

Washington Oregon California Texas Alaska Colorado Montana

July 6, 2017

City of Spokane Attn: Inga Note, P.E. Senior Traffic Planning Engineer 808 W. Spokane Falls Boulevard Spokane, WA 99201

Re: Trip Generation & Distribution Letter for **The Falls** Proposed Development 829 W Broadway Avenue

Dear Inga,

DCI Engineers understands that the City of Spokane requires a trip generation and distribution letter to understand the possible traffic impacts for the proposed Falls Development to be constructed at 829 W Broadway. A vicinity map of the site location is included in Appendix I.

Project Description

The proposed project includes the redevelopment of a 2.25-acre property located along the north side of the Spokane River. The property was previously a YWCA. The existing structures and paved surface parking lot will be demolished and removed for the proposed development. The current project proposes (2) 13-story towers that contain a mix of condominiums, apartments, hotel, restaurant, and parking garage space along with a 3-story building that will be primarily office space. See Appendix III for the proposed project site plan. The current program matrix for the project can be found in Appendix VI.

Trip Generation Summary:

The number of trips generated by this project was estimated using information found in the 9th Edition of ITE's *Trip Generation Manual* along with excerpts from the 3rd Edition of ITE's *Trip Generation Handbook*. These resources were used to calculate the number of trips entering and exiting the site during the AM and PM Peak Hours. The *Trip Generation Manual* was used to determine the total number of existing and proposed trips entering and exiting the site during the AM and PM peak hours. The land use for the existing site was Recreation Community Center. The proposed land uses are Hotel, High-Rise Apartments, Quality Restaurant, General Office, and High-Rise Condominiums. The fitted curve equation was used in instances when it was representative of the data. When the fitted curve was not available or not representative data, the average rate was used. Pass-by trips and internal capture were not considered for this project as they were determined to be negligible. The corresponding charts from the ITE Manual and the trip calculations are included in Appendix II. The following is a summary of the anticipated trip generation for the proposed project.

Land Use 485 – Recreational Community Center (Existing)

- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 7-9 AM • Average vehicle trip ends vs. 1000 s.f. of gross floor area
 - Approximately 73 trips are generated
 - ➢ 66% IN, 48 trips
 - > 34% OUT, 25 trips
- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 4-6 PM Average vehicle trip ends vs. 1000 s.f. of gross floor area
 - Approximately 98 trips are generated
 - > 49% IN, 48 trips
 - ➢ 51% OUT, 50 trips

Land Use 310 - Hotel

- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 7-9 AM • Average vehicle trip ends vs. Rooms
 - Approximately 66 trips are generated
 - > 59% IN, 39 trips
 - ➢ 41% OUT, 27 trips
- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 4-6 PM Average vehicle trip ends vs. Rooms 0
 - Approximately 74 trips are generated
 - > 51% IN, 38 trips
 - ➢ 49% OUT, 36 trips

Land Use 710 – General Office Building

- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 7-9 AM •
 - Average vehicle trip ends vs. 1000 s.f. of gross floor area
 - Approximately 31 trips are generated
 - > 88% IN, 27 trips
 - 12% OUT, 4 trips \triangleright
- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 4-6 PM 0
 - Average vehicle trip ends vs. 1000 s.f. of gross floor area
 - Approximately 30 trips are generated
 - 17% IN, 5 trips
 - 83% OUT, 25 trips \geq

Land Use 931 – Quality Restaurant

- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 7-9 AM
 - Average vehicle trip ends vs. 1000 s.f. of gross floor area
 - Approximately 22 trips are generated

- ➢ 67% IN, 15 trips
- > 33% OUT, 7 trips
- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 4-6 PM
 Average vehicle trip ends vs. 1000 s.f. of gross floor area
 - Approximately 201 trips are generated
 - > 67% IN, 135 trips
 - > 33% OUT, 66 trips

Land Use 222 - High-Rise Apartments

- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 7-9 AM
 Average vehicle trip ends vs. dwelling units
 - Approximately 38 trips are generated
 - > 25% IN, 9 trips
 - > 75% OUT, 29 trips
- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 4-6 PM
 Average vehicle trip ends vs. dwelling units
 - Approximately 53 trips are generated
 - 61% IN, 32 trips
 - ➢ 39% OUT, 21 trips

Land Use 232 – High-Rise Residential Condominiums

- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 7-9 AM
 Average vehicle trip ends vs. dwelling units
 - Approximately 9 trips are generated
 - > 19% IN, 2 trips
 - > 81% OUT, 7 trips
- Weekday, Peak Hour of Adjacent Street Traffic, One hour between 4-6 PM
 - Average vehicle trip ends vs. dwelling units
 - Approximately 10 trips are generated
 - > 62% IN, 6 trips
 - > 38% OUT, 4 trips

Existing Trips		
AM Trips:	73	Trips
Entering:	48	Trips
Exiting:	25	Trips
PM Trips:	98	Trips
Entering:	48	Trips
Exiting:	50	Trips

Total New Trips					
AM Trips:	166	Trips			
Entering:	92	Trips			
Exiting:	74	Trips			
PM Trips:	368	Trips			
Entering:	216	Trips			
Exiting:	152	Trips			

Infill Trip Generation

Because of the site's proximity to downtown, it was advised by Inga Note of the City of Spokane to consider Infill Trip Generation to take into account walking, transit, and biking trips to and from the site and get a more accurate representation of the vehicular trips generated by the site. The process for determining infill trip generation is detailed in Chapter 7 of the *Trip Generation Handbook*, which can be found in Appendix IV. Additionally, data from Appendices C and D of the *Trip Generation Handbook* were used in these calculations. Data used is highlighted and can also be found in Appendix IV. Calculations for the infill trip generation can be found in Appendix II. The following is a summary of the anticipated infill trip generation for the proposed project.

Land Use	Peak	Net Total	Net	Net
	Hour	Proposed	Proposed	Proposed
		Trips	Trips In	Trips Out
Hotel	AM	64	38	26
	PM	68	33	35
Office	AM	22	19	3
	PM	21	4	17
Restaurant	AM	14	10	4
	PM	127	87	40
Apartment	AM	31	8	23
	PM	38	23	15
Condominium	AM	8	2	6
	PM	8	5	3
Total	AM	139	77	62
	PM	262	152	110

Summary

Based on the results provided above, accounting for existing trips along with infill trips, the estimated net total trips generated by the proposed site are as follows:

Net Trips		
AM Trips:	66	Trips
Entering:	29	Trips
Exiting:	37	Trips
PM Trips:	164	Trips
Entering:	104	Trips
Exiting:	60	Trips

These trip calculations along with the appropriate pages from the ITE Manual can be found in Appendix II.

Trip Distribution and Assignment:

Appendix V includes exhibits that show the estimated distribution of the newly generated trips by the proposed development. The figures show the outgoing and incoming trips for both the AM and PM peak hours of adjacent street traffic.

We believe that the trips will be fairly consistent in the directions they are coming and going during AM and PM peak hours. Because residents of the site are anticipated to be working downtown or using I-90, a majority (~60%) of the outbound trips in the AM and inbound trips in the PM are expected to be going toward or coming from downtown or I-90, with 40% going to or coming from elsewhere. Incoming trips in the AM and outgoing trips in the PM are expected to have a distribution of approximately 50% south toward downtown and I-90, with 50% elsewhere.

If you have any questions, please don't hesitate to contact me.

Sincerely, DCI Engineers Inc.

Wade Gelhausen, P.E. Associate Principal

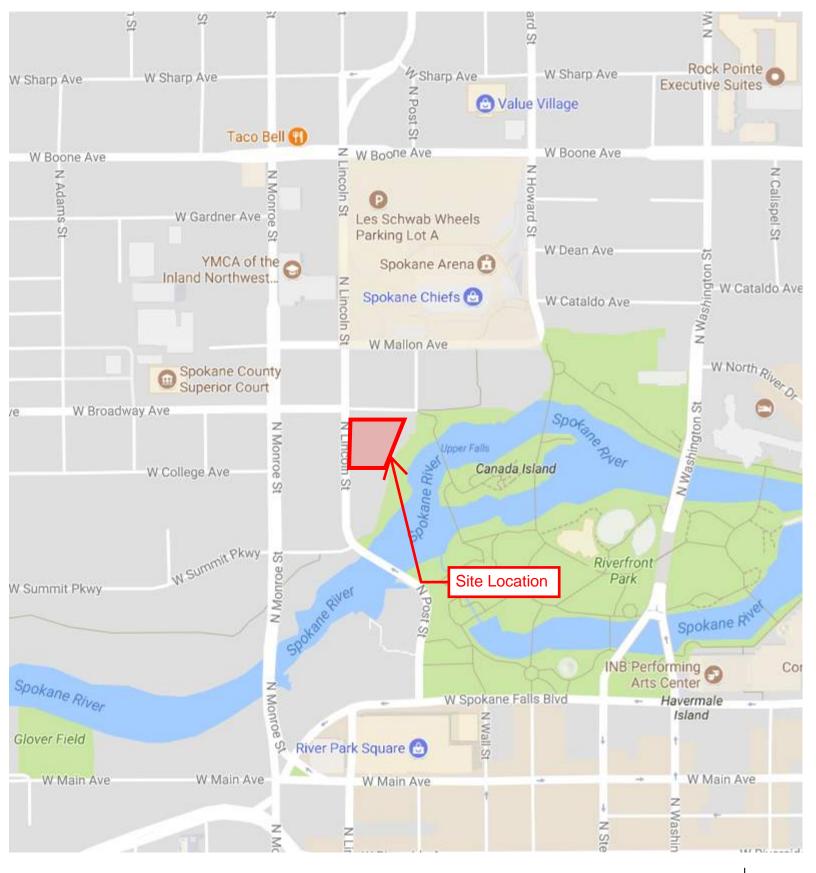
Sam Shastany, E.I.T

Project Engineer

Appendix I: Vicinity Map Calculations/ITE Manual (AM & PM Peak Hour) Appendix II: Appendix III: Site Plan Appendix IV: **ITE Handbook Excerpts** Trip Distribution (AM & PM Peak Hour) Appendix V: Appendix VI: **Current Program Matrix**

Appendix I

Vicinity Map



Appendix II



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date:	7/6/2017					
Job Number:	17042-0024					
Architect:	CollinsWoerman	n				
Project:	The Falls Develo	opment				
	Land Use:	495 - Recreati	onal Comm	unity Center	•	
Average Vehic	le Trip Ends Vs.:	1000 Sq. Feet	Gross Flooi	- Area		
1000 Sq. Feet G	ross Floor Area	35.6				
-	On A:	Weekday				
		Peak Hour of A	Adjacent St	reet Traffic		
		One Hour Bety	ween 7 and	9 a.m.		
	Average Rate:	2.05	→	73	Total Trips	
Fitted Curve Equ	uation (If given):		→		Total Trips	
•	,					
	Equation Used:	Average Rate				
	•••••	Fitted Curve I				
		-				
	Total Trips:	73				
P	ercent Entering:	66%	→	48	Entering Tr	ins
F	Percent Exiting:		→		Exiting Trip	-
	i ci cent LAiting.	5470		25		5



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date:	7/6/2017					
Job Number:	17042-0024					
Architect:	CollinsWoerma	n				
Project:	The Falls Develo	opment				
	Land Use:	495 - Recreati	onal Comm	unity Center		
Average Vehic	le Trip Ends Vs.:	1000 Sq. Feet	Gross Floo	r Area		
1000 Sq. Feet G	ross Floor Area	35.6				
	On A:	Weekday				
		Peak Hour of A	Adjacent St	reet Traffic		
		One Hour Bet	ween 4 and	l 6 p.m.		
	Average Rate:	2.74	→	98	Total Trips	
Fitted Curve Equ	uation (If given):		→		Total Trips	
	Equation Used:	Average Rate				
		Fitted Curve I	Equation			
			•			
	Total Trips:	98				
Р	ercent Entering:	49%	→	48	Entering Tr	ips
	Percent Exiting:	51%	→	50	Exiting Trip	S



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date:	7/6/2017					
Job Number:	17042-0024					
Architect:	CollinsWoerman	n				
Project:	The Falls Develo	opment				
	Land Use:	310 - Hotel				
Average Vehic	le Trip Ends Vs.:	Rooms				
	Rooms	124				
	On A:	Weekday				
		Peak Hour of A	Adjacent Sti	reet Traffic		
		One Hour Betw	ween 7 and	9 a.m.		
	Average Rate:	0.53	→	66	Total Trips	
Fitted Curve Equ	uation (If given):		→		Total Trips	
	Equation Used:	Average Rate				
		Fitted Curve I	Equation			
	Total Trips:	66				
Р	ercent Entering:	59%	→	39	Entering Trip	S
	Percent Exiting:	41%	→	27	Exiting Trips	



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date:	7/6/2017					
Job Number:	17042-0024					
Architect:	CollinsWoerman	า				
Project:	The Falls Develo	pment				
	Land Use:	310 - Hotel				
Average Vehic	le Trip Ends Vs.:	Rooms				
	Rooms	124				
	On A:	Weekday				
		Peak Hour of A	Adjacent Str	reet Traffic		
		One Hour Betw	ween 4 and	6 p.m.		
	Average Rate:	0.60	→	74	Total Trips	
Fitted Curve Equ	ation (If given):		→		Total Trips	
	Equation Used:	Average Rate				
		O Fitted Curve I	Equation			
	Total Trips:	74				
	-					
Pe	ercent Entering:	51%	→	38	Entering Tr	ips
	Percent Exiting:	49%	→	36	Exiting Trip	s



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date: Job Number: Architect: Project:	7/6/2017 17042-0024 CollinsWoerman The Falls Develo					
Average Vehic 1000 Sq. Feet G	le Trip Ends Vs.: ross Floor Area	710 - General Office B 1000 Sq. Feet Gross F 20.038 Weekday AM Peak Hour	oor Area			
Fitted Curve Equ	Average Rate: lation (If given): Equation Used: Total Trips:	1.56 Ln(T)=0.80Ln(X)+1.57 Average Rate Fitted Curve Equation	→	72 *Average r fitted curve representa	Total Trips Total Trips ate used bee e equation is tive of build are footage	s ings with
	ercent Entering: Percent Exiting:	88% 12%	→ →		Entering Tr Exiting Trip	-



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date: Job Number: Architect: Project:	7/6/2017 17042-0024 CollinsWoerman The Falls Develo				
Average Vehic 1000 Sq. Feet G	le Trip Ends Vs.: ross Floor Area	710 - General Office B 1000 Sq. Feet Gross Fl 20.038 Weekday PM Peak Hour	oor Area		
Fitted Curve Equ			-	30 Total Trips 111 Total Trips	
	Equation Used: Total Trips:	Fitted Curve Equation	l	*Average rate used beca fitted curve equation is representative of buildir greater square footage (500,000+)	
	ercent Entering: Percent Exiting:	17% 83%	→ →	5 Entering Trip 25 Exiting Trips	



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date: Job Number: Architect: Project:	7/6/2017 17042-0024 CollinsWoerman The Falls Develo					
	Land Use:	931 - Quality Restaura	nt			
Average Vehic	le Trip Ends Vs.:	1000 Sq. Feet Gross Fl	oor Area			
1000 Sq. Feet G	ross Floor Area	26.882				
	On A:	Weekday Peak Hour of Adjacent One Hour Between 7 a		ffic		
	Average Rate:	0.81	→	22	Total Trips	
Fitted Curve Equ	uation (If given):		→		Total Trips	
	Equation Used:	 Average Rate Fitted Curve Equation 		*Directional distribution data not available for AM peak hour and assur to be equal to directional distribution		and assumed
	Total Trips:	22		PM peak hou	r.	
P	ercent Entering:	67%	→	15	Entering Tr	ips
	Percent Exiting:	33%	→	7	Exiting Trip	S



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date: Job Number: Architect: Project:	7/6/2017 17042-0024 CollinsWoerma The Falls Develo					
	Land Use:	931 - Quality Rest	aurant			
Average Vehi	cle Trip Ends Vs.:	1000 Sq. Feet Gro	ss Floor Area			
1000 Sq. Feet 0	Gross Floor Area	26.	882			
	On A:	Weekday Peak Hour of Adja One Hour Betwee				
Fitted Curve Eq	Average Rate: uation (If given):		7.49 → →		Total Trips Total Trips	
	Equation Used:	 Average Rate Fitted Curve Equation 	tion			
	Total Trips:		201			
F	Percent Entering:	(67% →	135	Entering Tr	ps
	Percent Exiting:	:	33% →	66	Exiting Trip	s



