

APPENDIX M

2020 & 2040 Build 2 Freeway HCS Operational Analysis

			REEWA	YWEAV			=			
Genera	I Informati	on			Site Info	rmation				
-	rmed me Period	AECO AM			Weaving Seg	Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sam Analysis Year 2020 Build 2				
Project Des nputs	scription SW 101	h Street SIM	2							
Veaving n Veaving se Freeway fre	onfiguration umber of lanes, I egment length, L ee-flow speed, F	s FS		One-Sided 4 2380ft 70 mph	Segment typ Freeway min Freeway max Terrain type	imum speed			Freewa 240 Lev	
Conver	sions to p		1	1	ĩ	-			(())	
1	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)	
/ _{FF}	4565	0.95	3	0	1.5	1.2	0.985	1.00	4877	
/ _{RF}	355	0.92	2	0	1.5	1.2	0.990	1.00	390	
/ _{FR}	800	0.92	2	0	1.5	1.2	0.990	1.00	878	
/ _{RR}	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
/ _{NW}	4877							V =	6145	
/ _W	1268									
/R	0.206									
	uration Cha		tics						4000 1-	
	naneuver lanes,	N _{WL}		2 lc		-	hanges, LC _{MIN}		1268 lc	
•	e density, ID RF lane changes			0.7 int/mi	Weaving lan	•	**		1703 lc	
	-	14			Non-weaving		1111		1524 lc	
	R lane changes				Total lane ch	7.2	-		3227 lc	
	RR lane changes	Tux	D ''		Non-weaving	-	100		81	
	ig Segmen				· · · ·				0.28	
•	egment flow rate	•		6061 veh/h	Weaving inte Weaving sec				0.20 54.3 mp	
-	egment capacity	, c _w		8788 veh/h 0.690	Average wea				57.7 mp	
•	egment v/c ratio egment density,	D	2	0.690 8.3 pc/mi/ln	Average nor				53.5 mp	
-	ervice, LOS	-	2	D	Maximum we				4601	
Notes							, -max			
a. Weaving	segments longer t			ength should l	be treated as is	olated merge	and diverge are	eas using the	procedures of	
	"Freeway Merge and the sthat exceed the structure of the			he level of se	vice is "F"					

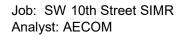
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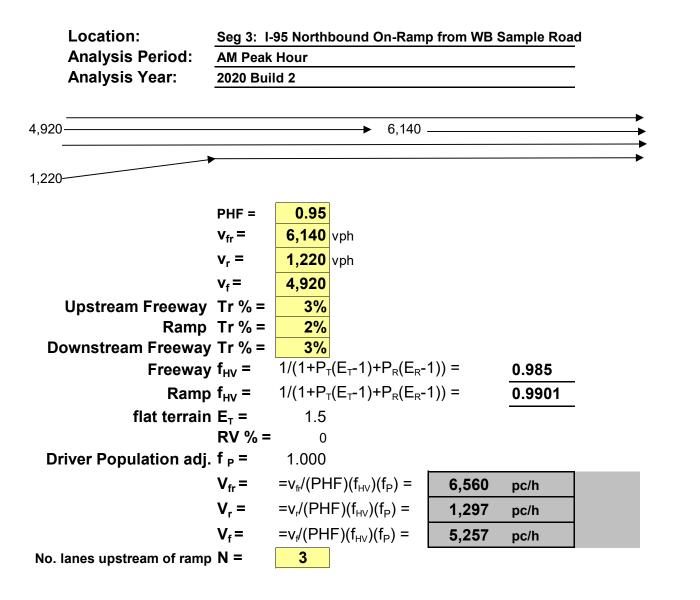
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General Information			Site Information		
Analyst			Highway/Direction of Travel	I-95 NB	
Agency or Company	AECOM		From/To	Seg 2-Bet Of Sample	f & On from
Date Performed Analysis Time Period	AM		Jurisdiction Analysis Year	2020 Build 2	
Project Description SW 10th	h Street SIMR				
✓ Oper.(LOS)			Des.(N)	Planning	g Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4920	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
			Up/Down %		
Calculate Flow Adjustn	nents				
f _p	1.00		E _R	1.2	
É _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			·
LOS and Performance	Measures		Design (N)		
Operational (LOS)			Design (N) Design LOS		
v _p = (V or DDHV) / (PHF x N > S D = v _p / S LOS	66.5 66.4 D	pc/h/ln mph pc/mi/ln	v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2	-13 f _{LC} TR	, - Exhibit 11-8 - Exhibit 11-9 D - Page 11-11

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<u>No. Ln</u>	Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
4	Fwy downstream of ramp (assume 70 mph free-flow speed) =	9,600	6,560	0.68	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,257	0.73	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,297	0.62	No

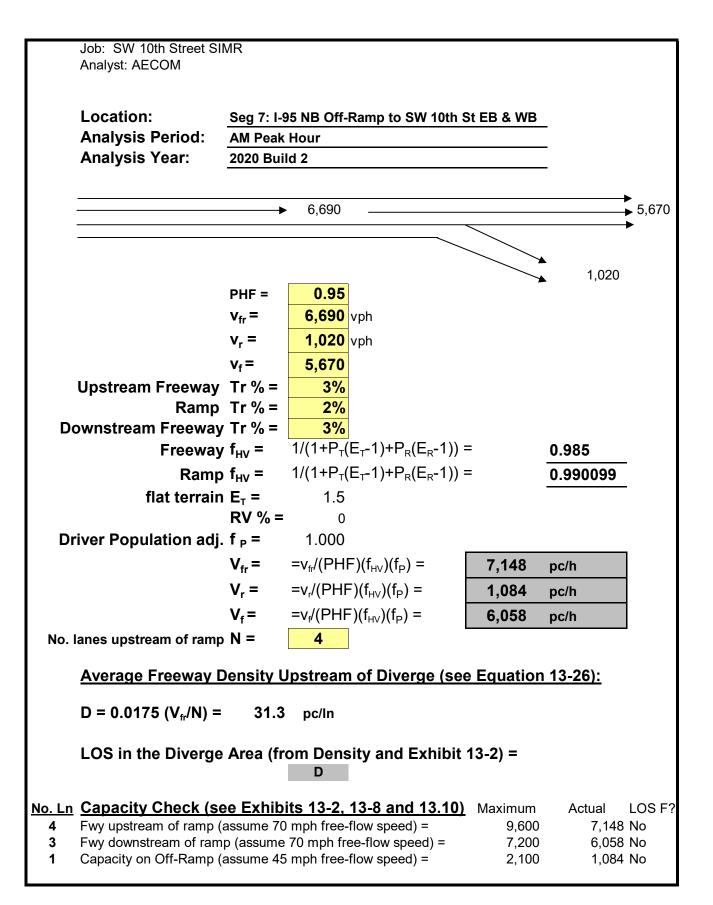
		RAI	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET				
Genera	l Infor	mation			Site Infor	mation					
Analyst				Fr	eeway/Dir of Tr	avel I-	·95 NB				
Agency or (AECO	MC	Ju	nction	S	Seg 4-On fr	om Exp			
Date Perfor					risdiction			_			
Analysis Tir				Ar	nalysis Year	2	020 Build 2	2			
	scription	SW 10th Stree	t SIMR								
nputs			Eroowov Num	ber of Lanes, N	4						
Jpstream A	Adj Ramp				4					Downstre	eam Adj
Yes	🗌 On		Ramp Numbe		1					Ramp	
				ane Length, L _A	1500					🗹 Yes	🗌 On
✓ No	Off		Deceleration	_ane Length L _D						No	✓ Off
			Freeway Volu	me, V _F	6140						
-up =	ft		Ramp Volume	e, V _R	690					L _{down} =	2950 ft
	. //		Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	140 veh/h
/ _u =	veh/h		Ramp Free-F	ow Speed, S _{FR}	50.0					VD -	140 Ven/11
Conver	rsion to	pc/h Und	der Base	Conditions							
(pc/		V	PHF	Terrain	%Truck	%Rv	f		f	v = V/PH	F x f _{HV} x f _p
)	(Veh/hr)					f _{HV}				
Freeway		6140	0.95	Level	3	0	0.985		1.00		6560
Ramp		690	0.92	Level	2	0	0.990		1.00		757
UpStream		4.40	0.00				0.000		4.00		454
DownStrea	am	140	0.92	Level	2	0	0.990	Dive	1.00 erge Areas		154
Estima	tion of	V	Merge Areas			Estimatio	on of v		erge Areas		
_301110			(Loundar		12			
		V ₁₂ = V _F					V	12 = V _R	+ (V _F - V _R)	P _{FD}	
-EQ =		(Equa	ation 13-6 o	r 13-7)		L _{EQ} =		(Ec	uation 13-	12 or 13-	13)
P _{FM} =		0.123	using Equa	ion (Exhibit 13-6)		P _{FD} =			ng Equatio		
/ ₁₂ =		808 p	c/h			V ₁₂ =		pc/		,	,
V_3 or V_{av34}			pc/h (Equati	on 13-14 or 13-		V_3^{12} or V_{av34}^{12}			n (Equation 13	3-14 or 13-	.17)
		17)) no/h2 🗔) (—			Is V ₃ or V _{av34}	> 2,700 p				,
• •) pc/h? 🗹 Ye				Is V_3 or V_{av34}					
is v_3 or v_a	_{v34} > 1.5 "	V ₁₂ /2		10 10 10			1.0 1	۲ <u>- '2</u> /pc	h (Equation	13-16. ⁻	13-18. or
f Yes,V _{12a}	=	2624 18, or		on 13-16, 13-		If Yes,V _{12a} =		13-1			10 10, 01
Capaci	tv Che		10-13)			Capacity	Check	S			
Jupaon	. <u>y ene</u>	Actual		apacity	LOS F?		ii.	ctual	Cap	acity	LOS F?
						V _F			Exhibit 13-8		
V		7047	E 1 1 1 40 0			$V_{FO} = V_{F}$ -	V_		Exhibit 13-8	_	
V _F	0	7317	Exhibit 13-8		No		⁻ R		Exhibit 13-	_	
						V _R			10		
low E	ntering	Merge In	fluence A	rea		Flow Ent	ering D	Diverg	e Influen	ce Area	а
		Actual	Max	Desirable	Violation?		Actua	al	Max Desir	able	Violation?
V _R	12	3695	Exhibit 13-8	4600:All	No	V ₁₂		E	xhibit 13-8		
level o	f Servi	ice Detern	nination (if not F)	8	Level of	Service	e Dete	rminatio	n (if no	t F)
D _R :	= 5.475 +	0.00734 v _R + ().0078 V ₁₂ - 0.	00627 L _A		D	R = 4.25	2 + 0.00	86 V ₁₂ - 0.	009 L _D	
	26.2 (pc/mi						:/mi/ln)			2	
	C (Exhibit 1						khibit 13-	2)			
	,	nination				Speed D					
•).328 (Exib	,				ů (hibit 13-12				
		Exhibit 13-11)					h (Exhibit 1				
0		Exhibit 13-11)				· ·	h (Exhibit 1				
6 = 6	63.0 mph (Exhibit 13-13)				S = mpł	h (Exhibit 1	3-13)			
nt © 2016 L	Iniversity of	f Florida, All Rigl	hts Reserved			HCS2010 [™]	1 Varaian 6	00		Genera	ated: 6/18/2020

		RAMP	S AND RAM	P JUNCTI	ONS WC	ORKS	HEET			
General Infor	rmation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel	I-95 NE	3			
Agency or Company	AEC	ОМ		inction		Seg 5-0	Off to Exp t	from GPL		
Date Performed				risdiction						
nalysis Time Perio			Ar	nalysis Year		2020 B	uild 2			
Project Description	SW 10th Stree	I SIMR								
		Eroowov Num	ber of Lanes, N	4						
Upstream Adj F		Ramp Number		4 1					Downstrea Ramp	am Adj
✓ Yes	∕ On	Acceleration L	ane Length, L _A						Yes	On
No	Off		ane Length L _D	200					🗹 No	Off
I – or	NEO #	Freeway Volu	1	6830					L _{down} =	ft
L _{up} = 29	950 ft	Ramp Volume	IX .	140					-down	
V _u = 69	0 veh/h	-	Flow Speed, S _{FF} ow Speed, S _{FF}	70.0 45.0					V _D =	veh/h
Conversion t	o nc/h lln	-		45.0						
	<u>U pe/II UII</u>						6	ſ		
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	-	v = V/PHF	1
reeway	6830	0.95	Level	3	0	_	985	1.00	72	
Ramp	140	0.92	Level	2	0	_	990	1.00	1:	
JpStream	690	0.92	Level	2	0	0.	990	1.00	75	57
DownStream										
stimation o		Merge Areas			Estimat	tion o		Diverge Areas		
		(D)			Lotinat					
	V ₁₂ = V _F	1 101						• V _R + (V _F - V _F		
eq =		ation 13-6 or			L _{EQ} =		(Equation 13-1	2 or 13-13)
FM =	using	Equation (E	xhibit 13-6)		P _{FD} =		0.	436 using Equ	ation (Exhi	bit 13-7)
12 =	pc/h				V ₁₂ =		32	268 pc/h		
$_3$ or V $_{av34}$	pc/h (Equation 13-	-14 or 13-17)		V_3 or V_{av34}		20)14 pc/h (Equa	ation 13-14	l or 13-17
s V ₃ or V _{av34} > 2,70	00 pc/h? 🗌 Ye	s 🗌 No			Is V_3 or V_{a_1}	_{/34} > 2,7	00 pc/h?	Yes 🗹 No		
s V_3 or $V_{av34} > 1.5$								Yes 🗹 No		
			-16, 13-18, or					c/h (Equation	13-16, 13-	18, or 13
Yes,V _{12a} =	13-19)				If Yes,V _{12a} :			9)		
Capacity Che	T	-		T	Capacit	ty Ch	ecks	-		
	Actual	C C	apacity	LOS F?			Actual		pacity	LOS F
					V _F		7297	Exhibit 13-8		No
V _{FO}		Exhibit 13-8			$V_{FO} = V_{FO}$		7143	Exhibit 13-8	-	No
					V _R		154	Exhibit 13-10		No
low Enterin				Violation	Flow Er	17	-	rge Influen		Violation
M	Actual	i r	Desirable	Violation?	V		Actual	Max Desirab		Violation
V _{R12}		Exhibit 13-8			V ₁₂		3268	Exhibit 13-8	4400:All	No
evel of Serv		1	/		1			termination	•	F)
D _R = 5.475 + 0		0.0078 V ₁₂ -	0.00627 L _A			••		.0086 V ₁₂ - 0.0	009 L _D	
_R = (pc/mi/lr	,					0.6 (pc	,			
OS = (Exhibit	,						oit 13-2)			
Speed Deteri	mination				Speed I	Deter	minatio	on		
1 _S = (Exibit 1	3-11)				ŭ	.312 (E	xhibit 13	-12)		
	nibit 13-11)				S _R = 6	1.3 mph	(Exhibit	13-12)		
	nibit 13-11)				S ₀ = 7	2.8 mph	(Exhibit	13-12)		
	nibit 13-13)				S = 6	7.2 mph	(Exhibit	13-13)		

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-S 2020 Bu	outh of Off to 10th ild 2
Project Description SW 10th Oper.(LOS)	Street SIMR		Des.(N)	Pla	Inning Data
Flow Inputs			500.(11)		
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	6690	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents				
f _ρ Ε _Τ	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	ft ft ramps/mi mph mph	f _{LW} f _{LC} TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance I	Veasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 1787 66.0 27.1 D	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro ur volume	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 8-Be 2020 Bu	et Off & Off Ramps ild 2
Project Description SW 10th	Street SIMR				
Oper.(LOS)			Des.(N)		nning Data
<i>Flow Inputs</i> Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	5670	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents				
f _p E _T	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f _{⊥w} f _{LC} TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance I	Veasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	t f _{HV} x f _p)2019 62.2 32.4 D	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x S)$ $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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Concuel I-F-			S AND RAM			1113				
General Info	rmation			Site Infor						
Analyst				eeway/Dir of Tr		I-95 NB				
gency or Company	iy AEC	OM		inction		Seg 9-(Off to Hills	oro EB&WB		
ate Performed nalysis Time Peric	od AM			risdiction alysis Year		2020 D				
Project Description			AI	alysis teal		2020 B				
nputs	300 1001 3000									
		Eroowov Num	ber of Lanes, N	3						
Upstream Adj I	Ramp			3					Downstrea	am Adj
Yes	On	Ramp Numbe		1					Ramp	
		Acceleration L	ane Length, L _A						🗹 Yes	🗹 On
✓ No	Off	Deceleration L	ane Length L _D	200					🗌 No	Off
		Freeway Volu	me, V _F	5670						
L _{up} =	ft	Ramp Volume	e, V _D	1250					L _{down} =	2100 ft
			-Flow Speed, S _{FF}	70.0						
V _u = v	veh/h	-	ow Speed, S _{FR}	45.0					V _D =	1060 veh
	40 00/10 1100		110	40.0						
Conversion	<u>το pc/n Une</u> V	T Base (Conditions	r	r					
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	$x f_{HV} x f_{p}$
reeway	5670	0.95	Level	3	0	0	985	1.00	60	58
Ramp	1250	0.92	Level	2	0	_	990	1.00		72
JpStream	1200	0.02	LOVGI			0.	550	1.00		12
DownStream	1060	0.92	Level	2	0	0.9	990	1.00	11	64
		Merge Areas	2010.	_				Diverge Areas		•••
stimation o					Estimat	ion o				
		(D)						$\cdot $		
	V ₁₂ = V _F				1			· V _R + (V _F - V _F		
EQ =		ation 13-6 or	,		L _{EQ} =			Equation 13-1		
_{FM} =	•	Equation (E	Exhibit 13-6)		P _{FD} =			545 using Equ	uation (Exhi	bit 13-7)
' ₁₂ =	pc/h				V ₁₂ =		39)28 pc/h		
$'_3$ or V_{av34}	pc/h (Equation 13	-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		2	l30 pc/h (Equ	ation 13-14	1 or 13-17
s V ₃ or V _{av34} > 2,7	'00 pc/h? 🗌 Ye	s 🗌 No			Is V_3 or V_{av}	₃₄ > 2,7	00 pc/h?	Yes 🗹 No		
s V ₃ or V _{av34} > 1.5	5*V ₁₂ /2 □Ye	s 🗌 No			Is V_3 or V_{av}	₃₄ > 1.5	* V ₁₂ /2	Yes 🗹 No		
Yes,V _{12a} =			-16, 13-18, or		If Yes,V _{12a} =	-	, P	c/h (Equation	13-16, 13-	18, or 13
120	13-19))			.24		1	9)		
Capacity Ch	<u>a</u>			0	Capacit	y Che	ecks			11
	Actual	C	apacity	LOS F?			Actual	Ca	pacity	LOS F
	Actual	ř								
	Actual	ŤŤ			V _F		6058	Exhibit 13-8	3 7200	No
V _{FO}	Actual	Exhibit 13-8	· ·		· · · ·	- V _R	6058 4686	Exhibit 13-8 Exhibit 13-8		No No
V _{FO}	Actual				V _{FO} = V _F	- V _R	4686	Exhibit 13-8	3 7200	No
		Exhibit 13-8	<u></u>		V _{FO} = V _F V _R		4686 1372	Exhibit 13-8 Exhibit 13-1	3 7200 0 2100	_
	ng Merge In	Exhibit 13-8			V _{FO} = V _F V _R	nterin	4686 1372 g Dive	Exhibit 13-8 Exhibit 13-1 rge Influen	3 7200 0 2100 ce Area	No No
low Enterin		Exhibit 13-8 offuence A Max 1	rea Desirable	Violation?	V _{FO} = V _F V _R Flow En	nterin	4686 1372 g Dive Actual	Exhibit 13-6 Exhibit 13-1 r ge Influen Max Desirab	3 7200 0 2100 ce Area	No No Violation
Flow Enterin V _{R12}	n g Merge In Actual	Exhibit 13-8 offuence A Max Exhibit 13-8	Desirable		$V_{FO} = V_F$ V_R Flow En	nterin / 3	4686 1372 g Dive Actual 1928	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8	3 7200 0 2100 ce Area ole 4400:All	No No Violation
Flow Enterin V _{R12} .evel of Serv	ng Merge In Actual Vice Detern	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R Flow En	nterin / 3 f Serv	4686 1372 g Dive Actual 1928 /ice De	Exhibit 13-6 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No
Flow Enterin V _{R12} .evel of Serv D _R = 5.475 + 0	Actual Vice Detern 0.00734 v _R +	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R Flow En V_{12} Level of	<i>terin</i> <i>A</i> 3 f Serv D _R = 4	4686 1372 g Dive Actual 1928 rice De 252 + 0	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No
Flow Enterin V _{R12} .evel of Serv D _R = 5.475 + 0	Actual Vice Detern 0.00734 v _R +	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R Flow En V_{12} Level of	nterin / 3 f Serv	4686 1372 g Dive Actual 1928 rice De 252 + 0	Exhibit 13-6 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No
V _{R12} evel of Serv D _R = 5.475 + 0 R = (pc/mi/li	Actual Actual Vice Detern 0.00734 v _R +	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 36$	terin f Serv D _R = 4 5.2 (pc/	4686 1372 g Dive Actual 1928 rice De 252 + 0	Exhibit 13-6 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No
V _{R12} evel of Serv D _R = 5.475 + 0 P _R = (pc/mi/li OS = (Exhibit	ng Merge In Actual vice Detern 0.00734 v _R + In) t 13-2)	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 36$	nterin f Serv D _R = 4 3.2 (pc/ (Exhik	4686 1372 g Dive Actual 1928 rice De 252 + 0 (mi/ln) pit 13-2)	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No
Flow Enterin V_{R12} evel of Serv $D_R = 5.475 + 0$ $D_R = (pc/mi/lit)$ OS = (Exhibit) Speed Deterv	ng Merge In Actual vice Detern 0.00734 v _R + n) t 13-2) rmination	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 36$ LOS = E Speed L	terin f Serv D _R = 4 3.2 (pc/ (Exhik Detern	4686 1372 g Dive Actual 9928 /ice De 252 + 0 /mi/ln) oit 13-2) minatic	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No
Flow Enterin V_{R12} Evel of Servent $D_R = 5.475 + 0$ $P_R = (pc/mi/lit)$ OS = (Exhibit) Speed Detervent $P_S = (Exibit)$	ng Merge In Actual vice Detern 0.00734 v _R + In) t 13-2) mination 13-11)	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R Flow End V_{12} Level of $D_R = 36$ $LOS = E$ Speed L $D_s = 0.$	terin f Serv D _R = 4 6.2 (pc/ (Exhik Detern 421 (E:	4686 1372 g Dive Actual 1928 rice De 252 + 0 (mi/ln) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No
Flow Enterin V_{R12} Evel of Server $D_R = 5.475 + 0$ $D_R = (pc/mi/lit)$ OS = (Exhibit) Exhibit 1 $Speed Deterred Contents R_R^= mph (Exhibit)$	ng Merge In Actual vice Detern 0.00734 v _R + n) t 13-2) mination 13-11) chibit 13-11)	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R Flow End V_{12} Level of $D_R = 36$ $LOS = E$ $Speed L$ $D_s = 0.$ $S_R = 58$	terin f Serv D _R = 4 6.2 (pc/ (Exhik Detern 421 (E: 8.2 mph	4686 1372 g Dive Actual 928 252 + 0 /mi/ln) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No
Flow Enterin V_{R12} Evel of Server $D_R = 5.475 \pm 0$ $D_R = (pc/mi/lit)$ OS = (Exhibit) Exhibit of the server of the	ng Merge In Actual vice Detern 0.00734 v _R + In) t 13-2) mination 13-11)	Exhibit 13-8 ofluence A Max Exhibit 13-8 mination (i	Desirable if not F)		$V_{FO} = V_F$ V_R <i>Flow En</i> V_{12} <i>Level of</i> $D_R = 36$ LOS = E <i>Speed L</i> $D_s = 0.$ $S_R = 58$ $S_0 = 72$	f Serv D _R = 4 6.2 (pc/ (Exhik Detern 421 (E: 8.2 mph 2.4 mph	4686 1372 g Dive Actual 1928 rice De 252 + 0 (mi/ln) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 0 2100 ce Area ole 4400:All n (if not a)	No No Violation No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 10-I 2020 Bu	Bet Off & On Ramps ild 2
Project Description SW 10th	Street SIMR		Des.(N)		nning Data
Flow Inputs					In Thing Data
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4420	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents				
f _p E _T	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	5	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f _{⊥w} f _{LC} TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance I	Veasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 1574 68.4 23.0 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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			REEWAY	WEAV		-	Т			
General	Informati	ion			Site Information					
Analyst Agency/Con Date Perforr Analysis Tin	med	AECO AM	M		Freeway/Dir Weaving Seg Analysis Yea	gment Locati		IB 1-Bet On & C Build 2)ff to Exp	
	cription SW 10	th Street SIM	2							
Inputs					1					
Weaving se	nfiguration mber of lanes, l gment length, L e-flow speed, F	-S		Two-Sided 4 2970ft 70 mph	Segment typ Freeway min Freeway max Terrain type	imum speed			Freewa 1 240 Leve	
Convers	sions to p	<u>c/h Unde</u>	r Base Co	ondition	5		-			
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)	
V _{FF}	3770	0.95	3	0	1.5	1.2	0.985	1.00	4028	
V _{RF}	1970	0.92	2	0	1.5	1.2	0.990	1.00	2163	
V _{FR}	650	0.92	2	0	1.5	1.2	0.990	1.00	714	
V _{RR}	340	0.92	2	0	1.5	1.2	0.990	1.00	373	
V _{NW}	6905				•			V =	7278	
V _W	373							-		
VR	0.051									
	ration Ch		tics							
	aneuver lanes,	N _{WL}		0 Ic			hanges, LC _{MIN}		1119 lc/h	
Interchange	5			0.7 int/mi	Weaving lan				1612 lc/h	
	F lane changes	T.		0 lc/pc	Non-weaving				2463 lc/h	
	R lane changes	T K		0 lc/pc	Total lane ch				4075 lc/h	
Minimum R	R lane changes	s, LC _{RR}		3 lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		1436	
Weaving	g Segmen	t Speed,	Density, I	_evel of	1					
0	egment flow rate			7186 veh/h	Weaving inte	,			0.290	
-	egment capacity	**		8485 veh/h	Weaving seg Average wea				53.4 mph	
0	gment v/c ratio		0	0.847		•			57.6 mph	
Weaving se Level of Sei	egment density,	U	34	4.1 pc/mi/ln D	Average nor	• •	1444		53.2 mph	
				U	Maximum we	eaving lengtr	I, L _{MAX}		6205 ft	
	egments longer			ength should I	be treated as is	olated merge	and diverge are	eas using the	procedures of	
	'Freeway Merge es that exceed th			ne level of ser	vice is "F".					

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BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
		Site Information		
			el <i>I-95 NB</i>	
AECOM		From/To	Seg 12-	North of Hillsboro
AM			2020 Bi	uild 2
	1R		2020 8	
		Des.(N)	Pla	nning Data
5740	veh/h	Peak-Hour Factor, PHF	0.95	
	veh/day	%Trucks and Buses, P_T	3	
		%RVs, P _R	0	
		General Terrain:	Level	
	veh/h	Grade % Length	mi	
		Up/Down %		
tments				
1.00		E _R	1.2	
1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1	1)] <i>0.985</i>	
		Calc Speed Adj and	FFS	
	ft			
	ft	f		mph
4				mph
	ramps/mi			mph
70.0	-	-	70.0	
	-	гго	70.0	mph
	прп			
e Measures	6	Design (N)		
		<u>Design (N)</u>		
N v f		Design LOS		
1533 N 1533	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f _{HV}	··· - //- //
aa 7		x f _p)		pc/h/ln
	-	S		mph
	pc/mi/ln	$D = v_p / S$		pc/mi/ln
С		F	s, N	·
		Factor Location		
S - Spee	ed			f = E.J. 19 19 4 4 0
-				f _{LW} - Exhibit 11-8
	-	· ·	11-13	f _{LC} - Exhibit 11-9
		E. C.		TRD - Page 11-1
			11-2,	
		11-3		
	AECOM AM Oth Street SIN 5740 5740 1.00 1.5 4 70.0 e Measures N x f _{HV} 1533 68.7 22.3 C N x f _{HV} 1533 68.7 22.3 C	AECOM AM Oth Street SIMR $\overline{}$ $\overline{}$ $\phantom{$	Site InformationAECOMHighway/Direction of Trave From/To JurisdictionAMAnalysis YearOth Street SIMRDes.(N)5740veh/h veh/dayPeak-Hour Factor, PHF %Trucks and Buses, P_T %RVs, P_R General Terrain: Grade5740veh/hPeak-Hour Factor, PHF %Trucks and Buses, P_T %RVs, P_R General Terrain: Up/Down %1.00E_R ft ft1.00E_R ft ft_C1.00FR ft ft_C1.00FR ft ft_C1.00FR ft ft_C1.5ft ft_C70.0mph mphPFSDesign (N) Design LOS Vp = (V or DDHV) / (PHF x x fp) S D = vp / S Required Number of LaneaS- Speed D - Density FFS - Free-flow speed BFFS - Base free-flowS- Speed Free-flow speed BFFS - Base free-flow	AECOMHighway/Direction of Travel I-95 NB From/To JurisdictionAMAnalysis Year2020 BiOth Street SIMRDes.(N)Plan5740veh/hPeak-Hour Factor, PHF0.95veh/day%Trucks and Buses, PT3%RVs, PR0General Terrain:LevelGrade% LengthmiUp/Down %tments1.00ER1.21.5ftftftftftftftftftftTRD Adjustment70.0mphFFS70.0mphCDesign (N)Design LOSvariableVariableVariableN x fp,68.7mphSDesign LOSvariableVariableVariableN x fp,S- SpeedSD = vp, / SRequired Number of Lanes, NFactor LocationS- SpeedER- Exhibits 11-10, 11-12G- DensityFFS - Free-flow speedERFFS - Free-flow speedBFFS - Base free-flowERBFFS - Base free-flowFactor LocationES- Speed 11-18LOS, S, FFS, vpExhibits 11-12, 11-13S- Speed 11-18LOS, S, FFS, vpExhibits 11-12, 2.4

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_			FREEWA	VVEAV		_			
General	Informati	on			Site Info	ormation			
Analyst Agency/Con Date Perforr Analysis Tin Project Deco	med	AECO PM			Freeway/Dir Weaving Sea Analysis Yea	gment Locati		IB -Bet Copans Build 2	& Sample
Inputs			\						
Weaving seg Freeway fre	nfiguration mber of lanes, I gment length, L e-flow speed, F sions to p	s FS	r Base Cr	One-Sided 4 2380ft 70 mph	Segment typ Freeway mir Freeway ma Terrain type	nimum speed ximum capac			Freewa 24(Lev
	V (veh/h)	PHF	Truck (%)	RV (%)	Б Т	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	4265	0.95	3	0	1.5	1.2	0.985	1.00	4557
V _{RF}	415	0.92	2	0	1.5	1.2	0.990	1.00	456
V _{FR}	1560	0.92	2	0	1.5	1.2	0.990	1.00	1713
V _{RR}	0	0.95	0	0	1.5	1.2	1.000	1.00	0
V _{NW}	4557							V =	6726
V _W	2169								
VR	0.322								
Configu	ration Ch	aracteris	tics		_				
Minimum m	aneuver lanes,	N _{WL}		2 lc	Minimum we	eaving lane c	hanges, LC _{MIN}		2169 lc
Interchange	e density, ID			0.7 int/mi	Weaving lan	ie changes, L	_C _w		2604 lc
Minimum R	F lane changes	, LC _{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		1458 lc
Minimum F	R lane changes	, LC _{FR}		1 lc/pc	Total lane cl	hanges, LC _{AL}	L		4062 lc
Minimum R	R lane changes	s, LC _{RR}		lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		75
Weavin	g Segmen	t Speed,	Density,	Level of	Service,	and Cap	oacity		
Weaving se	gment flow rate	e, V		6637 veh/h	•	ensity factor,			0.34
Weaving se	gment capacity	′, C _w		7332 veh/h	•	gment speed			49.0 mp
•	gment v/c ratio			0.905	-	aving speed,	**		55.9 mp
-	gment density,	D	34	4.3 pc/mi/ln	Average nor				46.3 mp
Level of Ser	rvice, LOS			D	Maximum w	eaving length	n, L _{max}		5826

Chapter 13, "Freeway Merge and Diverge Segments". b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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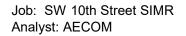
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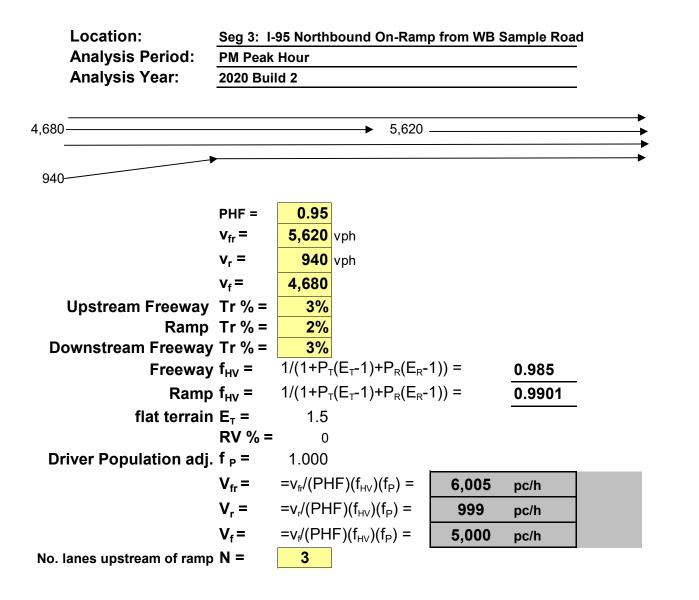
Oonovol Information					
General Information			Site Information		
Analyst	450014		Highway/Direction of Travel	I-95 NB Seq 2-Bet	Off & On from
Agency or Company	AECOM		From/To	Sample	
Date Performed Analysis Time Period	PM		Jurisdiction Analysis Year	2020 Build	12
Project Description SW 10th	n Street SIMR				
✓ Oper.(LOS)			Des.(N)	🗌 Planı	ning Data
Flow Inputs					
Volume, V	4680	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P _T	3	
Peak-Hr Prop. of AADT, K			%RVs, P _R	0	
Peak-Hr Direction Prop, D			General Terrain:	Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Coloulate Flour Adiustr			Sp/Down //		
Calculate Flow Adjustm			_		
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	5	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance I	Measures		Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
v _p = (V or DDHV) / (PHF x N x	1	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x N x)$	f _{HV} x f _n)	pc/h/ln
S	67.5	mph	S	nv p	mph
D = v _p / S	24.7	pc/mi/ln	D = v _p / S		pc/mi/In
LOS	С		Required Number of Lanes, N		• • •
Glossary			Factor Location		
N - Number of lanes	S - Speed				
V - Hourly volume	D - Density		E _R - Exhibits 11-10, 11-12		f _{LW} - Exhibit 11-8
v _n - Flow rate	FFS - Free-flow	speed	E _T - Exhibits 11-10, 11-11, 11-		f _{LC} - Exhibit 11-9
LOS - Level of service	BFFS - Base fre	-	f _p - Page 11-18		TRD - Page 11-11
DDHV - Directional design ho			LOS, S, FFS, v _p - Exhibits 11-	2, 11-3	
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<u>No. Ln</u> <u>C</u>	Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
4 F\	wy downstream of ramp (assume 70 mph free-flow speed) =	9,600	6,005	0.63	No
3 Fv	wy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,000	0.69	No
1 Ca	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	999	0.48	No

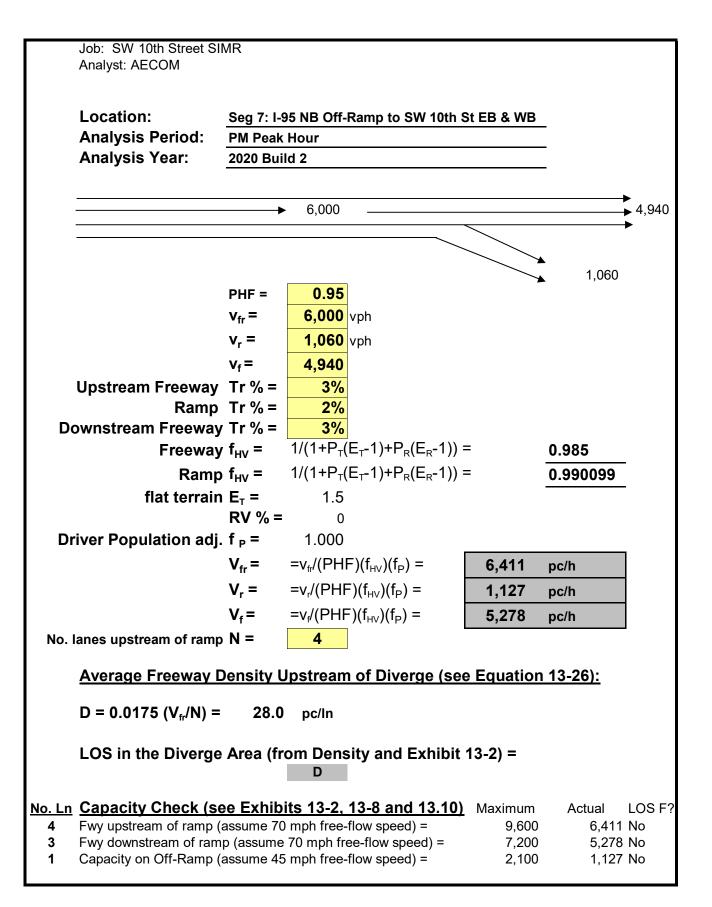
			<u>MPS</u> AND	RAMP JUN	<u>CTIONS W</u>	ORKSHE	ET				
General Ir	nform	ation			Site Infor	mation					
Analyst				Fr	eeway/Dir of Tr	avel I	-95 NI	3			
Agency or Com		AECO	MC	Ju	Inction	8	Seg 4-	On from Ex	р		
Date Performed					irisdiction						
Analysis Time F		PM		Ar	nalysis Year	2	2020 E	Build 2			
Project Descrip I nputs	DTION S	w 10th Street	(SINK								
	_		Freeway Num	ber of Lanes, N	4					_	
Jpstream Adj F	Ramp		Ramp Numbe		4					Downstre Ramp	eam Adj
Yes	On				•					-	
				ane Length, L _A	1500					🗹 Yes	🗌 On
✓ No	Off			ane Length L _D						🗌 No	✓ Off
_	u		Freeway Volu	1	5620						2950 ft
-up = 1	ft		Ramp Volume	IX	610					L _{down} =	2950 H
/ _u = v	veh/h		-	-Flow Speed, S_{FF}	70.0					V _D =	230 veh/h
′u v	VCII/II		Ramp Free-Fl	ow Speed, S _{FR}	50.0					U	
Conversio	on to	pc/h Unc	der Base (Conditions							
(pc/h)		V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
Freeway		5620	0.95	Level	3	0	0	.985	1.00		6005
Ramp		610	0.92	Level	2	0		.990	1.00		670
UpStream											
DownStream		230	0.92	Level	2	0	0	.990	1.00		252
			Merge Areas						iverge Areas		
Estimatio	n of v	12				Estimatio	on c	of v ₁₂			
		V ₁₂ = V _F	(P _{FM})					V = V	V _R + (V _F - V _R)P	
- _{EQ} =		(Equa	ation 13-6 or	⁻ 13-7)					Equation 13-		12)
P _{FM} =		0.134	using Equat	ion (Exhibit 13-6))	L _{EQ} = P -			using Equation		-
/ ₁₂ =		805 po	÷ .	, , , , , , , , , , , , , , , , , , ,		P _{FD} =					13-7)
		-		on 13-14 or 13-		V ₁₂ =			oc/h		47)
V_3 or V_{av34}		17)				V ₃ or V _{av34}			oc/h (Equation 1	3-14 or 13-	17)
Is V_3 or V_{av34} >									Yes No		
Is V ₃ or V _{av34} >	> 1.5 * V					Is V ₃ or V _{av34}	₄ > 1.5	°°V ₁₂ /2 ∟	Yes No	- 10 10 /	10.40
f Yes,V _{12a} =				on 13-16, 13-		If Yes,V _{12a} =			oc/h (Equation 3-19)	n 13-16, 1	13-18, or
Capacity	Choc	18, or	13-19)			Capacity	, Ch		,		
sapacity		Actual	0	apacity	LOS F?			Actual	Car	pacity	LOS F?
		riotaar	Ĭ	apaony	20011	V _F		riotadi	Exhibit 13-8	1	
		0075	E 1 11 11 40 0			$V_{FO} = V_F$	- V_		Exhibit 13-8	_	
V_{FO}		6675	Exhibit 13-8		No		*R		Exhibit 13-		_
						V _R			10		
-low Ente	ering	Merge In	fluence A	rea		Flow Ent	terin	ng Diver	ge Influen	ce Area	3
		Actual	Max	Desirable	Violation?			Actual	Max Desi	rable	Violation?
V _{R12}		3360	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
Level of S	Servic	e Detern	nination (if not F)		Level of	Ser	vice De	terminatio	n (if no	t F)
D _R = 5.4	475 + 0.	00734 v _R + 0	0.0078 V ₁₂ - 0.0	00627 L _A) _R = 4	4.252 + 0	0086 V ₁₂ - 0.	009 L _D	
0 _R = 23.5	(pc/mi/lr	ו)				D _R = (po	c/mi/l	n)			
.OS = C (Ex	xhibit 13	-2)					xhibit	: 13-2)			
Speed De		,				Speed D		,	n		
	3 (Exibit						khibit 1				
		(hibit 13-11)						nibit 13-12)			
S_= 621						I D	· ··				
							h (Fxł	nibit 13-12)			
S ₀ = 66.2	mph (Ex	(hibit 13-11) (hibit 13-13)				S ₀ = mp		nibit 13-12) nibit 13-13)			

