

SCOPE OF SERVICES

A. PROJECT MANAGEMENT AND COORDINATION

The Fehr & Peers team will attend a kick-off meeting with Culver City staff. The intent of this meeting is to identify team communication protocol, confirm the project schedule and deliverables, and review/finalize the scope of work.

The project team plans to work collaboratively, with personalized attention given to the management, administration, and coordination of day-to-day activities for the project. Fehr & Peers will provide regular project updates to City staff, so that there is no lapse in work timing or products.

Monthly Check-Ins

A total of 12 monthly conference calls will be held to present overall progress and status of tasks such as data collection, analysis results and deliverables.

A total of 12 monthly progress reports will be submitted to the Culver City project manager accompanied by conference calls as needed. Each report will itemize tasks completed, percentage of budget spent and achievement of overall study objectives. They will also contain a summary of obstacles and issues, recommended solution or course of action, and a timeline for resolution.

B. PROJECT INITIATION

Fehr & Peers will apply the project management and communication protocols established in Task A.

Due to the schedule of the project, the Culver City Travel Forecasting Model will rely on the most recent Census and California Household Transportation Survey (CHTS) data and data inputs used within the 2016 SCAG Regional Transportation Plan travel demand model. Specifically, Fehr & Peers will collect existing and available traffic and travel demand data for the Culver City Model. The presumed level of available data is listed below. The scope of work and fee assumes that the City of Culver City and SCAG will provide some of data necessary for the development and calibration/validation of the travel behavior model. It is also assumed that the City of Culver City staff will assist with the requests for both the 2016 SCAG RTP model and the City of Los Angeles model.

| Data Type | Use | Status |
|------------------------|--------------|--|
| Land Use | Model Inputs | Base & Future year land use & socioeconomic database to be provided at parcel level by Culver City. Regional socioeconomic data provided from the 2016 SCAG RTP and City of Los Angeles model. |
| Transportation Network | Model Inputs | To be developed by Fehr & Peers |

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|---|--|--|
| Travel Behavior | Model – Estimation and Calibration | Available - 2012 California Household Survey, 2010 Census, and 2012 American Community Survey. Mobile device data to be collected as part of Task B. |
| Interregional Travel | Countywide SCAG Model – Estimation and Calibration | Available – 2016 SCAG RTP Model. Interregional Origin-Destination mobile device data to be collected as part of Task B. |
| Trip Generation Counts | Countywide Model – Trip Generation | To be collected by Fehr & Peers |
| Screenline and individual traffic counts | Model – Validation | To be collected by Fehr & Peers |
| Geographic Information Systems Street and Land Use Layers | Model | Culver City parcel level land use/SED and built environment data to be provided by the City (if available) |
| Transit Ridership | Model | Observed data available from Metro, Santa Monica Big Blue Bus, and Culver CityBus |

C. BUILD TDFM

This task includes the development of a new Travel Demand/Behavior Forecasting Model for the City. This is a tool that is only useful if it is understood, used, and applied to answer specific technical questions. Furthermore, most regional travel behavior forecasting models lack the sensitivity to be of value in answering many of the technical questions that involve complex land use transportation interactions being asked today.

Because of our diverse experience in both developing and applying these types of models, we have built an extensive knowledge of how these models work, their benefits, and their limitations. Our models are designed to be user friendly so that updating the model inputs, running the tool, and interpreting the results are intuitive processes. Fehr & Peers develops models with capabilities that go beyond those of traditional highway-focused travel demand models to provide enhanced capabilities in such areas as smart growth, GHG emissions, transit operations, and alternative modes such as walking and bicycling. We have developed innovative techniques that allow travel behavior models to capture the interactions between neighborhood- scale land use characteristics and travel patterns. This is based on research and tool development in the areas of state-of-the-art travel demand modeling, TDM effectiveness, VMT estimation, and mixed-use trip generation considering the effects of the built environment.

