RIDESHARING ELEMENT OF PARKING FACILITIES
FOR
INDUSTRIAL EMPLOYMENT CENTERS

Prepared for

TRANSPORTATION MANAGEMENT AND
RIDESHARING PROGRAMS BRANCH
FEDERAL HIGHWAY ADMINISTRATION
U. S. DEPARTMENT OF TRANSPORTATION
WASHINGTON, D.C. 20590

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A Report to

DINGLE ASSOCIATES, INC.
1625 Eye Street, N.W.
Suite 915
Washington, D.C. 20006

by

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University of Maryland
College Park, Maryland

September 1982
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 Schaumberg, 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.
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

<table>
<thead>
<tr>
<th>Population Group of Urbanized Area</th>
<th>Type of Facility</th>
<th>Average Number of Total Spaces</th>
<th>Spaces per 1,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off-Street</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Curb</td>
<td>Lot</td>
<td>Garage</td>
</tr>
<tr>
<td>10,000-25,000</td>
<td>1,090</td>
<td>1,530</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>(43%)</td>
<td>(57%)</td>
<td>(0)</td>
</tr>
<tr>
<td>25,000-50,000</td>
<td>1,430</td>
<td>2,420</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>(38%)</td>
<td>(59%)</td>
<td>(3%)</td>
</tr>
<tr>
<td>50,000-100,000</td>
<td>1,610</td>
<td>2,790</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>(35%)</td>
<td>(60%)</td>
<td>(5%)</td>
</tr>
<tr>
<td>100,000-250,000</td>
<td>2,130</td>
<td>4,760</td>
<td>820</td>
</tr>
<tr>
<td></td>
<td>(27%)</td>
<td>(62%)</td>
<td>(11%)</td>
</tr>
<tr>
<td>250,000-500,000</td>
<td>2,450</td>
<td>7,910</td>
<td>1,940</td>
</tr>
<tr>
<td></td>
<td>(20%)</td>
<td>(64%)</td>
<td>(16%)</td>
</tr>
<tr>
<td>500,000-1,000,000</td>
<td>3,200</td>
<td>12,500</td>
<td>6,900</td>
</tr>
<tr>
<td></td>
<td>(14%)</td>
<td>(56%)</td>
<td>(31%)</td>
</tr>
<tr>
<td>Over 1,000,000</td>
<td>8,000</td>
<td>32,000</td>
<td>18,600</td>
</tr>
<tr>
<td></td>
<td>(14%)</td>
<td>(55%)</td>
<td>(31%)</td>
</tr>
</tbody>
</table>

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

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

*NOTE: As estimated by company, due to ridesharing activities.
<table>
<thead>
<tr>
<th>NAME OF COMPANY</th>
<th>LOCATION</th>
<th>NUMBER OF EMPLOYEES</th>
<th>% CARPOOL</th>
<th>% VANPOOL + BUSPOOL</th>
<th>% USING TRANSIT</th>
<th># OF PARKING SPACES ON SITE</th>
<th># OF PARKING SPACES NO LONGER NEEDED</th>
<th>PARKING STUDY DONE</th>
<th>CONTACT WITH ZONING AGENCY</th>
<th>PREFERENTIAL PARKING</th>
<th>OTHER INCENTIVES</th>
<th>PROGRAM COST DATA AVAILABLE</th>
<th>TYPE OF COMPANY (INDUSTRIAL OR OFFICE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulf Oil</td>
<td>Houston, Tex.</td>
<td>2,700</td>
<td>-</td>
<td>50</td>
<td>30</td>
<td>-</td>
<td>780</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Gulf Res. and Dev.</td>
<td>Pittsburgh, Penn.</td>
<td>2,000</td>
<td>40</td>
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<td>-</td>
<td>1,030</td>
<td>-</td>
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<td>N</td>
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<td>3,000</td>
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<tr>
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<td>-</td>
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<td>-</td>
<td>-</td>
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<td>1,300</td>
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<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>O</td>
</tr>
</tbody>
</table>

