

Park and Ride: The Dallas Program

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As part of the Dallas Urban Corridor Demonstration Program, a park-and-ride facility was developed as an incentive for automobile users to switch to transit. The goals of the program were to improve the level of service on the North Central Expressway and to divert some of the 160,000 trips projected for 1990, but improvements in air quality and energy consumption were also achieved. Because of the success of the initial park-and-ride facility, other facilities were developed. This paper presents the criteria used for selecting and evaluating potential park-and-ride sites. Other data such as demand analyses and on-bus surveys were used to determine the need and desirability of park-and-ride facilities. Another factor in site selection was the pending opening of the Dallas/Fort Worth Airport.

Dallas was one of the cities selected by the U.S. Department of Transportation to participate in the Urban Corridor Demonstration Program (UCDP). The primary thrust of the program was to relieve congestion in central business district travel corridors during peak periods by diverting trips from automobiles to high-occupancy vehicles. This effort was to be accomplished by creating incentives, i.e., providing preferential treatment to buses, to attract trips to transit.

The North Central Expressway corridor was selected as the location for the Dallas UCDP. The North Central Expressway, a controlled-access freeway that extends from downtown Dallas generally northward to Richardson, a distance of approximately 12 miles, is the principal travel facility in the corridor. Interchanges on the expressway are diamond types except for a full cloverleaf interchange at Loop 12 (Northwest Highway) and a directional interchange at I-635 (L.B.J. Freeway). The expressway has three lanes in each direction from the downtown area to Mockingbird Lane (approximately 5 miles) and two lanes in each direction from that point north. One-way frontage roads, generally three lanes wide, are continuous except at the Mockingbird, Loop 12, and L.B.J. interchanges. Traffic entering the freeway is controlled by a ramp-metering system that has been in operation for 3 years. Also additional control systems are interfaced with the ramp-metering system in an effort to optimize travel throughout the corridor.

The specific UCDP projects approved by the Department of Transportation for implementation in the North Central Expressway corridor (1) are

1. A freeway control system giving preferential treatment to transit vehicles and

2. An arterial signal control system allowing transit vehicles to preempt signals.

As a complement to these control strategies a park-and-ride facility was developed at the northern end of the corridor. Although the initial emphasis was to improve the level of traffic service on the freeway and to divert some of the 160,000 trips projected for the facility in 1990, recent air quality control and energy conservation measures have become important factors as well.

PLANNING EFFORT

Design and development of a park-and-ride facility were based on the following objectives:

1. Optimize the use of each mode of travel in order to minimize urban congestion and travel time, improve air quality, and conserve energy.
2. Develop a strategy for an integrated transportation system and examine its potential as a valid mode of transportation for work trips in the Dallas area.
3. Identify the necessary conditions for an effective policy on park and ride.
4. Develop a facility that serves trips destined to both the CBD and the new Dallas/Fort Worth Airport.

The general location for the park-and-ride facility was based on studies that identified the centroid of trip origins for air travelers living in the North Dallas area and to serve residents in the North Central Expressway corridor bound for destinations in the Dallas CBD. These studies showed that the intersection of L.B.J. Freeway with Central Expressway was the focal point of these two considerations. Since there were several candidate sites available near the intersection of these freeways, the following criteria were developed as a basis for evaluating each site:

1. Cost,
2. Accessibility,
3. Visual exposure to users,
4. Compatibility with long-range transit plans,
5. Compatibility with desired SURTRAN routing,
6. Compatibility with Texas Highway Department freeway access plans,
7. Compatibility with desired CBD expressway routing,
8. Availability of property,
9. Time required for purchase and access revisions,
10. Compatibility with adjacent land uses,
11. Compatibility with land requirements, and
12. Effect on other traffic operations.

The sites shown in Figure 1 were rated according to the criteria. Table 1 gives a comparison of the sites and shows that site D is the most desirable location for a park-and-ride facility.

DEMAND ANALYSIS

The park-and-ride facility in the North Central corridor was planned to serve as a park and ride for person-trips to downtown Dallas and also as a terminal for the surface transportation system, SURTRAN, to the Dallas/Fort Worth Airport. This multifunctional capability made the project especially compatible with regional public transportation plans.

The demand for parking facilities was estimated in part by relating the diversion of potential CBD work trips to fringe or intermediate parking locations. During the Dallas Center City Transportation Project, special interviews were conducted at

Figure 1. Site priority.