This task will rely on the use of either the 2016 SCAG RTP/SCS model and/or the City of Los Angeles Travel Demand Model if available. There are other models available

such as the Metro travel demand model, but we believe the aforementioned two models will be the best starting point for a local Culver City model that balances automobile and transit travel behavior. Of these, the City of LA model would be particularly useful in that its zone system is already more disaggregated and its network more detailed in the areas surrounding Culver City than is the zone system and network in the SCAG model. Fehr & Peers developed and recently updated the City of LA model and is intimately familiar with it.

TAZ System Development

The Culver City Model transportation analysis zone (TAZ) system will be developed using the 2016 SCAG RTP model and/or the City of Los Angeles model as the starting point. It is expected that the TAZs will be disaggregated substantially to reflect local geographical details. Fehr & Peers will recommend a TAZ system within the City and surrounding area with sufficient geographical detail for local model applications and that includes the following elements:

- Physical boundaries that influence travel patterns
- Jurisdictional boundaries (city limits, and sphere of influence)
- Existing and future development patterns (i.e., future specific plan boundaries)

Land Use and Socioeconomic Data

Base year and horizon year land use and socioeconomic data (SED) obtained from the City of Culver City and SCAG will be used as input into the Culver City model. The SED categories proposed for the Culver City model will be presented to and discussed with City staff to determine the appropriate level of detail. Fehr & Peers will coordinate directly with the City of Culver City regarding the horizon year demographic dataset (expected to be 2040 consistent with the 2016 SCAG RTP). The City staff will provide a parcel level land use/SED database consistent with the zone system and variable formats used in the model.

Network Development

To support a relatively dense TAZ structure, Fehr & Peers will develop a detailed highway network for current and future conditions with variables for:

- Facility type
- Adjacent development
- Mixed-flow lanes
- Turn prohibitions and cul de sacs
- Transit (drive, park-n-ride, and walk/bicycle access)
- Peak-Period parking restrictions
- HOV lanes
- Road diets

Fehr & Peers will perform quality checks using geographic information system software to conduct a quality assurance/quality control (QA/QC) process on connectivity, duplicate and dead-end links to be checked for and discarded from the final network.

Trip Generation

The travel model will estimate Culver City specific person trip generation rates based on the SCAG/LA regional model, the California Household Travel Survey (CHTS), and local data (if available). We anticipate that calibration of the rates will focus on capturing the unique travel characteristics of Culver City and adjacent areas. This trip generation model will also be sensitive to built environment variables, accessibility to transit or active mode facilities, transportation system (highway, transit, walk or bicycle network), and land use/socioeconomic factors.

By developing a person trip model, it provides the City with a model that is sensitive when testing a variety of transportation policies, programs and strategies and being able to report the influence that they have on person and hence multi modal trip making. This type of tool would be particularly effective in evaluating the effect of TDM and trip reduction strategies as well as being able to determine the amount of tripmaking by mode (transit, bike, walk, carpool etc.).

Trip Distribution

The trip distribution function uses a gravity model formulation that relies on friction factors to relate the likelihood of selecting a particular destination given the distance or travel time to that destination compared to other similar destinations. The model will use friction factor curves to represent internal trip purposes and the I-X and X-I trips. The initial friction factors will be taken from the current model and tested against other friction factors developed by Fehr & Peers since 2000. A single set of factors will be selected and then adjusted for each trip purpose being modeled during trip distribution calibration to better represent each trip purpose's unique tripmaking characteristics.

The trip distribution process that will be tested for inclusion in the updated model includes the introduction of a separate external trip distribution function for different sub-areas or sub-groups. Our experience in developing traffic models for other cities has demonstrated that it could be advantageous to allow different areas of the City to distribute trips to external gateways in different proportions. Our regional linking process specifically defines and distinguishes gateway travel by trip purpose for consistency with regional estimates. We will adapt this process to the updated model.

Mode Choice

The mode choice component of the model will be derived from the SCAG/LA model and will be calibrated to account for vehicle trips shifted to other modes of transportation (transit, bicycle and pedestrian). Vehicle trip reductions occurring during the trip generation component must be shifted to other travel modes in order to accurately account for all person trips in the model. It is anticipated that transit data from Metro, Santa Monica Big Blue Bus, and Culver CityBus will be used in the calibration process. No specific modifications to the format of the mode split model are proposed.

