

## **APPENDIX M**

2020 & 2040 Build 2 Freeway HCS Operational Analysis

		F	REEWAY	( WEAV	ING WOF	RKSHEE	Г			
General	Informatio	on			Site Info	rmation				
Analyst Agency/Con Date Perforr Analysis Tim	npany ned ne Period	AECON AM	Λ		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sample Analysis Year 2020 Build 2					
Project Desc	cription SW 10th	n Street SIMF								
Inputs					1					
Weaving configurationOne-SideWeaving number of lanes, N2380Weaving segment length, Ls2380Freeway free-flow speed, FFS70 mpl					Segment typ Freeway min Freeway ma: Terrain type	e imum speed, ximum capac	S <sub>MIN</sub> ity, C <sub>IFL</sub>		Freeway 15 2400 Leve	
Convers	sions to po	/h Unde	r Base Co	ondition	S	0	•	Ĩ	-	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	4565	0.95	3	0	1.5	1.2	0.985	1.00	4877	
V <sub>RF</sub>	355	0.92	2	0	1.5	1.2	0.990	1.00	390	
V <sub>FR</sub>	800	0.92	2	0	1.5	1.2	0.990	1.00	878	
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
V <sub>NW</sub>	4877		-			-		V =	6145	
V <sub>w</sub>	1268							-	•	
VR	0.206									
Configu	ration Cha	racterist	ics		•					
Minimum m	aneuver lanes, N	N <sub>WL</sub>		2 lc	Minimum we	eaving lane cl	nanges, LC <sub>MIN</sub>		1268 lc/h	
Interchange	density, ID			0.7 int/mi	Weaving lan		1703 lc/h			
Minimum RI	F lane changes,	LC <sub>RF</sub>		1 lc/pc	Non-weaving lane changes, LC <sub>NW</sub>				1524 lc/h	
Minimum FF	R lane changes,	LC <sub>FR</sub>		1 lc/pc	Total lane ch	nanges, LC <sub>ALI</sub>	_		3227 lc/h	
Minimum RI	R lane changes,	LC <sub>RR</sub>		lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		813	
Weaving	g Segment	Speed,	Density, I	Level of	Service,	and Cap	acity			
Weaving se Weaving se	gment flow rate, gment capacity,	v c <sub>w</sub>		6061 veh/h 8788 veh/h	Weaving inte Weaving seg	ensity factor, gment speed	W S		0.287 54.3 mph	
Weaving se	gment v/c ratio			0.690	Average wea	aving speed,	Sw		57.7 mph	
Weaving se	gment density, D	)	28	8.3 pc/mi/ln	Average nor	n-weaving sp	eed, S <sub>NW</sub>		53.5 mph	
Level of Ser	vice, LOS			D	Maximum we	eaving length	i, L <sub>max</sub>		4601 ft	
<b>Notes</b> a. Weaving se Chapter 13, " b. For volume	egments longer th Freeway Merge a es that exceed the	an the calcula nd Diverge Se weaving segr	ted maximum le gments". nent capacity, th	ength should l ne level of sei	be treated as is vice is "F".	solated merge	and diverge ar	eas using the	procedures of	

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst			Highway/Direction of Travel	I-95 NB Sea 2-Bi	et Off & On from
Agency or Company	AECOM		From/To	Sample	
Date Performed Analysis Time Period	AM		Jurisdiction Analysis Year	2020 Bu	ild 2
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	5)		Des.(N)	Pla	inning Data
Flow Inputs					
Volume, V AADT	4920	veh/h veh/dav	Peak-Hour Factor, PHF %Trucks and Buses, P-	0.95 .3	
Peak-Hr Prop. of AADT K		Voli/day	%RVs P_	0	
Peak-Hr Direction Prop, D			General Terrain:	Level	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjust	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
Ε <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FF	S	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS	3	mph			·
LOS and Performance	Measures		Design (N)		
Operational (LOS)			Design (N)		
	1 x f x f \ 4750	n e /h /lin	Design LOS		
$v_p = (v \text{ or } D D \Pi v) / (P \Pi F X N)$	$(X_{HV} X_p) 7752$	pc/n/in	v <sub>p</sub> = (V or DDHV) / (PHF x N x	(f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln
S D=v / C	66.5	mpn	S		mph
$D = V_p / S$	26.4	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LUS	D		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	10	T <sub>LW</sub> - Exhibit 11-8
v <sub>p</sub> - Flow rate	FFS - Free-flow	speed	$E_{T}$ - Exhibits 11-10, 11-11, 11	-13	T <sub>LC</sub> - Exhibit 11-9
LOS - Level of service	BFFS - Base fre	e-flow speed	r <sub>p</sub> - Page 11-18		I'RD - Page 11-11
DDHV - Directional design h	our volume		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	2, 11-3	

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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

General Infor	mation			Site Inform	nation				
Analyst	nation		En	eeway/Dir of Tra		95 NR			
Agency or Company		лм	Г! 	nction	Sog 4 On from Exp				
ngency of company	AEU		Ju	risdiction	5	eg 4-011 110111 E	·vh		
Analysis Time Period	АМ		Ar	alvsis Year	2	020 Build 2			
Project Description	SW 10th Stree	t SIMR	7.4		L				
Inputs									
Instream Adi Pamp		Freeway Num	ber of Lanes, N	4				Downstr	oam Adi
Spstream Auj Namp		Ramp Number	of Lanes. N	1				Ramp	eann Auj
🗌 Yes 🗌 On		Acceleration I	ane Length I.	1500					
		Decoloration I	1000				I Yes	On	
No Off				6140				🗌 No	✓ Off
= ft			ne, v <sub>F</sub>	6140				I. =	2950 ft
-ир п		Ramp volume	, v <sub>R</sub>	690				-down	2000 11
V= veh/h		Freeway Free	Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	140 veh/h
u		Ramp Free-Fl	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	p pc/h Und	der Base (	Conditions			1			
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
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									
DownStream	140	0.92	Level	2	0	0.990	1.00		154
		Merge Areas					Diverge Areas	6	
Estimation of	v <sub>12</sub>				Estimatio	on of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				V -	$\gamma + \gamma \gamma$		
- <u>FO</u> =	(Equa	ation 13-6 or	13-7)		_	v 12 -	VR' (VF - V	'R <sup>J</sup> FD	10)
P, =	0 123	using Equat	, ion (Exhibit 13-6)		EQ -		(Equation 1	3-12 OF 13-	-13)
FM / _	0.120	alling Equat			P <sub>FD</sub> =		using Equat	tion (Exhibit	13-7)
v <sub>12</sub> –	808 p	C/N 			V <sub>12</sub> =		pc/h		
V <sub>3</sub> or V <sub>av34</sub>	20/0   17)	pc/n (Equalio	on 13-14 of 13-		$V_3^{}$ or $V_{av34}^{}$		pc/h (Equation	n 13-14 or 13	-17)
Is V <sub>2</sub> or V <sub>2124</sub> > 2.70	0 pc/h? 🔽 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av34</sub>	> 2,700 pc/h?	Yes 🛛 N	lo	
$I_{\rm s} V_{\rm s}$ or $V_{\rm s} > 1.5^{*}$					Is V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V <sub>12</sub> /2	Yes 🗆 N	lo	
av34	2624	oc/h (Equatio	on 13-16 13-		If Yes V =		pc/h (Equat	ion 13-16,	13-18, or
f Yes,V <sub>12a</sub> =	18, or	13-19)			12a	1	3-19)		
Capacity Che	cks				Capacity	Checks			
	Actual	C	apacity	LOS F?		Actual	C	Capacity	LOS F?
					V <sub>F</sub>		Exhibit 1	3-8	
Vro	7317	Exhibit 13-8		No	V <sub>FO</sub> = V <sub>F</sub> -	V <sub>R</sub>	Exhibit 1	3-8	
- FO					· · · · ·		Exhibit 1	13-	
					۷R		10		
Flow Entering	Merge In	fluence A	rea		Flow Ent	ering Dive	erge Influe	ence Are	a
	Actual	Max	Jesirable	Violation?		Actual	Max De	esirable	Violation?
V <sub>R12</sub>	3695	Exhibit 13-8	4600:All	NO	V <sub>12</sub>				<u> </u>
Level of Servi			T <b>NOT F)</b>		Level of	Service De	eterminati		τ <b>Γ</b> )
$\nu_{\rm R} = 0.475 + 0.475 + 0.000$	0.00734V <sub>R</sub> +(	0.0070 v <sub>12</sub> - 0.0	UUZI LA		ט	R - 4.252 + (	oudo v <sub>12</sub> -	0.009 L <sub>D</sub>	
<sub>R</sub> = 26.2 (pc/m	ı/ln)				u <sub>R</sub> = (pc	:/mi/ln)			
	13-2)				LOS = (Ex	(hibit 13-2)			
LOS = C (Exhibit	Speed Determination						on		
_OS = C (Exhibit Speed Detern	mation					hihit 12 12)			
LOS = C (Exhibit <b>Speed Detern</b> $M_S = 0.328$ (Exit	bit 13-11)				⊔ <sub>s</sub> –      (⊏xi	(III)( 13-12)			
$_{\rm OS}$ = C (Exhibit <b>Speed Detern</b> $M_{\rm S}$ = 0.328 (Exit $S_{\rm p}$ = 60.8 mph (	bit 13-11) Exhibit 13-11)				D <sub>s</sub> −       (⊏xi S <sub>R</sub> =       mpł	n (Exhibit 13-12)	)		
LOS = C (Exhibit <b>Speed Detern</b> $M_S = 0.328$ (Exhi $S_R^{=} 60.8$ mph ( $S_{0}^{=} 65.7$ mph (	bit 13-11) Exhibit 13-11) Exhibit 13-11)				D <sub>s</sub> =      (EXI S <sub>R</sub> =       mpł S <sub>0</sub> =      mpł	n (Exhibit 13-12) n (Exhibit 13-12	)		
$LOS = C \text{ (Exhibit}$ $Speed Detern$ $M_{S} = 0.328 \text{ (Exhibit}$ $S_{R}^{=} 60.8 \text{ mph} \text{ (}$ $S_{0}^{=} 65.7 \text{ mph} \text{ (}$ $S_{0}^{=} 63.0 \text{ mph} \text{ (}$	Dit 13-11) Exhibit 13-11) Exhibit 13-11) Exhibit 13-13)				D <sub>s</sub> - (EXI S <sub>R</sub> = mpt S <sub>0</sub> = mpt S = mpt	n (Exhibit 13-12) n (Exhibit 13-12 n (Exhibit 13-12 n (Exhibit 13-13	) )		

RAMPS AND RAMP JUNCTIONS WORKSHEET											
General Infor	mation			Site Infor	mation						
Analyst			Fre	eeway/Dir of Tr	ravel I-95 NB						
Agency or Company	AEC	OM	Ju	nction		Seg 5-0	Off to Exp f	rom GPL			
Date Performed			Ju	risdiction							
Analysis Time Period	MA M		An	alysis Year		2020 B	uild 2				
Project Description	SW 10th Stree	IT SIMR									
inputs		<b>F</b> N	han af Lanaa N						1		
Upstream Adj R	amp	Freeway Nurr	ider of Lanes, IN	4					Downstrea	am Adj	
		Ramp Numbe	er of Lanes, N	1					Ramp		
res 🖻	Un	Acceleration I	_ane Length, L <sub>A</sub>						🗌 Yes	On	
No 🗆	200						□ Off				
		Freeway Volu	me, V <sub>F</sub>	6830							
L <sub>up</sub> = 29	50 ft	Ramp Volume	e, V <sub>R</sub>	140					L <sub>down</sub> =	ft	
		Freeway Free	-Flow Speed, S	70.0							
$V_u = 69$	0 veh/h	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					v <sub>D</sub> =	ven/n	
Conversion to	o pc/h Un	der Base	Conditions						•		
(pc/h)	V ()/ah/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>n</sub>	
Freeway	(Ven/nr) 6830	0.95		3	0	0	085	1.00	7	007	
Ramn	140	0.95	Level	2	0	0.	905	1.00	1	54	
UnStream	600	0.92	Level	2	0	0.	990	1.00	7	57	
DownStream	030	0.32	Levei	2	0	0.	550	1.00	<u> </u>	51	
		Merge Areas			Diverge Areas						
Estimation of	<sup>f</sup> v <sub>12</sub>				Estimat	ion o	f v <sub>12</sub>				
	$V_{12} = V_{E}$	(P <sub>EM</sub> )					V <sub>12</sub> =	V <sub>P</sub> + (V <sub>F</sub> - V			
L <sub>F0</sub> =	(Equa	tion 13-6 or	13-7)		L <sub>FO</sub> =		(	Equation 13-	12 or 13-13	3)	
P =	usina	Equation (I	=xhihit 13-6)		EQ P =		(- 0/	136 usina Ec	ulation (Evh	ihit 13_7)	
. нм V., =	nc/h				· FD V=		30	68 nc/h			
V or V	po/h	Equation 13	-14  or  13-17		V or V		20	11 po/b (Equ	untion 12 1	1 or 12 17)	
$v_3 v_{av34}$	pc/n ( ∩ nc/h2 ⊡ x-		-14 01 13-17)		$v_3 \circ v_{av34}$	> 2 7	∠u ⊐ 20, no			+ 01 13-17)	
$13 v_3 \text{ or } v_{av34} \neq 2,70$						34 ~ 2,1	*\/ /2 □				
$15 v_3 01 v_{av34} > 1.5$	$v_{12}/2  \square Ye$	SN0 Equation 13	-16 13-18 or		$p_{av34} \sim 1.5 v_{12}^{1/2}$ Yes No pc/h (Equation 13-16, 13-18, or 13-						
lf Yes,V <sub>12a</sub> =	13-19)		-10, 10-10, 01		If Yes, $V_{12a} = 19$						
Capacity Che	ecks				Capacit	y Che	ecks				
	Actual	0	Capacity	LOS F?			Actual	C	apacity	LOS F?	
					V <sub>F</sub>		7297	Exhibit 13-	-8 9600	No	
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	7143	Exhibit 13-	-8 9600	No	
					V <sub>R</sub>		154	Exhibit 13-	10 2100	No	
Flow Entering	n Merae In	fluence A	rea		Flow En	terin	a Diver	ae Influer	ice Area		
	Actual	Max	Desirable	Violation?		4	Actual	Max Desira	ble	Violation?	
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	268	Exhibit 13-8	4400:All	No	
Level of Service Determination (if not F)					Level of Service Determination (if not F)						
$D_{\rm B} = 5.475 + 0.00734 v_{\rm B} + 0.0078 V_{12} - 0.00627 L_{\rm A}$						D <sub>R</sub> = 4	.252 + 0.	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>		
D <sub>R</sub> = (pc/mi/ln		D <sub>P</sub> = 30	).6 (pc/	/mi/ln)		2					
LOS = (Exhibit		LOS = D	(Exhit	, pit 13-2)							
Speed Detern	Speed L	Deter	minatio	n							
$M_{o} = (Fxibit 1)$	$M_{\rm c} = (Fxibit 13-11)$					$D_{c} = 0.312$ (Exhibit 13-12)					
S_= mnh (Evh	- · · / nihit 13_11)				S <sub>R</sub> = 61	1.3 mph	(Exhibit	13-12)			
S = mnh(Eyh)	131(13-11)				S_= 72	2.8 mnh	(Exhibit	13-12)			
S = mnh (Exh	nibit 13-13)				S = 67	7.2 mnh	(Exhibit	13-13)			
		lights Reserved				. <u>~</u> pi1		10 10)	Generated	6/18/2020 1.09	

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 6-So 2020 Bu	outh of Off to 10th
Project Description SW 10th	Street SIMR			2020 Du	
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					0
Volume, V AADT Peak-Hr Prop. of AADT, K Peak Hr Direction Prop. D	6690	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> Coneral Terrain:	0.95 3 0	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjustm	nents				
f <sub>ρ</sub> Ε <sub>Τ</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance I	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	t f <sub>HV</sub> x f <sub>p</sub> ) 1787 66.0 27.1 D	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design hol	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	speed e-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - 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	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 8-Bo	et Off & Off Ramps
Analysis Time Period			Analysis rear	2020 Bu	
Oper (LOS)			Des (N)	Pla	nning Data
Flow Inputs	, 				innig Data
Volume, V AADT	5670	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	nents				
f <sub>ρ</sub> Ε <sub>Τ</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 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 <sub>⊥w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> )2019 62.2 32.4 D	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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Infor	rmation			Site Infor	mation					
Analyst			Fr	reeway/Dir of Tr	Fravel I-95 NB					
Agency or Company	/ AEC	OM	Ju	unction		Seg 9-0	Off to Hillst	oro EB&WB		
Date Performed	-L ANA		Ju	urisdiction		0000 0	110			
Project Description	Q AIVI		A	nalysis rear		2020 B	ulia z			
Innuts										
inputo	_	Freeway Num	ber of Lanes N	3						
Upstream Adj F	Ramp	Ramo Numbe	r of Lanes N	1					Downstre	am Adj
Yes	On	Accoloration I	and Longth L	I						
			Lane Length L	000					Yes 🗹	l On
I No □	Off			200					🗆 No	Off
	£4	5670					. =	2100 ft		
L <sub>up</sub> –	IL	Ramp Volume	e, V <sub>R</sub>	1250					⁻down	2100 11
V = v	/eh/h	Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	1060 veh/h
		Ramp Free-F	low Speed, S <sub>FR</sub>	45.0						
Conversion t	to pc/h Un	der Base	Conditions		r					
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	5670	0.95	Level	3	0	0.	985	1.00	60	)58
Ramp	1250	0.92	Level	2	0	0.	990	1.00	1;	372
UpStream										
DownStream	1060	0.92	Level	2	0	0.	990	1.00	1	164
Estimation	fv	Merge Areas			Estimat	iono	L I I I I I I I I I I I I I I I I I I I	liverge Areas		
	12	· ·			LStimat		12			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	΄ <sub>R</sub> )Ρ <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	545 using Ec	uation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		39	)28 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		21	30 pc/h (Equ	uation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h? 🗌 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 2,7	00 pc/h? [	Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5$	*V <sub>12</sub> /2 Ye	s 🗌 No			Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes No					
If Yes,V <sub>12a</sub> =	pc/h ( 13-19	Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> = pc/h (Equation 13-16, 13-18, or 13- 19)					
Capacity Che	ecks	)			Capacity Checks					
	Actual	(	Capacity	LOS F?			Actual	С	apacity	LOS F?
					V <sub>F</sub>		6058	Exhibit 13-	8 7200	No
Vro		Exhibit 13-8			$V_{ro} = V_r$	V <sub>D</sub>	4686	Exhibit 13-	8 7200	No
FU						ĸ	1372	Exhibit 13-	10 2100	No
Elow Enterin	<u>a Morao Ir</u>	<u> </u>	roa			torin		rao Influor		
	Actual	Max	Desirable	Violation?	1 10W EI		Actual	Max Desira	ble	Violation?
V <sub>P12</sub>		Exhibit 13-8			V <sub>12</sub>		3928	Exhibit 13-8	4400:All	No
Level of Serv	ice Deterr	nination (	if not F)		Level of	f Serv	/ice De	terminatio	n (if not	<b>F</b> )
$D_{\rm p} = 5.475 \pm 0.00734 \text{ y}_{\rm p} \pm 0.0078 \text{ V}_{40} \pm 0.00627 \text{ L}_{\star}$						$D_p = 4$	.252 + 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
$D_{\rm p} = (\rm pc/mi/ln)$					$D_{p} = 36$	5.2 (pc	/mi/ln)	12	D	
LOS = (Exhibit		LOS = F	(Exhib	oit 13-2)						
Speed Determination					Speed I	Deter	minatic	n		
M = (Eviliat 1						421 (F	xhibit 13.	.12)		
S = mah(Ext	$\frac{1}{10} = 1 + 1$				S <sub>D</sub> = 59	3.2 mnh	(Exhihit	·-, 13-12)		
$P_R^-$ (iipi) (EXI	$\frac{101113-11}{101112}$				$S_{a} = 7$	2 4 mnh	(Exhibit	13-12)		
S = mnh (EV)	nibit 13-11)				S = 6	pli ) 5 mnh	(Evhibit	13_13)		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 NB Seg 10-l	Bet Off & On Ramps
Analysis Time Period	AM		Analysis Year	2020 Bu	ild 2
Project Description SW 10t					unning Data
Flow Inputs	)		Jes.(N)		
Volume, V AADT	4420	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	ments				
f <sub>p</sub> F	1.00 1.5		$E_{R}$	1.2 0.985	
-⊺ Spood Inpute	1.0		$H_{\rm HV}$ $(100  {\rm m}^{-1})$ $(100  {\rm m}^{-1})$ $(100  {\rm m}^{-1})$ $(100  {\rm m}^{-1})$	0.000	
			Calc Speed Auj allu FFS	)	
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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1574 68.4 23.0 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - 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	5,855	0.61	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	4,722	0.66	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,127	0.54	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 12-I	Bet On Ramps
Analysis Time Period	AM		Analysis Year	2020 Bu	iild 2
Project Description SW 10th	h Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V AADT	5480	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%Rvs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustn	nents				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
Έ <sub>Τ</sub>	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 <sub>LW</sub>		mph
Number of Lanes, N	4		f <sub>LC</sub>		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 <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1464 69.2 21.2 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWA	( WEAV	ING WOF	RKSHEE	Т			
Genera	Informatio	on			Site Info	rmation				
Analyst Agency/Cor Date Perfor Analysis Tin	npany ned ne Period	AECON AM	Л		Freeway/Dir Weaving Seg Analysis Yea	Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 13-Bet On & Off to Exp Analysis Year 2020 Build 2				
Project Des	cription SW 10th	n Street SIMF	R							
Inputs										
Weaving configurationTwo-SiderWeaving number of lanes, N4Weaving segment length, Ls4600fFreeway free-flow speed, FFS70 mpl					Segment typ Freeway min Freeway ma: Terrain type	e imum speed, ximum capac	, S <sub>MIN</sub> ity, C <sub>IFL</sub>		Freeway 15 2400 Leve	
Conver	sions to po	/h Unde	r Base Co	ondition	s	1	<b>r</b>	1	-	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	4615	0.95	3	0	1.5	1.2	0.985	1.00	4931	
V <sub>RF</sub>	1125	0.92	2	0	1.5	1.2	0.990	1.00	1235	
V <sub>FR</sub>	865	0.92	2	0	1.5	1.2	0.990	1.00	950	
V <sub>RR</sub>	125	0.92	2	0	1.5	1.2	0.990	1.00	137	
V <sub>NW</sub>	7116							V =	7253	
V <sub>W</sub>	137									
VR	0.019									
Configu	ration Cha	racterist	tics		1					
Minimum m	aneuver lanes, N	√ <sub>WL</sub>		0 lc	Minimum we	aving lane cl	hanges, LC <sub>MI</sub>	١	411 lc/h	
Interchange	density, ID			0.7 int/mi	Weaving lan	e changes, L	.C <sub>w</sub>		1037 lc/h	
Minimum R	F lane changes,	LC <sub>RF</sub>		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3276 lc/h	
Minimum F	R lane changes,	LC <sub>FR</sub>		0 lc/pc	Total lane ch	nanges, LC <sub>ALI</sub>	L		4313 lc/h	
Minimum R	R lane changes,	LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2291	
Weavin	g Segment	Speed,	Density, l	_evel of	Service,	and Cap	oacity			
Weaving se Weaving se	gment flow rate, gment capacity,	V C <sub>w</sub>		7157 veh/h 9064 veh/h	Weaving inte Weaving seg	ensity factor, gment speed	W , S		0.215 58.4 mph	
Weaving se	gment v/c ratio	vv		0.790	Average wea	aving speed,	S <sub>w</sub>		60.3 mph	
Weaving se	gment density, [	)	3	1.1 pc/mi/ln	Average nor	n-weaving sp	eed, $S_{_{\sf NW}}$		58.3 mph	
Level of Se	Level of Service, LOS					Maximum weaving length, L <sub>MAX</sub> 5902				
Notes										
a. Weaving s Chapter 13, ' b. For volum	egments longer th Freeway Merge a es that exceed the	an the calcula nd Diverge Se weaving segr	ted maximum le gments". nent capacity, tl	ength should l	be treated as is rvice is "F".	solated merge	and diverge a	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	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 NB Seg 14-l	North of Hillsboro
Analysis Time Period	AM		Analysis Year	2020 Bu	ild 2
Project Description SW 10th	n Street SIMR				unning Data
Flow Inputs			Jes.(N)		
Volume, V AADT	5740	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	nents				
f <sub>p</sub> E-	1.00 1.5		$E_{R}$ f <sub>1</sub> = 1/(1+P_{T}(E_{T} - 1) + P_{D}(E_{D} - 1))	1.2 0.985	
Sneed Innuts			$\mathbf{Calc Speed Adi and FES}$	3	
				<b>,</b>	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	π ft ramps/mi mph mph	f <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N ) S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1533 68.7 22.3 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	WEAV	ING WOF	RKSHEE	Г			
General	Informatio	on			Site Information					
Analyst Agency/Con Date Perforr Analysis Tin	npany ned ne Period	AECOM PM	1		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sample Analysis Year 2020 Build 2				& Sample	
Project Desc	cription SW 10th	n Street SIMR								
Inputs					1					
Weaving configurationOne-SidedWeaving number of lanes, N4Weaving segment length, Ls2380ftFreeway free-flow speed, FFS70 mph				Segment type Freeway minimum speed, S <sub>MIN</sub> Freeway maximum capacity, C <sub>IFL</sub> Terrain type				Freeway 15 2400 Level		
Convers	sions to po	h Under	Base Co	ondition	S		I	1		
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	4265	0.95	3	0	1.5	1.2	0.985	1.00	4557	
V <sub>RF</sub>	415	0.92	2	0	1.5	1.2	0.990	1.00	456	
V <sub>FR</sub>	1560	0.92	2	0	1.5	1.2	0.990	1.00	1713	
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
V <sub>NW</sub>	4557			•	-		-	V =	6726	
V <sub>W</sub>	2169									
VR	0.322									
Configu	ration Cha	racterist	ics		•					
Minimum m	aneuver lanes, N	N <sub>WL</sub>		2 lc	Minimum we	aving lane cl	nanges, LC <sub>MIN</sub>		2169 lc/h	
Interchange	density, ID			0.7 int/mi	Weaving lane changes, LC <sub>w</sub>				2604 lc/h	
Minimum R	F lane changes,	LC <sub>RF</sub>		1 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		1458 lc/h	
Minimum Ff	R lane changes,	LC <sub>FR</sub>		1 lc/pc	Total lane ch	nanges, LC <sub>ALI</sub>	L		4062 lc/h	
Minimum R	R lane changes,	LC <sub>RR</sub>		lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		759	
Weavin	g Segment	Speed, I	Density, I	_evel of	Service,	and Cap	oacity			
Weaving segment flow rate, v6637 veh/hWeaving segment capacity, c_w7332 veh/h				Weaving intensity factor, W Weaving segment speed, S				0.345 49.0 mph		
Weaving segment v/c ratio 0.905				Average weaving speed, $S_w$				55.9 mph		
Weaving segment density, D 34.3 pc/mi/ln			Average non-weaving speed, $S_{NW}$				46.3 mph			
Level of Service, LOS D				D	Maximum weaving length, L <sub>MAX</sub> 5826 ft					
Notes a. Weaving s Chapter 13, " b. For volume	egments longer th Freeway Merge a	an the calculat nd Diverge Seg	ted maximum le gments".	ength should l	be treated as is	olated merge	and diverge ar	eas using the	procedures of	

