone: Technical Appendix

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Executive Summary

This volume reports on the final phase of the Auto Restricted Zone/Multi-User Vehicle System Study undertaken on behalf of the Urban Mass Transportation Administration of the United States Department of Transportation. The purpose of the study was to (1) investigate existing experience with auto restricted zones and multi-user vehicle systems, (2) evaluate their feasibility as concepts applicable to urban transportation systems, (3) identify and evaluate potential sites for suitable demonstration projects, and (4) design demonstration programs for selected sites. This particular report documents the demonstration program designs for five selected cities. Volume I reported on the investigation of existing experience and the evaluation of key factors and the feasibility of auto restricted zones. Volume II described the investigation and evaluation of Multi-User Vehicle Systems. Volume IV documents the demonstration site selection procedure used to derive the five ARZ candidate cities described in this report.

The term "auto restricted zone" or ARZ can apply to almost any land area where vehicular travel is regulated, controlled or restricted in some manner. Thus, although we seldom think of it in this way, all of our urban areas are already functioning as ARZ's for vehicular traffic is presently subject to a wide range of controls. The underlying characteristics of an ARZ as discussed in this study, then, is that of a district or zone distinguished by a higher degree of control over vehicular traffic than the surrounding area.

In earlier phases of this study, a wide array of techniques for traffic restraint were identified and categorized as physical, operational, economic, and regulatory control measures. Options range from the complete closure of streets and the prohibition of all traffic to such measures as parking controls, area permits, turn restrictions, and exclusive use lanes or streets. Within the focus of this study on physical and operational measures of restraint, the techniques identified are already in common use and are therefore familiar and available for immediate implementation. This document reports on the application of some of these techniques to downtown areas of five American cities.

While the five cities were not selected with an eye to being a "representative sample" of American cities, they do cover a wide range of sizes and conditions and, not unexpectedly, have many characteristics which are shared by others. Each city, though, has unique problems and opportunities, and they are considering an ARZ for a variety of reasons.

The five cities are

- Boston, Massachusetts
- Burlington, Vermont
- Memphis, Tennessee
- Providence, Rhode Island
- Tucson, Arizona

These five cities represent quite different sizes, densities, and street patterns. They have very different transit service to their downtown centers and corresponding differences in transit usage. The reasons for considering an ARZ, or put another way, the objectives sought also show considerable variety. That variety speaks for the adaptability of the ARZ concept to many different conditions and reinforces the conclusions reached in earlier phases of this study to the effect that:

- City size is not critical to ARZ success
- Complete prohibition of traffic is not the only option

Other key factors identified in the earlier phases guided the development of the plans. Thus, the areas considered for ARZ treatment were the most active areas in the five downtowns because the need to have a high level of activity and a diversity of activity had been identified as a key factor for success.

In Boston, attention focused on a .7 square-mile area in the heart of the active CBD of a metropolitan area of nearly 3 million persons. This downtown, with its archaic street system, excellent transit service and pedestrian travel volumes, resembles, perhaps more than any other U.S. city, the European environments that have had such success with auto restricted zones. The plan proposed extensive reorganization of the surface circulation system to reduce the apparent conflict

and congestion. A major element of the plan was improved transit operations within the area through the creation of the Washington Street Busway and exclusive contra-flow lanes for smoother flow of bus traffic. Pedestrians benefit too, through the proposed closure of Winter and Summer Streets to vehicular traffic, thus creating a vehicle-free link from the heart of the shopping area to Boston Common.

Burlington demonstrates the validity of the ARZ approach to small and medium-sized urban areas. Although the City has a population of less than 40,000, the active pedestrian-scale downtown serves as a regional center for a large and well-populated section of New England. The ARZ approach here, sought to build on significant local initiative in restricting auto traffic. The ARZ plan expanded on the large-scale urban renewal effort of prior years, which had included some street closures, and was only now beginning to come to fruition. Thus the ARZ plan proposed major improvement in pedestrian facilities with the creation of the Church Street Mall on four blocks of the main downtown shopping street. This mall provides the North-South connector to the recently completed East-West enclosed shopping mall, thus creating a highly functional and largely weather-protected pedestrian circulation network for the entire CBD.

For the ARZ plan in Memphis, a unique approach was adopted. Emphasis was directed away from major new facilities or services to consideration of selective improvements that could be made to expand and enhance existing auto restricted areas. The Mid-America Mall, only fully operational in the last year, is a complete transformation of the former Main Street, constituting one of the largest pedestrian malls in the United States. The plan developed for Memphis sought to enhance the attractiveness of the area to shoppers and to expand the impact of the mall to a greater portion of the downtown area. A major feature of the plan was the proposed, extended free-fare zone for improved transit connections to the Medical Center, a nearby concentration of employees and visitors that could be tapped by downtown businesses. Other features of the plan involved expanding East-West pedestrian linkages to connect the mall with underused parks along the bluffs overlooking the scenic Mississippi River. Perhaps most important, the ARZ plan offered an approach that can unify a number of existing plans and proposals for downtown

redevelopment and thus provide a foundation or perspective for downtown planning in the years ahead.

The congested, older CBD of Providence, like Boston, demonstrated the utility of the ARZ approach in the densely developed cities of the Northeast. Although like other central cities, Providence's population has declined somewhat in recent decades, the downtown remains active, primarily due to the concentration of government employees and others. Pedestrianization has been popular in Providence for a number of years, dating back to the creation of the Westminster Mall in 1965. The ARZ plan built upon this and the volume of recent activity in restoration and rehabilitation of the downtown, with projects such as Weybosset Hill, the Biltmore Hotel, and the Civic Center. The ARZ plan sought to extend this revitalization to the Union Station, City Hall, and Kennedy Plaza area. Primarily, plan elements are oriented toward improvement in the transit-pedestrian interface. The plan proposes major improvement in downtown bus stops and their connections to the pedestrian network. Improved transit operations are also sought through reduced delays in downtown service. Revisions in the current circulation pattern are proposed to improve traffic operations and reduce auto-pedestrian conflicts.

Tucson represented an urban area significantly different from the others. The Tucson metropolitan area has been characterized by rapid growth and comparatively low density development, even in the central area. The area's auto orientation and the resulting impacts of widespread auto usage led to consideration of ARZ as a step in encouraging the use of public transport modes. The foundation of the ARZ approach here was the unification of the CBD. The plan sought to create needed connections between isolated downtown sub-areas such as the Government Center, the Business District, and La Placita. To create a new downtown cohesiveness, a number of changes were proposed in the downtown pedestrian and transit systems. Pedestrians would experience a major improvement in level of service through the closure of Stone to vehicular traffic and the conversion of Congress into an East-West transit-pedestrianway. Similarly, bus operations would be improved by reduced conflict with auto traffic, and the proposed downtown transit shuttle would improve accessibility within downtown and open nearby activity centers, such as the University of Arizona to downtown stores and activity.

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1. INTRODUCTION

Chapter 1. INTRODUCTION

BACKGROUND

This report describes Auto Restricted Zone proposals for five American cities. The proposals were prepared by a consulting team and illustrate the kinds of actions which might be taken to re-allocate street space to achieve a better balance between the many competing users.

The five cities cover a wide range of sizes and types. The largest is Boston, one of America's oldest cities, with a downtown street system which is reminiscent of European cities. Boston is also the most transit-oriented of the five downtown places studied and, with heavy transit usage and narrow, irregular streets, it has the greatest concentration of pedestrians and the most congestion of any of the cities.

The smallest of the five is Burlington, Vermont, with a population of 39,000. Burlington is the major trading hub of an extended region, however, and is representative of many regional hubs throughout the United States. Providence, Rhode Island, is the other eastern city. Like many such cities, it has substantial downtown employment, good freeway access, but a relatively poor street system.

Memphis, Tennessee is the only southern city. Memphis has invested heavily in its downtown, and the business community is responding with the result that downtown is regaining some of its retail and commercial strength.

Tucson, Arizona, completes the group. It is the fastest growing and the most auto-oriented of the four large cities. It is representative of many western cities with broad arterial streets, low density development, and a small downtown. Tucson has also invested heavily in its downtown in recent years and has plans to encourage more new development, including in-town housing immediately adjacent to the office and retail core.

DEMONSTRATION PLAN DEVELOPMENT AND CONTENT

The consulting team visited each City initially for a reconnaissance and briefing. In these sessions, the City staff outlined the issues and problems from their perspective, the availability of information, and the status of planning. Through a series of group and individual meetings and field reconnaissance, the consultants attempted to identify the problems and opportunities in enough detail to be able to specify the kinds of information needed to define the problems more precisely.

While every effort was made to use existing data sources, it was necessary to obtain certain kinds of field data and sometimes to process existing information to extract the pertinent facts. The data collection program was then divided between the City and consultants and work continued on defining objectives for an ARZ, alternative plans, and programs.

The team then reassembled in the City to discuss alternatives. At the conclusion of that visit, there was general agreement on the objectives and a broad outline of the plan. The consultants then refined the plan and submitted it to the City. Each City then refined the plan further with the objective of submitting an application for a demonstration project.

The plans which are described in this Volume are those which were prepared by the consultant team. Thus, they are illustrative and are neither adopted nor approved by the respective cities.

At the same time, they are not pie-in-the-sky plans. In most cases, they would represent only a modest advance in the restriction of auto traffic. But those modest changes will be seen by the reader to make possible a significant change in the ability of pedestrians, buses, and essential vehicles to circulate within the area in comfort and safety. They would also make possible a dramatic improvement in the appearance of the area.

The plans propose not just street improvements, but activity and management programs as well. Some of the cities already have such programs. For the others,

major elements of these proposed activity plans are identified and described, along with a number of other implementation-related considerations such as potential funding sources.

Each of the cities is different, with different problems and opportunities. The plans for the five cities that follow reflect both this diversity of ARZ opportunities and the variety of objectives, problems, and constraints influencing the ARZ planning process.

2. BOSTON

Chapter 2. BOSTON

I. INTRODUCTION

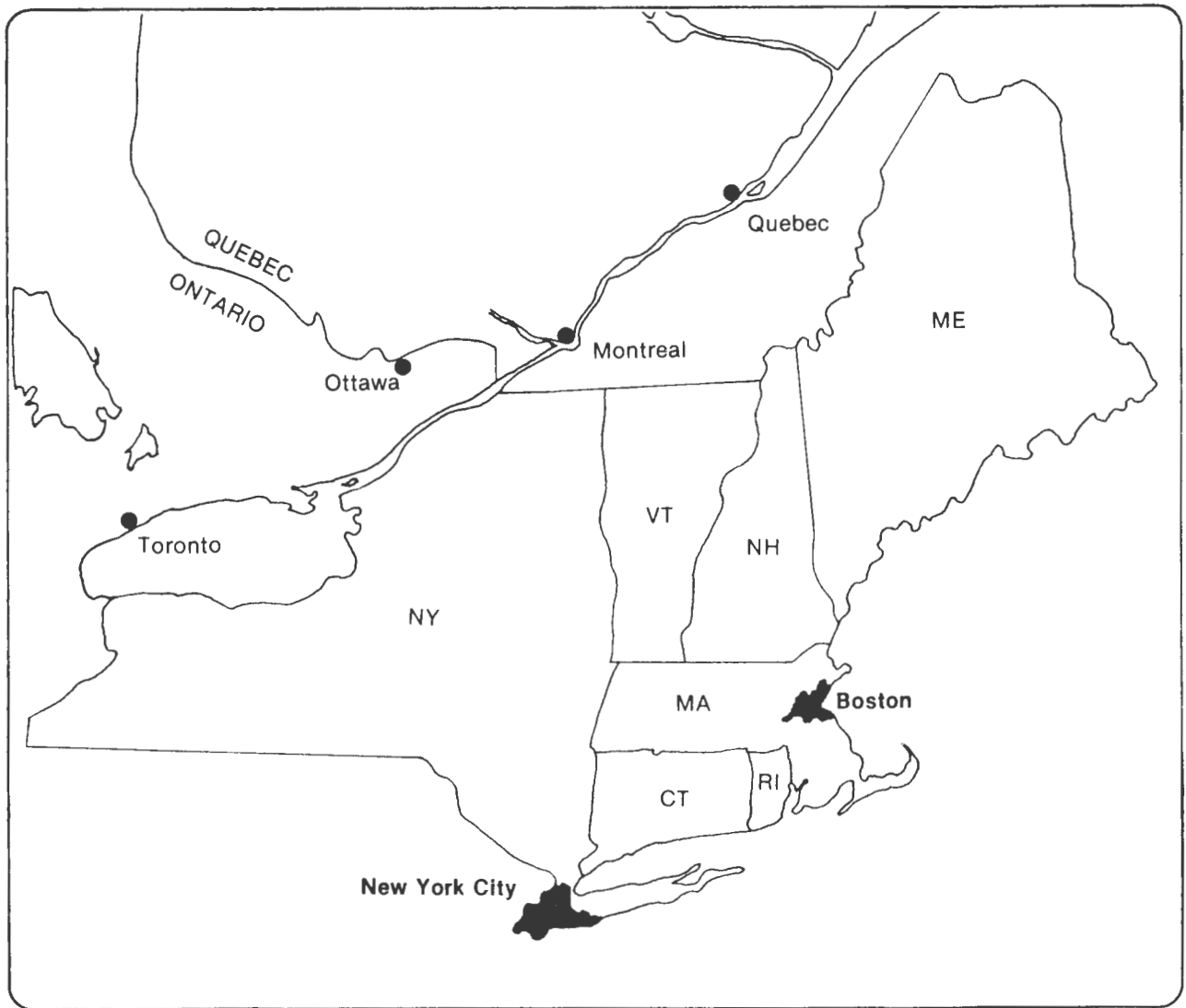
Boston, Massachusetts is the principal urban center of New England and one of the oldest and most densely developed urban areas in the United States. The Boston metropolitan area, the eighth largest in the country with an estimated 2.9 million people occupies 50 square miles of land bordering Massachusetts Bay and the Atlantic Ocean, as shown in Figure II-1.

Because of the area's long-established economic base, trends in area population do not show indications of strong growth as found in urban areas in other developing regions of the nation. Although metropolitan area population grew 8 percent between 1960 and 1970, city population declined 8 percent to 641,000 persons. Recent census projections indicate that Massachusetts and the New England region will show population growth rates of 4 percent and 2 percent, respectively, in the current decade. This picture of slight population increase within the region probably implies an extension of the 1960-1970 population trends for the City and the metropolitan area.

Despite these population trends, Boston remains one of the most densely developed cities in the country. Population density within the City is almost 14,000 persons per square mile. Economic activity is also heavily concentrated in the City as the density of employment is 5,783 jobs per square mile. Employment in the Boston area is spread over a wide range of activities. Boston is a strong regional and national center for banking, insurance, manufacturing, government, and education. In the New England region of nearly 12 million people living east of New York State, as shown in Figure II-1, Boston is the principal urban area, serving as a regional center for entertainment and distribution of retail goods and services.

II. THE DOWNTOWN

The area chosen as the focus of the Boston Auto Restricted Zone Study is the heart of the downtown, the oldest developed area in the City. Within the 3.6 square-mile



BOSTON AUTO RESTRICTED ZONE STUDY

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Figure II-1. Boston and the New England Region

area defined as the Central Business District, nearly 300,000 persons are employed. The area chosen for the ARZ Study comprises only .7 square miles but has an overall employee population of 126,343. Figure II-2 illustrates the ARZ study area and the locations of various concentrations of activity in the area. The study area covers the core retail and financial districts of the CBD. On the north is the government center; Boston Common is the western boundary; and to the east are more offices and the revitalized waterfront.

Retailing is a principal activity within the area, anchored by the presence of several major department and variety stores. Despite a 14 percent constant dollar decline in total sales volume reported for the five years prior to 1972, the retail environment appears to be strong. Vacant retail ground floor space is minimal. Major retail establishments are showing future commitment to downtown with reconstruction of facilities and continued promotion and support of downtown outlets. Other retail activity in downtown includes clothing, shoes, cameras, records and books. In recent years branch banking has grown considerably in use of ground floor space.

Dining and entertainment are well represented in downtown Boston. The old City Hall has been converted to a French restaurant, complete with an outdoor cafe-style dining area. The Parker House on Tremont Street remains a first-class hotel and a center of evening activity with its bars, restaurants and social functions. The Boston Opera Company is headquartered in the former Orpheum Theater. Along Washington Street are several legitimate movie theaters and the adult entertainment district which offers a variety of bars, theaters, and bookshops.

Many highly visible improvements have occurred in downtown Boston during the last fifteen years. Numerous major new office buildings were constructed in the Financial District, particularly along Franklin Street. A major new Government Center, as shown in Photo II-1, was constructed at the head of Washington Street, and a renewed connection to the waterfront has just been completed. Renewal in the South Cove and the Tufts Medical Center, as well as other current proposals, reinforce the activity base of the downtown area.

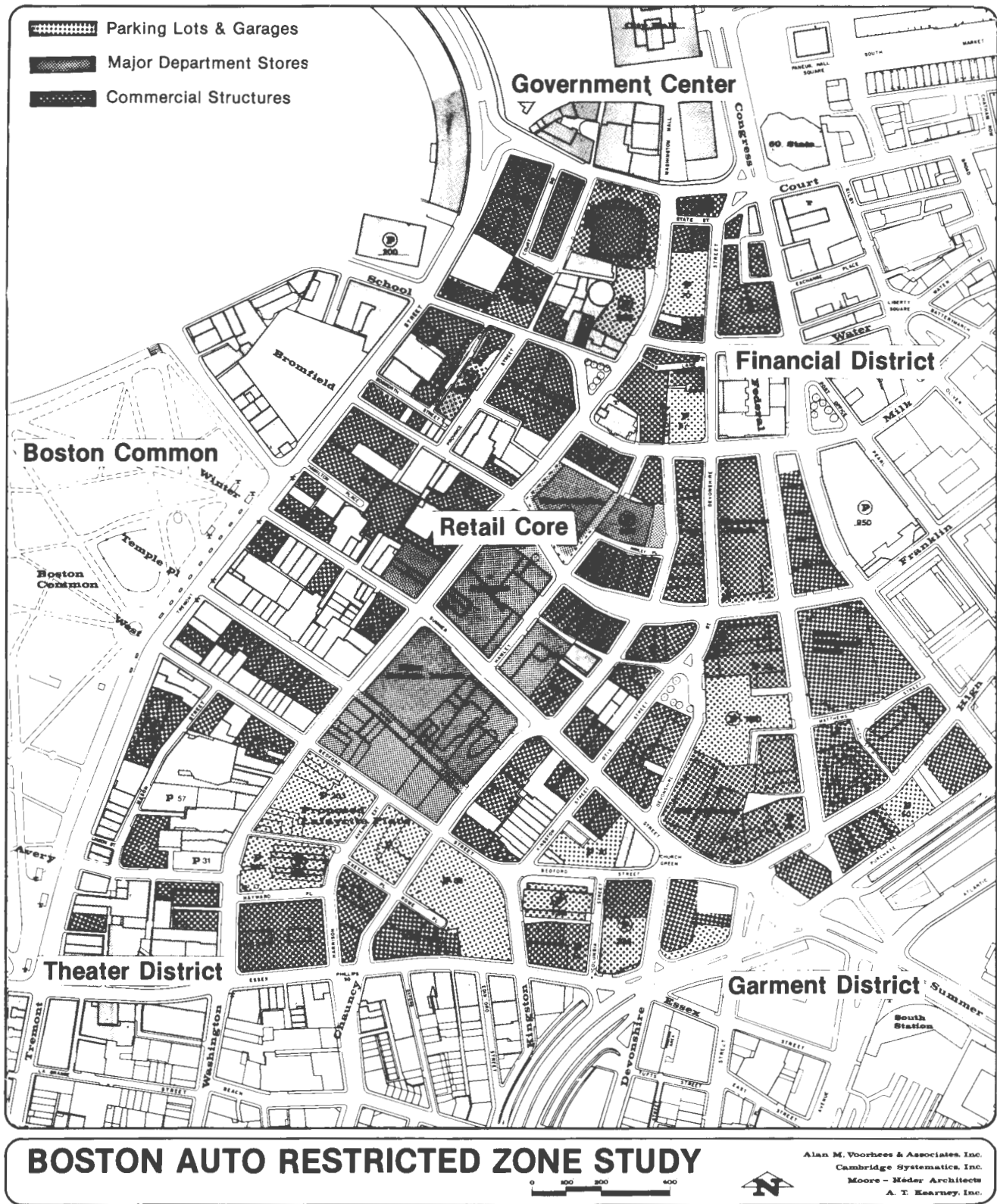


Figure II-2. Study Area Activity



Photo II-1. Government Center Plaza and New City Hall



Photo II-2. Faneuil Hall Markets—Building Reuse for Restaurants and Specialty Shopping

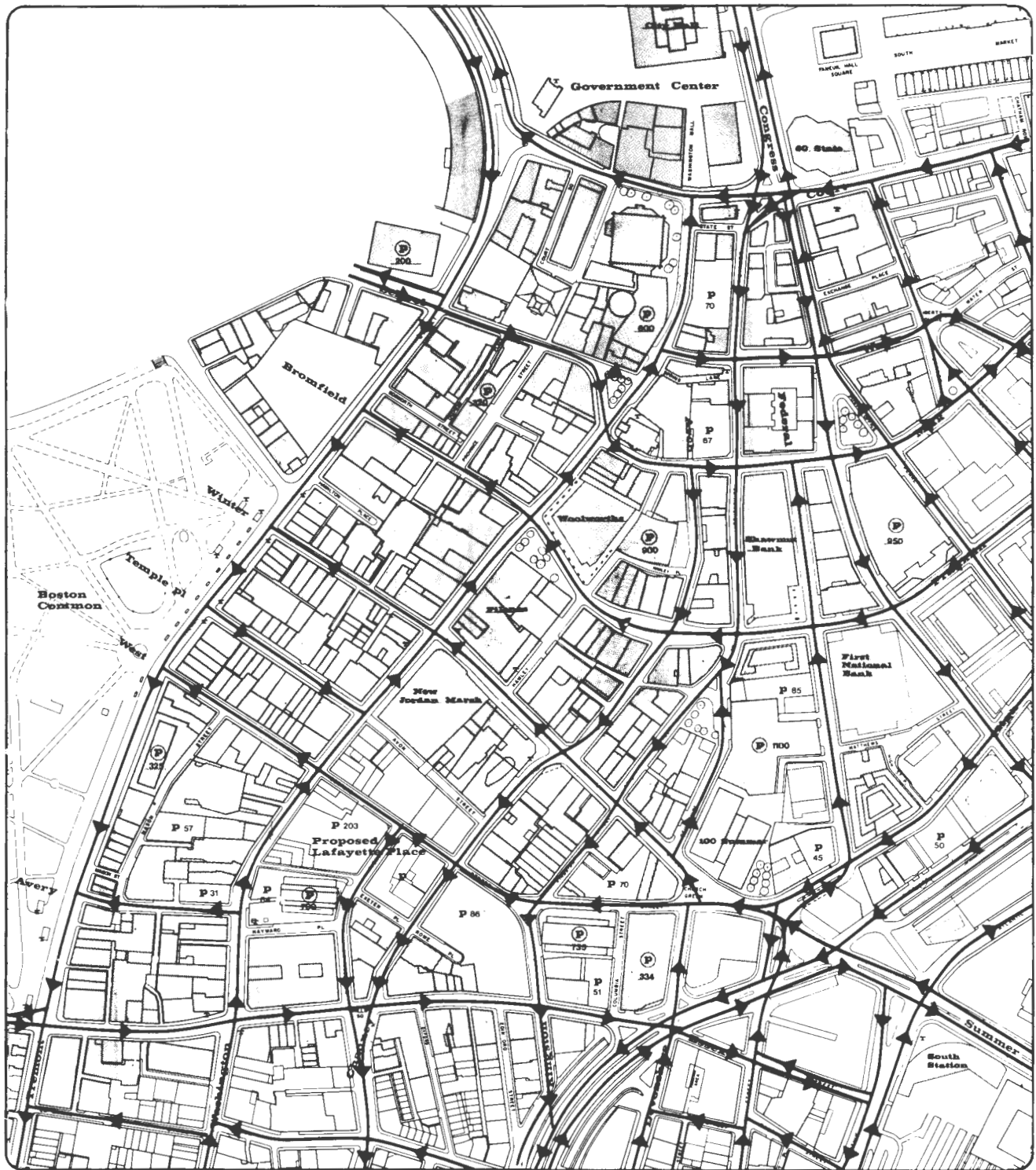
The historically important and attractive buildings dotting these streets enhance their potential for successful renewal. Many of the buildings possess a quality and scale which have made European pedestrianized streets delightful. Reuse of such buildings has accelerated in Boston in recent years. Old City Hall, the Record American Building, and the Faneuil Hall Markets, shown in Photo II-2, are good examples of conversion and reuse in the downtown area.

As the result of a careful, incremental approach by the Boston Redevelopment Authority Urban Design Department, a number of small but highly significant open space improvements occurred within the downtown at School and Washington, Filene's Park, Winthrop Square, next to Summer Street, and Liberty Tree Park. On workdays, particularly at peak hours, there is more than sufficient activity to keep all of these improved areas well-occupied.

The physical renewal and relatively stable activities make downtown Boston one of the most successful examples of downtown revitalization in the country. Its current physical character is set by a dense blending of new and historic buildings on a complex irregular street pattern. It serves as the financial and government center for a 3 million person metropolitan area. It is a center of a major underground rapid transit system. It is alive with concentrated daily business activities and caters to a large number of tourists and visitors. The downtown is surrounded by attractive residential areas, medical institutions, and other stable activity centers, insure its long-range vitality. The following is a description of each major element of the downtown infrastructure.

Streets

The existing pattern of traffic circulation is shown in Figure II-3. As can be readily seen, traffic patterns within the study area comprise a maze of narrow, discontinuous one-way streets. This is largely due to the incremental development of the street network which was extended so the City grew. Thus the origins of the downtown street system date back to the period of Boston's settlement in the 17th Century and by 1810, the network closely resembled the pattern that exists today. The existing downtown street network has become an anachronism in this automobile age. The street system was not designed for movement of high volumes



BOSTON AUTO RESTRICTED ZONE STUDY

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Figure II-3. 1977 Existing Circulation Pattern

of motor vehicle traffic but rather for a compact 18th Century city where walking was the most common travel mode.

The performance of this street system in accomodating downtown traffic reflects its origins in another era. Although traffic volumes are not excessive for a major urban area, the narrow streets and complex intersections in the study area produce traffic congestion throughout much of the day. Evening peak-hour volumes range from over 1,000 vehicles on Court Street to 280 on Federal Street. Average traffic volume for the evening peak is in the vicinity of 700 vehicles per hour. Congestion within the area is exacerbated by a lack of proper traffic regulations enforcement. Illegal parking, double parking, and illegal loading and unloading combine with heavy pedestrian volumes to create severe congestion in peak hours and a high "base level" of congestion in the off peak. Lack of parking regulation enforcement reduces the capacity of the downtown street network by as much as 45 percent.

Analysis of traffic conditions led to the identification of several critical intersections on the periphery of the study area. These critical intersections, many of which are actually outside the study area, are highly congested and act as throttles, backing up traffic leaving the area. These intersections are located to the north, west and south of the study area and are the major gateways for traffic originating or destined for the retail core. Key intersections include: Tremont at Boylston, Beacon, and Kneeland; Dewey Square; Congress at Atlantic; and Kneeland at Washington.

Parking

Automobile parking in the study area creates many of the problems in traffic circulation described above. In the entire Boston CBD it is estimated that one-fourth of the vehicles, as many as 20,000 cars, are illegally parked on a typical weekday. The demand for convenient and inexpensive on-street parking far exceeds the limited supply, but enforcement of parking regulations is not rigorous enough to transfer this excess demand to off-street facilities.

The supply of parking within the study area has been a focus of controversy in recent years. The 1973–75 Environmental Protection Agency's transportation control plan

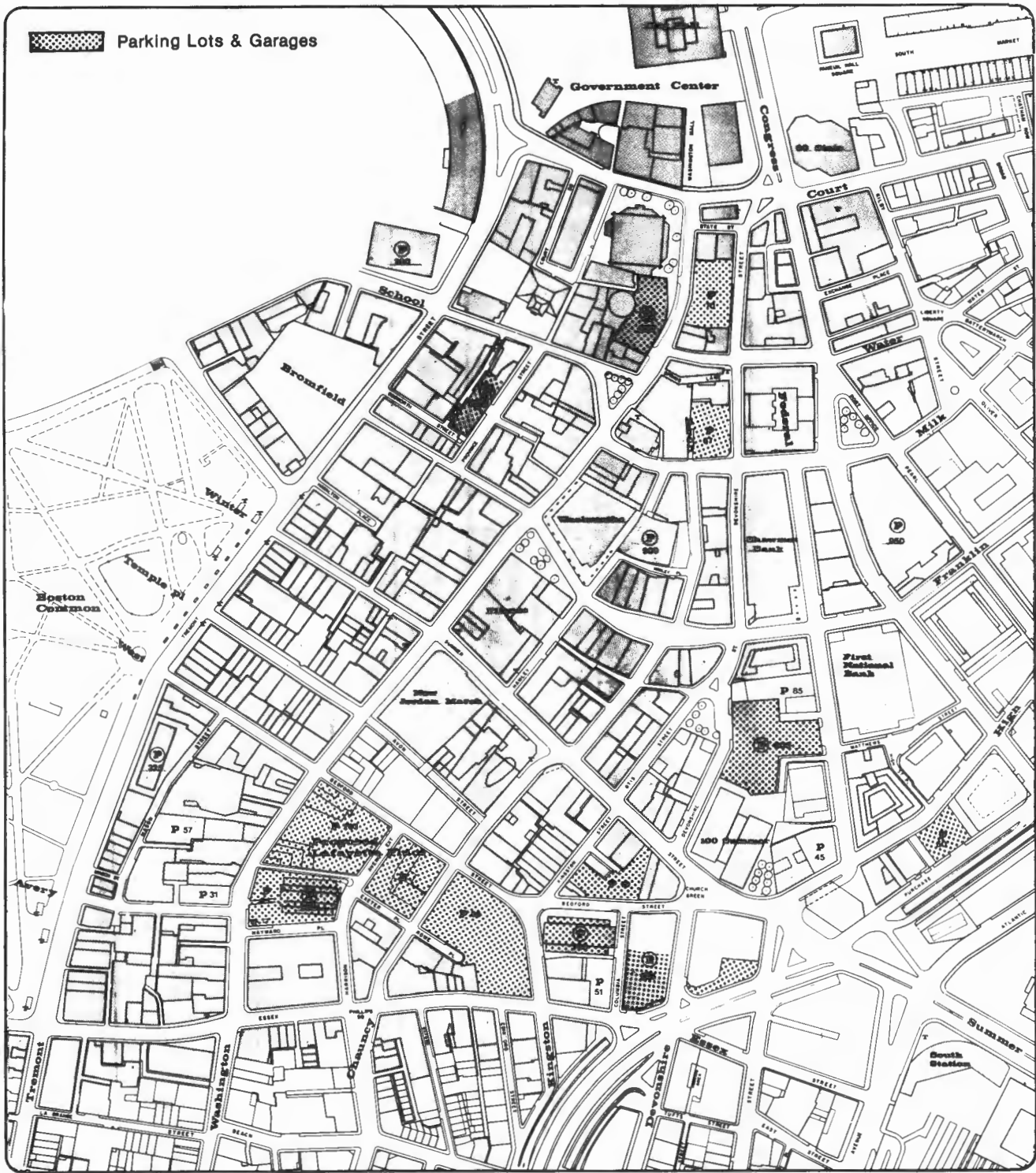
for the Boston area created a moratorium on new parking facilities and a ban on on-street parking within the City's core. Figure II-4 shows the locations of current parking lots and garages within the ARZ study area. Despite apparent strong demand for auto parking and constraints on supply, some surplus capacity exists even during periods of maximum accumulation. Table II-1 identifies the facilities and shows a total of almost 1,400 parking spaces within the ARZ study area and the adjacent financial district.

Table II-1. Parking Garage Surplus Within ARZ Catchment Area

<u>Location</u>	<u>Type</u>	<u>Effective Capacity</u>	<u>Maximum Accumulation</u>	<u>Surplus</u>
Woolworth	Drive-In	810	630	180
Tremont on the Common	Drive-In	180	130	60
Hayward Place	Mechanical	595	455	140
Bedford-Kingston St.	Mechanical	625	370	255
Beach St.	Drive-In	540	375	165
Kilby St.	Mechanical	595	420	175
Fort Hill	Mechanical	550	390	160
Harbor Towers	Drive-In	1,350	1,100	<u>250</u>
				1,385

Transit

The Boston metropolitan area has one of the most extensive systems of public transportation in the United States. The downtown is the hub of the Massachusetts Bay Transportation Authority's (MBTA) regional transit network that offers a broad array of services. Available modes include subway, local bus, express bus, shuttle bus, commuter rail and taxicab. An estimated 40 percent of all trips to the CBD on a typical day are made by using one of these modes of public transportation. Transit usage in the ARZ study area at the core of the CBD is even higher, as shown in Table II-2. To review the available modes:



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Figure II-4. Study Area Parking Facilities

Table II-2. ARZ Study Area Travel: Mode Split*

Mode	Percent of All Trips To and From the Study Area	Percent	
		Work	Non Work
Subway	57		
Local Bus	2		
Express Bus	3		
Total Transit	62	62	38
Total Auto	38	40	60

* Walk and commuter rail trips excluded.

- Rapid Transit — The subway system comprises four major lines which extend radially from the CBD. Figure II-5 shows the location of the lines and stations within the study area, together with the number of boardings at each stop. The six subway stations within the ARZ study area provide access to all of the four regional lines. Daily patronage is estimated to be over 190,000 trips per day to and from the area.
- Local Bus Routes — The MBTA also operates several local bus routes that serve the ARZ study area. Routes within the area are shown in Figure II-6. Table II-3 displays data on areas served, ridership to and from the ARZ, and frequency of service in the peak hour. Route 43 connecting Roxbury and the South End to downtown shows the highest ridership of any of the local bus routes. Overall, local bus patronage amounts to 2 percent of all travel to and from the study area.
- Express Commuter Bus Routes — Figure II-6 also shows the route pattern followed by the four commuter express buses that connect the suburbs to the City's core. Route 304 from the Watertown area has the highest patronage of these express routes, as shown in Table II-3. Express bus users account for 3 percent of all travel to and from the study area.

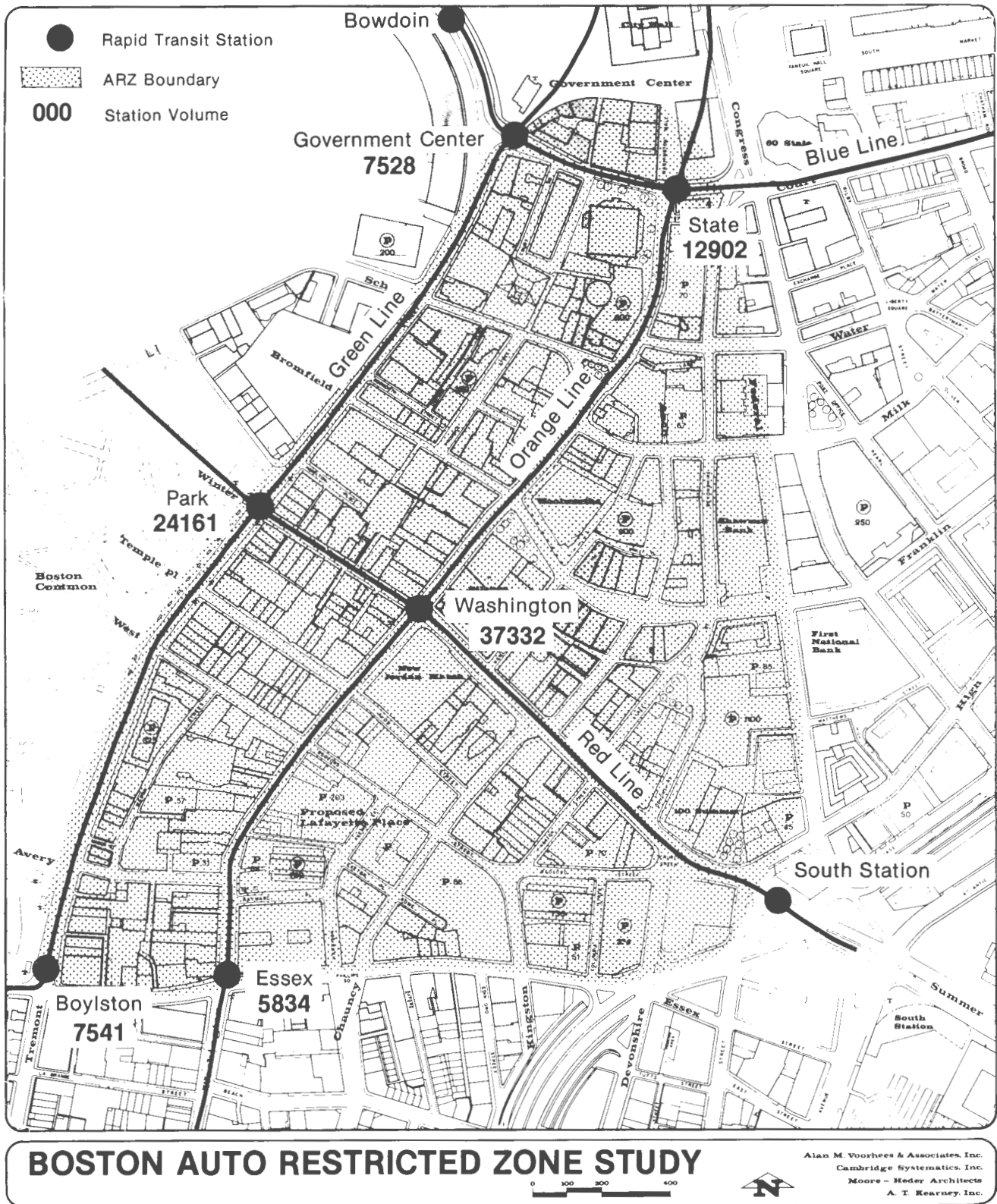


Figure II-5. Rapid Transit Service



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Figure II-6. Existing MBTA Bus Service

Table II-3. Summary of MBTA Bus Routes Affected by the ARZ

<u>Route</u>	<u>Area Served</u>	<u>Trips To or From Study Area</u>	<u>Buses in Peak Hour</u>
<u>Local Routes</u>			
2	North Station Haymarket South Station Financial District	750	10
11	South Boston	1,070	7
43	Roxbury South End	2,756	8
49	Orange Line between Northampton and Essex	95	2
<u>Express Routes</u>			
300	Riverside Newton Western Sub- urbs	3,600	16
301	Brighton Center	1,850	9
304	Watertown	4,350	13
305	Waltham Western Suburbs	1,200	5
TOTAL		1,5671	70

- Commuter Rail — In addition to rapid transit and bus services, the MBTA also operates 12 commuter rail lines which carry 30,000 passengers per day to or from the CBD. The lines connect the more distant suburbs to the CBD via South Station at the southeastern corner of the ARZ study area.
- Taxi — An estimated 4,000 trips per day are made by taxicabs to or from the ARZ study area, demonstrating that taxi service in the core is an integral part of the Boston CBD internal circulation and feeder service. Cabs may be hired at any of the 55 full-time taxi stands within the study area or anywhere within the retail district in which empty cabs cruise for fares. Taxi travel to the study area peaks in the early morning with taxi trips originating in the area concentrated around midday.

Pedestrian Facilities

Because the study area comprises the core of the extremely active and densely developed retail and financial district, pedestrian travel volumes are among the highest in the City and the nation. These heavy pedestrian volumes serve to compound other circulation problems due to inadequate streets, heavy vehicular traffic, and widespread illegal parking. Pedestrians and vehicles are in a state of conflict throughout the day, but especially in peak hours, as they both attempt to cope with inadequate facilities.

The pedestrian experience in downtown Boston is one of conflict, congestion, and confusion. During peak hours, pedestrian volumes on Washington, Tremont, Winter-Summer, and Franklin are in the 5,000 to 9,000 range; facilities which can accommodate these volumes are lacking. Moreover, congested flow along sidewalks occurs throughout the downtown area. On the links between the Government Center and Financial District employment areas and subway stops, express bus stops, and the Retail District, heaviest congestion occurs during morning, evening, and lunchtime peaks. Using Fruin's measure of pedestrian congestion, level of service along Franklin Street falls in the D and E range, in which conflicts between pedestrians are inevitable, physical collisions probable, crossing or reverse movement severely restricted, and passing of slower pedestrians rarely possible. On major shopping streets, such as Washington and Winter-Summer, the level of pedestrian congestion rarely abates through the afternoon shopping period between lunchtime and evening peaks.

Levels of service on these streets range from C to E, and the amount of additional sidewalk width required to achieve level of service B ranges up to 21 feet, as shown in Table II-4.

Figure II-7 compares pedestrian volumes and the number of occupants in vehicles on the streets in the area. It graphically illustrates the inequitable allocation of public street space. Four times as many pedestrians as people in vehicles use Washington Street. Yet, the pedestrian sidewalk space is half the amount of roadway provided for the vehicles.

As pedestrians tire of being buffeted about on congested sidewalks, they move out into the roadway space and into conflict with automobiles. Photos II-3 and II-4 show pedestrians abandoning crowded sidewalks and moving into the streets. Pedestrian-vehicular conflict at corners is heaviest along Tremont, Court, Washington, Franklin, and Winter-Summer. Pedestrians overflow onto roadway due to heavy levels of corner congestion. Vehicles inevitably move into the intersection on yellow lights and when the traffic light changes to the WALK phase, pedestrians are forced to pick their way through a mass of cars, as shown in Photo II-5. On the major shopping streets, Washington and Winter-Summer, pedestrians often cross streets in mid-block to get from store to store on opposite sides of the street. Both types of conflict are potentially dangerous and undoubtedly an irritant to the pedestrian experience downtown.

Sidewalk obstructions further reduce effective sidewalk width available for pedestrian flow by 40 to 60 percent on streets within the area. On Washington and Franklin, an array of mailboxes, light poles, sign poles, parking meters, trash cans, loading doors, and subway grates set into the sidewalk (over which few pedestrians choose to walk) decreases a 9-10 foot average sidewalk to an effective width of 5-6 feet. On the north side of Winter, the sidewalk is reduced from 9 feet to 4 feet, and on Summer, from 12 feet to 6 feet.

The greatest degree of sidewalk obstruction, though, occurs at street corners where the various poles, mailboxes, and trash cans congregate at the areas of greatest pedestrian flow and congestion. Figure II-8 summarizes areas of pedestrian conflict within the study area.

**Table II-4. Pedestrian Levels of Service*
12:30 to 1:30 pm**

	<u>Existing Level of Service</u>	<u>Additional Feet of Sidewalk Width Required to Reach LOS B</u>
Washington Temple to Winter	E	17
Washington Winter to Bromfield	D	8
Washington Summer to franklin	C	2
Washington Bromfield to School	E	8
Washington Franklin to Milk	C	5
Summer Washington to Arch	A	0
Summer Washington to Chauncy	A	0
Temple (South)	A	0
Temple (North)	A	0
Franklin Howley to Arch	D	10
Franklin Washington to Arch	E	21
Bromfield (South)	B	0
Bromfield (North)	C	2

* Source: Boston Mayor's Office

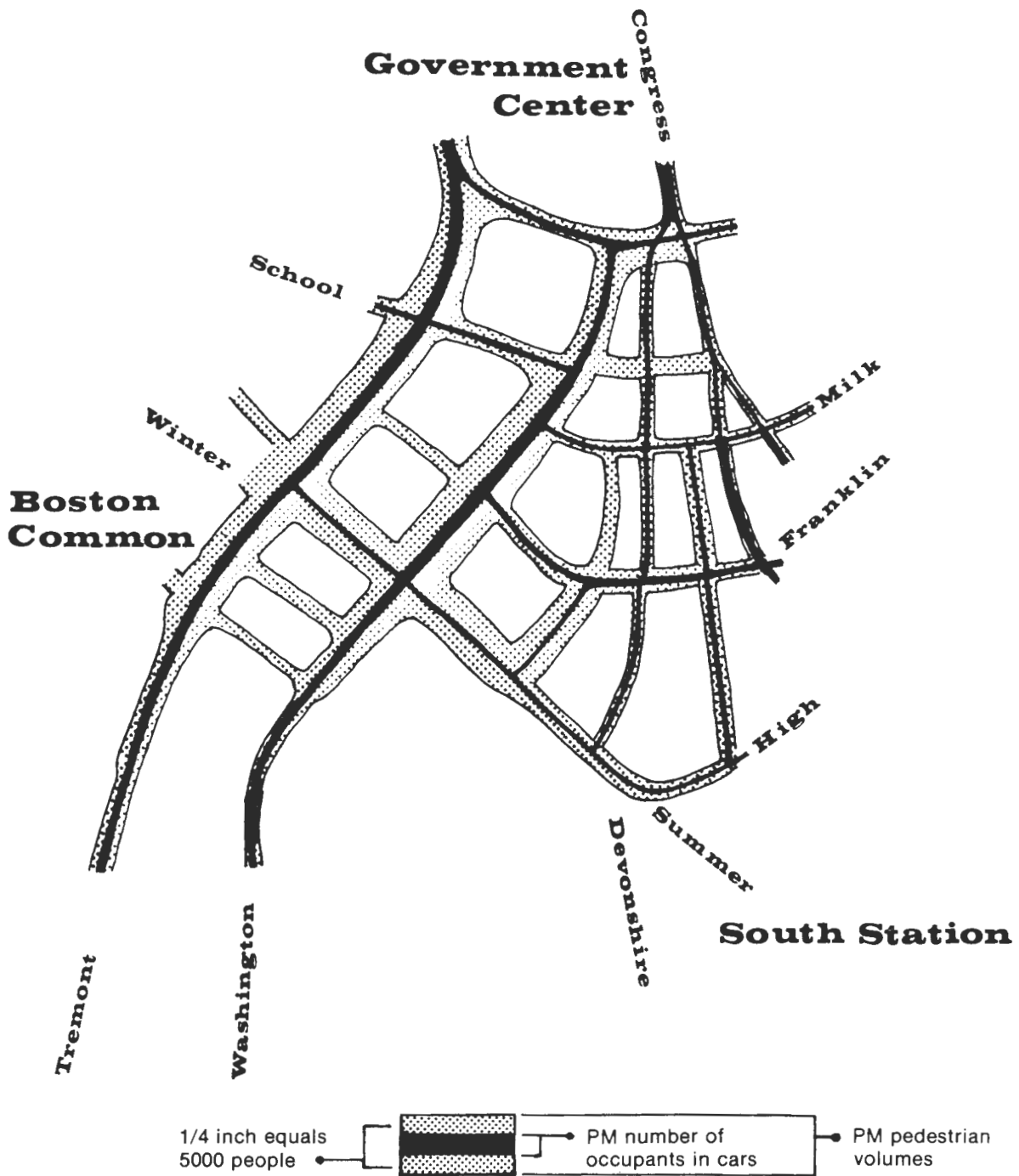


Figure II-7. P.M. Pedestrian Volumes vs. Number of Occupants in Cars



Photo II-3. Winter Street—Pedestrians Move into Roadway Due to High Levels of Sidewalk Congestion



Photo II-4. Washington Street



Photo II-5. The 100% Corner—Washington and Winter/Summer Streets

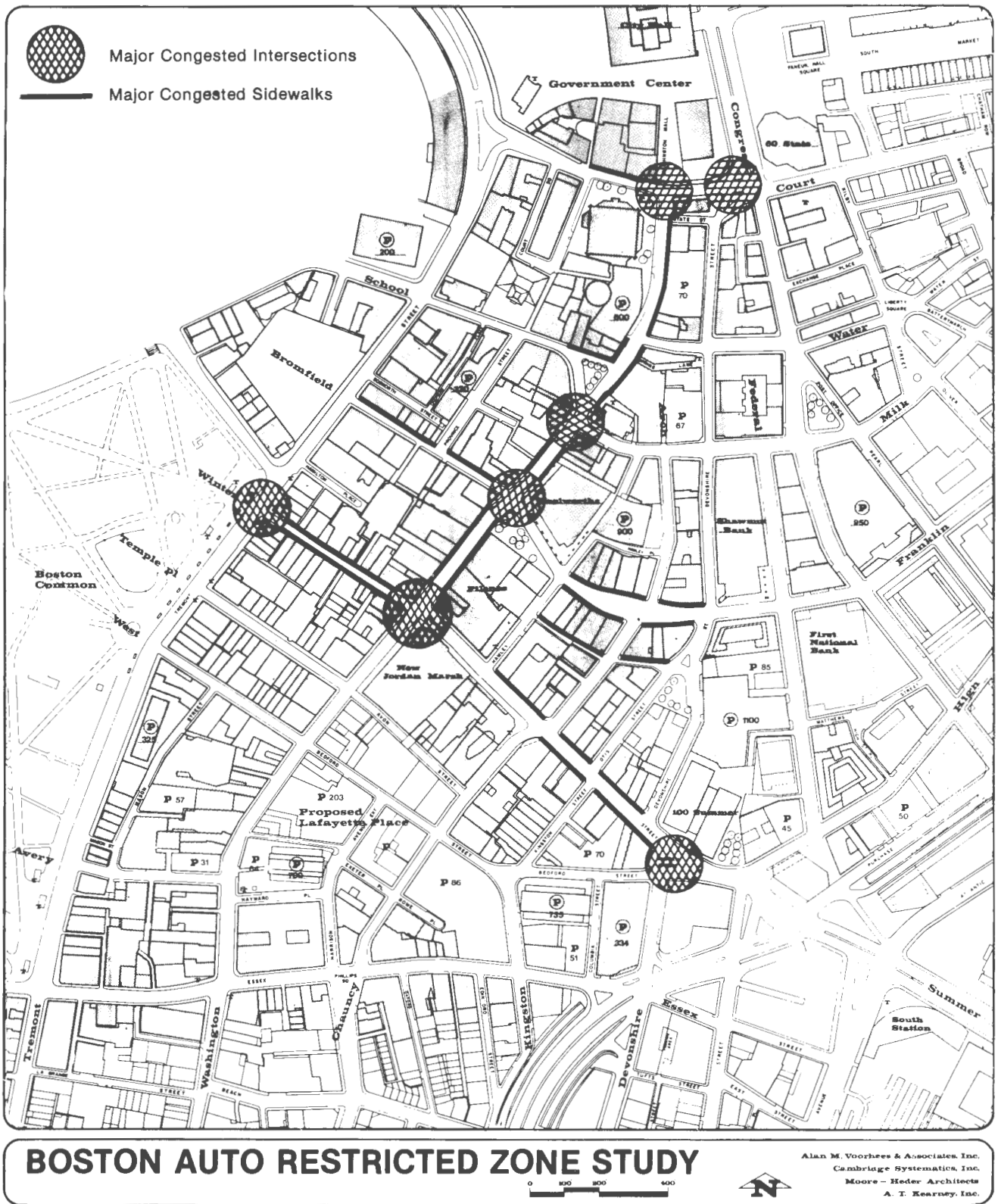
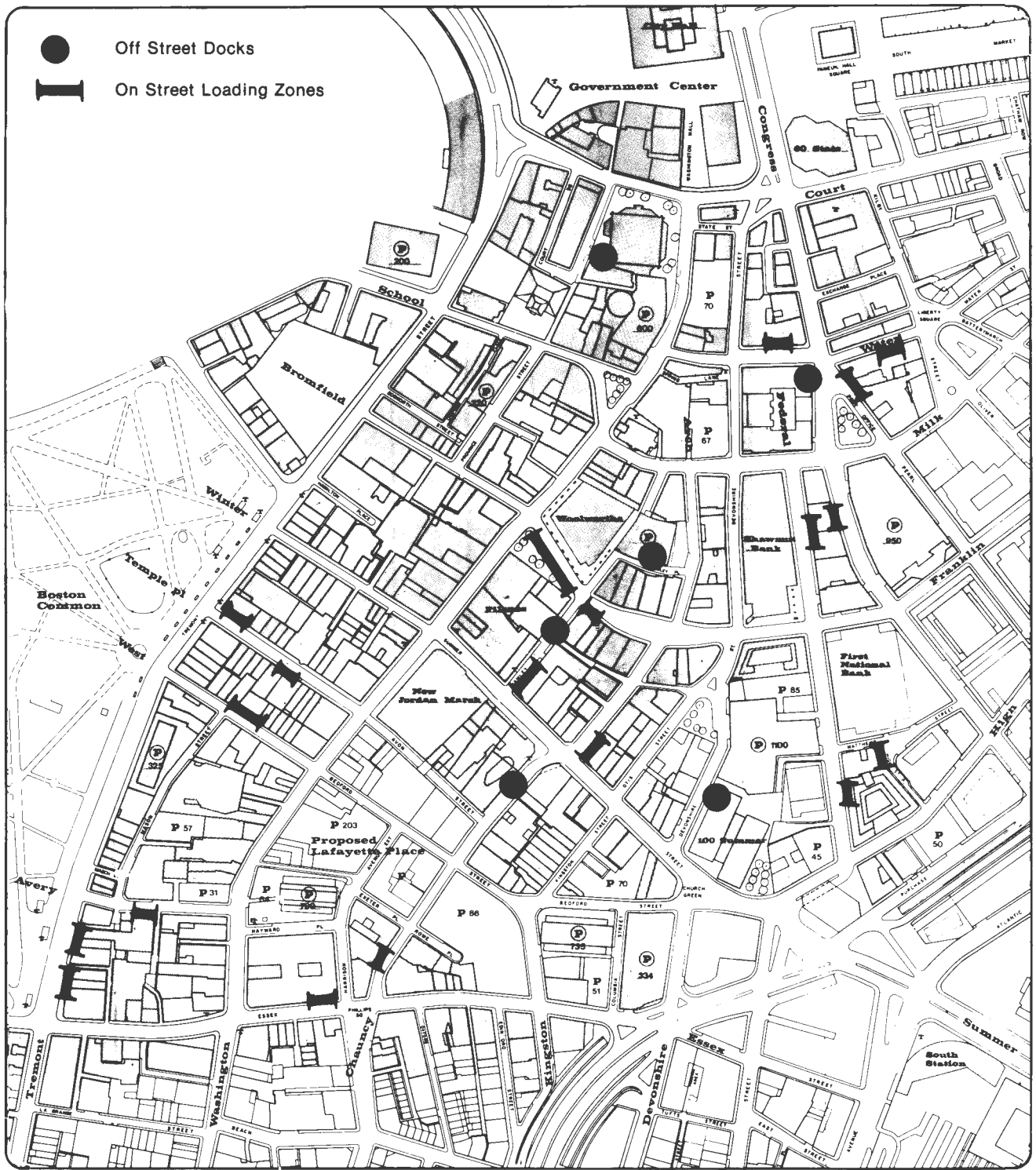


Figure II-8. Areas of Pedestrian Conflict

Goods Movement

Approximately 600 potential delivery points exist within the ARZ study area. Principal shippers and receivers in this total include 400 small retail shops, four major department stores, 40 restaurants, and 45 banks or other financial institutions. Very few of the businesses in the downtown core have any sort of backdoor or alley access for pickups and deliveries. Thus most deliveries in downtown Boston are made through the front doors of businesses with the delivery vehicle parked in the street nearby. In addition to these goods vehicles, which are frequently double-parked, other delivery trucks are often queued in the streets waiting to unload at one of the busy off-street facilities within the area. Although on-street parking and loading is heavily restricted in the study area, the lack of enforcement permits private vehicles to encroach on designated loading zones. Figure II-9 illustrates the few facilities for goods movement existing within the study area. Available legal loading zones in the area total 685 linear feet, which is equivalent to 23 legal truck loading spaces. Off-street loading docks, provided for some of the major shippers and receivers, are also shown in Figure II-9.

Delivery activity for a typical day in the study area is displayed in Table II-5. More than one-third of all deliveries consists of retail goods, and an additional one-third consists of goods-related service calls such as armored express and parcel services. The 40 restaurants in the area account for a disproportionate 20 percent of total deliveries to the area due to the large number of suppliers that service each restaurant. Figure II-10 shows the maximum daily delivery vehicle accumulations for the study area. Survey data on average delivery volumes and times by type of delivery yielded an estimated average cost of \$7.16 per delivery and an annual cost of \$5.5 million for goods movement in the ARZ study area.



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Figure II-9. Loading Zones and Dock Facilities

Before 11 a.m. 00/00 After 11 p.m.



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0 100 200 400



Figure II-10. Maximum Daily Delivery Vehicle Accumulations

Table II-5. Daily Goods Movement Activity Boston ARZ Study Area

<u>Type of Delivery</u>	<u>Before 11.a.m.</u>	<u>After 11 a.m.</u>	<u>Total</u>	<u>Percent of Total</u>
Retail	430	610	1,040	35.4
Goods Related Service	401	554	955	32.5
Food	382	204	586	19.9
Service	172	154	326	11.1
Other	<u>18</u>	<u>17</u>	<u>35</u>	<u>1.1</u>
Total	1,403	1,539	2,942	100.0
Percentage	48	52	100	

Source: 1976 Kearney Truck Activity Survey.

III. CURRENT PLANNING STATUS

The formulation of the Auto Restricted Zone Plan for Boston has taken place within the context of a number of previous planning studies. The Boston Redevelopment Authority has produced several studies and proposals for circulation changes and pedestrian improvements in the downtown core. The latest of these is the proposed development scheme for Lafayette Place on Washington Street. The complex would include a department store, a hotel, office space, other retail shops, and a 1,500-car parking garage. The development proposal would further intensify retail activity on Washington Street and extend the atmosphere of downtown vitality to the less attractive segment of lower Washington Street.

In a study funded by the National Endowment for the Arts, the Redevelopment Authority is examining the dynamics of vacancy in the upper floors of many buildings in the study area. Lack of demand for space in these older buildings has resulted

in deferred maintenance and loss of tax revenues. A plan is under preparation that will set forth potential new uses for this floor space and identify strategies for resolution of the problem. One alternative under consideration is conversion of vacant upper floors into loft apartments which have proved popular in the waterfront redevelopment.

South Station at the periphery of the study area is to be rehabilitated and expanded into a multi-modal transportation center for downtown. Other redevelopment projects on the edges of the study area have contributed a great deal to the vitality and amenity levels of downtown. These include:

- Government Center — This urban renewal project north of the study area created two major pedestrian areas, City Hall Plaza and Pemberton Square, that cover a total of 60 acres.
- Quincy Markets/Dock Square Park — These areas are being improved in the rehabilitation of the Boston waterfront market buildings to the northwest of the study area.
- Winthrop Square — In 1975, some truck loading demands were shifted to off-street facilities, and this mini-park was created from the available street space.
- Waterfront Park — In this recently completed urban renewal project, two ramps from the elevated central artery were removed to facilitate pedestrian movements between this park and the Faneuil Markets and Government Center.

IV. OPPORTUNITIES AND OBJECTIVES

Opportunities

Downtown Boston presents a unique opportunity to test the concepts of auto restriction in the United States. The physical renewal and stable activity base make downtown Boston one of the most successful examples of downtown revitalization in the country. By contrast to most U.S. downtowns, the Boston study area is alive with an unusual amount and variety of activity. By rough estimates, 27 million person-hours per year are now spent on these streets. Nevertheless, much of the area is made unpleasant by crowding, conflict with autos, noise and pollution, and a neglected physical environment. Some of the older niches and alleys, such as

Spring Lane and Winter Place, offer a pleasantly surprising contrast. The newer small parks, such as those at Filene's and the Boston Five Bank, have also introduced some relief and a chance to relax. But most of the shopping streets continue to have a rather harsh environment and an anonymous flow of crowds, with little enrichment. This problem is composed of a number of related aspects:

- The overall image of the area is not very attractive, especially on the older streets not touched by recent renewal.
- Activities such as window shopping, socializing, people-watching, recreation, and street vending are substantially eliminated by the crowding on these streets. If ample space and facilities were provided, such activities would attract more people to the area and induce those already there to stay longer.
- The elderly and handicapped are even more severely affected by the crowding and pedestrian-vehicle conflicts than the average user. The numerous elderly use the streets with great aggravation and discomfort, while handicapped people are rarely seen on the street, probably because they could not compete for such scarce space.
- The physical environment is severely affected by noise and air pollution. Recent measurements at Jordan Marsh on Washington Street indicated that carbon monoxide levels greatly exceed Federal standards and that emissions would have to be reduced by 60 percent to meet EPA requirements. An experiment conducted in 1971 on Washington Street showed that average daily CO measurements of 19 parts per million (ppm) on June 3 with "normal traffic" were reduced to 4 ppm on May 29, and 0.7 ppm on June 5, when the street was closed to traffic.

Although the regional public transportation system provides a very high level of service for regional trips into the CBD, the radial transit system which produces this high level of service provides very little circulation within the CBD in general and more specifically within the ARZ study area. Each of the four major rapid transit lines focuses on the ARZ and each has at least two stops within the ARZ study area, yet the subway system provides very little circulation service between activity centers within and on the fringe of the study area. Similarly, MBTA bus routes and privately operated commuter bus routes provide service to and from the ARZ study area but provide very little circulation within the study area. In fact, severe traffic congestion and unpredictable operating conditions within the study area have prevented the extension of the bus routes into the area considered for auto restriction.

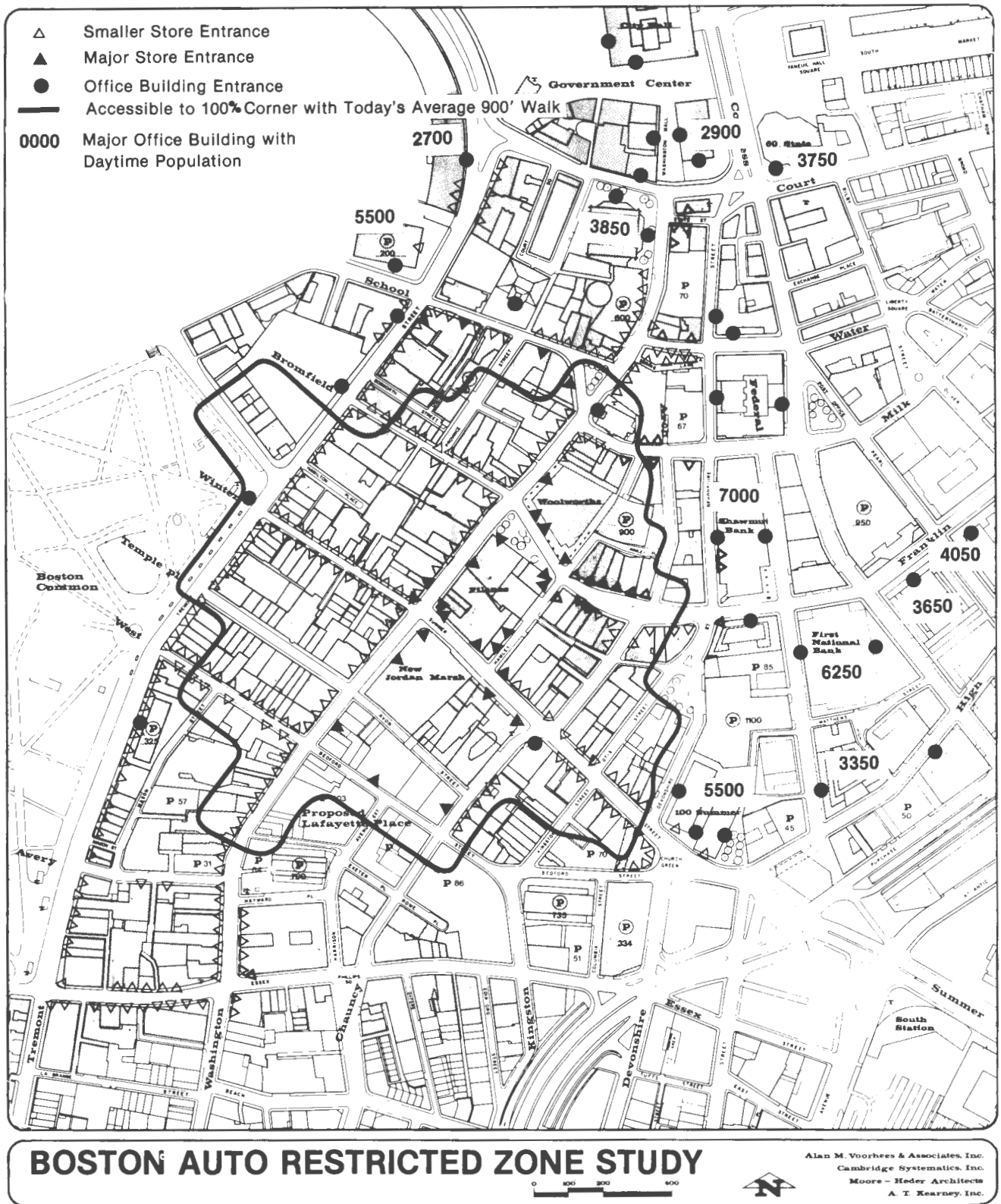
The consideration of an auto restricted zone in the primary commercial district of downtown Boston also raises the issue of maintaining accessibility to the ARZ for those tripmakers for whom transit is not available or who would choose not to come downtown if auto accessibility were not maintained. For some auto drivers, the implementation of the ARZ will mean finding new parking locations on the periphery of the ARZ much further from their desired destinations. The existing transit system offers very little service between these peripheral parking locations and the centers of high activity, particularly the commercial district which comprises most of the ARZ.

Some of this intra-CBD circulation function could be better handled by improved pedestrian facilities. As shown in Figure II-11 on the pedestrian potential map, the retail district in downtown Boston is surrounded by major activity centers: Government Center, the Financial District, South Station, the State House and Common, Chinatown, and Park Square. Several hundred-thousand daily users of these districts have potential access to the retail area. Yet, as the map shows, current average walking distances of 900 feet fail to connect any of these destinations to the 100 percent corner (Washington and Winter-Summer intersection).

A few examples of walking distances and average times are cited below:

City Hall	to 100% corner	1,800 feet	7 min.
State St. Bank Bldg.	to 100% corner	1,600 feet	6 min.
South Station	to 100% corner	1,800 feet	7 min.
Harbor Towers	to 100% corner	3,000 feet	11 min.
Tufts Medical Center	to 100% corner	1,800 feet	7 min.
Back Bay at Arlington & Boylston Streets	to 100% corner	3,200 feet	12 min.

Poor pedestrian facilities and congested walkways, however, mean perceived walking distances along Franklin, Summer and Washington Streets are considerably greater than the actual ones cited above. Based on the experience of other auto restricted zones in Europe and the United States, it is predictable that pedestrian improvements would increase people's walking range and would make them spend more time on the shopping streets. Figure II-11 shows the activity generators which will become accessible if walking range along the improved streets is extended to an average of 1,200 feet (4.5 min.).



- △ Smaller Store Entrance
- ▲ Major Store Entrance
- Office Building Entrance
- Accessible to 100% Corner with Today's Average 900' Walk
- 0000 Major Office Building with Daytime Population

Figure II-11. Pedestrian Potential

Improved pedestrian facilities are also needed to provide better access from other modes of transportation, to enhance rail and bus use from South Station, to make better use of peripheral garages, and to improve surface conditions at the access points to downtown subway stations.

The capacity analysis indicates streets within the ARZ impact area have sufficient additional capacity to accommodate interior street closures and changes in the circulation pattern. The capacity analysis further indicates that almost every access/egress point in the ARZ area is controlled by an existing critical intersection outside the study area. Thus the opportunity exists to balance internal street capacity with external traffic operations without significantly increasing the traffic problems of downtown.

Lax enforcement of parking and other traffic restrictions contributes to many of the circulation problems within the study area for both pedestrians and vehicles. An auto restricted zone could serve to focus attention on the reasons behind existing traffic regulations and create the interest and support required for proper enforcement.

The bulk of the clientele of downtown retail is formed by the combination of office workers and innercity residents arriving by subway. The more auto-dependent suburban shoppers are primarily oriented to the suburban shopping centers for the bulk of their shopping and thus will have to be lured back to downtown by its vitality and improved environment. The most immediate opportunity for expanding the downtown retail market is in capturing more of the local office workers and expanding in the specialty and entertainment markets.

In order to increase the downtown's share of the above markets, its street environment and overall attractiveness will have to be improved. The solution of the physical and functional problems described earlier is necessary for a healthy retail environment and a successful auto restricted zone.

Objectives

The Boston Auto Restricted Zone Plan was prepared within a general intent to encourage the continued physical and economic revitalization of downtown Boston. The plan seeks to set up a more balanced circulation framework, make the streets more attractive through specific urban design improvements, and create new programs for the management and utilization of downtown resources. The objectives related to these goals can be stated more specifically as:

- Economic Vitality — The ARZ study area is above all the commercial center of the Boston metropolitan area. Any consideration of traffic restraint and street improvements must be directed at supporting and expanding markets and opportunities for the downtown economy. The extraordinary street life and activity in the area attest to its role and attraction within the community. The ARZ Plan should work toward the expansion and diversification of this already bustling activity area.
- Pedestrians — Provide better access for pedestrians from activity areas on the periphery of the retail district. Develop a continuous pedestrian circulation network within the retail and financial districts. Use this network to connect primary activity areas—concentration of offices, shops, residences, and tourist recreational areas—to one another. Allocate adequate space and create a comfortable, safe, and pleasant walking environment along this network. Minimize conflict with vehicular traffic. Improve pedestrian crossing of major streets and reduce perceived walking distances by the design of this network.

Create special pedestrian-oriented public places, such as shopping streets, small resting areas, special historic sites, and primary open spaces where these are appropriate to the adjacent activities. Make a public commitment to the design, furnishing, maintenance of the physical setting, and the management of activities in these places. Provide necessary pedestrian services such as toilets, telephones, seating, planting, and weather protection.

- Public Transit — Improve accessibility to and within the ARZ by improving service by public transit modes. Improve the service on the existing city and turnpike bus routes by improved routing, coordinated stops and schedules, and allocating exclusive street space for transit use where possible. Increase the travel speeds of public transit vehicles within the downtown area.
- Deliveries, Emergency, and Service Vehicles — Maintain all necessary access for these vehicles. Establish scheduled delivery hours for downtown service at times when conflict with pedestrians and other

traffic can be minimized. Allow exclusive use of certain streets by delivery vehicles at these times. Require off-street loading facilities for all major new development.