Trip Assignment

The most common measurement of traffic model accuracy is the degree to which it can approximate actual traffic counts in the base year. Fehr & Peers will test different trip assignment algorithms to determine the one that best replicates existing behavior, but also responds appropriately to variations in the model's input variables. Potential algorithms will include methods such as capacity restrained equilibrium and multiple iteration incremental assignments.

Various speed/delay curves will also be tested to determine their role in the routing of trips from origin to destination. We have experimented in the past with more sensitive delay curves, which are consistent with the Highway Capacity Manual (HCM) rather than standard Bureau of Public Roads (BPR) curves, and have found much better success in replicating delay due to congestion with these curves. If the City of LA model is used, testing speed/delay curves will not be required.

Model Static Validation

Model validation is a critical component of the model development process where the model's ability to replicate base year conditions is measured. Fehr & Peers takes a unique approach to validation in that we perform both static and dynamic tests. As part of the static validation procedure, elements of the trip generation, trip distribution, and traffic assignment modules may be adjusted. Our goal is to meet or exceed the validation criteria published in the 2017 California Regional Transportation Guidelines for Metropolitan Planning Organizations (California Transportation Commission, January 2017), but validation testing will be limited to 10 iterations at which point we will assess the model performance and City staff will determine if future testing is needed to improve the test results. Examples of static tests may include evaluation of the following:

- Trip length frequency by purpose
- Interregional distribution patterns
- Average travel times by purpose
- Roadway segment model-to-count ratios
- Screenline model-to-count ratios
- Percent Root Mean Squared Error
- Model congested speed versus observed congested speed
- Spot checks of route assignment
- VMT within the county compared to the highway performance monitoring system (HPMS)

Fehr & Peers will also use cell-phone or mobile device data during the calibration and validation process. This approach has already been used successfully on other similar projects. The specific use of this data will depend on preliminary static and dynamic validation findings. Typical applications include calibration refinements related to trip tables or trip lengths.

The following source of transportation data is proposed for use in the static validation tests. These have been accounted for as a direct cost in the overall budget. If the City has recent data (no later than two years old) that can be used, then some of this data may not be necessary:

- 24-hour roadway segment traffic counts on a typical weekday (up to 150 locations). The counts will be collected on neighborhood feeders, collectors, secondary and primary arterials.
- Big data (mobile/GPS data)
- Transit ridership data from Metro and Culver City Bus (overall system and individual lines)
- RIITS data for locations outside of Culver City such as Los Angeles
- Freeway data from PeMS

Model Dynamic Validation

The static validation tests described in the previous task ensures that the model can replicate existing traffic counts and speeds. While these tests are useful at confirming that the model can replicate existing conditions, models are generally used to forecast change, which static tests say nothing about. To determine how well the model responds to changes in land use and the transportation network, we will perform a set of dynamic validation tests. Dynamic tests may include testing the changes in the following (list to be refined):

- Add 1, 10, and 1,000 households to a TAZ
- Remove 10 and 1,000 households from a TAZ
- Add and remove 100 and 1,000 ksf of retail employment in a TAZ
- Add and remove a roadway link in the network
- Add and remove travel lanes in the network

Based on the results of the dynamic validation tests, elements of the trip generation, trip distribution, and traffic assignment modules may be adjusted. We will document and interpret the results of the dynamic validation tests in graphical and tabular form.

Model Output Data and Performance Measures

The travel demand model will be developed to output data that includes the following information listed below. Should other metrics be required, Fehr & Peers will discuss with City staff and determine the level of effort necessary to obtain the information. (For example, if LOS is required at the intersection level it would be necessary to develop a post processing methodology to obtain this data, as raw model data is not typically used to assess LOS. Developing an intersection post-processor is not included as part of this work scope.)