*NOTE: As estimated by company, due to ridesharing activities.
<table>
<thead>
<tr>
<th>NAME OF COMPANY</th>
<th>LOCATION</th>
<th>NUMBER OF EMPLOYERS</th>
<th>% CARPOOL</th>
<th>% VANPOOL + BUSPOOL</th>
<th>% USING TRANSIT</th>
<th># OF PARKING SPACES ON SITE</th>
<th># OF PARKING SPACES NO LONGER NEEDED</th>
<th>PARKING STUDY DONE</th>
<th>CONTACT WITH ZONING AGENCY</th>
<th>PREFERENTIAL PARKING</th>
<th>OTHER INCENTIVES</th>
<th>PROGRAM COST DATA AVAILABLE</th>
<th>TYPE OF COMPANY (INDUSTRIAL OR OFFICE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offutt Air Force Base</td>
<td>Nebr.</td>
<td>12,329</td>
<td>53</td>
<td>2</td>
<td>-</td>
<td>11,298</td>
<td>-</td>
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<td>N</td>
<td>Y</td>
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<td>10</td>
<td>13</td>
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<td>-</td>
<td>-</td>
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<td>N</td>
<td>Y</td>
<td>Y</td>
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<td>12</td>
<td>12</td>
<td>3</td>
<td>-</td>
<td>-</td>
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<td>N</td>
<td>Y</td>
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<td>11</td>
<td>-</td>
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<td>N</td>
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<td>Y</td>
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<td>3</td>
<td>-</td>
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<td>32</td>
<td>1</td>
<td>-</td>
<td>1,800</td>
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<td>Y</td>
<td>Y</td>
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<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>O</td>
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*NOTE: As estimated by company, due to ridesharing activities.
<table>
<thead>
<tr>
<th>NAME OF COMPANY</th>
<th>LOCATION</th>
<th>NUMBER OF EMPLOYEES</th>
<th>% CARPOOL</th>
<th>% VANPOOL + BUSPOOL</th>
<th>% USING TRANSIT</th>
<th># OF PARKING SPACES ON SITE</th>
<th># OF PARKING SPACES NO LONGER NEEDED</th>
<th>PARKING STUDY DONE</th>
<th>CONTRACT WITH ZONING AGENCY</th>
<th>PREFERENTIAL PARKING</th>
<th>OTHER INCENTIVES</th>
<th>PROGRAM COST DATA AVAILABLE</th>
<th>TYPE OF COMPANY (INDUSTRIAL OR OFFICE)</th>
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<td>Southern New England Telephone</td>
<td>New Haven, Conn.</td>
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<td>10</td>
<td>6</td>
<td>15</td>
<td>-</td>
<td>2,600</td>
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<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
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<td>STATITROL</td>
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<td>235</td>
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<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>N</td>
<td>N</td>
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<td>Tennessee Valley Authority</td>
<td>Knoxville, Tenn.</td>
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<td>-</td>
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<td>N</td>
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<td>San Antonio, Tex.</td>
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<td>24</td>
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<td>-</td>
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<td>1,400</td>
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<td>N</td>
<td>Y</td>
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<td>St. Louis, Mo.</td>
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<td>3</td>
<td>3</td>
<td>-</td>
<td>1,500</td>
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<td>Y</td>
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<td>N</td>
</tr>
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<td>Winnebago Industries</td>
<td>Forest City, Iowa</td>
<td>900</td>
<td>-</td>
<td>22</td>
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<td>1,000</td>
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<td>N</td>
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<td>Y</td>
<td>Y</td>
<td>N</td>
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<tr>
<td>Zenith Radio</td>
<td>Chicago, Ill.</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
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<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>O</td>
</tr>
</tbody>
</table>

*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.
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 Schaumberg, Illinois - The Village of Schaumberg, 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 Schaumberg, 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


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.