			S AND RAM			RKS	HEET			
General Info	rmation			Site Infor						
nalyst				eeway/Dir of Tr		I-95 NE				
gency or Compan	y AECO	MC		nction		Seg 5-0	Off to Exp	rom GPL		
ate Performed nalysis Time Peric	od PM			risdiction alysis Year		2020 B	uild 2			
Project Description		t SIMR		aiysis i cai		2020 D				
nputs										
		Freeway Num	ber of Lanes, N	4						
Upstream Adj	Ramp	Ramp Number		1					Downstrea Ramp	m Adj
✓ Yes	✓ On			I					•	
			ane Length, L _A						Yes	🗌 On
No	Off		ane Length L _D	200					✓ No	Off
		Freeway Volu	me, V _F	6230						
L _{up} = 2	2950 ft	Ramp Volume	, V _R	230					L _{down} =	ft
<u>ار م</u>		Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	veh/h
$V_u = 6$	510 veh/h	Ramp Free-Fl	ow Speed, S _{FR}	45.0					VD -	VEII/II
Conversion	to pc/h Und		110							
(pc/h)	V	PHF		%Truck	0/ Dv		f	f	v = V/PHF	vf vf
(pc/n)	(Veh/hr)	РПГ	Terrain	% ITUCK	%Rv	_	f _{HV}	1		1
reeway	6230	0.95	Level	3	0	0.	985	1.00	66	56
Ramp	230	0.92	Level	2	0	0.	990	1.00	25	2
JpStream	610	0.92	Level	2	0	0.	990	1.00	67	0
ownStream										
- 4:		Merge Areas						Diverge Areas		
stimation o	or v ₁₂				Estimat		^{TV} 12			
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	• V _R + (V _F - V _F)P _{FD}	
_{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13))
	using	Equation (E	Exhibit 13-6)		P _{FD} =		0.	436 using Equ	uation (Exhil	oit 13-7)
12 =	pc/h		,		V ₁₂ =)44 pc/h	,	,
V_{3}^{12} or V_{av34}^{12}	-	Equation 13	-14 or 13-17)		V_3^{12} or V_{av34}^{12}			306 pc/h (Equ	ation 13-14	or 13-17
s V ₃ or V _{av34} > 2,7						> 2 7		⊇Yes ☑ No		
		S III INO			13 v ₃ 01 v _{av}			Yes 🗹 No c/h (Equation	13-16 13-	18 or 13
s V ₃ or V _{av34} > 1.5			-16 13-18 or				۲		10 10, 10	10, 01 10
u .u.u.		Equation 13-	-16, 13-18, or		If Yes,V _{12a} =	=	1	9)		
Yes,V _{12a} =	pc/h (13-19)	Equation 13-	-16, 13-18, or		If Yes,V _{12a} = Capacit			9)		
Yes,V _{12a} =	pc/h (13-19)	Equation 13-	-16, 13-18, or apacity	LOS F?				·	pacity	LOS F
Yes,V _{12a} =	pc/h (13-19) ecks	Equation 13-		LOS F?		ty Ch	ecks	·		LOS F No
Yes,V _{12a} = Capacity Ch	pc/h (13-19) ecks	Equation 13-		LOS F?	Capacit	ty Ch	e cks Actual 6656	Ca Exhibit 13-8	9600	No
Yes,V _{12a} =	pc/h (13-19) ecks	Equation 13-		LOS F?	Capacit V_F $V_{FO} = V_F$	ty Ch	Actual 6656 6404	Ca Exhibit 13-8 Exhibit 13-8	9600 9600	No No
Yes,V _{12a} = Capacity Ch	pc/h (13-19) ecks Actual	Equation 13-	apacity	LOS F?	Capacit V_F $V_{FO} = V_F$ V_R	ty Cho V _R	Actual 6656 6404 252	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1	9600 9600 9600 2100	No
Yes,V _{12a} = Capacity Ch	pc/h (13-19) ecks Actual	Equation 13- C Exhibit 13-8	apacity		Capacit V_F $V_{FO} = V_F$ V_R	- V _R	Actual 6656 6404 252 g Dive	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen	9600 9600 9600 2100 Ce Area	No No No
Yes,V _{12a} = Capacity Chr V _{FO}	pc/h (13-19) ecks Actual	Equation 13- C Exhibit 13-8	apacity	LOS F? Violation?	Capacit V_F $V_{FO} = V_F$ V_R Flow Er	ty Cho - V _R	Actual 6656 6404 252 g Dive Actual	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 r ge Influen Max Desirab	9600 9600 9600 2100 ce Area	No No Violation
Yes,V _{12a} = Capacity Ch V _{FO} Flow Enterin	pc/h (13-19) ecks Actual	Equation 13- C Exhibit 13-8 Ifluence A Max I Exhibit 13-8	apacity I rea Desirable		Capacit V_F $V_{FO} = V_F$ V_R Flow End V_{12}	ty Cho = - V _R	Actual 6656 6404 252 g Dive Actual 3044	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	9600 9600 9600 2100 Ce Area Ile 4400:All	No No Violation No
Yes,V _{12a} = Capacity Chr V _{FO} Flow Enterin V _{R12} evel of Ser	pc/h (13-19) ecks Actual	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow Er V_{12} Level of	ty Che	Actual 6656 6404 252 g Dive Actual 3044 /ice De	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No Violation No
Yes,V _{12a} = Capacity Chr V _{FO}	pc/h (13-19) ecks Actual	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow Er V_{12} Level of	ty Che	Actual 6656 6404 252 g Dive Actual 3044 /ice De	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No No Violation No
Yes,V _{12a} = Capacity Ch V _{FO} Flow Enterin V _{R12} evel of Serv D _R = 5.475 + 0	pc/h (13-19) ecks Actual og Merge In Actual vice Detern 0.00734 v _R +	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow Er V_{12} Level of	ty Che	Actual 6656 6404 252 g Dive Actual 3044 /ice De 252	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No No Violation No
V_{FO} Flow Enterin V_{FO} Flow Enterin V_{R12} evel of Ser $D_R = 5.475 + C$ $R^{=} (pc/mi/l)$	pc/h (13-19) ecks Actual og Merge In Actual vice Detern 0.00734 v _R + 1 n)	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow Er V_{12} Level of $D_R = 28$	$= -V_R$	Actual 6656 6404 252 g Dive Actual 3044 /ice De 252	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No No Violation No
Yes,V _{12a} = Capacity Ch V _{FO} Flow Enterin V _{R12} evel of Ser D _R = 5.475 + 0 R ⁼ (pc/mi/l DS = (Exhibit	pc/h (13-19) ecks Actual og Merge In Actual Actual 0.00734 v _R + 1 0.00734 v _R + 1 13-2)	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow Er V_{12} Level of $D_R = 28$	$\frac{\mathbf{ty} \ Cho}{\mathbf{t}}$	Actual 6656 6404 252 g Dive Actual 3044 /ice De 4.252 + 0 (mi/ln) pit 13-2)	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 T ge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No No Violation No
Yes,V _{12a} = Capacity Ch V_{FO} Flow Enterin V_{R12} Evel of Ser $D_R = 5.475 + C$ $R^{=}$ (pc/mi/l DS = (Exhibit Speed Deter	pc/h (13-19) ecks Actual ag Merge In Actual vice Detern 0.00734 v _R + 1 n) t 13-2) mination	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit V_F $V_FO = V_F$ V_R Flow Er V_{12} Level of $D_R = 28$ LOS = D Speed L	ty Che - V _R - V _R - V _R V _R V _R 	Actual 6656 6404 252 g Dive Actual 8044 /ice De 2.252 + 0 /mi/In) bit 13-2) minatic	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influent Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No No Violatior No
Yes,V _{12a} = Capacity Ch V _{FO} V _{FO} Flow Enterin V _{R12} evel of Ser D _R = 5.475 + 0 R = (pc/mi/I OS = (Exhibit Speed Deter	pc/h (13-19) ecks Actual og Merge In Actual vice Detern 0.00734 v _R + 1 n) t 13-2) rmination	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit Capacit V_F $V_F = V_F$ V_R Flow Er V_{12} Level of $D_R = 28$ LOS = D Speed L $D_s = 0.$	ty Che - V _R - V _R V _R V _R V _R V _R V _R 	Actual 6656 6404 252 g Dive Actual 3044 /ice De (/mi/ln) bit 13-2) minatic xhibit 13-	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influen Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No Violation No
Yes, $V_{12a} =$ Capacity Ch V_{FO} Flow Enterin V_{R12} Evel of Ser $D_R = 5.475 + C$ $R^{=}$ (pc/mi/l OS = (Exhibit Speed Deter $R^{=}$ (pc/mi/l S = (Exhibit S = (Exhibit)	pc/h (13-19) ecks Actual ag Merge In Actual Actual vice Detern 0.00734 v _R + h n) t 13-2) cmination 13-11) thibit 13-11)	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit Capacit V_F $V_FO = V_F$ V_R Flow Er V_{12} Level of $D_R = 28$ LOS = D Speed L $D_S = 0.$ $S_R = 6$	ty Che $= -V_R$ $= -V_R$	Actual 6656 6404 252 g Dive Actual 3044 /ice De 2.252 + 0 (mi/ln) bit 13-2) minatic xhibit 13-	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8 Ex	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No Violation No
Yes, V_{12a} = Capacity Chi V_{FO} Flow Enterin V_{R12} Evel of Serve D_R = 5.475 + 0 R_R = (pc/mi/l DS = (Exhibit Compared Deterve R_R = mph (Ex R_R = mph (Ex	pc/h (13-19) ecks Actual og Merge In Actual vice Detern 0.00734 v _R + 1 n) t 13-2) rmination	Equation 13- C Exhibit 13-8 fluence A Max 1 Exhibit 13-8 nination (i	apacity Irea Desirable if not F)		Capacit $V_FO = V_F$ $V_{FO} = V_R$ V_{I2} Flow Er V_{12} Level of $D_R = 28$ LOS = D $D_R = 28$ $D_S = 0$ $S_R = 6$ $S_0 = 7$	ty Che - V _R - V _R V _R V _R V _R V _R 	Actual 6656 6404 252 g Dive Actual 3044 /ice De (/mi/ln) bit 13-2) minatic xhibit 13-	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Trge Influen Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0 00 01 .12) 13-12) 13-12)	9600 9600 2100 Ce Area lle 4400:All n (if not l	No No Violation No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-S 2020 Bu	outh of Off to 10th ild 2
Project Description SW 10th	Street SIMR				naina Data
✓ Oper.(LOS) Flow Inputs			Des.(N)		anning Data
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	6000	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents		, , , , , , , , , , , , , , , , , , ,		
f _ρ Ε _Τ	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	5	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	ft ft ramps/mi mph mph	f _{∟w} f _{LC} TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance I	Veasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 1603 68.1 23.5 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 8-B 2020 Bu	et Off & Off Ramps ild 2
Project Description SW 10th	Street SIMR				
Oper.(LOS)			Des.(N)	Pla	inning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4940	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents		Op/Down %		
f _p	1.00		E _R	1.2	
E _T	1.5		к f _{HV} = 1/[1+Р _т (Е _т - 1) + Р _R (Е _R - 1)]	0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	3	ft ft ramps/mi	f _{∟w} f _{LC} TRD Adjustment		mph mph mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 1759 66.4 26.5 D	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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0	5	RAMP	S AND RAM			DRKS	HEET			
General Inf	ormation			Site Infor						
Analyst		~		eeway/Dir of Tr	avel	I-95 NE				
gency or Compa Date Performed	any AEC	OM		nction risdiction		Seg 9-0	Off to Hillst	oro EB&WB		
nalysis Time Pe	eriod PM			nalysis Year		2020 B	uild 2			
	on SW 10th Stree	t SIMR	74			2020 D				
nputs										
	di Davaa	Freewav Num	ber of Lanes, N	3						una A alli
Upstream A	aj Ramp	Ramp Numbe		1					Downstrea Ramp	m Aaj
Yes	On	•		I					•	
			ane Length, L _A	000					Yes	🗹 On
✓ No	Off		ane Length L _D	200					No	Off
	<i>c</i> .	Freeway Volu	1	4940					ı –	0400 G
L _{up} =	ft	Ramp Volume	e, V _R	1250					L _{down} =	2100 ft
\/ -	, , , , la /la	Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	1200 veh
V _u =	veh/h	Ramp Free-Fl	ow Speed, S _{FR}	45.0					* D	1200 VEI
Conversio	n to pc/h Un	der Base (Conditions							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f	f	v = V/PHF	vf vf
,	(Veh/hr)		Terrain	/0 ITUCK	/0RV	_	f _{HV}	1		1
reeway	4940	0.95	Level	3	0	0.	985	1.00	527	78
Ramp	1250	0.92	Level	2	0	0.	990	1.00	137	72
JpStream										
DownStream	1200	0.92	Level	2	0	0.	990	1.00	13	17
otim otio n		Merge Areas			Catimat	tion o		iverge Areas		
stimation	01 V ₁₂				Estimat		^{T V} 12			
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	V _R + (V _F - V _F	_R)P _{FD}	
_{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13)	
FM =	using	Equation (E	Exhibit 13-6)		P _{FD} =		0.	565 using Equ	uation (Exhib	oit 13-7)
/ ₁₂ =	pc/h				V ₁₂ =		35	579 pc/h		
₃ or V _{av34}	pc/h (Equation 13	-14 or 13-17)		V_3 or V_{av34}			699 pc/h (Equ	ation 13-14	or 13-17
	2,700 pc/h? 🔲 Ye		,			ou > 2.7		Yes No		
	1.5 * V ₁₂ /2 □ Ye							Yes Vo		
			-16, 13-18, or					c/h (Equation	13-16, 13-	18. or 13
Yes,V _{12a} =	13-19)	• •	,,,		If Yes,V _{12a}	=	19		,	
Capacity C	hecks				Capacit	ty Ch	ecks			
	Actual	С	apacity	LOS F?			Actual	Ca	pacity	LOS F
					V _F		5278	Exhibit 13-8	7200	No
		Exhibit 13-8			V _{FO} = V _F	_F - V _R	3906	Exhibit 13-8	7200	No
V _{FO}					V _R		1372	Exhibit 13-1		No
V _{FO}							1012	Extribute for the		
	ing Morgo In		<u>r02</u>				a Divo	rao Influon	co Aros	
	ing Merge In			Violation?		nterin	-	r ge Influen Max Desirah		Violation
Flow Enter	ing Merge In Actual	Max	rea Desirable	Violation?	Flow Er	nterin	Actual	Max Desirab	le	Violation'
Flow Enter V _{R12}	Actual	Max Exhibit 13-8	Desirable	Violation?	Flow Er	nterin	Actual 3579	Max Desirab Exhibit 13-8	le 4400:All	No
Flow Enter V _{R12} .evel of Se	Actual ervice Detern	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Er V ₁₂ Level o	nterin	Actual 3579 /ice De	Max Desirab Exhibit 13-8 terminatio	le 4400:All n (if not F	No
Flow Enter V _{R12} .evel of Se D _R = 5.475 +	Actual ervice Determ + 0.00734 v _R +	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Er V ₁₂ Level o	nterin 7 5 f Serv D _R = 4	Actual 3579 / ice De 1.252 + 0	Max Desirab Exhibit 13-8	le 4400:All n (if not F	No
Flow Enter V _{R12} .evel of Se D _R = 5.475 +	Actual ervice Determ + 0.00734 v _R +	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Er V ₁₂ Level o	nterin	Actual 3579 / ice De 1.252 + 0	Max Desirab Exhibit 13-8 terminatio	le 4400:All n (if not F	No
<i>V_{R12}</i> <i>V_{R12}</i> <i>evel of Se</i> D _R = 5.475 + _R = (pc/m	Actual ervice Determ + 0.00734 v _R +	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Ei V_{12} Level o $D_R = 3$	nterin 7 5 f Serv 0 _R = 4 3.2 (pc)	Actual 3579 / ice De 1.252 + 0	Max Desirab Exhibit 13-8 terminatio	le 4400:All n (if not F	No
Flow Enter V_{R12} evel of Se $D_R = 5.475 + 0$ $P_R = (pc/m)$ OS = (Exhil	Actual ervice Detern + 0.00734 v _R + ii/ln)	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Ei V_{12} Level o $D_R = 3$	nterin f Serv D _R = 4 3.2 (pc,) (Exhit	Actual 3579 1.252 + 0 /mi/In) pit 13-2)	Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.	le 4400:All n (if not F	No
Flow Enter V_{R12} evel of Se $D_R = 5.475 +$ $d_R = (pc/m)$ OS = (Exhill Speed Dete	Actual Prvice Detern + 0.00734 v _R + ii/ln) bit 13-2) Prmination	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Ei V_{12} Level o $D_R = 3$ LOS = D Speed I	nterin f Serv D _R = 4 3.2 (pc,) (Exhilt Deter	Actual 3579 1.252 + 0 /mi/In) pit 13-2)	Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	le 4400:All n (if not F	No
Flow Enter V_{R12} evel of Se $D_R = 5.475 +$ R = (pc/m) OS = (Exhill) Speed Detection	Actual Actua	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Ei V_{12} Level o $D_R = 3$ LOS = D Speed I $D_s = 0$	nterin f Serv D _R = 4 3.2 (pc,) (Exhit Deter .421 (E	Actual 3579 1.252 + 0 /mi/ln) pit 13-2) minatic xhibit 13-	Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	le 4400:All n (if not F	No
Flow Enter V_{R12} evel of Se $D_R = 5.475 +$ $R^{=}$ (pc/m OS = (Exhil Speed Dete $R^{=}$ (Exibi $R^{=}$ mph (E	Actual Actual	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Ei V_{12} Level o $D_R = 3$ LOS = D Speed I $D_s = 0$ $S_R = 5$	nterin f Ser D _R = 4 3.2 (pc,) (Exhit Deter .421 (E 8.2 mph	Actual 3579 1.252 + 0 /mi/In) bit 13-2) minatic xhibit 13- (Exhibit	Max Desirat Exhibit 13-8 termination .0086 V ₁₂ - 0.0 000 001 12) 13-12)	le 4400:All n (if not F	No
Flow Enter V_{R12} Evel of Se $D_R = 5.475 +$ $R^{=}$ (pc/m DS = (Exhilt Speed Detection $R^{=}$ mph (E $D_{0}^{=}$ mph (E	Actual Actua	Max Exhibit 13-8 mination (i	Desirable if not F)	Violation?	Flow Ei V_{12} Level o $D_R = 3$ LOS = D $D_S = 0$ $S_R = 5$ $S_0 = 7$	f Serv D _R = 4 3.2 (pc, 0 (Exhite A21 (E 8.2 mph 4.1 mph	Actual 3579 1.252 + 0 /mi/ln) pit 13-2) minatic xhibit 13-	Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.1 000 12) 13-12) 13-12)	le 4400:All n (if not F	No

General Information					
			Site Information		
Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year		Bet Off & On Ramps
Project Description SW 10t	th Street SIMR				
✓ Oper.(LOS))		Des.(N)	Pla	nning Data
Flow Inputs					
/olume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	3690	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain:	0.95 3 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjust	ments				
f _p	1.00		E _R	1.2	
Ε _τ	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	\$	
_ane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Fotal Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
<u>Dperational (LOS)</u> v _p = (V or DDHV) / (PHF x N S D = v _p / S _L OS	x f _{HV} x f _p) 1314 69.8 18.8 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes / - Hourly volume / _p - Flow rate _OS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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0	11.6		REEWAY	WEAV		-	Т		
Genera	al Informati	on			Site Info	rmation			
Analyst Agency/Co Date Perfo Analysis T		AECOI PM	M		Freeway/Dir Weaving Seg Analysis Yea	gment Locati		IB 1-Bet On & C Build 2)ff to Exp
Project De	scription SW 10	th Street SIMF	R						
Inputs									
Weaving n Weaving s Freeway fr	onfiguration umber of lanes, l egment length, L ee-flow speed, F	FS		Two-Sided 4 2970ft 70 mph	Segment type Freeway min Freeway may Terrain type	imum speed			Freewa 240 Lev
Conve	rsions to p	<u>c/h Unde</u>	r Base Co	ondition	S		1	1	1
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	3198	0.95	3	0	1.5	1.2	0.985	1.00	3417
V _{RF}	2132	0.92	2	0	1.5	1.2	0.990	1.00	2341
V _{FR}	492	0.92	2	0	1.5	1.2	0.990	1.00	540
V _{RR}	328	0.92	2	0	1.5	1.2	0.990	1.00	360
V _{NW}	6298							V =	6658
V _W	360								
VR	0.054								
Config	uration Ch	aracteris	tics		r				
Minimum ı	maneuver lanes,	N _{WL}		0 lc	Minimum we	eaving lane c	hanges, LC _{MIN}		1080 lc/
-	je density, ID			0.7 int/mi	Weaving lan	-			1573 lc/
	RF lane changes	T.		0 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		2150 lc/
Minimum I	FR lane changes	s, LC _{FR}		0 lc/pc	Total lane ch	nanges, LC _{AL}	L		3723 lc/
Minimum I	RR lane changes	s, LC _{RR}		3 lc/pc	Non-weaving	g vehicle ind	ex, I _{NW}		130
Weavir	ng Segmen	t Speed,	Density, I	_evel of	Service,	and Cap	pacity		
0	segment flow rate segment capacity			6576 veh/h 8473 veh/h	Weaving inte Weaving seg	5			0.27 54.4 mp
-	segment v/c ratio	VV		0.776	Average wea	aving speed,	S _W		58.3 mp
0	segment density,		30).6 pc/mi/ln	Average non	n-weaving sp	eed, S _{NW}		54.2 mp
Level of S	ervice, LOS			D	Maximum we	eaving length	n, L _{MAX}		6232
Notes					•				
Chapter 13	segments longer f , "Freeway Merge nes that exceed th	and Diverge Se	egments".	-		olated merge	and diverge ar	eas using the	procedures of

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	:1	
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Trave From/To Jurisdiction		North of Hillsboro
Analysis Time Period	PM		Analysis Year	2020 Bi	uild 2
Project Description SW 1	Oth Street SIM				
✓ Oper.(LOS) Flow Inputs			Des.(N)		nning Data
Volume, V	5330	veh/h	Peak-Hour Factor, PHF	0.95	
AADT	0000	veh/day	%Trucks and Buses, P_T	3	
Peak-Hr Prop. of AADT, K		, j	%RVs, P _R	0	
Peak-Hr Direction Prop, D			General Terrain:	Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments		00,20111,0		
f _p	1.00		E _R	1.2	
Е _т	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.985</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performanc	e Measures	5	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
Operational (LOS)	N v f		Design LOS		
$v_p = (V \text{ or } DDHV) / (PHF x)$	1424 HV	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f _{HV}	pc/h/ln
x f _p) S	60.4	mah	x f _p)		pc/n/in
	69.4 20 5	mph	S		mph
$D = v_p / S$	20.5	pc/mi/ln	$D = v_p / S$		pc/mi/In
LOS	С		Required Number of Lane	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E _R - Exhibits 11-10, 11-12		f _{I W} - Exhibit 11-8
V - Hourly volume	D - Dens	ity	$E_{\rm R}$ - Exhibits 11-10, 11-11,		f_{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free	e-flow speed	$f_{p} - Page 11-18$,	TRD - Page 11-1
LOS - Level of service	BFFS - Ba	ase free-flow	•	11 2	IND - Faye II-I
speed	h		LOS, S, FFS, v _p - Exhibits 11-3	i I-∠,	
DDHV - Directional design	nour volume				

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 1-B 2020 Ви	et Hillsboro & Palmette iild 2
Project Description SW 10th	n Street SIMR				anning Data
✓ Oper.(LOS) Flow Inputs			Des.(N)	L Pla	anning Data
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4580	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain:	0.95 3 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustn	nents				
f _p	1.00		E _R	1.2	
Ε _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	S	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N	4	ft ft	f _{LW} f _{LC}		mph mph
Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	70.0	ramps/mi mph mph	TRD Adjustment FFS	70.0	mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N > S D = v _p / S LOS	(f _{HV} x f _p) 1223 70.0 17.5 B	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fro ur volume	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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		I	REEWAY	WEAV		RKSHEE	Т		
Genera	al Informati	on			Site Info	rmation			
-	rmed ime Period	AECO AM			Freeway/Dir Weaving Seg Analysis Yea	gment Locati		3 -Bet On from Build 2	Exp & Off
Project De Inputs	scription SW 10t	th Street SIMF	2						
Weaving c Weaving n Weaving s Freeway fr	onfiguration umber of lanes, I egment length, L ree-flow speed, F	s FS	_	Two-Sided 4 3900ft 70 mph	Segment typ Freeway min Freeway max Terrain type	imum speed			Freeway 1! 2400 Leve
Conve	rsions to p		1		1	_	<u> </u>	<u> </u>	1
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	3460	0.95	3	0	1.5	1.2	0.985	1.00	3697
V _{RF}	850	0.92	2	0	1.5	1.2	0.990	1.00	933
V _{FR}	1120	0.92	2	0	1.5	1.2	0.990	1.00	1230
V _{RR}	90	0.92	2	0	1.5	1.2	0.990	1.00	99
V _{NW}	5860							V =	5959
V _w	99								
VR	0.017								
	uration Cha		tics		Minimum	oving long o	hanges IC		207 la/h
	maneuver lanes,	N _{WL}		0 lc			hanges, LC _{MIN}		297 lc/h
	ge density, ID RF lane changes			0.7 int/mi	Weaving lan	-			869 lc/h
	-	i ti		0 lc/pc	Non-weaving				2756 lc/h
	FR lane changes	T K		0 lc/pc	Total lane ch	- //	. L		3625 lc/h
	RR lane changes	IXX			Non-weaving	-			1600
	ng Segmen				í.				0.010
Ũ	segment flow rate			5882 veh/h	Weaving inte Weaving sec	,			0.213 60.7 mph
Ũ	segment capacity	, с _w		8859 veh/h	Average wea	, ,			60.3 mph
0	segment v/c ratio segment density,	П	2,	0.664 1.5 pc/mi/ln	Average nor	0.	**		60.7 mph
Ŭ	ervice, LOS		Ζ-	е.5 рс/пп/пт С	Maximum we	• •			5881 ft
	, _00			Ŭ			', LMAX		500111
Chapter 13	segments longer t , "Freeway Merge ; nes that exceed th	and Diverge Se	egments".	-		solated merge	and diverge are	eas using the	procedures of

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	l-95 SB Seg 3-B 2020 Bu	et Off & On Ramp iild 2
Project Description SW 10th	Street SIMR				
Oper.(LOS)			Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4310	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	3	ft ft ramps/mi	f _{∟w} f _{LC} TRD Adjustment		mph mph mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 1535 68.7 22.3 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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<u> </u>		RAMP	S AND RAM			RKS	HEET			
General Inf	ormation			Site Infor						
nalyst	. = 0	~		eeway/Dir of Tr						
Agency or Compa Date Performed	any AEC	OM		nction risdiction	Seg 4-Diverge to SW 10th St					
Analysis Time Pe	eriod AM			nalysis Year		2020 B	uild 2			
	on SW 10th Stree	t SIMR	7.4			2020 D				
nputs										
	di Dama	Freeway Num	ber of Lanes, N	3					Deveneting	یمه ۸ ما:
Upstream A	aj Ramp	Ramp Numbe		1					Downstrea Ramp	m Aaj
Yes	On		Lane Length, L_{Δ}	I					•	_
			- 1	000					Yes	🗹 On
✓ No	Off		Lane Length L _D	200					No	Off
	~	Freeway Volu	I	4310					ı –	0400 #
L _{up} =	ft	Ramp Volume	e, V _R	1100					L _{down} =	2400 ft
\/ -	veh/h	Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	1290 veh
V _u =	ven/n	Ramp Free-Fl	ow Speed, S _{FR}	45.0					• D	1200 001
Conversio	n to pc/h Uno	der Base	Conditions							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{uv} x f
	(Veh/hr)					_		1		I
Freeway	4310	0.95	Level	3	0	_	985	1.00	460	
Ramp	1100	0.92	Level	2	0	0.	990	1.00	120	08
UpStream DownStream	1200	0.92		0	0		000	1.00	14	16
JownStream	1290	Merge Areas	Level	2	0	0.	990)iverge Areas	14	10
stimation		merge Areas			Estimat	ion o		nverge Areas		
					200,11140					
	V ₁₂ = V _F	1.00						V _R + (V _F - V _F	(IB	
EQ =		ation 13-6 or			L _{EQ} =			Equation 13-1		
P _{FM} =	using	Equation (B	Exhibit 13-6)		P _{FD} =		0.	589 using Equ	uation (Exhib	oit 13-7)
′ ₁₂ =	pc/h				V ₁₂ =		32	210 pc/h		
V_3 or V_{av34}	pc/h (Equation 13	-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		13	95 pc/h (Equ	ation 13-14	or 13-17
s V ₃ or V _{av34} > 2	2,700 pc/h? 🗌 Ye	s 🗌 No				₃₄ > 2,7	00 pc/h?	Yes 🗹 No		
	1.5 * V ₁₂ /2 🗌 Ye							Yes 🗹 No		
Yes,V _{12a} =			-16, 13-18, or		If Yes,V _{12a} =	•		c/h (Equation	13-16, 13-	18, or 13-
	13-19))					19	9)		
Capacity C				ĩ	Capacit	y Che				ī
	Actual	C	apacity	LOS F?			Actual		pacity	LOS F?
					V _F		4605	Exhibit 13-8	7200	No
V _{FO}		Exhibit 13-8			V _F V _{FO} = V _F		4605 3397	Exhibit 13-8	-	No No
V _{FO}		Exhibit 13-8							7200	_
	ing Merge In		Irea		V _{FO} = V _F	- V _R	3397 1208	Exhibit 13-8 Exhibit 13-1	7200 2100	No
	r ing Merge In Actual	nfluence A	rea Desirable	Violation?	V _{FO} = V _F	- V _R	3397 1208	Exhibit 13-8	7200 2100 ce Area	No
Flow Enter		ofluence A		Violation?	V _{FO} = V _F V _R Flow En	- V _R	3397 1208 g Dive Actual	Exhibit 13-8 Exhibit 13-1 r ge Influen Max Desirab	7200 2100 Ce Area	No No
Flow Enter V _{R12}	Actual	fluence A Max Exhibit 13-8	Desirable	Violation?	$V_{FO} = V_F$ V_R	nterin	3397 1208 g Dive Actual 3210	Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	7200 2100 ce Area Ile 4400:All	No No Violation?
Flow Enter V _{R12} Level of Se	Actual	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R Flow En	terin	3397 1208 g Dive Actual 2210 /ice De	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	7200 2100 2100 200 2100 200 2100	No No Violation?
Flow Enter V _{R12} Level of Se D _R = 5.475 +	Actual ervice Determ + 0.00734 v _R +	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R Flow End V_{12} Level of	<i>terin</i> <i>f</i> Serv	3397 1208 g Dive Actual 2210 rice De 252 + 0	Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	7200 2100 2100 200 2100 200 2100	No No Violation
Flow Enter V _{R12} evel of Se D _R = 5.475 + 0 _R = (pc/m	Actual ervice Detern + 0.00734 v _R + hi/ln)	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 30$	$\frac{1}{P} - V_R$	3397 1208 g Dive Actual 3210 /ice De 252 + 0 (mi/ln)	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	7200 2100 2100 200 2100 200 2100	No No Violation
Flow Enter V_{R12} Level of Se $D_R = 5.475 + 0_R = (pc/m)$ OS = (Exhild)	Actual ervice Detern + 0.00734 v _R + 1 hi/ln) bit 13-2)	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R Flow End V_{12} Level of $D_R = 30$ $LOS = D$	$= -V_R$ $=$	3397 1208 g Dive Actual 2210 rice De 252 + 0 (mi/ln) pit 13-2)	Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	7200 2100 2100 200 2100 200 2100	No No Violation
Flow Enter V_{R12} Level of Se $D_R = 5.475 + 0_R = (pc/m)$ OS = (Exhild)	Actual ervice Detern + 0.00734 v _R + hi/ln)	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 30$	$= -V_R$ $=$	3397 1208 g Dive Actual 2210 rice De 252 + 0 (mi/ln) pit 13-2)	Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	7200 2100 2100 200 2100 200 2100	No No Violation
Flow Enter V_{R12} Level of Se $D_R = 5.475 + 0_R = (pc/m)$ OS = (Exhill Speed Deter	Actual ervice Detern + 0.00734 v _R + 1 hi/ln) bit 13-2)	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 30$ LOS = D Speed L	- V _R - V	3397 1208 g Dive Actual 2210 rice De 252 + 0 (mi/ln) pit 13-2)	Exhibit 13-8 Exhibit 13-10 Tge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	7200 2100 2100 200 2100 200 2100	No No Violation
Flow Enter V_{R12} Eevel of Se $D_R = 5.475 + 0$ $D_R = (pc/m)$ OS = (Exhill Speed Deternations)	Actual ervice Detern + 0.00734 v _R + 1 hi/ln) bit 13-2) ermination it 13-11)	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R Flow End V_{12} Level of $D_R = 30$ $LOS = D$ Speed L $D_s = 0.$	$= -V_R$ $=$	3397 1208 g Dive Actual 2210 /ice De 252 + 0 /mi/ln) Dit 13-2) minatic	Exhibit 13-8 Exhibit 13-10 Tige Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	7200 2100 2100 200 2100 200 2100	No No Violation
Flow Enter V_{R12} Evel of Se $D_R = 5.475 + 0$ $O_R = (pc/m)$ OS = (Exhile) OS	Actual Actual	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R Flow End V_{12} Level of $D_R = 30$ LOS = D $Speed L$ $D_s = 0.$ $S_R = 58$	- V _R - V _R	3397 1208 g Dive Actual 2210 rice De 252 + 0 (mi/ln) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-10 Tige Influent Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0 .0086 V ₁₂ - 0.0	7200 2100 2100 200 2100 200 2100	No No Violation
Flow Enter V_{R12} DR = 5.475 + $D_R = (pc/m)$ OS = (Exhild Speed Detection $M_S = (Exibild M_S = (Exibild)M_S =$	Actual ervice Detern + 0.00734 v _R + 1 hi/ln) bit 13-2) ermination it 13-11)	nfluence A Max Exhibit 13-8 mination (i	Desirable <i>if not F)</i>	Violation?	$V_{FO} = V_F$ V_R <i>Flow En</i> V_{12} <i>Level of</i> $D_R = 30$ LOS = D Speed L $D_s = 0.$ $S_R = 58$ $S_0 = 75$	$= -V_R$ $=$	3397 1208 g Dive Actual 210 /ice De 252 + 0 /mi/ln) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0 000 12) 13-12) 13-12)	7200 2100 2100 200 2100 200 2100	No No Violation?

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	l-95 SB Seg 5-Be 2020 Bu	et Off & On Ramps ild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	🗌 Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	3210	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents		Up/Down %		
	1.00		E _R	1.2	
E _T	1.5		к f _{HV} = 1/[1+Р _т (Е _т - 1) + Р _R (Е _R - 1)]	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N	3	ft ft	f _{LW} f _{LC}		mph mph
Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	70.0	ramps/mi mph mph	TRD Adjustment FFS	70.0	mph mph
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 1143 70.0 16.3 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S D = v_p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design bo	S - Speed D - Density FFS - Free-flow BFFS - Base fre	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
DDHV - Directional design ho Copyright © 2016 University of Florida			HCS 2010 TM Version 6.00		enerated: 6/18/2020 9

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General Information Site Information Analyst Freeway/Dir of Travel I-95 SB Agency or Company AECOM Junction Seg 6-Merge from Hillsboro E&W Date Performed Amalysis Time Period AM Analysis Year 2020 Build 2 Project Description SW 10th Street SIMR Inputs Downstream A Upstream Adj Ramp Freeway Number of Lanes, N 1 Ramp Vers On Acceleration Lane Length, L _A 300 Vers Vers On No Off Deceleration Lane Length L _D Freeway Volume, V _F 3210 Volume = ft Volume = ft V _u = 1100 veh/h Freeway Free-Flow Speed, S _{FF} 70.0 Volume = veh Volume = veh Freeway 3210 0.95 Level 3 0 0.985 1.00 3430 Ramp 1290 0.92 Level 2 0 0.990 1.00 1416 Upstream 1100 0.92 Level 2 0 0.990 1.00 1416 Upstream 1100 0.92 Level	On Off n/h					
Agency or Company Date Performed Analysis Time Period AECOM AM Junction Jurisdiction Seg 6-Merge from Hillsboro E&W Project Description SW 10th Street SIMR 2020 Build 2 Imputs Imputs Imputs Downstream Af Ramp Number of Lanes, N 3 Imputs Freeway Number of Lanes, N 1 Ramp Imputs Acceleration Lane Length, L _A 300 Imputs Imputs Preserve Volume, V _F 3210 Imputs Imputs Imputs Preserve Volume, V _F 3210 Imputs Imputs Imputs Imputs Freeway Volume, V _F 3210 Imputs	On Off n/h					
Agency or Company AECOM Junction Seg 6-Merge from Hillsboro E&W Date Performed AM Analysis Year 2020 Build 2 Project Description SW 10th Street SIMR Downstream A Inputs Project Description SW 10th Street SIMR Downstream A Westeam Adj Ramp Freeway Number of Lanes, N 3 Downstream A Imputs Project Description Seg 6-Merge from Hillsboro E&W Downstream A Imputs Project Description SW 10th Street SIMR Downstream A Imputs Freeway Number of Lanes, N 3 Downstream A Imputs Ramp Number of Lanes, N 1 Preserval Downstream A Imputs Ramp Number of Lanes, N 1 Imputs Downstream A Imputs Ramp Number of Lanes, N 3 Imputs Downstream A Imputs Ramp Number of Lanes, N 3 Imputs Imputs Imputs Imputs Downstream A Imputs Ramp Number of Lanes, N 3 1 Imputs Imputs Imputs Imputs Imputs Imputs Imputs Imputs Imputs </td <td>On Off n/h</td>	On Off n/h					
Analysis Time Period AM Analysis Year 2020 Build 2 Project Description SW 10th Street SIMR Inputs Freeway Number of Lanes, N 3 Downstream Aramp If Yes On Acceleration Lane Length, LA 300 If Yes If Yes <t< td=""><td>On Off n/h</td></t<>	On Off n/h					
Project Description SW 10th Street SIMR Inputs Freeway Number of Lanes, N 3 Downstream Adj Ramp Freeway Number of Lanes, N 1 Downstream Adj Ramp Downstream Adj Ramp Preeway Number of Lanes, N 1 Ramp Number of Lanes, N 1 Ramp	On Off n/h					
InputsJpstream Adj RampFreeway Number of Lanes, N3 \square YesOnAcceleration Lane Length, LA300 \square No \square OffDeceleration Lane Length LD \square Yes \square No \square OffDeceleration Lane Length LD \square Yes \square No \square OffDeceleration Lane Length LD \square Yes \square vup2400 ftRamp Volume, VR1290 \square up1100 veh/hFreeway Free-Flow Speed, SFF70.0 \square Ramp Free-Flow Speed, SFR50.0VDConversion to pc/h Under Base Conditions(pc/h) \bigvee (Veh/hr)PHFTerrain $\%$ Truck $\%$ Rv f_{HV} freeway32100.95Level300.9851.00Aramp12900.92Level200.9901.00Instream11000.92LevelDownStreamIntereasDiverge AreasDiverge AreasDiverge Areas	On Off n/h					
Jpstream Adj RampFreeway Number of Lanes, N3 Ramp Number of Lanes, N1 Ramp \checkmark YesOnAcceleration Lane Length, LA300 \bigcirc YesO \bigcirc No \checkmark OffDeceleration Lane Length LD Freeway Volume, VF3210 \bigcirc No \bigcirc O $\square_{up} =$ 2400 ftRamp Volume, VR1290 \lor No \bigcirc O $/_u =$ 1100 veh/hFreeway Free-Flow Speed, SFF70.0 Ramp Free-Flow Speed, SFR50.0 $\lor_D =$ vehConversion to pc/h Under Base Conditions (pc/h) \bigvee (Veh/hr)PHFTerrain $\%$ Truck $\%$ Rv f_{HV} f_p $v = V/PHF \times f_{HV}$ Freeway32100.95Level300.9851.003430Ramp12900.92Level200.9901.001416UpStream11000.92Level200.9901.001208Diverge AreasEstimation of v_{12}	On Off n/h					
Application Koll KampRamp Number of Lanes, N1Ramp \checkmark YesOnAcceleration Lane Length, LA300 \bigcirc Yes \bigcirc No \bigcirc No \checkmark OffDeceleration Lane Length LD \bigcirc No \bigcirc No \bigcirc No \bigcirc up =2400 ftRamp Volume, VF3210 \checkmark No \bigcirc No \checkmark up =1100 veh/hFreeway Free-Flow Speed, SFF70.0 \lor No \bigcirc No \checkmark up =1100 veh/hFreeway Free-Flow Speed, SFF50.0 \lor No \bigcirc NoConversion to pc/h Under Base Conditions (pc/h) \bigvee (Veh/hr)PHFTerrain $\%$ Truck $\%$ Rv f_{HV} f_p $v = V/PHF \times f_{HV}$ Freeway32100.95Level300.9851.003430Ramp12900.92Level200.9901.001416UpStream11000.92Level200.9901.001208DownStream1111111Merge AreasDiverge AreasEstimation of v_{12}	On Off n/h					
YesOnAcceleration Lane Length, L_A 300YesOn \square No \square OffDeceleration Lane Length L_D Freeway Volume, V_F 3210 \square No \square O $u_u =$ 2400 ftRamp Volume, V_R 1290 $L_{down} = ft$ $V_D = wehnV_u =1100 veh/hFreeway Free-Flow Speed, S_{FF}70.0Ramp Free-Flow Speed, S_{FR}50.0Conversion to pc/h Under Base Conditions(pc/h)\frac{V}{(Veh/hr)}PHFTerrain\%Truck\%Rvf_{HV}f_pv = V/PHF x f_{HV}Freeway32100.95Level300.9851.003430Ramp12900.92Level200.9901.001416UpStream11000.92Level200.9901.001208Diverge AreasEstimation of v_{12}$	Off n/h					
Image: NoImage: Cooleration Lane Length L_D Freeway Volume, V_F300Image: Ves $u_p = 2400 \text{ ft}$ Ramp Volume, V_F3210 $u_p = 2400 \text{ ft}$ Ramp Volume, V_R1290 $V_u = 1100 \text{ veh/h}$ Freeway Free-Flow Speed, S _{FF} 70.0Ramp Free-Flow Speed, S _{FR} 50.0Conversion to pc/h Under Base Conditions (pc/h) V_V PHFTerrain%Truck%Rv f_{HV} f_p $v = V/PHF \times f_{HV}$ Freeway32100.95Level300.98511000.92Level200.9901.0011000.92Level200.9901.00Merge AreasDiverge AreasEstimation of v_{12}	Off n/h					
INO upINO ICONINO Freeway Volume, VF Ramp Volume, VF Ramp Volume, VR 12903210 1290Ino Lown = ft VD = veh $V_u = 1100 \text{ veh/h}$ Freeway Free-Flow Speed, SFF Ramp Free-Flow Speed, SFR Ramp Free-Flow Speed, SFR Speed, SFR 	n/h					
Freeway Volume, V rup =3210Left of Large $u_{\mu} =$ 100 veh/hRamp Volume, V Ramp Free-Flow Speed, S Ramp Free-Flow Speed, S FR70.0V D =V V D =V V V D =V V V D =V V V D =V V V D =V V V D =V V V D =V V V D =V V V D =V V V V D =V V V V D =V V V V D =V V V V D =V V V V V D =V V V V D =V V V V V D =V V V V V V V V D =V V<	n/h					
up2.100 HRamp Volume, v_R 1290Identify Volume, v_R 1290 $/_u = 1100 \text{ veh/h}$ Freeway Free-Flow Speed, S_{FF} 70.0 $V_D = \text{ veh}$ Conversion to pc/h Under Base ConditionsYou amp Free-Flow Speed, S_{FR} 50.0You approximately the second secon						
$V_u =$ 1100 veh/hFreeway Free-Flow Speed, S _{FF} Amp Free-Flow Speed, S _{FR} 50.070.0 50.0 $V_D =$ vehConversion to pc/h Under Base ConditionsPHFTerrain%Truck%Rv f_{HV} f_p $v = V/PHF x f_{HV}$ Freeway32100.95Level300.9851.003430Ramp12900.92Level200.9901.001416UpStream11000.92Level200.9901.001208Diverge AreasEstimation of v_{12}						
$V_u =$ 1100 veh/h Ramp Free-Flow Speed, S _{FR} 50.0 $V_D -$ ven Conversion to pc/h Under Base Conditions (pc/h) V PHF Terrain %Truck %Rv f_{HV} f_p $v = V/PHF x f_{HV}$ Freeway 3210 0.95 Level 3 0 0.985 1.00 3430 Ramp 1290 0.92 Level 2 0 0.990 1.00 1416 UpStream 1100 0.92 Level 2 0 0.990 1.00 1208 DownStream Merge Areas Diverge Areas Diverge Areas						
Conversion to pc/h Under Base Conditions (pc/h) V PHF Terrain %Truck %Rv f_{HV} f_p $v = V/PHF x f_{HV}$ Freeway 3210 0.95 Level 3 0 0.985 1.00 3430 Ramp 1290 0.92 Level 2 0 0.990 1.00 1416 JpStream 1100 0.92 Level 2 0 0.990 1.00 1208 Diverge Areas Estimation of v_{12}	_V x f _p					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	_V x f _p					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	V X fp					
Ramp 1290 0.92 Level 2 0 0.990 1.00 1416 UpStream 1100 0.92 Level 2 0 0.990 1.00 1208 DownStream Image Areas Image Diverge Areas						
UpStream 1100 0.92 Level 2 0 0.990 1.00 1208 DownStream Merge Areas Diverge Areas Diverge Areas Estimation of v ₁₂ Estimation of v ₁₂ Estimation of v ₁₂						
DownStream Merge Areas Diverge Areas Estimation of v ₁₂						
Merge Areas Diverge Areas Estimation of v ₁₂ Estimation of v ₁₂						
Estimation of v ₁₂ Estimation of v ₁₂						
$V_{\alpha} = V_{\alpha} (P_{\alpha \alpha})$						
$V_{12} = V_{\rm F} + (V_{\rm F} - V_{\rm R})P_{\rm FD}$						
= 1383.24 (Equation 13.6 or 13.7)						
P = 0.5% using Equation (Exhibit 12.6)						
1/20 pc/h (Equation 13.14 or 13.						
$r_3 = r_{av34}$ 17) $v_3 = r_{av34}$ pc/n (Equation 13-14 or 13-17)						
Is V_3 or $V_{av34} > 2,700$ pc/h? Yes No Is V_3 or $V_{av34} > 2,700$ pc/h? Yes No						
$ s V_3 \text{ or } V_{av34} > 1.5 * V_{12}/2 \forall \text{ Yes } \text{No}$						
f Yes V_{12a} = 2010 pc/h (Equation 13-16, 13- If Yes V_{12a} = pc/h (Equation 13-16, 13-18, 13-18)	or					
18, 0F 13-19)						
Capacity Checks Capacity Checks						
	.OS F?					
V _F Exhibit 13-8						
V_{FO} 4846 Exhibit 13-8 No $V_{FO} = V_F - V_R$ Exhibit 13-8						
V ₋ Exhibit 13-						
Flow Entering Merge Influence Area Flow Entering Diverge Influence Area						
	olation?					
V _{R12} 3426 Exhibit 13-8 4600:All No V ₁₂ Exhibit 13-8						
Level of Service Determination (if not F)						
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ $D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$						
$D_R = 29.7 (pc/mi/ln)$ $D_R = (pc/mi/ln)$						
OS = D (Exhibit 13-2) LOS = (Exhibit 13-2)						
Speed Determination Speed Determination						
$M_{\rm s} = 0.411 (\text{Exibit 13-11})$ $D_{\rm s} = (\text{Exhibit 13-12})$						
$S_{R}^{s} = 58.5 \text{ mph} (Exhibit 13-11)$ $S_{R}^{s} = mph (Exhibit 13-12)$						
$S_0 = 66.7 \text{ mph} (Exhibit 13-11)$ S = 60.7 mph (Exhibit 13-13) S = mph (Exhibit 13-13) S = mph (Exhibit 13-13)						