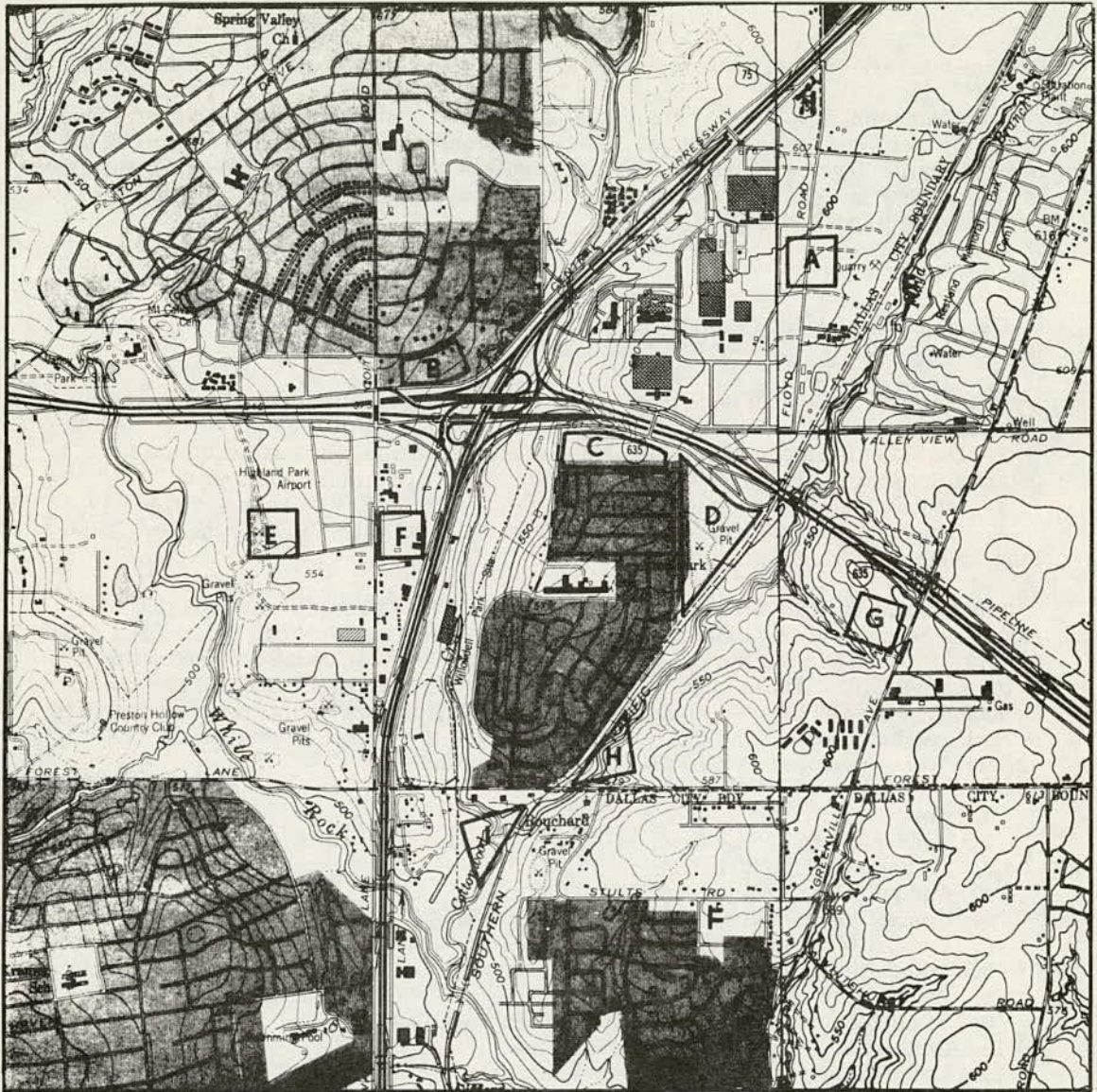


Table 1. Evaluation criteria for terminal site selection.

