

Appendix R-2

Alternative 5 Calculations

October 25, 2022

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WEST CAMPUS UPPER PLATEAU TRIP GENERATION EVALUATION

Mr. Timothy Reeves,

This letter has been prepared to document the findings for the trip generation evaluation for the proposed West Campus Upper Plateau (Project) located in the jurisdiction of the March Joint Powers Authority (March JPA). The purpose of this trip generation evaluation is to evaluate the trip generation associated with two Project alternatives and determine if additional traffic analysis is necessary based on a comparison to the West Campus Upper Plateau Traffic Analysis, October 18, 2022, prepared by Urban Crossroads, Inc., referred to hereafter as the "2022 Traffic Study."

SUMMARY OF FINDINGS

Alternatives 2 and 3 both result in a reduction in trips compared to the 2022 Traffic Study. As such, additional traffic analysis is not necessary as the 2022 Traffic Study provides a more conservative analysis of the traffic deficiencies within the study area.

PROJECT OVERVIEW

2022 TRAFFIC STUDY

Consistent with the 2022 Traffic Study, the proposed Project consists of the following uses:

- Building B – 1,250,000 square feet (SF) of high-cube fulfillment center warehouse use
- Building C – 587,000 SF of high-cube fulfillment center warehouse use
- Industrial Area – 725,561 SF of high-cube fulfillment center warehouse use and 500,000 SF of high-cube cold storage warehouse use
- Business Park Area – 1,280,403 SF of business park use
- Mixed Use Area – 160,921 SF of retail use (25%)
- Mixed Use Area – 482,765 SF of business park use (75%)
- 42.20 Acre Active Park (with sports fields)
- 18.08 Acres of Public Park
- The proposed Project also includes an approximately 445-acre Conservation Area that is not anticipated to generate traffic.

ALTERNATIVE 2

This alternative consists of a 70% reduction in square footage to the Business Park land use, excluding the Business Park square footage associated with the Mixed-Use area. The total non-Mixed-Use Business Park square footage for Alternative 2 is 384,121 square feet (a reduction of 896,282 square feet compared to the non-Mixed-Use Business Park square footage from the 2022 Traffic Study).

ALTERNATIVE 3

This alternative consists of a reduction of 244,550 square feet of High-Cube Fulfillment Center use. The total High-Cube Fulfillment Center square footage (within the “Remaining Industrial” category) for Alternative 3 is 481,011 square feet.

TRIP GENERATION

In order to develop the traffic characteristics of the proposed Project and consistent with the 2022 Traffic Study, trip-generation statistics published in the Institute of Transportation Engineers (ITE) [Trip Generation Manual](#) (11th Edition, 2021), the [High Cube Warehouse Trip Generation Study](#) (WSP, January 2019), and the San Diego Association of Governments (SANDAG) [\(Not So\) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region](#) (April 2002) were used to estimate the Project’s trip generation. The trip generation summary illustrating daily, and peak hour trip generation estimates for the proposed Project are shown in Table 1.

2022 TRAFFIC STUDY

Consistent with the 2022 Traffic Study, the proposed land uses are anticipated to generate a total of 35,314 trip-ends per day with 1,761 AM peak hour trips, 3,389 PM peak hour trips, and 1,642 weekend Saturday peak hour trips.

ALTERNATIVE 2

Table 2 provides the trip generation summary for Alternative 2. As shown in Table 2, Alternative 2 is anticipated to generate a total of 24,728 trip-ends per day with 1,263 AM peak hour trips, 2,237 PM peak hour trips, and 1,468 weekend Saturday peak hour trips.

ALTERNATIVE 3

Table 3 provides the trip generation summary for Alternative 3. As shown in Table 3, Alternative 3 is anticipated to generate a total of 34,792 trip-ends per day with 1,730 AM peak hour trips, 3,349 PM peak hour trips, and 1,640 weekend Saturday peak hour trips.

