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Ridesharing Element of Parking Facilities for Industrial Employment Centers

September 1982



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RIDESHARING ELEMENT OF PARKING FACILITIES
FOR
INDUSTRIAL EMPLOYMENT CENTERS

Prepared for

TRANSPORTATION MANAGEMENT AND
RIDESHARING PROGRAMS BRANCH
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A Report to

DINGLE ASSOCIATES, INC.
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by

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September 1982

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The author wishes to express his thanks to the National Association of Van Pool Operators and the Institute of Transportation Engineers for data collection and analysis.

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EXECUTIVE SUMMARY

This study entailed determination of the role of ridesharing in the planning, design, provision, and economics of parking facilities at industrial employment centers. Additionally, the role of local zoning and planning agencies in reducing parking requirements for employers and developers who institute active ridesharing programs was examined.

For the purpose of this study, ridesharing is defined as the use of multiple-occupancy vehicles, such as carpools, vanpools, buspools, and transit, for commuting purposes. Industrial employment centers (IEC's) are defined as mixed-use facilities which are predominantly industrial. They were studied in order to provide information for revision of the Institute of Transportation Engineers' (ITE) informational report, "Parking Facilities for Industrial Plants."

A literature review of both ridesharing and parking facilities was conducted. The literature review illustrated the importance of parking to ridesharing since any vehicle trip begins and ends with vehicle storage. It also indicated that an analysis of parking facility requirements must take into account several significant variables: type of facility; its location; the availability of on-street parking; and zoning regulations/parking ordinances, their underlying assumptions and objectives, and their relationship to ridesharing.

Data for this study were obtained from four previously administered questionnaires -- University of Maryland Questionnaire 1, sent to employers known to have ridesharing programs; Questionnaire 2, sent to planning/zoning agencies; the ITE/NAVPO (National Association of Vanpool Operators) Survey of Parking Facilities at Major Employment Centers, sent to over 200 NAVPO members; and the NAVPO/ITE Employee Home-Work Travel Survey, distributed by some of those members to their employees. These data indicate that decreased parking requirements result from active ridesharing programs and that many zoning/planning agencies are considering ridesharing as an alternative to increasing parking space requirements. The major concern expressed by these agencies involves monitoring employers' ridesharing programs and enforcing the regulations. Enforcement generally takes the form of conditional use permits, covenants in occupancy permits or land deeds, annual or other periodic reports, or some other form of program verification.

The selected case studies illustrate parking reduction and the economics of ridesharing programs at industrial employment centers. They also illustrate local zoning agency involvement in the form of exemptions to code or ordinance and new legislation.

Reductions in employee parking needs due to ridesharing programs have been documented, for example, at the 3M Company, despite a 23 percent increase in the work force; at the Southern New England Telephone Company, where the

automobile population was reduced by an estimated 1,000 to 2,000; and at the Corning Glass Works, approximately 300 parking spaces are no longer needed.

A detailed study of the economic savings derived from ridesharing was conducted by the Texas Transportation Institute and others on 120 vanpool programs in Texas serving 141 locations with over 2,300 vans. In addition to gasoline savings estimated in excess of \$12.5 million, the study indicated that the reduction in parking space requirements attributed to ridesharing can translate into savings of as much as \$35 per employee per month in urban areas such as Houston. The unused parking spaces made available through ridesharing can, in turn, generate direct income through leasing.

The ability of the IEC's to successfully operate ridesharing programs, and to demonstrate the reduced demand for parking that results, has encouraged local jurisdictions to modify or to provide exemptions to ordinances regulating off-street parking requirements. Such exemptions or modifications generally stipulate verification procedures to ensure that a proper ridesharing program is being maintained. The planning and zoning agency survey (Questionnaire 2) indicated that about 7 percent of local jurisdictions have approved reductions in parking requirements, with 5 percent offering the reductions through exemptions.

A few jurisdictions have responded to the favorable impact of ridesharing on parking demand by amending existing zoning ordinances. For example, the village of Schaumburg, Illinois, amended its zoning ordinance in May 1982 to permit a reduction of up to 40 percent of the required parking of new developments. To obtain the reduction, a developer must arrange for implementation of a ridesharing program or locate the development near public transportation. The ordinance clearly defines the verification and evidence required to demonstrate that parking needs have been reduced.

This study also documents the changed commuting habits of employees of IEC's due to ridesharing programs. Local planning and zoning agencies have, to some degree, acknowledged these changes and the benefits of ridesharing, especially with regard to parking demand. These agencies have incorporated potential ridesharing benefits into the planning process by providing exemptions or making amendments to existing ordinances. Amended ordinances that link ridesharing and reductions in parking requirements can act as an incentive to establish ridesharing programs.

These developments are very different from the trends outlined by the ITE report published in 1969. The trends projected at that time included growth in the number of employees driving to work, increasing use of single-occupant vehicles, and an increase in the ratio of parking spaces to employees. Given the discrepancies between these trends and present developments, a revision of the ITE report is warranted.

INTRODUCTION

Transportation planning has traditionally attempted to accommodate peak highway and parking demand by striving to provide adequate supply. However, this attitude is changing among transportation planners, engineers, and public agencies for several reasons. Continued energy, environmental, and social concerns are forcing a re-evaluation of the traditional premise of meeting transportation demands with an ever increasing supply of highway and parking facilities. Attention is now shifting to reducing the demand component of the transportation sector, particularly the demand created by the single-occupant automobile driver. In other words, attention is shifting to the use of ridesharing to increase vehicle occupancy, thereby reducing the demand placed on the highway and parking facilities.

The purpose of this study was to gather data which might justify changes in the Institute of Transportation Engineers' (ITE) informational report, entitled "Parking Facilities for Industrial Plants," published in September 1969. Recognition of the role of ridesharing in reducing parking supply requirements at industrial employment centers, and methods for handling these trade-offs were examined, in addition to planning and zoning agency involvement.

It is the intent of this publication to provide evidence to support the concept of trading off parking requirements for viable ridesharing programs at industrial employment centers (IEC's). The IEC's are defined as employment sites housing mixed types of employment with a substantial part being industrial. Because of the location of most IEC's outside the central cities of metropolitan areas, transit service is often poor or nonexistent. Thus, ridesharing programs are presently the only alternative to the drive-alone mode for commuting.

To provide support for the argument that active ridesharing programs can be instituted to allow developments to provide fewer parking spaces than are presently locally mandated, the following format will be used. A brief synopsis of pertinent literature is first provided, followed by a summary of the data collected for this study, and finally, a selection of case studies illustrating both ridesharing programs at IEC's and local zoning agency involvement. A detailed list of references is also included.

LITERATURE REVIEW

The authors of chapter VI of the 1969 publication, entitled "Trends in Industrial Plant Parking," recognized the dynamic nature of commute characteristics and their effect on the planning of adequate parking facilities. It was noted that, "If for no other reason than emphasizing the need to look ahead rather than back, trends are always worth inspection." Parameters considered by the authors were the growth in the number of employees driving to work, increasing use of single-occupant vehicles, rising real family income, greater car ownership, greater dispersion of both home and job locations, changes in shift timing, and length of the work day. In summary, the authors stated that "...future trends will show an increase in the ratio of parking spaces to employees, and higher costs as parking facilities are improved to meet the needs for both safety and community acceptability."

The decades of the 1960's and 1970's saw an increasing concern by the public with air quality, noise, traffic congestion, urban growth, life-style, cost-of-living, and the energy crisis.

"This public concern resulted in substantial involvement by transportation engineers in the traffic assessment of physical change. Out of the ferment of social concern two issues emerge which have not yet been effectively addressed. The first is traffic on residential streets and concern for the environment around the home. The second is how to facilitate the trip to work." (Khisty, 1980, p. 511)

The problem facing transportation planners and engineers was how to facilitate the trip to work, satisfy the concerns of the public, and still accomplish the objectives of mobility and accessibility. Ridesharing is one of the answers that transportation planners and engineers have found to date. Now the problem facing transportation planners and engineers is encouraging commuters to use ridesharing programs to their fullest potential.

Because every automobile trip begins and ends with storage of the vehicle, parking facilities are an integral part of motor vehicle transportation. Ridesharing involves the use of motor vehicles, therefore, parking facilities are an integral part of ridesharing activities. Because parking requirements are reduced by ridesharing programs, they are especially appealing in large metropolitan areas and urban central business districts (CBD's) with severe parking shortages. The relationship between parking supply in the CBD and area population is given in Table 1, taken from the Highway Research Board Special Report 125 (1975, p. 9). This table illustrates that large metropolitan areas usually have fewer parking spaces per person than smaller urban areas.

TABLE 1

Parking Supply Data for Major U.S. Cities

Population Group of Urbanized Area	Type of Facility			Average Number of Total Spaces	Spaces per 1,000 Population
	Curb	Off-Street			
		Lot	Garage		
10,000-25,000	1,090 (43%)	1,530 (57%)	10 (0)	2,630	150
25,000-50,000	1,430 (38%)	2,420 (59%)	140 (3%)	3,990	120
50,000-100,000	1,610 (35%)	2,790 (60%)	260 (5%)	4,660	70
100,000-250,000	2,130 (27%)	4,760 (62%)	820 (11%)	7,710	50
250,000-500,000	2,450 (20%)	7,910 (64%)	1,940 (16%)	12,300	30
500,000-1,000,000	3,200 (14%)	12,500 (56%)	6,900 (31%)	22,600	30
Over 1,000,000	8,000 (14%)	32,000 (55%)	18,600 (31%)	58,000	20

The literature also illustrates several factors which affect parking facility requirements. Of utmost importance is the type of facility and its location. Availability of on-street parking is another important factor to consider. Additionally, almost every jurisdiction in the country has parking ordinances, as part of its zoning regulations, requiring a minimum number of parking spaces for a given facility based on the premise of maximum single-automobile use. These ordinances, with few exceptions, make no provision for the reduction of parking spaces required by the ordinance due to the implementation of demand management techniques such as ridesharing.

For additional information not detailed above, the reader is directed to the list of references.

DATA COLLECTION, ANALYSIS, AND RESULTS

As part of this study, data were obtained and analyzed from four 1981 questionnaires--University of Maryland Questionnaires 1 and 2; ITE/NAVPO (National Association of Van Pool Operators) Survey of Parking Facilities at Major Employment Centers (Form "A"); and NAVPO/ITE Employee Home-Work Travel Survey (Form "B"). (See appendix A for copies of each questionnaire.)

DATA COLLECTION

University of Maryland

Questionnaire 1 was sent to over 150 companies and agencies known to have viable ridesharing programs in order to obtain further information regarding their programs. This included more details of their parking arrangements; estimated number of parking spaces no longer needed due to ridesharing; public agency involvement in reducing parking ordinance requirements; and data on cost savings due to reduced parking requirements resulting from their ridesharing programs. Forty responses (26.79 percent) were received from organizations in 17 States.

Questionnaire 2 was sent to over 500 county and city planning agencies around the country, randomly selected from the roster of the American Institute of Certified Planners. The questionnaire was designed to obtain data on agencies' policies regarding criteria for calculating parking space requirements and special exemptions to these requirements due to ridesharing programs. Two hundred thirty-five surveys (46 percent) were returned.

ITE/NAVPO

The ITE/NAVPO Survey of Parking Facilities at Major Employment Centers (Form "A") was sent to over 200 members of NAVPO. These organizations then decided whether or not to distribute Form "B," the NAVPO/ITE Employee Home-Work Travel Survey, to employees. The surveys obtained data concerning available parking spaces, commute habits of employees, ridesharing activities, and parking management programs.

MERGING AND ANALYSIS OF DATA

Statistical analysis of the survey returns involved large amounts of data and it was felt that the best way this could be performed was through the use of an existing statistical computer package. Specifically, it was felt that the Statistical Package for the Social Sciences (SPSS) would best serve the purpose, and was therefore selected. (See appendix B for some typical results of SPSS analysis.)