- Private Auto Traffic and Parking — Restrict or eliminate private auto traffic on streets in the retail district where it seriously interferes with the other circulation elements. Create a simplified auto circulation system that clearly identifies primary auto circulator streets and secondary auto access streets. The primary streets will continue to serve destinations in as well as outside the district. The secondary access streets will only serve specific parking and drop-off locations. Mitigate congestion impacts through improvement of intersections, proper traffic enforcement, and elimination of parking search and superfluous circulating traffic.
- Image and Environment — Improve the general image and attraction of the older downtown streets. Create a physically comfortable street environment free of noise and pollution and equipped with pedestrian amenities. Create a more varied and balanced street life with excitement and comfort for all different types of street users. Encourage the preservation and reuse of older buildings, particularly their conversion to mixed retail and residential use. Create a physical and institutional framework for improved environmental management and ongoing urban design for the district.

V. BOSTON AUTO RESTRICTED ZONE PLAN

The opportunities for the application of the concept of auto restriction and the potential for its success clearly exist within the Boston CBD. The area possesses many of the characteristics identified as key factors to ARZ success in Volume I of this study, Auto Restricted Zones: Background and Feasibility. Of foremost importance are the level of economic activity in the area, the high level of transit service, and the amount of street life and dependence on pedestrian travel already existing in the area. The high pedestrian volumes on major shopping streets, as discussed earlier, are major contributors to a snarled circulation system within the CBD. The reduction of pedestrian-vehicle conflicts coupled with the historic character of the area and its architecture could combine to create a new atmosphere in downtown Boston in which its many assets could be more fully appreciated.

In seeking to capitalize on these opportunities for auto restriction and contribute to the objectives outlined above, the Boston ARZ Plan incorporates a variety of components, as shown in Figure II-12. Elements of the plan include expanded



Figure II-12. Boston Auto Restricted Zone

pedestrian facilities, exclusive pedestrian streets, transitways, revised auto circulation, and improved goods movement facilities. The plan concentrates on improving pedestrian facilities on major shopping streets where conditions are worst and on improving transit accessibility for bus riders bound for the auto restricted zone. Specific elements of the Plan include the following.

Auto Circulation

Simplification of the existing maze-like pattern of traffic circulation within the area was identified as the key to reducing the impacts of auto traffic on the area. The proposed ARZ circulation pattern is illustrated in Figure II-13. As shown on the figure, auto traffic is proposed to be eliminated from all of Winter, Hawley, and Avon Streets, Temple Place, and portions of Summer, Washington, Franklin, and Bromfield Streets. Chauncy and Arch Streets will carry northbound traffic to Milk Street. Milk becomes westbound only from Arch to Washington, and Washington Street remains open to northbound circulation north of Milk. School Street traffic heading east is diverted to Water Street, and a short section of School Street next to the Boston Five Bank will be closed.

Franklin Street from Arch to Hawley will be open for garage access and taxis only. Bedford Street will run eastbound and connect through West Street to Tremont, forming the southern edge of the ARZ. Washington Street below Bedford will be open to northbound traffic for local access.

Major traffic circulation will be accommodated on Court, Tremont, School, Federal, Devonshire, Congress, West, and Bedford Streets. Under this plan, Chauncy, Arch, West, Bedford, Federal, School, and Water Streets are critical no-parking streets that must remain clear.

Transit System

The proposed transit element of the ARZ plan includes both physical and operational improvements. The operational changes are comprised of revised route patterns for both local and express bus service. Figure II-14 shows the revised

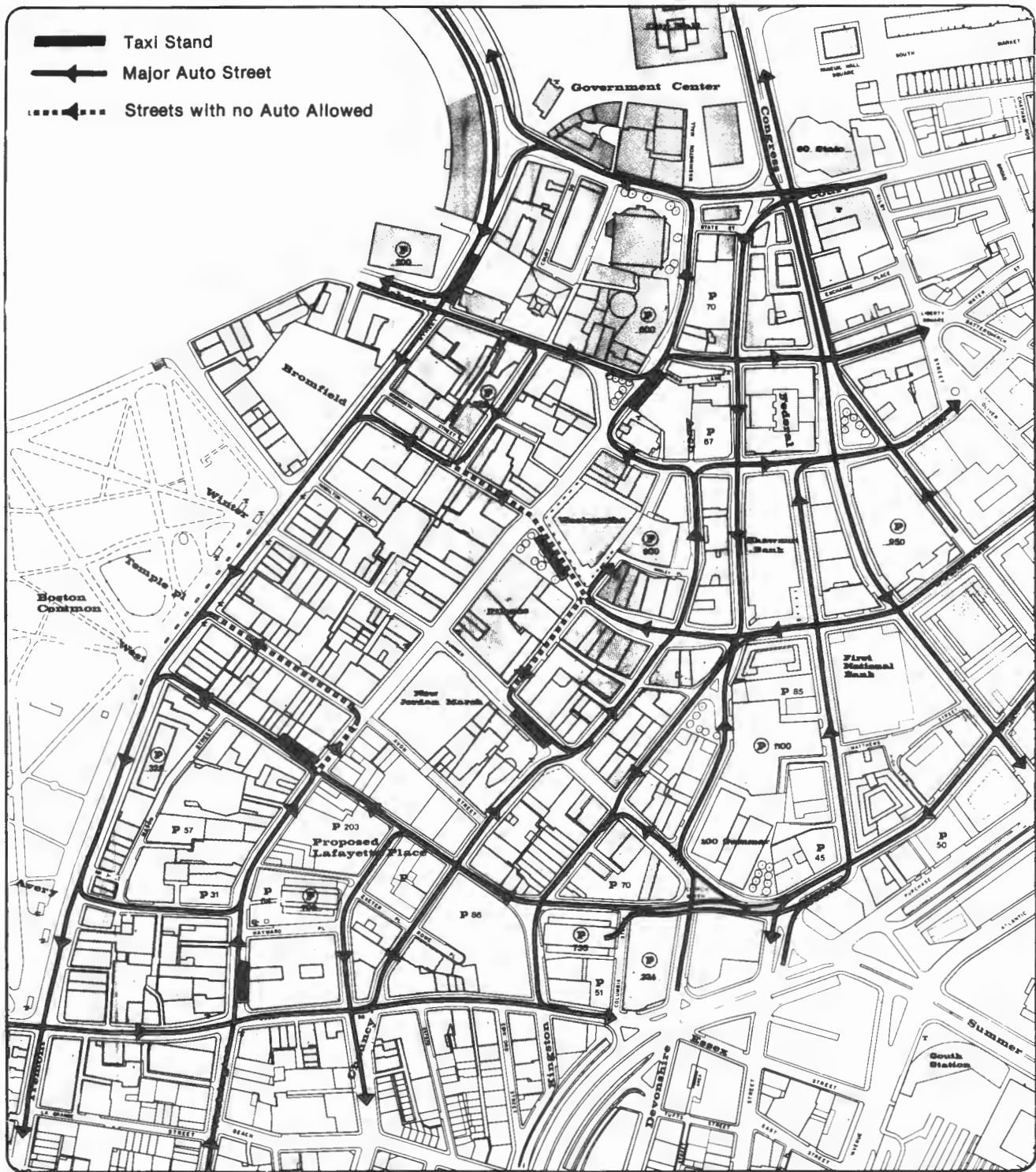
route patterns. The proposed local bus route will enter the ARZ via northbound Washington Street, turn right on Milk then southbound on Devonshire, Franklin and Chauncy/Arch to Bedford. From there, buses will return to Washington and exit the area heading south. Express buses, under the new route pattern will enter the area northbound on South Street and make a loop on Federal, Franklin, Arch, and Summer Streets and exit the area southbound on the Surface Artery.

To accommodate these revised routes, new transit facilities are also proposed. A combination of exclusive transitways and contra-flow bus lanes is proposed to permit buses to operate primarily on traffic-free streets within the ARZ area. The major new transit facility is the Washington Street transitway between Bedford and Milk Streets. The removal of auto traffic from this segment will permit buses to serve the heart of the retail core without delays caused by auto traffic. Contra-flow bus lanes are proposed for Milk Street eastbound, Chauncy/Arch Streets southbound, Franklin Street westbound, and Washington Street southbound from Bedford. These exclusive bus lanes will be self-enforcing because of the contra-flow and the mountable median barriers to segregate them from auto traffic.

It is proposed that in addition to access along all auto streets, taxis will be allowed to use Franklin and Bromfield Streets from Hawley to Province, Hawley Street and Temple Place for access to cab stands. Five major taxi stands are to be provided in the ARZ area, as shown in Figure II-15.

Pedestrian System

The plan provides increased space for pedestrians on all the more congested shopping streets, as shown in Figure II-16. The street space gained for pedestrian use through auto restriction will allow full pedestrianization on Winter Street and Summer Street from Washington to Hawley. Major sidewalk widening is proposed for Washington Street from Bedford to Milk, on Summer from Hawley to Kingston, and on Franklin from Arch to Washington Street. The Boston Five Park can be extended across what is now School Street to the bank building.



BOSTON AUTO RESTRICTED ZONE STUDY

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 Moore - Heder Architects
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Figure II-15. Taxi Circulation

Thus, the Plan proposes a series of combined pedestrian and transit improvements. The most congested segment of Washington Street will become a pedestrian/transit-way, offering major accessibility improvements for both pedestrians and transit riders. The creation of an exclusive pedestrian area on Winter Street will provide an excellent link to the Boston Common, a large vehicle-free area and a major downtown resource. The pedestrianization of Winter Street also serves to connect the interior of the ARZ, the retail core, to the Park Street Rapid Transit Station, one of the principal stations on the Green Line and a major generator of pedestrian trips within the CBD.

Service Circulation

As shown on Figure II-17, service access will follow the auto access pattern. In addition, service vehicles are proposed to be allowed on all the pedestrian and bus streets before 11:00 a.m. with the exception of Summer Street between Washington and Hawley where no traffic will be allowed. For certain key goods haulers which require special allowances, circulation will be allowed on Washington Street from Temple to Milk and on Winter Street from Tremont to Washington after 2:00 p.m. These special goods haulers would include armored express and U.S. Mail and also perhaps newspapers, air freight forwarders, and parcel delivery services. The loading zones, shown in Figure II-17, could be supplemented early in the day to accommodate the peak demand for loading to 11:00 a.m.

Street Improvement Projects

To create the new pedestrian and transit facilities described above, a number of specific street improvement projects are proposed. The ARZ Plan adopts an existing set of street improvement projects put forth by the Boston Redevelopment Authority for the auto restricted zone. Figure II-18 illustrates the location and priority of the proposed improvements. These projects include:

- Winter Street — Old curbing shall be removed. Mountable curb placed at both ends of the street. Brick paving building face to building face. Staggered lighted concrete bollards at old curb line to separate before 11:00 a.m, service vehicles. The project consists of 21,000 sq. ft.

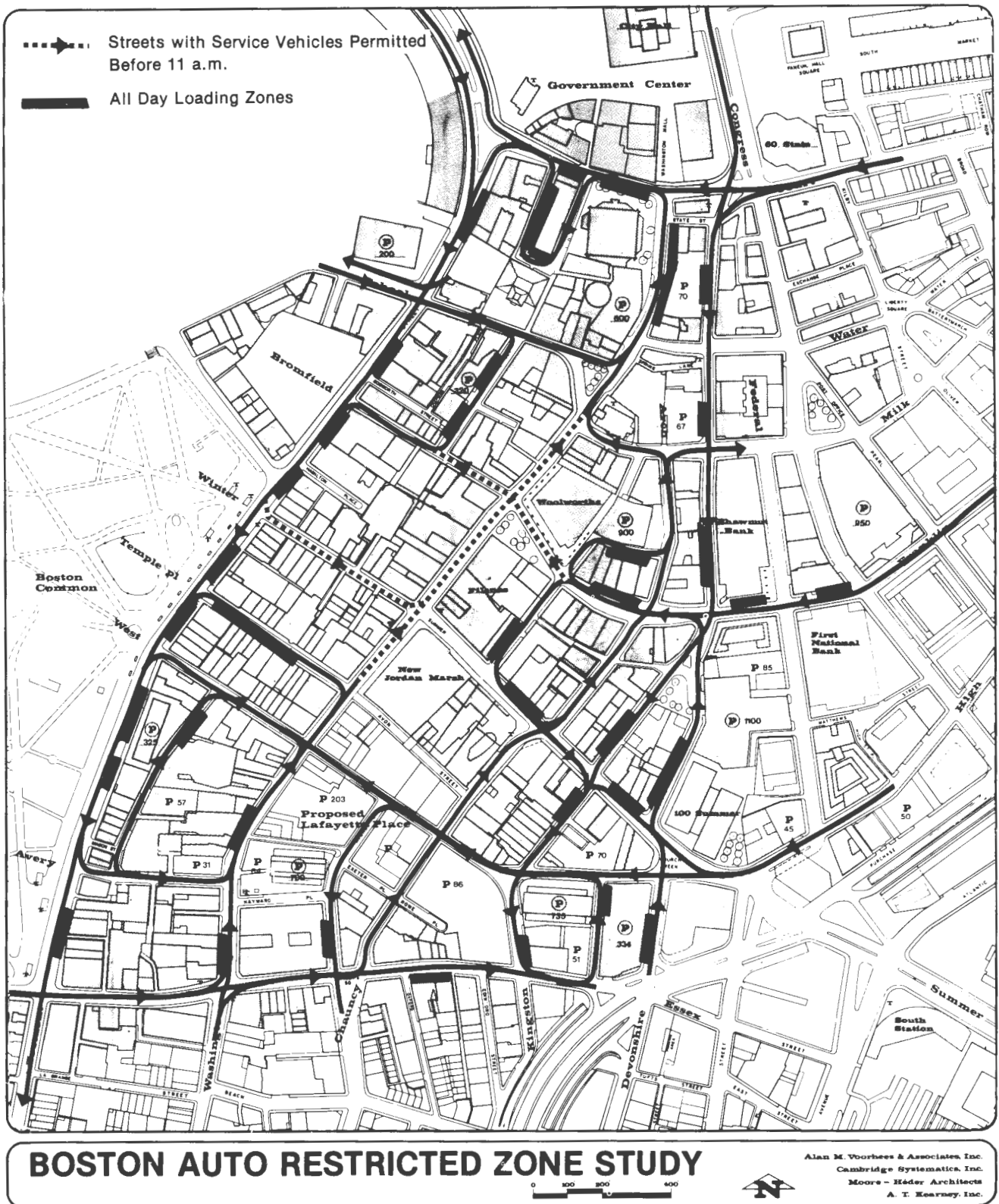
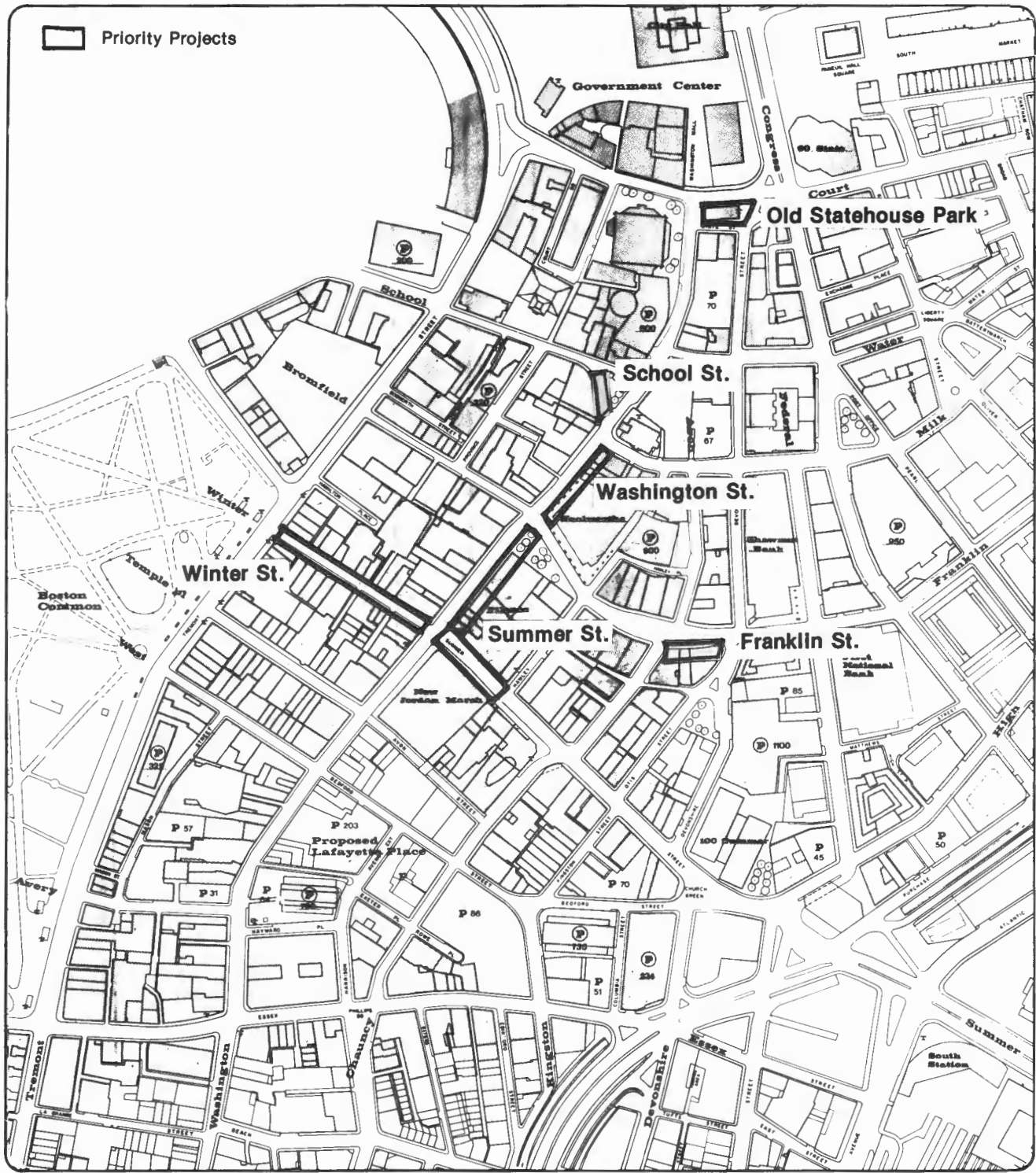


Figure II-17. Service Circulation



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Figure II-18. Implementation Projects

- Summer Street — Old curbing shall be removed from Washington to Hawley Street. Brick paving building face to building face. Major opening cut in street surface to expose portion of MBTA concourse below. The project consists of 18,000 sq. ft.
- Franklin Street — Widen sidewalk with new curbing. Provide surface differentiation for MBTA bus boarding. The project consists of 10,000 sq. ft.
- Old State House Park — Provide granite pavers for surface, new lighting, benches, and bollards.
- Washington Street — Widen easterly side of sidewalk 10 feet providing new curbing with brick paving from Summer Street to Milk Street. The project consists of 14,000 sq. ft.
- School Street — Extend existing 5 Cent Saving Bank Park to Bank sidewalk using granite pavers leaving existing curbing. The project consists of 4,300 sq. ft.

Although actual designs for the project areas will be developed at a later date by the Redevelopment Authority with the participation of owners and merchants on the affected street segments, Figures II-19 and II-20 illustrate views of two elements of the proposed street improvement program.

VI. ARZ PLAN IMPACTS AND COSTS

The proposed Boston Auto Restricted Zone Plan, as discussed in the preceding section, would achieve many of the objectives presented earlier. These benefits would only be attained at some cost. The principal impacts of the Plan would include the following.

Transit

The proposed Plan would improve accessibility for transit riders both to and within the ARZ. Bus riders would receive gains in accessibility due to greater penetration of the downtown by the proposed local and express routes. Rapid transit users, especially those using the Park Street Station for access to the downtown retail core would experience shorter walking times due to reduced conflict with vehicular traffic. This translates into reduced overall travel times and improved accessibility.



EXISTING

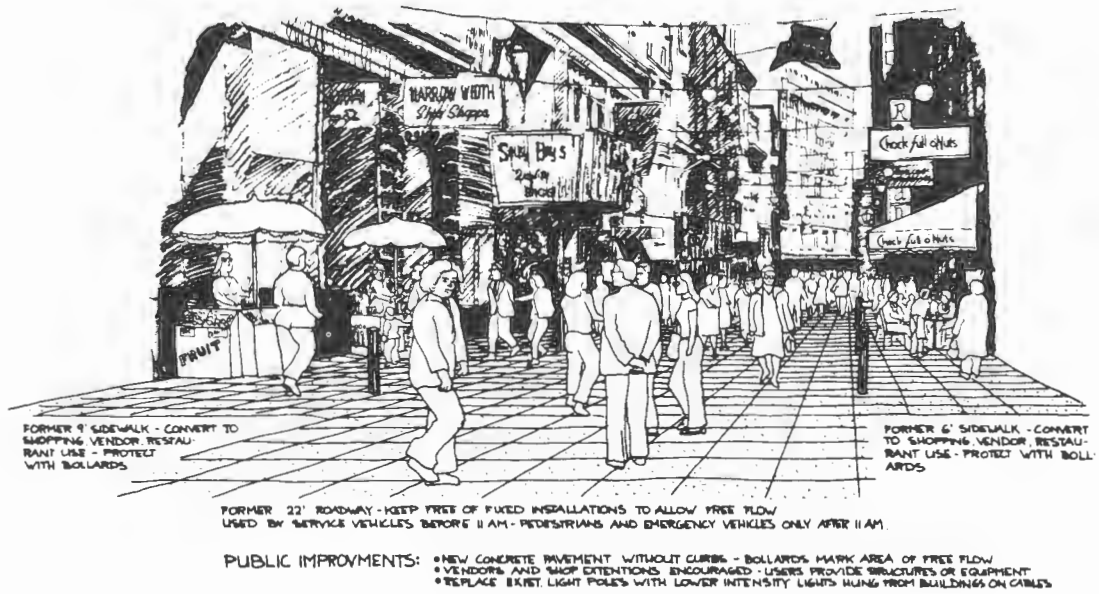
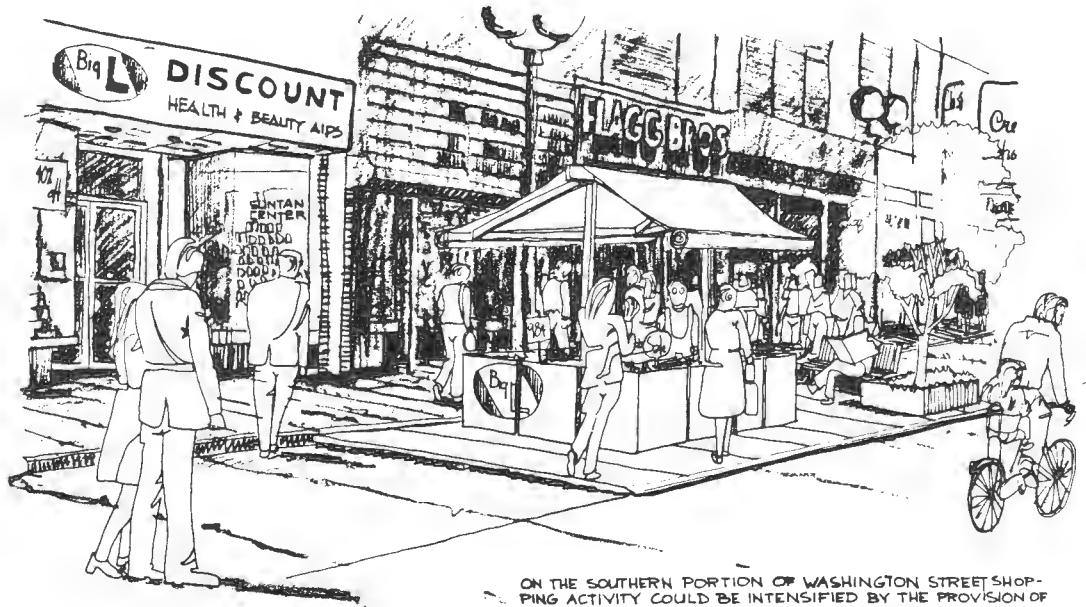


Figure II-19. Proposed Winter Street



EXISTING



ON THE SOUTHERN PORTION OF WASHINGTON STREET SHOPPING ACTIVITY COULD BE INTENSIFIED BY THE PROVISION OF 'AMENITY ISLANDS' FOR VENDORS - SEE DESIGN PATTERN 553-B - PERMANENT STREET REPAVING IN THIS AREA SHOULD AWAIT DECISION ABOUT THE LAFAYETTE PLACE DEVELOPMENT

Figure II-20. Proposed Washington Street Vendors's Island

The major changes proposed for the express and local bus routes should have an impact on ridership. Based on estimated changes in in-vehicle and excess (out-of-vehicle) travel times, a total increase in ridership of 4.1 percent is projected as shown in Table II-6.

Table II-6. Estimated Change in MBTA Bus Ridership

	Route				
	11	43	49	Express	Total
Ridership to or from ARZ Area	1,070	2,756	95	11,000	
Change in In-Vehicle Travel Time/Estimated Percent Change in Ridership	+2.5/-2.5	0.0/0.0	+2.0/-2.0	+1.5/-1.5	
Change in Excess Time/Percent Estimated Change in Ridership	-6.6/26.4	.67/2.68	-4.5/18	1/4	
Estimated Number Overall Change in Ridership/Percent Change	255/+23.9	74/2.68	15/+16	275/+2.5	620/4.1

A second factor which may produce an increase in ridership above that projected is a change in the image of MBTA bus service. Current traffic conditions in the Boston CBD have prevented bus access to the area now proposed for an ARZ and bus service on the periphery of this area is frequently delayed by severe traffic congestion. An improvement in the operating conditions within and on the edge of the proposed ARZ could potentially improve the overall image of MBTA bus service in the Boston CBD. In addition, physical improvement such as bus shelters, improved street lighting, addition of bus stop amenities, such as benches, an improved communication system, and renovation of subway stations will certainly help to improve the image of MBTA service.

Pedestrian Environment and Accessibility

The elements of the ARZ Plan should have a major effect on the pedestrian environment and accessibility. Reduced crowding and corner congestion due to expanded pedestrian facilities and removal of conflicting vehicular traffic flows should enable increases in the number and length of walking trips in the Boston CBD. Levels of service for pedestrians on Washington Street will be improved from "D" to "B" or better. The pedestrian environment would be significantly improved at Washington and Summer Streets, especially. Although traffic congestion at the ARZ periphery will cause some deterioration of air and noise pollution levels there, impacts on pedestrians should be reduced overall.

Traffic

Traffic shifted by the implementation of the auto restricted zone will necessarily result in some congestion impacts. The obvious impact of the auto restricted zone is the closure of Washington Street to auto traffic and elimination of several street links crossing Washington Street. Two major east-west traffic carriers would be affected by the plan. These are the westbound routes of Summer/Winter Streets and the westbound Franklin/Bromfield Street connector. The majority of these westbound volumes ultimately exit the ARZ area to the southwest via southbound Tremont Street and then westbound Boylston or westbound Stuart Street. The closure of these streets will force vehicles currently using them to adjust travel routes and impact adjoining westbound streets.

The intersection of Arch and Milk Streets will produce delays to northbound vehicles and will create backups at times extending through the Franklin-Arch Street area. Traffic congestion will also occur at Post Office Square due to the increase of northbound vehicles using Federal Street. An additional area of concern is the segment of Washington Street between School and Water Street and the eastbound Water Street link between Washington and Devonshire. The increased turning movements from School to Washington Street, as well as the added travel demand on Water Street, will produce added delay at this area unless parking and truck-loading restrictions are strictly adhered to.

The only location outside the ARZ area to be impacted is the Beacon Street travel corridor from Charles to Somerset Street. Some southwest approach traffic will tend to by-pass the ARZ district and, therefore, place added demand on the Beacon Street link as well as the Charles/Beacon intersection. The impact of the proposed auto circulation plan to streets within the Financial District appears to be minimal except for the specific locations just mentioned. In general, adequate street capacity is available in this area to accommodate any resulting minor shifts in traffic demand. It should be re-emphasized that present congestion in Downtown Boston is not caused by the interior street system, but by congestion points at the entering/exiting "gateways" located along the collar which surrounds Downtown.

Parking

An estimated 600 on-street parking spaces would be eliminated by the proposed ARZ Plan. Of these, 240 are existing legal spaces and 360 are illegal spaces. Because these spaces are utilized approximately 90 percent of the time, this will result in an effective loss of 540 spaces. The number of surplus spaces in off-street garages and lots, however, is estimated to be approximately 1,400 spaces, and thus the reduction of on-street parking space due to the ARZ is not projected to have significant impacts.

Goods Movement

Analysis indicates that no major capacity problems will emerge on any streets with loading zones, assuming that the required space is provided and adequately policed to ensure that it is available to goods haulers. If this is done, goods haulers could expect little, if any, increase in the amount of time needed to make deliveries as a result of delays.

However, because the circulation scheme for the Plan calls for diversion of trucks from certain key circulation streets which also have a considerable volume of goods movement activity, additional walking time will be required for deliveries to businesses on these streets. This additional time translates directly into additional delivery cost incurred by goods haulers serving these businesses. Based on the

number of deliveries per day to businesses located on these streets and the walking distance from the delivery points on those streets to the most likely nearby loading zone, it is estimated that the Plan will result in an increase in delivery costs for the ARZ as a whole of \$357,000 or about 6.5 percent over the present \$5.5 million.

The ARZ Plan represents a very reasonable approach from the standpoint of goods movement. It affords good circulation for goods movement vehicles and, given that a recommended amount of loading zone space is allotted and policed, can provide adequate facilities for delivery vehicles so as to eliminate the double (and sometimes triple) parking which is so prevalent by goods movement vehicles in downtown Boston today. Although the cost of goods movement within the ARZ would increase as a result of the Plan, the 6 percent increase (although substantial) could be absorbed through increased sales within the ARZ.

Finally, the goods movement system under the ARZ Plan in some ways represents a substantially better system than the present system in downtown Boston. By providing adequate, well-defined, and well-policed loading zone spaces throughout the ARZ, many of the present efficiencies of goods movement in the area (which often take the form of double- and triple-parking) could be maintained.

Economic Factors

Retail business should improve significantly under the proposed plan. Attraction of the central part of the retail area will increase considerably. Retail sales gains of as much as 10 percent could be expected on the streets with environmental improvements: Washington in the ARZ area, Winter Street, and Temple Place. Other streets are not likely to be significantly impacted. Due to the numerous factors influencing the retail business, these projections can only be treated as general indicators. They do, however, indicate the order of magnitude of benefits that may be expected and allow general comparisons with estimated costs.

Real Estate and Redevelopment

Real estate development is likely to be affected by the plan. The Lafayette Place development is the largest and highest priority project for the Redevelopment

Authority in this area. It is seen as critical that the ARZ proposals support and complement this project.

The Plan provides options and some flexibility for planning access to Lafayette Place although it creates some traffic congestion at its periphery. Bedford Street was designed as an interior pedestrian mall in the original Lafayette Place proposals but is one of the traffic streets on the edge of the ARZ in the proposed plan. If the Lafayette Place plan gains financial backing and the pedestrian mall is still appropriate on Bedford, traffic patterns in this area can be revised. This would probably occur after the ARZ Plan has been implemented.

The architectural and historic character of some of the streets is threatened by the vacancies in many older buildings. Without the prospect of income, owners are leaving buildings empty, unheated, and in need of repairs. A few years of such neglect can cause the buildings to deteriorate beyond repair and force them to be torn down. The demolition of more older buildings could destroy the character and attraction of the area as a district.

The current real estate tax policies, giving breaks to large new developments but not to smaller scale rehabilitation, create the greatest obstacle to building reuse. But if such policies are reversed, the improvement of adjacent streets and renewed and well-managed pedestrian preference districts could become the most important incentive for preserving these buildings. Incentives for building reuse will exist on Washington, Winter, and Temple Streets due to the improved ARZ environment. The streets that contain the majority of vacant reuseable buildings, however, lower Washington Street, Chauncy, Kingston, lower Summer Street, Bedford and West Streets, will not be improved by the proposed plan.

Costs

Costs of implementing the proposed ARZ Plan that are potentially coverable by demonstration funds arise from three sources: traffic operations, transit services, and street improvement projects. The estimated costs of extending bus routes into the ARZ are partially offset by revenues from projected ridership increases, as shown in Table II-7. A summary of all estimated costs is displayed in Table II-8.

Table II-7. Net Cost of MBTA Extension

	Route				Total
	11	43	49	Express	
Estimated Change in Yearly Revenue	\$13,056	\$3,774	\$ 765	\$28,050	\$45,645
Estimated Cost	62,727	14,246	31,175	53,795	163,300
Estimate Net Cost	49,677	10,472	30,410	25,745	116,304
Net Cost per Additional Passenger	\$.65	\$.47	\$ 6.76	\$.31	\$.63

Table II-8. Boston ARZ Estimated Cost Summary

Street Improvement Projects	\$ 858,000
Extended Bus Routes	\$116,000 per year
Intersection Improvements and Transitway Channelization	\$218,000
Traffic Signal Improvements	\$524,000

VII. ARZ PLAN IMPLEMENTATION

While the design of the final ARZ Plan and its schedule of implementation are the responsibilities of the City of Boston, the following are some considerations related to the implementation of the ARZ Plan proposed here:

Current Activity

The first stage of the ARZ Plan is already in place in the form of the Washington Street Mall I. This recently completed project widened the sidewalk on the west side of Washington Street, the area's major shopping street to 22 feet between School Street and Winter Street. This sidewalk improvement means that the majority of space in the Washington Street right-of-way is now devoted to pedestrian

travel. Auto traffic is still permitted on the entire length of Washington Street but must operate with less space available than before.

Funding

The amount of local funds available for ARZ implementation will have a significant effect on the Plan's final form. Indications are that bond issues or other special Federal funding may not be available to supplement ARZ demonstration funds, if awarded. Thus the extent of improvements implemented may be limited to those that can be covered out of demonstration funds and existing transportation funding programs.

Parking Enforcement

The proposed circulation pattern for the area is the principal element of change in the ARZ Plan. In order for traffic to flow at all through this congested area, parking regulations must be enforced with more vigilance than in the past. Key intersections and critical street segments for the operation of the circulation plan are shown in Figure II-21. These areas will be particularly susceptible to illegal parking due to high parking demand and the availability of open curb space. Critical areas of enforcement include; School, Water, Chauncy/Arch, Devonshire, Bedford and Essex Streets. All street rights-of-way in these areas are needed for traffic use and, if regulations are not adhered to, all projected levels of service and qualities of traffic flow will be significantly reduced by resulting heavy congestion.

Downtown Management

One of the most critical factors in maintaining the vitality of the Downtown is an effective management program. Such a program must respond to the whole range of issues affecting the downtown environment from implementation of plans to sweeping the streets, from communications with business interests to enforcing traffic regulations. The key feature of a management program must be the ability to coordinate all of these concerns and respond to them in ways that work in combination to improve the downtown environment. Responsibility for the downtown

Boston environment is now divided among many agencies. The Boston Redevelopment Authority carries out planning and implementation of public improvements. The Public Works Department carries out maintenance and routine reconstruction of streets. The Real Property Department operates city-owned parking. The Public Facilities Department is responsible for construction and maintenance of public buildings. The Traffic Department handles traffic operations and ticketing for standing violations, while the Police Department is responsible for moving violations and the towing of cars. The Parks Department maintains Boston Common but is not responsible for the smaller, recently built downtown parks. The MBTA, a regional agency, operates subways and buses. A state Parking Authority operates the garage under Boston Common and the Shuttle Bus servicing it. A three-member Public Improvements Commission consisting of Commissioners of Traffic, Public Works, and Real Property must approve any public improvement. The Mayor's Office of Transportation establishes transportation policies for the City. The complexity of downtown Boston makes environmental management in the context of such diverse authority particularly difficult. Boston has had successful experiences with the "Little City Halls" acting as coordinators of government services in the neighborhoods. No such entity exists now for Downtown. It is difficult to envision a successful environmental improvement program for the Downtown without establishing some form of managing entity which can effectively coordinate transportation and environmental planning, phased implementation and ongoing design, ongoing communication with downtown interests, management, enforcement, and funding programs. An improvement effort will need a very effective and constant advocate to ensure that its various needs receive attention from the other agencies.

3. BURLINGTON

Chapter 3. BURLINGTON

I. INTRODUCTION

Burlington, the largest urban area in Vermont, is located in the northwestern section of the state on the eastern shore of Lake Champlain. In addition to being the largest city in Vermont, Burlington plays an important role as a regional center for northern New England as shown in Figure III-1. The current population of the city is approximately 39,000, which represents an increase of nine percent over 1960, somewhat less than the fourteen percent increase in population for Vermont as a whole. The major growth in the Burlington urban area in recent years, however, has occurred in several outlying communities. This is reflected in the thirty-three percent growth in population of Chittenden County, more than double the average increase for the state over 1960.

Census data for Burlington indicates an average population density of over 3,800 persons per square mile. Substantial portions of the city's actual residential development, however, are denser, exceeding 7,000 persons per square mile. To a large degree, Burlington fits the pattern of urban development in the northeastern United States. A compact central city which has been fully developed for many years offering a mix of commercial, office, institutional, and dense residential development is surrounded by spreading low-density suburban residential and retail development.

Over the period of Burlington's development, the local economy has made major adjustments to adapt to changing economic conditions. The early economy, based on exploitation of natural resources such as timber and limited service and trade activity in support of subsistence agriculture, gave way in the 19th century to manufacturing, especially in textiles and the production of agricultural products for consumption outside the region. In turn, this base has given way to the current dependence on trade and service employment and a more diverse array of manufacturing operations. Tourism has emerged as a major source of income for the area, and the University of Vermont and its Medical Center are now major sources of employment in the public and institutional sector.

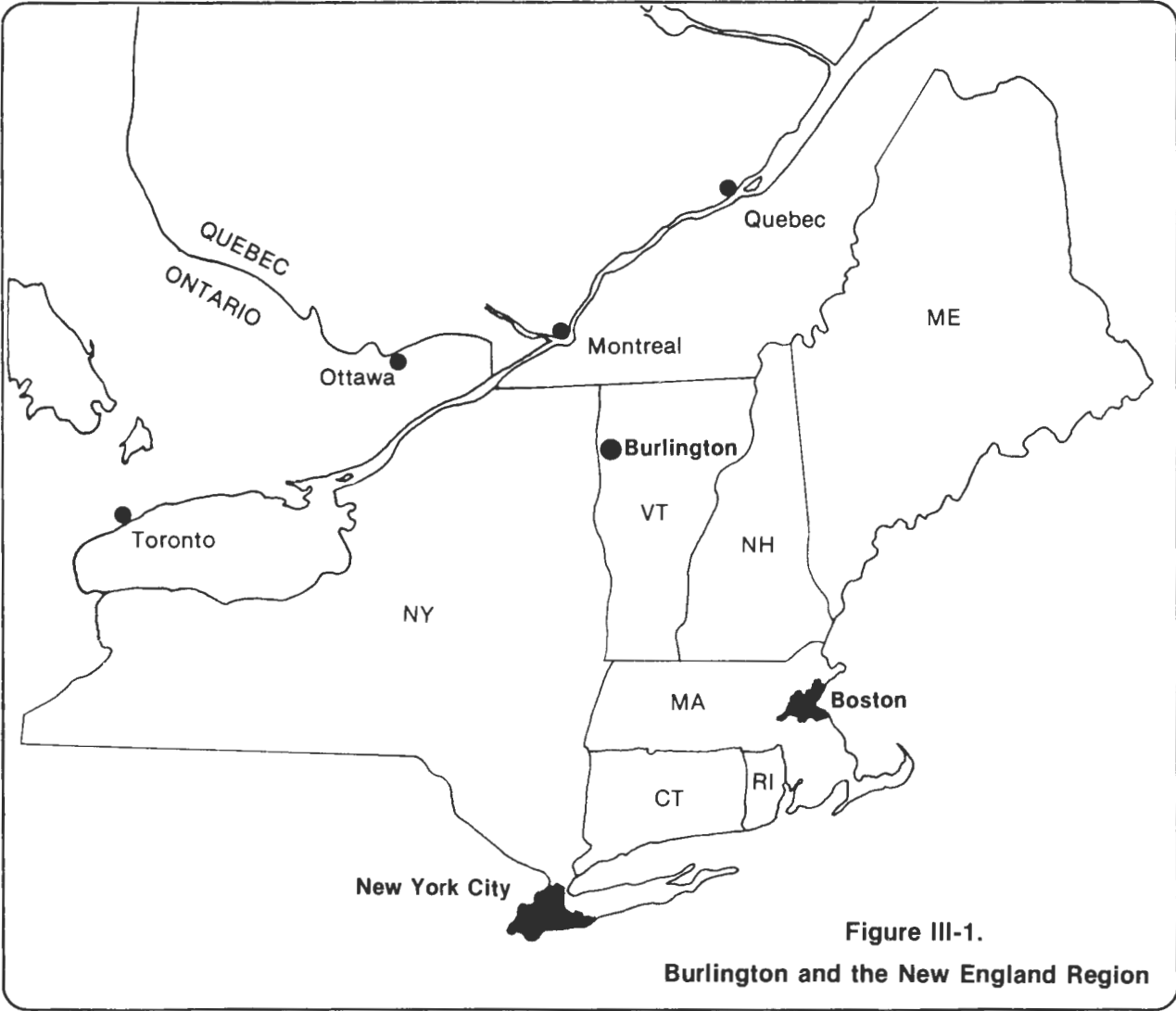


Figure III-1.

Burlington and the New England Region

As noted above, Burlington functions as a principal regional retail center for largely non-urban northwestern New England. The Burlington urban area has developed a concentration of retail and service activity that draws consumers relatively long distances to purchase nationally advertised goods and specialized services that are not available in the region's small towns and rural villages. It is estimated that the retail market area covered by Burlington's service and retail sector includes nearly 300,000 people. This role as a regional marketplace is reflected in the volume of retail sales and in trade and service employment. In the period from 1963 to 1972, retail sales in the Burlington urban area increased 136 percent. Since 1972, sales have doubled again to almost \$500 million per year. Trade and service industry employment dominates the local economy with a 56-percent share of local employment.

II. THE DOWNTOWN

The study area for the design of a potential Auto Restricted Zone demonstration project is bounded by Pearl, Union, Maple, and Battery. This area incorporates the Burlington central business district and small amounts of residential development adjacent to downtown.

The 36-square block study area, bounded by the streets noted above, cannot be described as a single homogenous zone. Several distinct subareas exist, each dominated by different activities and land uses as shown in Figure III-2. Along the shore of Lake Champlain is a waterfront industrial district containing lumber yards, the power company, a ferry terminal, and a railroad line. Abutting this waterfront district and extending east for four blocks through the study area is the urban redevelopment area. In the late 1960's this decaying district was cleared of structures and unified into a single superblock parcel through the closure of the cross-streets of Pine and St. Paul. At present, the area is under development as "Burlington Square," with several major structures either under construction or recently completed. These include a shopping mall, hotel, and parking garage.

The eastern and southern borders of the study area comprise a different subarea. Along the streets of Union, King, and Maple is a well-established residential area

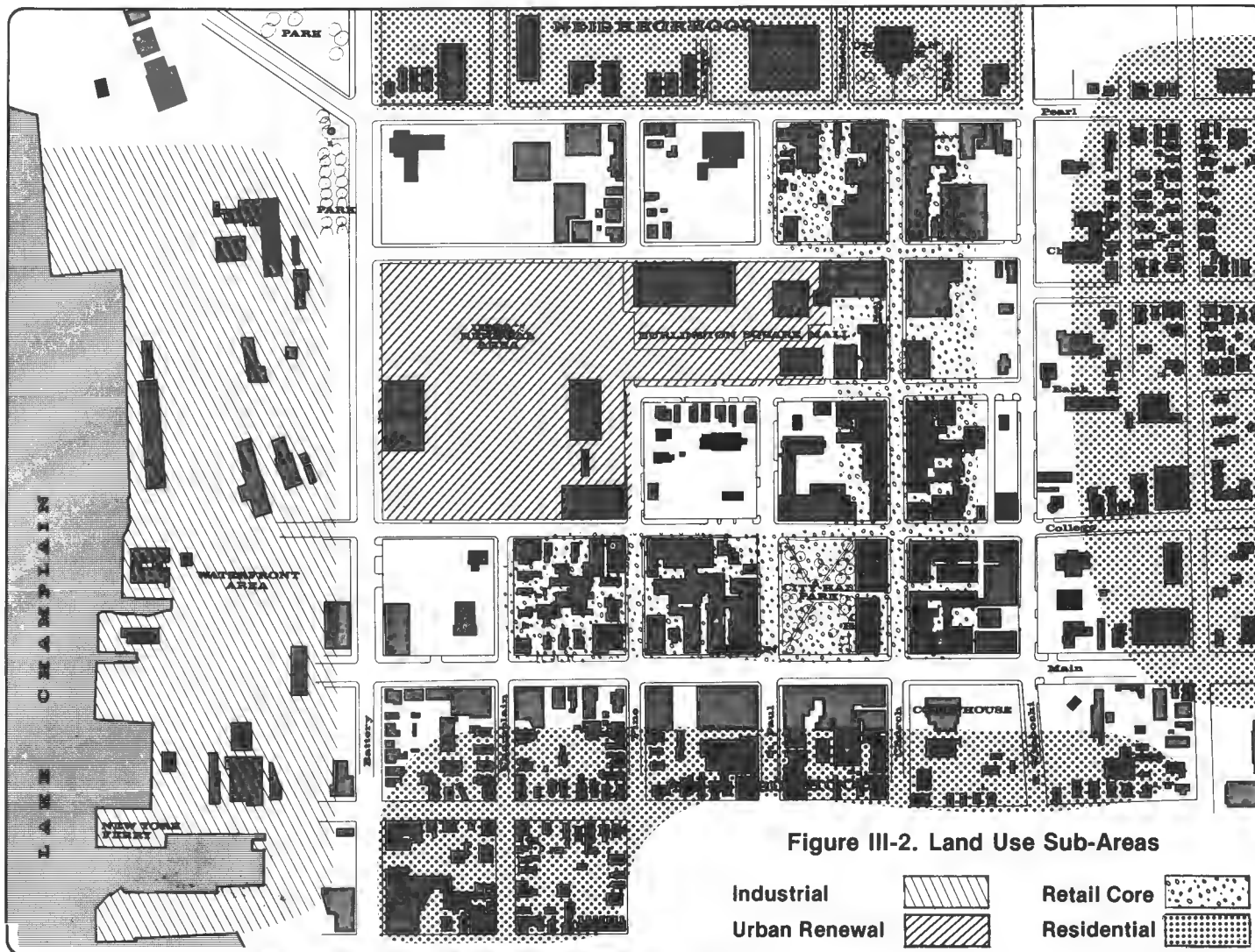


Figure III-2. Land Use Sub-Areas

- Industrial
- Urban Renewal
- Retail Core
- Residential

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which has been fully developed for many years. The density of the area ranges from average for the city of about 4,000 persons per square mile, to a high density of about 7,000 persons per square mile. Because of the residential character of the area, the streets are among the most narrow in the study area, ranging from 26 to 35 feet.

The major feature of the downtown, and the primary focus of the ARZ planning effort, is the four-block segment of Church Street from Main to Pearl. Figure III-3 shows that Church Street comprises the largest concentration of downtown shopping in Burlington, with nearly 500,000 square feet of floor space devoted to retailing. As shown in Photograph III-1, Church Street is characterized by older, three- and four-story buildings including several of historical quality. At ground floor, the street is lined with shops offering a wide range of goods and attracting a diverse group of shoppers. Almost every type of retail operation is represented on Church Street, from large department stores to small specialty shops. Above the ground floor shops are second- and third-floor levels which house some retail operations but primarily serve as underutilized storage space and inexpensive office locations.

Closely interwoven with the retail shopping element are local governmental, institutional, and office activities. At the intersection of Church and Main is the Burlington City Hall which houses the offices of the operating departments of local government. The county courthouse is also located on Church Street, diagonally across the Main Street intersection from City Hall. Other institutional activities in the area include the U.S. Customs House on Main Street and the offices of the State Employment Commission on Pearl. The Fire and Police Departments are located one block east of Church Street on South Winooski.

Clearly, this retail core area with its accompanying office and institutional development is the area of highest activity in downtown Burlington. Recent estimates indicate that more than 5,000 people are employed in the downtown area. These workers make morning and evening commuter trips as well as noon-hour lunch and shopping trips. Indicators show that the retail sector is quite active. An estimated 55,000 purchasing customers converged on the downtown area every day

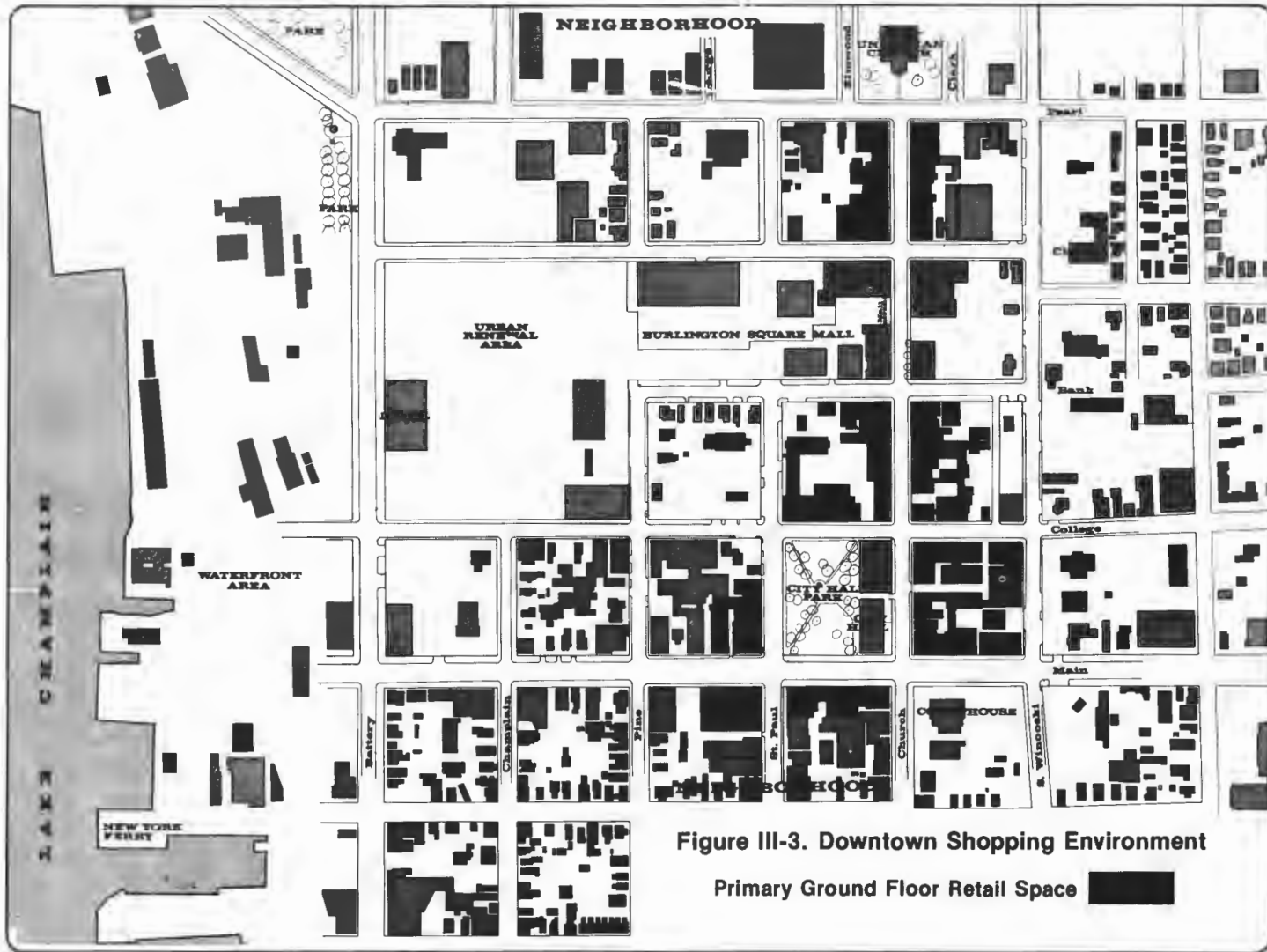


Figure III-3. Downtown Shopping Environment
 Primary Ground Floor Retail Space

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in 1975. The volume of retail sales means not only that a large number of shoppers are attracted to Church Street daily, but also that large numbers of trucks must deliver merchandise and supplies. The offices of local and county government within the core area create a steady flow of people in and out of the area transacting official business that cannot be accommodated anywhere else in town. Added to this are the priority movements of the emergency services, fire and police, which must be accommodated within this congested core area.

In addition to this volume of vehicular travel to and from the Church Street area are the pedestrian movements within the retail core. The concentration of activities in the Burlington downtown creates an ideal base for pedestrian travel. The wide range of opportunities, the proximity of major origins and destinations, and the level of vehicular congestion within the retail core make walking a relatively efficient mode of transportation in downtown Burlington. Besides these characteristics of the downtown discussed above, there are other points of background information salient to ARZ planning for Burlington that are best described as elements of the existing study area infrastructure.



Photo III-1. Church Street Looking North From Main

Transit

Burlington currently has three modes of public transportation serving the core area: bus, taxi, and ferry. Of these, the bus services provided by the Chittenden County Transportation Authority (CCTA) play the greatest role in the regional transportation system. The CCTA, now in its fourth year of operation as the public transit agency for the Burlington area, operates seven regular bus routes within a service area estimated to include 67,000 persons. Ridership on this small city system has been up sharply in recent years, totaling over one million passengers in 1975-76. Data on the seven routes are summarized in Table III-1. Under the existing route scheme, all routes converge on downtown where they are interconnected. Figure III-4 illustrates the looping pattern of transit operations in the core area which allows for maximum interconnection of routes and easy access for passengers to any part of the downtown area.

Among the other forms of public transport serving the area, the ferry service across Lake Champlain between Burlington and Port Kent, New York, is most significant. Of special interest is the volume of pedestrian and bicycle trips generated by the ferry service. In the operating year of April through December of 1973, over 50,000 pedestrians and bicyclists passed through the ferry terminal on King Street at the western edge of the study area. This volume of non-auto oriented trips represents a substantial addition to downtown Burlington's pedestrian activity base described above.

Streets

Currently, the street network in downtown Burlington is dominated by one-way streets and on-street parking. Figure III-5 illustrates the pattern of traffic circulation within the study area. Major streets within the retail core area include Battery, Main, Church, Pearl, and Winooski. All streets in the area have two travel lanes with the exception of Battery, which is a four-lane facility. Peak-hour traffic volumes are heaviest on the major access routes of Battery, Main, Winooski, and Pearl. Although volumes on these streets range from 900 to 1,300 vehicles in the peak hour, the capacity of the downtown street network is sufficient to

**Table III-1. Transit Route and Service Characteristics:
Burlington Chittenden County Transportation Authority**

Route	Headway (Minutes)				Route Length (Miles)		Travel time (Minutes)	Ridership ¹
	Weekdays		Sat.	Sun.	One Way	Round Trip	Round Trip	Average Daily
	Day	Even.	Day	Day				
North End Loop	60	--	60	--	--	3.0	15	508
North Avenue	30	60	30	120	4.6	9.6	45	805
Winooski	30	60	30	60	5.9	8.0	45	60
Essex	30	60	30	60	--	27.0 ²	60	942
Airport	30	60	30	120	8.9	11.0	45	175
South End Loop	30	60	30	60	4.3	7.9	30	465
Lakeside	60	--	60	120	--	3.0	15	546

Notes:

¹3,500 Total Average Daily Riders Based on 300-Day Operating Year

²Includes Essex Center

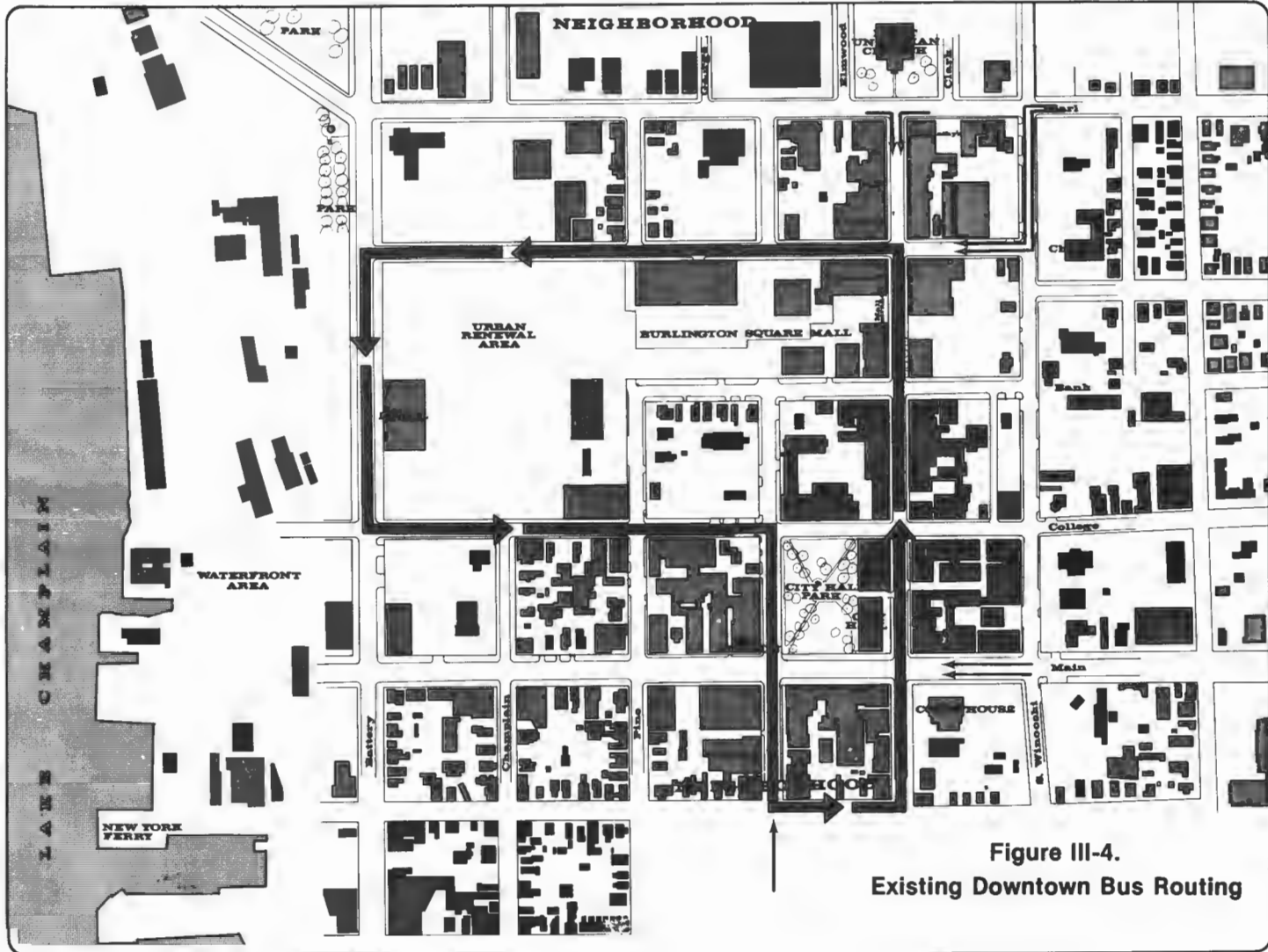


Figure III-4.
Existing Downtown Bus Routing

minimize significant congestion problems. The one-way street pattern in the retail core area reduces traffic movement conflicts and improves vehicle flow into and out of the area.

Parking

As also shown in Figure III-5, the downtown off-street parking supply is dominated by small lots scattered throughout the area. "Public" spaces, those not reserved for employees or customers, are, however, much more consolidated than the private spaces. All off-street spaces are in surface lots with the exception of the new 600-car garage on Cherry Street. On-street parking comprises a significant portion of the total spaces available to the public, as shown in Table III-2. Church Street and others in the core area presently have metered curb parking on both sides of the street. A number of unmetered curb spaces exist within three blocks of Church Street, along Cherry, College and Main. The results of a midday parking occupancy survey showed little excess capacity in either the garage, surface lots, or curb spaces.

Table III-2. Burlington Public Parking Inventory *

	<u>On Street</u>		<u>Off Street</u>		<u>Total</u>
	<u>Metered</u>	<u>Unmetered</u>	<u>Lots</u>	<u>Garages</u>	
Total Public Spaces	779	285	617	600	2,281
Percent of Total	34	13	27	26	100
Percent of Estimated Occupancy	95	100	95	75	90

*Spaces open to use by the general public.

Goods Movement

The concentrated retail activity of the Church Street area not only generates demand for person trips, but also demand for the movement of merchandise and supplies. The volume of goods movements generated, however, varies widely between types of commercial establishments. Restaurant deliveries vary daily in the number of suppliers servicing that business type: food distributors, beverage

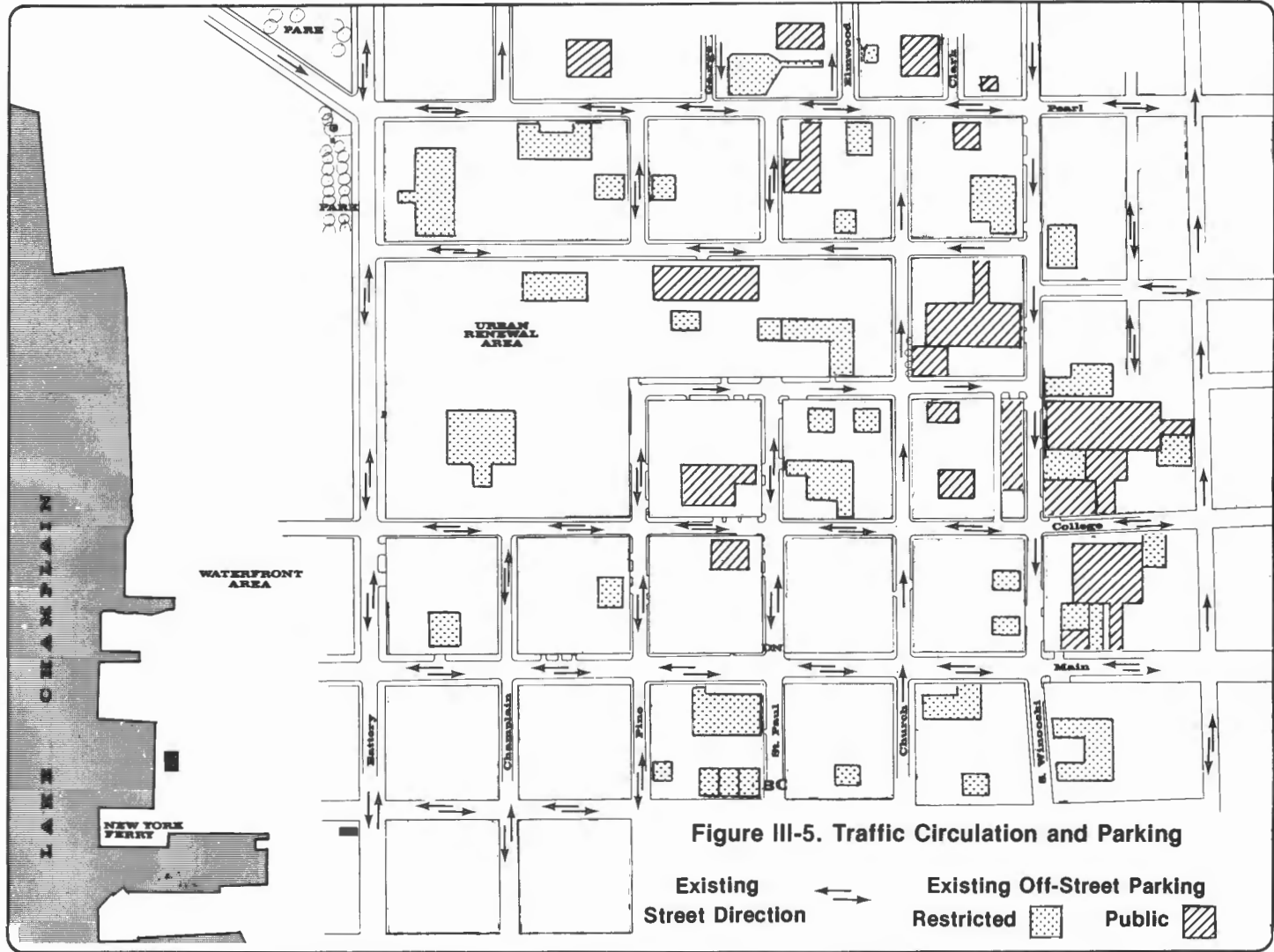


Figure III-5. Traffic Circulation and Parking

Existing Street Direction \longleftrightarrow Existing Off-Street Parking
 Restricted  Public 

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salesmen, vending, trash, and linen services. Government and other business offices receive office supplies on a biweekly, monthly, or quarterly basis. Some businesses, such as gift shops, are seasonal, and have heavy delivery schedules during only a few months of the year. Existing goods movement facilities are shown in Figure III-6. On Church Street, 61 percent of the 87 separate businesses are either small specialty shops or offices where the volume of deliveries is low. There are seven restaurants on Church which generate comparatively large numbers of goods movements, but they are concentrated in the blocks south of College Street. The large variety and department stores are all located on street corners with rear access for deliveries. At present, front-door deliveries to the many small shops are made from loading zones provided on Church. Table III-3 summarizes data on deliveries for the Church Street area. Total daily deliveries are estimated at just over 100, with an average of 16 front-door deliveries per block per day.

Pedestrian Facilities

The discussion of existing conditions in Burlington thus far has highlighted the concentrated activities of the Church Street shopping district. One characteristic of this area is its orientation to pedestrian travel. An assessment of pedestrian activity and facilities, however, disclosed that Burlington has just begun to provide for the accommodation and encouragement of downtown pedestrians. The primary generators of pedestrian travel are the retail establishments that dominate the Church Street area as was shown in Figure III-6. Other major pedestrian generators are the intercity bus terminal, City Hall, and the colleges and University located

Table III-3. Estimated Daily Deliveries: Church Street

<u>Street Segment</u>	<u>Front Access</u>	<u>Rear Access</u>	<u>Total</u>
Main - College	16	7	23
College - Bank	16	9	25
Bank - Cherry	15	15	30
Cherry - Pearl	<u>16</u>	<u>12</u>	<u>28</u>
TOTAL	63	43	106

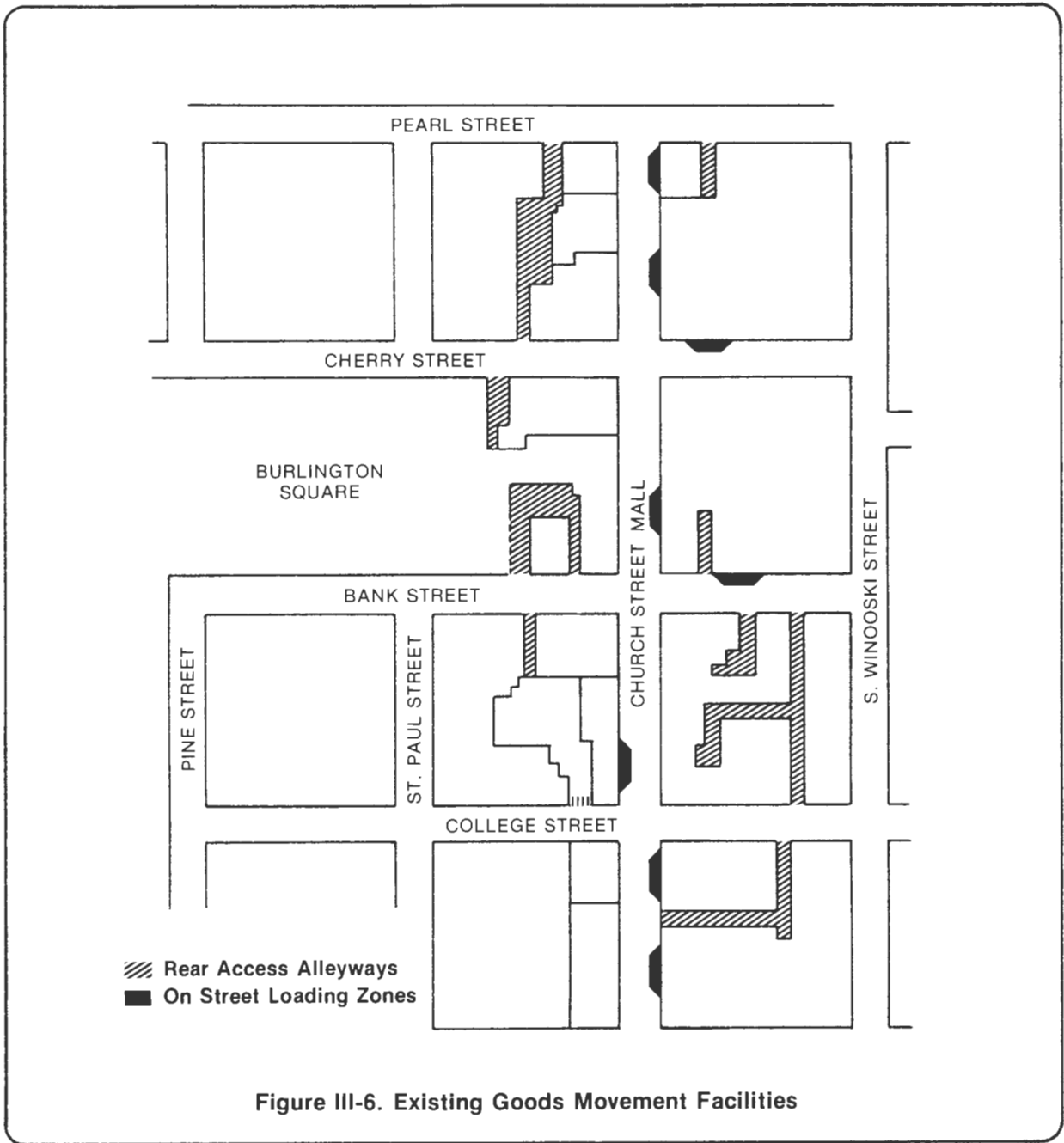


Figure III-6. Existing Goods Movement Facilities

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east of the downtown study area. Noon-hour pedestrian volumes presented in Figure III-7 show Church Street as the major pedestrian corridor. Although the volumes shown are low compared with the pedestrian traffic of very large urban centers, they can be considered high within the scale of the City of Burlington. The facilities provided for pedestrian flow, however, are often overburdened during peak periods. While space would be adequate for unobstructed flow on most Church Street sidewalks, given their width of 9 feet westside and 14 feet eastside, pedestrian flow frequently breaks down. This is largely due to the various sidewalk obstructions such as parking meters, light poles, and shop signs which displace the pedestrian flow area by as much as 50 percent at some points. Other activities which restrict flow and occasionally force pedestrians out into the street include sidewalk vendors, window shoppers, and sidewalk conversations. Moreover, sidewalk pavements conditions, along Main Street particularly, have deteriorated to the point that walking may be hazardous to limited mobility groups such as the elderly. Special pedestrian facilities for the handicapped are inadequate or non-existent. The lack of protection from Burlington's harsh winter weather is a further impediment to pedestrian travel.