TABLE 1: TRIP GENERATION RATES

Land Use ¹	Units ²	ITE LU Code	AM Peak Hour			PM Peak Hour			Weekday Daily	Saturday Mid-day			
			In	Out	Total	In	Out	Total		In	Out	Total	
Warehousing ³	TSF	150	0.115	0.020	0.135	0.317	0.903	1.220	12.440	0.032	0.018	0.050	
Passenger Cars (AM = 87.0%; PM = 85.0%; Daily = 73.0%)			0.077	0.018	0.095	0.260	0.920	1.180	11.870	0.026	0.014	0.040	
Trucks (AM = 13.0%; PM = 15.0%; Daily = 27.0%)			0.032	0.008	0.040	0.009	0.031	0.040	0.570	0.006	0.004	0.010	
2-Axle Trucks (AM-2.17%; PM-2.51%; Daily-4.51%)			0.005	0.001	0.007	0.001	0.005	0.007	0.095	0.001	0.001	0.002	
3-Axle Trucks (AM-2.69%; PM-3.11%; Daily-5.59%)			0.007	0.002	0.008	0.002	0.006	0.008	0.118	0.001	0.001	0.002	
4-Axle+ Trucks (AM-8.14%; PM-9.39%; Daily-16.90%)			0.020	0.005	0.025	0.006	0.020	0.025	0.357	0.004	0.002	0.006	
High-Cube Fulfillment Center Warehouse ^{3,6}	TSF	--	0.094	0.028	0.122	0.046	0.119	0.165	2.129	0.004	0.002	0.007	
Passenger Cars (AM = 84.4%, PM = 87.3%, Daily = 82.2%)			0.079	0.024	0.103	0.040	0.104	0.144	1.750	0.004	0.002	0.006	
Trucks (AM = 15.6%, PM = 12.7%, Daily = 17.8%)			0.015	0.004	0.019	0.006	0.015	0.021	0.379	0.001	0.000	0.001	
2-4 Axle Trucks			0.006	0.002	0.008	0.003	0.008	0.011	0.162	0.000	0.000	0.000	
5+ Axle Trucks			0.008	0.003	0.011	0.003	0.007	0.010	0.217	0.000	0.000	0.000	
High-Cube Cold Storage Warehouse (With Cold Storage) ³	TSF	157	0.085	0.025	0.110	0.034	0.086	0.120	2.120	0.003	0.002	0.005	
Passenger Cars (AM-73.0%; PM-77.0%; Daily-65.0%)			0.076	0.004	0.080	0.019	0.071	0.090	1.370	0.002	0.001	0.004	
2-Axle Trucks (AM-9.37%; PM-7.98%; Daily-12.15%)			0.003	0.007	0.010	0.005	0.005	0.010	0.260	0.000	0.000	0.000	
3-Axle Trucks (AM-2.97%; PM-2.53%; Daily-3.85%)			0.001	0.002	0.003	0.002	0.001	0.003	0.083	0.000	0.000	0.000	
4-Axle+ Trucks (AM-14.66%; PM-12.49%; Daily-19.01%)			0.005	0.011	0.016	0.008	0.008	0.016	0.407	0.000	0.000	0.001	
Trucks (AM = 28.0%, PM = 23.0%, Daily = 35.0%)			0.009	0.021	0.030	0.015	0.015	0.030	0.750	0.001	0.000	0.001	
Active Park	AC	-- ⁴	3.25	3.25	6.50	2.25	2.25	4.50	50.00	4.44	4.81	9.26	
Public Park	AC	-- ⁴	0.33	0.32	0.65	0.23	0.22	0.45	5.00	0.44	0.48	0.93	
General Office ⁵	TSF	710	Based on the ITE Fitted Curve Equation										
General Office (60.000 TSF)			1.58	0.29	1.87	0.31	1.50	1.81	12.40	0.29	0.24	0.53	
General Office (324.121 TSF)			1.25	0.23	1.48	0.23	1.13	1.36	9.96	0.29	0.24	0.53	
General Office (144.830 TSF)			1.40	0.25	1.65	0.27	1.29	1.56	11.06	0.29	0.24	0.53	
Shopping Plaza (40-150 TSF)	TSF	821	1.07	0.66	1.73	2.54	2.65	5.19	67.52	4.72	4.54	9.26	

¹ Trip Generation Source: Institute of Transportation Engineers (ITE), [Trip Generation Manual](#), Eleventh Edition (2021).

² TSF = thousand square feet; AC = Acres

³ 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.

⁴ Trip Generation Source: SANDAG (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002. For Developed and Undeveloped Parks.

⁵ Trip generation rates based on the regression equation are not available for the Saturday peak hour, due to limitations in the ITE Trip Generation Manual for ITE Land Use Code 710. As such, the average rate has been utilized.

⁶ The ITE [Trip Generation Manual](#), Eleventh Edition (2021), does not provide Saturday trip generation rates for industrial uses. As such, the Saturday peak hour trip generation rates are based on the breakdown of the trip rates, by vehicle type, during the PM peak hour.