RESULTS AND APPLICATIONS

Based on the returns received for this study, it is apparent that many employers have seen a significant decrease in parking requirements as a result

of their ridesharing programs. Bechtel Power Corporation, Gaithersburg, Maryland, estimates a reduction of 75 spaces and notes that number is expected to increase to 200 as their vanpool program expands. Brown & Root, Inc., of Houston, Texas, estimates that over 900 parking spaces are no longer needed at its industrial and office locations in and around Houston. Hallmark Cards offers complete ridesharing services to its employees at its headquarters in Kansas City, Missouri. Over 800 out of an original 3,000 parking spaces at this location, consisting of mixed office and industrial space, are no longer needed.

For further information on organizations which have experienced reduced parking requirements, see the summary of returns received from the University of Maryland Questionnaire 1 at the end of this section.

Returns of the University of Maryland Questionnaire 2, sent to planning/zoning officials across the country, illustrate that ridesharing is being seriously considered as an alternative to increasing parking space requirements. Approximately 5 percent of the responding agencies have had experience handling parking exemptions due to ridesharing programs, and approximately 75 percent of the responding agencies have done studies on the ridesharing/parking trade-off, plan to do so, or anticipate requests for exemptions in the near future. Several jurisdictions have either enacted, or have considered enacting, ordinance modifications to allow reductions in parking requirements when specified ridesharing programs exist. (See the "Exemptions to Code or Ordinance" and "New Legislation" sections, beginning on page 13.)

It appears that the public agencies which responded are well aware of ridesharing and the rising interest regarding the effects of ridesharing upon parking. However, most commented that enforcement is a major concern of agencies when considering the exemption of parking ordinances, as ridesharing programs are often difficult to monitor and are frequently subject to change. At the same time, many agencies expressed interest in the results of research done in this area, and approximately 95 percent gave permission to be contacted in the future for additional information.

UNIVERSITY OF MARYLAND SURVEY SUMMARY - 1981

NAME OF COMPANY	LOCATION	NUMBER OF EMPLOYEES	% CARPOOL	% VANPOOL + BUSPOOL	% USING TRANSIT	# OF PARKING SPACES ON SITE	*# OF PARKING SPACES NO LONGER NEEDED	PARKING STUDY DONE	CONTACT WITH ZONING AGENCY	PREFERENTIAL PARKING	OTHER INCENTIVES	PROGRAM COST DATA AVAILABLE	TYPE OF COMPANY (INDUSTRIAL OR OFFICE)
Adolph Coors	Golden, Colo.	8,500	36	6	-	2,000	1,282	N	N	Y	Y	N	I
Allied Corporation	Morristown, N.J.	2,500	27	11	1	2,474	700	N	N	Y	Y	N	O
Allstate Insurance	Northbrook, Ill.	3,500	10	16	-	4,500	-	N	N	Y	N	Y	O
Aramco Services	Houston, Tex.	2,137	8	37	-	-	650	Y	N	Y	Y	Y	O
Bechtel	Gaithersburg, Md.	2,800	20	10	-	-	75	N	N	Y	Y	Y	O
Brown and Root	Houston, Tex.	7,700	2	22	-	-	900	N	N	Y	Y	Y	I
Cargill	Minnetonka, Minn.	1,300	25	10	2	1,000	350	N	N	Y	Y	N	O
Cenex	St. Paul, Minn.	730	35	16	-	480	300	N	N	Y	N	Y	I

*NOTE: As estimated by company, due to ridesharing activities.

UNIVERSITY OF MARYLAND SURVEY SUMMARY - 1981

NAME OF COMPANY	LOCATION	NUMBER OF EMPLOYEES	% CARPOOL	% VANPOOL + BUSPOOL	% USING TRANSIT	# OF PARKING SPACES ON SITE	*# OF PARKING SPACES NO LONGER NEEDED	PARKING STUDY DONE	CONTACT WITH ZONING AGENCY	PREFERENTIAL PARKING	OTHER INCENTIVES	PROGRAM COST DATA AVAILABLE	TYPE OF COMPANY (INDUSTRIAL OR OFFICE)
Connecticut Dept. of Transportation	Wethersfield, Conn.	35,000	32.5	2.5	5	-	2,000	N	N	Y	Y	N	O
Conoco	Houston, Tex.	2,000	-	42	-	1,400	-	N	N	Y	Y	Y	I
Control Data	Rockville, Md.	700	6	4	-	486	50	Y	N	Y	Y	N	O
Corning Glass	Corning, N.Y.	8,000	-	5	-	-	290	N	N	Y	N	Y	I
Detroit Edison	Detroit, Mich.	2,600	4.2	6.6	-	3,000	200	N	N	Y	N	Y	I
Erving Paper Mills	Erving, Mass.	750	-	22	-	380	600	N	N	Y	Y	Y	I
General Mills	Minneapolis, Minn.	3,000	-	10	-	2,000	310	N	N	Y	Y	Y	I
Grain Terminal Association	St. Paul Minn.	600	10	12	-	395	160	N	N	Y	Y	N	O

*NOTE: As estimated by company, due to ridesharing activities.

UNIVERSITY OF MARYLAND SURVEY SUMMARY - 1981

NAME OF COMPANY	LOCATION	NUMBER OF EMPLOYEES	% CARPOOL	% VANPOOL + BUSPOOL	% USING TRANSIT	# OF PARKING SPACES ON SITE	**# OF PARKING SPACES NO LONGER NEEDED	PARKING STUDY DONE	CONTACT WITH ZONING AGENCY	PREFERENTIAL PARKING	OTHER INCENTIVES	PROGRAM COST DATA AVAILABLE	TYPE OF COMPANY (INDUSTRIAL OR OFFICE)
Gulf Oil	Houston, Tex.	2,700	-	50	30	-	780	N	N	N	Y	Y	O
Gulf Res. and Dev.	Pittsburgh, Penn.	2,000	40	20	-	1,030	-	N	N	Y	N	N	-
Hallmark Cards	Kansas City, Mo.	6,000	33	11	2	3,000	800	N	N	Y	Y	N	I
Hoffman-LaRoche	Nutley, N.J.	-	-	-	-	-	200	N	N	Y	N	N	I
Johns-Manville	Denver, Co.	1,200	30	9	1	1,300	250	N	N	Y	Y	N	O
Minnesota Mutual Life Insurance	St. Paul, Minn.	1,000	6	8	25	-	-	N	N	N	Y	N	O
Northeast Utilities Service	Hartford, Conn.	1,800	-	17	-	1,500	-	N	N	Y	N	N	O

*NOTE: As estimated by company, due to ridesharing activities.

UNIVERSITY OF MARYLAND SURVEY SUMMARY - 1981

NAME OF COMPANY	LOCATION	NUMBER OF EMPLOYEES	% CARPOOL	% VANPOOL + BUSPOOL	% USING TRANSIT	# OF PARKING SPACES ON SITE	*# OF PARKING SPACES NO LONGER NEEDED	PARKING STUDY DONE	CONTACT WITH ZONING AGENCY	PREFERENTIAL PARKING	OTHER INCENTIVES	PROGRAM COST DATA AVAILABLE	TYPE OF COMPANY (INDUSTRIAL OR OFFICE)
Offutt Air Force Base	Nebr.	12,329	53	2	-	11,298	-	Y	N	Y	Y	N	-
Prudential Insurance	Minneapolis, Minn.	2,000	10	13	1	-	-	N	N	Y	Y	N	I
Ralph Parsons	Pasadena, Calif.	4,600	12	12	3	-	-	Y	N	Y	N	Y	O
Rockwell International	Golden, Co.	4,000	60	11	-	2,430	327	N	N	Y	N	Y	I
Sandoz	E. Hanover, N.J.	1,500	5	3	-	1,200	70	N	N	Y	Y	Y	I
Scott Paper	Philadelphia Penn.	2,500	32	1	-	1,800	-	N	N	Y	Y	N	-
Smith-Kline	Philadelphia Penn.	2,500	25	18	35	800	-	N	N	Y	Y	N	O

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*NOTE: As estimated by company, due to ridesharing activities.

UNIVERSITY OF MARYLAND SURVEY SUMMARY - 1981

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NAME OF COMPANY	LOCATION	NUMBER OF EMPLOYEES	% CARPOOL	% VANPOOL + BUSPOOL	% USING TRANSIT	# OF PARKING SPACES ON SITE	**# OF PARKING SPACES NO LONGER NEEDED	PARKING STUDY DONE	CONTACT WITH ZONING AGENCY	PREFERENTIAL PARKING	OTHER INCENTIVES	PROGRAM COST DATA AVAILABLE	TYPE OF COMPANY (INDUSTRIAL OR OFFICE)
Southern New England Telephone	New Haven, Conn.	14,000	10	6	15	-	2,600	N	N	Y	N	N	I
STATITROL	Lakewood, Colo.	235	10	1	-	-	-	N	N	N	N	N	I
Tennessee Valley Authority	Knoxville, Tenn.	57,000	-	50	28	-	5,100	Y	N	Y	Y	Y	-
United Services Automobile Association	San Antonio Tex.	4,700	24	30	-	3,064	1,400	Y	N	Y	Y	Y	O
Washington University Medical School	St. Louis, Mo.	3,500	3	3	-	1,500	150	N	N	Y	Y	N	-
Winnebago Industries	Forest City, Iowa	900	-	22	-	1,000	350	N	N	Y	Y	N	I
Zenith Radio	Chicago, Ill.	1,000	-	6	-	-	45	Y	N	Y	Y	Y	O

*NOTE: As estimated by company, due to ridesharing activities.

CASE STUDIES

The case studies which follow include both industrial employment centers and public (planning and zoning) agencies. Upon review of these case studies, it is evident that:

- Parking requirements can be reduced.
- Ridesharing programs provide cost savings to both employers and participants.
- Public agencies (planning and zoning) are sympathetic to petitions for reduced off-street parking requirements when viable ridesharing programs exist. The agencies are, however, concerned that the public investment in street facilities is protected and that they have proper enforcement power. This has generally taken the form of:
 - conditional use permits;
 - covenants in the occupancy permits or land deeds;
 - annual (periodic) reports; and/or
 - other verification of viable ridesharing programs and options.

RIDESHARING PROGRAMS AT INDUSTRIAL EMPLOYMENT CENTERS

Almost all companies that have initiated successful ridesharing programs have experienced a reduction in parking demand and economic savings. A few of these companies have been selected as representative of the overall experience, and are briefly described in this section.

Parking Reduction

Since the average carpooler or vanpooler may occasionally drive alone for a variety of reasons, the parking demand reduction is not an exact trade-off. For example (based on estimates provided by questionnaire respondents), the average size carpool at a given center is four people. Rather than a parking reduction of three times the number of carpools, a realistic trade-off would be 2.2 to 2.6 spaces per carpool. This is partly due to the fact that, for a variety of reasons, carpoolers occasionally need to drive alone. Similarly, but greater in magnitude, the vanpool trade-off would be slightly less than $n-1$, where n is the number of participants per vanpool. (Fewer vanpoolers occasionally drive alone.)

The following companies are listed to provide a sampling of parking reductions due to ridesharing program implementation.

- The 3M Company (St. Paul, Minn.) - Experienced a reduction in the need for employee parking during a period when employment increased 23 percent.

- Southern New England Telephone Company (Hartford, Conn.) - Estimated that between 1,000 and 2,000 fewer automobiles need parking spaces due to their ridesharing program.
- Corning Glass Works (Corning, N.Y.) - A reduction of 280 to 300 parking spaces has been achieved as a result of their ridesharing program.
- Erving Paper Mills (Erving, Mass.) - Achieved a reduction of over 600 parking spaces.

Economics of Ridesharing Programs

Many examples exist in the literature and many more examples were gathered in this study that show substantial cost savings due to viable ridesharing programs. These cost savings accrue not only to the participants, but also to the sponsoring companies. Selected examples of these experiences are briefly described below.