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date: Job Number: Architect: Project:	7/6/2017 17042-0024 CollinsWoerman The Falls Develo	-				
	Land Use:	232 - High-Rise R	esidential	Condominiur	n/Townhouse	
Average Vehic	le Trip Ends Vs.:	-			,	
_	Dwelling Units	26				
	On A:	Weekday				
		Peak Hour of Adj	acent Stree	et Traffic		
		One Hour Betwee	en 7 and 9	a.m.		
	Average Rate:	0.34		9	Total Trips	
Fitted Curve Equ	uation (If given):	T=0.29(X)+28.86	→	35	Total Trips	
	Equation Used:	 Average Rate Fitted Curve Equal 	ation	representat	ate used becaus tive of studies v	
	Total Trips:	9		units.		
P	ercent Entering:	19%	→	2	Entering Trips	
	Percent Exiting:	81%	→	7	Exiting Trips	



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date: Job Number: Architect: Project:	7/6/2017 17042-0024 CollinsWoerman The Falls Develo	-				
	Land Use:	232 - High-Rise R	esidential	Condominiur	n/Townhouse	
Average Vehic	le Trip Ends Vs.:				.,	
U U	Dwelling Units	26				
	On A:	Weekday				
		Peak Hour of Adj	acent Stree	et Traffic		
		One Hour Betwee	en 4 and 6	p.m.		
	Average Rate:	0.38	→	10	Total Trips	
Fitted Curve Equ	uation (If given):	T=0.34(X)+28.86	→	22	Total Trips	
	Equation Used:	 Average Rate Fitted Curve Equation 	ation	representat	ate used because f tive of studies with	
	Total Trips:	10		units.		
Р	ercent Entering:	62%	→	6	Entering Trips	
	Percent Exiting:	38%	→	4	Exiting Trips	



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date: Job Number:	7/6/2017 17042-0024					
Architect:	CollinsWoerma	n				
Project:	The Falls Develo	opment				
-						
	Land Use:	222 - High-Rise Apartr	nent			
Average Vehic	le Trip Ends Vs.:	Dwelling Units				
	Dwelling Units	126				
	On A:	Weekday				
		Peak Hour of Adjacen	t Street Tra	ffic		
		One Hour Between 7	and 9 a.m.			
	Average Rate:	0.30	→	38	Total Trips	
Fitted Curve Equ	ation (If given):	Ln(T)=0.99Ln(x)-1.14	→	38	Total Trips	
	Equation Used:	Average Rate				
		O Fitted Curve Equation				
	Total Trips :	38				
	-					
Pe	ercent Entering:	25%	→	9	Entering Tr	ips
	Percent Exiting:	75%	→		Exiting Trip	-
	0				U I	



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition

Date: Job Number: Architect:	7/6/2017 17042-0024 CollinsWoerman					
Project:	The Falls Develo	opment				
		222 - High-Rise Apartr	nent			
Average Vehic	le Trip Ends Vs.:	-				
	Dwelling Units	126				
		Weekday				
		Peak Hour of Adjacent	t Street Tra	ffic		
		One Hour Between 4 a	and 6 p.m.			
	Average Rate:	0.35	→	44	Total Trips	
Fitted Curve Equ	ation (If given):	T=0.32(x)+12.30	→	53	Total Trips	
	Equation Used:	 Average Rate Fitted Curve Equation 				
	Total Trips:	53				
P	ercent Entering:	61%	→	32	Entering Tr	ips
	Percent Exiting:	39%	→	21	Exiting Trip	s



Per Institute of Transportation Engineers Trip Generation Manual - 9th Edition Copy Sheet As Necessary for Additional Land Uses or Time Periods

Date:	7/6/2017	
Job Number:	17042-0024	
Architect:	CollinsWoerman	
Project:	The Falls Developm	ne

Trip Calculation Summary

Land Use:	485 - Recreational Community Center (Existing)	Land Use:		310 - Hotel
AM Trips:	73 Trips	AM Trips:		66 Trips
Entering:	48 Trips		Entering:	39 Trips
Exiting:	25 Trips		Exiting:	27 Trips
PM Trips:	98 Trips	PM Trips:		74 Trips
Entering	48 Trips		Entering:	38 Trips
Exiting	50 Trips		Exiting:	36 Trips
Land Use:	710 - General Office Building	Land Use:		931 - Quality Restaurant
AM Trips:	31 Trips	AM Trips:		22 Trips
Entering:	27 Trips		Entering:	15 Trips
Exiting:	4 Trips		Exiting:	7 Trips
PM Trips:	30 Trips	PM Trips:		201 Trips
Entering:	5 Trips		Entering:	135 Trips
Exiting:	25 Trips		Exiting:	66 Trips
Land Use:	222 - High-Rise Apartments	Land Use:		232 - High-Rise Residential Condominium
AM Trips:	38 Trips	AM Trips:		9 Trips
Entering:	9 Trips		Entering:	2 Trips
Exiting:	29 Trips		Exiting:	7 Trips
PM Trips:	53 Trips	PM Trips:		10 Trips
Entering	: 32 Trips		Entering:	6 Trips
Exiting:	21 Trips		Exiting:	4 Trips



Infill Trip Generation

*Based on Chapter 7 of the Trip Generation Handbook, Third Edition

		Baseline Vehicle Mode	Baseline Vehicle Mode	Baseline Vehicle	Baseline Vehicle	Study Site Vehicle	Study Site Vehicle	Incoming Infill	Outgoing
Land Use	Peak Hour	Share* (Incoming)	Share* (Outgoing)	Occupancy* (Incoming)	Occupancy* (Outgoing)	Mode Share**	Occupancy**	Trips	Infill Trips
Hotel	AM	94%	97%	1.29	1.32	94%	1.32	38	26
Hotel	PM	96%	100%	1.33	1.55	96%	1.55	33	35
Office	AM	99%	100%	1.06	1.06	69%	1.07	19	3
Office	PM	100%	99%	1.11	1.07	68%	1.06	4	17
Apartment	AM	100%	100%	1.22	1.10	83%	1.17	8	23
Apartment	PM	99%	100%	1.15	1.14	78%	1.26	23	15
Condominium	AM	95%	95%	1.17	1.17	83%	1.17	2	6
Condominium	PM	95%	95%	1.26	1.26	78%	1.26	5	3
Restaurant	AM	100%	100%	1.62	1.52	75%	1.89	10	4
Restaurant	PM	100%	100%	1.62	1.52	75%	1.89	87	40

*Baseline Vehicle Mode Share and Vehicle Occupancy based on data from Appendix C of the Trip Generation Handbook, Third Edition. Numbers used are averages of incoming and outgoing numbers. Similar land uses were used when exact land use data was not available. Where no similar land use is available, baseline vehicle mode share is assumed to be 0.95 and baseline vehicle occupancy is assumed to equal study site vehicle occupancy per section 7.4.1. **Study Site Vehicle Mode Share and Vehicle Occupancy based on data from Appendix D of the Trip Generation Handbook, Third Edition

Existing Tri	ps	
AM Trips:	73 Trips	
Entering:	48 Trips	
Exiting:	25 Trips	
PM Trips:	98 Trips	
Entering:	48 Trips	
Exiting:	50 Trips	
Total New Tr	ips (Before Infill Calcs)	
<u>Total New Tr</u> AM Trips:	ips (Before Infill Calcs) 166 Trips	
AM Trips:	166 Trips	
AM Trips: Entering:	166 Trips 92 Trips	
AM Trips: Entering: Exiting:	166 Trips 92 Trips 74 Trips	

Total New Trips (After Infill Calcs)			
AM Trips:		139 Trips	
Enter	ring:	77 Trips	
Exit	ting:	62 Trips	
PM Trips:		262 Trips	
Enter	ring:	152 Trips	
Exit	ting:	110 Trips	

Ne	et Trips
AM Trips:	66 Trips
Entering:	29 Trips
Exiting:	37 Trips
PM Trips:	164 Trips
Entering:	104 Trips
Exiting:	60 Trips

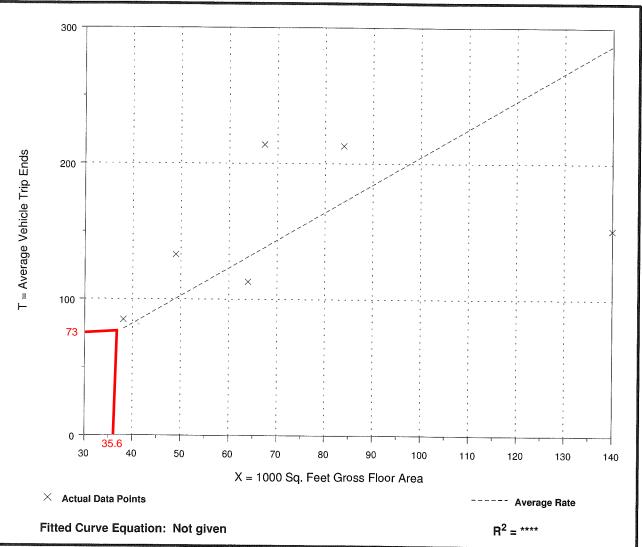
Recreational Community Center (495)		
	1000 Sq. Feet Gross Floor Area Weekday, Peak Hour of Adjacent Street Traffic One Hour Between 7 and 9 a.m.	
Number of Studies: Average 1000 Sq. Feet GFA: Directional Distribution:	-	

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
2.05	1.08 - 3.18	1.62

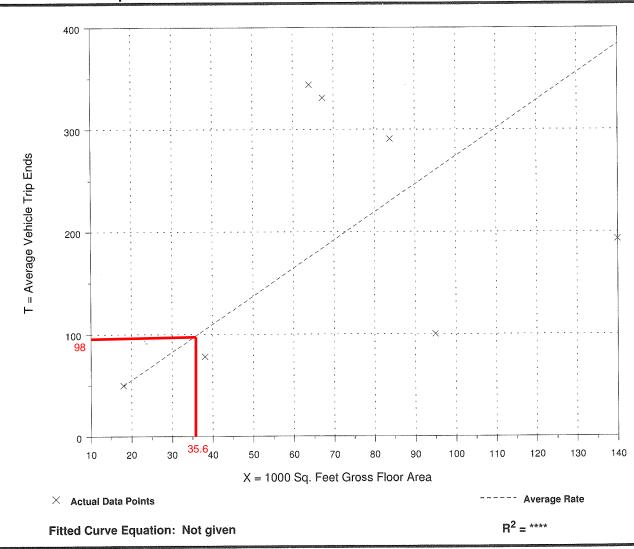
Data Plot and Equation

 \hat{c}



	ommunity Center 95)
•	1000 Sq. Feet Gross Floor Area Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.
Number of Studies: Average 1000 Sq. Feet GFA: Directional Distribution:	

Average Rate	Range of Rates	Standard Deviation
2.74	1.05 - 5.37	2.32

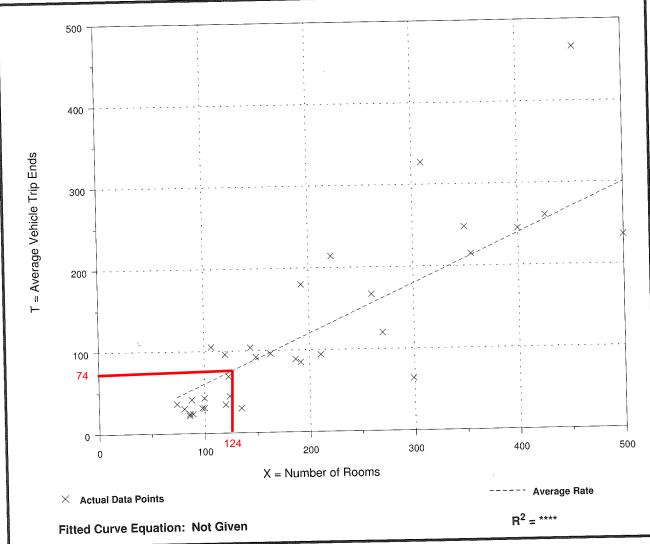


	A	verage Vehicle T	rip Ends vs: On a:	Rooms Weekday, Peak Hour of One Hour Bet	Adjacent Street ween 7 and 9 a.r	Traffic, n.
		Average Numb	er of Studies: er of Rooms: I Distribution:	204	41% exiting	
p Ger		on per Room				
		ge Rate .53	Range 0.20	of Rates	Standard 0.7	
	500					×
	400					• • • • • • • • • • • • •
cle Trip Ends	300	••••••				······
T = Average Vehicle Trip Ends	200				×	
		4. 4.	×	XX-	×× ×	
	100 - · · · 66 -	× ***	× × ×	×		
	0	× × × × × × × 100 ¹²	24 200	300	400	
				300	400	50

	otel 10)
Average Vehicle Trip Ends vs: On a:	Rooms Weekday, Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m.
Number of Studies: Average Number of Rooms: Directional Distribution:	

Trip Generation per Room

	a disease disease disease disease a disease disease disease disease disease disease disease disease disease dis	
Average Rate	Range of Rates	Standard Deviation
0.60	0.21 - 1.06	0.81



General Office Building

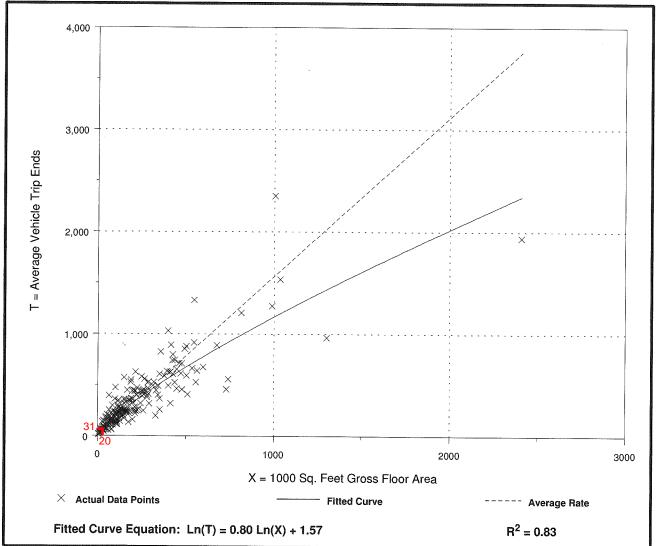
(710)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area On a: Weekday, A.M. Peak Hour

Number of Studies: 218 Average 1000 Sq. Feet GFA: 222 Directional Distribution: 88% entering, 12% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

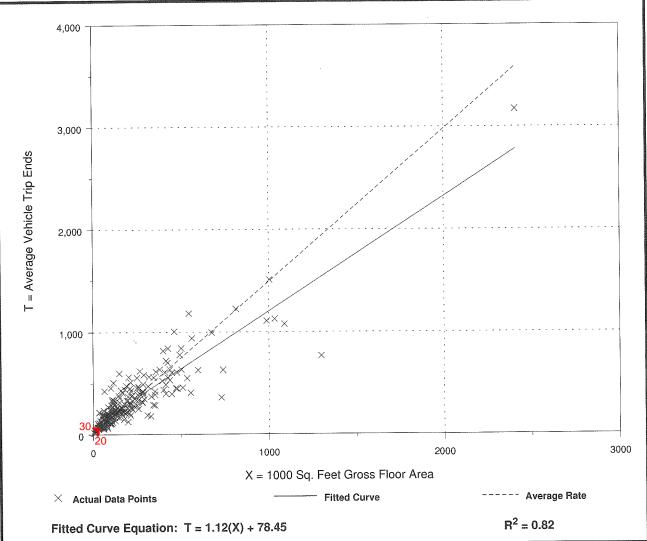
Average Rate	Range of Rates	Standard Deviation
1.56	0.60 - 5.98	1.40



General Office Building (710) Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area On a: Weekday, P.M. Peak Hour Number of Studies: 236 Average 1000 Sq. Feet GFA: 215 Directional Distribution: 17% entering, 83% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.49	0.49 - 6.39	1.37

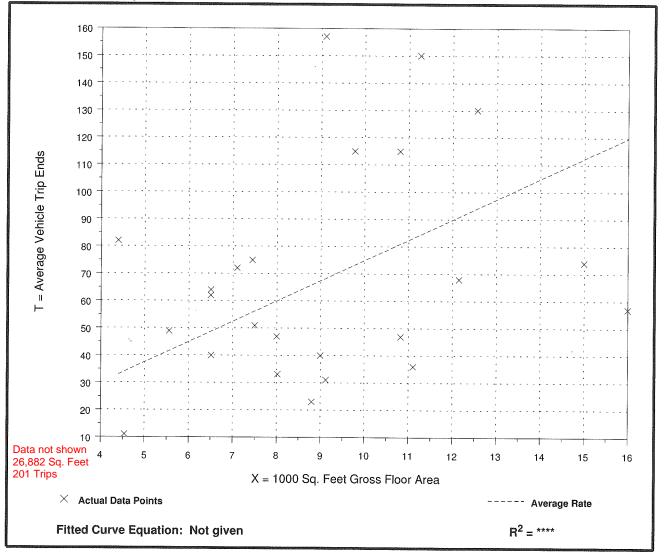


	4	Verag	e Veh	icle Tr		ls vs: On a:	Weel Peak	day, Hour	of Adj	acent	oor Ar Street nd 9 a	t Traff	ic,	
			rage 1 Dired	Numbe 000 Sc ctional	ı. Feet Distrib	GFA: oution:	Not a		е					
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Quality Restaurant
(931)Average Vehicle Trip Ends vs:1000 Sq. Feet Gross Floor Area
On a:On a:Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.Number of Studies:24
Picture 1000 Sq. Feet GFA:Average 1000 Sq. Feet GFA:9
Directional Distribution:67% entering, 33% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
7.49	2.42 - 18.64	4.89