Criterion	Terminal Site								
	A	B	C	D	E	F	G	H	I
Accessibility	3	1	3	1	4	2	2	3	2
Visual exposure to users	4	1	2	2	4	2	2	4	3
Compatibility with long-range transit plans	1	4	3	1	5	4	3	1	1
Compatibility with THD freeway access plans	3	2	3	1	5	4	1	2	2
Compatibility with desired SURTRAN routing	3	1	2	1	4	3	2	3	2
Compatibility with desired CBD express routing	3	1	3	2	3	1	4	4	2
Availability of property	2	2	2	3	3	3	2	1	2
Time required for purchase and access revisions	3	2	2	3	5	4	2	2	2
Compatibility with adjacent land uses	1	1	3	2	2	1	2	1	2
Compatibility with land area requirements	2	2	3	1	2	3	1	2	1
Effect on other traffic operations	2	4	3	2	3	3	2	3	3
Total	27	21	29	19	40	30	23	26	22

Note: 1 = best; 5 = worst.

major office buildings in downtown Dallas (2). The results of this survey indicated the potential for a 20 percent diversion. In 1970, the occupancy level of CBD parking spaces by work trip parkers was about 30 percent of the 50,000. This figure of 15,000 spaces was established from an analysis of trip purpose, duration, and accumulation data. Thus about 3,000 spaces or 20 percent of 15,000 spaces should be established for design.

The demand for the park-and-ride facility was substantiated by the need for a high level of ground transportation to the Dallas/Fort Worth Airport to serve passengers, visitors, and employees. Based on the 1972 Terminal Movement Study forecast and the 1969 on-board bus survey, approximately 35 percent of the air passengers in the Dallas/Fort Worth region have origins or destinations in northern Dallas. About 81 percent of the region's air passengers using bus or limousine service will have origins or destinations in downtown and northern Dallas.

Employee needs for service to and from the airport are entirely different and constitute a large portion of public transportation service. About 50 percent of the daily employee population at the airport has origins or destinations in the Dallas area of which 15 percent originates or terminates in the North Dallas area.

JOINT PARK-AND-RIDE/SURTRAN TERMINAL

In October 1973 the city of Dallas decided to implement another park-and-ride facility on an interim basis pending approval by the Texas Highway Department and the U.S. Department of Transportation for a grant to cover a portion of the cost of the proposed terminal. This decision was made in an effort to meet the target date for the opening of the Dallas/Fort Worth Airport and a commitment to the Environmental Protection Agency to establish park-and-ride service as a means of reducing pollution caused by automobiles (3). The city entered into a 2-year lease on 4.5 acres of land on the west side of Central Expressway just south of I-635 at a cost of \$50,000 per year. The lease included use of an existing building for a terminal and a paved parking area accommodating 450 automobiles. Repairs to the building and parking area cost an additional \$20,000. It is anticipated that the permanent park-and-ride terminal will be completed at the end of the lease period. The city is recovering some of these costs from a rental charge to SURTRAN and revenues from parking, car rental operations, and food and beverage concessions.

The facility was opened 2 days after President Nixon appealed to the nation to conserve energy. Nonstop bus service was inaugurated from the terminal to the CBD. The operation was a success from the outset. The facility was overrun with automobiles on its first day of operation. The 692 parkers overflowed the facility onto an adjacent unpaved area. The Dallas Transit System carried 1,058 passengers inbound and 986 outbound on the first day. The high interest continued during the next 2 days of operation when 679 and 628 parkers respectively used the facility. Transit ridership was comparable to that observed on the first day. On the fourth day of operation, use dropped to 479 and the total riders (inbound and outbound) to 1,550. This decline was anticipated, for coupons had been distributed for free bus service on the first 3 days of operation. The use was up to 560 parkers and 1,686 riders on the following Monday. The city leased and surfaced an adjacent area to accommodate several hundred additional automobiles after it became apparent that the service was a success. Use of the facility continued at this level until the opening of the Dallas/Fort Worth Airport on January 13, 1974. After the initiation of SURTRAN service at the facility, the parking facility was unable to accommodate the vehicles left by both air travelers and commuters. A search began for another facility that could provide an instant solution to the need for additional parking space. There was no room for further expansion of the original facility. Consequently, on January 22, 1974, the North Dallas Park-and-Ride Terminal was moved across North Central Expressway to the Gemini Drive-In Theater, which could accommodate 1,000 cars. Currently, more than 1,600 passengers ride the express buses, which have headways of 5 minutes

during rush hours. More than 600 automobiles are parked in the theater lot each day.

The SURTRAN terminal continues to be a success at the original location. Use of the SURTRAN parking facility ranges from a low of about 225 vehicles on an average Sunday to more than 450 on an average Wednesday.