Bus stops are the critical link between the transit and pedestrian modes. In Burlington, waiting for buses is a major pedestrian activity, with as many as 40 people waiting at a single stop during peak-hour. Yet, the bus stops in downtown are currently inadequate as pedestrian and waiting facilities. Specific problems include insufficient seating, climate protection, and pedestrian information. In general, downtown Burlington's pedestrian facilities do not constitute a genuine pedestrian circulation network. Pedestrian amenities are scarce and even basic facilities such as sidewalks are inadequate. Clearly, downtown planning in the past has not incorporated the pedestrian point-of-view. The provision of pedestrian-oriented facilities has been haphazard and consequently a functional pedestrian system does not exist.

Recent events, however, demonstrate that pedestrian-oriented planning has become the new perspective for downtown Burlington. The Burlington Square development project in the urban renewal area adjacent to the Church Street retail core has recently opened a major pedestrian facility. An enclosed shopping arcade with space for 57 new shops now stretches westward from Church Street toward Lake

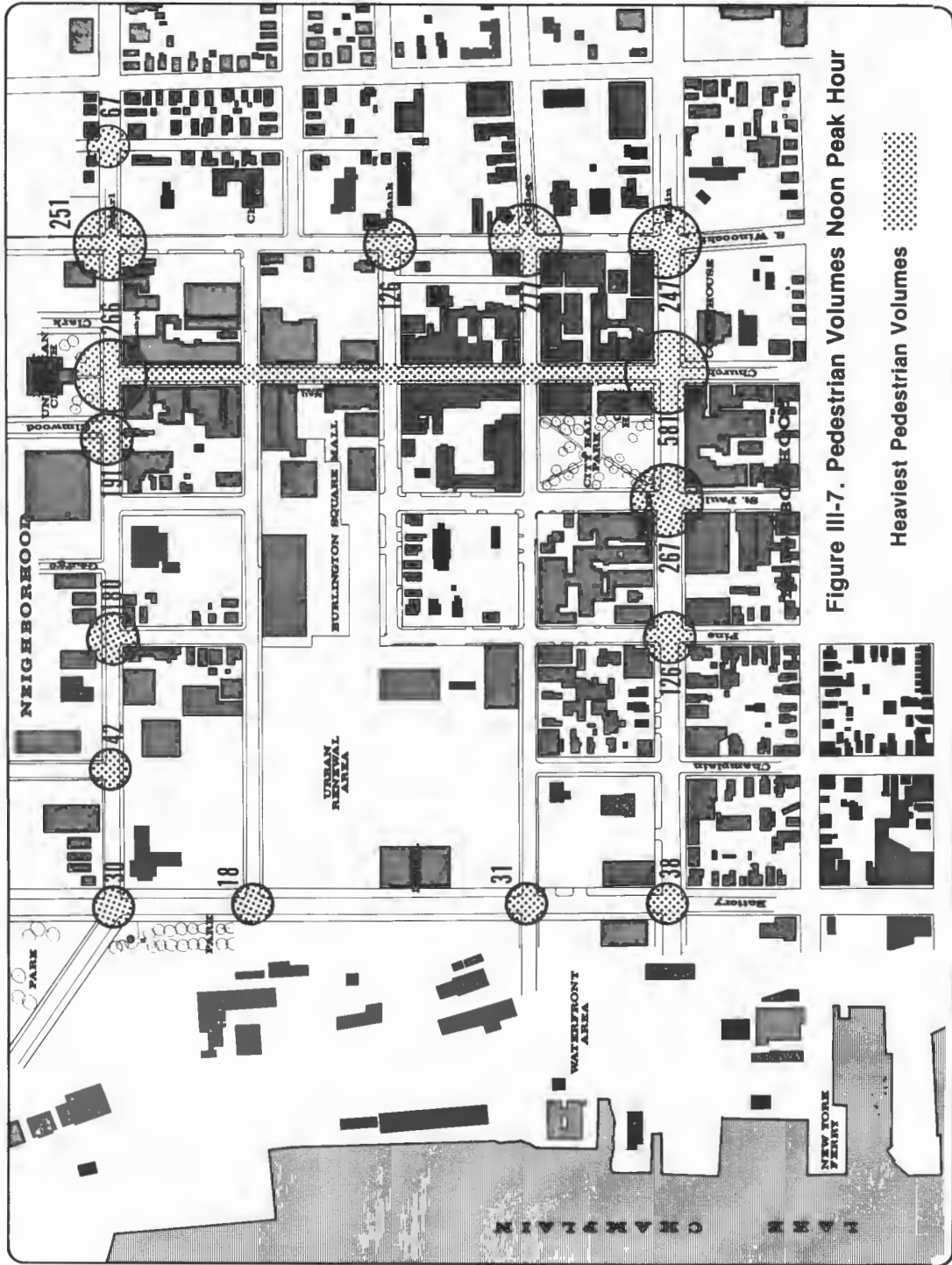


Figure III-7. Pedestrian Volumes Noon Peak Hour

Heaviest Pedestrian Volumes

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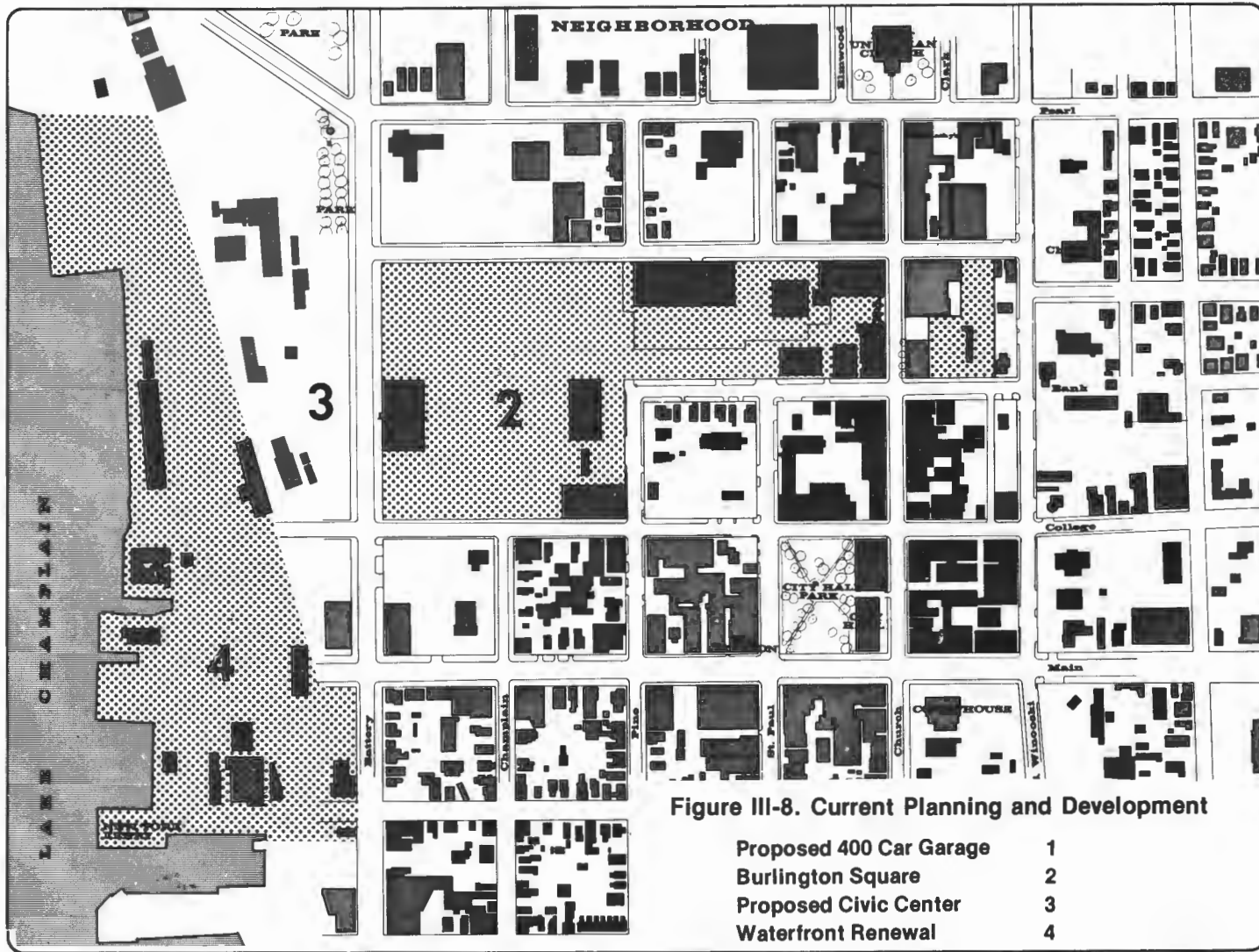
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Champlain. Retail space in this new facility is almost entirely leased and more than 50 percent of the businesses are in place and operating. The entire Burlington Square project, as well as other downtown development activities, is described further in the following section.

III. CURRENT PLANNING AND DEVELOPMENT STATUS

Indicators show that the City of Burlington has mounted an extensive program of downtown improvements. The broad range of planning and development activities underway are primarily based on the premise that downtown Burlington can become an attractive pedestrian-oriented marketplace for the entire northwest New England region. The major focus of downtown redevelopment to date has been the Burlington Square project in the urban renewal area. This large-scale redevelopment effort covers a six-block area linking the waterfront to the Church Street retail district, as shown in Figure III-8. From the first, the planning for this project, which is now partially completed, has reflected the community's desire to reduce auto traffic in the downtown area. As a result, the project has eliminated segments of Pine and St. Paul streets in order to create a large auto-free area which features an enclosed shopping arcade, a hotel, and several new office buildings. Following the recent completion of these project elements, attention has turned to the high-rise apartments included in the Burlington Square plan, which are now in the initial development phase.

Three other major downtown development projects, now in the planning stages, relate to the Burlington Auto Restricted Zone demonstration design. A civic center is planned for the area south and west of the Burlington Square project. An economic study has been completed, and the City is currently soliciting proposals for the civic center design from various architectural firms. Major changes are also under consideration for the waterfront area on the shore of Lake Champlain. A design study supported by a grant from the National Endowment for the Arts is currently underway. This planning study is assessing opportunities for reuse of publicly-owned buildings and exploring the potential for public access and recreational use of the waterfront area. The third development, shown in Figure III-8, is a new 400-car parking garage proposed for the Church Street shopping area.



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Funds for the construction of the garage have been secured from the Economic Development Administration, and it is anticipated that construction will shortly be underway. A major feature of the proposed plan is an enclosed pedestrian connector between the garage and Church Street. Currently consideration is being given to possible commercial development of this city-owned pedestrianway.

Burlington's transit services, provided by the CCTA, have undergone recent changes and current plans call for further improvements. The Chittenden County Transportation Authority, in cooperation with downtown merchants, has recently implemented a "Goodwill Token" program. Over 70 downtown businesses participate in the program which enables transit-riding shoppers to receive a free return-trip token with a \$5 minimum purchase. The program balances existing "park-and-shop" programs and offers merchants the opportunity to encourage both transit and auto-oriented shoppers. In addition, major improvements are planned for downtown transit service. Applications have been submitted for funding assistance for improved bus stops and for ten new buses, an increase of 66 percent in the size of the CCTA fleet.

The contributions of these recent developments and future plans are clear. The Burlington Square development has increased downtown retail floor space by 18 percent. In addition to the shopping mall, the office buildings and hotel have made strong contributions to the already diverse downtown activity base. If plans for the civic center and waterfront developments are realized, the attractiveness of downtown Burlington will double and redouble. Given current levels of congestion, however, the accommodation of the travel demands generated by these additions to the downtown activity base will prove to be a difficult problem. The following section explores the potential objectives and opportunities of a program of auto restriction for downtown Burlington.

IV. ARZ OPPORTUNITIES AND OBJECTIVES

The previous sections of this report have provided a description of the background and principal characteristics of Burlington and its central area. This section reviews this information from the perspective of auto restriction and assesses the potential for ARZ in Burlington and its contributions to local goals.

Opportunities

Volume I of this report entitled "Auto Restricted Zones: Background and Feasibility" presents a complete discussion of auto restricted zones including objectives, measures of implementation, and existing experience with the concept. Among the conclusions reached in this feasibility assessment are three with particular relevance to Burlington:

1. There are substantial opportunities for ARZ in American cities.
2. City size is not critical to ARZ success.
3. A strong activity base is required.

The opportunities for a successful program of auto restriction in Burlington center on the strong activity base of the downtown area. There are three major dimensions of the downtown activity base: volume, range, and concentration. Although these characteristics were touched upon in the description of the retail core subarea of the downtown, it is useful to review them here in summary form.

- Volume of Downtown Activity — As noted earlier, the Burlington central area appears to be far more active than one would expect in a city of its size. It is the central place in a county of over 100,000 persons, and it has been estimated that the market area covered by the Burlington retail and service sector includes 300,000 people. The downtown currently contains 1.6 million square feet of total building space which attracts 55,000 shoppers and over 5,000 employees to the area on a daily basis. To serve this volume of activities of all types, over 100 deliveries of merchandise and supplies are made every day on the four-block section of Church Street that comprises the heart of the retail core. The seven transit routes serving the downtown area carry an average 3,500 passengers per day. The downtown streets, predominately 2-lane facilities, each carry average loads of approximately 1,000 vehicles in the daily evening peak hour.
- Range of Activities — Although retailing makes the greatest contribution to the volume of downtown activity, it is by no means the only activity in the area. Fully 66 percent of the floor space in downtown is occupied by residential, office, storage, and entertainment uses. Downtown Burlington has maintained economic viability over the years and continues to offer a wide range of goods and services that attract a diverse group of shoppers and employees. In addition, important governmental offices and functions, such as City Hall, the County Courthouse, Fire and Police Departments, are all located in the downtown area. The downtown also functions as a regional

transportation center, with an innercity bus terminal, rail freight service, a ferry terminal, and as the center for countywide transit services. Recent redevelopment has broadened the downtown activity base with construction of a new hotel and office buildings in addition to the retail mall. Future plans for the civic center, high-rise apartments, and waterfront redevelopment promise to further expand the diversity of the existing activity base.

- Concentration of Activity — The characteristics that primarily define the opportunity for auto restriction in Burlington are the concentration and scale of downtown activity. Figure III-3 illustrated the concentration of retail space along the four blocks of Church Street from Main to Pearl. This street is also the location of major city and county offices. Within one block of Church Street, on either side, are major supplies of car parking, recreational activities, the City Hall park, office buildings, and emergency services. This concentration of major origins and destinations in the Church Street vicinity reduces the relative advantages of auto travel within the area.

Downtown Burlington still retains a pedestrian scale, despite decades of auto domination. The area bounded by Battery, Pearl, Maple, and Union Streets was almost fully developed by the close of the 18th century. Hence, although there has been a continuous process of renewal and reconstruction, and few structures from this early period remain, the basic pattern of urban development was formed at a time when walking was the major travel mode. As a result, Burlington developed as a compact urban area closely tied to Lake Champlain, the major regional transportation outlet. Downtown streets are comparatively narrow, with pavement widths as low as 22 feet in the residential subarea. Even primary circulation streets, however, are used for on-street parking which contributes to problems of traffic congestion.

As a university town, Burlington has a constant population of young adults who own no car. The proximity of the campuses of the University of Vermont, Champlain College, Trinity College, and St. Michael's College, with their student population of 10,000, has long been a leading downtown asset. Combined with the residential areas adjacent to downtown, these campuses provide a significant non-auto-oriented clientele within a short distance of a downtown well-suited to pedestrian travel.

Equally as important as these components of the downtown activity base is its future. Trend indicators all point to increased growth for downtown. Retail sales

have doubled since 1972. Transit ridership is up 14 percent over 1974-75. The demand for parking spaces continues to expand to meet supply as the newly opened garage has experienced overflow conditions on peak shopping days. Vacant floor space, currently 4 percent of the downtown total, continues to decline. Burlington and Vermont are increasingly popular tourist destinations, with Lake Champlain ferry ridership by pedestrians and bicyclists up 23 percent over the last four years for which data is available.

Clearly the potential for a successful auto restricted zone exists in downtown Burlington. For despite present levels of activity and the historic pedestrian potential of downtown, in Burlington as in other American cities, suburban shopping centers have cut heavily into the downtown retail market, and the auto is firmly established as the dominant travel mode. The City has tried to adapt to ever-increasing auto traffic and has succeeded in reducing excessive delays and traffic congestion. The automobile, however, continues to dominate the core area, and conflict between auto traffic and other activities is one of the most negative characteristics of downtown. A comprehensive program of auto restriction could produce tangible benefits and contribute to the resolution of these conflicts.

Objectives

Although opportunity for auto restriction has been identified, the specific objectives of the concept for Burlington have not yet been discussed. The following consideration of Burlington ARZ objectives is aimed at defining in specific terms the goals of a comprehensive program of auto restriction and pedestrian and transit enhancement for the Church Street core. Based on research conducted in Phase I of the ARZ study, four objectives have been identified for the Burlington ARZ which cover primary areas of concern and major benefit sources.

- Maintain and Stimulate the Downtown Economy — As noted earlier, downtown Burlington has managed to maintain its economic viability. The amount of vacant floor space is small and has been declining. The major variety and department stores which serve as downtown retail anchors are still in place, attracting shoppers to the area. New floor space in the Burlington Square arcade was quickly leased to merchants seeking to open new outlets in downtown. Competition from other retail centers, however, has put pressure on the downtown economy. Although the dollar volume of retail sales has risen, downtown's share of the regional retail market has declined significantly.

An estimated 14 suburban shopping centers have reduced downtown Burlington's sales to 40 percent of the county total, a loss of 14 percent of total regional sales in ten years. One aim of an ARZ for Burlington would be to improve the viability of the downtown economy. If negative features of the core area can be reduced or eliminated, the competitive position of downtown can be strengthened for both retail sales and other activities such as office location. If downtown real estate increases in value, substantial benefits can accrue to the local economy from private redevelopment, reinvestment, and a stronger downtown tax base.

- Improved Accessibility and Circulation — A second objective of a Burlington ARZ would be to adjust the balance of all three downtown modes; auto, transit, and pedestrian, for improved accessibility. Auto congestion and domination of street space can be reduced, especially on Church Street. Transit services could be improved with new routing and facilities to better transit users' accessibility to downtown. Pedestrian circulation could be greatly improved through the provision of more pedestrian facilities and reduction of pedestrian and auto conflicts. Delivery trucks which make an estimated 100 stops daily on Church Street could be accommodated in such a way that routine and necessary movements of goods would not interfere with auto, transit, and pedestrian travel as is presently the case. Basically, an ARZ plan could rationalize the use of existing road space by separating conflicting travel movements and allocating street utilization in a more efficient manner.
- Encourage a Shift to Non-Auto Modes — A number of national and local goals are centered on the reduction of use of the private automobile. Less use of personal automobiles could bring benefits in energy conservation, air quality, and improved utilization of land resources. In downtown Burlington, a shift away from auto use would reduce congestion and improve the financial position of CCTA transit service. Although the CCTA has been cited as one of the most efficient transit operations in the nation, a boost to the already encouraging ridership trend would further reduce the City of Burlington's deficit obligations, which amounted to over \$76,000 in 1975, a 25 percent increase over 1974. A shift toward pedestrian and bicycle travel would create a demand for a functional pedestrian system in downtown Burlington including special facilities for bicycle users.
- Provide a Positive Urban Image and Improved Environmental Quality — Clearly, the preservation, redevelopment, and enhancement of the Burlington core is one local goal with widespread support. Substantial public efforts and funds have been directed at urban renewal and the elimination of blight within the central area. These efforts are just now coming to fruition with the completion of several elements of the new Burlington Square development. Planning now underway for the civic center and waterfront redevelopment promise to further extend the commitment of public funds to the improvement of the CBD. All the groundwork has been laid for an exciting new

urban environment in downtown Burlington. The potential benefits of this investment of time, effort, and money, however, will not be fully realized if all the pieces are not stitched together into a unified urban fabric. The ARZ offers a way to link the parts of the downtown together, by reducing the divisive obstacles of streets and traffic.

Some potential exists for improved environmental quality through auto restriction. A shift to transit and pedestrian travel could produce measurable changes in emission levels. The environmental and amenity impacts of a shift in auto traffic would certainly contribute to every individual's enjoyment of the downtown area. Other local goals also point to the need for the continued vitality of downtown Burlington. The importance of tourism to the local economy mandates the preservation of the scenic character of the Burlington area. Local officials and the public are aware that sprawling suburban development is destroying the pastoral qualities for which Vermont is famous. It is recognized that the preservation of open space will require restraining further suburban growth and directing it to the other areas. In some cases this will mean a further intensification of activity in already developed areas, such as downtown Burlington.

V. BURLINGTON AUTO RESTRICTED ZONE PLAN

The auto restricted zone plan for downtown Burlington was created to capitalize on the opportunities of the Church Street core and to achieve the broader objectives outlined above. Local initiative in Burlington had produced a plan, known as the "Church Street Project," which was adopted by the study team as the basis for the ARZ Plan. The ARZ study approach was to bring together expertise in a wide variety of disciplines to work together in the preparation of a comprehensive ARZ Plan that unifies all the individual elements of the emerging form of downtown Burlington.

The ARZ Plan for Burlington comprises a wide variety of component recommendations including physical, operational, and activity elements. Figure III-9 presents a number of these elements in a general picture of the Plan. The major feature is the reallocation of street space, separating primary auto, transit, and pedestrian flows. This separation of major flows should reduce movement conflicts and assist in the coordination of travel modes and activities at the points of interaction. By reducing conflicts and divisive elements, the plan seeks to build linkages between the assets, both old and new, of the downtown and create a more unified urban environment that should ultimately produce benefits for both the City and the

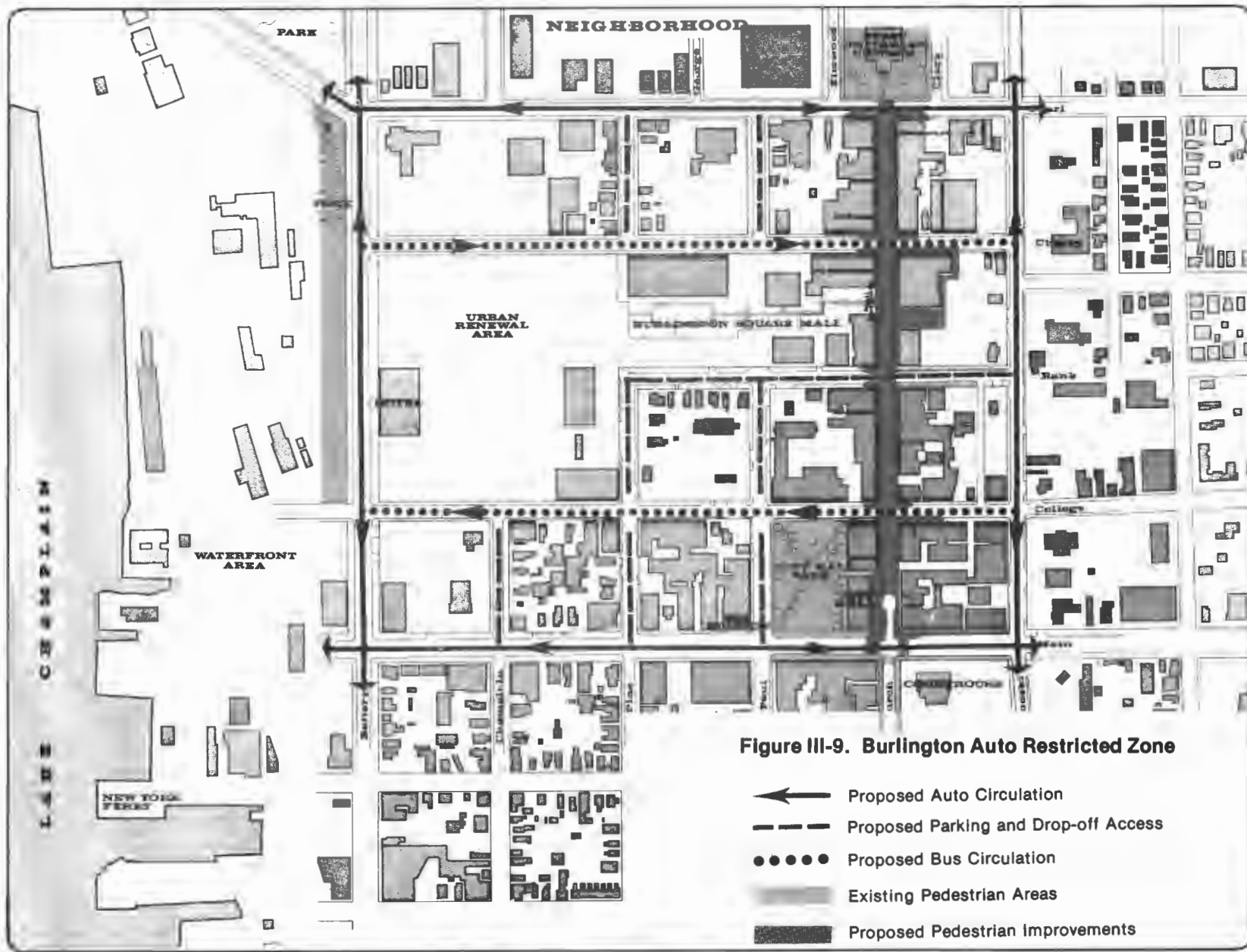


Figure III-9. Burlington Auto Restricted Zone

- ← Proposed Auto Circulation
- - - Proposed Parking and Drop-off Access
- Proposed Bus Circulation
- Existing Pedestrian Areas
- Proposed Pedestrian Improvements

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entire region. Specific components of the recommended ARZ Plan include the following.

Pedestrian Facilities

The major feature of the Plan is the creation of a four-block pedestrian mall on Church Street between Main and Pearl. This pedestrianization of Burlington's main shopping street is the heart of the ARZ Plan for the entire downtown. Figure III-10 illustrates proposed pedestrian space and facilities under the ARZ Plan. The improvements recommended for Church Street would remove traffic and parking from the street and create a primary pedestrian zone with amenities and opportunities for vendors, street activities, and special user groups. Special features would include new pedestrian paving, trees, planters, sitting areas, and a reflecting pool. Other features include construction of new shopping areas in what is now the street, an upper level deck covering a portion of mall, and an automatic snow-melting system built into the pavement. Detailed design development for the entire Church St. mall is currently underway, as shown in Figure III-11.

The creation of this north-south pedestrianway, coupled with other proposed improvements, is a major step toward a functional pedestrian circulation system for downtown Burlington. As shown in Figure III-10, the proposed pedestrian mall would be directly linked to the newly opened shopping arcade in Burlington Square. The new parking garage planned for the area would also offer a direct pedestrian connection to the Church St. mall. Improvements to sidewalks and pedestrian areas on side streets would further facilitate pedestrian movement between downtown activity centers. Thus, in the central area, the busiest part of downtown, pedestrians will be free to roam year round, without interference from auto traffic.

Recommended pedestrian facilities will improve modal transition points. The direct pedestrian connectors to auto parking will offer a safe, climate-protected transition to the pedestrian mode for auto-oriented shoppers and employees. Transit stop improvements will make these areas a pleasant element of the overall pedestrian system, providing better climate protection, seating, and pedestrian information to the transit rider.

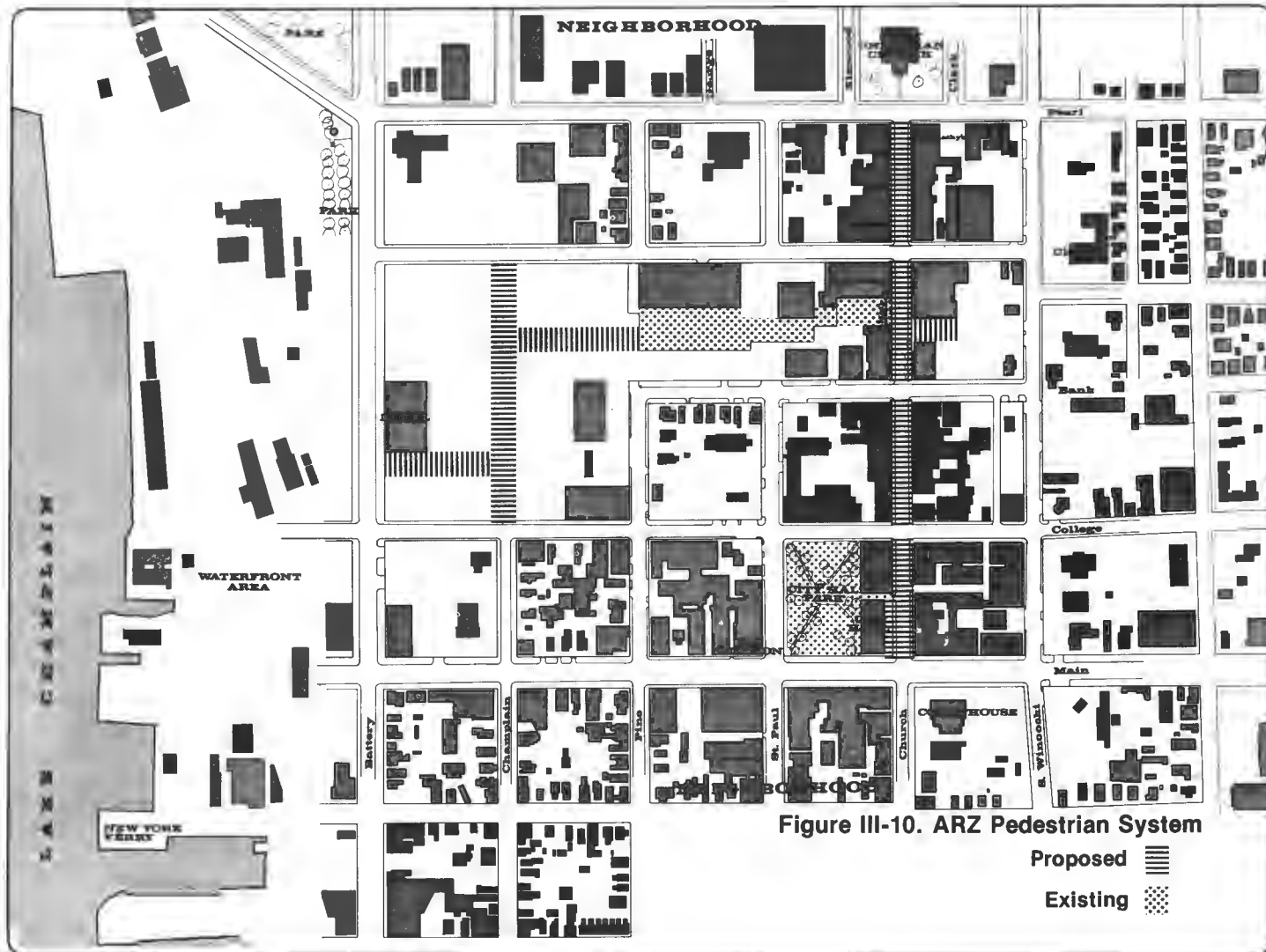


Figure III-10. ARZ Pedestrian System

Proposed 

Existing 

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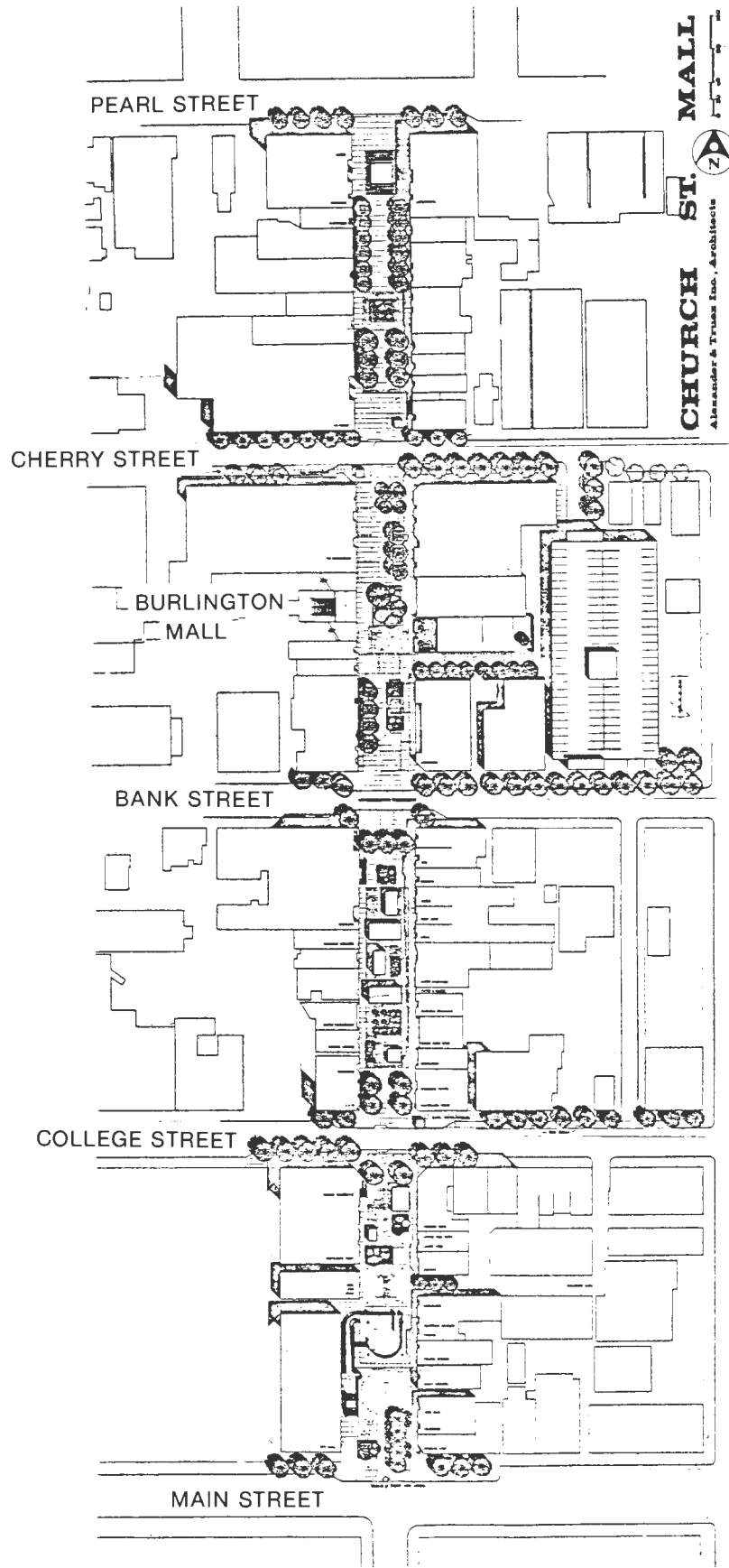


Figure III-11. Church Street Mall

Transit Improvements

The ARZ Plan proposes changes in transit routes and facilities to serve the objectives of improved accessibility and increased transit ridership. In the downtown area, the principal recommendation is for a revision of the current transit loop to the routing pattern shown in Figure III-12. This change improves transit access to the downtown by eliminating the previous "detour" in the loop to King Street and reroutes the buses in a simplified loop on Battery, College, Winooski, and Cherry. This loop is designed for clockwise operation in order to place bus stops on the "interior" sides of streets, allowing for unimpeded access of pedestrian/transit riders to the auto restricted zone. This transit circulation improvement will preserve high standards of transit access with stops within a block of all major activity centers, yet at the same time reduce running times in downtown and conflicts with pedestrians, autos, and goods vehicles.

Other transit service elements of the ARZ Plan deal with improving accessibility to the downtown ARZ area. A university shuttle service is proposed to relieve the on-street parking burden at the University of Vermont and to provide a peripheral parking location for auto drivers bound for downtown. The shuttle would connect parking lots containing nearly 3,000 spaces with the center of the University campus and with downtown. The proposed service would operate 18 hours a day with free fare for students and personnel and 10¢ charge for the general public. A demand-responsive feeder service is proposed as a means of extending transit service to the area poorly served by the North Avenue route. This route has the fastest growing ridership of any of the CCTA routes, and the extension of its service could significantly improve transit accessibility to the ARZ.

Transit facility improvements are also recommended in the ARZ Plan. A downtown transit terminal is planned for the corner of Cherry and St. Paul Streets which would serve as a center for transit information and a central route coordination post, adjusting headways on arriving and departing routes. As mentioned earlier, a substantial addition to the CCTA fleet is planned, with grant applications already submitted for the purchase of ten new buses. Also included in the application for Federal assistance were requests for funds to provide improved transit stops, as

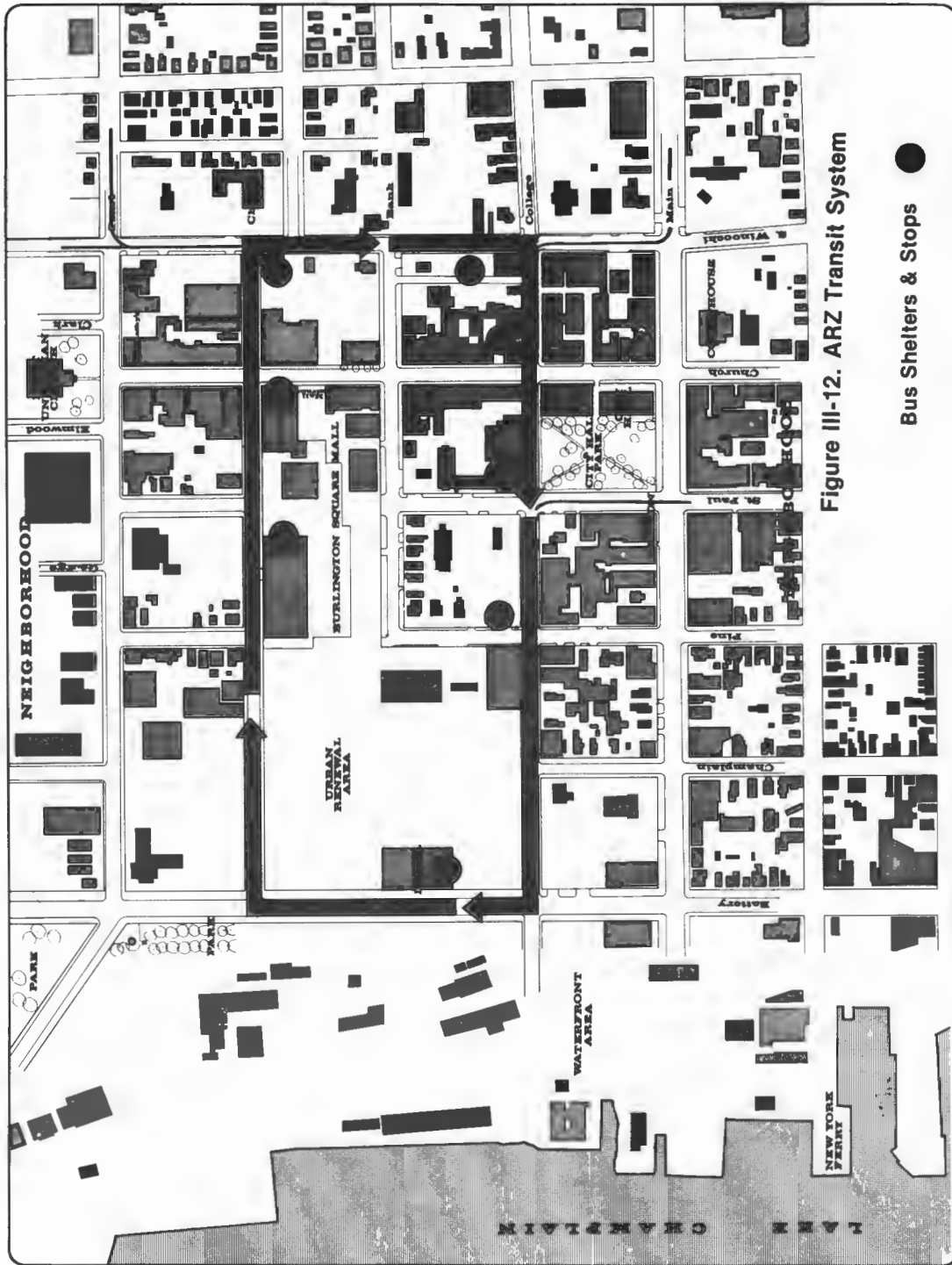


Figure III-12. ARZ Transit System

● Bus Shelters & Stops

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described above. Like the other elements of the plan, the proposed transit improvements were designed to complement and enhance the overall ARZ program.

Streets and Traffic

The reallocation of street space proposed in the Burlington ARZ Plan required adjustments in street operations and traffic flows. Figure III-13 presents the principal features of the auto circulation plan. The chief objective was to develop a circulation plan that would distribute traffic around the periphery of the auto restricted zone, while simultaneously preserving access to parking areas and overall auto accessibility to downtown. Major changes involved the closure of Church Street to traffic and the conversion of Winooski, Bank, Cherry, and College streets to two-way operation. The proposed circulation changes simplify the current network of one-way streets and provide greater access opportunities due to two-way operation. The recommended changes will further concentrate auto traffic on the arterial streets at the periphery of the ARZ and some adjustments in the traffic system are required. These all involve the elimination of on-street parking on some street segments and special turn lanes at the intersections noted in Figure III-13. These minor modifications enable the existing street system to additionally accommodate auto traffic forced onto Winooski, Union, Battery, and Main as a result of the Church Street closure.

Parking

The ARZ Plan proposes only minor changes in the downtown parking supply. The location of lots and garages open to the public is also shown in Figure III-13. Alterations to the supply of off-street parking involve the elimination of less than 100 spaces in temporary lots on the Burlington Square construction site, and the provision of 400 new spaces in the proposed garage between Church Street and Winooski. A total of 196 on-street spaces are eliminated in the ARZ Plan due to the closure of Church Street and necessary reductions of parking for improved intersection operations on the auto distributor streets at the ARZ periphery. Accessibility to parking areas should be improved under the ARZ Plan. The "interior" streets of Cherry, Bank, College, Pine, and St. Paul, have all been opened to two-way operation to permit easier access to parking from all approaches, and

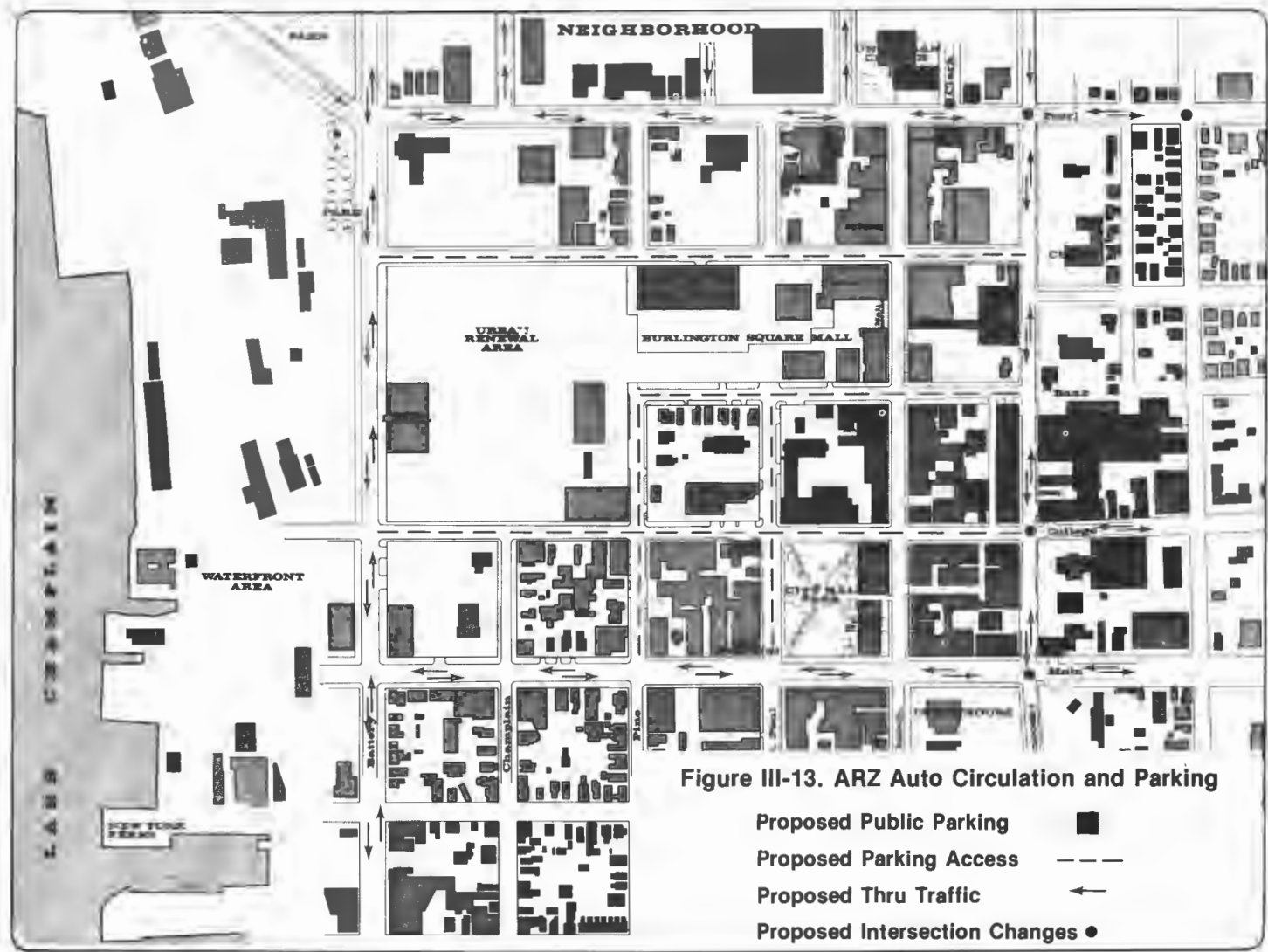


Figure III-13. ARZ Auto Circulation and Parking

- Proposed Public Parking ■
- Proposed Parking Access - - -
- Proposed Thru Traffic ←
- Proposed Intersection Changes ●

to reduce the volume of traffic now forced to circulate the busy downtown area's one-way street system to find available parking. Thus, the plan for auto restriction in downtown Burlington actually maintains high standards of auto accessibility through improved auto circulation and parking convenience.

Goods Movement

The goods movement component of the ARZ Plan combines both physical and operational elements. As a result of the adopted circulation plan, only deliveries to merchants on Church Street will be affected. The survey of goods movements discussed earlier, however, showed that approximately 40 percent of the deliveries to Church Street businesses are rear access, and therefore are not impacted by the Plan. A range of options has been created to accommodate the remaining front access deliveries affected by the creation of the mall.

As one option, delivery access will be allowed on the Church Street mall during off-peak hours. Because of the primary pedestrian nature of the street, goods movements will only be permitted on the mall at times when such activities will not interfere with pedestrian movement. Accordingly, deliveries will be permitted on the mall before 9:30 a.m. and after 5:00 p.m.

As a second option, the ARZ Plan includes some physical elements to accommodate deliveries that cannot be made within the time periods allotted for mall access, as shown in Figure III-14. These design elements consist of a turnaround/loading zone at the southern end of the Church Street mall which would be accessed from Main Street. Deliveries would be permitted in this area throughout the day. In addition, a series of loading zones are proposed for the intersections of Church and the cross streets of College, Bank, and Cherry. From the analysis of present delivery activity, it was apparent that relatively little on-street space on these cross streets will need to be dedicated to loading zones. Allowing for some peaking in delivery access throughout the day, four 35-foot loading zones at each intersection should be sufficient to accommodate those front access deliveries that cannot be made before 9:30 a.m. or after 5:00 p.m.

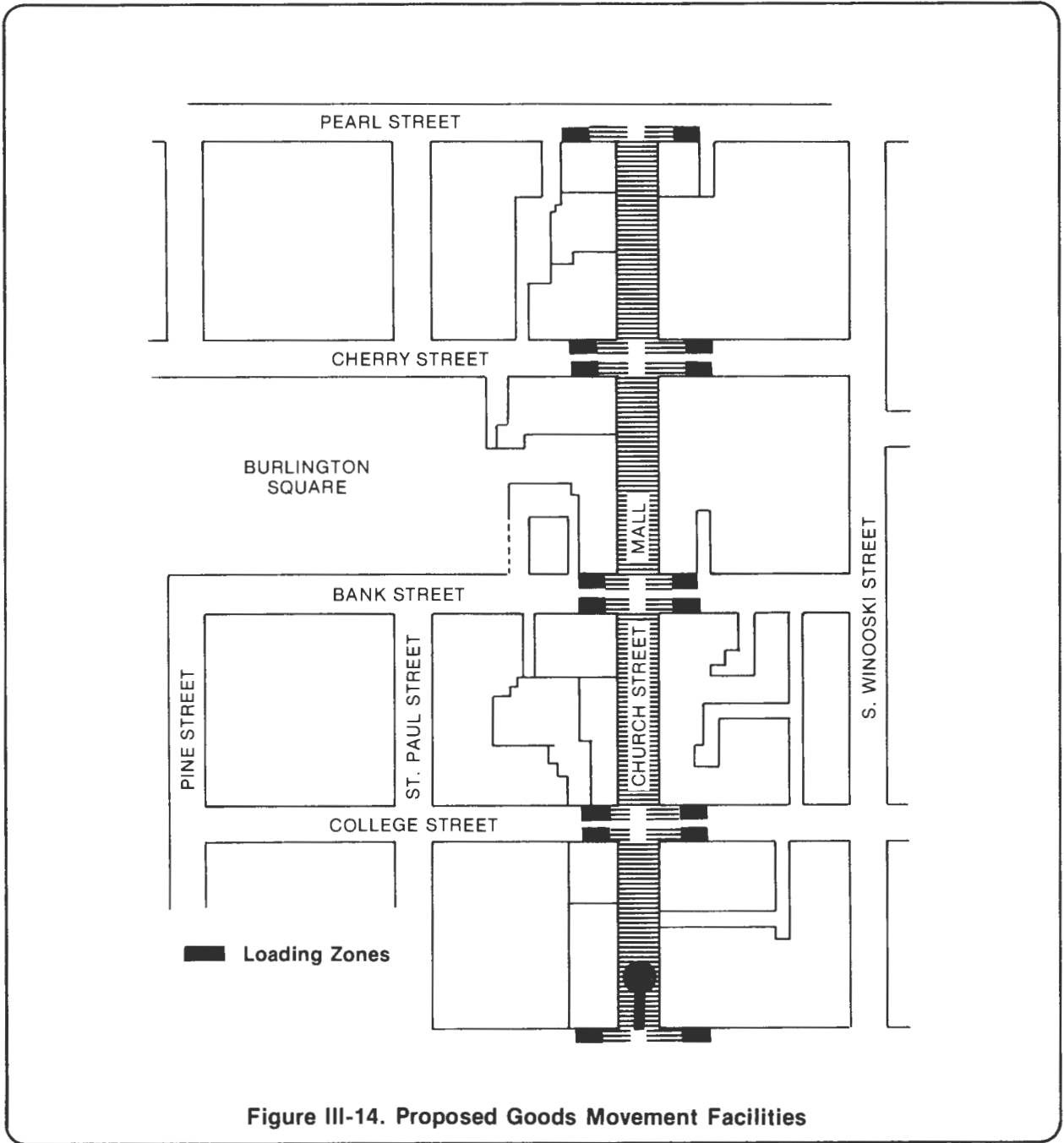


Figure III-14. Proposed Goods Movement Facilities

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Design Elements

Although the detailed design features are currently being developed by the City's contracted mall design firm, the ARZ Plan includes some recommendations for design details. Figure III-15 illustrates the proposed ARZ gateway at the corner of Church and Main. Such facilities call attention to the auto restricted zone as a special area and help to stimulate a new, more positive image of the downtown. Figure III-16 shows sample information systems such as sign designs of the recommended "trail marker" type and information kiosks which provide assistance in orientation and serve as kind of quiet advertising for other downtown resources.

Special Programs

A program for activities in the downtown area was prepared in the design program phase of the Church Street mall. The City has proposed a number of specific activity types and facilities for the mall as part of the ARZ Plan. The objective is to create an auto restricted zone that will become a place for local activities and celebrations that promote the image of downtown as the vital and enjoyable center of community life. The various recommended activities and facilities include:

- Merchandising space in public spaces for shops and vendors
- Outdoor eating facilities
- Special and seasonal events such as:
 - Farmers Market
 - Trade Exhibits
 - Arts and Crafts Displays
 - Promotion Attractions
- Public facilities such as:
 - Public Toilets
 - Telephones
 - Drinking Fountains
- Recreational facilities and programs such as:
 - Doll Shows
 - Children's Theater
 - Speakers' Program

At the major entry points to the improvement area pedestrians will cross heavily traveled auto streets. At these points the motorists get a glimpse of the pedestrian areas. A festive, symbolic and functional structure that allows both pedestrians and vehicles to enjoy the excitement of the improved streets should be provided.

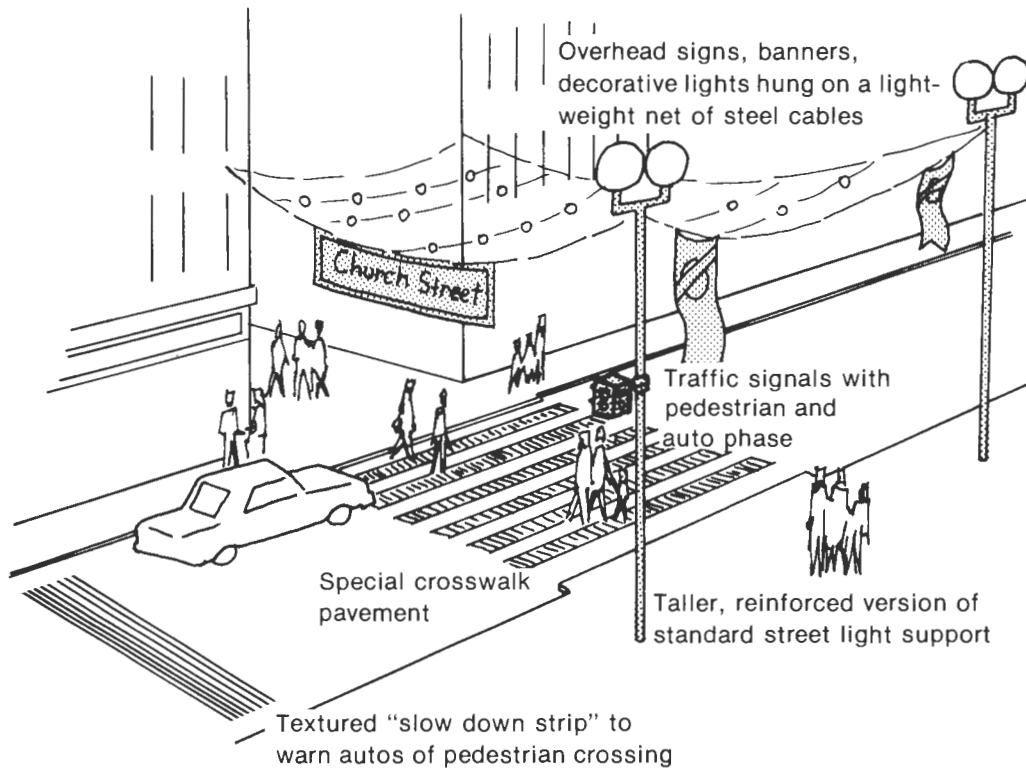
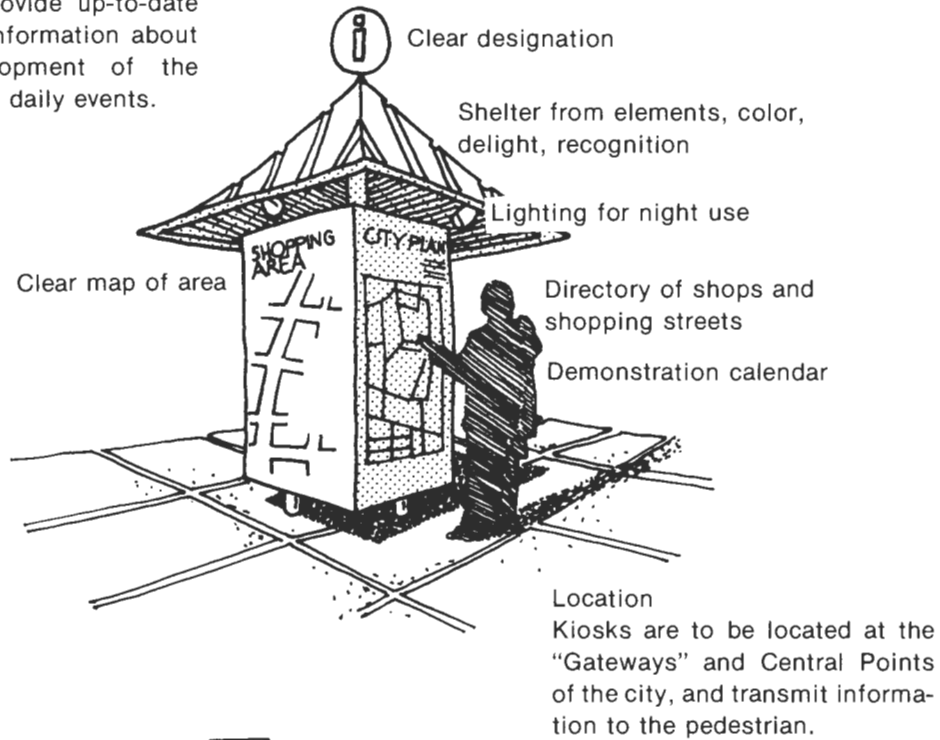


Figure III-15. Proposed ARZ Gateway

An information system for pedestrians to provide up-to-date publicity and information about ongoing development of the area, as well as daily events.

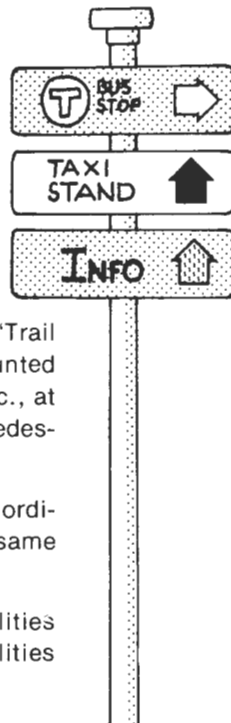


SIGNS FOR PEDESTRIANS

Small scale color coded "Trail Blazer" signs should be mounted on light posts, buildings, etc., at frequent intervals in busy pedestrian areas.

Color coding should be coordinated with signs for same vehicles on roadways.

Signs for pedestrian facilities should be integral with facilities but related to "trail" signs.



TRAIL MARKERS

Small color coded "Trail Marker" signs should be placed frequently along the vehicular routes.

At least one on each block

Recognition by color and letter symbol

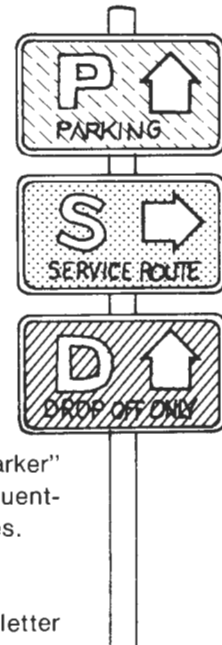


Figure III-16. Proposed Pedestrian Information Systems

The actual activity plan which allocates activities to specific locations and provides the facilities on the mall and the ARZ is currently being developed in the detailed design phase for the mall.

A plan for management of programmed activities is critical to the successful pedestrian use of the mall and the ARZ. A management plan will deal with logistical problems and scheduling questions that are bound to arise with respect to mall activities. The mall is likely to be in greatest demand during months of good weather, so careful planning and preparation will be required to make maximum use of facilities. In addition, the mall management program should direct specific attention to the needs of particular user groups such as the handicapped, elderly, children, and teenagers, for these groups often have special interests that could easily be ignored in a more general mall activity plan.

Summary of ARZ Plan Elements

As described above, the Burlington ARZ Plan is a combination of a wide variety of physical, operational, and activity elements. The Plan includes recommendations on pedestrian facilities, transit operations, streets, parking, design, and programmed activities. Figure III-17 presents a summary of the major recommendations for the Burlington ARZ.

VI. PLAN EVALUATION AND COSTS

As part of the Burlington ARZ Demonstration Design, the ARZ study team prepared preliminary estimates of the impacts of the Plan. Because of the future orientation of the ARZ Plan, precise quantification of all impacts is not possible. Reasonable estimates of the consequences of ARZ Plan implementation show potentially large positive benefits and no major negative impacts. ARZ Plan impacts are classed in three groups: transportation, economics, and urban design.

Transportation

Overall, the ARZ Plan should impact positively on nearly all modes of transportation operating in downtown Burlington.

<p style="text-align: center;"><u>PEDESTRIAN FACILITIES</u></p> <ul style="list-style-type: none"> • Church St. Pedestrian Mall • ARZ Gateway • Connections to Burlington Square Arcade and New Parking Garage • Improved Pedestrian Facilities • Improved Transit/Ped Interface 	<p style="text-align: center;"><u>TRANSIT</u></p> <ul style="list-style-type: none"> • New Downtown Loop Routing • University Shuttle • North Ave. Feeder Route • Ten New Buses • Improved Downtown Stops • Downtown Terminal 	<p style="text-align: center;"><u>STREETS AND TRAFFIC</u></p> <ul style="list-style-type: none"> • Church St. Closure • Revised Circulation Plan • Intersection Improvements on Sidestreets
<p style="text-align: center;"><u>PARKING</u></p> <ul style="list-style-type: none"> • New 400 Car Garage • 196 On-Street Spaces Eliminated • 100 Off-Street Spaces Eliminated • Improved Access to Parking Areas 	<p style="text-align: center;"><u>DESIGN DETAILS</u></p> <ul style="list-style-type: none"> • Church St. Gateway • Sign Systems • Information Kiosks 	<p style="text-align: center;"><u>PROGRAMMED ACTIVITIES</u></p> <ul style="list-style-type: none"> • Art Exhibits • Craft Fairs • Merchant Promotions • Music • Speakers • Theater

Figure III-17. Burlington ARZ Plan: Summary of Recommendations

- Auto Traffic — The changes proposed for auto circulation within the area should have balancing positive and negative results. Traffic rerouted from Church Street will experience some slight changes in travel time in shifting to other streets. These changes may be both positive and negative, however, as the current one-way pattern of streets is changed to two-way operation, permitting greater route flexibility. As a result of the proposed changes, intersections will continue to operate well within capacity despite the fact that more traffic is being accommodated. Accessibility by auto to the downtown area should remain unchanged.
- Transit Operations — Because of proposed improvements in transit service and facilities, ridership can be expected to continue its upward trend. The new routes, especially the University shuttle, should stimulate new increases in system usage. Transit accessibility to the downtown will increase, and the accessibility of downtown destinations to disembarking transit riders will show slight improvement.
- Pedestrian Travel — The major impacts of the ARZ Plan will be improvements in pedestrian accessibility. Because of the creation of the pedestrian mall and other pedestrian-oriented improvements, pedestrians should experience increased accessibility to both transit stops and parking areas. Because of the improved capacity of the pedestrian network, overall pedestrian mobility within the ARZ will increase. Pedestrian access to the ARZ from adjacent neighborhoods and the University of Vermont should remain unchanged.
- Goods Movement — As noted in the presentation of the ARZ Plan, at most only 60 percent of the deliveries to Church Street will be affected by the Plan. Assuming that each front access delivery required one minute additional delivery time, the increase in delivery cost for the Church Street area would be about \$.17 per delivery. This represents an increase of about 2.6 percent in goods movement cost. In all probability, this increase in cost is overstated as some on-street deliveries can be made before 9:30 a.m. and after 5 p.m. at no additional cost.
- Parking — The parking component of the ARZ Plan should offer moderate benefits to the community. The Plan calls for the elimination of approximately 100 temporary off-street spaces and 196 metered spaces on-street. The loss of metered spaces represents about a 14 percent decline in this category, but the construction of the proposed parking garage will provide 400 spaces in the heart of downtown Burlington. Thus, the Plan proposes a net gain of approximately 100 spaces for the ARZ. Accessibility to parking areas by both autos and pedestrians should show definite improvement.

Economics

Implementation of the proposed ARZ Plan should have a number of positive effects on the Burlington economy.

- Increased Retail Sales — Expected retail benefits from the ARZ are dependent on a number of currently unknown factors. The actual impact that the new Burlington Square shopping arcade will have on Church Street merchants is unclear. Based on experience in other U.S. cities documented in Volume I of this report, retail sales should increase 10-20 percent after the mall is completed. This means benefits not only for merchants but also for the state in the form of increased state sales tax revenues.
- Increased Property Values — While statistics on total property values on Church Street are not available, increases in assessed values are expected. As a consequence, the amount of vacant floor space on the second and third floors of Church Street buildings should decline following implementation of the ARZ Plan. Conceivably, if the area experiences an economic boom, property owners may raise rents to reflect the greater attractiveness of the area.
- Increased Reinvestment and Redevelopment — Although no quantifiable estimates can be made, it can be expected that the public funds used to improve the downtown environment will stimulate similar investment by the private sector. This would produce a number of economic benefits to the community including employment and an improved tax base.

Urban Design

The proposed Burlington ARZ Plan would produce major urban design and amenity benefits for downtown.

- Improved Image and Attractiveness of Downtown — The most obvious impact anticipated if the ARZ Plan is implemented as proposed is the improved image and attractiveness of the downtown area. This is primarily expected along the four blocks of Church and some adjacent streets. The cars, trucks, and buses now on Church Street will be replaced by craftsmen, shoppers, trees, and benches. The shopping environment will be enormously improved which should result in more downtown visitors and a better all around image of the downtown. Especially noticeable will be the increased use of downtown at noontime, evenings, and on weekends.
- Increased Rehabilitation of Older Buildings — With new pedestrian activity and sales generated by the mall, rehabilitation initiatives may be taken by building owners on Church. This is a trend that has been occurring in the downtown, and may be encouraged further by development of the auto restricted zone. The increased reuse of older structures will help preserve the traditional character of

downtown Burlington. The creation of the auto restricted zone should also provide a framework for the protection of Burlington's historic structures. These local landmarks will become major elements of the new "downtown character area" established by the ARZ Plan.

Costs

In developing designs for the Church Street mall, adopted as the central feature of the ARZ Demonstration Design Plan, the City of Burlington has prepared cost estimates for the proposed Church Street improvements and parking garage. To these estimates the ARZ study team has added cost estimates for other elements of the proposed ARZ Plan.

The costs can be itemized as follows:

1.	Church Street mall including design fees, contingencies, and inflation	\$4,300,000
2.	400-car parking garage	\$1,700,000
3.	Church Street Gateway, including signs, lights, pedestrian marking and paving	\$ 25,000
4.	Transit pedestrian facilities on bus loop. Eight bus shelters with seating, lighting, information kiosks, and other facilities. 8 at \$6,000 each.	\$ 48,000
	TOTAL STREET IMPROVEMENT COSTS	\$6,073,000

The per-square-foot cost of the mall, as estimated by the City, is about \$38 per square foot. This is much higher than costs experienced in other cities for mall development. Reductions may be possible on certain items in the City's cost estimate, using more modest materials, or eliminating certain items such as a portion of proposed vending structures. A detailed breakdown of the City's cost estimate for the pedestrianization of Church Street and the construction of the parking garage is given in Table III-4. The street improvement costs do not include new traffic signs, signalization, and intersection improvements required for the ARZ.

**Table III-4. City of Burlington Cost Estimate:
Church Street Mall and Parking Garage**

A.	Utility Reconstruction:		
	1. Water System	\$122,000	
	2. Storm Sewer System	106,000	
	3. Sanitary Sewer System	10,000	
	4. Electric Light Department Systems	102,000	
	5. Fire Alarm System	20,000	
	6. Vermont Gas System, Inc.	53,000	
	7. New England Telephone Company	41,000	
	8. Green Mountain Cable T.V.	<u>None</u>	\$ 454,000
B.	Automatic Snow Melting System (53,800 Sq. Ft.):		270,000
C.	Surface Excavation and Subgrade Preparation:		160,000
D.	Pedestrian Paving:		900,000
E.	Vehicular Paving and Curbs:		21,000
F.	Street Furniture:		393,000
G.	Irrigation:		46,000
H.	Planting:		125,000
I.	Lighting:		116,000
J.	Structures:		<u>745,000</u>
		Subtotal of Estimated Nov. 1975 Construction Costs:	\$3,230,000
K.	Architectural, Landscape Architecture, Engineering and Special Engineering Compensation, Plus Related Expenses:		470,000
L.	Allowance for Contingencies:		185,000
M.	Estimated Inflation to March 1977: 16 Months at a Rate of 8 Percent Per Annum (25,900 per mo.)		<u>414,500</u>
		Subtotal of Estimated Costs For Church Street Mall Project:	\$4,300,000
N.	Estimated Package Cost for 400-Car Parking Facility:		
	Estimated Nov. 1975 Cost	\$1,550,000	
	Estimated Inflation to Mar. 1977	<u>150,000</u>	1,700,000
		GRAND TOTAL	\$6,000,000

Note: Estimates are based on current costs.

