

# Transportation Planning Methods for Improving Mobility in Developing Activity Centers in Orange County, California

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The Orange County Transit District (OCTD) has a three-phase proactive planning process for developing transportation demand and systems management (TDM and TSM) actions at suburban activity centers, and implementing them with assistance from the private sector. The first phase involves coordinating with city planners and project developers to determine needed transit amenities (turnouts, shelters, pedestrian access, transit center) and preferential facilities for ridesharers, and then integrating these amenities in the project development plans through the local jurisdiction development conditions for the project. The second phase, formation of a transportation management association (TMA), is based on activity center employer and employee surveys. The key objective is to assist employers and the TMA (once formed) in planning and implementing various TDM and TSM strategies for the activity center. The third phase involves analysis of employee travel characteristics and a determination of transportation infrastructure and service deficiencies within the activity center, based on an analysis of existing and future travel demand. The demand methodology used involves locally developed procedures and models run on an in-house microcomputer system. The travel forecasting results are used to plan capital facilities including transitways, HOV/transit access ramps, and park-and-rides, and to develop transit services for the activity center.

Orange County is located in Southern California, between Los Angeles and San Diego, and covers approximately 750 square miles. In 1989, the County had approximately 2 million people and 1.4 million jobs. The County is a typical suburban environment, with a number of activity centers that approach the density and total employment of traditional central business districts, surrounded by areas of low density residential and other development. The County has ten major activity centers located within one mile of an existing freeway, with several of the activity centers located near two or more freeways. All the centers are heavily dependent on these freeways to provide access for employees, business patrons, and deliveries.

The Orange County Transit District (OCTD) is the countywide transit operator for Orange County and offers a wide range of services, including:

- local and express bus service;

- Dial-A-Ride (curb-to-curb) service; and
- commuter transportation services such as rideshare matching, vanpool organization and seed fleet vehicles, and development of employer-based strategies such as alternative work hours and telecommuting.

OCTD focuses on activity centers from three different levels in its efforts to improve and maintain mobility in Orange County:

1. coordination of private land development activities and proposals, and local jurisdiction public works projects, with services and facilities needs for transit and other high occupancy modes;
2. development and support of Transportation Management Associations (TMAs) in the major activity centers; and
3. long-range infrastructure and facilities planning focused on the freeways serving the major activity centers.

This paper focuses on OCTD's activities within the South Coast Metro Activity Center (the Metro) for two reasons:

1. The Metro is an established multiuse center that is still experiencing significant levels of new development in office, retail, and mixed uses. The Metro currently has in excess of 1,000 employers, with over 25,500 employees, and experiences significant peak-hour congestion on both local streets and the adjacent freeways.
2. All three levels of OCTD's planning process have been successfully implemented in the Metro area.

## COORDINATION OF TRANSIT SERVICES AND FACILITIES NEEDS WITH LAND DEVELOPMENT ACTIVITIES AND PUBLIC WORKS PROJECTS

OCTD has several goals in coordinating its service and facility needs with private land development and public works projects proposed in Orange County:

- To ensure that needed physical facilities to support alternative travel modes such as bus, carpooling and vanpooling are incorporated in proposed development projects. As used in this paper, transit is defined to encompass all bus modes

(public and private) and high-occupancy modes such as carpooling and vanpooling.

- To begin conceptual development of the need for a TMA or other activity center-oriented support systems, and to ensure participation in existing TMA type activities in an established activity center.

- To plan for future infrastructure improvements and to ensure the incorporation of design controls to protect opportunities to implement preferential facilities in the future.

OCTD has developed a straightforward process for coordination of its transit needs with proposed land use and public works projects. The process includes the following major steps:

- Identification of the legal authority for a transit agency to be involved in local land use planning. In California, the California Environmental Quality Act (CEQA) gives local agencies such as OCTD the authority and responsibility to comment on the effect of proposed land uses on each agency's services and/or facilities and their ability to continue to function effectively once the proposed project is implemented. The mitigation of any impacts on the agency generated by the proposed project is included as part of the final environmental finding for the project.