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
Conorol Information			Site Information		
			Highway/Direction of Travel		
Analysi Agapay ar Campany	AECOM			Seg 2-B	et Off & On from
Agency or Company	AECOM		From/To	Sample	
Date Performed Analysis Time Period	РМ		Jurisdiction Analysis Year	2020 Bu	uild 2
Project Description SW 10	0th Street SIMR				
Oper.(LOS	S)		Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V	4680	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	3	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D		vob/b	General Terrain:	Level	
		ven/n	Grade % Length	mi	
Coloulate Flow Adius	4				
Calculate Flow Adjus	tments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
Ε <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FF	S	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFF	S	mph			·
LOS and Performance	e Measures		Design (N)		
			Design (N)		
Operational (LOS)			Design LOS		
$v_p = (V \text{ or } DDHV) / (PHF x N)$	N x f <sub>HV</sub> x f <sub>p</sub> ) 1667	pc/h/ln	$v_{p} = (V \text{ or DDHV}) / (PHF x N x)$	(f <sub>HV</sub> x f <sub>n</sub> )	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/ln
LOS	С		Required Number of Lanes, N		·
Glossary			Factor Location		
N - Number of lanes	S - Speed				
V - Hourly volume	D - Densitv		E <sub>R</sub> - Exhibits 11-10, 11-12		t <sub>LW</sub> - Exhibit 11-8
v <sub>n</sub> - Flow rate	FFS - Free-flow	speed	E <sub>T</sub> - Exhibits 11-10, 11-11, 11	-13	t <sub>LC</sub> - Exhibit 11-9
LOS - Level of service	BFFS - Base fre	ee-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
DDHV - Directional design I	hour volume	F	LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	2, 11-3	

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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	6,005	0.63	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,000	0.69	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	999	0.48	No

General Infor	mation			Site Inform	nation				
Analyst			Fr	reeway/Dir of Tra		95 NR			
Agency or Company	AFC	M	. ii	inction		en I-On from	Evn		
Date Performed	ALO	5101		risdiction			Lvb		
Analysis Time Period	PM		Ar	nalvsis Year	2	020 Build 2			
Project Description	SW 10th Stree	t SIMR			L	020 Build 2			
Inputs									
Instroom Adi Domp		Freeway Num	ber of Lanes, N	4				Downstr	oom Adi
		Ramp Number	r of Lanes. N	1				Ramp	ean Auj
🗌 Yes 📃 On		Acceleration I	ane Length L.	1500					
		Deceloration L	ano Longth I	1000				I Yes	On
l No □ Of	-			5000				🗌 No	✓ Off
= ft			ine, v <sub>F</sub>	5620				I. =	2950 ft
up n		Ramp volume	, v <sub>R</sub>	610				-down	2000 11
/= veh/h		Freeway Free-	-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	230 veh/h
u		Ramp Free-Fl	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	p pc/h Und	der Base (	Conditions	1					
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	5620	0.95	Level	3	0	0.985	1.00		6005
Ramp	610	0.92	Level	2	0	0.990	1.00		670
JpStream									
DownStream	230	0.92	Level	2	0	0.990	1.00		252
		Verge Areas					Diverge Areas	;	
Estimation of	<sup>v</sup> 12				Estimatio	on of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				V	= \/ + (\/ _ \		
-FO =	(Equa	ation 13-6 or	13-7)		_	* 12		'R/'FD 2 12 or 12	12)
р <sub>см</sub> =	0.134	using Equation (Exhibit 13-6)						· 13)	
	805 m	9 = c/h	$P_{FD} = using Equa$					tion (Exhibit	13-7)
' 12	2600 P	o/h oc/b (Equatio	on 12 14 or 12		V <sub>12</sub> =		pc/h		
/ <sub>3</sub> or V <sub>av34</sub>	2000 j 17)	John (Equalit	511 13-14 01 13-		$V_3^{}$ or $V_{av34}^{}$		pc/h (Equatior	n 13-14 or 13	-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h? 🗍 Ye	s 🔽 No			Is $\rm V_3$ or $\rm V_{av34}$	> 2,700 pc/h?	Yes 🗌 N	0	
Is $V_2$ or $V_{2,24} > 1.5$ *	V <sub>10</sub> /2 Ve	s 🗌 No			Is $V_3$ or $V_{av34}$	> 1.5 * V <sub>12</sub> /2	Yes N	0	
3 av34	2402	oc/h (Fouatio	on 13-16, 13-		If Yes V <sub>40</sub> =		pc/h (Equat	ion 13-16,	13-18, or
f Yes,V <sub>12a</sub> =	18, or	13-19)			12a		13-19)		
Capacity Che	cks				Capacity	Checks			
	Actual	C	apacity	LOS F?		Actua	al C	Capacity	LOS F?
					V <sub>F</sub>		Exhibit 1	3-8	
V <sub>EO</sub>	6675	Exhibit 13-8		No	V <sub>FO</sub> = V <sub>F</sub> -	V <sub>R</sub>	Exhibit 1	3-8	
	-				V		Exhibit 1	3-	
	<u> </u>			<u> </u>	^R		10		
low Entering	Merge In	fluence A	rea	Miclette 0	Flow Ent	ering Div	erge Influe	ence Are	a
V	ACTUAL	IVIAX I Evhibit 12 0		violation?	V	Actual	Evhibit 12 0		violation?
	ico Dotorn	nination (	4000.All			l Sonvice D		ion (if no	( <i>t E</i> )
			10( <i>F)</i>						
$D_{R} = 0.470 +$	0.00704 V R + (				ש י – ח	R - +.202 +	0.0000 v <sub>12</sub> -	5.003 LD	
v <sub>R</sub> − ∠3.5 (pc/m	i/i(1)				<sub>R</sub> – (рс	/mi/in)			
OS = C (Exhibit	13-2)				LOS = (E>	(hibit 13-2)			
Speed Detern	nination				Speed D	eterminat	ion		
M <sub>S</sub> = 0.283 (Exil	oit 13-11)				D <sub>s</sub> = (Ex	hibit 13-12)			
$S_{2} = 621 \text{ mph} (\text{Exhibit 13-11})$					S <sub>R</sub> = mpl	n (Exhibit 13-1	2)		
$P_R = 62.1 \text{ mph} (\text{Exhibit } 13-11)$									
$S_R = 62.1 \text{ mph} ($	Exhibit 13-11)	$S_0 = 66.2 \text{ mph} (Exhibit 13-11)$				n (Exhibit 13-1	2)		
5 <sub>R</sub> = 62.1 mph ( 5 <sub>0</sub> = 66.2 mph ( 5 = 64.0 mph (	Exhibit 13-11) Exhibit 13-13)				S <sub>0</sub> = mpl S= mpl	n (Exhibit 13-1 n (Exhibit 13-1	2) 3)		

		RAMP	S AND RAM	P JUNCTI	ONS WC	RKS	HEET			
General Infor	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel	I-95 NE	3			
Agency or Company	AEC	OM	Ju	inction		Seg 5-0	Off to Exp fr	om GPL		
Date Performed			Ju	risdiction		0000 0				
Analysis Time Period	SW 10th Stree		Ar	alysis Year		2020 B	ulia 2			
mputs		Freeway Nun	aber of Lanes N	1						
Upstream Adj R	amp	Dome Numbe		4					Downstrea Bomn	m Adj
VYes V	On			1					катр	
		Acceleration	Lane Length, L <sub>A</sub>						Yes	On
No 🗌	Off	Deceleration	Lane Length L <sub>D</sub>	200					✓ No	Off
		Freeway Volu	ıme, V <sub>F</sub>	6230						
L <sub>up</sub> = 29	50 ft	Ramp Volum	e, V <sub>R</sub>	230					L <sub>down</sub> =	π
Freeway Free-Flow Speed, S <sub>FF</sub> 70.0			70.0					V_ =	veh/h	
	0 ven/n	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					- D	VOII/II
Conversion to	o pc/h Un	der Base	Conditions							
(nc/h)	V	PHF	Terrain	%Truck	%Rv		f	f	v = V/PHF	x fx f
(po/ii)	(Veh/hr)	0.05		,011dok				.p	,	HV Y p
Freeway	6230	0.95	Level	3	0	0.	985	1.00	665	об О
Ramp	230	0.92	Level	2	0 0.990 1.00			1.00	25	2
UpStream DownStroom	610	0.92	Level	2	0 0.990 1.00			1.00	0 670	
DownStream		Merge Areas					I Di	verge Areas		
Estimation of V					Estimat	tion o	f V <sub>40</sub>	verge / lieue		
	- 12 V - V	(D)					<u> </u>			
	v <sub>12</sub> – v <sub>F</sub>	( <sup>г</sup> <sub>FM</sub> )	40.7)				v <sub>12</sub> –	$v_R + (v_F - v_F)$		
L <sub>EQ</sub> =	(Equa	ition 13-6 or	- 13-7)		L <sub>EQ</sub> =		(E		2 or 13-13)	
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	36 using Equ	uation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		304	14 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	3-14 or 13-17)		$V_3$ or $V_{av34}$		180	)6 pc/h (Equ	ation 13-14	or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	0 pc/h? 🔲 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>/34</sub> > 2,7	00 pc/h?	Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5$ '	*V <sub>12</sub> /2  Ye	s 🗌 No			Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes  No					
lf Yes,V <sub>12a</sub> =	pc/h (	Equation 13	3-16, 13-18, or		If Yes, $V_{12a} = \frac{pc/h}{10}$ (Equation 13-16, 13-18, or 13-					
Canacity Che	rks				Canacit	v Ch	ecks	)		
	Actual		Canacity	LOS F2		<u>y 011</u>	Actual	Ca	nacity	LOS E2
	/ lotadi		Supuony	2001.	V_		6656	Exhibit 13-8	9600	No
V		Evhibit 12.9			-V	- V	6404	Evhibit 12.9	0600	No
* FO					FO FO	= <sup>-</sup>	0404		9000	NU
							252	Exhibit 13-10	2100	NO
Flow Entering	g Merge In	fluence A	Area		Flow Er	<u>nterin</u>	g Diver	ge Influen	ce Area	
V	Actual		Desirable	Violation?	V					Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub> 3044 Exhibit 13-8 4400:All			N0		
Level of Serv	ice Detern	nination (			Level of	r Serv	/ice Det	erminatio	<u>n (IT NOT F</u>	)
$D_{R} = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub>	- 0.00627 L <sub>A</sub>			$D_{R} = 4$	1.252 + 0.0	0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
$D_R = (pc/mi/ln)$ $D_R = 28.6 (pc/mi/ln)$										
LOS = (Exhibit 13-2) LOS = D (I					(Exhi	oit 13-2)				
Speed Determination Speed Determination										
M <sub>S</sub> = (Exibit 1;	3-11)				D <sub>s</sub> = 0.	.321 (E	xhibit 13-1	12)		
S <sub>R</sub> = mph (Exh	ibit 13-11)				S <sub>R</sub> = 6	1.0 mph	(Exhibit 1	3-12)		
S <sub>0</sub> = mph (Exh	, ibit 13-11)				S <sub>0</sub> = 73	3.6 mph	(Exhibit 1	3-12)		
S = mph (Exh	ibit 13-13)				S = 6	7.3 mph	(Exhibit 1	3-13)		
<u>بر میں</u>	- /				ı		、	- /		

2020 Build 2 Freeway HCS Operational Analysis

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 6-South of Off to 10th	
Project Description SW 10	FM th Street SIMR		Analysis fear	2020 Bu	
✓ Oper.(LOS)	)		Des.(N)	Pla	inning Data
Flow Inputs	/		()		
Volume, V AADT Poak Hr Prop. of AADT, K	6000	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs_P	0.95 3	
Peak-Hr Prop. of AAD1, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	u Level mi	
Calculate Flow Adjust	ments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - 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-Bet Off & Off Ramps	
Project Description SW 10t	h 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 <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.95 3 0 Level mi	
Calculate Flow Adjustr	nonte		Up/Down %		
	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 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 <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1759 66.4 26.5 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	rmation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel	I-95 NE	}			
Agency or Company	AEC	OM	Ju	Inction		Seg 9-0	Off to Hills	ooro EB&WB		
Date Performed			Ju	Irisdiction		0000 0	1.1.0			
Project Description	SW/ 10th Strop		Ar	lalysis rear		2020 B				
Innuts										
		Freeway Num	her of Lanes N	3						
Upstream Adj R	Ramp	Ramo Numbe	of Lanes N	1					Downstre	am Adj
Yes	On		and Longth L	I						
			Lane Length, L <sub>A</sub>	000					Ves 🖌	🗹 On
I No □	Off			200					🗌 No	Off
	4	Freeway Volu	way Volume, V <sub>F</sub> 4940						. =	2100 ft
L <sub>up</sub> = T	τ	Ramp Volume, V <sub>R</sub> 1250							└down ─	2100 11
V = v	eh/h	Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	1200 veh/h
-u ·	011/11	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0						
Conversion t	o pc/h Un	der Base	Conditions		-				_	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	4940	0.95	Level	3	0	0.	985	1.00	5	278
Ramp	1250	0.92	Level	2	0	0.	990	1.00	1	372
UpStream										
DownStream	1200	0.92	Level	2	0	0.	990	1.00	1	317
		Merge Areas			Diverge Areas					
Estimation of	f v <sub>12</sub>				Estimat	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	= V <sub>R</sub> + (V <sub>F</sub> - V	′ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	565 using Ec	uation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		3	579 pc/h		
$V_3$ or $V_{av34}$	pc/h (	Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$		16	699 pc/h (Equ	uation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	0 pc/h? 🗌 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>84</sub> > 2,7	00 pc/h?	Yes 🗹 No		,
Is $V_3$ or $V_{av34} > 1.5$	*V <sub>12</sub> /2 □Ye	s 🗌 No			Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes  No					
If Yes,V <sub>12a</sub> =	pc/h (	Equation 13	-16, 13-18, or		If Yes $V_{42}$ = pc/h (Equation 13-16, 13-18, or 13-					
Canacity Cho	13-19	)			Capacity Chacks					
	Actual		anacity	LOS F2			Actual	C	anacity	LOS F2
	riolaan		Jupuolity	20011	V_		5278	Exhibit 13	-8 7200	No
V		Evhibit 13.8			F	- V	3006	Exhibit 13	8 7200	No
¥ FO					VFO VF	<sup>-</sup> • R	3900		10 0100	NU
					V <sub>R</sub>		1372	Exhibit 13-	10 2100	NO
Flow Entering	g Merge In	nfluence A	lrea	Violation	Flow En	terin	g Dive	rge Influer	ice Area	Violation
V	Actual		Desirable	violation?	V					Violation?
V <sub>R12</sub>	iaa Dataw		·····		v <sub>12</sub>		579		4400:All	
Level of Service Determination (if not F)					Level of	Ser				<u>F)</u>
$D_{R} = 5.475 \pm 0.00734 \text{ v}_{R} \pm 0.0078 \text{ v}_{12} \pm 0.00627 \text{ L}_{A}$				$D_{R} = 4.252 + 0.0086 V_{12} - 0.009 L_{D}$						
D <sub>R</sub> = (pc/mi/ln)				D <sub>R</sub> = 33.2 (pc/mi/ln)						
LOS = (Exhibit 13-2) LO					LOS = D (Exhibit 13-2)					
Speed Determination					Speed L	)eter	minatio	on		
M <sub>S</sub> = (Exibit 1	3-11)				D <sub>s</sub> = 0.4	421 (E	xhibit 13	-12)		
S <sub>R</sub> = mph (Exh	nibit 13-11)				S <sub>R</sub> = 58	8.2 mph	(Exhibit	13-12)		
S <sub>0</sub> = mph (Exh	nibit 13-11)				S <sub>0</sub> = 74	.1 mph	(Exhibit	13-12)		
S = mph (Exh	nibit 13-13)				S = 62	2.5 mph	(Exhibit	13-13)		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 NB Seg 10-l	Bet Off & On Ramps
Analysis Time Period	PM		Analysis Year	2020 Bu	ild 2
Project Description SW 10	th Street SIMR		- 4.0		
✓ Oper.(LOS)	)		Des.(N)	∐ Pla	inning Data
Flow inputs					
Volume, V AADT	3690	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjust	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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	3	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD	3	ft ft ramps/mi	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment		mph mph mph
FFS (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 <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1314 69.8 18.8 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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Capacity Check (see Exhibits 25-3 and 25-7):	Maximum	Actual	V/c	LOS F?
Fwy downstream of ramp (assume 70 mph free-flow speed) =	9,600	5,225	0.54	No
Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	3,942	0.55	No
Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,276	0.61	No
	Capacity Check (see Exhibits 25-3 and 25-7): Fwy downstream of ramp (assume 70 mph free-flow speed) = Fwy upstream of ramp (assume 70 mph free-flow speed) = Capacity on On-Ramp (assume 45 mph free-flow speed) =	Capacity Check (see Exhibits 25-3 and 25-7):MaximumFwy downstream of ramp (assume 70 mph free-flow speed) =9,600Fwy upstream of ramp (assume 70 mph free-flow speed) =7,200Capacity on On-Ramp (assume 45 mph free-flow speed) =2,100	Capacity Check (see Exhibits 25-3 and 25-7):MaximumActualFwy downstream of ramp (assume 70 mph free-flow speed) =9,6005,225Fwy upstream of ramp (assume 70 mph free-flow speed) =7,2003,942Capacity on On-Ramp (assume 45 mph free-flow speed) =2,1001,276	Capacity Check (see Exhibits 25-3 and 25-7):MaximumActualV/cFwy downstream of ramp (assume 70 mph free-flow speed) =9,6005,2250.54Fwy upstream of ramp (assume 70 mph free-flow speed) =7,2003,9420.55Capacity on On-Ramp (assume 45 mph free-flow speed) =2,1001,2760.61

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 12-	Bet On Ramps
Analysis Time Period	PM		Analysis Year	2020 Bu	iild 2
Project Description SW 10th	h Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V AADT	4890	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustn	nents				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment		mph mph mph
Base free-flow Speed, BFFS	70.0	mph	FFS	70.0	mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1306 69.9 18.7 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	( WEAV	ING WOF	RKSHEE	Г		
General	Informatio	on		Site Info	rmation				
Analyst Agency/Company AECOM Date Performed Analysis Time Period PM				Freeway/Dir Weaving Seg Analysis Yea	Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 13-Bet On & Off to Exp Analysis Year 2020 Build 2				
Project Dese	cription SW 10th	n Street SIMF							
Inputs					1				
Weaving configurationTwo-SidWeaving number of lanes, N460Weaving segment length, Ls460Freeway free-flow speed, FFS70 n					Segment typ Freeway min Freeway ma: Terrain type		Freeway 15 2400 Leve		
Convers	sions to po	/h Unde	r Base Co	ondition	S		•	-	-
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	4200	0.95	3	0	1.5	1.2	0.985	1.00	4487
V <sub>RF</sub>	1130	0.92	2	0	1.5	1.2	0.990	1.00	1241
V <sub>FR</sub>	690	0.92	2	0	1.5	1.2	0.990	1.00	758
V <sub>RR</sub>	130	0.92	2	0	1.5	1.2	0.990	1.00	143
V <sub>NW</sub>	6486							V =	6629
V <sub>W</sub>	143					-			
VR	0.022								
Configu	ration Cha	racterist	ics						
Minimum m	aneuver lanes, N	√ <sub>WL</sub>		0 lc	Minimum weaving lane changes, $LC_{_{MIN}}$				429 lc/h
Interchange	density, ID			0.7 int/mi	Weaving lan	1055 lc/h			
Minimum R	F lane changes,	LC <sub>RF</sub>		0 lc/pc	Non-weaving	3135 lc/h			
Minimum Fl	R lane changes,	LC <sub>FR</sub>		0 lc/pc	Total lane ch	4190 lc/h			
Minimum R	R lane changes,	LC <sub>RR</sub>		3 lc/pc	Non-weaving vehicle index, I <sub>NW</sub> 20				
Weaving	g Segment	Speed,	Density, I	_evel of	Service,	and Cap	acity		
Weaving segment flow rate, v654Weaving segment capacity, c.,905					Weaving inte Weaving seg	ensity factor, gment speed,	W S		0.210 59.0 mph
Weaving segment v/c ratio 0.722					Average wea	aving speed,	S <sub>w</sub>		60.5 mph
Weaving segment density, D 28.1 pc/mi/ln					Average non-weaving speed, $S_{_{\sf NW}}$				59.0 mph
Level of Service, LOS D					Maximum weaving length, L <sub>MAX</sub> 5927				5927 ft
Notes									
a. Weaving s Chapter 13, " b. For volume	egments longer th Freeway Merge a es that exceed the	an the calcula nd Diverge Se weaving segr	ted maximum le gments". nent capacity, tl	ength should l	be treated as is ∿ice is "F".	olated merge	and diverge ar	eas using the	procedures of

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company AECOM Date Performed		Highway/Direction of Trav From/To Jurisdiction		vel I-95 NB Seg 14-North of Hillsbord	
Analysis Time Period	PM		Analysis Year	2020 Bu	ild 2
					unning Data
	)		Jes.(N)		
Volume, V	5330	veh/h veh/dav	Peak-Hour Factor, PHF %Trucks and Buses, P+	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjust	ments				
f <sub>ρ</sub> Ε <sub>τ</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
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 <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1424 69.4 20.5 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes       S - Speed         V - Hourly volume       D - Density         v <sub>p</sub> - Flow rate         FFS - Free-flow speed         LOS - Level of service       BFFS - Base free-flow speed         DDHV - Directional design hour volume			E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - 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 AECOM Date Performed			Highway/Direction of Travel From/To Jurisdiction	n of Travel I-95 SB Seg 1-Bet Hillsboro		
Analysis Time Period	AM th Street SIMR		Analysis Year	2020 Bu		
Oper (LOS)			Des (N)	Pla	anning Data	
Flow Inputs	/					
Volume, V AADT	4580	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjustr	ments					
f <sub>p</sub>	1.00 1.5		$E_{R}$	1.2		
-T Speed Inpute	1.5			0.900		
Speed inputs				2		
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 <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph	
LOS and Performance	Measures		Design (N)			
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1223 70.0 17.5 B	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	.13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11	

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			REEWA	Y WEAV	ING WOF	RKSHEE	Т		
Genera	al Informati	on		Site Info	rmation				
Analyst Agency/Company AECOM Date Performed Analysis Time Period AM				Freeway/Dir of Travel I95/SB Weaving Segment Location Seg 2-Bet On from Exp & C Analysis Year 2020 Build 2					
Project De	scription SW 10t	h Street SIM	२						
Inputs					1				
Weaving configurationTwo-SidWeaving number of lanes, N520Weaving segment length, Ls520Freeway free-flow speed, FFS70 m				Two-Sided 4 5200ft 70 mph	Segment type Fre Freeway minimum speed, S <sub>MIN</sub> Freeway maximum capacity, C <sub>IFL</sub> Terrain type				
Conve	rsions to p	<u>c/h Unde</u>	r Base Co	ondition	<u>s</u>	1	•	1	_
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	3460	0.95	3	0	1.5	1.2	0.985	1.00	3697
V <sub>RF</sub>	850	0.92	2	0	1.5	1.2	0.990	1.00	933
V <sub>FR</sub>	1120	0.92	2	0	1.5	1.2	0.990	1.00	1230
V <sub>RR</sub>	90	0.92	2	0	1.5	1.2	0.990	1.00	99
V <sub>NW</sub>	5860			-	-	•	-	V =	5959
V <sub>w</sub>	99								
VR	0.017								
Config	uration Cha	aracteris	tics		•				
Minimum	maneuver lanes,	N <sub>WL</sub>		0 lc	Minimum we	297 lc/ł			
Interchang	ge density, ID			0.7 int/mi	Weaving lan	965 lc/h			
Minimum	RF lane changes	, LC <sub>RF</sub>		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		2996 lc/h
Minimum	FR lane changes	, LC <sub>FR</sub>		0 lc/pc	Total lane changes, LC <sub>ALL</sub>				3961 lc/h
Minimum	RR lane changes	, LC <sub>RR</sub>		3 lc/pc	Non-weaving vehicle index, I <sub>NW</sub> 211				
Weavir	ng Segmen	t Speed,	Density,	Level of	Service,	and Cap	pacity		
Weaving s	segment flow rate	e, V		5882 veh/h	Weaving inte	ensity factor,	W		0.182
Weaving segment capacity, c <sub>w</sub> 9253 veh/h					Weaving see	gment speed	, S		60.7 mph
Weaving s	segment v/c ratio			0.636	Average weaving speed, $S_{W}$				61.5 mph
Weaving segment density, D 24.5 pc/mi/ln					Average non-weaving speed, $S_{NW}$				60.7 mpł
Level of S	ervice, LOS			С	Maximum weaving length, L <sub>MAX</sub> 5881 ft				
Notes									
a. Weaving	segments longer t	han the calculation of the calcu	ated maximum le	ength should l	pe treated as is	solated merge	and diverge ar	eas using the	procedures of