TABLE 2: ALTERNATIVE 2 TRIP GENERATION SUMMARY

Land Use ⁵	Quantity Units ¹	AM Peak Hour			PM Peak Hour			Weekday	Saturday Peak Hour		
		In	Out	Total	In	Out	Total	Daily	In	Out	Total
Building B: High-Cube Fulfillment	1,250.000 TSF										
Passenger Cars:		99	30	129	50	130	180	2,188	5	3	8
Trucks:		18	5	23	7	19	26	474	1	0	1
Total Trips²		117	35	152	57	149	206	2,662	6	3	9
Building C: High-Cube Fulfillment	587.000 TSF										
Passenger Cars:		47	14	61	24	61	85	1,028	2	1	3
Trucks:		9	3	12	3	9	12	222	0	0	0
Total Trips²		56	17	73	27	70	97	1,250	2	1	3
High-Cube Cold Storage Warehouse	500.000 TSF										
Passenger Cars:		38	2	40	10	36	46	686	1	1	2
Trucks:		5	11	16	8	8	16	376	0	0	0
Total Trips²		43	13	56	18	44	62	1,062	1	1	2
Remaining Industrial: High-Cube Fulfillment	725.561 TSF										
Passenger Cars:		58	17	75	29	75	104	1,270	3	2	5
Trucks:		11	3	14	4	11	15	276	0	0	0
Total Trips²		69	20	89	33	86	119	1,546	3	2	5
Business Park ⁵	384.121 TSF										
Office Passenger Cars:	97.236 TSF	122	22	144	22	110	132	968	28	24	52
Office Passenger Cars:	18.000 TSF	28	5	34	6	27	33	224	5	4	9
Business Park Warehouse	268.885 TSF										
Warehouse Passenger Cars:		21	5	26	70	247	317	3,192	7	4	11
Warehouse Trucks:		9	2	11	2	8	10	154	2	1	3
Business Park ⁵ (Mixed-Use, 75%)	482.765 TSF										
Office Passenger Cars:	144.830 TSF	203	36	239	39	187	226	1,602	41	35	76
Business Park Warehouse	337.936 TSF										
Warehouse Passenger Cars:		26	6	32	88	311	399	4,012	9	5	14
Warehouse Trucks:		11	3	14	3	11	14	194	2	1	3
Total Business Park Trips		420	79	500	230	901	1,131	10,346	94	74	168
Retail (Mixed-Use, 25%)											
Passenger Cars:	160.921 TSF	173	106	279	409	426	835	10,866	760	730	1,490
Pass-by Reduction (AM: 0%; PM/Daily: 40%) ⁴		0	0	0	-164	-164	-327	-4,348	-304	-292	-596
Total Retail Trips		173	106	279	245	262	508	6,518	456	438	894
Active Park	42.20 AC	137	137	274	95	95	190	2,110	187	203	390
Public Park	18.08 AC	6	6	12	4	4	8	90	19	20	39
Total Park Trips		143	143	286	99	99	198	2,200	206	223	429
Total Passenger Cars		958	386	1,345	682	1,545	2,228	23,888	763	740	1,503
Internal Trip Reduction ³		-86	-86	-172	-42	-42	-84	-856	-21	-21	-42
Total Trucks		63	27	90	27	66	93	1,696	5	2	7
Project Total Trips		935	327	1,263	667	1,569	2,237	24,728	747	721	1,468

¹ TSF = thousand square feet; AC = Acres

² Total Trips = Passenger Cars + Truck Trips.

³ Internal trip reduction based on NCHRP 684 Internal Trip Capture Estimation Tool for the passenger car trips and commercial retail.

⁴ Pass-by reduction percentage source: ITE [Trip Generation Handbook](#), 3rd Edition (2017).

⁵ 2-axle trucks have been evaluated as trucks as opposed to delivery vans or passenger cars.

