

TRANSPORTATION SYSTEMS PLANNING



Bicycle & Pedestrian Planning
Intelligent Transportation Systems
Land Use & Transportation Planning
Parking
Smart Growth
Traffic Calming
Traffic Engineering Design
Traffic Operations & Simulation
Transit Planning & Simulation
Transportation Systems Planning
Travel Demand Forecasting

Fehr & Peers has unmatched experience and expertise in providing transportation planning and traffic engineering support for improvements to transportation systems throughout the western United States. We have successfully completed hundreds of projects involving complex infrastructure improvements for freeways, expressways, highways, arterials, interchanges, bus systems, bus rapid transit, light rail, inter-city rail, and freight transport systems.

SPECIALIZED SERVICES

Our role in these types of systems planning projects includes not only typical tasks such as travel demand forecasting and operations analysis, but also many unique, value-added services, such as:

- **Needs Assessment** – fulfilling a key role in identifying the need for the improvement and in developing the purpose and need statement.
- **Alternatives Screening** – developing targeted measures of effectiveness to help decision makers identify those alternatives that warrant further consideration.
- **Comparative Analysis** – using state-of-the-art analytical tools to communicate results clearly and effectively.
- **Design Refinement** – refining key aspects of a project design.

Another unique quality of our firm is our unparalleled experience with the project development and environmental clearance processes of federal, state, and local agencies. This experience enables us to expedite the approval process for our clients.



3500 SOUTH CORRIDOR EIS – WEST VALLEY CITY, UT

Fehr & Peers served as the transportation planning consultant for this large multi-modal environmental impact statement in West Valley City, UT. The focus of the project was an alternatives analysis to improve mobility through this built-out urban environment. This project is a pilot for context-sensitive solutions for the Utah Department of Transportation.

Fehr & Peers successfully completed several key tasks including travel demand forecasting, operations analysis using CORSIM and VISSIM, and alternatives development and analysis. Fehr & Peers also provided support in the extensive public involvement program, including an adopt-a-school program. In addition, Fehr & Peers completed an extensive mode choice analysis, which addressed the requirements of both the Federal Highway Administration and the Federal Transit Administration.



I-80/U.S. 395 CORRIDOR STUDY – WASHOE COUNTY, NV

Fehr & Peers assisted the Nevada Department of Transportation in cooperation with the Washoe County Regional Transportation Commission, the Cities of Sparks and Reno, and Washoe County, in a study that will define future transportation alternatives along the Interstate 80 and U.S. 395 Corridors. The purpose of this study was to develop transportation investments for the Washoe County 2030 Regional Transportation Plan. This study provided the participating agencies with a range of innovative, cost-effective, and workable transportation alternatives in sufficient detail to accurately assess socioeconomic, community, environmental, and cost impacts, and to allow selection of preferred alternative(s) to address existing and projected transportation problems in the area. During the first phase, the purpose and need for the project were established, improvement alternatives were identified and screened, a public participation program was initiated, and an early action plan was prepared. During the second phase, a detailed evaluation of alternatives was conducted, alternative investment strategies were compared, and a staged implementation plan was developed.



STATE ROUTE 87 HOV LANES – SAN JOSE, CA

Fehr & Peers was retained by the Santa Clara Valley Transportation Authority (VTA) to conduct a detailed traffic operations analysis to support the design of High Occupancy Vehicle (HOV) lanes to be added to SR 87 from Julian Street to SR 85. The SR 87 HOV Lane project is part of the Santa Clara County voter-approved 1996 Measure A+B transportation improvement program. This project will provide a continuous HOV lane on SR 87, connecting the existing HOV lanes on U.S. 101 and SR 85. The traffic operations analyses used FREQ11 software to evaluate freeway mainline and ramp operations and TRAFFIX software to evaluate ramp intersections. Freeway operations were evaluated using corridor-wide measures of effectiveness (such as average travel time and travel speed), and segment levels of service (based on density). Vehicular queuing on the freeway mainline, on-ramps, and off-ramps was also estimated. Intersection operations were evaluated with peak-hour level of service calculations. The projected operations under “no project” and “project” conditions were compared to evaluate the benefit of the project. The methodology and results of the analysis were documented in a traffic operations report, which was submitted to the VTA and Caltrans for review and approval.



