SR-241 TCM Substitution

Proposed Emission Analysis Methodology

Introduction

The Transportation Corridor Agencies (TCA) previously committed to fund an extension of State Route 241 (SR-241) between Oso Parkway and Interstate 5 (I-5) as a single transportation control measure (TCM). The new facility currently proposes to have two lanes in each direction by 2021 and three lanes in each direction by 2030 (ORA052). The implementation of this project is being delayed, therefore, the TCM must be replaced. For air quality conformity purposes, TCA is proposing the construction of a high-occupancy toll direct connector between SR-241 and the State Route 91 (SR-91) Express Lanes (241/91 Express Lanes Connector) as a single replacement TCM to the previously planned SR-241 Extension TCM in the Federal Transportation Improvement Program. The proposed evaluation methodology is discussed below.

Project Description

The 241/91 Express Lanes Connector (ELC) consists of constructing high-occupancy toll direct connector ramps between SR-241 and the SR-91 Express Lanes. The ramps would connect northbound SR-241 with the eastbound SR-91 Express Lanes, and the westbound SR-91 Express Lanes with southbound SR-241. The 241/91 ELC will be completed by 2019 with air quality benefits to the region that are anticipated to be equivalent to the current SR-241 Extension TCM. The locations of the 241-91 ELC TCM and the previously proposed SR-241 Extension TCM are graphically illustrated in Attachment A.

Compliance with Substitution Requirements

- Equivalent Emissions Reduction: OCTA will analyze the countywide emissions impacts of the substitute TCM (241/91 ELC) relative to the of SR-241 extension TCM. See the Air Quality Analysis Methodology below.
- Similar Geographic Area: Both the SR-241 Extension TCM and the 241-91 ELC TCM are located in the Orange County portion of the South Coast Air Basin.
- Full Funding: TCA currently has funding for the 241/91 ELC TCM.
- Similar Time Frame: The proposed 241/91 ELC TCM will be operational by 2019, equivalent or better than the schedule of the SR-241 Extension TCM schedule.

- Timely Implementation: The proposed substitution is the means by which the obstacles to implementation of the SR-241 Extension TCM is being overcome.

- Legal Authority: TCA has legal authority and personnel to implement and operate the substitute 241/91 ELC TCM.

Air Quality Analysis Methodology

The air quality impacts will be calculated with the SR-241 Extension TCM and the proposed 241/91 ELC TCM using a multi-step method based on the Southern California Association of Governments (SCAG) emission methodology focused on Orange County. The following process will be used:

Step 1: Obtain daily vehicle miles traveled (VMT) and speed data for freeways and arterials from Orange County Transportation Analysis Model (OCTAM). OCTAM is a conventional four step transportation model used to forecast travel demand with a base year of 2010 and a forecast year of 2035. It is consistent with SCAG's regional model as it incorporates the most recent approved socio-economic data for Orange County and the surrounding region.

Three alternatives for forecast year 2035 will be run using OCTAM as part of this study. The coding of all alternatives will be consistent with previous OCTAM modeling practices.

Alternative 1: No Project
Alternative 2: SR-241 Extension TCM
Alternative 3: 241/91 ELC TCM

All alternatives will be based on the OCTAM future year baseline, which includes approved and funded projects. These projects are primarily those defined in the Federal Transportation Improvement Program. The No Project alternative will not include both the proposed SR-241 Extension TCM and the proposed 241/91 ELC TCM.

The SR-241 Extension TCM consists of an extension of SR-241 between the current southern terminus of SR-241 at Oso Parkway and I-5 near the Cristianitos Road interchange. The proposed facility would be built to freeway standards with three lanes in each direction. Consistent with the existing SR-241, it is assumed to be a toll facility. New interchanges will be assumed to be constructed between the SR-241 extension and Cristianitos Road, Avenida Pico, and the Rancho Mission Viejo development north of Ortega Highway. This alternative will be used for the SR-241 Extension TCM "with project" analysis.

The proposed 241/91 ELC TCM consists of constructing direct connector ramps between SR-241 and the SR-91 Express Lanes. The ramps will connect northbound

SR-241 with the eastbound SR-91 Express Lanes, and the westbound SR-91 Express Lanes with southbound SR-241. Consistent with the current policies on SR-241 and the SR-91 Express Lanes, the connector ramps are assumed to be only available to drivers willing to pay a toll. This alternative will be used for the 241/91 ELC TCM "with project" analysis.

Each alternative will be modeled separately using OCTAM and post-processed using the NCHRP 255 process. This process provides a standard methodology to refine forecasted volumes on links based on a combination of base year traffic counts, base year model estimates, and forecasted model estimates using incremental adjustments. The output of the travel demand model and post-processing will include travel information on the No Project, the SR-241 Extension TCM, and the 241/91 ELC TCM. Loaded link information, intrazonal travel speeds, and intrazonal travel volumes will be extracted for all modeled time periods for both alternatives.

Step 2: The Emission Factors 2014 (EMFAC) program was developed by the California Air Resources Board and is used throughout California to calculate emission rates from motor vehicles, such as passenger cars and heavy-duty trucks, operating on freeways and local roads for typical summer, winter, and annual conditions. EMFAC provides an estimate of the level of exhaust emissions (via Reactive Organic Gases [ROG] and Nitrogen Oxides [NOx]) for all Orange County.

A spreadsheet tool has been created to develop EMFAC input data that reflects the results of OCTAM runs. The tool will be run for the base year, forecast year 2035 and forecast year 2040 using the extracted information from Step 1 as input to update the VMT and vehicle speed data needed by EMFAC. This process will be performed multiple times for all three alternatives in order to analyze conditions for summer, winter, and averaged annual timeframes.

Interpolation between base and forecast year 2035 results will be used to estimate the emissions changes for interim years (e.g. 2021, 2023, and 2031). Since model scenarios for forecast year 2040 do not exist yet, the year 2035 travel forecasts will be extrapolated out to 2040 using demographic growth projections.

Step 3: Determine the emissions output from Step 2 to identify the emissions for all three of modeled alternatives.

<u>Next Steps</u>

The air quality forecasts for the No Project, SR-241 Extension TCM, and the 241/91 ELC TCM will be developed and compared using the methodology described in the previous section. Four forecast years – 2021, 2023, 2031, and 2040 – as well as three conditions – summer, winter, and annual – will be compared as appropriate. These results will be presented at the next meeting.

ATTACHMENT A