VII. IMPLEMENTATION

A fixed implementation process has been established for cities interested in receiving funding assistance under the ARZ demonstration program. The City of Burlington must review the proposed ARZ Plan, modify it if necessary, and adopt it as the plan to be implemented. An implementation program must then be developed which covers the following considerations.

Environment

In order to be considered for selection as an ARZ demonstration site, Burlington must prepare an assessment of the environmental impacts of the auto restricted zone. This assessment must then be followed by a public hearing where all affected parties may comment on the Plan adopted for implementation. If Burlington is selected as a demonstration site, a formal environmental impact statement will be required before construction can begin.

Citizen Participation

Burlington has already initiated a process to involve citizens in the ARZ planning process. Members of the ARZ Project Committee are conducting a series of 30 design discussion workshops for the Burlington community. The workshops include a slide show illustrating proposed changes and various other devices such as questionnaires designed to stimulate dialogue and gain information on citizen reaction to the Plan. Additional citizen reaction will be documented at the public hearing on the environmental assessment.

Legal Issues

Legislative work necessary to the implementation process has been completed by the City of Burlington. The Burlington City Charter has been modified to authorize a referendum on the creation of a commission with the power to issue bonds to finance the ARZ program. Thus, the legal and financial structure to carry out ARZ implementation is now in place.

Funding

A key element of the implementation program being developed by the city is a detailed account of funding sources for the ARZ project. As noted above, preliminary legal work has been completed paving the way for a bond issue to be financed by a surcharge on property taxes within a special downtown tax district. In addition to these local sources, other Federal funding programs are being utilized to finance the proposed ARZ Plan. The new 400-car parking garage has recently been funded by the Economic Development Administration. Federal revenue sharing monies have been authorized by Burlington officials for detailed design development and preliminary engineering work on the Church Street mall. A capital grant application for new buses and facilities has been submitted to the Urban Mass Transportation Administration.

The Construction Process

The construction process can have a potentially disruptive influence on downtown use and business. In order to minimize these impacts, it is critical that construction activities be realistically scheduled to avoid misallocation of project funds.

Key considerations include:

- The heavy part of construction such as demolition, utility work, and foundation must be accomplished as quickly as possible during the off-peak retail season.
- Interim access and clear signing must be maintained to all shops during construction.
- Promotional efforts for the ARZ should include a clear presentation of the improvements that are being built and their schedule of completion to the downtown public, so that people can anticipate future benefits, become involved in their progress, and overlook the interim inconvenience.

Maintenance, Management and Activity Programs

These must be preplanned and ready to go with full force the day the first section of ARZ improvements opens. A mall coordinator must at that time be available in person and by telephone to answer inquiries, alleviate confusion, and solve the inevitable start-up problems.

4. MEMPHIS

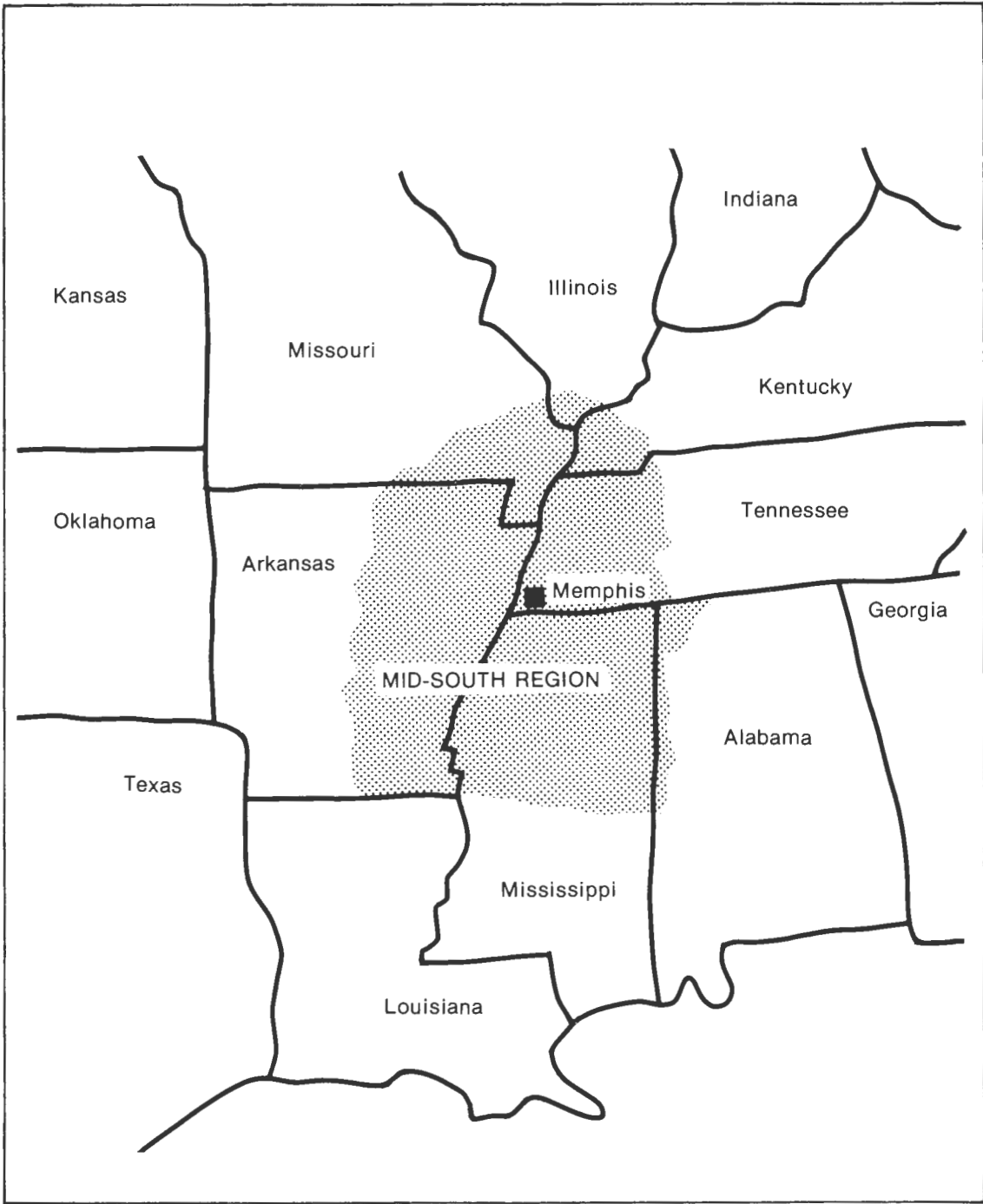
Chapter 4. MEMPHIS

I. INTRODUCTION

Memphis, Tennessee, is a historic city of over 667,000 people located on the eastern banks of the Mississippi River. Despite its origins as a "river town", the city now spreads out far to the north, south, and east of the downtown, the oldest developed area, situated on a steep bluff overlooking the Mississippi. The City of Memphis with its associated metropolitan area is the principal urban center of both Tennessee and the emerging region of the Mid-South. As shown in Figure IV-1, the Mid-South region is composed of sections of six states both east and west of the Mississippi, between the large urban areas of St. Louis and New Orleans.

Memphis and the entire Mid-South region are located in the heart of the "Sunbelt", the nation's area of highest growth. Census data indicates that Memphis and its metropolitan area have participated strongly in this regional growth trend. In the decade from 1960-1970 the population of the City of Memphis increased by 25 percent, which was 2.5 times the population growth rate for the State of Tennessee. It must be noted, however, that although the City grew 25 percent over this period, the population of the entire Memphis metropolitan area increased only 14 percent, a situation contrary to the common pattern of suburban growth, which was characteristic of the 1960's. The disparity in rates of growth for the City and the SMSA is due to a policy of annexation which brought developing areas at the fringe, into the city limits. Thus, despite large increases in population, density declined 26 percent, to less than 3,000 persons per square mile, as the City's land area grew 68 percent. Census projections indicate that as immigration to the Sunbelt continues, the Mid-South will claim its share of the regional increase. It is estimated that the Memphis population increased 7 percent from 1970-1975, and the projected growth rate for the State of Tennessee is more than 11 percent in the decade 1970-1980.

This trend of rapid growth in population has developed concurrently with the recent evolution of the local economy. Through its association with Mississippi River



MEMPHIS AUTO RESTRICTED ZONE STUDY

Alan M. Voorhees & Associates, Inc.
 Cambridge Systematics, Inc.
 Moore-Hedrick Architects
 A.T. Kearney, Inc.



Figure IV-1. Memphis and the Mid-South Region

traffic, Memphis first developed as a tightly settled commercial center for a regional economy based almost entirely on agriculture. Cotton became the major cash crop of the region and Memphis became the center for cotton finance, marketing and transportation. In the period of sustained national economic growth which followed the Second World War, however, the Memphis economy diversified, especially in the retail and service sectors. As a result, the Memphis area no longer revolves around agriculture but also includes strong service, manufacturing, and industrial components. The agricultural influence remains, however, with 52 percent of the land in Shelby County, the most urban county in the Memphis SMSA, devoted to farm use in 1970.

II. THE DOWNTOWN

The Memphis Auto Restricted Zone Study focused on the core of the Central Business District (CBD), as shown in Figure IV-2. Because the Study was based on existing local planning efforts, the boundaries of the study area were drawn to conform with the boundaries of the existing special taxing district. This area comprises the most densely developed area in the region, downtown Memphis. Also shown in Figure IV-2 is the Medical Center, a concentration of hospitals and medical education and service facilities, which is the second major activity node in the Memphis area.

Within the district identified as the study area is a mix of the variety of activities traditionally associated with a downtown area. Office employment, the dominant sector of the downtown economy, is led by government offices for City, County, State, and Federal operations. Banking is a second leading downtown function with a number of major banks located in the newest high-rise buildings of the downtown. Office activity is heavily concentrated in the northern and eastern sections of the study area, as shown in Figure IV-3.

Retailing is a prominent activity in downtown Memphis with an estimated 1.5 million square feet of floor space in retail use. A 1976 survey disclosed 216 retail establishments in the Memphis CBD. Foremost of these are Goldsmiths' and Lowenstein's department stores, which are the main retail attractions of the downtown.

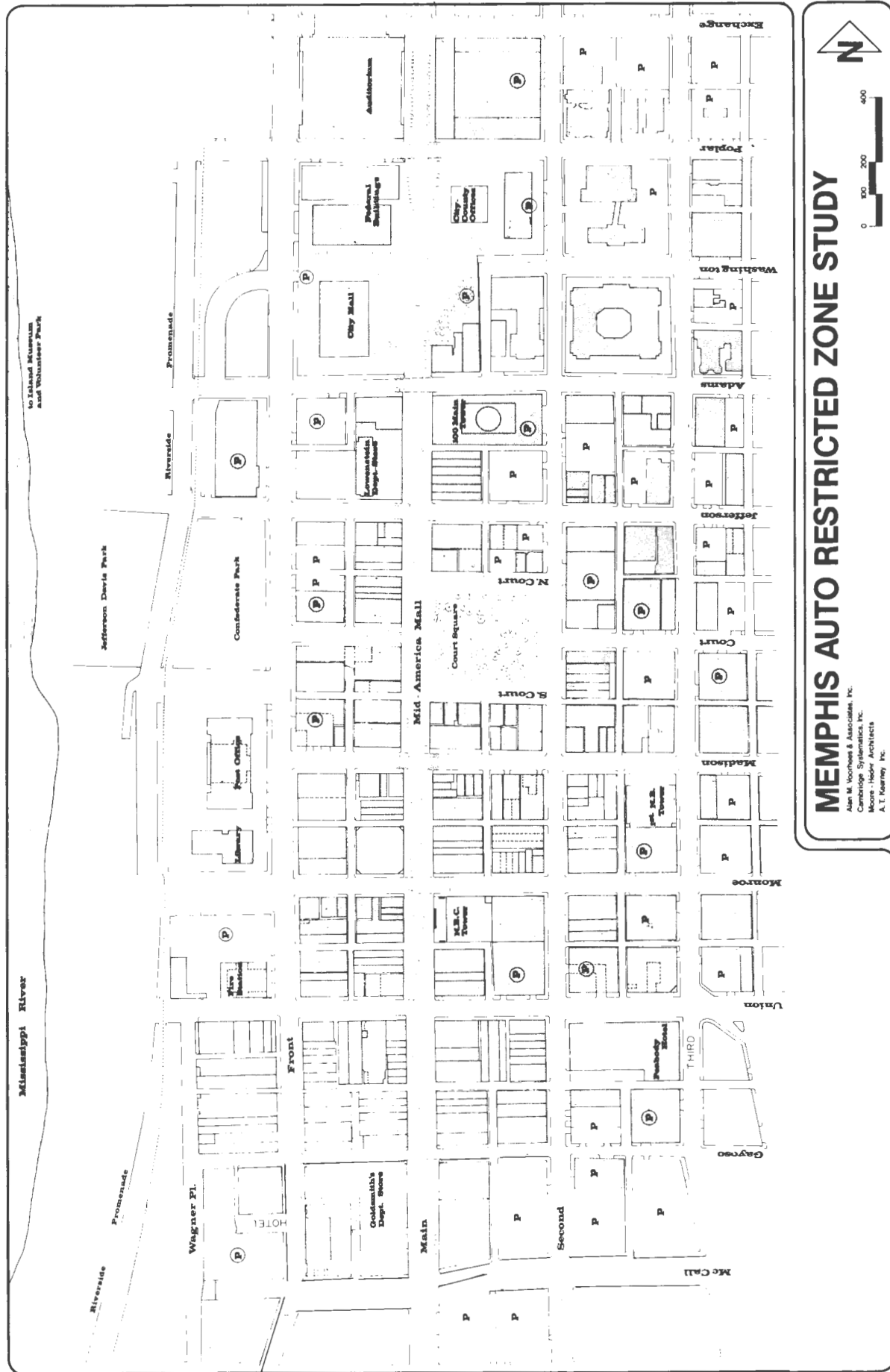


Figure IV-2. ARZ Study Area and Memphis CBD

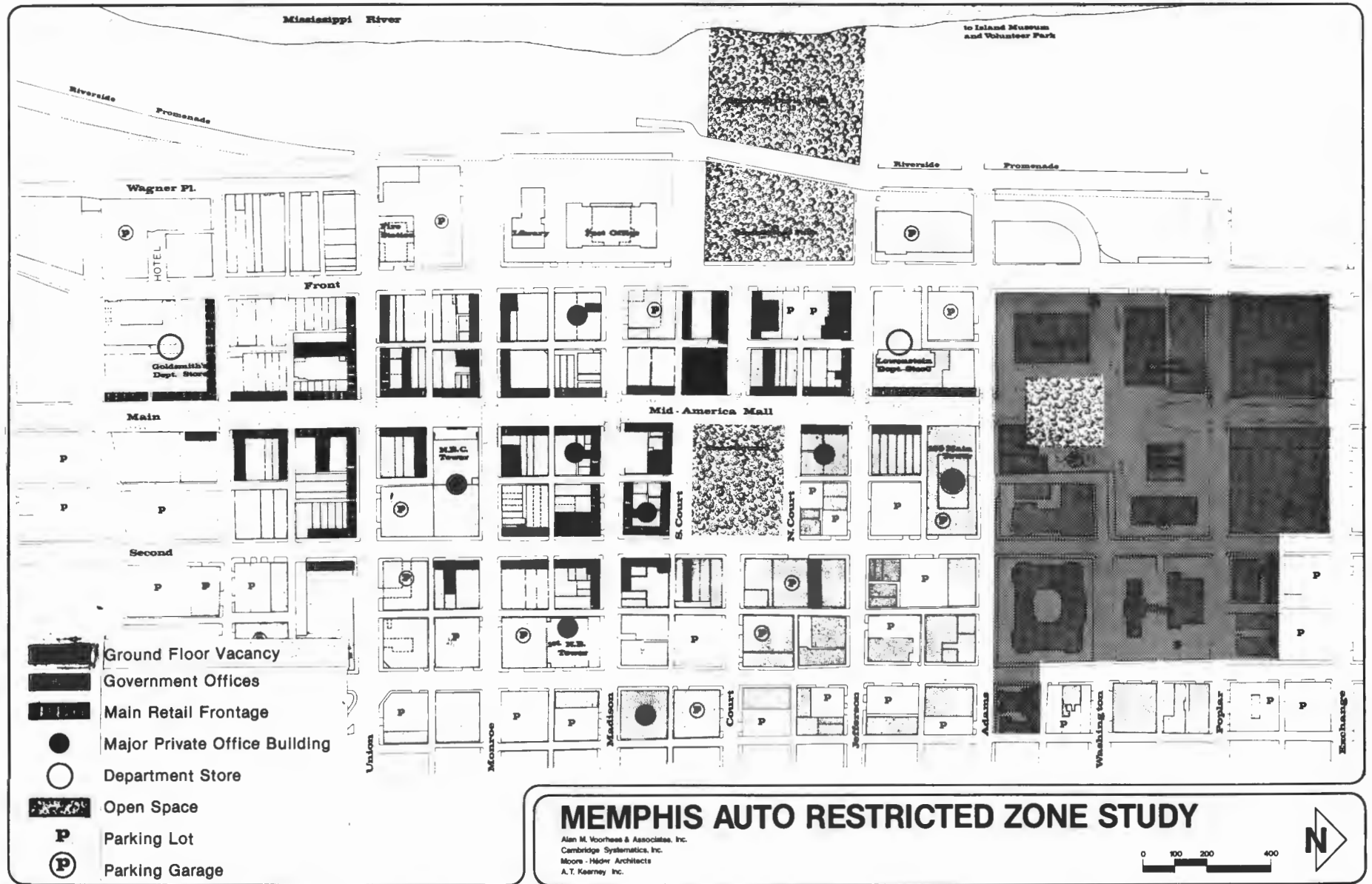


Figure IV-3. Study Area Activity

In addition to these large department stores, a variety of smaller specialty shops are located in downtown, offering typical items such as clothing, jewelry, and office supplies.

In the recent past, however, the retail position of downtown Memphis has declined in face of competition from suburban retail outlets, especially those in the East Popular Street area and the enclosed Raleigh Springs Mall. As a result, an estimated 24 percent of the potential retail floor space in downtown is vacant. A large proportion of this total vacant floor area, however, is on upper floors and therefore cannot be considered as prime rental property. Its distribution is illustrated in Figure IV-3. Only 16 percent of the total vacant retail space is on ground floors. As also shown in Figure IV-3, the major concentration of retail activity is in the vicinity of the Mid-America Mall through the central portion of the study area.

Downtown employees, visitors, and residents provide support for the service and entertainment sector of the CBD economy. In addition to the estimated 30,000 persons employed in the study area, a limited number of people reside downtown in Lowenstein Towers, West Court Apartments, and in loft condominiums along "Cotton Row". An estimated 1,000 hotel rooms are also located in the downtown area. This market supports some 48 eating and drinking establishments in the CBD. In general, these eating places are heavily oriented towards high-turnover lunch service with few restaurants providing opportunity for dinner and evening entertainment. This is no doubt due in part to the extremely limited entertainment opportunities present in the downtown.

Redevelopment projects recently completed or now underway, however, are directed at reinforcing the diversity of the downtown activity base, especially in the retail and entertainment sectors. The most visible of these revitalization efforts is the Mid-America Mall, a ten-block pedestrian shopping mall created out of the former Main Street. This \$6.7 million project was funded locally through the creation of a special downtown property tax district and has initiated a process of transformation for downtown Memphis.

Several other redevelopment projects now in progress seek to extend the retail interest generated by the Mid-America Mall into the recreation and entertainment field. Preliminary work is underway for the creation of a new Volunteer Park on Mud Island in the Mississippi River, as shown in Figure IV-4. This \$25 million program will turn the under-used island, shown in Photo I, into a Mississippi River museum and general recreation area with a pedestrian and cable-car connection to the Civic Center Plaza. In the private sector, the restoration of the downtown's vitality has focused on the reuse and rehabilitation of existing structures. Phase I of the Beale Street Landing project, the conversion of a former warehouse into an entertainment complex, is nearing completion. The nearby Orpheum Theatre has recently reopened as a downtown center for the performing arts. Close by this emerging entertainment area, old commercial and industrial structures are being renovated for reuse as restaurants and residences in other individual attempts to restore the vitality of downtown Memphis.



Photo IV-1. Aerial Toward Riverfront

A further description of the study area is contained in the following discussion of several key functional elements:

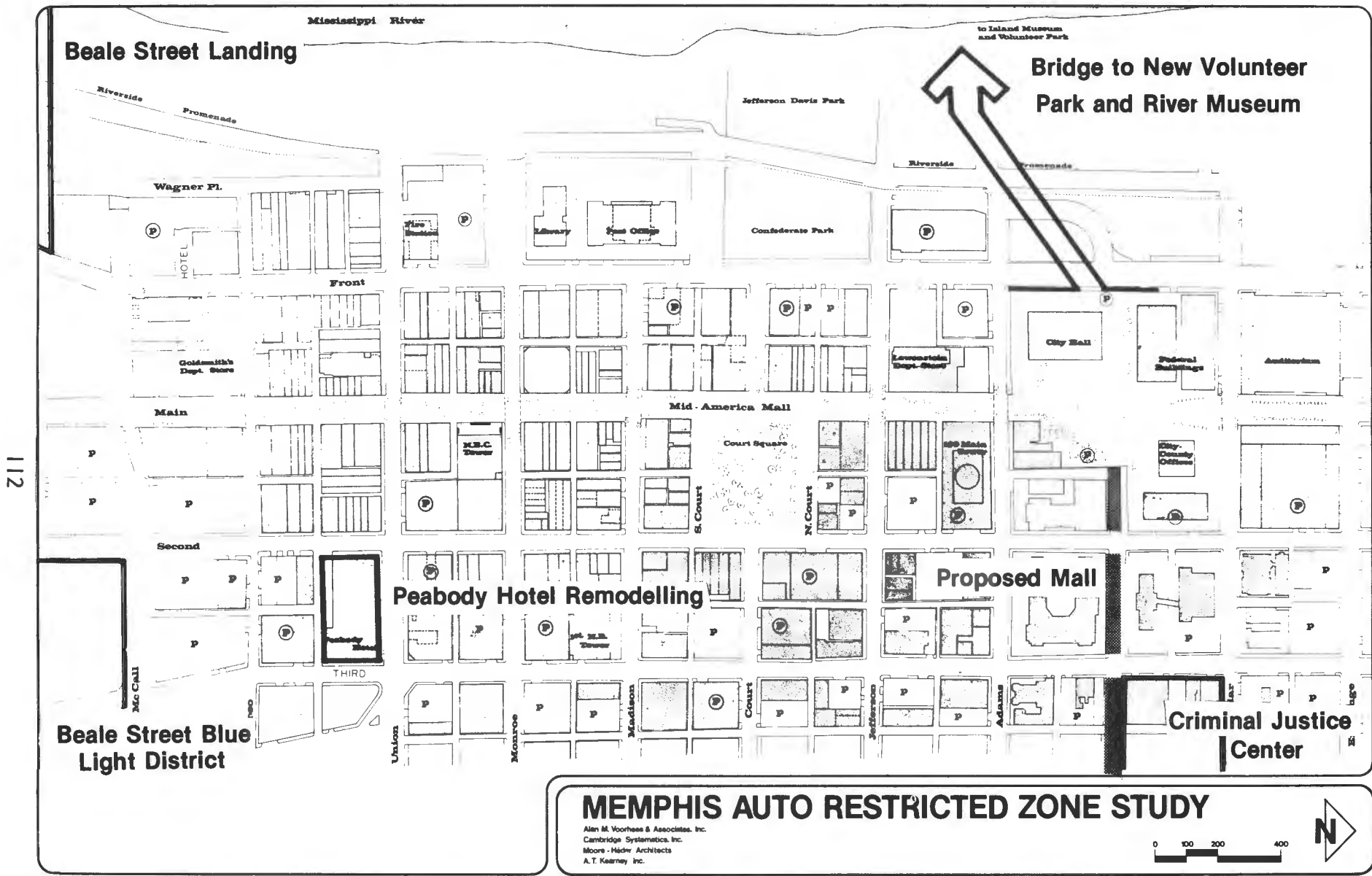


Figure IV-4. Active and Proposed Redevelopment Projects

Transit

Public transit services in the Memphis area are provided by the Memphis Area Transit Authority (MATA). The move to take over the operations of the former private operator was made to counter the effects of a steady decline of patronage that has seen system ridership fall 21 percent from 1964 to 1975. In an attempt to reverse this trend of decline, steps have recently been taken to reorganize the transit system in order to provide for more useful services and efficient operations. As the Memphis Auto Restricted Zone Study was in progress, the MATA's transit management firm, A.T.E., implemented a number of measures that were influential in the design of the Memphis ARZ Plan.

The Memphis CBD is presently served by 51 transit routes which serve areas to the north, south and east of the downtown area. Of these 51 routes, 23 are peak-hour routes; the remaining 28 routes have service throughout the day. During the peak hour, headways range from a high of 60 minutes to 10-minute headways for the most frequent service. As of October 1976, 42 of the 51 routes which served the downtown terminated in the downtown area and returned on the same route. These 42 routes would circle the mall on a route referred to as the Mid-America Circle and which is illustrated in Figure IV-5. At some times during the day the volume of buses on the circle would get as high as 125 buses per hour. The other nine routes were interlocked in a manner such that a bus would not leave the downtown area on the same route on which it had entered. Three crosstown routes were operated which crossed most of the radial routes serving the downtown.

In downtown Memphis, MATA operated a free bus referred to as the Mid-America Circle (MAC) shoppers' bus from 1974 until November 1976. The route was two miles in length with three buses and essentially overlapped the downtown circulation pattern of other incoming and outgoing routes that was shown in Figure IV-5. In the last year of operation, using three buses between the hours of 7:30 AM and 6:30 PM, seven days a week, the MAC averaged 1,934 passengers per weekday and 1,002 passengers per Saturday. The service was designed to maintain accessibility and mobility for intra-CBD trips when Main Street was closed and the Mid-America Mall constructed. Although the MAC never crossed the mall or provided direct service to the mall, the route was within one block at all times.

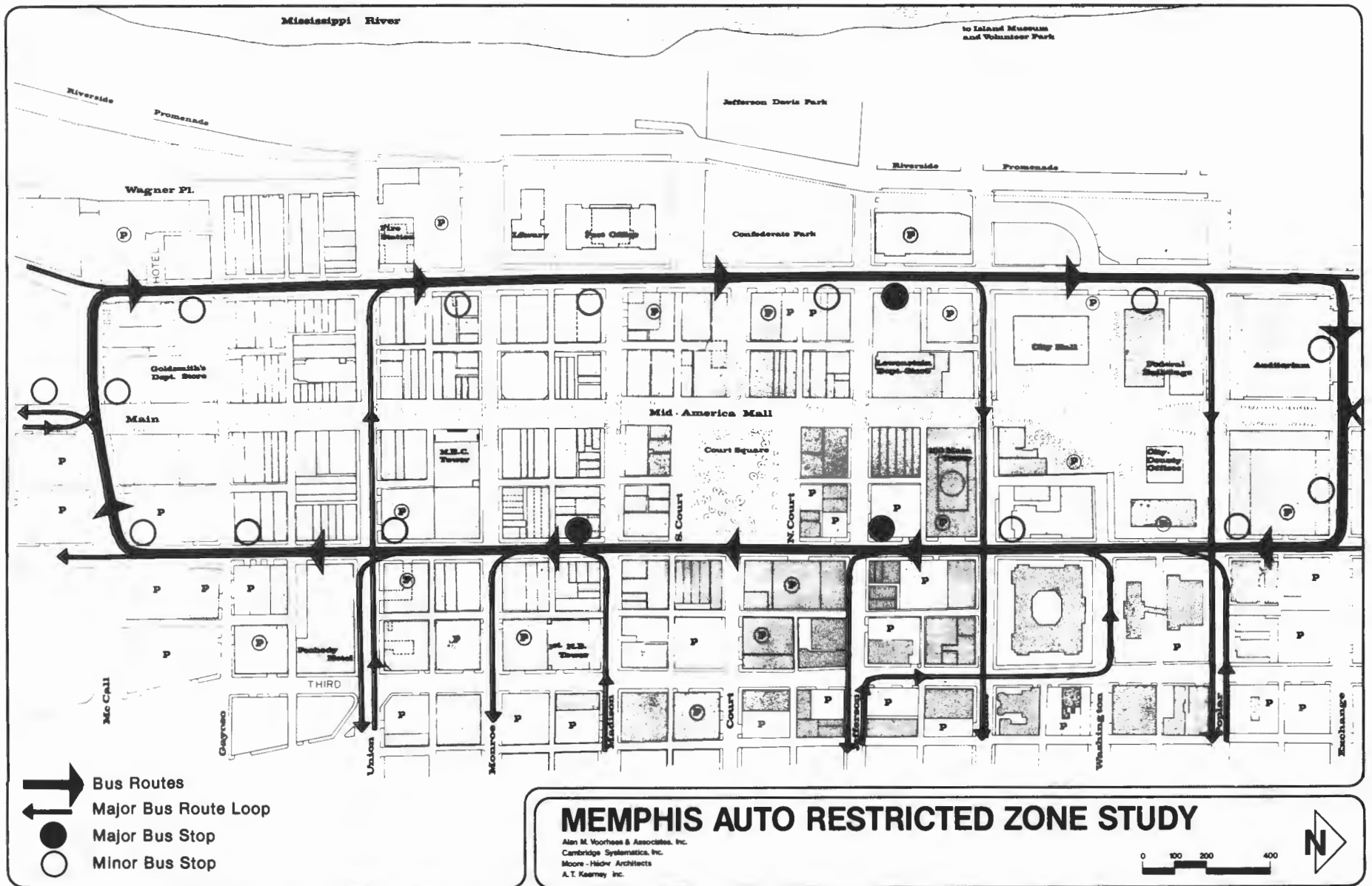


Figure IV-5. Downtown Bus Routes and Stops

Table IV–I provides a summary of the operating statistics of the routes operated by the MATA. The routes have been grouped according to the street on which they approach the downtown loop. Total passenger boardings are estimated at about 67,000 passengers per weekday; 31,000 per Saturday; and about 9,000 on an average Sunday. This distribution of trips is very uneven among the routes, with the four most popular routes constituting 30 percent of the average weekday ridership. One of these, Route 30–Crosstown, alone carries 9 percent of the total daily system ridership. This reflects the change in travel patterns which has taken place since the radial system, which concentrated service on the CBD, was designed. The summary statistics also indicate the extreme peaking in service that occurs in the morning and in the evening. More than 2.5 times as many buses are in operation in the peak hours as during the midday.

While the ARZ Study was in progress, MATA management implemented several planned changes in transit operations and services. The most significant element was the interlocking of downtown bus routes so that a bus inbound on one route would pass through the CBD and proceed outbound on another route. With these through routings, more direct service could be provided, thus eliminating some need for transferring in downtown. Routes were designed so that a person traveling from any part of the City could get direct service to the Medical Center, previously a source of many transfer movements. A second major change for transit service downtown was the creation of a free-fare zone, called Mid-America Short Hop (MASH), as a substitute for the former MAC free shopper buses. Under the new arrangement, passengers wishing to ride within the downtown area can ride free within the zone shown in Figure IV–5 on any of the 51 regular bus routes that serve the downtown. These changes in downtown transit service and operations were adopted by the ARZ study team and incorporated into the Memphis Plan, as discussed in a later section.

Streets and Circulation

The street network of downtown Memphis is arranged in a grid pattern forming square blocks approximately 400 feet on a side. As shown in Figure IV–6, each block is bisected by service alleys which run parallel to the streets within the block interior. Downtown streets generally offer two to four travel lanes with typical

Table IV-1. Memphis Transit - Summary Statistics

	Average Weekday Ridership	Buses in Operation			Buses on Downtown Loop During A.M. Peak Hour
		A.M. Peak	Midday	P.M. Peak	
North	12,822	42	17	39	20
- A	7,320	24	9	21	11
- B	2,100	8	4	8	4
- C	3,402	10	4	10	5
East	18,133	59	19	58	38
- D	6,785	21	7	22	8
- E	1,408	5	2	5	4
- F	4,348	7	5	7	9
- G	5,452	26	5	24	17
South	26,518	98	33	95	57
- H	3,741	12	5	13	6
- I	10,147	38	13	37	20
- J	12,474	44	15	41	28
- K	156	4	--	4	3
Crosstowns	9,542	21	6	19	
- L	9,542	21	6	19	10
MAC	1,934	3	3	3	10
Grand Total	67,356	223	80	214	125

Groups	Routes	Groups	Routes
North		South	
A	8,14,40,52	H	36,50
B	11	I	4,7,9,18,23B,30,38,57,58,PR
C	19,A	J	12,13,15,16,17,39,42,44,45, 46,47,49
East		K	GR
D	5,41,55,55,J	Cross-	
E	3,22	towns	
F	1,2	L	31,32,33
G	20,23A,34,43,48,56,B,C, BB		

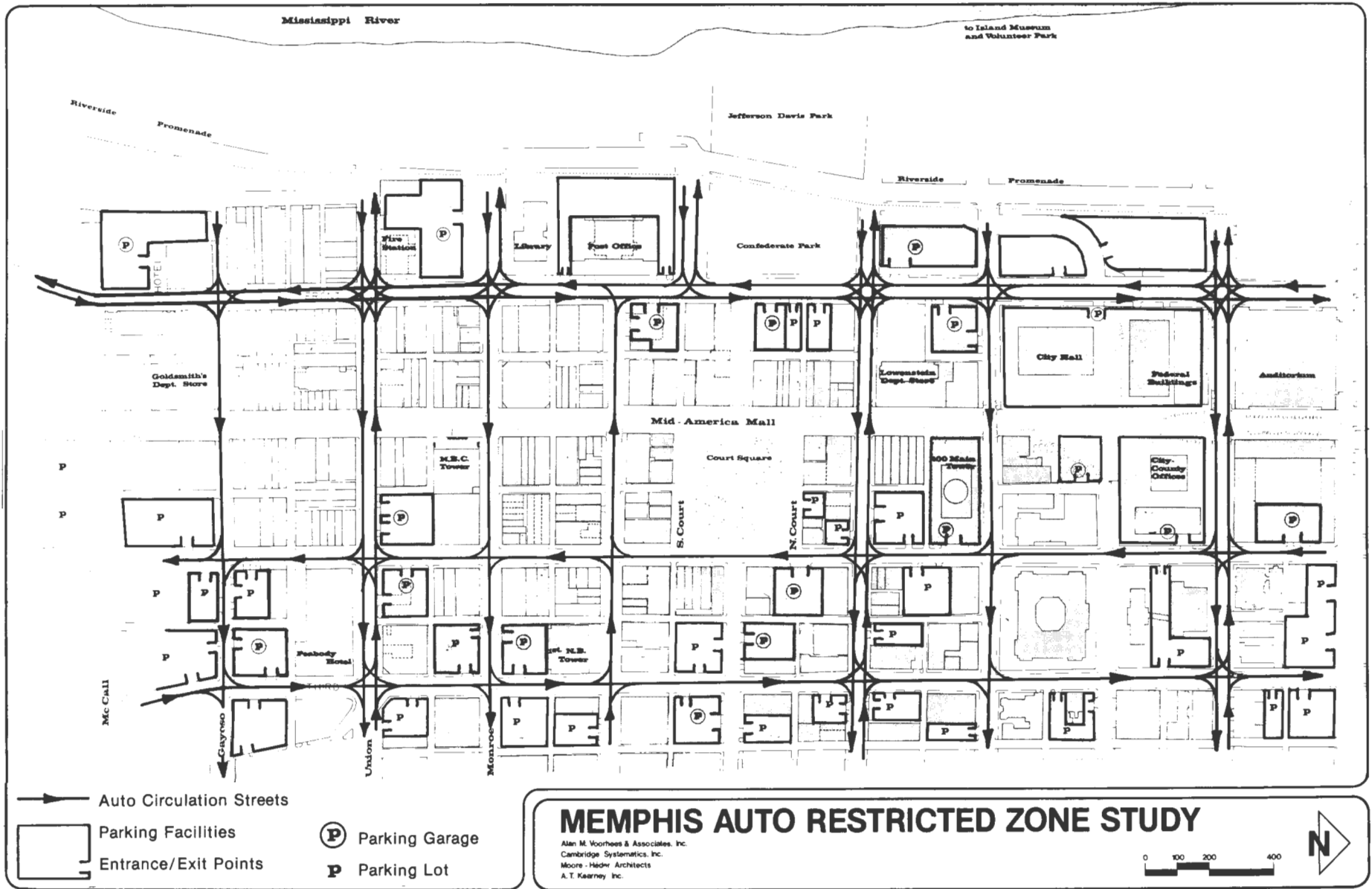


Figure IV-6. Traffic Circulation and Public Parking

pavement widths of 40 to 50 feet. Since the early 1970's and the creation of the Mid-America Mall, a number of modifications to the pattern of vehicular circulation in the downtown have been implemented. Before its dedication to exclusive pedestrian use, Main Street was a major two-way component of the traffic circulation scheme and the principal transit street in downtown Memphis. Since the closure of Main and the construction of the mall, traffic has been redistributed on other streets in the network and the transit loop created on the periphery of the retail core. As a result of this shift in traffic flow, some other minor modifications in street operations were made to produce the current circulation pattern shown in Figure IV-6.

The major gateways to the downtown area are on Riverside to the south, Second Street and the I-40 bridge on the north, and on Poplar, Madison, and Union Streets on the east. These thoroughfares are the primary traffic carriers within the study area. In the evening peak hour, traffic volumes are heaviest on the north-south streets of Third, Second, Front, and Riverside where typical volumes range from 1,000 to 2,000 vehicles per hour. Volumes on the major east-west streets are lower, less than 1,000 vehicles in the peak hour, due to less direct connections to the regional highway system. Overall, traffic congestion in downtown Memphis is not a significant problem. Turning movements necessitated by the one-way street pattern result in congested conditions during the evening peak hour at certain intersections, but these conditions are of brief duration and have little impact on the overall level of congestion in the study area.

Parking

The availability of auto parking is a major element in the attractiveness and accessibility of downtown in an auto-oriented metropolitan area such as Memphis. In programs to revitalize the downtown area parking supply, location and cost become important topics for those seeking to attract shoppers from the outlying residential areas. Figure IV-6 illustrates the supply of off-street parking within the ARZ study area. As shown on the map, auto parking is not concentrated in any particular area of downtown, but scattered throughout the study area in a maze of small surface lots. Only four blocks within the downtown area have no off-

street parking of any kind. Within the study area, a total of nearly 15,000 parking spaces of all types have been identified. A parking inventory performed for the City in 1974 yielded utilization data that show 64 percent of these spaces were occupied. Of prime importance for downtown retailers, however, is the amount and availability of parking open to the public and not restricted to employees or customers of a particular establishment. Table IV-2 summarizes parking data for the study area which show that 77 percent of the downtown spaces are open to the general public and that only 61 percent of these were occupied at the time of the inventory.

Table IV-2. Parking Data Summary

	<u>Curb Spaces</u>	<u>Off-Street Spaces</u>	<u>Total Public Spaces</u>	<u>Grand Total</u>
Number of Spaces	1,138	13,494	11,254	14,632
1974 Occupancy	87%	62%	61%	64%
Percent of All Spaces	8%	92%	77%	100%

Besides the availability of spaces, parking location is the other key factor in shoppers' overall perception of parking convenience. Analysis of the inventory data disclosed an interesting distribution of empty parking spaces in downtown Memphis, as summarized in Table IV-3. The limited number of spaces within 200 feet of the Mid-America Mall are effectively fully utilized, but occupancy in the ring 200-500 feet

Table IV-3. Parking Occupancy by Location

<u>Characteristic</u>	<u>Distance From Mid-America Mall</u>			
	<u>Within 200 Feet</u>	<u>200-500 Feet</u>	<u>500-1,000 Feet</u>	<u>Over 1,000 Feet</u>
Walk Time	1 minute	2 minutes	4 minutes	5 minutes
Total Public Off-Street Parking Spaces	441	4,738	4,435	809
Occupancy (1974)	88%	47%	66%	83%

from the mall is much lower with only 47 percent of the spaces open to the public filled, leaving over 2,500 empty spaces within a 2-minute walk from the mall. As distance from the mall increases, however, the utilization of public spaces increases to 66 percent in the ring between 500-1,000 feet and to 83 percent for the public spaces almost one-quarter mile from the mall.

This pattern of utilization indicates a marked sensitivity to parking price with downtown auto drivers preferring the cost, as low as 30¢ for all day, of peripheral parking to the higher price of spaces closer in, despite walking distances of as much as one-quarter mile. Overall, there are an estimated 4,000 unused spaces open to the general public within 1,000 feet of the Mid-America Mall.

Goods Movement

As the most densely developed portion in the Memphis metropolitan region, the downtown circulation network must accommodate a substantial number of goods movements within a small area. As disclosed in the ARZ study's survey of goods movements, Memphis is equipped with an excellent set of facilities to handle deliveries efficiently. Foremost is the extensive alley system that serves virtually every block in downtown as shown in Figure IV-7. Although in several cases segments of the alley system have been removed to make way for development, some form of rear or side access is available to nearly every structure in the study area.

In general, the north-south alleys represent the more valuable goods movement channel, handling five times as many deliveries as their east-west counterparts. This imbalance reflects the fact that the north-south alleys are generally wider and are better able to accommodate present day delivery vehicles. In addition, the presence of the mall and its vehicle restrictions creates an effective "dead-end" situation for the east-west alleys during much of the working day.

The off-street loading docks contained in many major downtown buildings represent a particularly valuable tool in reducing congestion on the street, especially when they offer vehicle maneuvering space off the street, as is typically the case in Memphis. Both major department stores and all major newer office buildings have

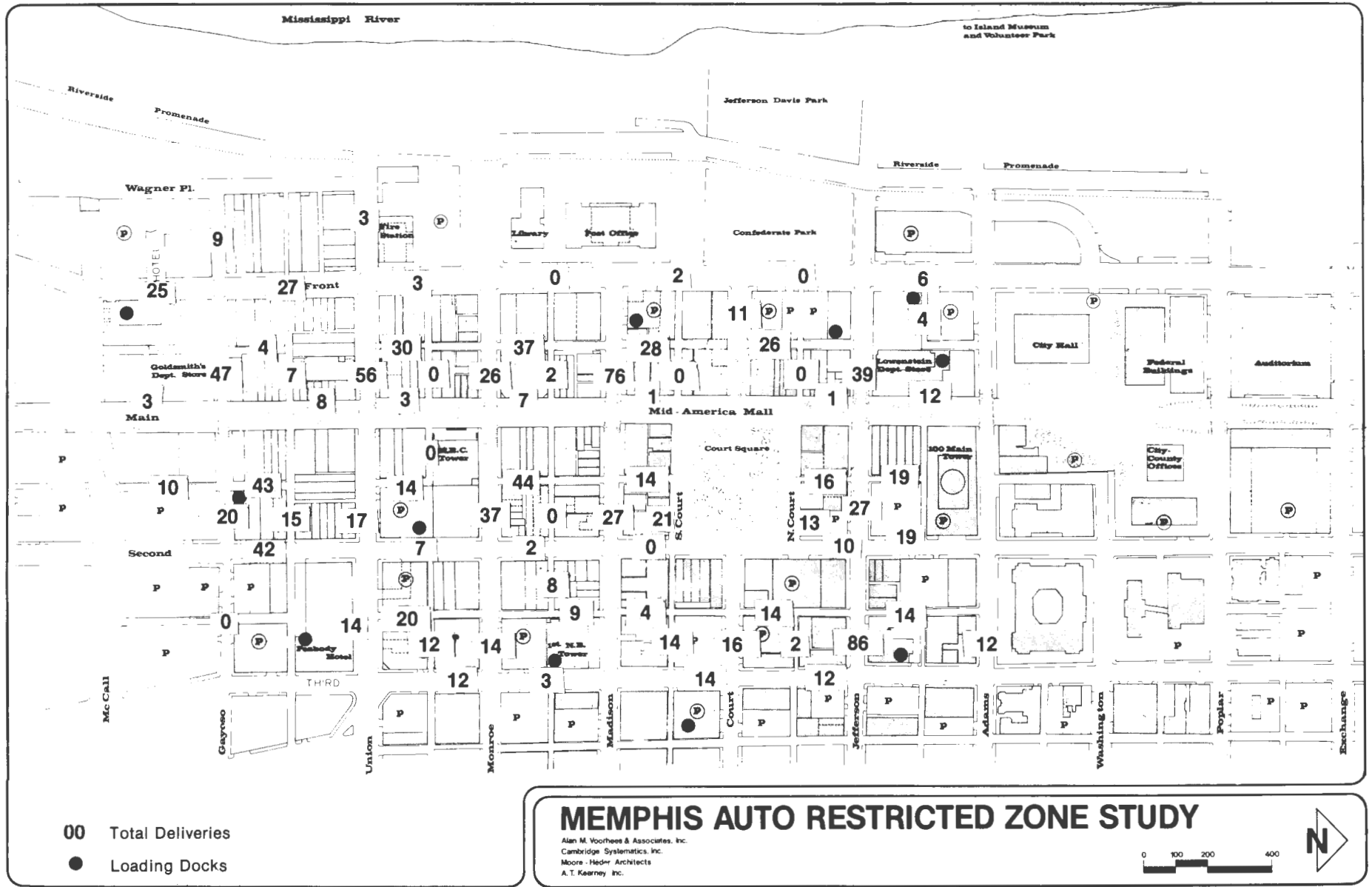


Figure IV-7. Goods Movement Facilities and Activity

off-street docks, and most of them are located indoors as well. In addition to general purpose docks, the major bank buildings also have indoor docks for armored express trucks, thus removing this major source of street level activity. Consequently, queues of trucks are a very rare sight on the streets surrounding major buildings in downtown Memphis.

The on-street deliveries in downtown Memphis are restricted to specified loading zones. In the course of the survey, no particular problems were noted with respect to either the adequacy of the location of the loading zones. Double parking by delivery vehicles is not a common sight in downtown Memphis. This is a reflection both of the adequacy of the goods movement facilities and the effectiveness of the Police Department in enforcing parking restrictions.

The survey of goods movements in downtown Memphis indicated that approximately 1,300 deliveries are made in the study area between 8 a.m. and 5 p.m. Over the course of the day, it appears that deliveries are concentrated in the morning and midday periods with 79 percent of the stops made before 2 p.m. Refuse pickups, another major source of truck movements within downtown, are typically performed in the off-peak hours. In general, the density of goods movement activity is fairly low in downtown Memphis for, of the 85 street and alley segments observed, only four averaged more than five observations per hour. These four are shown in Figure IV-7. The most common activity level for a Memphis street segment is 1-2 deliveries per hour or 9-17 deliveries in the nine-hour working day. More than 70 percent of the street segments have fewer than 3 deliveries in the average hour or 26 deliveries in the working day.

Approximately 75 percent of the activity recorded in the survey occurred in the area bounded by Front, Second, Adams, and McCall Streets. Since the three major north-south streets in this area, Front, Second, and the mall are not favorable for deliveries, they account for only approximately 18 percent of the activity. The east-west streets carry the primary burden with 48 percent of the activity, but the north-south alleys also play a major role with 28 percent of the activity. The remaining 6 percent occurs on the east-west alleys. The most active of all streets, Madison from Front to Second, accounts for only 13 percent of the deliveries in this district, which further indicates the dispersal of goods movement activity throughout the CBD.

Pedestrian Facilities

As a pedestrian environment, downtown Memphis has much to offer. The downtown provides an expanding base of activities that presently includes opportunities for a range of shopping, services, and eating places. Moreover, activities are mixed in such a way that walking distances are not long. The buildings in downtown represent a rich collection of commercial structures which date back to the various periods of the City's history, and these older structures offer a significant measure of interest to the eye in their different styles and decorative details. The climate is conducive to pedestrian travel with generally mild temperatures and minimal problems with snow, ice, and wind. Yet, despite these positive influences, Memphis has only recently begun to encourage pedestrian travel in the downtown area.

The transformation of Main Street into the Mid-America Mall, the longest pedestrian mall in the nation, was the first major step toward encouraging pedestrian circulation in downtown. Although no pre-mall data exist, local officials and merchants report large increases in pedestrian volumes for the former Main Street since it was converted to pedestrian use. Figure IV-8 shows that weekday pedestrian volumes on the mall since its opening in May 1976 are much higher than on any of the adjacent streets. As shown in Photo IV-2, during shopping hours, and



Photo IV-2. Mid-America Mall

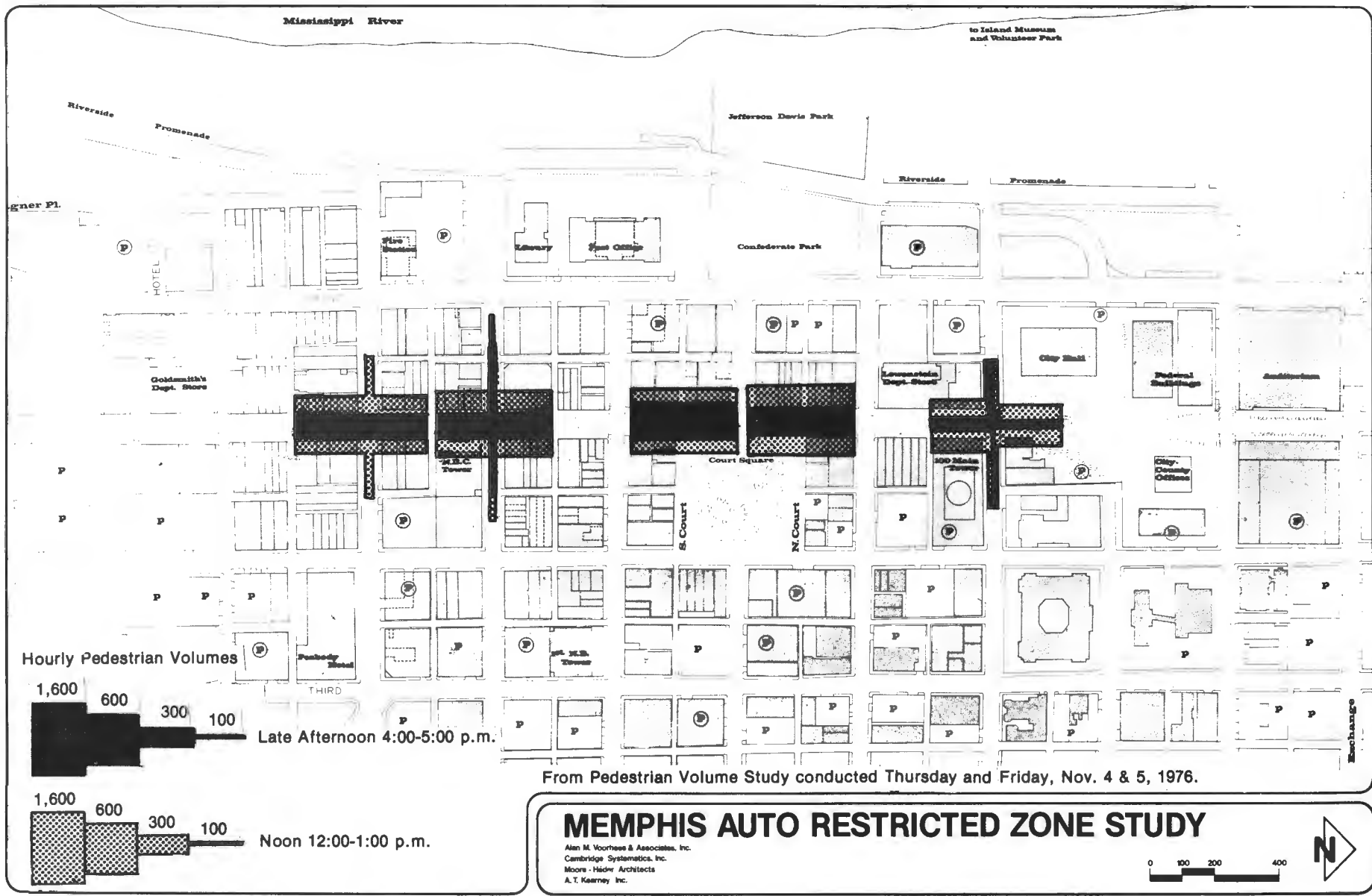


Figure IV-8. Pedestrian Facilities and Activity

especially at lunch hour, the mall is an interesting and active facility, filled with pedestrians.

Besides the Mid-America Mall, several other pedestrian areas exist within the downtown. At the northern end of the mall is the Civic Center Plaza setting for the City, County, and Federal office buildings. Here the mall widens to encompass a four-square-block area featuring a fountain, sitting areas, and planters. Court Square, near the midpoint of the mall, is an attractive oasis with tall trees shading a bandstand, benches, and a fountain. To the west are two parks, Confederate Park and Jefferson Davis Park, which serve as reminders of the City's historic past. Aside from Court Square and the Plaza, which are connected by the mall, no special pedestrian facilities link these areas which remain under-used and isolated from each other and the rest of the downtown.

Substantial problems exist with pedestrian facilities away from the mall. Although volumes are generally light, sidewalk conditions in many areas are poor, especially where the pedestrian and transit systems interface. Bus passenger waiting facilities present the most obvious pedestrian problem in the downtown. While in the rest of the study area, pedestrian volumes range from pleasantly lively to very low, the primary bus stops on Front and Second Streets are congested with waiting passengers. Accumulations of 60-80 people can be seen at these stops throughout the afternoon. The number of waiting transit passengers and the position of the shelters on the sidewalk serve to effectively block the sidewalk to through pedestrian travel as illustrated in Photo IV-3. The transit riders wait, leaning against



Photo IV-3. Transit Shelter Blocking Sidewalk

the buildings since the shelters can only accommodate 6–8 people, and are subjected to the noise and fumes of bus after bus, as every bus on every route makes its loop around the downtown area. Away from these concentrations of waiting transit passengers, the sidewalks that serve as the pedestrian circulation system for the study area appear to be adequate to accommodate present volumes of pedestrians, but provide a low level of amenities and hence little encouragement for walk travel.

III. CURRENT PLANNING STATUS

Reflecting the concern of local officials, merchants, and the general public for the future of downtown Memphis, a wide range of plans and developments have been proposed. Of these, the Plan for Downtown Memphis, prepared in 1974 by Marcou, O'Leary and Associates, is the most broad-based in addressing the problems of downtown. This plan proposed an ambitious \$150 million program of downtown redevelopment to be accomplished over 15 years by both public and private interests. In general, the plan proposed development of large-scale residential, office, and entertainment complexes to infuse new vitality into the downtown. Specific proposals include a promenade gateway opening Court Square to the riverfront, new office buildings around Court Square, and the construction of a tiered residential complex on the riverfront.

A number of other specific development projects included in the 1974 plan are the subject of current planning consideration. These include:

- The Memphis/Shelby County Justice Center — A \$33 million complex of government offices and other law enforcement facilities to be located one block east of the present civic center plaza, between Washington and Poplar Streets.
- The Beale Street Entertainment District — This development proposed for the southern periphery of the downtown area would contain a mix of uses and new and old structures featuring entertainment and cultural facilities.
- A Major Convention Hotel — Is needed to take advantage of existing downtown convention facilities. Discussion has centered on the construction of a new hotel in the vicinity of the convention center or the possible renovation of the existing Peabody Hotel on Union Street which closed in 1975.

The development of these proposed projects would have significant impact on a Memphis auto restricted zone. This impact would appear to be a strong positive influence on the success of any proposed ARZ plan. Expansion of the downtown activity base will draw more employees, residents, shoppers, and visitors to the area, creating increased demand for circulation within the downtown area. Proper planning can direct this demand for intra-area travel to the transit and pedestrian modes and away from personal auto use.

Other plans and recent innovations can augment this potential for auto restriction. The 1974 Plan for Downtown Memphis proposed two extensions of the Mid-America Mall; to the Justice Center and to the Beale Street entertainment district. Pedestrianization of Washington and Beale Streets, if the proposed projects are constructed, would create an enjoyable and functional pedestrian network connecting many of the major downtown activity nodes. Recent transit-related plans and experiments would also contribute to the viability of the ARZ approach for downtown Memphis. In a special promotional effort, the MATA sponsored a recent "dime day" in conjunction with sales by local merchants. The combination of the low 10¢ fare and special shopping values boosted ridership 38 percent for the day, requiring increases in service during both peak and off-peak periods. A related project, under discussion for possible future implementation, is to provide transit directly on the Mid-America Mall with a merchant-supported trolley service, compatible with the pedestrian character of the area.

Overall, the current planning and development status of downtown Memphis is favorable to a re-orientation towards increased pedestrian and transit travel. The 1974 Marcou O'Leary plan, the most recent comprehensive plan for downtown, bases its development program on a circulation and parking framework that aims to separate primary auto, transit, and pedestrian travel flows. Elements included in this plan which are now in place, such as the Mid-America Mall and the downtown transit loop, have brought about some reduction in conflicts between the modes. Instead of buses, cars, and pedestrians all competing for travel space on Main Street, which was formerly the case, pedestrians now have exclusive use of the mall while auto and transit vehicles share the streets around the periphery of the retail and office core. The new management of the transit authority, with a strong marketing effort such as in the "dime day" promotion described above, has shown the inno-

vative spirit necessary to reverse the downward ridership trend and make transit the primary mode for travel to and within downtown Memphis.

IV. ARZ OPPORTUNITIES AND OBJECTIVES

The previous section discussed the current status of planning and development for downtown Memphis and its relation to the consideration of auto restraint. This point of view is expanded in this section in a review of the principal resources and problems of the downtown to identify objectives for the Memphis ARZ Plan.

Opportunities

A variety of resources both within and outside the study area create potential for a successful auto restricted zone in downtown Memphis. Of those resources actually outside the study area, the Medical Center, shown in Figure IV-2, can make the greatest immediate contribution to the ARZ. A major finding of the first phase of this study reported in "Volume I — Auto Restricted Zones: Background and Feasibility," was that activity and street life are basic requirements for the consideration of auto restriction. The Medical Center is an extremely active concentration of hospitals, schools, and other health-related facilities that employ an estimated 37,000 people. In addition to this working population, which is higher than the number of people employed downtown, an estimated 7,000 students attend classes daily in the Medical Center vicinity, and approximately 2.6 million visitors call on Medical Center patients annually. The Medical Center is located 1.25 miles east of downtown in an area that offers few opportunities for activities such as shopping, eating, and personal services which are, however, present downtown. Thus, the Medical Center and downtown could be complementary resources of people and activity, each offering something the other needs.

Other resources and problems within downtown Memphis, as shown in Figure IV-9, contribute to the opportunity for a program of auto restriction. The wide range of development projects, either underway or in the planning stages, could add substantially to the downtown activity base. These projects, such as Volunteer Park, Beale Street Landing, the Orpheum Theater, and the proposed convention hotel,

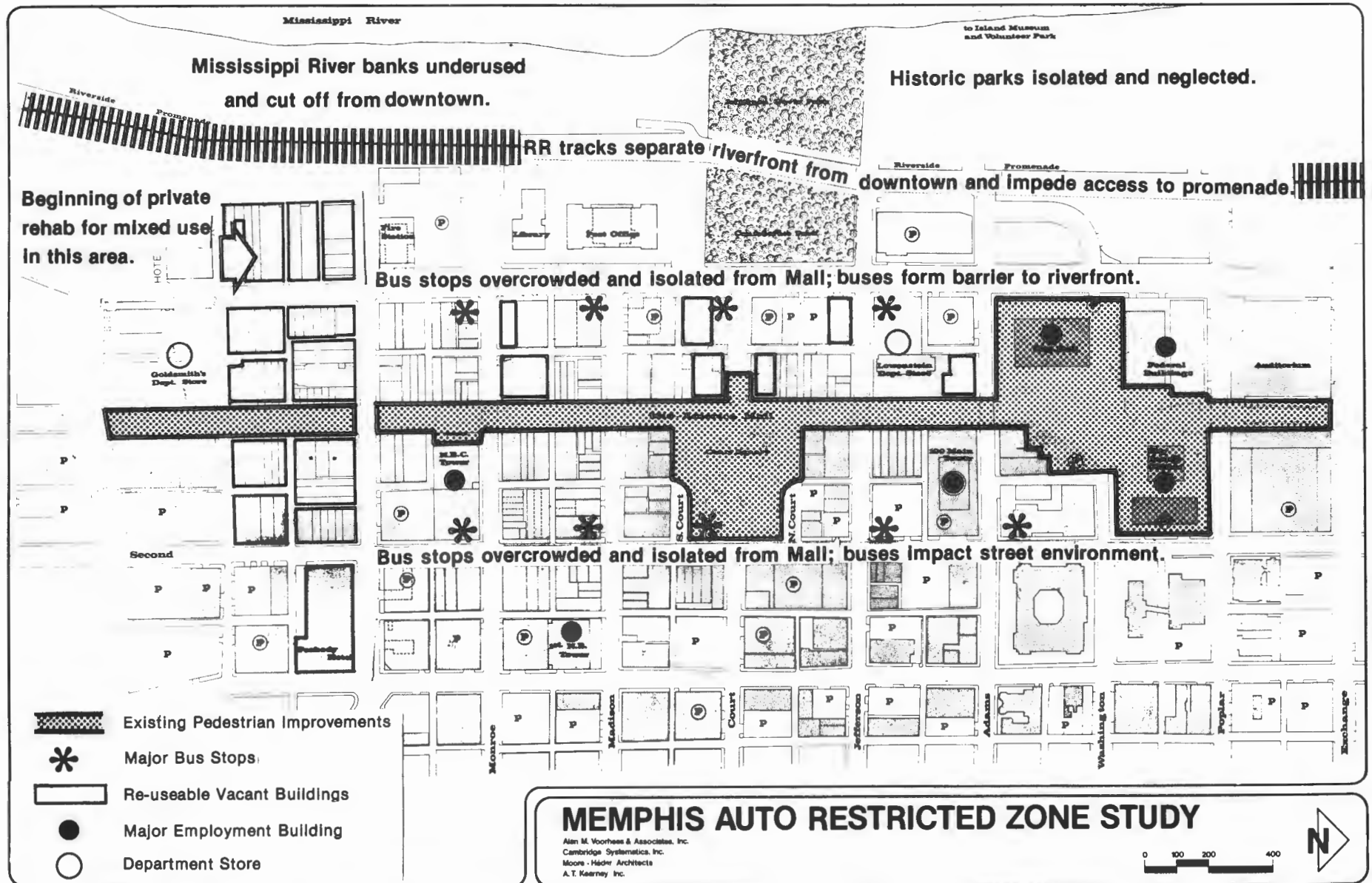


Figure IV-9. Downtown Problems and Resources

are primarily directed at the revival of the downtown cultural and entertainment sector. The construction of the Justice Center will further reinforce the role of downtown as the governmental and administrative center of the metropolitan area. Office employment, one of the existing strengths of downtown Memphis, would be bolstered if any of the new office structures proposed in the 1974 downtown plan are built.

The Mississippi River and the downtown waterfront are major resources which have gone underutilized for many years. Despite a history of grand plans for development of this scenic area, the waterfront still serves only as low cost auto parking. Volunteer Park, to be developed on Mud Island, is the first step in the attempt to make the riverfront an attraction once again and the western anchor of downtown activity. The problem ahead will be the linking of Volunteer Park and any other riverfront development to the rest of the downtown so that the amenities of Confederate, Jefferson Davis, and Volunteer Parks are made an integral part of the downtown environment and do not remain isolated, as they are today, and cut off by traffic, parking lots, and railroad tracks.

Among other existing resources significant in assessing downtown's potential for auto restriction are the convention center and the Mid-America Mall. The Cook Convention Center in the northern part of the study area offers facilities for meetings, exhibitions, and conventions with convenient parking in an adjoining garage. Functions held at the convention center attract approximately 600,000 visitors to downtown annually. The potential for growth in usage of the convention center is tied to the development of the proposed convention hotel. Discussion has centered on the construction of a new luxury hotel convenient to the convention center, but other proposals call for the renovation and reopening of the Peabody Hotel several blocks south of the center. At present, vacant hotels are a major component of total downtown vacancy, with the former King Cotton, Claridge, Albert Pick, and Downtowner hotels also closed. The expansion of convention activity could possibly lead to the reopening of the newest or most adaptable of these empty structures.

The Mid-America Mall, described earlier, defines more than any other element of downtown the opportunity for a successful plan for auto restriction. This mile-long pedestrian zone covers ten blocks of the former Main Street, connecting the principal shopping, office, and government buildings in downtown Memphis. As was shown in Figure IV-8, the mall carries by far the heaviest pedestrian volumes of any street in downtown. It is clear, however, that many of these pedestrian trips have been generated by the mall environment and its convenience for access to shopping and eating establishments. Further evidence of the mall's positive impact is in the expansion of retail trade. Although significant quantities of vacant floor space can still be found on the mall and throughout downtown, new businesses are moving in. In the first nine months of mall operation, vacant first floor space declined 38 percent. An estimated 25 new businesses have located in downtown, heavily oriented towards noon hour shopping and eating by office employees.

The success of the Mid-America Mall has highlighted pedestrian travel conditions elsewhere in downtown. The pleasant mall environment which has generated so much new pedestrian activity is not evident even one block away. Although the mall is paid for by special assessments from a special taxing district that has boundaries east of Third Street and at Riverside Drive, the beneficial effects are contained within its linear strip. With the exception of Court Square and Civic Center Plaza, the visible improvements occur within the former Main Street right-of-way. A pedestrian, driver, or bus rider may pass through on Second or Front Streets without even being aware of the mall. The earlier description of the downtown's pedestrian facilities discussed the low level of pedestrian amenity away from the mall and the acute problems of bus passenger waiting facilities. Thus, significant potential for further pedestrianization rounds out the opportunities for auto restriction in downtown Memphis. It appears that an ARZ could capitalize on resurging existing activity, long-ignored scenic resources, nearby concentrations of employment, and ambitious plans for redevelopment in a fundamental reorientation of downtown as a place for working, shopping, and recreational activity unhindered by traffic and the automobile.

Objectives

The specific objectives of the ARZ planning effort in Memphis reflect its unique position with respect to the other four cities in the study. In Memphis, many of the first steps toward the implementation of an auto restricted zone have already been taken. Downtown is no longer dormant and dying; activity and investment appear to be returning to the historic Memphis core. Heavy public expenditures in government office buildings, Civic Center Plaza, and Volunteer Park have stimulated private sector investment in new high-rise offices, riverfront restaurants, and entertainment complexes. A major pedestrian facility, the Mid-America Mall, has recently been completed and preliminary indications show a positive effect on downtown. The new management of the transit authority has initiated a process of change that should improve the efficiency and attractiveness of public transit services. Thus, many of the pieces of the first stage ARZ plan are already in place.

The approach taken in downtown Memphis, therefore, had a dual purpose: to provide a framework to tie together many of these independent pieces, and to facilitate their operation as part of a coordinated plan for short-range downtown improvement. Because of the many changes that had recently taken place in downtown, consideration was directed away from additional major physical changes and toward incremental and operational recommendations for the successful utilization of the range of emerging downtown resources described above. Emphasis was placed on the design of a plan that would help foster the hopeful trends and contribute to the resolution of the remaining problems.

In Memphis, then, the evolutionary nature of an auto restricted zone became apparent. Memphis had already made a major commitment to reclaiming its Main Street from traffic and improving facilities and services for transit riders and pedestrians. Although analysis showed that further street closings and other changes in downtown access and circulation were technically feasible, such changes might well disrupt the initial positive responses to first-stage actions. There are, however, opportunities to enhance the effects of the mall through modest and selective additions. Thus, the objectives of the Memphis ARZ plan include the following:

- Extend Downtown Revitalization and the Effects of the Mall — The effects of the Mid-America Mall are currently limited in both time and space. The aim of the ARZ study is to transform the now merely linear mall into a two-dimensional network linked to the major access corridors of Front and Second Streets. The revitalization of downtown activity at night and on weekends is tied to the success of the new parks, entertainment, and cultural opportunities. The viability of these new ventures will be greatly improved by an extended pedestrian circulation network, and an expanded program of downtown promotion.
- Link the Medical Center to Downtown — As described earlier, the Medical Center is a concentration of hospitals and educational facilities employing more people than all of downtown. Despite the fact that the Medical Center is only 1.25 miles from downtown, CBD businesses are prevented from tapping this potential retail and restaurant market because of the high \$1.00 cost of transit for the round trip. Because convenient parking is also at a premium, few employees, students, or visitors are willing to drive the short distance to take advantage of the shopping and eating opportunities present in downtown.
- Improve Conditions for Transit Riders — Passenger waiting facilities, the point where the transit and pedestrian systems interface, are a leading downtown problem. Over the long term, success in restricting auto traffic will depend on the attractiveness of transit as an alternative mode. Current conditions at downtown bus stops are a major detriment to the image of transit service and its attractiveness and utility for all kinds of CBD-destined trips. Crowds of passengers waiting for buses also disrupt pedestrian flow on the sidewalks and restrict their use as a functional travel network.
- Maintain High Levels of Accessibility and Circulation — Because of the auto orientation of the Memphis area, the revitalization of downtown must recognize and plan for the continued widespread use of automobiles for access to downtown. The first step in further auto restriction for Memphis is to provide attractive and convenient alternatives to the use of the auto for circulation within the downtown area leaving the personal car in a garage on the ARZ periphery. Access must be maintained for the deliveries of goods critical to the economic resurgence of downtown. Potential trouble spots in goods movements must be identified early for later reference as the ARZ evolves.