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
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 ____

A-4
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:

<table>
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<tr>
<th>Type</th>
<th>Day Shift</th>
<th>Second Shift</th>
<th>Third Shift</th>
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<td>Office</td>
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<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Employment</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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:

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<tr>
<th>Type</th>
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<th>Multi-Story</th>
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<tr>
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<tr>
<td>Use of Commercial Parking</td>
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<tr>
<td>On-Street Parking</td>
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<td></td>
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<tr>
<td>Other (Visitors, Service Personnel, etc.)</td>
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<td></td>
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</table>

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Currently Date:</th>
<th>Prior Count Date:</th>
<th>Pre-ridesharing Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Occupant Auto</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool (2 to 7 persons)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanpool (8 persons or more)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walk, Bicycle, Taxi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of employees</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A-6
9. Estimated average one-way commuting distance for employees: ________ miles

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

<table>
<thead>
<tr>
<th>Activity</th>
<th>YES</th>
<th>NO</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpool Promotion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpool Matching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanpool Program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transit Promotion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staggered Hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flextime</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuttle Service to Subway, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you subsidize fares?
- Vanpool:     ☐ ☐
- Bus:        ☐ ☐

Special Roadway Access for:
- Carpools:  ☐ ☐
- Vanpools:  ☐ ☐
- Buses:     ☐ ☐

Other
1. ________________ ☐ ☐
2. ________________ ☐ ☐

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

<table>
<thead>
<tr>
<th>Activity</th>
<th>YES</th>
<th>NO</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority Parking for:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanpools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide free parking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide subsidized parking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Note cost $ ______ /month)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial parking in area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Note cost $ ______ /month)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pickup/Dropoff Areas for</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ridesharing Vehicles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuttle Service to Off-Site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking Facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking Spaces allocated by:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seniority</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Union Contract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Occupancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. ________________ ☐ ☐
2. ________________ ☐ ☐

RETURN THIS SURVEY TO:

ED MARKS
NAVPO
12208 W. Kingsgate Drive
Knoxville, TN 37922
(615) 966-4507
A-7
FORM "B"

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
   2. Apartment (more than 2 families)
   3. Duplex
   4. Townhouse or condominium

4. My sex is (circle one)
   1. Female
   2. Male

5. My age is ___________.

6. My marital status is (circle one)
   1. Unmarried
   2. Married

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
   2. Supervision/Management
   3. Office
   4. Technical/Laboratory
   5. Other

9. My family's income class is (circle one)
   1. Under $15,000
   2. $15,000 — 25,000
   3. $26,000 or more

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.

12. I got to work by (circle only one)
    1. Driving car
    2. Walking
    3. Dropped off at work
    4. Bicycle
    5. Public transit
    6. Riding in a carpool
    7. Riding in a vanpool
    8. Motorcycle, motorbike, etc.
    9. Other

PLEASE RETURN TO YOUR SUPERVISOR

THANKS FOR YOUR COOPERATION

A-B
APPENDIX B

TYPICAL RESULTS OF SPSS ANALYSIS
TYPICAL RESULTS OF SPSS ANALYSIS

SPSS STATISTICAL SYSTEM
05/27/82 FILE - ITENAVPC - CREATED 05/27/82

MODE OF TRAVEL TO WORK

<table>
<thead>
<tr>
<th>MODE OF TRAVEL TO WORK</th>
<th>CODE</th>
<th>ABSOLUTE FREQ</th>
<th>RELATIVE FREQ (PCT)</th>
<th>ADJUSTED FREQ (PCT)</th>
<th>CUM FREQ (PCT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRIVING A CAR</td>
<td>1</td>
<td>151</td>
<td>83.4</td>
<td>83.4</td>
<td>83.4</td>
</tr>
<tr>
<td>CRCPPEC OFF AT WORK</td>
<td>3</td>
<td>5</td>
<td>2.8</td>
<td>2.8</td>
<td>86.2</td>
</tr>
<tr>
<td>RICING IN A CARPCOL</td>
<td>6</td>
<td>22</td>
<td>12.2</td>
<td>12.2</td>
<td>98.3</td>
</tr>
<tr>
<td>OTHER</td>
<td>9</td>
<td>3</td>
<td>1.7</td>
<td>1.7</td>
<td>100.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>181</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

FREQUENCY OF MODE OF TRAVEL TO WORK
APPENDIX C

MARYLAND NATIONAL CAPITAL PARK
AND PLANNING COMMISSION SURVEY
### Characteristics of Ridesharing Measures