AMERICAN RIVER BRIDGE CROSSING PROJECT – FOLSOM, CA

Fehr & Peers worked as the transportation consultant to the City of Folsom to study alternative locations for a new bridge crossing of the American River. Fehr & Peers' staff has directed the completion of several key tasks as this project has progressed since its beginning in 1990. These tasks included:

- Identification of study alternatives for the environmental analysis, including the provision of bicycles, pedestrians, and future HOV facilities.
- Preparation of conceptual plans for each study alternative.
- Development of a focused area travel demand model consistent with SACOG's regional model.
- Development of travel demand forecasts for each alternative, including AM peak, PM peak and daily projections.
- Preparation of the transportation section of the EIR/EIS, which considered the multi-modal impacts of each project alternative in equal detail.
- Development of supplemental analysis of the impacts of 21 bridge crossing alternatives on the Historic District for use in working with a citizen's committee of area residents and merchants.
- Attendance at more than 50 public meetings.

A variety of supplemental analyses were also conducted throughout the process to 1) provide input for the city council regarding the selection of a preferred alternative; 2) successfully defend a legal challenge against the environmental document; and 3) analyze the effects of an advisory ballot initiative. Fehr & Peers was also involved in the preliminary design stage of the selected alternative to evaluate local development access needs and to identify key project mitigation improvements.



STATE ROUTE 4 WIDENING PROJECT – CONTRA COSTA COUNTY, CA

Fehr & Peers prepared the Traffic Analysis Report for the widening of approximately five miles of State Route 4 from Loveridge Road to State Route 160 in eastern Contra Costa County. The work included several key tasks necessary to define the improvement needs for the mainline and the Loveridge Road, Somersville Road, Contra Loma/G Street, Lone Tree Way/A Street, and Hillcrest Avenue interchanges along the corridor. Key steps included:

- Existing Conditions Analysis – The FREQ11 software was used to develop a validated model of the peak period mainline and ramp operations. The Synchro software was used to evaluate the peak hour operations of the 30 study intersections.
- Travel Demand Forecasts – Year 2030 forecasts were developed for the mainline and each interchange using the East Contra Costa County travel demand model. Demand volumes were constrained at the mainline, ramps, and intersections using the FREQ 11 software.
- Operations Analysis – Year 2030 peak-period operations were analyzed for the mainline and interchanges using the FREQ11, SYNCHRO, and CORSIM software packages. Two build alternatives (including varying lengths of HOV lanes) and a no-build alternative were evaluated for the mainline. Several alternatives were also analyzed at each interchange. A variety of performance measures were computed to aid the alternatives evaluation including levels of service, delay, demand served, peak-period spreading, queue lengths, and diversion of mainline traffic to local streets.

The final products included the traffic analysis report, which served as the operations component of the project report / environmental document, as well as the HOV lane report. Both were reviewed and approved by CCTA and Caltrans District 4.

I-80/I-680/STATE ROUTE 12 INTERCHANGE – SOLANO COUNTY, CA

Fehr & Peers is currently responsible for the travel demand forecasting and traffic operations analysis for the I-80/I-680/State Route 12 interchange in Solano County. This junction of three major transportation facilities is one of the most highly congested interchanges in Northern California, especially during peak weekend periods.

The study area includes the freeway corridors, connecting interchanges, and local arterial system – due to the heavy diversion of traffic to local roadways during peak hours and the impact this diversion has on local neighborhoods. The problems are exacerbated by the presence of truck scales located directly on I-80 in the heart of the interchange. Given the complexity of the traffic operations in the area, Fehr & Peers developed a unique operations model that integrated the travel demand model with the traffic simulation model (VISSIM) using the VISUM software as the interface. This integrated approach enabled us to dynamically assign the demand volumes to the roadway network to develop more accurate forecasts that reflect the impacts of congestion in the system. The result of this approach was a validated base year operations model that accurately reflected the unique operational aspects of the interchange including the traffic diversion and peak-hour spreading. This tool is now being used to develop and test improvement alternatives and phasing plans. This analysis will form the basis for the project report and environmental document (i.e. EIR/EIS).



CENTRAL CONNECTOR BRT OPERATIONS AND SIMULATION STUDY – DENVER, CO

Fehr & Peers assisted with a planning and conceptual feasibility study for the Regional Transportation District in Denver, Colorado. Our initial role included assisting in screening preliminary light rail transit alternatives using broadly defined level of service criteria related to traffic volumes, vehicular travel times, and affected intersections. As the study progressed, a bus rapid transit solution was also suggested. We were asked to perform a detailed operations and simulation analysis for the bus rapid transit alternative using the VISSIM traffic operations and simulation software package. The multi-modal analysis included approximately 40 intersections along Broadway, Lincoln, and 18th and 19th Street in downtown Denver and was completed in less than two months.



