

Figure 8  
Suburban Mac Participants

	SHORT-TERM	LONG-TERM
S U P P L Y	<ul style="list-style-type: none"> <li>• Local Govnm't</li> <li>• SDOT (operations)</li> <li>• RTA</li> </ul>	<ul style="list-style-type: none"> <li>• Local Govnm't</li> <li>• SDOT</li> <li>• RTA</li> <li>• RCOG</li> </ul>
D E M A N D	<ul style="list-style-type: none"> <li>• Local Govnm't</li> <li>• Employers</li> </ul>	<ul style="list-style-type: none"> <li>• Local Govnm't</li> <li>• Land Owners</li> </ul>

DIMENSIONS AND CHARACTERISTICS OF SUBURBAN ACTIVITY CENTERS AND

TRANSPORTATION

by

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Suburban mobility is one of the most critical transportation problems facing American cities today. This presentation attempts to provide a better understand on the physical characteristics of suburban activity centers and their relationship to travel behavior by referring to findings from two related studies conducted by Rice Center. The first study was funded by the Urban Mass Transportation Administration. It developed a national data base on major activity centers, including suburban and downtown centers, to be used to examine physical and institutional characteristics, mobility problems, and management and financing of transportation programs (Rice Center 1989). The second study, on Houston's major activity centers, was sponsored by the Houston-Galveston Area Council. It looked at land use and travel characteristics and similarities and differences between suburban activity centers and the CBD (Rice Center 1987).

NATIONAL SUBURBAN ACTIVITY CENTERS

The Rice Center survey compiled information for 63 suburban centers and 22 CBDs in the largest metropolitan areas (an average of about 3 centers per metro area - but 9 areas had more than 4 centers). The variables measured were the following:

- o location
- o size
- o density
- o land use mix
- o travel patterns
- o transportation facilities and services

- o mobility problems
- o organizational characteristics
- o financial mechanisms
- o regional characteristics

The research builds on a study by Cervero (1988), which examined how suburban mobility could be improved through better land use planning and urban design. The focus of Cervero's study was a statistical analysis of the relationship between land use, employment characteristics, and travel choices in major suburban employment centers and corridors around the country.

The Rice Center study validated Cervero's information by contacting multiple sources and expanded the data base to include additional variables related to the financing and managing of transit programs in a large number of activity centers and downtowns. Selected case studies provided more in-depth analysis of those issues.

The main purpose of the study was to identify potential roles for the Federal government, local governments, transit agencies, and the private sector in solving suburban mobility needs.

#### CHARACTERISTICS OF ACTIVITY CENTERS

A Suburban Activity Center (SAC) is a major concentration of offices, businesses, industries or institutions located outside a CBD. It also may include residential development. There are several SACs which are primarily defined by membership in a Transportation Management Organization (TMO) or employers' association (i.e. 1-5 Corridor in Portland) or developed under single ownership or management (i.e. Hacienda Business Park, Pleasanton, CA, and Greenway Plaza in Houston).

The average distance of SACs from their regional CBD is 18 miles, the closest 4 miles and the farthest 50 miles. Suburban centers are significantly smaller on the average than their associated CBDs. The average SAC has an employment of 35,000 people, an area of 27,000 areas and office space of 6.2 million sq. ft. The average CBD has an employment of 240,000 people, an area of 1,265 acres and office space of 43.5 million sq. ft. CBDs are generally denser in terms of employees per acre. They have a mean of 175 workers/acre versus 21 workers/acre in suburban centers.

Table 1.  
Land Use and Employment Characteristics

	Suburban Centers	CBDs
<b>Location (miles from CBD)</b>		
Mean	18	0
Min	4	0
Max	50	0
<b>Employment</b>		
Mean	35,000	240,000
Min	1,100	30,000
Max	500,000	1,850,000
<b>Area (acres)</b>		
Mean	27,000	1,2650
Min	82	265
Max	840,000	7,000
<b>Office space (000 sq.ft.)</b>		
Mean	6,250	43,500
Min	500	2,000
Max	63,000	320,000
<b>Density (empl/acre)</b>		
Mean	21	175
Min	0.1	38
Max	115	415

#### TYPES OF CENTERS

The suburban centers are extremely diverse in terms of land use and employment composition. Rice Center has concluded that there are 4 distinct categories of centers, a reduction from Cervero's topology of 6 types.