- The 3M Company (St. Paul) - The company estimated savings of about \$2.5 million between 1973 and 1979, considering only the reduced need for employee parking spaces. This occurred at a time when employment actually increased.
- Texas Ridesharing Programs- A study done by the Texas Transportation Institute, the Texas Energy and Natural Resources Advisory Council, and the U.S. Department of Energy, regarding the Texas Ridesharing Program indicated that, as of July 1981, there were 120 vanpool programs involving 141 locations and 2,303 vans in the State. Gasoline savings due to vanpools alone were estimated to be in excess of \$12.5 million. This study resulted in a chart which can be used to calculate savings due to the reduction of parking requirements. For example, at \$20 per stall per month, a 20-van program results in an annual savings of \$38,400 to the company. This Texas report devotes an entire section to charts and figures relating ridesharing to parking costs.

Maxwell, of the Texas Transportation Institute, states that 10 parking spaces per vanpool are reduced in the Houston area. He states that the monthly cost per stall in the Houston area is \$70, and the cost per person, per month, in a vanpool is \$35. Therefore, a savings of \$35 per person, per month, is realized, or, considering a 10 stall reduction, a company can realize a savings of over \$4,000 per year, per van. Maxwell states that companies located in the CBD, Houston area, can lease these unused spaces for approximately \$70 per month, thereby yielding \$8,400 per year, per van.

MUNICIPAL/COUNTY (ZONING AGENCY) INVOLVEMENT

In order to achieve parking reduction due to ridesharing, the local planning and/or zoning agency must be involved and agree to the provision of less than the parking normally required by ordinance. Agency approval can take one of two forms--exemption to the current code or a modification of the ordinance. This study, through the literature search and surveys conducted, found that both approaches have been used, but only on a rather limited basis. The current trend appears to be toward considering modification of the ordinance. Selected case studies are briefly described in this section.

Exemptions to Code or Ordinance

Several jurisdictions have followed this approach when a private developer and/or owner has requested approval of a reduction in the off-street parking requirements determined by the current zoning ordinance. The planning agency survey conducted as part of this study indicated that about 7 percent of the jurisdictions have approved some reduction. About 5 percent of those agencies have granted exemptions for requests that meet specified criteria. A selection of these agencies are listed below.

Anne Arundel County (Maryland)
Broome County (New York)
Chester County Planning Commission (Pennsylvania)
City of Austin (Texas)
City of Bellevue Planning Department (Washington)
City of Boulder Planning Office (Colorado)
City of Los Angeles (California)
City of Naperville (Illinois)
City of Port Arthur Planning Department (Texas)
Hillsboro Planning Department (Oregon)
Oakland City Planning Department (California)
Township of East Brunswick (New Jersey)
Village of Skokie Planning Department (Illinois)

In granting exemptions, the planning agencies are very much concerned, "...that reduction of off-street parking requirements do not result in increased parking congestion and street congestion because the development did not have the transit usage or ridesharing that was claimed or a new lease results in modified use that leads to this same situation." Sample criteria for granting exemptions include:

- An actual ridesharing program, as evidenced by identification of a program coordinator, with some percentage of his/her time devoted to the program.
- Conditional use permits and monitoring to ensure compliance with the conditions.

- A guarantee that if the above conditions are not met, the developer has either land on site, or land within a reasonable distance (750 to 1,000 feet), that can be developed for parking, or possibly a more remote site with provision of shuttle transportation.

New Legislation

A few jurisdictions have actually modified their zoning ordinance, while other agencies have studied the possibility, and some have developed drafts of modified ordinances. A table summarizing the results from a similar survey for the Maryland National Capital Park and Planning Commission is included in appendix C. Two examples of agencies that have this experience are described below.

- Village of Schaumburg, Illinois - The Village of Schaumburg, in May 1982, amended its zoning ordinance to provide incentives for ridesharing and use of public transportation (see appendix D). The ordinance now permits reduction of up to 40 percent of the parking required of new developments, in return for "substantial projections of reduction in demand," through implementation of vanpool, carpool, or subscription bus programs, and/or location within 1/2 mile of public transportation. Reductions are also permitted for mixed use developments which use the same parking spaces during different peak hours. The ordinance clearly defines the evidence required for the parking reductions, and also suggests ridesharing incentives to be used to enhance the petitioner's request.

Development plans must include a designated area for parking construction in the event of noncompliance with the regulations. Additionally, verification of ridesharing implementation must be provided by the employer(s) prior to occupancy of the building(s), and an evaluation report of its ridesharing program must be submitted prior to issuance of an annual business license.

- City of Los Angeles, California - The City of Los Angeles has recently proposed amending its municipal code to allow reduced parking requirements for industrial and commercial developments (see appendix D for ridesharing excerpts). This proposal, largely based on an extensive study, partially sponsored by the Urban Mass Transportation Administration, would create a conditional use permit to encourage alternative means of transportation through provision of off-site required parking and reduction of off-street parking requirements in order to encourage alternative means of transportation (i.e., carpools, vanpools, transit, bicycles, etc.).

CONCLUSIONS

As a result of the data obtained, the literature reviewed, and the case studies described, it is clearly evident that active employer-sponsored ridesharing programs can, and do, result in decreased parking needs at industrial employment centers.

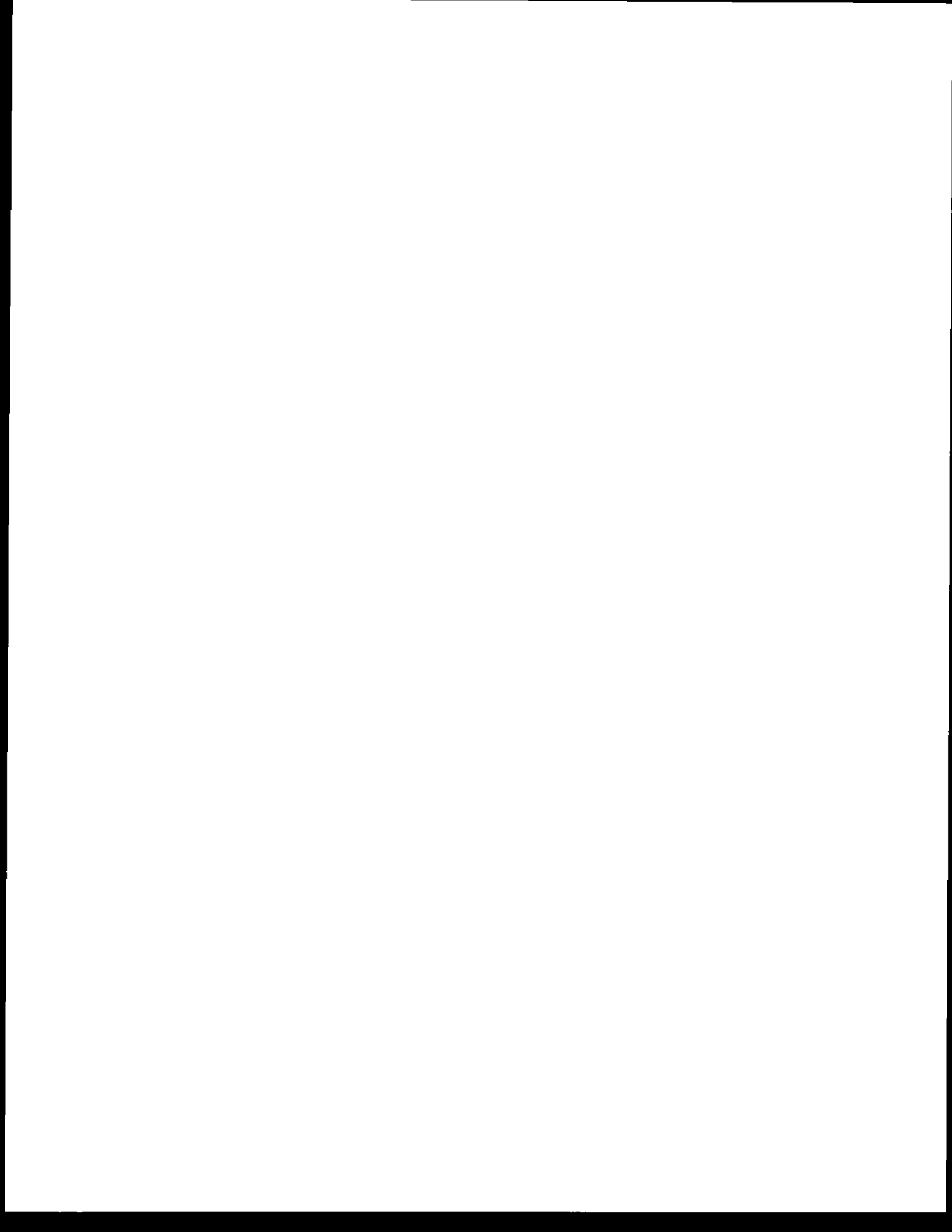
The magnitude of this decrease can be estimated from the average size of carpools and vanpools. If, for example, the average size carpool at a given center is comprised of four people, a realistic estimation of the decline in demand would be 2.2 to 2.6 spaces per carpool. Similarly, for vanpools, the decline in demand for parking spaces would be slightly less than $n-1$, where n is the number of participants per vanpool. The potential economic savings for employers due to reduced parking needs, and economic and energy savings for employees, can provide strong incentives for the implementation of ridesharing programs.

To further encourage developers and employers to implement active ridesharing programs, many local zoning and planning agencies are considering, and a few are implementing, amended ordinances to allow reduced parking requirements in return for ridesharing programs. Two examples of jurisdictions which have passed amended ordinances linking ridesharing and reduced parking requirements are Los Angeles, California, and Schaumburg, Illinois. In each case, the kinds of ridesharing programs that will satisfy the ordinance, and the penalties for failure to satisfy the provisions of the ordinance, are clearly outlined.