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 AECOM Date Performed			Highway/Direction of Travel From/To Jurisdiction	I I-95 SB Seg 3-Bet Off & On Ram		
Project Description SW 10t	th Street SIMR		Analysis Teal	2020 Bu		
✓ Oper.(LOS)	)		Des.(N)	Pla	nning Data	
Flow Inputs	, 					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4310	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.95 3 0 Level mi		
		ven/n	Up/Down %	1111		
Calculate Flow Adjustr	ments					
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2		
Ε <sub>T</sub>	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 FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph	
LOS and Performance	Measures		Design (N)			
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1535 68.7 22.3 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11	

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RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Infor	rmation			Site Infor	mation					
Analyst	Freeway/Dir of Trav					avel I-95 SB				
Agency or Company	npany AECOM Junction					Seg 4-Diverge to SW 10th St				
Date Performed	ed Jurisdiction					0000 0	110			
Project Description	U AIVI		A	nalysis rear		2020 B	ulia 2			
Innuts	300 1001 3000									
inputo		Freeway Num	ber of Lanes N	3						
Upstream Adj F	Ramp	Ramo Numbe	ar of Lanes N	1					Downstre	am Adj
Yes	On		one Longth L	I						
			Lane Length I	000					Ves 🗹	🖌 On
I No □	Off			200					🗌 No	Off
	<b>F</b> 4	Freeway Volu	ime, V <sub>F</sub>	4310					1. =	2400 ft
Lup –	L	Ramp Volume	e, V <sub>R</sub>	1100					⁻down	2400 11
V = v	eh/h	Freeway Free	e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	1290 veh/h
		Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					5	
Conversion t	o pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	<sup>=</sup> x f <sub>HV</sub> x f <sub>p</sub>
Freeway	4310	0.95	Level	3	0	0.	985	1.00	4	605
Ramp	1100	0.92	Level	2	0	0.	990	1.00	1	208
UpStream										
DownStream	1290	0.92	Level	2	0	0.	990	1.00	1	416
	<u>,</u>	Merge Areas			Diverge Areas					
Estimation of	r v <sub>12</sub>				Estimat	ion o	<i>t v</i> <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	$V_{R}$ + ( $V_{F}$ - $V_{F}$	/ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> = 0.589 using Equation (Exhibit 13-7)					
V <sub>12</sub> =	pc/h				V <sub>12</sub> = 3210 pc/h					
$V_3^{}$ or $V_{av34}^{}$	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub> 1395 pc/h (Equation 13-14 or 13-17)					
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h? 🗌 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av34</sub> > 2,700 pc/h? Yes Vo					
Is $V_3$ or $V_{av34} > 1.5$	* V <sub>12</sub> /2 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes  No					
If Yes,V <sub>120</sub> =	pc/h (	Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> = pc/h (Equation 13-16, 13-18, or 13-					
Canaaity Che	13-19	)			Canacity Checks					
	Actual		anacity		Actual Capacity LLOS E2					
	Actual		Japacity	LOOT:	V_		4605	Exhibit 13	-8 7200	No
V		Evhibit 12.0			$-\gamma$	V	2207	Exhibit 12	0 7200	No
<sup>♥</sup> FO					V <sub>FO</sub> - V <sub>F</sub>	- v <sub>R</sub>	3397	EXHIDIC 13	-0 7200	INO
			-		V <sub>R</sub>		1208	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	Area Desirable	Violation	Flow En	terin	<u>g Diver</u>	<u>'ge Influer</u>	nce Area	Violation
	Actual	IVIAX	Desirable	Violation?	V			Evhibit 12.9		Violation?
	 viae Deterr		(if mot <b>F</b> )		v <sub>12</sub>					
					Leveror		252 ± 0			<u>r)</u>
$D_R = 3.475 \pm 0.00734 \text{ v}_R \pm 0.0076 \text{ v}_{12} \pm 0.00027 \text{ L}_A$						$D_{\rm R} = 4.252 + 0.0086 \rm V_{12} - 0.009 \rm L_{\rm D}$				
$P_{R} = (p_{0}(1)/11)$						$\nu_{\rm R}$ = 30.1 (pc/mi/ln)				
LUS = (EXRIDIC 13-2)						(Exhil	oit 13-2)			
Speed Deterr	mination				Speed L	Deter	minatio	on (a)		
M <sub>S</sub> = (Exibit 1	3-11)				$D_{s} = 0.0$	407 (E	xhibit 13-	12)		
S <sub>R</sub> = mph (Exh	nibit 13-11)				$S_R = 58$	3.6 mph	(Exhibit	13-12)		
S <sub>0</sub> = mph (Exh	nibit 13-11)				S <sub>0</sub> = 75	5.2 mph	(Exhibit	13-12)		
S = mph (Exh	nibit 13-13)				S = 62	2.8 mph	(Exhibit	13-13)		
yright © 2016 University of Florida, All Rights Reserved						<sup>/</sup> Versi	on 6.90		Generated:	6/18/2020 9:46

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company AECOM Date Performed			Highway/Direction of Travel From/To Jurisdiction	ravel I-95 SB Seg 5-Bet Off & On Ram	
Project Description SW 10t	h Street SIMR		Analysis Teal	2020 Bu	
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs			( )		3
Volume, V AADT Peak-Hr Prop. of AADT, K	3210	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	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 Adjustr	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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General Infor	mation			Site Infor	mation					
Analyst Freeway/Dir of Tra						1-95 95	3			
Agency or Company	Agency or Company AECOM Junction			unction		Sea 6 Merce from Hillsboro F		Hillsborn F&W		
Date Performed		• •••	J	urisdiction		y 0-				
Analysis Time Period	d AM		A	nalysis Year		2020 E	Build 2			
Project Description	SW 10th Stree	t SIMR								
Inputs										
Upstream Adi Ramp		Freeway Num	ber of Lanes, N	3					Downstr	eam Adi
o poti o ciin 7 (cij 1 (ciin) p		Ramp Number	r of Lanes, N	1					Ramp	
Ves Or	า	Acceleration L	ane Length, L	300						
	r.	Deceleration L	ane Length Lp							
	I	Freeway Volu	me.V-	3210					I No	Off
= 2400	ft	Ramp Volume	V	1200					L <sub>down</sub> =	ft
up		Eroowov Eroo	, R Elow Speed S	70.0						
V <sub>u</sub> = 1100 v	veh/h		-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
0	//- //		ow Speed, S <sub>FR</sub>	50.0						
Conversion t	opc/nun v	der Base (	Jonaitions		1					
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
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										
<b>F</b> = 41 = 41	<b>6</b>	Merge Areas			<b>F</b> atin (		Div	verge Areas		
	v <sub>12</sub>				Estimati	onc	<sup>12</sup>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V10 = V		)Pro	
- <sub>EQ</sub> =	1383.24	(Equation	13-6 or 13-7)		=		12 (F	auation 13-	<sup>,</sup> ⊢∪ 12 or 13-	.13)
P <sub>FM</sub> =	0.586	using Equat	ng Equation (Exhibit 13-6)				sina Faustio	(Evhibit 13-7)		
V <sub>12</sub> =	2010	pc/h			$F_{FD}$ using Equation (Exhibit 15-7)					
V or V	1420	pc/h (Equatio	on 13-14 or 13	-	$v_{12} - p_{C/11}$					
v <sub>3</sub> 01 v <sub>av34</sub>	17)				$v_3 \text{ or } v_{av34}$ pc/n (Equation 13-14 or 13-17)					
Is $V_3$ or $V_{av34} > 2,70$	0 pc/h? 🗌 Ye	s 🗹 No			IS V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 2,1		Yes No		
Is $V_3$ or $V_{av34} > 1.5$	*V <sub>12</sub> /2 🗹 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5	o^v <sub>12</sub> /2	Yes No	10.10	40.40
If Yes,V <sub>120</sub> =	2010	pc/h (Equatio	on 13-16, 13-		If Yes,V <sub>12a</sub> =		рс 13-	c/n (Equatioi .19)	n 13-16,	13-18, or
	18, or	13-19)			Concoit	· Ch	<u>aaka</u>	,		
Capacity Che	Actual		anaoitu		Capacity		Actual	Cor	a oitu	
	Actual	<del>i</del> i	apacity	LUGT	V		Actual	Evhibit 13.9		20311
					¥F	$\overline{}$				
V <sub>FO</sub>	4846	Exhibit 13-8		No	$v_{FO} = v_F$	- v <sub>R</sub>		Exhibit 13-8	2 	
					V <sub>R</sub>			Exhibit 13-	-	
Flow Enterin	a Merae In	fluence A	rea		Flow Fn	terin	na Diver	<u>n iv</u>	ce Are	 a
	Actual	Max I	Desirable	Violation?			Actual	Max Desi	rable	Violation?
V <sub>R12</sub>	3426	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
Level of Serv	ice Detern	nination (i	if not F)		Level of	Ser	vice Det	erminatio	n (if no	t F)
D <sub>p</sub> = 5.475 +	0.00734 v <sub>D</sub> + 0	0.0078 V <sub>12</sub> - 0.0	)0627 L <sub>A</sub>		1	D <sub>R</sub> = 4	4.252 + 0.0	086 V <sub>12</sub> - 0.	.009 L <sub>D</sub>	
$D_{\rm D} = 29.7 ({\rm nc/m})$	ıi/ln)	١Z	~		$D_p = (p$	c/mi/l	n)	12	U	
R = D(Evhibit)	13-2)						··/ : 13-2)			
	nination						minatio	<u> </u>		
Speed Deterr	mination				speea D			1		
M <sub>S</sub> = 0.411 (Exi	bit 13-11)				ν <sub>s</sub> - (Ε)		13-12)			
S <sub>R</sub> = 58.5 mph	(Exhibit 13-11)				⊳ <sub>R</sub> = mp	on (Exh	nibit 13-12)			
S <sub>0</sub> = 66.7 mph	(Exhibit 13-11)				S <sub>0</sub> = mp	oh (Exł	nibit 13-12)			
S = 60.7 mph	(Exhibit 13-13)				S = mp	oh (Exh	nibit 13-13)			
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	BASIC F	REEWAY SE	GMENTS WORKSHEET			
General Information			Site Information			
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To	I-95 SB Seg 7-Bet On Ramps		
Analysis Time Period	AM		Analysis Year	2020 Bu	ild 2	
Project Description SW 10th	n Street SIMR					
✓ Oper.(LOS)			Des.(N)	Pla	inning Data	
Flow Inputs						
Volume, V AADT	4500	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3		
Peak-Hr Prop. of AAD I , K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjustn	nents					
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2		
E <sub>T</sub>	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	3		
Lane Width		ft				
Rt-Side Lat. Clearance	0	ft	† <sub>LW</sub>		mph	
Number of Lanes, N	3	romo /mi	ILC		mpn	
FES (measured)	70.0	mph		70.0	mph	
Base free-flow Speed, BFFS	70.0	mph	FF3	70.0	трп	
LOS and Porformanco	Mogeuroe		Dosign (N)			
<u>Operational (LOS)</u> $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S D = $v_p / S$ LOS	(f <sub>HV</sub> x f <sub>p</sub> ) 1603 68.1 23.5 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln	
Glossarv			Factor Location			
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	.13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11	

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Job: SW 10th Street SIMR Analyst: AECOM

Locati	on:	Seg 8: I-	95 South	bound On-Ram	p from SW 1	0th Street E	EB & WB
Analys	sis Period:	AM Peak	Hour				
Analys	sis Year:	2020 Bui	ld 2				
4,500				→ 5,460			
							$\rightarrow$
960							
		PHF =	0.95				
		v <sub>fr</sub> =	5,460	vph			
		v <sub>r</sub> =	960	vph			
		v <sub>f</sub> =	4,500				
Upstre	am Freeway	Tr % =	3%				
	Ramp	Tr % =	2%				
Downstre	eam Freeway	/ Tr % =	3%				
	Freeway	/ f <sub>HV</sub> =	1/(1+P	(E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -	1)) =	0.985	
	Ramp	f <sub>HV</sub> =	1/(1+P	(E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -	1)) =	0.9901	
	flat terrair	i Ε <sub>τ</sub> =	1.5				
		RV % =	0				
Driver Po	pulation adj	. f <sub>P</sub> =	1.000				
		V <sub>fr</sub> =	=v <sub>fr</sub> /(PH	$IF)(f_{HV})(f_{P}) =$	5,834	pc/h	
		V <sub>r</sub> =	=v <sub>r</sub> /(PH	$F)(f_{HV})(f_{P}) =$	1,021	pc/h	
		V <sub>f</sub> =	=v <sub>f</sub> /(PH	$F)(f_{HV})(f_P) =$	4,808	pc/h	

<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
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,021	0.49	No

3

No. lanes upstream of ramp N =

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 9-Bo	et 10th & Exit to Exp
Analysis Time Period	AM		Analysis Year	2020 Bu	11a 2
					unning Data
Flow Inputs			Des.(III)		
Volume, V AADT	5460	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV/</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>P</sub> (E <sub>P</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adi 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 <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1458 69.2 21.1 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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## RAMPS AND RAMP JUNCTIONS WORKSHEET

Gonoral Infor	mation			Site Inform	nation				
	nauon		<b>F</b> _						
Analyst		014	Fr	eeway/DIF OT 1 ra		95 SB			
ngency or company	AECO	UNI	JU	risdiction	S	eg 10-merge fro			
Analysis Time Period	ΔΜ		Δn	nalvsis Year	21	020 Build 2			
Project Description	SW 10th Stree	t SIMR				Duna 2			
Inputs									
		Freeway Num	ber of Lanes N	4					
Upstream Adj Ramp		Damp Numbo	of Lanos N	1				Downstr	eam Adj
Ves On				1				капр	
		Acceleration L	ane Length, L <sub>A</sub>	600				🗹 Yes	🗌 On
No Off		Deceleration L	ane Length L <sub>D</sub>						<b>√</b> Off
		Freeway Volu	me, V <sub>F</sub>	5460					
L <sub>up</sub> = ft		Ramp Volume	, V <sub>R</sub>	270				L <sub>down</sub> =	1150 ft
		Freeway Free	Flow Speed. S	70.0					
V <sub>u</sub> = veh/h		Ramp Free-Fl	ow Speed S	50.0				v <sub>D</sub> =	650 veh/h
Conversion to	nc/h lln/	dor Baso	Conditions	50.0					
	<u>ر الم الم الم الم الم الم الم الم الم الم</u>								
(pc/h)	(Veh/hr)		Ierrain	% I ruck	%Rv	THV	Гр	v = V/PF	ı⊢ x ĭ <sub>HV</sub> x f <sub>p</sub>
Freeway	5460	0.95	Level	3	0	0.985	1.00		5834
Ramp	270	0.92	Level	2	0	0.990	1.00		296
UpStream									
DownStream	650	0.92	Level	2	0	0.990	1.00		714
		Merge Areas					Diverge Areas		
Estimation of	v <sub>12</sub>				Estimatio	on of v <sub>12</sub>			
	$V_{12} = V_{F}$	( P <sub>EM</sub> )				V -	$\gamma + \gamma \gamma \gamma$		
	(Fau	ation 13-6 or	13-7)			v <sub>12</sub> –	$v_{R} + (v_{F} - v_{I})$	R <sup>JP</sup> FD	
-EQ P =	0 1 2 1	using Equat	ion (Evhibit 13.6)		L <sub>EQ</sub> =		(Equation 13	-12 or 13	-13)
'FM	0.101				P <sub>FD</sub> =		using Equati	on (Exhibit	13-7)
v <sub>12</sub> –	1055	pc/n	10.11.10		V <sub>12</sub> =		pc/h		
V <sub>3</sub> or V <sub>av34</sub>	2389	pc/h (Equation	on 13-14 or 13-		$V_3$ or $V_{av34}$		pc/h (Equation	13-14 or 13	-17)
ls V. or V > 2.70	) nc/h? $\square V_{o}$				Is $V_3$ or $V_{3\sqrt{34}}$	> 2,700 pc/h?	Yes No	)	
$\log V_{av34} = 2,70$					Is V <sub>2</sub> or V <sub>2124</sub>	> 1.5 * V <sub>10</sub> /2	 □Yes □No	'n	
13 v <sub>3</sub> 01 v <sub>av34</sub> > 1.5	v <sub>12</sub> /∠ ⊻ re	S [] INO			5 av54	IZ	pc/h (Equation	, on 13-16.	13-18. or
lf Yes,V <sub>12a</sub> =	2000   18. or	pc/n (Equalio 13-19)	51113-10, 13-		if Yes,V <sub>12a</sub> =	1	3-19)	,	,
Capacity Che	cks	10 10)			Capacity	Checks			
	Actual	C	apacity	LOS F?		Actual	Ca	apacity	LOS F?
					V <sub>F</sub>		Exhibit 13	-8	
N/	0400				$V_{-a} = V_{-}$	V_	Exhibit 13	-8	
v <sub>FO</sub>	6130	Exhibit 13-8		No	FO F	· R		2	
					V <sub>R</sub>		10	-	
Flow Entering	ı Merae In	fluence A	rea	<u> </u>	Flow Ent	erina Dive	rae Influe	nce Are	 a
	Actual	Max	Desirable	Violation?		Actual	Max De	sirable	Violation?
V <sub>R12</sub>	2629	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
Level of Serv	ice Detern	nination (i	if not F)		Level of S	Service De	terminatio	n (if no	ot F)
D <sub>D</sub> = 5.475 +	0.00734 v <sub>P</sub> + (	0.0078 V <sub>10</sub> - 0.0	)0627 L <sub>A</sub>		D	<sub>P</sub> = 4.252 + (	).0086 V <sub>12</sub> - (	).009 L <sub>n</sub>	
$D_{\rm p} = 22.1 ({\rm nc/m})$	/ln)	12	~		$D_{\rm p} = (p_{\rm c})$	/mi/ln)	12	U	
$\kappa$ $\sum (po)$	····, 13_2)				к (рс	hibit 12 2			
	1J-2)					andre 13-2)			
Speed Detern	nination				Speed De	eterminati	on		
M <sub>S</sub> = 0.315 (Exit	oit 13-11)				D <sub>s</sub> = (Exi	nibit 13-12)			
0 (					S <sub>D</sub> = moh	n (Exhibit 13-12	)		
S <sub>R</sub> = 61.2 mph (	Exhibit 13-11)			I	- K	(			
S <sub>R</sub> = 61.2 mph ( S <sub>0</sub> = 65.5 mph (	Exhibit 13-11) Exhibit 13-11)				S <sub>0</sub> = mpt	n (Exhibit 13-12	)		
S <sub>R</sub> = 61.2 mph ( S <sub>0</sub> = 65.5 mph ( S = 63.6 mph (	Exhibit 13-11) Exhibit 13-11) Exhibit 13-13)				S <sub>0</sub> = mpt S= mpt	n (Exhibit 13-12 n (Exhibit 13-13	)		

	RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Infor	mation			Site Infor	mation					
Analyst			Fre	eeway/Dir of Tr	avel	I-95 SE	}			
Agency or Company	AEC	ОМ	Ju	nction		Seg 11	- Diverge to	o Express		
Date Performed			Ju	risdiction						
Analysis Time Period	MA M		An	alysis Year		2020 B	uild 2			
Project Description	SW 10th Stree	t SIMR								
inputs		E N							1	
Upstream Adj R	amp	Freeway Nurr	IDER OF Lanes, IN	4					Downstrea	m Adj
		Ramp Numbe	er of Lanes, N	1					Ramp	
res 🖻	Un	Acceleration I	_ane Length, L <sub>A</sub>						🗌 Yes	On
No 🗆	Off	Deceleration	Lane Length L <sub>D</sub>	200					Mo	Off
		Freeway Volu	ime, V <sub>F</sub>	5730						
L <sub>up</sub> = 11	50 ft	Ramp Volume	e, V <sub>R</sub>	650					L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>EE</sub>	70.0					V _	
$V_u = 27$	0 veh/h	Ramp Free-F	low Speed, S <sub>ED</sub>	45.0					v <sub>D</sub> =	ven/h
Conversion t	o pc/h Un	der Base	Conditions						1	
(no/h)	V		Torroin	0/ Truck	0/ Dv		f	f		vf vf
(pc/n)	(Veh/hr)	PHF	remain	% ITUCK	%RV		'HV	ľр		× ' <sub>HV</sub> × ' <sub>p</sub>
Freeway	5730	0.95	Level	3	0	0.	985	1.00	612	22
Ramp	650	0.92	Level	2	0	0.	990	1.00	71	4
UpStream	270	0.92	Level	2	0	0.	990	1.00	29	6
DownStream										
Estimation of	F vz	werge Areas			Estimati	ion o	u uf v	liverge Areas		
Estimation of	v12				Estimati		<b>1 v</b> 12			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	′ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(E	Equation 13-	12 or 13-13)	
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	436 using Eq	uation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		30	72 pc/h		
$V_3$ or $V_{av34}$	pc/h (	Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$		15	25 pc/h (Equ	uation 13-14	or 13-17)
Is $V_3$ or $V_{2\sqrt{34}} > 2,70$	0 pc/h? 🗌 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>2V3</sub>	2,7	00 pc/h? 🔽	Yes <b>√</b> No		,
Is $V_2$ or $V_{av24} > 1.5^{3}$	* V <sub>10</sub> /2	s 🗌 No			Is V <sub>2</sub> or V <sub>2</sub>	, , > 1.5	* V <sub>10</sub> /2	 Yes √No		
	pc/h (	Equation 13	-16, 13-18, or		pc/h (Equation 13-16, 13-18, or 13-					18, or 13-
n res,v <sub>12a</sub> –	13-19)	-			11 Tes, v <sub>12a</sub> –	•	19	9)		
Capacity Che	ecks			a.	Capacit	y Ch	ecks	<u>.</u>		
	Actual	0	Capacity	LOS F?			Actual	Ca	apacity	LOS F?
					V <sub>F</sub>		6122	Exhibit 13-	8 9600	No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	5408	Exhibit 13-	8 9600	No
					V <sub>R</sub>		714	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	lrea		Flow En	terin	g Diver	ge Influer	ice Area	
	Actual	Max	Desirable	Violation?			Actual	Max Desira	ble	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3072	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)					
D <sub>R</sub> = 5.475 + 0.		$D_{\rm p} = 4.252 + 0.0086 V_{12} - 0.009 L_{\rm p}$								
D <sub>R</sub> = (pc/mi/ln		$D_{\rm p} = 31.5 ({\rm pc/mi/ln})$								
LOS = (Exhibit	LOS = D	(Exhil	, pit 13-2)							
Speed Detern	Speed D	)eter	minatio	n						
M = (Exibit 1)	2 11)				D = 0	362 (F	xhibit 13-	12)		
	U-11)				$S_{n} = 50$	0 mnh	(Evhibit	·-/ 13_12)		
S <sub>R</sub> − mpn (Exh	1010 1 <b>3-</b> 11)				S = 75			12 12)		
$S_0 = mph (Exh$	1011 13-11)				S <sub>0</sub> − 75	.o mpn		10-12)		
S = mpn (Exh	iidit 13-13)				S = 65	o.9 mph	(Exhibit	13-13)		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 13-L	Bet Off & On Ramps
Project Description SW 10t	h Street SIMR		Analysis real	2020 Би	
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					3
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4220	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain:	0.95 3 0 Level	
DDHV = AADT x K x D		ven/h	Grade % Length Up/Down %	mı	
Calculate Flow Adjustr	nents				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
Ε <sub>T</sub>	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 FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1503 68.9 21.8 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	( WEAV	ING WOF	RKSHEE	Г			
General	Informatio	on			Site Info	rmation				
Analyst Agency/Company AECOM Date Performed Analysis Time Period AM					Freeway/Dir Weaving Seg Analysis Yea	of Travel gment Locatio	I-95 S on Seg 1 2020	B 4- Bet Samp Build 2	e & Copans	
Project Desc	cription SW 10th	n Street SIMF	ł							
Inputs					1					
Weaving configurationOne-SidedWeaving number of lanes, N4Weaving segment length, Ls2520ftFreeway free-flow speed, FFS70 mph					Segment typ Freeway min Freeway maa Terrain type	e imum speed, ximum capac	S <sub>MIN</sub> ity, C <sub>IFL</sub>		Freeway 15 2400 Level	
Convers	sions to po	/h Unde	r Base Co	ondition	S		•	1	-	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	3605	0.95	3	0	1.5	1.2	0.985	1.00	3852	
V <sub>RF</sub>	1780	0.92	2	0	1.5	1.2	0.990	1.00	1954	
V <sub>FR</sub>	615	0.92	2	0	1.5	1.2	0.990	1.00	675	
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
V <sub>NW</sub>	3852		•		-			V =	6481	
V <sub>W</sub>	2629							-		
VR	0.406									
Configu	ration Cha	racterist	tics		•					
Minimum m	aneuver lanes, N	N <sub>WL</sub>		2 lc	; Minimum weaving lane changes, LC <sub>MIN</sub>					
Interchange	density, ID			0.7 int/mi	Weaving lane changes, LC <sub>w</sub>					
Minimum RI	F lane changes,	LC <sub>RF</sub>		1 lc/pc	Non-weaving lane changes, LC <sub>NW</sub>				lc/h	
Minimum FF	R lane changes,	LC <sub>FR</sub>		1 lc/pc	Total lane changes, LC <sub>ALL</sub>					
Minimum RI	R lane changes,	LC <sub>RR</sub>		lc/pc	Non-weaving vehicle index, I <sub>NW</sub>					
Weaving	g Segment	Speed,	Density, I	Level of	Service,	and Cap	acity			
Weaving segment flow rate, v6398 veh/hWeaving segment capacity, cw5829 veh/h					Weaving inte Weaving seg	ensity factor, gment speed,	W S		mph	
Weaving segment v/c ratio 1.09					Average weaving speed, $S_w$				mph	
Weaving segment density, D pc/mi/lr					Average nor	n-weaving spe	eed, S <sub>NW</sub>		mph	
Level of Ser	vice, LOS			F	Maximum we	eaving length	, L <sub>MAX</sub>		6745 ft	
Notes			te d		- 44 1 .					
a. vveaving se Chapter 13, " b. For volume	egments longer th Freeway Merge a es that exceed the	nd Diverge Se weaving segr	gments". nent capacity, th	ngth should f	vice is "F".	solated merge	and diverge ar	eas using the	proceaures of	