ADDITIONAL PARK-AND-RIDE TERMINALS

The North Central Expressway Park-and-Ride Service had such a favorable response from the public that the city next initiated a program to identify and assess potential park-and-ride sites in other sections of the city. Information on some 30 sites was evaluated to varying degrees of detail. Locating and evaluating potential park-and-ride terminal sites were based on the following criteria.

1. A site should require limited improvements; that is, the parking area should be already paved, lighted, and fenced if possible and have a bus loading area available.
2. A site should have ready access to a freeway to the CBD.
3. A site should be located at the centroid of an area that would have the potential for attracting park-and-ride patrons.
4. A site should be located to offer as many Dallas residents as possible the opportunity to use park-and-ride services.
5. A site should be available at minimum expense to the city, and lease, improvement, and bus operating costs should be fundable from operating revenues if possible.
6. A site should be located near an existing bus line in order to use that service during off-peak periods.
7. A site should be available for use as soon as possible.

Pleasant Grove Facility

Based on these criteria and results of site assessment, the Pleasant Grove Athletic Field parking area containing 710 parking spaces was selected as a site to serve the Pleasant Grove area of Dallas. This facility is owned by the Dallas Independent School District and is used only for athletic events during a limited time of the year. The city leased this parking facility at an annual rental of \$15,000. Because only minimal improvements were required for lighting and shelter, the first year lease and improvement cost amounted to \$23,300, and the second year would require only \$15,000 for the rental fee.

The facility was opened and express bus service initiated on January 23, 1974. Although initial use and transit ridership were less than had been anticipated, both have climbed steadily from an initial daily average of 165 parkers and 516 inbound and outbound riders to 337 parkers and 745 riders in June 1974.

Oak Cliff Facility

A park-and-ride site adjacent to South R. L. Thornton Freeway, just north of Loop 12, was opened in April 1974. It serves residents of Oak Cliff and cities to the south and southwest of Dallas and can accommodate 625 cars. The 5-acre site was leased for 2 years at an annual rental of \$48,164.80. The site is paved, lighted, and fenced.

Although this facility has been less successful than the two earlier ones, the average number of daily parkers increased from 115 in April to 140 in June. The total inbound and outbound ridership increased from 274 to 334 in the same period (Table 2).

PARKING AND TRANSIT COSTS

A fee of 25 cents is charged for all-day parking at each of the facilities. The bus fare is 50 cents each way or \$1.00 for the round trip.

Figure 2. Proposed sites for park-and-ride facilities.