INTERSTATE 5/STATE ROUTE 56 FREEWAY CONNECTORS PROJECT REPORT AND ENVIRONMENTAL DOCUMENT – SAN DIEGO, CA

Fehr & Peers is preparing the Caltrans/FHWA traffic operations report and NEPA/CEQA transportation impact report for the freeway-to-freeway interchange between Interstate 5 (I-5) and State Route 56 (SR 56) in San Diego, California. I-5 is the main north-south route through Southern California and SR 56 is a critical east-west link between I-5 and I-15. The study area includes the freeway corridors connecting to the interchange as well as the local arterial system due to the heavy diversion of traffic to local roadways during peak hours. Without major infrastructure improvements, congestion will extend to multiple peak hours affecting both local and regional traffic. Regional traffic includes substantial truck traffic and recreational traffic that can overwhelm the freeway system on Friday afternoons and major holiday weekends.

To accurately analyze existing and future operations, Fehr & Peers is collecting extensive multiple-hour traffic counts, conducting a license plate survey, and using the unique combination of the regional SANDAG travel demand model, SYNCHRO, VISUM, and VISSIM for the travel demand and traffic operations modeling. The SANDAG model is being used to provide peak period trip tables and link volumes for direct input to VISUM, which is a travel-demand model that converts trip table, link level travel demand flows, and geometric data to a format readable by the VISSIM micro-simulation traffic model. VISSIM is one of the most sophisticated micro-simulation models available and is being used to dynamically assign portions of the trip tables to improve the accuracy of assignment results between the freeway and arterial systems and to conduct the peak-period and peak-hour operational analysis of the entire study area (i.e. freeway system and arterial system). SYNCHRO is being used to develop optimized signal timing plans for input into VISSIM as part of the operations analysis. The photo above shows a typical view of the VISSIM model 3-D simulation output, which will be instrumental in ensuring that decision makers understand the key operational differences and benefits of the project alternatives.

I-405 ARTERIAL IMPROVEMENT PLANNING STUDIES - LOS ANGELES, CA

Fehr & Peers, working with the South Bay Cities Council of Government's I-405 Taskforce, along with the Southern California Association of Governments, Caltrans, and Los Angeles Metropolitan Transportation Authority, conducted a comprehensive assessment of existing conditions along the I-405 freeway and arterial corridors. The goals of the project were not only to find solutions in the way of operational and physical improvements, but also to evaluate, weigh, and prioritize alternatives so that implementation could be expedited and the means identified if a certain project was pursued. The primary means to achieve this goal was in the development of the "Project Matrix". The Project Matrix was comprehensive, up to date, relevant, and useful database in identifying, selecting and prioritizing improvement options. Discussions with six cities along the corridor led to a refinement of the improvement concepts. Based on the results of the analysis and the recommended list of improvements, a strategic plan was developed for implementation. A timeframe for integrated improvements on the updated Project Matrix, categorized into short-term, medium-term, and long-term improvements, was established by using a set of evaluation criteria. Funding opportunities and lead agencies for project initiations were identified.

Taking into consideration the various agencies involved, their jurisdictions and authorities, and their different needs and requirements, Fehr & Peers assisted South Bay Cities Council of Governments in gathering community support and gaining priority with funding agencies for the implementation schedule. As such, presentations to various city planning and transportation commissions and city councils were made, and ongoing coordination meetings with the regional agencies were held.

DOWNTOWN LA FREEWAY IMPROVEMENT STUDY - LOS ANGELES, CA

Fehr and Peers prepared a traffic report for the Project Study Report for the Hollywood Freeway (US 101) improvements project as part of the short-term improvements identified in the Downtown Los Angeles Mobility Program (DLAMP). A VISSIM model was developed to conduct the traffic operations analysis for this project to provide a wide range of measures of effectiveness (MOE) to identify the benefits of the proposed improvements. The study included documentation of existing traffic conditions, developing traffic forecasts for study freeway locations, and evaluating the near-term year traffic conditions with and without the proposed project alternatives. Based on the near-term year analysis, Fehr & Peers was able to determine how long the benefits of the freeway improvements would last before congestion would worsen to the same level or below existing conditions, using the both location-based and systemwide MOEs, including AM and PM peak hour levels of service at study freeway mainline and ramp junctions, number of vehicles served, travel times, speeds, vehicle-miles-traveled (VMT), and vehicle-hours-delay (VHD).