- Seeking an expanded role with the appropriate local jurisdiction, to cover types of land use plans not covered by CEQA, such as site plans and street improvement designs. The roles and responsibilities of the local jurisdiction and OCTD in this expanded review process can be detailed in a memorandum of understanding (MOU) or in a less formal manner.

- Involvement in the local land use proposal review process, including review of land use proposals for potential impacts on transit, submittal of formal comments on the proposal describing the impacts and the appropriate mitigation, and the incorporation of these comments in the conditions placed on the development proposal by the local jurisdiction.

- Development of professional working relationships with planning and public works staffs in the affected local jurisdictions to ensure that the process works smoothly with minimum delay to the proposed project.

OCTD considers a number of topical areas when reviewing proposed land use plans, including:

- The need for facilities to support a broad range of alternative travel modes, including:

- amenities for both public and private bus services, including shelters, benches, paved passenger waiting areas, pedestrian access to adjacent uses, lighting, turnouts, concrete bus pads, information signs and handicapped accessible ramps;

- amenities for other high-occupancy modes, including park-and-ride spaces (in residential areas), rider meeting and waiting areas, reserved parking spaces at work sites, and on-site services for employees;

- amenities for bicycle commuters, including racks and lockers, bicycle lanes and protected access to work sites, showers, and clothing lockers; and

- pedestrian amenities including lighted, paved, handicapped-accessible walkways between project buildings and adjacent uses (restaurants, banks etc.), and bus stops.

- The need to develop a TMA or for tenants of a proposed project to join an existing TMA.

- The need for design provisions to accommodate any long-term infrastructure improvements such as transitway access/egress ramps or local street preferential facilities.

The District conducts a number of activities to directly support this process:

- Assignment of staff to review and comment on proposed land use plans.

- Development and wide distribution of *Design Guidelines for Bus Facilities* to ensure that all facilities provided as part of private or public development projects are designed and built to standards for the types of public and private transit vehicles operated in Orange County. *Guidelines* is approximately 60 pages long and several thousand copies have been distributed at no cost to city staffs, developers, architects, planners, and engineers in Orange County.

- Development and wide distribution of *Consideration of Transit in Project Development*, a brochure that describes the benefits of coordinated planning in a straightforward and easy to understand manner for nonplanners, such as city councilpersons, other elected officials, and company executive officers. Several thousand copies of this document have been distributed and have been very positively received.

- Conduct of seminars on facilities planning, as part of a larger seminar series on alternative commute modes, largely focussing on major employers. The seminars provide a concise summary of facilities needs assessment, planning, and implementation in a nontechnical manner appropriate for audiences with nonengineering and nontechnical backgrounds.

The land use review and coordination process has been successful in the provision of facilities to support high-occupancy modes in the major activity centers for a number of reasons:

- OCTD staff have formed strong relationships with the local jurisdiction planning, engineering and public works staffs, developers, and other professionals in the land development process, resulting in open and trusting interactions among the participants in the process.

- OCTD has consistently provided clear, concise comments within the mandated project time frames, thereby minimizing any delay to proposed projects.

- The availability of the *Design Guidelines* ensures that designers have ready and convenient access to the appropriate design standards for needed amenities.

- The availability of the *Consideration of Transit* brochure has provided useful explanations to local decision makers to solicit their support and approval of needed HOV amenities as part of proposed land use projects.

#### **DEVELOPMENT OF TRANSPORTATION MANAGEMENT ASSOCIATIONS: HELPING THE PRIVATE SECTOR TO HELP ITSELF**

The next level in the OCTD planning process to improve mobility in activity centers is the development of TMAs, in order to focus the limited resources of the OCTD Commuter

Network Department in the high-density activity centers in Orange County. Commuter Network provides a wide range of employer-based services, including rideshare matching, technical expertise and support for specialized program development, and the development and early technical and staff support for TMAs. The goals of the OCTD TMA development program include:

- to organize activity center employers to participate in transportation demand management (TDM) planning through TMAs or other related groups;
- to assist employers and/or the TMA in developing goals and in implementing selected TDM strategies;
- to work with city and county planning agencies to include them in the TDM planning efforts and to assist them in developing and implementing municipal TDM measures; and
- to coordinate TDM plans in the activity centers with other transportation strategies planned by all the regional, county, and local agencies for major transportation corridors in Orange County.