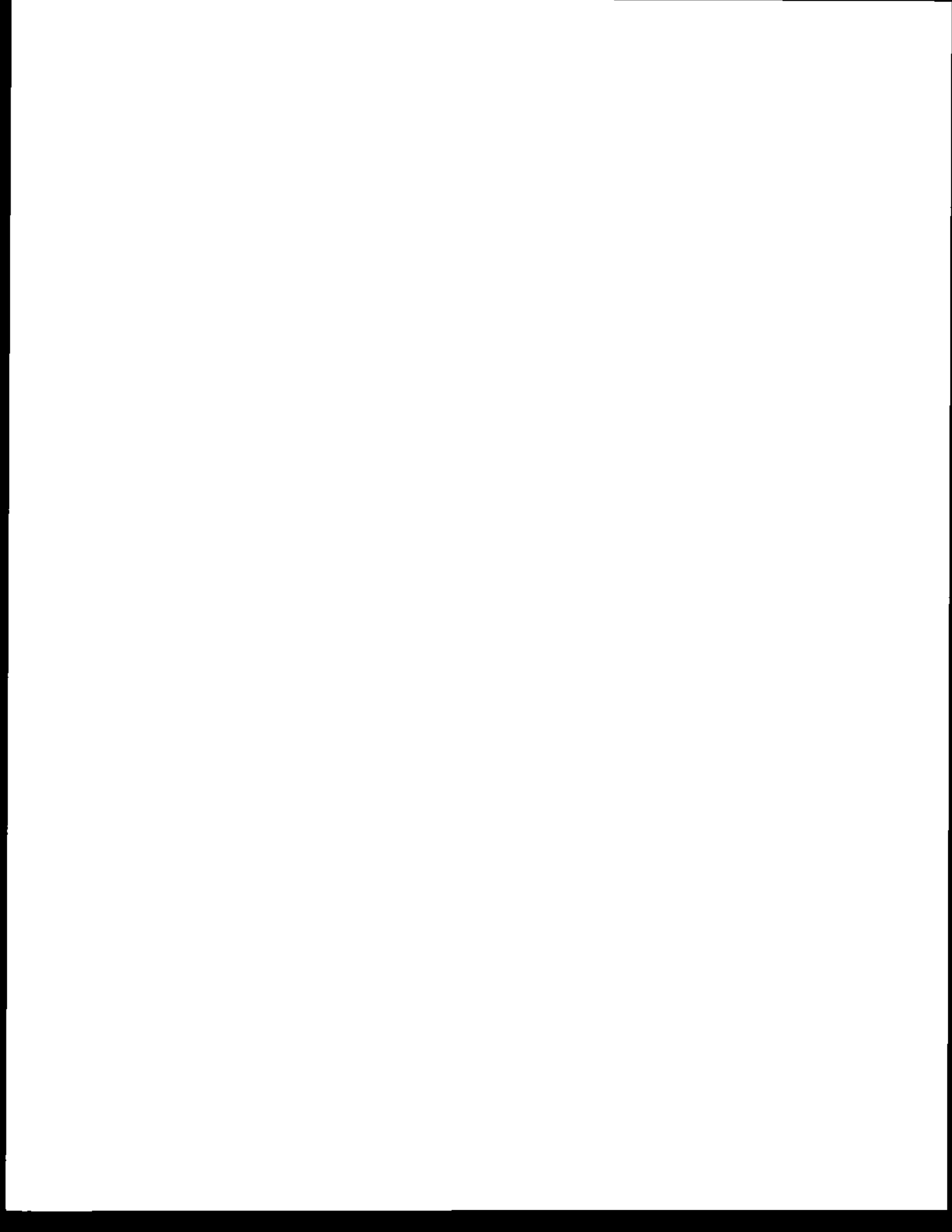
At present, the exchange of reduced parking requirements for ridesharing programs most often occurs in cases of individual exemptions to existing zoning ordinances. Local planning and zoning agencies, whether they offer these exchanges through exemption or amendment, express caution in providing developers with significant and tangible savings in exchange for frequently unstable and difficult to monitor ridesharing programs. In attempts to ensure that developers fulfill their obligations, local jurisdictions have imposed the following kinds of stipulations or controls:

- well-defined evidence of an operational ridesharing program;
- conditional use permits and monitoring to ensure compliance with the ordinance or conditions of the exemptions; and
- a guarantee that if the developer does not meet the stipulated obligations, he/she will provide the legally required number of parking spaces in accordance with ordinance.

The result of these efforts, by employers and developers, and by local jurisdictions should be decreased congestion and parking costs for employers and developers.



LIST OF REFERENCES



Brunso, Joanna, Ugolik, Wayne, and Hartgen, David, Research Design for the Neighborhood Ridesharing Demonstration, New York State Department of Transportation, Planning Research Unit, Albany, August 1980.

"Carpooling - Current and Promising Strategies," Institute of Transportation Engineers, Committee 6All Final Report, May 1980.

Central Missouri State University, "Parking Restrictions: Commuter Parking," The National Traffic Law News, Vol. 4, No. 11, Warrensburg, Missouri, November 1977.

Corridor Parking Facilities for Carpoolers, Federal Highway Administration, Washington, D.C., 1981.

Demetsky, Michael J., and Parker, Martin R., Jr., "The Role of Parking in Transportation Systems Management," paper presented at the 57th annual meeting of the Transportation Research Board, Washington, D.C., January 1978.

Dueker, Kenneth J., Bair, Brent O., and Levin, Irwin P., "Ridesharing: Psychological Factors," Transportation Engineering Journal, Vol. 103, No. TE6, American Society of Civil Engineers, New York, November 1977.

Ellis, Raymond H., "Parking Management Strategies," Special Report 172, Transportation Research Board, Washington, D.C., 1977.

Fact Sheet, Numbers 1, 3, and 11, Federal Highway Administration, Washington, D.C., 1980.

Free Parking as a Transportation Problem, U.S. Department of Transportation, Research and Special Programs Administration, Final Report, 1978.

Gillen, David W., "Parking Policy, Parking Location Decisions and the Distribution of Congestion," Transportation, Vol. 7, No. 1, Elsevier Scientific Publishing Company, Amsterdam, Netherlands, March 1978.

Highway Research Board, "Parking Principles," Special Report 125, National Academy of Sciences, Washington, D.C., 1971.

Hoey, William F. and Levinson, Herbert S., "Attitude Surveys, Transit Planning, and Automobile - Use Constraints," Transportation Research Record 625, Transportation Research Board, Washington, D.C., 1977.

Keefer, Louis E., "The Traffic Engineer, the Clean Air Act and Energy," Institute of Transportation Engineers Journal, Vol. 49, No. 12, Institute of Transportation Engineers, Washington, D.C., December 1979.

Keefer, Louis E., "Transportation Control Plans: The Next Round," Institute of Transportation Engineers Journal, Vol. 48, No. 6, Institute of Transportation Engineers, Arlington, Va., June 1978.

- Keyani, Barbara I. and Putnam, Evelyn S., Transportation Systems Management: State of the Art, Section 4-Parking Management, Urban Mass Transportation Administration, U.S. Department of Transportation, Washington, D.C., September 1976.
- Khisty, C. J., "Some Views on Traffic Management Strategies - With Emphasis on Parking and Energy Use," Traffic Quarterly, October 1980, p. 511.
- Margolin, Joseph B., Misch, Marion R., and Dobson, Ricardo D., "Incentives and Disincentives to Ride-Sharing Behavior: A Progress Report," Transportation Research Record No. 592, Transportation Research Board, Washington, D.C., 1976.
- National Academy of Sciences, "Parking," Transportation Research Record 786, Transportation Research Board, 1980.
- Parker, Martin R., Jr., "An Evaluation of Parking Management Strategies for Urban Areas," Master's Thesis, University of Virginia, School of Engineering and Applied Science, Charlottesville, Virginia, May 1977.
- Parker, Martin R. and Demetsky, Michael J., Evaluation of Parking Management Strategies for Urban Areas, Virginia Highway and Transportation Research Council, 1980.
- Parking and Mode Split, Institute of Transportation Engineers, Committee 6Y-12 Final Report, 1979.
- Preferential Facilities for Carpools and Buses, Federal Highway Administration, Washington, D.C., 1976.
- Rappaport, Ann B., "Designing a Parking Management Program," Transportation Research Record 644, Transportation Research Board, Washington, D.C., 1977.
- Ridesharing: Meeting the Challenges of the '80's, The Report of the National Task Force on Ridesharing, Federal Highway Administration, Washington, D.C., 1980.
- Ridesharing News, Numbers 2 and 3, Federal Highway Administration, Washington, D.C., U.S. Government Printing Office, March and May 1981.
- Ridesharing Programs of Business and Industry, Federal Highway Administration, Washington, D.C., 1982.
- Study of Parking Management Tactics, Federal Highway Administration, Washington, D.C., 1980.
- The Texas Vanpool Program, Texas Transportation Institute, U.S. Department of Energy, and Texas Energy and Natural Resources Advisory Council, 1981.
- Transportation Research Board, "Car-Pool Parking Meters," Paratransit, Committee on Urban Transport Service Innovations, Washington, D.C., February 1978.

Transportation Research Board, "Determining the Effect of Residential Parking Permits," Newsline, Vol. 5, No. 1, Washington, D.C., December/January 1979.

"Trends in Industrial Plant Parking," Parking Facilities for Industrial Plants, ITE Informational Report, Project Committee 6T, Institute of Transportation Engineers, September 1969.

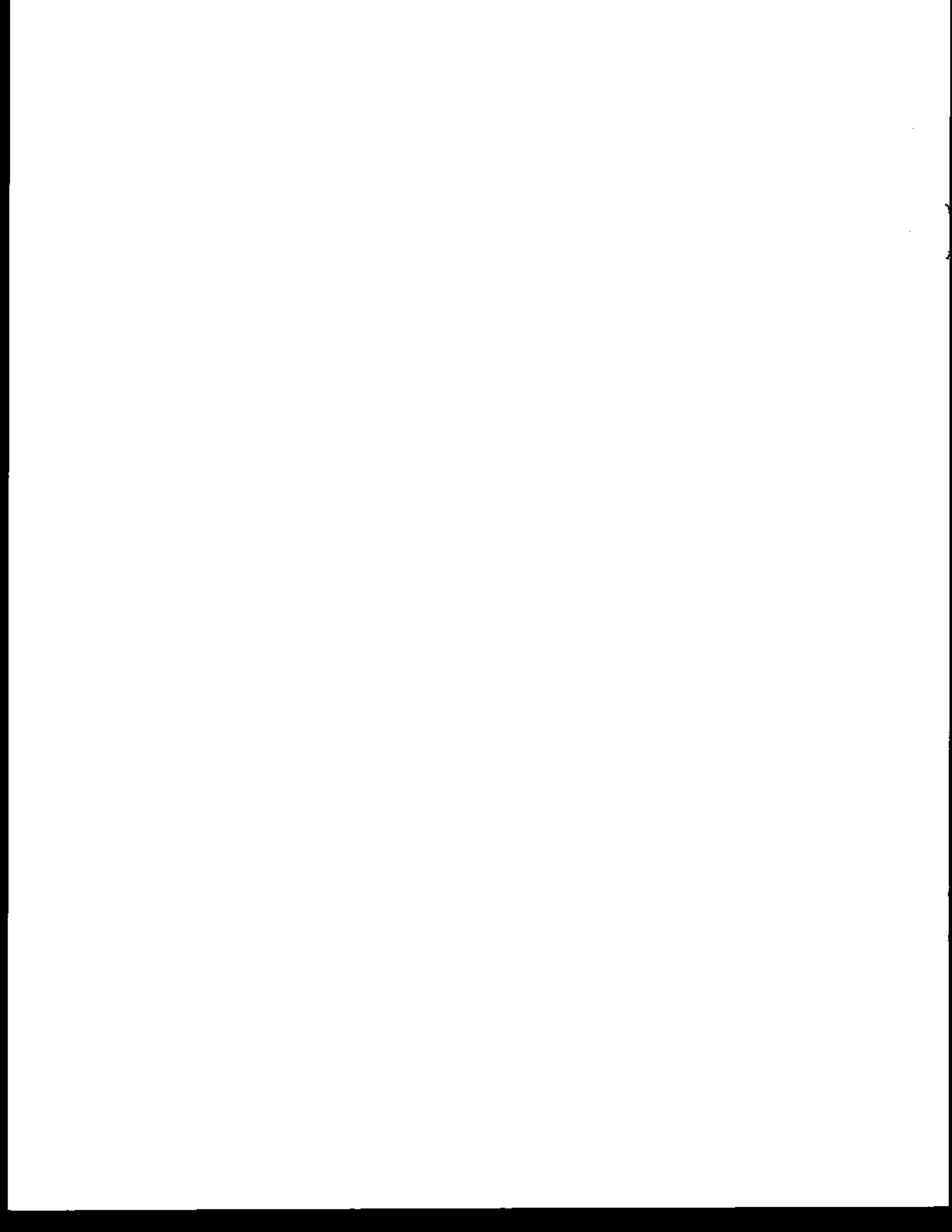
"TSM: An Assessment of Impacts," U.S. Department of Transportation, Urban Mass Transportation Administration and Federal Highway Administration, Washington, D.C., U.S. Government Printing Office, November 1978.

"Utah's Carpool Parking Survey," Newsletter, No. 12, Federal Highway Administration, Office of Research and Development, Washington, D.C., April 1977.