High-Rise Residential Condominium/Townhouse (232)

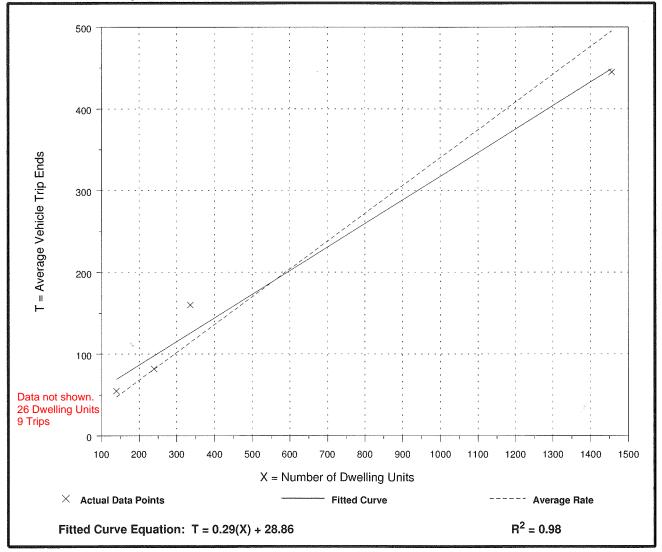
Average venicle Trip Ends vs: On a:	Dweiling Units Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.
Number of Studies:	4
Avg. Number of Dwelling Units:	543
Directional Distribution:	19% entering, 81% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.34	0.31 - 0.48	0.59

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



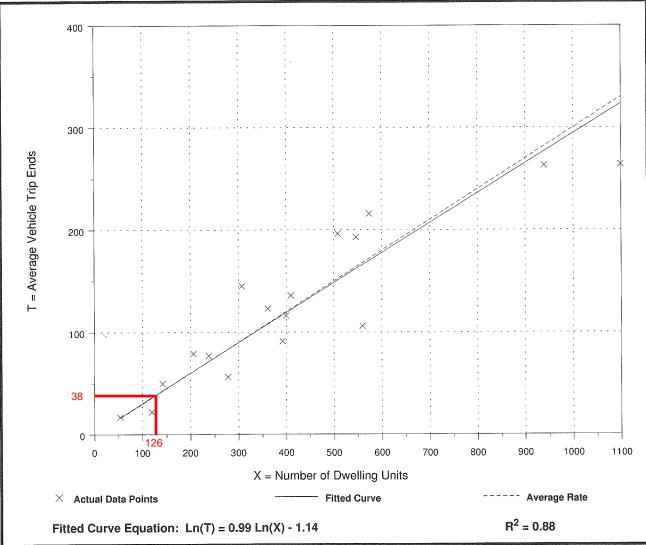
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 \times Actual Data PointsFitted Curve------ Average RateFitted Curve Equation: T = 0.34(X) + 15.47 $R^2 = 0.99$

High-Rise Apartment (222)		
Average Vehicle Trip Ends vs: On a:	Dwelling Units Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.	
Number of Studies: Avg. Number of Dwelling Units: Directional Distribution:		

Trip Generation per Dwelling Unit

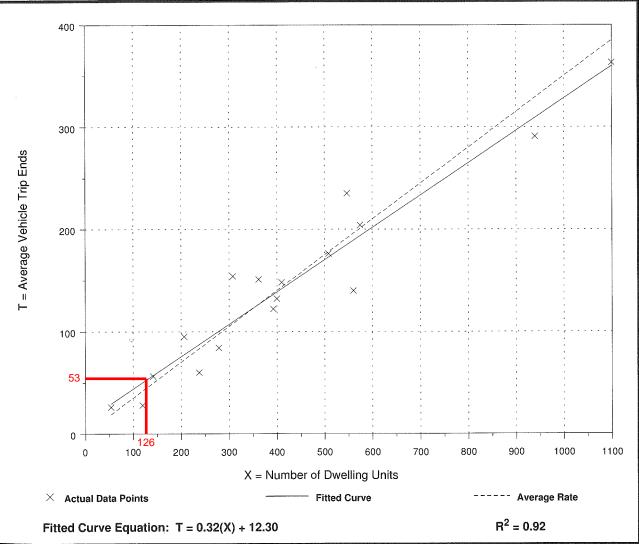
Average Rate	Range of Rates	Standard Deviation
0.30	0.18 - 0.47	0.55



High-Rise Apartment (222)		
Average Vehicle Trip Ends vs: On a:	Dwelling Units Weekday, Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m.	
Number of Studies: Avg. Number of Dwelling Units: Directional Distribution:		

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.35	0.23 - 0.50	0.59



Appendix III



Appendix IV

7 Trip Generation for Urban Infill/Redevelopment

7.1 Background

This chapter presents a recommended approach for estimating person and vehicle trip generation for development and redevelopment in compact, urbanized, mostly developed areas where walking, bicycling, and transit are viable modes of transportation. Development in this type of area is also known as "infill" development.

The current *Trip Generation Manual* data volumes do not reflect trip generation at urban infill sites. Redevelopment in built out areas and new development in areas that are almost fully built out often results in fewer vehicle trips generated than would result in suburban and outlying locations. These effects may be the result of modal shifts:

- More walking (because of closer proximity of complementary uses);
- More transit ridership (because of convenient, frequent transit service);
- More bicycling (because of bicycle facilities that improve safety or reduce travel time); or
- Higher vehicle occupancy (because of more carpooling that results from overall traffic congestion, preferential treatments along roadway network, or parking pricing).

In recent years, several research efforts have collected trip generation data at various types of infill sites and devised methods and tools for estimating vehicle trip generation for infill and related types of development sites. The approach recommended in this chapter draws from the research findings and was selected for its ease of application and likelihood of widespread acceptance. The approach relies on data that are typically available for proposed developments at the time of their applications for zoning, land use revisions, and development review.

The recommended approach conforms to the Chapter 3 flow chart for estimation of site trip generation (see Figure 3.1):

- The baseline vehicle trip generation estimates used in the infill trip estimation method are produced using the procedures presented in Chapters 4 and 9, as appropriate.
- Vehicle trip estimates are converted to person trips using methods presented in Chapter 5.
- If the infill development is a mixed-use development, the internal capture trips should be estimated (using the Chapter 6 procedures) prior to applying the external trip adjustments presented in this chapter.
- The product of the process recommended in this chapter is an estimate of the total person trips entering or exiting the study site by pedestrian, bicycle, or transit mode.
- If the infill site is located near a rail or rapid transit station or a multi-route bus transit center with high-frequency service, the procedures presented in Chapter 8 should also be applied to the product of the person trip estimates produced in this chapter.
- Infill development can attract vehicle traffic that is currently on adjacent or nearby streets. Refer to Chapter 10 for guidance on estimating pass-by and diverted trips.

7.2 Definition of Infill Development

For the purpose of this *Handbook*, an infill site is a site for which the surrounding area within a one-half mile radius is mostly developed (perhaps, more than 80 percent¹⁰). An infill site can be in or around a central business district, an urban center, or any other area that is substantially developed.

The following are suggested approximate thresholds for typical infill sites. A particular site does not need to satisfy all four criteria to be considered infill. However, most infill sites will exhibit most of the characteristics; few will exhibit none or only one.

- Walkable area—A study site or proxy site is likely infill if it is located within a built urban or suburban district composed of traditional central city blocks (typically 200 to 500 ft. long [approximately 61 to 152 m long]) with sidewalks on all block faces, crosswalks at all intersections, and pedestrian phases on all traffic signals. The analyst may define other metrics for walkability.¹¹
- Convenient/frequent transit service—A study site or proxy site is likely infill if there is a light or heavy rail station within one-half mile, or a bus rapid transit station or bus stop on the same or the adjacent block, providing peak headways of typically 20 minutes or less for 4 to 6 hours each weekday.
- Bicycle accessible—A study site or proxy site is likely infill if it has a pedestrian entry, parking lot/ garage, and/or location of bicycle parking within one block of a designated bicycle facility such as a marked bicycle lane, a signed bicycle route, a bicycle boulevard, or an off-street path.
- Mix of interacting land uses—A study site or proxy site is likely infill if it is located in a district composed of a mix of commercial, residential, retail, dining, civic, cultural, or other interacting land uses so that a worker, resident, or visitor of the district need not travel long distances for everyday needs and services.

These thresholds are not intended to limit applications to just highly urban sites. The threshold size, density, and intensity of the context in which the study site and proxy site are located are not as important as the similarity in their contextual characteristics. Criteria may be adjusted, for example, by a local agency to represent a small town business district or nearly fully developed suburban sites exhibiting the stated characteristics. Similarly, a small-to-medium municipality may be well-served by peak transit service of 30-minute headways, for peak periods shorter than 2 hours, with a result of significant transit use in corridors served during those periods.

7.3 Underlying Assumptions for Infill Site Trip Generation

The recommended method relies on an underlying premise that a particular land use will generate the same number of person trips regardless of context (whether general suburban, suburban business district, or general urban), with the only differences being the mode of travel and vehicle occupancy for person trips that enter or exit the land use.

¹⁰ For this calculation, surface and structured parking is considered "developed" and rural land and open space are considered "undeveloped." Public streets are excluded from the computation.
¹¹ Other less monopurable share structure of the last stru

Other less measurable characteristics of a walkable network include buffers that separate pedestrians from moving traffic, landscaping (especially street trees that provide shade), pedestrian scaled lighting, buildings that front the back of sidewalk, direct entries onto sidewalks, and architectural interest at the scale of the pedestrian.

Vehicle trips are the portion of person trips that use a vehicle (personal passenger vehicle or truck), adjusted for vehicle occupancy. The formula is

vehicle trips = <u>person trips</u> * vehicle mode share <u>average vehicle occupancy</u>

VT = (PT * MS) / VO

where

VT = vehicle trips

PT = person trips

MS = person trip mode share in vehicles

VO = average vehicle occupancy

The equation can be reordered to calculate person trips as the dependent variable. For a baseline site:

baseline person trips = baseline vehicles trips * baseline vehicle occupancy baseline person trip mode share in vehicles

 $PT_{BL} = (VT_{BL} * VO_{BL}) / MS_{BL}$

where

 PT_{BL} = baseline person trips

 VT_{BL} = baseline vehicle trips

 VO_{BL} = baseline vehicle occupancy

 MS_{BL} = baseline person trip mode share in vehicles

For an infill site (substituting for study site in the equation above):

infill site vehicle trips = $\frac{infill \text{ site vehicle trips }^* \text{ infill site vehicle occupancy}}{infill \text{ site person trip mode share in vehicles}}$

 $PT_{SS} = (VT_{SS} * VO_{SS}) / MS_{SS}$

where

 PT_{ss} = infill site person trips

 VT_{ss} = infill site vehicle trips

VO_{ss} = infill site vehicle occupancy

 MS_{ss} = infill site person trip mode share in vehicles

Given the assumption that baseline site person trips and infill site person trips are the same, the two equations are equal. The result is the following formula for calculating vehicle trips for an infill site, using the mode shares of person trips in vehicles and vehicle occupancy for baseline and infill conditions:

infill site vehicle trips = baseline vehicle trips * $\frac{infill site vehicle mode share}{baseline vehicle mode share} * \frac{baseline veh. occ.}{infill site veh. occ.}$

$$VT_{SS} = VT_{BL} * (MS_{SS} / MS_{BL}) * (VO_{BL} / VO_{SS})$$

where

 VT_{ss} = infill site vehicle trips

 VT_{BL} = baseline vehicle trips

 MS_{ss} = infill site person trip mode share in motor vehicles

 $MS_{_{BL}}$ = baseline person trip mode share in motor vehicles

 VO_{BL} = baseline vehicle occupancy

VO_{ss} = infill site vehicle occupancy

If the infill study site and baseline vehicle occupancy values are the same (as is typically the case), the equation simplifies to

infill site vehicle trips = baseline vehicle trips * infill site vehicle mode share baseline vehicle mode share

$$VT_{SS} = VT_{BL} * (MS_{SS} / MS_{BL})$$

where

 VT_{ss} = infill site vehicle trips

 VT_{BL} = baseline vehicle trips

 MS_{ss} = infill site person trip mode share in vehicles

 $MS_{_{BL}}$ = baseline person trip mode share in vehicles

Given: Study site is estimated to generate 300 PM peak hour vehicle trips. Baseline person trips mode share in vehicles is 95 percent. Study site person trip mode share in vehicles is 80 percent (based on survey of three proxy Baseline site and study site vehicle occupancy is assumed to be the same Infill vehicle trips are calculated as follows: infill site vehicle trips = $300 \times \frac{0.80}{0.95} = 253$

The recommended approach described below requires the analyst to determine four values:

- Mode shares for baseline sites and for the infill site; and
- Vehicle occupancy for baseline sites and the infill site.

The simplicity or complexity of the method lies within the way these values are determined. If the baseline and study site vehicle occupancy are assumed to be identical, neither value is required for the calculation of infill site vehicle trips.

7.4 Process for Estimating Infill Trip Generation

The recommended process for estimating infill site trip generation follows three steps:

- Step 1—Determine baseline mode shares and vehicle occupancy
- Step 2—Estimate study site mode shares and vehicle occupancy
- Step 3—Estimate vehicle trips for study site

The method is both simple and transparent, using person trips as the common denominator. The method can be readily applied across all land uses and contexts without further model development.

7.4.1 Step 1—Determine Baseline Mode Shares and Vehicle Occupancy

Baseline site mode shares and vehicle occupancy are discussed and presented in Chapter 5. The analyst should use values listed in Tables C.1 through C.3 in Appendix C for baseline site mode shares and vehicle occupancy. If baseline data are not available in the tables, either

- Use a default value of 95 percent vehicle mode share and assume no change in vehicle occupancy between the baseline and study sites;
- Use the average of mode share and vehicle occupancy data collected at three or more comparable developments in baseline locations. A procedure for collecting baseline data is provided in Chapter 12.

It is incorrect to simply assume baseline values of 100 percent person trips by vehicle and a 1.00 vehicle occupancy.

7.4.2 Step 2—Estimate Study Site Mode Shares and Vehicle Occupancy

The following section presents three alternative methods for deriving the study site mode share and vehicle occupancy factors. The analyst should consider all three methods in order to select a preferred method for a particular study site application. Method A is recommended if there are sufficient data in the national database for the land use type and site context.

7.4.2.1 Method A—Use Data from National Database

Tables D.1 through D.7 in Appendix D provide infill trip generation mode share (and limited vehicle occupancy) data summaries that can be used directly to estimate the same for a study site. If the tables include data for at least three sites of an

Conclusions Drawn from Limited Infill Data

- Fewer vehicle trips than baseline sites
- The more urban the site, the fewer vehicle trips
- Proximity to rail transit results in greater vehicle trip reduction than bus transit availability
- In most cases, walk trips exceed transit and bike trips

applicable land use type in a similar context, the analyst should compute an average mode share and vehicle occupancy (if the latter are likely to be different for the study site than for baseline sites in the same area) and use for the study site (described below in Step 3).

This method is easy and convenient to apply and does not require the expense of significant new data collection. It is consistent with the recommended use of Trip Generation Manual data (described in Chapter 4) to estimate vehicle trips. However, the shortage of existing infill data

makes the utility of the method quite limited and the method has not been formally validated.

The method uses qualitative context descriptors in lieu of quantifiable metrics describing varying levels of context. This is done to simplify the estimation process and reduce the quantity of data required to both develop and apply the estimation method. The flexibility afforded in this method of qualifying infill areas relies on the professional judgment of the analyst to account for any variations in similar contexts found in different locales.

The data in Tables D.1 through D.7 in Appendix D represent a start on an infill trip generation database, but are still very limited. There are too few sites in each context type to be able to conclude much other than that the more "urban" the site, the lower the motor vehicle mode shares. Data are needed from more sites, more land uses, and more contexts to permit the development of a set of adjustment factors or models that are applicable across the most commonly analyzed land uses, let alone all land use codes. Nevertheless, the limited data do provide significant findings and

 The total vehicle mode shares of person trips at infill sites are consistently and significantly conclusions, as follows.

- below baseline levels for most land uses for which data are available from multiple sites. Correspondingly, vehicle trips at infill sites are below those at baseline sites.
- The variance in the percentage of trips made by motor vehicle appears to be related to the site context (that is, the more urban settings have lower motor vehicle mode shares) and proximity to rail transit.

1CF

• Walk mode makes up most of the non-motor vehicle mode shares. Even at infill sites where rail stations are nearby, the walk mode share appears in large sample results to exceed transit mode share at most sites surveyed. Bicycle trips, where counted separately, make up a small percentage of person trips.