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 7-B 2020 Ви	et On Ramps iild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4500	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain:	0.95 3 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustn	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS)			<u>Design (N)</u> Design LOS		
v _p = (V or DDHV) / (PHF x N > S D = v _p / S LOS	x f _{HV} x f _p) 1603 68.1 23.5 C	pc/h/ln mph pc/mi/ln	$v_p = (V \text{ or DDHV}) / (PHF x N x)$ S D = v_p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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Job: SW 10th Street SIMR Analyst: AECOM

Location: Analysis Period: Analysis Year:	Seg 8: I- AM Peak 2020 Bui	Hour	bound On-Ram	p from SW 1	0th Street E	B & WB
4,500			▶ 5,460			
960						
	PHF =	0.95				
	v _{fr} =	5,460	vph			
	v _r =	960	vph			
	v _f =	4,500				
Upstream Freeway	Tr % =	3%				
Ramp	Tr % =	2%				
Downstream Freeway						
-			r(E _T -1)+P _R (E _R -		0.985	
Ramp	f _{HV} =	1/(1+P	r(E _T -1)+P _R (E _R -	1)) =	0.9901	
flat terrain	•	1.5				
	RV % =	Ũ				
Driver Population adj.	•	1.000				
	V _{fr} =	=v _{fr} /(PF	$(f_{HV})(f_{P}) =$	5,834	pc/h	
	V _r =	=v _r /(PH	$ F)(f_{HV})(f_{P}) =$	1,021	pc/h	
	V _f =	=v _f /(PH	$F)(f_{HV})(f_{P}) =$	4,808	pc/h	
No. lanes upstream of ramp	N =	3				

<u>No. Ln</u>	Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
4	Fwy downstream of ramp (assume 70 mph free-flow speed) =	9,600	5,834	0.61	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	4,808	0.67	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,021	0.49	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 9-B 2020 Bu	et 10th & Exit to Exp ild 2
Project Description SW 10th	Street SIMR				
Oper.(LOS)			Des.(N)	∐ Pla	inning Data
<i>Flow Inputs</i> Volume, V AADT	5460	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustm	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	4	ft ft ramps/mi	f _{∟w} f _{LC} TRD Adjustment		mph mph mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	f _{HV} x f _p) 1458 69.2 21.1 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fre	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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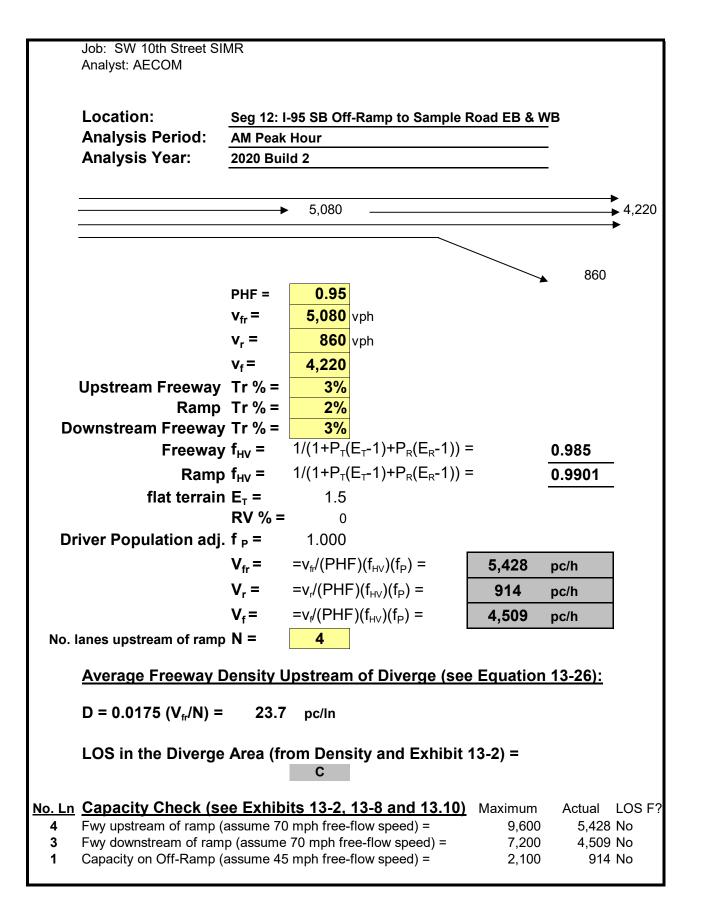
RAMPS AND RAMP JUNCTIONS WORKSHEET

General Info			RAMP JUN	Site Infor						
Analyst			Fn	eeway/Dir of Tr		I-95 S	R			
igency or Company	y AECO	DM		nction			o O-Merge fro	m Fx to GP		
ate Performed	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			risdiction		9 1				
nalysis Time Perio			Ar	nalysis Year		2020	Build 2			
roject Description	SW 10th Stree	t SIMR								
nputs		1								
pstream Adj Ramp)		ber of Lanes, N	4					Downstre	eam Adj
		Ramp Number	of Lanes, N	1					Ramp	
Yes 0	n	Acceleration L	ane Length, L _A	600					🗹 Yes	🗌 On
No O	ff	Deceleration L	ane Length L _D						No	✓ Off
		Freeway Volu	ne, V _F	5460						V OII
_{up} = ft		Ramp Volume	, V _R	270					L _{down} =	1150 ft
		Freeway Free	Flow Speed, S _{FF}	70.0					V –	050
′ _u = veh/l	h		ow Speed, S _{FR}	50.0					V _D =	650 veh/h
Conversion t	to pc/h Und		110							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f	f _p	v = V/PH	F x f _{HV} x f _p
. ,	(Veh/hr)						f _{HV}	•		
reeway	5460	0.95	Level	3	0	_).985	1.00		5834
Ramp	270	0.92	Level	2	0).990	1.00		296
JpStream DownStream	650	0.92	Level	2	0).990	1.00		714
ownotream		Merge Areas	Level	2	0			Diverge Areas		/ 14
istimation o					Estimati	ion (of v_{42}			
	$V_{12} = V_{F}$	(P)								
_	12 1		12 7)				V ₁₂ =	V _R + (V _F - V _R)P _{FD}	
EQ =		ation 13-6 or			L _{EQ} = (Equation 13-12 or 13-13)					
FM =			ion (Exhibit 13-6)		P _{FD} = using Equation (Exhibit 13-7)					
12 =	1055		10.11.10		V ₁₂ =			pc/h		
₃ or V _{av34}	2389 17)	oc/n (Equation	on 13-14 or 13-		$V_3^{}$ or $V_{av34}^{}$			pc/h (Equation 1	3-14 or 13-	17)
s V ₃ or V _{av34} > 2,7		s 🔽 No			Is V_3 or V_{av3}	₃₄ > 2,	700 pc/h? [Yes 🗌 No		
s V ₃ or V _{av34} > 1.5					Is V_3 or V_{av3}	₃₄ > 1.	5 * V ₁₂ /2 [Yes 🗌 No		
Yes,V _{12a} =		oc/h (Equatio	on 13-16, 13-		If Yes,V _{12a} =			pc/h (Equatio 3-19)	n 13-16, ′	13-18, or
Capacity Che					Capacity	y Ch	necks			
	Actual	C	apacity	LOS F?						LOS F?
					V _F			Exhibit 13-8	8	
V _{FO}	6130	Exhibit 13-8		No	$V_{FO} = V_F$	- V _D		Exhibit 13-8		
v FO	0150	EXHIBIC 13-0		NU		ĸ		Exhibit 13		
					V _R			10		
low Enterin		Ú.			Flow En	terii	_	rge Influen		
	Actual	i r	Desirable	Violation?		_	Actual	Max Desi	irable	Violation?
V _{R12}	2629	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
evel of Serv		1	1					terminatio		t F)
D _R = 5.475 +	+ 0.00734 v _R + ().0078 V ₁₂ - 0.0	0627 L _A		[D _R =	4.252 + 0	.0086 V ₁₂ - 0	.009 L _D	
_R = 22.1 (pc/r	ni/ln)				D _R = (p	c/mi/	′ln)			
OS = C (Exhibit	t 13-2)				LOS = (E	xhibi	it 13-2)			
peed Deter	mination				Speed D)ete	rminatio	on		
•	kibit 13-11)						13-12)			
	(Exhibit 13-11)						(hibit 13-12)			
	. ,						(hibit 13-12)			
	(Exhibit 13-11) (Exhibit 13-13)				-		(hibit 13-13)			
00.0 mpn					۳ ۳		(inore 10-10)			

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		RAMP	S AND RAM			RKS	HEET						
General Info	ormation			Site Infor									
Analyst				eeway/Dir of Tr									
gency or Compa	ny AEC	OM		nction	Seg 11- Diverge to Express								
ate Performed	iad AM			risdiction		2020 0							
nalysis Time Per	iod AM n SW 10th Stree		All	alysis Year		2020 B							
nputs													
		Freeway Num	ber of Lanes, N	4									
Upstream Adj	Ramp	Ramp Numbe		1					Downstream Ac Ramp				
✓ Yes	🗹 On		ane Length, L _∆						Yes	On			
No	Off	Deceleration L	ane Length L _D	200					✓ No	Off			
		Freeway Volu	me, V _F	5730									
L _{up} =	1150 ft	Ramp Volume	IX	650					L _{down} =	ft			
V,, =	270 veh/h	-	-Flow Speed, S _{FF}	70.0					V _D =	veh/h			
^v u		Ramp Free-Fl	ow Speed, S _{FR}	45.0					D				
conversion	to pc/h Un	der Base (Conditions										
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{H∨}	f _p	v = V/PHF	x f _{HV} x f _p			
reeway	5730	0.95	Level	3	0	0.	985	1.00	61	22			
Ramp	650	0.92	Level	2	0	0.	990	1.00	7′	4			
JpStream	270	0.92	Level	2	0	0.	990	1.00	29	96			
DownStream													
		Merge Areas						Diverge Areas					
stimation	of v ₁₂				Estimat	tion o	f v ₁₂						
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	· V _R + (V _F - V _F)P _{FD}				
_{EQ} =	12 1	ation 13-6 or	13-7)		L _{EQ} =			Equation 13-1	5)			
EQ FM =		Equation (E			P _{FD} =			436 using Equ					
	•									51(15-7)			
12 =	pc/h				V ₁₂ =)72 pc/h					
₃ or V _{av34}			-14 or 13-17)		$V_3 \text{ or } V_{av34}$			525 pc/h (Equa	ation 13-14	or 13-17			
	700 pc/h? 🗌 Ye				Is V ₃ or V _{av}	_{/34} > 2,7	00 pc/h? [Yes 🗹 No					
s V ₃ or V _{av34} > 1.	5 * V ₁₂ /2 🗌 Ye				Is V_3 or V_{av}	_{/34} > 1.5		🗌 Yes 🗹 No					
Yes,V _{12a} =			-16, 13-18, or		lf Yes,V _{12a} =	=		oc/h (Equation	13-16, 13-	18, or 13			
Capacity Ch	13-19))			Capacit			9)					
	Actual	0	apacity	LOS F?		y ch	Actual	Ca	pacity	LOS F			
	/ 1010101	Ť	apaony	2001	V _F		6122	Exhibit 13-8	1	No			
V _{FO}		Exhibit 13-8			V _{FO} = V _F		5408	Exhibit 13-8	_	No			
FO					V _R	- 'R	714	Exhibit 13-1	-	No			
low Entori	ng Merge In	I I	<i>r</i> 02			ntorin		rge Influen		110			
	Actual		Desirable	Violation?		ii.	Actual	Max Desirab		Violation			
V _{R12}		Exhibit 13-8	2 0011 01210		V ₁₂		3072	Exhibit 13-8	4400:All	No			
	vice Detern		if not E)					terminatio		-			
	0.00734 v _R +				1			.0086 V ₁₂ - 0.0		/			
		0.0070 v ₁₂	0.00027 LA					.0000 12 0.	DOD LD				
R = (pc/mi/						1.5 (pc	,						
	it 13-2)						oit 13-2)						
Speed Dete	rmination				Speed L								
l _S = (Exibit	13-11)				ŭ		xhibit 13						
					S _R = 59	9.9 mph	(Exhibit	,					
S _R = mph (Exhibit 13-11)													
	xhibit 13-11)				S ₀ = 75	5.3 mph	(Exhibit	13-12)					
₀ = mph (E	xhibit 13-11) xhibit 13-13)					-	(Exhibit (Exhibit						



	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 13-I 2020 Bu	Bet Off & On Ramps ild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4220	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents		Up/Down %		
	1.00		E _R	1.2	
E _T	1.5		к f _{HV} = 1/[1+Р _т (Е _т - 1) + Р _R (Е _R - 1)]	0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N	3	ft ft	f _{LW} f _{LC}		mph mph
Total Ramp Density, TRD	0	ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	t f _{HV} x f _p) 1503 68.9 21.8 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hol	S - Speed D - Density FFS - Free-flow BFFS - Base fre	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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_			FREEWA	WEAV		_				
Genera	I Informati	on			Site Information					
Analyst Agency/Co Date Perfo Analysis Ti	rmed me Period	AECO AM			Freeway/Dir Weaving Seg Analysis Yea	gment Locati		B 4- Bet Sampl Build 2	e & Copans	
Inputs	scription SW 10t	IN STEEL SIMI	1							
Weaving n Weaving se Freeway fre	onfiguration umber of lanes, I egment length, L ee-flow speed, F	s FS	r Base Co	One-Sided 4 2520ft 70 mph	Segment typ Freeway min Freeway ma: Terrain type	imum speed			Freewa 240 Lev	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _T	E _R	f _{HV}	fp	v (pc/h)	
V _{FF}	3605	0.95	3	0	1.5	1.2	0.985	1.00	3852	
V _{RF}	1780	0.92	2	0	1.5	1.2	0.990	1.00	1954	
V _{FR}	615	0.92	2	0	1.5	1.2	0.990	1.00	675	
V _{RR}	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
V _{NW}	3852							V =	6481	
V _W	2629									
/R	0.406									
Config	uration Cha	aracteris	tics							
Minimum r	naneuver lanes,	N _{WL}		2 lc	Minimum we	aving lane c	hanges, LC _{MIN}		lc	
Interchang	e density, ID			0.7 int/mi	Weaving lan	e changes, L	-C _w		lc	
Minimum F	RF lane changes	, LC _{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		lc	
Minimum F	R lane changes	, LC _{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		lc	
Minimum F	RR lane changes	, LC _{RR}		lc/pc	Non-weaving vehicle index, I _{NW}					
Weavin	ig Segmen	t Speed,	Density, I	Level of	Service,	and Cap	oacity			
Weaving segment capacity, c _w 5829 ve			6398 veh/h 5829 veh/h	Weaving segment speed, S				mp mp		
Weaving segment v/c ratio 1.098 Weaving segment density, D pc/mi/ln				1.098						
•	egment density, ervice, LOS	U		pc/mi/m F	Maximum weaving length, L_{MAX}				mբ 6745	
Notes				I			', ∟ _{MAX}		0743	

Chapter 13, "Freeway Merge and Diverge Segments". b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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	DAJIC F	REEWAI JE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 1-B 2020 Вг	et Hillsboro & Palmetto iild 2
Project Description SW 10th	Street SIMR				anning Data
✓ Oper.(LOS) Flow Inputs			Des.(N)		anning Data
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4680	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
Coloulata Elour Adiuate	anta		Up/Down %		
Calculate Flow Adjustm	1.00			1.2	
f _p E _T	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
Speed Inputs	1.0		Calc Speed Adj and FFS		
Lane Width		ft		, 	
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4	it.	f _{LC}		mph
Total Ramp Density, TRD	1	ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	
Base free-flow Speed, BFFS	70.0	mph	FF3	70.0	mph
LOS and Performance I	Measures	•	Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	x f _{HV} x f _p) 1250 70.0 17.9 B	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hol	S - Speed D - Density FFS - Free-flow BFFS - Base free	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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		F	REEWAY	WEAV		RKSHEE	Т		
Genera	I Informati	on			Site Info	rmation			
Analyst Agency/Co Date Perfo Analysis Ti	rmed me Period	AECOI PM			Freeway/Dir of TravelI95/SBWeaving Segment LocationSeg 2-Bet On from Exp & OffAnalysis Year2020 Build 2				
Project Des Inputs	scription SW 10	th Street SIMF	2						
Weaving co Weaving nu Weaving se Freeway fre	onfiguration umber of lanes, l egment length, L ee-flow speed, F	s FS		Two-Sided 4 3900ft 70 mph	Segment typ Freeway min Freeway max Terrain type	imum speed			Freewa 1! 2400 Leve
Conver	sions to p	1				-			(")
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	3730	0.95	3	0	1.5	1.2	0.985	1.00	3985
V _{rf}	870	0.92	2	0	1.5	1.2	0.990	1.00	955
V _{FR}	950	0.92	2	0	1.5	1.2	0.990	1.00	1043
V _{RR}	100	0.92	2	0	1.5	1.2	0.990	1.00	110
V _{NW}	5983							V =	6093
V _W	110								
VR	0.018								
	uration Ch		tics		Minimum	oving long o	hangaa I C		220 10/1
	naneuver lanes,	N _{WL}		0 lc			hanges, LC _{MIN}		330 lc/h
	e density, ID			0.7 int/mi	Weaving lan	-			902 lc/h
	RF lane changes	i tu		0 lc/pc	Non-weaving				2805 lc/h
	R lane changes	T IX		0 lc/pc	Total lane ch	- //	. L		3707 lc/h
	RR lane changes	IXIX			Non-weaving	-			1633
Weavin	ng Segmen	t Speed,	Density, I	_evel of	í.				
Weaving segment flow rate, v6014 veh/hWeaving segment capacity, c8855 veh/h			Weaving intensity factor, W Weaving segment speed, S				0.217 60.3 mph		
5 5				0.679					60.2 mph
0	egment density,	D	25	5.3 pc/mi/ln	Average nor	• •			60.3 mph
Level of Se	ervice, LOS			С	Maximum we	eaving length	n, L _{MAX}		5894 ft
Chapter 13,	segments longer t "Freeway Merge nes that exceed th	and Diverge Se	egments".	-		olated merge	and diverge ar	eas using the	procedures of

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General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 3-Be 2020 Bui	et Off & On Ramp Id 2
Project Description SW 10t	th Street SIMR				
✓ Oper.(LOS))		Des.(N)	🗌 Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4600	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain:	0.95 3 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustr	ments				
f _p	1.00		E _R	1.2	
Ε _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	\$	
_ane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N S D = v _p / S LOS	x f _{HV} x f _p) 1638 67.8 24.2 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-1 ⁻

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<u> </u>		RAMP	S AND RAM			RKS	HEET			
General Int	ormation			Site Infor						
Analyst				eeway/Dir of Tr		I-95 SB				
Agency or Comp	any AEC	OM		nction		Seg 4-I	Diverge to	SW 10th St		
Date Performed Analysis Time Pe	eriod PM			risdiction alysis Year		2020 B	uild 2			
	on SW 10th Stree	t SIMR				2020 D				
nputs										
•		Freeway Num	ber of Lanes, N	3					D (A 11
Upstream A	dj Ramp	Ramp Numbe		1					Downstrea Ramp	m Adj
Yes	On			I					•	
			ane Length, L _A						Yes	🗹 On
🗹 No	Off		_ane Length L _D	200					No	Off
		Freeway Volu	me, V _F	4600						
L _{up} =	ft	Ramp Volume	, V _R	840					L _{down} =	2400 ft
V/ -		Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	1410 veh
V _u =	veh/h	Ramp Free-Fl	ow Speed, S _{FR}	45.0					v _D –	1410 Ven
Conversio	n to pc/h Uno	-								
	V	PHF		0/ Truck	0/ Dv	1	f	f	v = V/PHF	vf vf
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p		× _{HV} × _p
reeway	4600	0.95	Level	3	0	0.	985	1.00	49	15
Ramp	840	0.92	Level	2	0	0.	990	1.00	92	2
JpStream		\downarrow								
DownStream	1410	0.92	Level	2	0	0.	990	1.00	154	18
-		Merge Areas			Fatimat	ion o		Diverge Areas		
stimation	01 V ₁₂				Estimat		¹ V 12			
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	: V _R + (V _F - V _F	_R)P _{FD}	
EQ =	(Equa	ation 13-6 or	13-7)		L _{EQ} = (Equation 13-12 or 13-13)					
9 _{FM} =	using	Equation (E	Exhibit 13-6)		P _{FD} =		0.	595 using Equ	uation (Exhib	oit 13-7)
′ ₁₂ =	pc/h				V ₁₂ =		32	297 pc/h		
′ ₃ or V _{av34}	pc/h (Equation 13	-14 or 13-17)		V_3 or V_{av34}		16	518 pc/h (Equ	ation 13-14	or 13-17
	2,700 pc/h? 🔲 Ye		,			₂₄ > 2.7		Yes No	-	
	1.5 * V ₁₂ /2 Ye							Yes Vo		
			-16, 13-18, or			•		oc/h (Equation	13-16, 13-	18. or 13-
Yes,V _{12a} =			,,,		If Yes,V _{12a} =	=	•	9)		,
	13-19)	,			12a					
Capacity C	1	/			Capacit	y Ch	ecks			
Capacity C	1	,	Capacity	LOS F?		y Ch	e cks Actual	Са	pacity	LOS F
Capacity C	hecks	,	apacity	LOS F?		y Che		Ca Exhibit 13-8	I	LOS F? No
	hecks	,	apacity	LOS F?	Capacit		Actual	Exhibit 13-8	7200	
Capacity C V _{FO}	hecks) C	apacity	LOS F?	Capacit V _F V _{FO} = V _F		Actual 4915 3993	Exhibit 13-8 Exhibit 13-8	3 7200 3 7200	No No
V _{FO}	Checks	C Exhibit 13-8		LOS F?	Capacit V_F $V_{FO} = V_F$ V_R	- V _R	Actual 4915 3993 922	Exhibit 13-8 Exhibit 13-8 Exhibit 13-1	3 7200 3 7200 3 7200 0 2100	No
V _{FO}	Checks Actual Actual ring Merge In	C Exhibit 13-8	Irea		Capacit V_F $V_{FO} = V_F$ V_R	- V _R	Actual 4915 3993 922 g Dive	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen	3 7200 3 7200 0 2100	No No No
-low Enter	Checks	Exhibit 13-8		LOS F? Violation?	Capacit V_F $V_{FO} = V_F$ V_R Flow En	- V _R	Actual 4915 3993 922 g Dive Actual	Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab	3 7200 3 7200 0 2100	No No Violation?
V _{FO} Flow Enter V _{R12}	Actual Actual	Exhibit 13-8 offluence A Max Exhibit 13-8	rea Desirable		Capacit V_F $V_{FO} = V_F$ V_R Flow En	terin	Actual 4915 3993 922 g Dive Actual 2297	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	3 7200 3 7200 0 2100 CE Area ole 4400:All	No No Violation No
V _{FO} Flow Enter V _{R12} Level of Se	Checks Actual Actual Actual Actual Actual Actual Actual Actual Actual	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	terin f Serv	Actual 4915 3993 922 g Dive Actual 2297 rice De	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influen Max Desirab Exhibit 13-8 termination	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
V _{F0} Flow Enter V _{R12} Evel of Se D _R = 5.475 +	Actual Ac	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	$\frac{1}{P_{R}} = 4$	Actual 4915 3993 922 g Dive Actual 2297 /ice De 252 + 0	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
V _{FO} Flow Enter V _{R12} .evel of Se D _R = 5.475 +	Actual Ac	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	terin f Serv	Actual 4915 3993 922 g Dive Actual 2297 /ice De 252 + 0	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influen Max Desirab Exhibit 13-8 termination	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
V_{FO} Flow Enter V_{R12} evel of Se $D_R = 5.475 + 10^{-10}$ $V_R = (pc/m)$	Actual Ac	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 30$	- V _R	Actual 4915 3993 922 g Dive Actual 2297 /ice De 252 + 0	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influen Max Desirab Exhibit 13-8 termination	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
V_{FO} Flow Enter V_{R12} evel of Se $D_R = 5.475 + 0_R = (pc/m)$ OS = (Exhil	Actual Actual Actual Actual Actual Actual Actual Actual Actual Actual Actual Actual	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 30$	$\frac{1}{r} = V_R$	Actual 4915 3993 922 g Dive Actual 297 /ice De .252 + 0 /mi/ln) pit 13-2)	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
V_{FO} Flow Enter V_{R12} evel of Se $D_R = 5.475 + 0_R = (pc/m)$ OS = (ExhillSpeed Deter	Actual ACtual ACTUA ACTUA ACTUAC ACTUAC ACTUAC ACTUAC ACTUAC ACTUAC ACTU	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 30$ LOS = D Speed L	- V _R	Actual 4915 3993 922 g Dive Actual 297 /ice De .252 + 0 /mi/ln) pit 13-2)	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
V_{FO} Flow Enter V_{R12} D _R = 5.475 + D _R = (pc/m OS = (Exhi Speed Deter I_S = (Exibi	Actual Ac	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacit $V_{FO} = V_F$ $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 30$ LOS = D Speed L $D_s = 0.$	$\frac{1}{2} + V_R$	Actual 4915 3993 922 g Dive Actual 297 vice De .252 + 0 'mi/ln) bit 13-2) minatic xhibit 13	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Comon Com Exhibit 13-8	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
V_{FO} Flow Enter V_{R12} evel of Se $D_R = 5.475 + 0_R = (pc/m)$ OS = (Exhill Speed Dete $M_S = (ExibleR_R = mph (R)$	Actual Ac	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 30$ LOS = D Speed D $S_R = 59$	terin f Serv D _R = 4 0.8 (pc/ (Exhit Detern 381 (E. 9.3 mph	Actual 4915 3993 922 g Dive Actual 2997 /ice De 252 + 0 (mi/ln) bit 13-2) minatic xhibit 13 (Exhibit	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
V_{FO} Flow Enter V_{R12} evel of Se $D_R = 5.475 + 0$ $D_R = (pc/m)$ OS = (Exhild) OS = (Exhild) Speed Detectors $M_S = (Exhild)$ $M_S = (Exhild)$ $M_R = mph (H)$	Actual Ac	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (Trea Desirable if not F)		Capacity $V_{FO} = V_F$ $V_{FO} = V_F$ V_{R} Flow En V_{12} Level of $D_R = 30$ LOS = D Speed L $D_s = 0$. $S_R = 59$ $S_0 = 74$	$\frac{1}{2} + V_R$ $\frac{1}{2}$	Actual 4915 3993 922 g Dive Actual 297 vice De .252 + 0 'mi/ln) bit 13-2) minatic xhibit 13	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-10 Exhibit 13-8 Exhibit 13-10 Exhibit 13-8 Exhibit 13-10 Exhibit 13-8 Exhibit 13-8 Ex	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No

General Information Analyst Agency or Company Date Performed Analysis Time Period Project Description SW 10th	AECOM		Site Information		
Agency or Company Date Performed Analysis Time Period	AECOM				
Project Description SW 10th	PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 5-Be 2020 Buil	t Off & On Ramps d 2
	h Street SIMR				
✓ Oper.(LOS)			Des.(N)	🗌 Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	3760	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain:	0.95 3 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustn	nents				
f _p	1.00		E _R	1.2	
Ε _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
_ane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> / _p = (V or DDHV) / (PHF x N x S D = v _p / S _OS	x f _{HV} x f _p) 1339 69.8 19.2 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-1 ⁻

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	RAI	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET				
General Infor	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tra	avel I-	95 SB				
gency or Company	AECO	MC		nction		eg 6-Merge	from Hil	Isboro E&W		
Date Performed			Ju	risdiction						
Analysis Time Period			An	alysis Year	2	020 Build 2				
Project Description	SW 10th Stree	t SIMR								
nputs			han af Lanaa Ni					I		
Jpstream Adj Ramp			ber of Lanes, N	3					Downstre	eam Adj
🖌 Yes 🗌 Or	'n	Ramp Number		1					Ramp	
	1		ane Length, L _A	300					🗌 Yes	🗌 On
No 🗹 Of	f	Deceleration L	ane Length L _D						🗹 No	Off
		Freeway Volu	1	3760						
_{up} = 2400	ft	Ramp Volume	e, V _R	1410					_ _{down} =	ft
/ _u = 840 ve	ah/h	Freeway Free	-Flow Speed, S _{FF}	70.0				,	V _D =	veh/h
$v_{\rm u} = 840 {\rm ve}$	en/n	Ramp Free-Fl	ow Speed, S _{FR}	50.0					- D	Volum
Conversion t	o pc/h Und	der Base (Conditions							
(pc/h)	V () (= h /h = r)	PHF	Terrain	%Truck	%Rv	f _{HV}		f _p	v = V/PH	F x f _{HV} x f _p
-reeway	(Veh/hr) 3760	0.95	Level	3	0	0.985		р 1.00		4017
Ramp	1410	0.95	Level	2	0	0.985		1.00		4017 1548
UpStream	840	0.92	Level	2	0	0.990		1.00		922
DownStream	0+0	0.32	Level	2	0	0.550		1.00		522
		Merge Areas		<u>I</u>			Dive	rge Areas		
stimation of	fv ₁₂				Estimatio	on of v_{12}	,			
	V ₁₂ = V _F	(P _{EM})								
_{EQ} =			13-6 or 13-7)			V ₁₂		+ (V _F - V _R)		
P _{FM} =			ion (Exhibit 13-6)		$L_{EQ} =$ (Equation 13-12 or 13-13)					
/ ₁₂ =	2354	•			P _{FD} = using Equation (Exhibit 13-7)					
			on 13-14 or 13-		V ₁₂ =		pc/ł			
V_3 or V_{av34}	17)		511 10-14 61 10-		V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17)					
s V ₃ or V _{av34} > 2,70	0 pc/h? 🗌 Ye	s 🗹 No			Is V ₃ or V _{av34} > 2,700 pc/h? Yes No					
ls V ₃ or V _{av34} > 1.5 *	* V ₁₂ /2 🔽 Yes	s 🗌 No			Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No					
f Yes,V _{12a} =	2354	pc/h (Equatio	on 13-16, 13-		lf Yes,V _{12a} =		pc/ł 13-1	ו (Equatior מ	n 13-16, 1	13-18, or
120	18, or	13-19)				<u> </u>		5)		
Capacity Che		1 .			Capacity	ii.		-		
	Actual		apacity	LOS F?		Act	ual	Сар		LOS F?
					V _F			Exhibit 13-8	-	
V _{FO}	5565	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	V _R		Exhibit 13-8		
					V _R			Exhibit 13- 10		
low Entering	<u>I</u> Morgo In	I I	<u>r02</u>		Flow Ent	l oring Di	vora	-		<u> </u>
	Actual	ii .	Desirable	Violation?		Actual	Verge	Max Desir		Violation?
V _{R12}	3902	Exhibit 13-8	4600:All	No	V ₁₂		E	xhibit 13-8		
Level of Serv					Level of	Service			n (if no	t F)
	0.00734 v _R + (1					86 V ₁₂ - 0.0		/
0 _R = 33.3 (pc/m		12 0.0	Ā			R 1.202 :/mi/ln)	2.00	12 0.	- D	
						-				
OS = D (Exhibit			(hibit 13-2)							
Speed Detern					Speed De		tion			
1 _S = 0.484 (Exi					ů i	hibit 13-12)	10			
R ⁼ 56.4 mph	(Exhibit 13-11)					h (Exhibit 13-				
•	(Exhibit 13-11)				· ·	h (Exhibit 13-				
= 59.0 mph	(Exhibit 13-13)				S = mpł	h (Exhibit 13-	·13)			
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 7-B 2020 Ві	et On Ramps iild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	🗌 Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	5170	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
		VCH/H	Up/Down %		
Calculate Flow Adjustn	nents				
f _p	1.00		E _R	1.2	
Ê _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	c f _{HV} x f _p) 1841 65.2 28.2 D	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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Job: SW 10th Street SIMR Analyst: AECOM

Location:	Seg 8: I-	95 Southbound On-Ram	p from SW 1	0th Street EB	& WB
Analysis Period:	PM Peak	Hour			
Analysis Year:	2020 Buil	d 2			
5,170		→ 6.220			
		,			
1.050					
1,050					
	PHF =	0.95			
	v _{fr} =	6,220 vph			
	v _r =	1,050 vph			
	v _f =	5,170			
Upstream Freeway	Tr % =	3%			
Ramp	Tr % =	2%			
Downstream Freeway		L			
Freeway	f _{HV} =	1/(1+P _T (E _T -1)+P _R (E _R -	1)) =	0.985	
Ramp	f _{HV} =	1/(1+P _T (E _T -1)+P _R (E _R -	1)) =	0.9901	
flat terrain	Ε _τ =	1.5			
	RV % =	0			
Driver Population adj.	f _P =	1.000			
	V _{fr} =	$=v_{fr}/(PHF)(f_{HV})(f_{P}) =$	6,646	pc/h	
	V _r =	$=v_r/(PHF)(f_{HV})(f_P) =$	1,116	pc/h	
	-	$=v_f/(PHF)(f_{HV})(f_P) =$	5,524	pc/h	
No. lanes upstream of ramp	•	3	-,		

<u>No. Ln</u>	Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
4	Fwy downstream of ramp (assume 70 mph free-flow speed) =	9,600	6,646	0.69	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,524	0.77	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,116	0.53	No

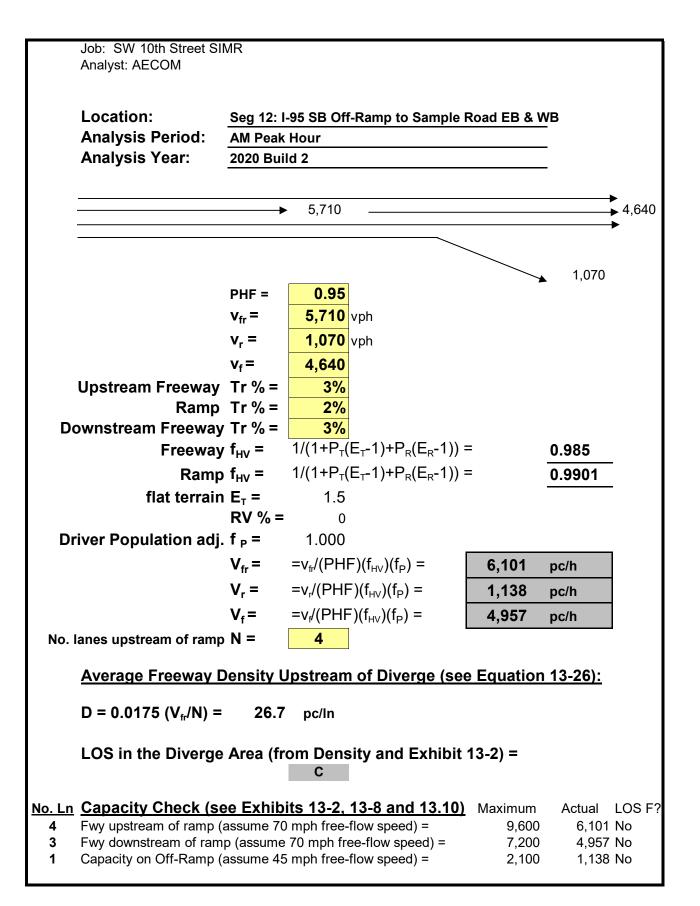
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 9-Be 2020 Bui	et 10th & Exit to Exp Id 2
Project Description SW 10th	Street SIMR				
Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	6220	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
	1.		Up/Down %		
Calculate Flow Adjustm					
f _p E _T	1.00 1.5		E_{R}	1.2 0.985	
Speed Inputs	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$ Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		70.0	mpn
LOS and Performance M	leasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	f _{HV} x f _p) 1661 67.5 24.6 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base free	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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		RAI	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET				
Genera	l Infori	mation			Site Infor	mation					
Analyst				Fr	eeway/Dir of Tr	avel I	-95 S	В			
gency or (AECO	MC	Ju	inction	S	Seg 1	0-Merge from	m Ex to GP		
ate Perfor					irisdiction						
nalysis Tir				Ar	nalysis Year	2	2020 [Build 2			
nputs	cription	SW 10th Stree	t SIMR								
			Freeway Num	ber of Lanes, N	4						
Ipstream A	Adj Ramp		-		4					Downstre	eam Adj
Yes	🗌 On		Ramp Numbe		1					Ramp	
	0			ane Length, L _A	600					🗹 Yes	🗌 On
✓ No	🗌 Off	:		Lane Length L _D						🗌 No	✓ Off
			Freeway Volu	1	6220						
up =	ft		Ramp Volume	IX .	190					L _{down} =	1150 ft
/ =	veh/h		Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	700 veh/h
u	VCII/II		Ramp Free-F	ow Speed, S _{FR}	50.0					D	
Conver	sion to	o pc/h Und	der Base	Conditions	u-	-		10		0	
(pc/	′h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
reeway		6220	0.95	Level	3	0		.985	1.00		6646
Ramp		190	0.92	Level	2	0).990	1.00		209
JpStream		100	0.02	20101			+		1.00		200
DownStrea	ım	700	0.92	Level	2	0	0).990	1.00		768
			Merge Areas						iverge Areas	•	
stimat	tion of	v ₁₂				Estimati	on d	of v ₁₂			
		V ₁₂ = V _F	(P _{EM})					V - V	V _R + (V _F - V _R		
eq =		.= .	ation 13-6 o	r 13-7)		_					10)
, FM =				tion (Exhibit 13-6)	1	L _{EQ} =			Equation 13-		
/ ₁₂ =		1274 g		,		P _{FD} =			using Equatio	n (Exhibit	13-7)
				on 13-14 or 13-		V ₁₂ =			oc/h		4 -)
V_3 or V_{av34}		17)				V ₃ or V _{av34}			oc/h (Equation 1	3-14 or 13-	·17)
s V_3 or V_{av}	_{v34} > 2,700	0 pc/h? 🗌 Yes	s 🗹 No						Yes No		
s V_3 or V_{av}	_{v34} > 1.5 *	V ₁₂ /2 Ves	s 🗌 No			Is V ₃ or V _{av34}	₄ > 1.9	5 * V ₁₂ /2	Yes No	10.10	10.10
Yes,V _{12a}	=			on 13-16, 13-		If Yes,V _{12a} =			oc/h (Equatio 3-19)	n 13-16, '	13-18, or
.24		18, or	13-19)			Conositu	. Ch		,		
Capacit	ly Che	Actual		Capacity	LOS F?	Capacity			Ca	pacity	LOS F?
		Actual		apacity	LUGF?	V _F		Actual	Exhibit 13-	1	LUGF?
						· ·	V			_	
V _F	0	6855	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v _R		Exhibit 13-		
						V _R			Exhibit 13 10	-	
low Er	ntering	n Merge In	fluence A	rea	<u> </u>	Flow Ent	terii	na Diver	rge Influen	ce Area	<u>'</u>
		Actual	ý l	Desirable	Violation?		1	Actual	Max Des		Violation?
V _{R1}	12	2867	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
.evel o	f Servi	ice Detern	nination (if not F)		Level of	Ser	vice De	terminatio	n (if no	t F)
D _R =	= 5.475 +	0.00734 v _R + 0).0078 V ₁₂ - 0.	00627 L _A) _R = .	4.252 + 0	.0086 V ₁₂ - 0	.009 L _D	
_R = 2	4.0 (pc/mi	i/ln)				D _R = (po	c/mi/	ln)		-	
	C (Exhibit 1	13-2)						t 13-2)			
		nination				Speed D			n		
								13-12)			
•	.330 (Exib	,						hibit 13-12)			
		Exhibit 13-11)					•	hibit 13-12)			
•	• •	Exhibit 13-11)				, i					
		Exhibit 13-13)						hibit 13-13)			
ι© 2016 U	iniversity of	f Florida, All Righ	nts Reserved			HCS2010 [™]	^{vi} Vei	rsion 6 90		Genera	ated: 6/18/2020

		RAMP	S AND RAM	P JUNCTI		RKS	HEET			
General Info	rmation			Site Infor						
nalyst				eeway/Dir of Tr		I-95 SB				
gency or Company	y AECO	MC		nction		Seg 11	Diverge t	o Express		
ate Performed nalysis Time Peric	od PM			risdiction alysis Year		2020 B	ild 0			
Project Description		t SIMR	All	aiysis i cai		2020 D				
nputs										
		Freeway Num	ber of Lanes, N	4					<u> </u>	A 11
Upstream Adj I	Ramp	Ramp Number		1					Downstrea Ramp	am Adj
✓ Yes	🗹 On			I						
			ane Length, L _A						🗌 Yes	🗌 On
No [Off		ane Length L _D	200					✓ No	Off
		Freeway Volu	me, V _F	6410						
L _{up} = 1	150 ft	Ramp Volume	e, V _R	700					L _{down} =	ft
		Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	veh/h
$V_u = 1$	90 veh/h	Ramp Free-Fl	ow Speed, S _{FR}	45.0					VD -	ven/n
Conversion		-								
	V	PHF		%Truck	0/ Dv		f	f	v = V/PHF	vf vf
(pc/h)	(Veh/hr)		Terrain	% ITUCK	%Rv		f _{HV}	F		F
reeway	6410	0.95	Level	3	0	0.9	985	1.00	68	49
Ramp	700	0.92	Level	2	0	0.9	990	1.00	76	68
JpStream	190	0.92	Level	2	0	0.9	990	1.00	20)9
ownStream										
- 45		Merge Areas			F ation of			Diverge Areas		
stimation o	07 V ₁₂				Estimat	ion o	r v ₁₂			
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	· V _R + (V _F - V _F	_R)P _{FD}	
_{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13)
	using	Equation (E	Exhibit 13-6)		P _{FD} =		0.	436 using Equ	uation (Exhi	bit 13-7)
12 =	pc/h		,		V ₁₂ =			19 pc/h	,	,
V_{3} or V_{av34}	•	Equation 13	-14 or 13-17)		V_3^{12} or V_{av34}^{12}			715 pc/h (Equ	ation 13-14	l or 13_17
s V ₃ or V _{av34} > 2,7						> 2 7		Yes ⊡ No		
	(((((((((((((((((((34 - 1.0		Yes Vo	40.40.40	18 or 13
0 0.01			-16 13-18 or			• •		n n n n n n n n n n n n n n n n n n n	13-16 13-	
0 0.01		Equation 13	-16, 13-18, or		lf Yes,V _{12a} =	• •	ې 1	oc/h (Equation 9)	13-16, 13-	. 10, 01 13
Yes,V _{12a} =	pc/h (13-19)	Equation 13	-16, 13-18, or			=	1		13-16, 13-	.10, 01 13
Yes,V _{12a} =	pc/h (13-19)	Equation 13	-16, 13-18, or apacity	LOS F?	If Yes,V _{12a} =	=	1	9)	13-16, 13-	
Yes,V _{12a} =	pc/h (13-19) ecks	Equation 13		LOS F?	If Yes,V _{12a} =	=	is ecks	9)	pacity	
Yes,V _{12a} = Capacity Cho	pc/h (13-19) ecks	Equation 13-		LOS F?	If Yes,V _{12a} = Capacit	y Che	2 cks Actual 6849	9) Ca Exhibit 13-8	pacity 3 9600	LOS F No
Yes,V _{12a} =	pc/h (13-19) ecks	Equation 13		LOS F?	If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$	y Che	19 Actual 6849 6081	9) Ca Exhibit 13-8 Exhibit 13-8	pacity 3 9600 3 9600	LOS F No No
Yes,V _{12a} = Capacity Cho V _{FO}	pc/h (13-19) ecks Actual	Equation 13-) C Exhibit 13-8	apacity	LOS F?	If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R	y Che	19 Actual 6849 6081 768	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1	pacity 3 9600 3 9600 0 2100	LOS F No
Yes,V _{12a} = Capacity Cho V _{FO}	pc/h (13-19) ecks Actual	Equation 13- C Exhibit 13-8	apacity		If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R	y Che	19 20 20 20 20 20 20 20 20 20 20	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen	pacity 3 9600 3 9600 0 2100 ce Area	LOS F No No
low Enterin	pc/h (13-19) ecks Actual	Equation 13- C Exhibit 13-8	apacity	LOS F? Violation?	If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R Flow En	y Che	19 Actual 6849 6081 768 g Dive Actual	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab	pacity 3 9600 3 9600 0 2100	LOS F No No Violation
Yes,V _{12a} = Capacity Cho V _{FO} Flow Enterin	pc/h (13-19) ecks Actual	Equation 13- C Exhibit 13-8 Influence A Max I Exhibit 13-8	apacity I rea Desirable		If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12}	y Che	19 Actual 6849 6081 768 g Dive Actual 419	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	pacity 3 9600 3 9600 3 9600 0 2100 Ce Area ole 4400:All	LOS F No No Violation No
Yes,V _{12a} = Capacity Cho V _{FO} Flow Enterin V _{R12} evel of Serv	pc/h (13-19) ecks Actual og Merge In Actual vice Detern	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	y Che	19 20 20 20 20 20 20 20 20 20 20	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 termination	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No
Yes,V _{12a} = Capacity Cho V _{FO}	pc/h (13-19) ecks Actual og Merge In Actual vice Detern	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	y Che	19 20 20 20 20 20 20 20 20 20 20	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No
Yes,V _{12a} = Capacity Cho V _{FO} Flow Enterin V _{R12} evel of Serv	pc/h (13-19) ecks Actual og Merge In Actual vice Detern 0.00734 v _R + 0	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit V_F $V_FO = V_F$ V_R Flow En V_{12} Level of	y Che	Actual 6849 6081 768 g Dive vctual 419 rice De .252 + 0	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 termination	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No
V_{FO} Flow Enterin V_{R12} Evel of Serv $D_R = 5.475 + 0$ $R^{=} (pc/mi/li$	pc/h (13-19) ecks Actual ng Merge In Actual vice Detern 0.00734 v _R + (n)	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 3^2$	y Che y Che terin f Serv D _R = 4	Actual 6849 6081 768 g Dive vctual 419 rice De .252 + 0	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 termination	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No
Yes,V _{12a} = Capacity Cho V_{FO} Flow Enterin V_{R12} evel of Serve $D_R = 5.475 + 0$ $R^{=}$ (pc/mi/li OS = (Exhibit	pc/h (13-19) ecks Actual og Merge In Actual Actual 0.00734 v _R + 0 0.00734 v _R + 0 13-2)	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit $V_F = V_F$ $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 32$ LOS = D	y Che y Che y Che y Che y terin <i>f</i> <i>f</i> <i>f</i> <i>f</i> <i>f</i> <i>f</i> <i>f</i> <i>f</i>	19 Actual 6849 6081 768 g Dive Actual 419 rice De .252 + 0 mi/ln) pit 13-2)	2) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.1	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No
Yes, V_{12a} = Capacity Cho V_{FO} Flow Enterin V_{R12} evel of Serv D_R = 5.475 + 0 $R^{=}$ (pc/mi/li OS = (Exhibit Speed Deterv	pc/h (13-19) ecks Actual ag Merge In Actual vice Detern 0.00734 v _R + 0 n) t 13-2) mination	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 32$ LOS = D Speed L	y Che y Che y Che y Che y y terin <i>f</i> serv <i>A</i> <i>A</i> <i>A</i> <i>A</i> <i>A</i> <i>A</i> <i>A</i> <i>A</i>	19 Actual 6849 6081 768 g Dive Actual 419 rice De .252 + 0 mi/ln) bit 13-2) minatic	9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No
Yes, V_{12a} = Capacity Cho V_{FO} Flow Enterin V_{R12} evel of Serve D_R = 5.475 + 0 $R^{=}$ (pc/mi/lo DS = (Exhibit Cos = (Exhibit 1)	pc/h (13-19) ecks Actual og Merge In Actual vice Detern 0.00734 v _R + (n) t 13-2) rmination	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit V_F $V_F = V_F$ V_R Flow En V_{12} Level of $D_R = 3^2$ LOS = D Speed L $D_s = 0.$	y Che y Che y Che y Che y y terin <i>f</i> <i>f</i> <i>f</i> <i>g</i> <i>f</i> <i>g</i> <i>f</i> <i>g</i> <i>f</i> <i>g</i> <i>f</i> <i>g</i> <i>f</i> <i>g</i> <i>f</i> <i>g</i> <i>g</i> <i>f</i> <i>g</i> <i>g</i> <i>f</i> <i>g</i> <i>g</i> <i>g</i> <i>g</i> <i>g</i> <i>g</i> <i>g</i> <i>g</i>	11 Actual 6849 6081 768 g Dive Actual 419 vice De .252 + 0 mi/In) bit 13-2) minatic chibit 13-	29) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No
Yes, V_{12a} = Capacity Characterized V_{FO} Flow Enterin V_{R12} evel of Servent D_R = 5.475 + 0 $R^{=}$ (pc/mi/lin DS = (Exhibit Cos = (Exhibit 1) $R^{=}$ mph (Exhibit 1)	pc/h (13-19) ecks Actual ag Merge In Actual Actual vice Detern 0.00734 v _R + (n) t 13-2) cmination 13-11) thibit 13-11)	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit $V_F = V_F$ $V_{FO} = V_F$ V_R Flow End V_{12} Level of $D_R = 3^2$ LOS = D Speed L $D_s = 0.$ $S_R = 55$	y Che y Che y Che y Che y y terin f Serv D _R = 4 4.8 (pc/ (Exhik Detern 367 (E: 9.7 mph	Actual 6849 6081 768 g Dive Actual 419 .252 + 0 mi/ln) bit 13-2) minatic khibit 13-	29) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No
Yes, V_{12a} = Capacity Cho V_{FO} Flow Enterin V_{R12} evel of Serve D_R = 5.475 + 0 R^R (pc/mi/li DS = (Exhibit CS = (Exhibit 1) R^R = mph (Ex D_R = mph (Ex	pc/h (13-19) ecks Actual og Merge In Actual vice Detern 0.00734 v _R + (n) t 13-2) rmination	Equation 13- C Exhibit 13-8 fluence A Max I Exhibit 13-8 nination (i	apacity rea Desirable if not F)		If Yes, $V_{12a} =$ Capacit $V_F = V_F$ $V_{FO} = V_F$ V_R Flow End V_{12} Level of $D_R = 32$ LOS = D Speed L $D_s = 0.$ $S_R = 59$ $S_0 = 72$	${P}$	11 Actual 6849 6081 768 g Dive Actual 419 vice De .252 + 0 mi/In) bit 13-2) minatic chibit 13-	29) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0 000 12) 13-12) 13-12)	pacity 3 9600 3 9600 0 2100 ce Area ole 4400:All n (if not l	LOS F No No Violation No



			GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 13- 2020 Bu	Bet Off & On Ramps iild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	🗌 Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4640	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain:	0.95 3 0 Level	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustm	nents				
f _p	1.00		E _R	1.2	
Ε _Τ	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	f _{HV} x f _p) 1652 67.6 24.4 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S D = v_p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
•	C Chood				
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base free	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
DDHV - Directional design not Copyright © 2016 University of Florida, A			HCS 2010 TM Version 6.90		Generated: 6/18/2020 3

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			FREEWA	Y WEAV		_	Γ		
Genera	al Informati	on			Site Info	rmation			
-	ormed Time Period	AECO PM			Freeway/Dir Weaving Seg Analysis Yea	gment Locati		B 4- Bet Sampl Build 2	e & Copans
Project De Inputs	escription SW 10	th Street SIM	2						
Weaving r Weaving s Freeway f	configuration number of lanes, l segment length, L iree-flow speed, F	s FS		One-Sided 4 2520ft 70 mph	Segment typ Freeway min Freeway ma: Terrain type	imum speed			Freew 24 Lev
Conve	rsions to p	1	1	1	8	_	<u> </u>		<u> </u>
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _Τ	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	3995	0.95	3	0	1.5	1.2	0.985	1.00	4268
V _{RF}	1410	0.92	2	0	1.5	1.2	0.990	1.00	1548
V _{FR}	645	0.92	2	0	1.5	1.2	0.990	1.00	708
V _{RR}	0	0.95	0	0	1.5	1.2	1.000	1.00	0
V _{NW}	4268							V =	6524
V _W	2256								
VR	0.346								
	juration Ch		tics						
Minimum	maneuver lanes,	N _{WL}		2 lc	Minimum we	eaving lane c	hanges, LC _{MIN}		2256 lc
	ge density, ID			0.7 int/mi	Weaving lan	e changes, L	-C _w		2705 lc
	RF lane changes	ru -		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		1475 lc
Minimum	FR lane changes	, LC _{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		4180 lc
Minimum	RR lane changes	s, LC _{RR}		lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		75
Weavi	ng Segmen	t Speed,	Density,	Level of	Service,	and Cap	oacity		
Weaving	segment flow rate	e, v		6439 veh/h	Weaving inte	•			0.33
-	segment capacity	ν, C _w		6838 veh/h	Weaving seg				49.0 mp
•	segment v/c ratio	_		0.942	Average wea				56.1 mp
-	segment density,	D	3	3.3 pc/mi/ln	Average nor				45.9 mp
	Service, LOS			D	Maximum w	eaving length	n, L _{MAX}		6080
Notes	g segments longer t	than the calcul	ated maximum l	enath should l	be treated as is	solated merge	and diverge an	eas using the	procedures of
Chapter 13	8, "Freeway Merge mes that exceed th	and Diverge S	egments".	U U		solated merge	and diverge an		
	ersity of Florida All	0 0				OTM Version			erated: 6/18/2

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		RAMP	S AND RAM	P JUNCTI	ONS WC	RKS	HEET			
General In	formation			Site Infor						
Analyst Agency or Comp Date Performed Analysis Time Pe		ОМ	Ju Ju	reeway/Dir of Tr Inction Irisdiction		Off to S	B Express L SW 10th Co			
-	on SW 10th Stree	at SIMR	A	nalysis Year		2020 B				
Inputs										
Upstream A	dj Ramp	Freeway Num Ramp Numbe	ber of Lanes, N	2					Downstrea Ramp	am Adj
Yes	On	· ·	ane Length, L _A	I					Yes	On
✓ No	Off	Deceleration L Freeway Volu	ane Length L _D	345 1110					✓ No	Off
L _{up} =	ft	Ramp Volume	, V _R	60					L _{down} =	ft
V _u =	veh/h		-Flow Speed, S _{FF} ow Speed, S _{FR}	70.0 60.0					V _D =	veh/h
Conversio	n to pc/h Un									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _p
Freeway	1110	0.95	Level	3	0	0.	985	1.00	11	86
Ramp	60	Level	2	0	0.	990	1.00	ť	4	
JpStream										
DownStream		Morgo Aroac						iverge Areas		
Estimation		Merge Areas			Estimat	tion o		iverye Areas		
		(D)								
	$V_{12} = V_F$		10 7)					$V_{R} + (V_{F} - V_{F})$		`
EQ =		ation 13-6 or	-		L _{EQ} =		-	Equation 13-1		-
P _{FM} =	-	Equation (E			P _{FD} =)00 using Equ	ation (Exil	DIL 13-7)
$l_{12} = l_{12}$	pc/h	Equation 12	-14 or 13-17)		$V_{12} =$			86 pc/h	- 10 11 -	40 47)
V_3 or V_{av34}	2,700 pc/h? 🗌 Ye		-14 01 13-17)		V_3 or V_{av34}	、) 7		pc/h (Equatio] Yes	n 13-14 ol	13-17)
$f Yes, V_{12a} =$	1.5 * V ₁₂ /2	Equation 13	-16, 13-18, or		If Yes,V _{12a} =			Yes I No c/h (Equation })	13-16, 13	-18, or 13
Capacity C		/			Capacit	ty Ch				
	Actual	С	apacity	LOS F?			Actual	Ca	pacity	LOS F
					V _F		1186	Exhibit 13-8	4800	No
V _{FO}		Exhibit 13-8			V _{FO} = V _F	- V _R	1122	Exhibit 13-8	4800	No
					V _R		64	Exhibit 13-10) 2200	No
- Iow Enter	ring Merge Ir	ofluence A	rea			<u>8</u>		ge Influen	ce Area	
	Actual	1	Desirable	Violation?		1	Actual	Max Desirab		Violation
V _{R12}		Exhibit 13-8			V ₁₂	1	186	Exhibit 13-8	4400:All	No
	ervice Deterr	nination (i	if not F)			f Serv	/ice De	termination	n (if not	<u> </u> F)
	+ 0.00734 v _R +				- î			0086 V ₁₂ - 0.0		
_R = (pc/m	ni/In)					1.3 (pc				
	bit 13-2)						oit 13-2)			
	ermination				Speed I		,	n		
ℓ _S = (Exib	it 13-11)				D _s = 0.	.109 (E	xhibit 13-	12)		
S _R = mph (I	Exhibit 13-11)						(Exhibit	-		
	Exhibit 13-11) Exhibit 13-13)				, i i i i i i i i i i i i i i i i i i i	-	(Exhibit 1 (Exhibit	-		
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		RA	MPS AND	RAMP JUN	CTIONS W	ORKSH	EET				
General	Inforn		_		Site Infor						
Analyst Agency or C Date Perforr Analysis Tim	company ned	AEC	ОМ	JL JL	reeway/Dir of Tr unction urisdiction nalysis Year	avel	On fr	NB Express om SW 10th Build 2	Lanes St. Connector		
		SW 10th Stree	et SIMR		5						
nputs											
Jpstream A	dj Ramp		Freeway Num Ramp Number	per of Lanes, N	2 1					Downstre Ramp	eam Adj
Yes	🗌 On		Acceleration L	ane Length, L _A	1040					Yes	On
✓ No	Off		Deceleration L Freeway Volur	ane Length L _D ne, V _E	1050					🗹 No	Off
up =	ft		Ramp Volume	, V _R	760					L _{down} =	ft
′ _u =	veh/h		Freeway Free- Ramp Free-Flo	Flow Speed, S _{FF} ow Speed, S _{FR}	70.0 60.0					V _D =	veh/h
Convers	sion to	pc/h Un	der Base (Conditions							
(pc/h	1)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
Freeway		1050	0.95	Level	3	0		0.985	1.00		1122
Ramp JpStream		760	0.95	Level	2	0	-	0.990	1.00		808
DownStrear	m										
			Merge Areas						Diverge Areas		
Estimat	ion of	v ₁₂				Estimat	ion	of v_{12}			
EQ = FM =		1.000	ation 13-6 or using Equati	13-7) on (Exhibit 13-6)	L _{EQ} = P _{FD} =			V _R + (V _F - V _I (Equation 13 using Equation	-12 or 13-	-
0 40	₃₄ > 1.5 * \	pc/h? Ye V ₁₂ /2 Ye pc/h	, h (Equation [,] s	13-14 or 13-17)		₃₄ > 1	,700 pc/h? [.5 * V ₁₂ /2 [pc/h pc/h (Equation Yes Nc Yes Nc pc/h (Equatio)	
		13-19)						3-19)		
Capacit	y cnec		0	anadhu		Capacit	y Ci		<u> </u>	noolty	
		Actual		apacity	LOS F?	V _F		Actual	Exhibit 13		LOS F?
V _{FC}		1930	Exhibit 13-8		No	V _{FO} = V _F	- V _R		Exhibit 13 Exhibit 13		
									10		
-low En	itering		fluence A		Violation?	FIOW En	iteri		rge Influe		
V _{R1}	2	Actual 2064	Exhibit 13-8	Desirable 4600:All	Violation? No	V ₁₂	╈	Actual	Max Des Exhibit 13-8		Violation?
		ce Deteri	nination (i	f not F)		Level of	f Se	rvice De	terminatio	on (if no	t F)
	5.475 + 0 3.6 (pc/mi/		0.0078 V ₁₂ - 0.0	0627 L _A			D _R = pc/mi		.0086 V ₁₂ - (0.009 L _D	
	(Exhibit 1							it 13-2)			
		ination				Speed L			<u>on</u>		
Λ _S = 0.	227 (Exibi	t 13-11)				D _s = (E	xhibit	13-12)			
		xhibit 13-11) xhibit 13-11)						xhibit 13-12) xhibit 13-12)			
63 = 63		xhibit 13-13)						xhibit 13-13)			
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		RAMP	S AND RAM	IP JUNCTI	ONS WO	RKS	HEET			
General In	formation		-	Site Infor						
Analyst Agency or Comp Date Performed	oany AEC	ОМ	Ju Ju	reeway/Dir of Tr unction urisdiction	avel	Off to S	Express L W 10th Co			
Analysis Time P Project Descripti	eriod AM ion SW 10th Stree		A	nalysis Year		2020 B	ulia 2			
nputs										
Upstream A	di Ramn	Freeway Num	ber of Lanes, N	2					Downstrea	am Adi
		Ramp Number	of Lanes, N	1					Ramp	in , taj
Yes	On		ane Length, L _A						Yes	On
✓ No	Off	Deceleration L Freeway Volur	ane Length L _D	250					🗹 No	Off
L _{up} =	ft	Ramp Volume		1010 370					L _{down} =	ft
·			Flow Speed, S _{FF}	70.0					V _D =	veh/h
V _u =	veh/h	Ramp Free-Fle	ow Speed, S _{FR}	60.0					v _D –	ven/n
Conversio	n to pc/h Un	der Base (Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _p
Freeway	1010	0.95	Level	3	0	0.	985	1.00	10	79
Ramp	370	Level	2	0	0.	990	1.00	3'	93	
UpStream DownStream		+				_				
JownSilean		Merge Areas					I D	iverge Areas		
Estimation					Estimat	ion o		<u> </u>		
	V ₁₂ = V _F	(P _{EM})						V _R + (V _F - V _R	P _{FD}	
EQ =	(Equa	ation 13-6 or	13-7)		L _{EQ} =		(E	Equation 13-1	2 or 13-13)
P _{FM} =	using	Equation (E	xhibit 13-6)		P _{FD} =		1.(000 using Equ	iation (Exhi	bit 13-7)
/ ₁₂ =	pc/h				V ₁₂ =			79 pc/h		
V_3 or V_{av34}			-14 or 13-17)		V_3 or V_{av34}	0.7		pc/h (Equatio	n 13-14 oi	13-17)
	2,700 pc/h? Ye							Yes No		
s v ₃ or v _{av34} > [*] Yes,V _{12a} =	1.5 * V ₁₂ /2 pc/h (-16, 13-18, or		Is V_3 or V_{av} If Yes, V_{12a} =			Yes	13-16, 13 [.]	-18, or 13
	13-19)					19	9)		
Capacity C	Actual		anacitu	LOS F?	Capacit	y Ch	Actual	Ca	pacity	LOS F
	Actual		apacity	LUST	V _F		1079	Exhibit 13-8		No
V _{FO}		Exhibit 13-8			V _{FO} = V _F	- V _R	686	Exhibit 13-8	_	No
10					V _R		393	Exhibit 13-10	-	No
-low Enter	ring Merge Ir	fluence A	rea	-		nterin	g Diver	ge Influen	ce Area	-
	Actual	1	Desirable	Violation?			Actual	Max Desirab		Violation
V _{R12}		Exhibit 13-8			V ₁₂		079	Exhibit 13-8	4400:All	No
	ervice Deteri				1			terminatio		F)
	+ 0.00734 v _R +	0.0078 V ₁₂ -	0.00627 L _A					0086 V ₁₂ - 0.0	009 L _D	
0 _R = (pc/n	-					1.3 (pc	-			
-	ibit 13-2)						oit 13-2)			
•	ermination				Speed L		minatio xhibit 13-			
5	oit 13-11)				5	•	(Exhibit			
	Exhibit 13-11) Exhibit 13-11)						(Exhibit 1	-		
	Exhibit 13-11)				Ű		(Exhibit	-		
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<u></u>	11				ICTIONS W						
	l Inforn	nation			Site Infor						
nalyst gency or (ate Perfor		AEC	ОМ	J	reeway/Dir of Tr unction urisdiction			B Express L m SW 10th	anes St. Connector		
	me Period	AM		A	Analysis Year		2020 E	Build 2			
roject Des	scription S	W 10th Stree	et SIMR								
nputs											
pstream A	Adj Ramp		Freeway Numb Ramp Number		2 1					Downstre Ramp	eam Adj
Yes	🗌 On		Acceleration La		1100					Yes	On
✓ No	Off		Deceleration La	- D							Off
	£4		Freeway Volun		640						ft
- qu	ft		Ramp Volume,		160					L _{down} =	п
'u =	veh/h		-	Flow Speed, S _{FF}	70.0					V _D =	veh/h
u	Volivit		Ramp Free-Flo	w Speed, S _{FR}	60.0						
Conver	rsion to	pc/h Un	der Base C	Conditions							
(pc/	/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
reeway		640	0.95	Level	3	0	0	.985	1.00		684
Ramp		160	0.95	Level	2	0	0	.990	1.00		170
JpStream											
ownStrea	am		Merge Areas)iverge Areas		
stima	tion of		INICI YE AIEdo			Estimat	ion		nvelye Aleas		
Suma		12				Lotimat				<u>, </u>	
		V ₁₂ = V _F	1 101						V _R + (V _F - V		
EQ =			ation 13-6 or	-		L _{EQ} =			Equation 13		
FM =				on (Exhibit 13-6	b)	P _{FD} =			using Equati	on (Exhibit 1	13-7)
12 =		684 p				V ₁₂ =			oc/h		
$_3$ or V $_{av34}$		-		3-14 or 13-17	")	V_3 or V_{av34}			pc/h (Equation		17)
		pc/h? 🗌 Ye							Yes 🗌 No		
s V_3 or V_a	_{v34} > 1.5 * \	/ ₁₂ /2 □Ye				Is V ₃ or V _{av}	₃₄ > 1.!		Yes 🗌 No		
Yes,V _{12a}	=	pc/h 13-19		·16, 13-18, or		If Yes,V _{12a} =	=		oc/h (Equatio 3-19)	on 13-16, 1	13-18, or
apaci	ty Chec		/			Capacit	v Ch		5 10/		
apaon	.) ene	Actual	Ca	pacity	LOS F?		<u>, , , , , , , , , , , , , , , , , , , </u>	Actual	C	apacity	LOS F?
			Ť			V _F			Exhibit 13		
V		054	E., hikiki 12,0		Nia	V _{FO} = V _F	- V_		Exhibit 13		
V _F	0	854	Exhibit 13-8		No		ĸ		Exhibit 1		
						V _R			10	-	
low E	ntering	Merge Ir	nfluence A	rea		Flow Er	nterii	ng Dive	rge Influe	nce Area	а
		Actual	-	esirable	Violation?			Actual	Max De	sirable	Violation?
V _R	12	936	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
evel o	of Servic	e Deteri	nination (i	f not F)		Level of	f Ser	vice De	terminatio	on (if no	t F)
D _R :	= 5.475 + 0	.00734 v _R +	0.0078 V ₁₂ - 0.0	0627 L _A			D _R = -	4.252 + 0	.0086 V ₁₂ - 0	0.009 L _D	
_R = 5	5.2 (pc/mi/ln)				D _R = (p	oc/mi/	ln)			
OS = A	A (Exhibit 13	8-2)				LOS = (E	Exhibi	t 13-2)			
	Determ					Speed L		-	on		
).199 (Exibit						xhibit				
0		xhibit 13-11)				3		hibit 13-12)			
		(hibit 13-11)					-	hibit 13-12)			
0		xhibit 13-11)				ů	-	hibit 13-13)			
= 6											

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		RAMP	S AND RAM	IP JUNCTI	ONS WOP	RKSI	HEET			
General Inf	ormation			Site Infor	mation					
Analyst Agency or Compa Date Performed	any AEC	ОМ	Ju	reeway/Dir of Tr unction urisdiction			Express La W 10th Cor			
Analysis Time Pe			A	nalysis Year	2	2020 Bi	uild 2			
	on SW 10th Stree	et SIMR								
nputs		F N	han af Lanaa Ni							
Upstream Ac		Ramp Number	ber of Lanes, N r of Lanes, N	2 1					Downstrea Ramp	am Adj
Yes	On	Acceleration L	ane Length, L _A						Yes	On
✓ No	Off		ane Length L _D	345					✓ No	Off
I –	ft	Freeway Volu		890					L _{down} =	ft
L _{up} =	ii.	Ramp Volume	IX .	150					down	
V _u =	veh/h	-	Flow Speed, S _{FF}	70.0				·	V _D =	veh/h
<u></u>			ow Speed, S _{FR}	60.0						
	n to pc/h Un		onaltions		1	T				
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	1	HV	f _p	v = V/PHF	x f _{HV} x f _p
Freeway	890	0.95	Level	3	0	0.9	985	1.00	95	51
Ramp	150	0.95	Level	2	0	0.9	90	1.00	15	59
UpStream DownStream										
JUWIISIIEdili		Merge Areas					I Di	iverge Areas		
Estimation		J			Estimation of v ₁₂					
	$V_{12} = V_{F}$	(P.,)						V _R + (V _F - V _R		
EQ =		ation 13-6 or	13-7)		L _{EQ} =		•=	equation 13-1)
P _{FM} =		Equation (E	-		P _{FD} =		-	00 using Equ		
/ ₁₂ =	pc/h				V ₁₂ =			l pc/h	,	,
V_3 or V_{av34}		Equation 13	-14 or 13-17)		V_3^{12} or V_{av34}^{12}			pc/h (Equatio	n 13-14 or	13-17)
	2,700 pc/h? 🗌 Ye	s 🗌 No				₄ > 2,70		Yes 🗹 No		,
$ \text{s V}_3 \text{ or V}_{av34} > 1$	I.5 * V ₁₂ /2 □ Ye	s 🗌 No						Yes 🗹 No		
f Yes,V _{12a} =	pc/h (Equation 13	-16, 13-18, or		If Yes,V _{12a} =	-	po	h (Equation	13-16, 13-	18, or 13
Capacity C	13-19))			Capacity		19 19)		
Supuony o	Actual	С	apacity	LOS F?			Actual	Car	pacity	LOS F
					V _F		951	Exhibit 13-8	1	No
V _{FO}		Exhibit 13-8			$V_{FO} = V_F$	- V _P	792	Exhibit 13-8	4800	No
10					V _R		159	Exhibit 13-10		No
low Enter	ing Merge In	fluence A	roa		1	torin		ge Influen		
	Actual	ii .	Desirable	Violation?		1	ctual	Max Desirab		Violation
V _{R12}		Exhibit 13-8			V ₁₂	Ģ	951	Exhibit 13-8	4400:All	No
	rvice Deterr	nination (i	if not F)	1	Level of	Serv	ice Det	ermination	n (if not l	F)
D _R = 5.475 +	• 0.00734 v _R +	0.0078 V ₁₂ -	0.00627 L _A		D) _R = 4	.252 + 0.0	0086 V ₁₂ - 0.0	009 L _D	
0 _R = (pc/m	i/ln)				D _R = 9.3	(pc/n	ni/In)			
OS = (Exhib	oit 13-2)				LOS = A (Exhib	it 13-2)			
Speed Dete	-				Speed D			n		
	t 13-11)				+ '		hibit 13-			
-	Exhibit 13-11)					7 mph	(Exhibit 1	3-12)		
	Exhibit 13-11)					A mph (Exhibit 1	3-12)		
	Exhibit 13-13)					7 mph	(Exhibit 1	3-13)		
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		RA	MPS AND	RAMP JUN	CTIONS W	<u>/ORKSH</u>	<u>EE</u> T				
Genera	I Inform	nation			Site Infor	mation	_				
nalyst gency or (late Perfor		AEC	OM	J	reeway/Dir of Tr unction urisdiction			B Express I om SW 10th	anes St. Connector		
	me Period	PM		A	nalysis Year		2020	Build 2			
-	scription S	SW 10th Stree	et SIMR								
nputs										1	
Ipstream A	Adj Ramp		Freeway Numb		2					Downstre	eam Adj
Yes	🗌 On		Ramp Number		1					Ramp	
			Acceleration La	- 11	1040					Yes	🗌 On
🗸 No	🗌 Off		Deceleration La	- 0						✓ No	Off
	<i>c</i> 1		Freeway Volun		740						ft
up =	ft		Ramp Volume,	IX .	390					L _{down} =	п
′ _u =	veh/h		-	Flow Speed, S_{FF}						V _D =	veh/h
			Ramp Free-Flo	110	60.0						
Conver	<u>sion to</u>		der Base (Conditions		r					
(pc/	/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
Freeway		740	0.95	Level	3	0	(.985	1.00		791
Ramp		390	0.95	Level	2	0	_	.990	1.00		415
JpStream											
DownStrea	am										
- time	tion of		Merge Areas			F atimat	io m		Diverge Areas		
stima	tion of					Estimat					
		V ₁₂ = V _F	(P _{FM})					V ₁₂ = '	V _R + (V _F - V	_R)P _{FD}	
EQ =		(Equ	ation 13-6 or	13-7)		L _{EQ} =		((Equation 13	8-12 or 13-	13)
FM =		1.000	using Equation	on (Exhibit 13-6)	P _{FD} =		I	using Equati	on (Exhibit [*]	13-7)
' ₁₂ =		791 p	oc/h			V ₁₂ =		I	pc/h		
$'_3$ or V_{av34}		0 pc/	h (Equation 1	3-14 or 13-17)	V_3 or V_{av34}			pc/h (Equation		17)
		pc/h? 🗌 Ye							Yes 🗌 No		
s V_3 or V_a	_{v34} > 1.5 * '	V ₁₂ /2 🗌 Ye				Is $\rm V_3$ or $\rm V_{av}$	₃₄ > 1.		Yes 🗌 No		
Yes,V _{12a}	=	pc/h 13-19		-16, 13-18, or		If Yes,V _{12a} =	=		pc/h (Equatio 3-19)	on 13-16, ⁻	13-18, or
-	ty Chec)			Capacit			5-19)		
Japaon	iy oned	Actual	Ca	pacity	LOS F?		<u>y 01</u>	Actual	C	apacity	LOS F?
		riotadi	Î	puolity	2001.	V _F		rotaa	Exhibit 13		20011
		400/	E 1 11 1 40 0			V _{FO} = V _F	- V_		Exhibit 13		
V _F	0	1206	Exhibit 13-8		No		۰R		Exhibit 1		_
						V _R			10	<u> </u>	
low E	ntering	Merge Ir	nfluence A	rea		Flow En	nteri	ng Dive	rge Influe	nce Area	a
		Actual	i r	esirable	Violation?			Actual	Max De	sirable	Violation?
V _R	12	1300	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
.evel o	f Servi	ce Deteri	nination (i	f not F)		Level of	f Ser	vice De	terminatio	on (if no	t F)
D _R :	= 5.475 + 0	0.00734 v _R +	0.0078 V ₁₂ - 0.0	0627 L _A			D _R =	4.252 + 0	.0086 V ₁₂ - 0	0.009 L _D	
_R = 8	8.2 (pc/mi/lr	ו)				D _R = (p	oc/mi/	ln)			
OS = A	A (Exhibit 1	3-2)				LOS = (E	Exhibi	t 13-2)			
Speed	Determ	ination				Speed L			on		
).211 (Exibi						xhibit				
0		Exhibit 13-11)				3		hibit 13-12)			
							-	hibit 13-12)			
0	• •	xhibit 13-11) Exhibit 13-13)				Ŭ	-	hibit 13-13)			
	, т. т. нирн (E	-7111016 13-13)				P- III	ιμιι (ΕΧ	111UIL IJ-IJ)			

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		RAMP	S AND RAN	IP JUNCT	ONS WC	RKS	HEET			
General Inf	ormation			Site Infor	mation					
Analyst Agency or Compa Date Performed	-	ОМ	ıL Ju	reeway/Dir of Ti unction urisdiction	ravel	Off to S	Express L W 10th Co			
Analysis Time Pe			A	nalysis Year		2020 B	uild 2			
	n SW 10th Stree	et SIMR								
nputs		Eroowov Num	ar of Lance N							
Upstream Ad	lj Ramp		ber of Lanes, N	2					Downstre	am Adj
Yes	On	Ramp Number		1					Ramp	
			ane Length, L _A	050					Yes	On
🗹 No	Off		ane Length L _D	250					✓ No	Off
1 -	ft	Freeway Volur		1730					I. =	ft
L _{up} =	ii.	Ramp Volume	IX	560					L _{down} =	it.
V,, =	veh/h		Flow Speed, S _{FF}	70.0					V _D =	veh/h
-			ow Speed, S _{FR}	60.0						
Conversion	n to pc/h Un	der Base (Conditions	1						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{H∨}	f _p	v = V/PHF	x f _{HV} x f _p
Freeway	1730	0.95	Level	3	0	0.	985	1.00	18	348
Ramp	mp 560 0.95 Level				0	_	990	1.00		95
JpStream										
DownStream										
Estimation		Merge Areas			Estimat	tion o	<u> </u>	viverge Areas		
Sumation					Estimat					
	$V_{12} = V_{F}$						•	V _R + (V _F - V _F		
EQ =		ation 13-6 or	-		L _{EQ} =		-	Equation 13-1		-
P _{FM} =	-	Equation (E	xhibit 13-6)		P _{FD} =			000 using Equ	ation (Exh	ibit 13-7)
/ ₁₂ =	pc/h				V ₁₂ =			48 pc/h		
V_3 or V_{av34}			14 or 13-17)		V_3 or V_{av34}	0.7		pc/h (Equatio	n 13-14 o	r 13-17)
	,700 pc/h? Ye							Yes 🗹 No		
	.5 * V ₁₂ /2 Ye		16, 13-18, or					Yes No	12 16 12	10 or 12
Yes,V _{12a} =	13-19		10, 13-10, 0		If Yes,V _{12a} =	=	р 19	c/h (Equation	13-10, 13	-10, 01 15
Capacity C					Capacit	ty Che		,		
	Actual	С	apacity	LOS F?			Actual	Са	pacity	LOS F
					V _F		1848	Exhibit 13-8	4800	No
V _{FO}		Exhibit 13-8			V _{FO} = V _F	- V _R	1253	Exhibit 13-8	4800	No
					V _R		595	Exhibit 13-10) 2200	No
-low Enteri	ing Merge Ir	fluence A	rea		Flow Er	nterin	a Diver	ge Influen	ce Area	
	Actual	ii .	Desirable	Violation?	_	ii ii	Actual	Max Desirab		Violation
V _{R12}		Exhibit 13-8			V ₁₂	1	848	Exhibit 13-8	4400:All	No
	rvice Deterr	nination (i	f not F)		Level of	f Serv	vice De	termination	n (if not	F)
D _R = 5.475 +	0.00734 v _R +	0.0078 V ₁₂ -	0.00627 L _A			D _R = 4	.252 + 0.	.0086 V ₁₂ - 0.0	009 L _D	
) _R = (pc/mi	i/ln)				D _R = 1 ⁻	7.9 (pc /	ˈmi/ln)			
OS = (Exhib	oit 13-2)				LOS = B	(Exhib	oit 13-2)			
Speed Dete	ermination				Speed I			n		
	t 13-11)						xhibit 13-			
	Exhibit 13-11)					•	(Exhibit			
	Exhibit 13-11)					-	(Exhibit 1	-		
	Exhibit 13-13)				ů	-	(Exhibit	-		
	niversity of Florida,	All Dights Docon	rad		HCS2010 TM		•	,	poratod: 6/6/	2021 11:55

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		<u> </u>	MPS AND	RAMP JUN	<u>ICTIONS W</u>	<u>ORKSH</u>	EET				
Genera	l Inform	nation			Site Infor	mation					
nalyst gency or (ate Perfor	med	AEC	ОМ	ال ال	reeway/Dir of Tr unction urisdiction		On fro		anes St. Connector		
	me Period	PM		A	nalysis Year		2020	Build 2			
	scription S	SW 10th Stree	et SIMR								
nputs				en ef Lenne M						<u> </u>	
pstream A	Adj Ramp		Freeway Numb		2					Downstre	eam Adj
Yes	On		Ramp Number		1					Ramp	
			Acceleration La	- 11	1100					Yes	🗌 On
🗸 No	🗌 Off		Deceleration La	- 0						✓ No	Off
			Freeway Volun		1170						ft
- qu	ft		Ramp Volume,	IX .	80					L _{down} =	п
′ _u =	veh/h		-	Flow Speed, S_{FF}	70.0					V _D =	veh/h
			Ramp Free-Flo		60.0						
Conver	sion to		der Base C	Conditions	<u>.</u>						
(pc/	′h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
reeway		1170	0.95	Level	3	0		.985	1.00		1250
Ramp		80	0.95	Level	2	0			1.00		85
JpStream						-					
DownStrea	am										
			Merge Areas				-		iverge Areas		
stima	tion of	v ₁₂				Estimat		of v ₁₂			
		$V_{12} = V_{F}$	(P _{FM})					V ₁₂ = '	V _R + (V _F - V _F	_R)P _{FD}	
EQ =		(Equ	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13	-12 or 13-	13)
FM =		1.000	using Equation	on (Exhibit 13-6)	P _{FD} =		ι	using Equation	on (Exhibit 1	13-7)
12 =		1250	pc/h			V ₁₂ =		I	oc/h		
$_3$ or V _{av34}		0 pc/	h (Equation 1	3-14 or 13-17)	V_3 or V_{av34}			pc/h (Equation	13-14 or 13-	17)
s V_3 or V_{av}	_{v34} > 2,700	pc/h? 🗌 Ye	s 🗹 No						Yes 🗌 No		
s V_3 or V_{av}	_{v34} > 1.5 * '	V ₁₂ /2 □Ye				Is V_3 or V_{av}	₃₄ > 1.		Yes 🗌 No		
Yes,V _{12a}	=			-16, 13-18, or		If Yes,V _{12a} =	-		oc/h (Equatio	on 13-16, ´	13-18, or
-	ty Chec	13-19)			Capacit			3-19)		
apach		Actual	C	pacity	LOS F?		y on	Actual	Ca	pacity	LOS F?
		Actual		ιρασιτγ	LUJT:	V _F		Actual	Exhibit 13	· · · ·	LUJT:
						$V_{FO} = V_F$	- V		Exhibit 13		
V _F	0	1335	Exhibit 13-8		No		- • R		Exhibit 13		
						V _R			10		
low El	ntering	Merge Ir	fluence A	rea		Flow Er	nterii	ng Dive	rge Influei	nce Area	<u>,</u>
	Ī	Actual		esirable	Violation?			Actual	Max Des		Violation?
V _{R1}	12	1485	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
.evel o	f Servi	ce Deteri	nination (i	f not F)		Level of	f Ser	vice De	terminatio	on (if no	t F)
D _R =	= 5.475 + 0).00734 v _R +	0.0078 V ₁₂ - 0.0	0627 L _A			D _R =	4.252 + 0	.0086 V ₁₂ - 0).009 L _D	
_R = 9	.0 (pc/mi/lr	ו)				D _R = (p	oc/mi/	ln)			
	(Exhibit 1	3-2)						t 13-2)			
		ination				Speed L			on		
•	.206 (Exibi						Exhibit				
0		-				3		hibit 13-12)			
		Exhibit 13-11)				i n	-	hibit 13-12)			
0	• •	xhibit 13-11) Exhibit 13-13)				Ŭ	-	hibit 13-12)			
		ALILUI 15-151				• • = m		11111113-131			

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				RAMP JUN								
	l Inforn	nation			Site Infor							
nalyst gency or (ate Perfor		AEC	ОМ	J	reeway/Dir of Tr unction urisdiction	avel	I-95 NB CD N. of Hillsboro Blvd					
,	me Period	AM		Ą	nalysis Year		2020	Build 2				
	scription S	W 10th Stree	et SIMR									
nputs			ì									
pstream A	Adj Ramp		Freeway Numb Ramp Number		2 1					Downstre Ramp	eam Adj	
Yes	🗌 On		Acceleration La		890					Yes	On	
✓ No	Off		Deceleration La	- D							Off	
			Freeway Volun		1230							
up =	ft		Ramp Volume,		710					L _{down} =	ft	
′ _u =	veh/h			Flow Speed, S_{FF}	55.0					V _D =	veh/h	
u	Volivit		Ramp Free-Flo	w Speed, S _{FR}	40.0							
Conver	rsion to	pc/h Un	der Base C	Conditions								
(pc/	/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	$IF \ge f_{HV} \ge f_{p}$	
reeway		1230	0.95	Level	3	0	().985	1.00		1314	
Ramp		710	0.95	Level	2	0	().990	1.00		755	
JpStream							_					
ownStrea	am		Merge Areas						iverge Areas			
stima	tion of		Merge Areas			Estimat	ion	of V	iverge Areas	•		
_		V ₁₂ = V _F	1 101	10 7)				•=	/ _R + (V _F - \ Equation 1		12)	
ΞQ =			ation 13-6 or	-	<u>۱</u>	L _{EQ} = D _			Equation 1 Ising Equat			
FM = 12 =		1.000		on (Exhibit 13-6))	P _{FD} = V ₁₂ =			oc/h		13-7)	
$^{12}_{3}$ or V _{av34}			•	3-14 or 13-17	')	$V_{12} = V_3$ or V_{av34}			oc/h (Equation	12 11 or 12	17)	
	> 2 700	pc/h? Ye		5-14 01 15-17)		> 2	-	Yes □N		-17)	
		/ ₁₂ /2 □Ye					- ·		∃Yes □N			
				-16, 13-18, or			01		oc/h (Equat		13-18, or	
Yes,V _{12a}		13-19				If Yes,V _{12a} =		13	3-19) ·			
Capaci	ty Chec		0			Capacit	y Ch	iecks				
		Actual	Ca	pacity	LOS F?			Actual	1	Capacity	LOS F?	
						V _F			Exhibit 1			
V _F	0	2069	Exhibit 13-8		No	V _{FO} = V _F	- V _R		Exhibit 1			
						V _R			Exhibit 1 10	3-		
	nterina	Merce li	nfluence A	roa			ntori	na Dive	ge Influe	nce Are	 a	
		Actual		lesirable	Violation?	1011 21		Actual	Max De		Violation?	
V _R	12	2069	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8	1		
		ce Deteri	nination (i	f not F)	•	- D	f Ser	vice De	terminat	ion (if no	t F)	
			0.0078 V ₁₂ - 0.0			1			0086 V ₁₂ -		,	
	5.7 (pc/mi/l		12				c/mi/		12	U		
	3 (Exhibit 13							it 13-2)				
	Determ	-				· ·			n			
						Speed Determination D _s = (Exhibit 13-12)						
0		xhibit 13-11)						hibit 13-12)				
		(hibit 13-11)				$S_0 = mph$ (Exhibit 13-12)						
0		xhibit 13-13)				Ů		hibit 13-13)				
J	· · · · · · · · · · · · · · · (Ľ					r "	·Ի·· (⊏^					

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			WF 5 AND	RAMP JUN									
	l Inforn	nation			Site Infor								
nalyst gency or (ate Perfor	Company rmed	AEC	ОМ	J	reeway/Dir of Tr unction urisdiction	avel	I-95 N N. of I	IB CD Hillsboro Blv	d.				
,	me Period	PM		A	Analysis Year			2020 Build 2					
-	scription S	SW 10th Stree	et SIMR										
nputs			1							- í			
pstream A	Adj Ramp		Freeway Numb Ramp Number		2 1					Downstr Ramp	eam Adj		
Yes	🗌 On		Acceleration La		890					Yes	On		
🗸 No	Off		Deceleration La	- D						✓ No	Off		
_	ft		Freeway Volun		1520					L _{down} =	ft		
= qL	п		Ramp Volume,		640					-down	i.		
. =	veh/h		-	Flow Speed, S _{FF}						V _D =	veh/h		
			Ramp Free-Flo		40.0								
onver	rsion to		der Base (conditions		1							
(pc/	/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	$IF \ge f_{HV} \ge f_{p}$		
reeway		1520	0.95	Level	3	0	().985	1.00		1624		
Ramp		640	0.95	Level	2	0	().990	1.00		680		
JpStream							_			_			
ownStrea	am		Merge Areas						iverge Areas				
stima	tion of		merge meus			Estimat	ion	of V ₄₀	iverge nicu.	,			
		$V_{12} = V_{F}$	(D)				-		/ _R + (V _F - \	/ \D			
_		12 1	ation 13-6 or	13 7)		_		.=		' R ^{/F} FD 3-12 or 13-	13)		
EQ = _				on (Exhibit 13-6	.)	L _{EQ} = P _				tion (Exhibit			
FM = 12 =		1624))	P _{FD} = V ₁₂ =			oc/h		13-7)		
$^{12}_{3}$ or V _{av34}				3-14 or 13-17	')	V_{12} – V_3 or V_{av34}				n 13-14 or 13	17)		
		pc/h? Ye		5-14 01 15-17)		> 2	-	Yes □N		-17)		
		/ ₁₂ /2 □Ye							∃Yes □N				
				-16, 13-18, or		0 u.	0.			ion 13-16,	13-18. or		
Yes,V _{12a}		13-19				If Yes,V _{12a} =		13	3-19) ່				
Capaci	ty Chec	:ks	2			Capacit	y Cł	necks					
		Actual	Ca	pacity	LOS F?			Actual		Capacity	LOS F?		
						V _F			Exhibit 1		_		
V _F	0	2304	Exhibit 13-8		No	V _{FO} = V _F	- V _R		Exhibit 1				
						V _R			Exhibit 1 10	13-			
	ntorina	Morgo Ir	nfluence A	roa			otori	na Divo		ence Are	<u> </u>		
		Actual		esirable	Violation?	1000 21		Actual		esirable	Violation?		
V _R	12	2304	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8	1			
		ce Deteri	nination (i	f not F)		- ÷	f Sei	rvice De	terminat	ion (if no	t F)		
			0.0078 V ₁₂ - 0.0	,		1			0086 V ₁₂ -				
	17.6 (pc/mi/l		12	~			bc/mi/		12	D			
	3 (Exhibit 13	3-2)						, it 13-2)					
	Determ					`		rminatio	n				
							$D_{s} = (Exhibit 13-12)$						
0		(xhibit 13-11)				3 .		(hibit 13-12)					
		xhibit 13-11)				$S_0 = mph$ (Exhibit 13-12)							
0		xhibit 13-13)				, i i i i i i i i i i i i i i i i i i i		(hibit 13-13)					
	cb (r					r "	יריי (<i>ב</i> י						