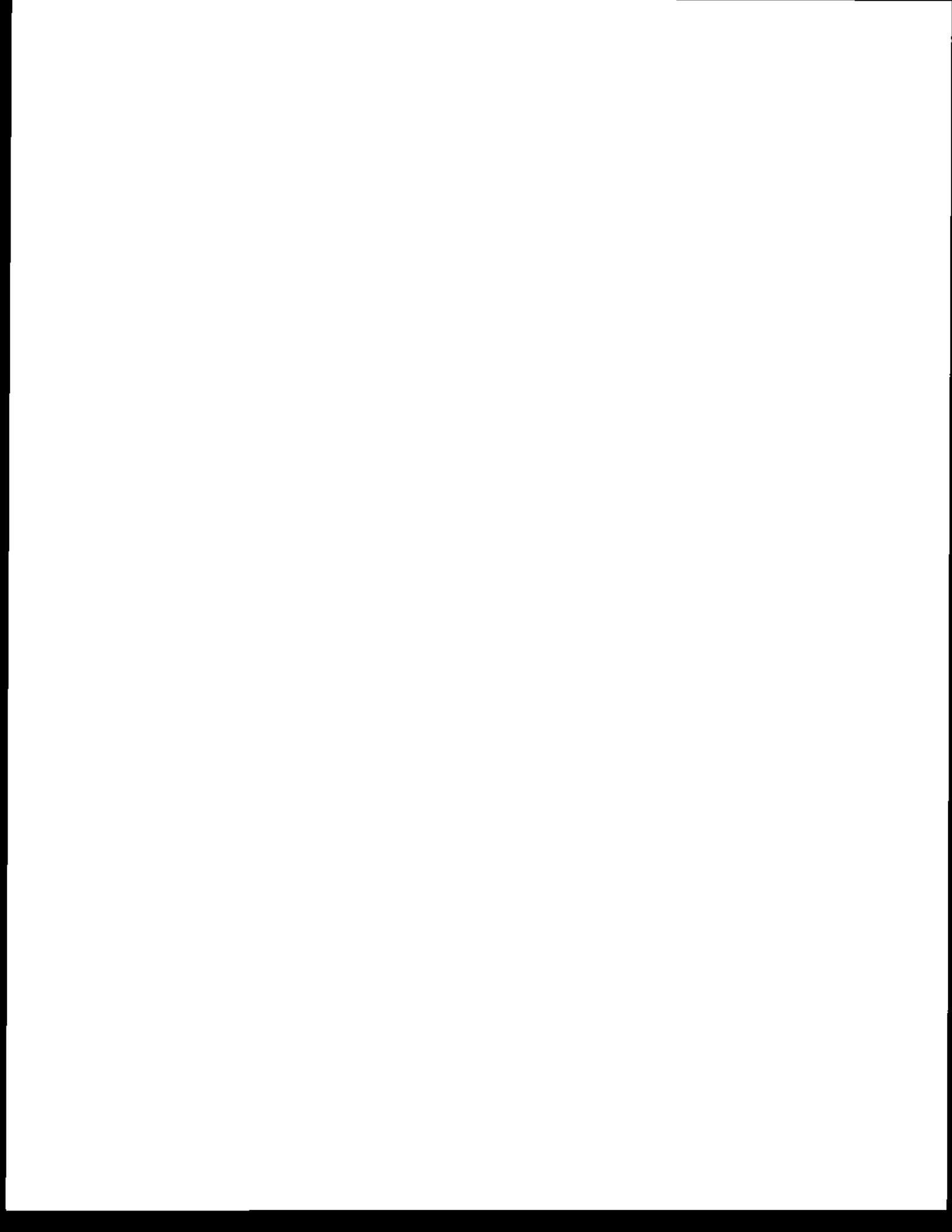
Wagner, Frederick, Energy Impacts of Urban Transportation Improvements, Institute of Transportation Engineers, 1980.

Wallen, Martin, Parking Management - A Realistic Approach, Institute of Transportation Engineers, Southern California Section, 1981.

Wallen, Martin, Transportation Engineering - New Realities, Institute of Transportation Engineers, Southern California Section, 1981.



APPENDIX A
QUESTIONNAIRES



UNIVERSITY OF MARYLAND

QUESTIONNAIRE 1

(Sent to Companies/Agencies)

1. Name and address of firm/company: _____

2. Date: _____

3. Name and title of person completing questionnaire: _____

4. How would you classify the location where your ridesharing program is in effect?

- _____ Industrial Employment Center
- _____ Office Space Only
- _____ Other, explain: _____

5. Approximately how many employees are employed at this location? _____

6. Do you operate shifts? Yes _____ No _____

If yes, please give details: _____

7. How many employees participate in ridesharing programs?

a. Approximate breakdown (% or real numbers):

- _____ carpool
- _____ vanpool
- _____ buspool
- _____ transit
- _____ other, explain: _____

8. Is preferential parking offered to participants in ridesharing operations?

Yes _____ No _____

9. What other incentives and/or services are offered to existing and prospective ridesharing employees? _____

10. Approximately how many parking spaces would you estimate to be no longer needed due to ridesharing activity? _____

a. Total parking spaces at facility _____.

11. Has your organization done any studies on ridesharing/parking facility relationships? Yes _____ No _____

If yes, could you send us a copy? Yes _____ No _____

12. Has your organization made an effort to have the public agency involved reduce parking ordinance requirements because of the reduction of demand for parking due to your ridesharing program? Yes _____ No _____

If yes, complete a, b, & c; if no, go to question 13.

a. Name of public agency involved _____

b. Name of person or office within that agency which handled your request _____

c. What was the result of your effort? _____

d. Do you know of any other organizations which have taken similar action? Yes _____ No _____

If yes, please list: _____

13. Do you have data on the cost to your firm for providing the ridesharing program? Yes _____ No _____

If yes, complete part a.

a. approximate yearly costs

1) of vanpools _____

2) of carpools _____

3) of other _____

14. Do you have data on the savings to your firm resulting from reduced facility requirements because of reduced parking requirements or circulation improvements resulting from your ridesharing program? Yes _____ No _____

If yes, complete part a, b.

a. approximate parking space savings: _____

b. other savings such as:

- 1) traffic signals: _____
- 2) access roads: _____
- 3) other, explain: _____

15. Can we contact you in the future for additional information regarding this research? Yes _____ No _____

If yes, telephone number: _____

Any comments on the feasibility of the trade-off of ridesharing/parking requirements or comments regarding this study can be made on the back of the questionnaire and are most welcome.

UNIVERSITY OF MARYLAND

QUESTIONNAIRE 2

(Sent to Local Planning Agencies)

1. Name and address of agency: _____

2. Date: _____

3. Jurisdiction of agency: _____

4. Is your agency involved with zoning/legislation, for the provision of parking facilities in your jurisdiction? Yes _____ No _____

a. Which of the following areas are addressed in regard to number of parking spaces or amount of parking area required?

_____ maximum allowed

_____ minimum allowed

_____ both maximum and minimum

_____ other, please explain: _____

b. What criteria are used in calculating the number of spaces required?

_____ number of employees

_____ amount of floor area

_____ land use

_____ some combination of above

_____ other, please explain: _____

c. Do these ordinances provide specific requirements for "industrial employment centers" (as defined in cover letter)? Yes _____ No _____

5. Does your office/agency handle "special exemptions" (zoning variances) to parking space requirements? Yes _____ No _____

a. Has your office/agency ever handled an exemption to parking ordinances because of a viable ridesharing program? Yes _____ No _____

If yes, continue with b & c; if not, go to question 7.

b. Have these cases ever resulted in lower parking area requirements being granted? Yes _____ No _____

- c. Have these cases ever involved an "Industrial Employment Center" (as defined in cover letter)? Yes _____ No _____

Answer question 6 only if response to 5 b. was "yes".

6. How was the amount of parking space reduction determined?

_____ sliding scale of employees involved in ridesharing program
_____ 1-1 reduction for number of ridesharing participants
_____ other, please explain: _____

7. Does your office/agency anticipate requests for exemptions, as mentioned in question 5a, in the near future? Yes _____ No _____

8. Is your office/agency planning to consider the effects of viable ridesharing programs on parking requirements in the future?
Yes _____ No _____

9. Does your office/agency have or expect to have an official policy concerning the effects of viable ridesharing programs on parking area requirements for "Industrial Employment Centers" (as defined in cover letter)? Yes _____ No _____

10. Does your office/agency have or plan to have any studies done on the effects of ridesharing programs on parking supply and demand?
Yes _____ No _____

If yes, answer part a.

- a. Could you send a copy of any such report or be willing to be contacted regarding it? Yes _____ No _____

11. Can we contact you in the future for additional information regarding this research? Yes _____ No _____

If yes, telephone number: _____

- a. Name and title: _____

Any comments on the feasibility of the trade-off of ridesharing/parking requirements or comments regarding this study can be made on the back of the questionnaire and are most welcome.

FORM "A"

ITE/NAVPO SURVEY OF PARKING FACILITIES AT MAJOR EMPLOYMENT CENTERS

1. Company Name: _____ Phone: _____
 Contact: _____
 Address: _____

2. Will your organization participate in the NAVPO/ITE Employee Home-Work
 Travel Survey (Form "B")? _____

3. Where is this employment center located?
 _____ Central Business District; _____ Suburban; _____ Rural/small city

4. Current primary use and employment levels:

	Number of Employees		
	Day Shift	Second Shift	Third Shift
Manufacturing _____ (Type)			
Office _____ (Type)			
Other _____ (Type)			
Total Employment			

5. Total Gross Floor Area: _____ Estimated Square Feet

6. Total number of parking spaces available on site: _____ spaces

7. Total parking spaces used by day shift:

	Surface Lots	Multi-Story
Employer Provided		
Use of Commercial Parking		
On-Street Parking		
Other (Visitors, Service Personnel, etc.)		

8. How do your employees travel to work? (Answer only if not participating in employee survey.)

	Currently Date:	Prior Count Date:	Pre-ridesharing Date:
Single Occupant Auto			
Carpool (2 to 7 persons)			
Vanpool (8 persons or more)			
Bus			
Subway			
Walk, Bicycle, Taxi			
Total number of employees			

9. Estimated average one-way commuting distance for employees; _____ miles

10. Is your organization engaged in any of the following ridesharing activities?

	YES	NO	COMMENTS
Carpool Promotion	<input type="checkbox"/>	<input type="checkbox"/>	_____
Carpool Matching	<input type="checkbox"/>	<input type="checkbox"/>	_____
Vanpool Program	<input type="checkbox"/>	<input type="checkbox"/>	_____
Transit Promotion	<input type="checkbox"/>	<input type="checkbox"/>	_____
Staggered Hours	<input type="checkbox"/>	<input type="checkbox"/>	_____
Flextime	<input type="checkbox"/>	<input type="checkbox"/>	_____
Shuttle Service to Subway, etc.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Do you subsidize fares?			
Vanpool	<input type="checkbox"/>	<input type="checkbox"/>	_____
Bus	<input type="checkbox"/>	<input type="checkbox"/>	_____
Special Roadway Access for:			
Carpools	<input type="checkbox"/>	<input type="checkbox"/>	_____
Vanpools	<input type="checkbox"/>	<input type="checkbox"/>	_____
Buses	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other			
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	_____

11. Is your organization engaged in any of the following parking management programs?

	YES	NO	COMMENTS
Priority Parking for:			
Carpools	<input type="checkbox"/>	<input type="checkbox"/>	_____
Vanpools	<input type="checkbox"/>	<input type="checkbox"/>	_____
Buses	<input type="checkbox"/>	<input type="checkbox"/>	_____
Provide free parking	<input type="checkbox"/>	<input type="checkbox"/>	_____
Provide subsidized parking (Note cost \$ _____ /month)	<input type="checkbox"/>	<input type="checkbox"/>	_____
Commercial parking in area (Note cost \$ _____ /month)	<input type="checkbox"/>	<input type="checkbox"/>	_____
Pickup/Dropoff Areas for Ridesharing Vehicles	<input type="checkbox"/>	<input type="checkbox"/>	_____
Shuttle Service to Off-Site Parking Facilities	<input type="checkbox"/>	<input type="checkbox"/>	_____
Parking Spaces allocated by:			
Seniority	<input type="checkbox"/>	<input type="checkbox"/>	_____
Rank	<input type="checkbox"/>	<input type="checkbox"/>	_____
Union Contract	<input type="checkbox"/>	<input type="checkbox"/>	_____
Vehicle Occupancy	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other			
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	_____

RETURN THIS SURVEY TO:

ED MARKS
NAVPO
 12208 W. Kingsgate Drive
 Knoxville, TN 37922
 (615) 966-4507

FORM "B"

--	--	--	--

Organization

NAVPO/ITE EMPLOYEE HOME-WORK TRAVEL SURVEY

In order to plan proper transportation facilities, we need to learn about your travel habits. Please complete the following questions and return to your supervisor. Boxes are for Official Use only.