- Individual link/segment traffic volumes by direction (daily and peak periods)
- Origin-Destination information
- Select link analysis
- Select zone (trip distribution) analysis

- Congested speeds
- Vehicle Miles Traveled
- Vehicle Trips
- External – External (X-X) trips (pass through trips)
- Internal – Internal (I-I) trips
- Internal – External trips (I-X), External – Internal (X-I) trips

Fehr & Peers will also work with the City to develop performance measures (qualitative and quantitative) appropriate for assessing a variety of multi modal improvement project and polices/programs. Based on our experience, the most important step is defining performance measures that address community concerns, address the goals and objectives of the study and do not conflict with goals/policies of the General Plan. In particular, the model will be developed in order to produce metrics that will be needed to evaluate land use growth under the new SB743 guidelines.

As part of this task Fehr & Peers will facilitate a workshop with City staff where we will present the measures, and modify them based on input and feedback from the meeting. A key question that will be asked is, “What does the City want to create, avoid, and protect when it comes to mobility in Culver City?”

Fehr & Peers will then work with the Culver City staff to help define the performance measures that can be produced by the TDFM, as not all measures can be assessed directly from the model. A sample list of measures is provided below:

- Vehicle miles traveled (VMT)
- Vehicle hours of delay (VHD)
- Vehicle trips (VT)
- Level of service (LOS)
- Trip length
- Mode split
- Origin – destination patterns
- Accessibility to bicycle /pedestrian/transit facilities

A specific goal of the model development (as referred to in the RFP) will be the ability of the tool to assess and evaluate various TDM strategies and changes in transportation mode and/or network.

Model Documentation

Fehr & Peers will prepare a draft Model Development Report that describes the methods, data sources, and assumptions used to develop the validated Culver City TDFM. Flow chart diagrams will be included which will illustrate the relationship of data inputs, model steps, and output. Fehr & Peers will prepare a draft and final version of the Model Development Report.

SB743 VMT Metrics and Threshold Options for Land Use Projects

Fehr & Peers will develop VMT threshold options for land use projects based on policy goals as directed by the Culver City staff and consistent with SB743 guidance from the State. The guidelines will describe where and when the selected VMT metrics should be applied. Potential metrics to be evaluated include:

- Areawide VMT
- VMT per capita
- Household VMT per capita
- VMT per service population
- Work VMT per employee

As part of this task Fehr & Peers will document how the various threshold options would meet the substantial evidence test under the California Environmental Quality Act.

Case Studies for Land Use Projects

After developing the VMT threshold options and the project-level VMT calculator sketch tool to be prepared under Task J, Fehr & Peers will apply the selected metrics to up five different case studies, to be selected in consultation with Culver City staff. The sketch tool will be used to evaluate the project-level impacts for each case study as well as the potential to mitigate impacts with potential TDM strategies/programs as provided by the City's TDM consultant. Only TDM strategies that have available research supporting quantifiable trip/VMT reductions will be included in the sketch tool.

Threshold Recommendation

Fehr & Peers will summarize the results of results of the aforementioned tasks in technical memo that demonstrates how the recommended metrics and thresholds support policy goals to increase the VMT performance of new projects, implements CEQA streamlining for infill development and "Complete Streets" projects, and meets the substantial evidence standard under CEQA. The proposed guidelines will clarify the methodology for determining significant impacts, such as projects that induce travel demand or increase VMT per capita. The most appropriate software tool (citywide travel demand model or sketch model tool) for quantifying the impacts will be identified as well.

District-Level Local Trip Generation Rates

The City may seek to gain a greater understanding of the different vehicle trip generation characteristics of specific business or residential districts in Culver City. As per the RFP, City staff have identified 14 business/residential districts which may be of interest, which will vary in household income, land use mix and proximity to transit. Per the City's responses to questions, this task will focus on areas or land use types where it is determined in consultation with the City that having a better understanding of local trip generation rates would be useful for model development or other City purposes. After information is provided, the City will determine if Fehr & Peers conducts trip

generation studies/surveys of either commercial or residential districts in different areas of Culver City.

In addition to the site study/survey, a combination of literature review, and coordination with NACTO trip generation efforts, travel survey data and the cell phone data that is available as part of this project may also be used to assist with the development of localized trip generation rates.