V. MEMPHIS AUTO RESTRICTED ZONE PLAN

In pursuing the objectives outlined above, the Memphis Auto Restricted Zone Plan focused on small-scale improvements to build upon the recent changes in downtown. Many of the elements of the Plan, illustrated in Figure IV-10, are directed at micro-

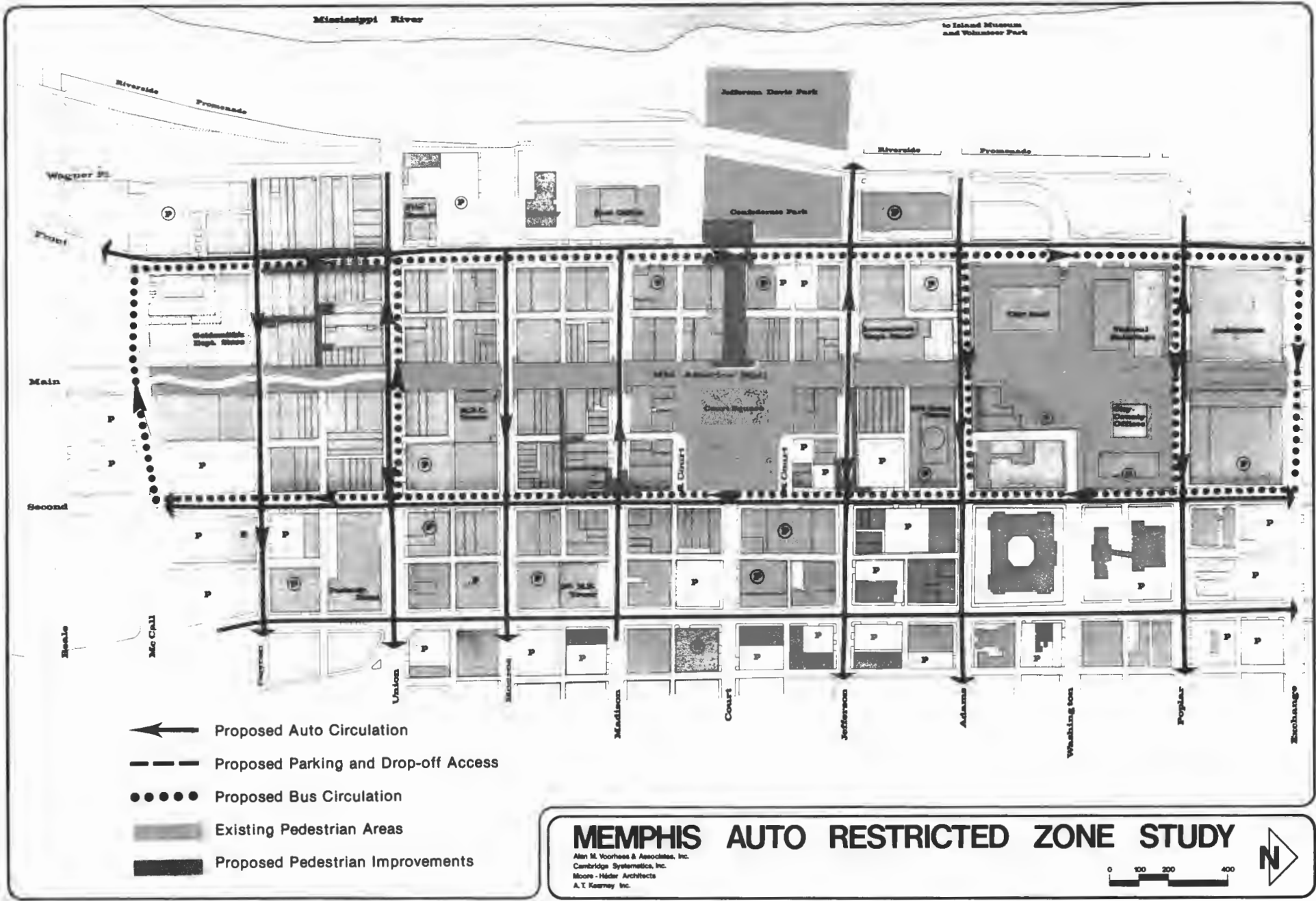


Figure IV-10. Memphis Auto Restricted Zone

level concerns rather than broader regional or study area issues. This focus on the details of the downtown environment sprang directly from the conviction that current levels of activity in downtown Memphis are only beginning to animate the existing pedestrian areas. Therefore, major changes in downtown access and circulation patterns have not been recommended for short-range implementation within the scope of the ARZ Study and Demonstration Program.

The Memphis Plan reflects the multidisciplinary nature of the approach taken to ARZ planning. The major features of the Plan combine pedestrian, transit, and urban design elements in a series of improvement projects for several points identified as leading problem or opportunity areas. In keeping with the planning objectives, the elements of the ARZ Plan are oriented toward extending the beneficial effects of the "Mall atmosphere" to other areas of downtown and components of its circulation network. Thus, in general, the Plan takes a positive approach seeking primarily to extend and improve facilities and services for downtown pedestrians and transit riders. Further restrictive measures on auto traffic are currently counterproductive, but may well be justified in the future if plans for the revitalization of downtown are realized. Specific plan elements include the following.

Transit

The transit element of the ARZ Plan proposes a combination of new facilities and services designed to improve the attractiveness and utility of this leading modal alternative to the automobile. The MATA has recently begun to implement a restructuring of the route system that should have a major impact on bus travel convenience. The old pattern of radial routes terminating downtown is being replaced, with a system of linked routes which should reduce the volume of transfers, a major problem under the former route pattern. Because the analysis of transfer movements revealed a high proportion of trips destined for the Medical Center, routes were interlocked so that direct service to the Medical Center would be available from any part of the city.

Recognizing, however, that the downtown must continue and grow in its role as a transit center, the ARZ Plan proposes improvements to four principal downtown

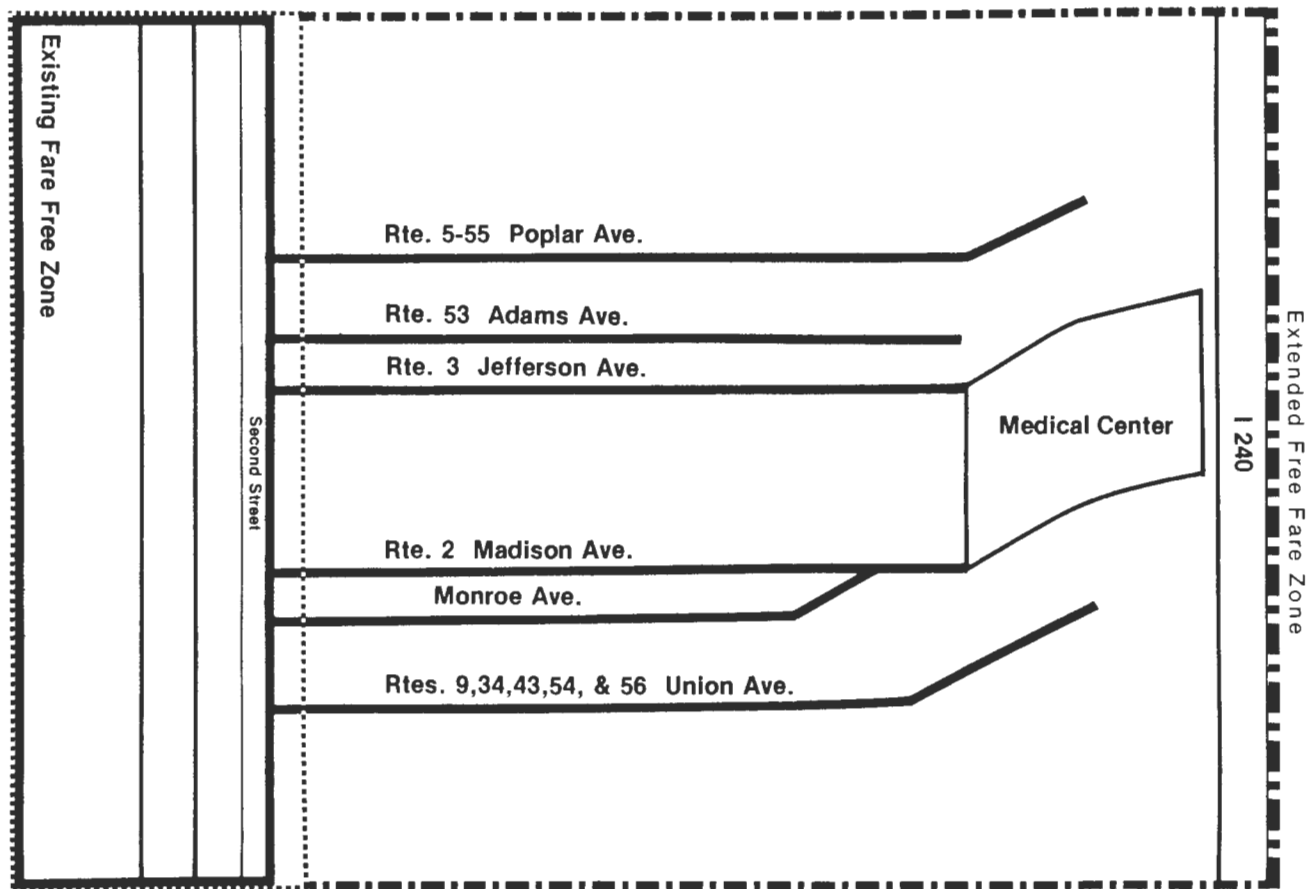
bus stops. The crowded conditions and inadequate shelters at these stops are a leading deficiency of Memphis transit and an eyesore in the downtown area. Proposed improvements including new shelters, seating, and information for waiting passengers are described in a later sections.

In order to expand the downtown retail market and activity base, a free bus service is recommended between downtown and the Medical Center during the midday period of 10 a.m. to 3 p.m. To economize on the costs of providing a shuttle service for casual shopping and lunch trips by Medical Center employees or visitors, it is proposed that the existing MASH free fare zone be extended westward during midday as shown in Figure IV-11. Under this proposal, no new services would be provided as the shuttle service could be implemented on the routes already serving the Medical Center as shown. In order to offer a high quality shuttle service, some routes on Union Street may have to be relocated to Jefferson or Madison Streets to provide frequent service to the Medical Center core. Bus stops within the Medical Center district would be upgraded to the same high standard as the new stops to be provided downtown and thus would serve as an image to reinforce the link to downtown.

Within the auto restricted zone, as shown in Figure IV-12, Front and Second Streets will continue to carry heavy transit volumes as the downtown route pattern will remain unchanged. Transit operations, however, could be improved through the creation of transit preference lanes on Front and Second Streets. At present, the sheer volume of buses on these streets in peak hours establishes the right lane as a de facto bus lane with auto access only for turning movements. There are, however, occasional parked cars or delivery trucks in the right lane to hinder the flow of buses. The clear designation of a "bus only" lane and enforcement of its restrictions could improve service reliability and travel times for patrons.

Pedestrian Facilities

Proposed facilities for pedestrian travel are shown in Figure IV 12. The ARZ Plan calls for a phased expansion of downtown pedestrian area as street life and activity levels continue to grow. As the figure shows, pedestrian facilities recommended for current implementation are incremental extensions of the Mid-America Mall



MEMPHIS AUTO RESTRICTED ZONE STUDY

Alan M. Voorhees & Associates, Inc.
Cambridge Systematics, Inc.
Moore-Hedrick Architects
A. T. Kearney, Inc.



Figure IV-11. Proposed Downtown and Medical Center Transit Linkage

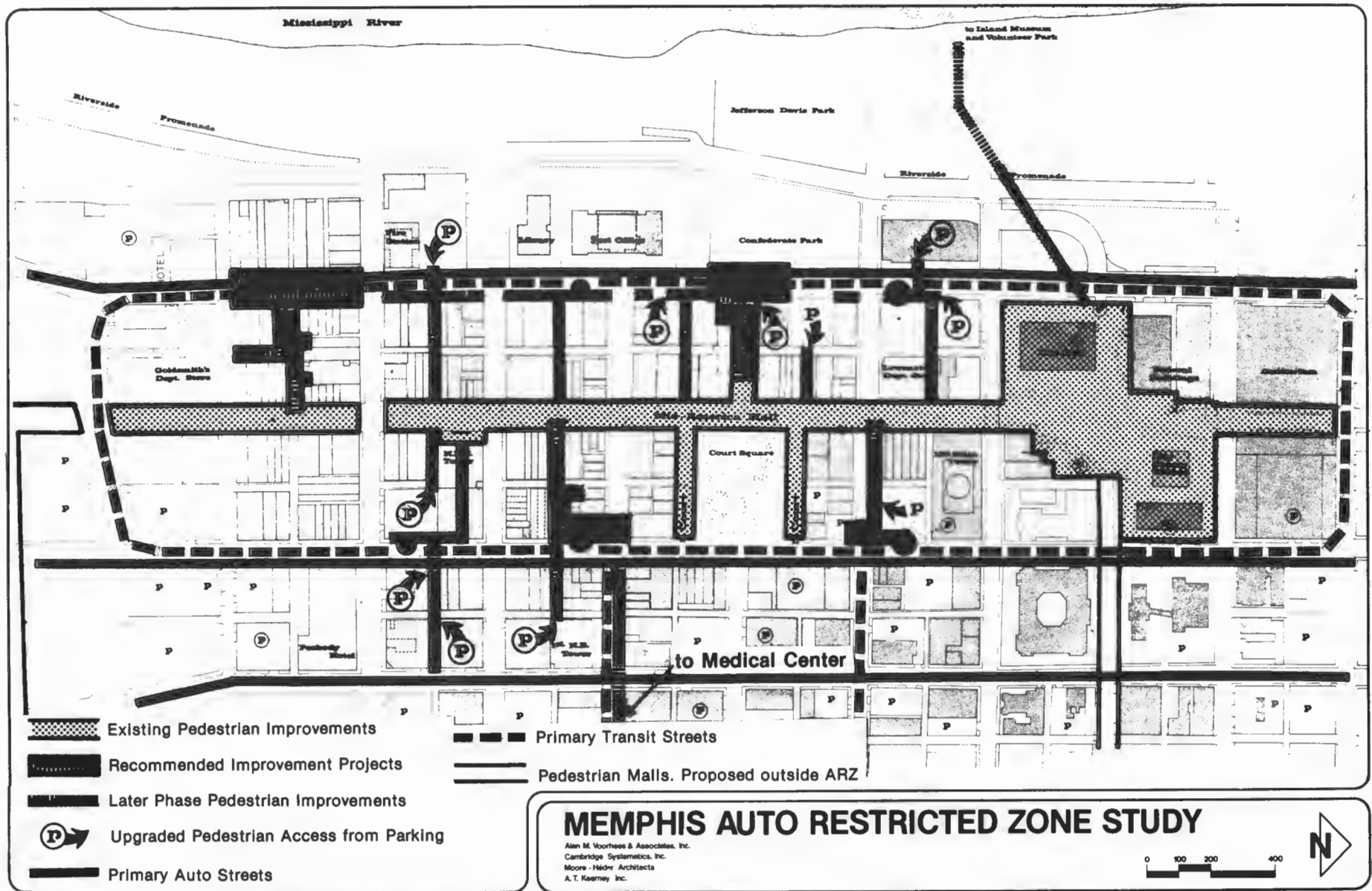


Figure IV-12. Proposed Pedestrian Facilities and Vehicular Circulation

aimed at establishing linkages between mall activities and other downtown resources. Under the ARZ Plan, West Court Street would be fully pedestrianized to create a connection between the isolated Confederate Park and the mall. One feature of this connection would be special pedestrian pavement in an expanded crosswalk on Front Street to give pedestrian movements between the park and the mall priority over vehicular traffic. Other pedestrianization in the ARZ Plan focuses on the alley system as a potential pedestrian resource. A number of the east-west alleys such as is shown in Photo IV-4 offer opportunities for upgraded pedestrian con-



Photo IV-4. Alley Near Mall

nections from the mall to parking facilities and other features of the downtown area which presently are not well linked to downtown's principal activity center. Figure IV-13 illustrates the type of treatment that could transform these dingy passageways into attractive, well-lighted, human-scale activity areas and travel corridors. As envisioned here, the alley development program would combine both public investment and private redevelopment. Currently some alleys, as shown in Photo IV-5, are semi-improved and already function as pedestrianways and even as shopping areas for such alley-located businesses as the Desoto Hobby Shop and the Rendezvous restaurant. The ARZ Plan proposes to expand such use of these alleys to create a functional and aesthetic network of pedestrianways tied to the mall.

Figure IV-13. Alley Treatment

DOWNTOWN MEMPHIS

Alleys connecting perpendicularly to the mall serve minimal vehicular functions but are potentially important pedestrian connectors. They should be rebuilt as pedestrian ways with a cooperative *Public-Private Program*



PEDESTRIAN ALLEYS

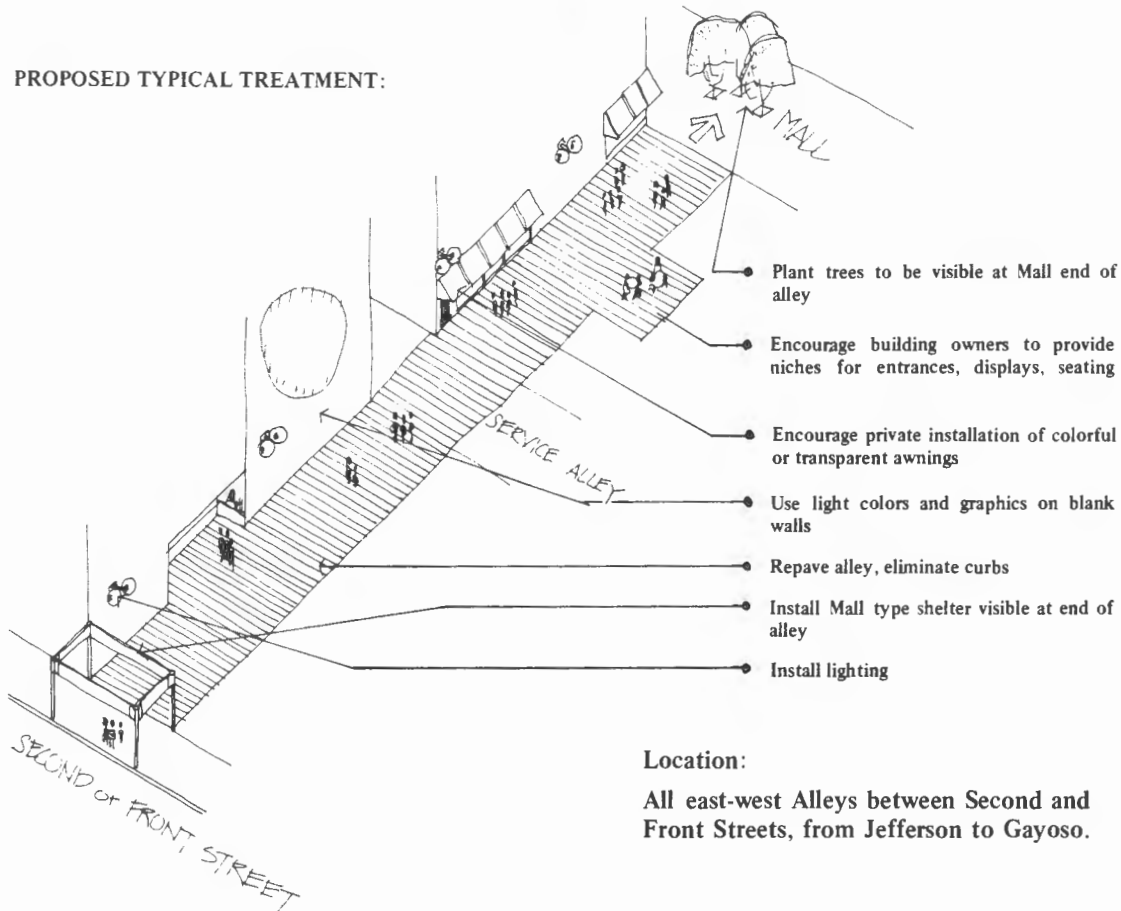
PUBLIC ROLE:

- Repave alleys including privately provided public niches, provide lighting
- Provide trees at mall end and mall-type shelters at Front and Second st. end
- Provide tax breaks, design assistance, free paint or canvas for private improvement

PRIVATE ROLE:

- Provide entrances, display niches onto pedestrian alleys
- Paint and refurbish sides of buildings

PROPOSED TYPICAL TREATMENT:



Location:

All east-west Alleys between Second and Front Streets, from Jefferson to Gayoso.



Photo IV-5. Improved Alley

Transit/Pedestrian Improvement Projects

Many of the recommendations for the transit and pedestrian systems described above are incorporated into the Plan as a series of joint transit and pedestrian improvement projects. These projects, as shown in Figure IV-14, are located at the principal bus stops and other opportunity areas as part of the proposed extension of the downtown pedestrian network. Two of the recommended projects would function as gateways to the auto restricted zone on the primary "arrival streets" of Front and Second.

Foremost of these is the Second and Madison transit terminal. This proposal would provide a transit center for downtown by leasing and rebuilding part of the now vacant ground floor of the Goodwyn Institute Building. As shown in the sketch, Figure IV-15, the new transit facility would include an office for the MATA, public toilets, vendor space and a restaurant, in addition to seating areas. The first floor of a portion of the building will have to be rebuilt to match the sidewalk grade. Canopies similar in design to the shelters on the Mall will be added to provide weather protection over the sidewalk. Figure IV-16 illustrates the existing situation and the proposed improvement.

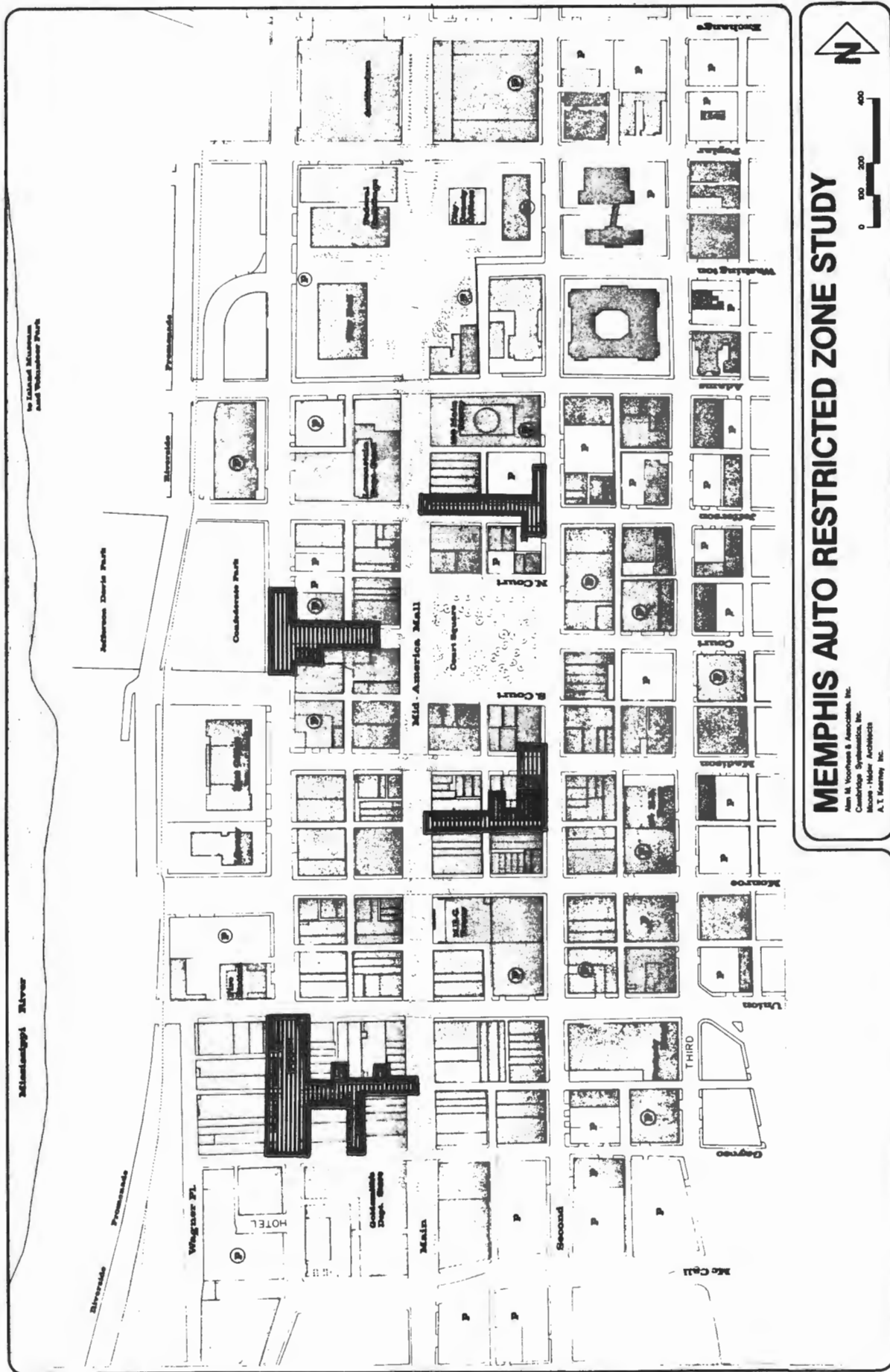


Figure IV-14a. Location of Transit/Pedestrian Improvement Projects

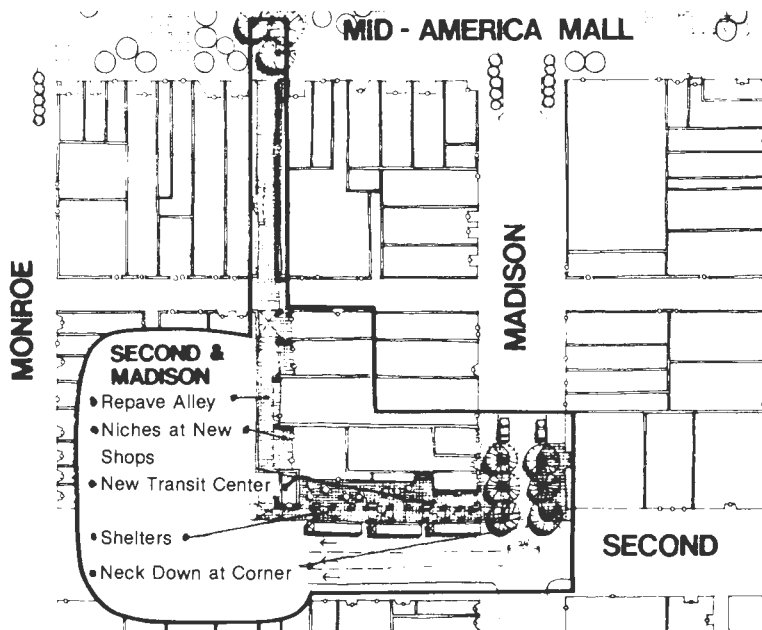
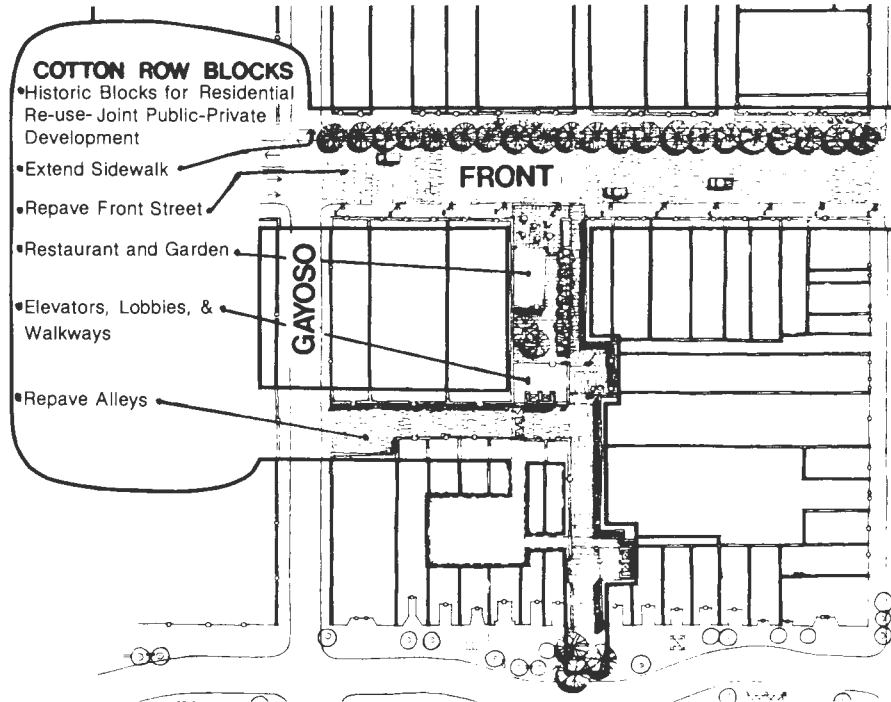


Figure IV-14b. Transit/Pedestrian Improvement Projects

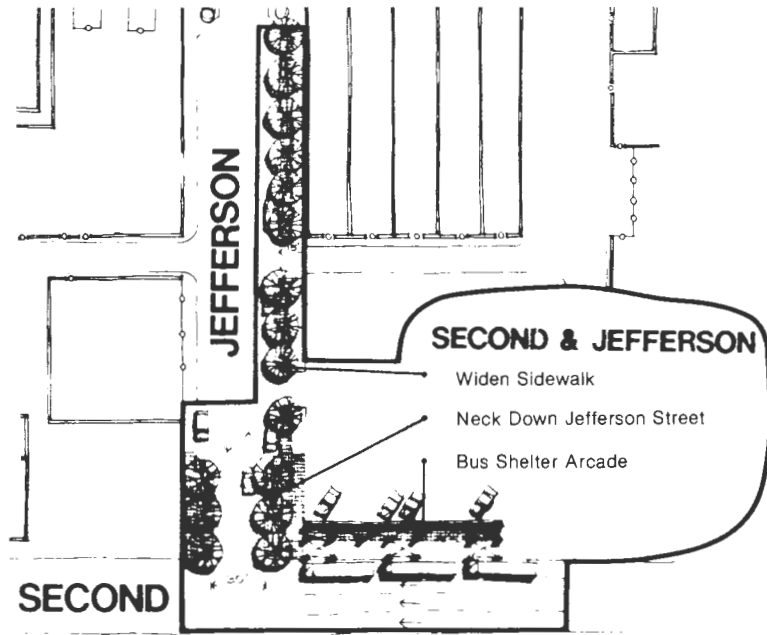
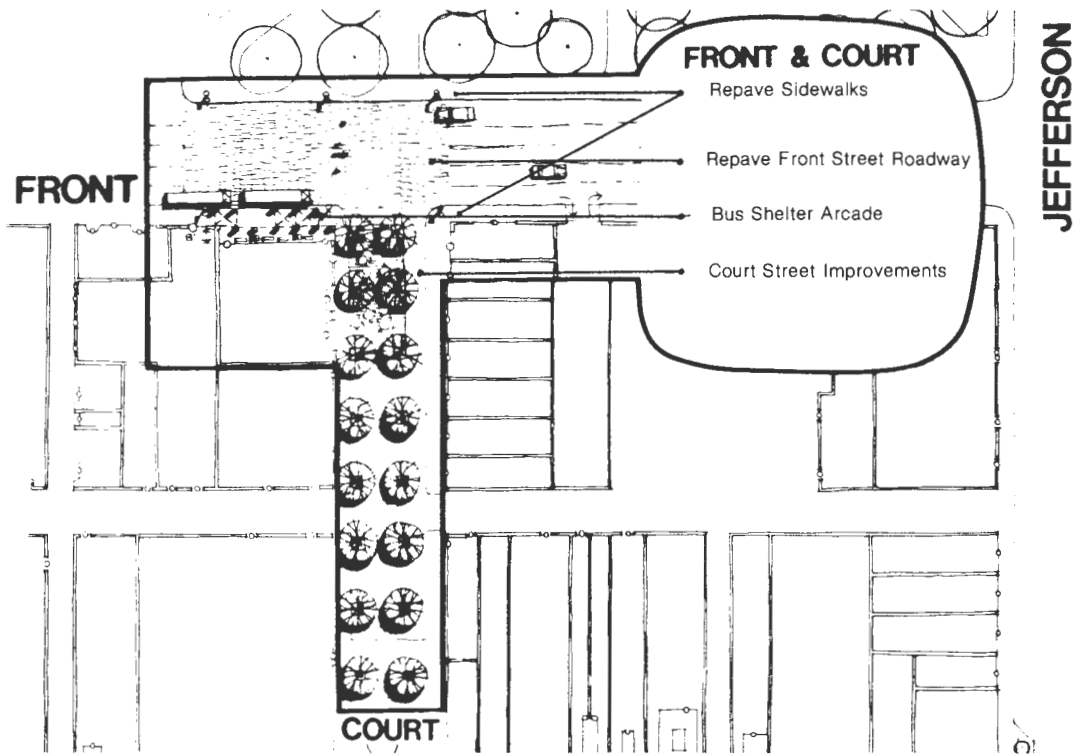


Figure IV-14c. Transit/Pedestrian Improvement Projects

Figure IV-15.

DOWNTOWN MEMPHIS

Up to 60 or 70 passengers accumulate at major downtown bus stops. While bus traffic is heavy on front and second streets, headways for each bus route average ca 20 minutes at peak hour and longer at off peak. The bus shelters provided are inadequate for downtown use. Waiting passengers are exposed to weather, bus fumes and noise and conflicts created by crowding.

MAJOR BUS STOP

TYPICAL EXISTING CONDITION:
Buses by narrow sidewalks create canyon effect, reverberating sound and trapping fumes where people wait

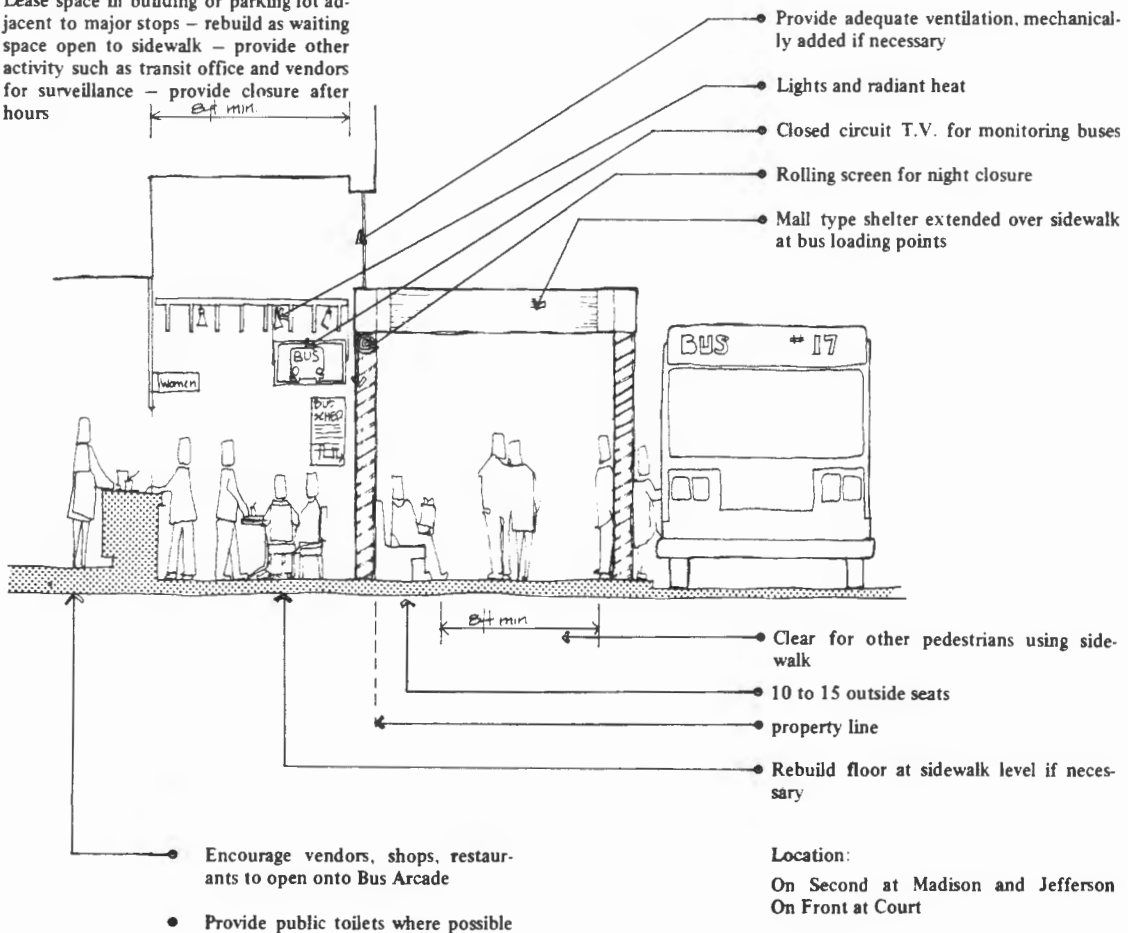
Prefab shelter adequate for 8 or 10 blocks most of sidewalk

Remaining 10 to 60 waiting passengers wait against wall without weather protection, blocking rest of sidewalk



RECOMMENDED STANDARDS FOR DOWNTOWN BUS ARCADE DESIGN

Lease space in building or parking lot adjacent to major stops – rebuild as waiting space open to sidewalk – provide other activity such as transit office and vendors for surveillance – provide closure after hours

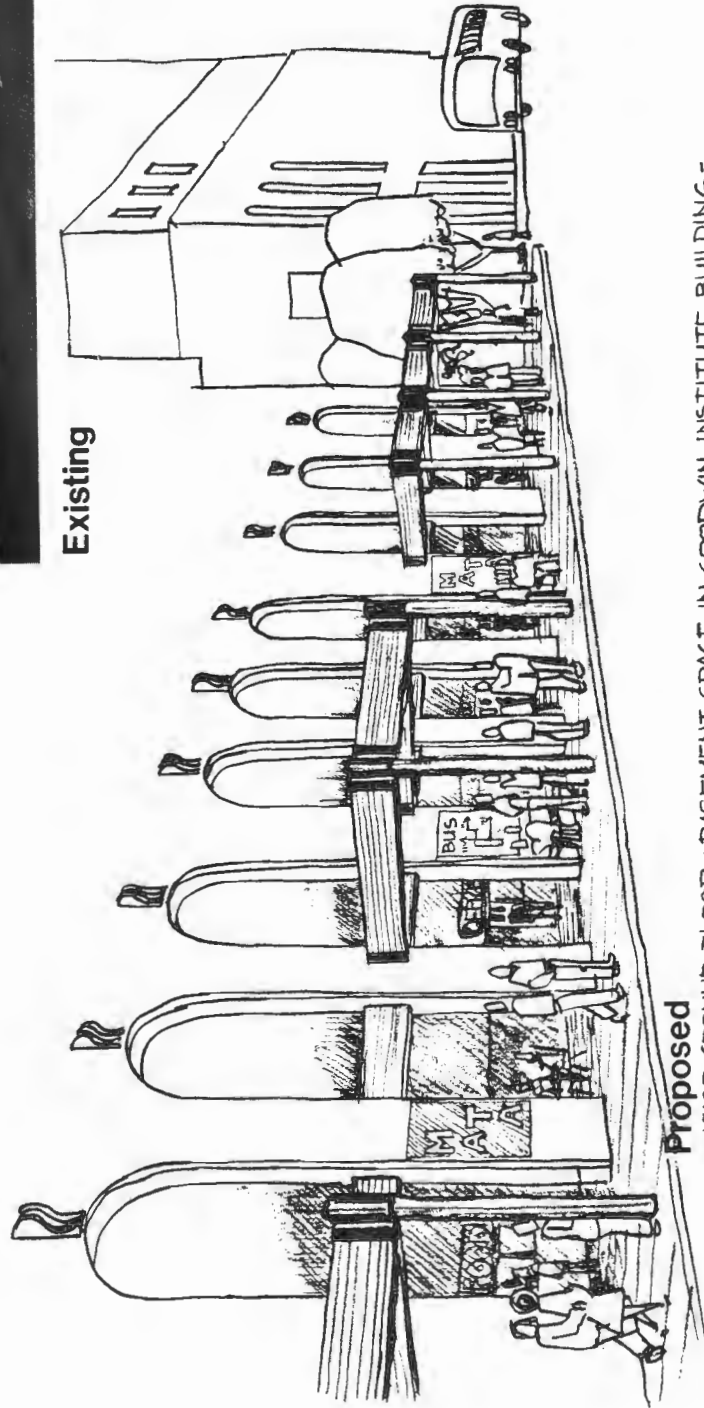


Location:
On Second at Madison and Jefferson
On Front at Court

Figure IV-16. Transit Terminal on Second at Madison



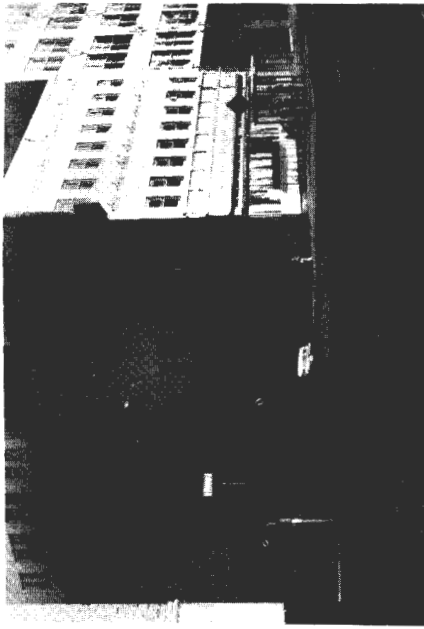
Existing



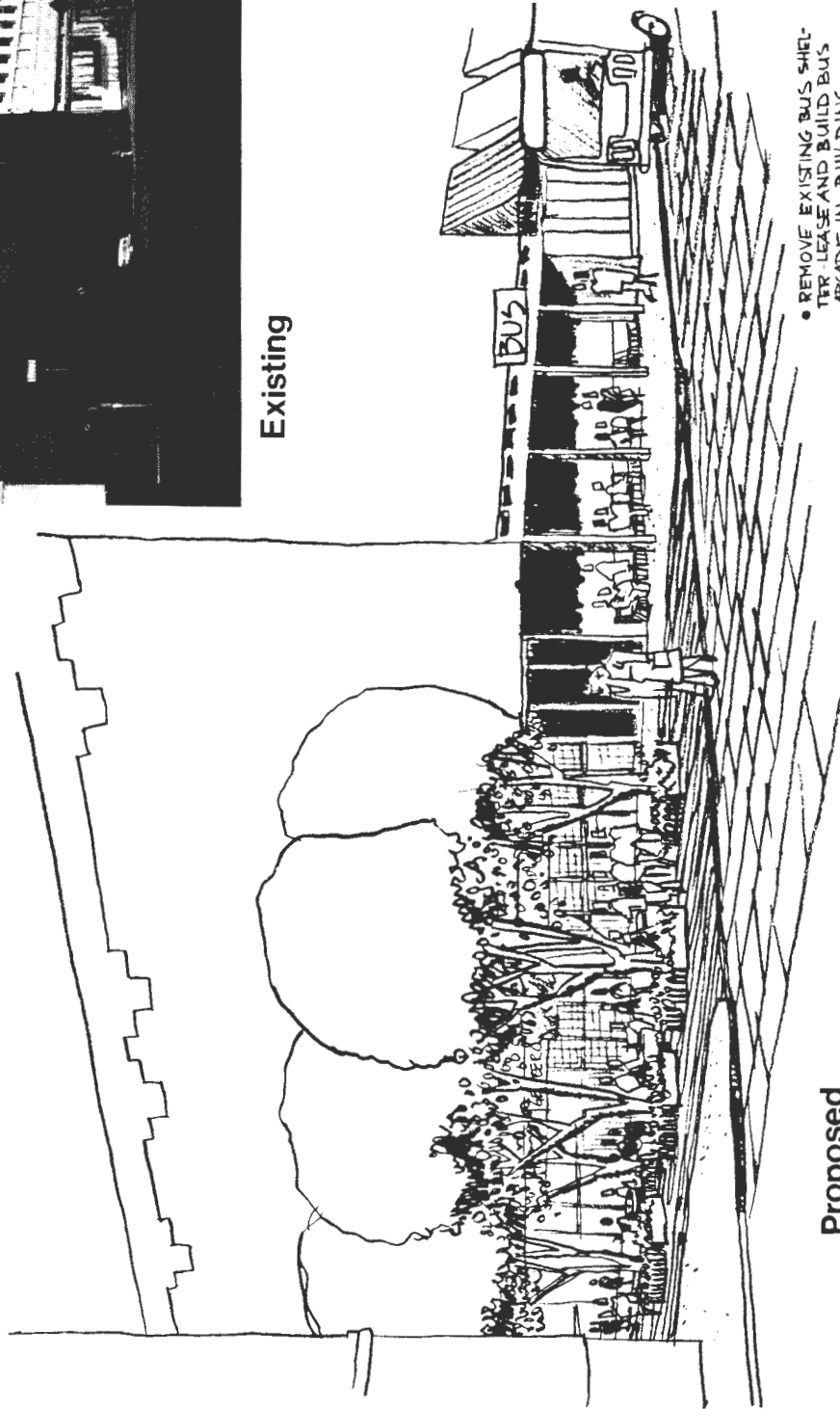
Proposed

- LEASE GROUND FLOOR • BASEMENT SPACE IN GOODWIN INSTITUTE BUILDING - OPEN UP ARCHES, REBUILD FLOOR AT SIDEWALK LEVEL
- PROVIDE WAITING FACILITIES, TRANSIT OFFICE, CONCESSIONS, TOILETS UNDER ARCADE
- ADD MALL TYPE SHELTERS AT BUS LOADING POINTS

Figure IV-17. Front and Court Gateway



Existing



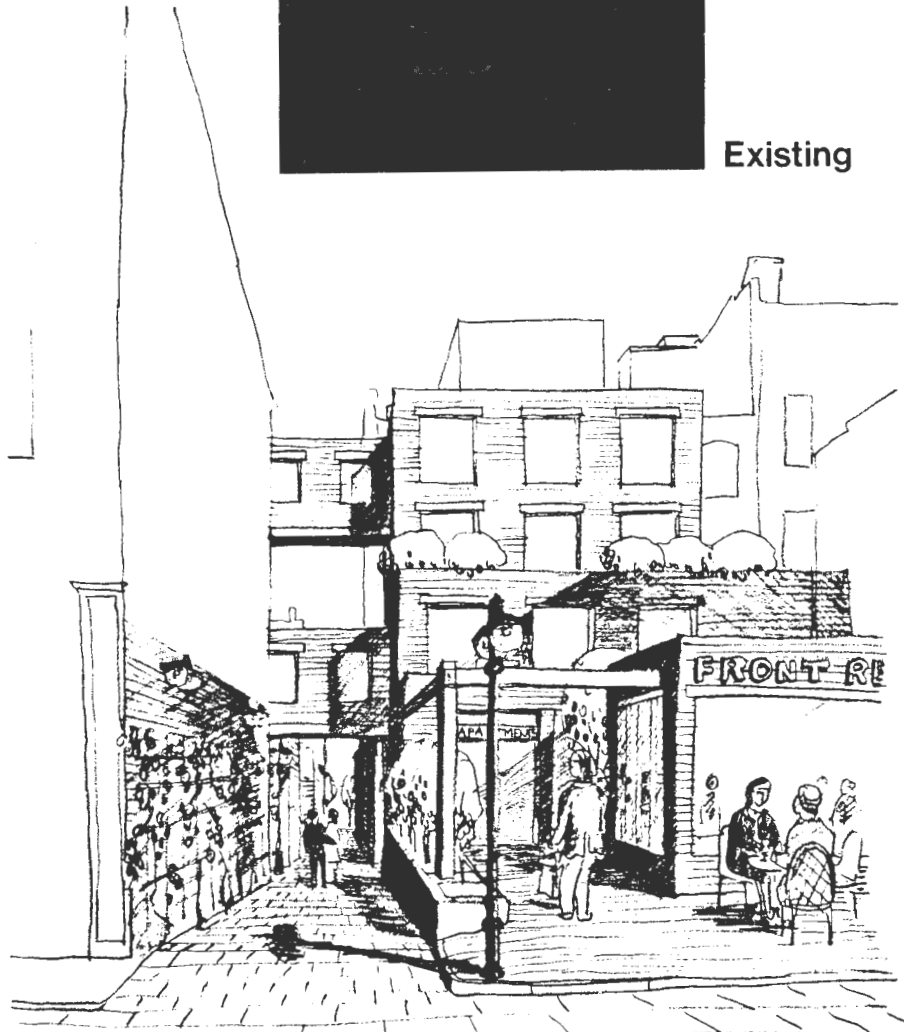
Proposed

- REPAIR SECTION OF FRONT STREET WITH COBBLE STONES
- CLOSE WEST COURT STREET WITH PLANTERS & TEMPORARY WOOD DECK
- REMOVE EXISTING BUS SHELTER - LEASE AND BUILD BUS ARCADE IN BUILDING
- RE-OPEN GERBER'S TEA ROOM AS RESTAURANT - CAFE

Figure IV-18. Cotton Row Alley



Existing



Proposed

- REPAVE ALLEY, CONNECT FRONT STREET TO MALL (PUBLIC)
- BUILD NEW LOBBIES, ELEVATORS, UPPER LEVEL WALKWAYS TO CONVERT VACANT UPPER FLOORS TO RESIDENTIAL USE (PRIVATE)

A similar treatment is also proposed for the Front and Court Street gateway area in a design that seeks to link the activity of Court Square and the mall with the pleasant environment and scenic vistas of Confederate Park. This project proposes the creation of a bus shelter arcade in space leased from the former Gerber's Tea Room, now closed. As noted earlier, West Court Street is recommended for full pedestrianization which would create an ideal area for outdoor dining if the Tea Room were re-opened as a cafe/restaurant. Since some new construction or major rehabilitation is likely in the near future along this block, immediate permanent repaving of the street may not be advisable. As a temporary but attractive substitute, a wooden boardwalk could be constructed over the present roadway that would match the sidewalk level and the pavement of the improved pedestrian crosswalk for easy access to the park. Figure IV-17 illustrates the gateway project as seen from Front Street. These environmental improvements in what is now essentially "dead space" could generate pedestrian travel to riverfront attractions and perhaps stimulate the adaptive reuse of the former Gerber's Department Store, now one of the major vacancies in the mall area.

A simpler combination pedestrian and transit facility is proposed for the bus stop at Second and Jefferson Streets. The transit waiting area can be created by acquiring or leasing a small strip at the edge of the parking lot and constructing a shelter styled after those on the mall. If development occurs on this site in the future, the bus shelter could be incorporated into the new structure as an arcade easement. To improve the connection between this bus stop, parking, and the mall, it is proposed that the sidewalk on the north side of Jefferson Street be widened to 15 feet, incorporating a planting strip and new pedestrian pavement.

The fourth improvement project, the Cotton Row section of Front Street, is intended to combine public and private investment in an effort to capitalize on current redevelopment in the area and animate the southern segment of the Mid-America Mall. This proposal is based on the excellent opportunities for the reuse and rehabilitation of the old cotton warehouses and other commercial structures still standing in this block. The project, as illustrated in Figure IV-18, would focus on the alley connecting the mall to Cotton Row in creating a new pedestrian-oriented residential, restaurant, and specialty shopping area. If a private developer

Figure IV-19.

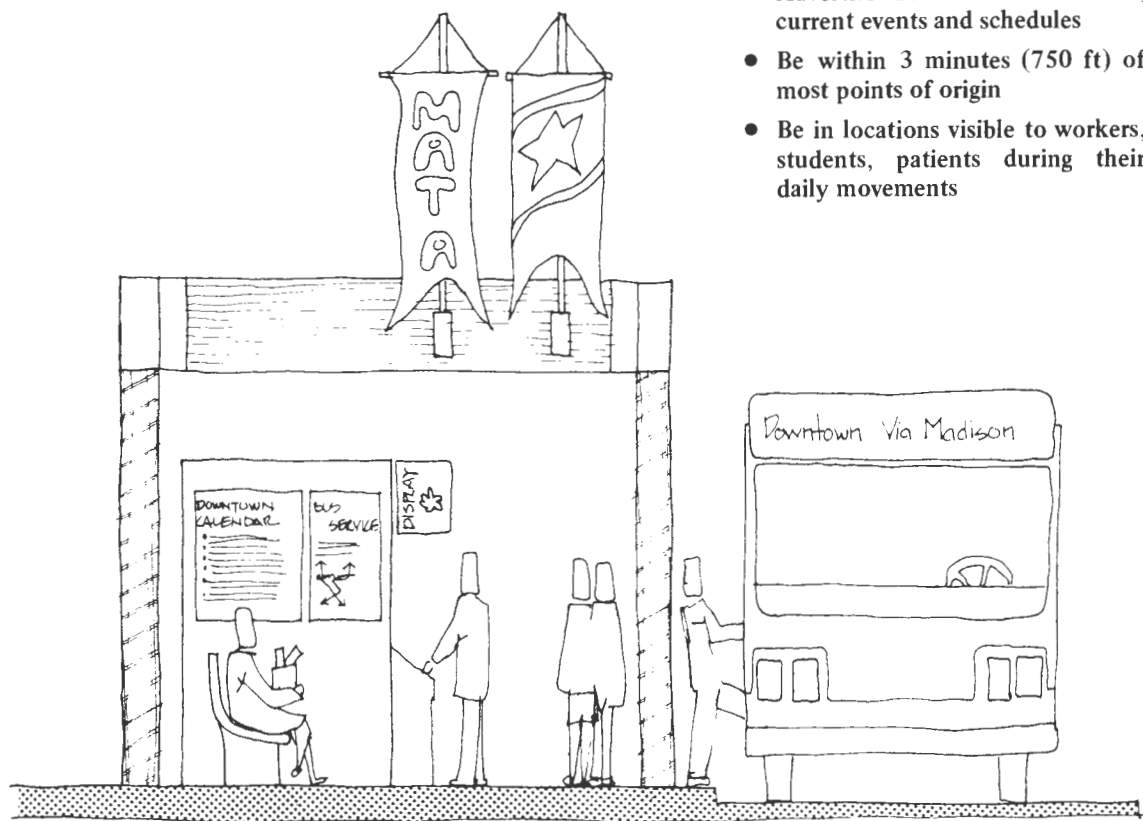
DOWNTOWN MEMPHIS

To complement the improved and fare free service between downtown and the Medical Center new bus shelters should be located at key inbound pick up locations

MEDICAL CENTER BUS STOPS

THE BUS SHELTERS SHOULD:

- Provide seating, shelter, lighting, for safety for waiting passengers
- Advertise bus service, schedule routes and destinations, free fare zone and times
- Advertise downtown attractions, current events and schedules
- Be within 3 minutes (750 ft) of most points of origin
- Be in locations visible to workers, students, patients during their daily movements



● Provide concrete, wood and plexiglass shelters similar to those on mall

● Include seats, lighting, structures for information and display

Location:

At main pick-up points along Madison and Jefferson Streets such as Baptist Hospital, U. of Tenn. Medical School, State, County & City Hospital.

Figure IV-20.

DOWNTOWN MEMPHIS

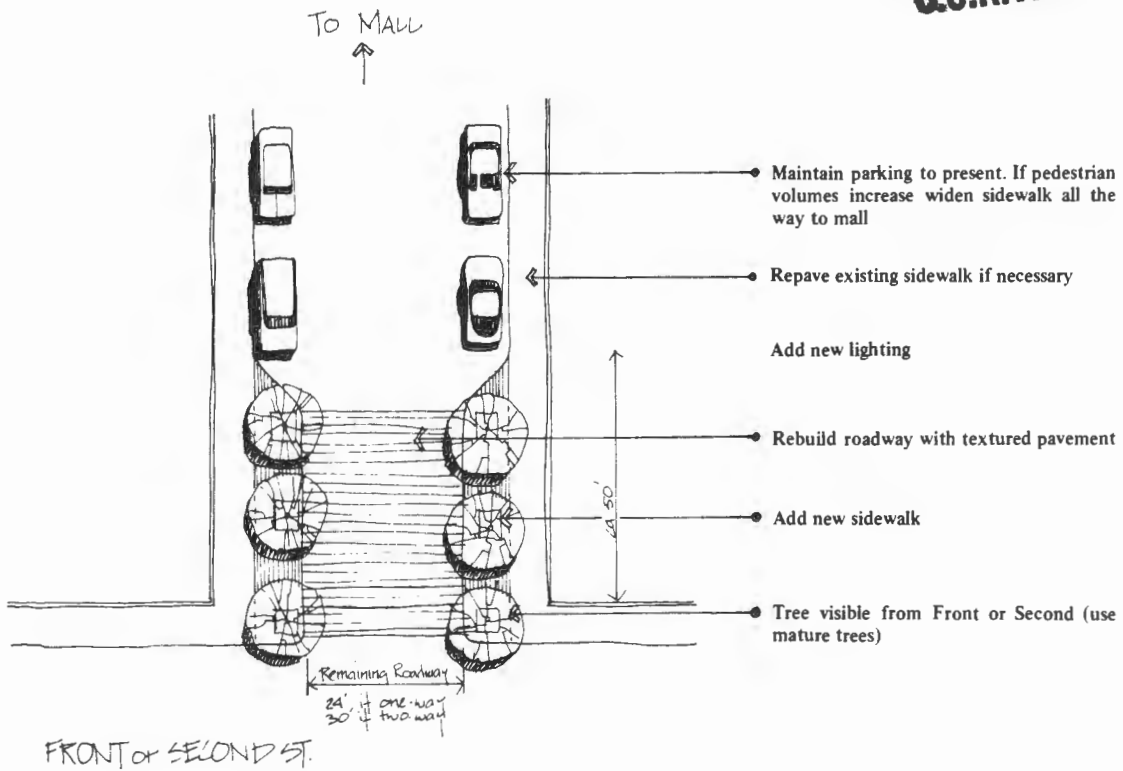
STREET CORNER TREATMENT

On streets running across the mall the corners at Front and Second Streets should be necked down and improved to extend the visual effect of the mall to the next parallel streets

These improvements will often coincide with bus stops and thus improve both the image of bus service and accessibility by bus riders to stops



S.C.R.T.D. LIBRARY



Location:

East side of Front St. and west side of Second at Adams, Jefferson, Madison, Monroe, Union and Gayoso.

could be found to assemble the parcel and coordinate the development of ground floor shopping and restaurants with apartments on the floors above, the City could provide new pavement and lighting of this section of Front Street and the connecting alley. The improved pedestrian space would tie together a variety of attractions that could make a significant contribution to the revitalization of the downtown area.

Urban Design

In designing the improvement projects described above, emphasis was placed on the use of a consistent "vocabulary" or pattern of design elements that will create and mutually reinforce a unified image of downtown Memphis and the auto restricted zone. The major feature of this design vocabulary was the adoption of the existing mall shelters as the pattern for the improved bus stops. These shelters, illustrated in Figure IV-19, are recommended as replacements for the existing inadequate shelters in the places discussed above and also at the Medical Center, Lowenstein's, and Goldsmith's to provide a sample of the mall environment and thus establish a mental and physical connection between these areas. Figure IV-20 shows a similar design element proposed for immediate implementation as part of the Second and Jefferson and transit center projects. This street corner treatment is an effective means of extending the mall atmosphere out to Second and Front Streets with minimal disruption to traffic patterns. These corner treatments, if utilized properly, would help reduce cross traffic on Madison, Monroe, Jefferson, and Adams Streets and thus create an image of a two-dimensional ARZ, a special amenity area, instead of the current linear Mid-America Mall.

Circulation and Parking

Because of the emphasis placed on micro-level improvements to extend the revitalizing effects of the mall and support its successful operation, no major changes in traffic circulation or goods movement facilities are proposed. In order to avoid further disruption of downtown circulation, traffic and goods movement considerations became constraints that guided the planning process in producing the transit and pedestrian improvement projects described above. One element critical to

downtown revitalization in the short term, however, is adequate auto parking. Analysis revealed a substantial amount of excess parking capacity already present in downtown Memphis and thus ended discussion of the need for more parking. The ARZ Plan does recommend the creation of a program designed to make better use of existing parking capacity. The public perceives parking in downtown Memphis to be expensive and inconvenient. Analysis of actual parking data, however, shows an estimated 2,500 empty spaces within a two-minute walk of the Mid-America Mall. The parking element of the Plan calls for a parking management program to inform the public and promote the success of downtown Memphis. A parking information program is needed to publicize the availability of parking, its location, and price. Such a publicity campaign might take the form of a brochure or flyer sponsored by the Mall Office or downtown merchants to inform Memphis area shoppers of the availability of downtown parking. Once such information is generally distributed, merchants could incorporate it into their advertising and other promotional efforts.

Along with the information program, a central downtown-wide parking validation program should be established. Currently many downtown merchants already have parking validation programs in effect, but to the potential shopper such scattered programs require the coordination of one lot and one store. The entire downtown would benefit if shoppers interested in exploring downtown could be confident of free or reduced rate parking at any lot, no matter which store was patronized. From the City's viewpoint, a coordinated parking management program would provide a framework for future discussion of relocation of parking lots to the ARZ periphery and the implementation of the intercept parking strategy currently under consideration.

Promotion and Programmed Activity

Activity management and promotion is currently one of the most successful aspects of the Mid-America Mall. The Mall Office, sponsored by the Business District Advisory Board, takes charge of programming and special activities as well as overseeing maintenance and marketing. Events range from lunch time entertainment to major fairs and festivals. The annual Oktoberfest on the mall has become

a popular local event that draws people downtown from the entire metropolitan area. Promotional activities are also emphasized as in, for example, the 1976 Christmas Catalog, which featured distinctive merchandise from a variety of downtown stores. The promotion and activity element of the ARZ Plan recommends the continued expansion of these efforts, capitalizing on new attractions such as Volunteer Park and Beale Street Landing, to promote and stimulate the revitalization of the downtown sector. The extension of the free fare zone to the Medical Center offers an excellent opportunity to expand downtown retail markets. Promotional activities could call attention to the opportunities for shopping and eating in downtown Memphis and emphasize the convenience of transit service to and from the area. The proposed Medical Center bus stops illustrated earlier could become centers of information about downtown, advertising special sales, entertainment, or other coming attractions. Table IV-4 presents a summary of Memphis' ARZ Plan recommendations.

VI. ARZ PLAN IMPACTS AND COSTS

The proposals included in the Memphis Auto Restricted Zone Plan would achieve the objectives set forth. These impacts, of course, would involve public expenditures, primarily for the series of transit/pedestrian improvement projects. Foreseeable impacts would include the following:

- Transit — The through-routing scheme recently implemented by MATA will have the greatest impact on transit services. The interlocking routes will mean fewer transfers for passengers, formerly a major inconvenience and obstacle to attracting new riders. The new passenger waiting facilities will significantly improve conditions for transit riders both downtown and at the Medical Center. These new facilities and the extension of the free-fare zone during midday could play a major role in expanding the transit market into the exclusively auto-oriented segments of the Memphis community.
- Circulation and Parking — Because the ARZ Plan proposes minimal changes in vehicular circulation, few impacts are anticipated. The pedestrianization of West Court Street will have little or no impact on auto accessibility to the area. The change in transit routings, however, will result in a 20 percent reduction in buses on the downtown loop during the peak hour. This reduction should improve traffic flow for all downtown vehicles. Because traffic congestion is not presently severe, the institution of transit preference lanes on Front and Second Streets should not result in adverse impacts as those lanes

Table IV-4. Summary of Memphis ARZ Recommendations

Pedestrian Facilities	Transit	Transit/Pedestrian Improvement Projects
<ul style="list-style-type: none"> ● Pedestrianize West Court St. ● Improve Front St. crosswalks at Court & Cotton Row ● Widen sidewalk on Jefferson St. ● Improve pedestrian connections to transit, parking areas, and riverfront 	<ul style="list-style-type: none"> ● Route interlocking for more direct service ● Extend free-fare zone to Medical Center ● Improve all major downtown bus stops ● Provide downtown-type bus shelters within Medical Center ● Create a transit center for downtown ● Implement transit preference lanes on Front & Second St. 	<ul style="list-style-type: none"> ● Second & Madison Transit Center ● Second & Jefferson Bus Stop ● West Court ARZ Gateway ● Cotton Row alley development
Urban Design	Circulation and Parking	Promotion and Programmed Activity
<ul style="list-style-type: none"> ● Extension of Mall atmosphere ● Alley treatments ● Street corner treatments ● Pedestrian pavements ● Mall-type bus shelters 	<ul style="list-style-type: none"> ● West Court St. closure ● Improved transit circulation ● Parking information program ● Downtown-wide parking validation program 	<ul style="list-style-type: none"> ● Continue strong program ● Extend downtown marketing to Medical Center ● Promote downtown accessibility by both transit and auto ● Hire additional personnel ● Capitalize on new downtown attractions

currently function as de facto transit lanes. Pedestrian circulation will be greatly improved under the ARZ Plan. The pedestrianization element of the Plan utilizes the extensive alley system to create linkages between the existing pedestrian area and other downtown resources such as parks, transit stops, and parking facilities. A total of 89 on-street parking spaces will be eliminated, constituting only 1 percent of all parking open to the public in downtown Memphis. The proposed parking promotion and management component will improve the attractiveness of downtown for auto-oriented shoppers without provision of new parking facilities.

- Urban Design — The proposed transit/pedestrian improvement projects will have a substantial impact on the visual quality of downtown Memphis. Currently, the amenities paid for by the special downtown taxing district are confined to the Mid-America Mall. The Plan proposes selective extensions of the Mall design vocabulary which should create the image of a special downtown zone beyond the linear strip of the mall. This should help reinforce and stimulate user activity on Second and Front Streets, essential to the preservation of Memphis' urban character. Further deterioration of the building fabric along these streets will create an "island" effect for the Mall and limit its revitalizing influence on downtown. The treatments proposed for Cotton Row, West Court, and the Second and Madison transit center, should produce needed street life in these areas, critical to the creation of a new active and prosperous atmosphere for downtown.
- Economy — The change proposed in the ARZ Plan will only augment the recent actions taken in downtown. Thus, it can be expected that any economic benefits resulting to local merchants and the community will be the product of the cumulative influence of downtown improvements. It is anticipated that the Plan's focus on environmental improvements will serve to reinforce the initial success of the mall, stimulate further redevelopment activity and generally improve the economic viability of downtown Memphis.
- Goods Movement — The pedestrian circulation component of the Plan draws heavily on a major goods movement resource of downtown Memphis. Analysis shows that improvement of the selected east-west alleys for pedestrian circulation to and from the mall will have minimal impact on the pattern of goods movement. The Memphis Fire Department has stated, however, that these alleys are essential access corridors for emergency vehicles. Thus, the design of the alley pedestrianways will have to incorporate the requirements of the Fire Department as constraints on the modifications to be made. Other goods-related impacts involve the relocation of loading zones as a result of the proposed intersection treatments, and the pedestrianization of West Court Streets.

Costs

A preliminary cost estimate for the component parts of the Plan was prepared by the ARZ study team. Cost estimates are provided for the capital expenditures on new facilities and for the annual expenditures for the service or activity elements:

- Capital Costs — Table IV-5 presents estimates of capital costs for projects proposed in the ARZ Plan. The estimates for street surface and other aboveground improvements were based on prevailing unit construction costs. After rough quantity takeoffs yielded prices for each element in each project, allowances were added for special features such as furnishings, signs, and lights. The total cost for each project was increased by 28 percent: 10 percent for contingencies and 18 percent for architects', engineers', and contractors' fees.

Utility reconstruction and other sub-grade demolition and rebuilding often account for a substantial portion of the cost of pedestrianized streets. Without detailed surveys, it is difficult to estimate the cost of this component, since it has ranged from minimal to over \$10/sq. ft. in other projects. For this preliminary estimate, we assumed \$5.00 sub-grade cost per square foot of new pavement. However, the Memphis Public Works Department should verify the utility conditions at each site and correct these costs if necessary.

**Table IV-5. Memphis Auto Restricted Zone
Capitol Cost Estimates**

<u>Location</u>	<u>Proposed Treatment</u>	<u>Estimated Cost</u>
Second & Madison	Transit Center: Reconstruction of Goodwyn Bldg. transit shelters, street corner treatment, alley modifications	\$ 594,000
Second & Jefferson	Transit Stop: Property acquisition, transit shelter, street corner and sidewalk treatment	\$ 199,000
Front & Court	ARZ Gateway: Street deck, improved crosswalk, building arcade	\$ 189,000
Front & Lowensteins	Transit Stop: Transit shelter	\$ 20,000
Cotton Row	Area Redevelopment: Alley treatment, improved crosswalk, sidewalk widening	\$ 530,000
Medical Center	Transit Stops: Two new transit shelters	\$ 40,000
TOTAL		\$1,572,000

The Madison and Second Street and the Front and Court Street projects involve the leasing and rebuilding of ground floor areas of private buildings as transit facilities. The \$50/sq. ft. estimate is based on other projects of comparable complexity, but before the cost of rebuilding these structures can be reliably estimated, the City will have to conduct more detailed architectural and engineering feasibility studies.

Costs for downtown-type bus shelters in the Medical Center area were estimated on the basis of 400 sq. ft. per shelter at the cost of \$25/sq. ft. for structure and \$25/sq. ft. for furnishings, exhibits, and other equipment. The capital cost estimates are given in terms of 1977 construction costs and do not make allowances for inflation.

- Operating Costs — Non-capital costs are much harder to estimate accurately, but Table IV-6 indicates approximate requirements for the various services proposed in the ARZ Plan. Most difficult to estimate is the actual cost of the midday extension of the free-fare zone to the Medical Center. Because of a lack of detailed data, an estimate was derived based upon boardings and alightings and the known volume of transfer movements. Due to the high number of transfers in the MATA system, a major difficulty centered on whether the downtown-Medical Center journey was a full fare or transfer fare to be deducted from system revenue. Analysis yielded an estimate of \$35,000 to \$45,000 in annual revenue to be lost from Medical Center to downtown trips. Other information indicates, however, that transit travel to and from points between the downtown and the Medical Center may more than double this estimated loss.