1. My zip code is: _____

--	--	--	--	--

2. The number of vehicles owned in the household where I live is _____

--	--

3. The type of dwelling I live in is (circle one)

1. Single family	3. Duplex			
2. Apartment (more than 2 families)	4. Townhouse or condominium	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>		

4. My sex is (circle one)

1. Female	2. Male			
		<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>		

5. My age is _____

--	--

6. My marital status is (circle one)

1. Unmarried	2. Married			
		<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>		

7. The number of persons employed in my family and residing in my household is _____

--	--

8. My job would be classified as (circle only one)

1. Production	3. Office			
2. Supervision/Management	4. Technical/Laboratory	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>		
		5. Other		

9. My family's income class is (circle one)

1. Under \$15,000	3. \$26,000 or more			
2. \$15,000 - 25,000				
		<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>		

10. On my way to work today, I left home at _____ : _____ A.M., P.M.
I arrived at work at _____ : _____ A.M., P.M.

--	--	--	--

--	--	--	--

11. I live _____ miles from work.

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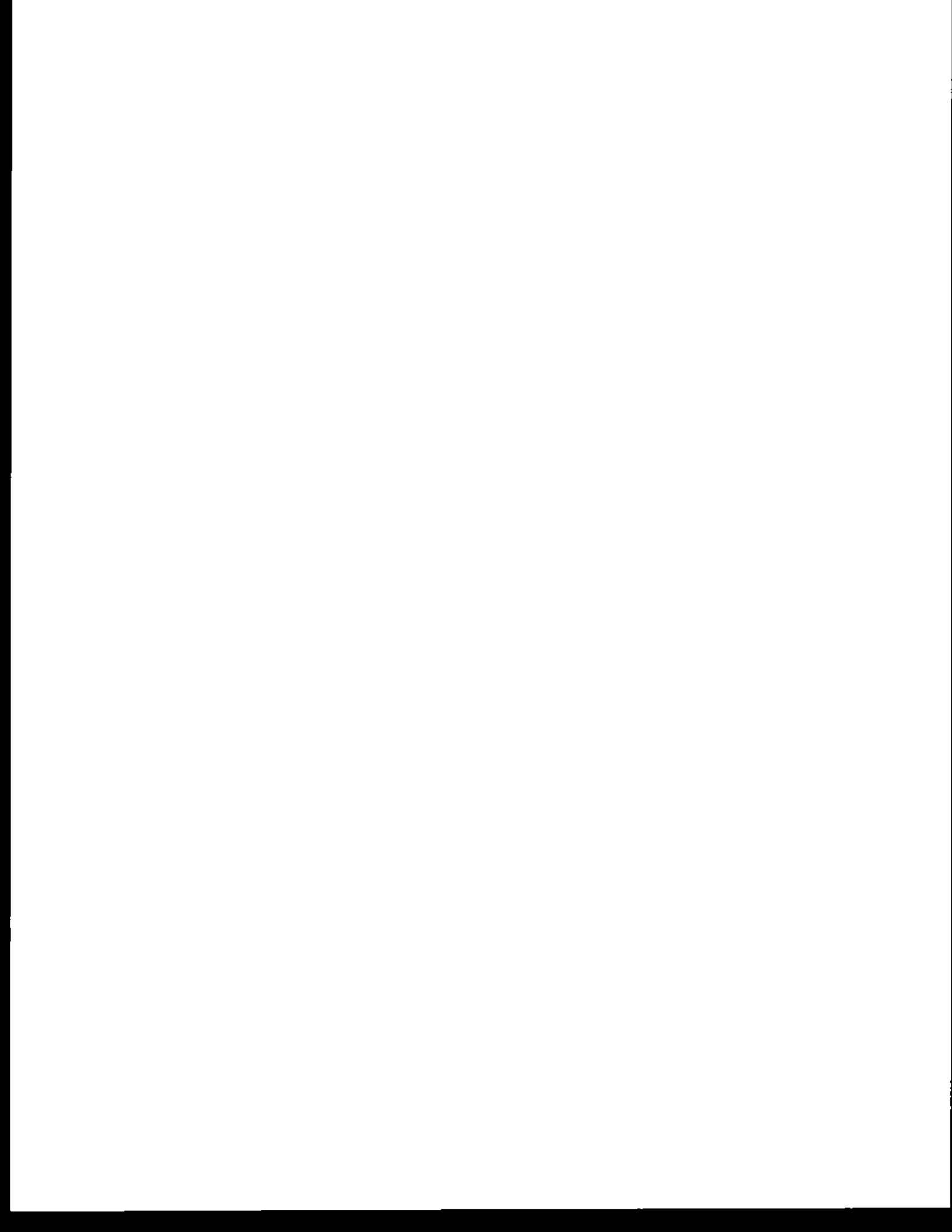
12. I got to work by (circle only one)

1. Driving car	6. Riding in a carpool			
2. Walking	7. Riding in a vanpool	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table>		
3. Dropped off at work	8. Motorcycle, motorbike, etc.			
4. Bicycle	9. Other			
5. Public transit				

PLEASE RETURN TO YOUR SUPERVISOR

THANKS FOR YOUR COOPERATION

APPENDIX B
TYPICAL RESULTS OF SPSS ANALYSIS

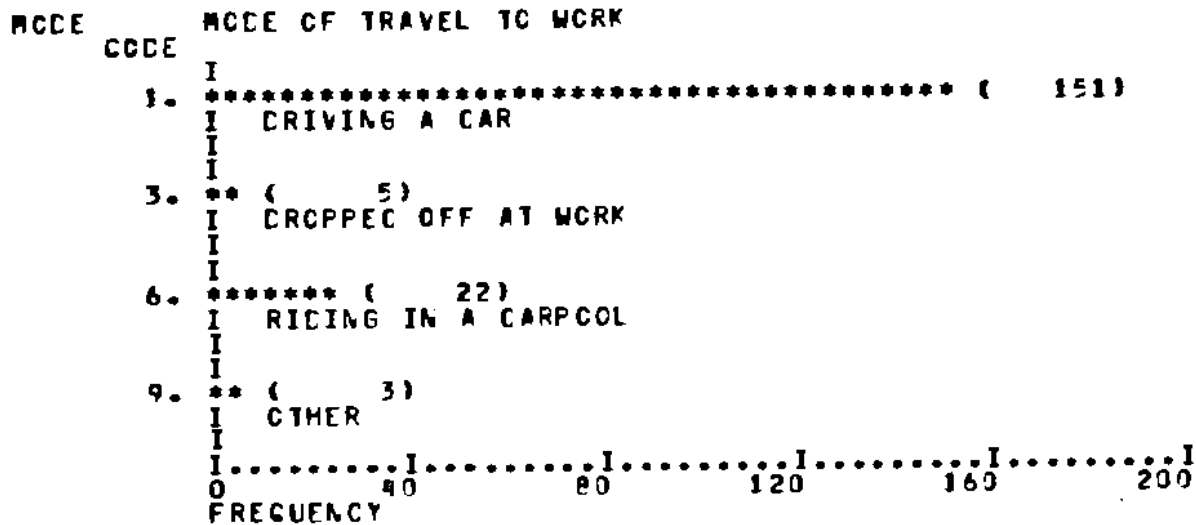


TYPICAL RESULTS OF SPSS ANALYSIS

SPSS STATISTICAL SYSTEM

05/27/82

FILE - ITENAVPC - CREATED 05/27/82



MEAN	1.796	MEDIA	1.199	MODE	1.000
STC DEV	1.897	VARIANCE	3.597	RANGE	8.000
MINIMUM	1.000	MAXIMUM	9.000		
VALID CASES	181	MISSING CASES	0		

