

DATE: August 21, 2023
TO: Tracy Zinn, T&B Planning, Inc
FROM: Alex So, Urban Crossroads
JOB NO: 14174-01 Supplemental Truck VMT

MAJESTIC THOUSAND PALMS SUPPLEMENTAL VEHICLE MILES TRAVELED (VMT) ANALYSIS

Urban Crossroads, Inc. is pleased to provide the following Supplemental Vehicle Miles Traveled (VMT) Analysis for the Majestic Thousand Palms (**Project**), which is located on the northeast corner of Rio Del Sol Road and 30th Avenue in the County of Riverside.

SUPPLEMENTAL VMT EVALUATION

In an effort to fully disclose potential VMT impacts, this memorandum includes a supplemental VMT evaluation measuring the Project's estimated Total VMT. The Total VMT calculation differs from the County's adopted VMT metric for industrial land uses projects of Work VMT in that it includes all vehicle trips (i.e., passenger cars and trucks) and all trip purposes (i.e., not just home-based work trips). Table 1 presents the Project's Total VMT estimate, which utilizes vehicle trip generation rates (see Attachment A) consistent with the Project's greenhouse gas analysis, multiplied by the average trip length for each vehicle type. Average trip length information has been obtained from the Riverside County Traffic Analysis Model (RIVTAM) for passenger cars and StreetLight Data's Truck Volume Metrics for medium heavy-duty trucks (MDT) (2 and 3 axle trucks) and heavy heavy-duty trucks (HDT) (4+ axle trucks).

ABOUT STREETLIGHT DATA¹

StreetLight Data's Truck Volume Metrics are based on five linked machine-learning models that estimate vehicle volume and trip length by vehicle class and total vehicles. StreetLight Data provides truck volume information from 2019 through 2021. To support volume estimates over the range of time periods, StreetLight Data applies the Monthly Average Daily Trip (MADT) to the days or parts of the day required for a particular analysis. In the scaling process, StreetLight factors the ratio between sample trip counts for particular hours, days and trip counts for the entire month with the volume for corresponding hours, day type and MADT for that zone.

¹ StreetLight Insight Truck Volume Methodology and Validation (September 2022).

The estimated truck volume is compared to the actual volume reported by permanent traffic counters to validate model results. The permanent counter data comes from the Federal Highway Administration (FHWA) Travel Monitoring Analysis System (TMAS) CLS (vehicle classification) dataset, which includes traffic counts from more than 3,000 unique sites from January 2019 through December 2021. The StreetLight Model produces Pearson correlation coefficients of 0.99, 0.92 and 0.97 for light- medium- and heavy-duty vehicles, respectively, between estimated and actual MADT, indicating that StreetLight's model is highly explanatory.

SURVEY AREA

Truck travel characteristics have been collected from an existing distribution warehouse located along the I-10 Freeway based on its proximity to the proposed Project and anticipated operational characteristics. As shown in Exhibit 1, the survey location includes the Arrowhead Water Distribution building located at 14163 Elm St, Cabazon, CA 92230.

EXHIBIT 1: SURVEYED LOCATION



Data collected for this survey includes MDT and HDT that originated, ended or passed through the surveyed area over the most recent 12-month period available from StreetLight Data.

TRIP LENGTH

Utilizing the above parameters, average daily zone traffic² of MDT vs. HDT, average trip length by vehicle class, and distance bins³ of per-trip length in miles was obtained from StreetLight Data. Total average trip length for MDT and HDT was calculated by multiplying the disaggregated data's average trip length with its' respective percentage of total aggregated trucks (effectively calculating a weighted mean using percentages as weights) and then summing the amounts.

TABLE 1: AVERAGE TRIP LENGTH BY VEHICLE TYPE (01/01/21-12/31/21)

	MDT Avg Trip Length	MDT % of Total	HDT Avg Trip Length	HDT % of Total	Weighted Average Trip Length
Arrowhead	39.1	22.1%	108.1	77.9%	92.8

Based on traffic monitoring data collected for the most recent 12-month period of complete data available from StreetLight Data, the average trip length of MD and HD trucks has been calculated 92.8 miles.

PROJECT VMT CALCULATIONS

Table 2 presents an estimation of total VMT for the Project, which utilizes vehicle trip generation rates consistent with the Project's level of service (LOS) and greenhouse gas analyses, multiplied by the average trip length for each vehicle type.

TABLE 2: PROJECT TOTAL VMT

Vehicle Type	Vehicle Trips	Vehicle Trip Length	VMT
Automobile	2,076	15.6	32,386
Truck	564	92.8	52,339
Total	2,640	-	84,725

Table 3 presents the calculation of the efficiency metric Project generated total VMT per Service Population (SP), which is the product of total VMT generated by the Project divided by its SP (i.e., employees). The efficiency metric VMT per SP is commonly used throughout Southern California to evaluate the efficiency of travel for a given project based on total VMT.