7.4.2.2 Method B—Use Data from Local Proxy Sites

This method uses trip generation surveys at local proxy sites to estimate mode share and vehicle occupancy for the study site. This method has the potential to provide accurate results because characteristics of the study site and the proxy site(s) can be very similar. If properly selected, use of proxy sites as a basis for infill mode share and vehicle occupancy could yield more accurate data than small sample national data summaries.

The analyst should select at least three comparable infill (proxy) sites at which to collect data. Proxy sites should have developments of similar character (with the same land use type, general size, and types of activity) and context. If three sites are not available, two may be sufficient if they are very similar to the study site in development and context characteristics. Proxy sites near the study site are preferred.

Context characteristics to consider include, but are not limited to, the following:

- Area type;
- Density;
- Compactness (as measured by land coverage);
- Development mix within one-quarter to one-half mile;
- Parking availability, convenience, and pricing;
- Pedestrian environment;
- Transit service levels (defined as number of routes, headways, and proximity of stops/stations to site); and
- Apparent vitality (visible level of activity).

It is important that the analyst focuses on characteristics that make the mode shares and vehicle occupancy of the potential proxy sites similar to those of the study site.

Chapter 12 provides guidance on how to develop and execute a data collection plan to collect person trips by mode and vehicle occupancy at an infill site. The analyst should submit any new infill data to ITE for inclusion in the national infill trip generation database.

7.4.2.3 Method C—Use Relationships Developed for Local Application

Several research projects (described in Appendix H) have compiled infill trip generation data and have developed multivariate approaches to account for the influence of urban context characteristics on trip generation. These research results are limited to a small number of land uses and site contexts at this time. However, they may provide sufficient information for adjusting baseline trip generation estimates for these land uses in the regions where they were developed.

7.4.3 Step 3—Estimate Vehicle Trips for Study Site

The analyst should use the equations in section 7.3 of this chapter to calculate vehicle trips for the study site:

infill site vehicle trips = baseline vehicle trips * infill site vehicle mode share baseline veh.occ. infill site veh.occ.

 $VT_{_{SS}} = VT_{_{BL}} * (MS_{_{SS}} / MS_{_{BL}}) * (VO_{_{BL}} / VO_{_{SS}})$

where

 VT_{ss} = infill site vehicle trips

 VT_{BL} = baseline vehicle trips (developed using procedures presented in Chapters 4 and 9)

 MS_{ss} = infill site person trip mode share in motor vehicles (from step 2 above)

 MS_{BL} = baseline person trip mode share in motor vehicles (from step 1 above)

 VO_{BL} = baseline vehicle occupancy (from step 1 above)

 VO_{ss} = infill site vehicle occupancy (from step 2 above)

7.5 Examples of Recommended Process

7.5.1 Method A—Use Data from National Database

Objective: Estimate weekday AM and PM street peak hour vehicle trips for a proposed 320,000 square foot, free-standing, mixed tenant, general office building to be located on a redevelopment site in a mid-sized regional CBD well-served by transit. There is a light rail station three blocks away that is served by two lines. Parking supply more than meets demand but most employees must pay to park. The area is very walkable and attracts some bicycle commuting and visitors. The regional CBD has the same land use and activity mix as most healthy mid-size downtowns.

Step 1—Determine Baseline Mode Shares and Vehicle Occupancy: In the professional judgment of the analyst, the baseline mode share and vehicle occupancy data in Appendix C are sufficient for this application.

- AM motor vehicle mode share—99 percent inbound and 100 percent outbound
- PM motor vehicle mode share—100 percent inbound and 99 percent outbound
- AM vehicle occupancy—1.06 (both inbound and outbound)
- PM vehicle occupancy—1.11 inbound and 1.07 outbound

Step 2—Estimate Study Site Mode Shares and Vehicle Occupancy: Table D.2 in Appendix D shows data for several downtown general office buildings with rail transit stations within one-quarter mile (area type "0Ta"). The average mode shares and vehicle occupancy for those buildings are as follows:



			AM				PM		
Ргоху	Range of	Mo	ode Share	Percent		Mo	ode Share	Percent	
Office Buildings	Floor Areas (1,000 GSF)	Motor Vehicle	Transit	Walk	Bike	Motor Vehicle	Transit	Walk	Bike
Average	64–416	46	30	18	6	42	35	19	4

Vehicle occupancy data are not provided. Even though vehicle occupancy for an office building in this regional CBD could be a little higher than for typical suburban sites due to parking fees, in the professional judgment of the analyst the study site vehicle occupancy is assumed to be the same as the baseline level.

Step 3—Estimate Vehicle Trips for Study Site: The data requirements for the equation in section 7.4.3 are

- Proxy site vehicle mode share—from step 2
- Baseline vehicle mode share—from step 1
- Baseline vehicle trips—from Chapter 4 of this Handbook

Calculations of the AM and PM baseline vehicle trips are shown in the first set of rows in the following worksheets. Calculations of infill vehicle trips are shown in the second set of rows.

Compute baseline vehicle trips for 320,000 sq. ft. GFA office building (Land Use Code 710 in *Trip Generation Manual*). Use fitted curve equations because the AM Peak Hour and PM Peak Hour data pages contain 218 and 236 data points, respectively.

AM Peak Hour	PM Peak Hour
Ln (T) = 0.80 Ln (x) + 1.57	T = 1.12 (x) +78.45
for x = 320, T = 485	for x = 320, T = 437
Inbound trips = 0.88 x 485 = 427	Inbound trips = 0.17 x 437 = 74
Outbound trips = 0.12 x 485 = 58	Outbound trips = 0.83 x 437 = 363
Compute infill vehicle trips adjusting for	ar made share and vehicle ecouperat

Compute infill vehicle trips adjusting for mode share and vehicle occupancy:

infill site vehicle trips = baseline vehicle trips * infill site vehicle mode share baseline average mode share

AM Peak Hour	PM Peak Hour
Infill Site Vehicle Trips	Infill Site Vehicle Trips
Inbound Trips = 427 * 46%/99% = 198	Inbound Trips = 74 * 42%/100% = 31
Outbound Trips = 58 * 46%/100% = 27	Outbound Trips = 363 * 42%/99% = 154

7.5.2 Method B—Use Data from Local Proxy Sites

Because the study site is located near a rail transit station, an alternative approach for estimating vehicle trip generation is to use (1) the Appendix D infill data for estimating walk and bike trips only and (2) Chapter 8, Transit-Friendly Development guidance for estimating transit trips. *Objective:* Estimate weekday AM and PM street peak hour vehicle trips for a proposed 150-room motel to be located in an almost fully developed outlying business district about three blocks by four blocks in size.

The business district consists of low- to mid-rise office buildings totaling about 800,000 sq. ft., six high turnover sit-down and quality restaurants, 800,000 sq. ft. of retail, 800 apartments in low- to mid-rise buildings, and small amounts of supporting

and complementary commercial. Blocks average about 400 ft. by 500 ft (122 m by 152 m). There are three bus routes with 12–20 minute headways connecting this area to downtown (three miles east) and a medical center (two miles south). Parking is adequate in every block with some in pay garages (two-hour free parking with validation), some in free lots, and 30-minute and two-hour meters on street. Informal observations indicate there are significant walking and transit use in the business district. Based on this description, the motel study site qualifies as an urban infill setting.

Step 1—Determine Baseline Mode Shares and Vehicle Occupancy: Appendix C provides the following baseline values for surveyed motels:

- AM motor vehicle mode share—93.3 percent inbound and 99.0 percent outbound
- PM motor vehicle mode share—98.7 percent inbound and 98.0 percent outbound
- AM vehicle occupancy—1.26 (inbound and outbound)
- PM vehicle occupancy—1.31 inbound and 1.30 outbound

Step 2: Estimate Study Site Mode Shares and Vehicle Occupancy: The available infill trip generation data in Appendix D do not include any information for motels. The analyst needs to use the Method B approach in order to estimate study site mode shares and vehicle occupancy.

There are no hotels or motels in the business district. The anticipated market for the proposed motel is for business travel to places in the business district, downtown, and the medical center. There are potential proxy motels in another business district five miles south of downtown. The proxy site business district is four blocks by seven blocks averaging about 400 ft. on a side. It includes 1,200,000 sq. ft. of office, 14 various restaurants, 600,000 sq. ft. of retail, 1,200 apartments, one movie theater, and similar parking, transit service, and walkability. The proxy business district is determined to be similar to the study site business district.

Person trip mode shares and vehicle occupancy are collected at three motels within the proxy site business district. The data are presented in the following worksheet. The average proxy site values for directional mode shares and vehicle occupancy for both the AM and PM peak periods are determined to be reasonable and appropriate to use for the study site.



				AM			No. 2		PM		
	ALL PROPERTY.	M	ode Share	Percent		1.255	M	ode Share	Percent		
Proxy Motels	Occupied Rooms	Motor Vehicle	Transit	Walk	Bike	Vehicle Occup.	Motor Vehicle	Transit	Walk	Bike	Vehicle Occup.
1	78	85	5	9	1	1.24	76	8	15	1	1.31
2	143	89	7	2	2	1.36	89	4	5	2	1.15
3	189	90	3	7	0	1.33	90	0	10	0	1.32
Average		88	5	6	1	1.31	85	4	10	1	1.26

Step 3—Estimate Vehicle Trips for Study Site: The data requirements for the equation in section 7.4.3 are

- Proxy site person trips in motor vehicle mode share—from step 2
- Baseline person trips in motor vehicle mode share—from step 1
- Proxy site vehicle occupancy—from step 2
- Baseline vehicle occupancy—from step 1

11

7.1

• Baseline vehicle trips—from Chapter 4 in this Handbook

Calculations of the AM and PM baseline vehicle trips are shown in the first set of rows in the following worksheet. Calculations of infill vehicle trips are shown in the second set of rows.

Compute baseline vehicle trips for 150-room motel (from *Trip Generation Manual*):

Use Land Use Code 320 (Motel) fitted curve equations because the AM Peak Hour of Adjacent Street Traffic and the PM Peak Hour of Adjacent Street Traffic data pages contain 24 and 26 data points, respectively.

AM Peak Hour	PM Peak Hour
Ln (T) = 0.92 Ln (x) – 0.46	Ln (T) = 0.94 Ln (x) – 0.51
for x = 150, T = 63	for x = 150, T = 67
Inbound Trips = 0.36 * 63 = 23	Inbound Trips = 0.54 * 67 = 36
Outbound Trips = 0.64 * 63 = 40	Outbound Trips = 0.46 * 67 = 31

Compute infill vehicle trips adjusting for mode share and vehicle occupancy using baseline data and proxy site data and formula (1) in chapter, which is:

infill site vehicle trips = baseline vehicle trips * infill site vehicle mode share baseline veh. occ. * baseline vehicle mode share * baseline veh. occ.

AM Peak Hour	PM Peak Hour
Infill Site Vehicle Trips	Infill Site Vehicle Trips
Inbound Trips = 23 * 88%/93.3% * 1.26/1.31 = 21	Inbound Trips = 36 * 85%/98.7% * 1.31/1.26 = 32
Outbound Trips = 40 * 88%/99.0% * 1.26/1.31 = 34	Outbound Trips = 31 * 85%/98% * 1.30/1.26 = 28

Appendix D. Person Trip Data for Infill Sites

This appendix contains a compilation of infill site modal person trip data originating in part from the sources described in Appendix H and in part from data collected at additional sites specifically for development of this *Handbook*. These limited data represent a start on an infill trip generation database. More data are needed for additional land uses and sites to confirm the conclusions described in Chapter 7 and to develop comprehensive mode share and vehicle occupancy for infill development across all major land use classifications and context types.

Tables D.1 through D.5 contain AM and PM peak period mode share information for residential (Table D.1), office (D.2), general retail (D.3), convenience store (D.4), and restaurant (D.5) in infill settings. Site context is represented by area type categories described in Chapter 3 of this *Handbook*. Many of the sites are non-isolated and required a combination of interview and count data to determine mode shares. Data were collected during one or more weekday peak periods. All data were collected directionally but were combined to report as non-directional. Vehicle occupancy was not reported for most sites.

Tables D.6 and D.7 present directional (inbound and outbound) mode share and vehicle occupancy during AM and PM peak periods, respectively, for a subset of the sites presented in Tables D.1 through D.5.

Data collected at infill sites, though limited, provides some significant findings and conclusions.

- One of the most important findings is confirmation that the motor vehicle mode share at infill development is consistently and significantly less than 100 percent. This finding is true for all of the land uses for which data are reported.
- The variance in the percentage of trips made by motor vehicle appears to depend on the site context (the more-urban settings have lower motor vehicle mode shares) and the proximity of rail transit.
- The proximity of an infill site to a university campus appears to result in a significant reduction in the motor vehicle mode share.⁴
- Walking is the predominant mode of the non-motor vehicle trips at infill sites. Even at sites close to rail stations, walk trips tend to substantially outnumber transit trips.
- Bicycle trips, where counted separately, make up a small percentage of the person trips at infill sites.

Although data presented in the tables demonstrates that infill development generates fewer person trips by motor vehicle, more data are needed to determine to what extent the motor vehicle mode share changes with changes in site context.

This finding was also observed in the *California Urban Infill Trip Generation Study*. Data collected at multiple mixed-use sites near the University of California at Berkeley campus showed significantly lower vehicle trips than similar mixed-use sites elsewhere. Further investigation found that nearly 50 percent of the persons surveyed were associated with the campus either as a student, faculty, or staff. Source: Kimley-Horn and Associates, Inc. Economic & Planning Systems, and Gene Bregman & Associates. *Trip-Generation Rates for Urban Infill Land Uses in California Phase 2: Data Collection Final Report.* California Department of Transportation (Caltrans) Headquarters Divisions of Transportation Planning and Research & Innovation, Sacramento, CA, 2009.

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(i.e.) (i.j.) (i.j.)<	Land Use	Location	Area Type ¹	Develop- ment Units	LUC	Motor ₂ Vehicle ²	Transit	<u> </u>	-	Size ³	Motor Vehicle ²	-	-			
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Invention Invention <t< td=""><td>Apartments</td><td>Los Angeles, CA</td><td>е</td><td>73 DU</td><td>220</td><td>69</td><td>31</td><td>0</td><td>1.12</td><td>83</td><td>60</td><td>40</td><td>0</td><td>1,14</td><td>76</td><td>Gibson Transp. Consu-</td></t<>	Apartments	Los Angeles, CA	е	73 DU	220	69	31	0	1.12	83	60	40	0	1,14	76	Gibson Transp. Consu-
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Table D.1 Infill Weekday AM and PM Non-Directional Peak PeriodMode Share and Vehicle Occupancy Examples—Multi-Family Residential