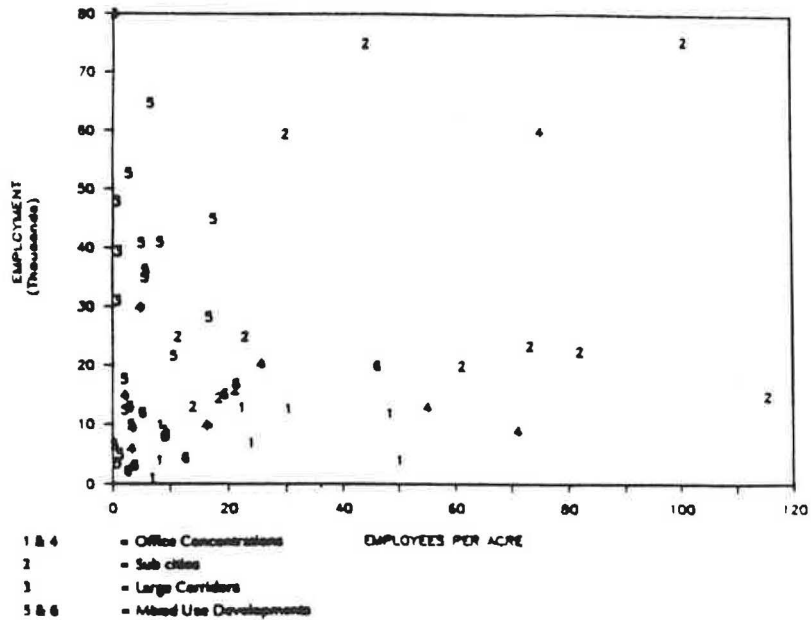
1. Office concentrations
2. Mixed Use Developments
3. Sub-cities or megacenters
4. Large-scale office growth corridors

#### OFFICE CONCENTRATIONS

Office parks generally are master-planned developments under 1,250 acres in size, with low floor area ratios and over 60 percent of total floorspace in office use. They are the smallest type with a mean of 570 acres. The Hacienda Business Park in Pleasanton, CA is such a center. Office parks tend to be found in smaller rapidly growing metropolitan areas. Office centers tend to be larger in acreage and floorspace, denser and less architecturally unified than office parks such as the Greenway Plaza in Houston. They have the greatest variability in acreage; the mean is 2,200 and the standard deviation is 2,747.



Figure 2.  
Chart Employment versus Density



Finally, Large-scale office corridors are expansive (average size 1/4 million acres) and include stretches of office, light industrial, and spot commercial development along major highway axes with generally very low densities (average of 1 employee/acre). Examples include Rt 128 in Boston, Silicon Valley, and Rt 1 Princeton. Large corridors are not activity centers in the strict meaning of the word. They differ significantly from all other centers in acreage and density. They have the most ill defined boundaries. However, they are too important to ignore because they represent an increasingly common suburban environment.

#### TRANSPORTATION CHARACTERISTICS AND PROBLEMS

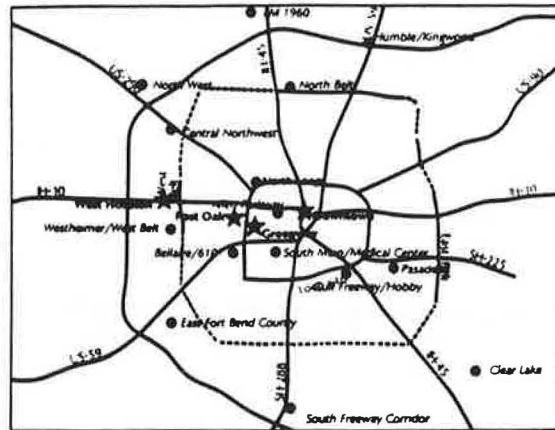
Variations in travel behavior have been explained by the differences in land use mix, density and design as well as the type of transportation facilities available. Suburban centers tend to have densities too low to support transit and pedestrian investments commonly found in CBDs. The suburban centers with higher densities and wide variety of land uses have the highest incidence of ridesharing and transit usage, but also the most congested streets. On the other hand, higher levels of density are necessary to build up a ridership base to sustain transit and pedestrian facilities. The lack of moderate-priced housing nearby many suburban centers prohibits a large number of clerical and service industry workers from residing near their workplaces and they end up driving long distances to work. Sub-cities appear to have the least peaking of commuter trips due to the diversity of land uses. Employees and residents of suburban activity centers rely predominantly on the private automobile for transportation. Availability of ample free parking reinforces auto dependency. Work trips to the CBDs involve longer commuting time than those to SACs, even though distances are similar. Travel needs are dispersed making traditional transit service too expensive to operate.

