

# Proposed Transportation Control Measure Substitution of Four Transit Projects (FTIP Project IDs: ORA170205, ORA085004, ORA130099, & ORA030612) with New Bravo! Express Bus Service

## Introduction

The Orange County Transportation Authority (OCTA) previously committed to four capital improvement projects within Orange County: the Hazard Avenue Bikeway project (FTIP Project ID: ORA170205); the Anaheim Canyon Station project (FTIP Project ID: ORA085004); Paratransit Vehicle Extension (FTIP Project ID: ORA130099); and the Placentia Station project (FTIP Project ID: ORA030612). These four projects are included as committed TCM's in SCAG's 2020 RTP/SCS (Connect SoCal), 2021 FTIP, and SCAQMD's 2016 South Coast AQMP/Ozone SIPs. Below are the summary project descriptions of these four committed TCMs. Their 2021 FTIP project sheets including detailed project information are included in **Attachment A**:

- The Hazard Avenue Bikeway project was previously committed by the County of Orange. The project would have added approximately four miles of Class IV bikeway on Hazard Avenue between Goldenwest Street and Euclid Avenue. The County of Orange has put this project on hold due to a lack of community support. The planned implementation date was December 2023.
- The Anaheim Canyon Station project is a commuter rail project that will add a second track and platform to the existing Anaheim Canyon Station, which is served by Metrolink's IEOC Line. The existing platform will also be extended. Construction is underway and was originally planned to be complete by December 2022. The project is delayed due to construction issues.
- The Paratransit Vehicle Expansion involved the purchase of fifteen gas/diesel buses for use in paratransit service. These vans would have expanded OCTA's existing paratransit fleet. However, consistent with the OCTA Bus Fleet Plan, these expansion vehicles are no longer needed in the near term. This is particularly true following the impacts of the coronavirus pandemic which has resulted in a reduction in the use of paratransit service. The vehicles were planned to be purchased by December 2022.
- The Placentia Station project is a commuter rail project that will add a new station in the City of Placentia, near the intersection of Crowther Avenue and Melrose Street. It will be served the Metrolink's existing 91 Line. Completion of this TCM project has been delayed beyond the committed completion date due to protracted negotiations with the BNSF Railway, which owns the tracks that will serve the station. Construction was originally planned to be complete by December 2022.

These four committed TCMs will be delayed beyond the scheduled completion dates. One substitute TCM project involving a new 10-mile express bus line is now proposed as a replacement TCM to the previously committed projects.

### Description of Proposed Substitute TCM Project

OCTA is proposing a substitute project as a replacement to these previously committed TCMs. The recommended substitute project consists of a new 10-mile Bravo! express bus line that will follow Main Street between the Anaheim Regional Transportation Intermodal Center and the South Coast Metro district in the City of Costa Mesa. The project will improve transit access along a corridor with high existing transit demand. Traffic signal operations are also expected to be improved along the corridor, which will benefit transit as well as other vehicles.

The substitute project will be implemented by December 2022. Current funding, as part of Measure M2 (Project P), will be used for this project. Project descriptions are listed below and a map of the locations of both the committed and substitute projects is in **Attachment B**. Note that this proposed project is not in the SCAG's 2021 FTIP yet but will be amended into the FTIP upon completion of the TCM substitution.

### Compliance with TCM Substitution Requirements

- **Equivalent Emissions Reduction:** OCTA has analyzed the countywide emissions of the substitute TCM project relative to those of previously committed TCM projects. The replacement TCM project will provide equivalent emission reductions. OCTA used the Orange County Transportation Analysis Model 5.0 (OCTAM) for the analysis of the alternatives. The following three sections document the OCTAM Model Information, the Emissions Analysis Methodology, and the Emissions Analysis Findings.
- **Similar Geographic Area:** The substitute TCM project and the previously committed TCM projects are both located in the Orange County portion of the South Coast Air Basin.
- **Full Funding:** Current funding is available for the replacement TCM project as documented under the previous section Description of Proposed Substitute TCM Project.
- **Similar Time Frame:** The proposed substitute TCM project will be operational by December 2022, equivalent to the schedule of the previously committed TCM projects.
- **Timely Implementation:** The proposed substitution is the means by which the obstacles to implementation of previously committed TCM projects is being overcome.