FREQUENCY OF MODE OF TRAVEL TO WORK

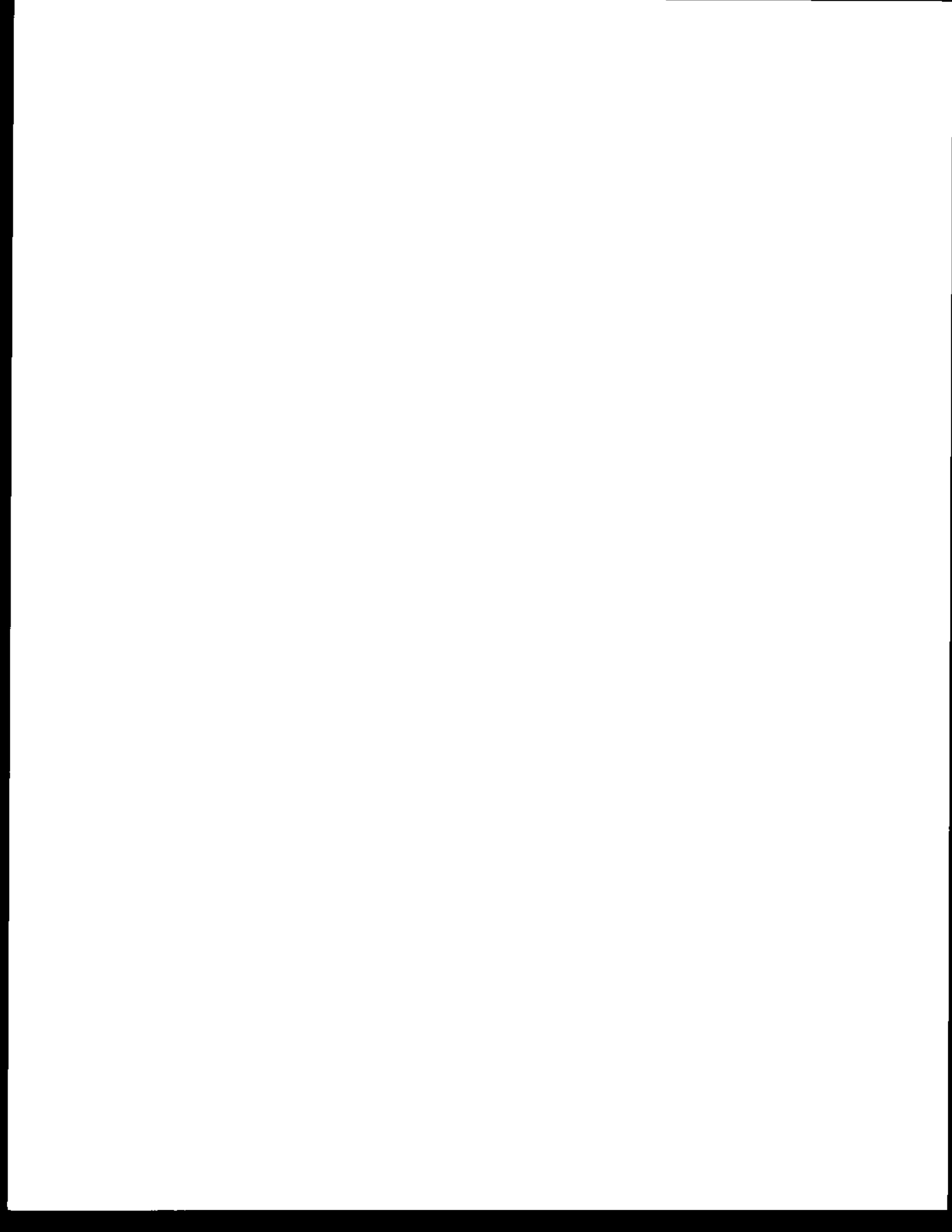
SPSS STATISTICAL SYSTEM

05/27/82

FILE - ITENAVPC - CREATED 05/27/82

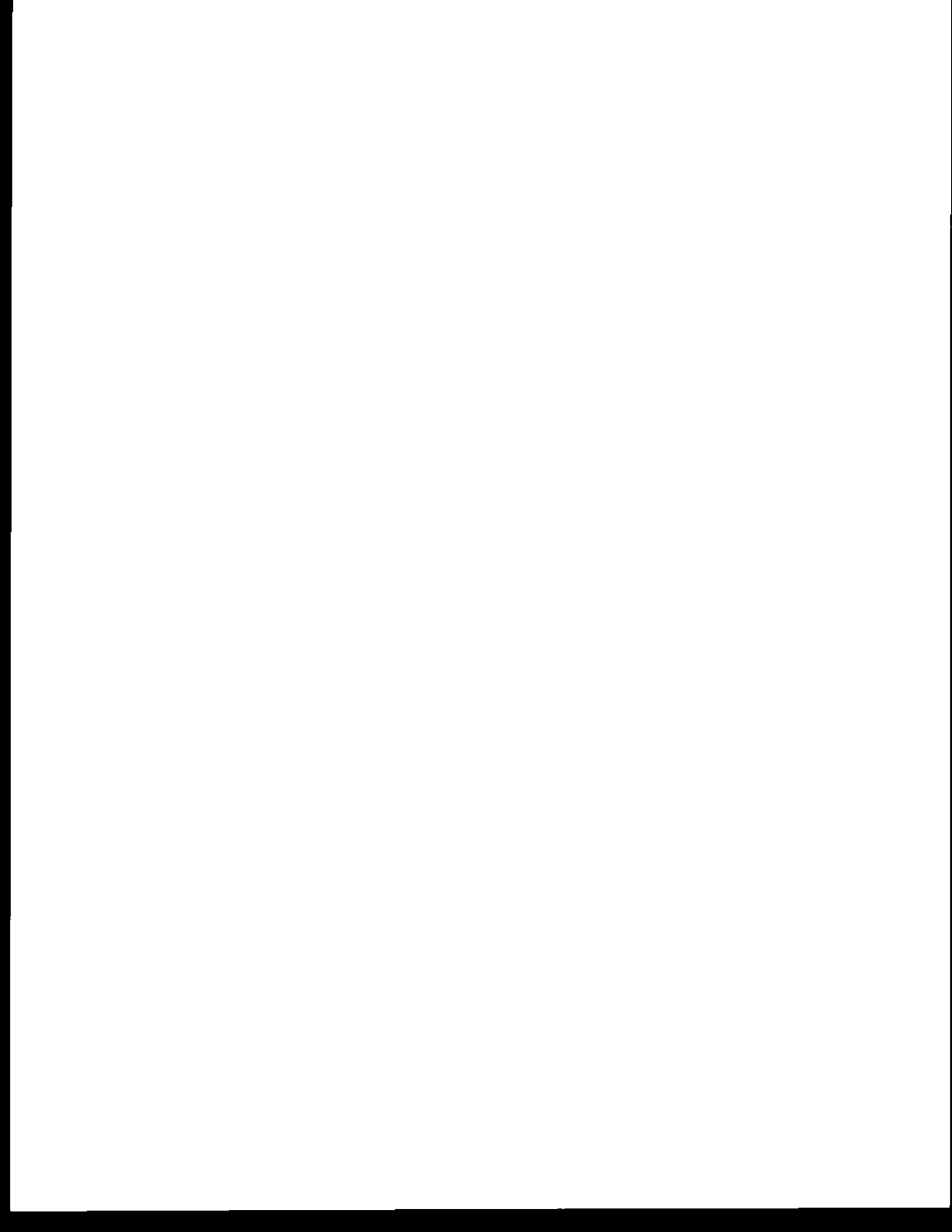
MODE	MODE OF TRAVEL TO WORK	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	DRIVING A CAR	151	83.4	83.4	83.4
	DROPPED OFF AT WORK	5	2.8	2.8	86.2
	RIDING IN A CARPOOL	22	12.2	12.2	98.3
	OTHER	3	1.7	1.7	100.0
	TOTAL	181	100.0	100.0	

FREQUENCY OF MODE OF TRAVEL TO WORK



APPENDIX C

MARYLAND NATIONAL CAPITAL PARK
AND PLANNING COMMISSION SURVEY



Characteristics of Ridesharing Measures

Jurisdiction	Type of Area	ETC *	Participation in Ride Matching Service *	Provision of HOV parking Spaces	Flex-time Work Hours	Parking Charges	Provision of HOV's	Transit Passes HOV Cost Subsidy	Provision of Transit or Bicycles	Contribution to Transportation/RS Fund	Company RS Program	Implementation	Enforcement	Reductions Permitted	Comments
Bellevue, WA	CBD (12,000) ^{1/}	X	X	X	X	X	X	X	X			When landowner accepts reduction, takes responsibility.	"Such covenants and guarantees as necessary."	Up to 50 percent.	Most comprehensive of all ordinances surveyed.
Seattle, WA	CBD			X ²				O		O		Requires landowner to implement.	City agency funded by transportation fee.	Currently parking maximums.	Required of several new developments under comprehensive study proposing other techniques.
Sacramento, CA	CBD (C-3)			X ²				X				When landowner accepts reduction, takes responsibility.	Landowner self-enforcement.	-60 percent new or expanded office -100 percent office conversions	Just instituted both maximum and minimum in CBD, C-3 zone.
Palo Alto, CA	City										X	When landowner accepts reduction takes responsibility.	"Such covenants and guarantees as necessary."	Up to 20 percent.	Landowner must set outside additional land or parking facility equal to the reduction granted for use if program fails.
Sunnyvale, CA	City (110,000) ^{1/}			X	O				O	O		Can require landowner to implement.	Required and monitored by city.	None; measure is condition of approval.	Attempt to limit parking at new industrial developments.
Santa Cruz, CA	City				X			X	X			Can require landowner to implement.	Required and monitored by city.	None; measure is condition of approval.	City can set maximum parking standards where "city standards (minimums) exceeded"
Los Angeles, CA	City and County	O	O									When landowner accepts reduction, takes responsibility.	Self-enforcement of agreed to performance standard.	Staff sets.	Has been proposed for five years but no specifics have been implemented.
Savannah, GA	City			O		O			O			Voluntary encouragement.	City monitors voluntary enforcement actions.	If CBD minimums implemented, permit percent reduction (staff discretion)	On-street HOV meters and parking permits both considered; require new downtown development to provide off-street parking.
Dallas Galleria Mixed-Use Development	Suburban N. Dallas - 44 acres - 2,000,000 sq. office	O	O	O		O			O			Developer agreement to mitigate high trip generation rates.	Approval conditioned upon self-enforcement and effective program.	None requested.	This is a site specific reductions but principles are same.
Fairfax, VA Mixed-Use Development	Outlying Suburban - 1,900,000 sq. office	O	O	O		O			O			Developer agreement to mitigate high trip generation rates.	Must meet established trip generation rate goals.	Not yet established.	Parking space reductions have not yet been negotiated.

1/ Total employment

2/ Development approval conditioned upon provision of HOV parking spaces.

3/ 15 percent maximum reduction for this method.