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Los Angeles, CA Simple average - all Simple average - 01a Simple average - 07a Simple averages are shown only where at ulable or insufficient sample size, types: (0) regional CBD, (1) urban core, (2 toorditions noted are (C) adjacent to univ vehicle trips is the sum of person trips in per of person trips is the sum of person trips in core of person trips ince	Los Angeles, CA Simple average - all Simple average - 07a Simple average - 07a Simple averages are shown only where at ubble or insufficient sample size, types: (0) regional CBD, (1) urban core, (2 vonditions noted are (C) adjacent to univ to conditions noted are (C) adjacent to univ vehicle trips is the sum of person trips in oer of person trips covered by usable inter-	lice	Culver City, CA	5	347,000 sf	210	83	14	0	e	1,03	747	91	6	0	0	1,04	681	Gibson Transp. Consult.
$ \frac{1}{100} = 1$	icoSeal Beach, CA6255,000 sf710100001.04427na </td <td>fice</td> <td>Los Angeles, CA</td> <td>5</td> <td>180,000 sf</td> <td>710</td> <td>71</td> <td>23</td> <td>5</td> <td>-</td> <td>1.15</td> <td>233</td> <td>68</td> <td>22</td> <td>6</td> <td>4</td> <td>1.07</td> <td>338</td> <td>Gibson Transp. Consult.</td>	fice	Los Angeles, CA	5	180,000 sf	710	71	23	5	-	1.15	233	68	22	6	4	1.07	338	Gibson Transp. Consult.
Simple average - all 64.3 21.4 10.1 4.6 1.07 57.6 2.5.8 1.3.5 3.3 1.06 A Simple average - 0Ta 46.3 30.2 17.8 5.8 na 41.8 35.2 19.2 3.8 na 4cs cs: Simple averages are shown only where at least three sites are available for similar combinations of area type. context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "na" destrict (3) regional CBD, (1) urban core, (2) activity center, (3) general urban, (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) special district, (8) rural town business district, (9) rural Si town business district, (9) rural station within 1/4 mile or (70) rail station immediately adjacent or connected-TOL for which trips is the sum of person trips in personal passenger vehicles and trucks.	Simple average all 64.3 21.4 10.1 4.6 10.7 57.6 25.8 13.5 3.3 10.6 10.6 Simple average are shown only where at least three sites are available for similar combinations of area type, context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "Ina" design available or insufficient sample size. 10.1 46.3 $3.0.2$ 17.8 5.3 10.6 10.6 10.6 10.6 rest types: (0) regional CBD, (1) where at least three sites are available for similar combinations of area type, context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "Ina" design vertices: (0) regional CBD, (1) when core, (2) activity center, (3) general urban, (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) special district, (8) rural town business district, (9) rural. Spectext conficients and be shored are (C) adjacent to university campus, (M) mixed-use within larger development. Rail transit availability is (13) rail transit station within $1/4$ mile or (10) rail station immediately adjacent or connected-TOD.totor vehicle trips is the sum of personal passenger vehicles and trucks.umber of person trips covered by usable interviews, if two values are listed, the number of vehicles counted for vehicle occupancy is shown after the dash.	Ice	Seal Beach, CA	9	265,000 sf	012	100	0	0	0	1.04	427	Па	na	L13	na	na	ла	Gibson Transp. Consult.
Simple average - 0Ta 35.2 19.2 3.8 na 46.3 30.2 17.8 5.8 na 41.8 35.2 19.2 3.8 na 41.8 and 41	Simple average - 0Ta 5 imple average - 0Ta 64.3 30.2 17.8 5.8 na 44.8 35.2 19.2 3.8 na 51.2 19.2 3.8 na 51.2 19.2 19.2 19.2 19.2 19.2 19.2 19.2 1	Simple average - al	H				64.3	21.4	10.1	4.6	1.07		57.6	25.8	13.5	3.3	1.06		
tes. Simple averages are shown only where at least three sites are available for similar combinations of area type, context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "na" desi availability is (1) regional CBD, (1) urban core, (2) activity center, (3) general urban, (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) special district, (8) rural town business district, (9) rural. Sp text conditions noted are (C) adjacent to university campus, (M) mixed-use within larger development. Rail transit availability is (Ta) rail transit station within 1/4 mile or (To) rail station immediately adjacent or connected-TOI totor vehicle tips is the sum of person trips in personal passenger vehicles and trucks.	tes. Simple averages are shown only where at least three sites are available for similar combinations of area type, context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "na" design available or insufficient sample size. ea types: (0) regional CBD, (1) urban core, (2) activity center, (3) general urban, (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) special district, (8) rural town business district, (9) rural. Spec text conditions noted are (C) adjacent to university campus, (M) mixed-use within larger development. Rail transit availability is (Ta) rail transit station within 1/4 mile or (To) rail station immediately adjacent or connected-TOD. How vehicle trips is the sum of person trips in personal passenger vehicles and trucks. unber of person trips covered by usable interviews; if two values are listed, the number of vehicle occupancy is shown after the dash.	Simple average - 0T.	3				46.3	30.2	_	5.8	Ла		41.8	35.2	19.2	3.8	na		
rea types: (0) regional CBD, (1) urban core, (2) activity center, (3) general urban, (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) special district, (8) rural town business district, (9) rural. Special activity computed are (C) adjacent to university campus, (M) mixed-use within larger development. Rail transit availability is (Ta) rail transit station within 1/4 mile or (To) rail station immediately adjacent or connected-TOL for vehicle trips is the sum of person trips in personal passenger vehicles and trucks.	rea types: (0) regional CBD, (1) urban core, (2) activity center, (3) general urban, (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) special district, (8) ural town business district, (9) rural. Spec text conditions noted are (C) adjacent to university campus, (M) mixed-use within larger development. Rail transit availability is (Ta) rail transit station within 1/4 mile or (To) rail station immediately adjacent or connected-TOD. Hotor vehicle trips is the sum of person trips in personal passenger vehicles and trucks. unber of person trips covered by usable imerviews; if two values are listed, the number of vehicles counted for vehicle occupancy is shown after the dash.	tes: Simple averages are s available or insufficient s		ist three si	tes are availabl	le for sim	ilar combir	lations of	area type	contex,	t, and rail trai	ısit availab	ility. Sums	s of avera	ge mode	shares m	ay not add to	00% due to	o rounding. "na" designa
text condutions fored are (U) adjacent to university campta, (w) mixed-use within target development. Kaii transit availabuity is (1 a) raii transit station within 1/4 mile or (1.0) raii station immediately adjacent or connected-1.0L to or vehicle trips is the sum of person trips in personal passenger vehicles and trucks.	text condutions noted are (L) adjacent to university campus, (w) mixed-use within larger development. Kall transit availabuity is (1a) trail transit station within 1/4 mile or (1o) trail station immediately adjacent or connected-IUD. toto the control of person trips in personal passenger vehicles and trucks.	rea types: (0) regional CB	3D, (1) urban core, (2) at	ctivity cer	iter, (3) genera	ll urban, (4) suburbal	n busines:	s district,	(5) subu	irban strip cor	nmercial, (6) general	suburban	, (7) spe	cial distri	ct, (8) rural to	wn business	district, (9) rural. Specia
		lext conditions noted are lotor vehicle trips is the si imber of mercon trips covi	(C) adjacent to universi um of person trips in per pered by usable interview	riy campu: rsonal pas	s, (M) mixed-u senger vehicle: values are liste	s and truc	n larger de ks. mber of vel	velopmen hicles cou	. Kail tra	nsıt avaı	liability is (15) rau trans	It station w	111111 1/4	mile or (I 0) rail s	lation immed.	ately adjace	int or connected-1UU.
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Table D.2 Infill Weekday AM and PM Non-DirectionalPeak Period Mode Share and Vehicle Occupancy Examples---Office

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Array for a compiled marked m	Land Use Pasade				Ì			ATA					111				
Lumber Ander Shares Mode Shares Size Size Mode Shares Size Size <th>Use</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>AM</th> <th></th> <th></th> <th></th> <th></th> <th>I'M</th> <th></th> <th></th> <th></th>	Use							AM					I'M				
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000000000000000000000000000000000000		location	Area Tvne	Develop- ment Units	LUC	Motor Vehicle ²	Transit		Vehicle Occupancy	Sample Size ³	Motor Vehicle ²	Transit	-	_		Source	
Instruction 3 54,000 cf 820 86 12 2 144 42 63 37 1 104 43 Los Angeles: CA 4 11,000 cf 820 68 24 8 139 348 63 33 4 119 44 Los Angeles: CA 4 11,000 cf 820 68 24 8 144 7 23 35 4 119 44 le average 11 0 43 50 180 50 14 70 14 70 119 44 sarblego: CA 3 40 50 10 40 70 12 14 70 12 110 7 112 14 7 12 14 11 14		CA	-	497 600 sf	820	Da	р	na	Па	na	78	18	4	1.39	252-1190	Caltrans/UC Davis; TTI	
Incomplete. CM 3 1 1000 ft 820 63 24 8 1,39 343 63 33 4 1,19 474 Ice Angeles. CM 1 11000 ft 820 50 10 400 11 025 350 2.5 112 112 113 Ice Average - 11 2 3 1			•	54 000 of	008	86	0	0	44	42	62	37	-	1 04	43	Gibson Transp. Consult.	
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quart and and na na na na na s55 0 155 na 41 Costandeles.CA 3 30.000 sf 876 95 5 0 1.12 53 54 45 1 1,13 58 Costangeles.CA 3 44.800 sf 876 95 5 0 1.12 53 54 45 1 1,13 58 Obstand.CA 070 11.000 sf 880 na na na na 1 1,13 58 7 45 55 na 46 Obstand.CA 17aC 11aC 3.000 sf na na na na 16 1.13 1.13 1.13 1.13 1.13 1.13 1.13 1.13 1.13 1.13 1.13 1.13 1.13 1.13 1.14 1.13 1.14 1.13 1.14 1.13 1.14 1.14 1.14 1.14 1.14		iego, CA	0	43,300 sf	850	50	01	40	па	na	50	12	38	na	na	Caltrans/Kimley-Horn	
Instruction		nd, CA	3M	30,000 sf	867	112	na	nà	na	па	85	0	15	na	41	Caltrans/UC Davis	
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and. CA 0ToM 11,000 sf 880 na na na d6 eley. CA 1TaC 3,000 sf na na na na na 46 eley. CA 1TaC 3,000 sf na na na na na na 16 eley. CA 1TaC 2,000 sf na na na na na na na na na 16 eley. CA 1TaC 2,400 sf na 100 0 na na na na na eley. eley. CA 1TaC 2,400 sf na 100 0 na 100 0 na na na eley. CA 1TaC 2,400 sf na 100 0 0 na na na eley. CA 1TaC 2,400 sf na 100 0 0 1.1.15 1.1.15 1.1.15 1.1.15 1.1.15 1.1.15 1.1.15		ngeles, CA	m	44,800 sf	876	66	^	•	1-12	с ^с	ţ	f			2		
ant. CA VION i. Note it is a state it is a		CA CA	OTOM	11 000 cf	880	EL.	E.	Ца	пa	na	0	45	55	na	46	Caltrans/UC Davis	
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uly where at least		ley, CA	ITaC	2,400 sf	na	100	0	0	na	13	100	0	0	ua	Па	Caltrans/Kimley-Horn	
aly where at least	Simple average - all retail					72.5	14.3	13,3	1.31		52,4	28.3	19.3	1,15			
	Notes: Simple averages are shown only	ly where at least t	three sites	are available fo	or similar	r combinutio	ons of area	type, context,	and rail transit	availability.	Sums of av	erage mode	: shares may n	ot add to 100%	due to roundi	ng. "na" designates not	
	Motor vehicle trips is the sum of pers Number of person trips covered by us	son trips in perso isable interviews;	if two val	nger vehicles an lues are listed,	nd trucks the numb	ter of vehic	les countec	1 for vehicle occ	cupancy is shov	wп after the	dash.						
⁴ Motor vehicle trips is the sum of person trips in personal passenger vehicles and trucks. ⁹ Number of person trips covered by usable interviews; if two values are listed, the number of vehicle occupancy is shown after the dash.	* Section surveyed.																

Table D.3 Infill Weekday AM and PM Non-Directional Peak Period Mode Share and Vehicle Occupancy Examples—General Retail

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0° «		Iple Motor	Mode Shares	hares Walk	e iid	Vehicle	Sample	
se Location Type ¹ ment Units LUC Vehicle ² Transit Walk Bike Develoted CP 175, 2100 Vehicle ² Transit Walk Bike	_	-	_	Walk	n the	Vehicle	ordinac	
Doveland OD 115 3 100 of 251 no no no	-	1			DIKC	Occupancy	Size	Source
	na na na	a 19	13	19	7	Па	31	OTREC/Portland State U
Convenience store Portland, OR ITa 2,400 sf 851 na na na na na		a 28	13	52	5	Па	46	OTREC/Portland State U
Convenience store Portland, OR 1Ta 3,318 sf 851 na na na na na		a 29	9	56	6	Па	34	OTREC/Portland State U
Convenience store Portland, OR 3 2,600 sf 851 na na na na na		a 42	13	39	9	Па	32	OTREC/Portland State 1.
Convenience store Portland, OR 3 2,400 sf 851 na na na na na		a 66	4	26	4	Па	47	OTREC/Portland State U
Convenience store Portland, OR 3 2,400 sf 851 na na na na na		a 39	80	51	4	Па	83	OTREC/Portland State U
Convenience store Portland, OR 3 2,400 sf 851 na na na na na		a 62	oo	19	=	Па	37	OTREC/Portland State U
Convenience store Portland, OR 3 2,400 sf 851 na na na na na		88	2	0	0	па	51	OTREC/Portland State U
Convenience store Portland, OR 3 2,400 sf 851 na na na na na		a 45	01	Ξ	14	Па	42	OTREC/Portland State U
Convenience store Portland, OR 3 2,400 sf 851 na na na na na		a 25	••	- 22	12	Па	40	OTREC/Portland State U
Convenience store Portland, OR 3 2,400 sf 851 na na na na na		a 74	0	91	0	Па	32	OTREC/Portland State U
Convenience store Portland, OR 3 2,400 sf 851 na na na na na		a 63	e	27	7	Па	30	OTREC/Portland State U
Convenience store Portland, OR 3 2,464 sf 851 na na na na na		a 56	0	37	7	Па	31	OTREC/Portland State U
Convenience store Portland, OR 3 3,334 sf 851 na na na na na		a 77	n	13	1	ВП	31	OTREC/Portland State U
Convenience store Portland. OR 3Ta 2,400 sf 851 na na na na na		a 67	15	15	m	па	33	OTREC/Portland State U
Convenience store Clackamas. OR 5 2,475 sf 851 na na na na na		a 90	0	-	m	ЦЗ	41	OTREC/Portland State U
Convenience store Gresham, OR 5 2,500 sf 851 na na na na na		a 74	0	01	16	Па	31	OTREC/Portland State U
Convenience store Portland, OK 5 2,500 sf 851 na na na na na		a 76	5	21	0	Па	34	O'IREC/Portland State U
Convenience store Forest Grove, OR 6 2,400 sf 851 na na na na na		a 70	0	19	H	Па	69	OTREC/Portland State U
Convenience store Wilsonville, OR 6 2,500 sf 851 na na na na na na		a 94	0	9	0	Па	35	OTREC/Portland State U
Convenience store Aloha, OR 6 3,000 sf 851 na na na na na		a 56	11	24	6	Па	48	OTREC/Portland State U
Šimple average - all		59.0	5.7	28.3	6'9			
Simple average - 17a		25,3	10,7	56.3	7.7			
Simple average - 3		57.9	5.4	29.5	7.3			
Simple average - 5		80.0	1.0	12.7	6.3			
Simple average - 6		73.3	3.7	16.3	6.7			

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Table D.4 Infill Weekday AM and PM Non-Directional Peak PeriodMode Share and Vehicle Occupancy Examples—Convenience Store

