



**APPENDIX G**  
**DRAFT MEMORANDUM VEHICLE MILES**  
**TRAVELS (VMT) ANALYSIS**

## MEMORANDUM

**TO:** Jarrett Ramaiya, City of Murrieta

**FROM:** Erik Ruehr, VRPA Technologies, Inc.

**DATE:** August 16, 2019

**RE:** Murrieta General Plan Update – Vehicle Miles Traveled (VMT) Analysis

VRPA Technologies (VRPA) has reviewed the VMT results from the transportation model prepared for the Murrieta General Plan Update and we believe that revisions are needed in the calculations in order to obtain accurate VMT results for the Adopted General Plan scenario and the Proposed General Plan Update scenario. Although the transportation model was prepared using typical modeling procedures, we believe that the model was not able to accurately account for the following situations that are important in the VMT analysis:

- ◆ In the Adopted General Plan scenario, the model assumes buildout of Office and Research Park and Business Park land uses. In reality, it is doubtful that buildout of these land uses could occur given market conditions. In fact, of the underlying considerations in the General Plan update was the need to better balance employment land use with the market for development of employment-related facilities.
- ◆ In the Proposed General Plan Update scenario, there are plans for development of an employment-related innovation center and associated residential units that will be oriented toward employees of the innovation center. The transportation model does not have a way to accurately model the transportation characteristics of these units.

This memo provides proposed revisions to the VMT analysis calculations to account for these two conditions.

### ADJUSTMENT FOR EMPLOYMENT-RELATED LAND USES

Due to the high numbers of residents of southern Riverside County who commute to other counties, each employee added in Murrieta reduces VMT as residents of southern Riverside County who formerly commuted long distances now have the opportunity to be employed closer to where they live. As described above, the Adopted General Plan scenario assumed more employees in Murrieta than would actually occur due to market conditions. The proposed revision to the VMT analysis to account for this change is to calculate the increase in VMT that would occur if fewer employees were located in Murrieta. The first step is to calculate the number of employees assumed in the model that would not actually be

located in Murrieta. This value is called “excess employees” in the calculation. The proposed calculation is as follows:

Increase in Daily VMT = Excess Employees x Average Daily Trips per Employee x (Average Trip Length to External County Job Location – Average Trip Length to Murrieta Job Location)

#### **ADJUSTMENT FOR RESIDENTIAL UNITS ORIENTED TOWARD INNOVATION CENTER**

In the Proposed General Plan Update, residential units are proposed to be oriented toward an employment area known as the Innovation Center. The residential units would be located in close proximity to job opportunities and trips would be expected to be made by walking, bicycling, or short vehicle trips. From the transportation model’s point of view, the residential units oriented toward the Innovation Center would be treated as typical residential units in Murrieta with a typical commute distance for a resident commuting to a job in an external County. The proposed VMT adjustment to take this into account would be to determine the increase in VMT that would occur if these residential units were oriented toward a typical employment location. The proposed calculation is as follows:

Increase in Daily VMT = Residential Units Oriented Toward Innovation Center x Average Daily Employment Trips per Unit x (Average Trip Length to External County Job Location – Average Trip Length to Innovation Center)

#### **KEY PARAMETERS**

In order to complete the calculations proposed above, certain key parameters need to be determined. They include the following:

Excess Employees in Adopted General Plan Scenario: 7,258

Average Daily Trips Per Employee: 2.0

Average Trip Length From Murrieta to External County Jobs: 55.0

Average Trip Length To Southern Riverside County Job Locations: 5.0

Residential Units Oriented Toward Innovation Center: 1,796

Average Daily Employment Trips Per Unit: 2.0

Average Trip Length to Southern Riverside County Employment Location: 5.0

Average Trip Length to Innovation Center: 1.0

## **CALCULATIONS AND RESULTS**

Given the adjustment calculations and key parameters described above, the following methodology was used to determine VMT results for the 2035 General Plan Update:

- ◆ VMT results were calculated for 2040 conditions, based on the VMT results produced by the regional transportation model, which has a horizon year of 2040.
- ◆ VMT results were calculated for base year 2016 using the regional transportation model's base year scenario.
- ◆ VMT results were calculated for intervening years (2020, 2030, and 2035) using linear interpolation of the results for 2016 and 2040.

Unadjusted VMT results obtained from the regional transportation model are shown below:

Daily Base Year (2016) VMT – Adopted General Plan: 4,136,700

Daily Base Year (2016) VMT – Proposed General Plan Update: 4,132,649

Daily 2035 VMT – Adopted General Plan: 4,956,788

Daily 2035 Proposed General Plan Update: 5,868,181

Use of equations and key parameters identified above leads to the following results:

Increase in Daily 2035 VMT in Adopted General Plan Scenario: 623,046

Decrease in Daily 2035 VMT in Proposed General Plan Update Scenario: 11,375

Total Daily 2035 VMT in Adopted General Plan Scenario: 5,588,834

Daily 2035 VMT/Capita in Adopted General Plan Scenario: 43.2

Total Daily 2035 VMT in Proposed General Plan Update Scenario: 5,495,806

Daily 2035 VMT/Capita in Proposed General Plan Update Scenario: 41.1

The VMT results by scenario and horizon year are provided in Exhibit 1. Exhibit 2 shows the socio-economic data from the transportation modeling process that were used in the VMT analysis.

Please feel free to contact me with any comments or questions by email at [eruehr@vrpatechnologies.com](mailto:eruehr@vrpatechnologies.com) or by phone at 858/361-7151.

**Exhibit 1**

**Total Citywide Vehicle Miles Traveled (VMT)**

Analysis Year	Scenario		
	Existing (Adopted) General Plan	Proposed General Plan Update	Net Change
2016 (Base)	4,136,700	4,132,649	-4,051
2020	4,442,413	4,419,630	-22,783
2030	5,206,697	5,137,080	-69,617
2035 (General Plan Update Horizon Year)	5,588,834	5,495,806	-93,028
2040 (Regional Transportation Model Horizon Year)	5,970,980	5,854,532	-116,448

Note: VMT totals calculated using origin-destination method

**Exhibit 2**

**Total Citywide Socio-Economic Data (SED) Summary\***

Analysis Year	Scenario								
	Existing (Adopted) General Plan			Proposed General Plan Update			Net Change		
	Households	Population	Employment	Households	Population	Employment	Households	Population	Employment
2016 (Base)	33,796	106,185	27,735	35,534	110,897	28,628	1,738	4,712	893
2020	35,631	111,057	38,951	37,341	115,718	39,205	1,710	4,661	254
2030	40,218	123,238	66,990	41,859	127,772	65,646	1,641	4,534	-1,344
2035 (General Plan Update Horizon Year)	42,511	129,329	81,009	44,118	133,798	78,866	1,607	4,470	-2,143
2040 (Regional Transportation Model Horizon Year)	44,805	135,419	95,029	46,377	139,825	92,087	1,572	4,406	-2,942

\* As described in this memo, the Adopted General Plan scenario assumed more employees in Murrieta than would actually occur due to market conditions. See text in the memo for comments regarding employment data adjustments for Existing (Adopted) General Plan scenario.