Most frequent problems mentioned in the survey are those involving intra-center congestion due to traffic passing through. It was found that SACs have less roadways and transit and pedestrian facilities compared to CBDs. It is the fear of anticipated congestion, rather than existing congestion that most often simulates local action. Only in large corridors and CBDs, is there more concern about existing than anticipated congestion by the private sector. In general, public sector concerns tend to be higher than those of the private sector. Only in megacenters are private concerns higher.

### HOUSTON'S ACTIVITY CENTERS

The second study examined three of Houston's activity centers -- City Post Oak, Greenway, and West Houston's I-10 Energy Corridor, and compared them with the Central business District. The 19 major activity centers in Houston have played an important role in the City's development.

Figure 3.  
Houston's Major Activity Centers



City Post Oak (Uptown), characterized as a sub-city, is the second largest employment center in Houston after the CBD and one of the largest suburban centers in the country. Large scale retail development began in 1959. Office construction started as early as 1962, but did not expand rapidly until the late

downtown in the nation, and is comparable to that of downtown Atlanta. It is located on the west loop at the intersection of US-59, 6 miles from CBD. It is a multi-use center with 78,000 workers, 25.3 million sq. ft. of office space, and encompasses an area of 960 acres. The density is 81 employees per acre. At City Post Oak is located the Galleria, a 2 million sq. ft. retail-hotel-office entertainment center including the 64-story Transco tower, the tallest office building outside a CBD.

Greenway Plaza, an office center located 5 miles west of downtown, was developed by the Century Development Company in 1968. Office construction in this area started in 1956. Greenway Plaza replaced existing multi-family and other residential development with offices, a major sports entertainment complex, an

underground retail center, and high rise residential development. Today it contains 12 million sq. ft. of office space and has an estimated 33,000 workers in an area of 850 acres with a density of 40 employees per acre. (The core area contains 127 acres with 9,000 employees, at a density of 70 employees per acre). West Houston, classified as a large mixed use development, is located on I-10, 17 miles west of the CBD. The Energy Corridor, as the center is known because of its high concentration of energy companies, is a relatively new center. Office development did not start until 1976. The first freeway segments of I-10 opened in 1967. It has 7.4 million sq. ft. of offices and occupies 1,715 acres of land. Office buildings tend to be low rise in campus-style research park facilities. Much of the land still is undeveloped. There are over 28,000 workers in the area at a density of 16 employees per acre.

Houston CBD occupies 969 acres with about 180,000 employees. The CBD has an employment density of 184 workers per acre, more than double that of City Post Oak, the next highest density area in the city.

Post Oak, Greenway, and the Medical Center combined have almost as many employees as the CBD. They provide 30 percent of the non-CBD jobs inside the Loop 610. The average density in activity centers is 30 workers/acre, compared to inside the loop, for non-activity centers, 5 workers/acre, and the Harris County average of about 1 employee/acre.