~~As the magnitude of this task is not currently known, we have provided an estimate of unit cost for collecting data in a single district. Depending on the size, transportation network and mix of land uses the complexity of the evaluation may increase and hence the cost may vary by +/- 20%. The fee includes an estimate for four districts with collection of counts at up to 12 isolatable sites per district.~~

Transportation Safety Initiatives

Parallel to the development of the Travel Demand Forecast Model, our team will coordinate and align with the transportation safety initiatives already underway in Culver City. Fehr & Peers is currently working with the City on the development of a Vision Zero Action Plan, as part of the Bicycle Pedestrian Master Plan Update. The Vision Zero Action Plan began with a robust collision data analysis for all modes, focusing specifically on collisions that resulted in severe injuries and fatalities, using data from the City's Crossroads system. The Fehr & Peers team then identified the High Injury Network, the 15% of Culver City streets that account for 82% of all collisions resulting in a severe injury or fatality. Forthcoming work includes the development of engineering countermeasures, education campaigns, and enforcement approaches along the High Injury Network that will reduce the collision patterns observed.

Some of these countermeasures, actions, and other elements proposed along the High Injury Network may be relevant for coordination with the TDFM effort. These elements could include signal-timing changes, operational changes to the roadway network, and speed limit adjustments. As part of this task, Fehr & Peers staff leading the Vision Zero Action Plan will ensure the development of the TDFM aligns with the projects and actions included in the Vision Zero Action Plan. Fehr & Peers can also ensure close coordination around issues like evaluation, ongoing collision analysis, and performance metrics.

D. TECHNICAL SUPPORT FOR GPU MOBILITY ELEMENT

Fehr & Peers will provide technical support to the team selected for the General Plan Update (GPU) project. This task may involve coding of the travel demand model to ensure its accuracy for use in the future year general plan scenarios. As per the RFP, this could include the following tasks but is not limited to:

- Modifying land use/SED model input files
- Roadway network system modifications
- Transit system coding, including, but not limited to, micro-transit
- TDM/TSM program elements

- Bicycle network and pedestrian circulation system master plans

As the extent to which assistance required by the GPU project is not currently known, the fee includes an allowance of 80 hours for this task.

E. PREPARE TRAFFIC STUDY GUIDELINES

Fehr & Peers will revise the City's existing Traffic Study Guidelines to incorporate all the new procedures necessary to conduct a project-level VMT-based analysis. This update will also include any pertinent evaluation protocols that result from the revised State CEQA Guidelines pursuant to SB 743. This task will include an evaluation of the City's current traffic study guidelines, and in consultation with City staff, determine which elements should be carried over. In addition, the revised guidelines will include project components that are critical to Culver City when evaluating a proposed development project, such as site access, queuing at project driveways, queuing analyses on arterial highways, LOS analyses for intersections close to the projects, warrant studies at intersections for traffic signals and all-way stop control and roadway operations. After presenting the updated draft procedures to city staff, Fehr & Peers will respond to two rounds of consolidated comments before submitting a final draft.

F. HEARINGS, MEETINGS, AND EVENTS

Fehr & Peers staff will prepare for and attend the following meetings with City staff:

- One internal kick-off meeting with City staff (included in Task A)
- 12 internal meetings with City staff (monthly), can be mix of in-person and conference as warranted (same meetings as described in Task A)

Fehr & Peers staff will prepare for, attend and support City staff at the following public meetings, events, or hearings:

- Four community meetings/events
- Three Planning Commission meetings/hearings
- Six City Council meetings/hearings

The fee includes all the meetings listed above. Should the City require Fehr & Peers' attendance at additional meeting not listed above, such as the GPU transportation TAC meetings, these will be billed on a time-and-materials basis using our standard billing rates.

G. ASSIST TDM CONSULTANT ON EVALUATION OF RECOMMENDED FUTURE TDM STRATEGIES

Fehr & Peers will support the City's TDM consultant on an as-needed basis. As part of Task C, the model will be developed so that it is sensitive to certain TDM strategies. The Fehr & Peers team will be available to the City staff and the TDM consultant on an as-needed, time-and-materials basis to assist with the analysis and evaluation of TDM strategies and programs. The fee includes an allowance of 80 hours for this task.