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 1-B	et Hillsboro & Palmetto
Analysis Time Period	PM		Analysis Year	2020 Bu	ilia 2
					unning Data
Flow Inputs	)		Des.(III)		anning Data
Volume, V AADT	4680	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
Ε <sub>Τ</sub>	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 FFS (measured) Base free-flow Speed, BFFS	4 70.0	ft ft ramps/mi mph mph	f <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWA	Y WEAV	ING WOF	RKSHEE	Т		
Genera	al Informati	on			Site Info	rmation			
Analyst Agency/Company AECOM Date Performed Analysis Time Period PM					Freeway/Dir of Travel I95/SB Weaving Segment Location Seg 2-Bet On from Exp & Off Analysis Year 2020 Build 2				
Project De	scription SW 10t	h Street SIMF	8		-				
Inputs					1				
Weaving configurationTwo-SidedWeaving number of lanes, N4Weaving segment length, L <sub>S</sub> 5200ftFreeway free-flow speed, FFS70 mph					Segment type     Free       Freeway minimum speed, S <sub>MIN</sub> Freeway maximum capacity, C <sub>IFL</sub> 2       Terrain type     Lu				Freeway 1 2400 Leve
Conve	rsions to p	<u>c/h Unde</u>	r Base Co	ondition	S				
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	3730	0.95	3	0	1.5	1.2	0.985	1.00	3985
V <sub>RF</sub>	870	0.92	2	0	1.5	1.2	0.990	1.00	955
V <sub>FR</sub>	950	0.92	2	0	1.5	1.2	0.990	1.00	1043
V <sub>RR</sub>	100	0.92	2	0	1.5	1.2	0.990	1.00	110
V <sub>NW</sub>	5983		-	-				V =	6093
V <sub>w</sub>	110							-	
VR	0.018								
Config	uration Cha	aracteris	tics						
Minimum	maneuver lanes,	N <sub>WL</sub>		0 lc	Minimum we	aving lane c	hanges, LC <sub>MIN</sub>		330 lc/h
Interchang	ge density, ID			0.7 int/mi	Weaving lan	e changes, L	.C <sub>w</sub>		998 lc/h
Minimum	RF lane changes	, LC <sub>RF</sub>		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3023 lc/h
Minimum	FR lane changes	, LC <sub>FR</sub>		0 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4021 lc/h
Minimum	RR lane changes	, LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2178
Weavir	ng Segmen	t Speed,	Density,	Level of	Service,	and Cap	oacity		
Weaving s	segment flow rate	, V		6014 veh/h	Weaving inte	ensity factor,	W		0.185
Weaving segment capacity, c <sub>w</sub> 9249 veh/				9249 veh/h	Weaving seg	gment speed	, S		60.3 mph
Weaving segment v/c ratio 0.650				0.650	Average weaving speed, $S_w$				61.4 mph
Weaving s	segment density,	D	2	5.2 pc/mi/ln	Average non-weaving speed, S <sub>NW</sub>				60.3 mph
Level of Service, LOS C				С	Maximum weaving length, L <sub>MAX</sub> 5894 ft				
Notes									
a. Weaving	segments longer t	han the calcula	ated maximum le	ength should l	be treated as is	olated merge	and diverge ar	eas using the	procedures of

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	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 3-Bo	et Off & On Ramp
Analysis Time Period	PM		Analysis Year	2020 Bu	ild 2
					unning Data
Flow Inputs			Jes.(N)		
Volume, V AADT	4600	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	nents				
f <sub>p</sub> Ε <sub>τ</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adi 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 <sub>⊥w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1638 67.8 24.2 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Info	rmation			Site Infor	rmation					
Analyst			Fr	eeway/Dir of Ti	ravel I-95 SB					
Agency or Compan	y AEC	OM	Ju	Inction		Seg 4-I	Diverge to	SW 10th St		
Date Performed			Ju	irisdiction		0000 0	1.1.0			
Analysis Time Peric	SW 10th Strop		Ar	halysis Year		2020 B	ulid 2			
Innuts										
mputo	_	Freeway Nun	ber of Lanes N	3						
Upstream Adj	Ramp	Ramo Numbe	ar of Lanes N	1					Downstre	am Adj
Yes	On			I						
	Deceleration Lane Length, L <sub>A</sub>								Ves 🗹	🗹 On
✓ No	No Off Deceleration Lane Length L <sub>D</sub> 200								🗌 No	Off
	Freeway Volume, V <sub>F</sub> 460								. =	2400 <del>ft</del>
L <sub>up</sub> –	IL	Ramp Volum	e, V <sub>R</sub>	840					⁻down	2400 11
V =	veh/h	Freeway Free	e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	1410 veh/h
u		Ramp Free-F	low Speed, S <sub>FR</sub>	45.0						
Conversion	to pc/h Un	der Base	Conditions			_			_	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	4600	0.95	Level	3	0	0.	985	1.00	4	915
Ramp	840	0.92	Level	2	0	0.	990	1.00	Ģ	22
UpStream										
DownStream	1410	0.92	Level	2	0	0.	990	1.00	1	548
Estimation	<b></b>	Merge Areas			Ectimot	iono	<u>[</u>	Diverge Areas		
Estimation C	<sup>11</sup> <sup>12</sup>				Estimat		<sup>1</sup> <b>v</b> 12			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	• V <sub>R</sub> + (V <sub>F</sub> - V	√ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13	-12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	595 using E	quation (Exh	ibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		32	297 pc/h		
$V_3^{}$ or $V_{av34}^{}$	pc/h (	(Equation 13	-14 or 13-17)		$\mathrm{V_{3}}\mathrm{or}\mathrm{V_{av34}}$		16	618 pc/h (Eq	uation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,7$	'00 pc/h? 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av34} > 2,700$ pc/h? Yes No					
Is $V_3$ or $V_{av34} > 1.5$	5*V <sub>12</sub> /2 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes No					
lf Yes,V <sub>12a</sub> =	pc/h ( 13-19	(Equation 13	-16, 13-18, or		If Yes,V <sub>12a</sub> =	=	۲ 1	oc/h (Equatio	n 13-16, 13	-18, or 13-
Capacity Ch	ecks	/			Capacit	y Ch	ecks			
	Actual	(	Capacity	LOS F?			Actual	(	Capacity	LOS F?
					V <sub>F</sub>		4915	Exhibit 13	-8 7200	No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	3993	Exhibit 13	-8 7200	No
10							922	Exhibit 13-	-10 2100	No
Flow Enterin	na Merae Ir	fluence A	Area	1	Flow En	terin	a Dive	rae Influe	nce Area	
	Actual	Max	Desirable	Violation?			Actual	Max Desir	able	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3297	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of	Ser	vice De	terminatio	on (if not	F)
$D_{R} = 5.475 + 0.00734 v_{R} + 0.0078 V_{12} - 0.00627 L_{A}$						D <sub>R</sub> = 4	1.252 + 0	.0086 V <sub>12</sub> - (	0.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/l	D <sub>R</sub> = 30	).8 (pc/	/mi/ln)							
LOS = (Exhibit	13-2)		LOS = D	(Exhil	oit 13-2)					
Speed Deter	Speed L	Deter	minatio	on						
$M_{a} = (Exibit)^{2}$	13-11)				$D_{a} = 0.381$ (Exhibit 13-12)					
$S_{p} = mnh (Fv)$	hibit 13-11)				S <sub>R</sub> = 59	9.3 mph	(Exhibit	13-12)		
	hibit 13_11)				S <sub>0</sub> = 74	1.4 mph	(Exhibit	, 13-12)		
S = mph (Ex	(hibit 13-13)				S = 63	3.6 mnh	(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		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 5-Bo	et Off & On Ramps
Project Description SW 10t	h Street SIMR		Analysis Teal	2020 Bu	
✓ Oper.(LOS)	)		Des.(N)	Pla	nning Data
Flow Inputs					0
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 <sub>T</sub> %RVs, P <sub>R</sub> 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 <sub>p</sub> F_	1.00 1.5		$E_{R}$	1.2 0.985	
-T Speed Inputs	1.0		$\Gamma_{\rm HV}$ is the field of the		
			Calc Speed Auj allu 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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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General Infor	mation			Site Inform	nation				
Analyst			Fr	eeway/Dir of Tra		95 SB			
Agency or Company	AFC	OM	u.	inction	-1001 I-	an 6-Merne fro	m Hillshoro F&M	I	
Date Performed			Ju	risdiction	0	eg o-merge no			
Analysis Time Period	PM		Ar	nalysis Year	2	020 Build 2			
Project Description	SW 10th Stree	t SIMR		,					
Inputs									
Instream Adi Ramp		Freeway Numb	per of Lanes, N	3				Downstr	oam ∆di
		Ramp Number	of Lanes, N	1				Ramp	can Auj
🗹 Yes 📃 On		Acceleration L	ane Length. L.	300					
		Deceleration I	ane Length L					L res	L On
No Vff		Freeway Volur	ne V	3760				🗹 No	Off
= 2400 f	Ŧ	Domn Volumo	V	1440				L <sub>down</sub> =	ft
-up 2100 1			<sup>,</sup> <sup>v</sup> R	1410				down	
V = 840 ve	⊧h/h	Freeway Free-	Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h
		Ramp Free-Flo	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	<u>pc/n Une v</u>	der Base (	conditions			<u> </u>	1	1	
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3760	0.95	Level	3	0	0.985	1.00		4017
Ramp	1410	0.92	Level	2	0	0.990	1.00		1548
UpStream	840	0.92	Level	2	0	0.990	1.00		922
DownStream									
<b>-</b>		Merge Areas			<b>F</b> - 4i 4i -		Diverge Areas		
estimation of	V <sub>12</sub>				Estimatio	on of $v_{12}$			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )				V <sub>12</sub> =	= V <sub>D</sub> + (V <sub>C</sub> - V <sub>C</sub>	)P=n	
-EQ =	1537.11	l (Equation	13-6 or 13-7)			12	(Equation 13	-12 or 13-	13)
P <sub>FM</sub> =	0.586	using Equati	on (Exhibit 13-6)		EQ P =		using Equation	n (Exhibit	13_7)
/ <sub>12</sub> =	2354	pc/h			' FD V =		nc/h		101)
/a or V	1663	pc/h (Equatio	on 13-14 or 13-		12 VorV		pc/li	13 11 or 13	17)
3 <b>Ch</b> vav34	17)				av34	> 2 700 no/h2		13-14 01 13	-17)
Is $V_3$ or $V_{av34} > 2,700$	) pc/h? [] Ye	s 🗹 No			$15 v_3 01 v_{av34}$	> 1 5 * 1/ /0			
Is $V_3$ or $V_{av34} > 1.5 *$	V <sub>12</sub> /2	s 🗌 No			IS V <sub>3</sub> OF V <sub>av34</sub>	>1.5 V <sub>12</sub> /2	Yes □ No	n 12 16	12 10 or
f Yes,V <sub>12a</sub> =	2354	pc/h (Equatio	on 13-16, 13-		lf Yes,V <sub>12a</sub> =		13-19)	JII 13-10,	13-10, 01
Canacity Cho	18, 01	13-19)			Canacity	Chocks	,		
capacity che	Actual	C	anacity	LOS F2	Capacity	Actua	l Ca	nacity	LOS F2
	/ lotadi	Ĩ	apaony	20011	V_	7 10100	Exhibit 13	-8	20011
					V = V	V	Exhibit 10	•	
V <sub>FO</sub>	5565	Exhibit 13-8		No	v <sub>F0</sub> - v <sub>F</sub> -	V <sub>R</sub>	Exhibit 13	••	
					V <sub>R</sub>			5-	
Flow Entering	ı Merae In	fluence A	rea	-	Flow Ent	erina Dive	erae Influer	ice Are	 a
	Actual	Max D	Desirable	Violation?		Actual	Max Des	sirable	Violation?
V <sub>R12</sub>	3902	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
evel of Servi	ce Deterr	nination (i	f not F)		Level of	Service D	eterminatio	on (if no	t F)
D <sub>R</sub> = 5.475 + 6	0.00734 v <sub>R</sub> + (	0.0078 V <sub>12</sub> - 0.0	0627 L <sub>A</sub>		D	<sub>R</sub> = 4.252 +	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = 33.3 (pc/mi	/ln)				D <sub>R</sub> = (pc	;/mi/ln)			
	13-2)				LOS = (E)	, (hibit 13-2)			
.OS = D (Exhibit 'i	inction				Speed D	eterminati	ion		
OS = D (Exhibit '	IIIIauon								
DS = D (Exhibit ' Speed Detern	it 13_11)				D_= (⊢x	nidit 13-171			
$_{OS} = D$ (Exhibit ' <b>Speed Detern</b> $M_{S} = 0.484$ (Exib	iit 13-11)				D <sub>s</sub> = (EX S <sub>n</sub> = mnl	nibit 13-12) h (Exhibit 13-12	2)		
DS = D (Exhibit Speed Detern $M_S = 0.484$ (Exib $S_R = 56.4$ mph (I	bit 13-11) Exhibit 13-11)				D <sub>s</sub> = (Ex S <sub>R</sub> = mpl S <sub>s</sub> = mpl	nibit 13-12) h (Exhibit 13-12 h (Exhibit 13-13	2) 2)		
DS = D (Exhibit <b>Speed Detern</b> $M_S = 0.484$ (Exit $S_R = 56.4$ mph (1 $S_0 = 65.8$ mph (1 $S_0 = 65.8$ mph (1)	nit 13-11) Exhibit 13-11) Exhibit 13-11)				D <sub>s</sub> = (Ex S <sub>R</sub> = mpl S <sub>0</sub> = mpl S - mal	nibit 13-12) h (Exhibit 13-12 h (Exhibit 13-12	2) 2)		

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 7-Bo 2020 Bu	et On Ramps ild 2
Project Description SW 10th	h Street SIMR			2020 Du	
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					0
Volume, V AADT Peak-Hr Prop. of AADT, K	5170	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	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 Adjustr	nents				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
Ε <sub>T</sub>	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 FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N : S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1841 65.2 28.2 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - 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:	2020 Buil	20 Build 2								
5,170			→ 6,220							
1.050										
,		1								
	PHF =	0.95								
	v <sub>fr</sub> =	6,220	vph							
	v <sub>r</sub> =	1,050	vph							
	v <sub>f</sub> =	5,170								
Upstream Freeway	Tr % =	3%								
Ramp	Tr % =	2%								
Downstream Freeway	Tr % =	3%								
Freeway	f <sub>HV</sub> =	1/(1+P	<sub>r</sub> (E <sub>r</sub> -1)+P <sub>R</sub> (E <sub>r</sub> -	·1)) =	0.985					
Ramp	f <sub>HV</sub> =	1/(1+P	r(E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -	-1)) =	0.9901					
flat terrain	<b>Ε</b> <sub>τ</sub> =	1.5								
	RV % =	0								
Driver Population adj.	f <sub>P</sub> =	1.000								
	V <sub>fr</sub> =	=v <sub>fr</sub> /(PF	IF)(f <sub>HV</sub> )(f <sub>P</sub> ) =	6,646	pc/h					
	V. =	=v./(PH	$ F\rangle(f_{\mu\nu})(f_{\rm P}) =$	1.116	pc/h					
	V.=	=v./(PH	$F(f_{res})(f_{res}) =$	5 524	nc/h					
No. Jonoo unotroom of roma	v <sub>f</sub> − N −	-v <sub>f</sub> /(i 1 i	• ЛинуЛиру –	3,324	pc/li					
NO. Ianes upstream of ramp	IN —	J								

<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

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 9-B	et 10th & Exit to Exp
Project Description SW 10t	th Street SIMR		Analysis Teal	2020 Bu	
✓ Oper.(LOS)	)		Des.(N)	Pla	nning Data
Flow Inputs					Ū.
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	6220	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> 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 <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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 FFS (measured) Base free-flow Speed, BFFS	4 70.0	ft ft ramps/mi mph mph	f <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1661 67.5 24.6 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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General Infor	mation			Site Inform	nation	-			
Analyst			Fr	eeway/Dir of Tra		95 SB			
Agency or Company	AEC.	OM	.lu	nction	ייסו וסעו כ	og 10-Merge fr	m Ex to GP		
Date Performed	ALO	OW	Ju	risdiction	0	eg to-merge in			
Analysis Time Period	PM		An	alysis Year	20	020 Build 2			
Project Description	SW 10th Stree	et SIMR							
Inputs									
Instream Adi Ramp		Freeway Num	ber of Lanes, N	4				Downstr	am ∆di
		Ramp Number	of Lanes, N	1				Ramp	Sann Auj
🗌 Yes 📃 On		Acceleration L	ane Length, L.	600					
		Deceleration I	ane Length L_					I res	
✓ No Off		Ereeway Volu	ne V	6220				🗌 No	✓ Off
= ft		Romp Volumo	N, V <sub>F</sub>	100				L <sub>down</sub> =	1150 ft
-ир			, v <sub>R</sub>	190				down	
√, = veh/h		Freeway Free	Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	700 veh/h
		Ramp Free-Fl	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	<u>pc/n Unexpression of the second seco</u>	der Base (	conditions				1	1	
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6220	0.95	Level	3	0	0.985	1.00		6646
Ramp	190	0.92	Level	2	0	0.990	1.00		209
UpStream									
DownStream	700	0.92	Level	2	0	0.990	1.00		768
		Merge Areas			<b>F</b> (1) (1)		Diverge Areas		
estimation of	v <sub>12</sub>				Estimatic	on of V <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )				V <sub>10</sub> =	V <sub>D</sub> + (V <sub>F</sub> - V	D)P-D	
- <sub>EQ</sub> =	(Equ	ation 13-6 or	13-7)		=	12	(Equation 13	-12 or 13-	13)
P <sub>FM</sub> =	0.192	using Equat	ion (Exhibit 13-6)		-EQ P =		using Equati	on (Evhibit	13_7)
/ <sub>12</sub> =	1274	pc/h		ļ	'FD V -		no/b		10-1
/ or V	2686	pc/h (Equatio	on 13-14 or 13-	ļ	$v_{12}^{-}$		pc/n	12 11 or 12	17)
3 01 Vav34	17)				v <sub>3</sub> 01 v <sub>av34</sub>	> 0 700 ma/b0 l		13-14 01 13	•17)
Is $V_3$ or $V_{av34} > 2,70$	) pc/h? 🗌 Ye	s 🗹 No			15 V <sub>3</sub> 01 V <sub>av34</sub>	2,700 pc/m²		)	
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2 Ve	s 🗌 No			IS V <sub>3</sub> Or V <sub>av34</sub>	>1.5 " V <sub>12</sub> /2	_Yes ∟No	)	10.10
f Yes,V <sub>12a</sub> =	2658	pc/h (Equatio	on 13-16, 13-		lf Yes,V <sub>12a</sub> =	1	2-19)	on 13-16,	13-18, 01
Canacity Cho	18, or	13-19)			Canacity	Chocks	/		
capacity che	Actual		anacity	1 OS E2	Capacity	Actual	C	anacity	
	Actual	ŤŤ	apacity	20011	V_	Actual	Evhibit 13	-8	2001:
					V = V	V		0	
V <sub>FO</sub>	6855	Exhibit 13-8		No	v <sub>FO</sub> – v <sub>F</sub> -	v <sub>R</sub>	Exhibit 13	-8	
					V <sub>R</sub>		Exhibit 1	3-	
Flow Entering	ı Merae Ir	fluence A	rea		Flow Ent	erina Dive	rae Influe	nce Are	<u> </u>
	Actual	Max	Desirable	Violation?		Actual	Max De	sirable	Violation?
V <sub>R12</sub>	2867	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
evel of Serv	ce Deterr	nination (i	f not F)		Level of S	Service De	terminatio	on (if no	t F)
D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> + (	0.0078 V <sub>12</sub> - 0.0	0627 L <sub>A</sub>		D	<sub>R</sub> = 4.252 + (	).0086 V <sub>12</sub> - (	).009 L <sub>n</sub>	
) =	i/ln)				D <sub>R</sub> = (pc	/mi/ln)		2	
J <sub>R</sub> – 24.0 (pc/m	13-2)				LOS = (Ex	, hibit 13-2)			
$D_R = 24.0 \text{ (pc/m)}$ OS = C (Exhibit)	· -/				Speed D	terminati	on		
OS = C (Exhibit Speed Detern	ination			-			~ / 1		
$D_{R} = 24.0 \text{ (pcm)}$ OS = C  (Exhibit)	nination				D. = /Fvł	nibit 13-12)			
OS = C (Exhibit Speed Detern $M_S = 0.330$ (Exhi	<b>nination</b>				D <sub>s</sub> = (Ext S_= mot	nibit 13-12) h (Exhibit 13-12			
$D_{R}^{-}$ 24.0 (pc/m) COS = C (Exhibit 1) <b>Speed Detern</b> $M_{S}^{-}$ 0.330 (Exit $D_{R}^{-}$ 60.8 mph (	<b>nination</b> hit 13-11) Exhibit 13-11)				D <sub>s</sub> = (Ext S <sub>R</sub> = mpt S = mot	nibit 13-12) n (Exhibit 13-12)	)		
OS = C  (Exhibit) $OS = C  (Exhibit)$ $OS = 0.330  (Exhibit)$ $OR = 0.330  (Exhibit)$ $OR = 60.8  mph  ($ $OR = 64.6  mph  ($	nination bit 13-11) Exhibit 13-11) Exhibit 13-11)				D <sub>s</sub> = (Ext S <sub>R</sub> = mpt S <sub>0</sub> = mpt	nibit 13-12) n (Exhibit 13-12 n (Exhibit 13-12	)		

		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	rmation			Site Infor	mation					
Analyst			Fre	eeway/Dir of Tr	avel	I-95 SE	}			
Agency or Company	AEC	OM	Ju	nction		Seg 11	- Diverge to	o Express		
Date Performed			Ju	risdiction						
Analysis Time Period	d PM		An	alysis Year		2020 B	uild 2			
Project Description	SW 10th Stree	t SIMR								
inputs									1	
Upstream Adj R	Ramp	Freeway Nurr	IDER OF Lanes, IN	4					Downstrea	m Adj
		Ramp Numbe	er of Lanes, N	1					Ramp	
res 🗈		Acceleration I	_ane Length, L <sub>A</sub>						🗌 Yes	On
No □	Off	Deceleration	Lane Length L <sub>D</sub>	200					No	Off
		Freeway Volu	ime, V <sub>F</sub>	6410						
L <sub>up</sub> = 11	150 ft	Ramp Volume	e, V <sub>R</sub>	700					L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>EE</sub>	70.0						
$V_u = 19$	0 veh/h	Ramp Free-F	low Speed, S <sub>ED</sub>	45.0					V <sub>D</sub> =	ven/h
Conversion t	o pc/h Un	der Base	Conditions						1	
(po/b)	V		Torroin	0/ Truck	0/ Dv	1	f	f		v fv f
(pc/n)	(Veh/hr)	PHF	remain	% ITUCK	%RV		'HV	Гр		<b>^ '</b> HV <b>^ '</b> p
Freeway	6410	0.95	Level	3	0	0.	985	1.00	68	49
Ramp	700	0.92	Level	2	0	0.	990	1.00	76	68
UpStream	190	0.92	Level	2	0	0.	990	1.00	20	9
DownStream								· · · · · · · · · · · · · · · · · · ·		
Estimation of	fv	werge Areas			Ectimat	ion o	u u f v	liverge Areas		
Estimation of	<sup>1</sup> 2				Estimat		<b>1 v</b> <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	′ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-	12 or 13-13)	)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	436 using Ec	uation (Exhil	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		34	19 pc/h		
$V_3$ or $V_{av34}$	pc/h (	Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$		17	15 pc/h (Equ	uation 13-14	or 13-17)
Is $V_3$ or $V_{2\sqrt{34}} > 2,70$	)0 pc/h? 🗌 Ye	s 🗌 No			Is V <sub>2</sub> or V <sub>2V</sub>	34 > 2,7	00 pc/h?	Yes <b>√</b> No		,
$I_{\rm S} V_{2} \text{ or } V_{2,24} > 1.5$	*V <sub>10</sub> /2 TYe	s 🗌 No			Is V <sub>2</sub> or V <sub>2</sub>	> 1.5	* V <sub>40</sub> /2	Yes VNo		
	pc/h (	Equation 13	-16, 13-18, or		lf Vee V		- 12'- ∟	c/h (Equation	n 13-16, 13-	18, or 13-
11 Yes, v <sub>12a</sub> =	13-19)				19)					
Capacity Che	ecks				Capacit	y Ch	ecks			
	Actual	(	Capacity	LOS F?			Actual	C	apacity	LOS F?
					V <sub>F</sub>		6849	Exhibit 13-	-8 9600	No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	6081	Exhibit 13-	-8 9600	No
					V <sub>R</sub>		768	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	Ifluence A	lrea	•	Flow En	terin	g Diver	rge Influer	nce Area	-
	Actual	Max	Desirable	Violation?			Actual	Max Desira	ible	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3419	Exhibit 13-8	4400:All	No
Level of Serv	vice Detern	nination (	if not F)		Level of	Serv	vice De	terminatic	on (if not l	 F)
D <sub>R</sub> = 5.475 + 0.	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> ·	- 0.00627 L <sub>A</sub>			D <sub>R</sub> = 4	.252 + 0.	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/In	ı)				D <sub>R</sub> = 34	1.8 (pc)	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = D	(Exhil	oit 13-2)			
Speed Deterr	nination				Speed L	Deter	minatio	n		
$M_{a} = (Evibit 1)$	3_11)				D <sub>0</sub> = 0.	367 (E	xhibit 13-	12)		
$S_{=}$ mph (Ev)					$S_{p} = 50$	.7 mnh	(Exhibit	, 13-12)		
	$\frac{101110-11}{10140}$				$S_{a} = 7/$	1 7 mnh	(Exhibit	13_12)		
$S_0$ - mph (EXP	$\frac{101113-11}{1313}$				S - 60	inpli		12 12)		
		)ighta D '			<u> </u>	.o mpn		13-13)	Constant	110/0000 0 1
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 13-I	Bet Off & On Ramps
Project Description SW 10	TM th Street SIMR			2020 Би	110 2
Qper (LOS)	)		Des (N)	Pla	Inning Data
Flow Inputs	/				
Volume, V AADT	4640	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %P\/s_P	0.95 3	
Peak-Hr Prop. of AAD1, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	u Level mi	
Calculate Flow Adjust	ments				
f <sub>ρ</sub> Ε <sub>Τ</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1652 67.6 24.4 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	( WEAV	ING WOF	RKSHEE	Г			
General	Informatio	on			Site Info	rmation				
Analyst Agency/Con Date Perforr Analysis Tim	npany ned ne Period	AECON PM	Л		Freeway/Dir of Travel I-95 SB Weaving Segment Location Seg 14- Bet Sample & Copans Analysis Year 2020 Build 2					
Project Desc	cription SW 10th	n Street SIMF	ł							
Inputs					1					
Weaving cor Weaving nu Weaving seg Freeway free	nfiguration mber of lanes, N gment length, L <sub>s</sub> e-flow speed, FF	One-Sided 4 2520ft 70 mph	Segment typ Freeway min Freeway maa Terrain type	e imum speed, ximum capac	S <sub>MIN</sub> ity, C <sub>IFL</sub>		Freeway 15 2400 Level			
Convers	sions to po	/h Unde	r Base Co	ondition	S		•	1	-	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	3995	0.95	3	0	1.5	1.2	0.985	1.00	4268	
V <sub>RF</sub>	1410	0.92	2	0	1.5	1.2	0.990	1.00	1548	
V <sub>FR</sub>	645	0.92	2	0	1.5	1.2	0.990	1.00	708	
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
V <sub>NW</sub>	4268		•		-			V =	6524	
V <sub>W</sub>	2256								•	
VR	0.346									
Configu	ration Cha	racterist	tics							
Minimum m	aneuver lanes, N	N <sub>WL</sub>		2 lc	Minimum we	aving lane ch	nanges, LC <sub>MIN</sub>		2256 lc/h	
Interchange	density, ID			0.7 int/mi	Weaving lan	e changes, L	C <sub>w</sub>		2705 lc/h	
Minimum RI	<sup>=</sup> lane changes,	LC <sub>RF</sub>		1 lc/pc	Non-weaving	g lane change	es, LC <sub>NW</sub>		1475 lc/h	
Minimum FF	R lane changes,	LC <sub>FR</sub>		1 lc/pc	Total lane ch	nanges, LC <sub>ALI</sub>	_		4180 lc/h	
Minimum RI	R lane changes,	LC <sub>RR</sub>		lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		753	
Weaving	g Segment	Speed,	Density, I	_evel of	Service,	and Cap	acity			
Weaving se Weaving se	gment flow rate, gment capacity,	6439 veh/h 6838 veh/h	Weaving inte Weaving seg	ensity factor, gment speed,	W S		0.337 49.0 mph			
Weaving se	gment v/c ratio	vV		0.942	Average weaving speed, $S_w$				56.1 mph	
Weaving segment density, D 33.3 pc/mi					Average non-weaving speed, S <sub>NW</sub>				45.9 mph	
Level of Ser	vice, LOS			D	Maximum weaving length, L <sub>MAX</sub> 6080					
Notes					•					
a. Weaving s Chapter 13, " b. For volume	egments longer th Freeway Merge a es that exceed the	nan the calcula nd Diverge Se weaving segr	ted maximum le gments". nent capacity, th	ength should l	be treated as is vice is "F".	olated merge	and diverge ar	eas using the	procedures of	