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	Turber frame Tree of the frame Turber f				Occupied			Mode Sha	res	T	Wahicle	_	Motor			Γ	Vehicle	Sample	Course
Portiand. OR 3 2.2.964 923 101	Intendior Name Y XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		notion	Area	Develop- ment Units	LUC	Motor, Vehicle ²	Transit	-	-	cupancy	-	Vehicle ²	Transit	_	+	Decupancy	33	OTREC/Portland State U
Portname.co. 3 1,0054 92 na	Interfactor Nation S 1.0054 S2 1.0054		LOUGHUN	2	2.250 sf	932	na	ກa	na	Па	П3	Па	13			0	61	36	OTREC/Portland State U
Pertinand. (R) s 110054 32 110054 32 11005 32 11005 32 11005 32 11005 32 11005 32 1100 11 11005 32 Pertinand. (R) 5 2.0001 932 na na na na 98 1 0 1 100 na 30 sep - all 2.0001 932 na na na 130 13 10 10 10 10 na 30 sep - all 1 1 1 1 1 1 1 1 1 10	iii down returnin Printial (M 3 2 model 10		ortiand, OK		1 100 -1	010	na	Па	Ла	na	na	Па	8	4	RI	π	119		CrrptC/Dueland State 1
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Burbank, CA 3 500051 932 na	Bit manual Bit manual Solution	T	ortiand. OR	en	2.000 sf	932	Ug	611	PII			Da	98	-	0	-	1.89	98	Gibson Transp. Consult.
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Portland. OK 3 ord 750 2.8 11.6 7.6 Table rge - all i	Right correction: Name Name <td></td> <td></td> <td></td> <td>1.001.0</td> <td>650</td> <td>Па</td> <td>na</td> <td>Пâ</td> <td>na</td> <td>Па</td> <td>na</td> <td>8</td> <td></td> <td>2</td> <td></td> <td></td> <td></td> <td></td>				1.001.0	650	Па	na	Пâ	na	Па	na	8		2				
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Simple average - 3 Control Contro Control Control	Simple concrete Image	Simple average - all								+			75.0	3.5	12,0	5.6	na		
	Image Image <th< td=""><td>Simple average - 3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Simple average - 3																	
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	Answer Eachedy, CA Tarce 4 300 i 73 i 10 i 53 i 10 i <td></td> <td>San Diego, CA</td> <td>0</td> <td>1,250 sf</td> <td>933</td> <td>nc</td> <td>2</td> <td>5</td> <td>1</td> <td></td> <td>ed.</td> <td>35</td> <td>00</td> <td>2</td> <td>-</td> <td>na</td> <td>na</td> <td>Caltrans/Kimley-Horn</td>		San Diego, CA	0	1,250 sf	933	nc	2	5	1		ed.	35	00	2	-	na	na	Caltrans/Kimley-Horn
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Oakland, CA 3M 1.300 sf 936 45 7 44 4 na 1.2, 7 47.3 7.3 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 2.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 7 47.3 47.3 47.3 47.3 47.3 47.3 47.3 47.3 47.3 4	$\frac{1}{1} = \frac{1}{1} = \frac{1}$	West show	Oakland, CA	WE	1,329 sf	936	na	na	Na	Па	PI	- 44	26	01	62	4	ла	49	Caltrans/UC Davis
Imple average - all Imple average - all 43.3 1.3 <th1.3< th=""></th1.3<>	Iffee shop Outware Outware 25.8 1.8.8 54.3 1.3 <th1.3< th=""> 1.</th1.3<>	lice suop	Cuttered CA	ME	1.300 sf	936	45	6	4	4	na	13	4		0.00	2.0			
ITac 12.000 sf 92.5 or 18.0 25.0 57.0 0.0 10 8.0 61.0 0.0 10 <t< td=""><td>Simple average - all Simple average - all 0.0 0.0 0.0 0.0 0.0 Simple average - 0M 110 12,000 st 25,0 57,0 0.0 0.0 31,0 8,0 61,0 0.0 0 0 arrest.terrationent (night Beckeley, CA 113C 12,000 st 25,0 na na 43 29 28.1 na Calumant/Kimley-Hon ub) Simple average are stream 3 14,1 50,1 70 13,00 6,9 38.1 na 0 Simple averages are shown only where at least three sites are available for similar combinations of area type, context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not are types : context. and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding." na" designates not a</td><td>offee shop</td><td></td><td></td><td></td><td>1</td><td>35.8</td><td>18.8</td><td>54.3</td><td>1.3</td><td></td><td>_</td><td>43.3</td><td>C=1</td><td>11</td><td>3</td><td></td><td></td><td></td></t<>	Simple average - all Simple average - all 0.0 0.0 0.0 0.0 0.0 Simple average - 0M 110 12,000 st 25,0 57,0 0.0 0.0 31,0 8,0 61,0 0.0 0 0 arrest.terrationent (night Beckeley, CA 113C 12,000 st 25,0 na na 43 29 28.1 na Calumant/Kimley-Hon ub) Simple average are stream 3 14,1 50,1 70 13,00 6,9 38.1 na 0 Simple averages are shown only where at least three sites are available for similar combinations of area type, context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not are types : context. and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding. "na" designates not add to 100% due to rounding." na" designates not a	offee shop				1	35.8	18.8	54.3	1.3		_	43.3	C=1	11	3			
ITac 12.000 sf 925 or na na	Simple average - 0M Interface Inter	Simple average - all					0.01	25.0	\$7.0	0.0			31.0	8.0	61.0	0.0			
ITac 12,000 sf 925 or na na na na f3 29 28 na na <thna< th=""> <thna< th=""> na</thna<></thna<>	artrest-tentertaimment (night Berkeley. CA 17aC 12,000 sf 925 or na na can na can na can na caltrank/kimley-Honr ub) Simple ave all restaumment Simple ave all restaumment station sufficient sample size. Area types: (0) regional CBD, (1) urban core, (2) activity center, (3) general urban, (4) suburban strip connectial, (6) general suburban, (7) special district, (8) rural. Special contender rounding. "na" designates not additions noted are (C) adjacent to investivy center, (3) general urban, (4) suburban strip connectial, (6) general suburban, (7) special district, (8) rural town business district, (5) suburban strip connectial, (6) general suburban, (7) special district, (8) rural town business district. (9) rural. Special contending to investigate and rust investigates and rust transit availability is (7a) rail transit availability is (7a) rail station immediately adjacent or connected. TOD.	Simple average - 0M		7			1.01	2											
arriest-centerimination were and real mediation and real media	Other contraction 936 91 92 93 93 1 91	the function in the first the	Berkelev, CA	ITaC				na		la	na	Па	43	29		33	ца	na	Caltrans/Kimley-Hott
Sy 14,1 30,1 14,1 and restaurant Simple we all restaurant for and real mode shares may not add to 100% due to rounding. Yun designate not	Simple averages are shown only where at least three sites are available for similar combinations of area type, context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. In: designates not observe the states are available for similar combinations of area type, context, and rail transit availability. Sums of average mode shares may not add to 100% due to rounding. In: designates not value or insufficient sample size.	ub)	21			936				+ 1			55.0	6.9		38.1			
	cores. Simple averages are shown only where at least three sites are available for similar combinations of area (yer, concert and an available of insufficient sample size. valiable or insufficient sample size. Area types: (0) regional CBD. (1) urban core. (2) activity center (3) general urban. (4) suburban stup commercial. (6) general suburban. (7) special district. (8) ural town business district. (9) rural. Special contact types: (0) regional CBD. (1) urban core. (2) activity center (3) general urban. (4) suburban stup commercial. (6) general suburban. (7) special district. (8) ural town business district. (9) rural. Special contact types: (0) regional CBD. (1) urban core. (2) activity center (3) general urban. Rait transit availability is (Ta) rait transit station within 1/4 mile or (To) rait station inmediately adjacent or connected-TOD.	Simple ave. all restruran				_	35.7	14.1		U.I.	d rail transit	availability	. Sums of a	iverage m	ode shares	s may not	add to 100%	due to rout	wing. nu designates not
		conditions noted are (C) aujas	en in and como 3	reonal nas	senger vehicle	ss and truc	ks.				1000		a dach						

Table D.5 Infill Weekday AM and PM Non-Directional Peak Period Mode Share and Vehicle Occupancy Examples—Restaurant

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				Γ				Inbound						l°	Outbound				
						Mod	Mode Shares						Moc	Mode Shares					
Land Use	Location	Area Type ¹	Develop-ment Units ²	E DUC	Personal Passenger Vehicle	Truck	Walk	Transit	Bike	Vehicle Occ.	Sample Size	Personal Passenger Vehicle	Truck	Walk	Transit	Bike	Vehicle Occ.	Sample Size	Source
Apartments	Los Angeles, CA	3	73 DU	220	па	na	па	na	na	na	na	72	0	28	0	0	1.18		Gibson Transp. Consult.
Apartments ³	Los Angeles, CA	3C	72 DU	220	na	na	na	па	กล	na	па	86	0	14	0	0	1.19	25	Gibson Transp. Consult,
Simple average	82				na	ua	пâ	па	цâ	na	na	19.0	0.0	21.0	0.0	0'0	1.19		
Office	Culver City, CA	S	347.000	710	82	m	13	0	2	1.04	530	70	9	61	0	9	1.03	217	Gibson Transp. Consult.
Office	Pasadena, CA	4	98,600	710	74	2	18	9	0	1.05	174	33	3	64	0	0	1.22	31	Gibson Transp. Consult.
Office	Los Angeles. CA	S	1 80.000	710	71		21	9	1	1.07	207	54	4	42	0	0	1.00	26	Gibson Transp. Consult.
Office	Seal Beach, CA	9	265.000	710	98	2	0	0	0	1.04	393	74	26	0	0	0	1.08	34	Gibson Transp. Consult.
Simple average	<u>N1</u>				81.3	2,0	13,0	3,0	0.8	50.1		57.8	9,8	31.3	0.0	1,5	1.08		
Shopping center	Los Angeles, CA	4	11,000	820	68	0	25	5	2	1.21	179	69	0	23	9	2	1.18	169	Gibson Transp. Consult.
Shopping center	Los Angeles, CA	е	54,900	820	70	12	15	0	Э	1.05	32	na	na	Па	na	na	na	па	Gibson Transp. Consult.
Retail apparel	Los Angeles, CA	e	44,800	876	68	0	32	0	0	1.15	31	50	80	42	0	0	1.09	22	Gibson Transp. Consult.
Simple average	A1.				68.7	4.0	24,0	1.7	1.7	L=14		59,5	4.0	32,5	3.0	10	1,14		
na - not available or insufficient sample size.	ufficient sample size.					1	1				1		1	1	1	1		1	
¹ Area types: (0) regic tural, (C) adjacent to ² Development unite	¹ Area types: (0) regional CBD, (1) urban core, (2) activity center, (3) general urban, (4) suburban business district, (5) suburban strip com tural, (C) adiacent to university campus, (Ta) rail transit station within 1/4 mile, (To) rail station immediately adiacent or connected-TOD, ² Duvelorment unite in more course feet of floor an unlex on unlex indicated indicated.	re, (2) ac i) rail tra	activity center, (3) general urbar ransit station within 1/4 mile, (T area indice otherwise indicated	3) genel :hin 1/4	ral urban, (4 . mile, (To) r; .dicatod) suburt ail statio	an busir n immec	ness distr Jiately ad	ict, (5) s ljacent o	uburban yr connec	strip com ted-TOD,	imercial, (6) genera	l suburb	an, (7) sț	oecial dis	trict, (8)	rural to	activity center, (3) general urban, (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) special district, (8) rural town business district, (9) transit station within 1/4 mile, (To) rail station immediately adjacent or connected-TOD,
⁸ Serving UCLA campus area.	us area.		כם תווכסי סחופ		וחורקובה.														

Table D.6 Infill Development Weekday Directional AM Peak PeriodMode Share and Vehicle Occupancy Examples

								Inbound						õ	Outbound		Ī	T	
		_							ł	Ī			Mad	Mada Charac		1			
						Mod	Mode Shares						MIOC	C OIIGICS		T			
		Area	Develop-ment	L.	Personal					Vehicle	Sample	Personal Passenger			ie F	Dilo	Vehicle S	Sample	Source
		Town I			Vehicle	Truck	Walk	Transit	Bike	Occ.	Size	Vehicle	Truck	Walk	LIAUSH	DIAC		Т	Citteon Tranco Consult.
Land Use	Location	adda	4	000	9L	c	24	0	0	1.14	30	na	na	па	Пâ	Пâ	в	Т	Cheen Transp. Consult
Apartments	Los Angeles, CA	m	13 DU	077	01		36	0	0	1.23	52	na	na	na	na	na	na	Па	Citoson transp. Consum
L	Los Angeles, CA	ğ	72 DU	220	8	-	00			01.1		03	na	na	na	na	Па		
Apartments Simple average	-				20.0	0 0	30.0	0.0	0.0	1		1				1			furner County
					1	,	00	6	"	1.04	106	95	2	7	0	-	1.03	-	CIDSOR I FAILSP. COUSULL
Office	Culver City, CA	5	347,000	710	10	-	40			1.11	N8	80	2	13	S	2	1.03	183	Gibson Transp. Consult.
Office	Pasadena, CA	4	98,600	710	70	^	74	-	-		3	10	-	55	10	-	I.H	301	Gibson Transp. Consult.
	I as A multice CA	5	180,000	710	74	0	26	0	0	1.36	15	2 10	17	12.3	43	13	1.06		
Ottice Simple average					65.0	40	29.7	0.0	n	1.17			1						
									1			:	-	10		-	1.45	249	Gibson Transp. Consult.
		-	11 000	820	09	1	35	ŝ	-	1.31	225	Ż	-	5	,		07.1	202	Ghose Tranch Consult.
Shopping center	Los Angeles, CA	t	11,000	000		0	35	c	-	1 46	288	99	0	39	0	-	L 42	167	Ologon Hanaps Conserve
Shopping center	Los Angeles. CA	m	54,900	820	ŧ		2		-	113	11	52	-	46	-	0	1.12	87	Gibson Transp. Consult.
Retail anoarel	Los Angeles, CA	9	44,800	876	55	0	6	0	-	120	-	58.7	0.7	38.7	1.3	0.7	1.33		
Simple average	2	-			59.7	63	38,3	1.0	/'0	3		-						1	Present Transa Crossilt
2					4	4	0	0	-	061	50	16	0	"	•	π	1.88	30	Citoson Junior della 100000
High turn restaurant	Burbank, CA	m.	5,000	756		2	200	00	0	1 00		0'10	0.0	2:0	0.0	1.0	1.88		
Simple average	20			_	0766	80	0.0	N	0.4	2									
na - not available or in	na - not available or insufficient sample size											ļ	į		(2)	in Ininon-	ictrict (8) rural t	own business district, (9
Area types: (0) reg rural, (C) adjacent tu	⁴ Area types: (0) regional CBD, (1) urban core, (2) rural, (C) adjacent to university campus, (Ta) rall	core, (2) (Ta) rall 1) activity center, (3) general urban, (4) suburban business district, (5) suburban strip com transit station within 1/4 mile, (To) rail station immediately adjacent or connected-TOD.	(3) gen vithin 1	ieral urban, /4 mile. (To)	(4) subu	rban bu: ion imm	siness dis ediately	trict, (5, adjacen) suburbi t or conn	an strip c iected-TC	ommercial, DD	(b) gene	rall subu	(/) ()IPG) activity center, (3) general urban, (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) spectar district, (9) reading transit station within 1/4 mile, (To) rail station immediately adjacent or connected-TOD.
¹ Development unit	¹ Development units in gross square feet of floor area unless otherwise indicated.	of floor	area unless oti	herwise	e indicated.														
Serving UCLA campus area.	ipus area.																	ľ.	

Table D.7 Infill Development Weekday Directional PM Peak PeriodMode Share and Vehicle Occupancy Examples

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Appendix C. Person Trip Data For Baseline Sites

Baseline Mode Shares

Trip Generation Manual contains no data on mode shares for baseline site trip generation. For this *Handbook*, a limited amount of weekday peak period (7:00–9:00 a.m., 4:00–6:00 p.m.) site trip generation mode share data were collected for baseline sites to provide a general starting point for baseline mode shares for the most common land use types. Baseline data were collected at apartments, motels, offices, shopping centers, restaurants, a bank, and a bowling alley. The land use types were selected so the data would be transferrable to similar land uses (for example, residential apartment mode shares should be applicable to all suburban baseline apartment classifications). Tables C.1 and C.2 show the available weekday AM and PM peak period average mode shares and ranges for the baseline sites at which data were collected.

There are not enough samples to derive precise percentages by mode for the land use codes for which data were collected. However, for all but one direction during one peak period for one land use category,³ the motor vehicle percentage (personal passenger vehicle plus truck) of total person trips is at least 96 percent. Nearly half of the land use category averages in the tables are 100 percent motor vehicle. Based on the limited data shown, the following conclusions appear reasonable:

- The percentage mode share of person trips made by motor vehicle for baseline sites appears to be 96 percent or more. Where sample sizes exceed 100 observations, almost all the individual sites have motor vehicle shares of 96 percent or more.
- Almost all non-vehicle trips are by walking (rather than transit or bicycle).
- From the limited number of samples with more than 100 observations, it appears that there may be only very small **directional** differences in motor vehicle share percentages for some land uses. Smaller samples contain larger variations that could be the result of data noise from the smaller samples. More data are needed to fully understand the directional differences.
- Motor vehicle percentages are only available in this data set for a few land uses. The findings
 may or may not be transferrable to other land uses based on limited alternative opportunities.
 However, it may be reasonable to assume similar results for land uses within the same land use
 category (such as residential, lodging, or general retail).
- If the analyst assumes a baseline mode share of 96 percent motor vehicles, it means the ITE vehicle trip generation rates/equations represent 96 percent of the total **person** trips. The other 4 percent would be walk, bicycle, or transit trips.

Baseline Vehicle Occupancy

Trip Generation Manual contains limited vehicle occupancy data for some land use classifications. Table C.3 summarizes the vehicle occupancy data. All data are for baseline sites. Many of the most commonly analyzed land use codes are not included in this table.

³ Inbound trips during the AM peak period at three motels were an average 94 percent motor vehicle.

The limited baseline site weekday peak period (7:00–9:00 a.m., 4:00–6:00 p.m.) data collection conducted for this *Handbook* also includes vehicle occupancy. These data were collected to provide a general starting point for baseline vehicle occupancy for the most common land use types. Tables C.1 and C.2 show the available average vehicle occupancy values for the counted baseline sites.

For land uses for which there are sample sizes of more than 100 observations, vehicle occupancy is fairly consistent for a given land use. For those few land uses, inbound and outbound vehicle occupancy is similar. However, there are differences in vehicle occupancy by land use. Likewise, there could be some land uses for which directional peak period vehicle occupancy might logically differ, such as office. That remains to be determined through more data collection.

Vehicle occupancy values shown in Tables C.1 through C.3 for similar land uses appear to be similar, considering the effect of limited samples sizes and number of sites. This *Handbook* recommends that additional data be collected—especially for the land uses most frequently analyzed in infill areas where the differences between baseline and infill trip generation rates may differ significantly.

