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WHAT TRANSPORTATION CAN BE.

MEMORANDUM

Date:	July 12, 2019	**TG:**	15020.00
To:	Steven Chen, P.E. and Isabel Díaz, P.E., PTOE – City of Sammamish Josh Anderson, P.E., PTOE – David Evans and Associates (DEA)		
From:	Kevin L. Jones, P.E., PTOE – Transpo Group		
Subject:	Sammamish Town Center (STC)-Phase I for Development Permit Applications in the A-1 Zone, Traffic Trip Generation Estimates		

This memo summarizes net new vehicle trip generation estimates associated with the demolition of four (4) existing single-family detached housing units and proposed construction of 357 new residential dwelling units, including:

- 300 apartment units; and
- 57 townhouse units (including 12 live/work units)

and up to 82,000 gross square feet (gsf) of commercial space, including:

- 56,000 gsf of retail space;
- 22,100 gsf of quality restaurant space; and
- 3,900 gsf of high-turnover restaurant space.

The project site is located south of SE 4th Street and east of 224th Avenue SE in transportation analysis zone (TAZ) 247.

The trip generation estimates in this memo supersede the estimates summarized in my memo dated May 30, 2019 and submitted with the City of Sammamish's Traffic Concurrency Review Application on that same day. For purposes of estimating trip generation and based on recent discussions with City of Sammamish staff, changes from the last memo include:

1) Treating the 12 live/work units as multifamily units (and not retail space) and consequently, increasing the number of multifamily units from 345 to 357 units and decreasing the total retail space from 64,000 to 56,000 gsf;
2) Applying the *total* retail square footage to estimate AM peak hour trip generation; and
3) Refining the restaurant space into two primary categories and applying the *total* restaurant square footage to estimate AM peak hour trip generation.

Table 1 summarizes the anticipated number of new (primary) weekday AM and PM peak hour vehicle trips the proposed development would likely generate; detailed trip generation calculations are attached to this memo. These estimates were derived based on the size of development and average trip rates for applicable land uses published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual* (10th Edition, 2017). ITE methodologies in the *Trip Generation Handbook* (3rd Edition, 2017) were also used to estimate trip internalization (e.g., trips made between complimentary land uses, both within the subject project and between it and the existing

Town Center development located north of SE 4th Street and west of 228th Avenue SE)[1]. A 25 percent[2] pass-by adjustment was applied to PM peak hour retail and restaurant trip generation.

Table 1 also summarizes the number of primary AM and PM peak hour vehicle trips generated by the 4-demolished single-family detached units. These estimates were derived by multiplying this unit count by the average AM and PM peak hour trip rates (0.74 trips/unit and 0.99 trips/unit, respectively) for "Single-Family Detached Housing" in the *Manual*.

Table 1. Weekday Peak Hour Trip Generation Estimates

		AM Peak Hour			PM Peak Hour		
Land Use (ITE Code)	**Size**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
New Construction							
Retail (#820)	56,000 gsf	31	17	48	56	48	104
Quality Restaurant (#931)	22,100 gsf	4	5	9	59	10	69
High-Turnover Restaurant (#932)	3,900 gsf	10	13	23	12	3	15
Multifamily Housing (#221)	357 DUs[1]	35	82	117	38	29	67
New (Primary) Trips		80	117	197	165	90	255
Demolition							
Single-Family Housing (#210)	4 DUs	-1	-2	-3	-3	-1	-4
Net New (Primary) Trips		**79**	**115**	**194**	**162**	**89**	**251**

Note: gsf = gross square feet; DUs = dwelling units
1. This includes a total of 300 apartment units and 57 townhouse units (including 12 live/work units).

By subtracting the trips generated by the demolished single-family dwelling units from the trips generated by the proposed development, parcels in the A-1 zone of Phase I of the STC project would generate approximately **194 net new AM peak hour trips and 251 net new PM peak hour trips**. Table 2 summaries the approximate number of weekday peak hour vehicle trips, pass-by, primary and net new (primary) trips.

