

**DATE:** February 8, 2023  
**TO:** Derek Hicks, Discovery Village LLC  
**FROM:** Alex So, Urban Crossroads  
Connor Paquin, Urban Crossroads  
**JOB NO:** 14073-07

## **DISCOVERY VILLAGE VMT AND TRIP GENERATION SUPPLEMENTAL LETTER**

Urban Crossroads, Inc. is pleased to provide the following VMT and Trip Generation Supplemental Letter for the Discovery Village, which is generally located at the southwest corner of Whitewood Road and Baxter Road in the City of Murrieta. The purpose of this supplemental letter is to evaluate potential changes to the Vehicle Miles Traveled (VMT) and trip generation associated with an Innovation development scenario that includes light manufacturing and commercial uses (in addition to residential uses) rather than business park and commercial uses currently evaluated the Discovery Village Traffic Analysis, November 14, 2022, prepared by Urban Crossroads, Inc., hereafter referred to as the “2022 Traffic Study.” In addition, for informational purposes, this supplemental letter also analyzed the traffic volumes and trip generation for light manufacturing uses in comparison to the business park uses evaluated in the 2022 Traffic Study.

## **PROJECT OVERVIEW**

The 2022 Traffic Study evaluates the Discovery Village Project comprised of a large lot Tentative Tract Map and development of 267,000 square feet (sf) of business park uses, and 5,000 sf of retail/shopping center uses on Lot 1 through Lot 3 (18.8 gross acres/16.53 net acres), consistent with the “Innovation” land use designation (“Innovation Zone”); and 199 multifamily (low-rise) housing units (condo) and 237 single family detached residential dwelling units for a total of 436 residential dwelling units on Lot 4 through Lot 8 (24.25 net acres), consistent with the existing zoning (MF-2, Multi-Family Residential). It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2027. For the purposes of this work effort, instead of the 267,000 square feet (sf) of business park uses, the Innovation Zone has been evaluated with 267,000 square feet of light manufacturing use. The residential uses on Lots 4 through 8 and the 5,000 square feet of commercial uses in the Innovation Zone are unchanged in this analysis. The Innovation development scenario with manufacturing, commercial and residential uses evaluated in this study is referred to herein as the “Project.”

## VEHICLE MILES TRAVELED (VMT)

As identified in the City of Murrieta Traffic Impact Analysis Preparation Guidelines (City Guidelines), “projects not screened out using the process above shall perform a limited analysis of VMT expected to be generated by the project and compare that to the VMT expected to be generated by the land use assumed in the General Plan.” As noted in the City Guidelines, the results of this test will result in one of the following outcomes:

- VMT is less than the land use assumed in the General Plan – Less than Significant VMT impact and no need for further analysis in a TIA for VMT
- VMT is more than the land use assumed in the General Plan - Likely Significant VMT impact and need for full analysis in a TIA for VMT

The proposed Project intends to develop Innovation land use within lot 1-4. As defined by the City of Murrieta’s General Plan 2035 (General Plan) as follows:

*The Innovation designation provides for a wider variety and intensity of non-residential uses allowed elsewhere in the City with the goal of providing a cutting edge and campus-like mixed-use business setting. The Innovation designation provides for employment intensive uses such as business and medical offices, corporate headquarters, medical services, research and development, education, technological advancement, makers labs (such as people using digital tools to design new products) craftsman products (such as furniture and window design/construction), and hotels. The designation also provides for a limited amount of commercial uses for the sale of products made in facilities on-site and restaurants that support the employment and primary uses.<sup>1</sup>*

1. The City’s General Plan traffic model assumes approximately 44 retail employees over the 83.2-acre TAZ (TAZ 43423201). This equates to approximately 0.53 employees per acre (44 employees /83.2 acres). Based on the proposed Project’s Innovation District area of 18.8 acres, we calculated 10 employees. Using the County of Riverside’s General Plan Appendix E, we applied the 500 square feet per employee conversion factor to translate 10 employees to 5,000 square feet (500 SF/emp x 10 emp). As the Project includes 5,000 sf of retail uses, the Project’s retail land use would be the same as that analyzed in the General Plan traffic analysis for the TAZ. In addition, as part of the VMT screening process, the retail component would qualify for local serving retail under 50,000 square feet.
2. The City’s General Plan traffic model assumed 1,970 non-retail employees over the 83.2-acre TAZ. This equates to approximately 23.68 employees per acre (1,970 employees/83.2 acres). Based on the proposed Project’s Innovation District area of 18.8 acres, we calculated 445 light manufacturing employees. Using the County of Riverside’s General Plan Appendix E, we applied the 1,030 square feet per employee conversion factor to translate 446 employees to a maximum 458,350 square feet (1,030 SF/emp x 446 emp) for industrial type uses.