- Legal Authority: OCTA has legal authority and personnel to implement and operate the substitute TCM project.

### OCTAM Model Information

OCTAM is a four-step (trip generation, trip distribution, mode choice, and trip assignment), trip-based travel demand model built on the TransCAD platform. The current model version 5.0 uses 2010 Census data and the SCAG household travel survey to help calibrate the model. The assumptions used in the current model for future forecasting are based on demographic projections from Orange County Projections 2018 and the SCAG RTP.

OCTAM forecasts travel demand with a base year of 2016 and a future forecast year of 2045. It is consistent with SCAG's regional travel demand model as it incorporates the most recent approved socio-economic data for Orange County and the surrounding region at the time it was developed.

### CMAQ Toolkit

The purpose of the CMAQ Toolkit is to provide users a standardized approach to estimating emission reductions from the implementation of CMAQ projects, including signal synchronization. The CMAQ Toolkit uses emission rates for highway vehicles based on a series of project-scale and national-scale runs of the Motor Vehicle Emission Simulator as well as other data sources. See **Attachment C** for the input and output summaries for the CMAQ Toolkit applications.

### Emissions Analysis Methodology

The emissions were calculated for the future no project, previously committed TCM projects, and the proposed substitute projects. A multi-step approach was used that combined the OCTAM, EMFAC, and the CMAQ Toolkit. This methodology was developed with the guidance of California Air Resources Board (CARB) staff to better estimate the emissions reduction from signal synchronization improvements. The following process was used:

Step 1: Obtain daily vehicle miles traveled (VMT) and speed data for freeways and arterials from OCTAM. Three alternatives for forecast year 2045 were run using OCTAM as part of this study. The coding of all alternatives was consistent with OCTAM modeling practices and used the 2020 RTP/SCS network. **Attachment D** includes additional modeling details and summary of modeling files. **Attachment E** includes 2045 OCTAM model output summary statistics for Orange County.

The previously committed TCM projects as described earlier were modeled with OCTAM in an alternative referred to as the "Original Committed Projects" analysis.

The “With Proposed Substitute” analysis includes the addition of the substitute TCM project and the removal of the previously committed TCM projects. The substitute TCM project is expected to improve transit service along a corridor with high existing demand.

For comparison purposes, a third alternative was modeled that assumed the removal of the previously committed TCM projects with no substitute added. This is referred to as the “With No Projects” analysis.

All three alternatives were modeled separately using OCTAM and post-processed using the National Cooperative Highway Research Program (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 includes travel information for all three alternatives. Loaded link information, intrazonal travel speeds, and intrazonal travel volumes were extracted for all time periods for all alternatives.

Step 2: The Emission Factors (EMFAC2017) model was developed by the California Air Resources Board and is used throughout California to calculate emission 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 model outputs include total emissions for all criteria pollutants for all Orange County.

A spreadsheet tool has been created to modify EMFAC input data to reflect the results of OCTAM runs. The tool was run for the base year and forecast year 2045 using the extracted information from Step 1 as input to update the VMT and vehicle speed data needed by EMFAC. This process was performed multiple times for each modeled alternative in order to analyze conditions for summer, winter, and averaged annual timeframes.

Step 3: Bikeway projects are not explicitly modeled within OCTAM. For the emission reductions from the implementation of the Hazard Avenue Bikeway Project in the “Original Committed Projects” scenario, the CMAQ Toolkit methodology was used. The inputs for the tool were estimated using OCTAM future year forecast data. The CMAQ Toolkit calculated emissions reductions, which were then subtracted from the EMFAC emissions results created in Step 2 to find the emissions of the “Original Committed Projects.”

The Main Street Bravo! Project is expected to include signal operations enhancements. For the emission reductions from these enhancements, the CMAQ Toolkit methodology was applied to account for those benefits. The required input data was collected for the Main Street corridor and directly used in the tool, except as described below.