1 In estimating the trip activity between STC-Phase I and existing Town Center development north of SE 4th Street and west of 228th Avenue SE ("The Village"), tenants of The Village and their weekday hours of operation were reviewed. It was determined the existing grocery store (Metropolitan Market) and approximately 8,000 square feet of the existing medical-dental office space (Overlake Medical Clinic and Sammamish Smiles Dentistry) are open every weekday during the City's AM peak hour for transportation concurrency testing (7:00 to 8:00 a.m.); it was assumed they would remain open in the future. If additional Village commercial uses were open weekdays during this hour, this could *decrease* the number of net new AM peak hour trips generated by STC-Phase I but it would not *increase* these trips.

2 We note that this 25 percent pass-by rate is less than the average PM peak hour pass-by percentage published by ITE in the *Trip Generation Handbook* for Land Use #820 (Shopping Center), Land Use #931 (Quality Restaurant) and Land Use #932 (High-Turnover Restaurant); 34 percent, 44 percent and 43 percent, respectively. We have applied this 25 percent pass-by percentage for this trip generation memo because City staff has indicated it is the upper limit for pass-by trip adjustment according to the City's "Traffic Impact Analysis Report Guidelines," Appendix E to the City's *Public Works Standards* (2016). However, we note that Appendix E is a *guideline* only and that the 25 percent pass-by cap may not be appropriate for Phase I or future phases given that ITE data suggests higher percentages are warranted.

Table 2. Trip Generation Estimates by Trip Type

Time Period	Final Vehicle Trips *(in/out)*	Pass-By Trips *(in/out)*	New (Primary) Trips *(in/out)*	Net New Trips *(in/out)*
AM Peak Hour	197 (80/117)	0 *(0/0)*	197 (80/117)	194 (79/115)
PM Peak Hour	321 (198/123)	66 (33/33)	255 (165/90)	251 (162/89)

Attachments

KLJ/

AM PEAK HOUR TRIP GENERATION

	Land Use (ITE LU Code)	Size[1]	Average Trip Rates[2]	Baseline Vehicle Trips				AVO[4]		Person Trips in Vehicles			Vehicle Mode Share[5]		Person Trips			Internal Person Trips[6]					External Person Trips			Local Vehicle Mode Share[7]		External Person Trips in Vehicles			Local AVO[8]		Final Vehicle Trips			Pass-By Trips				Primary Trips		
				Total	In%[3]	In	Out	In	Out	In	Out	Total	In	Out	In	Out	Total	Proportion In	In	Proportion Out	Out	Total	In	Out	Total	In	Out	In	Out	Total	In	Out	In	Out	Total	Pass-By %	In	Out	Total	In	Out	Total
Zone A-1	Retail (820)	56,000 sq ft	0.94 per 1000 sq ft	53	62%	33	20	1.17	1.16	39	23	62	100%	100%	39	23	62	29%	3	27%	3	6	36	20	56	100%	100%	36	20	56	1.17	1.16	31	17	48	0%	0	0	0	31	17	48
	Quality Restaurant (931)	22,100 sq ft	0.73 per 1000 sq ft	16	55%	9	7	1.33	1.34	12	9	21	100%	97%	12	9	21	30%	7	26%	2	9	5	7	12	100%	97%	5	7	12	1.33	1.34	4	5	9	0%	0	0	0	4	5	9
	High-Turnover Restaurant (932)	3,900 sq ft	9.94 per 1000 sq ft	39	55%	21	18	1.33	1.34	28	24	52	100%	97%	28	25	53	70%	15	74%	7	22	13	18	31	100%	97%	13	17	30	1.33	1.34	10	13	23	0%	0	0	0	10	13	23
	Multifamily (221)	357 Units	0.36 per unit	129	26%	34	95	1.13	1.09	38	104	142	89%	97%	43	107	150	69%	1	69%	8	9	42	99	141	87%	87%	37	86	123	1.05	1.05	35	82	117	0%	0	0	0	35	82	117
STC-PHASE I (Zone A-1) SUM				**237**		**97**	**140**			**117**	**160**	**277**			**122**	**164**	**286**		**26**		**20**	**46**	**96**	**144**	**240**			**91**	**130**	**221**			**80**	**117**	**197**		**0**	**0**	**0**	**80**	**117**	**197**
The Village (TRF)	Medical-Dental Office (720)	8,000 sq ft	2.78 per 1000 sq ft	22	78%	17	5	1.06	1.06	18	5	23	97%	90%	19	6	25	100%	5	100%	5	10	14	1	15	97%	90%	14	1	15	1.06	1.06	13	1	14	0%	0	0	0	13	1	14
	Retail (820)	0 sq ft	0.94 per 1000 sq ft	0	62%	0	0	1.17	1.16	0	0	0	100%	100%	0	0	0	0%	0	0%	0	0	0	0	0	100%	100%	0	0	0	1.17	1.16	0	0	0	0%	0	0	0	0	0	0
	Supermarket (850)	35,000 sq ft	3.82 per 1000 sq ft	134	60%	80	54	1.17	1.16	94	63	157	100%	100%	94	63	157	71%	6	73%	10	16	88	53	141	100%	100%	88	53	141	1.17	1.16	75	46	121	0%	0	0	0	75	46	121
	High-Turnover Restaurant (932)	0 sq ft	9.94 per 1000 sq ft	0	55%	0	0	1.33	1.34	0	0	0	100%	97%	0	0	0	0%	0	0%	0	0	0	0	0	100%	97%	0	0	0	1.33	1.34	0	0	0	0%	0	0	0	0	0	0
	Multifamily (221)	159 Units	0.36 per unit	57	26%	15	42	1.13	1.09	17	46	63	89%	97%	19	48	67	31%	1	31%	3	4	18	45	63	90%	90%	16	41	57	1.05	1.05	15	39	54	0%	0	0	0	15	39	54
The Village (TRF) SUM				213		112	101			129	114	243			132	117	249		12		18	30	120	99	219			118	95	213			103	86	189		0	0	0	103	86	189