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		F	REEWAY	WEAV	ING WOF	RKSHEE	Г			
General	Informatio	on			Site Information					
Analyst Agency/Con Date Perforr Analysis Tin	npany ned ne Period	AECON AM	1		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sample Analysis Year 2040 Build 2					
Project Dese	cription SW 10th	n Street SIMR								
Inputs					1					
Weaving co Weaving nu Weaving se Freeway fre	nfiguration mber of lanes, N gment length, L <sub>s</sub> e-flow speed, FF	One-Sided 4 2380ft 70 mph	Segment typ Freeway min Freeway ma: Terrain type	e imum speed, ximum capac	S <sub>MIN</sub> ity, C <sub>IFL</sub>		Freeway 15 2400 Level			
Convers	sions to po	/h Under	<sup>r</sup> Base Co	ondition	S		•	-	-	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	4690	0.95	3	0	1.5	1.2	0.985	1.00	5011	
V <sub>RF</sub>	420	0.92	2	0	1.5	1.2	0.990	1.00	461	
V <sub>FR</sub>	970	0.92	2	0	1.5	1.2	0.990	1.00	1065	
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
V <sub>NW</sub>	5011			•	-			V =	6537	
V <sub>w</sub>	1526							-		
VR	0.233									
Configu	ration Cha	racterist	ics		•					
Minimum m	aneuver lanes, N	N <sub>WL</sub>		2 lc	Minimum we	aving lane ch	nanges, LC <sub>MIN</sub>		1526 lc/h	
Interchange	density, ID			0.7 int/mi	Weaving lan	e changes, L	C <sub>w</sub>		1961 lc/h	
Minimum R	F lane changes,	LC <sub>RF</sub>		1 lc/pc	Non-weaving	g lane change	es, LC <sub>NW</sub>		1552 lc/h	
Minimum Fl	R lane changes,	LC <sub>FR</sub>		1 lc/pc	Total lane ch	nanges, LC <sub>ALI</sub>	_		3513 lc/h	
Minimum R	R lane changes,	LC <sub>RR</sub>		lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		835	
Weaving	g Segment	Speed,	Density, I	_evel of	Service,	and Cap	acity			
Weaving se Weaving se	gment flow rate, gment capacity,	v c <sub>w</sub>		6448 veh/h 8705 veh/h	Weaving inte Weaving seg	ensity factor, gment speed,	W , S		0.307 52.4 mph	
Weaving se	gment v/c ratio			0.741	Average weaving speed, $S_w$				57.1 mph	
Weaving se	gment density, D	)	3′	1.2 pc/mi/ln	Average nor	n-weaving spe	eed, S <sub>NW</sub>		51.2 mph	
Level of Ser	vice, LOS			D	Maximum we	eaving length	, L <sub>MAX</sub>		4881 ft	
Notes										
a. Weaving s Chapter 13, " b. For volume	egments longer th Freeway Merge a es that exceed the	an the calcula nd Diverge Se weaving segn	ted maximum le gments". nent capacity, tl	ength should l	be treated as is ∿ice is "F".	olated merge	and diverge ar	eas using the	procedures of	

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
0					
General Information			Site Information		
Analyst			Highway/Direction of Travel	I-95 NB Sea 2-B	et Off & On from
Agency or Company	AECOM		From/To	Sample	
Date Performed Analysis Time Period	AM		Jurisdiction Analysis Year	2040 Bu	ild 2
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	6)		Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V	5110	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	%Trucks and Buses, P <sub>T</sub>	3	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D		voh/h	General Terrain:	Level	
		Ven/m	Up/Down %	1111	
Calculate Flow Adjust	monte				
	4.00				
	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.985	
Speed Inputs			Calc Speed Adj and FF	S	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS	6	mph			
LOS and Performance	e Measures		Design (N)		
			Desian (N)		
Operational (LOS)			Design LOS		
v <sub>p</sub> = (V or DDHV) / (PHF x N	l x f <sub>HV</sub> x f <sub>p</sub> ) 1820	pc/h/ln	$v_{\rm p} = (V \text{ or DDHV}) / (PHF x N x)$	(f <sub>uv</sub> x f <sub>n</sub> )	pc/h/ln
S	65.5	mph	S	nv p	mph
$D = v_p / S$	27.8	pc/mi/ln	D = v_ / S		pc/mi/ln
LOS	D		ہ Required Number of Lanes, N	I	F
Glossary			Factor Location		
N - Number of lanes	S - Speed				
V - Hourly volume	D - Density		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v Flow rate	FFS - Free-flow	speed	E <sub>T</sub> - Exhibits 11-10, 11-11, 11	-13	f <sub>LC</sub> - Exhibit 11-9
LOS - Level of service	BFFS - Base fre	e-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
DDHV - Directional design h	iour volume	ie non opoou	LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	-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	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

General Infor	mation			Site Inform	nation				
Analyst			Fr	reeway/Dir of Tra		95 NB			
Agency or Company	AFC	M	 . li	inction	-101 C	eg 1-On from l	Evn		
Date Performed	ALO	5101		risdiction	0		_^p		
Analysis Time Period	AM		Ar	nalvsis Year	2	040 Build 2			
Project Description	SW 10th Stree	t SIMR			£	o to Build 2			
Inputs									
Instream Adi Pamp		Freeway Num	per of Lanes, N	4				Downstr	oom Adi
		Ramp Number	of Lanes. N	1				Ramp	eani Auj
🗌 Yes 📃 On		Acceleration I	ane Length, L.	1500					
		Deceleration I	ane Length L	1000				I Yes	⊡ On
I No ☐ Of	-	Eroowov Volu		6F60				🗌 No	✓ Off
= ft			ne, v <sub>F</sub>	0000				I. =	2950 ft
up n		Ramp volume	, v <sub>R</sub>	830				-down	2000 11
/ = veh/h		Freeway Free-	Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	180 veh/h
u		Ramp Free-Flo	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	p pc/h Und	der Base (	Conditions	<u> </u>			1		
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6560	0.95	Level	3	0	0.985	1.00		7009
Ramp	830	0.92	Level	2	0	0.990	1.00		911
JpStream									
DownStream	180	0.92	Level	2	0	0.990	1.00		198
		Verge Areas					Diverge Areas	;	
Estimation of	V <sub>12</sub>				Estimatio	on of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				V -	= \/ + (\/ _ \		
-FO =	(Equa	ation 13-6 or	13-7)		-	<b>*</b> 12	(Equation 1)	'R/'FD 2 12 or 12	12)
р <sub>см</sub> =	0.104	usina Equati	on (Exhibit 13-6)	)	EQ -			3-12 UI 13-	-13)
	729 po/b				P <sub>FD</sub> =		using Equat	tion (Exhibit	13-7)
' 12	720 p	o/h oc/b (Equatio	n 12 11 or 12		V <sub>12</sub> =		pc/h		
/ <sub>3</sub> or V <sub>av34</sub>	17)	Jo/II (Equalit	JI 13-14 01 13-		$V_3^{}$ or $V_{av34}^{}$		pc/h (Equatior	n 13-14 or 13	-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h? 🗸 Yes	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				
Is $V_2$ or $V_{2,24} > 1.5$ *	V <sub>10</sub> /2 Ve	s 🗌 No							
3 av34	2803	oc/h (Fouatio	on 13-16, 13-		If Yes V <sub>10</sub> =		pc/h (Equat	ion 13-16,	13-18, or
f Yes,V <sub>12a</sub> =	18, or	13-19)			12a		13-19)		
Capacity Che	cks				Capacity	Checks			
	Actual	C	apacity	LOS F?		Actua	I C	Capacity	LOS F?
					V <sub>F</sub>		Exhibit 1	3-8	
V <sub>EO</sub>	7920	Exhibit 13-8		No	V <sub>FO</sub> = V <sub>F</sub> -	V <sub>R</sub>	Exhibit 1	3-8	
	-				V_		Exhibit 1	3-	
	<u> </u>			<u> </u>	^R		10		
low Entering	Merge In	fluence A	rea	Vial-the O	Flow Ent	ering Div	erge Influe	ence Are	
V	ACIUAI	IVIAX L Evhibit 12 0		violation?	V	Actual	Exhibit 12 0		violation?
		nination (	4000.All			l Sonvica D		ion (if no	<u> </u>
$D_{R} = 0.475 +$	0.00704 V R + (	12 - 0.0			ע י - ח	R - +.232 +	0.0000 v <sub>12</sub> -	0.009 LD	
v <sub>R</sub> − 29.0 (pc/m	i/i(1)				u <sub>R</sub> –      (pc	/mi/in)			
LOS = D (Exhibit 13-2)					LOS = (Ex	hibit 13-2)			
Speed Detern	nination				Speed De	eterminat	ion		
M <sub>S</sub> = 0.395 (Exil	oit 13-11)				D <sub>s</sub> = (Exl	hibit 13-12)			
$S_{-}= 58.9 \text{ mph} (Exhibit 13-11)$					S <sub>R</sub> = mpł	n (Exhibit 13-1	2)		
S <sub>R</sub> = 58.9 mph (	$P_R^-$ 50.9 mpr (Exmut 15-11)								
$S_{R}^{=}$ 58.9 mph ( $S_{0}^{=}$ 65.2 mph (	Exhibit 13-11)				S <sub>0</sub> = mpł	n (Exhibit 13-1	2)		
$S_R = 58.9 \text{ mph}$ ( $S_0 = 65.2 \text{ mph}$ ( S = 61.8  mph (	Exhibit 13-11) Exhibit 13-13)				S <sub>0</sub> = mpł S= moł	n (Exhibit 13-1) n (Exhibit 13-1)	2) 3)		

RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Infor	rmation			Site Infor	mation					
Analyst			Fre	eeway/Dir of Tr	avel	I-95 NE	3			
Agency or Company	AEC	ОМ	Ju	nction		Seg 5-0	Off to Exp f	rom GPL		
Date Performed			Ju	risdiction						
Analysis Time Period	d AM		An	alysis Year		2040 B	uild 2			
Project Description	SW 10th Stree	t SIMR								
inputs									1	
Upstream Adj R	Ramp	Freeway Num	IDER OF Lanes, IN	4					Downstrea	m Adj
		Ramp Numbe	er of Lanes, N	1					Ramp	
res 🖻		Acceleration I	Lane Length, L <sub>A</sub>						🗌 Yes	On
□ No □	Off	Deceleration	Lane Length L <sub>D</sub>	200					Mo	Off
		Freeway Volu	ıme, V <sub>F</sub>	7390						
L <sub>up</sub> = 29	L <sub>up</sub> = 2950 ft Ramp Volume, V <sub>R</sub> 180								L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V _	
$V_u = 83$	30 veh/h	Ramp Free-F	low Speed, S <sub>ED</sub>	45.0					v <sub>D</sub> =	ven/h
Conversion t	o pc/h Un	der Base	Conditions						1	
(no/h)	V		Torroin	0/ Truck	0/ Dv	1	f	f		vf vf
(pc/n)	(Veh/hr)	PHF	remain	% ITUCK	%RV		'HV	ľр		× ' <sub>HV</sub> × ' <sub>p</sub>
Freeway	7390	0.95	Level	3	0	0.	985	1.00	789	96
Ramp	180	0.92	Level	2	0	0.	990	1.00	19	8
UpStream	830	0.92	Level	2	0	0.	990	1.00	91	1
DownStream										
Estimation of	fv	werge Areas			Ectimat	ion o	L.	liverge Areas		
	v 12				Estimat		<b>12</b>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	′ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		38	34.82 (Equat	ion 13-12 oi	<sup>-</sup> 13-13)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	436 using Eq	uation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		35	54 pc/h		
$V_3$ or $V_{2\sqrt{3}4}$	pc/h (	Equation 13	-14 or 13-17)		$V_3$ or $V_{2y34}$		21	71 pc/h (Eau	uation 13-14	or 13-17)
$I_{\rm S}$ V <sub>2</sub> or V <sub>224</sub> > 2.70	)0 pc/h? □ Ye	s 🗌 No	,		Is V <sub>2</sub> or V <sub>2</sub>	<sub>24</sub> > 2.7	00 pc/h? [	Yes Vo		- /
$1 \text{ s} V_{2} \text{ or } V_{24} > 1.5^{3}$	*V/2 UVe				Is V <sub>o</sub> or V	<sup>54</sup> س > 1.5	* V/2			
	pc/h (	Equation 13	-16. 13-18. or		pc/h (Equation 13-16, 13-18, or 13-					
If Yes,V <sub>12a</sub> =	13-19)		-,,		If Yes, V <sub>12a</sub> = 19)					
Capacity Che	ecks				Capacity Checks					
	Actual	(	Capacity	LOS F?			Actual	Ca	apacity	LOS F?
					V <sub>F</sub>		7896	Exhibit 13-	8 9600	No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	7698	Exhibit 13-	8 9600	No
					V <sub>R</sub>		198	Exhibit 13-	10 2100	No
Flow Entering	a Merae In	fluence A	Area		Flow En	terin	a Diver	ae Influer	ice Area	
	Actual	Max	Desirable	Violation?			Actual	Max Desira	ble	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		3554	Exhibit 13-8	4400:All	No
Level of Serv	vice Detern	nination (	ïf not F)		Level of Service Determination (if not F)					
$D_{p} = 5.475 + 0.$	.00734 v <sub>P</sub> +	0.0078 V <sub>12</sub>	- 0.00627 L		$D_{p} = 4.252 \pm 0.0086 V_{co} - 0.0091 -$					
$D_{\rm p} = (\rm pc/mi/ln)$				$D_{\rm r} = 330 (\rm nc/mi/ln)$						
LOS = (Exhibit 13-2)					$P_{R}^{-} = 50.0 \text{ (pc/mi/m)}$					
Speed Determination					Sneed [	)eter	minatio	n		
	2 11)				D = n	316 (F	xhihit 12-	12)		
	0-11)				$S_{n} = 61$	0.0 (∟   2 mnh	(Evhihit	· <i>-,</i> 13_12)		
ວ <sub>R</sub> = mph (Exh	13-11)				$\sim_{\rm R}$ 0			10-12)		
S <sub>0</sub> = mph (Exh	nibit 13-11)				S <sub>0</sub> - 72	∠.∠ mph	(⊏xnibit	13-12)		
S = mph (Exh	101t 13-13)				5 = 66	o.8 mph	(Exhibit	13-13)		
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2040 Build 2 Freeway HCS Operational Analysis

Generated: 6/16/2020 9:51 PM Page 61 of 112

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 6-Se	outh of Off to 10th
Project Description SW 10t	h Street SIMR			2040 Du	
✓ Oper.(LOS)			Des.(N)	Pla	Inning Data
Flow Inputs					<u> </u>
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	7210	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.95 3 0 Level mi	
		Ven/m	Up/Down %	1111	
Calculate Flow Adjustr	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1926 63.9 30.1 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - 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		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 8-Be	et Off & Off Ramps
Project Description SW 10th	Street SIMR			2040 Dui	
✓ 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	6020	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.95 3 0 Level mi	
Calculate Flow Adjustn	nents		Up/Down %		
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 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 <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 2144 59.7 35.9 E	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	speed e-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Infor	mation			Site Infor	mation					
Analyst			Fre	eeway/Dir of Tr	avel	I-95 NE	3			
Agency or Company	AEC	OM	Ju	nction		Seg 9-0	Off to Hillst	oro EB&WB		
Date Performed			Ju	risdiction		0040 0	1.1.0			
Project Description	SW/ 10th Stree		An	lalysis rear		2040 B				
Innuts										
inputo		Freeway Num	her of Lanes N	3					L .	
Upstream Adj R	lamp	Pamp Numbe	or of Lanes N	1					Downstre	am Adj
Yes	On			I						
			Lane Length, L <sub>A</sub>	000					✓ Yes	🗹 On
I No □	Off			200					🗌 No	Off
	4	Freeway Volu	me, v <sub>F</sub>	6020					. =	2100 ft
	L	Ramp Volume	e, V <sub>R</sub>	1330					⁻down	2100 11
V= v	eh/h	Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	1230 veh/h
		Ramp Free-F	low Speed, S <sub>FR</sub>	45.0						
Conversion t	o pc/h Un	der Base	Conditions						0	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	= x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6020	0.95	Level	3	0	0.	985	1.00	6	432
Ramp	1330	0.92	Level	2	0	0.	990	1.00	1	460
UpStream										
DownStream	1230	0.92	Level	2	0	0.	990	1.00	1	350
	<b>C</b>	Merge Areas			<b>F</b> = 4 <sup>2</sup> + + = 4		<u>[</u>	iverge Areas		
Estimation of	<sup>r v</sup> 12				Estimat	ion o	<sup>or v</sup> 12			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	R)P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-13	3)
P <sub>FM</sub> =	using	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		0.	532 using Eq	uation (Exh	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		41	05 pc/h		
$V_3^{}$ or $V_{av34}^{}$	pc/h (	Equation 13	-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		23	327 pc/h (Equ	ation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	0 pc/h? 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av}$	<sub>34</sub> > 2,7	00 pc/h?	Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5$	*V <sub>12</sub> /2 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes  No					
If Yes,V <sub>12a</sub> =	pc/h (	Equation 13	-16, 13-18, or		If Yes, $V_{120}$ = pc/h (Equation 13-16, 13-18, or 13-					
Capacity Cho	13-19)	)			Canacity Chacks					
	Actual		anacity	LOS F2		<u>y Cin</u>	Actual	C	anacity	1.0S F2
	/ totudi	Ĩ	apaony	20011	V_		6432	Exhibit 13-	8 7200	No
V		Evhibit 12.9			V = V	- V	4072	Exhibit 12	9 7200	No
* FO					FO F	- <b>v</b> R	4972		0 7200	NU
					V <sub>R</sub>		1460	Exhibit 13-	10 2100	NO
Flow Entering	g Merge In	fluence A	lrea	Violetiano	Flow En	iterin	g Dive	rge Influer	ice Area	Violation
V	Actual	IVIAX	Desirable	violation?	V			Evhibit 12.9		Violation?
	ica Datarr	EXIMULI 13-0	if not E)			<u> </u>		Exhibit 15-0	4400.All	
$\frac{\text{Level of Serv}}{D = 5.475 \pm 0}$					Leveror					<u>r)</u>
$D_R = 5.475 \pm 0.00734 v_R \pm 0.0078 v_{12} \pm 0.00627 L_A$				$D_{\rm R} = 4.252 + 0.0086 \rm V_{12} - 0.009 \rm L_{\rm D}$						
$D_R = (pc/m/m)$				$D_{\rm R} = 3/$	/.8 (pc/	/mi/in)				
LOS = (Exhibit 13-2)				LOS = E (Exhibit 13-2)						
Speed Deterr	nination				Speed L	Deter	minatic	on		
M <sub>S</sub> = (Exibit 1)	3-11)				D <sub>s</sub> = 0.	429 (E	xhibit 13-	·12)		
S <sub>R</sub> = mph (Exh	nibit 13-11)				S <sub>R</sub> = 58	3.0 mph	(Exhibit	13-12)		
S <sub>0</sub> = mph (Exh	nibit 13-11)				S <sub>0</sub> = 71	1.6 mph	(Exhibit	13-12)		
S = mph (Exh	nibit 13-13)				S = 62	2.3 mph	(Exhibit	13-13)		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 NB Seg 10-l	Bet Off & On Ramps
Analysis Time Period	AM		Analysis Year	2040 Bu	ild 2
Project Description SW 10t	n Street SIMR				unning Data
Flow Inputs			Jes.(III)		
Volume, V AADT	4690	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, Ρ <sub>τ</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	nents				
f <sub>p</sub> E-	1.00 1.5		$E_{R}$ f, = 1/(1+P_{T}(E_{T} - 1) + P_{D}(E_{D} - 1))	1.2 0.985	
Sneed Innuts			$\frac{1}{100}$	3	
				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	π ft ramps/mi mph mph	f <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1670 67.4 24.8 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - 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	6,325	0.66	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,011	0.70	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,308	0.62	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 NB Seg 12-l	Bet On Ramps
Analysis Time Period	AM		Analysis Year	2040 Bu	ild 2
Project Description SW 10th	n Street SIMR				unning Data
Elow Inputs			Jes.(N)		anning Data
	5020	veb/b	Dook Hour Foster, DHF	0.05	
AADT Peak-Hr Prop. of AADT. K	5920	veh/day	%Trucks and Buses, P <sub>T</sub> %RVs, P <sub>D</sub>	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 <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
Ε <sub>Τ</sub>	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 <sub>LW</sub>		mph
Number of Lanes, N	4		t <sub>LC</sub>		mph
Total Ramp Density, TRD	70.0	ramps/mi	IRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mpn			
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1581 68.3 23.1 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWA	Y WEAV	ING WOF	RKSHEE	Т			
Genera	al Informati	on			Site Info	rmation				
Analyst Agency/Co Date Perfo Analysis T	ompany ormed ïme Period	AECO AM	М		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 13-Bet On & Off to Exp Analysis Year 2040 Build 2					
Project De	escription SW 10	th Street SIMF	8		-					
Inputs					1					
Weaving configurationTwo-SidedWeaving number of lanes, N4Weaving segment length, Ls4600ftFreeway free-flow speed, FFS70 mph				Segment typ Freeway min Freeway ma: Terrain type	e imum speed ximum capac	, S <sub>MIN</sub> sity, C <sub>IFL</sub>		Freewa 1: 240 Leve		
Conve	rsions to p	<u>c/h Unde</u>	r Base Co	ondition	S					
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	4950	0.95	3	0	1.5	1.2	0.985	1.00	5289	
V <sub>RF</sub>	1090	0.92	2	0	1.5	1.2	0.990	1.00	1197	
V <sub>FR</sub>	970	0.92	2	0	1.5	1.2	0.990	1.00	1065	
V <sub>RR</sub>	300	0.92	2	0	1.5	1.2	0.990	1.00	329	
V <sub>NW</sub>	7551							V =	7880	
V <sub>w</sub>	329							-		
VR	0.042									
Config	uration Ch	aracteris	tics							
Minimum	maneuver lanes,	N <sub>WI</sub>		0 lc	Minimum weaving lane changes, LC <sub>MIN</sub> 987 lc/					
Interchang	ge density, ID			0.7 int/mi	Weaving lan	1613 lc/h				
Minimum	RF lane changes	, LC <sub>RF</sub>		0 lc/pc	Non-weaving	3373 lc/h				
Minimum	FR lane changes	, LC <sub>FR</sub>		0 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4986 lc/h	
Minimum	RR lane changes	, LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2431	
Weavir	ng Segmen	t Speed,	Density,	Level of	Service,	and Cap	pacity			
Weaving s	segment flow rate	e, V		7776 veh/h	Weaving inte	ensity factor,	W		0.241	
Weaving segment capacity, c <sub>w</sub> 9001 veh/h					Weaving seg	gment speed	, S		53.7 mph	
Weaving	segment v/c ratio			0.864	Average weaving speed, $S_{W}$				59.3 mph	
Weaving s	segment density,	D	3	6.7 pc/mi/ln	Average non-weaving speed, $S_{_{NW}}$				53.4 mph	
Level of S	ervice, LOS			E	Maximum weaving length, L <sub>MAX</sub> 6115				6115 f	
Notes										
a. Weaving	segments longer t	han the calcula	ated maximum le	ength should l	be treated as is	olated merge	and diverge ar	eas using the	procedures of	