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			REEWA	WEAV		-						
Genera	l Informati	on			Site Information							
Analyst Agency/Co Date Perfor Analysis Tir	med	AECO AM			Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sample Analysis Year 2040 Build 2							
Inputs			\									
Weaving configuration One-Sid Weaving number of lanes, N Weaving segment length, L _s Weaving segment length, L _S 238 Freeway free-flow speed, FFS 70 m Conversions to pc/h Under Base Condition					Segment typ Freeway min Freeway max Terrain type	Freew 24 Lev						
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _T	E _R	f _{HV}	fp	v (pc/h)			
V _{FF}	4690	0.95	3	0	1.5	1.2	0.985	1.00	5011			
V _{RF}	420	0.92	2	0	1.5	1.2	0.990	1.00	461			
V _{FR}	970	0.92	2	0	1.5	1.2	0.990	1.00	1065			
V _{RR}	0	0.95	0	0	1.5	1.2	1.000	1.00	0			
V _{NW}	5011		8					V =	6537			
V _W	1526											
/R	0.233											
Configu	uration Cha	aracteris	tics		_							
Minimum n	naneuver lanes,	N _{WL}		2 lc	Minimum we	1526 lc						
Interchang	e density, ID			0.7 int/mi	Weaving lan	e changes, L	-C _w		1961 lc			
Minimum F	RF lane changes	, LC _{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		1552 lc			
Minimum F	R lane changes	, LC _{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		3513 lc			
Minimum F	RR lane changes	s, LC _{RR}		lc/pc	· • • • • • • • • • • • • • • • • • • •							
Weavin	g Segmen	t Speed,	Density, I	Level of	Service,	and Cap	pacity					
Weaving s	egment flow rate egment capacity			6448 veh/h 8705 veh/h	Weaving inte Weaving seg		0.30 52.4 mp 57.1 mp					
•	Veaving segment v/c ratio 0.7 Veaving segment density, D 31.2 pc/m											
•	egment density, ervice, LOS	U	3	1.2 pc/mi/ln D	-				51.2 mp			
	51 VICE, LOG			U	Maximum we	eaving length	I, L _{MAX}		4881			

Chapter 13, "Freeway Merge and Diverge Segments". b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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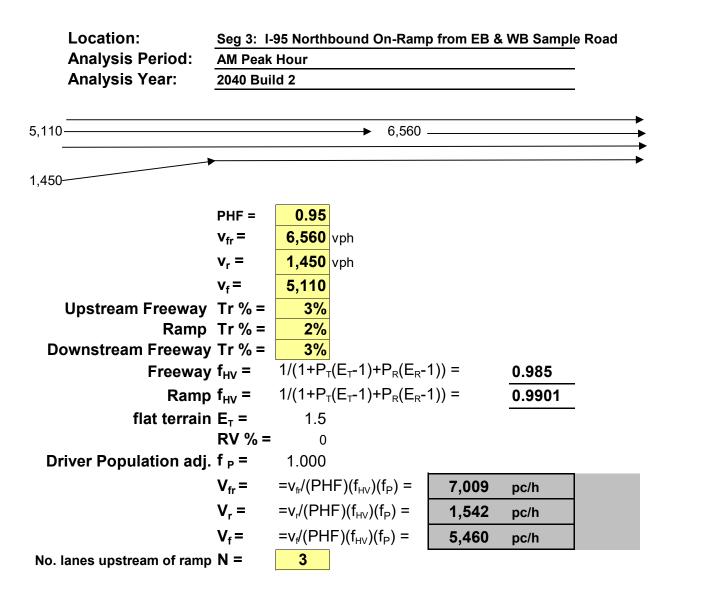
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company	AECOM		Highway/Direction of Travel From/To	I-95 NB Seg 2-Bet Sample	Off & On from
Date Performed Analysis Time Period	AM		Jurisdiction Analysis Year	2040 Build	2
Project Description SW 10th	n Street SIMR				
✓ Oper.(LOS)			Des.(N)	Planr	iing Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	5110	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
			Up/Down %		
Calculate Flow Adjustn	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	S	
_ane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
OS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N > S D = v _p / S LOS	x f _{HV} x f _p) 1820 65.5 27.8 D	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-	-13 1	: _{LW} - Exhibit 11-8 : _{LC} - Exhibit 11-9 IRD - Page 11-11
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Job: SW 10th Street SIMR Analyst: AECOM



<u>No. Ln</u>	Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
4	Fwy downstream of ramp (assume 70 mph free-flow speed) =	9,600	7,009	0.73	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,460	0.76	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,542	0.73	No

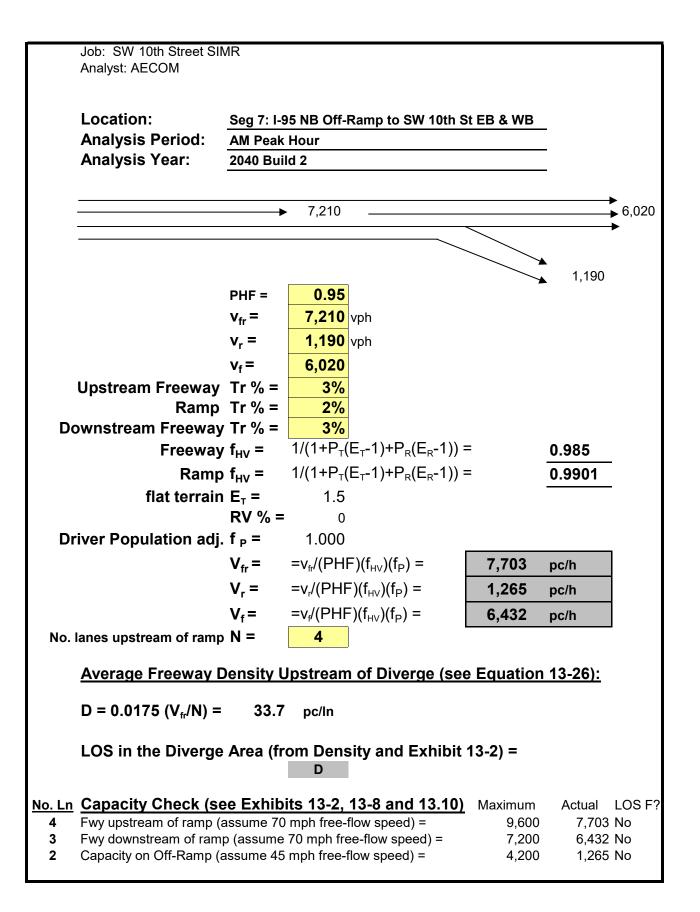
		RA	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET				
General	Inform	nation			Site Infor	mation					
Analyst	_			 Fr	eeway/Dir of Tra	avel I-	-95 NB	3			
gency or C	ompany	AECO	DM	Ju	nction	5	Seg 4-0	On from Ex	p		
ate Perforn					risdiction						
Analysis Tim		AM		Ar	nalysis Year	2	2040 B	uild 2			
	cription	SW 10th Street	t SIMR								
nputs			I							1	
Jpstream Ad	dj Ramp		· ·	ber of Lanes, N	4					Downstre	eam Adj
Yes	🗌 On		Ramp Numbe		1					Ramp	
				ane Length, L _A .ane Length L _D	1500					🗹 Yes	On
✓ No	Off		Freeway Volu		6560					🗌 No	✓ Off
-up =	ft		Ramp Volume	1	830					L _{down} =	2950 ft
up				-Flow Speed, S _{FF}	70.0						
/ _u =	veh/h			ow Speed, S _{FR}	50.0					V _D =	180 veh/h
Convers	sion to			Conditions							
(pc/h		V	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
	'')	(Veh/hr)							•		1
Freeway		6560	0.95	Level	3	0		985	1.00		7009
Ramp UpStream		830	0.92	Level	2	0	0.:	990	1.00		911
DownStream	n	180	0.92	Level	2	0	0.9	990	1.00		198
			Merge Areas		1			 D	verge Areas		
Stimat	ion of	v ₁₂				Estimatio	on o	f v ₁₂			
		V ₁₂ = V _F	(P _{EM})					<u> </u>			
_{EQ} =		12 1	ation 13-6 or	13-7)					V _R + (V _F - V _R		
P _{FM} =				ion (Exhibit 13-6)		L _{EQ} =			Equation 13-		
						P _{FD} =		ι	using Equation	on (Exhibit '	13-7)
/ ₁₂ =		728 po				$V_{12} = pc/h$					
V_3 or V_{av34}		17)	c/n (⊏quau	on 13-14 or 13-		V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17)					
ls V ₂ or V ₂	₂₄ > 2,700	pc/h? 🗹 Yes	s 🗌 No			Is V ₃ or V _{av34} > 2,700 pc/h? Yes No					
	• ·	V ₁₂ /2 ⊡ Yes				Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No					
f Yes,V _{12a} =		2803 p	oc/h (Equati	on 13-16, 13-		If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					
Capacit		18, or	13-19)			Capacity Checks					
Japach	y chet	Actual		apacity	LOS F?			Actual	Ca	pacity	LOS F?
		Actual	Ť	apacity	LUGT	V _F		Actual	Exhibit 13-		LUGT
						· · · · ·	V		Exhibit 13-	_	_
V _{FC}	D I	7920	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	- V _R		Exhibit 13		
						V _R			10	-	
-low En	tering	Merge In	fluence A	rea	-	Flow Ent	terin	g Diver	rge Influen	nce Area	<u> </u>
		Actual	Max	Desirable	Violation?		ŀ	Actual	Max Des	irable	Violation?
V _{R12}	2	4050	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
.evel of	^r Servi	ce Detern	nination (if not F)		Level of	Serv	vice De	terminatio	on (if no	t F)
D _R =	5.475 + ().00734 v _R + 0	0.0078 V ₁₂ - 0.0	00627 L _A) _R = 4	.252 + 0.	.0086 V ₁₂ - 0	.009 L _D	
0 _R = 29	9.0 (pc/mi/	′ln)				D _R = (po	c/mi/Ir	ר)			
OS = D	(Exhibit 1	3-2)				LOS = (Ex	xhibit	13-2)			
Speed L	peed Determination					Speed D	eter	minatio	n		
	395 (Exib						khibit 1				
-	•	Exhibit 13-11)						, ibit 13-12)			
		Exhibit 13-11)				S_0 = mph (Exhibit 13-12)					
		Exhibit 13-13)				-		ibit 13-13)			
				HCS2010 TM				Generat			

		RAMP	S AND RAM			RKS	HEET						
General Info	rmation			Site Infor									
Analyst			Fre	eeway/Dir of Tr	avel	I-95 NE	}						
Agency or Compar	iy AEC	OM		nction		Seg 5-0	Off to Exp	from GPL					
Date Performed				risdiction	2040 D:H 2								
nalysis Time Peri			An	alysis Year		2040 B	uild 2						
Project Description	SW 10th Stree	t SIMR											
nputs		E											
Upstream Adj	Ramp	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes, N	4 1					Downstrea Ramp	ım Adj			
✓ Yes	🗹 On		ane Length, L _A						Yes	🗌 On			
No	Off		ane Length L _D	200					✓ No	Off			
I – (050 6	Freeway Volu	1	7390					I =	ft			
$L_{up} = 2$	2950 ft	Ramp Volume	IX	180					L _{down} =	it.			
V,, = 8	330 veh/h	Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	veh/h			
°u C		Ramp Free-Fl	ow Speed, S _{FR}	45.0					D				
Conversion	to pc/h Une	der Base (Conditions										
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _r			
reeway	7390	0.95	Level	3	0	0.	985	1.00	78	96			
Ramp	180	0.92	Level	2	0	0.	990	1.00	19	98			
JpStream	830	0.92	Level	2	0	0.	990	1.00	91	1			
DownStream													
		Merge Areas						Diverge Areas					
stimation o	of v ₁₂				Estimat	tion o	f v ₁₂						
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	· V _R + (V _F - V _F)P _{FD}				
_{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} =			334.82 (Equation	5	r 13-13)			
FM =		Equation (E			P _{FD} =			436 using Equ		,			
12 =	pc/h				V ₁₂ =			554 pc/h					
	•	Equation 12	14 or 12 17					-		40.47			
³ or V _{av34}			-14 or 13-17)		V_3 or V_{av34}			171 pc/h (Equa	ation 13-14	or 13-1			
s V_3 or $V_{av34} > 2,7$								Yes 🗹 No					
s V ₃ or V _{av34} > 1.5			40.40.40		Is V ₃ or V _{av}	_{/34} > 1.5		Yes 🗹 No	10 10 10	10 10			
Yes,V _{12a} =	pc/n (13-19)		-16, 13-18, or		If Yes,V _{12a} :	=		oc/h (Equation 9)	13-16, 13-	18, or 13			
Capacity Ch	,	1			Capacit	v Ch		5)					
	Actual	С	apacity	LOS F?		<u>y en</u>	Actual	Ca	pacity	LOS F			
	7101001	t i	apuony	20011	V _F		7896	Exhibit 13-8		No			
V		Exhibit 13-8			-		7698	Exhibit 13-8	-				
V _{FO}					$V_{FO} = V_{FO}$	= " R			-	No			
					V _R		198	Exhibit 13-1		No			
low Enterin					Flow Er	T	<u> </u>	rge Influen					
	Actual	i r	Desirable	Violation?			Actual	Max Desirab		Violatior			
V _{R12}		Exhibit 13-8			V ₁₂		3554	Exhibit 13-8	4400:All	No			
evel of Ser	vice Detern	nination (i	if not F)		Level of	f Serv	vice De	terminatio	n (if not l	F)			
D _R = 5.475 + (0.00734 v _R +	0.0078 V ₁₂ -	0.00627 L _A			D _R = 4	.252 + 0	.0086 V ₁₂ - 0.0	009 L _D				
_R = (pc/mi/	n)				D _R = 33	3.0 (pc	/mi/ln)						
OS = (Exhibi	t 13-2)						oit 13-2)						
Speed Deter					Speed I		,	on					
•													
0 1							$D_s = 0.316$ (Exhibit 13-12)						
	(hibit 13-11)				S _R = 61.2 mph (Exhibit 13-12)								
•	(hibit 13-11)				S ₀ = 72.2 mph (Exhibit 13-12)								
	(hibit 13-13)		S = 6	6 8 mph	(Exhibit	12 12)							
= mph (E>	(10-10)				5- 0	0.0 11101		13-13)					

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-S 2040 Bu	outh of Off to 10th ild 2
Project Description SW 10th Oper.(LOS)	Street SIMR		Des.(N)		nning Data
Flow Inputs			Jes.(N)		anning Data
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	7210	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	ents				
f _ρ Ε _Τ	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	ft ft ramps/mi mph mph	f _{LW} f _{LC} TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	f _{HV} x f _p) 1926 63.9 30.1 D	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro ur volume		E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 8-B 2040 Bu	et Off & Off Ramps ild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	inning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	6020	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
Calculate Flow Adjust			Up/Down %		
Calculate Flow Adjustm	1.00			1.2	
f _p E _T	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance I	Veasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 2144 59.7 35.9 E	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base free		E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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Concretist			S AND RAM											
General Info	ormation			Site Infor										
Analyst				eeway/Dir of Tr	avel	I-95 NE								
gency or Compar	ny AEC	OM		inction	Seg 9-Off to Hillsboro EB&WB									
ate Performed nalysis Time Peri	iod AM			risdiction alysis Year		2040 0								
· ·	iod AM n SW 10th Stree		AI	alysis i eai		2040 B								
nputs														
		Erooway Num	ber of Lanes, N	3										
Upstream Adj	Ramp			3					Downstrea	am Adj				
		Ramp Number		1					Ramp					
Yes	On	Acceleration L	ane Length, L _A						🗹 Yes	🗹 On				
✓ No	Off	Deceleration L	ane Length L _D	200										
		Freeway Volur	ne, V _F	6020					🗌 No	Off				
L _{up} =	ft	Ramp Volume		1330					L _{down} =	2100 ft				
Ϋ́Ρ			Flow Speed, S _{FF}	70.0										
V _u =	veh/h	-							V _D =	1230 veh				
		Ramp Free-Flo	110	45.0										
conversion	to pc/h Un	der Base (Conditions	r		_								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _n				
reeway	6020	0.95	Level	3	0	_	985	1.00		132				
Ramp	1330	0.95	Level	2	0	_	900	1.00		+32 160				
JpStream	1550	0.92	Levei	2	0	0.	990	1.00	14	100				
DownStream	1230	0.92	Level	2	0	0	990	1.00	13	350				
Jownoticam		Merge Areas	Levei	2	0	0.		Diverge Areas		50				
stimation		incige Alcus			Estimat	ion o		Siverge Areas						
		(5)			_0at				<u>, </u>					
	V ₁₂ = V _F							= V _R + (V _F - V _F						
_{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13	5)				
_{FM} =	using	Equation (E	xhibit 13-6)		P _{FD} =		0	532 using Equ	uation (Exh	ibit 13-7)				
/ ₁₂ =	pc/h				V ₁₂ =		4	105 pc/h						
$_3$ or V $_{av34}$	pc/h (Equation 13-	-14 or 13-17)		V_3 or V_{av34}		2	327 pc/h (Equ	ation 13-1	4 or 13-17				
	,700 pc/h? 🔲 Ye		,			₂₄ > 2.7		Yes ☑ No						
0 4001	.5 * V ₁₂ /2 Ye							Yes Vo						
			-16, 13-18, or			• ·		c/h (Equation	13-16 13	-18 or 13				
Yes,V _{12a} =	13-19		10, 10 10, 01		If Yes,V _{12a} =	=		9)	10 10, 10	10, 01 10				
Capacity Ch	necks				Capacit	y Ch	ecks							
	Actual	C	apacity	LOS F?		_	Actual	Ca	pacity	LOS F				
					V _F		6432	Exhibit 13-8	7200	No				
V _{FO}		Exhibit 13-8			$V_{FO} = V_{FO}$		4972	Exhibit 13-8	7200	No				
• FO						• • R			_	_				
					V _R		1460	Exhibit 13-1		No				
low Enteri	ng Merge In	Ĩ.			Flow Er	1		rge Influen		1				
	Actual		Desirable	Violation?			Actual	Max Desirab		Violation				
V _{R12}		Exhibit 13-8			V ₁₂	4	105	Exhibit 13-8	4400:All	No				
evel of Ser	rvice Detern	nination (i	f not F)		Level of	f Serv	∕ice De	terminatio	n (if not	F)				
D _R = 5.475 +	0.00734 v _R +	0.0078 V ₁₂ -	0.00627 L _A			D _R = 4	.252 + 0	.0086 V ₁₂ - 0.	009 L _D					
_R = (pc/mi/						7.8 (pc/			2					
	it 13-2)						oit 13-2)							
						•	,							
weed Dete	rmination				Speed L									
	(Exibit 13-11)						D _s = 0.429 (Exhibit 13-12)							
•	,	mph (Exhibit 13-11)						S _R = 58.0 mph (Exhibit 13-12)						
l _s = (Exibit					$S_R = 50$	8.0 mpn	(Exhibit	13-12)						
l _s = (Exibit _R = mph (E:	xhibit 13-11)						(Exhibit	•						
s = (Exibit _R = mph (Ex ₀ = mph (Ex					S ₀ = 7 ⁻	1.6 mph	•	13-12)						

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 10-1 2040 Bu	Bet Off & On Ramps ild 2
Project Description SW 10th	Street SIMR				
Oper.(LOS)			Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4690	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain:	0.95 3 0 Level	
		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustm	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance I	Veasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	t f _{HV} x f _p) 1670 67.4 24.8 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service	S - Speed D - Density FFS - Free-flow BFFS - Base free	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
DDHV - Directional design ho					enerated: 6/14/2020 11:

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<u></u>	11.6		REEWAY	WEAV		_			
Genera	l Informati	on			Site Info	rmation			
Analyst Agency/Co Date Perfo Analysis Ti	rmed	AECO AM	И		Freeway/Dir Weaving Seg Analysis Yea	gment Locati		IB 1-Bet On & C Build 2	Off to Exp
Project De: Inputs	scription SW 10	th Street SIMF	2		-				
Weaving co Weaving n Weaving so Freeway fr	onfiguration umber of lanes, l egment length, L ee-flow speed, F	rs FS		Two-Sided 4 2970ft 70 mph	Segment typ Freeway min Freeway may Terrain type	imum speed			Freewa 1 240 Leve
Conver	rsions to p	<u>c/h Unde</u>	r Base Co	ondition			1	1	
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	3875	0.95	3	0	1.5	1.2	0.985	1.00	4140
V _{RF}	2165	0.92	2	0	1.5	1.2	0.990	1.00	2377
V _{FR}	815	0.92	2	0	1.5	1.2	0.990	1.00	895
V _{RR}	455	0.92	2	0	1.5	1.2	0.990	1.00	500
V _{NW}	7412		-	-				V =	7912
V _W	500								-
VR	0.063								
Config	uration Ch	aracteris	tics		1				
Minimum r	maneuver lanes,	N _{WL}		0 Ic	Minimum we	aving lane c	hanges, LC _{MIN}		1500 lc/
0	e density, ID			0.7 int/mi	Weaving lan	-			1993 lc/
	RF lane changes			0 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		2728 lc/
Minimum F	R lane changes	, LC _{FR}		0 lc/pc	Total lane ch	nanges, LC _{AL}	L		4721 lc/
Minimum F	RR lane changes	s, LC _{RR}		3 lc/pc	Non-weaving	g vehicle ind	ex, I _{NW}		154
Weavir	ng Segmen	t Speed,	Density, l	_evel of	Service,	and Cap	oacity		
5	egment flow rate	-		7813 veh/h 8449 veh/h	Weaving inte Weaving sec	gment speed	, S		0.32 50.1 mp
Weaving s	egment v/c ratio			0.925	Average wea	U .	**		56.5 mp
v	egment density,	D	39	9.5 pc/mi/ln	Average non	• ·			49.7 mp
Level of Se	ervice, LOS			E	Maximum we	eaving length	n, L _{MAX}		6318
Notes	segments longer	than the calcula	ited maximum le	enath should b	be treated as is	olated merce	and diverge an	eas using the	procedures of
Chapter 13,	"Freeway Merge nes that exceed th	and Diverge Se	egments".	-		inter morgo	units and a second of the second of th	unig uno	

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst			Highway/Direction of Trave	el <i>I-95 NB</i>	
Agency or Company	AECOM		From/To	Seg 12-	North of Hillsboro
Date Performed Analysis Time Period	AM		Jurisdiction Analysis Year	2040 Bi	uild 2
•	Oth Street SIN	/R		2010 8	
Oper.(LOS)			Des.(N)	Plai	nning Data
Flow Inputs					
Volume, V	6040	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P_{T}	3	
Peak-Hr Prop. of AADT, K		-	%RVs, P _R	0	
Peak-Hr Direction Prop, D			General Terrain:	Level	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	stments				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1)] <i>0.985</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	
Base free-flow Speed,		-	FFS	70.0	mph
BFFS		mph			
LOS and Performanc	e Measures	3	Design (N)		
Operational (LOS)			Design (N)		
<u>Operational (LOS)</u>	NIVE		Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x)$	^{IN X I} HV 1613	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f _{HV}	
x f _p)			x f _p)		pc/h/ln
S	68.0	mph	S		mph
D = v _p / S	23.7	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lane	s. N	po/m/m
Glossary			Factor Location	,	
N - Number of lanes	S - Spee	ed			, _
V - Hourly volume	D - Dens		E _R - Exhibits 11-10, 11-12		f _{LW} - Exhibit 11-8
•		•	E _T - Exhibits 11-10, 11-11,	, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate LOS - Level of service		e-flow speed ase free-flow	f _p - Page 11-18		TRD - Page 11-1
speed	0FF3 - Ba		LOS, S, FFS, v _p - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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0.0.0	- f		REEWA			-	1		
Gener	al Informati	on			Site Info	rmation			
Analyst Agency/C Date Perfe Analysis T		AECO PM	М		Freeway/Dir Weaving Seg Analysis Yea	gment Locati		IB -Bet Copans Build 2	& Sample
Project De Inputs	escription SW 10t	h Street SIMF	२						
Weaving o Weaving r Weaving s Freeway f	configuration number of lanes, N segment length, L ree-flow speed, F	One-Sided 4 2380ft 70 mph	Freeway min Freeway ma: Terrain type	Segment type Freeway minimum speed, S _{MIN} Freeway maximum capacity, C _{IFL} Terrain type					
Conve	rsions to p	1	1	1	ĩ	_		r	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _Τ	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	4355	0.95	3	0	1.5	1.2	0.985	1.00	4653
V _{RF}	495	0.92	2	0	1.5	1.2	0.990	1.00	543
V _{FR}	1810	0.92	2	0	1.5	1.2	0.990	1.00	1987
V _{RR}	0	0.95	0	0	1.5	1.2	1.000	1.00	0
V _{NW}	4653							V =	7183
V _W	2530								
VR	0.352								
Config	juration Cha	aracteris	tics		1				
Minimum	maneuver lanes,	N _{WL}		2 lc	Minimum we	aving lane c	hanges, LC _{MIN}		lc
Interchan	ge density, ID			0.7 int/mi	Weaving lan	e changes, L	-C _w		lc
Minimum	RF lane changes,	, LC _{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		lc
Minimum	FR lane changes,	, LC _{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		lc
Minimum	RR lane changes	, LC _{RR}		lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		
Weavi	ng Segmen ⁻	t Speed,	Density,	Level of	Service,	and Cap	pacity		
Weaving	segment flow rate	, V		7090 veh/h	Ŭ,	ensity factor,			
Weaving	segment capacity	, c _w		6713 veh/h	Weaving see				mp
Weaving	segment v/c ratio			1.056	Average wea				mp
-	segment density,	D		pc/mi/ln	Average nor				mp
	Service, LOS			F	Maximum w	eaving length	n, L _{MAX}		6151
Notes		han the!- !		an atta alta sul 11	- +++ '		and diverse		
Chapter 13	g segments longer t 3, "Freeway Merge a	and Diverge Se	egments".	-		solated merge	and diverge are	eas using the	procedures of
	mes that exceed the ersity of Florida. All	0 0		ne level of sei		TM Version			ated: 6/17/20

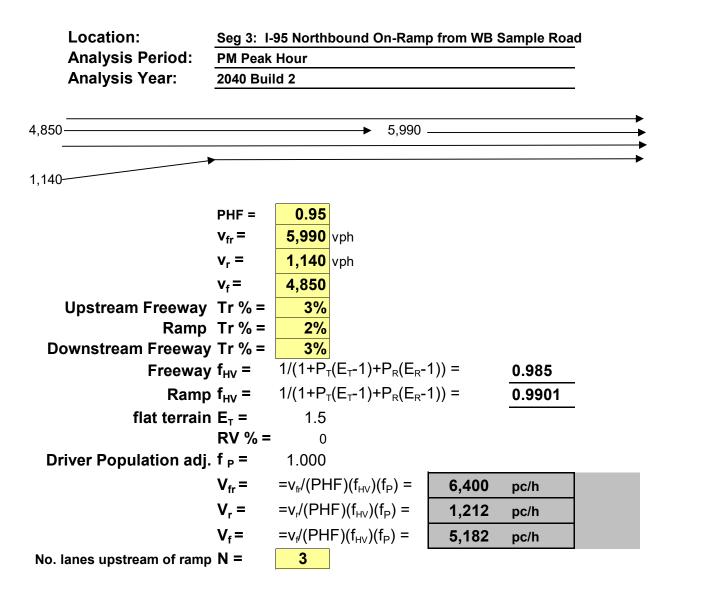
HCS 2010TM Version 6.90 Generated: 6/17/2020 12:37 PM

General Information Analyst Agency or Company Date Performed Analysis Time Period Project Description SW 10th ✓ Oper.(LOS) Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	AECOM PM Street SIMR 4850	veh/h veh/day	Site Information Highway/Direction of Travel From/To Jurisdiction Analysis Year Des.(N) Peak-Hour Factor, PHF	I-95 NB Seg 2-Bet Off Sample 2040 Build 2 Planning 0.95	
Agency or Company Date Performed Analysis Time Period Project Description SW 10th © Oper.(LOS) Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	PM Street SIMR	veh/h	From/To Jurisdiction Analysis Year Des.(N)	Seg 2-Bet Off Sample 2040 Build 2	
Date Performed Analysis Time Period Project Description SW 10th	PM Street SIMR	veh/h	Jurisdiction Analysis Year Des.(N)	2040 Build 2	Data
Analysis Time Period Project Description SW 10th Oper.(LOS) Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	Street SIMR	veh/h	Analysis Year Des.(N)	Planning	Data
✓ Oper.(LOS) Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K		veh/h		-	Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	4850	veh/h		-	Data
Volume, V AADT Peak-Hr Prop. of AADT, K	4850		Peak-Hour Factor, PHF	0.95	
AADT Peak-Hr Prop. of AADT, K	4850		Peak-Hour Factor, PHF	0.05	
Peak-Hr Prop. of AADT, K		veh/dav		0.90	
•		· · · · · · · · · · · · · · · · · · ·	%Trucks and Buses, P _T	3	
			%RVs, P _R	0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		v o b /b	General Terrain:	Level	
		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustme	onte		-p		
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance N	leasures		Design (N)		
Operational (LOS)			Design (N)		
	f y f) 1707	~~/b/ln	Design LOS		
v _p = (V or DDHV) / (PHF x N x ⁻	1	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x N x)$	f _{HV} x f _p)	pc/h/ln
S D = y / S	66.8	mph	S		mph
$D = v_p / S$	25.9	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lanes, N		
Glossary			Factor Location		
N - Number of lanes	S - Speed			c	E 1 11 11 4 4 9
V - Hourly volume	D - Density		E _R - Exhibits 11-10, 11-12	=	Exhibit 11-8
-	FFS - Free-flow	speed	E _T - Exhibits 11-10, 11-11, 11-	20	Exhibit 11-9
P	BFFS - Base fre	-	f _p - Page 11-18) - Page 11-1
DDHV - Directional design hou			LOS, S, FFS, v _p - Exhibits 11-2	2, 11-3	

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Job: SW 10th Street SIMR Analyst: AECOM



<u>No. Ln</u>	Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
4	Fwy downstream of ramp (assume 70 mph free-flow speed) =	9,600	6,400	0.67	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,182	0.72	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,212	0.58	No

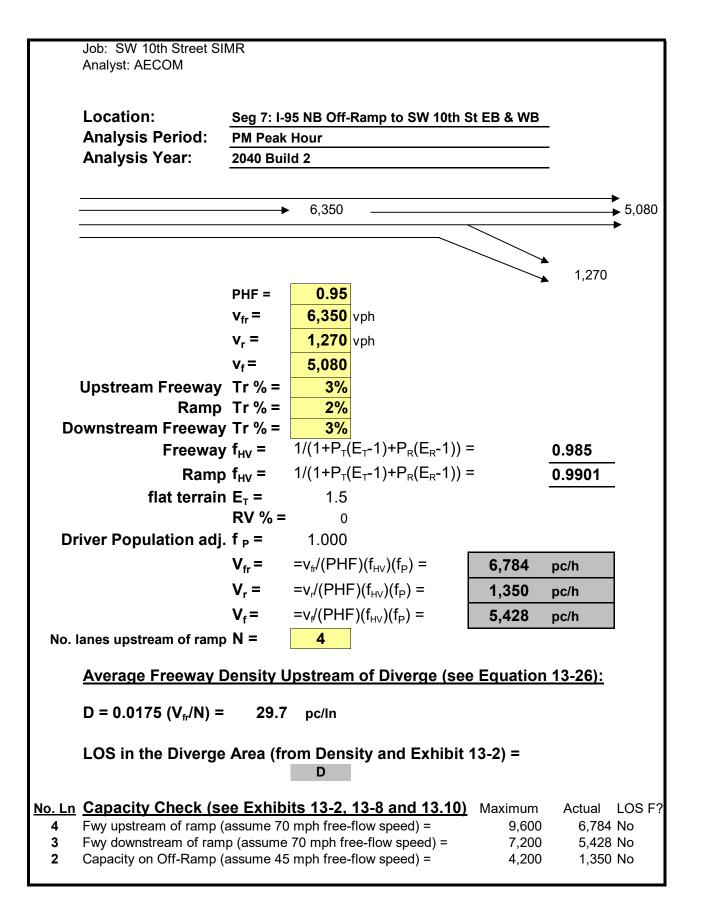
		RAI		RAMP JUN	CTIONS W	ORKSHE	ET				
Genera	l Infor	mation			Site Infor	mation					
Analyst				Fr	eeway/Dir of Tr	avel l	-95 NE	3			
gency or (AECO	MC		Inction	5	Seg 4-	On from Ex	р		
ate Perfor					irisdiction						
nalysis Ti		PM SW 10th Stree		Ar	nalysis Year		2040 B	Suild 2			
nputs	scription	SW 10th Stree	I SINK								
			Freeway Num	ber of Lanes, N	4					L .	
Jpstream A	Adj Ramp		Ramp Numbe							Downstre Ramp	eam Adj
Yes	🗌 On				1						
				ane Length, L _A	1500					🗹 Yes	On
✓ No	🗌 Off			Lane Length L _D						🗌 No	✓ Off
_	4		Freeway Volu	1	5990					1. =	2950 ft
up =	ft		Ramp Volume	IX .	670					L _{down} =	2950 IL
/ _u =	veh/h			-Flow Speed, S _{FF}	70.0					V _D =	310 veh/h
				ow Speed, S _{FR}	50.0					D	
Conver	rsion to		der Base	Conditions							
(pc/	/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	IF x f _{HV} x f _p
reeway		5990	0.95	Level	3	0		985	1.00		. 6400
Ramp		670	0.92	Level	2	0		990	1.00		736
JpStream		010	0.02	20101		Ů	<u>, ,</u>	000	1.00		100
DownStrea	am	310	0.92	Level	2	0	0.	990	1.00		340
			Merge Areas		•				iverge Areas		
stima	tion of	v ₁₂				Estimati	on o	of v ₁₂			
		$V_{12} = V_{F}$	(P _{EM})					\/\			
eq =		12 1	ation 13-6 o	r 13-7)		_			V _R + (V _F - V _R		40)
, FM =				tion (Exhibit 13-6)		L _{EQ} =			Equation 13-		
/ ₁₂ =		805 p				P _{FD} =			using Equatic	n (Exhibit	13-7)
		•		on 13-14 or 13-		V ₁₂ =			oc/h		(-)
V_3 or V_{av34}		17)				V ₃ or V _{av34}			oc/h (Equation 1	3-14 or 13-	·17)
s V_3 or V_a	_{v34} > 2,700) pc/h? 🗹 Yes	s 🗌 No						Yes No		
s V_3 or V_a	_{v34} > 1.5 *	V ₁₂ /2 Ves	s 🗌 No			Is V ₃ or V _{av34}	₄ > 1.5	* V ₁₂ /2	Yes No	10.10	10.10
Yes,V _{12a}	=			on 13-16, 13-		If Yes,V _{12a} =			oc/h (Equatio 3-19)	n 13-16, 1	13-18, Or
.20		18, or	13-19)			Canaaitu	· Ch		,		
Japaci	ty Che	Actual		`apaaitu	LOS F?	Capacity			Ca	pacity	LOS F?
		Actual		Capacity	LUGF?	V _F		Actual	Exhibit 13-	1	LUGF?
						· · · · ·	$\overline{}$			_	
V _F	0	7136	Exhibit 13-8		No	$V_{FO} = V_{F}$	- v _R		Exhibit 13-		
						V _R			Exhibit 13 10	-	
low E	nterina	Merge In	fluence A	rea		Flow Ent	terin	a Diver	rge Influen	ce Area	<u>'</u>
		Actual	Ú.	Desirable	Violation?		1	Actual	Max Des		Violation?
V _R	12	3603	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
		ice Detern	hination (if not F)	<u>.</u>	Level of	Ser	vice De	terminatio	n (if no	t F)
		0.00734 v _R + 0		1		-			.0086 V ₁₂ - 0		
	25.4 (pc/mi		12	~			c/mi/li		12	U	
	C (Exhibit 1							13-2)			
		nination				Speed D		,	n		
						1 1	chibit 1		<u>, , , , , , , , , , , , , , , , , , , </u>		
•).314 (Exib										
		Exhibit 13-11)						nibit 13-12)			
•	• •	Exhibit 13-11)				, i i i i i i i i i i i i i i i i i i i		nibit 13-12)			
		Exhibit 13-13)						nibit 13-13)			
t © 2016 L	Jniversity of	f Florida, All Righ	nts Reserved			HCS2010 [™]	Versi	on 6 90		Generat	ed: 6/17/2020

General Infor		RAIMP	S AND RAM			RKS	HEET			
	rmation			Site Infor						
nalyst				eeway/Dir of Tr		I-95 NB				
gency or Company	AECO	MC		nction		Seg 5-0	Off to Exp f	rom GPL		
ate Performed	d 0.14			risdiction		2040 0				
nalysis Time Perioc			An	alysis Year		2040 B				
nputs	SW TULT SLIEE									
1		Freeway Num	ber of Lanes, N	4						
Upstream Adj R	Ramp	Ramp Numbe		1					Downstrea Ramp	am Adj
Ves Ves	∕ On	Acceleration L	ane Length, L _A						Yes	On
No	Off		ane Length L _D	200					🗹 No	Off
I – oc	NF0 #	Freeway Volu	1	6660					. =	ft
L _{up} = 29	950 ft	Ramp Volume		310					L _{down} =	п
V _u = 67	70 veh/h	-	-Flow Speed, S _{FF}	70.0					V _D =	veh/h
			ow Speed, S _{FR}	45.0						
conversion t	<u>орс/п Und</u> V		Conditions							
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _p
reeway	6660	0.95	Level	3	0	_	985	1.00		16
Ramp	310	0.92	Level	2	0	0.9	990	1.00	34	40
lpStream	670	0.92	Level	2	0	0.9	990	1.00	73	36
ownStream										
atimatian a		Merge Areas			Fatimat	ion o		Diverge Areas		
stimation of	^{1 V} 12				Estimat					
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	• V _R + (V _F - V _F)P _{FD}	
_{EQ} =	(Equa	tion 13-6 or	13-7)		L _{EQ} =		35	524.43 (Equation	on 13-12 o	r 13-13)
= m =	using	Equation (E	Exhibit 13-6)		P _{FD} =		0.	436 using Equ	ation (Exhi	bit 13-7)
12 =	pc/h		,		V ₁₂ =			294 pc/h	,	,
	•							. p. c,		
orV	nc/h (Equation 13	-14 or 13-17)		Valor Valor		10)11 nc/h (Equ	ation $13_1/$	1 or 13-17
$_{3} \text{ or V}_{av34}$			-14 or 13-17)		V ₃ or V _{av34}	S 0 7)11 pc/h (Equa	ation 13-14	l or 13-17
$V_3 \text{ or } V_{av34} > 2,70$	00 pc/h? 🗌 Ye	s 🗌 No	-14 or 13-17)		Is $\rm V_3$ or $\rm V_{av}$		00 pc/h? [Yes 🗹 No	ation 13-14	1 or 13-17
	00 pc/h?	s 🗌 No s 🗌 No			Is $\rm V_3$ or $\rm V_{av}$		00 pc/h? [* V ₁₂ /2 [Yes ⊻No Yes ⊻No		
$V_3 \text{ or } V_{av34} > 2,70$	00 pc/h?	s 🗌 No s 🗌 No	-14 or 13-17) -16, 13-18, or		Is $\rm V_3$ or $\rm V_{av}$	₃₄ > 1.5	00 pc/h? [* V ₁₂ /2 [p	Yes		
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ^s Yes,V _{12a} =	00 pc/h?	s 🗌 No s 🗌 No			Is V ₃ or V _{av} Is V ₃ or V _{av} If Yes,V _{12a} =	₃₄ > 1.5 =	00 pc/h? [* V ₁₂ /2 [p 1!	Yes		
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ⁻	00 pc/h?	s 🔲 No s 🔲 No Equation 13		LOS F?	Is V_3 or V_{av} Is V_3 or V_{av}	₃₄ > 1.5 =	00 pc/h? [* V ₁₂ /2 [p 1!	Yes ☑ No Yes ☑ No oc/h (Equation 9)		-18, or 13
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ^s Yes,V _{12a} =	00 pc/h?	s 🔲 No s 🔲 No Equation 13	-16, 13-18, or	LOS F?	Is V ₃ or V _{av} Is V ₃ or V _{av} If Yes,V _{12a} =	₃₄ > 1.5 =	00 pc/h? [* V ₁₂ /2 [p 19 ecks	Yes ☑ No Yes ☑ No oc/h (Equation 9)	13-16, 13-	-18, or 13
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ^s Yes,V _{12a} =	00 pc/h?	s 🔲 No s 🔲 No Equation 13	-16, 13-18, or	LOS F?	Is V_3 or V_{av} Is V_3 or V_{av} If Yes, $V_{12a} =$ Capacit	₃₄ > 1.5 = y Che	00 pc/h? [* V ₁₂ /2 [p 19 ecks Actual	Yes ☑ No Yes ☑ No oc/h (Equation 9) Ca	13-16, 13- pacity 9600	-18, or 13
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ' Yes,V _{12a} = Capacity Che	00 pc/h?	s 🗌 No s 📄 No Equation 13	-16, 13-18, or	LOS F?	Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V _F	₃₄ > 1.5 = y Che	00 pc/h? [* V ₁₂ /2 [P 19 ec<i>ks</i> Actual 7116	Yes ✓ No Yes ✓ No oc/h (Equation 9) Ca Exhibit 13-8	13-16, 13- pacity 9600 9600	-18, or 13 LOS F No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ' Yes,V _{12a} = Capacity Che	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) ecks Actual	s I No s No Equation 13 C Exhibit 13-8	-16, 13-18, or apacity		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R	₃₄ > 1.5 = y Che = - V _R	00 pc/h? [* V ₁₂ /2 [p 19 ecks Actual 7116 6776 340	Yes ✓ No Yes ✓ No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8	13-16, 13- pacity 9600 9600 0 2100	-18, or 13 LOS F No No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ' Yes,V _{12a} = Capacity Che V _{FO}	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) ecks Actual	s INO s NO Equation 13 Exhibit 13-8	-16, 13-18, or apacity	LOS F? Violation?	Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R	34 > 1.5 y Che	00 pc/h? [* V ₁₂ /2 [p 19 ecks Actual 7116 6776 340	Yes No Yes No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10	13-16, 13- pacity 9600 9600 2100 ce Area	-18, or 13 LOS F No No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ' Yes,V _{12a} = Capacity Che V _{FO}	00 pc/h? □ Yes * V ₁₂ /2 □ Yes pc/h (13-19) ecks Actual g Merge In	s INO s NO Equation 13 Exhibit 13-8	-16, 13-18, or apacity		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_R	34 > 1.5 y Che - V _R - V _R	00 pc/h? [* V ₁₂ /2 [p ecks Actual 7116 6776 340 g Dive	Yes No Yes No bc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influence	13-16, 13- pacity 9600 9600 2100 ce Area	-18, or 13 LOS F No No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ' Yes,V _{12a} = Capacity Che V _{FO}	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) ccks Actual g Merge In Actual	s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8	-16, 13-18, or apacity I rea Desirable		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V_F $V_FO = V_F$ V_R Flow En V_{12}	34 > 1.5 y Che y Che y	00 pc/h? [* V ₁₂ /2 [F 92 8 6 7 11 7 116 6 7 7 116 6 7 7 116 6 7 7 16 6 7 7 16 6 7 7 16 6 7 7 6 7 9 0 0 9 0 0 9 0 0 9 0 0 9 0 9 0 9 9 19 9 19 9 19 9 19 19 19 19 19 19 19	Yes No Yes No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influent Max Desirab	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All	-18, or 13 LOS F No No Violation No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ⁻ Yes,V _{12a} = Capacity Che V _{FO} Flow Entering V _{R12} evel of Serv	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) ccks Actual g Merge In Actual	s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8 nination (-16, 13-18, or apacity Desirable if not F)		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V _{FO} = V_F V _{FO} = V_F Flow En V ₁₂ Level of	34 > 1.5 y Che y Che y	00 pc/h? [* V ₁₂ /2 [p ecks Actual 7116 6776 340 g Dive Actual 2294 vice De	Yes No Yes No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influent Max Desirab Exhibit 13-8 termination	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All n (if not)	-18, or 13 LOS F No No Violation No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ' Yes,V _{12a} = Capacity Che V _{FO} Flow Entering V _{R12} evel of Serv D _R = 5.475 + 0.	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) • Cks Actual g Merge In Actual • Characteria •	s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8 nination (-16, 13-18, or apacity Desirable if not F)		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V _{FO} = V_F V _{FO} = V_F Flow En V ₁₂ Level of	34 > 1.5 y Che y Che y	00 pc/h? [* V ₁₂ /2 [P 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Yes No Yes No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All n (if not)	-18, or 13 LOS F No No Violation No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 '' Yes,V _{12a} = Capacity Che V _{FO} Flow Entering V _{R12} evel of Serv D _R = 5.475 + 0. R = (pc/mi/ln	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) c.ks Actual g Merge In Actual ice Detern .00734 v _R + (s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8 nination (-16, 13-18, or apacity Desirable if not F)		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V_F $V_{FO} = V_F$ V_{R} Flow En V_{12} Level of $D_R = 30$	34 > 1.5 y Che y Che y	00 pc/h? [* V ₁₂ /2 [P 9 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Yes No Yes No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influent Max Desirab Exhibit 13-8 termination	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All n (if not)	-18, or 13 LOS F No No Violation No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 '' Yes,V _{12a} = Capacity Che V _{FO} Form Entering V _{R12} Evel of Serv D _R = 5.475 + 0. R = (pc/mi/ln DS = (Exhibit	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) 2 CKS Actual <i>g Merge In</i> Actual <i>vice Detern</i> .00734 v _R + 0 13-2)	s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8 nination (-16, 13-18, or apacity Desirable if not F)		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V _{FO} = V_F V _{FO} = V_F V _R Flow En D _R = 30 LOS = D	$_{34} > 1.5$ y Che y Ch	00 pc/h? [* V ₁₂ /2 [P 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Yes No Yes No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All n (if not)	-18, or 13 LOS F No No Violation No
s V ₃ or V _{av34} > 2,70 s V ₃ or V _{av34} > 1.5 ' Yes,V _{12a} = Capacity Che V _{FO} V_{FO} V_{R12} evel of Serv $D_R = 5.475 + 0.$ R = (pc/mi/ln) DS = (Exhibit)	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) c.ks Actual g Merge In Actual <i>vice Detern</i> .00734 v _R + 0 13-2) mination	s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8 nination (-16, 13-18, or apacity Desirable if not F)		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V _{FO} = V_F V _{FO} = V_F Flow En D _R = 30 LOS = D Speed L	34 > 1.5 y Che y Che y	00 pc/h? [* V ₁₂ /2 [P 9 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Yes No Yes No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All n (if not)	-18, or 13 LOS F No No Violation No
$V_{av34} > 2,70$ $V_{av34} > 1.5$ $V_{es},V_{12a} =$ Capacity Che V_{FO} Converse Entering V_{R12} Evel of Serv $D_R = 5.475 + 0.0$ $R_R = (pc/mi/ln)$ DS = (Exhibit 1) S = (Exhibit 1)	00 pc/h? ☐ Yes * V ₁₂ /2 ☐ Yes pc/h (13-19) c.ks Actual g Merge In Actual <i>d</i> <i>d</i> Actual <i>d</i> <i>d</i> <i>d</i> <i>d</i> <i>d</i> <i>d</i> <i>d</i> <i>d</i>	s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8 nination (-16, 13-18, or apacity Desirable if not F)		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V _{FO} = V_F $V_{FO} = V_F$ V_{R} Flow En D _R = 30 LOS = D Speed L D _s = 0.	34 > 1.5 y Che y Che y	00 pc/h? [* V ₁₂ /2 [P 4 2 2 2 2 2 2 2 2 2 2 2 2 2	Yes No Yes No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Ca Exhibit 13-8 Exhibit 13-8 Exhi	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All n (if not)	-18, or 13 LOS F No No Violation No
$V_{av34} > 2,70$ $V_{av34} > 1.5^{3}$ $Yes,V_{12a} =$ Capacity Che V_{FO} Formula State St	00 pc/h? Yes * V ₁₂ /2 Yes pc/h (13-19) c.ks Actual g Merge In Actual ice Detern .00734 v _R + 6 13-2) mination 3-11) hibit 13-11)	s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8 nination (-16, 13-18, or apacity Desirable if not F)		Is V_3 or V_{av} . Is V_3 or V_{av} . If Yes, $V_{12a} =$ Capacit V _{FO} = V_F V _{FO} = V_F Flow En D _R = 3(0) LOS = D Speed L $D_s = 0.$ $S_R = 6(0)$	34 > 1.5 y Che y Che y	00 pc/h? [* V ₁₂ /2 [P 4 2 2 2 2 2 2 2 2 2 2 2 2 2	Yes ✓ No Yes ✓ No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8 Exhi	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All n (if not)	-18, or 13 LOS F No No Violation No
$V_{av34} > 2,70$ $V_{av34} > 1.5$ $V_{es},V_{12a} =$ Capacity Che V_{FO} Fow Entering V_{FO} Fow Entering V_{R12} Evel of Serv $D_R = 5.475 + 0.0$ $R^R = (pc/mi/ln)$ DS = (Exhibit 10) S = (Exhib	00 pc/h? ☐ Yes * V ₁₂ /2 ☐ Yes pc/h (13-19) c.ks Actual g Merge In Actual <i>d</i> <i>d</i> Actual <i>d</i> <i>d</i> <i>d</i> <i>d</i> <i>d</i> <i>d</i> <i>d</i> <i>d</i>	s I No s No Equation 13 Exhibit 13-8 fluence A Max Exhibit 13-8 nination (-16, 13-18, or apacity Desirable if not F)		$ s V_{3} \text{ or } V_{av} s V_{12} = 0$ $ Capacit V_{FO} = V_{F} V_{FO} = V_{$	34 > 1.5 y Che y Che y	00 pc/h? [* V ₁₂ /2 [P 4 2 2 2 2 2 2 2 2 2 2 2 2 2	Yes ♥ No Yes ♥ No oc/h (Equation 9) Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8 Exhibit 13-8 Exhib	13-16, 13- pacity 9600 9600 2100 Ce Area le 4400:All n (if not)	-18, or 13 LOS F No No Violation No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-S 2040 Bu	outh of Off to 10th iild 2
Project Description SW 10th	Street SIMR				
Oper.(LOS)			Des.(N)	Pla	anning Data
<i>Flow Inputs</i> Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	6350	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents				
f _ρ Ε _Τ	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	ft ft ramps/mi mph mph	f _{⊥w} f _{LC} TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance I	Veasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 1696 67.1 25.3 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S $D = v_p / S$ Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Trave From/To Jurisdiction	Seg 8-E	Bet Off & Off Ramps
Analysis Time Period	PM		Analysis Year	2040 Bi	uild 2
Project Description SW 1	Oth Street SIM				
Oper.(LOS)			Des.(N)	Plar	nning Data
Flow Inputs	5000				
Volume, V AADT	5080	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$)] <i>0.985</i>	
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performanc	e Measures	6	Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or DDHV}) / (PHF x I)$	N x f		Design LOS		
x f _p)		pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x x f_p)$	N x f _{HV}	pc/h/ln
S / C	65.7	mph	S		mph
$D = v_p / S$	27.5	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	D		Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design	BFFS - Ba		E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-1