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Type of Area</th>
<th>ETC</th>
<th>Permits for Key Activities</th>
<th>Provisions for Key Activities</th>
<th>Implementation</th>
<th>Enforcement</th>
<th>Reductions Permitted</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allentown, PA</td>
<td>CBD, CBG</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>When landlord accepts reduction, takes responsibility.</td>
<td>&quot;Such covenants and guarantees as necessary.&quot;</td>
<td>Up to 50 percent.</td>
<td>Most comprehensive of all ordinances surveyed.</td>
</tr>
<tr>
<td>Seattle, WA</td>
<td>CBD, CBG</td>
<td>X²</td>
<td></td>
<td></td>
<td>Requires landlord to implement.</td>
<td>City agency, funded by transportation fee.</td>
<td>Currently parking maximum.</td>
<td>Required of several new developments under comprehensive study proposing other techniques.</td>
</tr>
<tr>
<td>Sacramento, CA</td>
<td>CBD, CBG</td>
<td>X²</td>
<td></td>
<td></td>
<td>When landlord accepts reduction, takes responsibility.</td>
<td>Landlord self-enforcement.</td>
<td>-50 percent new or expanded office -100 percent office conversions</td>
<td>Just instituted both maximum and minimums in CBD, CBG zone.</td>
</tr>
<tr>
<td>Palo Alto, CA</td>
<td>City</td>
<td>X</td>
<td></td>
<td></td>
<td>When landlord accepts reduction, takes responsibility.</td>
<td>&quot;Such covenants and guarantees as necessary.&quot;</td>
<td>Up to 20 percent.</td>
<td>Landlord must set outside additional land or parking facility equal to the reduction granted for use if program fails.</td>
</tr>
<tr>
<td>Sunnyvale, CA</td>
<td>City</td>
<td>X</td>
<td></td>
<td></td>
<td>Can require landlord to implement.</td>
<td>Required and monitored by city.</td>
<td>None; measure is condition of approval.</td>
<td>Attempt to limit parking at new industrial developments.</td>
</tr>
<tr>
<td>Santa Cruz, CA</td>
<td>City</td>
<td>X</td>
<td></td>
<td></td>
<td>Can require landlord to implement.</td>
<td>Required and monitored by city.</td>
<td>None; measure is condition of approval.</td>
<td>Can set maximum parking standards where &quot;City standards (minimum exceeded)&quot;</td>
</tr>
<tr>
<td>Los Angeles, CA</td>
<td>City and County</td>
<td>O</td>
<td></td>
<td></td>
<td>When landlord accepts reduction, takes responsibility.</td>
<td>Self enforcement of agreed to performance standard.</td>
<td>Staff sets.</td>
<td>Has been proposed for five years but no specifics have been implemented.</td>
</tr>
<tr>
<td>Savannah, GA</td>
<td>City</td>
<td>O</td>
<td></td>
<td></td>
<td>Voluntary encouragement.</td>
<td>City monitors voluntary enforcement actions.</td>
<td>If CBD minimum implemented, 100 percent reduction (staff discretion).</td>
<td>On-street MNO meters and parking permits both considered, require new downtown development to provide off-street parking.</td>
</tr>
<tr>
<td>Dallas, Fort Worth</td>
<td>Suburban</td>
<td>X²</td>
<td></td>
<td></td>
<td>Developer agreement to mitigate high trip generation rates.</td>
<td>Approval conditioned upon (self-enforcement) and effective program.</td>
<td>None requested.</td>
<td>This is a site specific reductions but principles are same.</td>
</tr>
<tr>
<td>Dallas, Fort Worth</td>
<td>Micronuclear Development</td>
<td>O</td>
<td></td>
<td></td>
<td>Developer agreement to mitigate high trip generation rates.</td>
<td>Must meet established trip generation rate goals.</td>
<td>Not yet established.</td>
<td>Parking space reductions have not yet been negotiated.</td>
</tr>
</tbody>
</table>

Key:
- X = Implemented
- O = Proposed
- E = Ridesharing
- T = Employer Transportation Coordinator
- W = High Frequency Vehicle

1. Total employment
3. 15 percent maximum reduction for this method.
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.
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.