The ARZ Plan proposes expansion of the operation of the Downtown Mall Office to cover activity management for the whole district. A more specific program for this should be developed by the Downtown Council and Mall Office personnel. The cost of these expanded activities will be dependent on their more accurate definition. An initial estimate here is based on:

- 1 additional full-time employee
- 1 additional part-time employee
- \$15,000 additional annual budget for marketing and promotion including the parking program
- \$5,000 annually for consulting help with signing and graphics

This level of expanded effort would require an addition funding of \$50,000 per year.

In addition, the Plan proposes the creation and enforcement of transit preference lanes on Front and Second Streets. The annual cost of this element as shown in Table IV-6 is \$4,000.

**Table IV-6. Memphis Auto Restricted Zone
Operating Cost Estimates**

ARZ Plan Element	Estimated Annual Cost
Midday Extension of Free-Fare Zone to Medical Center	\$100,000
Downtown Promotion, Management, and Marketing	\$ 50,000
Transit Preference Lanes: Maintenance and Enforcement	\$ 4,000

VII. ARZ PLAN IMPLEMENTATION

The strategies, priorities, and additional resources for the implementation of the ARZ program are currently being developed and are not yet finalized. The plans for implementation will be submitted by the City of Memphis as part of its application for demonstration funding under the Urban Mass Transportation Administration ARZ program. The following are some of the issues to be considered in devising the implementation plan.

- Further Feasibility Testing — Further feasibility testing of the proposals should be accomplished at the earliest possible date. The proposals for three of the transit-related projects include the purchase or leasing of portions of private property. Preliminary negotiations must be conducted between the City and the owners to ascertain if they are, in fact, willing to participate in the projects. As part of this phase, the Memphis Public Works Department should determine the requirements and costs of utility changes necessitated by the proposed projects. A required element of the package to be submitted for demonstration funding is an environmental assessment of the ARZ Plan impacts.
- Priorities — Priorities must be established by the City among proposed urban design projects as well as other transit and traffic oriented components of the ARZ proposal. Current conditions would suggest that the transit/pedestrian projects proposed for Second Street at Madison and Jefferson be given top priority. Similarly, the proposed ARZ gateway at Front and Court would contribute a

dramatic visual impact at a relatively low cost. The implementation of free transit service to the Medical Center during midday should be directly tied to the availability of funds to promote the service and provide the proposed mall-type transit shelters. The project proposed for Cotton Row will involve the greatest effort in planning and coordination. For this reason, and because of the private sector redevelopment already underway in this area, its priority for public funds is probably lower.

- Citizen Participation — Citizen participation is a critical element in consideration of the Memphis Plan for possible Federal assistance in the form of demonstration funds. The City has taken the first steps toward incorporating the views of the community into the final ARZ Plan recommendation through the creation of a new Center City Commission. The Commission, which replaces the former Downtown Council, has been formed to offer a forum for the consideration of a wide range of opinions from all segments of the community.
- Legal Issues — Legal issues are not of primary importance to many of the elements of the ARZ Plan. The viability of the free service to the Medical Center, however, may be closely linked to a bill still pending in the Tennessee State Legislature which would authorize an addition to the sales tax on gasoline for the purpose of providing municipalities with operating subsidies for public transit services. The infusion of new funds would relieve pressure on the MATA budget and improve the outlook for funding the Medical Center free service.
- Funding — Funding is a critical element in the City's ARZ implementation program. Several potential sources should be considered. As noted earlier, the Mid-America Mall is financed through assessments on the special downtown taxing district. Thus, the legal/financial institution for leading the ARZ funding program is already in existence. If legislative action is favorable on the addition to the gas tax for transit operating subsidies, a potential funding source would be gained for the extended free-fare zone. In addition, several of the proposed projects are directly related to transit and therefore may be eligible for Federal funding assistance under Section 3 of the Urban Mass Transportation Act. Funds for programming performances in pedestrian areas may be available from the National Endowment for the Arts in the form of 50 percent matching grants up to \$50,000.

5. PROVIDENCE

Chapter 5. PROVIDENCE

I. INTRODUCTION

Providence, the capital and largest city of Rhode Island, is also the second largest city in New England—next only to Boston. The first settlement in Rhode Island was in Providence in 1636. Because of its importance as a seaport and later as a railway center, the city grew steadily through 1940 when it reached a population of 253,000. Since that point it has declined, with the 1970 Census showing a population of 179,213.

II. THE DOWNTOWN

Figure V-1 shows Providence and its position within the northeast region of the United States. Residents of Providence have access to large shopping malls in suburban Boston as well as the retail center in downtown Boston.

Downtown is on the Providence River and immediately adjacent to Interstate Routes 95 and 195 as well as to the railroad with the train station in the downtown at Kennedy Plaza. It is very accessible to the region for every mode of travel.

Figure V-2 shows the downtown with the Providence River on the east, Interstate Route 95 on the west, Interstate Route 195 on the south, and the railroad on the north. Figure V-2 shows the downtown activity districts as well as those immediately adjacent to the downtown. Within the retail district, Westminster Street was closed to traffic in 1965 between Dorrance and Snow Streets, and turned into a pedestrian mall. The retail center is characterized by older, two- to five-story buildings. The financial district includes many historic buildings such as the Providence Arcade, completed in 1828. Kennedy Plaza is the major open space resource and is the major transportation center. It is surrounded by several important buildings such as the Old City Hall (built in 1875), the Federal Court Building, Union Station (1898), the main Post Office, and the Biltmore Hotel which is being

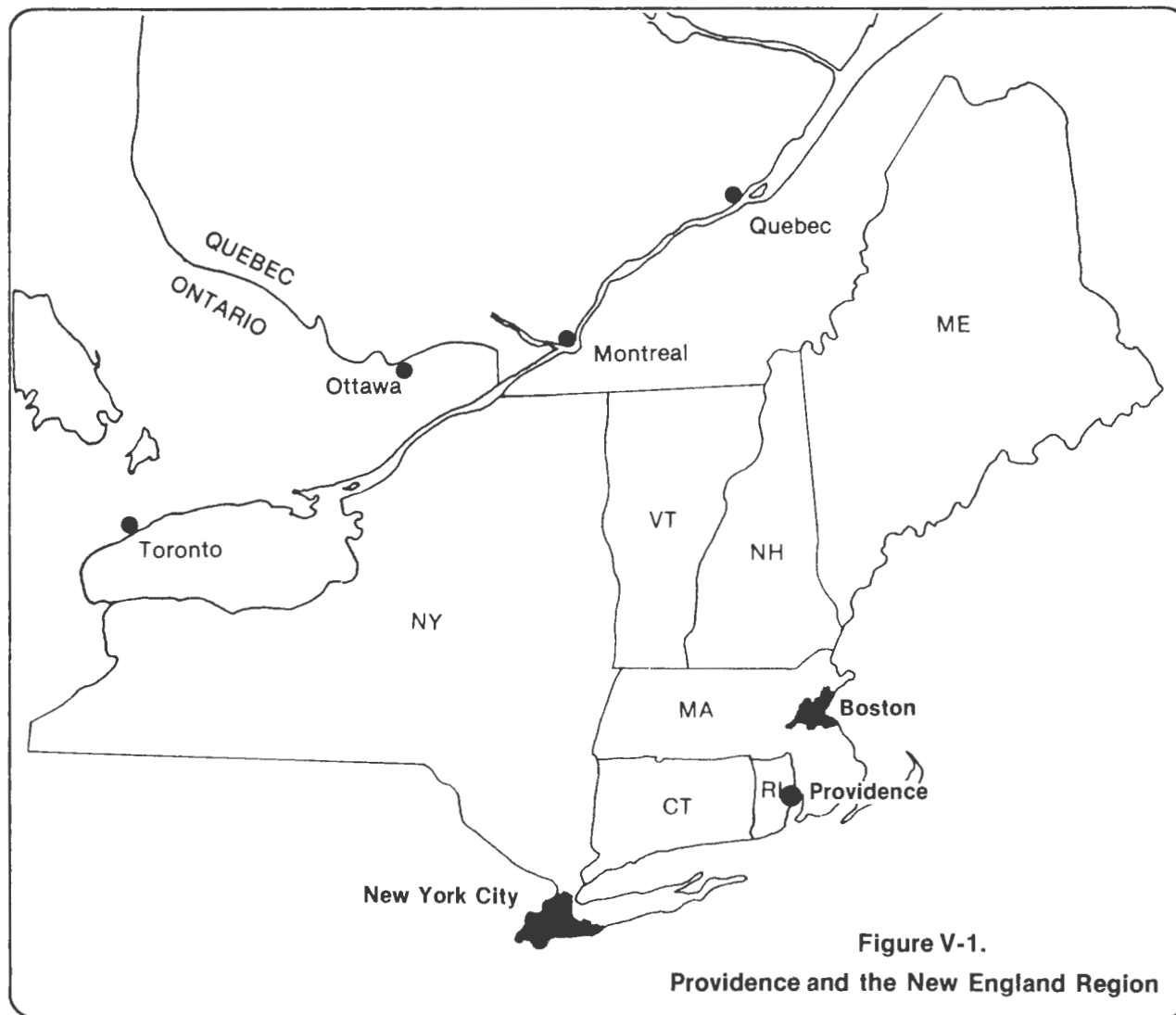


Figure V-1.
Providence and the New England Region

PROVIDENCE AUTO RESTRICTED ZONE STUDY

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Cambridge Systemica, Inc.
Moore-Hedder Architects
A. T. Kearney Inc.

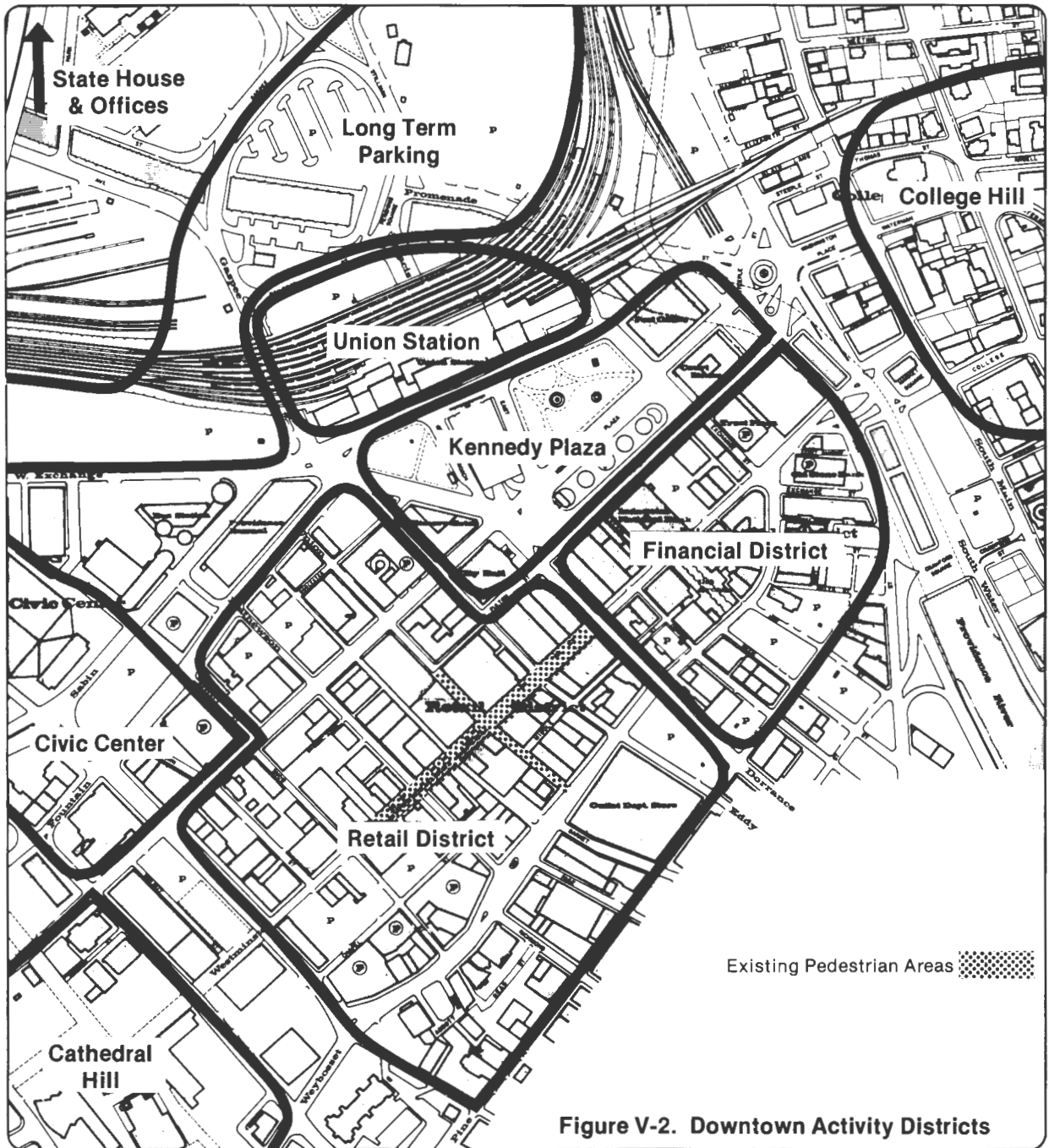


Figure V-2. Downtown Activity Districts

PROVIDENCE AUTO RESTRICTED ZONE STUDY



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 Moore - Heider Architects
 A. T. Kearney Inc.

refurbished with the opening set for the spring of 1978. Union Station is planned to be converted into a multi-use transportation, office, entertainment, and retail complex.

There are many vital activities occurring in the areas adjacent to the downtown. College Hill contains Brown University and the Rhode Island School of Design. Cathedral Hill is a major new redevelopment project comprised of elderly housing and a plaza. The Civic Center district houses the new Providence Civic Center, a new hotel, and several entertainment facilities. The State House District contains most of the state offices and employees.

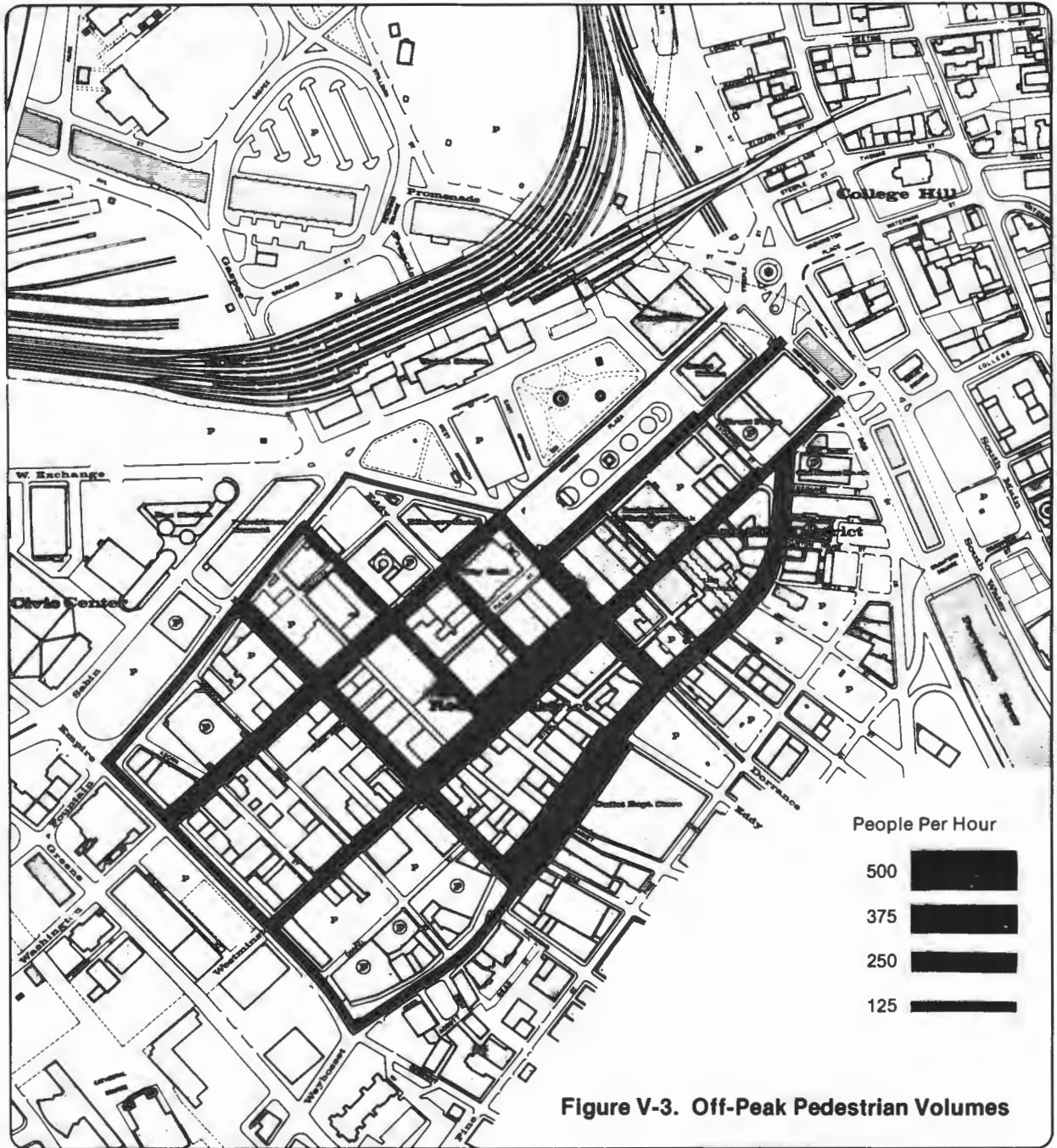
The growth in activity has been outside of downtown districts with the center retaining its historic character. The new developments, along with expanded and improved public transit systems and a new multi-use complex at Union Station, show the general health of Providence and form a solid base upon which it can grow.

Pedestrian Activity

Pedestrian activity peaks during lunchtime when downtown workers mix with shoppers. A second high period is in the afternoon between 4:00 and 6:00 p.m. Figure V-3 shows counts made in the off-peak period which would exclude most downtown workers. The Westminster Street Mall and the section of Weybosset Street adjacent to the Mall carry the heaviest volumes. During morning and evening rush hours, high pedestrian activity occurs between the large park areas north of the rail viaduct and the financial district as well as between transit terminals in Kennedy Plaza and the financial district.

Activity falls off quickly with the end of the business day, is moderate on Saturdays, and is very light on Sundays and holidays.

Figure V-4 shows the observed pedestrian problems. In most cases, sidewalk width was adequate to accommodate pedestrian flow. Pedestrian-auto conflicts occur in Kennedy Plaza at the southwest end and at the northeast end leading to the



PROVIDENCE AUTO RESTRICTED ZONE STUDY



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Source: Interface Providence Survey, 1975

PROVIDENCE AUTO RESTRICTED ZONE STUDY

Map by: Wickert & Associates, Inc.
 Cambridge, Massachusetts
 Report No. 1
 Date: 11/1/88

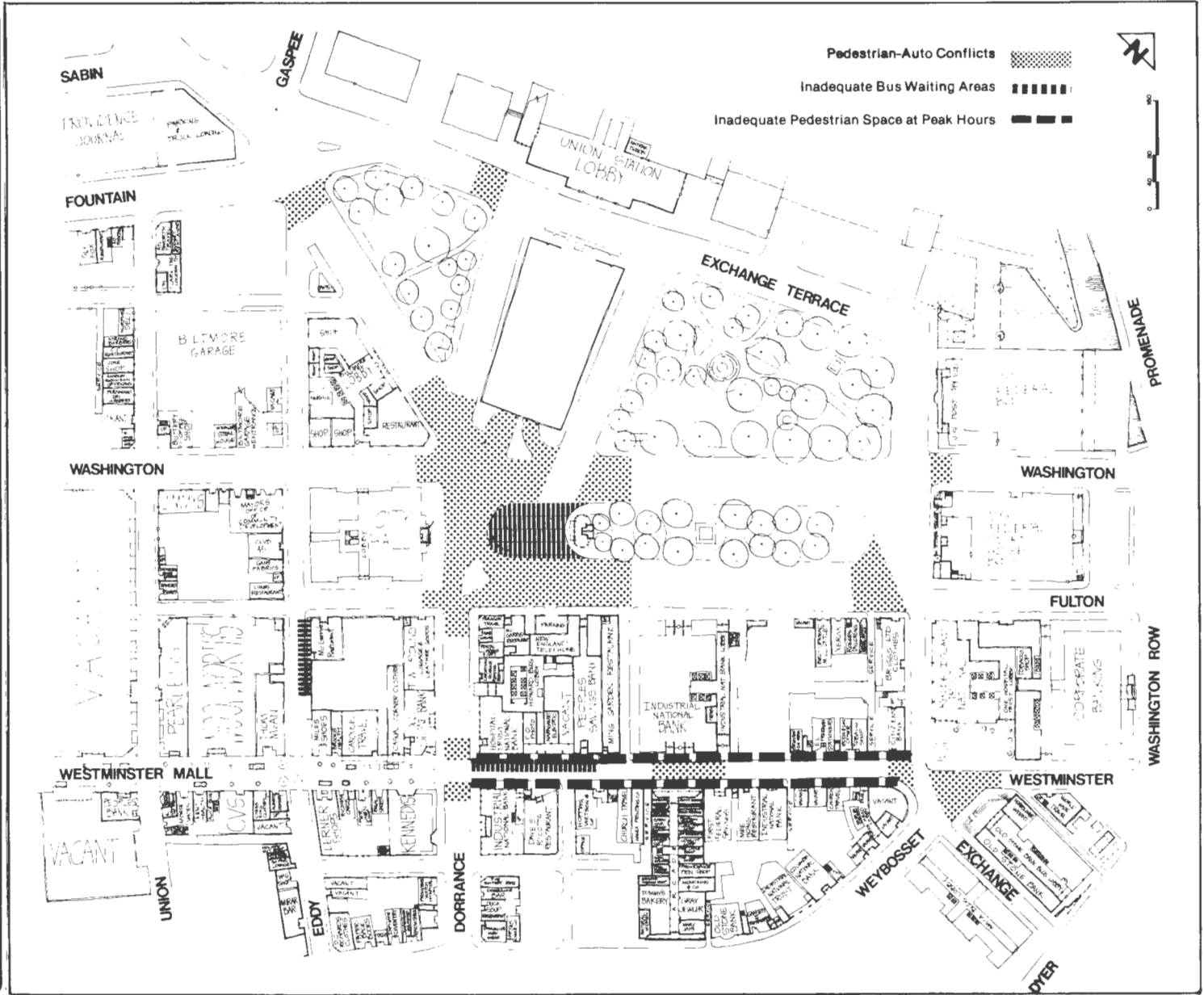


Figure V-4. Pedestrian Problems

financial district. They also occur at the intersection of Westminster Street, Exchange Terrace, and Weybosset Street, and at the intersection of Dorrance and Westminster Streets. The sidewalks of Westminster north of the Mall are inadequate during peak hours. Waiting areas for bus riders are not adequate at the major terminal area in Kennedy Plaza and on Westminster Street just north of the Mall.

Facilities for protecting pedestrians from harsh winter conditions and summer rains are lacking. Also, frequent delays due to traffic signals at most intersections increase walking times even for relatively short trips.

Present Traffic Circulation

The present circulation plan for downtown Providence is shown in Figure V-5. Weybosset and Washington Streets, which are parallel to Westminster Street, serve as a one-way pair in the east-west direction. Kennedy Plaza, with Washington Street on one side and Fulton Street on the other, serves as a circulator and distributor function for traffic going to and from the College Hill area, to the parking areas across the railroad viaduct and to the downtown in general. The skewed multiple-legged intersection of Gaspee, Fountain, Dorrance Streets, and Exchange Terrace is a major focal point in terms of both through travel and traffic destined to the downtown. The Gaspee Street approach is the major access route for traffic from the north going to either downtown or southbound on Interstate Route 95. Fountain Street and its complement, Sabin Street, serve as the primary connector between the southwest portion of the city and areas to the north and east. Also, most vehicles destined to the central portion of the downtown from Interstate Route 95 must traverse this key intersection. The other major streets in the downtown include Dorrance, Eddy, Matthewson, Empire, and Green Streets.

Capacity analyses were conducted and levels of service for key intersections were calculated. Figure V-6 shows the existing traffic flow conditions. The critical intersections are located on the perimeter of the downtown. One is the multi-legged intersection of Gaspee, Fountain, Dorrance Streets, and Exchange Terrace which was discussed earlier. Another is Memorial Square which is northeast of Kennedy Plaza. The Square serves as a focal point of all north-south travel on

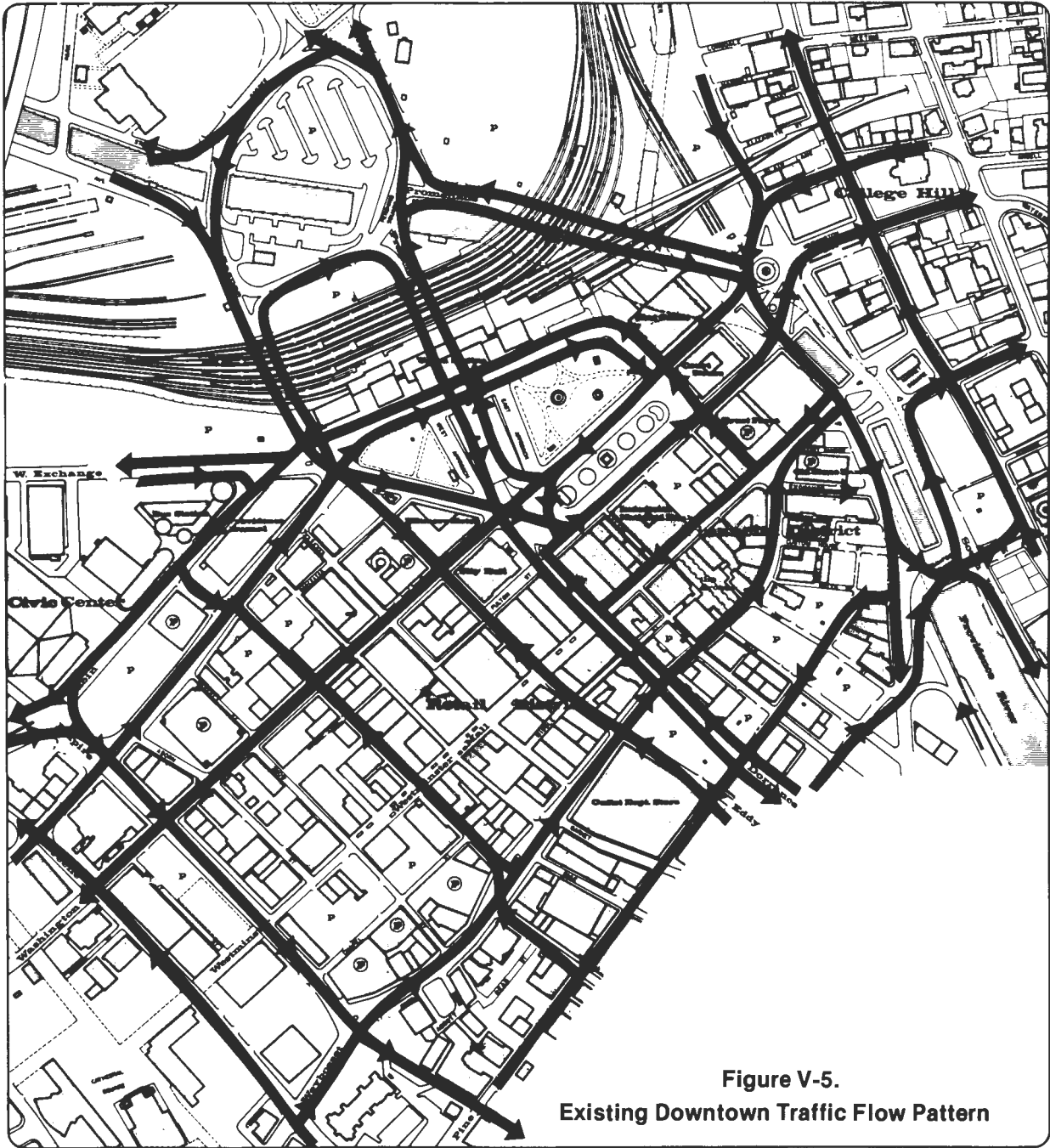


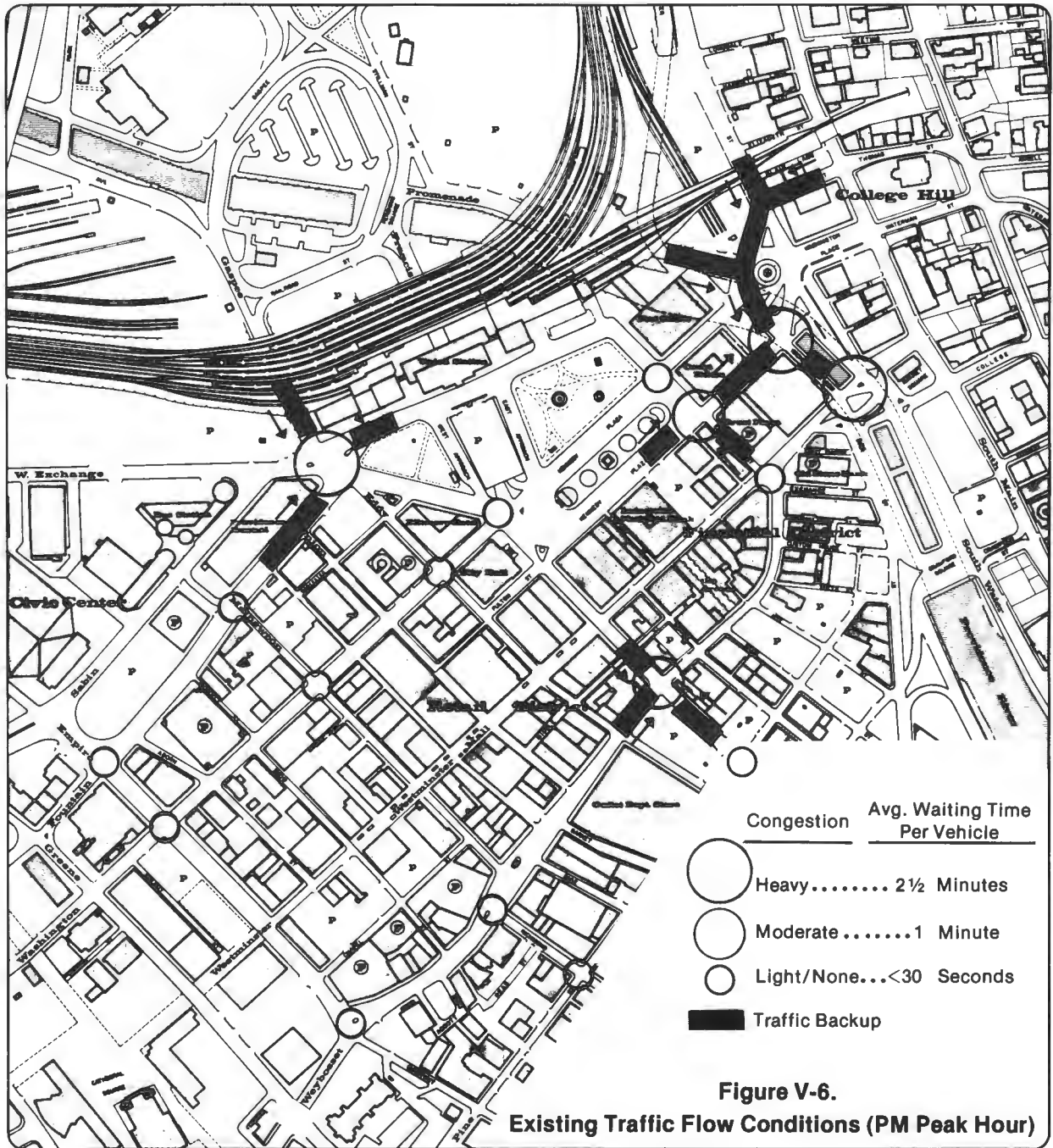
Figure V-5.
Existing Downtown Traffic Flow Pattern

PROVIDENCE AUTO RESTRICTED ZONE STUDY

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the eastern side of the city. Other less congested areas are the intersection of Dorrance and Weybosset Streets, the intersection of Exchange Street with South Kennedy Plaza, and the intersection of Dorrance and Friendship Streets.

Within the periphery of the downtown, there is sufficient additional capacity to accommodate interior street closures and changes in the circulation pattern.

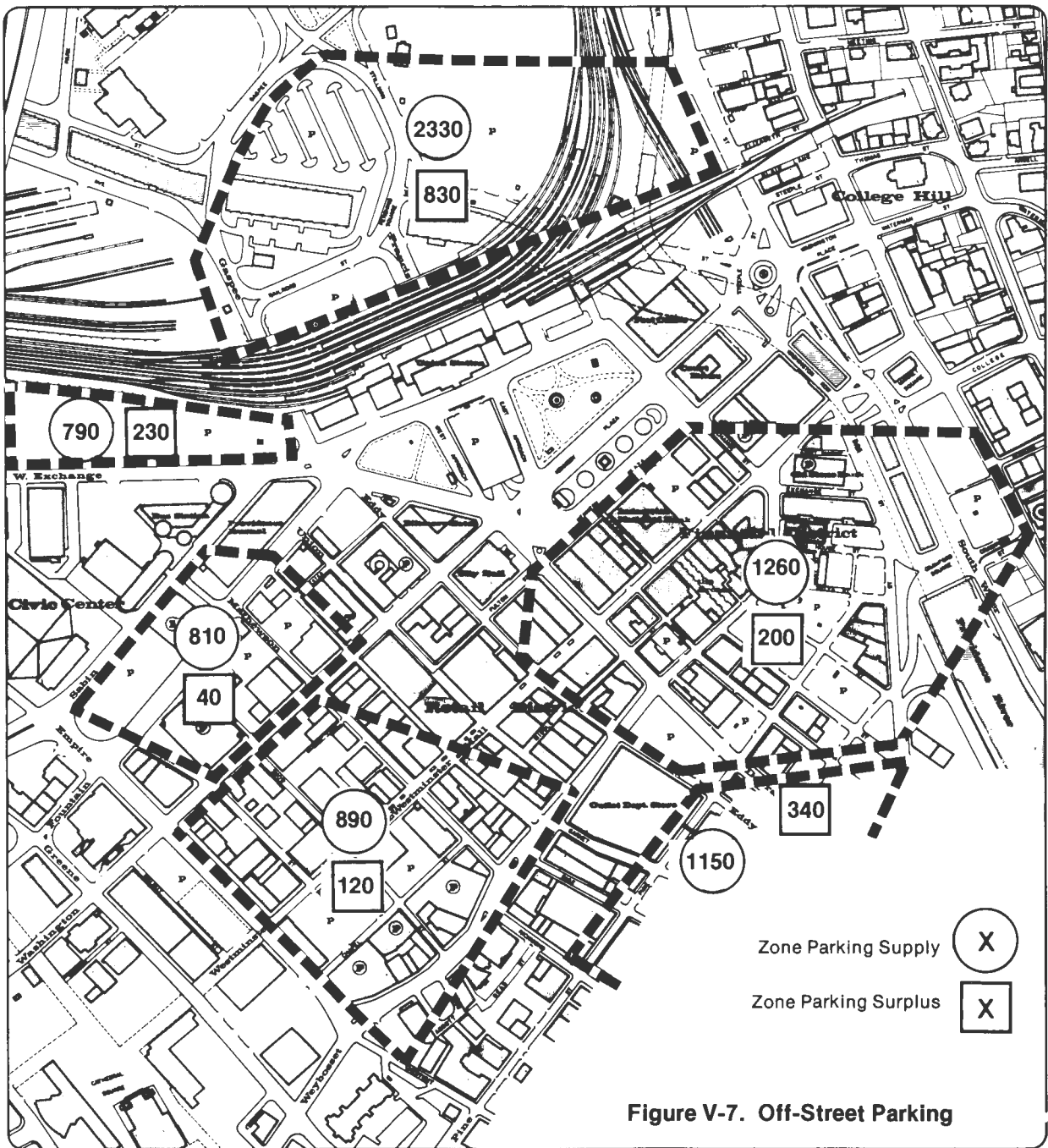
Present Parking

The supply of parking facilities within the downtown is adequate to meet the total demand for spaces. There are presently 7,230 off-street spaces and 840 on-street parking spaces. Figure V-7 shows the result of a study conducted by city officials in late 1976 in the major off-street parking areas of the downtown during the time of maximum parking demand. Within the six zones shown, there were a surplus of 1,760 spaces out of the 7,230 spaces inventoried. Most of the surplus spaces are adjacent to the retail district while 830 are in the parking areas north of the downtown.

In addition to the legal parking, illegal parking was observed to be quite prevalent. This is particularly true on Dorrance, Weybosset, and Washington Streets. Double and triple parking and illegal stopping and standing is common throughout the Kennedy Plaza area.

Transit Service

Downtown Providence is served by the Rhode Island Public Transportation Authority (RIPTA) which is a public agency responsible for the operation of all public bus routes within the State of Rhode Island. Within this statewide system, there is a basically radial system of 32 routes which serve downtown Providence. In addition to these public routes, there are a number of private bus companies that provide intercity and interstate transportation as well as some charter and contract service for special commuter routes or special functions. The 32 RIPTA routes carry approximately 40,000 person trips per weekday.



PROVIDENCE AUTO RESTRICTED ZONE STUDY

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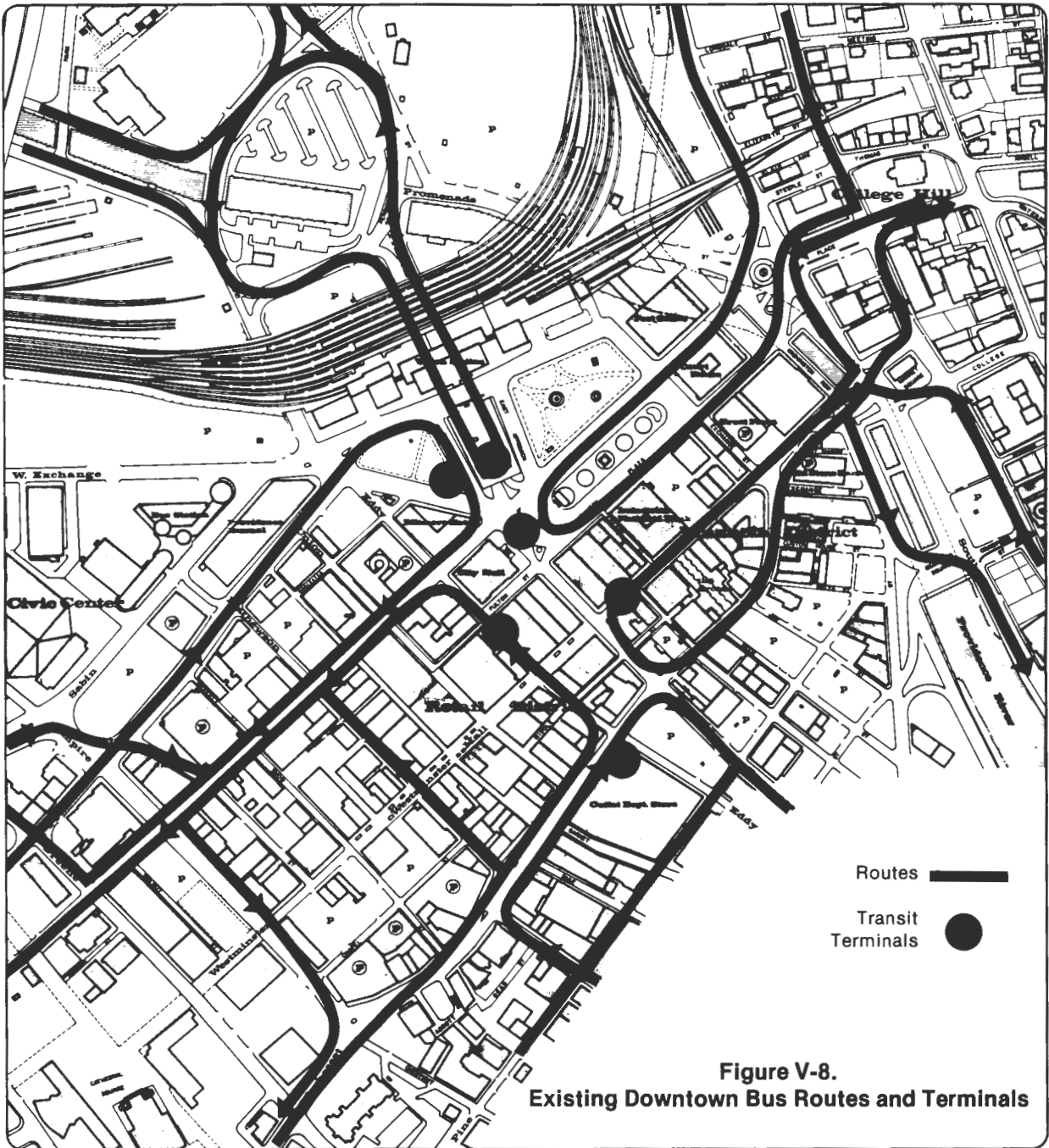
Figure V-8 shows the existing bus routing in downtown Providence and the terminal location. The 32 routes have been grouped into 14 aggregate groups according to the paths followed by the routes in the downtown. Approximately 1,200 buses per day operate on the routes and carry 50,000 passengers, including transfers and through trips. The volume of buses during peak service is 130 buses per hour. RIPTA has the routes lay over in the downtown with layovers ranging from 2 to 10 minutes at the locations shown in Figure V-8.

Together, the 32 routes carry 30,000 passengers per day to and from the downtown. Of these, about 40 percent are work trips and 60 percent non-work. The 12,000 transit work trips represent 30 percent of total work trips and the 18,000 non-work trips represent 30 percent of total non-work trips. Thus, RIPTA performs a major role in serving the downtown.

To the extent that RIPTA can be improved, it can become even more important in helping the downtown to grow. Figure V-9 shows six problem areas for existing transit. Buses lay over in the Kennedy Plaza area with 5-6 buses parking at the western end of the Plaza very frequently. This creates a visual distraction and also a physical barrier to pedestrians crossing the plaza. The layover problem is particularly acute on the much narrower Westminster Street between Dorrance and Exchange Streets. The other problem areas shown are due to congestion, illegally parked vehicles and delivery trucks and, in several cases, no traffic signals to allow left turns across heavy traffic. Another problem is the poor transit circulation in the downtown. Regional transit trips have only limited direct access to the downtown and activities within the downtown area are not connected by transit service.

Goods Movement and Deliveries

The retail district and the financial district of Providence require approximately 1,350 deliveries in a typical nine-hour working day. About 55 percent of these are made before 11 a.m.; 28 percent are between 11 a.m. and 2 p.m.; and 17 percent between 2 p.m. and 5 p.m.



PROVIDENCE AUTO RESTRICTED ZONE STUDY



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Figure V-9. Existing Problem Areas

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Figure V-10 shows the total daily deliveries by street segment for the two districts. The single busiest street in terms of goods movements is Kennedy Plaza from Dorrance to Washington Row which accounted for 16 percent of all activity in the surveyed area. Another busy segment is the portion of Weybosset between Dorrance and Westminster with 157 or 12 percent of the deliveries. In the retail district, approximately 25 percent of all downtown delivery activity occurs in the space of two adjacent blocks; the one containing City Hall and the next block to the west. The six street segments on Washington, Fulton, Union, and Eddy accounted for 13 percent of the deliveries. The remaining 50 percent of the daily deliveries is distributed evenly over the system. The most common activity level for a Providence Street segment is 0-2 deliveries per hour. Also, more than 75 percent of the segments have fewer than three deliveries in the average hour.

Providence is a "front door" city with most deliveries being channeled through the front doors of the business establishments. There are few alleys and off-street loading docks. There are delivery zones designated on most of the streets, but double parking by delivery trucks is quite prevalent. It is widely assumed that automobile drivers tend to use the loading zones for normal parking.

III. CURRENT PLANNING

Downtown revitalization is making progress. The Civic Center was constructed as well as Weybosset Hill undergoing major renewal. These projects were done under urban renewal. The Westminster Mall was then created in 1965 between Dorrance and Snow Streets. These areas provide significant pedestrian facilities and good design. The projects have not yet reached the heart of the downtown such as City Hall and Kennedy Plaza, and the distinct districts of the downtown have not been integrated into a single unit. The financial district is separate from the retail district and Civic Center. Kennedy Plaza is separated by wide streets and buses.

Other projects are now underway which will add to the revitalization of the downtown. These include the Biltmore Hotel which is presently being refurbished and the multi-use development of Union Station. City planners and the Providence

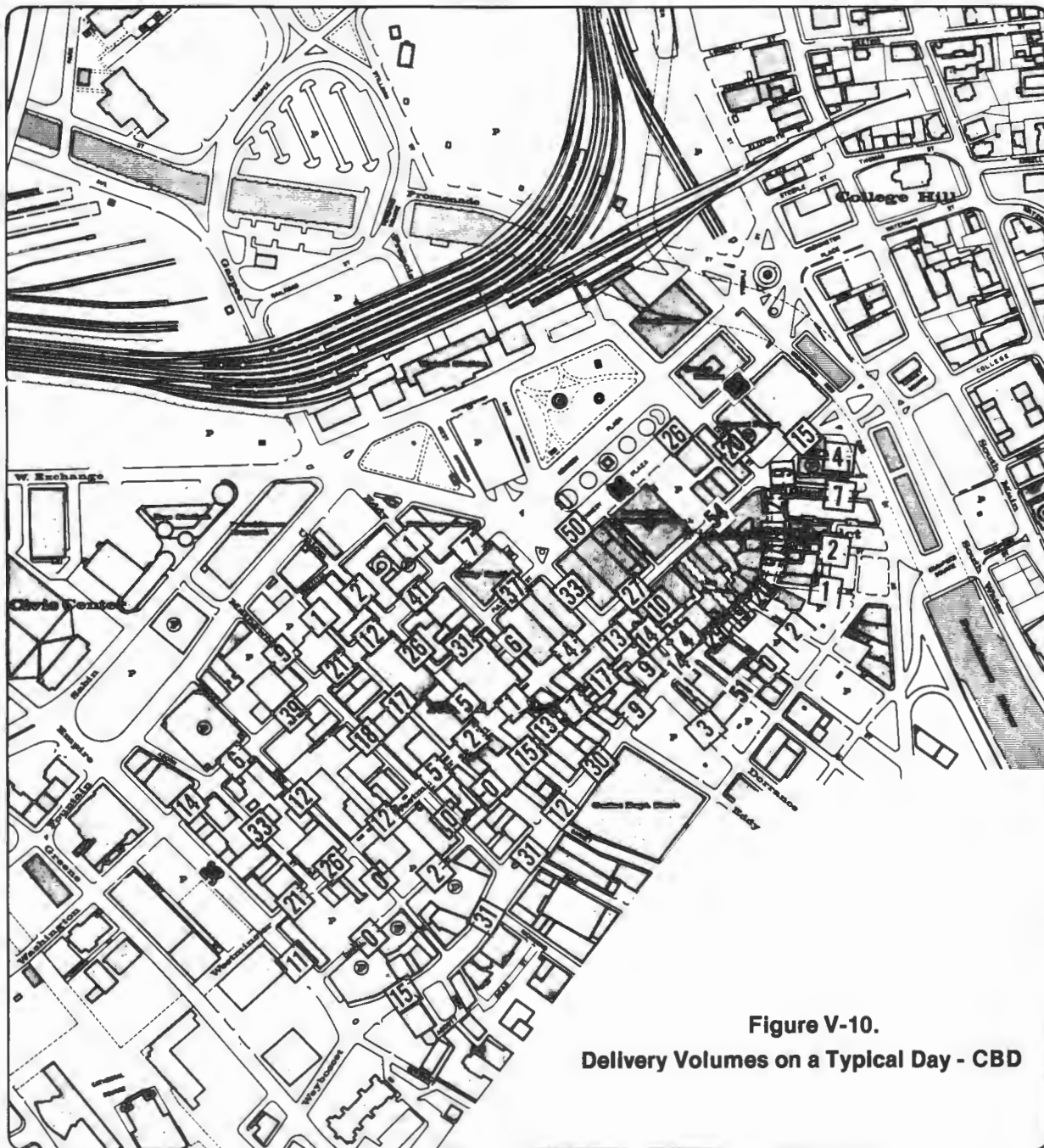


Figure V-10.
Delivery Volumes on a Typical Day - CBD

PROVIDENCE AUTO RESTRICTED ZONE STUDY

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Interface Group want to expand the Westminster Mall into Kennedy Plaza and the financial district as well as to rehabilitate the existing Mall. This would be a larger auto restricted zone. These recent past investments and new programs and possibilities will decidedly change the attractiveness, the functions, and the level of activities of the district. An ARZ demonstration would mesh with the plans for the future and could accelerate the rate of implementation.

IV. ARZ OBJECTIVES

In light of the existing conditions in Providence, and longer range objectives of the city to achieve a strong and attractive downtown, a number of objectives were developed for a demonstration of an auto restricted zone in the central business district.

1. Provide more direct and usable pedestrian connections between the downtown districts, Union Station, and Kennedy Plaza.
2. Provide a comfortable environment for pedestrians with emphasis on winter and severe weather protection, rest areas, space at bus stops, and reduce conflicts with motor vehicles. Providence has severe winters and rainy conditions which can make walking undesirable. Sidewalks in most areas are narrow and congested around bus stops.
3. Provide more spacious and more comfortable transit stop and waiting areas.
4. Reduce delays to transit vehicles with emphasis on reducing bus operations on narrow streets and in other environments in which the transit vehicle appears out of scale.
5. Reduce the need for transferring between transit routes and reduce walk distance required of transferring passengers.
6. Provide adequate facilities for delivery and service vehicles.
7. Provide convenient routes for vehicle traffic away from the major concentrations of pedestrians with emphasis on dispersing traffic to more even levels rather than concentrations at focal points.
8. Provide additional activities in the downtown area.

Obviously, not all of these can be fully achieved, but the proposed plan could achieve a reasonable balance with significant gains in the first five objectives.

V. PROVIDENCE AUTO RESTRICTED ZONE PLAN

Figure V–11 shows the total plan which consists of five basic elements: street improvements, transit rerouting, pedestrian facility improvements, a truck loading plan, and an activity plan. These individual elements are discussed in the following sections. More technical detail is provided both on existing conditions and on the proposals in the technical appendix.

Pedestrian System

Figure V–12 shows the existing and new pedestrian areas for the ARZ zone. The new areas build upon the Westminster Street Mall connecting the Civic Center and the financial district to the retail district. This improves pedestrian connections from the two strong centers to the retail district. Additionally, the west side of Weybosset Street and Dorrance Street are improved for pedestrian flow integrating Kennedy Plaza with the rest of the system, and the area in front of Union Station and Kennedy Plaza itself has increased pedestrian areas.

Pedestrian facility improvements include exclusive pedestrian areas with amenities such as lighting, planting, and benches; widening sidewalks; and creating pedestrian spaces as well as walkways.

A new focus for downtown will be a City Hall plaza, in front of City Hall. This is an important factor in the design to give a common hub for the different parts of the downtown. A sketch of this might be designed as shown in Figure V–13.

The street improvement plan for the Providence auto restricted zone, shown in Figure V–14, illustrates the interrelated pedestrian, transit, and traffic projects proposed to create the needed connections between the activity areas of downtown. Both Kennedy Plaza and the area in front of Union Station are shown in Figure V–15. Removal of the existing parking deck and replacement with a new pedestrian area is a key feature.

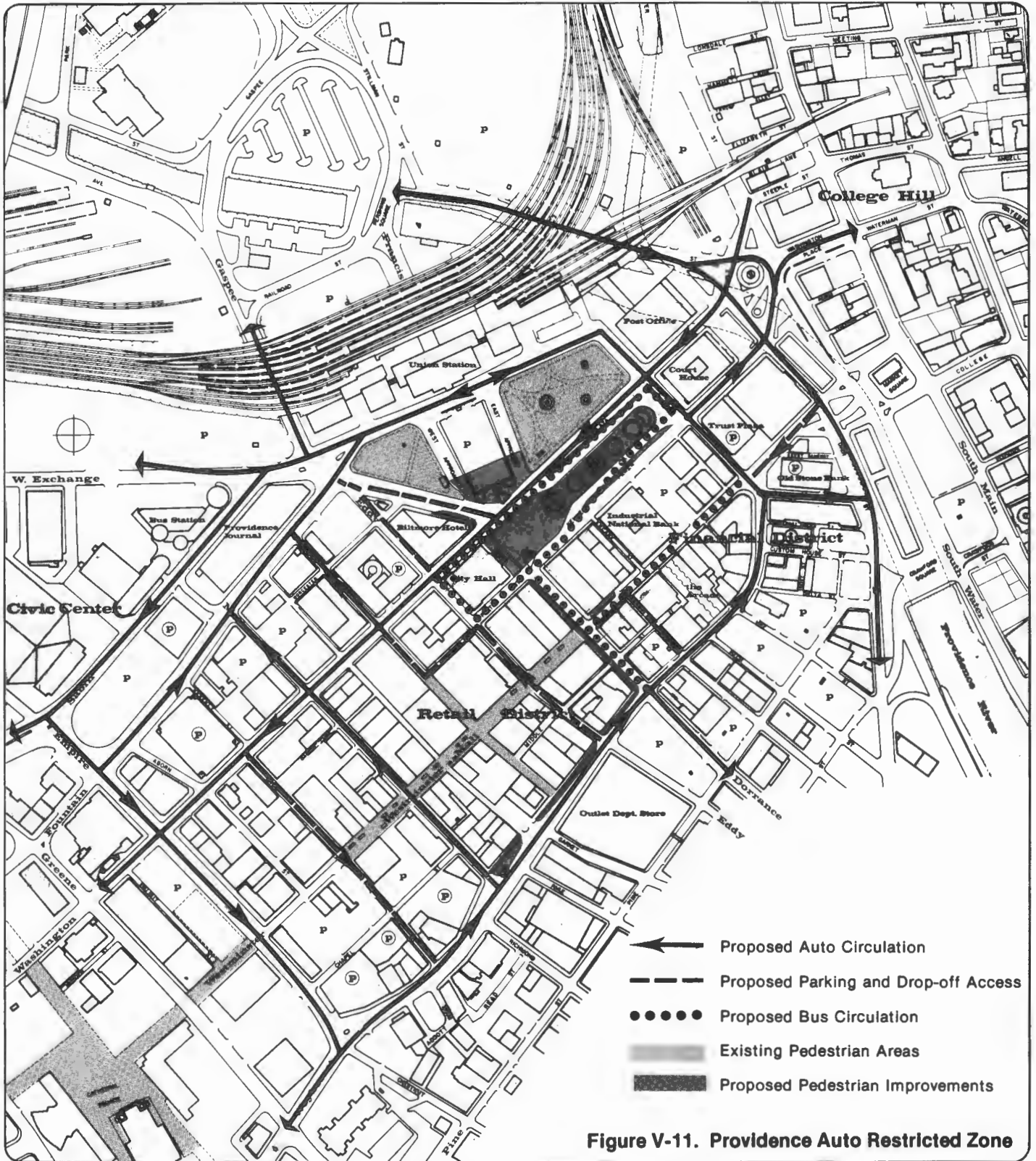
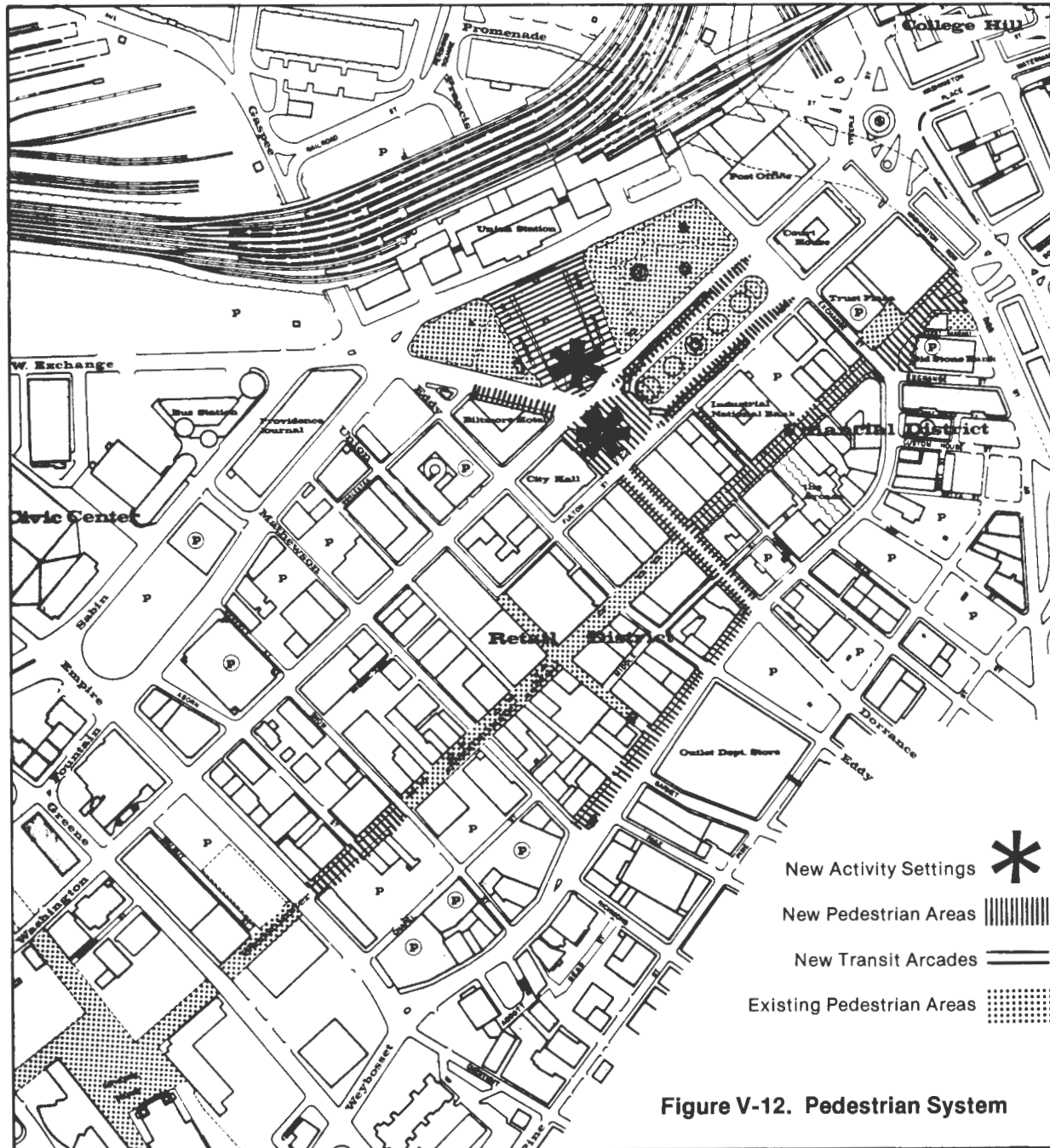


Figure V-11. Providence Auto Restricted Zone

PROVIDENCE AUTO RESTRICTED ZONE STUDY

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Existing

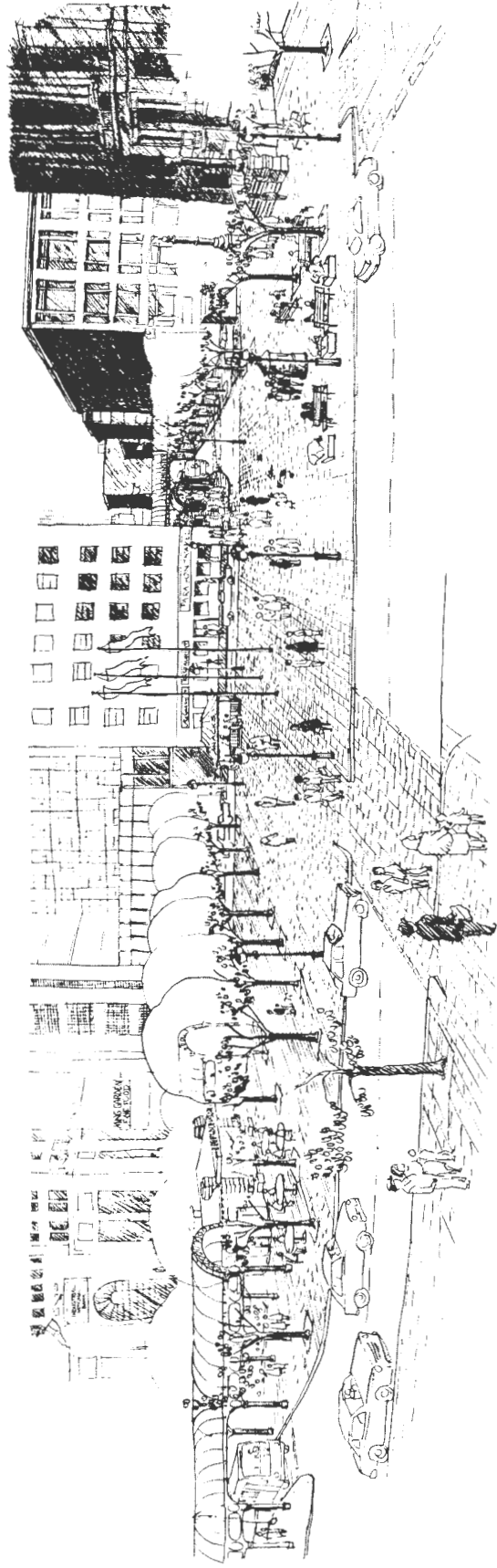


Figure V-13. Proposed Providence ARZ-City Hall Plaza

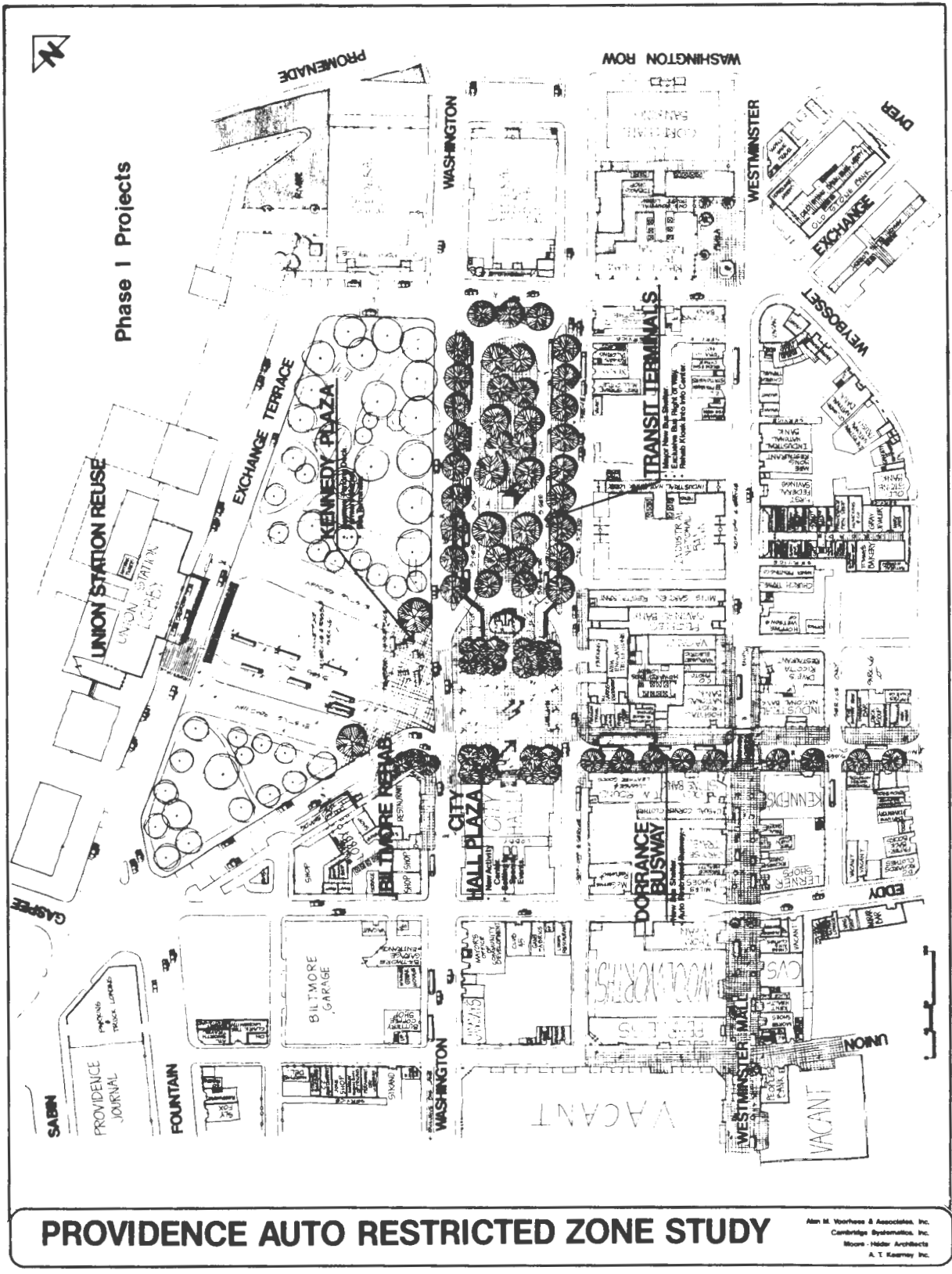
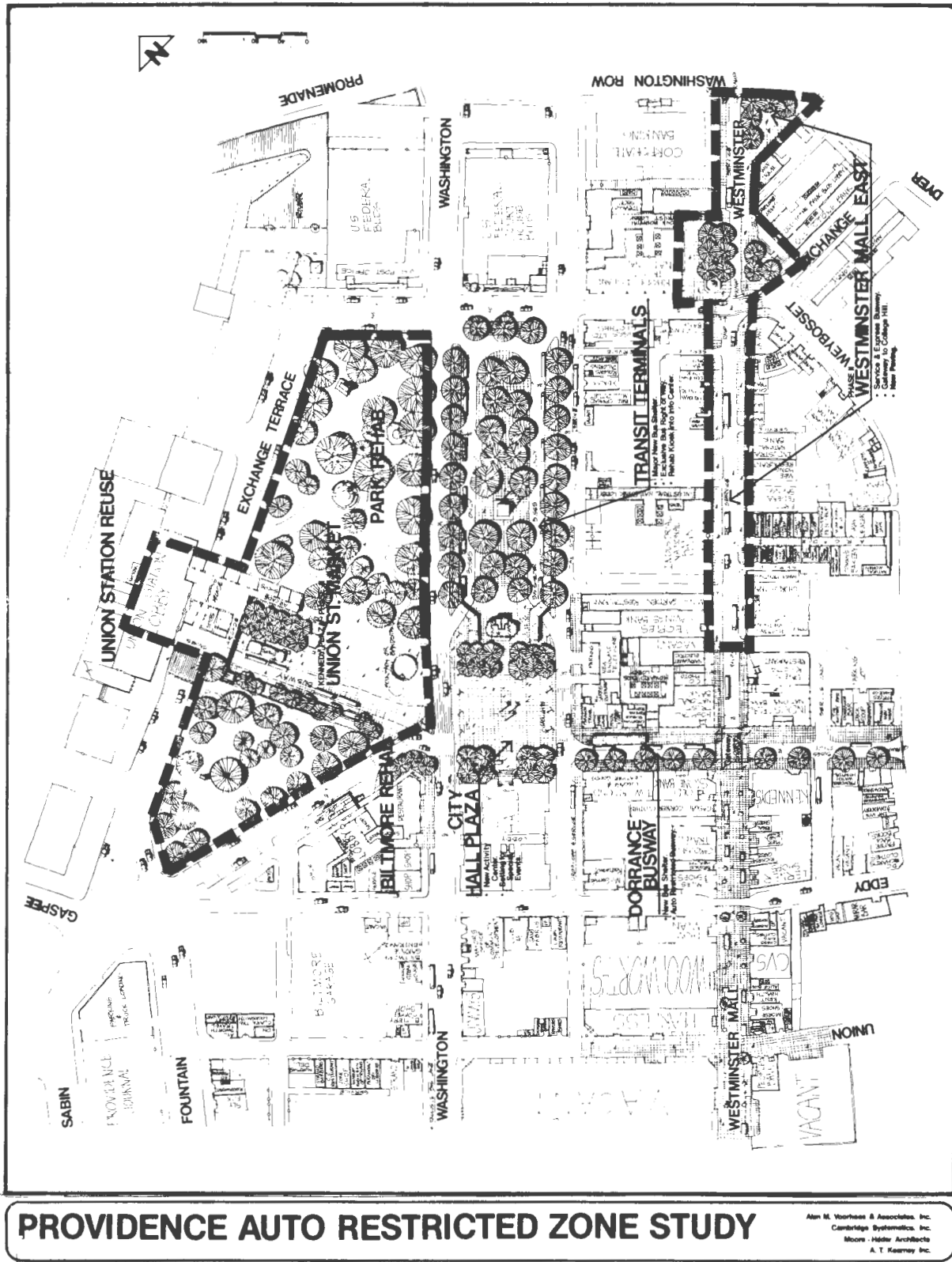


Figure V-14. Urban Design Plan



**Figure V-15. Urban Design Plan
Future Phase Projects**

Circulation Plan

Figure V-16 shows the primary travel corridors which would be in effect following implementation of the plan. Washington Street would continue as one-way westbound as well as Weybosset Street continuing as one-way eastbound. Cross traffic will now be on Empire and Exchange Streets, and Fountain Street and Sabin Street will continue as they are at the present time. Major pedestrian movements will be on Westminster, Union, and Dorrance Streets as well as Kennedy Plaza. Dorrance Street from Weybosset and Fulton Street is proposed as a transit mall. Autos would be allowed to use other streets, as shown in Figure V-17, for access to parking. Figure V-17 also shows the streets that are proposed as auto restricted areas. Francis Street would also be closed east of Promenade. Another feature would be the elimination of curb parking on Dorrance Street and selected legal spaces on Eddy, Fulton, and Exchange Streets. Loading and unloading would be improved with provision of "nose in" loading spaces on Westminster at Orange, enforcement of loading zone parking restrictions, and retention of delivery vehicles on the Dorrance transitway.