The Project’s proposed alternative development scenario for the Innovation component of 267,000 square feet of light manufacturing use and 5,000 square feet of commercial use on 18.8-acre Project Site would not generate an increase in VMT as compared with the land use assumed in the General Plan and would have a less than significant VMT impact.

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<sup>1</sup> City General Plan; Page 3-26

## TRIP GENERATION

Consistent with the 2022 Traffic Study, Project-related vehicle trips have been based on the Institute of Transportation Engineers (ITE) Trip Generation Manual (11<sup>th</sup> Edition, 2021). Although the Project anticipates light manufacturing uses, in an effort to conduct a conservative analysis, the following ITE land use code and vehicle mix has been utilized for the light manufacturing use:

- ITE land use code 140 (Manufacturing) has been used to derive site specific trip generation estimates. The vehicle mix has been obtained from the ITE's Trip Generation Manual Supplement (dated February 2020). This study provides the following vehicle mix: AM Peak Hour: 92.0% passenger cars and 8.0% trucks; PM Peak Hour: 93.0% passenger cars and 7.0% trucks; Weekday Daily: 90.0% passenger cars and 10.0% trucks. The truck percentages were further broken down by axle type per the following South Coast Air Quality Management District (SCAQMD) recommended truck mix: 2-Axle = 16.7%; 3-Axle = 20.7%; 4+-Axle = 62.6%.

It should be noted, the business park use utilized in the 2022 Traffic Study assumes 100% passenger car traffic (no truck traffic), consistent with the ITE guidance, as the use is not anticipated to generate truck traffic.

Refinements to the raw trip generation estimates have been made to provide a more detailed breakdown of trips between passenger cars and trucks. Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 3 different truck types: 2-axle, 3-axle, and 4+-axle trucks. Passenger Car Equivalent (PCE) factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with the recommended PCE factors for use within the County of Riverside.

The Project trip generation rates and trip generation summary assuming the light manufacturing uses in the Innovation Zone are provided in Table 1 for actual vehicles and in Table 2 for PCE. As shown in Table 1, the Project evaluated in this study is anticipated to generate 5,056 two-way trips per day, with 440 AM peak hour trips and 548 PM peak hour trips (in actual vehicles). Compared to the 2022 Traffic Study, the Project evaluated in this study is anticipated to generate 2,048 fewer two-way trips per day, with 178 fewer AM peak hour trips and 127 fewer PM peak hour trips (in actual vehicles).

As shown in Table 2, the Project evaluated in this study is anticipated to generate 5,240 two-way trips per day, with 440 AM peak hour trips and 548 PM peak hour trips (in PCE). Compared to the 2022 Traffic Study, the proposed Project is anticipated to generate 1,864 fewer two-way trips per day, with 166 fewer AM peak hour trips and 115 fewer PM peak hour trips (in PCE).

**TABLE 1: PROJECT TRIP GENERATION SUMMARY (ACTUAL VEHICLES)**

Land Use	ITE LU		AM Peak Hour			PM Peak Hour			Daily
	Code	Units <sup>1</sup>	In	Out	Total	In	Out	Total	
Actual Vehicles Trip Generation Rates									
Manufacturing <sup>3</sup>	140	TSF	0.517	0.163	0.680	0.229	0.511	0.740	4.750
Passenger Cars (AM=95.6%, PM=95.9%, Daily=90.5%)			0.500	0.150	0.650	0.217	0.493	0.710	4.300
2-Axle Trucks (AM=0.74%, PM=0.69%, Daily=1.59%)			0.003	0.002	0.005	0.002	0.003	0.005	0.075
3-Axle Trucks (AM=0.91%, PM=0.85%, Daily=1.97%)			0.003	0.003	0.006	0.003	0.004	0.006	0.093
4+-Axle Trucks (AM=3.73%, PM=2.56%, Daily=5.94%)			0.011	0.008	0.019	0.008	0.011	0.019	0.282
Single Family Residential Detached	210	DU	0.180	0.520	0.700	0.590	0.350	0.940	9.430
Multifamily Housing (Low-Rise)	220	DU	0.100	0.300	0.400	0.320	0.190	0.510	6.740
Business Park	770	TSF	1.150	0.200	1.350	0.320	0.900	1.220	12.440
Strip Retail Plaza	822	TSF	1.420	0.940	2.360	3.300	3.290	6.590	54.450