To estimate future-year volumes for the input, observed Average Annual Daily Traffic and peak-hour volumes were factored up using growth factors derived from OCTAM. For each corridor, base year and future year model volumes were obtained for a typical segment to estimate the growth. The truck percentages were estimated from similar arterial corridors in Orange County, as truck data for the specific corridor was not available.

Step 4: Compare the emissions output from Steps 2 and 3 between the alternatives to identify the emissions-related improvements from the proposed substitute TCM projects.

Note that interpolation of travel activity data between base year 2016 and forecast year 2045 (horizon year) results were used to estimate the emissions for interim year 2022 (completion year) and 2037 (2015 8-hour ozone standard attainment year).

### Emissions Analysis Findings

The projected emission from the “Originally Committed Projects” were compared with those of the “With Proposed Substitute” projects using the methodology described in the previous section. The results demonstrate that the proposed substitute TCM will yield less than or equivalent amounts of emissions compared with the previously committed TCM for all criteria pollutants for all milestone years. Emissions of all applicable criteria pollutants (Ozone – ROG & NO<sub>x</sub>, CO, PM<sub>2.5</sub>, and PM<sub>10</sub>) for the three forecast years (2022, 2037, and 2045) are summarized in the tables below.

## Year 2022

### Emission Reductions (Summer) - Ozone (kg/day)

	Original Committed Projects	With Proposed Substitute
ROG	- 0.3	-0.3
NOx	- 0.4	- 1.1

### Emission Reductions (Winter) - Carbon Monoxide, Nitrogen Dioxide (kg/day)

	Original Committed Projects	With Proposed Substitute
NOx	- 0.4	- 1.1
CO	- 6.4	- 13.0

### Emission Reductions (Annual) - PM<sub>10</sub>, PM<sub>2.5</sub> (kg/day)

	Original Committed Projects	With Proposed Substitute
ROG	- 0.4	- 0.4
NOx	- 0.4	- 1.1
PM10	- 0.2	- 1.3
PM2.5	-	- 0.2

## Year 2037

### Emission Reductions (Summer) - Ozone (kg/day)

	Original Committed Projects	With Proposed Substitute
ROG	- 1.0	- 1.1
NOx	- 1.4	- 3.7

### Emission Reductions (Winter) - Carbon Monoxide, Nitrogen Dioxide (kg/day)

	Original Committed Projects	With Proposed Substitute
NOx	- 1.4	- 3.8
CO	- 22.1	- 45.4

### Emission Reductions (Annual) - PM<sub>10</sub>, PM<sub>2.5</sub> (kg/day)

	Original Committed Projects	With Proposed Substitute
ROG	- 1.1	- 1.1
NOx	- 1.4	- 3.7
PM10	- 0.5	- 4.4
PM2.5	- 0.1	- 0.9

## Year 2045

### Emission Reductions (Summer) - Ozone (kg/day)

	Original Committed Projects	With Proposed Substitute
ROG	- 1.5	- 1.5
NOx	- 1.9	- 5.2

### Emission Reductions (Winter) - Carbon Monoxide, Nitrogen Dioxide (kg/day)

	Original Committed Projects	With Proposed Substitute
NOx	- 1.9	- 5.2
CO	- 30.6	- 62.8

### Emission Reductions (Annual) - PM<sub>10</sub>, PM<sub>2.5</sub> (kg/day)

	Original Committed Projects	With Proposed Substitute
ROG	- 1.5	- 1.5
NOx	- 1.9	- 5.2
PM10	- 0.7	- 5.9
PM2.5	- 0.2	- 1.2

In summary, the modeling results demonstrate that the proposed substitute TCM will yield an equivalent or better amount of emissions compared with the previously committed TCM for all criteria pollutants for all milestone years.

