FEHR PEERS

Memorandum

Date: September 3, 2021

To: Brian James, City of Fountain Valley
Temo Galvez, P.E., City of Fountain Valley

From: Jason D. Pack, P.E.
Paul Herrmann, P.E.

Subject: Fountain Valley General Plan Vehicle Miles Traveled (VMT) Impact Assessment

OC18-0601

Fehr & Peers has completed a Transportation Impact Assessment that analyzes Vehicle Miles Traveled in support of the Fountain Valley General Plan Update Environmental Impact Report (EIR). The assessment below is consistent with Senate Bill 743 (SB 743) and the *City of Fountain Valley Transportation Impact Assessment Guidelines for Land Use Projects in CEQA and for General Plan Consistency* (June 2020).

Approach & Traffic Modeling Methodology

The Orange County Traffic Analysis Model (OCTAM) Version 5 was utilized to estimate VMT for the analysis scenarios. This version of OCTAM uses a 2016 base year and 2045 future year. For the General Plan scenario modeling, Fehr & Peers worked with PlaceWorks to develop existing and buildout land use assumptions for the Existing (2019) Condition, Adopted General Plan (2045) Condition and Proposed General Plan (2045) Condition. These land use scenarios are summarized in **Table 1**. As shown in **Table 1**, the Proposed Plan anticipates a shift from employment to household as compared to the Adopted Plan. The employment category most affected by this shift was a reduction to Service Employment.

Table 1: OCTAM Land Use Inputs for General Plan Scenarios

Land Use	Existing (2019)	Adopted General Plan (2045)	Proposed General Plan (2045)
Households	**19,284**	**20,045**	**25,129**
Population	**57,595**	**59,775**	**73,668**
Total Employment	**32,485**	**38,355**	**36,542**
Retail Employment[1]	3,214	4,890	4,822
Service Employment[2]	23,316	27,584	25,909
Base Employment[3]	5,955	5,881	5,811

Notes:

1. All employees in occupation categories listed under Standard Industrial Classification (SIC) Division G, major groups 52-59. The SIC group description is available at https://www.naics.com/sic-codes-industry-drilldown/.
2. All employees in occupation categories listed under SIC Divisions I, major groups 70-89.
3. Total Employment excluding Retail and Service Employment.

The base year (2016) roadway network was used to represent Existing Baseline (2019) conditions and was not modified. Fehr & Peers reviewed the future year roadway network in OCTAM to reflect buildout roadway network for the Adopted Plan and Proposed Plan. The only Circulation Element map update applied to the Proposed Plan roadway network is the change of Heil Avenue from a four-lane Secondary Arterial to a two-lane Collector on both side of Mile Square Park.

VMT Impact Criteria

The *City of Fountain Valley Transportation Impact Assessment Guidelines for Land Use Projects in CEQA and for General Plan Consistency* (June 2020) outlines the methodology for VMT assessment for land use projects and defines adopted thresholds of significance for impact assessment, which are defined below. This transportation impact assessment compares VMT generated by the Proposed General Plan (2045) to VMT generated by the Existing Baseline (2019) and the Adopted General Plan (2045), reviewing total VMT and per capita VMT to provide a comprehensive assessment.

CEQA VMT Impact Thresholds

The Fountain Valley thresholds of significance for use as part of the environmental review process under CEQA, as defined in the City's Transportation Impact Assessment Guidelines, are defined for project specific analysis. As these thresholds were not intended to specifically address the appropriate methodology and metric for a general plan, the following thresholds of significance are proposed to evaluate the Proposed General Plan:

1. Any increase in the VMT per Service Population/Resident/Employee calculated using the

Boundary Method, Production/Attraction Method, or Origin/Destination method compared to the Existing Baseline would be considered a significant impact.

2. Any increase in the VMT per Service Population/Resident/Employee calculated using the Boundary Method, Production/Attraction Method, or Origin/Destination method compared to the Adopted General Plan would be considered a significant impact.

These methodologies and metrics are detailed below.

VMT Analysis Methodology

For all methodologies outlined, VMT can be presented as total VMT or as VMT per Service Population, Resident, or Employee. Total VMT represents all VMT generated in the City on a typical weekday. VMT per Service Population, Resident, or Employee is an efficiency metric which represents VMT generated on a typical weekday per person who lives and/or works in the City. VMT per person can be measured as VMT per Resident for residential only projects, VMT per Employee for employment only projects, and VMT per Service Population for projects and land use plans which include both residential and employment uses. Total VMT gives an estimate of the total travel, while VMT per person measures the efficiency of travel.

Total VMT and per person estimates were calculated using the three methodologies outlined below. Please note that there are multiple methods to estimate VMT, and there are limitations in the available VMT assessment tool, OCTAM, which is a typical four-step travel demand forecasting model. The model steps, which convert person trips to vehicle trips, limit the ability to separate trips by trip purpose (e.g. residential-based trips or work-based trips) while also accounting for all modal trips, as noted further below.