$ \ \ \ \ \ \ \ \ \ \ \ \ \ $	Mode Shares Truck Walk Transit 2 0 0 1 0 0 2 1 0 1 0 0 2 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 2 1 1 2 1 2 1 0 1 0 0 2 1 0 1 0 0 2 0 0 2 3 0.7	Vehicle Sample e Occ. Size 11.00 128 1.01 11.07 145 1.07 11.07 145 1.03 11.09 138 1.16 11.09 188 1.09 11.09 138 1.16 11.09 134 1.10 11.03 1.03 1.04 11.03 1.03 1.04 11.03 1.04 1.03 11.03 1.04 1.04 11.03 1.04 1.04 11.03 1.05 1.06 11.03 1.05 1.06	Source Kevin Hooper Assoc. Iteris, Inc. Traffic Engr. Consultants Parsons Britkerhoff Parsons Britkerhoff Parsons Britkerhoff Texas A&M University Texas A&M University Texas A&M University
	Truck Walk Transit 2 0 0 1 0 0 1 0 0 2 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 2 1 1 2 1 2 1 0 1 0 0 2 1 0 1 0 0 2 0 0 2 0 0 2 0 0 2 0 0	Vehicle Sample Occ. Size 1.0c. 128 1.07 145 1.07 145 1.09 158 1.09 158 1.08 314 1.08 314 1.08 314 1.08 314 1.09 158 1.09 158 1.09 158 1.00	
metric Rationati, ME 5 173 DU 220 82 18 0 0 1.22 23 98 2 7 menis Mt. Pleasart, SC 6 240 DU 220 92 0 0 1.02 49 96 0 0 10 102 49 95 0 0 1 11 4 95 10 11 10	2 0 0 0 0 0 0 0 1 0 1 0 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1	LJO 128 1.06 126 1.07 145 1.07 145 1.14 153 1.16 158 1.19 158 1.19 158 1.19 158 1.109 158 1.109 158 1.109 145 1.109 145 1.109 145 1.109 146 1.109 146 1.109 146 1.109 146 1.100 158 1.100 170 1.100 170	Kevin Hooper Assoc. Ileris, Inc. Irafic Engr. Consultant Parsons Brickerhoff Parsons Brickerhoff Parsons Brickerhoff Parsons Brickerhoff Texas A&M University Texas A&M University Texas A&M University Texas A&M University
Interfactor Mt. Pleasant, SC 6 240 DU 220 92 0 8 0 10.02 49 96 0 0 10.2 49 96 0 0 1 10.2 49 96 0 0 10.1 10.2 49 96 0 0 10.2 49 96 0 1 11 4 46 95 1 1 40 95 1 1 40 95 1 1 41 46 95 2 2 10 11.1 41 46 95 2 2 10 11.1 42 96 11 11 41 46 95 2 2 10 10 10.1 20 10 </td <td>0 4 0 1 0 0 2 1 0 1 1 0 0 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 2 1 2 0 0 2 0 0 2 0 0 2 0 0</td> <td>1.06 126 1.07 145 1.107 145 1.14 153 1.109 158 1.09 314 1.09 314 1.09 77 1.25 77</td> <td>lteris, Inc. Traffic Engr. Consultant Parsons Britukerhoff Parsons Britukerhoff Parsons Britukerhoff Texas A&M University Texas A&M University Texas A&M University Texas A&M University</td>	0 4 0 1 0 0 2 1 0 1 1 0 0 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 2 1 2 0 0 2 0 0 2 0 0 2 0 0	1.06 126 1.07 145 1.107 145 1.14 153 1.109 158 1.09 314 1.09 314 1.09 77 1.25 77	lteris, Inc. Traffic Engr. Consultant Parsons Britukerhoff Parsons Britukerhoff Parsons Britukerhoff Texas A&M University Texas A&M University Texas A&M University Texas A&M University
	1 0 0 2 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 2 1 2 1 5 0 0 23 07 03	1.07 145 1.14 153 1.19 158 1.09 158 1.09 158 1.09 158 1.09 169 1.09 170 1.25 77 1.05 106	Traffic Engr. Consultant Parsons Brinkerhoff Parsons Brinkerhoff Parsons Brinkerhoff Parsons Brinkerhoff Texas A&M University Texas A&M University Texas A&M University Texas A&M University
Declars Tampa, FL 6 278 DU 220 93 6 0 1 1.14 46 95 2 2 Declars Tampa, FL 6 317 DU 220 90 2 6 2 0 1.23 40 97 1 7 Declars Tampa, FL 6 689 DU 220 90 4 6 0 1.12 73 96 0 7 1 7 96.8 10 1 10 11 73 96 0 10 1 10 11 73 96.8 10	2 1 0 1 1 0 1 1 0 10 15 00 11 2 1 5 0 0 23 07 03	1.14 153 1.09 158 1.08 314 1.09 1.09 1.25 77 1.25 77	Parsons Brinkerhoff Parsons Brinkerhoff Parsons Brinkerhoff Parsons McM University Texas A&M University Texas A&M University Texas A&M University
Itanga, FL 6 317 DU 220 90 2 6 2 0 1.23 40 97 1 neuts Tanga, FL 6 689 DU 220 90 4 6 0 1.12 73 96 0 7.0 7.0 7.0 7.1 7.2 96 0 1.0 1.0 7.0	1 1 0 0 0 3 0 0 1.0 1.5 0.0 0 1 2 1 0 0 1 2 0 0 0 0 1 2 0 0 0 0 0 1 2 0 0 0 0 0 0 2 0.7 0.3 0.3 0.3 0	1.09 158 1.08 314 1.09 150 1.32 116 1.25 77	Parsons Brinkerhoff Parsons Brinkerhoff Texas A&M University Texas A&M University Texas A&M University
Dentise Tampa, FL 6 689 DU 220 90 4 6 0 1,12 73 96 0 0 1 2 96 0 0 1 2 95 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 10 2 10 2 10 2 10 2 10 2 <th2< th=""> 2 2</th2<>	0 3 0 1.0 1.5 0.0 1 2 1 5 0 0 1 2 1 2 0 0 1 0 0 2 0 0 2 0.7 0.3	1.08 314 1.09 11.09 1.32 116 1.25 77	Parsons Brinkerhoff Texas A&M University Texas A&M University Texas A&M University
Sumple average Simple average 1.13 96.8 1.0 1.0 College Station, IX 5 133 rooms 320 91 3 3 0.2 1.13 96.8 1.0 1.0 College Station, IX 5 133 rooms 320 91 3 3 3 96 1 1 College Station, IX 5 66 rooms 320 90 0 10 0 120 95 5 1 College Station, IX 5 79 rooms 320 96 0 4 0 129 95 1	1.0 1.5 0.0 1 2 1 5 0 0 1 0 0 2 0.7 0.3	1.09 1.32 1.25 77 1.25 77	Texas A&M University Texas A&M University Texas A&M University
College Station, IX 5 133 rooms 320 91 3 3 3 0 1.29 33 96 1 College Station, IX 5 68 rooms 320 90 0 10 0 0 1.21 19 95 5 College Station, IX 5 79 rooms 320 96 0 4 0 1.21 19 95 5 College Station, IX 5 79 rooms 320 96 0 4 0 1.29 23 99 1 Kimple average 3 9.0 5.7 1.0 0.0 12.6 96.7 2.3	1 2 1 5 0 0 1 0 0 23 0.7 0.3	1.32 116 1.25 77 1.20 24	Texas A&M University Texas A&M University Texas A&M University
College Station, IX 5 68 rooms 320 90 0 10 0 121 19 95 5 College Station, IX 5 79 rooms 320 96 0 4 0 0 129 23 99 1 College Station, IX 5 79 rooms 320 96 0 4 0 0 129 23 99 1 Simple average 3 9.0 5.7 1.0 0.0 126 96.7 23	5 0 0 1 1 0 0 0 1 23 0.7 0.3 1	1.25 77	Texas A&M University Texas A&M University
College Station, IX 5 79 rooms 320 96 0 4 0 0 129 23 99 1 Simple average 92.3 1.0 5.7 1.0 0.0 1.26 96.7 2.3	1 0 0 1 2.3 0.7 0.3 1	22 101	Texas A&M University
92.3 1.0 5.7 1.0 0.0 1.26 96.7 2.3	23 0.7 0.3	80	
		0,0 1.26	
Bowling alley College Station, TX 5 73,000 437 94.0 3 3 3 0 0 1.1.3 71 100 0 0 0		0 1.00 8	TX A&M Transp. Inst.
Simple average 0.0 0.0 1.13 100.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0	0.0 1.00	
Office Falmouth,ME 6 178,000 710 97 2 0 1 0 1.06 438 90 10 0 0	10 0 0	0 1.06 39	Kevin Hooper Assoc.
Simple average 97.0 2.0 0.0 1.0 0.0 1.06 90.0 10.0 0.0 0.0 0.0 0.0 0.0	10.0 0.0 0.0	0.0 1.06	
كامىيەتلەرخىڭ 🗄 ئىلىرىنىڭ 💈 110,000 820 100 0 0 0 0 0 1.19 179 100 0 0 0	0 0 0	0 1.19 130	TX A&M Transp. Inst.
0 0	0 0 0	0 1.13 210	TX A&M Transp Inst.
Simple average 1.17 1.00.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0'0 0'0 0'0	0.0 1.16	

Table C.1 Baseline Weekday AM Peak Period Mode Share andVehicle Occupancy Examples

-77

						Mode	Mode Shares		T	T	ſ		Mode	Mode Shares					
		Area	Develop-ment	ШE	Personal Passenger					Vehicle	Sample	Personal Passenger Vahiole	Tmek	Walk	Transit	Bike	Vehicle Occ.	Sample Size	Source
Land Use	Location	Type	Units ²	LUC	Vehicle	Truck	Walk	Transit	Bilke	j.	312C	96	4	0	0	0	1.14	189	Kevin Hooper Assoc.
Loartments	Falmouth, ME	5	173 DU	220	96		•	•	-	511	124	87	1	12	0	0	1.08	68	tteris, Inc.
Apartments	Mi. Pleasant, SC	9	240 DU	220	93	-	4	-	-		1		-	c	0	•	1.24	78	Traffic Engr. Consultants
	Oklahoma City, OK	9	360 DU	220	100	0	•	•	•	oF	001	64		-	0	•	130	58	Pursons Brinkerhoff
	Turns FI.	9	278 DU	220	16	1	-	0	-	1.20	138	16	•		•	-	1 26	96	Parsons Brinkethoff
	Turney FT.	0	317 DU	220	86	0	1	0	-	1.14	614	96					1 22	190	Parsons Brinkethoff
	Themes PT	0	0G 689	220	2	1	4	0	-	1.14	317	93	- 1	25	00	03	1.21		
Apartments Simple average	- chalman				96,3	0.1	1.8	0.2	1.0	1.15		Ì,	1	2)			
4											0	80	0	0	0	0	1.55	SI	Texas A&M University
Motel	College Station, TX	2	133 rooms	320	94	-	-	0		S	0	87	F	5	0	0	1.08	15	Texas A&M University
	College Station, TX	S	68 rooms	320	66	2	0		0 0	21.1	70	100	0	0	0	0	1.26	29	Texas A&M University
i.	College Station, TX	s	29 rooms	320	95.7	3.0	0	0"0	0.0	131		95.0	3.0	2,5	0'0	0.0	06'1		
Simple average									-		91	1001	c	0	0	0	1.33	27	TX A&M Transp. Inst.
Bowling alley	College Station, TX	S	73,000	437	100	• •	• •	• •	0 0	1.27		100	0	0	0	0	1,33		
Simple average					1001										4	4	1.07	452	Kevin Hooper Assoc.
		1	178.000	710	96	4	0	0	0	HTT I	47	80	-	•		4	1 07		Т
Office Simple average	Fainouth, Mit.					4	0	0	0	1111		86	-	-	>	>			T
		ŀ	100 000	000	1001	0	0	0	0	1.19	861	100	0	0	•	0	1.19	229	TX AKM ITERSP. Inst.
Shopping center	Bryun, TX		120,000	010			0	0	0	1.22	666	100	0	0	0	•	1.20	498	LA ACCO DIMINUM LINE
Shopping center	Bryan, TX	-	110,000	070		0	•	0	0	121	362	100	0	0	0	0	173	2/4	ACTI AGUNTI TATAY VI
Shopping center	College Station, TX		100001	000		0	0	0	0	1.27	286	100	0	•	0	0	1.16	208	liens, uic.
Shopping center	Mt Pleasant, SC	^	09,000	070			4		c	116	665	66		0	0	0	1.14	663	Kevin Hooper ASSOC.
Shopping center	Falmouth, ME	9	48,800	83	8		c	-	0	121		8.66	0.2	0	0	0	1.18		1
Simple average		_			BI	-	>	,	>										
		ŀ	~ 500	010		0	0	•	0	11.1	61	100	•	0	•	•	1.16	51	Jacots cupt, woup
Bunk	Prospect, KY	Ŷ	nnc'z	216	100	0	0	0	0	H.I.		100	0	0	0	•	I 16		_
Suple average	0			_									_	-	0	0	1.52	24	Traffic Engr. Consultants
Curling and arteant	Oklahoma City, OK	9	5,000	931	100	0	0	0	•	1.62	8	1	-	•	0	0	1 24	39	Iteris, Inc.
rrist to anotoniant	Mt Pleasant SC	9	8,150	932	100	0	0	•	0	13	161	36		-	0	0	1.30	139	Jacobs Engr. Group
High turn testamant	Prospect KY	S	2,500	934		0	-7	0	0	121	190	100	0	-	0.0	0.0	1.39		
Dove-uni response. Simple average		_			6.86	0.0	1,3	0.0	0.0	1 41		116	-						
		L				_							-				a fundamente de la construcción de la const	ee dictrict	F (9) rural (C) adjacent to
¹ Area types: (0) regiona university campus, (Ta) ² Development units in	Area types: (0) regional CBD, (1) urban core, (2) activity center, (3) general urban, (4) suburban business district, (5) suburban. university campus, (Ta) rall transit station within 1,4 mile, (To) rall station immediately adjacent or connected-TOD. ² Development units in gross square feet of floor area unless otherwise indicated. Italics denote occupied development units.) activity 1/4 mile r area un	r center, (3) general urban, (4) suburb e, (To) rall station immediately adjace nues otherwise indicated. Italics den	eral urb on imm indicat	aan, (4) subur ediately adjac ed. Italics de	ban busik cent or co note occi	ness disti nnected upied de	ict, (5) su. .TOD. velopmer	burban s it units.	trip com	nercial, (6)	general subi	urban, (7	special	district, (i	נ) רערפו נס	ארופטם מא		center, (3) general urban. (4) suburban business district, (5) suburban strip commercial, (6) general suburban, (7) special district, (8) rural rown ousness usurus, (2) rurar, (2) ru rurar, (2) rurar, (2) rura
There are two Brentwoods If	There are two Brentwoods in California, initial of a second store.																		
Anchored by discount	Anchored by discount source.	1																	

Table C.2 Baseline Weekday PM Peak Period Mode Share andVehicle Occupancy Examples

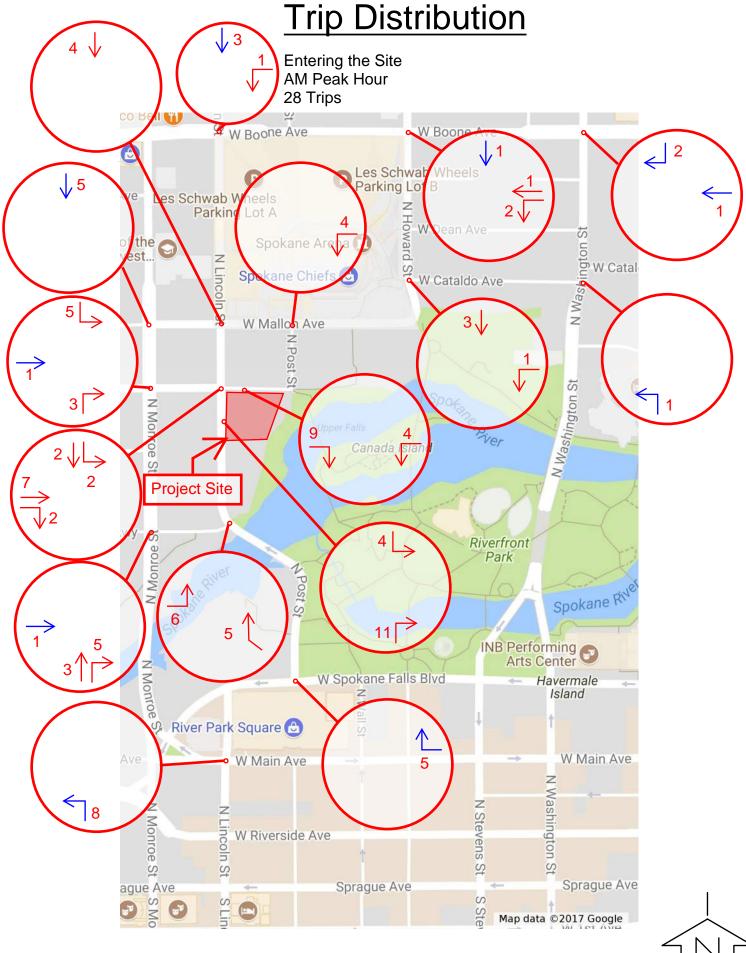
ite=

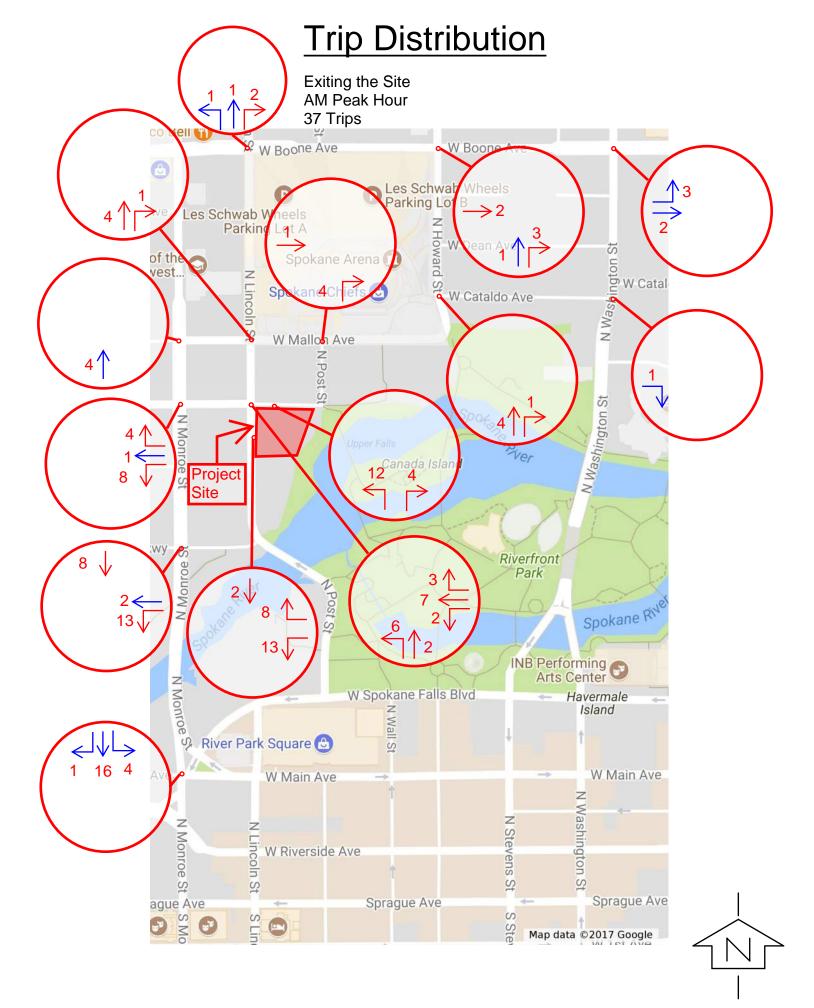
Table C.3 Baseline Vehicle Occupancy inTrip Generation Manual Data Volumes