### Attachments

- A. 2021 FTIP Project Sheets of the Four Committed TCM Projects (ORA170205, ORA085004, ORA130099, & ORA030612)
- B. Map of the Four Committed TCM Projects (ORA170205, ORA085004, ORA130099, & ORA030612) and the Proposed Substitute TCM Project
- C. CMAQ Toolkit Input/Output Files
- D. Additional Modeling Details and Summary of Modeling Files
- E. 2045 OCTAM Model Output Summary Statistics for Orange County



**ATTACHMENT A**

**2021 FTIP PROJECT SHEETS**

LAST MODIFIED BY: ECO TEST ADMIN LAST MODIFIED DATE: 8/17/2021 APPROVED BY: Heidi Busslinger APPROVED DATE: 1/29/2021 [DETAILS CHANGED]

FFY 18/19	\$0	\$0	\$3,566	\$3,566
ATP - Active Transportation Program - MPO	\$0	\$0	\$3,566	\$3,566
GRAND TOTAL	\$0	\$0	\$3,566	\$3,566

ESTIMATED TOTAL PROJECT COST IS EQUAL TO TOTAL PROGRAMMED \$

WHY DID THE TOTAL PROJECT COST INCREASE? PLEASE EXPLAIN ANY CHANGES IN SCOPE.

**Schedule Information**

HAS IMPLEMENTATION STATUS CHANGED? PROJECT COMPLETION DATE CURRENT IMPLEMENTATION STATUS LAST UPDATED

N 12/1/2023 Construction/Project Implementation begins 10/13/2020 9:57:45 AM

	SCHEDULED START		ACTUAL START		SCHEDULED COMPLETION		ACTUAL COMPLETION	
	MONTH	YEAR	MONTH	YEAR	MONTH	YEAR	MONTH	YEAR
PA&E	▼	▼	▼	▼	▼	▼	▼	▼
PS&E	▼	▼	▼	▼	▼	▼	▼	▼
ROW	▼	▼	▼	▼	▼	▼	▼	▼
CON	▼	▼	▼	▼	▼	▼	▼	▼

**Change Reason** All Comments

COMPLETE PROJECT  
 DELETE PROJECT  
 NEW PROJECT  
 SCHEDULE / FUNDING / SCOPE (select an option below)

OTHER CHANGE REASON

[SEE HISTORICAL COMMENTS]  
 GENERAL COMMENTS - LAST UPDATED: 10/13/2020 - GUIDANCE: (Please comment on the status of the project and provide the reason for any changes to the project description, funding information and schedule made above.)  
 Restoring project until substitution can be found per Rongsheng.

[SEE HISTORICAL COMMENTS]  
 MODELING COMMENTS - LAST UPDATED: 10/13/2020 - If the project scope has been changed, the project was delayed or advanced or the total projects cost has changed.

**OCTA**

**2023 Federal Transportation Improvement Program (\$000)**

TP# ID: <b>ORA085004</b>	Implementing Agency: <b>Orange County Transportation Authority (OCTA)</b>
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SCAG RTP Project #: 2TR0704, 2TR0704 FFNO: EA Number: IFAS #: System: Transit Route: Postmile: Program Code: TRRH6 - PASSENGER STATIONS/FACILITIES-REHAB/IMPROVEMENTS Environmental Document: DRAFT ENVIRONMENTAL IMPACT REPORT - 05/01/2012 Conformity Category: TCM Committed Total Estimate: \$34,153 Air Basin: SCAB Project Completion Date: 12/31/2022 Current Implementation Status: Construction/Project Implementation begins - 10/26/2021 Project Manager: Lora Cross - (714) 560-5788 Last Modified By: Heidi Busslinger on 10/26/2021 Administrative Comments:	Project Title: Anaheim Canyon Station Project Description: Anaheim Canyon Station project will add double track and another platform as well as extend the existing platform to be in conformance with the Metrolink standards for passenger platform length. (TDCs in FY18/19 \$136 for DES, \$29 for ROW and \$2,532 for CON; 5307 FHWA Transfer: \$43 in FY19/20 from Orange Parking Structure savings already in FTA grant CA-2017-072)
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Fiscal Year	Revenue Source	Engineering	Right of Way	Construction	Total Revenue
22/23	CMAG - Congestion Mitigation Air Quality			\$4,253	\$4,253
10/11	5307 - (FHWA Transfer Funds)	\$1,250			\$1,250
12/13	5307 - (FHWA Transfer Funds)	\$1,000			\$1,000
18/19	5307 - (FHWA Transfer Funds)	\$1,182	\$250	\$22,073	\$23,505
19/20	5307 - (FHWA Transfer Funds)			\$377	\$377
16/17	ORAFWY2 - Orange County Sales Tax Measure		\$1,000		\$1,000
20/21	ORAMZTR - Orange Co. Measure M2-Transit			\$1,000	\$1,000
16/17	AGENCY - Agency			\$174	\$174
18/19	AGENCY - Agency			\$1,594	\$1,594
		\$3,432	\$1,250	\$29,471	\$34,153