H. ESTIMATE FOR ONGOING TDFM OPERATIONS AND MANAGEMENT

Fehr & Peers will develop a user guide and training materials for Culver City staff to perform the analytic framework of project-level VMT analysis of both land use and transportation projects. The information will be presented at two half-day workshops with city staff. The training materials and course format will be based on the case studies developed under Task C. The training will cover the following topics:

- How to run the Travel Demand Model
- Most common travel model tasks
- Use of the sketch model to apply unique trip generation rates and TDM reduction benefits
- Use of VMT-based thresholds for project analysis
- Decision criteria in applying mitigation measures

The training materials will also document the when and how the citywide travel model should be updated to derive the necessary inputs for project-level review.

Additional training beyond the elements listed above can be conducted on a time-and-materials as-needed basis.

I. TRANSPORTATION REVIEW FEE

Fehr & Peers will develop a transportation review fee to recover the staff costs for project-level review and TDM monitoring and enforcement. The fee will also be set to account for periodic updates to the City's travel demand model, acquisition of additional mobile device ("big") data, or other elements of the transportation review procedures that are necessary to perform adequate project-level VMT impact analysis. The draft transportation review fee will be summarized in a technical memo; Fehr & Peers will respond to one round of comments from city staff before submitting a final memo.

J. PROJECT-LEVEL VMT CALCULATOR

Fehr & Peers will develop a spreadsheet-based tool that could be applied to project level review of transportation projects in the City of Culver City. While we have already developed and used multiple spreadsheet and web-based tools that perform VMT estimates, this project provides an opportunity to refine or build new tools that incorporate recent research about VMT effects of land use and TDM actions. The tool would incorporate trip length data and demographic data from empirical sources and the citywide travel model to calculate project-level VMT impacts, using the VMT metrics and thresholds developed in Task C. The appropriate geographic scale (TAZ, Census area, or other boundary) of the model inputs would be determined during the model calibration process. The tool would account for the VMT benefits of transit proximity, mixed land uses, urban design, and TDM measures. The quantification of some of these benefits would be linked to the available data on mode share, trip generation and CAPCOA research. Through consultation with the Culver City staff, the strategies identified by the City's TDM consultant that also have available research supporting

quantifiable trip/VMT reductions to reduce a project's VMT impact on the environment would be determined and incorporated into the sketch model.

The tool will be used to test the application of the selected VMT metrics and thresholds to five case studies, as discussed in Task C. The tool will be submitted to City staff in draft form for testing. Up to two rounds of review and modification in response to staff comments are anticipated. The fee presumes that the tool will be a spreadsheet-based tool, not a web-based application. If City staff were to determine that a web-based application is desired, this could be provided for an additional fee.

K. VMT IMPACT FEES NEXUS STUDY

Fehr & Peers will develop a VMT impact fees nexus study that would help the City to establish a project-level VMT impact fee program, or mobility fund. The tasks that will be completed and documented as part of the Nexus Study are outlined below.

-) Overview of Transportation Impact Assessment (TIA) fees under AB 1600
-) Land uses exempt from TIA fees (developed in consultation with the City)
-) TIA fee credits for existing uses, affordable housing, and transit-oriented developments under AB 3005
-) List of Transportation Improvements to be funded through the TIA fee program
-) Planning-level cost estimates for transportation improvements (based on available per mile costs for similar projects in the Los Angeles region)
-) Nexus analysis showing relationship between new development and need for transportation improvements; performance metric will be VMT and VMT per capita
-) Determination of new developments' fair share contribution to transportation improvements; accounting for regional pass-through traffic and existing deficiencies
-) Calculation of TIA fees for various land use types based on: vehicle trip generation, average trip length, and percent of new vehicle trips

A draft Nexus Report will be submitted for City review, with up to two rounds of consolidated comments by City staff and up to four total rounds of comments by the Planning Commission and City Council. Comments received will be incorporated in the final Nexus Report. The scope and budget assumes that the Nexus Study will occur once the General Plan land use has been adopted.

The VMT Impact Fees Nexus Study fee does not include potential economic review by an economist subconsultant (estimated at approximately \$10,000-\$20,000), nor additional meetings or public outreach/hearings beyond those described in Task F.