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		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 14-I 2040 Bu	North of Hillsboro
Project Description SW 10t	h Street SIMR			2040 Du	
✓ Oper.(LOS)	)		Des.(N)	Pla	Inning Data
Flow Inputs					<u> </u>
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	6040	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.95 3 0 Level mi	
Calculate Flow Adjustr	nonts		Up/Down %		
	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 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 <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1613 68.0 23.7 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	WEAV	ING WOF	RKSHEE	Г				
General	Informatio	on			Site Info	rmation					
Analyst Agency/Con Date Perforr Analysis Tin	npany ned ne Period	AECOM PM	1		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sample Analysis Year 2040 Build 2						
Project Dese	cription SW 10th	Street SIMR									
Inputs					1						
Weaving configurationOne-SidedWeaving number of lanes, N4Weaving segment length, Ls2380ftFreeway free-flow speed, FFS70 mph					Segment typ Freeway min Freeway ma: Terrain type	e imum speed, ximum capac	S <sub>MIN</sub> ity, C <sub>IFL</sub>		Freeway 15 2400 Level		
Convers	sions to po	/h Under	<sup>r</sup> Base Co	ondition	S			1	-		
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)		
V <sub>FF</sub>	4355	0.95	3	0	1.5	1.2	0.985	1.00	4653		
V <sub>RF</sub>	495	0.92	2	0	1.5	1.2	0.990	1.00	543		
V <sub>FR</sub>	1810	0.92	2	0	1.5	1.2	0.990	1.00	1987		
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0		
V <sub>NW</sub>	4653						•	V =	7183		
V <sub>W</sub>	2530							-	-		
VR	0.352										
Configu	ration Cha	racterist	ics		•						
Minimum m	aneuver lanes, N	I <sub>WL</sub>		2 lc	Minimum weaving lane changes, LC <sub>MIN</sub>						
Interchange	density, ID			0.7 int/mi	Weaving lane changes, LC <sub>w</sub>						
Minimum R	F lane changes,	LC <sub>RF</sub>		1 lc/pc	Non-weaving	g lane change	es, LC <sub>NW</sub>		lc/h		
Minimum Fl	R lane changes,	LC <sub>FR</sub>		1 lc/pc	Total lane ch	nanges, LC <sub>ALI</sub>	_		lc/h		
Minimum R	R lane changes,	LC <sub>RR</sub>		lc/pc	Non-weaving vehicle index, I <sub>NW</sub>						
Weavin	g Segment	Speed, I	Density, I	_evel of	Service,	and Cap	acity				
Weaving se Weaving se	gment flow rate, gment capacity,	v c <sub>w</sub>		7090 veh/h 6713 veh/h	Weaving inte Weaving seg	ensity factor, gment speed,	W S		mph		
Weaving segment v/c ratio 1.056					Average wea	aving speed,	Sw		mph		
Weaving segment density, D pc/mi/ln				pc/mi/ln	Average non-weaving speed, $S_{_{NW}}$				mph		
Level of Sei	VICE, LOS			F	Maximum weaving length, L <sub>MAX</sub> 6151 ft						
<b>Notes</b> a. Weaving s Chapter 13, " b. For volume	egments longer th Freeway Merge a es that exceed the	an the calculat nd Diverge Se weaving segn	ted maximum le gments". nent capacity, th	ength should l	be treated as is vice is "F".	solated merge	and diverge ar	eas using the	procedures of		

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst			Highway/Direction of Travel	I-95 NB Sea 2-Be	et Off & On from
Agency or Company	AECOM		From/To	Sample	
Date Performed Analysis Time Period	РМ		Jurisdiction Analysis Year	2040 Bu	ild 2
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V	4850	veh/h	Peak-Hour Factor, PHF	0.95	
AADT		veh/day	% Irucks and Buses, P <sub>T</sub>	3	
Peak-Hr Prop. of AADT, K			%RVs, P <sub>R</sub>	0	
Peak-Hr Direction Prop, D DDHV = AADT $x K x D$		veh/h	General Terrain: Grade % Length	Level mi	
		Venin	Up/Down %		
Calculate Flow Adjust	ments				
f	1.00			12	
'p F_	1.50		$rac{1}{2}R$ f, = 1/(1+P_(E, 1) + P_(E, 1))	0.985	
-T Cread Innute	1.0			0.000	
Speed inputs				5	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3		f <sub>LC</sub>		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)		
			Design (N)		
Operational (LOS)			Design LOS		
$v_p = (V \text{ or DDHV}) / (PHF x N)$	x f <sub>HV</sub> x f <sub>p</sub> ) 1727	pc/h/ln	$v_{p} = (V \text{ or DDHV}) / (PHF x N x)$	f <sub>HV</sub> x f <sub>n</sub> )	pc/h/ln
S	66.8	mph	S	11 <b>0</b> P	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 - Sneed				
V - Hourly volume	D - Density		E <sub>R</sub> - Exhibits 11-10, 11-12		f <sub>LW</sub> - Exhibit 11-8
v - Flow rate	FFS - Free-flow	speed	E <sub>T</sub> - Exhibits 11-10, 11-11, 11	-13	f <sub>LC</sub> - Exhibit 11-9
I OS - Level of service	BEES - Base fre	e-flow speed	f <sub>p</sub> - Page 11-18		TRD - Page 11-11
DDHV - Directional design he	our volume	ie new opoou	LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	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

General Infor	mation			Site Inform	nation				
Analyst			Fr	reeway/Dir of Tra		95 NB			
Agency or Company		ЭМ		inction		eg 4-On from I	Fxn		
Date Performed	ALO			irisdiction	3		μνμ		
Analysis Time Period	PM		Ar	nalysis Year	2	040 Build 2			
Project Description	SW 10th Stree	t SIMR		,	£				
Inputs									
Instream Adi Ramp		Freeway Num	per of Lanes, N	4				Downstr	oam Adi
		Ramp Number	of Lanes, N	1				Ramp	cani Auj
Yes On		Acceleration L	ane Length. L.	1500					
		Deceleration I	ane Length L					I res	
✓ No Off		Erooway Volu		5000				🗌 No	✓ Off
= ft			Ne, v <sub>F</sub>	5990				L <sub>daum</sub> =	2950 ft
-up n			, v <sub>R</sub>	670				down	2000 11
/,, =       veh/h		Freeway Free	Flow Speed, S <sub>FF</sub>	/0.0				V <sub>D</sub> =	310 veh/h
u		Ramp Free-Fl	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	p pc/h Und	der Base (	Conditions	,			1	-	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/Pł	IF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	5990	0.95	Level	3	0	0.985	1.00		6400
Ramp	670	0.92	Level	2	0	0.990	1.00		736
UpStream									
DownStream	310	0.92	Level	2	0	0.990	1.00		340
		Merge Areas					Diverge Areas	3	
Estimation of	v <sub>12</sub>				Estimatio	on of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )				V -	- \/ + (\/ \		
- <u>FO</u> =	(Equa	ation 13-6 or	13-7)		_	<b>v</b> 12 -	- v <sub>R</sub> ' (v <sub>F</sub> - v	'R <sup>J</sup> FD	10)
P_,, =	(-126) using Equation (Exhibit 13.6)				EQ -		(Equation 1	3-12 of 13	-13)
FM =							using Equat	tion (Exhibit	13-7)
12	005 P	on/b (Equativ	n 12 11 or 12		V <sub>12</sub> =		pc/h		
/ <sub>3</sub> or V <sub>av34</sub>	17)	bom (Equalit	JI 13-14 01 13-		$V_3^{}$ or $V_{av34}^{}$		pc/h (Equation	n 13-14 or 13	-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h? 🗸 Ye	s 🗌 No			Is $\rm V_3$ or $\rm V_{av34}$	> 2,700 pc/h?	Yes N	0	
Is $V_2$ or $V_{av24} > 1.5$ *	V <sub>10</sub> /2 Ve	s 🗌 No			Is $V_3$ or $V_{av34}$	> 1.5 * V <sub>12</sub> /2	Yes N	0	
	2560	oc/h (Equatio	on 13-16. 13-		If Yes.V402 =		pc/h (Equat	ion 13-16,	13-18, or
f Yes,v <sub>12a</sub> =	18, or	13-19)	,		12a		13-19)		
Capacity Che	cks				Capacity	Checks			
	Actual	C	apacity	LOS F?		Actua	al C	Capacity	LOS F?
					V <sub>F</sub>		Exhibit 1	3-8	
V <sub>EO</sub>	7136	Exhibit 13-8		No	V <sub>FO</sub> = V <sub>F</sub> -	V <sub>R</sub>	Exhibit 1	3-8	
FU					V_		Exhibit 1	13-	
				<u> </u>	<sup>'R</sup>	<u> </u>	10		
-low Entering	Merge In	fluence A	rea	Vieletie - O	Flow Ent	ering Div	erge Influe	ence Are	a Violation C
V	ACTUR	WIAX I			1/	Actual	Evhibit 12 0		violation?
	ico Dotorn	nination (	f not E			Sorvice D		ion (if no	( <i>t E</i> )
$D_{R} = 0.470 +$	0.00704 V R + (	12 - 0.0			ש י – ח	R - +.202 +	0.0000 v <sub>12</sub>	0.009 LD	
v <sub>R</sub> − 25.4 (pc/m	i/in)				<sub>R</sub> = (рс	/mi/in)			
OS = C (Exhibit	13-2)				LOS = (E>	hibit 13-2)			
Speed Detern	nination				Speed De	eterminat	ion		
M <sub>S</sub> = 0.314 (Exil	oit 13-11)				D <sub>s</sub> = (Ex	nibit 13-12)			
$S_{r} = 61.2 \text{ mph} (\text{Exhibit 13-11})$					S <sub>R</sub> = mpl	n (Exhibit 13-12	2)		
⊳ <sub>R</sub> = 61.2 mph (Exhibit 13-11)									
$S_R^-$ 61.2 mpn ( $S_0^-$ 65.8 mph (	$S_{0} = 65.8 \text{ mph} (Exhibit 13-11)$					n (Exhibit 13-12	2)		
S <sub>R</sub> = 65.8 mph ( S <sub>0</sub> = 65.8 mph ( S = 63.3 mph (	Exhibit 13-11) Exhibit 13-13)				S <sub>0</sub> = mpl S= mpl	n (Exhibit 13-12 n (Exhibit 13-13	2) 3)		

		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	rmation			Site Infor	mation					
Analyst			Fre	eeway/Dir of Tr	avel	I-95 NE	3			
Agency or Company	AEC	ОМ	Ju	nction		Seg 5-	Off to Exp f	rom GPL		
Date Performed			Ju	risdiction						
Analysis Time Period	d AM		An	alysis Year		2040 B	uild 2			
Project Description	SW 10th Stree	t SIMR								
inputs		Eastern Nier	han af Lanas N						1	
Upstream Adj F	Ramp	Freeway Nurr	IDER OF Lanes, IN	4					Downstrea	m Adj
		Ramp Numbe	er of Lanes, N	1					Ramp	
res 🖻		Acceleration I	_ane Length, L <sub>A</sub>						🗌 Yes	On
No 🗆	Off	Off Deceleration Lane Length L <sub>D</sub> 200								Off
		Freeway Volu	ime, V <sub>F</sub>	6660						
L <sub>up</sub> = 29	950 ft	Ramp Volume	e, V <sub>R</sub>	310					L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>EE</sub>	70.0					V _	
$V_u = 67$	70 veh/h	Ramp Free-F	low Speed, S <sub>ED</sub>	45.0					v <sub>D</sub> =	ven/h
Conversion t	o pc/h Un	der Base	Conditions							
(po/b)	V		Torroin	0/ Truck	0/ Dv		f	f		vfvf
(pc/n)	(Veh/hr)	PHF	remain	% ITUCK	%RV		'HV	Р		<b>^ '</b> HV <b>^ '</b> p
Freeway	6660	0.95	Level	3	0	0.	985	1.00	71	16
Ramp	310	0.92	Level	2	0	0.	990	1.00	34	0
UpStream	670	0.92	Level	2	0	0.	990	1.00	73	6
DownStream										
Estimation	fv	werge Areas			Estimat	iono	L of v	nverge Areas		
	12				LSumau		<b>** 12</b>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	′ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		35	524.43 (Equat	tion 13-12 o	r 13-13)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	436 using Eq	uation (Exhil	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		32	.94 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$		19	)11 pc/h (Equ	uation 13-14	or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h? 🗌 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av</sub>	<sub>34</sub> > 2,7	00 pc/h?	Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5$	* V <sub>12</sub> /2 Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>2V</sub>	34 > 1.5	* V <sub>12</sub> /2	Yes 🗸 No		
	pc/h (	Equation 13	-16, 13-18, or		If Yes V <sub>10</sub> = pc/h (Equation 13-16, 13-18, or 13-					
11 103, V <sub>12a</sub>	13-19)				19)					
Capacity Che	ecks	1		1	Capacity Checks					
	Actual		Capacity	LOS F?			Actual	C	apacity	LOS F?
					V <sub>F</sub>		7116	Exhibit 13-	·8 9600	No
V <sub>FO</sub>		Exhibit 13-8			V <sub>FO</sub> = V <sub>F</sub>	- V <sub>R</sub>	6776	Exhibit 13-	·8 9600	No
					V <sub>R</sub>		340	Exhibit 13-	10 2100	No
Flow Entering	g Merge In	fluence A	lrea		Flow En	terin	g Dive	rge Influer	nce Area	
	Actual	Max	Desirable	Violation?		/	Actual	Max Desira	ble	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3294	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)				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 <sub>R</sub> = (pc/mi/lr	ı)				$D_{R} = 30.8 (pc/mi/ln)$					
LOS = (Exhibit	13-2)				LOS = D (Exhibit 13-2)					
Speed Determination					Speed L	Deter	minatic	n		
M = (Evibit 13.11)					$D_{a} = 0.329$ (Exhibit 13-12)					
$S_{=}$ mph (Eyk					S <sub>R</sub> = 60	).8 mnh	(Exhibit	, 13-12)		
$rac{R}{R}$ Input (EXI	$\frac{101110-11}{10110}$				S_= 73	3 2 mnh	(Exhibit	13-12)		
S = mph(Ext)	non 13-11) hihit 13_13)				S = 66	a moh		13_12)		
	hor Floride AUD	lights Bosser -						10-10)	Concreted: C	16/2020 0.5
/iigiit ⊜ ∠u iu UtiiveľSli	y or rionual, All P	ignis reserved			HCS2010	versi	on 6.90		Generaleu. C	10/2020 9.54

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company AECOM Date Performed Analysis Time Period PM			Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-Se 2040 Bu	outh of Off to 10th ild 2
Project Description SW 10t	h 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	6350	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> General Terrain: Grade % Length	0.95 3 0 Level mi	
Calculate Flow Adjustr	nonts		Up/Down %		
	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	.13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - 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	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 8-B	et Off & Off Ramps
Analysis Time Period	PM		Analysis Year	2040 Bu	
Qper.(LOS)	)		Des.(N)	Pla	nning Data
Flow Inputs	,		()		
Volume, V AADT Peak-Hr Prop. of AADT, K	3760	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	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 Adjustr	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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 FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1339 69.8 19.2 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	.13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Infor	rmation			Site Infor	mation					
Analyst			Fre	eeway/Dir of Tr	avel	I-95 NE	}			
Agency or Company	AEC	OM	Ju	inction		Seg 9-0	Off to Hillst	ooro EB&WB		
Date Performed			Ju	risdiction		0040 0				
Project Description	SW 10th Stree		An	alysis rear		2040 B	ulia z			
Innuts										
inputo		Freeway Num	ber of Lanes N	3						
Upstream Adj R	lamp	Pamp Numbe	or of Lanes N	1					Downstre	am Adj
Yes	On			I						
			Lane Length, L <sub>A</sub>	000					✓ Yes	🗹 On
I No □	Off			200					🗌 No	Off
	4	Freeway Volu	reeway Volume, V <sub>F</sub> 5080						. =	2100 ft
	L	Ramp Volume	e, V <sub>R</sub>	1320					⁻down	2100 11
V= v	V. = veh/h			70.0					V <sub>D</sub> =	1440 veh/h
		Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					5	
Conversion t	o pc/h Un	der Base	Conditions			_			0	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHI	= x f <sub>HV</sub> x f <sub>p</sub>
Freeway	5080	0.95	Level	3	0	0.	985	1.00	5	428
Ramp	1320	0.92	Level	2	0	0.	990	1.00	1	449
UpStream										
DownStream	1440	0.92	Level	2	0	0.	990	1.00	1	581
	<b>f</b>	Merge Areas			<b>F</b> atimat		<u>[</u>	Diverge Areas		
Estimation of	r v <sub>12</sub>				Estimat	ion o	<sup>r v</sup> 12			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	: V <sub>R</sub> + (V <sub>F</sub> - V	<sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-1	3)
P <sub>FM</sub> =	using	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		0.	558 using Eq	uation (Ex	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		36	68 pc/h		
$V_3^{}$ or $V_{av34}^{}$	pc/h (	Equation 13	-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		17	760 pc/h (Equ	ation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h? 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av}$	<sub>34</sub> > 2,7	00 pc/h?	Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5$	*V <sub>12</sub> /2 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes  No					
If Yes,V <sub>122</sub> =	pc/h (	Equation 13	-16, 13-18, or		If Yes, $V_{12}$ = pc/h (Equation 13-16, 13-18, or 13-					
Capacity Cho	13-19)	)			Canadity Chacks					
	Actual		anacity	1.0S F2	lcapacit <u>i</u>	<u>y Cin</u>	Actual	C	anacity	LOS F2
	riotuui	Ĩ	apaony	2001:	V		5428	Exhibit 13-	8 7200	No
V		Evhibit 12.9			V = V	- V	2070	Exhibit 12	9 7200	No
* FO					FO F	<sup>−</sup> <sup>v</sup> R	3979		0 7200	NU
					V <sub>R</sub>		1449	Exhibit 13-	10 2100	NO
Flow Entering	g Merge In	fluence A	lrea	Vieletiero	Flow En	iterin	g Dive	rge Influer	ice Area	Violation
	Actual	IVIAX	Desirable	violation?	V			Evhibit 12.9		Violation?
	ica Datarr	EXIMULI 13-0	if not E)					Exhibit 15-0	4400.All	
$\frac{Level 01 Selv}{D = 5.475 \pm 0}$					Leveror		100 De			<u>r)</u>
$D_{R} = 5.475 \pm 0.00734 V_{R} \pm 0.0078 V_{12} \pm 0.00627 L_{A}$					U <sub>R</sub> – 4	+.252 + 0 / ·// \	.0000 v <sub>12</sub> - 0	.009 L <sub>D</sub>		
$P_{R} = (p_{0}, p_{0}, p_{0}, p_{0})$					υ <sub>R</sub> = 34.0 (pc/mi/ln)					
LOS = (Exhibit	13-2)				LOS = D (Exhibit 13-2)					
Speed Determination				Speed L	Deter	minatio	on			
M <sub>S</sub> = (Exibit 13-11)				D <sub>s</sub> = 0.428 (Exhibit 13-12)						
S <sub>R</sub> = mph (Exh	nibit 13-11)				S <sub>R</sub> = 58	3.0 mph	(Exhibit	13-12)		
S <sub>0</sub> = mph (Exh	nibit 13-11)				S <sub>0</sub> = 73	3.8 mph	(Exhibit	13-12)		
S = mph (Exh	nibit 13-13)				S = 62	2.3 mph	(Exhibit	13-13)		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 10-l	Bet Off & Off Ramps
Analysis Time Period	PM		Analysis Year	2040 Bu	ild 2
Project Description SW Tot					unning Data
Flow Inputs	)		Jes.(IV)		
Volume, V AADT	3760	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjust	ments				
f <sub>ρ</sub> Ε <sub>Τ</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - 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	5,556	0.58	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	4,017	0.56	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,531	0.73	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 NB Seg 12-	Bet On Ramps
Analysis Time Period	PM		Analysis Year	2040 Bu	iild 2
Project Description SW 10th	h Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	anning Data
Flow Inputs					
Volume, V AADT	5200	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	nents				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	4	, .			mph
Total Ramp Density, TRD	70.0	ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mpn			
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N : S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1389 69.6 20.0 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed e-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	WEAV	ING WOF	RKSHEE	Т			
General	Informatio	on			Site Information					
Analyst Agency/Con Date Perforr Analysis Tin	npany ned ne Period	AECOM PM	1		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 13-Bet On & Off to Exp Analysis Year 2040 Build 2				Off to Exp	
Project Desc	cription SW 10th	n Street SIMR			-					
Inputs					1					
Weaving configurationTwo-SidedWeaving number of lanes, N4Weaving segment length, Ls4600ftFreeway free-flow speed, FFS70 mph					Segment typ Freeway min Freeway ma: Terrain type	e imum speed, ximum capac	, S <sub>MIN</sub> sity, C <sub>IFL</sub>		Freeway 15 2400 Leve	
Convers	sions to po	h Under	<sup>r</sup> Base Co	ondition	5				_	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	4395	0.95	3	0	1.5	1.2	0.985	1.00	4696	
V <sub>RF</sub>	1185	0.92	2	0	1.5	1.2	0.990	1.00	1301	
V <sub>FR</sub>	805	0.92	2	0	1.5	1.2	0.990	1.00	884	
V <sub>RR</sub>	255	0.92	2	0	1.5	1.2	0.990	1.00	280	
V <sub>NW</sub>	6881							V =	7161	
V <sub>W</sub>	280									
VR	0.039									
Configu	ration Cha	racterist	ics		1					
Minimum m	aneuver lanes, N	N <sub>WL</sub>		0 lc	Minimum we	eaving lane cl	hanges, LC <sub>MIN</sub>		840 lc/h	
Interchange	density, ID			0.7 int/mi	Weaving lane changes, LC <sub>w</sub>				1466 lc/h	
Minimum R	F lane changes,	LC <sub>RF</sub>		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3223 lc/h	
Minimum F	R lane changes,	$LC_{FR}$		0 lc/pc	Total lane ch	nanges, LC <sub>ALI</sub>	L		4689 lc/h	
Minimum R	R lane changes,	$LC_{RR}$		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2216	
Weavin	g Segment	Speed, I	Density, I	_evel of	Service,	and Cap	oacity			
Weaving segment flow rate, v 7067 veh/h Weaving segment capacity, c <sub>w</sub> 9009 veh/h			Weaving intensity factor, W Weaving segment speed, S				0.229 55.5 mph			
Weaving segment v/c ratio 0.784				Average weaving speed, S <sub>w</sub>				59.7 mph		
Weaving segment density, D 32.2 pc/mi/ln			Average non-weaving speed, $S_{NW}$				55.4 mph			
Level of Service, LOS D				D	Maximum weaving length, L <sub>MAX</sub> 6091 ft					
<b>Notes</b> a. Weaving s Chapter 13, " b. For volume	egments longer th Freeway Merge a es that exceed the	nan the calculat nd Diverge Se weaving segn	ted maximum le gments". nent capacity, th	ength should l	be treated as is vice is "F".	solated merge	and diverge ar	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	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 NB Seg 14-i	North of Hillsboro
Analysis Time Period	PM		Analysis Year	2040 Bu	ild 2
Project Description SW 10t	th Street SIMR		- 40		
✓ Oper.(LOS)	)		Des.(N)	Pla	inning Data
Volume, V AADT	5580	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjust	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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	3	
Lane Width		ft #	f		mph
Number of Lanes, N	4	it.	f <sub>LC</sub>		mph
Total Ramp Density, TRD	70.0	ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance	Moasuros		Design (N)		
$\frac{\text{Operational (LOS)}}{v_p} = (V \text{ or DDHV}) / (PHF x N)$ S D = $v_p / S$ LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1490 69.0 21.6 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design he	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed e-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	.13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
Conorol Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 1-B	et Hillsboro & Palmetto
Analysis Time Period	AM		Analysis Year	2040 Bu	ild 2
Project Description SW 10th	h Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	inning Data
Flow Inputs					
Volume, V AADT	4820	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVS, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustn	nents				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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			mak
Rt-Side Lat. Clearance	1	π	T <sub>LW</sub>		mpn
Total Ramp Density TRD	7	ramos/mi	'LC TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		1010	
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1287 69.9 18.4 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	speed e-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	.13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWA	Y WEAV	ING WOF	RKSHEE	Т					
Genera	al Informati	on			Site Info	rmation						
Analyst Agency/Co Date Perfo Analysis T	Analyst Agency/Company AECOM Date Performed Analysis Time Period AM Project Description SW 10th Street SIMR					Freeway/Dir of Travel I95/SB Weaving Segment Location Seg 2-Bet On from Exp & Off Analysis Year 2040 Build 2						
Project De	scription SW 10	th Street SIMF	{									
Inputs					•							
Weaving configuration       Two-Sided         Weaving number of lanes, N       2         Weaving segment length, L <sub>s</sub> 5200f         Freeway free-flow speed, FFS       70 mpł					Segment typ Freeway min Freeway ma: Terrain type	e imum speed ximum capac	, S <sub>MIN</sub> sity, C <sub>IFL</sub>		Freewa 1: 240 Leve			
Conve	rsions to p	c/h Unde	r Base Co	ondition	S		1	•				
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)			
V <sub>FF</sub>	3525	0.95	3	0	1.5	1.2	0.985	1.00	3766			
V <sub>RF</sub>	1065	0.92	2	0	1.5	1.2	0.990	1.00	1169			
V <sub>FR</sub>	1295	0.92	2	0	1.5	1.2	0.990	1.00	1422			
V <sub>RR</sub>	125	0.92	2	0	1.5	1.2	0.990	1.00	137			
V <sub>NW</sub>	6357		•					V =	6494			
V <sub>W</sub>	137											
VR	0.021											
Config	uration Ch	aracteris	tics									
Minimum	maneuver lanes,	N <sub>WI</sub>		0 lc	Minimum we	aving lane c	hanges, LC <sub>MIN</sub>		411 lc/h			
Interchang	ge density, ID			0.7 int/mi	Weaving lan	e changes, L	-C <sub>w</sub>		1079 lc/h			
Minimum	RF lane changes	s, LC <sub>RF</sub>		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3107 lc/h			
Minimum	FR lane changes	, LC <sub>FR</sub>		0 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4186 lc/h			
Minimum	RR lane changes	s, LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2314			
Weavir	ng Segmen	t Speed,	Density,	Level of	Service,	and Cap	pacity					
Weaving s	segment flow rate	e, v		6412 veh/h	Weaving inte	ensity factor,	W		0.190			
Weaving segment capacity, c <sub>w</sub> 9241 veh/h				Weaving seg	gment speed	, S		59.3 mph				
Weaving segment v/c ratio 0.694				0.694	Average wea	61.2 mpł						
Weaving s	segment density,	D	2	7.4 pc/mi/ln	Average non-weaving speed, $S_{_{\sf NW}}$				59.2 mpł			
Level of S	ervice, LOS			С	Maximum weaving length, L <sub>MAX</sub> 5923 f							
Notes												
a. Weaving Chapter 13	segments longer	than the calcula	ated maximum le	ength should l	pe treated as is	solated merge	and diverge are	eas using the	procedures of			