Last Revised: **Adoption 23-00 - OPEN** Total Programmed: **\$34,153**

OCTA

2023 Federal Transportation Improvement Program (\$000)

TIP ID: <b>ORA130099</b>		Implementing Agency: <b>Orange County Transportation Authority (OCTA)</b>	
SCAG RTP Project #: <b>2TR0703</b>	Project Title: <b>Purchase (15) Expansion Paratransit Vans (OCTA)</b>		
PPNO:	Project Description: <b>Purchase (15) Expansion Paratransit Vans (OCTA)</b>		
EA Number:			
IFAS #:			
System: <b>Transit</b>	Route:	Postmile:	
Program Code: <b>PAN03 - PARATRANSIT VEHICLES-EXPANSION-GAS/DIESEL</b>			
Environmental Document: <b>CATEGORICALLY EXEMPT - 10/02/2019</b>			
Conformity Category: <b>TCM Committed</b>			
Total Estimate: <b>\$2,741</b>			
Air Basin: <b>SCAB</b>			
Project Completion Date: <b>12/31/2022</b>			
Current Implementation Status: <b>No Project Activity - 12/08/2011</b>			
Project Manager: <b>William Dineen - (714) 560-5917</b>			
Last Modified By: <b>Heidi Busslinger on 10/08/2021</b>			
Administrative Comments: <b>MLE1@OCTA.NET CTC Only 10/03/2019 20/21 includes potential 21/22 \$439K, 22/23 \$513K, 23/24 \$525K</b>			
Last Revised: <b>Adoption 23-00 - OPEN</b>		Total Programmed: <b>\$2,741</b>	

OCTA

2021 Federal Transportation Improvement Program (\$000)

TIP ID: <b>ORA030612</b>		Implementing Agency: <b>Orange County Transportation Authority (OCTA)</b>	
SCAG RTP Project #: <b>ORA030612</b>	Project Title: <b>PLACENTIA TRANSIT STATION - E OF SR-57 AND MELROSE ST AND N OF CROWTHER AVE. CONSTRUCT NEW METROLINK STATION AND RAIL SIDING PPNO 9514</b>		
PPNO:	Project Description: <b>PLACENTIA TRANSIT STATION - E OF SR-57 AND MELROSE ST AND N OF CROWTHER AVE. CONSTRUCT NEW METROLINK STATION AND RAIL SIDING PPNO 9514</b>		
EA Number:			
IFAS #:			
System: <b>Transit</b>	Route:	Postmile: <b>0 to 0</b>	
Program Code: <b>TRNH6 - PASSENGER STATIONS/FACILITIES-NEW</b>			
Environmental Document: <b>CATEGORICALLY EXEMPT - 01/01/2009</b>			
Conformity Category: <b>TCM Committed</b>			
Total Estimate: <b>\$34,825</b>			
Air Basin: <b>SCAB</b>			
Project Completion Date: <b>12/31/2022</b>			
Current Implementation Status: <b>ROW Acquisition - 02/14/2020</b>			
Project Manager: <b>Ben Ku - (714) 560-5473</b>			
Last Modified By: <b>Ben Ku on 05/18/2021</b>			
Administrative Comments: <b>MLE1@OCTA.NET CTC Only 10/03/2019 \$8.3M in FTA transferred to ORA120318, replaced with \$8.3M in CMAQ. Removed \$8.3M in CMAQ and replaced with Agency. Now Agency funds are 91 Express Lane Excess Toll Revenues. Apportionment Code M003 Agency Funds are 91 Express Lane Excess Toll Revenues</b>			
Last Revised: <b>Amendment 21-05 - APPROVED</b>		Total Programmed: <b>\$34,825</b>	