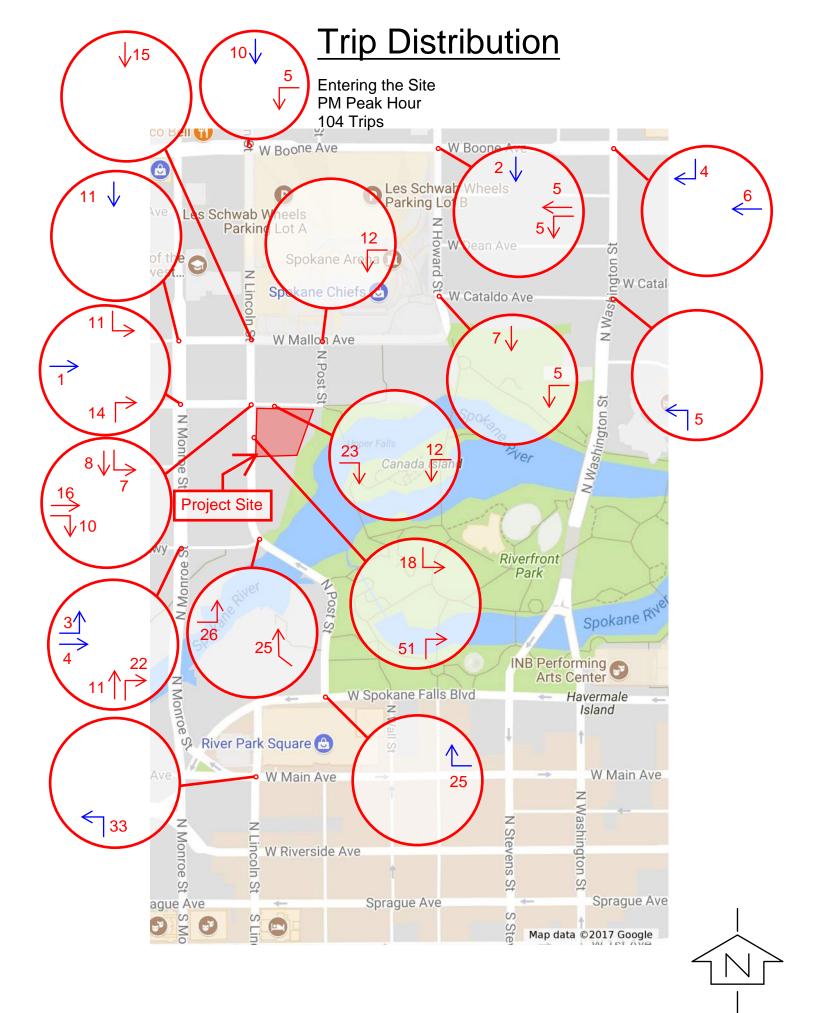
	Land Use Classification	NOT THE REAL		Vehicle Oco	cupancy
Code	Description	Time Period	Average	Range	Comment
021	Commercial Airport	Weekday		1.79-2.42	
022	General Aviation Airport	Weekday		1.20-1.70	
030	Intermodal Truck Terminal	Weekday	1.16		avg. of 2 studies
110	General Light Industrial	Not Available			for all industrial
120	General Heavy Industrial	Not Available	1.3		sites
150	Warehousing	Not Available			
130	Industrial Park	Weekday	1.37	1.20-1.80	
140	Manufacturing	Weekday		1.20-1.30	
151	Mini-Warehouse	Weekday		1.20-1.90	
714	Corporate Headquarters Building	Weekday	1.2	1.03-1.74	avg. of 10 studie
715	Single Tenant Office Building	Not Available	1.1	1.03–1.14	avg. of 10 studie
720	Medical Dental Office Building	Not Available	1.37	1.32–1.44	avg. of 6 studies
731	State Motor Vehicles Department	Weekday	1.38	1.30–1.48	
732	United States Post Office	Weekday	1.14		avg. of 4 studies
760	Research and Development Center	Weekday	1.19	1.10–1.33	avg. of 13 studie
812	Building Materials and Lumber Store	Weekday	1.17	1.10–1.21	
815	Free-Standing Discount Store	Weekday	1.32	1.19–1.46	avg. of 2 sites
816	Hardware/Paint Store	Weekday	1.31	1.15–1.39	avg. of all sites
857	Discount Club	Not Available	1.45		limited sample
860	Wholesale Market	Weekday	1.21		avg. for site
890	Furniture Store	Weekday	1.42	1.12-2.00	
920	Copy, Print, and Express Ship	AM street pk	1.12		
	Store	PM street pk	1.21		
		Pk. Hour	1.16		
931	Quality Restaurant	Weekday	1.78	1.59–1.98	
932	High-Turnover (Sit-Down) Restaurant	Weekday	1.52	1.39–1.69	

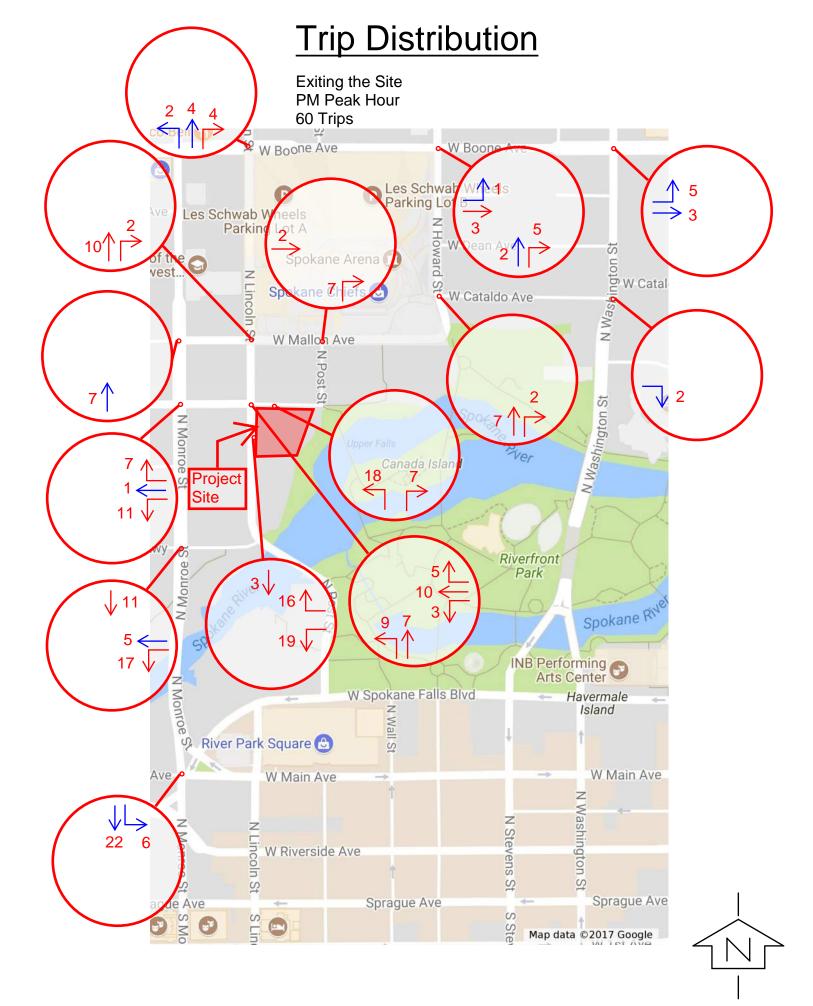
Source: Trip Generation Manual, 9th Edition, Institute of Transportation Engineers, Washington, DC, 2012.

Appendix V









Appendix VI

BUILDING A - SOUTH TOWER

									OFFICE				HOTEL		
LEVEL	HEIGHT	ELEVATION	# STAIRS	PARKING STALLS	GARAGE GSF	SERVICE/ LOAD/MECH	RETAIL RSF	OFFICE GSF	RSF	COMMON AREA	HOTEL GSF	RSF	COMMON AREA		# KEYS
L1	10'	1880'	2			1,561	6,189								
L1.5	10'	1890'					4,016								
L2	14'	1900'	2												
L3	10'	1914'	2												
L4	10'	1924'	2												
L5	10'	1934'	2												
L6	10'	1944'	2												
L7	10'	1954'	2												
L8	10'	1964'	2												
L9	10'	1974'	2												
L10	10'	1984'	2												
L11	10'	1994'	2												
L12	10'	2004'	2												
L13	12'	2014'	2												
ROOF/ME	15'	2026'	2			1,260									
SUBTOTA	AL.		28	0	0	2,821	10,205	0	0	0	0	0	0	0	0

BUILDING B - NORTH TOWER

									OFFICE			н	OTEL		
				PARKING	GARAGE	SERVICE/				COMMON	HOTEL		COMMON	INTERIOR	
	HEIGHT	ELEVATION	STAIRS	STALLS	GSF	LOAD/MECH	RETAIL RSF	OFFICE GSF	RSF	AREA	GSF	RSF	AREA	AMENITY	# KEYS
L1	20'	1880'	3			3,171	6,270				8,161	6,896	708		
L2	14'	1900'	4								13,004	2,887	2,564	7,057	6
L3	10'	1914'	4								13,004	9,898	2,610		23
L4	10'	1924'	4								10,507	7,759	2,311		19
L5	10'	1934'	2								10,507	7,759	2,311		19
L6	10'	1944'	2								10,507	7,759	2,311		19
L7	10'	1954'	2								10,507	7,759	2,311		19
L8	10'	1964'	2								10,507	7,759	2,311		19
L9	10'	1974'	2												
L10	10'	1984'	2												
L11	10'	1994'	2												
L12	10'	2004'	2												
L13	12'	2014'	2												
ROOF/ME	15'	2026'	2			1,840									
SUBTOTA	AL		35	0	0	5,011	6,270	0	0	0	86,704	58,476	17,437	7,057	124

BUILDING C - WEST PODIUM

									OFFICE			ŀ	HOTEL		
	HEIGHT	ELEVATION	# STAIRS	PARKING STALLS	GARAGE GSF	SERVICE/ LOAD/MECH	RETAIL RSF	OFFICE GSF	RSF	COMMON AREA	HOTEL GSF	RSF	COMMON AREA	INTERIOR AMENITY	# KEYS
L1	20'	1880'	3				7,729			1,278					
L2	14'	1900'	4					9,421	8,440	595					
L3	14'	1914'	4					9,421	8,440	595					
ROOF/ME	15'	1924'	4			722		1,196		474					
SUBTOTA	AL.			0	0	722	7,729	20,038	16,880	2,942	0	0	0	0	0

PARKING GARAGE & PLAZA

									OFFICE			Н	OTEL		
LEVEL	HEIGHT	ELEVATION	# STAIRS	PARKING STALLS	GARAGE GSF	SERVICE/ LOAD/MECH	RETAIL RSF	OFFICE GSF	RSF	COMMON AREA	HOTEL GSF	RSF	COMMON AREA	INTERIOR AMENITY	# KEYS
L1	20'	1880'		16											
P1	12'	1868'	2	108	52,181	3,235	2,678								
P2	10'	1858'	2	173	69,835										
P3	10'	1848'	1	91	34,584										
SUBTOT	AL		5	388	156,600	3,235	2,678	0	0	0	0	0	0	0	0
PROJE	CT TOT	ALS =	#REF!	388	156,600	11,789	26,882	20,038	16,880	2,942	86,704	58,476	17,437	7,057	124

				A	PARTMENTS								COND	OMINIUM	S		
APT GSF	RSF	COMMON AREA	INTERIOR AMENITY	TOTAL UNITS	OPEN 1 BEDROOM	1 BEDROOM	2 BEDROOM	3 BEDROOM	TOWNHOME	CONDO GSF	RENT/ LEASE	COMMON AREA	INTERIOR AMENITY	TOTAL UNITS	2 BEDROOM	2 BEDROOM	3 BEDROOM
11,390	6,826	4,046		7	1	2	1		3								
9,223	7,380	2,584		6	1	4	1										
10,905	5,294	1,822	3,336	6	1	3	2										
10,740	8,425	1,831		10	1	6	3										
10,740	8,425	1,831		10	1	6	3										
10,740	8,425	1,831		10	1	6	3										
10,740	8,425	1,831		10	1	6	3										
10,740	8,425	1,831		10	1	6	3										
10,740	8,425	1,831		10	1	6	3										
10,740	8,425	1,831		10	1	6	3										
10,740	8,394	1,862		10	1	6	3										
10,740	8,394	1,862		10	1	6	3										
10,740	8,394	1,862		10	1	6	3										
10,410	8,249	1,651		3			1	2									
2,439	0	1,179															
151,767	111,906	29,685	3,336	122	13	69	35	2	3	0	0	0	0	0	0	0	0

				A	PARTMENTS								COND	OMINIUM	S		
APT GSF	RSF	COMMON AREA	INTERIOR AMENITY	TOTAL UNITS	OPEN 1 BEDROOM	1 BEDROOM	2 BEDROOM	3 BEDROOM	TOWNHOME	CONDO GSF	RENT/ LEASE	COMMON AREA	INTERIOR AMENITY		1 BEDROOM	2 BEDROOM	3 BEDROOM
										1,798		1,798					
										40,400	0.440	4.000		0	4	-	
										10,403 10,403	8,113 8,293	1,836 1,656		6 6	1	5	
										10,403	8,293	1,656		6	1	5	
										10,403	8,293	1,656		6	1	5	
										9,331	7,355	1,656		2	0	0	2
										3,331	7,300	1,307		2	0	0	2
0	0	0	0	0	0	0	0	0	0	52,741	40,347	11,585	0	26	1	20	2
0	0	0	0	0	0	0	0	U	U	52,741	40,347	11,585	U	26	4	20	2

				A	PARTMENTS								COND	OMINIUM	S		
APT GSF	RSF		INTERIOR AMENITY			1 BEDROOM	2 BEDROOM	3 BEDROOM	TOWNHOME		RENT/ LEASE				2 BEDROOM		3 BEDROOM
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

				A	PARTMENTS								COND	OMINIUM	S		
APT GSF	RSF	COMMON AREA	INTERIOR AMENITY		OPEN 1 BEDROOM	1 BEDROOM	2 BEDROOM	3 BEDROOM	TOWNHOME	CONDO GSF	RENT/ LEASE	COMMON AREA			2 BEDROOM	2 BEDROOM	3 BEDROOM
4,664	3,919	745		4		4											
4,664	3,919	745	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0
156,431	115,825	30,430	3,336	126	13	73	35	2	3	52,741	40,347	11,585	0	26	4	20	2