The first step in the development of a TMA at the South Coast Metro was the development and conduct of a pre-TMA survey. The survey was intended to accomplish a number of purposes related to the desire to maximize the effectiveness of efforts in the South Coast Metro area, including:

- to provide reliable estimates of current employee commuting behavior at the activity center;
- to provide information on current employer initiatives and support concerning employee transportation and alternative trip modes; and
- to assess the employee and employer market potential for various TDM and transportation system management (TSM) techniques, including carpooling, vanpooling, alternative work hours, telecommuting, and parking management.

Three types of survey instruments, with different objectives for each survey, were used:

1. A written employee survey form, which was distributed to employees at their work sites. The survey objectives included collection of accurate data on current work trip characteristics (such as origin, destination, travel time, trip distance), work schedules, willingness to consider alternative trip modes, and employee need for an automobile before, during, and after work. Data were collected from a representative sample of employees (with a 56 percent response rate), which was approximately 10 percent of the workforce in the activity center.
2. A written employer survey form, which was distributed to employers at their work sites. The objectives of the survey included development of a profile of employers, including work schedule policies, parking availability and costs, availability of on-site services, and current ridesharing incentives.
3. Face-to-face interviews with company executives and senior management conducted by OCTD and consultant staff. The objectives of these interviews were to ascertain the perception by senior management of the area traffic conditions, the effect of traffic on the organization's ability to conduct business, and the willingness of the employer to participate

in an areawide cooperative effort to help solve traffic problems. These interviews were conducted with 24 of the largest employers in the South Coast Metro Activity Center.

The survey results were used in a number of ways:

- A TMA, a public (OCTD) and private (South Coast Metro Alliance and the Executive Task Force) joint venture, was formed in late 1986.
- The preliminary programs the TMA would pursue in the areas of both transportation systems and demand management were developed.
- Express bus service was instituted, with marketing focussed on those candidate employees most likely to use transit.
- The new programs in the Metro, such as on-site services, parking management, a guaranteed return trip program, and intercompany vanpooling, were planned.

#### **LONG-RANGE INFRASTRUCTURE IMPROVEMENTS: TRANSITWAY PLANNING ACTIVITIES**

As part of its long-range planning activities, OCTD has developed a countrywide Transitway Development Program to implement and promote the use of a freeway-based system of commuter lanes and transitways, focussing on the major Orange County activity centers, including the South Coast Metro. The proposed system includes approximately 110 miles of preferential facilities for buses, carpools and vanpools. These facilities are being evaluated and implemented by OCTD and the California Department of Transportation (Caltrans).

A key part of the concept design activities conducted by OCTD for the transitway system was the development and implementation of a travel forecasting methodology sensitive to changes in corridor level and site-specific characteristics, such as the ability of transitways to provide higher levels of service to activity centers like the South Coast Metro. The forecasting methodology used the 1980 U.S. Census Urban Transportation Planning Package (UTPP) for the base data set. Forecast year trip totals were built up with an iterative distribution process constrained by the adopted Orange County growth forecasts for the origin and destination market areas.

For the model, the transit and HOV mode splits were primarily determined based on the degree of travel time savings that commute trips would achieve by using preferential facilities in the morning peak hour versus using the mixed flow freeway lanes. Origin and destination area characteristics, such as employment density and type, also affected the modal share.

The UTPP Base/Socio-Economic Growth Approach modeling effort included a number of very specific tasks:

- Task 1: Review larger scale system level analysis assumptions, process, and output including the zone system, speed assumptions, prior mode assumptions, and transit and HOV mode split factors.
- Task 2: Establish more specific zone systems and design an origin-destination matrix for microcomputer analysis.
- Task 3: Establish base data files and determine background assumptions, including aggregation of the UTPP files

on total person trips, 2-person carpools and 3-person carpools to the zone system, and development of background assumptions based on empirical travel behavior data.

- Task 4: Estimation of travel time savings on the transitway versus the freeway for all trip interchanges. Travel time savings were computed based on the higher speeds on the transitways, on preferential facilities through major interchanges and on exclusive ramps into the activity centers.

- Task 5: Deletion of origin-destination cells with short trip lengths, less than 7 miles, and production of 1980 trip tables.