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	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 SB Seg 3-Be	et Off & On Ramp
Analysis Time Period	AM		Analysis Year	2040 Bu	ild 2
Project Description SW 10th	h Street SIMR		2 40		·
✓ Oper.(LOS)			Jes.(N)		nning Data
	4500			0.05	
Volume, V AADT	4590	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustn	nents				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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	2	Ħ	T <sub>LW</sub>		mpn
Total Ramp Density TRD	3	ramps/mi	<sup>I</sup> LC TRD Adjustment		mph
FES (measured)	70.0	mph	FES	70.0	mph
Base free-flow Speed, BFFS		mph		70.0	mpn
LOS and Performance	Measures	-	Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1635 67.8 24.1 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Infor	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel	I-95 SE	3			
Agency or Company	AEC	OM	Ju	inction	Seg 4-Diverge to SW 10th St					
Date Performed			Ju	risdiction		0040 0				
Project Description	SW/ 10th Stree		Aľ	alysis rear		2040 B				
Innuts										
inputo		Freeway Num	her of Lanes N	3						
Upstream Adj R	lamp	Ramp Numbe	or of Lance N	1					Downstre	am Adj
Yes	On Acceleration Lang Langth L									
		000					Ves 🗹	🗹 On		
I No □	Off			200					🗌 No	Off
	4	Freeway Volu	me, v <sub>F</sub>	4590					. =	2400 ft
	L	Ramp Volume	e, V <sub>R</sub>	1350					<sup>L</sup> down	2400 IL
V= v	eh/h	Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	1600 veh/h
		Ramp Free-Fl	low Speed, S <sub>FR</sub>	45.0						
Conversion t	o pc/h Un	der Base	Conditions			_			1	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	= x f <sub>HV</sub> x f <sub>p</sub>
Freeway	4590	0.95	Level	3	0	0.	985	1.00	4	904
Ramp	1350	0.92	Level	2	0	0.	990	1.00	1	482
UpStream										
DownStream	1600	0.92	Level	2	0	0.	990	1.00	1	757
	<b>C</b>	Merge Areas			Diverge Areas					
Estimation of	<sup>r v</sup> 12				Estimat	ion o	<sup>or v</sup> 12			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	• V <sub>R</sub> + (V <sub>F</sub> - V	′ <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-1	3)
P <sub>FM</sub> =	using	Equation (I	Exhibit 13-6)		P <sub>FD</sub> =		0.	569 using Eq	uation (Exl	nibit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		34	130 pc/h		
$V_3$ or $V_{av34}$	pc/h (	Equation 13	-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		14	174 pc/h (Equ	uation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	0 pc/h? 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av}$	<sub>34</sub> > 2,7	'00 pc/h?	Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5^{\circ}$	*V <sub>12</sub> /2 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av}$	<sub>34</sub> > 1.5	* V <sub>12</sub> /2	Yes 🗹 No		
If Yes,V <sub>122</sub> =	pc/h (	Equation 13	-16, 13-18, or		If Yes,V <sub>120</sub> =	-	р	c/h (Equatior	n 13-16, 13	8-18, or 13-
Capacity Cho	13-19)				Canacit	v Ch	ocks	9)		
	Actual		anacity	1.0S F2	lcapacit <u>i</u>	y Ch	Actual	C	anacity	LOS F2
	/ totudi	Ĭ	apaony	2001:	V		4904	Exhibit 13-	8 7200	No
V		Evhihit 12.9			V = V	- V	2400	Evhibit 12	9 7200	No
* FO					FO F	<sup>−</sup> <sup>v</sup> R	3422		10 7200	NU
							1482	Exhibit 13-	10 2100	NO
Flow Entering	g Merge In	fluence A	lrea	Vieletiero	Flow En	iterin	g Dive	rge Influer	ice Area	Violation
	Actual		Desirable	violation?	V		Actual			Violation?
	iaa Datawa	EXHIBIT 13-0	·····		v <sub>12</sub>		3430		4400:All	
Level of Service Determination (if not F)					Level of					<i>F)</i>
$D_{\rm R} = 5.475 \pm 0.15$	.00734 V <sub>R</sub> +	0.0076 v <sub>12</sub> -	0.00027 L <sub>A</sub>			υ <sub>R</sub> – 4	+.232 + U	.0000 v <sub>12</sub> - 0	.009 L <sub>D</sub>	
$\nu_{\rm R} = (pc/mi/in)$					$D_{\rm R} = 32$	2.0 (pc	/mi/in)			
LOS = (Exhibit 13-2)					LOS = D	(Exhil	bit 13-2)			
Speed Deterr	nination				Speed L	Deter	minatic	on		
M <sub>S</sub> = (Exibit 1)	3-11)				D <sub>s</sub> = 0.	431 (E	xhibit 13-	-12)		
S <sub>R</sub> = mph (Exh	nibit 13-11)				S <sub>R</sub> = 57	7.9 mph	ı (Exhibit	13-12)		
S <sub>0</sub> = mph (Exh	nibit 13-11)				S <sub>0</sub> = 74	1.9 mph	(Exhibit	13-12)		
S = mph (Exh	nibit 13-13)				S = 62	2.2 mph	(Exhibit	13-13)		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 SB Seg 5-Be	et Off & On Ramps
Analysis Time Period	AM		Analysis Year	2040 Bul	ild 2
Project Description SW 10th	n Street SIMR				nning Data
Flow Inputs					
Volume, V AADT	3240	veh/h veh/dav	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		E <sub>R</sub> f <sub>LV/</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>P</sub> (E <sub>P</sub> - 1)]	1.2 0.985	
Speed Inputs			Calc Speed Adi 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 <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N : S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1154 70.0 16.5 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base freeur volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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General Infor	mation			Site Infor	mation					
Analyst			F	reeway/Dir of Tr	avel	1-95 SI	 R			
Agency or Company		ОМ	۱	unction	Seg 6-Merge from Hillshoro E					
Date Performed		- ···	ſ	urisdiction	· · · · ·	2090				
Analysis Time Perio	d AM		A	nalysis Year		2040 E	Build 2			
Project Description	SW 10th Stree	t SIMR								
Inputs										
Upstream Adi Ramn		Freeway Num	ber of Lanes, N	3					Downstr	eam Adi
o poti o ann 7 taj 1 tamp		Ramp Number	r of Lanes, N	1					Ramp	
Ves Or	l	Acceleration L	ane Length, L₄	300						
	x.	Deceleration L	ane Length L							
	I	Freeway Volu	me.V_	3240					🗹 No	Off
= 2400	ft	Ramp Volume		1600					L <sub>down</sub> =	ft
up		Eroowov Eroo	, R Elaw Speed S	70.0						
V <sub>u</sub> = 1350	veh/h		-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
0	//		ow Speed, S <sub>FR</sub>	50.0						
Conversion t	opc/nune lv	der Base (	conditions		1					
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3240	0.95	Level	3	0	0	.985	1.00		3462
Ramp	1600	0.92	Level	2	0	0	.990	1.00		1757
UpStream	1350	0.92	Level	2	0	0	.990	1.00		1482
DownStream										
<b>F</b> = 41:00 - 14	<b>6</b>	Merge Areas			<b>F</b> atin (		Div	verge Areas		
	v 12				Estimati	onc	<sup>77</sup> <sup>7</sup> 12			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					$V_{10} = V$		)P <sub>ED</sub>	
<sub>EQ</sub> =	1463.07	' (Equation	13-6 or 13-7)				12 (F	auation 13-	, ⊦⊡ 12 or 13-	-13)
P <sub>FM</sub> =	0.586	using Equat	ion (Exhibit 13-6	5)	EQ P =		(-	sina Fauatio	n (Exhibit	13_7)
V <sub>12</sub> =	2028	pc/h			· FD V =		n	nng ⊑quuio ⊳/h		10 //)
V. or V	1434	pc/h (Equatio	on 13-14 or 13	-	* 12 V or V		pi n	/h (Equation 1	2 11 or 12	17)
*3 01 *av34	17)				$v_3$ $v_{av34}$	> 2 7	بر 🗔 ۲۵۵ م۵/b2		5-14-01-15	-17)
Is $V_3$ or $V_{av34} > 2,70$	)0 pc/h? [] Ye	s 🗹 No			$15 v_3 01 v_{av3}$	34 ~ Z,1				
Is $V_3$ or $V_{av34} > 1.5$	*V <sub>12</sub> /2 🗹 Ye	s 🗌 No			IS V <sub>3</sub> OF V <sub>av3</sub>	34 ~ 1.3	o v <sub>12</sub> /∠ □	Yes INO	. 12 16	12 19 or
f Yes,V <sub>12a</sub> =	2028	pc/h (Equatio	on 13-16, 13-		If Yes,V <sub>12a</sub> =		рс 13-	./11 (⊑qualioi .19)	115-10,	13-10, 01
Canacity Che		13-19)			Canacity		ocks	,		
	Actual	0	anacity	LOS F2			Actual	Car	acity	LOS F2
	7101001	Ť	apuony	20011	V-	-	71010001	Exhibit 13-8		20011
					V - V	_ \/			·	
V <sub>FO</sub>	5219	Exhibit 13-8		No	<sup>v</sup> FO - v <sub>F</sub>	⁻ <b>°</b> R			, <b> </b>	_
					V <sub>R</sub>			10 Exhibit 13-	·	
Flow Enterin	g Merae In	fluence A	rea		Flow En	terir	ng Divera	ne Influen	ce Are	<u>a</u>
	Actual	Max	Desirable	Violation?			Actual	Max Desi	rable	Violation?
V <sub>R12</sub>	3785	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
Level of Serv	rice Detern	nination (i	if not F)		Level of	Ser	vice Det	erminatio	n (if no	ot F)
D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> + 0	0.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>		[	D <sub>R</sub> = 4	4.252 + 0.0	086 V <sub>12</sub> - 0.	009 L <sub>D</sub>	
D <sub>R</sub> = 32.3 (pc/n	ni/ln)	-			$D_R = (p)$	c/mi/l	n)	-	_	
LOS = D (Exhibit	13-2)				LOS = (E	xhibi	, t 13-2)			
Speed Deter	nination				Speed D	)eter	minatio	า		
	hit 10 11				$D_{i} = (F_{i})$	xhihit '	13-12)	-		
w <sub>S</sub> – U.463 (EX	DIE 13-11)				$S_{-}$	nh (⊑v	hihit 13_12\			
$S_R = 57.0 \text{ mph}$	(Exhibit 13-11)				S -	on (EXI ab (Evi	hibit $12 \cdot 12$			
$5_0 = 66.6 \text{ mph}$	(Exhibit 13-11)				P₀− mp	א⊐) ווכ י	11101(13-12)			
5 = 59.4 mph	(Exhibit 13-13)				s= mp	on (Ex	nidit 13-13)			
ht © 2016 University	of Florida. All Rid	hts Reserved			HCS2010 <sup>™</sup>	1 Vers	ion 6 90		Genera	ted: 6/15/2020 1

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To	l-95 SB Seg 7-B	et On Ramps
Analysis Time Period	AM		Analysis Year	2040 Bu	ild 2
Project Description SW 10th	h Street SIMR				
Oper.(LOS)			Des.(N)	Pla	inning Data
Flow Inputs					
Volume, V AADT	4840	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustn	nents				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	t <sub>LW</sub>		mph
Number of Lanes, N	3		ILC		mpn
FES (measured)	70.0	mph		70.0	mph
Base free-flow Speed, BFFS	70.0	mph		70.0	трп
LOS and Porformanco	Moasuros		Dosign (N)		
<u>Operational (LOS)</u> $v_p = (V \text{ or DDHV}) / (PHF x N x)$ S D = $v_p / S$ LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1724 66.8 25.8 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre ur volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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Job: SW 10th Street SIMR Analyst: AECOM

Location:	Seg 8: I-	eg 8: I-95 Southbound On-Ramp from SW 10th Street E								
Analysis Period:	AM Peak	l Peak Hour								
Analysis Year:	2040 Buil	40 Build 2								
4.840			6.030							
1 100										
1,190										
	PHF =	0.95								
	v <sub>fr</sub> =	6,030	vph							
	v <sub>r</sub> =	1,190	vph							
	v <sub>f</sub> =	4,840								
Upstream Freeway	Tr % =	3%								
Ramp	Tr % =	2%								
Downstream Freeway	Tr % =	3%								
Freeway	f <sub>HV</sub> =	1/(1+P	<sub>r</sub> (E <sub>r</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -	1)) =	0.985					
Ramp	f <sub>HV</sub> =	1/(1+P	r(E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -	1)) =	0.9901					
flat terrain	<b>Ε</b> <sub>τ</sub> =	1.5								
	RV % =	0								
Driver Population adj.	f <sub>P</sub> =	1.000								
	V <sub>fr</sub> =	=v <sub>fr</sub> /(PF	$(f_{HV})(f_{P}) =$	6,443	pc/h					
	V <sub>r</sub> =	=v <sub>r</sub> /(PH	IF)(f <sub>HV</sub> )(f <sub>P</sub> ) =	1,265	pc/h					
	V <sub>f</sub> =	=v <sub>t</sub> /(PH	IF)(f <sub>HV</sub> )(f <sub>P</sub> ) =	5.171	pc/h					
No. lanes upstream of ramp	N =	3	/ \ UV/ \ F /	-,						

<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	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 9-Be	et 10th & Exit to Exp
Analysis Time Period	AM		Analysis Year	2040 Bu	ild 2
Oper (LOS)			Des (N)	Pla	nning Data
Flow Inputs	,				
Volume, V AADT Peak-Hr Prop. of AADT, K	6030	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>B</sub>	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 Adjustr	ments				
f <sub>p</sub> Ε <sub>T</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 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 <sub>⊥w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1611 68.0 23.7 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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General Infor	mation			Site Inform	nation	-			
Analyst			Fr	eeway/Dir of Tra		95 SB			
Agency or Company	AEC.	OM	.lu	nction	ייסו ו- כ	ea 10-Merce fra	m Ex to GP		
Date Performed	ALU		Ju	risdiction	0	eg to-merge itt			
Analysis Time Period	AM		An	nalysis Year	20	040 Build 2			
Project Description	SW 10th Stree	et SIMR							
Inputs									
Instream Adi Ramp		Freeway Num	ber of Lanes, N	4				Downstr	oam ∆di
		Ramp Numbe	r of Lanes, N	1				Ramp	cam Auj
Yes On		Acceleration L	ane Length. L.	600					
		Deceleration I	ane Length L					I res	
✓ No Off		Freeway Volu		6030				🗌 No	✓ Off
= ft		Pomp Volume	NO, VF	200				L <sub>down</sub> =	1150 ft
-ир К			<sup>r, v</sup> R	300				down	
√, = veh/h		Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	780 veh/h
		Ramp Free-FI	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	<u>) pc/n Une</u>	der Base (	Conditions				1	1	
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6030	0.95	Level	3	0	0.985	1.00		6443
Ramp	300	0.92	Level	2	0	0.990	1.00		329
UpStream									
DownStream	780	0.92	Level	2	0	0.990	1.00		856
		Merge Areas					Diverge Areas		
estimation of	v <sub>12</sub>				Estimatic	on of $v_{12}$			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )				V <sub>10</sub> =	V <sub>D</sub> + (V <sub>E</sub> - V	D)P-D	
- <sub>EQ</sub> =	(Equ	ation 13-6 or	<sup>-</sup> 13-7)		=	12	(Equation 13	-12 or 13-	.13)
P <sub>FM</sub> =	0.177	using Equat	ion (Exhibit 13-6)		-EQ P =		using Equati	on (Evhibit	13_7)
/ <sub>12</sub> =	1138	pc/h		,	FD V -		no/b		10-1)
/ or V	2652	pc/h (Equatio	on 13-14 or 13-		$v_{12}$ –		pc/n	12 11 or 12	17)
<sup>2</sup> 3 <sup>01</sup> <sup>v</sup> av34	17)				$v_3$ or $v_{av34}$	> 0 700 ma/b0 l		13-14 01 13	-17)
Is $V_3$ or $V_{av34} > 2,700$	) pc/h? 🗌 Ye	s 🗹 No			15 V <sub>3</sub> 01 V <sub>av34</sub>	2,700 pc/m²		)	
Is $V_3$ or $V_{av34} > 1.5 *$	V <sub>12</sub> /2 Ve	s 🗌 No			IS V <sub>3</sub> or V <sub>av34</sub>	> 1.5 " V <sub>12</sub> /2	_Yes ∟No	)	10 10
f Yes,V <sub>12a</sub> =	2577	pc/h (Equatio	on 13-16, 13-		If Yes,V <sub>12a</sub> =	1	pc/n (Equalio 3-19)	on 13-10,	13-18, 01
Canacity Cho	18, or	13-19)			Canacity	Chacks	/		
capacity che	Actual		anacity	1 OS E2	Capacity	Actual		anacity	
	Actual	Ť	apacity	LUGT	V	Actual	Evhibit 13		20311
					¥F	V		<u> </u>	
V <sub>FO</sub>	6772	Exhibit 13-8		No	$v_{FO} = v_F -$	<sup>v</sup> R	Exhibit 13	-0	
					V <sub>R</sub>		Exhibit 1	3-	
Flow Entering	ı Merae Ir	fluence A	rea		Flow Ent	erina Dive	rae Influe	nce Are	 a
	Actual	Max	Desirable	Violation?		Actual	Max De	sirable	Violation?
V <sub>R12</sub>	2906	Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
Level of Servi	ice Deterr	nination (	if not F)		Level of S	Service De	eterminatio	on (if no	t F)
D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> + (	0.0078 V <sub>12</sub> - 0.0	0627 L <sub>A</sub>		D	<sub>R</sub> = 4.252 + (	).0086 V <sub>12</sub> - (	).009 L <sub>n</sub>	
	i/ln)				D <sub>R</sub> = (pc	/mi/ln)	.2		
D <sub>R</sub> = 24.2 (pc/mi	, 13_2)				LOS = (Ex	, hibit 13-2)			
D <sub>R</sub> = 24.2 (pc/mi _OS = C (Exhibit 1	10-21				Sneed Da	terminati	on		
D <sub>R</sub> = 24.2 (pc/mi LOS = C (Exhibit 2 Speed Determ	ination								
D <sub>R</sub> = 24.2 (pc/m. .OS = C (Exhibit ' <b>Speed Determ</b>	nination				$D_{a} = (F_{Y})$	nibit 13-12)			
$D_R = 24.2 \text{ (pc/m)}$ OS = C  (Exhibit ' <b>Speed Determ</b> $M_S = 0.332 \text{ (Exhibit '}$	nination hit 13-11)				D <sub>s</sub> = (Ext S <sub>n</sub> = mot	nibit 13-12) h (Exhibit 13-12			
$D_R$ = 24.2 (pc/m COS = C (Exhibit) <b>Speed Detern</b> $M_S$ = 0.332 (Exhibit) $D_R$ = 60.7 mph (	nination bit 13-11) Exhibit 13-11)				D <sub>s</sub> = (Ext S <sub>R</sub> = mpt S = mot	nibit 13-12) n (Exhibit 13-12	)		
$D_{R} = 24.2 \text{ (pc/m}$ LOS = C  (Exhibit  2000  (Exhibit  2	nination nit 13-11) Exhibit 13-11) Exhibit 13-11)				D <sub>s</sub> = (Ext S <sub>R</sub> = mpt S <sub>0</sub> = mpt	nibit 13-12) n (Exhibit 13-12 n (Exhibit 13-12			

		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	rmation			Site Infor	mation					
Analyst			Fre	eeway/Dir of Tr	avel	I-95 SE	;			
Agency or Company	AEC	OM	Ju	nction		Seg 11	- Diverge to	Express		
Date Performed			Ju	risdiction						
Analysis Time Perio	d AM		An	alysis Year		2040 B	uild 2			
Project Description	SW 10th Stree	t SIMR								
inputs			less of Lesson NL						1	
Upstream Adj F	Ramp	Freeway Nurr	ider of Lanes, IN	4					Downstrea	m Adj
Vac		Ramp Numbe	er of Lanes, N	1					Ramp	
res 🗈	✓ On	Acceleration I	_ane Length, L <sub>A</sub>						🗌 Yes	On
No [	Off	Deceleration	Lane Length L <sub>D</sub>	200					V No	□ Off
		Freeway Volu	me, V <sub>F</sub>	6330						
L <sub>up</sub> = 11	150 ft	Ramp Volume	e, V <sub>R</sub>	780					L <sub>down</sub> =	ft
		Freeway Free	-Flow Speed, S <sub>EE</sub>	70.0						
$V_u = 30$	00 veh/h	Ramp Free-F	low Speed, S <sub>ED</sub>	45.0					V <sub>D</sub> =	ven/h
Conversion t	to pc/h Un	der Base	Conditions							
(no/h)	V		Torroin	0/ Truck	0/ Dv		f	f		vf vf
(pc/n)	(Veh/hr)	PHF	Terrain	% ITUCK	%RV		'HV	۱ <sub>р</sub>		• HV • P
Freeway	6330	0.95	Level	3	0	0.	985	1.00	676	3
Ramp	780	0.92	Level	2	0	0.	990	1.00	85	6
UpStream	300	0.92	Level	2	0	0.	990	1.00	32	9
DownStream		 Mayor Araaa					<u> </u>			
Estimation o	fv	werge Areas			Estimati	iono	 fv	iverge Areas		
	12				LSuman		12			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V	( <sub>R</sub> )P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(E	Equation 13-	12 or 13-13)	
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	136 using Ec	quation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		34	31 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		16	66 pc/h (Equ	uation 13-14	or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h? 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av3}$	<sub>34</sub> > 2,7	00 pc/h? 🗌	Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5$	* V <sub>12</sub> /2 Ye	s 🗌 No			Is $V_3$ or $V_{av}$	3 <sub>4</sub> > 1.5	* V <sub>12</sub> /2	Yes 🔽 No		
If Yes V <sub>40</sub> =	pc/h (	Equation 13	-16, 13-18, or		If Yes V <sub>40</sub> =	:	p	c/h (Equatio	n 13-16, 13-	18, or 13-
	13-19)				<b>O</b> and a <b>c</b> it	- 01	19	)		
Capacity Che			No 'I			y Ch	ecks		'1	
	Actual		apacity	LUS F?			Actual	U		LUS F?
					V <sub>F</sub>		6763	Exhibit 13	-8 9600	NO
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	5907	Exhibit 13-	-8 9600	No
					V <sub>R</sub>		856	Exhibit 13-	10 2100	No
Flow Enterin	g Merge In	fluence A	lrea		Flow En	terin	g Diver	ge Influer	nce Area	
	Actual	Max	Desirable	Violation?		/	Actual	Max Desira	able	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3431	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of	Serv	vice Det	terminatic	on (if not F	7)
D <sub>R</sub> = 5.475 + 0	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> ·	- 0.00627 L <sub>A</sub>			D <sub>R</sub> = 4	.252 + 0.	0086 V <sub>12</sub> - 0	0.009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/Ir		D <sub>R</sub> = 34	l.9 (pc	/mi/ln)						
LOS = (Exhibit	LOS = D	(Exhil	oit 13-2)							
Speed Determination					Speed L	)eter	minatio	n		
M <sub>e</sub> = (Exibit 1	3-11)				D <sub>s</sub> = 0.5	375 (E	xhibit 13-	12)		
$S_{n} = mnh (Fx)$	hibit 13-11)				S <sub>R</sub> = 59	9.5 mph	(Exhibit	13-12)		
	hibit $13_{-11}$				S <sub>0</sub> = 74	.9 mnh	(Exhibit	, 13-12)		
S = mnh (FxH)	hibit 13-13)				S = 65	4 mnh	(Exhibit	13-13)		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 13-l	Bet Off & On Ramps
Project Description SW 101	AM th Street SIMR		Analysis real	2040 Би	
✓ Oper.(LOS)	)		Des.(N)	Pla	inning Data
Flow Inputs	,				0
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4540	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub> 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 <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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 FFS (measured) Base free-flow Speed, BFFS	3 70.0	ft ft ramps/mi mph mph	f <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1617 68.0 23.8 C	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	-13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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			FREEWA	Y WEAV	ING WOF	RKSHEE	Т		
Genera	al Informati	on			Site Info	ormation			
Analyst Agency/Co Date Perfo Analysis Ti	ompany rmed ime Period	AECO AM	М		Freeway/Dir of Travel I-95 SB Weaving Segment Location Seg 14- Bet Sample & Copa Analysis Year 2040 Build 2				
Project De	scription SW 10t	h Street SIM	२						
Inputs					1				
Weaving configuration     One-Sided       Weaving number of lanes, N     2       Weaving segment length, L <sub>S</sub> 2520f       Freeway free-flow speed, FFS     70 mpl				One-Sided 4 2520ft 70 mph	Segment type F Freeway minimum speed, S <sub>MIN</sub> Freeway maximum capacity, C <sub>IFL</sub> Terrain type				Freewa 1 240 Leve
Conve	rsions to p	c/h Unde	r Base Co	ondition	s			1	-
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	3810	0.95	3	0	1.5	1.2	0.985	1.00	4071
V <sub>RF</sub>	1980	0.92	2	0	1.5	1.2	0.990	1.00	2174
V <sub>FR</sub>	730	0.92	2	0	1.5	1.2	0.990	1.00	801
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0
V <sub>NW</sub>	4071			-			-	V =	7046
V <sub>w</sub>	2975								
VR	0.422								
Config	uration Cha	aracteris	tics		•				
Minimum r	maneuver lanes,	N <sub>WL</sub>		2 lc	Minimum weaving lane changes, LC <sub>MIN</sub> Ic/h				
Interchang	je density, ID			0.7 int/mi	Weaving lan	ie changes, L	-C <sub>w</sub>		lc/ł
Minimum I	RF lane changes	, LC <sub>RF</sub>		1 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		lc/ł
Minimum I	FR lane changes	, LC <sub>FR</sub>		1 lc/pc	Total lane cl	nanges, LC <sub>AL</sub>	L		lc/ł
Minimum I	RR lane changes	, LC <sub>RR</sub>		lc/pc	Non-weavin	g vehicle inde	ex, I <sub>NW</sub>		
Weavir	ng Segmen	t Speed,	Density,	Level of	Service,	and Cap	oacity		
Weaving s	segment flow rate	, V		6957 veh/h	Weaving inte	ensity factor,	W		
Weaving s	segment capacity	, c <sub>w</sub>		5600 veh/h	Weaving see	gment speed	, S		mpł
Weaving s	egment v/c ratio			1.242	Average we	aving speed,	S <sub>w</sub>		mpł
Weaving s	segment density,	D		pc/mi/ln	Average non-weaving speed, $S_{_{\sf NW}}$				mpł
Level of S	ervice, LOS			F	Maximum weaving length, L <sub>MAX</sub> 6932 ft				
Notes									
a. Weaving Chapter 13	segments longer t	han the calculation of the calcu	ated maximum le	ength should l	pe treated as is	solated merge	and diverge ar	eas using the	procedures of