<sup>1</sup> Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

<sup>2</sup> DU = Dwelling Units; TSF = Thousand Square Feet

<sup>3</sup> Truck Mix: South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type.

Normalized % - Without Cold Storage: 16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks.

Land Use	Quantity Units <sup>1</sup>	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Trip Generation Summary								
Single Family Residential Detached	237 DU	43	123	166	140	83	223	2,236
Multifamily Housing (Low-Rise)	199 DU	20	60	80	64	38	102	1,342
Residential Total		63	183	246	204	121	325	3,578
Manufacturing								
Passenger Cars:	267,000 TSF	133	40	174	58	132	190	1,150
2-axle Trucks:		1	1	1	1	1	1	22
3-axle Trucks:		1	1	2	1	1	2	26
4+-axle Trucks:		3	2	5	2	3	5	76
Total Truck Trips (Actual Vehicles):		5	3	8	3	5	8	124
Strip Retail Plaza	5,000 TSF	7	5	12	17	16	33	272
Pass-by Reduction (25% PM/Daily)		0	0	0	-4	-4	-8	-68
Innovation District Total		145	49	194	74	148	223	1,478
Project Total (Actual Vehicles)								
Total from Traffic Study		377	241	618	302	373	675	7,104
Comparison		-169	-9	-178	-24	-104	-127	-2,048

<sup>1</sup> DU = Dwelling Units; TSF = Thousand Square Feet

**TABLE 2: PROJECT TRIP GENERATION SUMMARY (PCE)**

Land Use	ITE LU		AM Peak Hour			PM Peak Hour			Daily
	Code	Units <sup>1</sup>	In	Out	Total	In	Out	Total	
<b>PCE Trip Generation Rates</b>									
Manufacturing <sup>3,4</sup>	140	TSF	0.517	0.163	0.680	0.229	0.511	0.740	4.750
Passenger Cars (AM=95.6%, PM=95.9%, Daily=90.5%)			0.500	0.150	0.650	0.217	0.493	0.710	4.300
2-Axle Trucks (AM=0.74%, PM=0.69%, Daily=1.59%)			0.005	0.003	0.008	0.003	0.004	0.008	0.113
3-Axle Trucks (AM=0.91%, PM=0.85%, Daily=1.97%)			0.006	0.006	0.012	0.005	0.007	0.012	0.186
4+-Axle Trucks (AM=3.73%, PM=2.56%, Daily=5.94%)			0.033	0.023	0.056	0.023	0.033	0.056	0.845
Single Family Residential Detached	210	DU	0.180	0.520	0.700	0.590	0.350	0.940	9.430
Multifamily Housing (Low-Rise)	220	DU	0.100	0.300	0.400	0.320	0.190	0.510	6.740
Business Park	770	TSF	1.150	0.200	1.350	0.320	0.900	1.220	12.440
Strip Retail Plaza	822	TSF	1.420	0.940	2.360	3.300	3.290	6.590	54.450

<sup>1</sup> Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

<sup>2</sup> DU = Dwelling Units; TSF = Thousand Square Feet

<sup>3</sup> Truck Mix: South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type.

    Normalized % - Without Cold Storage: 16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks.

<sup>4</sup> PCE factors: 2-axle = 1.5; 3-axle = 2.0; 4+-axle = 3.0.