### **Additional Modeling Details and Summary of Modeling Files**

OCTAM was used to model the two project alternatives to develop future 2045 forecasts of VMT by speed bin. The following provides details on the modeled alternatives:

- TCMBase - No project alternative 2045
  - With the four committed TCM projects (ORA170205, ORA085004, ORA130099, & ORA030612)
  - Without the proposed substitute signal synchronization projects
- TCMOCTARep - With project alternative 2045
  - Without the four committed TCM projects (ORA170205, ORA085004, ORA130099, & ORA030612)
  - With the proposed substitute Bravo! express bus project

The highway and transit networks for each scenario includes the input scenario assumptions. The four fixed-format binary files in the asn-LVOL subdirectories contain the post-processed forecast outputs.

Key data fields in the TransCAD output:

- AB\_LN/BA\_LN: Number of lanes in the AB/BA directions
- PK\_Headway/OP\_headway: Transit headways in minutes for the peak and off-peak time periods.
- AB\_LVOL/BA\_LVOL: Post-processed forecast volumes in the AB/BA directions

The modeling output files are attached to this correspondence. Each scenario is packaged in a separate zip file:

- TCMBase.zip - No project alternative
- TCMOCTARep.zip - With project alternative

The forecast outputs were post-processed per the NCHRP-255 approach. EMFAC2017 was then used to forecast emissions using VMT by speed bin from the two OCTAM runs. The results of the EMFAC runs were presented in the TCWG February staff report.

**ATTACHMENT E****2045 OCTAM Model Output Summary Statistics for Orange County**

	<b>Previously Committed</b>	<b>Proposed Substitute</b>	<b>No Build</b>
<b>Total Population</b>	3,534,620	3,534,620	3,534,620
<b>Household Population</b>	3,488,505	3,488,505	3,488,505
<b>Total Dwelling Units</b>	1,154,416	1,154,416	1,154,416
<b>Employment</b>	1,980,433	1,980,433	1,980,433
<b>Daily Transit Trips</b>	151,973	152,960	151,855
<b>Total Vehicle Hours of Delay</b>	464,939	464,617	464,868
<b>Daily Vehicle Hours Traveled</b>	2,511,302	2,510,642	2,511,178
<b>Daily Vehicle Miles Traveled</b>	83,736,622	83,726,363	83,736,633
<b>Daily Peak Vehicle Hours Traveled</b>	1,620,193	1,619,655	1,620,189
<b>Daily Peak Vehicle Miles Traveled</b>	47,065,601	47,054,367	47,064,445
<b>Total Person Hours of Delay</b>	634,018	633,583	633,921
<b>Daily Person Hours Traveled</b>	3,424,556	3,423,680	3,424,383
<b>Daily Person Miles Traveled</b>	114,188,078	114,174,896	114,187,966
<b>Daily Peak Person Hours Traveled</b>	2,180,100	2,179,401	2,180,094
<b>Daily Peak Person Miles Traveled</b>	63,330,557	63,316,144	63,328,979
<b>Daily Average Speed (mph)</b>	33.3	33.3	33.3
<b>Avg. Spd. - Freeways Peak</b>	39.8	39.8	39.8
<b>Avg. Spd. - Freeway AM Pk Period</b>	38.3	38.3	38.3
<b>Avg. Spd. - Freeway PM Pk Period</b>	40.9	40.9	40.9
<b>Avg. Spd. - Arterials Peak</b>	25.1	25.1	25.1
<b>Avg. Spd. - Arterial AM Pk Period</b>	24.2	24.2	24.2
<b>Avg. Spd. - Arterial PM Pk Period</b>	25.7	25.7	25.7
<b>Avg. Spd. - All Facilities Peak</b>	31.6	31.6	31.6
<b>Avg. Spd. - All Facilities - AM Pk Period</b>	30.6	30.6	30.6
<b>Avg. Spd. - All Facilities PM Pk Period</b>	32.3	32.4	32.3