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Concretist			S AND RAM			/////				
General Info	prmation			Site Infor						
Analyst				eeway/Dir of Tr	avel	I-95 NE				
gency or Compar	ny AEC	OM		inction		Seg 9-	Off to Hills	boro EB&WB		
ate Performed nalysis Time Peri	iod PM			risdiction alysis Year		2040 0				
	n SW 10th Stree		AI	alysis teal		2040 B				
nputs										
		Eroowov Num	ber of Lanes, N	3						
Upstream Adj	Ramp	-		3					Downstrea	am Adj
		Ramp Number		1					Ramp	
Yes	On	Acceleration L	ane Length, L _A						🗹 Yes	🗹 On
✓ No	Off	Deceleration L	ane Length L _D	200						
		Freeway Volur	ne, V _F	5080					🗌 No	Off
L _{up} =	ft	Ramp Volume		1320					L _{down} =	2100 ft
Ϋ́Ρ			Flow Speed, S _{FF}	70.0						
V _u =	veh/h	-							V _D =	1440 veh
			ow Speed, S _{FR}	45.0						
conversion	to pc/h Un	der Base (Conditions	r	1			· · · · · · · · · · · · · · · · · · ·		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{H∨}	f _p	v = V/PHF	x f _{HV} x f _D
reeway	5080	0.95	Level	3	0		985	1.00		128
Ramp	1320	0.95	Level	2	0	_	905 990	1.00		149
JpStream	1320	0.92	Levei	2	0	0.	990	1.00	14	149
DownStream	1440	0.92	Level	2	0	- n	990	1.00	16	581
Jownoticam		Merge Areas	Levei	2	0	0.		Diverge Areas		101
stimation		inerge / ireae			Estimat	tion o				
								<u> </u>		
	V ₁₂ = V _F							= V _R + (V _F - V _F		
eq =		ation 13-6 or	,		L _{EQ} =		(Equation 13-1	2 or 13-13	5)
_{FM} =	using	Equation (E	xhibit 13-6)		P _{FD} =		0.	.558 using Equ	uation (Exh	ibit 13-7)
/ ₁₂ =	pc/h				V ₁₂ =		3	668 pc/h		
$'_3$ or V $_{av34}$	pc/h (Equation 13-	-14 or 13-17)		V_3 or V_{av34}		1	760 pc/h (Equ	ation 13-14	4 or 13-17
	700 pc/h? 🗌 Ye					_{مم} > 2,7		Yes ☑ No		
0 4001	5*V ₁₂ /2 Ye							Yes No		
			-16, 13-18, or			-		oc/h (Equation	13-16 13	-18 or 13
Yes,V _{12a} =	13-19)		10, 10 10, 01		If Yes,V _{12a} =	=		9)	10 10, 10	10, 01 10
Capacity Ch	necks				Capacit	y Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	Ca	pacity	LOS F
					V _F		5428	Exhibit 13-8	7200	No
V _{FO}		Exhibit 13-8			V _{FO} = V _F		3979	Exhibit 13-8	7200	No
• FO						- 'R			_	_
	<u> </u>				V _R		1449	Exhibit 13-1		No
low Enteri	ng Merge In	Î.			Flow Er	T		rge Influen		1
	Actual		Desirable	Violation?			Actual	Max Desirab		Violation
V _{R12}		Exhibit 13-8			V ₁₂	3	3668	Exhibit 13-8	4400:All	No
evel of Ser	vice Detern	nination (i	f not F)		Level of	f Serv	∕ice De	terminatio	n (if not	F)
D _R = 5.475 +	0.00734 v _R +	0.0078 V ₁₂ -	0.00627 L _A			D _R = 4	.252 + 0	.0086 V ₁₂ - 0.	009 L _D	
_R = (pc/mi/						4.0 (pc			2	
OS = (Exhibi	,						oit 13-2)			
						•	,			
Speed Deter					Speed L					
l _S = (Exibit	13-11)				ŭ	•	xhibit 13	,		
	xhibit 13-11)				S _R = 58	8.0 mph	(Exhibit	13-12)		
_R = mph (E:										
	, xhibit 13-11)				S ₀ = 73	3.8 mph	(Exhibit	13-12)		
₀ = mph (Ex	,					-	(Exhibit (Exhibit	,		

		Site Information		
AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 10-E 2040 Bui	Bet Off & Off Ramps Id 2
		Jes.(N)		nning Data
3760	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
nents				
1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	1.2 0.985	
		Calc Speed Adj and FFS	\$	
3 70.0	ft ft ramps/mi mph mph	f _{∟w} f _{LC} TRD Adjustment FFS	70.0	mph mph mph mph
Measures		Design (N)		
x f _{HV} x f _p) 1339 69.8 19.2 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
		Factor Location		
BFFS - Base fre	-	f _p - Page 11-18		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
	PM a Street SIMR37603760a1.001.5370.0Measures(f _{HV} x f _p) 133969.819.2CS - SpeedD - DensityFFS - Free-flow	PM a Street SIMR 3760 veh/h 3760 veh/h veh/h veh/h nents 1.00 1.5 ft ft ft 70.0 mph 70.0 S 69.8 mph 70.2 pc/mi/ln 69.5 T 70.0 mph 70.0	AECOMFröm/To JurisdictionPMAnalysis Yeara Street SIMR \Box Des.(N)3760veh/hPeak-Hour Factor, PHF %Trucks and Buses, PT %RVs, PR General Terrain: Grade % Length Up/Down %1.00ER ft1.00ER ft1.5ft ft1.5ft ftft ftfLC70.0mph mph70.0mph mph1.9.2 ft ftpc/h/ln 69.8 mph69.8 ft ft ft.2Design (N)S C- Speed CS ft ft- Vp / S Required Number of Lanes, NS FFS - Free-flow speed BFFS - Base free-flow speed ur volumeER FFS, vp - Exhibits 11-10, 11-11, 11-11 fp - Page 11-18 LOS, S, FFS, vp - Exhibits 11-2	AECOMFrom/ToSeg 10-EPMAnalysis Year2040 Builn Street SIMRDes.(N)Pla3760veh/hPeak-Hour Factor, PHF0.95veh/day%Trucks and Buses, PT3%RVs, PR0General Terrain:Level1.00ER1.21.5ftfLC1.5ftfLC1.00FFS70.0ftftfLCnonmphramps/miFFS70.0ftfLCTRD Adjustment70.0mphFFSftfLCramps/miTRD Adjustment70.0mphftfSftfLCramps/miTRD Adjustmentf0.0pc/h/ln69.8mph19.2pc/h/ln69.8mph19.2pc/mi/lnCFactor LocationS- SpeedD - DensityFFS - Free-flow speedBFFS - Base free-flow speedERBFFS - Base free-flow speedERar volumeCo, S, FFS, vp - Exhibits 11-2, 11-3

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		F	REEWAY	WEAV	NG WOF	RKSHEE	Т			
Genera	al Informati	on			Site Information					
Analyst Agency/Co Date Perfo Analysis Ti	rmed me Period	AECOI PM			Freeway/Dir of TravelI-95 NBWeaving Segment LocationSeg 11-Bet On & Off to ExpAnalysis Year2040 Build 2					
Project De: Inputs	scription SW 10	th Street SIMF	8							
Weaving c Weaving n Weaving s Freeway fr	onfiguration umber of lanes, egment length, L ee-flow speed, F	rs FS		Two-Sided 4 2970ft 70 mph	Segment typ Freeway min Freeway may Terrain type	imum speed			Freeway 1! 2400 Leve	
Convei	rsions to p	<u>c/h Unde</u>	r Base Co	ondition	1		1	r	-	
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)	
V _{FF}	3160	0.95	3	0	1.5	1.2	0.985	1.00	3376	
V _{RF}	2420	0.92	2	0	1.5	1.2	0.990	1.00	2657	
V _{FR}	600	0.92	2	0	1.5	1.2	0.990	1.00	659	
V _{RR}	460	0.92	2	0	1.5	1.2	0.990	1.00	505	
V _{NW}	6692							V =	7197	
V _W	505							-		
VR	0.070									
	uration Ch		tics		1					
Minimum r	maneuver lanes,	N _{WL}		0 lc			hanges, LC _{MIN}		1515 lc/h	
, i i i i i i i i i i i i i i i i i i i	je density, ID			0.7 int/mi	Weaving lan				2008 lc/h	
	RF lane changes	i vi		0 lc/pc	Non-weaving				2353 lc/h	
	FR lane changes			0 lc/pc	Total lane ch				4361 lc/h	
Minimum I	RR lane changes	s, LC _{RR}		3 lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		1391	
Weavir	ng Segmen	t Speed,	Density, I	_evel of	Service,	and Cap	oacity			
0	egment flow rate egment capacity			7109 veh/h 8430 veh/h	Weaving inte Weaving sec	5			0.306 50.9 mph	
Weaving segment v/c ratio 0.843					Average weaving speed, S_w				57.1 mph	
•	segment density,		35	5.4 pc/mi/ln	Average non-weaving speed, S_{NW}				50.5 mph	
Level of S	ervice, LOS			E	Maximum we	eaving length	n, L _{MAX}		6384 ft	
Notes					•					
Chapter 13,	segments longer "Freeway Merge nes that exceed th	and Diverge Se	egments".	-		solated merge	and diverge are	eas using the	procedures of	

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0					
General Information			Site Information		
Analyst Agency or Company	AECOM		Highway/Direction of Trave From/To		North of Hillsboro
Date Performed Analysis Time Period	РM		Jurisdiction Analysis Year	2040 Bi	uild 2
Project Description SW 1	Oth Street SIN	1R	, ,		
✓ Oper.(LOS)			Des.(N)	🗌 Plar	nning Data
Flow Inputs					-
Volume, V	5580	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P _T	3	
Peak-Hr Prop. of AADT, K			%RVs, P _R	0	
Peak-Hr Direction Prop, D			General Terrain:	Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tmonte				
,				1.0	
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$		
Speed Inputs			Calc Speed Adj and	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			•
LOS and Performanc		<u> </u>	Design (N)		
		•			
Operational (LOS)			<u>Design (N)</u>		
$v_p = (V \text{ or } DDHV) / (PHF x)$	N x f _{HV}			N £	
x f _p)	1490	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N X T _{HV}	pc/h/ln
S	69.0	mph	x f _p)		
D = v _p / S	21.6	pc/mi/ln	S / C		mph
LOS	С		$D = v_p / S$		pc/mi/ln
			Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	ed	E _R - Exhibits 11-10, 11-12		f _{I W} - Exhibit 11-8
V - Hourly volume	D - Dens	ity	E_{T} - Exhibits 11-10, 11-11,		f _{IC} - Exhibit 11-9
v _p - Flow rate	FFS - Free	e-flow speed	$f_{p} - Page 11-18$		TRD - Page 11-1
LOS - Level of service	BFFS - Ba	se free-flow		11 0	IND - Paye II-I
speed			LOS, S, FFS, v _p - Exhibits 11-3	i I - ∠,	
DDHV - Directional design	hour volume		11-9		

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 1-B 2040 Bu	et Hillsboro & Palmetto iild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4820	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
		Ven/m	Up/Down %	1111	
Calculate Flow Adjustn	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	c f _{HV} x f _p) 1287 69.9 18.4 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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Ganar	al Informati		REEWAY	WEAV		-			
Genera	ai informati	on			Site Info	rmation			
Analyst Agency/Co Date Perfo Analysis T		AECO AM	M		Freeway/Dir of TravelI95/SBWeaving Segment LocationSeg 2-Bet On from Exp & OffAnalysis Year2040 Build 2				
Project De	scription SW 10	th Street SIM	2						
Inputs					1				
Weaving number of lanes, N 44 Weaving segment length, L _s 3900f				Two-Sided 4 3900ft 70 mph	Segment typ Freeway min Freeway may Terrain type		Freewa 1 240 Lev		
Conve	rsions to p	c/h Unde	r Base Co	ondition	6				
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	3525	0.95	3	0	1.5	1.2	0.985	1.00	3766
V _{rf}	1065	0.92	2	0	1.5	1.2	0.990	1.00	1169
V _{FR}	1295	0.92	2	0	1.5	1.2	0.990	1.00	1422
V _{RR}	125	0.92	2	0	1.5	1.2	0.990	1.00	137
V _{NW}	6357							V =	6494
V _W	137								
VR	0.021								
	uration Ch		tics		1				
	maneuver lanes,	N _{WL}		0 Ic			hanges, LC _{MIN}		411 lc/
-	je density, ID			0.7 int/mi	C C W				983 lc/
	RF lane changes	T.		0 lc/pc	Non-weaving				2957 lc/
	FR lane changes			0 lc/pc	Total lane ch		-		3940 lc/
	RR lane changes				Non-weaving				173
Weavir	ng Segmen	t Speed,	Density, I	_evel of	1				
0	segment flow rate	-		6412 veh/h	Weaving inte	,			0.22 59.3 mp
Weaving segment capacity, c _w 8847 veh/h					Weaving segment speed, S				59.8 mp
Weaving segment v/c ratio0.725Weaving segment density, D27.4 pc/mi/ln					5 5 W				59.2 mp
v	ervice, LOS	U	Ζ.	C	Maximum weaving length, L_{MAX}				5923
Notes				-		caving iongli	·/ -MAX		5725
a. Weaving	segments longer			ength should b	be treated as is	olated merge	and diverge ar	eas using the	procedures of
	, "Freeway Merge nes that exceed th			ne level of ser	vice is "F".				

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R	Site Information Highway/Direction of Travel From/To Jurisdiction Analysis Year Des.(N)	2040 Build	Off & On Ramp 2
	From/To Jurisdiction Analysis Year	Seg 3-Bet (2040 Build	
	Des.(N)	Plann	
	Des.(N)	🗌 Plann	
veh/h			iing Data
veh/h			
veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
	Op , D O I I I I		
	E _R	1.2	
	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
	Calc Speed Adj and FFS	6	
ft ft ramps/mi	f _{∟w} f _{LC} TRD Adjustment	70.0	mph mph mph
mph	FF 3	70.0	mph
	Design (N)		
35 pc/h/ln 8 mph 1 pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
	Factor Location		
d ty -flow speed se free-flow speed	f _p - Page 11-18	13 f T	: _{LW} - Exhibit 11-8 : _{LC} - Exhibit 11-9 IRD - Page 11-11
	veh/day veh/h ft ft ramps/mi mph mph 35 pc/h/ln 8 mph 1 pc/mi/ln d ty -flow speed se free-flow speed	veh/day%Trucks and Buses, P_T %RVs, P_R General Terrain: veh/hveh/hGrade K_R $f_{HV} = 1/[1+P_T(E_T-1)+P_R(E_R-1)]$ Calc Speed Adj and FFSft ftf_L f_{LC} TRD Adjustment FFSft mphfFS MPh $f pc/mi/ln$ MPh $f pc/mi/ln<$	veh/day%Trucks and Buses, P_T 3 %RVs, P_R 0 General Terrain:veh/hGeneral Terrain:Level Gradeveh/hGeneral Terrain:Level

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<u> </u>		RAIVIP	S AND RAM			RKS	HEET			
General Info	ormation			Site Infor						
nalyst		~		eeway/Dir of Tr		I-95 SB				
gency or Compar	ny AEC	OM		Inction		Seg 4-I	Diverge to	SW 10th St		
ate Performed analysis Time Peri	iod AM			irisdiction nalysis Year		2040 B				
	n SW 10th Stree		AI	lalysis i eal		2040 D				
nputs										
		Freeway Num	ber of Lanes, N	3						
Upstream Adj	Ramp	Ramp Numbe		1					Downstrea Ramp	m Adj
Yes	On	•		I					•	
			ane Length, L _A	000					Yes	🗹 On
✓ No	Off		_ane Length L _D	200					No	Off
	C 1	Freeway Volu	I	4590					ı –	2400 ft
L _{up} =	ft	Ramp Volume	IX .	1350					L _{down} =	2400 IL
V,, =	veh/h	Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	1600 veł
v _u –	ven/n	Ramp Free-Fl	ow Speed, S _{FR}	45.0					D	1000 101
Conversion	to pc/h Une	der Base (Conditions							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x fuy x fu
,	(Veh/hr)			ļ		_		F		··· P
reeway	4590	0.95	Level	3	0	_	985	1.00	490	
Ramp	1350	0.92	Level	2	0	0.	990	1.00	148	32
JpStream DownStream	1000	0.00			0		000	1.00	471	-7
JownStream	1600	0.92 Merge Areas	Level	2	0	0.	990	1.00 Diverge Areas	17:	57
stimation		weige Aleas			Estimat	ion o		nverge Areas		
Sumation					LStimat					
	V ₁₂ = V _F							• V _R + (V _F - V _F	(IB	
_{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} = (Equation 13-12 or 13-13)					
FM =	using	Equation (E	Exhibit 13-6)		P _{FD} =		0.	569 using Equ	uation (Exhib	oit 13-7)
' ₁₂ =	pc/h				V ₁₂ =		34	130 pc/h		
′ ₃ or V _{av34}	pc/h (Equation 13	-14 or 13-17)		V_3 or V_{av34}		14	174 pc/h (Equ	ation 13-14	or 13-17
	700 pc/h? 🗌 Ye		,			₂₄ > 2.7		Yes Vo	-	-
$SV_{1}OV_{2}$	$12'^2 \square 12'^2$		-16, 13-18, or		Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes \bigvee No If $V_{av34} > 1.5 * V_{12}/2$ pc/h (Equation 13-16, 13-18, or 13-					
	nc/h (If Yes,V _{12a} =	=	19		10 10, 10	10, 01 10
	pc/h (13-19)	• •			12a			5)		
Yes,V _{12a} =	13-19)	• •			Capacit	y Che		57		
Yes,V _{12a} =	13-19))	apacity	LOS F?		y Ch		·	pacity	LOS F
Yes,V _{12a} =	13-19) 19:0)	apacity	LOS F?		y Che	ecks	·	I	LOS F No
Yes,V _{12a} = Capacity Ch	13-19) 19:0		apacity	LOS F?	Capacit V _F		e cks Actual 4904	Ca Exhibit 13-8	7200	No
Yes,V _{12a} =	13-19) 19:0)	apacity	LOS F?	Capacit V _F V _{FO} = V _F		Actual 4904 3422	Ca Exhibit 13-8 Exhibit 13-8	3 7200 3 7200	No No
Yes,V _{12a} = Capacity Ch	13-19) Decks Actual) C Exhibit 13-8		LOS F?	Capacit V_F $V_{FO} = V_F$ V_R	- V _R	Actual 4904 3422 1482	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1	3 7200 3 7200 3 7200 0 2100	No
Yes,V _{12a} = Capacity Ch	13-19) necks Actual ng Merge In) Exhibit 13-8	Irea		Capacit V_F $V_{FO} = V_F$ V_R	- V _R	Actual 4904 3422 1482 g Dive	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 r ge Influen	3 7200 3 7200 0 2100	No No No
Yes,V _{12a} = Capacity Ch V _{FO}	13-19) Decks Actual	Exhibit 13-8		LOS F? Violation?	Capacit V_F $V_{FO} = V_F$ V_R Flow Er	- V _R	Actual 4904 3422 1482 g Dive	Ca Exhibit 13-6 Exhibit 13-6 Exhibit 13-1 r ge Influen Max Desirab	3 7200 3 7200 0 2100	No No No Violation
Yes,V _{12a} = Capacity Ch V _{FO} Flow Enterin	13-19) necks Actual ng Merge In Actual	Exhibit 13-8 offuence A Max Exhibit 13-8	rea Desirable		Capacit V_F $V_{FO} = V_F$ V_R Flow En	- V _R	Actual 4904 3422 1482 g Dive Actual 4430	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8	3 7200 3 7200 0 2100 CE Area ole 4400:All	No No No Violation No
Yes,V _{12a} = Capacity Ch V _{FO} Flow Enterin V _{R12} .evel of Ser	13-19)	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	- V _R	Actual 4904 3422 1482 g Dive Actual 430 vice De	Ca Exhibit 13-6 Exhibit 13-6 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No No Violation No
Yes,V _{12a} = Capacity Ch V _{FO} Flow Enterin V _{R12} .evel of Ser	13-19) necks Actual ng Merge In Actual	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	- V _R	Actual 4904 3422 1482 g Dive Actual 430 vice De	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No No Violation No
Yes, V_{12a} = Capacity Ch V_{FO} Flow Enterin V_{R12} evel of Ser D_R = 5.475 +	13-19)	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	- V _R	Actual 4904 3422 1482 g Dive Actual 430 vice De 252 + 0	Ca Exhibit 13-6 Exhibit 13-6 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No No Violation No
Yes, $V_{12a} =$ Capacity Ch V_{FO} Flow Enterin V_{R12} evel of Sen $D_R = 5.475 +$ $_R = (pc/mi/$	13-19)	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 32$	<i>terin</i> <i>f</i> <i>Serv</i> D _R = 4 2.0 (pc/	Actual 4904 3422 1482 g Dive Actual 430 vice De 252 + 0	Ca Exhibit 13-6 Exhibit 13-6 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No No Violation No
Yes, V_{12a} = Capacity Ch V_{FO} Flow Enterin V_{R12} evel of Sen D_R = 5.475 + $_R$ = (pc/mi/ OS = (Exhibi	13-19)	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 32$ LOS = D	$\frac{1}{P_{R}} = \frac{1}{P_{R}}$	Actual 4904 3422 1482 g Dive Actual 4430 rice De 252 + 0 (mi/ln) bit 13-2)	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No No Violation No
Yes, V_{12a} = Capacity Ch V_{FO} Flow Enterin V_{R12} evel of Sen D_R = 5.475 + P_R = (pc/mi/ OS = (Exhibits) Speed Deter	13-19)	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 32$ LOS = D Speed L	- V _R	Actual 4904 3422 1482 g Dive Actual 430 vice De (252 + 0 (mi/ln) bit 13-2) minatic	Ca Exhibit 13-6 Exhibit 13-6 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 terminatio .0086 V ₁₂ - 0.	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No No Violation No
Yes, V_{12a} = Capacity Ch V_{FO} Flow Enterin V_{R12} evel of Ser D_R = 5.475 + R = (pc/mi/ OS = (Exhibit) Speed Deterning	13-19)	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit Capacit V_F $V_F = V_F$ V_R Flow En V_{12} Level of $D_R = 32$ LOS = D Speed L $D_s = 0.$	$\frac{1}{2} - V_R$	Actual 4904 3422 1482 g Dive Actual 4330 rice De 252 + 0 (mi/ln) bit 13-2) minatic xhibit 13-	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No No Violation No
Flow Enterin V_{R12} Evel of Sen $D_R = 5.475 +$ $D_R = (pc/mi)$ OS = (Exhibit Speed Deten $M_S = (Exibit)$ $R_R = mph (Exibit)$	13-19)	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 32$ LOS = D Speed L $D_S = 0$. $S_R = 57$	$\frac{1}{P} = V_R$	Actual 4904 3422 1482 g Dive Actual 430 vice De (252 + 0 (mi/ln) bit 13-2) minatic xhibit 13-	Ca Exhibit 13-6 Exhibit 13-6 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No Violation No
Yes, $V_{12a} =$ Capacity Ch V _{FO} Flow Enterin V _{R12} Evel of Sen D _R = 5.475 + R = (pc/mi/) OS = (Exhibit) Speed Deten R = mph (E:) 0 = mph (E:)	13-19)	Exhibit 13-8 Exhibit 13-8 Difluence A Max Exhibit 13-8 Dination (i	Trea Desirable if not F)		Capacit Capacit V_F $V_F = V_F$ V_R Flow En V_{12} Level of $D_R = 32$ LOS = D Speed L $D_S = 0.$ $S_R = 57$ $S_0 = 72$	$\frac{1}{2} - V_R$	Actual 4904 3422 1482 g Dive Actual 4330 rice De 252 + 0 (mi/ln) bit 13-2) minatic xhibit 13-	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.	3 7200 3 7200 0 2100 ce Area ble 4400:All n (if not I	No No No Violation No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	l-95 SB Seg 5-B 2040 Bu	et Off & On Ramps ild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	🗌 Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	3240	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	3	ft ft ramps/mi	f _{∟w} f _{LC} TRD Adjustment		mph mph mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	t f _{HV} x f _p) 1154 70.0 16.5 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hol	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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	RA	MPS AND	RAMP JUN		ORKSHE	ET			
General Inf	ormation			Site Infor	mation				
nalyst			Fr	eeway/Dir of Tra	avel I-9	95 SB			
gency or Compa	iny AEC	ОМ	Ju	nction	Se	eg 6-Merge fror	n Hillsboro E&W		
ate Performed	-		Ju	risdiction					
nalysis Time Per			Ar	alysis Year	20	040 Build 2			
· · ·	n SW 10th Stree	t SIMR							
nputs		1							
pstream Adj Rar	mp		ber of Lanes, N	3				Downstre	eam Adj
	_	Ramp Numbe	r of Lanes, N	1				Ramp	
Ves	On	Acceleration L	ane Length, L _A	300				🗌 Yes	🗌 On
No 🔽	Off	Deceleration L	ane Length L _D						
	Oli	Freeway Volu	me, V _r	3240				✓ No	Off
up = 2400) ft	Ramp Volume	1	1600				L _{down} =	ft
-P			-Flow Speed, S _{FF}	70.0					
′ _u = 1350) veh/h		ow Speed, S _{FR}	50.0				V _D =	veh/h
<u>No mu co voi o m</u>	40 mg/h 11m			50.0					
onversion	to pc/h Un ↓ ∨	I I	Conditions						
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
reeway	3240	0.95	Level	3	0	0.985	1.00		3462
Ramp	1600	0.92	Level	2	0	0.990	1.00		1757
JpStream	1350	0.92	Level	2	0	0.990	1.00		1482
DownStream									
		Merge Areas					Diverge Areas		
stimation	of v ₁₂				Estimatio	on of v ₁₂			
	V ₁₂ = V _F	(P _{EM})				<u>ــــــــــــــــــــــــــــــــــــ</u>			
eq =			13-6 or 13-7)				V _R + (V _F - V _R)		
FM =			ion (Exhibit 13-6)		$L_{EQ} =$ (Equation 13-12 or 13-13)				
FM 12 =	2028				P _{FD} = using Equation (Exhibit 13-7)				
			on 13-14 or 13-		$V_{12} = pc/h$				
$_3$ or V _{av34}	1434	po/ii (Equalit	511 15-14 01 15-		V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17)				
$s V_3 \text{ or } V_{av34} > 2$,700 pc/h? 🗍 Ye	s 🗹 No			Is V_3 or $V_{av34} > 2,700$ pc/h? Yes No Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No				
	.5 * V ₁₂ /2 🔽 Ye								
Yes,V _{12a} =			on 13-16, 13-		lf Yes,V _{12a} =		pc/h (Equatior	n 13-16, 1	13-18, or
120		13-19)					3-19)		
Capacity Cl	hecks				Capacity	Checks			
	Actual	C	apacity	LOS F?		Actual		acity	LOS F?
					V _F		Exhibit 13-8	3	
V _{FO}	5219	Exhibit 13-8		No	V _{FO} = V _F -	V _R	Exhibit 13-8	3	
10					V _R		Exhibit 13-	-	
							10		
low Enteri	ing Merge In	1			Flow Ente		rge Influen		
	Actual	r r	Desirable	Violation?		Actual	Max Desi	rable	Violation?
V _{R12}	3785	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
	rvice Deterr	1	/				eterminatio		t F)
D _R = 5.475	5 + 0.00734 v _R + (0.0078 V ₁₂ - 0.0	00627 L _A		D _f	_R = 4.252 + 0).0086 V ₁₂ - 0.	009 L _D	
_R = 32.3 (po	c/mi/ln)				D _R = (pc/	/mi/ln)			
OS = D (Exhi	bit 13-2)				LOS = (Ex	hibit 13-2)			
Speed Dete	rmination				Speed De	eterminati	on		
					t '	nibit 13-12)			
•	Exibit 13-11)					(Exhibit 13-12)			
	oh (Exhibit 13-11)								
	oh (Exhibit 13-11)				ů i	(Exhibit 13-12)			
-	oh (Exhibit 13-13)					(Exhibit 13-13)			
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 7-B 2040 Bu	et On Ramps ild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	🗌 Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4840	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
		VCH/H	Up/Down %		
Calculate Flow Adjustm	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	c f _{HV} x f _p) 1724 66.8 25.8 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hol	S - Speed D - Density FFS - Free-flow BFFS - Base free	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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Job: SW 10th Street SIMR Analyst: AECOM

Location:	Seg 8: I-	95 South	bound On-Ram	p from SW 1	0th Street E	B & WB
Analysis Period:	AM Peak	Hour				
Analysis Year:	2040 Bui	ld 2				
4,840			6.030			
			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
1 100						
1,190						
	PHF =	0.95				
	v _{fr} =	6,030	vph			
	v _r =	1,190	vph			
	v _f =	4,840				
Upstream Freeway	Tr % =	3%				
Ramp	Tr % =	2%				
Downstream Freeway						
Freeway	f _{HV} =	1/(1+P	r(E _⊺ -1)+P _R (E _R -	1)) =	0.985	
Ramp	f _{HV} =	1/(1+P	r(E _T -1)+P _R (E _R -	1)) =	0.9901	
flat terrain	Ε _τ =	1.5				
	RV % =	0				
Driver Population adj.	f _P =	1.000				
	V _{fr} =	=v _{fr} /(PF	HF)(f _{H∨})(f _P) =	6,443	pc/h	
	V _r =	=v _r /(PH	IF)(f _{HV})(f _P) =	1,265	pc/h	
			$ F(f_{HV})(f_{P}) =$	5,171	pc/h	
No. lanes upstream of ramp		3				

<u>No. Ln</u>	Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
4	Fwy downstream of ramp (assume 70 mph free-flow speed) =	9,600	6,443	0.67	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,171	0.72	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,265	0.60	No

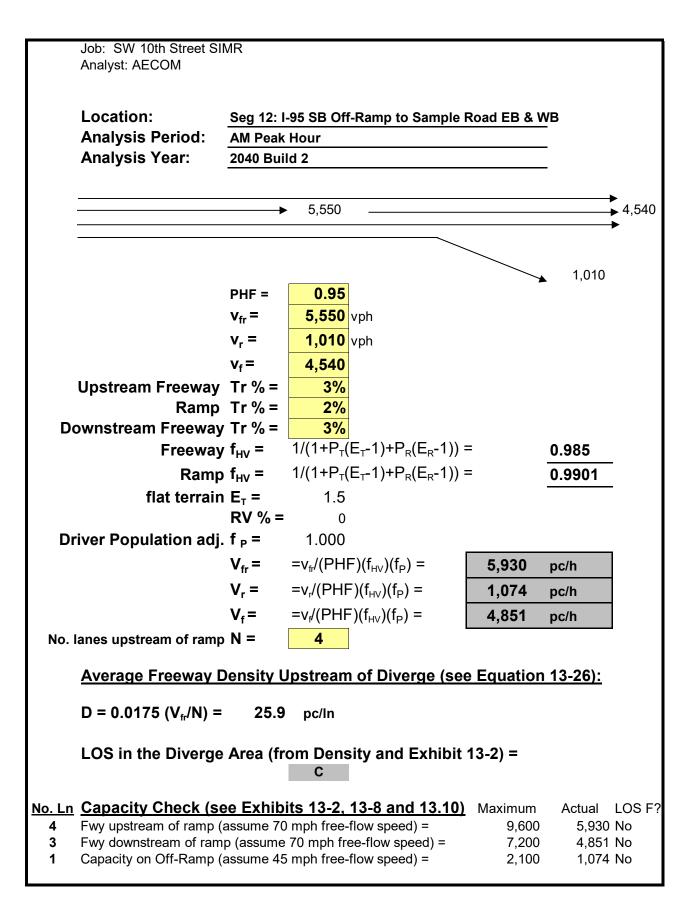
	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	l-95 SB Seg 9-B 2040 Bu	et 10th & Exit to Exp ild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	🗌 Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	6030	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
Calculate Flow Adjustm	ants		Up/Down %		
	1.00		E _R	1.2	
E _T	1.5		к f _{HV} = 1/[1+Р _т (Е _т - 1) + Р _R (Е _R - 1)]	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width Rt-Side Lat. Clearance		ft ft	f _{LW}		mph
Number of Lanes, N Total Ramp Density, TRD	4	ramps/mi	f _{LC} TRD Adjustment		mph mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance I	Veasures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	r f _{HV} x f _p) 1611 68.0 23.7 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hou	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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		RAI	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET						
Genera	I Inforr	nation			Site Infor	mation							
Analyst				Fr	eeway/Dir of Tr	avel I.	-95 SE	3					
gency or (AECO	MC	Ju	nction	S	Seg 10)-Merge fro	m Ex to GP				
ate Perfor					risdiction								
	me Period	AM		Ar	nalysis Year	2	2040 B	Build 2					
nputs	scription	SW 10th Stree	t SIMR										
			Freeway Num	ber of Lanes, N	4					I			
Jpstream A	Adj Ramp		Ramp Numbe							Downstre	eam Adj		
Yes	🗌 On		· ·		1					Ramp			
				ane Length, L _A	600					🗹 Yes	🗌 On		
✓ No	Off			_ane Length L _D						🗌 No	✓ Off		
			Freeway Volu		6030								
up =	ft		Ramp Volume	e, V _R	300					L _{down} =	1150 ft		
/ _	vob/b		Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	780 veh/h		
′ _u =	veh/h		Ramp Free-Fl	ow Speed, S _{FR}	50.0					·D	700 VCH/H		
Conver	rsion to	pc/h Und	der Base	Conditions						<u>.</u>			
(pc/	/h)	V () (= h /h = r)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p		
	,	(Veh/hr) 6030	0.95	Loval	3	0		.985	1.00		6443		
Freeway Ramp				Level		0							
JpStream		300	0.92	Level	2	0	0.	.990	1.00		329		
DownStrea		780	0.92	Level	2	0	0	.990	1.00		856		
			Merge Areas	20001	-	, v	0.		iverge Areas				
stima	tion of	V ₁₂				Estimatio	on o						
		V ₁₂ = V _F	(P)										
=			ation 13-6 o	13_7)					V _R + (V _F - V _F				
EQ =				ion (Exhibit 13-6)		L _{EQ} =			Equation 13-				
, = / _						P _{FD} =		ı	using Equation	on (Exhibit '	13-7)		
′ ₁₂ =		1138		on 12 14 or 12		V ₁₂ =		I	oc/h				
V_3 or V_{av34}		2002 j 17)	JC/II (⊏quati	on 13-14 or 13-		V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17)							
s V ₃ or V ₃	_{w34} > 2,700) pc/h? 🗌 Ye	s 🗸 No			Is V_3 or V_{av34}	₄ > 2,7	'00 pc/h? [Yes 🗌 No				
		V ₁₂ /2 Ve				Is V_3 or V_{av34}	₄ > 1.5	5 * V ₁₂ /2	Yes No				
f Yes,V _{12a}		2577	oc/h (Equati	on 13-16, 13-		lf Yes,V _{12a} =		I	oc/h (Equatio 3-19)	n 13-16, ′	13-18, or		
		18, or	13-19)			0 14	- 01-		5-13)				
Japaci	ty Che			No		Capacity			0.	'4 .			
		Actual		Capacity	LOS F?	N/		Actual		pacity	LOS F?		
						V _F			Exhibit 13-	_			
V _F	0	6772	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	- V _R		Exhibit 13-				
						V _R			Exhibit 13 10	-			
	nterina	Merge In	fluence A	rea		Elow Ent	torin	na Dive	rge Influer		<u> </u>		
1011 21		Actual	1 C	Desirable	Violation?		1	Actual	Max Des		Violation?		
V _R	12	2906	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8				
		ce Detern	nination (if not F)	8	Level of	Ser	vice De	terminatio	n (if no	t F)		
		0.00734 v _R + (,					.0086 V ₁₂ - 0				
	24.2 (pc/mi		12	~			c/mi/l		12	U			
	C (Exhibit 1							: 13-2)					
Speed		Speed D			n								
							chibit 1		///				
U U).332 (Exib					°							
		Exhibit 13-11)						nibit 13-12)					
•	• •	Exhibit 13-11)				, i i i i i i i i i i i i i i i i i i i		nibit 13-12)					
6 = 6	53.0 mph (I	Exhibit 13-13)				S= mp	h (Exh	nibit 13-13)					
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			S AND RAM			RKS	HEET			
General Info	ormation			Site Infor						
Analyst				eeway/Dir of Tr		I-95 SB				
gency or Compar	ny AECO	OM		nction		Seg 11	- Diverge t	o Express		
ate Performed nalysis Time Peri	iod AM			risdiction alysis Year		2040 B	uild 2			
· ·	n SW 10th Stree	t SIMR	All	aiysis i cai		2040 D				
nputs										
		Freeway Num	ber of Lanes, N	4					D (A 11
Upstream Adj	Ramp	Ramp Numbe		1					Downstrea Ramp	m Adj
✓ Yes	🗹 On			I					•	
			ane Length, L _A						🗌 Yes	🗌 On
No	Off		ane Length L _D	200					✓ No	Off
		Freeway Volu	me, V _F	6330						
L _{up} =	1150 ft	Ramp Volume	e, V _R	780					L _{down} =	ft
		70.0					V _D =	veh/h		
$v_u = 0$	$V_u = 300 \text{ veh/h}$ Freeway Free-Flow Speed, S_{FF} 70.0 Ramp Free-Flow Speed, S_{FR} 45.0								VD -	VEII/II
Conversion	to pc/h Und	-								
(pc/h)	V	PHF		%Truck	0/ Dv		f	f	v = V/PHF	vf vf
(pc/n)	(Veh/hr)		Terrain	% ITUCK	%Rv		f _{HV}	1		1
reeway	6330	0.95	Level	3	0	0.	985	1.00	676	53
Ramp	780	0.92	Level	2	0	0.	990	1.00	85	6
JpStream	300	0.92	Level	2	0	0.	990	1.00	32	9
ownStream										
- 41		Merge Areas			F ation of			iverge Areas		
stimation of	57 V ₁₂				Estimat	ion o	^{t v} 12			
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	V _R + (V _F - V _F	R)P _{FD}	
_{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13)	1
FM =	using	Equation (E	Exhibit 13-6)		P _{FD} =		0.	436 using Equ	uation (Exhit	oit 13-7)
12 =	pc/h		,		V ₁₂ =			31 pc/h	,	,
$_{3}^{12}$ or V _{av34}	•	Equation 13	-14 or 13-17)		V_3^{12} or V_{av34}^{12}			66 pc/h (Equ	ation 13-14	or 13-17
	700 pc/h? 🗌 Ye		,			>27		Yes ⊡ No		01 10 11
	5 * V ₁₂ /2 Yes									
0 0.01			-16, 13-18, or		Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No pc/h (Equation 13-16, 13-18, or 13					
Yes,V _{12a} =	13-19)		10, 10 10, 01		If Yes,V _{12a} =	=	19	· ·	10 10, 10	10, 01 10
Capacity Ch	iecks				Capacit	y Che	ecks			
	·				Joapach					
	Actual	C	apacity	LOS F?			Actual	Ca	pacity	LOS F
	Actual		apacity	LOS F?	V _F		Actual 6763	Ca Exhibit 13-8	I	LOS F No
VEO	Actual		apacity	LOS F?	V _F		6763	Exhibit 13-8	9600	No
V _{FO}	Actual	C Exhibit 13-8	apacity	LOS F?	V _F V _{FO} = V _F		6763 5907	Exhibit 13-8 Exhibit 13-8	9600 9600	No No
		Exhibit 13-8		LOS F?	$\frac{V_{F}}{V_{FO} = V_{F}}$	- V _R	6763 5907 856	Exhibit 13-8 Exhibit 13-8 Exhibit 13-1	3 9600 3 9600 3 9600 0 2100	No
	ng Merge In	Exhibit 13-8	rea		$\frac{V_{F}}{V_{FO} = V_{F}}$	- V _R	6763 5907 856 g Dive	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen	9600 9600 9600 2100	No No No
low Enterii		Exhibit 13-8 offluence A Max		LOS F? Violation?	$V_{FO} = V_{F}$ $V_{RO} = V_{RO}$ <i>Flow En</i>	- V _R	6763 5907 856 g Dive Actual	Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab	9600 9600 9600 2100	No No Violation
F low Enterin V _{R12}	ng Merge In Actual	Exhibit 13-8 afluence A Max Exhibit 13-8	rea Desirable		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ V_{R} Flow En	terin	6763 5907 856 g Dive Actual 431	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 r ge Influen Max Desirab Exhibit 13-8	9600 9600 9600 2100 ce Area ble 4400:All	No No No Violation No
Flow Enterin V _{R12} .evel of Ser	ng Merge In Actual	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ V_{R} <i>Flow En</i> V_{12} <i>Level of</i>	e - V _R	6763 5907 856 g Dive Actual 431 rice De	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influen Max Desirab Exhibit 13-8 termination	9600 9600 9600 2100 ce Area lle 4400:All n (if not l)	No No No Violation No
V _{R12} V _{R12} evel of Ser D _R = 5.475 +	ng Merge In Actual	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ V_{R} Flow End V_{12} Level of	$\frac{1}{P_{R}} = 4$	6763 5907 856 g Dive Actual 431 rice De .252 + 0	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 r ge Influen Max Desirab Exhibit 13-8	9600 9600 9600 2100 ce Area lle 4400:All n (if not l)	No No No Violation No
V _{R12} V _{R12} evel of Ser D _R = 5.475 +	ng Merge In Actual	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ V_{R} Flow End V_{12} Level of	e - V _R	6763 5907 856 g Dive Actual 431 rice De .252 + 0	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influen Max Desirab Exhibit 13-8 termination	9600 9600 9600 2100 ce Area lle 4400:All n (if not l)	No No No Violation No
V _{R12} evel of Ser D _R = 5.475 + 1 R = (pc/mi/	ng Merge In Actual vice Detern 0.00734 v _R + 0 /ln)	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ V_{R} <i>Flow En</i> V_{12} <i>Level of</i> $D_{R} = 32$	terin f Serv D _R = 4	6763 5907 856 g Dive Actual 431 rice De .252 + 0	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influen Max Desirab Exhibit 13-8 termination	9600 9600 9600 2100 ce Area lle 4400:All n (if not l)	No No No Violation No
Flow Enterin V_{R12} evel of Ser $D_R = 5.475 + 10^{-10}$ $R_R = (pc/mi/20)$ OS = (Exhibi	ng Merge In Actual rvice Detern 0.00734 v _R + 0 (In) it 13-2)	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ V_{R} <i>Flow En</i> V_{12} <i>Level of</i> $D_{R} = 32$	$\frac{1}{1} = V_R$	6763 5907 856 g Dive Actual 431 rice De 252 + 0 'mi/ln) bit 13-2)	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8	9600 9600 9600 2100 ce Area lle 4400:All n (if not l)	No No No Violation No
V _{R12} evel of Ser D _R = 5.475 + 1 R = (pc/mi/ DS = (Exhibition) Speed Deter	ng Merge In Actual Vice Detern 0.00734 v _R + 0 (In) it 13-2) rmination	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_F$ $V_{FO} = V_F$ V_R <i>Flow En</i> V_{12} <i>Level of</i> $D_R = 3^2$ $LOS = D$ <i>Speed L</i>	terin f Serv D _R = 4 (Exhit Deter	6763 5907 856 g Dive Actual 431 rice De .252 + 0 'mi/ln) bit 13-2) minatic	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	9600 9600 9600 2100 ce Area lle 4400:All n (if not l)	No No No Violation No
Flow Enterin V_{R12} evel of Ser $D_R = 5.475 + 0$ $R_R = (pc/mi/2)$ DS = (Exhibit) CS = (Exhibit) S = (Exibit)	ng Merge In Actual Vice Detern 0.00734 v _R + 0 (In) it 13-2) rmination 13-11)	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_F$ $V_{FO} = V_F$ V_R Flow End V_{12} Level of $D_R = 32$ $LOS = D$ $Speed L$ $D_s = 0.$	$\frac{1}{2} + V_R$	6763 5907 856 g Dive Actual 431 rice De 252 + 0 mi/In) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8 Exhibit 13-8 Com 0086 V ₁₂ - 0.0	9600 9600 9600 2100 ce Area lle 4400:All n (if not l)	No No No Violation No
Flow Enterin V_{R12} Evel of Ser $D_R = 5.475 + 0$ R = (pc/mi/) DS = (Exhibit) S = (Exibit) $R^{=} mph (E)$	ng Merge In Actual Vice Detern 0.00734 v _R + 0 /In) it 13-2) rmination 13-11) xhibit 13-11)	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_F$ $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 34$ LOS = D $S_Peed L$ $D_S = 0.$ $S_R = 59$	terin f Serv D _R = 4 1.9 (pc/ (Exhit 3 75 (E. 9.5 mph	6763 5907 856 g Dive 431 rice De .252 + 0 'mi/ln) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tige Influent Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0	9600 9600 9600 2100 ce Area lle 4400:All n (if not l)	No No No Violation No
Flow Enterin V_{R12} Evel of Ser $D_R = 5.475 + 10$ R = (pc/mi/) OS = (Exhibit) $Speed Detend P_S = (Exibit)R = mph (Exibit)R = mph (Exibit)$	ng Merge In Actual Vice Detern 0.00734 v _R + 0 (In) it 13-2) rmination 13-11)	Exhibit 13-8 offluence A Max Exhibit 13-8 mination (1	rea Desirable if not F)		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ V_{R} <i>Flow En</i> V_{12} <i>Level of</i> $D_{R} = 3^{2}$ $LOS = D$ $Speed L$ $D_{s} = 0.$ $S_{R} = 59$ $S_{0} = 72$	$\frac{1}{2} - V_R$ $\frac{1}{2}$	6763 5907 856 g Dive Actual 431 rice De 252 + 0 mi/In) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8 Exhib	3 9600 3 9600 0 2100 Ce Area ble 4400:All n (if not I	No No No Violation No