- Task 6: Estimation of HOV person-trips on the transitways and commuter lanes. Total HOV person-trips were computed based on factors such as the amount of travel time savings, the degree of travel time savings, and nonwork HOV travel.

- Task 7: Production of year 2000 and 2010 person-trip tables, based on increasing the UTPP 1980 person-trip table by the adopted socio-economic growth factors for Orange County.

- Task 8: Estimation and assignment of years 2000 and 2010 HOV person-trips on the transitways. Trip totals were assigned using a microcomputer assignment application developed by OCTD staff using macroequations on a LOTUS 1-2-3 spreadsheet program.

- Task 9: Estimation of years 2000 and 2010 transit usage on the transitway. Origins and destinations that could potentially be served by transit were identified, analyzed based on various mode splits, and those cells with greater than 150 peak-period trips were assigned to express bus transit.

The modelling process resulted in the following estimates of transit and HOV demand for the system of freeway preferential facilities:

- Overall summary of HOV projections for the entire system of proposed preferential facilities in Orange County.

- Comparison of demand generated under different occupancy restrictions (2- versus 3-person HOVs) on the preferential facilities.

- The destination/activity center level analysis output was used to help determine locations for direct HOV access ramps and characteristics of facilities in the transitway system.

The development and evaluation of potential access locations along the transitway system was conducted as a separate planning element of the overall OCTD Transitway Concept Design Studies. For the access element, the goal was to develop and evaluate conceptual physical connections between the transitway (within the freeway corridors) and the major activity centers adjacent to those segments of the freeway/transitway. The study effort was conducted in three phases:

1. The first level of analysis identified possible access points between the transitway and the adjacent general purpose travel lanes. This type of access would require HOVs to travel across the general purpose lanes and merge with the transitway at locations identified for this type of merge movement.

2. The next level of analysis identified those locations where a transitway and commuter lane would meet, and the need for a connection between the transitway and commuter lane to allow HOVs to continue to experience the travel benefits

of the transitway, without having to physically exit the transitway and then separately enter the commuter lane.

3. Finally, the analysis considered the need for separate and direct access between the transitways and the adjacent activity centers. This phase included identification and evaluation of alternative access/egress designs, coordination with the affected local jurisdictions, identification of land use coordination issues, impacts on arterials and local streets, and potential preferential treatments for arterials and local streets. Factors in identifying possible ramp locations included:

- understanding and knowledge of the existing activity centers and the potential changes in the activity center over time;

- previous OCTD studies on preferential access in activity centers, including consideration of local street impacts and possible preferential treatments;

- coordination with Caltrans and local jurisdiction staff;
- commitment to minimize the impact to existing interchanges and local street systems.

This ramp analysis was a fatal flaw analysis based on four factors:

1. the ability of the location to meet the estimated transitway demand for the identified activity center;

2. the ability of the arterials and interchanges to accommodate a ramp structure and traffic volumes;

3. the complexity and extensiveness of design problems; and

4. the proximity of the proposed access/egress ramp to existing freeway to freeway interchanges.

Based on this analysis, two of five possible locations in the South Coast Metro area were carried forward for further consideration, which included:

- development of alternative design concepts for each access location, based on ability to meet demand, construction costs, right-of-way requirements and environmental impacts; and

- review of design and ramp concepts with Caltrans and the affected local jurisdictions.

OCTD has begun an Alternatives Analysis/Environmental Assessment (AA/EA) for the two ramp locations identified in the Concept Design Study. The AA/EA is expected to be completed in late 1990.

## SUMMARY

To develop a planning methodology responsive to the needs of suburban activity centers that approach the density and total employment of more traditional central business districts, the OCTD:

- considered the overall ability of transit to serve the activity centers, patrons, and employees effectively;

- evaluated and began implementation of a broad range of transit services, including local and express bus (both public and private), carpool, vanpool, bike, and pedestrian modes within the activity center;

- considered both the origin and destination ends of the employee's commute trip, to ensure that facilities and services are in place for the user markets; and

- continued to provide technical staff and expertise to employers and other public agencies, as well as educating the general public, to ensure that provided services and facilities meet the users' needs.

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