Figure 4.  
Post Oak - Sub-city

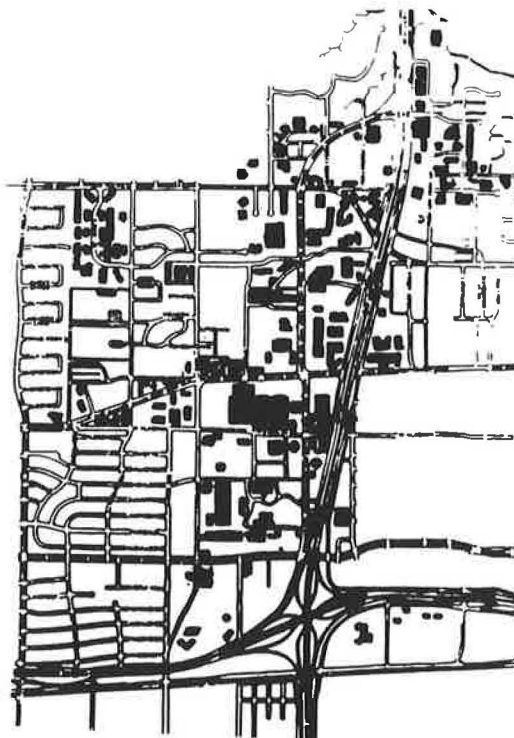


Figure 5.  
Houston CBD

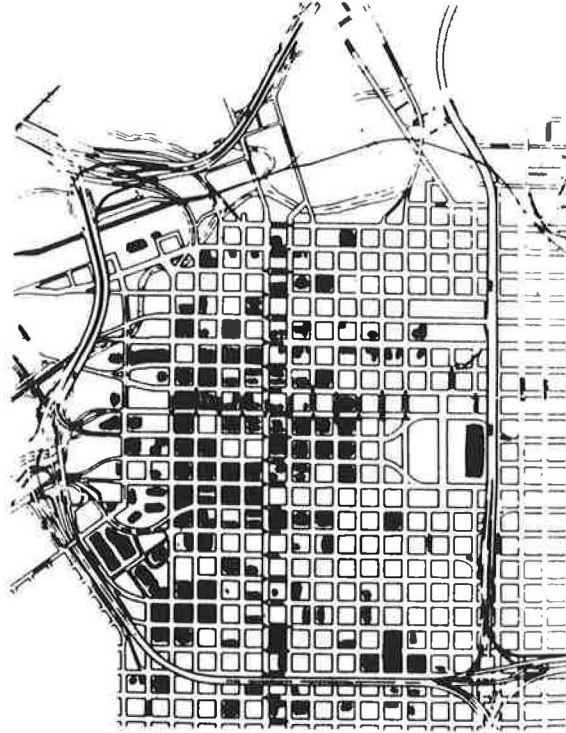


Figure 6.  
Greenway - Office Concentration

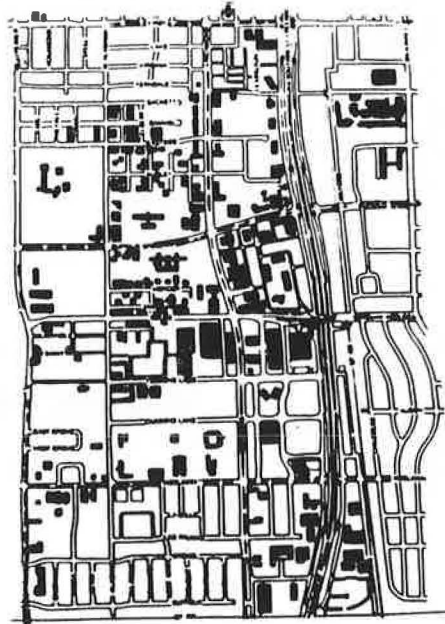




Figure 7.  
West Houston - Mixed Use Development

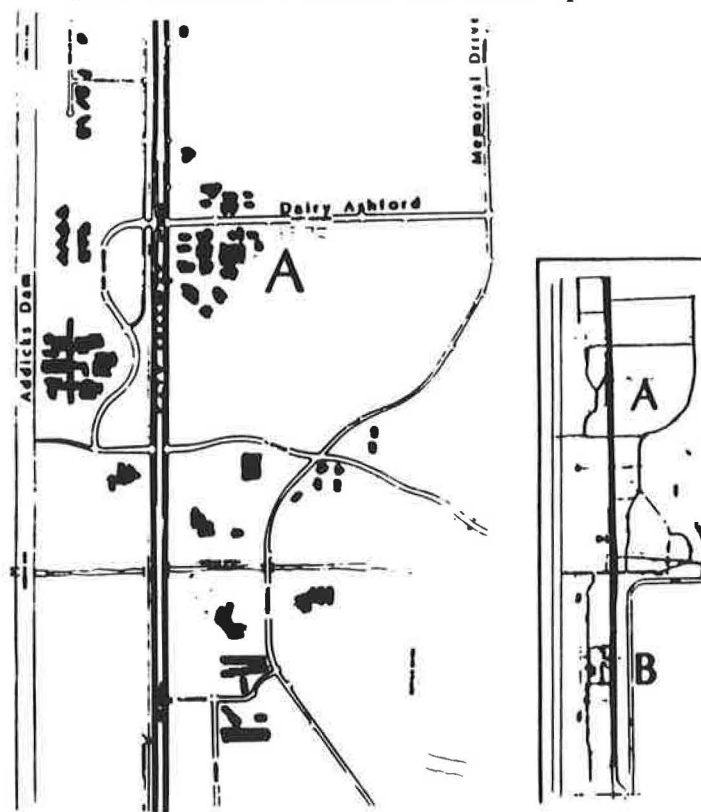


Table 2.  
Houston's Major Activity Centers

	Size (acres)	Labor Force (1985)	Office Space (million sq.ft.) (1985)	Density (Empl/acre)
CBD	969	178,304	51.8	184
Post Oak	960	78,000	25.3	81
Greenway	848	34,213	12.1	40
	[127	9,000	4.4	70]
W. Houston	1,715	28,317	7.4	16

TRAVEL BEHAVIOR

A major travel survey of workers in the activity centers found that there are many similarities between downtown and the three SACs. They all act as concentrations of white collar workers who travel generally about the same distance to work from many locations surrounding these centers. However, there are significant differences between downtown and the activity centers and these differences influence travel patterns. For example, activity centers experience considerable through traffic on major arterials, while the CBD handles through traffic on peripheral freeways; and the CBD has four times the percentage of land devoted to streets as the activity centers. (40 percent of CBD land is devoted to streets compared to 10-16 percent in the activity centers.)