	BASIC I	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 13- 2040 Bu	Bet Off & On Ramps iild 2
Project Description SW 10th	Street SIMR				
Oper.(LOS)			Des.(N)	Pla	anning Data
<i>Flow Inputs</i> Volume, V	4540	veh/h	Peak-Hour Factor, PHF	0.95	
AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D		veh/day	%Trucks and Buses, P _T %RVs, P _R General Terrain:	3 0 Level	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustm	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance I	Measures		Design (N)		
Operational (LOS)			Design (N)		
v _p = (V or DDHV) / (PHF x N x	(f _{uv} x f _a) 1617	pc/h/ln	Design LOS		
S	68.0	, mph	v _p = (V or DDHV) / (PHF x N x	f _{HV} x f _p)	pc/h/ln
D = v _p / S	23.8	pc/mi/ln	S		mph
LOS	C	P 0111111	D = v _p / S Required Number of Lanes, N		pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service	S - Speed D - Density FFS - Free-flow BFFS - Base fr	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
DDHV - Directional design ho	ur volume		4		
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			FREEWA	(WEAV		-				
Genera	I Informati	on			Site Information					
-		AECO AM			Freeway/Dir of Travel I-95 SB Weaving Segment Location Seg 14- Bet Sample & Copar Analysis Year 2040 Build 2					
Inputs			1							
Weaving n Weaving s Freeway fr	onfiguration umber of lanes, N egment length, L, ee-flow speed, F rsions to pe	s FS	r Base Co	4 2520ft 70 mph	Segment typ Freeway min Freeway max Terrain type	imum speed			Freew 24 Lev	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _T	E _R	f _{HV}	fp	v (pc/h)	
V _{FF}	3810	0.95	3	0	1.5	1.2	0.985	1.00	4071	
V _{RF}	1980	0.92	2	0	1.5	1.2	0.990	1.00	2174	
V _{FR}	730	0.92	2	0	1.5	1.2	0.990	1.00	801	
V _{RR}	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
V _{NW}	4071							V =	7046	
V _W	2975									
VR	0.422									
Config	uration Cha	aracteris	tics							
Minimum r	maneuver lanes,	N _{WL}		2 lc	Minimum we	lc				
Interchang	e density, ID			0.7 int/mi	Weaving lan	e changes, L	-C _w		lc	
Minimum I	RF lane changes,	, LC _{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		lc	
Minimum I	R lane changes,	, LC _{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		lc	
Minimum I	RR lane changes	, LC _{RR}		lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}			
Weavir	ng Segmen ⁻	t Speed,	Density, I	Level of	Service,	and Cap	pacity			
Weaving s	egment flow rate egment capacity egment v/c ratio		6957 veh/h 5600 veh/h 1.242	Weaving inte Weaving seg Average wea	ՠբ ՠբ					
Weaving s	egment density,	D		pc/mi/ln	Average nor	-weaving sp	eed, S _{NW}		m	
Level of S	ervice, LOS			F	Maximum weaving length, L _{MAX} 6932					
Notes										

Chapter 13, "Freeway Merge and Diverge Segments". b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	l-95 SB Seg 1-B 2040 Bu	et Hillsboro & Palmett
Project Description SW 10th	n Street SIMR				
✓ Oper.(LOS) Flow Inputs			Des.(N)	Pla	anning Data
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	5000	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
	4 -		Up/Down %		
Calculate Flow Adjustn				4.0	
f _p	1.00			1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	5	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	ft ft ramps/mi mph mph	f _{Lw} f _{LC} TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	x f _{HV} x f _p) 1336 69.8 19.1 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base frout ur volume	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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		F	REEWAY	WEAV		RKSHEE	Т			
Genera	I Informati	on			Site Info	rmation				
Analyst Agency/Co Date Perfol Analysis Ti	rmed	AECO PM	И		Freeway/Dir of TravelI95/SBWeaving Segment LocationSeg 2-Bet On from Exp & OffAnalysis Year2040 Build 2					
	scription SW 10	th Street SIMF	2							
Weaving nu Weaving se Freeway fre	onfiguration umber of lanes, l egment length, L ee-flow speed, F	rs FS		Two-Sided 4 3900ft 70 mph	Segment typ Freeway min Freeway ma: Terrain type	imum speed			Freeway 15 2400 Leve	
Conver	sions to p	<u>c/h Unde</u>	r Base Co	ondition	r	-	1	1		
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)	
V _{FF}	3835	0.95	3	0	1.5	1.2	0.985	1.00	4097	
V _{RF}	1135	0.92	2	0	1.5	1.2	0.990	1.00	1246	
V _{FR}	1165	0.92	2	0	1.5	1.2	0.990	1.00	1279	
V _{RR}	95	0.92	2	0	1.5	1.2	0.990	1.00	104	
V _{NW}	6622							V =	6726	
V _W	104									
VR	0.015									
Config	uration Ch	aracteris	tics		I					
Minimum n	maneuver lanes,	N _{WL}		0 lc	Minimum we		312 lc/h			
	e density, ID			0.7 int/mi	Weaving lan	884 lc/h				
	RF lane changes	T		0 lc/pc	Non-weaving	3065 lc/h				
Minimum F	R lane changes	, LC _{FR}		0 lc/pc	Total lane ch	nanges, LC _{AL}	L		3949 lc/h	
Minimum F	RR lane changes	s, LC _{RR}		3 lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		1808	
Weavin	ig Segmen	t Speed,	Density, I	_evel of	1					
Weaving segment flow rate, v6641 veh/hWeaving segment capacity, c8863 veh/h					Weaving intensity factor, W Weaving segment speed, S					
Ŭ	Veaving segment v/c ratio 0.7 Veaving segment density, D 28.2 pc/m									
0	ervice, LOS	U	20	D	Maximum w				59.7 mph 5870 ft	
Notes							', LMAX		5070 H	
a. Weaving Chapter 13,	segments longer f "Freeway Merge nes that exceed th	and Diverge Se	egments".	-		solated merge	and diverge are	eas using the	procedures of	

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Site InformationHighway/Direction of Travel From/To Jurisdiction Analysis YearDes.(N)Peak-Hour Factor, PHF %Trucks and Buses, PT %RVs, PR General Terrain: Grade % Length Up/Down % E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$ Calc Speed Adj and FFS f_{LW} f_{LC} TRD Adjustment FFS	2040 Buil 2040 Buil 0.95 3 0 Level mi 1.2 0.985	t Off & On Ramp Id 2 Inning Data
From/To Jurisdiction Analysis Year Des.(N) Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down % E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$ Calc Speed Adj and FFS f_{LW} f_{LC} TRD Adjustment	Seg 3-Be 2040 Buil Plar 0.95 3 0 Level mi 1.2 0.985	nning Data
Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down % E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$ Calc Speed Adj and FFS f_{LW} f_{LC} TRD Adjustment	0.95 3 0 Level mi 1.2 0.985	mph
Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length Up/Down % E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$ Calc Speed Adj and FFS f_{LW} f_{LC} TRD Adjustment	0.95 3 0 Level mi 1.2 0.985	mph
%Trucks and Buses, P_T %RVs, P_R General Terrain: Grade % Length Up/Down % E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$ Calc Speed Adj and FFS f_{LW} f_{LC} TRD Adjustment	3 0 Level mi 1.2 0.985	
%Trucks and Buses, P_T %RVs, P_R General Terrain: Grade % Length Up/Down % E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$ Calc Speed Adj and FFS f_{LW} f_{LC} TRD Adjustment	3 0 Level mi 1.2 0.985	
E_{R} $f_{HV} = 1/[1+P_{T}(E_{T}-1) + P_{R}(E_{R}-1)]$ Calc Speed Adj and FFS f_{LW} f_{LC} TRD Adjustment	0.985	
$f_{HV} = 1/[1+P_{T}(E_{T}-1) + P_{R}(E_{R}-1)]$ Calc Speed Adj and FFS f_{LW} f_{LC} TRD Adjustment	0.985	
Calc Speed Adj and FFS f _{LW} f _{LC} TRD Adjustment		
f _{LW} f _{LC} TRD Adjustment	3	
f _{LC} TRD Adjustment		
110	70.0	mph mph
Design (N)		
<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Factor Location		
f _p - Page 11-18		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-1
	$v_p = (V \text{ or DDHV}) / (PHF x N x S)$ D = v_p / S Required Number of Lanes, N Factor Location E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18	$v_p = (V \text{ or DDHV}) / (PHF x N x f_{HV} x f_p)$ S D = v_p / S Required Number of Lanes, N Factor Location E_R - Exhibits 11-10, 11-12 E_T - Exhibits 11-10, 11-11, 11-13

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<u></u>	f	RAMP	S AND RAM			RKS	HEET						
General Inf	formation			Site Infor									
nalyst				eeway/Dir of Tr		I-95 SE							
Agency or Compa Date Performed	any AEC	ЮM		nction risdiction		Seg 4-I	Diverge to	SW 10th St					
Analysis Time Pe	eriod PM			nalysis Year		2040 B	uild 2						
	on SW 10th Stree	et SIMR	7.4			2040 D							
nputs													
	di Domo	Freeway Num	ber of Lanes, N	3					Downstrog	m Adi			
Upstream A	aj Ramp	Ramp Numbe		1					Downstrea Ramp	im Adj			
Yes	On		ane Length, L_{Δ}	, i					•				
			- //	200					🗹 Yes	🗹 On			
✓ No	Off		ane Length L _D	200					🗌 No	Off			
		Freeway Volu		4970					ı –	2400 ft			
L _{up} =	ft	Ramp Volume	IX	1020					L _{down} =	2400 IL			
V =	voh/h	Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	1690 veh			
v _u –	$V_u = $ veh/h Ramp Free-Flow Speed, S _{FR} 45.0								- D				
Conversio	n to pc/h Un	der Base (Conditions										
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{uv} x f			
,	(Veh/hr)					_		F		F			
Freeway	4970	0.95	Level	3	0	_	985	1.00	53				
Ramp UpStream	1020	0.92	Level	2	0	0.	990	1.00	11:	20			
DownStream	1690	0.92	Level	2	0	0	990	1.00	18	55			
Jownoticam		Merge Areas	Level	2	0	0.		Diverge Areas	10	55			
Estimation					Estimat	ion o							
		(D)											
	V ₁₂ = V _F	1 101					12	= V _R + (V _F - V _F	(IB				
EQ =		ation 13-6 or			L _{EQ} =			Equation 13-1					
P _{FM} =	•	Equation (E	Exhibit 13-6)		P _{FD} =		0.	576 using Equ	uation (Exhil	bit 13-7)			
/ ₁₂ =	pc/h				V ₁₂ =		3	532 pc/h					
$V_3^{}$ or $V_{av34}^{}$	pc/h ((Equation 13	-14 or 13-17)		$\rm V_3$ or $\rm V_{av34}$		1	778 pc/h (Equ	ation 13-14	or 13-17			
Is V_3 or $V_{av34} > 2$	2,700 pc/h? 🗌 Ye	es 🗌 No			Is V_3 or V_{av}	_{/34} > 2,7	00 pc/h? [🗌 Yes 🗹 No					
Is V_3 or $V_{av34} > 7$	1.5 * V ₁₂ /2 🗌 Ye	es 🗌 No			Is V_3 or V_{av}	, ₃₄ > 1.5	* V ₁₂ /2 [Yes 🗹 No					
Yes,V _{12a} =			-16, 13-18, or		If Yes,V _{12a} =	=	•	c/h (Equation	13-16, 13-	18, or 13-			
	13-19))						9)					
Capacity C					Capacit	y Ch							
	Actual		apacity	LOS F?			Actual		pacity	LOS F?			
					V _F		5310	Exhibit 13-8	3 7200	No			
V _{FO}		Exhibit 13-8			V _{FO} = V _F	- V _R	4190	Exhibit 13-8	3 7200	No			
					V _R		1120	Exhibit 13-1	0 2100	No			
-low Enter	ring Merge In	nfluence A	rea		Flow En	nterin	g Dive	rge Influen	ce Area				
	Actual		Desirable	Violation?			Actual	Max Desirab	le	Violation?			
V _{R12}		Exhibit 13-8			V ₁₂	3	3532	Exhibit 13-8	4400:All	No			
	ervice Detern	nination (i	if not F)			f Serv	vice De	terminatio	n (if not l	F)			
	+ 0.00734 v _R +		· · · · ·					.0086 V ₁₂ - 0.	1	/			
) _R = (pc/m		12	A			т 2.8 (рс,		12	D				
	bit 13-2)						bit 13-2)						
	,					•	,						
	ermination				Speed L								
Speed Dete		= (Exibit 13-11)						D _s = 0.399 (Exhibit 13-12)					
Speed Dete	it 13-11)												
Speed Dete M _S = (Exibi	it 13-11) Exhibit 13-11)				S _R = 58		•						
Speed Dete $M_{\rm S}$ = (Exibi	,				S _R = 58		(Exhibit (Exhibit						
Speed Dete $I_{S} = (Exibiting R_{R}^{=} mph (E)$ $_{0} = mph (E)$	Exhibit 13-11)				S _R = 58 S ₀ = 73	3.8 mph	•	13-12)					

General Information					
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 5-Be 2040 Bu	et Off & On Ramps
Project Description SW 10t				2040 Du	
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
√olume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	3950	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain:	0.95 3 0 Level	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustr	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
∟ane Width Rt-Side Lat. Clearance		ft ft	f _{LW}		mph
Number of Lanes, N Total Ramp Density, TRD	3	ramps/mi	^r Lw f _{LC} TRD Adjustment		mph
FS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N S D = v _p / S _L OS	x f _{HV} x f _p) 1407 69.5 20.2 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S D = v_p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes / - Hourly volume / _p - Flow rate _OS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre		E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-1 ⁻

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	RA	MPS AND	RAMP JUN		ORKSHE	ET				
General Infor	mation			Site Infor	mation					
nalyst			Fre	eeway/Dir of Tra	avel I-9	95 SB				
gency or Company	AEC	ОМ	Ju	nction	S	eg 6-Merge fror	n Hillsboro E&W			
Date Performed			Ju	risdiction						
Analysis Time Period			An	alysis Year	20	040 Build 2				
Project Description	SW 10th Stree	t SIMR								
nputs										
Jpstream Adj Ramp		· ·	ber of Lanes, N	3				Downstre	eam Adj	
		Ramp Number	of Lanes, N	1				Ramp		
🖌 Yes 📃 Or	ו	Acceleration L	ane Length, L _A	300				🗌 Yes	🗌 On	
No 🗹 Of	f	Deceleration L	ane Length L _D					✓ No		
	I	Freeway Volu	me, V _r						Off	
up = 2400								L _{down} =	ft	
	Freeway Free-Flow Speed, S_{FF} 70.0									
/ _u = 1020 y	/eh/h	1 '	ow Speed, S _{FR}	50.0				V _D =	veh/h	
	<u></u>		110	50.0						
Conversion t	орс/п Und V	1	onaitions							
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p	
reeway	3950	0.95	Level	3	0	0.985	1.00		4220	
Ramp	1690	0.92	Level	2	0	0.990	1.00		1855	
JpStream	1020	0.92	Level	2	0	0.990	1.00		1120	
DownStream									-	
		Merge Areas					Diverge Areas			
stimation of	fv ₁₂				Estimatio	on of v ₁₂				
	V ₁₂ = V _F	(P _{EM})								
=	.= .		13-6 or 13-7)				V _R + (V _F - V _R			
_{EQ} = > =			ion (Exhibit 13-6)		L _{EQ} =		(Equation 13-			
P _{FM} =					P _{FD} =		using Equatio	n (Exhibit 1	13-7)	
/ ₁₂ =	2472		n 12 11 or 12		V ₁₂ =		pc/h			
V_3 or V_{av34}	1740	pc/n (⊏quau	on 13-14 or 13-		V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17)					
ls V ₃ or V _{av34} > 2,70	,	s 🗸 No			Is V_3 or V_{av34}	> 2,700 pc/h? [Yes No			
$V_{3} \text{ or } V_{av34} > 1.5$					Is V_3 or V_{av34}	> 1.5 * V ₁₂ /2 [Yes 🗌 No			
			on 13-16, 13-		If Yes,V _{12a} =		pc/h (Equation	n 13-16, 1	13-18, or	
f Yes,V _{12a} =		13-19)			12a	1	3-19)			
Capacity Che	ecks				Capacity	Checks				
	Actual	C	apacity	LOS F?		Actual	Cap	oacity	LOS F?	
					V _F		Exhibit 13-8	3		
V	6075	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	Vp	Exhibit 13-8	3		
V _{FO}	0075			NU			Exhibit 13-			
					V _R		10			
low Entering	g Merge In	fluence A	rea		Flow Ente	ering Dive	rge Influen	ce Area	a	
	Actual	1	Desirable	Violation?		Actual	Max Desi		Violation?	
V _{R12}	4327	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8			
evel of Serv	ice Detern	nination (i	f not F)	-	Level of S	Service De	eterminatio	n (if no	t F)	
	0.00734 v _R + 0		1).0086 V ₁₂ - 0.		<u>.</u>	
n _R = 36.5 (pc/m		12	~			/mi/ln)	12	U		
OS = E (Exhibit						(hibit 13-2)				
						;	<u></u>			
Speed Deterr						eterminatio	חט			
1 _S = 0.586 (Exi	bit 13-11)				, i	nibit 13-12)				
_R = 53.6 mph	(Exhibit 13-11)				S _R = mph	n (Exhibit 13-12)				
₀ = 65.5 mph	(Exhibit 13-11)				S ₀ = mph	n (Exhibit 13-12)				
	(Exhibit 13-13)				S= mph	n (Exhibit 13-13)				
	of Florida, All Rig	hta Basaniad				Version 6.90		Conorat	ed: 6/17/2020	

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 7-B 2040 Bu	et On Ramps iild 2
Project Description SW 10th	Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	5640	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.95 3 0 Level mi	
Coloulate Flour Adiust			Up/Down %		
Calculate Flow Adjustm	1.00		E _R	1.2	
f _p E _T	1.5		⊂ _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.985	
Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	3		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N x S D = v _p / S LOS	c f _{HV} x f _p) 2009 62.4 32.2 D	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design hol	S - Speed D - Density FFS - Free-flow BFFS - Base fro	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
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Job: SW 10th Street SIMR Analyst: AECOM

Location:	Seg 8: I-	95 South	bound On-Ram	p from SW 1	0th Street E	B & WB
Analysis Period:	PM Peak	Hour				
Analysis Year:	2040 Buil	d 2				
5,640			7 020			
			F 1,020			
1 000						>
1,380						
	PHF =	0.95				
	v _{fr} =	7,020	vph			
	v _r =	1,380	vph			
	v _f =	5,640				
Upstream Freeway	Tr % =	3%				
Ramp	Tr % =	2%				
Downstream Freeway						
Freeway	f _{HV} =	1/(1+P	r(E _⊺ -1)+P _R (E _R -	·1)) =	0.985	
Ramp	f _{HV} =	1/(1+P-	r(E _T -1)+P _R (E _R -	·1)) =	0.9901	
flat terrain	Ε _τ =	1.5				
	RV % =	0				
Driver Population adj.	f _P =	1.000				
	V _{fr} =	=v _{fr} /(PF	HF)(f _{HV})(f _P) =	7,500	pc/h	
		•	$(f_{HV})(f_{P}) =$	1,467	pc/h	
			IF)(f _{HV})(f _P) =	6,026	pc/h	
No. Joneo unotreom of roma	•	-v _f /(FT	·· , ('ну , ('P) -	0,020	pc/li	
No. lanes upstream of ramp	IN =	3				

<u>No. Ln</u>	Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
4	Fwy downstream of ramp (assume 70 mph free-flow speed) =	9,600	7,500	0.78	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	6,026	0.84	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,467	0.70	No

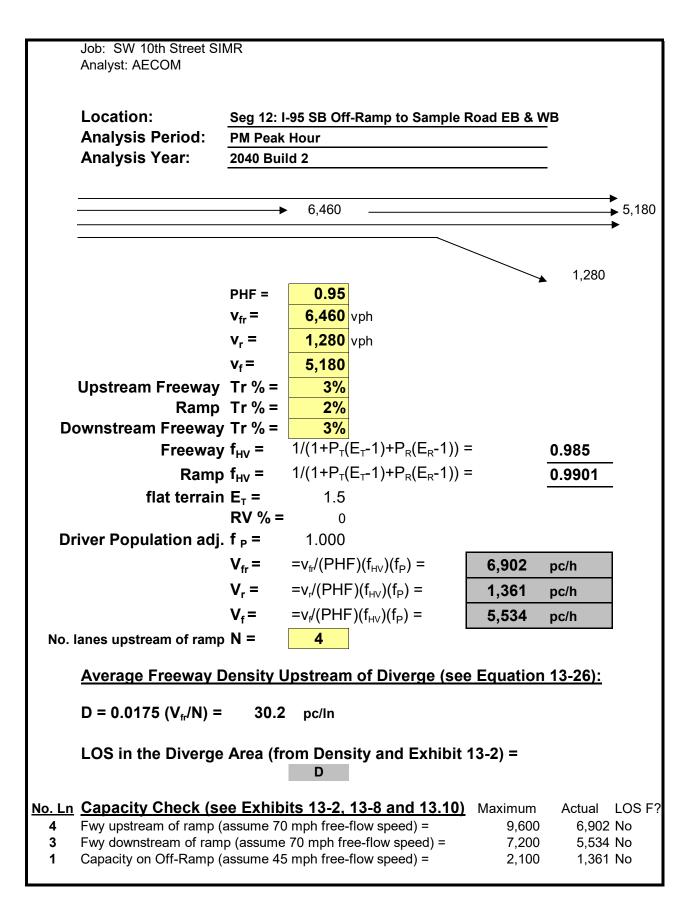
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	l-95 SB Seg 9-Be 2040 Bu	et 10th & Exit to Exp ild 2
Project Description SW 10th	n Street SIMR		_		
🗹 Oper.(LOS)			Des.(N)	🗌 Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	7020	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R	0.95 3 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjustn	nents				
f _p	1.00		E _R	1.2	
E _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS	5	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x N ኦ S D = v _p / S LOS	(f _{HV} x f _p) 1875 64.7 29.0 D	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre	-	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, 11- f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-2		f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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		RA	MPS AND	RAMP JUN	CTIONS W	ORKSHE	ET				
Genera	l Infori	mation			Site Infor	mation					
Analyst				Fr	eeway/Dir of Tr	avel I-	-95 SB				
gency or (AECO	MC	Ju	nction	S	Seg 10-M	erge from l	Ex to GP		
ate Perfor					risdiction	_					
	me Period			Ar	nalysis Year	2	040 Build	d 2			
	scription	SW 10th Stree	t SIMR								
nputs											
Ipstream A	Adj Ramp			ber of Lanes, N	4					Downstre	eam Adj
Yes	🗌 On		Ramp Numbe		1					Ramp	
163				ane Length, L _A	600					🗹 Yes	🗌 On
✓ No	🗌 Off		Deceleration I	ane Length L _D						No	✓ Off
			Freeway Volu	me, V _F	7020						
up =	ft		Ramp Volume	e, V _R	220					L _{down} =	1150 ft
			Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	780 veh/h
′ _u =	veh/h		Ramp Free-Fl	ow Speed, S _{FR}	50.0					• D	
Conver	rsion to	pc/h Und	der Base	Conditions							
(pc/		V	PHF	Terrain	%Truck	%Rv	f _H		f _p	v = V/PH	F x f _{HV} x f _p
	"')	(Veh/hr)							'		1
reeway		7020	0.95	Level	3	0	0.98		1.00		7500
Ramp		220	0.92	Level	2	0	0.99	0	1.00		242
JpStream		700	0.00	Level			0.00		4.00		050
DownStrea	am	780	0.92 Merge Areas	Level	2	0	0.99	<u>I</u>	1.00 erge Areas		856
stima	tion of		werge Areas			Estimatio	on of		erge Areas		
Sumu			<u> </u>			Loundar		12			
		$V_{12} = V_{F}$						V ₁₂ = V _R	+ (V _F - V _R))P _{FD}	
_{EQ} =		(Equa	ation 13-6 o	⁻ 13-7)		L _{EQ} =		(Ec	quation 13-	12 or 13-	13)
' _{FM} =		0.188	using Equat	ion (Exhibit 13-6)		P _{FD} =			ing Equatio		
′ ₁₂ =		1407 p	pc/h			V ₁₂ =		pc		(- /
V_3 or V_{av34}			pc/h (Equati	on 13-14 or 13-		V_3^{12} or V_{av34}^{12}			h (Equation 1	3-14 or 13-	17)
		17)				Is V ₃ or V _{av34}	> 2 700	-			,
) pc/h? 🗹 Yes									
s V ₃ or V _a	_{v34} > 1.5 ^	V ₁₂ /2 √ Yes				Is V ₃ or V _{av34}	1.0		h (Equatior	n 13-16	13-18 or
Yes,V _{12a}	=	3000 18, or		on 13-16, 13-		If Yes,V _{12a} =		13-1		110-10,	10-10, 01
`anaci	ty Che		15-19)			Capacity	Chor	ks			
Jupuen		Actual		apacity	LOS F?			Actual	Can	acity	LOS F?
		7101000		apacity	2001:	V _F		Notudi	Exhibit 13-8		20011
.,						· · · · ·	V		Exhibit 13-8	_	_
V _F	:0	7742	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	^v R				_
						V _R			Exhibit 13- 10		
low E	nterino	Merge In	fluence A	rea	<u> </u>	Flow Ent	erina	Divera	e Influen	ce Area	<u>'</u>
		Actual	1	Desirable	Violation?		Act		Max Desi		Violation?
V _R	12	3242	Exhibit 13-8	4600:All	No	V ₁₂		E	Exhibit 13-8		
		ce Detern	nination (if not F)	1	Level of	Servio	ce Dete	rminatio	n (if no	t F)
		0.00734 v _R + 0							086 V ₁₂ - 0.	•	/
	26.9 (pc/mi		12	А			k /mi/ln)		12	U	
	C (Exhibit 1						-	2 2)			
	,	,					xhibit 13				
	Determ	nination				Speed D					
1 _S = 0).361 (Exib	oit 13-11)				ů (hibit 13-1	,			
_R = 5	59.9 mph (I	Exhibit 13-11)				S _R = mpl	h (Exhibi	t 13-12)			
	3.7 mph (l		S ₀ = mpl	h (Exhibi	t 13-12)						
		Exhibit 13-13)				S = mpl	h (Exhibi	t 13-13)			
nt @ 2016 I	Iniversity of	f Florida, All Rigi	hts Reserved			HCS2010 [™]	1 Versier	6.00		Genera	ated: 6/17/2020

			S AND RAM			RKS	HEET			
General Info	ormation			Site Infor						
Analyst				eeway/Dir of Tr		I-95 SB				
gency or Compa	ny AECO	OM		nction		Seg 11	Diverge t	o Express		
ate Performed nalysis Time Per	iod PM			risdiction alysis Year		2040 B	uild 2			
<u> </u>	n SW 10th Stree	t SIMR				2040 D				
nputs										
		Freeway Num	ber of Lanes, N	4					D (A 11
Upstream Adj	Ramp	Ramp Number		1					Downstrea Ramp	m Adj
✓ Yes	🗹 On	•		I					•	
			ane Length, L _A						🗌 Yes	🗌 On
No	Off		_ane Length L _D	200					✓ No	Off
		Freeway Volu	me, V _F	7240						
L _{up} =	1150 ft	Ramp Volume	», V _R	780					L _{down} =	ft
۱ <i>.</i> –		Freeway Free	-Flow Speed, S _{FF}	70.0					V _D =	veh/h
V _u =	220 veh/h	Ramp Free-Fl	ow Speed, S _{FR}	45.0					VD -	VEII/II
Conversion	to pc/h Und	-								
(pc/h)	V	PHF		%Truck	0/ Dv		f	f	v = V/PHF	vf vf
(pc/n)	(Veh/hr)		Terrain	% ITUCK	%Rv		f _{HV}	1		1
reeway	7240	0.95	Level	3	0	0.	985	1.00	773	35
Ramp	780	0.92	Level	2	0	0.	990	1.00	85	6
JpStream	220	0.92	Level	2	0	0.	990	1.00	24	2
ownStream										
		Merge Areas			F atimat			Diverge Areas		
stimation	of V ₁₂				Estimati	ion o	r v ₁₂			
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	· V _R + (V _F - V _F	R)P _{FD}	
_{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13))
FM =	using	Equation (E	Exhibit 13-6)		P _{FD} =		0.	436 using Equ	uation (Exhil	oit 13-7)
12 =	pc/h		,		V ₁₂ =			355 pc/h	,	,
V_{3} or V_{av34}	-	Equation 13	-14 or 13-17)		V_3^{12} or V_{av34}^{12}			940 pc/h (Equ	ation 13-14	or 13-17
	,700 pc/h? 🗌 Ye		,			>27		Yes ⊡ No		01 10 11
	.5 * V ₁₂ /2									
			-16, 13-18, or					Yes 🗹 No c/h (Equation	13-16 13-	18 or 13
Yes,V _{12a} =			-10, 10-10, 01		If Yes,V _{12a} =	=	۲ 1	· ·	10-10, 10-	10, 01 10
-24	13-19))			12a			9)		
	1)			Capacit	y Che		9)		
	1	, <u> </u>	apacity	LOS F?		y Che		·	pacity	LOS F
	hecks	, <u> </u>	apacity	LOS F?		y Che	ecks	·	1	LOS F No
Capacity Ch	hecks	C	apacity	LOS F?	Capacity V _F		Actual 7735	Ca Exhibit 13-8	9600	No
	hecks	, <u> </u>	apacity	LOS F?	Capacity V_{F} $V_{FO} = V_{F}$		Actual 7735 6879	Ca Exhibit 13-8 Exhibit 13-8	9600 9600	No No
Capacity Ch	Actual	C Exhibit 13-8		LOS F?	Capacity V_F $V_{FO} = V_F$ V_R	- V _R	Actual 7735 6879 856	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1	3 9600 3 9600 3 9600 0 2100	No
Capacity Ch	hecks Actual ng Merge In	Exhibit 13-8	Irea		Capacity V_F $V_{FO} = V_F$ V_R	- V _R	Actual 7735 6879 856 g Dive	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen	9600 9600 9600 2100 Ce Area	No No No
Capacity Ch V _{FO}	Actual	Exhibit 13-8		LOS F? Violation?	Capacity V_F $V_{FO} = V_F$ V_R Flow En	- V _R	Actual 7735 6879 856 g Dive Actual	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 r ge Influen Max Desirab	9600 9600 9600 2100 ce Area	No No No Violation
V _{FO}	Actual Actual ng Merge In Actual	Exhibit 13-8 offluence A Max Exhibit 13-8	rea Desirable		Capacity V_F $V_{FO} = V_F$ V_R Flow En	terin	Actual 7735 6879 856 g Dive Actual 855	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	9600 9600 9600 2100 ce Area ble 4400:All	No No Violation No
Capacity Ch V _{FO} Flow Enterin V _{R12} evel of Ser	hecks Actual Actual Actual Actual Actual Actual Actual Actual	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	terin f Serv	Actual 7735 6879 856 g Dive Actual 855 rice De	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No Violation No
Capacity Cr V_{FO} Flow Enterin V_{R12} evel of Sei $D_R = 5.475 + 100$	Actual Actual ng Merge In Actual	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	terin f Serv	Actual 7735 6879 856 g Dive Actual 855 rice De	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 rge Influen Max Desirab Exhibit 13-8	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No Violation No
Capacity Cr V_{FO} Flow Enterin V_{R12} evel of Sei $D_R = 5.475 + 100$	Actual Ac	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of	terin f Serv	Actual 7735 6879 856 g Dive Actual 855 rice De .252 + 0	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No Violation No
Capacity Cr V_{FO} Flow Enterin V_{R12} evel of Sen $D_R = 5.475 + R^{=}$ (pc/mi/	Actual Ac	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity $V_{FO} = V_F$ $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 38$	terin f Serv D _R = 4 3.9 (pc/	Actual 7735 6879 856 g Dive Actual 855 rice De .252 + 0	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirab Exhibit 13-8 termination	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No No Violation No
Capacity Cr V_{FO} Flow Enterin V_{R12} Evel of Sen $D_R = 5.475 + \frac{1}{R} = \frac{1}{PC/mi}$ DS = (Exhib)	Actual Ac	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity $V_{FO} = V_F$ $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 38$	$\frac{1}{P} = \frac{V_R}{P}$	Actual 7735 6879 856 g Dive Actual 855 rice De .252 + 0 mi/ln) wit 13-2)	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 T ge Influen Max Desirab Exhibit 13-8 termination .0086 V ₁₂ - 0.0	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No No Violation No
Capacity Cr V_{FO} Flow Enterin V_{R12} evel of Sen $D_R = 5.475 +$ $R^{=}$ (pc/mi/ OS = (Exhib Speed Deter	Actual Ac	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity $V_{FO} = V_F$ $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 38$ LOS = E Speed L	Image: organized state Image: organized state <t< td=""><td>Actual 7735 6879 856 g Dive Actual 855 rice De .252 + 0 mi/ln) it 13-2) minatic</td><td>Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influent Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V₁₂ - 0.0</td><td>3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l</td><td>No No No Violation No</td></t<>	Actual 7735 6879 856 g Dive Actual 855 rice De .252 + 0 mi/ln) it 13-2) minatic	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Tge Influent Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No No Violation No
V_{FO} Flow Enterin V_{R12} Evel of Sen $D_R = 5.475 + (pc/mi)$ $D_S = (Exhib)$ Epeed Detends	Actual Ac	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity V_F $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 38$ LOS = E Speed D $D_s = 0.3$	$\frac{1}{2} - V_R$ $\frac{1}{2}$	Actual 7735 6879 856 g Dive Actual 855 rice De .252 + 0 mi/ln) wit 13-2) minatic chibit 13-	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Trge Influen Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No Violation No
Capacity Cr V_{FO} Flow Enterin V_{R12} evel of Sen $D_R = 5.475 +$ $R^{=}$ (pc/mi/ DS = (Exhibit $R^{=}$ (Exhibit $R^{=}$ mph (E	Actual Actual Actual Actual Actual Actual rvice Detern 0.00734 v _R + 0 /In) it 13-2) rmination 13-11) xhibit 13-11)	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity $V_{FO} = V_F$ $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 38$ LOS = E Speed D $D_s = 0.3$ $S_R = 59$	- V _R - V _R - V _R - 4 - 3 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4	Actual 7735 6879 856 g Dive Actual 855 rice De .252 + 0 mi/In) itt 13-2) minatic chibit 13- (Exhibit	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Max Desirab Exhibit 13-8 Exhibit 13-8 Ex	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No Violation No
Capacity Cr V_{FO} For Entering V_{R12} Evel of Sen $D_R = 5.475 + Cr R = (pc/mi)DS = (Exhibit)Expeed DeteS = (Exhibit)S = (Exhibit)R = mph (Exhibit)R = mph (Exhibit)R = mph (Exhibit)$	Actual Ac	Exhibit 13-8 fluence A Max I Exhibit 13-8 mination (i	Trea Desirable if not F)		Capacity V_F $V_{FO} = V_F$ $V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = 38$ LOS = E Speed D $D_s = 0.3$ $S_R = 59$ $S_0 = 73$	$\frac{1}{2} - V_R$ $\frac{1}{2}$	Actual 7735 6879 856 g Dive Actual 855 rice De .252 + 0 mi/ln) wit 13-2) minatic chibit 13-	Ca Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 Trge Influen Max Desirab Exhibit 13-8 Exhibit 13-8 termination .0086 V ₁₂ - 0.0 00 01 .12) 13-12) 13-12)	3 9600 3 9600 0 2100 ce Area ble 4400:All n (if not l	No No No Violation No



COM et SIMR		Site Information Highway/Direction of Travel From/To Jurisdiction Analysis Year	2040 Buila	et Off & On Ramps 1 2
t SIMR		From/To Jurisdiction Analysis Year	Seg 13-Be 2040 Build	
		Des.(N)	Planr	1
80		Des.(N)	🗌 Planr	
80				ning Data
80				
	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R	0.95 3 0	
	veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
i				
0		E _R	1.2	
		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
		Calc Speed Adj and FFS		
	ft			
	ft	f _{LW}		mph
		f _{LC}		mph
	ramps/mi	TRD Adjustment		mph
0	mph	FFS	70.0	mph
	mph			-
ures		Design (N)		
f _p) 1845 65.2 28.3 D	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x S D = v _p / S Required Number of Lanes, N	f _{HV} x f _p)	pc/h/ln mph pc/mi/ln
		Factor Location		
Density - Free-flow sp S - Base free-		f _p - Page 11-18	13	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11
	0 Sures f _p) 1845 65.2 28.3 D Speed Density - Free-flow sp S - Base free- Ime	veh/day veh/h veh/h veh/h veh/h veh/h sures veh/day	veh/day%Trucks and Buses, P_T %RVs, P_R General Terrain: Grade%RVs, P_R General Terrain: Grade0 E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$ 0 E_R f_L ftftft f_Lc TRD Adjustment0mph mphfsizesDesign (N)calc Speed Adj and FFSfp) 1845 28.3 D pc/h/ln 28.3 D fsizesDesign (N)Design LOS $v_p = (V \text{ or DDHV}) / (PHF x N xSD = v_p / SRequired Number of Lanes, NSpeedDensity- Free-flow speedSpeedDensity- Free-flow speedSales free-flow speedime$	veh/day $\ensuremath{\%}$ Trucks and Buses, P_T 3 $\ensuremath{\%}$ Revs, P_R 0 General Terrain: Level Grade % Length mi Up/Down %0E_R1.2 f_{HV} = 1/[1+P_T(E_T-1) + P_R(E_R-1)]0.9850E_R1.2 f_{LC}ftftf_{LC}ramps/miTRD Adjustment0mphFFS70.0fp) 1845pc/h/lnDesign (N)extremeDesign (N)curesDesign (N)fs2.3.3pc/mi/lnDSDE_R - Exhibits 11-10, 11-12E_R - Exhibits 11-10, 11-12DensityE_R - Exhibits 11-10, 11-11, 11-13- Free-flow speedE_R - Exhibits 11-10, 11-11, 11-13S- Base free-flow speedCS, S, FFS, v Exhibits 11-2, 11-3