PM PEAK HOUR TRIP GENERATION

	Land Use (ITE LU Code)	Size	Average Trip Rates[2]	Baseline Vehicle Trips				AVO[4]		Person Trips in Vehicles			Vehicle Mode Share[5]		Person Trips			Internal Person Trips[6]					External Person Trips			Local Vehicle Mode Share[7]		External Person Trips in Vehicles			Local AVO[8]		Final Vehicle Trips			Pass-By Trips				Primary Trips		
				Total	In%[3]	In	Out	In	Out	In	Out	Total	In	Out	In	Out	Total	Proportion In	In	Proportion Out	Out	Total	In	Out	Total	In	Out	In	Out	Total	In	Out	In	Out	Total	Pass-By %[9]	In	Out	Total	In	Out	Total
Zone A-1	Retail (820)	56,000 sq ft	3.81 per 1000 sq ft	213	48%	102	111	1.21	1.18	123	131	254	100%	100%	123	131	254	32%	33	35%	53	86	90	78	168	100%	100%	90	78	168	1.21	1.18	74	66	140	25%	18	18	36	56	48	104
	Quality Restaurant (931)	22,100 sq ft	7.8 per 1000 sq ft	172	67%	115	57	1.33	1.34	153	76	229	100%	97%	153	78	231	65%	58	61%	47	105	95	31	126	100%	97%	95	30	125	1.33	1.34	71	22	93	25%	12	12	24	59	10	69
	High-Turnover Restaurant (932)	3,900 sq ft	9.77 per 1000 sq ft	38	62%	24	14	1.33	1.34	32	19	51	100%	97%	32	20	52	14%	12	16%	12	24	20	8	28	100%	97%	20	8	28	1.33	1.34	15	6	21	25%	3	3	6	12	3	15
	Multifamily (221)	357 Units	0.44 per unit	157	61%	96	61	1.15	1.21	110	74	184	96%	95%	114	78	192	69%	68	69%	43	111	46	35	81	87%	87%	40	30	70	1.05	1.05	38	29	67	0%	0	0	0	38	29	67
STC-PHASE I (Zone A-1) SUM				**580**		**337**	**243**			**418**	**300**	**718**			**422**	**307**	**729**		**171**		**155**	**326**	**251**	**152**	**403**			**245**	**146**	**391**			**198**	**123**	**321**		**33**	**33**	**66**	**165**	**90**	**255**
The Village (TRF)	Medical-Dental Office (720)	30,000 sq ft	3.46 per 1000 sq ft	104	28%	29	75	1.11	1.07	32	80	112	96%	98%	33	82	115	100%	17	100%	17	34	16	65	81	96%	98%	15	64	79	1.11	1.07	14	60	74	0%	0	0	0	14	60	74
	Retail (820)	25,000 sq ft	3.81 per 1000 sq ft	95	48%	46	49	1.21	1.18	56	58	114	100%	100%	56	58	114	15%	15	15%	24	39	41	34	75	100%	100%	41	34	75	1.21	1.18	34	29	63	25%	8	8	16	26	21	47
	Supermarket (850)	35,000 sq ft	9.24 per 1000 sq ft	323	51%	165	158	1.21	1.18	200	186	386	100%	100%	200	186	386	53%	55	50%	75	130	145	111	256	100%	100%	145	111	256	1.21	1.18	120	94	214	25%	27	27	54	93	67	160
	High-Turnover Restaurant (932)	6,000 sq ft	9.77 per 1000 sq ft	59	62%	37	22	1.33	1.34	49	29	78	100%	97%	49	30	79	21%	19	23%	18	37	30	12	42	100%	97%	30	12	42	1.33	1.34	23	9	32	25%	2	2	4	21	7	28
	Multifamily (221)	159 Units	0.44 per unit	70	61%	43	27	1.15	1.21	49	33	82	96%	95%	51	35	86	31%	31	31%	19	50	20	16	36	90%	90%	18	14	32	1.05	1.05	17	13	30	0%	0	0	0	17	13	30
The Village (TRF) SUM				651		320	331			386	386	772			389	391	780		137		153	290	252	238	490			249	235	484			255	254	509		37	37	74	171	205	339