Transit Improvements

Reroutings of bus routes are proposed to create through-routing of the regional bus system in the downtown as well as to complement the pedestrian and street patterns. The proposed transit system is shown in Figure V-18. The major transit terminal is Kennedy Plaza with others on the Dorrance Street transit mall, on / Francis Street west of Kennedy Plaza, on Weybosset Street in front of the Outlet Department Store, and Washington Street at Union Street. Shelters, benches, and amenities would be provided at the terminals and other bus stops. Figure V-19 shows proposed transit terminal arcades as well as proposed locations. These main terminal locations are located on "transit only" right-of-way.

In addition to the changes in routes, a downtown free fare zone is proposed between the hours of 10 a.m. and 3 p.m. on weekdays. The new routings will provide capacity for intra-downtown circulation of passengers in downtown. As well as interconnecting the activity districts downtown, the free fare zone would give access to low cost surplus parking spaces on the fringes of downtown.

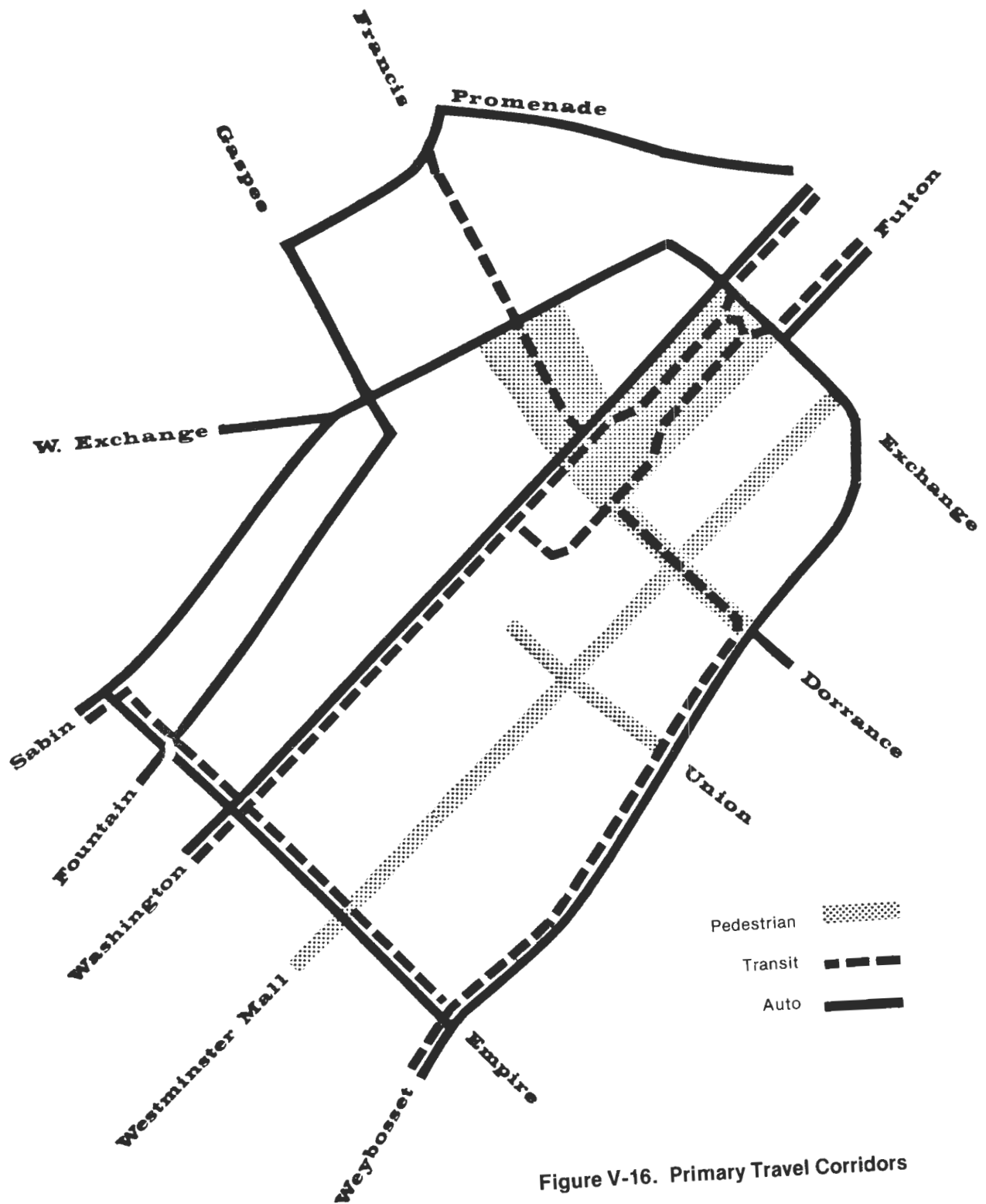


Figure V-16. Primary Travel Corridors

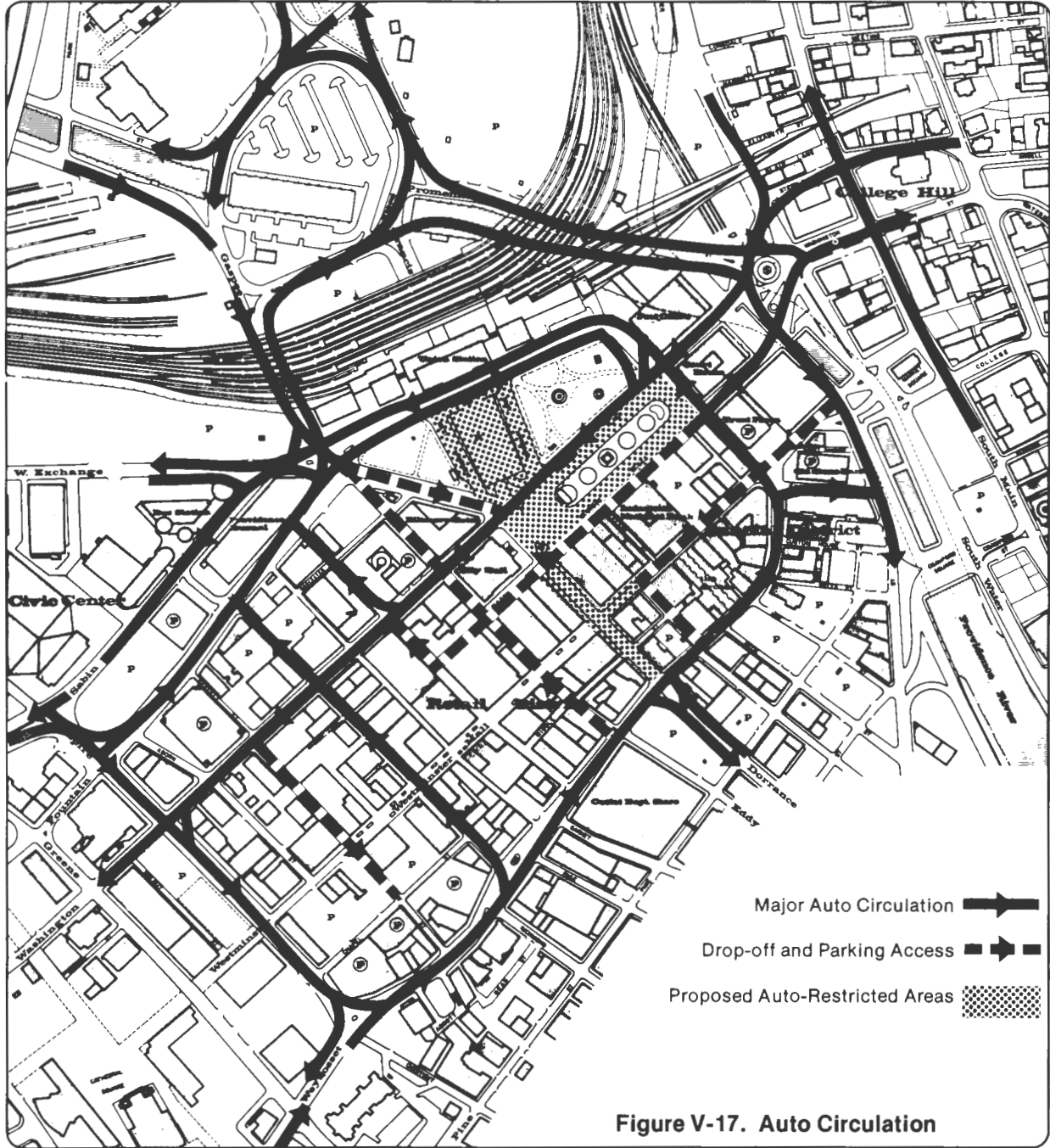


Figure V-17. Auto Circulation

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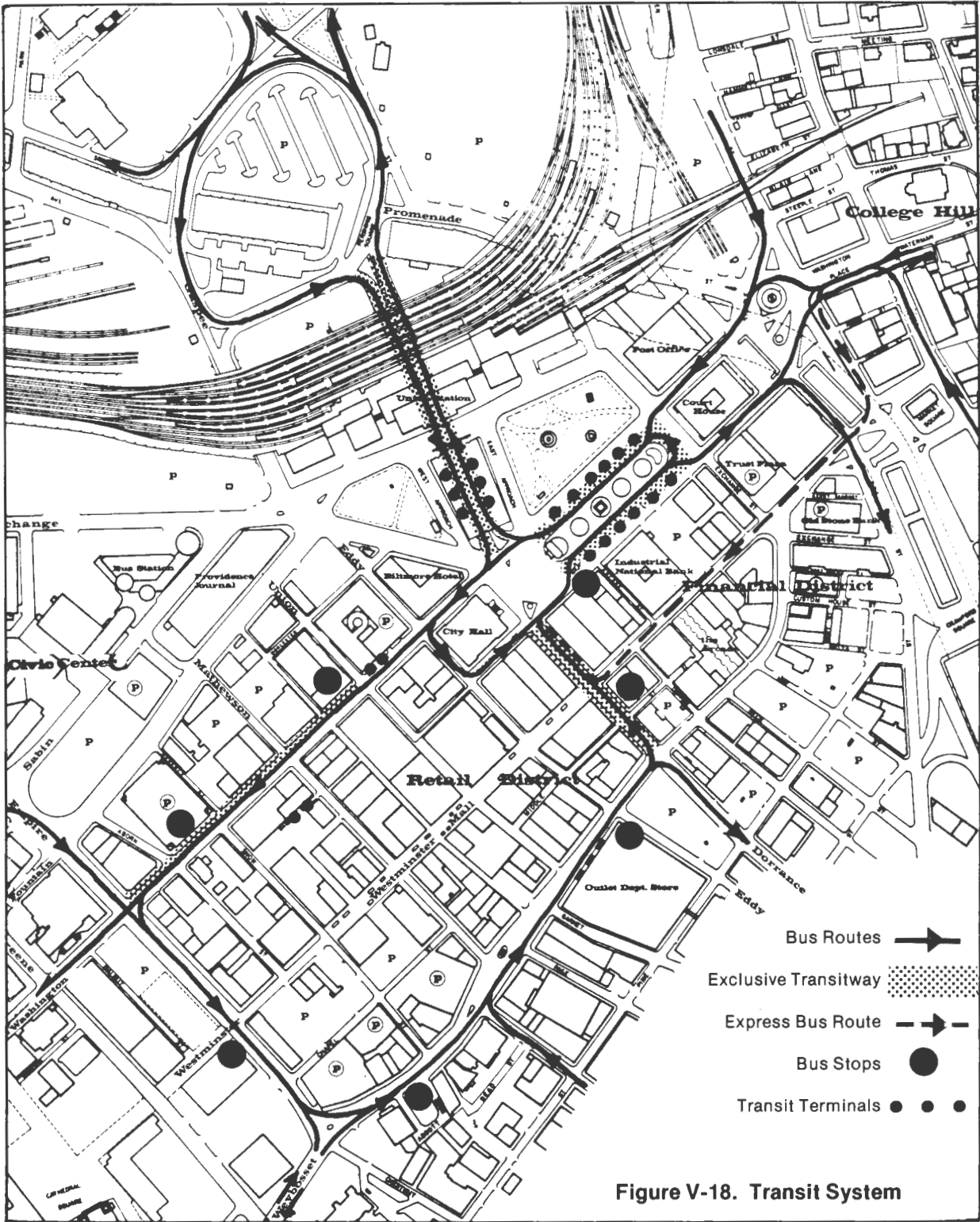


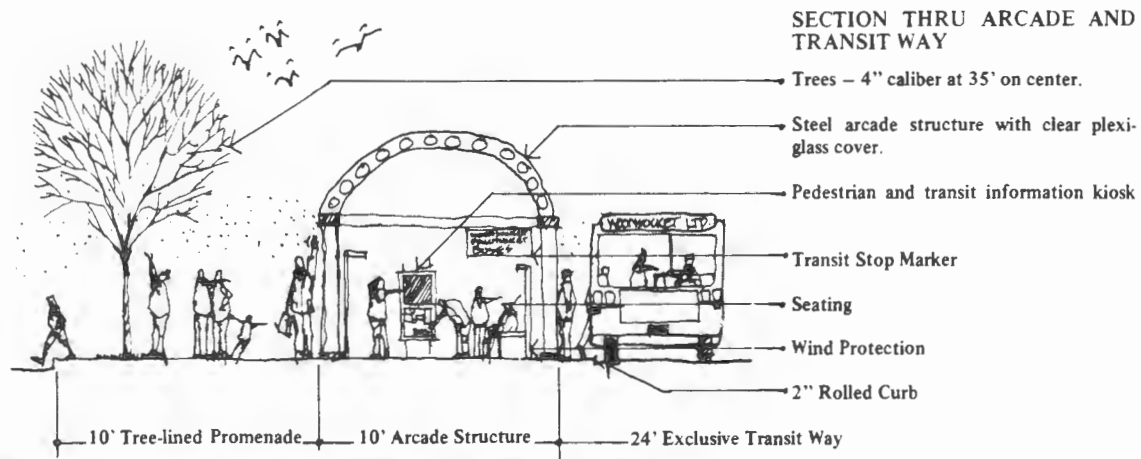
Figure V-18. Transit System

Transit riders are presently forced to wait for buses in crowded and unsheltered facilities in Downtown Providence. Improved facilities with shelter, seating and information are required if transit ridership and the use of the downtown is expected to be increased.

A transit arcade structure is proposed as part of the ARZ demonstration to provide shelter and amenities at new transit terminals. Included are snow and wind protection, seating, transit route information, landscaping, and lighting for night use.



Typical existing transit waiting facilities on Washington Street.



Prototype Arcade Structure, Pioneer Square, Seattle, Washington

LOCATION OF ARCADE STRUCTURES

- Dorrance Street between Westminster Mall and Fulton Street
- North Kennedy Plaza
- South Kennedy Plaza

Figure V-19. Transit Facilities

Goods and Service Plan

The goods movement system of Providence has adapted well in the past to major changes such as the opening of the Westminster Mall and the closing of Exchange Street for an extended period during a construction project. The auto restricted plan requires additional adaptations for Kennedy Plaza, Dorrance Street transitway, Westminster Mall extensions, and Exchange Street. Goods movement will be the same at Kennedy Plaza with rerouting required for access. Loading areas are recommended for the Dorrance Street transitway as well as provision of off-street parking for delivery of long duration. Closing Dorrance Street also affects Weybosset Street where it is proposed that loading on the north side be allowed except during the evening peak period. Loading for the south side would be diverted to the side streets where loading bays would be extended. Westminster Mall goods movements would be allowed on Westminster Mall during the morning and from Snow, Empire, and Aborn Streets during other hours of the day. Exchange Street loading is proposed to be restricted to the west side of the street and prohibited during the evening peak period.

The areas provided would be adequate to accommodate the goods movement requirements, particularly with increased enforcement of the loading zone restrictions.

Downtown Activity Plans

Earlier, it was stated that pedestrian activity was moderately heavy at weekday lunch hours and light at other times of the day, except for walking between parking lots and work areas. Both the general attraction and the economic potential of downtown are highly dependent on creating more continuous life on the streets, and in the new pedestrian areas proposed for the downtown.

In the course of the ARZ study, two related approaches to the problem of increasing street activity were identified:

- I. Design all new circulation patterns around pedestrian activity generators, such as office buildings, parking areas, and bus stops.

2. Generate an "activity plan" consisting of an extended period of programmed business promotions and public cultural and entertainment events using existing and proposed auto-free spaces.

The circulation and improvement plans set the proper "stage" for an exciting, lively downtown. The programmed activities described below will be needed to provide the "play." The creation of the Westminster Mall did not create the desired level of activity which makes it clear that even such ambitious physical renewal cannot induce new vitality without a complementary activity program. The programmed activities may require public and business support for a period of time while the renewed attraction of downtown can make it economically self-sufficient.

The Activity Plan shown in Figure V-20 illustrates the types of events which may be generated on the downtown streets. The events noted either already exist such as waiting areas, parks, and eating areas, or are suggestions such as special events and a Farmers' Market.

Management of programmed activities is recommended to be handled by a Mall Management Office with several energetic staff members to promote the ARZ. The office would coordinate maintenance and promotion of the ARZ and should be immediately opened in a vacant storefront in the downtown. A downtown policy group should be established to supervise the management program and a public space events program should be initiated to fund and produce performances as well as provide necessary sound equipment, part of the stages, and signs.

This activities program would need to be subsidized initially. In the long run, downtown activities would be on a firmer base, derived from a balance of government and private employment, specialty, and service shopping, regular programs and festivals, tourist and conventioners, regular entertainment and cultural events, and downtown housing. The induced activities suggested should be a part of a strategy to create these regular activities and after a two- to five-year period, reduce or eliminate the need for subsidy. Once downtown activities achieve a "critical mass" of attraction, they will support each other and maintain their own momentum.

VI. PROJECTED IMPACTS AND COSTS

Implementation of the Providence Auto Restricted Zone, as proposed here, would result in a variety of direct and indirect impacts on the city. Direct impact would be felt primarily in the area of transportation, while the local economy and visual environment would both experience secondary or indirect impacts. A brief description of the major impacts which are anticipated would include:

Transportation Impacts

The proposed transportation related changes included in the Providence ARZ plan will have a definite impact on the level of transportation service to and within downtown Providence. This change in level of service will lead to a shift in travel patterns that will result in a change in both the choice mode for many tripmakers and a change in the total number of tripmakers that choose to come downtown.

- Auto Traffic — As a result of the proposed traffic circulation plan, the major impact on auto travel routes will be due to the closure of Dorrance Street and Kennedy Plaza in front of City Hall. Most northbound traffic now using Dorrance will use Weybosset Street and Exchange Street. The remainder will stay to the east and use Memorial Square. Southbound traffic on Dorrance comes from either Memorial Square or the Gaspee-Fountain Street intersection. The first will bypass Kennedy Plaza and stay on Washington Row and Dyer Street. Traffic from Gaspee will use Promenade Street and Memorial Square. Traffic from Fountain will divert to Empire Street. Most of the traffic now traversing South Kennedy Plaza will divert north of Union Station onto Railroad and Promenade Streets. Other street closures and modifications will have minimal effect on traffic circulation. Although new travel patterns occasioned by the ARZ affects nearly all trips in the downtown to some extent, the impacts are well balanced and no increased congestion will result from the ARZ plan.
- Transit Operations — Many transit users will benefit from the through routing of regional transit lines because the new routings will provide more extensive coverage of the downtown for all routes that are through-routed. Transferring passengers will benefit because terminals will be located closer together, and in some cases the interlocking of routes will allow passengers that now transfer to remain on the same bus for the entire trip. The provision of "transit only" right-of-way on Dorrance Street, Washington Street, and in Kennedy Plaza will reduce the delays in transit service now caused by traffic congestion, and the Transit Authority will be able to provide more

consistent service throughout the day. The proposed fare-free zone and the through-routing of buses will provide a mode of transportation for internal circulation that does not presently exist. At present, workers or shoppers desiring to travel within the downtown area must either walk, drive or take a cab. The fare-free zone can be expected to generate new shopping, lunch, and personal business trips by connecting activity centers and employment centers with stores, restaurants, and offices in the downtown area. Workers that previously stayed in their own buildings for lack of a convenient place to go for lunch will be able to hop on a bus at no cost and have the entire downtown area at their disposal.

- Transit Ridership — The through-routing of RIPTA buses as proposed in the transit circulation plan will result in better access for bus patrons to many parts of the downtown area. The present practice of terminating bus routes on the fringe of downtown leaves most passengers with a lengthy walk at the downtown end of their trip. The through routing will maintain almost all existing access while adding significantly to the access for many transit users. The improvements, if implemented as recommended, are expected to produce an increase in transit trips to the CBD of about 10 percent. Because of the improved travel time for transit passengers passing through but not stopping in the downtown area, through trips by transit can be expected to increase by about 7.5 percent. The increases in transit patronage will be from both work and non-work trips and will more than compensate for decreases in accessibility for auto users produced by the auto restrictions. Improvements in reliability and travel time produced by the transit malls and exclusive rights-of-way should produce even greater shifts from automobile to transit use as well as more total trips to downtown. The fare-free zone will increase midday transit use by an estimated 600 to 800 passengers per day and in doing so, will further stimulate midday lunch and retail trade from among employees within the downtown area.
- Pedestrian Travel — The level of service for pedestrians will be improved because the connections between origins and desired destinations that require the crossing of Kennedy Plaza, Dorrance Street, or Westminster Street will require less conflict with cars and buses, will provide more space for pedestrians in the form of wider sidewalks and plazas, and will be more aesthetically pleasing because of physical design improvements. Connections that require a trip under the railroad track will also be more pleasant because of physical improvements, sidewalk widenings, and separation of pedestrians from cars and buses. The reorganization of transit terminals coupled with terminal improvements will provide easier access to buses. As a result of the improved facilities proposed for pedestrian travel, impedance will be reduced and pedestrian flow is expected to increase.

- Goods Movement — The circulation element of the proposed ARZ plan will have only slight effect on goods movement. Primary impacts are expected to be confined to Kennedy Plaza and Dorrance Street. Although curbside loading space is proposed for the south side of Kennedy Plaza, deliveries to that area may be affected by the loss of Dorrance for both northbound and southbound access to the area. Most vehicles would be forced to make a more circuitous approach to Kennedy Plaza. The greatest impact will be generated by the closure of Dorrance Street. The normal expediency of diverting delivery vehicles to side streets does not exist in this instance as the cross street, Westminster, is proposed for closure both west and east of Dorrance Street under the ARZ plan. The proposed curb cuts along the transitway for goods deliveries will provide adequate delivery space if use restrictions are properly enforced.
- Auto Parking — The proposed improvements would have the effect of removing 118 curbside parking spaces from the downtown areas as well as 95 spaces from the parking deck in front of Union Station which will be taken closed. However, there is a surplus of approximately 1,760 spaces. Thus, the loss of curbside parking should not be a serious adverse impact in terms of space shortage. It would, however, cause some inconvenience to very short-term parkers (those parking only a few minutes) and would cause an increase in parking costs for that group of shoppers and business visitors.

Economic Impacts

- Retail Sales — If the ARZ improvements are initiated at the same time as the rehabilitation of Westminster Mall, retail sales increases and reductions in vacant space are anticipated. This is dependent upon private investment in improving the condition and appearance of the buildings in the retail area and on the establishment of an active mall promotion and management office.
- Reinvestment and Redevelopment — Public improvements should help the city attract private investment to the Union Station area. By improving the quality of public space in Kennedy Plaza, incentives would be created for shops to locate in the presently vacant ground floor space of the Biltmore Hotel.
- Property Values — If the expenditure of public funds to implement the ARZ plan is successful in stimulating reinvestment in and rehabilitation of existing downtown buildings, property values will certainly increase. This in turn will contribute to the redevelopment of fringe areas and in an overall reinforcement of the downtown economy.

Urban Design Impacts

Although urban design impacts of auto restriction are the most difficult to measure, they make the greatest contribution to the improvement of the overall quality of life and image of the area. Most urban design effects will be felt in terms of opportunities for new shops, for building reuse, and for greater activity in downtown Providence.

- Image and Attractiveness — Environmental improvements proposed as part of the ARZ plan will significantly enhance the visual image of the Kennedy Plaza area. The removal of the existing parking deck will serve to visually unite the parkers in Kennedy Plaza and create the opportunity for establishing functional connectors between these areas.
- Street Life — If implemented, the activity plan can be expected to increase street life in the downtown. Programmed events and mall promotion should increase the utilization of public spaces such as Westminster Mall and Kennedy Plaza, and result in renewed vitality and the generation of a new image of downtown attractiveness.

Cost Estimates

A preliminary cost estimate based on the improvement plans was prepared by the consultant. These estimates are given separately for each project identified as part of the Providence ARZ proposals.

The estimates for street surface and above ground improvements were based on providing unit construction costs:

New brick pedestrian paving	\$8 sq. ft.
New transit arcades	\$35 sq. ft.
Asphalt transitway paving	\$2 sq. ft.
Pedestrian lighting	\$1,500 each
Trees — 4" caliber with metal grates	\$500 each

After rough quantity takeoffs yielded prices for each of these elements in each project, allowances were added for special elements, such as gateway structures, tents, etc. The total cost for each project was increased by 10 percent for contingencies and 18 percent for architects', engineers', and constructors' fees.

Utility reconstruction and other subgrade work often account for a major cost element in the cost of pedestrianized streets. Since detailed surveys were unavailable for the areas proposed for reconstruction, it is difficult to estimate these costs at this time. For this preliminary estimate, a \$6 subgrade cost per square foot of area was assumed.

The cost estimates are given in terms of 1976 construction costs and do not make allowances for inflation. It should be noted that the estimates are quite general and should only be used as general guidelines. Before firm budgeting can occur, further design, engineering, and costing studies will be required. Table V-1 is the summary of project-by-project cost estimates.

These costs could be somewhat offset in the longer term by leasing outdoor vending areas along the arcades. Such revenue might be used to defray maintenance and management costs. There is also the possibility of selling some of the publicly owned land in street rights-of-way.

The interlocking of routes will result in an overall increase in the total daily number of vehicle miles traveled by transit vehicles if the current level of service is maintained on all routes. Improvements in operating conditions, such as the Washington Street bus lane and the transitway proposed for Dorrance Street, combined with time savings gained by avoiding congestion on Weybosset and Eddy Streets will reduce the effective cost of the route extensions, but the magnitude of this reduction cannot be determined with the available data. The estimated maximum increase in bus miles traveled will be 156 miles per day. At an average bus speed of 5 mph, this would represent 9,360 bus hours per year. At the average RIPTA bus operating cost of \$13.50 per hour, the estimated maximum annual cost would be \$126,360.

**Table V-1. Cost Estimate Summary-
Providence ARZ**

CAPITAL COSTS

● Street Improvement Projects:	
- Dorrance Street Busway	\$ 709,300
- Kennedy Plaza	367,700
- City Hall Plaza	694,200
- Bus Terminals	<u>953,300</u>

TOTAL CAPITAL COSTS	\$2,724,500
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ANNUAL OPERATING COSTS

● Transit:	
- Through Routing of Buses (maximum)	\$ 126,360
- Free-Fare Zone Promotion (\$3,000 1st year)	1,000
- Washington Street Busway	3,200
● Mall Management Office	<u>72,500</u>

TOTAL ANNUAL OPERATING COSTS	\$ 203,060
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The only cost anticipated in the operation of the free-fare zone will be in marketing the service. It is recommended that at least \$3,000 be allocated for a "start-up" cost and at least \$1,000 be allocated annually for continuing promotion. The first-year costs would include the purchase of "Free-Fare Zone" signs to be placed at each downtown bus stop as well as leaflets and newspaper advertising.

VII. IMPLEMENTATION

The strategies, priorities, and additional resources for the implementation of the ARZ program are currently being developed and are not yet finalized. The plans for implementation will be submitted by the City of Providence as part of its application for demonstration funding under the Urban Mass Transportation Administration ARZ program. The following are some of the issues to be considered in devising the implementation plan.

Citizen Participation

The city is working with the downtown businessmen to refine the plan. This should continue even after the project is funded to ensure public support for the project.

Funding

In addition to the use of UMTA demonstration funds, the city should explore local, state, and private sources of funding to supplement the program. Other Federal funds could be applied to the project as well. For example, Section 3 Operating Assistance Funds from UMTA, and Urban System Funds from the Federal Highway Act, might be used.

Priorities

Priorities between the urban design, street improvements, transit improvements, and activity plans must be developed by the City of Providence. Important considerations in these decisions will be the lead times associated with the different

projects. The city will have to decide whether to implement the plan in workable phases and match the design, construction, and implementation to fund availability.

Legal Issues

These do not appear to be serious in Providence, but the necessary city ordinances governing street use will have to be prepared and processed prior to implementation. Also, legal requirements governing such administrative procedures as public hearings, environmental assessments, and notices will be needed to be followed.

Feasibility Studies

Some additional technical studies may be required with regard to specific details of ingress and egress, access to emergency vehicles, and so on. These are not expected to be very extensive.

6. TUCSON

Chapter 6. TUCSON

I. INTRODUCTION

Tucson is one of the fastest growing cities in the United States. It is favored by a good climate with dry air, warm temperatures year round, and a beautiful setting among scenic mountains. These and other attributes have attracted many newcomers since World War II. In fact, the growth of Tucson and the surrounding suburbs has been spectacular and it is expected to continue as can be seen in Table VI-1.

II. THE DOWNTOWN

Figure VI-1 shows the general form of the city and the location of downtown well to the west of center of population. Also shown are the two major regional shopping centers and the Miracle Mile to the north of the downtown where many of Tucson's hotels are located.

Downtown is immediately adjacent to Interstate Route 10. The major east-west street is Broadway which is paired with Congress to form a one-way couplet through downtown. The major north-south streets are Stone and 6th Avenues. Thus, although not located near the center of the population, downtown Tucson has good accessibility by auto, truck, and bus.

Figure VI-2 shows downtown Tucson and its immediate environs. Also shown are some of the recent and potential developments in and adjacent to downtown. The recent projects include the new convention hotel, the new Arizona Bank building, the rehabilitation of the Pioneer building and La Placita, a new commercial complex with offices and shops. Earlier projects include the Community Center and the Government Center. The development of a park along the Santa Cruz River, the Fox Theater block, and the Myerson block are potential projects, as is a new central library. El Presidio and Armory Park are historic districts with potential for downtown housing. The intercity bus and rail terminals are located at the east end of the area.

Table VI-1. Population Trends and Estimates for Tucson and Pima County

<u>Year</u>	<u>Population</u>	
	<u>Tucson</u>	<u>Pima County</u>
1950	45,000	141,000
1960	213,000	265,000
1970	263,000	352,000
1975	300,000*	450,000*
1980	345,000*	514,000*
1990	415,000*	618,000*

Note: All numbers rounded to nearest one thousand.

* Estimates

Source: Tucson Trends

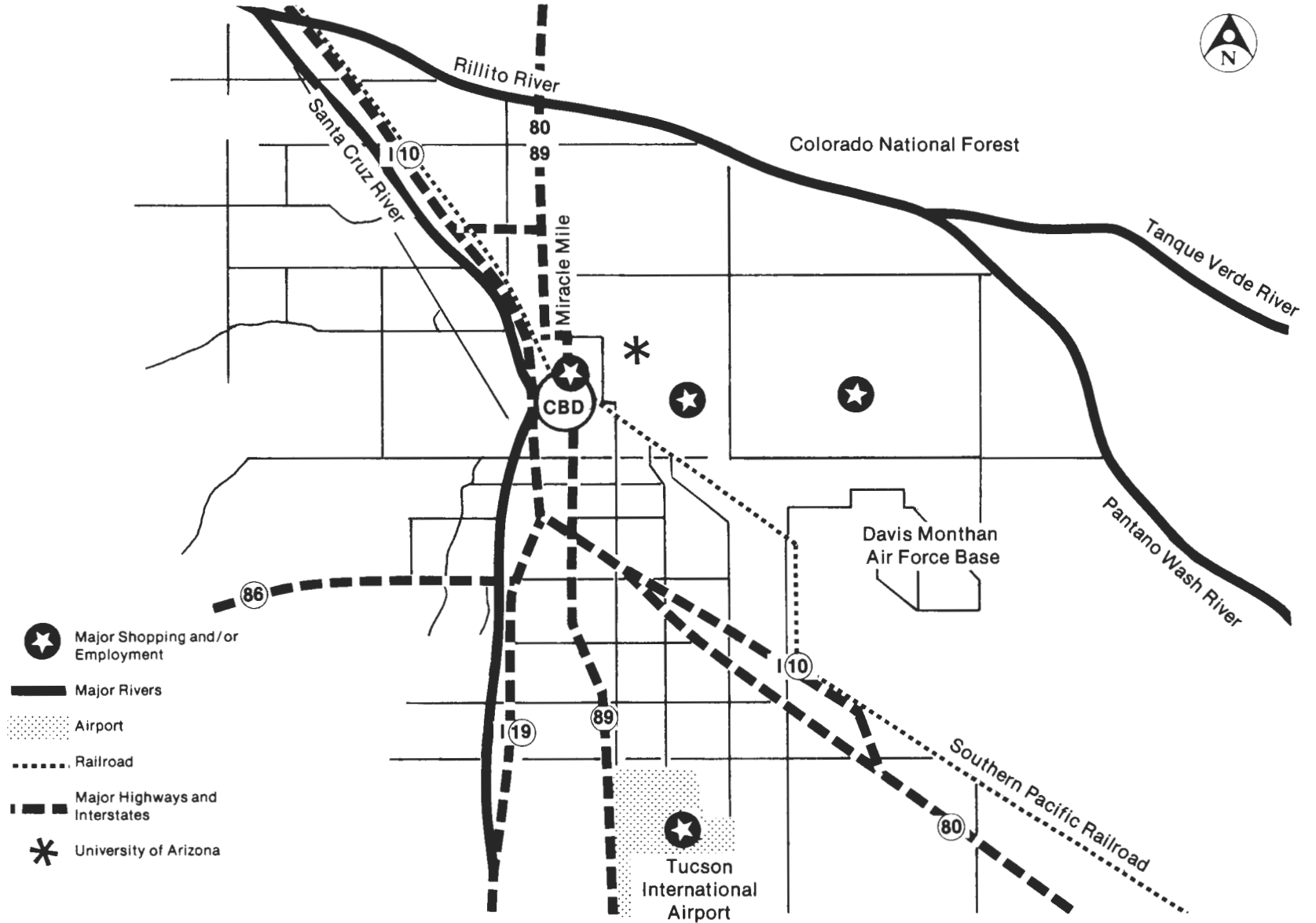


Figure VI-1. The Tucson Area

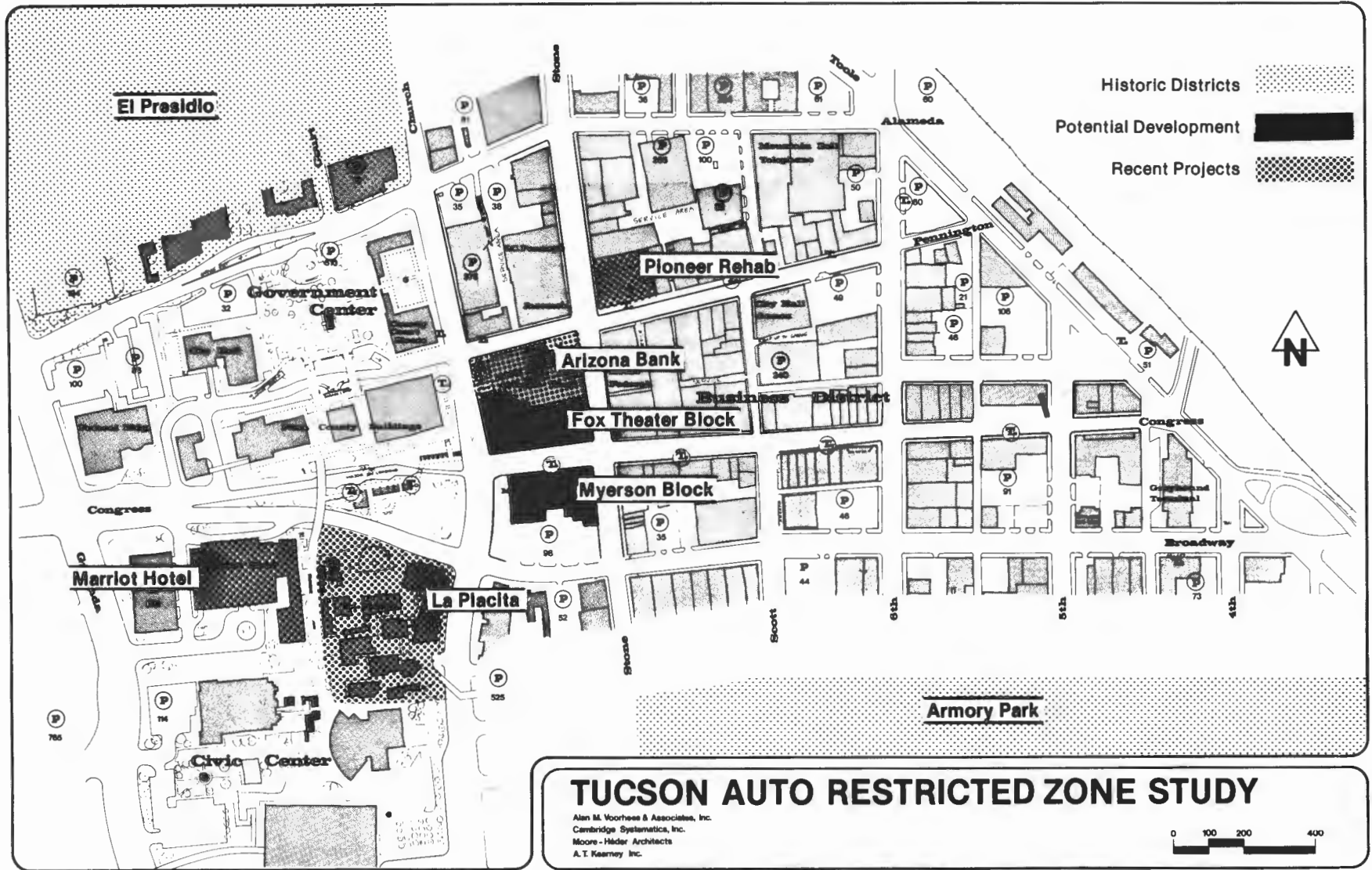


Figure VI-2. Real Estate Development

The rapid growth has been outward, rather than upward, with suburban shopping centers and office buildings following the residential growth. While downtown Tucson remains as the site of government and the largest office center, the shopping activities which remain tend to be specialty shops and stores catering primarily to downtown workers and low-income innercity residents.

Even so, Downtown Tucson has many strengths. The new governmental center, several new office buildings, new hotels, the Convention Center, expanded and improved public transit systems, and a new shopping/entertainment complex—La Placita, signal the general health of the downtown and form a solid base upon which it can grow.

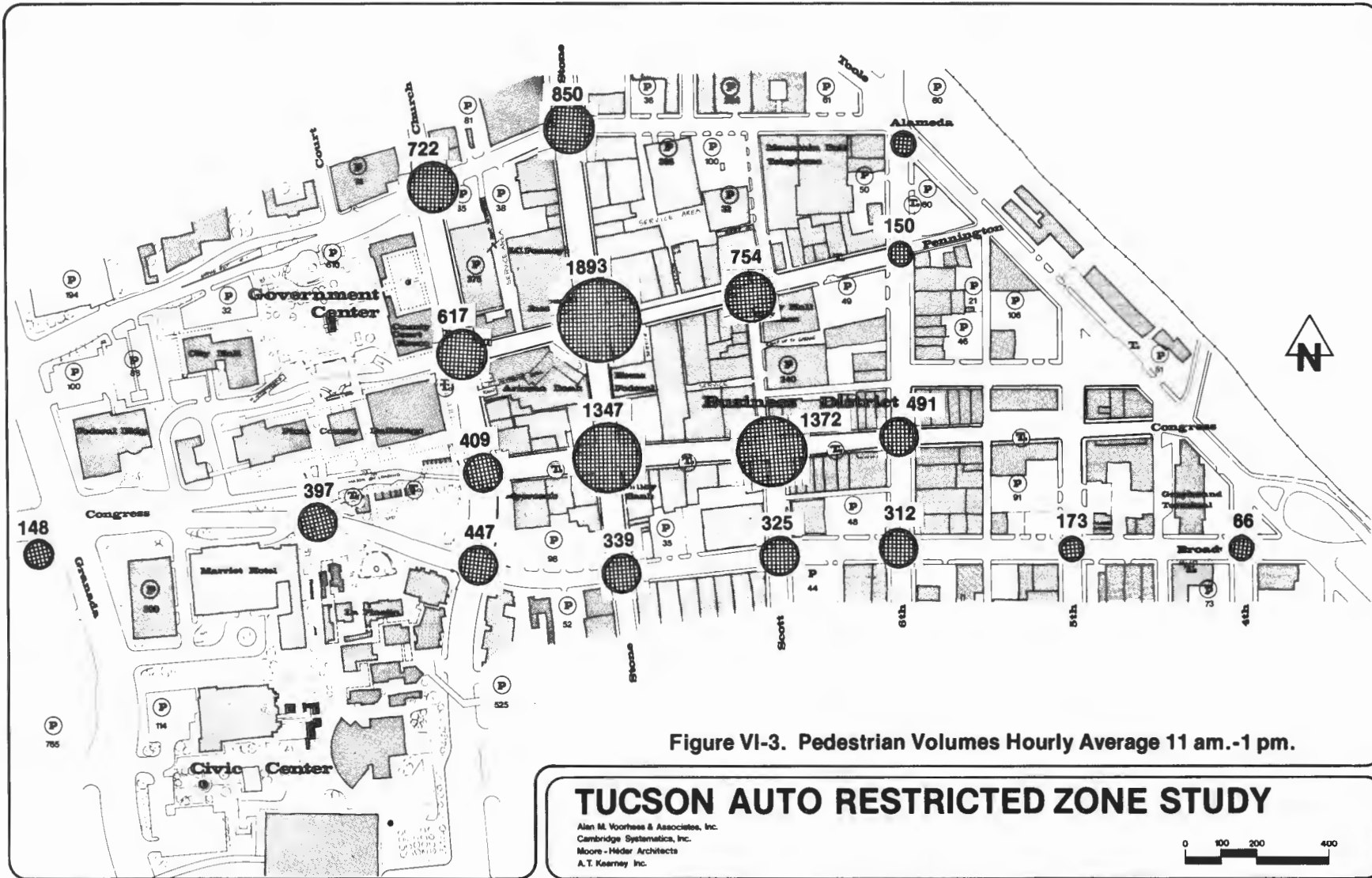
Although relatively small, downtown Tucson consists of several well-defined sub areas. Movement between these areas is deterred by their spatial separation, by wide street areas, and by basic design features which tend to make some of the areas "inward oriented." Thus, the shops along Congress Street seem unrelated to, and distant from, La Placita and the Government Center.

Pedestrian Activity

Pedestrian activity reaches its peak during the midday hours, about 11:00 a.m. to 2:00 p.m. when shoppers are joined by the lunch-time movements of downtown workers. The greatest activity is at three intersections: Stone/Pennington, Stone/Congress, and Congress/Scott. Additionally, El Presidio Park in the Government Center and La Placita are quite active at that time. Figure VI-3 shows the pedestrian volumes at downtown intersections.

Other nodes of pedestrian activity are the bus stops which tend to have peak concentrations in the late afternoon. Activity tends to fall off quickly with the end of the business day, with only very light pedestrian movements in the early evening hours.

Sidewalks in the section outside Government Center and La Placita generally lack shade, the occasional arcades bringing only temporary relief from the hot sun.



Because pedestrian volumes are low, there is no significant sidewalk capacity problem. However, frequent delays due to traffic signals at most intersections increase walking times even for relatively short trips. Bus stops are generally without shade and passengers waiting at the busier stops congest sidewalks and store entrances and windows.

Present Traffic Circulation

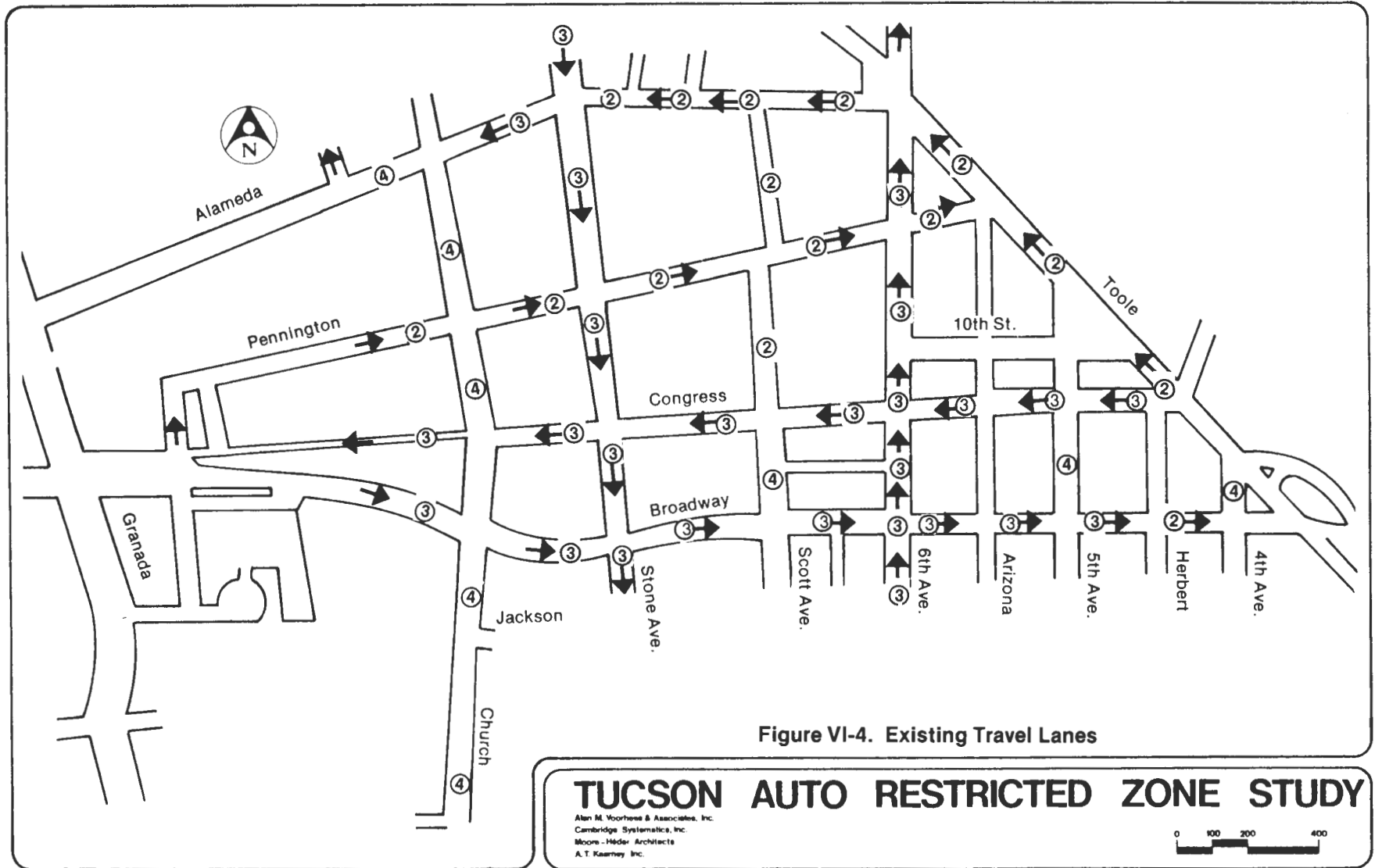
The present circulation plan for the Tucson downtown area is illustrated in Figure VI-4. The major routes through the area in an east-west direction are Congress and Broadway forming a one-way couplet. In the north-south direction, Stone and 6th Avenue form a second major one-way couplet. Stone and 6th Avenue presently serve as U.S. Routes 80 and 89. Pennington is a one-way street eastbound that primarily serves as an access and internal circulation route within the CBD. Alameda is also a one-way street from Toole to Church where it becomes two way. A short section of Toole from Broadway to Congress is also one-way mainly to simplify operational problems in this area.

The existing number of travel lanes on each street segment within the CBD is also shown in Figure VI-4. The major north-south and east-west one-way couplets have three travel lanes in each direction. Nearly all of the intersections are signal controlled with a signal installation presently being designed for the intersection of 5th Avenue and Congress and one being considered at the intersection of 4th, Toole, and Congress. All the signal installations include pedestrian indications and there is a special pedestrian-only signal on Pennington midway between Church and Scott.

Traffic volumes within the CBD over a 24-hour period are VI-shown in Figure 5. The dominant flow in the east-west direction is concentrated on Broadway and Congress. The major north-south flows are distributed on Granada, Scott, 6th Avenue, and 4th Avenue.

Present Parking

The supply of parking facilities within the study area appears adequate to satisfy the total demand for spaces. Parking has been banned on most of the major streets



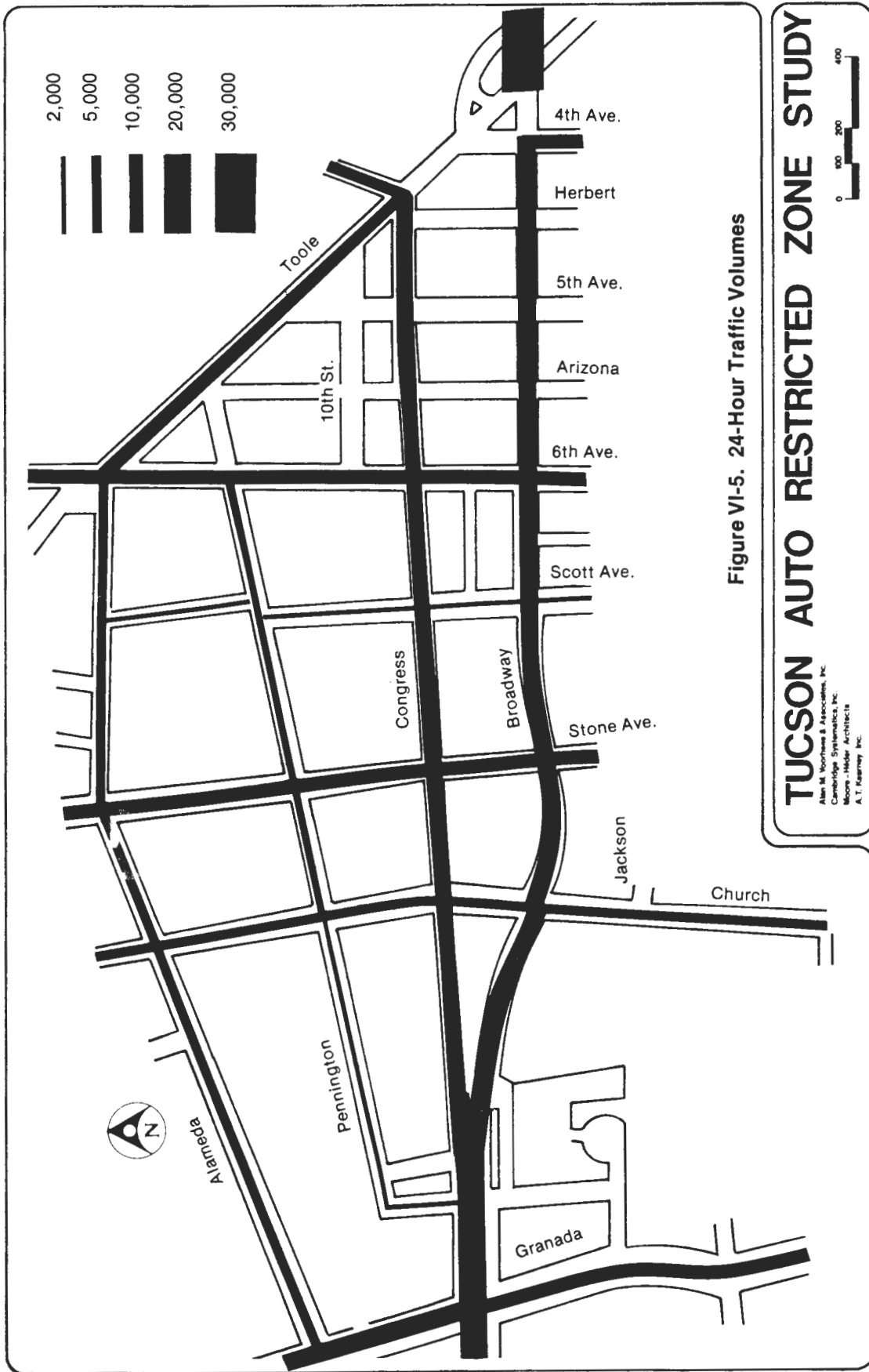


Figure VI-5. 24-Hour Traffic Volumes

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and the remaining metered spaces represent only a small portion of the total parking supply as shown in Table VI-2. Most downtown parking spaces are in the off-street lots and garages shown in Figure VI-6. Of the 3,113 spaces within the cordon line shown, 39 percent are restricted or reserved for employees or customers, or are leased by long-term parkers.

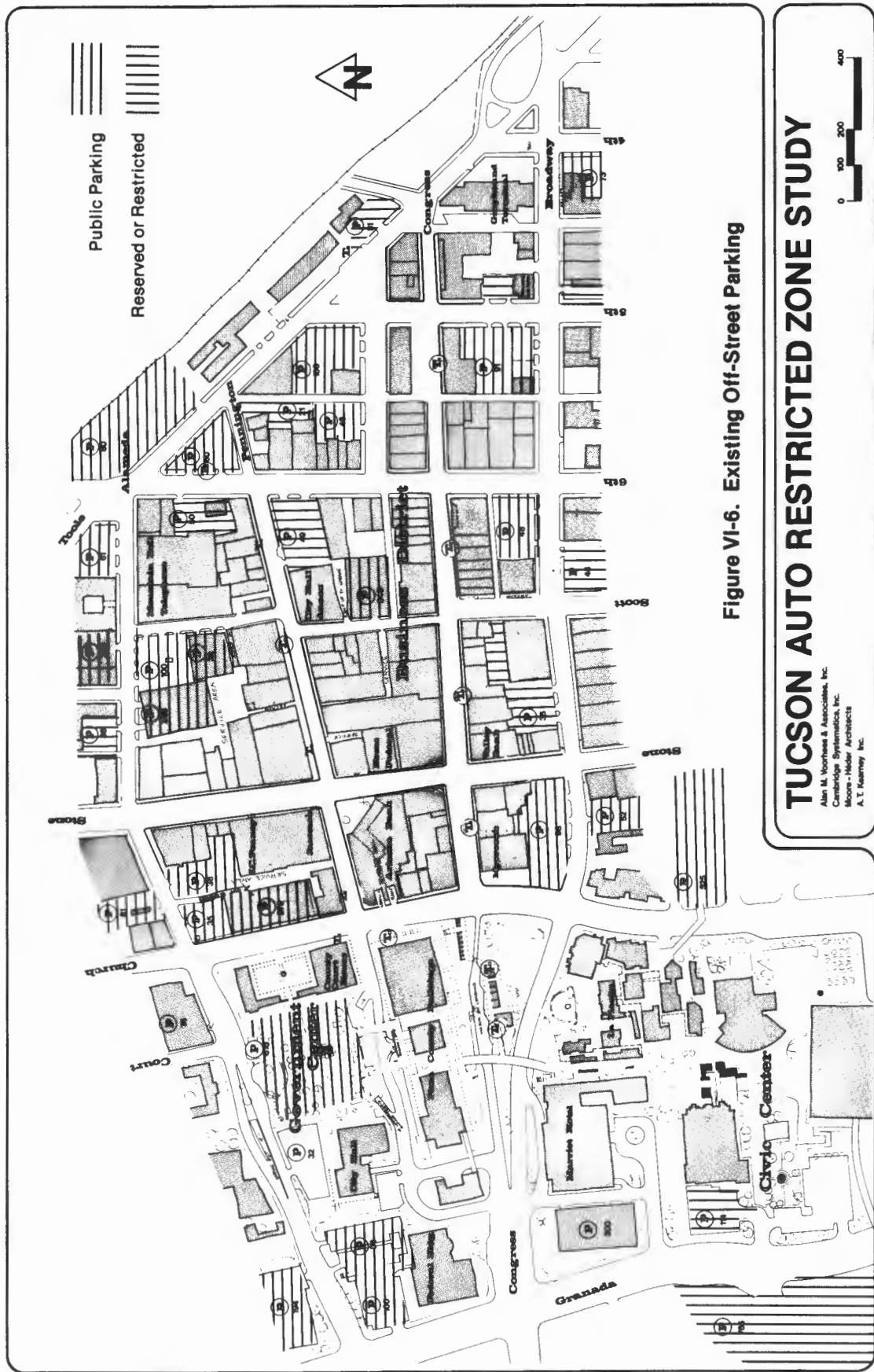
Table VI-2. Parking Supply and Occupancy

<u>Parking Type</u>	<u>Number of Spaces</u>	<u>Percent of Total</u>	<u>Percent Occupancy</u>
Off-Street:			
Public	1,660	53	---
Reserved	1,190	39	---
On-Street			
Metered	<u>260</u>	<u>8</u>	<u>---</u>
Total	3,110	100	59
Total Public Spaces	1,920	61	

On an average day, about 59 percent of the total spaces are occupied during the peak-parking period. A special study of the publicly available spaces was made to determine how many of them were available to short-term parkers (shoppers and visitors). Counts of the occupied spaces were made at 9:20 a.m. to determine the number of all-day parkers. It was assumed that all workers would have arrived at that time while very few shoppers would have arrived by then.

In the nine core blocks bounded by Broadway, 6th Avenue, Alameda and Church, there were 738 off-street spaces potentially available, of which 441 were apparently used by workers. This left 297 off-street spaces available for short-term parkers. Another 136 curb spaces were also available in the same six blocks.

Occupancy counts at 1:30 p.m., when short-term parking would be expected to be quite high, showed that only about 500 off-street spaces and 100 curb spaces were occupied at that time. Occupancy rates in blocks farther from the core of



Although transit patronage has been increasing in recent years, Tucson remains an auto-oriented city. It is estimated that 25 percent of the 7,000 work trips to the CBD, and only about 6 percent of shopping trips are by bus. Street and parking capacity is adequate so that it is not surprising that the automobile is the dominant mode for CBD travel.

Even so, the two transit systems do carry substantial volumes of people and, to the extent that they could be improved, they can become even more important in helping the downtown to grow and to be a more attractive place to work, shop, and transact business. The two major problems which exist are delays to buses in those sections where the routes are common and the lack of shade and space where riders congregate to wait for buses or transfer to other routes. Even relatively small numbers of waiting passengers on the narrow sidewalks tend to obstruct the passage of other pedestrians and to congest store entryways.

Goods Movement and Deliveries

The retail core of downtown Tucson contains approximately 160 commercial establishments which require over 300 truck deliveries during a normal business day. About 45 percent of these occur before 11:00 a.m.; 30 percent between 11:00 a.m. and 2:00 p.m. and 25 percent between 2:00 and 5:00 p.m. Nearly all refuse pickups are made after 5:00 pm. and as a result very few such pickups are reflected in the totals discussed here.

There are two street segments on which delivery volumes are relatively heavy. These are Pennington from Stone to Scott and Congress Street from Church Avenue to Scott Avenue. Together, these two streets account for 37 percent of all downtown truck deliveries. The remaining 63 percent is evenly distributed over the system with the result that only one other street segment has more than two deliveries per hour and half the street segments have less than one delivery per hour. Figure VI-8 shows the average deliveries per hour and peak accumulations of delivery vehicles for each street segment. Note that peak accumulations in the busier street segments get as high as 10.

downtown were much lower. In the ring of blocks immediately surrounding the nine core blocks mentioned above, there were 2,770 spaces of which only 1,210 were occupied at 9:20 a.m. while only 1,300 were occupied at 1:30 p.m., leaving 1,470 empty spaces available for use. Curb spaces in the ring were also lightly used. Of the 370 curb spaces, only 170 were occupied at 9:20 a.m. and only 200 were occupied at 1:30 p.m.

From this, it can be concluded that there is a substantial surplus of short-term parking conveniently located in downtown.

Transit Service

Downtown Tucson is served by two transit systems: the city-owned Sun Tran System and the privately-owned Old Pueblo Transit Company (OPTC). Sun Tran serves the north and east sections of the metropolitan area while OPTC serves the northwest and south sections. Average weekday ridership is 24,000 and 6,000, respectively.

Sun Tran has 14 routes which penetrate the CBD. All of these use Alameda Street and Broadway for east-west movement after entering downtown and all use a "lay-over" loop around the Community Center Complex. Bus frequency on the common routing is relatively high, ranging up to 45 buses per hour in peak periods and to 30 buses per hour in the off-peak.

Old Pueblo Transit operates seven routes which serve the Central Business District. The routes of both systems are shown in Figure VI-7. Together, it is estimated that the two systems carry about 3,600 passengers per day to the CBD. Of these, about 60 percent are work travelers. About 9 percent of downtown destined transit passengers are shoppers. The remainder come to downtown for personal business, school, social/recreation, and other purposes.

Fares on Sun Tran are 25 cents, while OPTC has a zone fare ranging from 25 to 50 cents. Transfers between systems cost 10 cents. Sun Tran offers a variety of reduced fare programs with the result that less than half the system's riders pay a full cash fare.

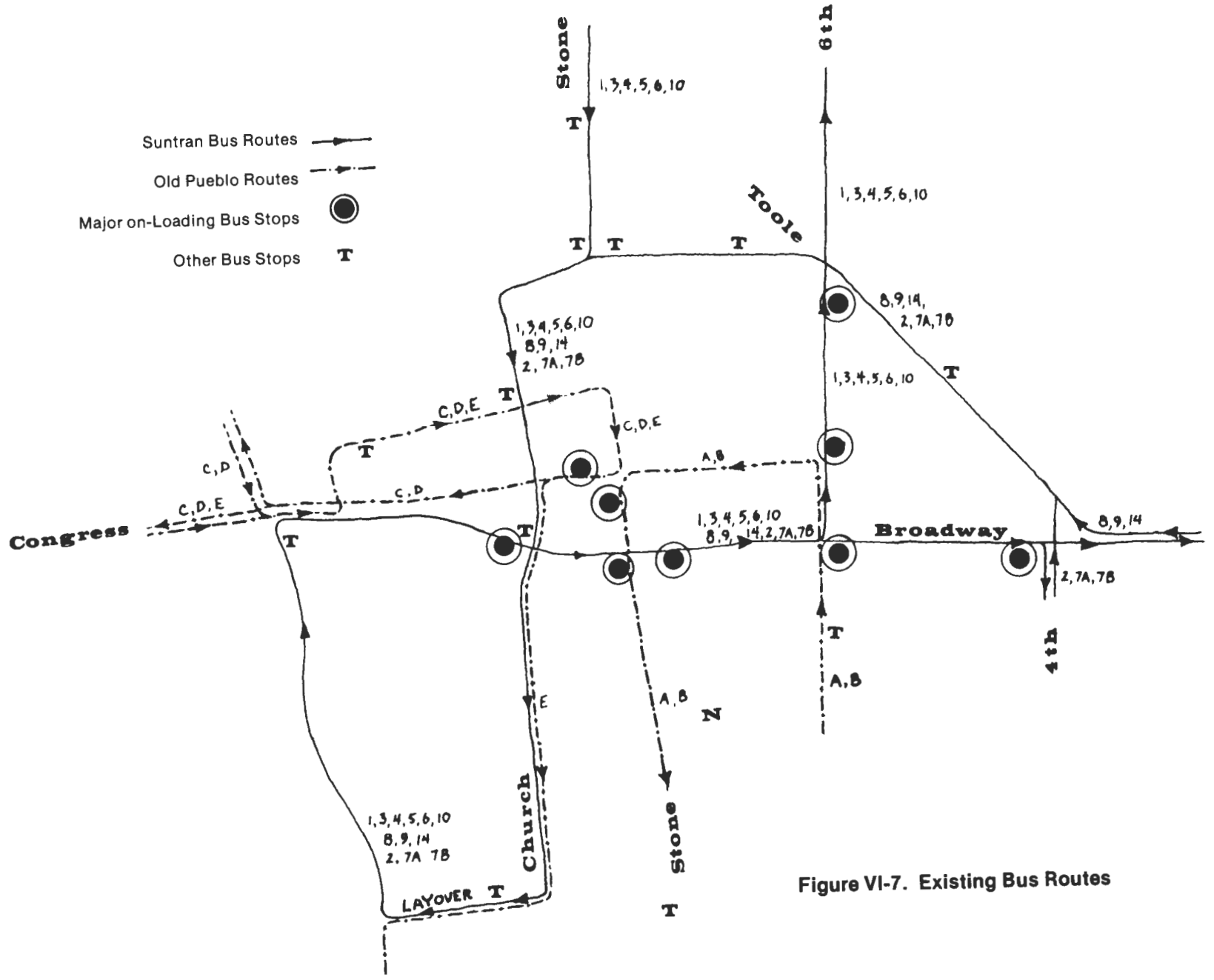
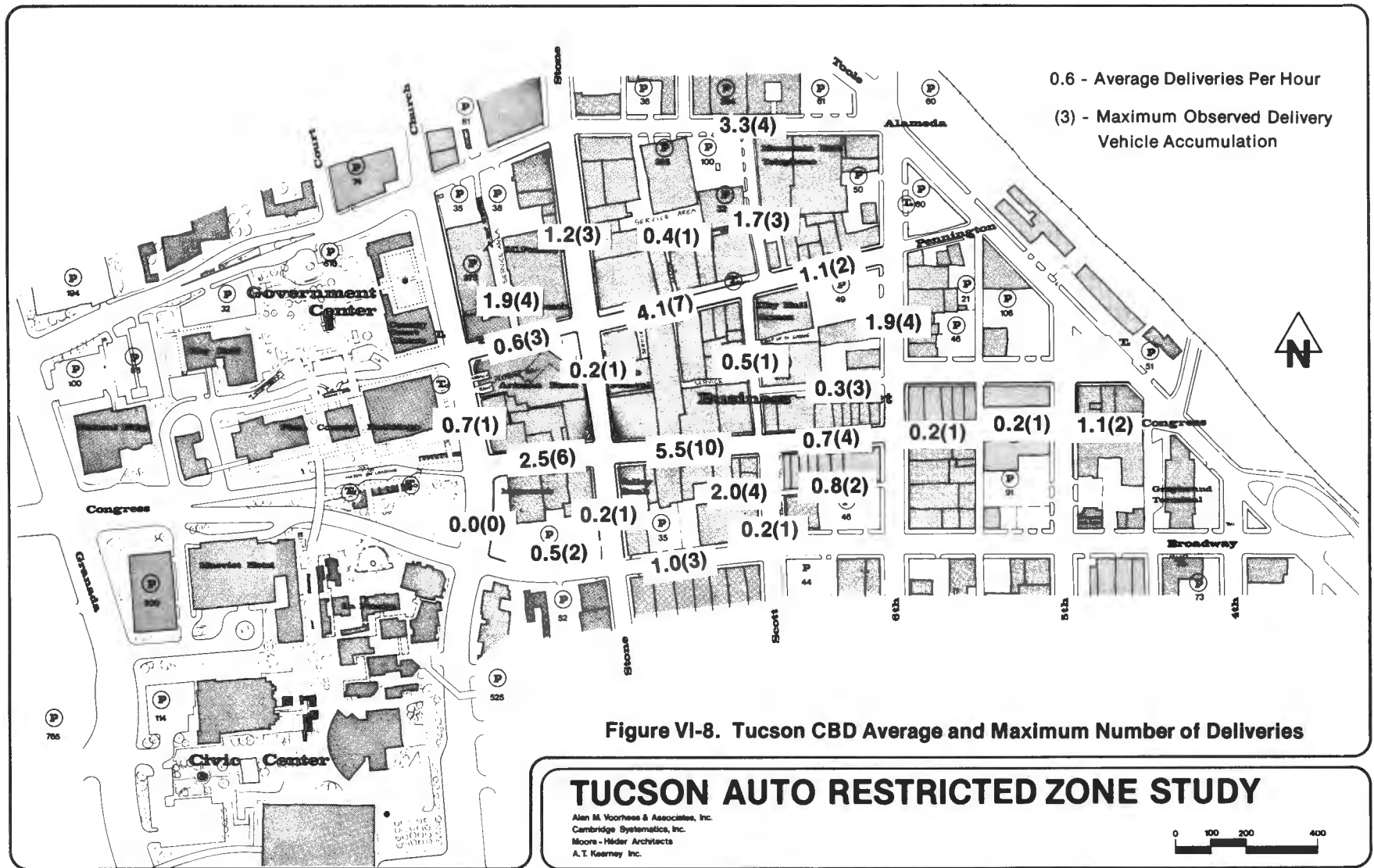


Figure VI-7. Existing Bus Routes



Source: Goods Movement Activity Sampling Study--May-June, 1976

All on-street deliveries are restricted to designated loading zones. Some truck fleet operators feel that the number of designated zones is not sufficient. The higher peak accumulations in the busiest street segments tend to support this observation. To avoid the need to circle or cruise while waiting for an opening, some operators are scheduling early morning deliveries, but daytime deliveries remain high throughout midday and afternoon partly because of insufficient street loading space.

III. CURRENT PLANNING STATUS

Downtown revitalization has made considerable progress. The Government Center and La Placita provide two areas with significant pedestrian facilities and good design. New office buildings and the refurbishment of others north of Congress Street have upgraded both the appearance and quality of that part of downtown. The revitalization of downtown has not yet reached Congress Street and Broadway to any appreciable extent; nor have the different parts of downtown been integrated and connected into a single unit. El Presidio Park in the Government Center is essentially isolated from Congress Street. La Placita is separated from all of downtown by the wide expanse of the west end of the Congress/Broadway couplet and by Church Street.

The improvements which have been made to date are forerunners to other projects and programs which will add to downtown as the cultural, governmental, and business center of Tucson. The projects which are planned or actively underway include a new public library, the revitalization of historic residential neighborhoods adjoining downtown, re-use of the railroad terminal at the west edge of downtown, and new residential development in and near downtown.