The study concluded that activity centers, although well served by the freeway system, are not as well served as the CBD by major and minor arterials, transit, or pedestrian facilities. West Houston especially represents a hostile transit environment. Conventional transit does not work there. Buildings are distant from roadways requiring long walks from any bus route. There is little clustering of development, and there are no sidewalks (see Table 3).

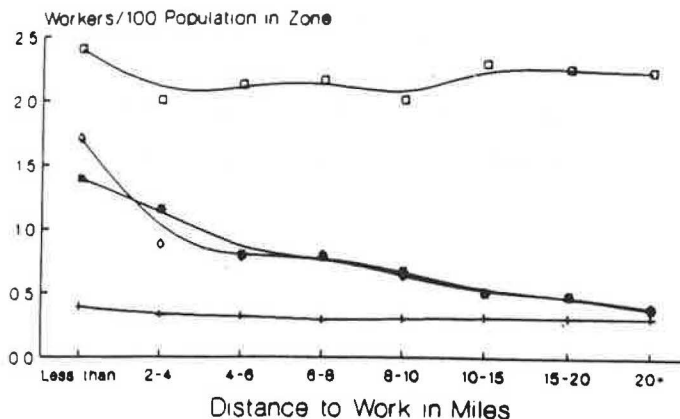
Workers in activity centers enjoy shorter travel times than CBD workers in general. The CBD and Greenway tend to maintain worker attraction of 2.4 and .4 workers per 100 residents in a zone respectively, regardless of distance, while workers from Post Oak and West Houston tend to reside closer to their work place (see Figure 8).

Table 3.  
Comparison of Roadway & Transit Facilities

Type Trip	CBD	Post Oak	Greenway	West Houston
Urban Arterials <i>Lane Miles</i>	57.5	19.0	9.7	13.5
Freeways <i>Lane Miles</i>	20.4	10.6	3.2	35.5
Freeway Entrance/Exit Ramps	18	9	8	19
Number of Bus Stops/Shelters	270	49	32	48*
Stops per Square Mile	180	33	25	18

*\*not directly serving Energy Corridor but inside of study area.*

Figure 8.  
Distance to work



There are more pronounced travel peaks for CBD related trips than any other activity center. One explanation for this is that the CBD has higher capacity to serve peak hour demand. Another explanation is that the other centers have more diversified trips. (i.e. City Post Oak has a significant number of retail related trips.)

Table 4 shows that CBD workers are five times more likely to use transit to get to work as other activity center workers and use carpooling and vanpooling at least five percent more frequently.