1. Only The Village's existing grocery store (Met. Market) and approx. 8,000 sf of it's medical/dental office space (Overlake Medical Clinic and Sammamish Smiles Dentistry) are currently open during the weekday AM peak hour for concurrency testing (7 to 8 a.m.) and would likely remain open in the futur
2. Avg. trip rates from the *ITE Trip Generation Manual, 10th Edition (2017)* , per Appendix E *of Sammamish's Public Work Standards (2016)*
3. Inbound and outbound trip percentages from the *ITE Trip Generation Manual, 10th Edition (2017)* ; Percentages not available for Land Use #931 (Quality Restaurant) during AM peak hour, assumed same percentages as Land Use #932 (High-Turnover Restaurant
4. Avg. vehicle occupancy (AVO) rates represent the average number of occupants per vehicle; AVO rates from the*ITE Trip Generation Handbook, 3rd Edition (2017),* Tables B.1 and B.2;
   Single-Family AVO rates not available, assumed same as Apartments; Medical-Dental Office AVO rates not available, assumed same as Office; Supermarket AVO rates not available, assumed same as Shopping Center; AM peak hour Restaurant AVO rate not available, assumed same as PM peak hour Restaurant AVO rat
5. Vehicle mode share (VMS) percentages, defined as the percent of all person trips using vehicles, from the*ITE Trip Generation Handbook, 3rd Edition (2017),* Tables B.1 and B.2;
   Single-Family VMS percentages not available, assumed same as Apartments; Medical-Dental Office VMS percentages not available, assumed same as Office; Supermarket and Drugstore VMS percentages not available, assumed same as Shopping Center; AM peak hour Restaurant VMS percentage not available, assumed same as PM peak hour Restaurant VMS percentag
6. Internal trips defined as person trips between complimentary land uses; Internal trip methodology is consistent with the*ITE Trip Generation Handbook, 3rd Edition (2017)*
7. Local VMS percentages for Single-Family and Multifamily Housing from *U.S. Census Bureau* Report B08137 (2013-2017) for Tract No. 322.03 (tract where the project is located); Local VMS percentages for all other land uses not available, assumed VMS percentages from the *ITE Trip Generation Handbook, 3rd Edition (2017)*
8. Local AVO rates for Single-Family and Multifamily Housing from *U.S. Census Bureau* Report B08137 (2013-2017) for Tract No. 322.03 (tract where the project is located); Local AVO rates for all other land uses not available, assumed AVO rates from the*ITE Trip Generation Handbook 3rd Edition (2017)*
9. Per Sammamish's "Traffic Impact Analysis Report Guidelines," Appendix E of the City's Public Work Standards (2016); 25% identified as an upper limit for pass-by trip adjustments; however, Appendix E is a guideline only and the 25% pass-by cap may not be appropriate given that ITE data suggests higher percentages are warranted, including 34% for Land Use #820 (Shopping Center), 36% for Land Use #850 (Supermarket), 44% for Land Use #931 (Quality Restaurant), and 43% for Land Use #932 (High-Turnover Restaurant