The possibilities taken together with recent past investments will decidedly change the attractiveness, the functions and the level of activities of the district.

An ARZ demonstration would mesh with the plans for the future and could accelerate the rate of implementation.

IV. ARZ OBJECTIVES

In light of the existing conditions in Tucson and longer-range objectives of the City to achieve a strong and attractive downtown, a number of objectives were developed for a demonstration of an auto restricted zone in the Central Business District.

1. Provide more direct and usable pedestrian connections between the three district precincts which make up the Central Business District.
2. Provide a comfortable environment for pedestrians with emphasis on shade, rest areas, space at bus stops, and reduce conflicts with motor vehicles. Although Tucson enjoys a good climate, walking or standing while exposed directly to the sun can be distinctly uncomfortable, particularly during the summer. Sidewalks in some areas are narrow and congested at peak activity and along Congress Street.
3. Provide more spacious and more comfortable transit stop and waiting areas.
4. Reduce delays to transit vehicles on downtown streets.
5. Provide adequate street space for delivery and service vehicles.
6. Provide convenient routes for vehicle traffic away from the major concentrations of pedestrians, but with access to downtown parking.
7. Provide additional activities in downtown.

Obviously not all of these can be fully achieved, but the proposed plan could achieve a reasonable balance with significant gains in the first three objectives.

V. TUCSON AUTO RESTRICTED ZONE PLAN

Figure VI-9 shows the total plan which consists of five basic elements: street improvements, transit re-routing, pedestrian facility improvements, a truck loading plan, and an activity plan. These individual elements are discussed in the following sections. More technical detail is provided both on existing conditions and on the proposals in the technical appendix.

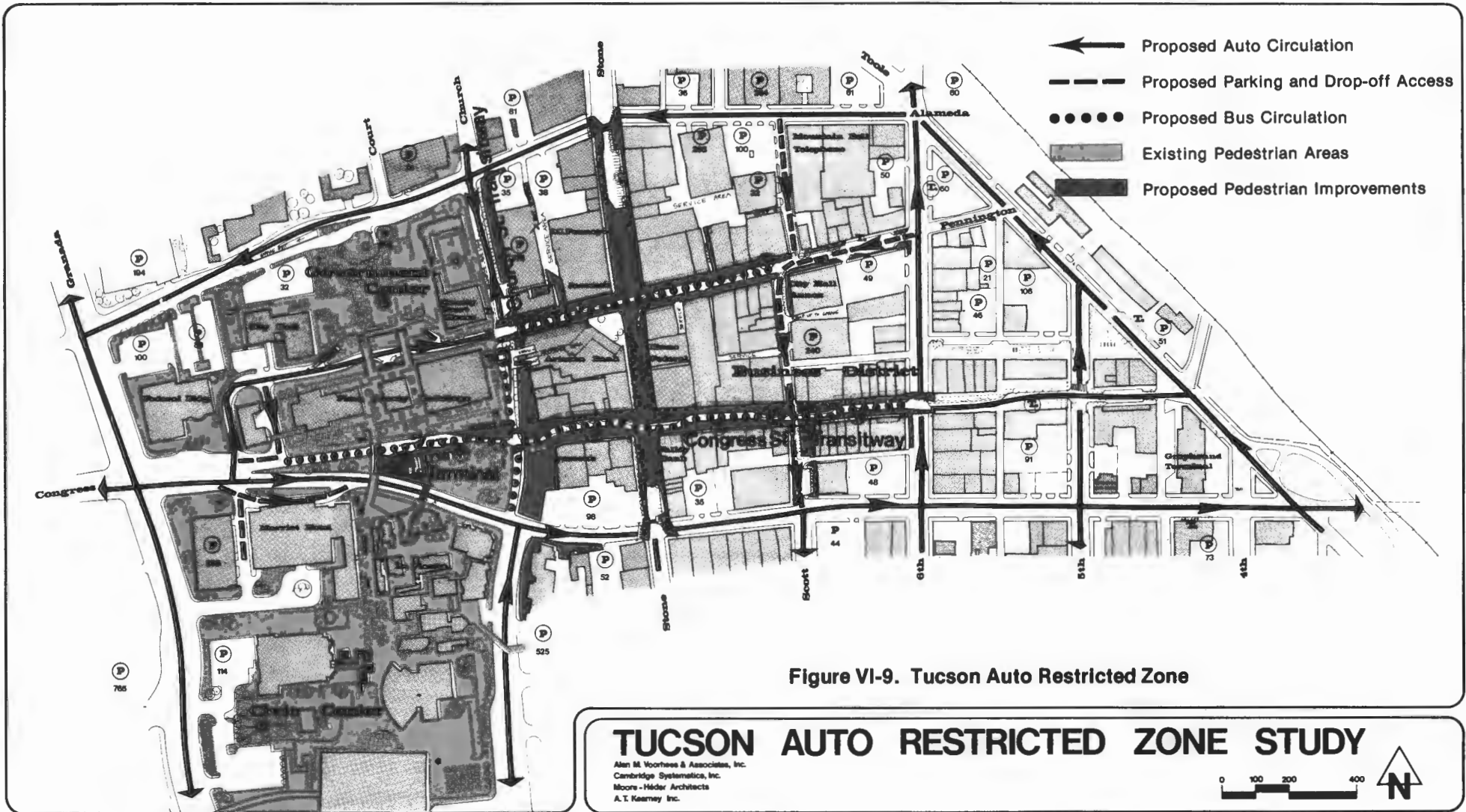


Figure VI-9. Tucson Auto Restricted Zone

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Pedestrian System

The proposed pedestrian improvements shown in Figure VI-10 build on the existing pedestrian systems in the Government Center and La Placita and are intended to improve pedestrian movements between those two strong centers and other parts of downtown. Additionally, the improvements are coordinated with transit system improvements such as the transit stops and shelters.

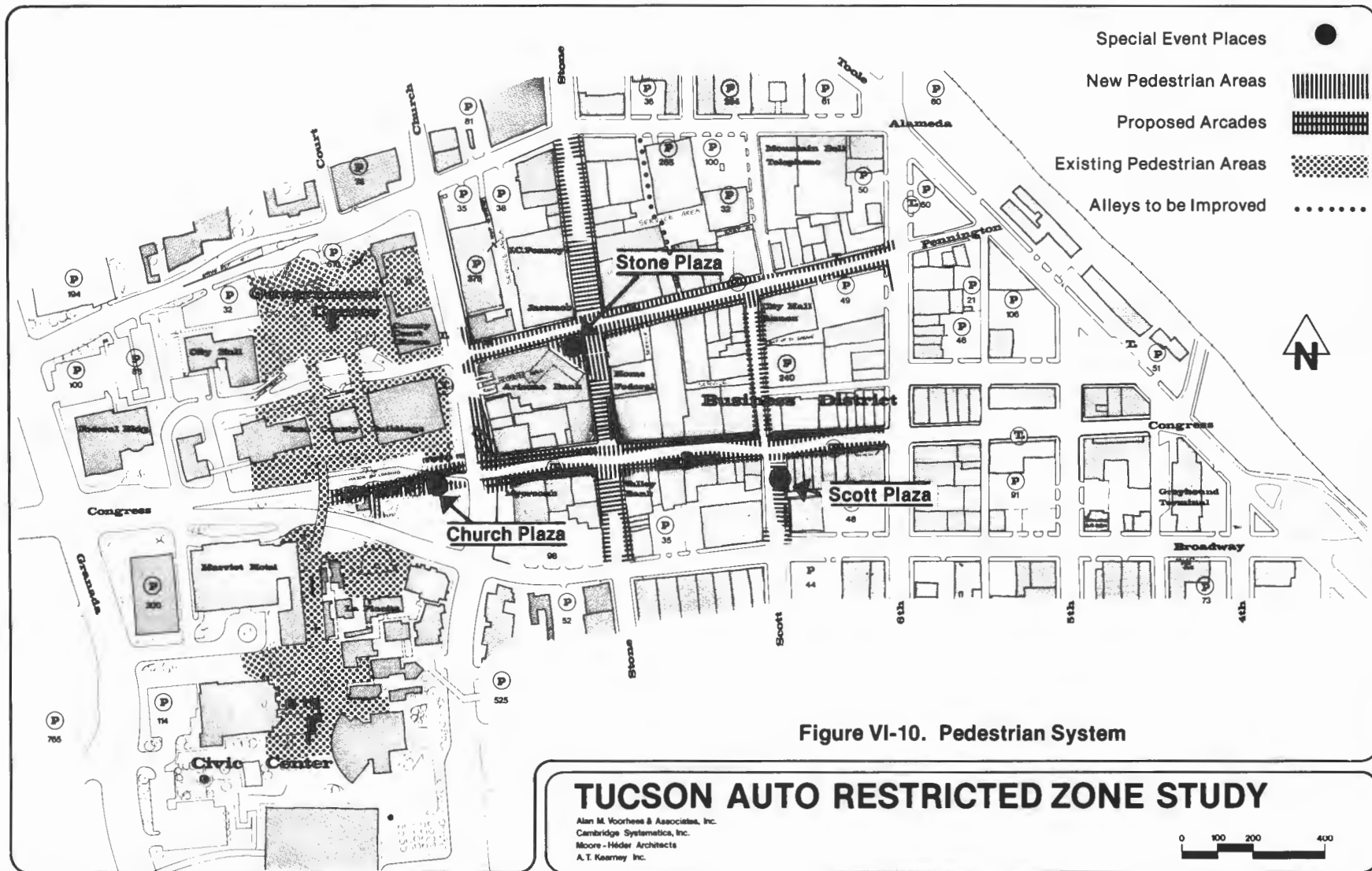
Pedestrian facility improvements would include widening sidewalks, creating pedestrian spaces as well as walkways. Arcades would provide shade and shelter. (Figure VI-11) A key feature of the pedestrian plan is the creation of an active area at the Church/Congress intersection. This is an important feature in the design to give a common hub for the different parts of downtown with a pedestrian scale common point which joins all of the parts. A sketch of how this might be designed is shown in Figure VI-12.

Additionally, the pedestrian improvements along Congress will be adequate to provide space for new activities to bolster the retail shops there. Similar space can be created along the other pedestrian/transit streets as shown in Figure VI-13, a sketch showing how Stone Avenue might appear following the improvements there.

The street improvement plan for the Tucson auto restricted zone, shown in Figure VI-14, illustrates the inter-related pedestrian, transit, and traffic projects proposed to create the needed connections between the activity areas of downtown.

Street System

Figure VI-15 shows the primary travel corridors which would be in effect following implementation of the plan. Broadway would continue to be one-way eastbound. Westbound traffic which now uses Congress Street would use Toole and Alameda. Congress, Pennington, and Church would serve the transit routes. Major pedestrian improvements would be made along Congress, Pennington, Stone, and Scott. Sixth and Granada Avenues would serve the north-south travel. Autos would be





Existing

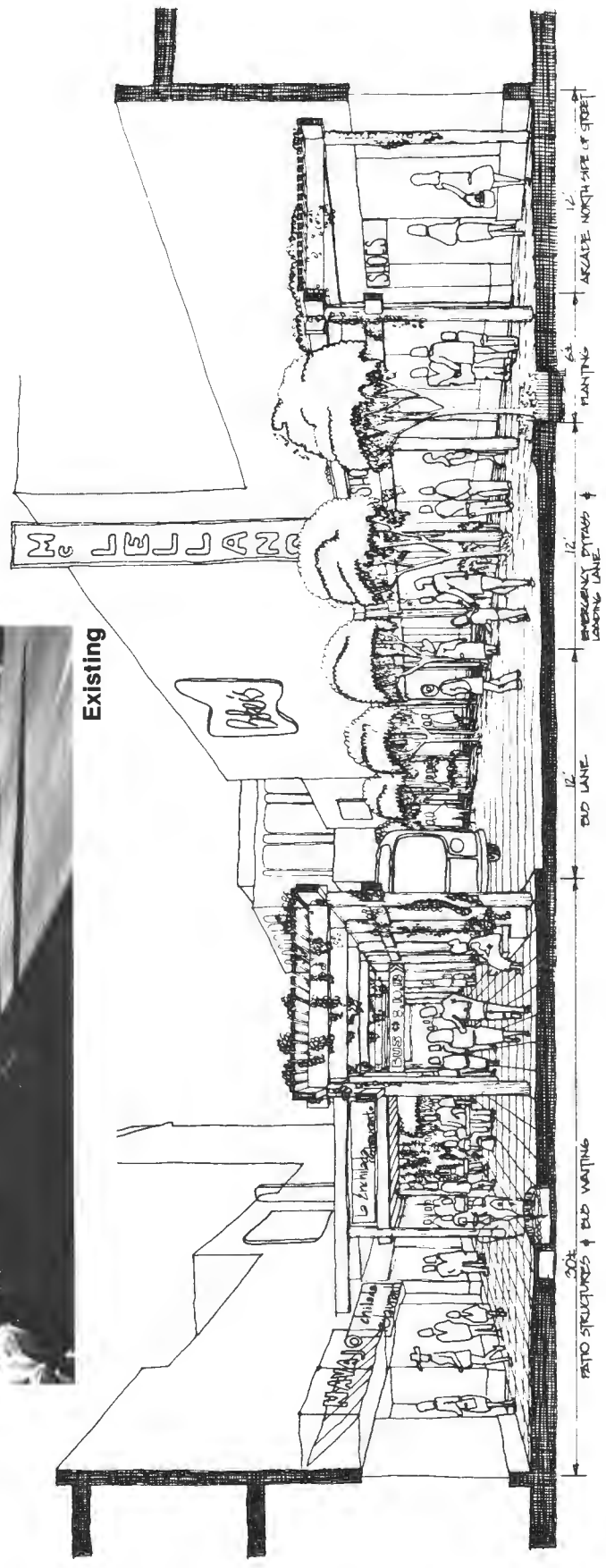


Figure VI-11. Proposed Congress Street Pedestrian-Busway



Existing

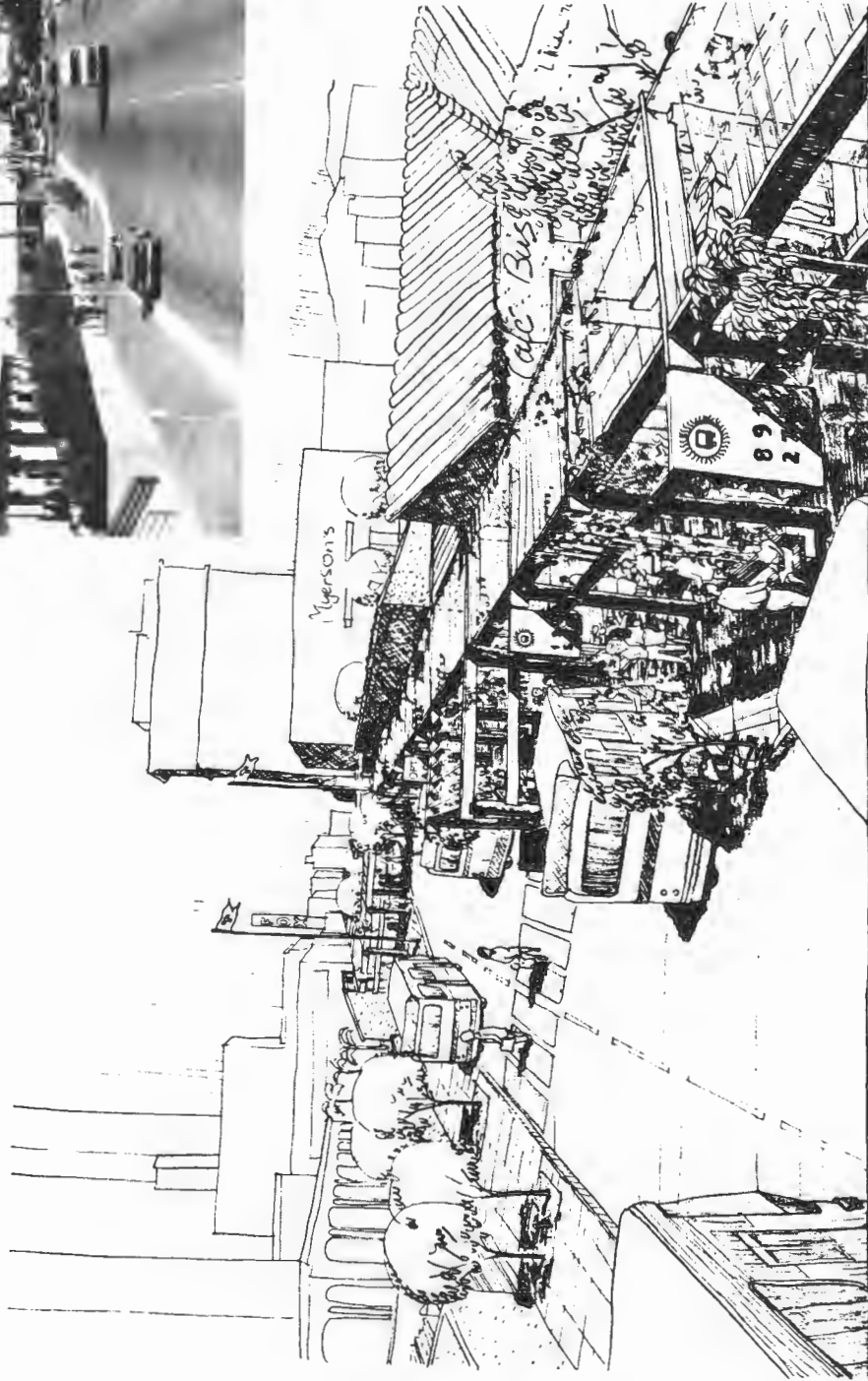


Figure VI-12. Proposed Congress Bus Terminal

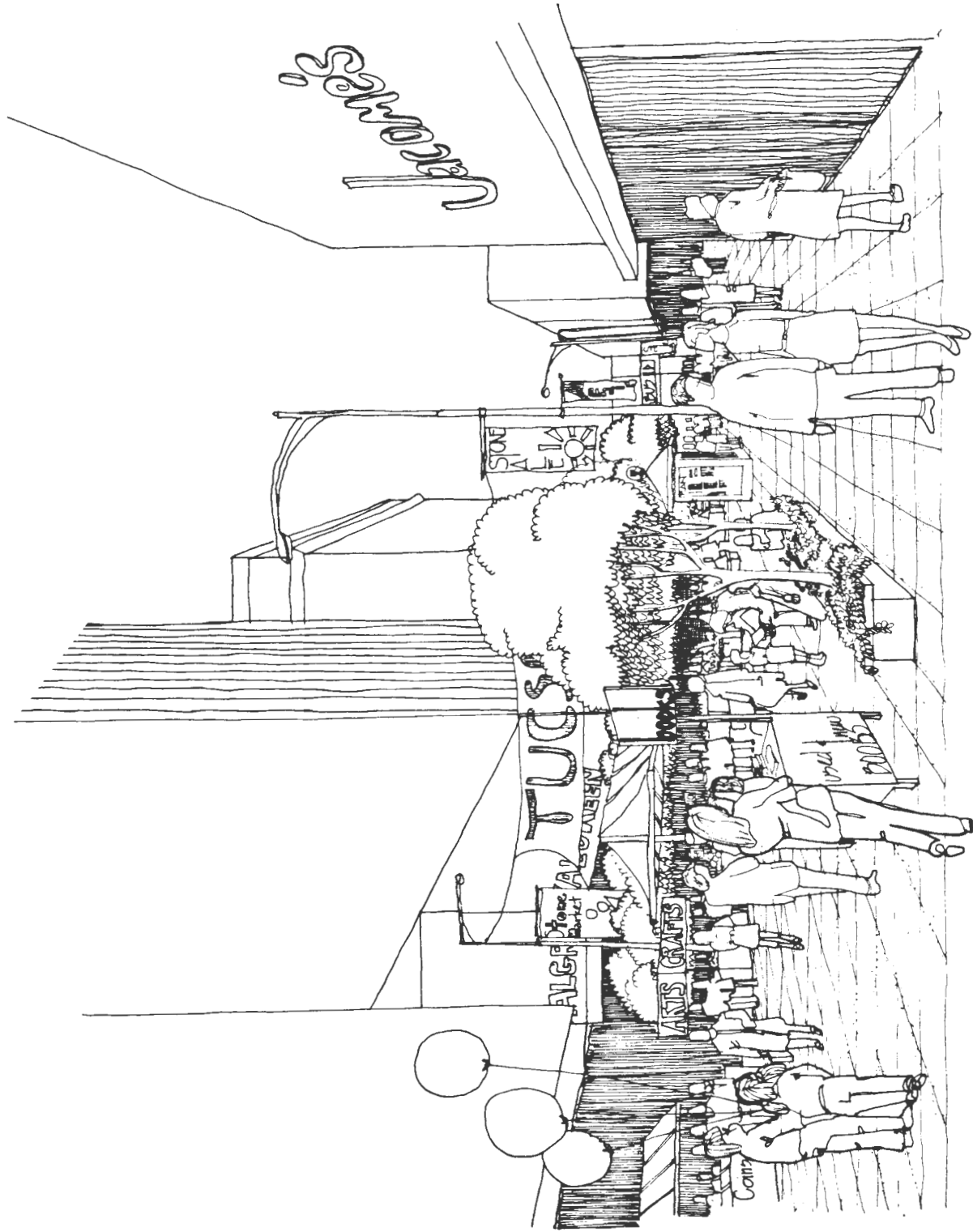


Figure VI-13. Stone Market

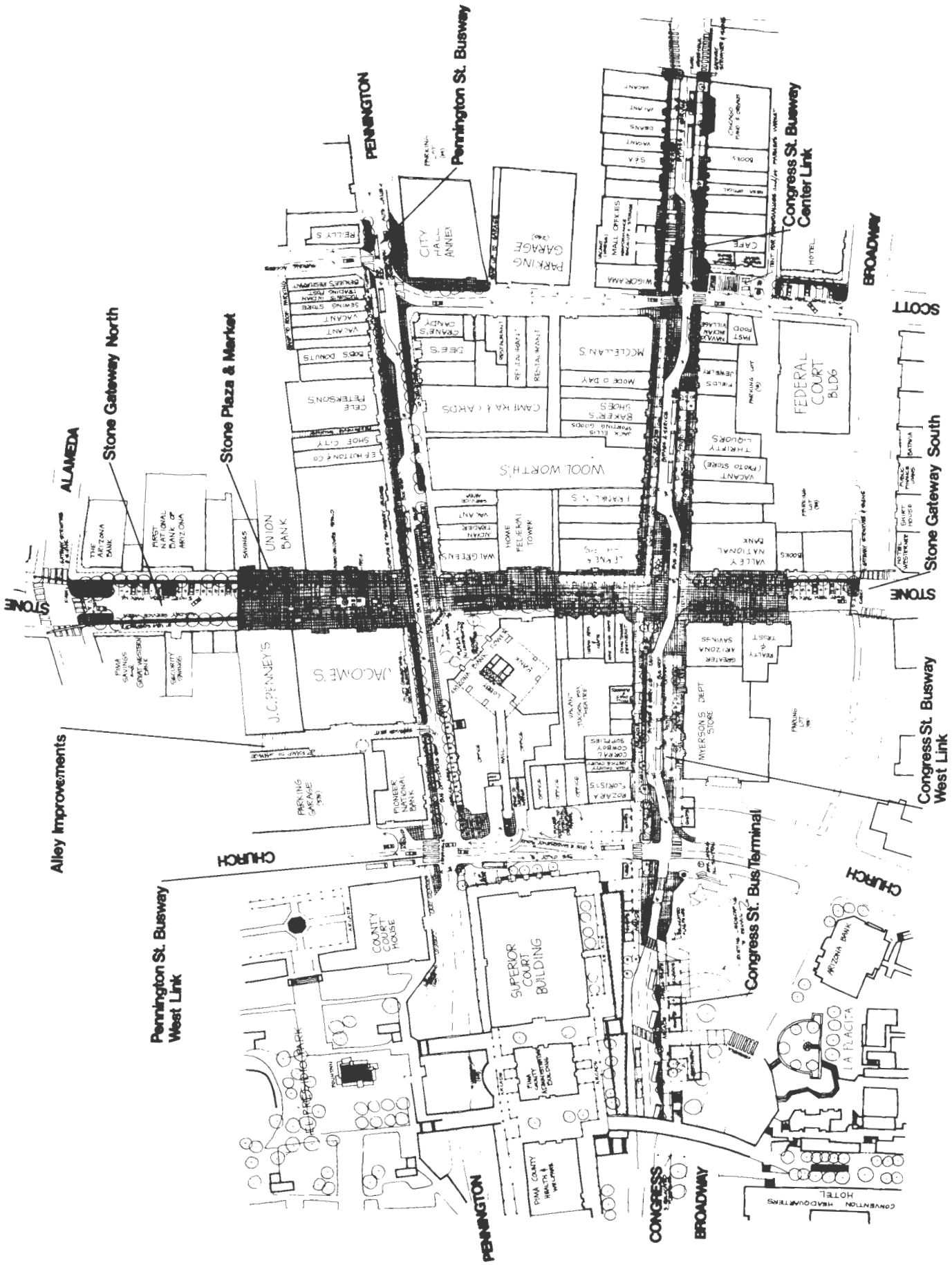


Figure VI-14. Street Improvement Plan

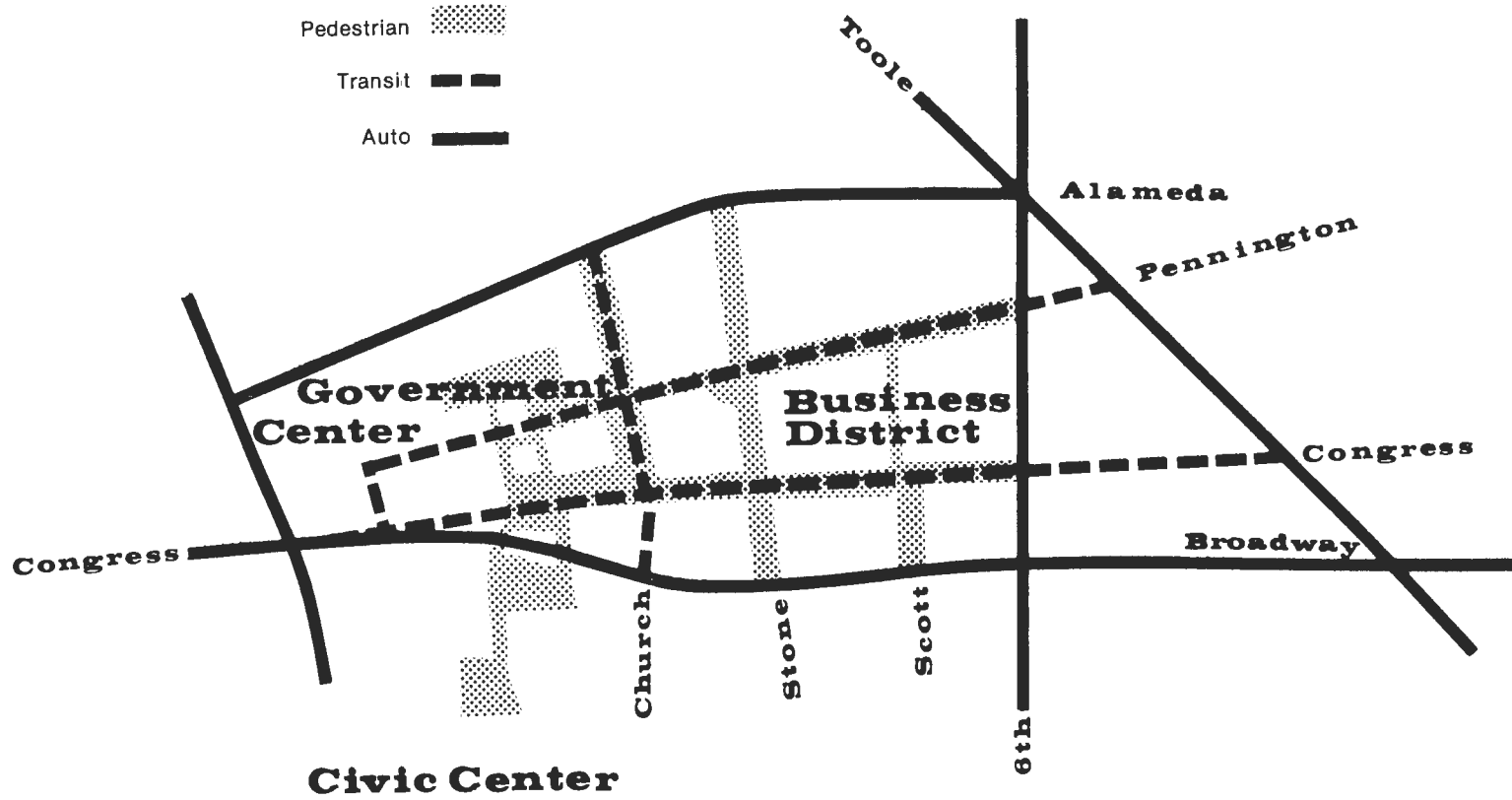


Figure VI-15. Primary Travel Corridors

allowed to use certain sections of the streets shown as transit and/or pedestrian corridors to assure access to all off-street parking, but through travel would be prohibited except on the primary auto corridors. Figure VI-16 shows the circulation pattern which provides auto access to parking.

A major feature of the street improvements would be the conversion of the section of Congress Street west of Church Avenue to a bus terminal and pedestrian area with a stairway connection to the pedestrian overpass which connects the Government Center and La Placita.

Another feature would be the elimination of curb parking, particularly along Congress Street, but also on Stone, Pennington and Scott. Loading and unloading zones would be provided in greater quantity than is now the case.

Transit Improvements

Certain re-routings of bus routes would be made to complement the pedestrian and street patterns. The revised routings are shown in Figure VI-17. Under the revised route structure, the intersection of Church and Congress would continue to be an important transfer hub. A major terminal to accommodate the transferees and originating outbound passengers would be provided there. Other shelters, benches and amenities would be provided at stops, particularly along Congress where there would be significant numbers of boarding passengers.

In addition to the changes in routes, the transit improvements will include a loop shuttle within the downtown area. A small open vehicle will be used for this purpose and will operate in a variety of modes with the basic route being a loop as shown in Figure VI-17.

Variations on the basic loop will include extension of the loop to the Convention Center when there are events, special charter runs between hotels and motels along Miracle Mile and the downtown convention center, and other similar special runs to serve activities and events in downtown, (see the Activity Plan).

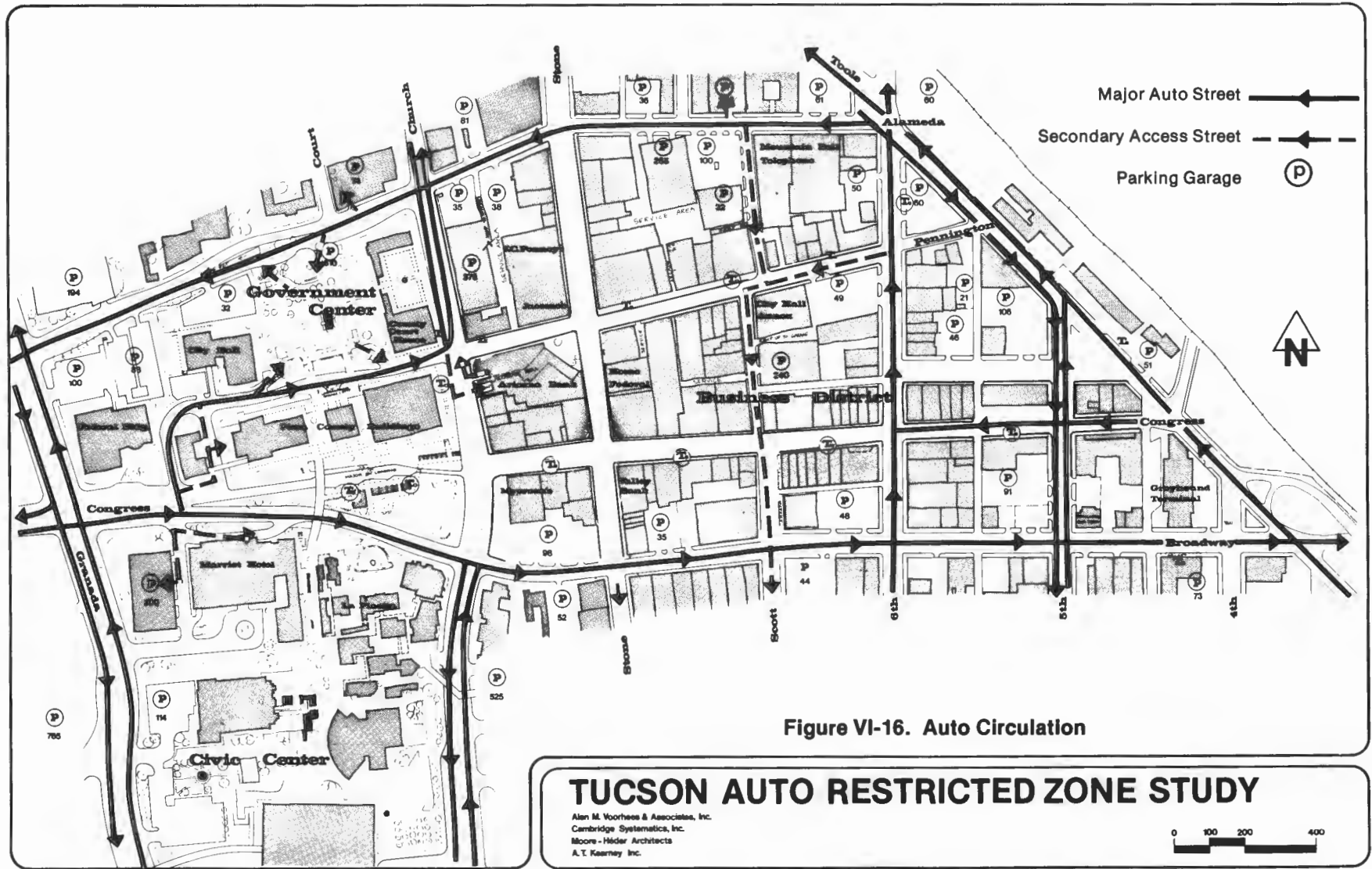
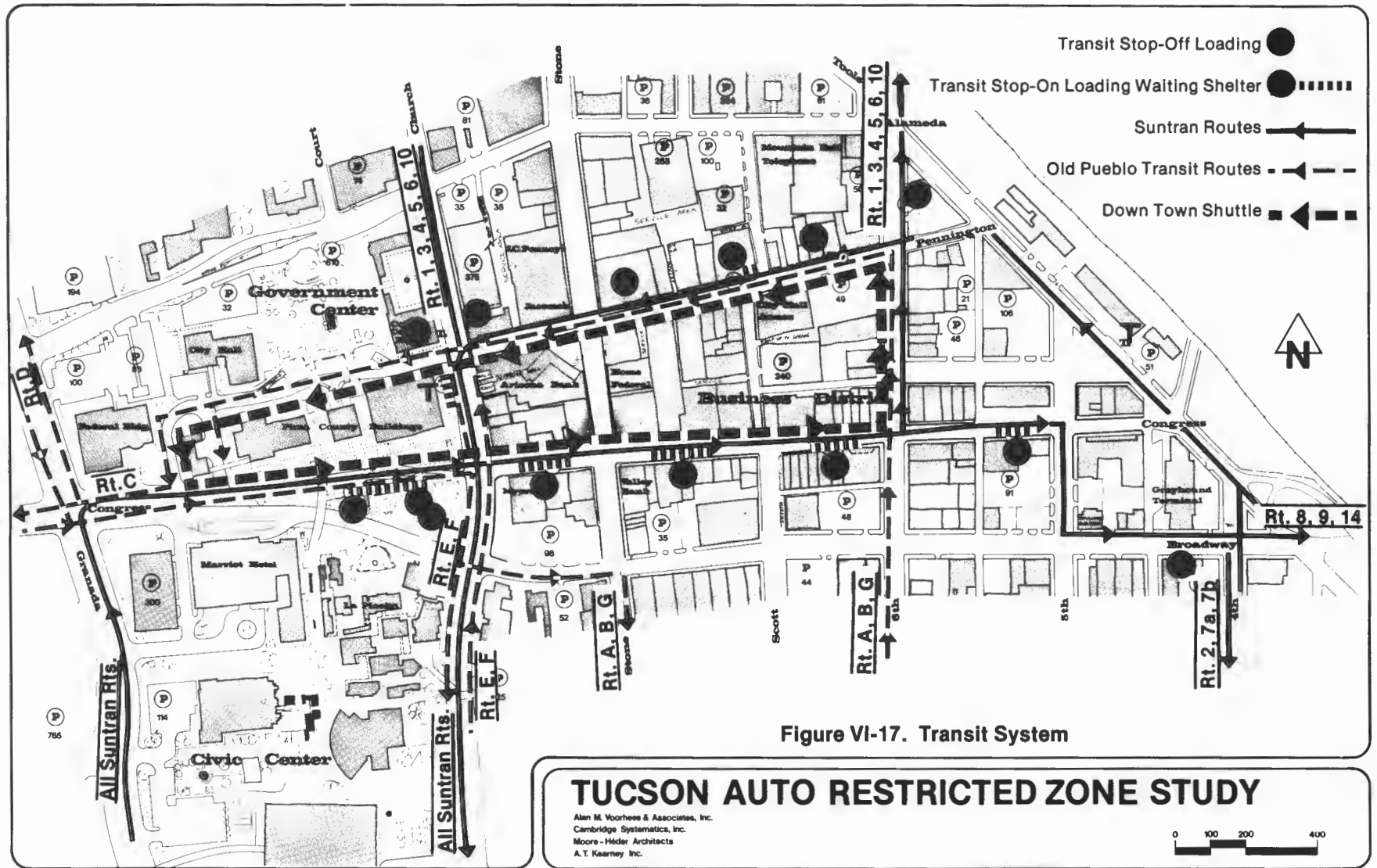
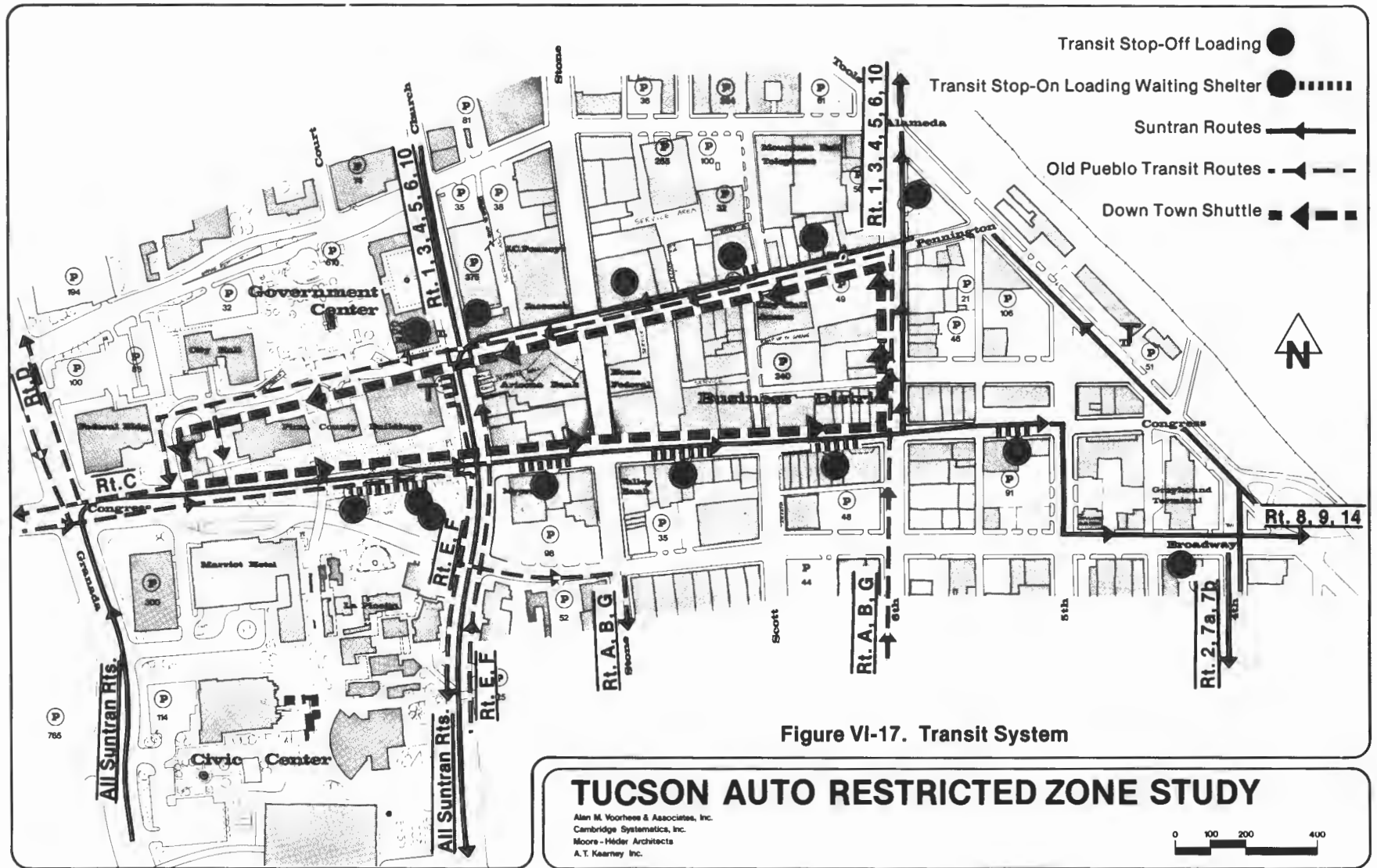


Figure VI-16. Auto Circulation

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Although analysis does not show a significant demand for this service, it is included in the plan as part of the total package to provide a new image and an increased activity for downtown.

Goods and Service Plan

The plan includes expanded and improved provision for truck loading and unloading. Figure VI-18 shows the Service Circulation Plan together with the service areas. The pedestrian and bus streets would also be open to goods and service vehicles except during the hours between 11:00 a.m. and 2:00 p.m.

The areas provided would be adequate to accommodate the increased demand in other hours. It is possible that some vehicles could not be excluded during the midday hours, particularly armored cars serving the financial institutions. However, there should be very few exceptions and the absence of vehicles from the streets, except buses, should make the downtown a much more attractive place for pedestrians without undue restriction of other users.

Downtown Activity Plans

As was stated earlier, street life in downtown Tucson is moderate at weekday lunch hours and almost non-existent at other times. Both the general attraction and the economic potential of downtown are highly dependent on creating more continuous life on the streets, and in the pedestrian areas of the new developments.

In the course of the ARZ study, two related approaches to the problem of increasing street activity were identified:

1. Design all new circulation patterns and pedestrian improvements so that they connect already existing activity generators such as office buildings, parking areas, and bus stops.
2. Generate an "activity plan" consisting of an extended period of programmed business promotions and public cultural and entertainment events using existing and proposed auto-free spaces.

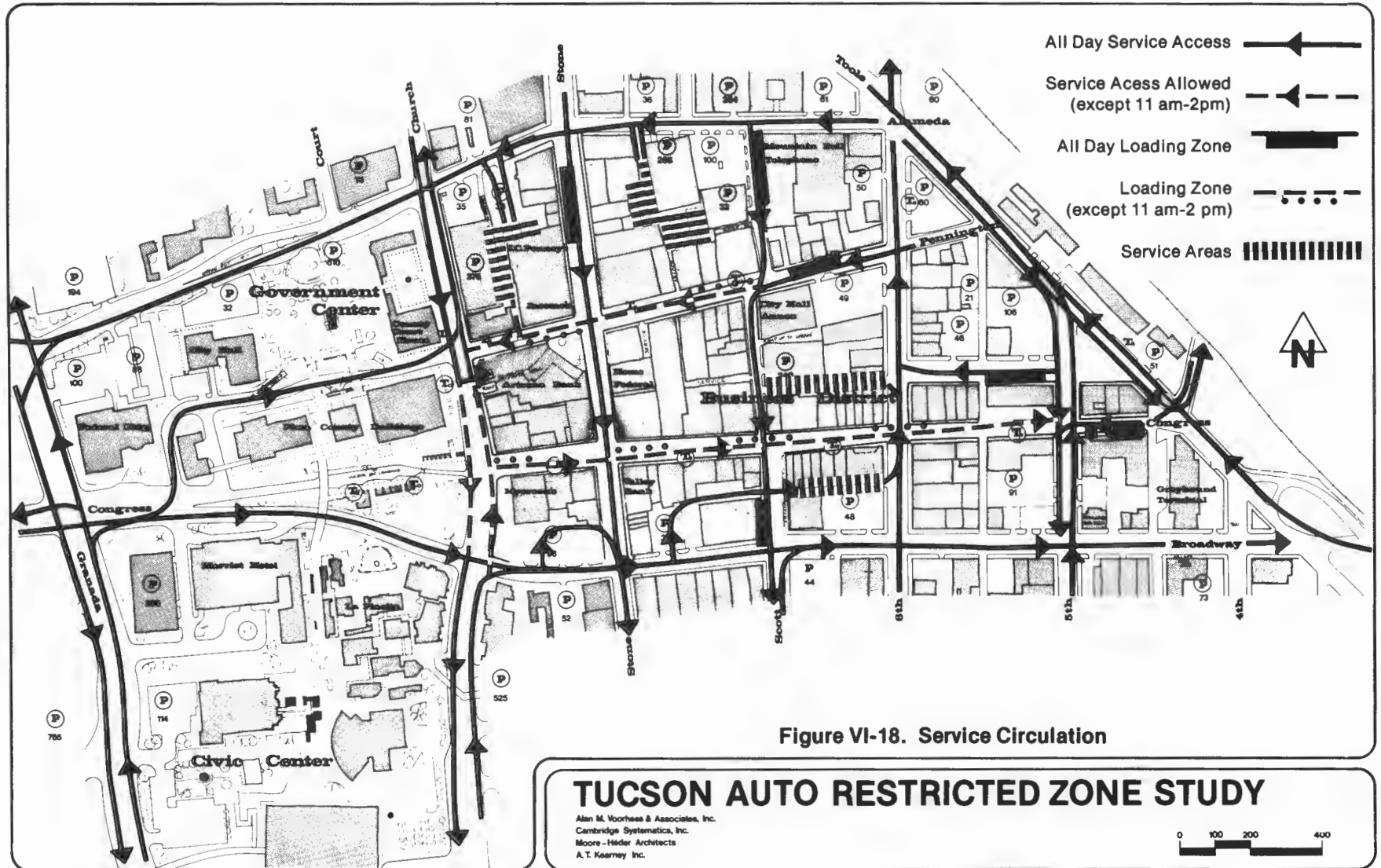


Figure VI-18. Service Circulation

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The circulation and improvement plans set the proper "stage" for an exciting, lively downtown. The programmed activities described below will be needed to provide the "play." The low level of activity that now exists in the La Placita/Civic Center area makes it clear that even such ambitious physical renewal cannot induce new vitality without a complementary activity program. Just as the physical renewal required an initial subsidy, the programmed activities may also require public and business support for a period of time until the renewed attraction of downtown can make it economically self-sufficient.

The Activity Plan shown in Figure VI-19 illustrates the types of events which may be generated on the downtown streets. The events noted either already exist, or have been suggested by the Trade Bureau. They will range from traditional yearly occasions such as the Rodeo Fiesta or Copper Days, to weekly occurrences, such as street vendors, musicians, and displays.

Management of programmed activities has been carried out by the City and the Trade Bureau for several years. In discussions with the consultants, members of the Trade Bureau have indicated their commitment to carry on and intensify these efforts. Their current staff of two full-time employees could form at least the nucleus of the staff for managing events in the ARZ. Their present budget of \$12,000/year for promotions would need to be supplemented, possibly from demonstration funds. The City and the Trade Bureau will submit a management plan of programmed activities along with their proposal for implementing the ARZ.

The University of Arizona represents a major untapped potential for downtown Tucson. Located less than two miles away, it has a student employee population of about 30,000. At the present time, most of these people rarely come downtown. Yet in many other cities, nearby universities have provided the major part of downtown street life.

University use of downtown facilities and streets could induce more frequent trips to downtown. The not-often used Civic Center buildings could lease space for University functions. The Art Museum could have more combined programs. The auto free streets in the ARZ could accommodate exhibitions and festivities related to the University.

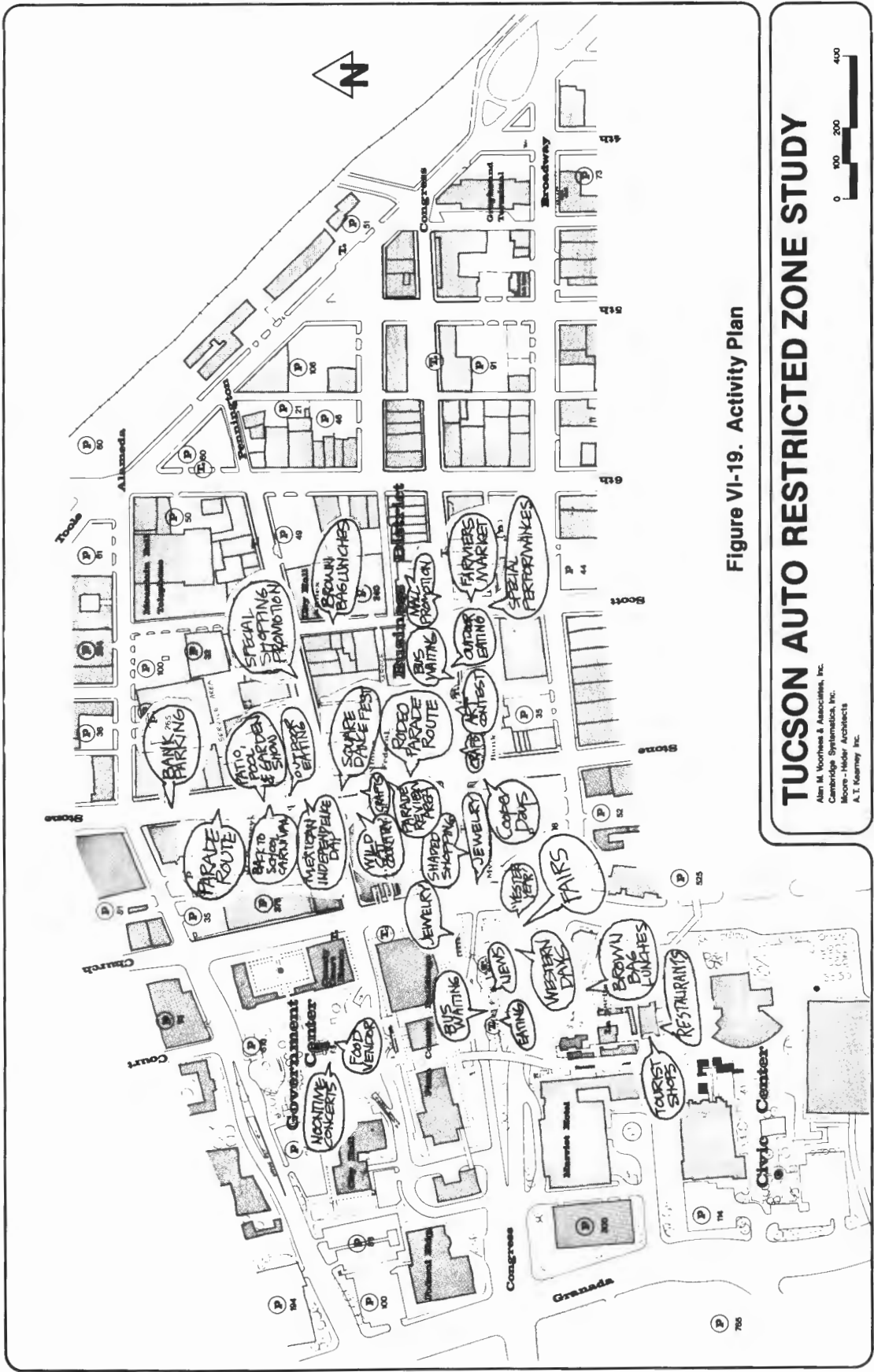


Figure VI-19. Activity Plan

TUCSON AUTO RESTRICTED ZONE STUDY

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The downtown can also be a laboratory for many university teaching programs. Architecture students have done some very good work planning downtown street improvements. Social studies courses working with the various governments and courts in downtown, theater, and visual arts courses using the street environment, are some additional opportunities.

One way to develop a cooperative program would be to appoint a committee of University, business, and City representatives to formulate specific proposals which could then be considered by the two administrations for incorporation in downtown plans.

In the long run, downtown activities must be put on a firmer base, derived from a balance of government and private employment, specialty and service shopping, regular university programs, tourists and conventioners, regular entertainment and cultural events, and downtown housing. The induced activities described above should be part of a strategy to create these regular activities and, after a two- to five-year period, reduce or eliminate the need for subsidy. Once downtown activities achieve a "critical mass" of attraction, they will support each other and maintain their own momentum.

VI. PROJECTED COSTS AND IMPACTS

Cost Estimates

A preliminary cost estimate based on the improvement plans was prepared by the consultants. These estimates are given separately for each project identified as part of the Tucson ARZ proposals.

The estimates for street surface and aboveground improvements were based on prevailing unit construction costs:

Arcade and patio structures:	\$10 sq. ft.
New public shop structures:	\$25 sq. ft.
New paving with some planting, lighting, and street furniture:	\$ 7 sq. ft.
New Roadbed:	\$ 1 sq. ft.

After rough quantity takeoffs yielded prices for each of these elements in each project, allowances were added for special elements, such as gateway structures, tents, etc. The total cost for each project was increased by 10 percent for contingencies, and 18 percent for architects', engineers' and contractors' fees.

The city architect's office had prepared plans for a new storm sewer system for an area roughly equivalent to the ARZ in 1972 and costed this at \$340,000. It was stated that costs for other utilities would be picked up by the utility companies directly, and thus should not be included here. Allowing for increase in costs for the storm sewer system since 1972, for other miscellaneous utility work and engineering, and contractor's fees, the consultants allowed \$460,000 or \$2 per square foot for utilities.

In addition, \$4/sq. ft. was allowed for demolition, foundation work, and unexpected subgrade conditions. Thus, a total of \$6/sq. ft. was added for "below ground" costs to the aboveground cost estimate for each project.

The costs estimates are given in terms of 1976 construction costs and do not make allowances for inflation. It should be noted that the estimates are quite general and should only be used as general guidelines. Before firm budgeting can occur, further design, engineering, and costing studies will be required. Table 3 is the summary of project by project cost estimates.

These costs could be somewhat offset in the longer term by leasing outdoor vending areas along the arcades. Such revenue might be used to defray maintenance and management costs. There is also the possibility of selling some of the publicly owned land in street rights-of-way.

Table VI-3. Cost Estimate Summary-Tucson ARZ

CAPITAL COSTS

●	Street Improvement Projects:		
-	Phase I		
--	Congress St. Bus Terminal	\$	433,000
--	Congress St. Busway — West Link		546,000
-	Phase II		
--	Stone Plaza Market		769,000
--	Pennington St. Busway — West Link		136,000
--	Pennington St. Busway		238,000
--	Stone Avenue, North Gateway		144,000
-	Phase III		
--	Congress St. Busway — Center Link		1,296,000
--	Stone Avenue, South Gateway		227,000
●	Transit:		
-	Tram Shuttle Vehicle		49,000

OPERATING COSTS

●	OPTC Operating Costs		2,500
●	Tram Shuttle Operating Costs		100,000

TOTAL COSTS

●	Street Improvements		3,789,000
●	Transit Costs		2,500
●	Tram Shuttle Costs		<u>149,000</u>
			\$3,940,500

Traffic Rerouting Impact

With the preliminary circulation as described previously, the major changes in travel routes are attributable to the closure of Stone and Congress. New routing patterns between major points of access into the CBD and major destination points within the ARZ were estimated for both the inbound and outbound directions.

- North Approach — For traffic approaching the ARZ from the north on Stone (650VPH), 5 percent are through westbound and are served equally well by the new circulation scheme; 13 percent are through eastbound and can be served reasonably well by Toole and 5th to Broadway. An estimated 20 percent (130VPH) is through southbound traffic for which the proposed plan is most disruptive. This traffic is assumed to distribute itself on Main, Stone, and 5th, depending upon the location of their final destination to the south. For traffic destined to the ARZ, the proposed plan is most disruptive to destinations in the area immediately south of Congress. Other areas are not significantly affected.

For the reverse flow, outbound on 6th, the proposed plan causes no increased circuitry for through trips or for those trips originating from south of Congress and east of Scott. For trips originating in the area west of Scott and north of Congress, the proposed plan is most disruptive. The advantages of one area for inbound direction tend to be offset by the advantages offered by other areas in the outbound direction.

- East Approach — For traffic approaching the ARZ from the east on Broadway (1450VPH during AMV peak, 900VPH other peak periods), 7 percent are through southbound and are served equally well by the new circulation scheme, and 15 percent are through northbound from Toole and served in the same manner by the new circulation plan. An estimated 10 percent (145VPH maximum) are through westbound trips. The portion of these whose ultimate destination is to the north, are expected to use Toole while the remainder will be diverted to Alameda around the ARZ and back onto Congress at Granada. For trips destined inside the ARZ, the change in circuitry occasioned by the new circulation plan is most pronounced for the area immediately south of Congress.

For the reverse flow, outbound on Broadway, the proposed plan would have no effect on through traffic except for that southbound on Stone to Broadway which could use Toole and 5th to reach Broadway under the new plan. For trips originating from within the ARZ, the area south of Congress and east of Scott are unaffected, while the area north of Congress and west of Scott do experience increased circuitry. As was the case for the north approach, advantages of one area over another for the inbound situation are offset by advantages of the other areas for the outbound situation.

- South Approach — For traffic approaching the ARZ from the south on 6th Avenue (750 vph), 8 percent are through eastbound and 33 percent are through northbound. Neither of these movements are changed by the new circulation plan. The through westbound trips amount to only 1 percent and can use 14th Street westbound and Main northbound to avoid the ARZ. For trips destined to the ARZ, the change in circuitry occasioned by the new plan is not significantly changed for any area.

For the reverse flow, the proposed plan causes an increased circuitry for through trips approaching the ARZ from the north as well as for trips originating in the area north of Congress. Other trips are essentially unaffected.

- West Approach — For traffic approaching the ARZ from the west on Congress (750 vph maximum), little or no change is occasioned by the new circulation plan either for through trips or for those destined to the ARZ.

For the reverse flow (outbound on Congress), the proposed plan increases circuitry by directing traffic from Congress to Alameda. For the area south of Congress, the increase in circuitry is of major significance.

Summarizing the impact of the rerouting of traffic occasioned by the ARZ, circulation plan, it is evident that nearly all trips will be affected to some extent. Equally important, the impact to major traffic movements is reasonably well-balanced (with inbound/outbound tradeoffs) and of only limited consequence.

Parking Impact

The proposed improvements would have the effect of removing 100 curb parking spaces from use in the core of the downtown area. However, there is a surplus of roughly 300 spaces in the core and over 1,600 spaces in the surrounding ring of blocks. Thus, the loss of curb parking should not have a serious adverse impact in terms of a space shortage. It would, however, cause some inconvenience to very short-term parkers (those parking only a few minutes) and would also cause an increase in parking costs for that group of shoppers and business visitors.

VII. IMPLEMENTATION

Phasing Recommendations

Priorities among the project areas are still subject to review and discussion in the City of Tucson, and will be determined prior to applying for the demonstration grant to UMTA. Based on studies and discussions conducted to date, it appears logical to consider implementation in three phases:

1. Congress Street Bus Terminal and Congress Street Busway West Link — This phase would accomplish accommodation of buses and bus passengers at a terminal, would divert through traffic from Congress Street, and improve connections across Church Street. It would allow a sufficient amount of the public arcade system to be built to test its design elements, costs, and operation.
2. Stone Plaza, Pennington Street Busway, and West Link, Stone Gateway North — This project would include the diversion of the state highway route from Stone, and would solidify the shopping and financial area. A second connection across Church Street would complete the integration of "old" and "new" downtowns.
3. Congress Street Busway: Center Link and Stone Gateway South — This phase would complete the public arcade system and push the improvements toward the East. It would help to revitalize the retail business on Congress Street, and to create new business for the now-vacant stores.

These phases can be combined if sufficient resources become available to accomplish more than one at a time. Generally, it is important that the physical improvements are evolved together with the activity programs and other revitalization efforts. The new public improvements should not be built until it is reasonably certain that the activities to fill them can be attracted.

The plan proposed in this report is only one of several plans which might be devised for downtown Tucson. The City is reviewing the proposal and working with downtown businessmen to amend it as necessary to obtain the wholehearted support of the Community. Following are some of the issues with respect to implementation of the plan.

Citizen Participation

As mentioned above, the City is working with downtown businessmen to refine the plan. Additional cooperative efforts with the University and the citizen advisory committees will be needed to obtain public support for the project.

Funding

In addition to the use of UMTA demonstration funds, the City should explore local, state, and private sources of funding to supplement the program. Other Federal funds could be applied to the project as well. For example, Section 3 Operating Assistance Funds from UMTA, and Urban System Funds from the Federal Highway Act might be used.

Priorities

Priorities between the urban design, street improvements, transit improvements, and activity plans must be developed by the City of Tucson. Important considerations in these decisions will be the lead times associated with the different projects. The City will have to decide whether to implement the plan in workable phases and match the design, construction, and implementation to fund availability.

Legal Issues

These do not appear to be serious in Tucson, but the necessary City ordinances governing street use will have to be prepared and processed prior to implementation. Also legal requirements governing such administrative procedures as public hearings, environmental assessments, and notices will be needed to be followed.

Feasibility Studies

Some additional technical studies may be required with regard to specific details of ingress and egress, access by emergency vehicles, and so on. These are not expected to be very extensive.

7. CONCLUSIONS

Chapter 7. CONCLUSIONS

This volume has reported on the third and final phase of the Auto Restricted Zone/Multi-User Vehicle System Study undertaken on behalf of the Urban Mass Transportation Administration of the U.S. Department of Transportation. The purpose of the study was to (1) investigate existing experience with auto restricted zones and multi-user vehicle systems, (2) evaluate their feasibility as concepts applicable to urban transportation systems, (3) identify and evaluate potential sites for suitable demonstration projects, and (4) design demonstration programs for selected sites. ARZ demonstration design plans for five U.S. cities were presented in this report.

ARZ PLANNING APPROACH

In each city the approach of the ARZ planning team was keyed to local plans and problems. At the foundation of this approach was the fact that the emphasis was on tailoring an auto restricted zone plan to each specific urban environment rather than imposing a pre-selected ARZ concept or strategy. The process began with a systematic close look at the existing downtown infrastructure. This included such elements as recent downtown economic trends, characteristics of the street network, traffic flow, transit services, patronage, parking and goods movement. Analysis of the data collected produced evaluations of pedestrian facilities, traffic operations, transit services and goods movement. Current plans and projects underway were also assessed for impact on or potential contributions toward ARZ planning. Assessment of the downtown and its component parts led then to the formulation of a set of objectives and opportunities for auto restricted zones in each downtown.

The plans formulated to meet those objectives contained a variety of elements. At the base was a revised downtown circulation plan. In several of the cities, the ARZ plan sought to separate different streams of vehicular traffic. As a result, circulation plans were prepared for auto, bus, pedestrian and goods traffic. Frequently, new services, such as transit shuttles or extended free fare zones were

incorporated into the ARZ plan as a way of maintaining accessibility within downtown, and opening new markets to downtown businesses. Each of the plans also called for construction of new facilities. By and large, these facilities were oriented towards improvement of the pedestrian environment and the points where the pedestrian and transit systems interface. These facilities ranged from extended pedestrian and transit malls to innovative designs for downtown transit shelters and information areas.

The plan for each city concluded with examination of impacts, costs, and the necessary steps to implementation. Impacts were investigated for each major downtown subsystem; transit services, traffic operations, pedestrian circulation, goods movement, the economy and the environment. Wherever possible, costs were identified and described. Each plan concluded with a brief section on funding sources and the necessary steps for consideration under the ARZ demonstration grant program.

SUMMARY PLAN DESCRIPTIONS

In Boston, attention focused on a .7-square-mile area in the heart of the active CBD of a metropolitan area of nearly 3 million persons. This downtown, with its archaic street system, excellent transit service and pedestrian travel volumes, resembles, perhaps more than any other U.S. city, the European environments that have had such success with auto restricted zones. The plan proposed extensive reorganization of the surface circulation system to reduce the apparent conflict and congestion. A major element of the plan was improved transit operations within the area through the creation of the Washington Street Busway and exclusive contra-flow lanes for smoother flow of bus traffic. Pedestrians benefit too, through the proposed closure of Winter and Summer Streets to vehicular traffic, thus creating a vehicle-free link from the heart of the shopping area to Boston Common.

Burlington demonstrates the validity of the ARZ approach to small and medium sized urban areas. Although the City has a population of less than 40,000, the active, pedestrian scale downtown serves as a regional center for a large and well-populated section of New England. The ARZ approach here, sought to build on significant

local initiative in restricting auto traffic. The ARZ plan expanded on the large-scale urban renewal effort of prior years, which had included some street closures, and was only now beginning to come to fruition. Thus the ARZ plan proposed major improvement in pedestrian facilities with the creation of the Church Street Mall on four blocks of the main downtown shopping street. This mall provides the North-South connector to the recently completed East-West enclosed shopping mall, thus creating a highly functional and largely weather-protected pedestrian circulation network for the entire CBD.

For the ARZ plan in Memphis, a unique approach was adopted. Emphasis was directed away from major new facilities or services to consideration of selective improvements that could be made to expand and enhance existing auto restricted areas. The Mid-American Mall, only fully operational in the last year, is a complete transformation of the former Main Street constituting one of the longest pedestrian malls in the United States. The plan developed for Memphis sought to enhance the attractiveness of the area to shoppers, and to expand the impact of the mall to a greater portion of the downtown area. A major feature of the plan was the proposed extended free-fare zone for improved transit connections to the Medical Center, a nearby concentration of employees and visitors that could be tapped by downtown businesses. Other features of the plan involved expanding East-West pedestrian linkages to connect the mall with underused parks along the bluffs overlooking the scenic Mississippi River. Perhaps most important, the ARZ plan offered an approach that can unify a number of existing plans and proposals for downtown redevelopment and thus provide a foundation or perspective for downtown planning in the years ahead.

The congested, older CBD of Providence, like Boston, demonstrated the utility of the ARZ approach in the densely developed cities of the Northeast. Although, like other central cities, Providence's population has declined somewhat in recent decades, the downtown remains active, primarily due to the concentration of government employees and others. Pedestrianization has been popular in Providence for a number of years, dating back to the creation of the Westminster Mall in 1965. The ARZ plan built upon this and the volume of recent activity in restoration and rehabilitation of the downtown, with projects such as Weybosset Hill, the Biltmore

Hotel and the Civic Center. The ARZ plan sought to extend this revitalization to the Union Station, City Hall, and Kennedy Plaza area. Primarily, plan elements are oriented toward improvement in the transit-pedestrian interface. The plan proposes major improvement in downtown bus stops and their connections to the pedestrian network. Improved transit operations are also sought through reduced delays in downtown service. Revisions in the current circulation pattern are proposed to improve traffic operations and reduce auto-pedestrian conflicts.

Tucson represented an urban area significantly different from the others. The Tucson metropolitan area has been characterized by rapid growth and comparatively low density development, even in the central area. The area's auto orientation and the resulting impacts of widespread auto usage led to consideration of ARZ as a step in encouraging the use of public transport modes. The foundation of the ARZ approach was the unification of the CBD. The plan sought to create needed connections between isolated downtown sub-areas such as the Government Center, the Business District, and La Placita. To create a new downtown cohesiveness, a number of changes were proposed in the downtown pedestrian and transit systems. Pedestrians would experience a major improvement in level of service through the closure of Stone to vehicular traffic and the conversion of Congress into an East-West transit-pedestrianway. Similarly, bus operations would be improved by reduced conflict with auto traffic, and the proposed downtown transit shuttle would improve accessibility within downtown and open nearby activity centers, such as the University of Arizona to downtown stores and activity.

FUTURE DIRECTIONS

It now appears that the concept of auto restricted zones may be near a turning point in its application to U.S. cities. Downtown pedestrian malls are now widespread in all types and sizes of urban areas. The benefits of these auto restricted zones to CBD revitalization are apparent and well-publicized. In many cities, downtown merchants, once the primary opponents of ARZ, are now leading advocates for downtown pedestrianization schemes that offer the same level of amenity as suburban shopping malls. Some questions however remain. What will the next step be? Where will it occur? When? While we cannot answer all these questions, some directions or trends can be identified.

It seems certain that new forms or applications of ARZ in the U.S. will evolve from existing downtown malls. In the absence of major new programs to rebuild America's central cities, it is most reasonable to expect a slow evolution of programs for auto restriction. In the past, this evolutionary process has primarily manifested itself in the construction and extension of what were formerly "temporary" "experimental" or "limited" malls. In the future, the next major step could be the creation of intersecting pedestrian or transit malls that effectively compartmentalize the CBD. Up to now, U.S. auto restricted zones have chiefly affected only North-South or East-West flow of traffic. In the highly developed grid systems of most American cities, the loss of a single link in the network seldom produces severe disruption of traffic flow. As auto restricted zones shed their linear character and begin to expand in two dimensions, however, the number of affected traffic flows will multiply almost geometrically. Such actions could produce disincentives to auto use substantially more than found today, and could provide greatly expanded opportunities for improved pedestrian facilities and efficient transit service to downtown destinations.

Because the expansion of the concept of auto restricted zones is seen as an evolutionary process, it seems clear that such expansions in U.S. applications will have to be fully justified. The primary justification of extended auto restricted zones rests on levels of activity, traffic congestion and transit service in the city center. Thus downtowns such as the five covered in this report that are successful in retaining or stimulating a wide variety of downtown activities, attracting new office workers, shoppers and visitors, and providing high quality transit service will be prime candidates for further ARZ developments in the years ahead. The time frame is set only by the resources the cities are able to muster and the extent of local initiative to transform the downtown into a place for people, and not traffic. The five ARZ plans in the report are a step in that direction.