Figure 9.  
Time of day travel

	Size (acres)	Labor Force (1985)	Office Space (million sq.ft.) (1985)	Density (Empl/acre)
CBD	969	178,304	51.8	184
Post Oak	960	78,000	25.3	81
Greenway	848	34,213	12.1	40
	[127	9,000	4.4	70]
W. Houston	1,715	28,317	7.4	16

Table 4.  
Mode of travel to work by percent of Workers

Type Trip	CBD	Post Oak	Greenway	West Houston
Drive Alone	56.4	73.0	69.4	75.7
Carpool/Vanpool	29.1	21.9	25.4	18.8
Bus	13.5	2.5	2.7	0.2
Bicycle	0.1	0.3	0.2	0.6
Walk	0.6	2.1	1.4	3.8
Other	0.3	0.3	0.8	0.9

Source: 1980 US Census

Parking and pedestrian travel are handled differently in the CBD than in other activity centers. Parking is more costly downtown for workers, (CBD \$44, activity centers \$27 per month). Downtown workers are more likely to pay for their parking, (CBD 26% park free compared to 83% in activity centers); Public parking exists to a much greater extent downtown; Activity center parking is connected or directly adjacent to the development it serves. The Post Oak area and Greenway have parking garages, while downtown workers must walk further to parking. Downtown facilities, such as skywalks, and the underground tunnel system, are designed to encourage pedestrian activity. Finally, activity centers provide 3.1 parking spaces/1000 sq. ft. versus CBD's .5, almost 6 times as much parking per worker as downtown.

#### SUMMARY AND CONCLUSIONS

Suburban Activity Centers developed during the last two decades as the highest concentrations of employment outside downtowns. A national survey of SACs conducted by Rice Center has categorized SACs into four types: Office concentrations, mixed use developments, megacenters, and large corridors.

Suburban mobility problems result from the interplay of transportation, urban development, political and environment issues. The rapid increase in suburban development and the mismatch between residential and commercial land uses has complicated traffic patterns and made traffic congestion a growing problem in metropolitan areas across the country.

In Houston, City Post Oak, Greenway, and the Medical Center combined have almost as many employees as the CBD. They provide 30 percent of the non-CBD jobs inside Loop 610.

SACs are not well served by arterials, transit or pedestrian facilities. Their design, mix of uses, and low density make them very difficult to serve by traditional transit. Their sole reliance on the private auto creates congestion problems.

There is need for further study. A major problem in the study of suburban centers mobility is the lack of activity (employment and land use) and travel behavior data in and around suburban centers. Such data is more readily available for central business districts.

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1. Cervero, Robert. America's Suburban Centers: A Study of the Land Use-Transportation Link, Urban Mass Transportation Administration, April 1988.
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3. Suburban Activity Centers: Private Sector Participation in the Financing and Management of Transportation Programs. Urban Mass Transportation Administration March 1989.

#### PLANNING, POLITICS, PUBLIC POLICY AND TRANSPORTATION MANAGEMENT

by

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Transportation planning is not my field. My areas of interest relate to planning, politics and public policy in governmental institutions. To the extent that transportation is part of all that, it is of interest to me.

I also come at the field as much from a political practitioner's perspective as from an academic perspective. I have been involved in local government in Chapel Hill for 13 years and currently serve as Mayor. I have chaired the Triangle J COG, I am Vice-Chair of our MPO, I was President of the National Association of Regional Councils when we began the 2020 process, and served last year as the President of the North Carolina League of Municipalities at a time when it had a very full legislative agenda in Raleigh. What you are going to hear reflects my work as a participant in local government as much as it represents my areas of academic interest.

In the University I teach a course called North Carolina Politics and Public Policy and a graduate seminar in Planning and Government. In these courses I deal with transportation as one of the central policy concerns.

In areas which have strong local and regional economies, suburban congestion is perhaps the most potent local political issue. In the future, elections will turn on the way local elected officials deal with the congestion problem. Congestion was the issue which defeated Harvey Gantt, the popular two-term Mayor of Charlotte, NC, in 1987 and which changed the Board of Supervisors in Fairfax County, VA. Traffic congestion, whether in a suburban setting or elsewhere, is