Production/Attraction VMT

The Production/Attraction (PA) method for calculating VMT sums all weekday VMT generated by trips with at least one trip end in the study area and while trips are still tracked by trip purpose. The PA method tracks trips with at least one trip end to/from their ultimate destination unless that destination is outside of the model boundary area. Productions are land use types that generate trips (residences) and attractions are land use types that attract trips (employment). Productions and attractions are converted from person trips to vehicle trips for the purposes of calculating VMT.

The PA method allows project VMT to be evaluated based on trip purpose which is consistent with OPR recommendations in the Technical Advisory and the City's guidelines. For example, a single-use project such as an office building could be analyzed based only on the commute VMT, or home-based-work (HBW) attraction VMT per employee; and a residential project could be analyzed based on the home-based (HB) production VMT per resident.

PA matrices do not include external trips that have one trip end outside of the model boundary (IX-XI trips) or truck trips, and therefore do not include those trips in the VMT estimates. This is not consistent with the OPR recommendations that suggest full accounting of VMT should be completed.

Origin/Destination VMT

The Origin/Destination (OD) method for calculating VMT sums all weekday VMT generated by trips with at least one trip end in the study area and tracks those trips to their estimated origins/destinations. The OD method is completed after the final loops of assignment in the travel demand model after person trips are converted to total vehicle trips. Origins are all vehicle trips that start in a specific traffic analysis zone, and destinations are all vehicle trips that end in a specific traffic analysis zone.

The OD method accounts for external and truck trips and therefore provides a more complete estimate of all VMT within the study area. This methodology also estimates VMT consistent with VMT estimates in Air Quality, Noise, and Energy sections of an EIR.

Unfortunately, OD trip matrices do not separate trips by trip purpose, and therefore VMT cannot be calculated by home-based-work (HBW) attraction VMT per employee or home-based (HB) production VMT per resident, but only by total VMT. It should also be noted that, although VMT includes trips to/from the City that originate or are destined to locations outside of the model area, those trip lengths are artificially truncated at the model boundary.

Boundary Method VMT

The boundary method is the sum of all weekday VMT on a roadway network within a designated boundary. Boundary method VMT estimates VMT by multiplying the number of trips on each roadway segment by the length of that segment. This approach includes all trips, including those trips that do not begin or end in the designated boundary and is another way to summarize VMT. This is the only VMT method that captures the effect of cut-through and/or displaced traffic. The boundaries utilized in the assessment below is the Fountain Valley City Boundary.

VMT Estimates and Impact Assessment

The VMT estimates performed for each scenario are presented in **Table 2** and compared **in Figure 1.**

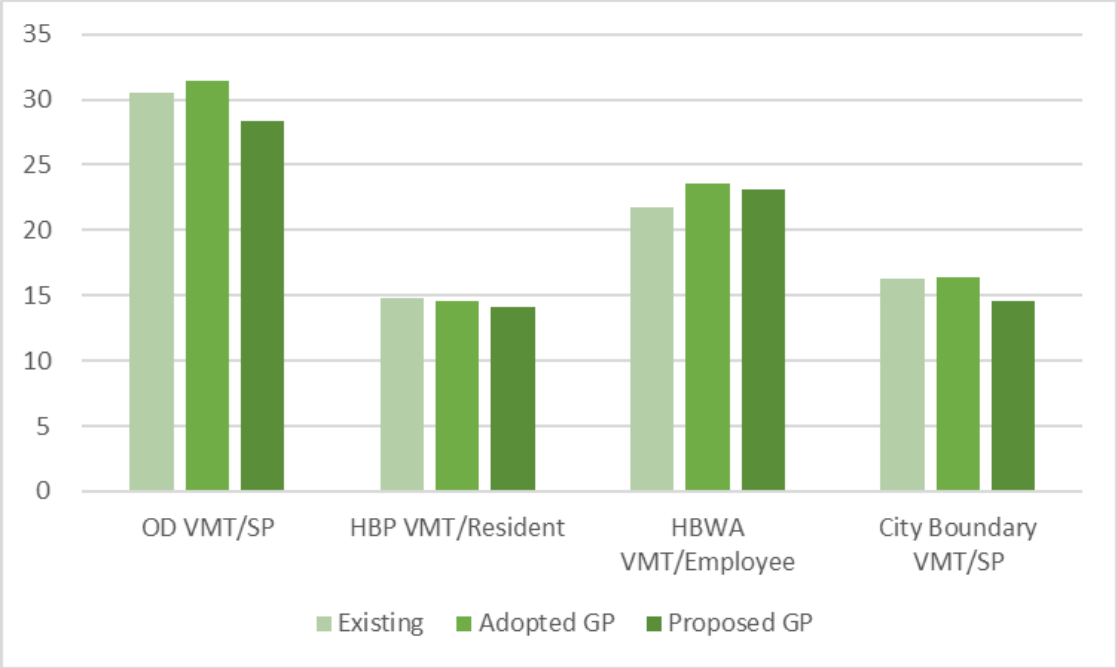
Table 2: VMT Summary

Land Use	2019 Existing	2045 Adopted General Plan	2045 Proposed General Plan
Population	57,595	59,775	73,668
Employment	32,485	38,355	36,542
Service Population	90,080	98,130	110,210
Total OD VMT	2,748,031	3,084,785	3,124,392
OD VMT/SP[3]	30.51	31.44	28.35
HBP VMT[1]	853,643	870,481	1,040,670
HBP VMT/Resident	14.82	14.56	14.13
HBWA VMT[2]	707,767	902,060	842,388
HBWA VMT/Employee	21.79	23.52	23.05
City Boundary VMT	1,464,650	1,606,725	1,608,530
City Boundary VMT/SP	16.26	16.37	14.60

Notes:

1. HBP VMT = Home-based production VMT; VMT generated by trips originating or ending at homes in Fountain Valley.
2. HBWA VMT = Home-based-work attraction VMT; VMT generated by trips originating or ending at employment centers in Fountain Valley.
3. SP = Service Population; the sum of population and employment.