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Zone A-1	**Organization:**	Transpo Group
Project Location:	Sammamish	**Performed By:**	
Scenario Description:		**Date:**	
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				25	19	6
Retail				219	133	86
Restaurant				74	40	34
Cinema/Entertainment				0		
Residential				217	62	155
Hotel				0	0	0
All Other Land Uses[2]				0	0	0
				535	254	281

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	3	0	0	0
Retail	1		11	0	1	0
Restaurant	3	5		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	2	8	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	535	254	281
Internal Capture Percentage	14%	15%	14%
External Vehicle-Trips[5]	459	216	243
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	26%	83%
Retail	7%	15%
Restaurant	55%	26%
Cinema/Entertainment	N/A	N/A
Residential	3%	7%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Zone A-1
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	19	19	1.00	6	6
Retail	1.00	133	133	1.00	86	86
Restaurant	1.00	40	40	1.00	34	34
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	62	62	1.00	155	155
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	4	0	0	0
Retail	25		11	0	12	0
Restaurant	11	5		0	1	1
Cinema/Entertainment	0	0	0		0	0
Residential	3	2	31	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		43	9	0	0	0
Retail	1		20	0	1	0
Restaurant	3	11		0	3	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	23	8	0		0
Hotel	1	5	2	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	5	14	19	14	0	0
Retail	9	124	133	124	0	0
Restaurant	22	18	40	18	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	60	62	60	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	5	1	6	1	0	0
Retail	13	73	86	73	0	0
Restaurant	9	25	34	25	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	11	144	155	144	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Zone A-1	**Organization:**	
Project Location:	Sammamish	**Performed By:**	
Scenario Description:		**Date:**	
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				115	33	82
Retail				754	379	375
Restaurant				362	234	128
Cinema/Entertainment				0		
Residential				278	165	113
Hotel				0	0	0
All Other Land Uses[2]				0	0	0
				1,509	811	698

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		800	1000		900	
Retail					100	
Restaurant					1000	
Cinema/Entertainment						
Residential		100	800			
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		13	2	0	2	0
Retail	8		68	0	76	0
Restaurant	4	52		0	21	0
Cinema/Entertainment	0	0	0		0	0
Residential	5	38	19	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,509	811	698
Internal Capture Percentage	41%	38%	44%
External Vehicle-Trips[5]	893	503	390
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	52%	21%
Retail	27%	41%
Restaurant	38%	60%
Cinema/Entertainment	N/A	N/A
Residential	60%	55%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	Zone A-1
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	33	33	1.00	82	82
Retail	1.00	379	379	1.00	375	375
Restaurant	1.00	234	234	1.00	128	128
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	165	165	1.00	113	113
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		13	2	0	2	0
Retail	8		109	15	98	19
Restaurant	4	52		10	21	9
Cinema/Entertainment	0	0	0		0	0
Residential	5	47	19	0		3
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		25	4	0	7	0
Retail	10		68	0	76	0
Restaurant	10	190		0	26	0
Cinema/Entertainment	2	15	7		7	0
Residential	19	38	27	0		0
Hotel	0	8	12	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	17	16	33	16	0	0
Retail	103	276	379	276	0	0
Restaurant	89	145	234	145	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	99	66	165	66	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	17	65	82	65	0	0
Retail	152	223	375	223	0	0
Restaurant	77	51	128	51	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	62	51	113	51	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.