TABLE 3: ALTERNATIVE 3 TRIP GENERATION SUMMARY

Land Use ⁵	Quantity Units ¹	AM Peak Hour			PM Peak Hour			Weekday	Saturday Peak Hour		
		In	Out	Total	In	Out	Total	Daily	In	Out	Total
Building B: High-Cube Fulfillment	1,250.000 TSF										
Passenger Cars:		99	30	129	50	130	180	2,188	5	3	8
Trucks:		18	5	23	7	19	26	474	1	0	1
Total Trips²		117	35	152	57	149	206	2,662	6	3	9
Building C: High-Cube Fulfillment	587.000 TSF										
Passenger Cars:		47	14	61	24	61	85	1,028	2	1	3
Trucks:		9	3	12	3	9	12	222	0	0	0
Total Trips²		56	17	73	27	70	97	1,250	2	1	3
High-Cube Cold Storage Warehouse	500.000 TSF										
Passenger Cars:		38	2	40	10	36	46	686	1	1	2
Trucks:		5	11	16	8	8	16	376	0	0	0
Total Trips²		43	13	56	18	44	62	1,062	1	1	2
Remaining Industrial: High-Cube Fulfillment	481.011 TSF										
Passenger Cars:		38	11	49	19	50	69	842	2	1	3
Trucks:		7	2	9	3	7	10	182	0	0	0
Total Trips²		45	13	58	22	57	79	1,024	2	1	3
Business Park ⁵	1,280.403 TSF										
Office Passenger Cars:	324.121 TSF	405	75	480	75	366	441	3,228	93	79	172
Office Passenger Cars:	60.000 TSF	95	17	112	19	90	109	744	17	15	32
Business Park Warehouse	896.282 TSF										
Warehouse Passenger Cars:		69	16	85	233	825	1,058	10,640	23	13	36
Warehouse Trucks:		29	7	36	8	28	36	512	6	3	9
Business Park ⁵ (Mixed-Use, 75%)	482.765 TSF										
Office Passenger Cars:	144.830 TSF	203	36	239	39	187	226	1,602	41	35	76
Business Park Warehouse	337.936 TSF										
Warehouse Passenger Cars:		26	6	32	88	311	399	4,012	9	5	14
Warehouse Trucks:		11	3	14	3	11	14	194	2	1	3
Total Business Park Trips		838	160	998	465	1,818	2,283	20,932	191	151	342
Retail (Mixed-Use, 25%)											
Passenger Cars:	160.921 TSF	173	106	279	409	426	835	10,866	760	730	1,490
Pass-by Reduction (AM: 0%; PM/Daily: 40%) ⁴		0	0	0	-164	-164	-327	-4,348	-304	-292	-596
Total Retail Trips		173	106	279	245	262	508	6,518	456	438	894
Active Park	42.20 AC	137	137	274	95	95	190	2,110	187	203	390
Public Park	18.08 AC	6	6	12	4	4	8	90	19	20	39
Total Park Trips		143	143	286	99	99	198	2,200	206	223	429
Total Passenger Cars		1,336	456	1,792	901	2,417	3,319	33,688	855	814	1,669
Internal Trip Reduction ³		-86	-86	-172	-42	-42	-84	-856	-21	-21	-42
Total Trucks		79	31	110	32	82	114	1,960	9	4	13
Project Total Trips		1,329	401	1,730	891	2,457	3,349	34,792	843	797	1,640

¹ TSF = thousand square feet; AC = Acres

² Total Trips = Passenger Cars + Truck Trips.

³ Internal trip reduction based on NCHRP 684 Internal Trip Capture Estimation Tool for the passenger car trips and commercial retail.

⁴ Pass-by reduction percentage source: ITE [Trip Generation Handbook](#), 3rd Edition (2017).

⁵ 2-axle trucks have been evaluated as trucks as opposed to delivery vans or passenger cars.

TRIP GENERATION COMPARISON

Table 4 provides a comparison of the anticipated trip generation from Alternatives 2 and 3 to the 2022 Traffic Study. As shown in Table 4, Alternative 2 is anticipated to result in a reduction of 10,586 trip-ends per day, with a reduction of 498 AM peak hour trips, a reduction of 1,152 PM peak hour trips, and a reduction of 174 weekend Saturday peak hour trips.

As shown in Table 4, Alternative 3 is anticipated to result in a reduction of 522 trip-ends per day, with a reduction of 31 AM peak hour trips, a reduction of 40 PM peak hour trips, and a reduction of 2 weekend Saturday peak hour trips.

TABLE 4: TRIP GENERATION COMPARISON

Project	AM Peak Hour			PM Peak Hour			Weekday Daily	Saturday Peak Hour		
	In	Out	Total	In	Out	Total		In	Out	Total
2022 Traffic Study ¹	1,353	408	1,761	902	2,486	3,389	35,314	844	798	1,642
Alternative 2	935	327	1,263	667	1,569	2,237	24,728	747	721	1,468
Comparison	-418	-81	-498	-235	-917	-1,152	-10,586	-97	-77	-174
2022 Traffic Study ¹	1,353	408	1,761	902	2,486	3,389	35,314	844	798	1,642
Alternative 3	1,329	401	1,730	891	2,457	3,349	34,792	843	797	1,640
Comparison	-24	-7	-31	-11	-29	-40	-522	-1	-1	-2

¹ Trip Generation Source: West Campus Upper Plateau Traffic Analysis, October 18, 2022, prepared by Urban Crossroads, Inc.

CONCLUSION

Alternatives 2 and 3 both result in a reduction in trips compared to the 2022 Traffic Study. As such, additional traffic analysis is not necessary as the 2022 Traffic Study provides a more conservative analysis of the traffic deficiencies within the study area.

If you have any questions or comments, I can be reached at (916) 806-8326.

Respectfully submitted,

URBAN CROSSROADS, INC.



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