Figure 1: VMT Comparison



Notes:

1. HBP VMT = Home-based production VMT; VMT generated by trips originating or ending at homes in Fountain Valley.
2. HBWA VMT = Home-based-work attraction VMT; VMT generated by trips originating or ending at employment centers in Fountain Valley.
3. SP = Service Population; the sum of population and employment. GP = General Plan.

Notable takeaways from the VMT estimates include:

<u>Proposed General Plan (2045) compared to Existing Baseline (2019):</u>

- OD VMT/SP, Home-Based Production (HBP) VMT/Resident and Boundary VMT/SP are forecast to be lower in the Proposed Plan in year 2045 as compared to existing conditions, indicating that the lower employment-to-household ratio proposed is beneficial from a VMT perspective for total VMT per person and home-based VMT per person.
- Home-Based-Work Attraction (HBWA) VMT/Emp increases from the Existing conditions to the Proposed Plan in year 2045, indicating that the Proposed Plan land use mix and its relation to other cities will result in longer commute VMT into the City.

Proposed General Plan (2045) compared to Adopted General Plan (2045):

- The Total VMT and HBP VMT are forecast to be higher in the Proposed Plan than the Adopted Plan in year 2045, which is due to the higher number of residences in the Proposed Plan. Alternatively, the HBWA VMT generated is lower in the Proposed Plan as there is higher employment forecast in the Adopted Plan.
- While some total VMT is higher in both future scenarios, the Proposed Plan land use mix is forecast to be more efficient from a VMT perspective as the OD VMT/SP, HBP VMT/Resident and HBWA VMT/Employee are all lower in the Proposed Plan than the Adopted Plan.
- The HBP VMT/Resident and HBWA VMT/Employee being lower in the Proposed Plan indicates a more efficient mix of jobs and households in the Proposed Plan as residents and employees are forecast to have shorter commutes on average.
- While the total boundary VMT is higher under the Proposed Plan as compared to the Adopted Plan within the Fountain Valley City boundary, the boundary VMT/SP is lower under the Proposed Plan indicating a more efficient land use mix on a per person basis.

Though, the Proposed Plan results in many benefits from a VMT efficiency perspective, since there would be a net increase in HBWA VMT/Emp from Existing Baseline to the Proposed Plan, the Proposed Plan is anticipated to result in a **significant and unavoidable transportation impact related to VMT**.

Analysis Limitations

This analysis was performed in March 2021 during the COVID-19 pandemic. The COVID-19 response has dramatically changed human activities and associated travel patterns. Performing more activities from home was already a trend due to the internet, but COVID-19 accelerated transitions to working and shopping from home. In addition, other disruptive trends related to demographic changes, new travel choices such as Uber and Lyft, and the potential for autonomous vehicle (AV) travel make predicting future travel demand and outcomes less certain. Given these limitations of modeling and forecasting, the general consistency of the project with the broader SB 743 objectives and the legislative intent of CEQA noted below may warrant greater emphasis in the VMT impact assessment.

> Public Resources Code 21001. ADDITIONAL LEGISLATIVE INTENT
>
> *The Legislature further finds and declares that it is the policy of the state to:*
>
> *(d) Ensure that the long-term protection of the environment, consistent with the provision of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions.*

VMT Estimates for Greenhouse Gas Assessment

VMT estimates were performed for the project using the Recommendations of the Regional Targets Advisory Committee (RTAC) methodology to utilize in the Greenhouse Gas Assessment. The estimates were performed using the Origin-Destination approach. The RTAC Methodology specifies to apply 100% of internal to internal trips (ii trips) and 50% of internal to external or external to internal trips (ix & xi trips). These estimates for each scenario and by vehicle type (passenger car, light truck, medium truck and heavy truck) are provided as **Attachment A.** Please note that these estimates differ from **Table 2** as those estimates applied 100% of ix & xi trips, consistent with transportation impact analysis.

Attachment A – Daily VMT (RTAC Methodology)

Table A: VMT Summary

Year		Total VMT		RTAC VMT
		i	x	100% ii +50% ix & xi
Existing Baseline	i	77,997	1,298,304	1,374,015
	x	1,293,734	-	
Adopted General Plan	i	87,706	1,451,747	1,542,392
	x	1,457,627	-	
Proposed General Plan	i	92,540	1,465,520	1,562,196
	x	1,473,792	-	

Source: Fehr & Peers, 2021