Land Use	Quantity Units <sup>1</sup>	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
<b>Trip Generation Summary</b>								
Single Family Residential Detached	237 DU	43	123	166	140	83	223	2,236
Multifamily Housing (Low-Rise)	199 DU	20	60	80	64	38	102	1,342
Residential Total		63	183	246	204	121	325	3,578
<b>Manufacturing</b>								
Manufacturing	267,000 TSF							
Passenger Cars:		133	40	174	58	132	190	1,150
2-axle Trucks:		1	1	2	1	1	2	32
3-axle Trucks:		2	2	3	1	2	3	50
4+-axle Trucks:		9	6	15	6	9	15	226
Total Truck Trips (PCE):		12	9	20	8	12	20	308
Strip Retail Plaza	5,000 TSF	7	5	12	17	16	33	272
Pass-by Reduction (25% PM/Daily)		0	0	0	-4	-4	-8	-68
Innovation District Total		152	54	206	79	156	235	1,662
<b>Project Total (PCE)</b>								
Project Total (PCE)		215	237	452	283	277	560	5,240
Total from Traffic Study		377	241	618	302	373	675	7,104
Comparison		-162	-4	-166	-19	-96	-115	-1,864

<sup>1</sup> DU = Dwelling Units; TSF = Thousand Square Feet

## TRIP DISTRIBUTION

The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. The trip distribution for the residential use is consistent with the 2022 Traffic Study. With respect to the non-residential land uses, and given the difference in travel patterns between passenger cars and trucks, separate trip distribution patterns have been utilized for passengers and trucks. The passenger car trip distribution patterns for the light manufacturing uses are consistent with the Innovation District trip distribution from the 2022 Traffic Study. The truck trip distribution for light manufacturing uses is modified for this work effort as compared with the business park distribution and is shown on Exhibit 1. It should be noted, per the City of Murrieta General Plan, there are no existing truck routes on local City roadways east of the I-215 Freeway. As such, truck travel patterns have been developed based on the shortest distance to the regional freeway system.

## TRAFFIC VOLUMES APPLYING INNOVATION ZONE LIGHT MANUFACTURING USES COMPARED WITH INNOVATION ZONE BUSINESS PARK USES

Based on the Project trip generation shown previously in Table 1 and the trip distribution patterns from the 2022 Traffic Study (for residential use and Innovation Zone) and shown on Exhibit 1 (for light manufacturing trucks), traffic volumes have been developed for Opening Year Cumulative (2027) With Project traffic conditions and Horizon Year (2040) With Project traffic conditions. The Project Average Daily Traffic (ADT) traffic volumes, in actual vehicles, have been compared to the 2022 Traffic Study for the following roadway segments:

- Whitewood Road, North of Baxter Road
- Whitewood Road, Between Clinton Keith Road and Baxter Road
- Clinton Keith Road, Between I-215 Freeway and Whitewood Road

As shown in Table 3, the anticipated ADT volume for the Project is less than the anticipated ADT volume from the 2022 Traffic Study.

**TABLE 3: TRAFFIC VOLUMES COMPARISON**

Roadway	Limits	From 2022 Traffic Study	Proposed Project
Opening Year Cumulative (2027) With Project			
	North of Baxter Road	24,082	23,430
Whitewood Road	Between Clinton Keith Road and Baxter Road	32,009	30,721
Clinton Keith Road	Between I-215 Freeway and Whitewood Road	52,603	51,641
Horizon Year (2040) With Project			
	North of Baxter Road	27,364	25,661
Whitewood Road	Between Clinton Keith Road and Baxter Road	34,695	33,407
Clinton Keith Road	Between I-215 Freeway and Whitewood Road	57,472	56,510

**FINDINGS**

In summary, development of the Innovation component of the Discovery Village Project with 267,000 square feet of light manufacturing uses would have less trip generation than development of the Innovation component of the Discovery Village Project with 267,000 square feet of business park uses evaluated in the 2022 Traffic Study. The trip generation from the 5,000 sf of commercial use and 436 residential uses would not change and would be consistent with the trip generation from the 2022 Traffic Study for these uses. Although the trip distribution patterns would change given that the truck travel patterns are different than what was evaluated in the 2022 Traffic Study, the anticipated ADT volumes are less than the ADT volumes from the 2022 Traffic Study. As such, the results from the 2022 Traffic Study are more conservative and additional analysis is not necessary.

If you have any questions, please contact us directly at [aso@urbanxroads.com](mailto:aso@urbanxroads.com) or [cpaquin@urbanxroads.com](mailto:cpaquin@urbanxroads.com).

Respectfully submitted,

URBAN CROSSROADS, INC.



Alexander So  
Senior Associate



Connor Paquin, PE  
Transportation Engineer

**EXHIBIT 1: PROJECT (TRUCK) TRIP DISTRIBUTION**