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_			REEWA	Y WEAV		_	T		
Genera	al Informati	on			Site Info	rmation			
Analyst Agency/Co Date Perfo Analysis T		AECO PM	М		Freeway/Dir of Travel I-95 SB Weaving Segment Location Seg 14- Bet Sample & Co Analysis Year 2040 Build 2				
Project De Inputs	escription SW 10t	th Street SIM	२						
Weaving o Weaving r Weaving s Freeway f	configuration number of lanes, l segment length, L ree-flow speed, F	s FS		4 2520ft 70 mph	Terrain type				Freewa 24(Lev
Conve	rsions to p		1	1	1				
	V (veh/h)	PHF	Truck (%)	RV (%)	E _T	E _R	f _{HV}	fp	v (pc/h)
V _{FF}	4415	0.95	3	0	1.5	1.2	0.985	1.00	4717
V _{RF}	1590	0.92	2	0	1.5	1.2	0.990	1.00	1746
V _{FR}	765	0.92	2	0	1.5	1.2	0.990	1.00	840
V _{RR}	0	0.95	0	0	1.5	1.2	1.000	1.00	0
V _{NW}	4717							V =	7303
V _W	2586								
VR	0.354								
Config	uration Cha	aracteris	tics		1				
Minimum	maneuver lanes,	N _{WL}		2 lc	Minimum we	eaving lane c	hanges, LC _{MIN}		lc
	ge density, ID			0.7 int/mi	Weaving lan	e changes, L	.C _w		lc
Minimum	RF lane changes	, LC _{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		lc
Minimum	FR lane changes	, LC _{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		lc
Minimum	RR lane changes	, LC _{RR}		lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		
Weavii	ng Segmen	t Speed,	Density,	Level of	Service,	and Cap	oacity		
Weaving	segment flow rate	e, V		7208 veh/h	•	ensity factor,			
Weaving	segment capacity	, c _w		6678 veh/h	• •	gment speed			mp
•	segment v/c ratio			1.079	_	aving speed,			mp
-	segment density,	D		pc/mi/ln	Average nor				mp
	Service, LOS			F	Maximum w	eaving length	n, L _{MAX}		6171
Notes	a ogmonte lever	hon the select	ated maximum	ongth about 1	o trooted as :-		and diverse		procedures -f
Chapter 13	g segments longer t 8, "Freeway Merge	and Diverge S	egments".	C		solated merge	and diverge ar	eas using the	procedures of
	mes that exceed the ersity of Florida All	0 0		ne level of sei				Carr	erated: 6/15/2

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		RAMP	S AND RAM	IP JUNCTI	ONS WC	RKS	HEET			
General In	formation			Site Infor						
Analyst Agency or Comp Date Performed	-	ОМ	ال ال	reeway/Dir of Tr unction urisdiction	avel	Off to S	B Express L SW 10th Co			
Analysis Time P	Period AM ion SW 10th Stree	at SIMP	A	nalysis Year		2040 B	uiia 2			
nputs										
	Ndi Domo	Freeway Num	ber of Lanes, N	2					Deumetre	ana Adi
Upstream A	adj Ramp	Ramp Number		1					Downstre Ramp	am Adj
Yes	On	1 '	ane Length, L_{A}						Yes	On
✓ No	Off		ane Length L _D	345						
INU INU		Freeway Volu	- 0	1370					🗹 No	Off
L _{up} =	ft	Ramp Volume	, V _R	90					L _{down} =	ft
<u>۱</u>	veh/h	Freeway Free	Flow Speed, S _{FF}	70.0					V _D =	veh/h
V _u =	ven/n	Ramp Free-Fl	ow Speed, S _{FR}	60.0					•D	VCII/II
Conversio	on to pc/h Un	der Base (Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _p
Freeway	1370	0.95	Level	3	0		985	۴ 1.00		164
Ramp	90	0.95	Level	2	0	_	990	1.00		96
UpStream										
DownStream								· · · · · · · · · · · · · · · · · · ·		
Estimatior		Merge Areas			Estimat	tion		iverge Areas		
					LStiniat			<u> </u>		
	$V_{12} = V_F$		40 7)				•=	$V_R + (V_F - V_F)$		
EQ =		ation 13-6 or Equation (E	-		L _{EQ} = P =		-	Equation 13-1		-
P _{FM} = / ₁₂ =	pc/h	Equation (E	XIIIDIL 13-0)		P _{FD} = V ₁₂ =			000 using Equ 64 pc/h	auon (Exil	IDIL 13-7)
12 / ₃ or V _{av34}	•	(Equation 13)	-14 or 13-17)		V_{12}^{-} V ₃ or V _{av34}			pc/h (Equatio	n 13-14 o	r 13_17)
	2,700 pc/h? Ye							Yes ⊻No		1017)
	1.5 * V ₁₂ /2 Ye							Yes No		
⁵ Yes,V _{12a} =	pc/h ((Equation 13-	-16, 13-18, or		If Yes,V _{12a} :		р	c/h (Equation	13-16, 13	-18, or 13
	13-19)					19	9)		
Capacity C	Actual		apacity	LOS F?	Capacit		Actual	Ca	pacity	LOS F
	Actual	Ĭ	apacity	LUST	V _F		1464	Exhibit 13-8		No
V _{FO}		Exhibit 13-8			$V_{FO} = V_F$		1368	Exhibit 13-8	-	No
FO		Exhibit 10 0			V _R		96	Exhibit 13-10	-	No
Jow Ento	ring Merge Ir	fluonco A	<i>r</i> o2					ge Influen		NO
	Actual	ii	Desirable	Violation?		1	Actual	Max Desirab		Violation
V _{R12}		Exhibit 13-8			V ₁₂	1	464	Exhibit 13-8	4400:All	No
	ervice Deteri	mination (i	if not F)		Level o	f Serv	vice De	terminatio	n (if not	
D _R = 5.475	+ 0.00734 v _R +	0.0078 V ₁₂ -	0.00627 L _A			D _R = 4	.252 + 0	.0086 V ₁₂ - 0.0	009 L _D	
_R = (pc/n	ni/ln)				D _R = 13	3.7 (pc/	/mi/ln)			
OS = (Exh	ibit 13-2)				LOS = B	(Exhib	oit 13-2)			
Speed Det	termination				Speed I	Deter	minatic	on		
1 _s = (Exib	oit 13-11)				D _s = 0	.112 (E	xhibit 13-	12)		
-	(Exhibit 13-11)				S _R = 6	6.9 mph	(Exhibit	13-12)		
	(Exhibit 13-11)				S ₀ = N	/A mph	(Exhibit '	13-12)		
	Exhibit 13-13)				S = 6	6.9 mph	(Exhibit	13-13)		
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		RA	MPS AND	RAMP JUN	CTIONS W	/ORKSH	EET				
Genera	l Inform	nation			Site Infor	mation					
nalyst gency or (ate Perfor	rmed	AEC	OM	J	reeway/Dir of Tr unction urisdiction	avel		IB Express L om SW 10th	anes St. Connector		
	me Period	AM		A	nalysis Year		2040	Build 2			
	scription S	SW 10th Stree	et SIMR								
nputs			Ero aurou Numh	or of Lanca N							
pstream A	Adj Ramp		Freeway Numb		2					Downstre	eam Adj
Yes	🗌 On		Ramp Number		1					Ramp	
			Acceleration La	- 11	1040					Yes	🗌 On
✓ No	🗌 Off		Deceleration L	- 0						✓ No	Off
			Freeway Volun		1280						ft
= qL	ft		Ramp Volume,	IX .	850					L _{down} =	п
u =	veh/h		-	Flow Speed, S_{FF}	70.0					V _D =	veh/h
			Ramp Free-Flo	110	60.0						
Conver	rsion to		der Base (Conditions							
(pc/	/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p
reeway		1280	0.95	Level	3	0).985	1.00		1368
Ramp		850	0.95	Level	2	0).990	1.00		904
JpStream						-					
DownStrea	am										
			Merge Areas				-		iverge Areas		
stima	tion of	v ₁₂				Estimat		of V ₁₂			
		$V_{12} = V_{F}$	(P _{FM})					V ₁₂ = V	V _R + (V _F - V _I	_R)P _{FD}	
EQ =		(Equ	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13	-12 or 13-	13)
FM =		1.000	using Equati	on (Exhibit 13-6)	P _{FD} =		ι	using Equati	on (Exhibit 1	13-7)
12 =		1368	pc/h			V ₁₂ =		k	oc/h		
$_3$ or V $_{av34}$		0 pc/	h (Equation 1	3-14 or 13-17)	V_3 or V_{av34}		I	pc/h (Equation	13-14 or 13-	17)
s V_3 or V_a	_{v34} > 2,700	pc/h? 🗌 Ye	s 🗹 No						Yes 🗌 No		
s V_3 or V_a	_{v34} > 1.5 * '	V ₁₂ /2 Ye				Is V_3 or V_{av}	₃₄ > 1.		Yes 🗌 No		
Yes,V _{12a}	=	pc/h 13-19		-16, 13-18, or		If Yes,V _{12a} =	=		oc/h (Equatio	on 13-16, 1	13-18, or
-	ty Chec)			Capacit			3-19)		
apaci	iy once	Actual	C	apacity	LOS F?		y 01	Actual	Ca	apacity	LOS F?
		notuur		puony	2001.	V _F		notuur	Exhibit 13	· · · ·	2001.
		0.070				V _{FO} = V _F	- V_		Exhibit 13		
V _F	0	2272	Exhibit 13-8		No		۰R		Exhibit 13		
						V _R			10	, 	
low E	ntering	Merge Ir	fluence A	rea		Flow Er	nteri	ng Dive	rge Influe	nce Area	а
		Actual	Max D)esirable	Violation?			Actual	Max Des	sirable	Violation?
V _R		2436	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
evel o	of Servi	ce Deteri	nination (i	f not F)		Level of	f Sei	rvice De	terminatio	on (if no	t F)
D _R :	= 5.475 + 0	0.00734 v _R +	0.0078 V ₁₂ - 0.0	0627 L _A			D _R =	4.252 + 0	.0086 V ₁₂ - 0	0.009 L _D	
_R = 1	6.3 (pc/mi/	/ln)				D _R = (p	oc/mi/	′ln)			
OS = E	3 (Exhibit 1	3-2)				LOS = (E	Exhib	it 13-2)			
Speed	Determ	ination						rminatic	on 🛛		
).241 (Exibi							13-12)			
0	-	Exhibit 13-11)				3		(hibit 13-12)			
		xhibit 13-11)				i n	-	(hibit 13-12)			
0	• •	xnidit 13-11) Exhibit 13-13)				Ŭ	-	(hibit 13-13)			
- 0	hii (c					r- "	ihii (r)	(101110-10)			

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		RAMP	S AND RAN	IP JUNCTI	ONS WC	RKS	HEET			
General In	formation			Site Infor		-				
Analyst Agency or Comp Date Performed	-	OM	ال ال	reeway/Dir of Tr unction urisdiction	avel	Off to S	Express L W 10th Co			
Analysis Time Pe	eriod AM on SW 10th Stree	ot SIMD	A	nalysis Year		2040 B	uild 2			
nputs										
-		Freeway Num	ber of Lanes, N	2						
Upstream A	dj Ramp	Ramp Number		1					Downstre Ramp	am Adj
Yes	On	1 '	ane Length, L_{A}	I						
			ane Length L _D	250					Yes	On
🗹 No	Off	Freeway Volur	- 0	1210					🗹 No	Off
L _{up} =	ft	Ramp Volume		450					L _{down} =	ft
			, *R Flow Speed, S _{FF}							
V _u =	veh/h		ow Speed, S _{FR}	60.0					V _D =	veh/h
Conversio	n to pc/h Un			00.0						
				0/ 7	0/ 5		<i>,</i>	ŗ		
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p		x f _{HV} x f _p
Freeway	1210	0.95	Level	3	0	_	985	1.00		293
Ramp	450	0.95	Level	2	0	0.	990	1.00	4	78
JpStream DownStream		+								
JownStream		Merge Areas					I)iverge Areas		
Stimation		J			Estimat	tion o		J		
	V ₁₂ = V _F	(P.,.)						V _R + (V _F - V _F)P-n	
EQ =	12 1	ation 13-6 or	13-7)		L _{EQ} =			Equation 13-1		3)
PFM =		Equation (E	-		$P_{FD} =$		-	000 using Equ		-
^r ₁₂ =	pc/h	- 4 -4-6-10-11 (2			V ₁₂ =			193 pc/h		
V_3 or V_{av34}	•	Equation 13	-14 or 13-17)		V_3 or V_{av34}			pc/h (Equatio	on 13-14 o	r 13-17)
	2,700 pc/h? 🗌 Ye		,			.24 > 2,7		Yes ⊻No		
	1.5 * V ₁₂ /2 Ye							Yes Vo		
Yes,V _{12a} =			-16, 13-18, or		If Yes, V _{12a} =			c/h (Equation	13-16, 13	-18, or 13-
	13-19)					19	9)		
Capacity C		1 0		1 00 50	Capacit	ty Ch				
	Actual		apacity	LOS F?	V _F		Actual	Exhibit 13-8	pacity 3 4800	LOS F
V		E-1-11-11-0			-		1293		_	No
V_{FO}		Exhibit 13-8			$V_{FO} = V_F$		815	Exhibit 13-8		No
					V _R		478	Exhibit 13-10		No
-low Enter	ring Merge Ir	ii		Violation2	Flow Er	ii ii		rge Influen		Violation
V	Actual	Exhibit 13-8	Desirable	Violation?	V ₁₂	1	Actual	Max Desirab Exhibit 13-8	4400:All	Violation
V _{R12}			f not El				293 vice De			No
	ervice Deteri + 0.00734 v _R +				1			<i>termination</i> .0086 V ₁₂ - 0.0		r)
		0.0078 v ₁₂ -	0.00027 L _A					.0000 v ₁₂ - 0.0	009 L _D	
0 _R = (pc/m	-					3.1 (pc/	-			
-	bit 13-2)						oit 13-2)			
•	ermination				Speed I					
-	it 13-11)				Ŭ	•	xhibit 13-			
	Exhibit 13-11)							-		
	Exhibit 13-11)				, and the second	-	-	-		
						-	-			
S _R = mph (l S ₀ = mph (l S = mph (l	Exhibit 13-11)	All Rights Reserv	red		S _R = 6 S ₀ = N	5.9 mph I/A mph 5.9 mph	(Exhibit (Exhibit (Exhibit	13-12) 13-12) 13-13)	nerated: 6/6/	2021

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Genera Analyst				RAMP JUN						
nalvet	l Inforn	nation			Site Infor	mation				
gency or C ate Perfori	med	AEC	OM	Ju Ju	eeway/Dir of Tr Inction Irisdiction		I-95 SB Expr On from SW	ess Lanes 10th St. Conn	ector	
nalysis Tin		AM		Ar	nalysis Year		2040 Build 2			
	cription S	W 10th Stree	et SIMR							
nputs			En anna Nimel						1	
pstream A	Adj Ramp			per of Lanes, N	2					tream Adj
Yes	On		Ramp Number		1				Ramp	
			Acceleration La	- 11	1100				Yes	On
🗸 No	🗌 Off		Deceleration L	- D					🗹 No	Off
_	ft		Freeway Volun		760				I. =	ft
- qu	п		Ramp Volume,	IX .	260				L _{down} =	it.
′ _u =	veh/h			Flow Speed, S _{FF}	70.0				V _D =	veh/h
			Ramp Free-Flo		60.0					
conver	sion to		der Base (Conditions	<u> </u>	1				
(pc/l	′h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/P	HF x f _{HV} x f _p
reeway		760	0.95	Level	3	0	0.985	1.00)	812
Ramp		260	0.95	Level	2	0	0.990	1.00)	276
JpStream										
DownStrea	am							Divorga		
stima	tion of v		Merge Areas			Estimat	ion of v ₁	Diverge A	reas	
.5011101			(5.)			LStimut		_		
		$V_{12} = V_{F}$	1 101				V ₁	₂ = V _R + (V		
EQ =			ation 13-6 or	-		L _{EQ} =		• •	on 13-12 or 13	
FM =				on (Exhibit 13-6)		P _{FD} =		-	quation (Exhibi	t 13-7)
12 =		812 p				$V_{12} =$		pc/h		0 17)
V_3 or V_{av34}	. 2 700			3-14 or 13-17)		V_3 or V_{av34}	2 700 pc		ation 13-14 or 1	3-17)
		pc/h? 🗌 Ye						/h? Yes [
		/ ₁₂ /2 □Ye		-16, 13-18, or				/2 Yes [_ No quation 13-16	13-18 or
Yes,V _{12a} =	=	13-19		10, 10 10, 01		If Yes,V _{12a} =	:	13-19)		, 10 10, 01
Capacit	ty Chec	ks				Capacit	y Checks	S		
		Actual	Ca	apacity	LOS F?		Ac	tual	Capacity	LOS F?
						1				
			1 1			V _F		Exhi	ibit 13-8	
V _F	0	1088	Exhibit 13-8		No	V _F V _{FO} = V _F	- V _R		ibit 13-8 ibit 13-8	
V _F	o	1088	Exhibit 13-8		No	V _{FO} = V _F	- V _R	Exhi	ibit 13-8 ibit 13-	
					No	V _{FO} = V _F V _R		Exhi Exh	ibit 13-8 ibit 1 3- 10	
		Merge Ir	nfluence A			V _{FO} = V _F V _R	tering D	Exhi Exh iverge Int	ibit 13-8 ibit 13- 10 fluence Are	
Flow Er	ntering	Merge Ir Actual	nfluence A	Desirable	Violation?	V _{FO} = V _F V _R Flow En		Exhi Exh iverge In Ma	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable	ea Violation?
Flow Er	ntering	Merge Ir Actual 1185	nfluence A Max D Exhibit 13-8	Desirable 4600:All		$V_{FO} = V_F$ V_R $Flow En$ V_{12}	ntering D Actual	Exhi Exh iverge Int Ma Exhibit	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8	Violation?
Flow Er V _{R1} .evel o	ntering 12 If Servic	Merge In Actual 1185 ce Detern	nfluence A Max D Exhibit 13-8 mination (i	Desirable 4600:All f not F J	Violation?	$V_{FO} = V_F$ V_R Flow En V_{12} Level of	Actual	Exhi Exh iverge Int Ma Exhibit Determin	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8 nation (if n	Violation?
Flow Er V _{R1} Level of D _R =	ntering 12 f Servic = 5.475 + 0.	Merge II Actual 1185 ce Detern 00734 v _R +	nfluence A Max D Exhibit 13-8	Desirable 4600:All f not F J	Violation?	$V_{FO} = V_F$ V_R Flow En	Actual	Exhi Exh iverge Int Ma Exhibit Determin	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8	Violation?
Flow Er V_{R1} evel of $D_R =$ $R^{=} = 6$	ntering 12 f Servic = 5.475 + 0. .9 (pc/mi/ln)	Merge Ir Actual 1185 ce Deterr 00734 v _R +	nfluence A Max D Exhibit 13-8 mination (i	Desirable 4600:All f not F J	Violation?	$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = (p$	Actual Actual Service D _R = 4.252 pc/mi/ln)	Exhi Exhi Ma Exhibit Determin + 0.0086 V	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8 nation (if n	Violation?
Flow Er V _{R1} .evel o D _R = 6. OS = A	ntering 12 f Servic = 5.475 + 0. 9.9 (pc/mi/ln) 4 (Exhibit 13	Merge Ir Actual 1185 :e Deterr 00734 v _R +) -2)	nfluence A Max D Exhibit 13-8 mination (i	Desirable 4600:All f not F J	Violation?	$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = (p$ $LOS = (E$	Actual Actual Service D _R = 4.252 D _C /mi/ln) Exhibit 13-2	Exhi iverge Int Ma Exhibit Determin + 0.0086 V	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8 nation (if n	Violation?
Flow Er V_{R1} Level of $D_R =$ $D_R =$ OS = A Speed I	ntering 12 f Servic = 5.475 + 0. 0.9 (pc/mi/ln) (Exhibit 13 Determ	Merge Ir Actual 1185 Ce Deterring 00734 v R +) -2)	nfluence A Max D Exhibit 13-8 mination (i	Desirable 4600:All f not F J	Violation?	$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = (p$ $LOS = (E$ Speed L	Actual Actual Service D _R = 4.252 D _C /mi/ln) Exhibit 13-2 Determin	Exhi iverge Int Ma Exhibit Determin + 0.0086 V	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8 nation (if n	Violation?
Flow Er V_{R1} $D_R = 0$ $D_R = 6$ OS = A Speed I $M_S = 0$	ntering 12 f Servic = 5.475 + 0. 9 (pc/mi/ln) A (Exhibit 13 Determi 0.202 (Exibit	Merge In Actual 1185 :e Detern 00734 v _R +) -2) ination 13-11)	nfluence A Max D Exhibit 13-8 mination (i	Desirable 4600:All f not F J	Violation?	$V_{FO} = V_F$ V_R Flow En V_{12} Level of $D_R = (p$ $LOS = (E$ Speed L $D_S = (E$	Actual Actual Service D _R = 4.252 D _C /mi/ln) Exhibit 13-2 Determin Xhibit 13-12)	Exhi Exh Ma Exhibit Exhibit + 0.0086 V 2) ation	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8 nation (if n	Violation?
Flow Er V_{R1} $D_R = 0$ $D_R = 0$ OS = A Speed I R = 0	ntering 12 f Servic = 5.475 + 0. 9 (pc/mi/ln) A (Exhibit 13 Determin 0.202 (Exibit 4.4 mph (E.	Merge In Actual 1185 Ce Detern 00734 v _R +) -2) ination 13-11) xhibit 13-11)	nfluence A Max D Exhibit 13-8 mination (i	Desirable 4600:All f not F J	Violation?	$V_{FO} = V_F$ V_R $Flow En$ V_{12} $Level of$ $D_R = (p$ $LOS = (E$ $Speed L$ $D_S = (E$ $S_R = m$	Actual Actual Service D _R = 4.252 D _C /mi/ln) Exhibit 13-22 Determin Exhibit 13-12) ph (Exhibit 13	Exhi iverge Int Ma Exhibit Determin + 0.0086 V 2) ation	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8 nation (if n	Violation?
Flow Er V_{R1} Evel of $D_R =$ $D_R =$ OS = A Speed I $A_S = 0$. $R_R = 6$. $O_R = 0$. $R_R = 6$. $O_R = 0$. $R_R = 0$.	ntering 12 f Servic = 5.475 + 0. 9.9 (pc/mi/ln) A (Exhibit 13 Determi 0.202 (Exibit 4.4 mph (Exibit 1/A mph (Exibit)	Merge In Actual 1185 :e Detern 00734 v _R +) -2) ination 13-11)	nfluence A Max D Exhibit 13-8 mination (i	Desirable 4600:All f not F J	Violation?	$V_{FO} = V_F$ V_R <i>Flow En</i> V_{12} <i>Level of</i> $D_R = (P)$ LOS = (E) $S_R = m$ $S_0 = m$	Actual Actual Service D _R = 4.252 D _C /mi/ln) Exhibit 13-2 Determin Xhibit 13-12)	Exhi Exh Ma Exhibit Determin + 0.0086 V 2) ation 3-12) 3-12)	ibit 13-8 ibit 13- 10 fluence Ard ax Desirable 13-8 nation (if n	Violation?

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		RAMP	S AND RAN	IP JUNCT	ONS WC	RKS	HEET			
General In	formation			Site Infor						
Analyst Agency or Comp Date Performed		OM	IL	reeway/Dir of Tru unction urisdiction			Express L W 10th Co			
analysis Time Pe			A	nalysis Year		2040 B	uild 2			
	on SW 10th Stree	et SIMR								
nputs		1								
Upstream A	dj Ramp	Freeway Num Ramp Number	ber of Lanes, N r of Lanes, N	2 1					Downstre Ramp	am Adj
Yes	On		ane Length, L _A	·					_ Yes	On
✓ No	Off		ane Length L _D	345					✓ No	Off
L _{up} =	ft	Freeway Volur Ramp Volume	•	1230 180					L _{down} =	ft
		Freeway Free	-Flow Speed, S _{FF}	70.0					V -	veb/b
V _u =	veh/h		ow Speed, S _{FR}	60.0					V _D =	veh/h
Conversio	n to pc/h Un									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{H∨}	f _p	v = V/PHF	x f _{HV} x f _p
Freeway	1230	0.95	Level	3	0	0.	985	1.00	1:	314
Ramp	180	0.95	Level	2	0	0.	990	1.00	1	91
UpStream										
DownStream										
- time officer		Merge Areas			F atimat		<u> </u>	iverge Areas		
Estimation					Estimat					
	$V_{12} = V_{F}$		(0,7)					V _R + (V _F - V _F		
EQ =		ation 13-6 or	-		L _{EQ} =		-	Equation 13-1		-
P _{FM} =	-	Equation (E	xhibit 13-6)		P _{FD} =			000 using Equ	ation (Exh	ibit 13-7)
/ ₁₂ =	pc/h				V ₁₂ =			14 pc/h		
V_3 or V_{av34}			-14 or 13-17)		V_3 or V_{av34}			pc/h (Equatio	n 13-14 o	r 13-17)
	2,700 pc/h? 🗌 Ye							Yes 🗹 No		
s V ₃ or V _{av34} >	1.5 * V ₁₂ /2 Ye				Is V_3 or V_{av}	_{/34} > 1.5		Yes 🗹 No		
Yes,V _{12a} =	pc/h (13-19		-16, 13-18, or		If Yes,V _{12a} =	=	р 19	c/h (Equation	13-16, 13	-18, or 13
Capacity C)			Capacit	ty Ch)		
Supuony C	Actual	C	apacity	LOS F?	Joapaon	<u>, y en</u>	Actual	Ca	pacity	LOS F
					V _F		1314	Exhibit 13-8		No
V _{FO}		Exhibit 13-8			$V_{FO} = V_{FO}$		1123	Exhibit 13-8	-	No
FU					V _R		191	Exhibit 13-10		No
Town Frates										NO
-low Enter	r ing Merge Ir Actual	Ť.	rea Desirable	Violation?	FIOW EI	ii ii	g Diver	'ge Influen Max Desirab		Violation
V _{R12}	Actual	Exhibit 13-8	Desilable	violation:	V ₁₂		314	Exhibit 13-8	4400:All	No
	ervice Deterr		if not E		. –			terminatio		
	+ 0.00734 v _R +							0086 V ₁₂ - 0.0		')
		0.0070 12	0.00027 LA			2.4 (pc/		0000 v ₁₂ 0.	Doo PD	
	-						-			
	bit 13-2)						oit 13-2)			
	ermination				Speed I $D_s = 0$					
5						-	xhibit 13-	-		
S _R = mph (I	Exhibit 13-11)		1	-	(Exhibit	-				
	Exhibit 13-11)				, and the second	-	(Exhibit '	-		
5 = mph (I	Exhibit 13-13)				S = 6	6.6 mph	(Exhibit	13-13)		
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		RA	MPS AND	RAMP JUN	CTIONS W	/ORKSH	EET					
General I	nforma	tion			Site Infor	mation						
nalyst gency or Cor late Performe	ed	AEC	OM	ال ال	reeway/Dir of Tr unction urisdiction	avel		IB Express I om SW 10th	anes St. Connector			
nalysis Time		PM		A	nalysis Year		2040	Build 2				
roject Descri	ption SW	10th Stree	et SIMR									
nputs				<u>()</u>								
pstream Adj	Ramp		Freeway Numb		2					Downstre	eam Adj	
Yes	On		Ramp Number		1					Ramp		
			Acceleration La	- 11	1040					Yes	On	
✓ No	Off		Deceleration La	- 0						✓ No	Off	
_	£4		Freeway Volun		1050					I. =	ft	
= qu	ft		Ramp Volume,	IX .	440					L _{down} =	it.	
'u =	veh/h			Flow Speed, S _{FF}	70.0					V _D =	veh/h	
			Ramp Free-Flo		60.0							
conversi	on to p		der Base (Conditions								
(pc/h)	0	V /eh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	IF x f _{HV} x f _p	
reeway		1050	0.95	Level	3	0).985	1.00		1122	
Ramp		440	0.95	Level	2	0).990	1.00		468	
JpStream												
DownStream												
stimatio	nofy		Merge Areas			Diverge Areas Estimation of v ₁₂						
.sumanc	12					LSumat	1011					
		V ₁₂ = V _F				$V_{12} = V_R + (V_F - V_R)P_{FD}$						
EQ =			ation 13-6 or	-		$L_{EQ} =$ (Equation 13-12 or 13-13)						
FM =				on (Exhibit 13-6)	$P_{FD} =$ using Equation (Exhibit 13-7)						
12 =		1122	•			$V_{12} = pc/h$						
₃ or V _{av34}	0.700	-		3-14 or 13-17)	$V_3 \text{ or } V_{av34}$ pc/h (Equation 13-14 or 13-17) Is $V_3 \text{ or } V_{av34} > 2,700$ pc/h? \square Yes \square No						
s V_3 or V_{av34}												
s V_3 or V_{av34}	> 1.5 ° V ₁₂ /			-16, 13-18, or		Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ F Vos V – pc/h (Equation 13-16, 13-18, 13-18)						
Yes,V _{12a} =		13-19		-10, 13-10, 01		If Yes,V _{12a} =	-		3-19)	011 13-10,	15-10, 01	
Capacity	Checks	;				Capacit	y Cl	necks				
		Actual	Ca	ipacity	LOS F?			Actual	Ca	apacity	LOS F?	
						V _F			Exhibit 13	-8		
V _{FO}		1590	Exhibit 13-8		No	V _{FO} = V _F	- V _R		Exhibit 13	-8		
10						V _R			Exhibit 1	3-		
						_			10			
low Ent			nfluence A		Violation?	Flow Entering Diverge Influence Area						
V _{R12}		Actual 1724	Exhibit 13-8	esirable 4600:All	Violation? No	V ₁₂	+	Actual	Max De Exhibit 13-8		Violation?	
					INU			nuioo Do		on (if no	+ E1	
			mination (i			ï			terminatio		(г)	
		/ 34 V _R +	0.0078 V ₁₂ - 0.0	JUZ/ LA			••		.0086 V ₁₂ - 0	0.009 L _D		
IX .	(pc/mi/ln)						oc/mi	-				
	xhibit 13-2)							it 13-2)				
Speed Determination							Speed Determination					
∕I _S = 0.218 (Exibit 13-11)								13-12)				
e _R = 63.9	mph (Exhil	oit 13-11)						hibit 13-12)				
0	mph (Exhib					Ŭ		hibit 13-12)				
= 63.9	9 mph (Exhil	oit 13-13)				S = m	iph (E)	hibit 13-13)				
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		RAMP	S AND RAM	IP JUNCTI	ONS WC	RKS	HEET				
General Inf	formation			Site Infor							
Analyst Agency or Compa Date Performed	-	ОМ	ال ال	reeway/Dir of Tr unction urisdiction	avel	Off to S	Express L W 10th Co				
Analysis Time Pe Project Descriptic	eriod PM on SW 10th Stree	t SIMR	A	nalysis Year		2040 B					
nputs											
Upstream Ac	dj Ramp		per of Lanes, N	2					Downstre	am Adj	
Yes	On	Ramp Number Acceleration L	of Lanes, N ane Length, L _A	1					Ramp	On	
✓ No	Off	Deceleration L	ane Length L _D	250					✓ No	Off	
L _{up} =	Freeway Volume, V _F ft Ramp Volume, V _R			2120 650					L _{down} =	ft	
V ₁₁ =	Freeway Free-Flow Speed, S								V _D =	veh/h	
		Ramp Free-Flow Speed, S _{FR}									
Conversion	n to pc/h Un	<u>der Base (</u>	Conditions		,	- r					
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}		v = V/PHF	x f _{HV} x f _p	
Freeway	2120	0.95	Level	3	0	_	985	1.00		265	
Ramp	650	0.95	Level	2	0	0.	990	1.00	6	91	
UpStream DownStream											
JownStream		Merge Areas					I D	viverge Areas			
Stimation		J			Estimation of v ₁₂						
	$V_{12} = V_{F}$	(P _{FM})			$V_{12} = V_R + (V_F - V_R)P_{FD}$						
EQ =		ation 13-6 or	13-7)		L _{EQ} = (Equation 13-12 or 13-13)						
P _{FM} =		Equation (E	-		$P_{FD} = 1.000$ using Equation (Exhibit 13-7)						
/ ₁₂ =	pc/h	I V	· · · · /		$V_{12} = 2265 \text{ pc/h}$						
V_3 or V_{av34}		Equation 13-	14 or 13-17)		$V_3 \text{ or } V_{av34}$ 0 pc/h (Equation 13-14 or 13-17)						
	2,700 pc/h? 🗌 Ye		,		$ S V_3 \text{ or } V_{av34} > 2,700 \text{ pc/h}? $ Yes \vee No						
	1.5 * V ₁₂ /2 Ye				Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No						
³ Yes,V _{12a} =		Equation 13-	16, 13-18, or		If Yes,V _{12a} = pc/h (Equation 13-16, 13-18, or 13- 19)						
Capacity C	hecks	/			Capacit	ty Che		,			
	Actual	C	apacity	LOS F?	Actual Capacity LOS						
					V _F		2265	Exhibit 13-8	4800	No	
V_{FO}		Exhibit 13-8			$V_{FO} = V_{F}$	- V _R	1574	Exhibit 13-8	4800	No	
					V _R		691	Exhibit 13-10	0 2200	No	
low Enter	ina Merae Ir	nfluence Area			ł –	ntering Dive		ae Influen	ce Area		
	Actual	ir	Desirable	Violation?	_	ii ii	Actual	Max Desirab		Violation	
V _{R12}		Exhibit 13-8			V ₁₂	2	265	Exhibit 13-8	4400:All	No	
	ervice Deterr	nination (i	f not F)	•	Level o	f Serv	/ice De	terminatio	n (if not	F)	
D _R = 5.475 +	- 0.00734 v _R +	0.0078 V ₁₂ -	0.00627 L _A			D _R = 4	.252 + 0	.0086 V ₁₂ - 0.0	009 L _D		
_R = (pc/m	i/ln)				D _R = 2 ⁻	1.5 (pc/	/mi/ln)				
	oit 13-2)					Exhit	oit 13-2)				
	ermination				Speed Determination						
•	t 13-11)				$D_s = 0.165$ (Exhibit 13-12)						
R= mph (E	Exhibit 13-11)				S _R = 6	5.4 mph	(Exhibit	13-12)			
6 ₀ = mph (E	Exhibit 13-11) Exhibit 13-13)				S ₀ = N/A mph (Exhibit 13-12)						
		All Rights Reserv			S = 65.4 mph (Exhibit 13-13) HC\$2010 TM Version 6.90 Generated: 6/6/2021 12:40 A						

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			MPS AND	KAMP JUN	ICTIONS W		EET						
Genera	l Inforn	nation			Site Infor								
Analyst Agency or C Date Perfor	med	AEC	ОМ		Freeway/Dir of Travel Junction Jurisdiction				anes St. Connector				
nalysis Tin		PM W 10th Stree		ŀ	Analysis Year		2040	Build 2					
nputs	сприон з												
-			Freeway Numb	er of Lanes, N	2					L			
pstream A	dj Ramp		Ramp Number		2					Downstre Ramp	eam Adj		
Yes	🗌 On				1100								
			Acceleration La	- 11	1100					Yes	On		
🗸 No	🗌 Off		Deceleration L	- D	1470					🗹 No	Off		
_	ft		Freeway Volun		1470					L _{down} =	ft		
= qL	it.		Ramp Volume,		100					down			
'u =	veh/h		-	Flow Speed, S _{FF}						V _D =	veh/h		
			Ramp Free-Flo	110	60.0								
onver	sion to	<u>pc/n Un</u>	der Base (Conditions		1	_						
(pc/l	n)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	F x f _{HV} x f _p		
reeway		1470	0.95	Level	3	0		0.985	1.00		1571		
Ramp		100	0.95	Level	2	0		0.990	1.00		106		
JpStream													
DownStrea	m		Marga Araaa						buorgo Arooo				
stimat	tion of v		Merge Areas			Estimat	ion		Diverge Areas				
Stimut			(5.)			LStimat							
		$V_{12} = V_{F}$				$V_{12} = V_R + (V_F - V_R)P_{FD}$							
EQ =			ation 13-6 or	-		$L_{EQ} =$ (Equation 13-12 or 13-13)							
FM =				on (Exhibit 13-6	6)	P _{FD} = using Equation (Exhibit 13-7)							
12 =		1571				$V_{12} = pc/h$							
₃ or V _{av34}		-		3-14 or 13-17	7)	$V_3 \text{ or } V_{av34}$ pc/h (Equation 13-14 or 13-17) Is $V_3 \text{ or } V_{av34} > 2,700 \text{ pc/h}? \square \text{ Yes } \square \text{ No}$							
0 ui		pc/h? 🗌 Ye					÷.						
		/ ₁₂ /2 □Ye		16 10 10		Is V_3 or V_{av}	₃₄ > 1		Yes No	lo tion 13-16, 13-18, or			
Yes,V _{12a} =	=	13-19		-16, 13-18, or		If Yes,V _{12a} =	=		5c/n (Equalic 3-19)	on 13-10,	13-18, 01		
Capacit	y Chec					Capacit	y Cl		/				
-		Actual	Ca	apacity	LOS F?			Actual	Ca	pacity	LOS F?		
						V _F			Exhibit 13	-8			
V _F		1677	Exhibit 13-8		No	V _{FO} = V _F	- V _R		Exhibit 13	-8			
- F0	5	1077	EXHIBIT TO O		110	V _R			Exhibit 13	3-			
									10				
low Er	ntering		fluence A			Flow Er	Intering Diverge Inf						
17		Actual		Desirable	Violation?	1/	+	Actual	Max Des		Violation?		
V _{R1}		1865	Exhibit 13-8	4600:All	No	V ₁₂		milas D-	Exhibit 13-8	 	<u> </u>		
			mination (i	,		1			terminatio		t F)		
			0.0078 V ₁₂ - 0.0	0627 L _A					.0086 V ₁₂ - 0	0.009 L _D			
	1.6 (pc/mi/l						oc/mi	,					
	(Exhibit 13							oit 13-2)					
Speed L		 '		erminatio	on								
∕/ _S = 0.214 (Exibit 13-11)							D _s = (Exhibit 13-12)						
-	4.0 mph (E	xhibit 13-11)				S _R = m	iph (E	xhibit 13-12)					
		(hibit 13-11)				S ₀ = m	iph (E	xhibit 13-12)					
0	• •	xhibit 13-13)				S = m	iph (E	xhibit 13-13)					
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2010-11-	1 1			RAMP JUN									
	l Inforn	nation			Site Infor								
nalyst	2				reeway/Dir of Tr	avel	I-95 N						
gency or (ate Perfor		AEC	OM		unction urisdiction		IN. OI I	Hillsboro Bl	Vû.				
	me Period	AM			Analysis Year			Build 2					
,		SW 10th Stree	t SIMR				2010	Dana L					
iputs	- 1												
-	di Domn		Freeway Numb	er of Lanes, N	2					Downstr	oom Adi		
pstream A	iuj Ramp		Ramp Number		1					Ramp	eann Auj		
Yes	🗌 On		Acceleration La		890								
-			Deceleration L	- 11	070					Yes	On		
No	Off		Freeway Volum	- 0	1300					🗹 No	Off		
=	ft									L _{down} =	ft		
p =	it.		Ramp Volume,		810					down			
, =	veh/h			Flow Speed, S _{FF}						V _D =	veh/h		
-			Ramp Free-Flo		40.0								
onver	<u>sion to</u>		der Base (Conditions	- -								
(pc/	′h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	IF x f _{HV} x f _p		
reeway		1300	0.95	Level	3	0).985	1.00		1389		
amp		810	0.95	Level	2	0	-).990	1.00		861		
pStream		010	0.75	Level	2	0	+	J. 770	1.00	+	001		
ownStrea	am												
			Merge Areas				•		Diverge Areas	•			
stima	tion of	V ₁₂				Estimation of v ₁₂							
		$V_{12} = V_{F}$	(P _{EM})					V ₄₀ =	V _R + (V _F - V	n)Prn			
=		12 1	ation 13-6 or	13_7)		$L_{EQ} =$ (Equation 13-12 or 13-13)							
iQ =				on (Exhibit 13-6	<u>۱</u>								
- M =))								
2 =		1389	•			$V_{12} = pc/h$							
or V_{av34}		-		3-14 or 13-17)	V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? □ Yes □ No							
		pc/h? Ye											
$V_3 \text{ or } V_{a}$	_{v34} > 1.5 * \	/ ₁₂ /2 □Ye				Is V_3 or V_{av}	Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No						
Yes,V _{12a}	=	pc/h 13-19)		-16, 13-18, or		If Yes,V _{12a} =	=		pc/h (Equatio 3-19)	on 13-16,	13-18, or		
anaci	ty Chec					Capacit			5-19)				
apach		Actual	C	apacity	LOS F?		y 01	Actual	C	apacity	LOS F?		
		Actual		раску	LUST	V _F		Actual	Exhibit 13		LUJT:		
V _F	0	2250	Exhibit 13-8		No	V _{FO} = V _F	F ^{-V} R		Exhibit 13				
						V _R			Exhibit 1: 10	3-			
	ntorina	Morgo Ir	fluence A	roa			ntori	na Dive	rge Influe	nco Are	 2		
		Actual)esirable	Violation?			Actual	Max De		Violation		
V _R		2250	Exhibit 13-8	4600:All	No	V ₁₂	+	. 101001	Exhibit 13-8		VIOLATION		
	110	- ÷	f Sou	wico Da	eterminatio	on (if no	+ F 1						
			nination (i	,		1).0086 V ₁₂ - (()		
			0.0078 V ₁₂ - 0.0	0027 L _A					1.0000 v ₁₂ - 0	0.009 L _D			
	7.0 (pc/mi/l	-					oc/mi/						
OS = B (Exhibit 13-2)							LOS = (Exhibit 13-2)						
Speed Determination							Dete	rminati	on				
$M_{\rm S} = 0.287 ({\rm Exibit}13.11)$							D _s = (Exhibit 13-12)						
0		xhibit 13-11)					iph (Ex	(hibit 13-12)	1				
•		(hibit 13-11)				$S_0 = mph (Exhibit 13-12)$							
	• •	xhibit 13-13)					-	(hibit 13-13)					
						r	יייקי (ביי		,				

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				RAMP JUN								
	l Inforn	nation			Site Infor							
nalyst gency or (ate Perfor		AEC	ОМ	J	reeway/Dir of Tr unction urisdiction	avel	I-95 NB CD N. of Hillsboro Blvd.					
,	me Period	PM		A	nalysis Year		2040	Build 2				
-	cription S	W 10th Stree	et SIMR									
nputs			1									
pstream A	Adj Ramp		Freeway Numb Ramp Number		2 1					Downstro Ramp	eam Adj	
Yes	🗌 On		Acceleration La		890					Yes	On	
🗸 No	Off		Deceleration La	- D						✓ No	Off	
-	ft		Freeway Volun		1770					L _{down} =	ft	
= qu	п		Ramp Volume,		740					-down		
/u = veh/h Freeway Free-Flow Speed,										V _D =	veh/h	
-			Ramp Free-Flo	110	40.0							
;onver	<u>sion to</u>		der Base C	Conditions		1						
(pc/	′h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PH	$IF x f_{HV} x f_{p}$	
reeway		1770	0.95	Level	3	0	(0.985	1.00		1891	
Ramp		740	0.95	Level	2	0	(0.990	1.00		787	
JpStream							_					
ownStrea	im		Merge Areas					 	viverge Areas			
stima	tion of		Nicige Aicus			Estimation of v ₁₂						
		12										
		$V_{12} = V_{F}$	1 101	40.7)		$V_{12} = V_R + (V_F - V_R)P_{FD}$						
EQ =			ation 13-6 or	-	`	$L_{EQ} =$ (Equation 13-12 or 13-13)						
FM =				on (Exhibit 13-6))	P _{FD} = using Equation (Exhibit 13-7)						
12 =		1891				$V_{12} = pc/h$						
3 or V _{av34}				3-14 or 13-17)	$V_3 \text{ or } V_{av34}$ pc/h (Equation 13-14 or 13-17) Is $V_3 \text{ or } V_{av34} > 2,700 \text{ pc/h}? \square \text{Yes} \square \text{No}$						
		pc/h? Ye										
		/ ₁₂ /2 □Ye		16 10 10		Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ If $V_{av34} > 0.5 * V_{12}/2$ Is $V_{av34} > 0.5 * V_{12}/2$ If $V_{av34} > 0.5 *$					10 10	
Yes,V _{12a}	=	13-19		-16, 13-18, or		If Yes,V _{12a} =	=		oc/n (⊑quat 3-19)	1011 13-10,	13-18, 01	
apaci	ty Chec					Capacit	v Cl		,			
	<u> </u>	Actual	Ca	pacity	LOS F?			Actual	(Capacity	LOS F?	
						V _F			Exhibit 1	3-8		
V _F		2678	Exhibit 13-8		No	V _{FO} = V _F	- V _P		Exhibit 1	3-8		
۴F	0	2070			NO				Exhibit 1	3-		
						V _R			10			
low E	ntering		fluence A			Flow Er	<u>iteri</u>		rge Influe		-	
		Actual	-	lesirable	Violation?		+	Actual		esirable	Violation?	
V _R		2678	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8			
			nination (i	,					terminat		ot F)	
			0.0078 V ₁₂ - 0.0	0627 L _A			D _R =	4.252 + 0	0086 V ₁₂ -	0.009 L _D		
_R = 2	0.4 (pc/mi/l	n)				D _R = (p	oc/mi/	/ln)				
DS = (C (Exhibit 13	3-2)				LOS = (E	Exhib	it 13-2)				
Speed	Determ	ination				Speed L	Dete	rminatic	n			
$A_{\rm S} = 0.307$ (Exibit 13-11)							xhibit	13-12)				
0	-	xhibit 13-11)				D _s = (E S _R = m	iph (E>	(hibit 13-12)				
		(hibit 13-11)					iph (E>	(hibit 13-12)				
0		xhibit 13-13)				, i i i i i i i i i i i i i i i i i i i		(hibit 13-13)				
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