TABLE 3: PROJECT TOTAL VMT PER SP

	Project
SP	1,203
Total VMT	84,725
Total VMT per SP	70.4

Although not specified by Riverside County [Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled](#) (December of 2020) (1), it is reasonable to assume that a project with a VMT per SP that exceeds the existing county-wide average VMT per SP would result in a potentially significant impact. As calculated from RIVTAM, the existing county-wide average VMT

² Average daily zone traffic was then used to calculate % of total aggregated trucks for each disaggregate.

³ Distance bins were defaulted to: 0-1, 1-2, 2-5, 5-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70, 70-80, 80-90, 90-100, and 100+ in miles.

per SP is 29.0. As presented previously, the Project is estimated to generate total VMT per service population of 70.4, which would exceed the County's threshold by 142.8% and would result in a potentially significant VMT impact.

If you have any questions, please contact me directly at aso@urbanxroads.com.

REFERENCES

1. **County of Riverside.** *Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled.* County of Riverside : s.n., December 2020.

ATTACHMENT A
PROJECT'S TRIP GENERATION SUMMARY

TABLE A-1: PROJECT TRIP GENERATION RATES

Land Use ¹	Units ²	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicle Trip Generation Rates									
High-Cube Cold Storage Warehouse ³	TSF	157	0.085	0.025	0.110	0.034	0.086	0.120	2.120
Passenger Cars			0.076	0.004	0.080	0.019	0.071	0.090	1.370
2-Axle Trucks			0.003	0.007	0.010	0.005	0.005	0.010	0.260
3-Axle Trucks			0.001	0.002	0.003	0.002	0.001	0.003	0.083
4+-Axle Trucks			0.005	0.011	0.016	0.008	0.008	0.016	0.407
High-Cube Fulfillment Center Warehouse ⁴	TSF	--	0.089	0.033	0.122	0.050	0.115	0.165	2.129
Passenger Cars			0.079	0.024	0.103	0.040	0.104	0.144	1.750
2-4 Axle Trucks			0.004	0.004	0.008	0.005	0.006	0.011	0.162
5+-Axle Trucks			0.005	0.006	0.011	0.005	0.005	0.010	0.217
Passenger Car Equivalent (PCE) Trip Generation Rates⁵									
High-Cube Cold Storage Warehouse ³	TSF	157	0.085	0.025	0.110	0.034	0.086	0.120	2.120
Passenger Cars			0.076	0.004	0.080	0.019	0.071	0.090	1.370
2-Axle Trucks (PCE = 1.5)			0.005	0.011	0.016	0.008	0.008	0.016	0.390
3-Axle Trucks (PCE = 2.0)			0.002	0.005	0.007	0.004	0.003	0.007	0.165
4+-Axle Trucks (PCE = 3.0)			0.015	0.034	0.049	0.024	0.025	0.049	1.222

¹ Trip Generation & Vehicle Mix Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

² TSF = thousand square feet

³ Truck Mix: South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type.
Normalized % - With Cold Storage: 34.7% 2-Axle trucks, 11.0% 3-Axle trucks, 54.3% 4-Axle trucks.

⁴ Vehicle Mix Source: High Cube Warehouse Trip Generation Study, WSP, January 29, 2019.

Inbound and outbound split source: ITE Trip Generation Manual, Eleventh Edition (2021) for ITE Land Use Code 154.

TABLE A-2: PROJECT TRIP GENERATION SUMMARY

Land Use	Quantity Units ¹	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Actual Vehicles:								
High-Cube Cold Storage	247.798 TSF							
Passenger Cars:		19	1	20	5	18	23	340
2-axle Trucks:		1	2	3	1	1	2	64
3-axle Trucks:		0	1	1	0	0	0	20
4+-axle Trucks:		1	3	4	2	2	4	102
Total Truck Trips (Actual Vehicles):		2	6	8	3	3	6	186
High-Cube Cold Storage Trips (Actual Vehicles) ²		21	7	28	8	21	29	526
High-Cube Fulfillment								
High-Cube Fulfillment	991.194 TSF							
Passenger Cars:		79	23	102	40	103	143	1,736
2-4axle Trucks:		4	4	8	5	6	11	162
5+-axle Trucks:		5	6	11	5	5	10	216
Total Truck Trips (Actual Vehicles):		9	10	19	10	11	21	378
High-Cube Fulfillment Trips (Actual Vehicles) ²		88	33	121	50	114	164	2,114
Total								
Total Passenger Cars		98	24	122	45	121	166	2,076
Total Trucks (Actual Vehicles)		11	16	27	13	14	27	564
Total Project Trips (Actual Vehicles)²		109	40	149	58	135	193	2,640

¹ TSF = thousand square feet

² Total Trips = Passenger Cars + Truck Trips.