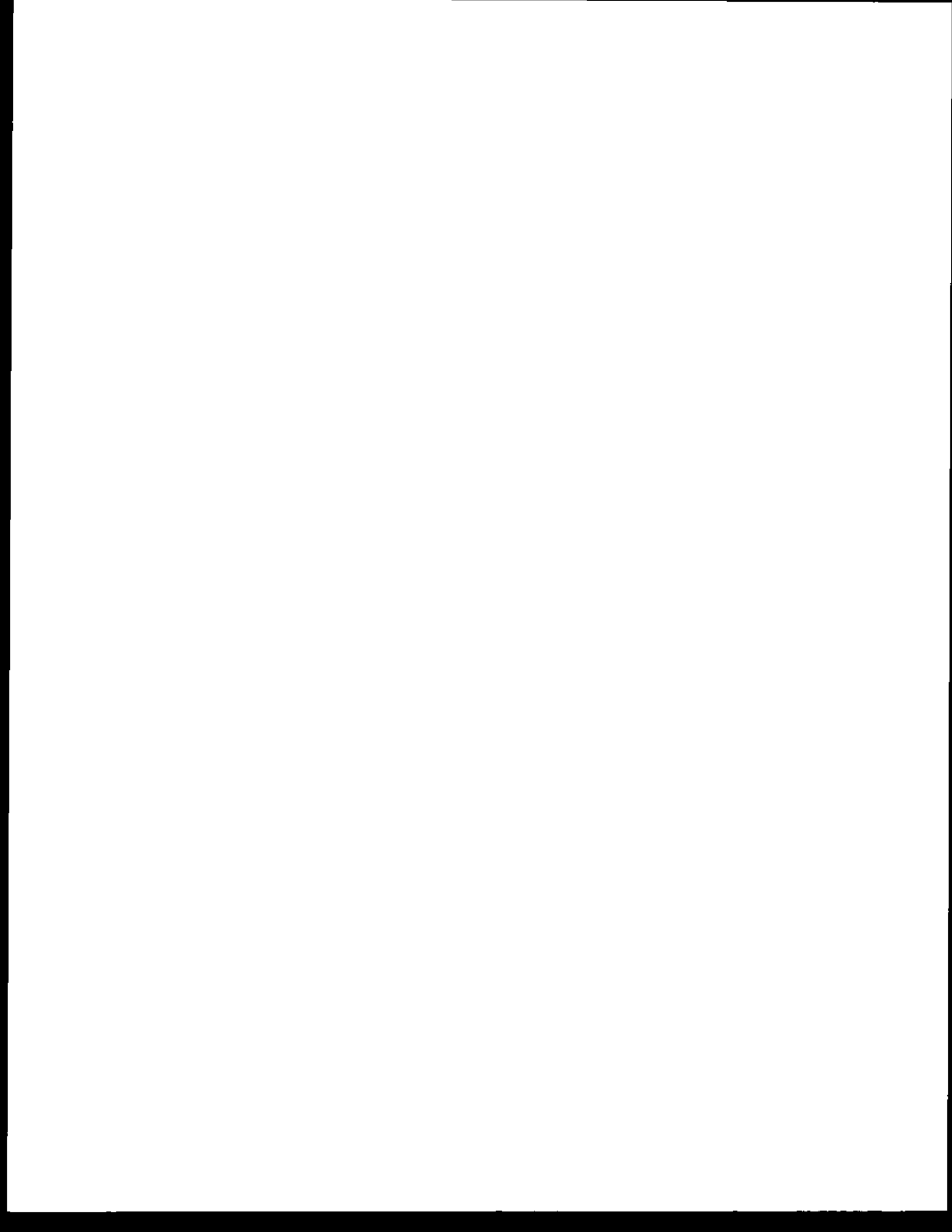
KEY: X = Implemented

O = Proposed

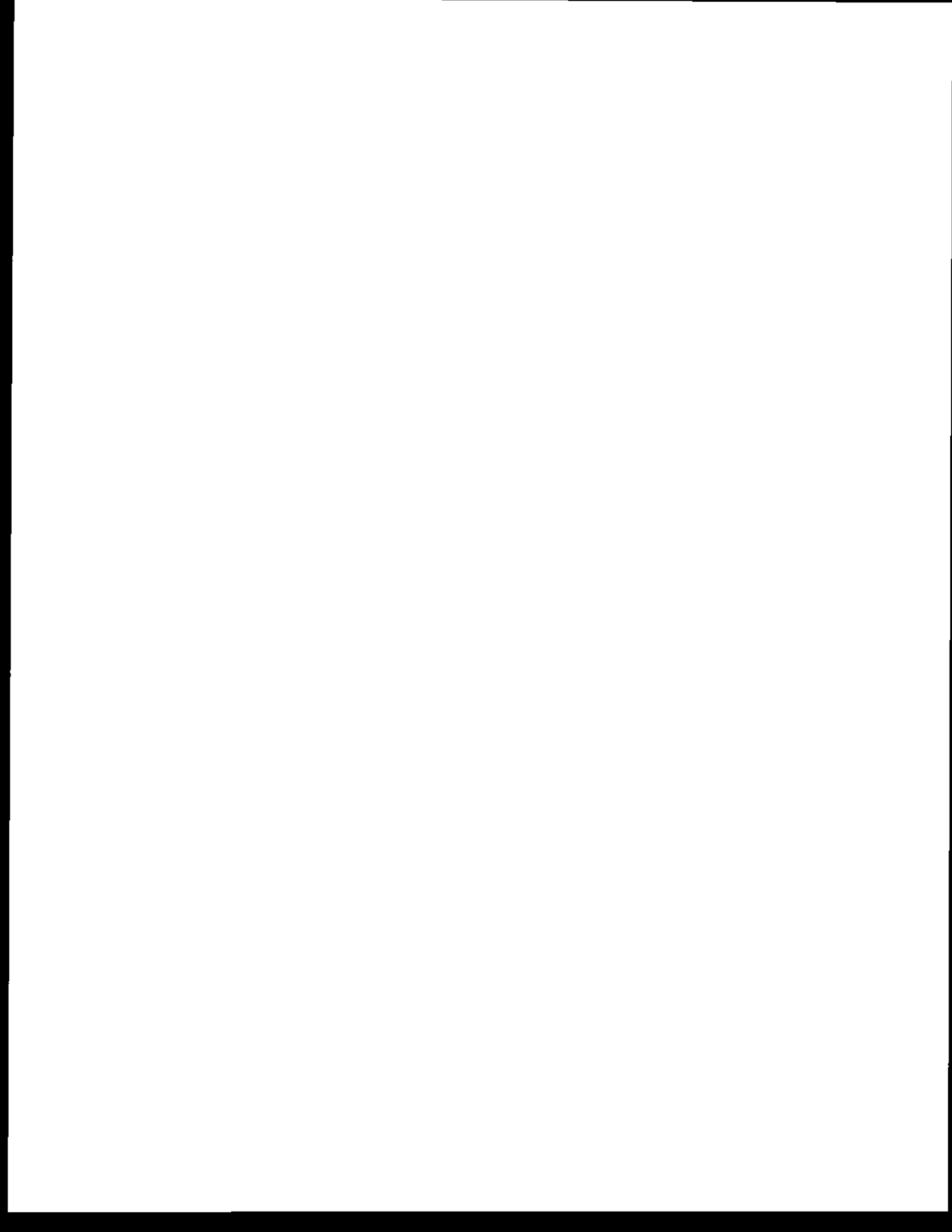
RS = Ridesharing

ETC = Employee Transportation Coordinator

HOV = High Occupancy Vehicle



APPENDIX D
SAMPLE LEGISLATION



AN ORDINANCE AMENDING ARTICLE VIII OF ORDINANCE
NO. 163 ZONING ORDINANCE OF THE VILLAGE OF SCHAUMBURG

BE IT ORDAINED BY THE PRESIDENT AND BOARD OF TRUSTEES OF THE VILLAGE
OF SCHAUMBURG:

SECTION ONE: That Article VIII of Ordinance No. 163, Zoning
Ordinance of the Village of Schaumburg, be and it is hereby amended by adding
thereto the following Section 9:

"SECTION 9 - ADJUSTMENTS TO REQUIRED PARKING

- 9.1 Purpose. The Village Board may grant relief to the parking regulations through the variation procedure in specific cases without meeting the hardship requirements of Article XIV, Section 4.1 herein. In the following cases, adjustments may be made to required parking demand.
- 9.2 Shared Ride Programs. Shared ride programs, by increasing the passengers per motor vehicle, decrease parking demand. Examples are employer sponsored vanpooling and subscription bus service. For buildings or complexes of a minimum of fifty thousand (50,000) square feet gross floor area, a reduction of up to 30 percent (30%) of required parking may be allowed based on substantiated projections of reduction in demand.

To qualify for vanpooling or subscription bus service, the petitioner must submit evidence to the satisfaction of the Zoning Board of Appeals that:

- a. The petitioner is participating or shall participate in an approved carpooling program established under the provisions of 9.3 below and either;
- b. Petitioner will obtain or lease to qualified employees vans, buses or other high passenger capacity vehicles, for the purpose of providing transportation of additional passengers (vanpooling); and/or
- c. Petitioner will operate or hire vans, buses or other high passenger capacity vehicles to provide exclusive or non-exclusive commuter transportation of employees from residential areas, train stations or other transit terminals.

In furtherance of the petition, the petitioner may show any other activities that will ease the creation of vanpools and carpools. For example:

- a. Petitioner will employ working day policy known as flextime where employees are given some latitude on starting and quitting times.
- b. Petitioner will provide adequate lunch facilities on the site.
- c. Petitioner will provide preferential parking.

As a part of his request for a variation, the petitioner shall show to the satisfaction of the Zoning Board of Appeals that the actions proposed by the petitioner shall reduce the parking demand by the amount requested.

9.3 Carpooling Programs. A variation of up to 10 percent (10%) of required parking based on substantiated projections of reduction in demand may be granted for any building or complex of fifty thousand (50,000) square feet of gross floor area which institutes or proposes to institute a carpooling program which meets the following minimum requirements:

- a. Carpooling program must be a specific responsibility of a designated individual or department.
- b. Program must provide an active matching service using manual or automated matching of addresses and providing employees with potential carpools (passive matching alone such as bulletin boards is not acceptable).
- c. Program must endeavor to register all existing and all new employees.
- d. Program must actively promote carpooling to employees through newsletter posters and other media.

9.4 Transit. A reduction of required parking may be granted for any complex within one-half mile of any regularly scheduled bus route or commuter train station, with service available during commuting hours, equal to the substantiated projections of use of public transportation by employees of such complex.

9.5 Shared Parking. In mixed use developments, uses with different peak hour demand may use the same parking areas. Up to 30 percent (30%) of total required parking may be allowed on a joint use basis. The petitioner must complete and submit to the Zoning Board of Appeals an analysis and substantiated projections of peak parking demand for the entire development to justify the shared use of parking spaces for separate uses.

9.6 Enforcement of Carpooling and Shared Ride Programs.

Development plans, wherein parking is reduced for shared ride or carpooling programs, shall have an area designated where parking could be constructed equal to the number being reduced. If the programs are not being conducted as testified to the Zoning Board of Appeals, the owner must construct the parking required to meet the regulations of the Village, during the next construction season. The petitioner, in accepting a parking reduction, agrees to construct such additional parking as would otherwise be required under the provisions of the Zoning Ordinance, if the Village Board shall determine after hearing by the Zoning Board that the reasons for granting said reduction no longer exist.

Prior to the issuance of any occupancy permit, the employer(s) must verify that such ridesharing plans, as shown at the time the variation was granted, are being implemented. Such verification must include copies of any contracts, lease agreements, purchase agreements and other documentation to show that such ridesharing has taken or is about to take place.

Prior to the issuance of an annual business license, the employer(s) shall submit a report evaluating its ridesharing program. Such report shall include the number of participants involved, the percentage of participants to total work force, number and types of vehicles used, and the percentage of parking spaces normally used by employees.

The commitments agreed to by the petitioner and recommended by the Zoning Board of Appeals and adopted by the Board of Trustees shall be applicable to all successors in title and to all tenants. The petitioner shall record a covenant, the content and form of which must be approved by the Director of Planning, which binds all successors in title to the commitments approved and the petitioner shall include in all leases a clause, content and form approved by the Director of Planning, which binds all tenants to this commitment made by the petitioner."

SECTION TWO: This ordinance shall be in full force and effect from and after its passage, approval and publication in the manner provided by law.

City of Los Angeles

Proposed Ordinance for Discussion
(Public Hearing March 18, 1982)

An ordinance pertaining to a conditional use permit to allow reduced parking requirements for commercial and industrial developments in the C and M zone.

Section 1. Section 12.03 of the Los Angeles Municipal Code is hereby amended by adding in proper alphabetical sequence the definitions of "Alternative Means of Transportation" and "Parking Demand," said definitions to read:

ALTERNATIVE MEANS OF TRANSPORTATION - Any alternative means of transportation to the single-occupant automobile such as carpool, vanpool, mass transit, bus, bicycle, etc.

PARKING DEMAND - The actual number of parking spaces needed to accommodate employees and non-employees at a development, with no parking "spill over" into the surrounding area.

Section 2. Subdivision 1.1 of Subsection C of Section 12.24 of the Los Angeles Municipal Code is hereby amended by adding a paragraph (n) thereto, said paragraph to read:

(n) Commercial or industrial buildings with reduced parking requirements in the C and M zones, provided that:

(1) Commercial and industrial developments must have not less than 100 employees or tenants working at that facility on the largest work shift.

(2) The number of parking spaces required by Section 12.21-A, 4, or any other provision of law may be reduced by not more than 40 percent, under any of the following circumstances:

(i) where open space or building area on or off the site is provided and located so it can be converted to parking if needed and such open space or building area if converted to parking would produce the additional number of parking spaces necessary to meet the requirements of Section 12.21-A, 4 and 5, or any other provision of law; or

(ii) where future construction of a parking structure on or off the site is determined by a Zoning Administrator to be practical, feasible and compatible with the site plan and such parking structure would produce the additional number of parking spaces necessary to meet the requirements of Section 12.21-A, 4 and 5, or any other provision of law; or

(iii) where an alternative system of remedies is determined by a Zoning Administrator to be adequate to protect the City against failure to achieve levels of compliance specified in the conditional use permit.

(3) When a reduction of parking spaces is approved, the owner of the land, or his agent, shall either:

(i) furnish and record an agreement in the Office of the County Recorder of Los Angeles County, California, as a covenant running with the land for the benefit of the City of Los Angeles, providing that, should the levels of compliance specified in the Conditional Use Permit not be achieved, the owner will develop the parking spaces on the open space or in a parking structure as planned under the provisions of subparagraph (2), (i) or (ii) above; or

(ii) enter into alternative legal agreements as to assurances and remedies that the Zoning Administrator, in consultation with the City Attorney, shall find adequate to protect the City against failure to achieve the levels of compliance specified in the Conditional Use Permit.

(4) The reduced number of parking spaces provided for each development shall be determined by a Zoning Administrator on the basis of:

(i) that anticipated parking demand (number of parking spaces) be determined and fully accommodated for each development by parking spaces and alternative means of transportation. There shall be no "spillover" of parking onto the surrounding area; and

(ii) that the number of parking spaces that are reduced for each development shall directly relate to the levels of alternative means of transportation that are determined to be achievable. Any change in the approved type or level of alternative means of transportation must be reviewed and approved by the Zoning Administrator as a plan review request; and

(iii) that each year prior to the anniversary date of the approval of the parking reduction request, the owner, or his agent, must submit to the Office of the Zoning Administrator a plan review request containing such information as the Zoning Administrator shall specify. Failure to submit this report will automatically revoke the conditional use permit. Submission of inaccurate or misleading information will cause this conditional use permit to be subject to revocation and corrective action under the provision of subparagraphs (2) and (3) above, or other appropriate remedy.

(iv) that the Zoning Administrator may impose additional corrective conditions, including requiring additional employee parking, if, in his opinion, such conditions are necessary for the protection of the adjacent area.

(5) Each application for such reduction of parking spaces shall be referred forthwith for review to the Councilperson of the district in which the property is located.