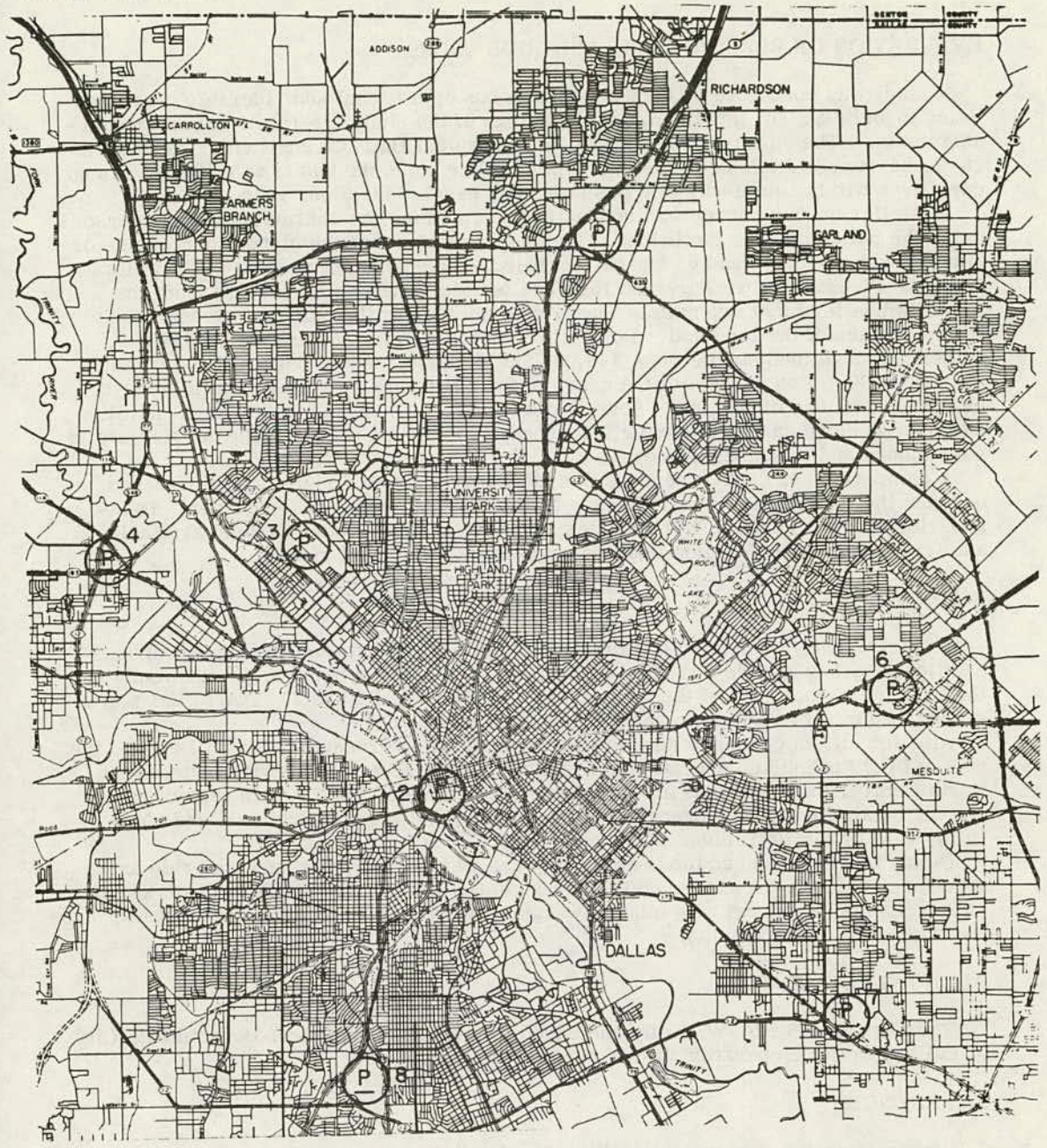


Table 2. Average daily riders and number of cars at park-and-ride facilities.

Month	North Dallas		Pleasant Grove		Oak Cliff	
	Riders	Cars	Riders	Cars	Riders	Cars
December	1,437	1,090				
January	1,794	1,220	558	400		
February	1,621	1,168	573	420		
March	1,619	1,160	688	580		
April	1,554	1,114	697	630	274	230
June	1,639	1,200	745	674	334	280

EVALUATION OF BUS AND PARK-AND-RIDE USERS

A study was conducted in 1972 to evaluate bus operational and ridership characteristics in Dallas. The most significant findings of the study are related to rider characteristics. The on-bus survey identified the typical Dallas transit rider as being a 16- to 24-year-old female. Also the typical rider rides the bus to work daily, has no car, lives within two blocks of a bus stop, and earns \$4,000 per year.

A similar on-bus survey was conducted to determine the characteristics of persons using the park-and-ride facilities. The study revealed that the highest percentage of riders are between 35 and 65 and are married. Seventy-eight percent of the riders from the Pleasant Grove Park and Ride are female, whereas 61 percent from the North Dallas terminal are male. The typical user rides the bus to work and lives within 5 miles of the terminal. Forty-three percent have incomes under \$10,000, 41 percent have incomes between \$10,000 and \$20,000, and 16 percent have incomes over \$20,000. Two percent of the users of the Pleasant Grove Park and Ride have incomes in excess of \$20,000. Seventy-three percent of the users are from families with two or more cars. The most frequent reasons given for using the service are to save money and to conserve energy.

A comparison of the two surveys indicated that there is a significant difference between the typical park-and-ride user and the typical Dallas transit rider. Park-and-ride users (a) have higher incomes, (b) have another mode of travel available, and (c) include fewer females than the regular Dallas transit riders.

FUTURE PLANS

Dallas recently completed a subregional public transportation plan that proposes additional park-and-ride facilities and express bus service between the terminals and the CBD. The locations of these facilities are shown in Figure 2. Two of these are scheduled for service in 1975 and the remainder in 1976.

Also the city in concert with the U.S. Department of Transportation will expand the Dallas UCDP to include operation and evaluation of dial-a-ride service between the North Central Park and Ride and the surrounding neighborhood. This service will use six small 18- to 22-passenger buses operating between the terminal and stops within a 1- to 2-mile radius.

Dallas has experienced the benefits that can be realized from park and ride and, therefore, plans to pursue an aggressive strategy to implement additional park-and-ride facilities in concert with other low-capital programs in an effort to meet its transportation requirements.

ACKNOWLEDGMENT

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REFERENCES

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