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	I-95 SB Seg 1-B 2040 Bi	et Hillsboro & Palmetto
Project Description SW 10	th Street SIMR			2010 00	
✓ Oper.(LOS	)		Des.(N)	Pla	anning Data
Flow Inputs	,				5
Volume, V AADT Peak-Hr Prop. of AADT, K	5000	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>R</sub>	0.95 3 0	
DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjust	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
E <sub>T</sub>	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	3	
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BEES	4 70.0	ft ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> $v_p = (V \text{ or DDHV}) / (PHF x N)$ S D = $v_p / S$ LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1336 69.8 19.1 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design he	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	.13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	( WEAV	ING WOF	RKSHEE	Г		
Genera	Informatio	on			Site Info	rmation			
Analyst Agency/Con Date Perforr Analysis Tin	npany ned ne Period	AECON PM	1		Freeway/Dir of Travel I95/SB Weaving Segment Location Seg 2-Bet On from Exp & Off Analysis Year 2040 Build 2				
Project Dese	cription SW 10th	N Street SIMR							
Inputs					1				
Weaving configurationTwo-SidedWeaving number of lanes, N4Weaving segment length, Ls5200ftFreeway free-flow speed, FFS70 mph					Segment typ Freeway min Freeway ma: Terrain type	Freeway 15 2400 Level			
Convers	sions to po	/h Under	Base Co	ondition	S		1	-	1
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	3835	0.95	3	0	1.5	1.2	0.985	1.00	4097
V <sub>RF</sub>	1135	0.92	2	0	1.5	1.2	0.990	1.00	1246
V <sub>FR</sub>	1165	0.92	2	0	1.5	1.2	0.990	1.00	1279
V <sub>RR</sub>	95	0.92	2	0	1.5	1.2	0.990	1.00	104
V <sub>NW</sub>	6622							V =	6726
V <sub>W</sub>	104							-	
VR	0.015								
Configu	ration Cha	racterist	ics		•				
Minimum m	aneuver lanes, N	I <sub>WL</sub>		0 lc	Minimum weaving lane changes, LC <sub>MIN</sub>				312 lc/h
Interchange	density, ID			0.7 int/mi	Weaving lane changes, $LC_w$				980 lc/h
Minimum R	F lane changes,	LC <sub>RF</sub>		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3166 lc/h
Minimum Fl	R lane changes,	LC <sub>FR</sub>		0 lc/pc	Total lane ch	nanges, LC <sub>ALI</sub>	L		4146 lc/h
Minimum R	R lane changes,	LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2410
Weavin	g Segment	Speed,	Density, I	_evel of	Service,	and Cap	oacity		
Weaving se Weaving se	gment flow rate, gment capacity,	v c <sub>w</sub>		6641 veh/h 9257 veh/h	Weaving inte Weaving seg	ensity factor, gment speed	W , S		0.189 59.7 mph
Weaving segment v/c ratio 0.717					Average wea	aving speed,	S <sub>W</sub>		61.3 mph
Weaving segment density, D 28.2 pc/mi/ln				8.2 pc/mi/ln	Average non-weaving speed, $S_{NW}$				59.7 mph
Level of Sei	vice, LOS			D	Maximum weaving length, L <sub>MAX</sub> 5870 ft				
A Weaving s Chapter 13, " b. For volume	egments longer th Freeway Merge a as that exceed the	an the calcula nd Diverge Se weaving segn	ted maximum le gments". nent capacity, th	ength should l	be treated as is	solated merge	and diverge a	reas using the	procedures of

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 3-B	et Off & On Ramp
Project Description SW 10	th Street SIMR			2040 Би	110 2
Qper (LOS	)		Des (N)	Pla	anning Data
Flow Inputs	/	·			
Volume, V AADT Peak Hr Prop. of AADT. K	4970	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs_P	0.95 3	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	u Level mi	
Calculate Flow Adjust	ments				
f <sub>ρ</sub> Ε <sub>Τ</sub>	1.00 1.5		E <sub>R</sub> f <sub>HV</sub> = 1/[1+P <sub>T</sub> (E <sub>T</sub> - 1) + P <sub>R</sub> (E <sub>R</sub> - 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 <sub>∟w</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1770 66.2 26.7 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design h	S - Speed D - Density FFS - Free-flow BFFS - Base fre our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	.13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		RAMP	'S AND RAM	P JUNCT	ONS WO	RKS	HEET				
General Inf	ormation			Site Infor	mation						
Analyst			Fr	eeway/Dir of Ti	ravel	I-95 SE	3				
Agency or Compa	any AEC	OM	Ju	Inction		Seg 4-I	Diverge to	SW 10th St			
Date Performed	riad DM		Ju	irisdiction		0040 0	1.1.0				
Project Descriptio	n SW 10th Strop		Ar	lalysis rear		2040 B					
mputo		Freeway Num	her of Lanes N	3							
Upstream Ad	lj Ramp	Ramo Numbe	ar of Lanes N	1					Downstre	am Adj	
Yes	On			I							
			Lane Length L	000					Ves 🗹	🗹 On	
🗹 No	Off	Deceleration		200					🗌 No	Off	
	4	Freeway Volu	ime, V <sub>F</sub>	4970						2400 ft	
L <sub>up</sub> –	п	Ramp Volume	e, V <sub>R</sub>	1020					⁻down	2400 11	
V =	V. = veh/h								V <sub>D</sub> =	1690 veh/h	
u		Ramp Free-F	low Speed, S <sub>FR</sub>	45.0							
Conversion	n to pc/h Un	der Base	Conditions			-			_		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>	
Freeway	4970	0.95	Level	3	0	0.	985	1.00	5	310	
Ramp	1020	0.92	Level	2	0	0.	990	1.00	1	120	
UpStream											
DownStream	1690	0.92	Level	2	0	0.	990	1.00	18	355	
Estimation	ofu	Merge Areas			Ectimot	iono	<u>[</u>	Diverge Areas			
Estimation	01 V <sub>12</sub>				Estimat		<sup>1</sup> <b>v</b> 12				
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )					V <sub>12</sub> =	• V <sub>R</sub> + (V <sub>F</sub> - V	√ <sub>R</sub> )P <sub>FD</sub>		
L <sub>EQ</sub> =	(Equa	ation 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13	-12 or 13-13	3)	
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	576 using E	quation (Exh	ibit 13-7)	
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		35	532 pc/h			
$V_3^{}$ or $V_{av34}^{}$	pc/h	(Equation 13	8-14 or 13-17)		$\rm V_3$ or $\rm V_{av34}$		17	78 pc/h (Eq	uation 13-1	4 or 13-17)	
Is $V_3$ or $V_{av34} > 2$	2,700 pc/h? 🗌 Ye	s 🗌 No			Is $V_3$ or $V_{av}$	<sub>34</sub> > 2,7	00 pc/h?	Yes 🗹 No	)		
Is $V_3$ or $V_{av34} > 1$	.5 * V <sub>12</sub> /2 Ye	es 🗌 No			Is $V_3$ or $V_{av}$	<sub>34</sub> > 1.5	* V <sub>12</sub> /2	Yes 🗹 No	)		
lf Yes,V <sub>12a</sub> =	pc/h ( 13_19	(Equation 13	8-16, 13-18, or		If Yes,V <sub>12a</sub> = pc/h (Equation 13-16, 13-18, or 13- 19)						
Capacity C	hecks	/			Capacit	v Ch	ecks	5)			
	Actual		Capacity	LOS F?	<u> </u>		Actual	(	Capacity	LOS F?	
					V <sub>F</sub>		5310	Exhibit 13	-8 7200	No	
V <sub>EO</sub>		Exhibit 13-8			$V_{EO} = V_{E}$	- V <sub>R</sub>	4190	Exhibit 13	-8 7200	No	
10						IX.	1120	Exhibit 13	-10 2100	No	
Elow Enteri	ing Morgo Ir	 ofluonco /	lroa			ntorin		rao Influo	nco Aroa	110	
riow Entern	Actual	Max	Desirable	Violation?			Actual	Max Desir	able	Violation?	
V <sub>P12</sub>		Exhibit 13-8			V <sub>12</sub>		3532	Exhibit 13-8	4400:All	No	
Level of Se	rvice Deterr	nination (	(if not F)		Level of	f Serv	vice De	terminati	on (if not	<b>F</b> )	
$D_{P} = 5.475 +$	0.00734 v <sub>P</sub> +	0.0078 V <sub>12</sub>	- 0.00627 L			$D_p = 4$	1.252 + 0	.0086 V <sub>12</sub> - (	0.009 L <sub>D</sub>	/	
$D_{n} = (nc/mi/ln)$					$D_{p} = -32$	2.8 (pc	/mi/ln)	12	D		
LOS = (Exhib	LOS = (Exhibit 13-2)						$P_{\rm R} = 0.0$ (pointinit) LOS = D (Exhibit 13-2)				
Speed Dete	ermination				Speed I	Deter	minatic	n			
M = (Evibit	+ 12 11)				D = 0	399 (F	xhibit 13	.12)			
	$\frac{10-11}{2}$				$S_{D} = 58$	8 8 mnh	(Exhibit	13-12)			
	$\frac{1}{2} $				$S_{a} = 7$	3 8 mnh	(Exhibit	13-12)			
S = mnh (E)	$\frac{1}{2} = \frac{1}{2} + \frac{1}{2} = \frac{1}{2} + \frac{1}$				S = 60	2.0 mph	(Evhibit	13_13)			
	rsity of Florida All	Rights Reserved				. i iiipii		10-10)	Generated: 6	15/2020 12·20	

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 5-Bo	et Off & On Ramps
Analysis Time Period			Analysis Year	2040 Bu	
Qper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs	, 				
Volume, V AADT Peak-Hr Prop. of AADT, K	3950	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P <sub>T</sub> %RVs, P <sub>P</sub>	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 Adjustr	ments				
f <sub>p</sub> F	1.00 1.5		$E_{R}$	1.2 0.985	
-⊺ Spood Inpute	1.0		$\Gamma_{\rm HV}$ $\Gamma_{\rm R}^{\rm (1)}$	0.000	
			Calc Speed Auj allu 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	π ft ramps/mi mph mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	mation			Site Infor	mation					
Analyst			Fr	eewav/Dir of Tr	avel I.	-95 SB				
Agency or Company		ОМ	i in hi	Inction	() (	Sea 6-Merce	from Hillshoro F	&\W		
Date Performed			.lu	risdiction		Jog U-INICI YC				
Analysis Time Period	PM		Ar	alysis Year	2	2040 Build 2				
Project Description	SW 10th Stree	t SIMR								
Inputs										
Instream Adi Ramn		Freeway Num	ber of Lanes, N	3				Downet	ream Adi	
		Ramp Number	r of Lanes, N	1				Ramp	cam Auj	
🗹 Yes 📃 On		Acceleration L	ane Length. L.	300						
		Deceleration I	ane Length L					i res	L On	
□ No 🗹 Off		Erooway Volu		2050				🗹 No	Off	
= 2400 f	ft .		ne, v <sub>F</sub>	3950				L <sub>daum</sub> =	ft	
-up 2400 I	L	Ramp volume	, v <sub>R</sub>	1690				-down		
V = 1020 v	eh/h	Freeway Free-	-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h	
		Ramp Free-Flo	ow Speed, S <sub>FR</sub>	50.0						
Conversion to	o pc/h Und	<u>der Base (</u>	Conditions	1	r	1				
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/Pł	HF x f <sub>HV</sub> x f <sub>p</sub>	
Freeway	3950	0.95	Level	3	0	0.985	1.00		4220	
Ramp	1690	0.92	Level	2	0	0.990	1.00		1855	
UpStream	1020	0.92	Level	2	0 0	0.990	1.00		1120	
DownStream					Ť	0.000	1.00			
		Merge Areas		<u> </u>		<u> </u>	Diverge Are	as		
Estimation of	V <sub>12</sub>				Estimati	on of v <sub>1</sub>	2			
	$V_{40} = V_{F}$	(P <sub>EM</sub> )								
	12 F	· FM/	13-6 or 13-7)			V <sub>1</sub>	$_{2} = V_{R} + (V_{F} -$	· V <sub>R</sub> )P <sub>FD</sub>		
-EQ D =	0 596		ion (Exhibit 12.6)		L <sub>EQ</sub> =		(Equation	13-12 or 13	-13)	
FM -	0.000	using ⊑quat	ION (EXHIBIT 13-0)		P <sub>FD</sub> =		ation (Exhibit	(ion (Exhibit 13-7)		
v <sub>12</sub> –	2472	pc/n	10.11.10		V <sub>12</sub> =					
$V_3$ or $V_{av34}$	1/48   17)	pc/n (Equation	on 13-14 or 13-		$V_3^{}$ or $V_{av34}^{}$		pc/h (Equati	ion 13-14 or 13	3-17)	
$I_{\rm S} V_{2} \text{ or } V_{2,24} > 2.70$	0 pc/h? 🗌 🗸 🗠	s 🗸 No			Is V <sub>3</sub> or V <sub>av34</sub>	2,700 pc/	h? 🗌 Yes 🗌	No		
$ls V_{av34} = 1.5 *$	$V_{\rm e}/2$ $V_{\rm e}$				Is $V_3$ or $V_{3\sqrt{3}}$	, > 1.5 * V <sub>12</sub> /	2 Yes	No		
av34 1.0	2/12/- ⊡ Te.	sNo nc/h (Equatio	n 13-16 13-			r 12	pc/h (Equ	ation 13-16,	13-18, or	
lf Yes,V <sub>12a</sub> =	18, or	13-19)	JIT 10-10, 10-		11 1 65, v <sub>12a</sub> –		13-19)			
Capacity Che	cks				Capacity	Checks	;			
	Actual	C	apacity	LOS F?		Ac	tual	Capacity	LOS F?	
					V <sub>F</sub>		Exhibit	13-8		
	6075	Evhibit 12.9		No		V <sub>P</sub>	Exhibit	: 13-8		
V							Exhibit	13-		
V <sub>FO</sub>	0010	1 1			1 1/			-		
V <sub>FO</sub>					V <sub>R</sub>		10	)		
V <sub>FO</sub> Flow Entering	Merge In	fluence A	rea	<u> </u>	V <sub>R</sub> Flow Ent	tering D	iverge Influ	ience Are	ea	
V <sub>FO</sub> Flow Entering	I <b>Merge In</b> Actual	fluence A	<b>rea</b> Desirable	Violation?	V <sub>R</sub> Flow Ent	tering Di Actual	iverge Influ Max	Desirable	violation?	
V <sub>FO</sub> Flow Entering V <sub>R12</sub>	Merge In Actual 4327	fluence A Max I Exhibit 13-8	<b>rea</b> Desirable 4600:All	Violation? No	V <sub>R</sub> Flow Ent	tering Di Actual	iverge Influ Max Exhibit 13	Desirable	va Violation?	
V <sub>FO</sub> Flow Entering V <sub>R12</sub> Level of Servi	Merge In Actual 4327	fluence A Max I Exhibit 13-8 nination (i	rea Desirable 4600:All <b>f not F)</b>	Violation? No	V <sub>R</sub> Flow Ent V <sub>12</sub> Level of	tering Di Actual	iverge Influ Max Exhibit 13 Determina	Desirable Desirable I-8 Ition (if no	va Violation?	
V <sub>FO</sub> Flow Entering V <sub>R12</sub> Level of Servi D <sub>R</sub> = 5.475 +	Image In           Actual           4327           ice Detern           0.00734 v R + 0	Influence A           Max I           Exhibit 13-8           nination (i           0.0078 V <sub>12</sub> - 0.0	<b>rea</b> Desirable 4600:All i <b>f not F)</b> 10627 L <sub>A</sub>	Violation? No	V <sub>R</sub> Flow Ent V <sub>12</sub> Level of	Actual	International         International           iverge Influe         Max           Exhibit 13         Exhibit 13           Determina         + 0.0086 V <sub>12</sub>	Desirable           1-8           tion (if not)           - 0.009 L <sub>D</sub>	violation?	
$V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 100$ $D_R = 36.5 (pc/mi)$	<i>I Merge In</i> Actual 4327 i <b>ce Detern</b> 0.00734 v <sub>R</sub> + 0 /ln)	Ifluence A Max I Exhibit 13-8 nination (i 0.0078 V <sub>12</sub> - 0.0	<b>rea</b> Desirable 4600:All <b>if not F)</b> 00627 L <sub>A</sub>	Violation? No	V <sub>R</sub> Flow Ent           V <sub>12</sub> Level of           D <sub>R</sub> = (pc)	Actual Actual Service D <sub>R</sub> = 4.252 c/mi/ln)	iverge Influ Max Exhibit 13 Determina + 0.0086 V <sub>12</sub>	Desirable 	violation?	
$V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 1$ $D_R = 36.5$ (pc/mi LOS = E (Exhibit 1)	in the second se	<b>Ifluence A</b> Max I Exhibit 13-8 <b>nination (i</b> 0.0078 V <sub>12</sub> - 0.0	<b>rea</b> Desirable 4600:All i <b>f not F)</b> 00627 L <sub>A</sub>	Violation? No	$V_{R}$ Flow Ent $V_{12}$ Level of $D_{R} = (poc LOS = (E)$	Actual	10 iverge Influ Max Exhibit 13 Determina + 0.0086 V <sub>12</sub>	Desirable H-8 - 0.009 L <sub>D</sub>	ea Violation?	
$V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 10^{-10}$ $D_R = 36.5 (pc/mi)$ $LOS = E (Exhibit 10)^{-10}$	<u>I Merge In</u> Actual 4327 i <b>ce Detern</b> 0.00734 v <sub>R</sub> + ( /ln) 3-2) <b>jination</b>	nfluence A Max I Exhibit 13-8 nination (i 0.0078 V <sub>12</sub> - 0.0	<i>rea</i> Desirable 4600:All i <b>f not F)</b> )0627 L <sub>A</sub>	Violation? No	V <sub>R</sub> Flow Ent           V <sub>12</sub> Level of           D <sub>R</sub> = (pc           LOS = (E)           Speed D	Actual Actual Service D <sub>R</sub> = 4.252 c/mi/ln) xhibit 13-2 etermin	10 iverge Influ Max Exhibit 13 Determina + 0.0086 V <sub>12</sub> ) ation	Desirable - 0.009 L <sub>D</sub>	ea Violation?	
$V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 100$ $D_R = 36.5 (pc/mi)$ LOS = E (Exhibit 100) Speed Determ	Merge In       Actual       4327       ice Detern       0.00734 v R + (       /In)       13-2)       nination	Ifluence A Max I Exhibit 13-8 nination (i 0.0078 V <sub>12</sub> - 0.0	<b>rea</b> Desirable 4600:All i <b>f not F)</b> 10627 L <sub>A</sub>	Violation? No	$V_{R}$ Flow Ent $V_{12}$ Level of $D_{R} = (pot LOS = (E)$ Speed D $D_{R} = (Fv)$	Actual Actual Service D <sub>R</sub> = 4.252 c/mi/In) xhibit 13-2 etermina hibit 13-12	iverge Influ Max Exhibit 13 Determina + 0.0086 V <sub>12</sub> ) ation	Desirable 8 0.009 L <sub>D</sub>	ea Violation?	
$V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 100$ $D_R = 36.5 (pc/minimum)$ OS = E (Exhibit 100) Speed Determ $M_S = 0.586 (Exit)$	Image In           Actual           4327           ice Detern           0.00734 v R + (0/10)           13-2)           nination           iit 13-11)	nfluence A Max I Exhibit 13-8 nination (i 0.0078 V <sub>12</sub> - 0.0	<b>rea</b> Desirable 4600:All i <b>f not F)</b> D0627 L <sub>A</sub>	Violation? No	$V_{R}$ Flow Ent $V_{12}$ Level of $D_{R} = (pot)$ LOS = (Ext Speed D $D_{s} = (Ext)$ S = (Ext)	Actual Actual Service D <sub>R</sub> = 4.252 c/mi/ln) xhibit 13-2 etermina thibit 13-12)	10 iverge Influ Max Exhibit 13 Determina + 0.0086 V <sub>12</sub> ) ation	Desirable H-8 - 0.009 L <sub>D</sub>	violation?	
$V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 10^{-10}$ $O_R = 36.5$ (pc/mi OS = E (Exhibit 1 Speed Detern $M_S = 0.586$ (Exit $S_R = 53.6$ mph (	Image In           Actual           4327           ice Detern           0.00734 v <sub>R</sub> + (           /ln)           13-2)           imation           wit 13-11)           Exhibit 13-11)	<b>afluence A</b> Max I Exhibit 13-8 <b>nination (i</b> 0.0078 V <sub>12</sub> - 0.0	rea Desirable 4600:All i <b>f not F)</b> )0627 L <sub>A</sub>	Violation? No	$V_{R}$ Flow Ent $V_{12}$ Level of $D_{R} = (pot)$ $LOS = (Ex)$ $Speed D$ $D_{s} = (Ex)$ $S_{R} = mp$ $S_{R} = mp$	Actual Actual Service D <sub>R</sub> = 4.252 c/mi/ln) xhibit 13-2 etermina hibit 13-12) h (Exhibit 13	10 iverge Influ Max Exhibit 13 Determina + 0.0086 V <sub>12</sub> ) ation	Desirable 	ea Violation?	
$V_{FO}$ Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 100$ $D_R = 36.5 (pc/minimum)$ OS = E (Exhibit 1) Speed Determ $M_S = 0.586 (Exhibit 2)$ $S_R = 53.6 mph (1)$ $S_0 = 65.5 mph (1)$	Merge In           Actual           4327           ice Detern           0.00734 v R + (           /In)           13-2)           Dination           wit 13-11)           Exhibit 13-11)           Exhibit 13-11)	<b>offluence A</b> Max I Exhibit 13-8 <b>nination (i</b> 0.0078 V <sub>12</sub> - 0.0	<b>rea</b> Desirable 4600:All i <b>f not F)</b> D0627 L <sub>A</sub>	Violation? No	$V_{R}$ Flow Ent $V_{12}$ Level of $D_{R} = (po)$ LOS = (E: Speed D $D_{S} = (Ex)$ $S_{R} = mp$ $S_{0} = mp$	Actual Actual Service D <sub>R</sub> = 4.252 c/mi/In) xhibit 13-2 etermina hibit 13-12) h (Exhibit 13	-12) -12)	Desirable i-8 i-0.009 L <sub>D</sub>	ea Violation?	

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	l-95 SB Seg 7-B	et On Ramps
Analysis Time Period	PM		Analysis Year	2040 Bu	iild 2
Project Description SW 10t					unning Data
Flow Inputs	)		Des.(IN)		anning Data
	5640	voh/h	Dook Hour Foster, DHE	0.05	
AADT	5040	veh/day	%Trucks and Buses, P <sub>T</sub>	3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%Rvs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
Ε <sub>Τ</sub>	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	2	ft	T <sub>LW</sub>		mph
Total Ramp Density TRD	5	ramps/mi	<sup>I</sup> LC TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph		70.0	mpn
LOS and Performance	Measures	-	Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 2009 62.4 32.2 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 <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base free our volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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Job: SW 10th Street SIMR Analyst: AECOM

Location:	Seg 8: I-	95 South	0th Street E	B & WB		
Analysis Period:	PM Peak	Hour				
Analysis Year:	2040 Bui	ld 2				
5.640			7.020			
1 200						
1,300-						
	PHF =	0.95				
	v <sub>fr</sub> =	7,020	vph			
	v <sub>r</sub> =	1,380	vph			
	v <sub>f</sub> =	5,640				
Upstream Freeway	Tr % =	3%				
Ramp	Tr % =	2%				
Downstream Freeway	Tr % =	3%				
Freeway	f <sub>HV</sub> =	1/(1+P	<sub>r</sub> (E <sub>⊤</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -	·1)) =	0.985	
Ramp	f <sub>HV</sub> =	1/(1+P	r(E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -	-1)) =	0.9901	
flat terrain	<b>Ε</b> <sub>τ</sub> =	1.5				
	RV % =	0				
Driver Population adj.	f <sub>P</sub> =	1.000				
	V <sub>fr</sub> =	=v <sub>fr</sub> /(PF	HF)(f <sub>HV</sub> )(f <sub>P</sub> ) =	7,500	pc/h	
	V <sub>r</sub> =	=v <sub>r</sub> /(PH	$(f_{HV})(f_{P}) =$	1,467	pc/h	
	V <sub>f</sub> =	=v <sub>f</sub> /(PH	$ F(f_{HV})(f_{P}) =$	6,026	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	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

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 9-B	et 10th & Exit to Exp
Analysis Time Period	PM		Analysis Year	2040 Bu	<i>ild</i> 2
					unning Data
	)		Jes.(IN)		In Thing Data
	7020	veh/h	Dook Hour Foster, DHF	0.05	
AADT	7020	veh/day	%Trucks and Buses, P <sub>T</sub>	0.95 3	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%Rvs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjustr	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
É <sub>T</sub>	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 <sub>LW</sub>		mph
Number of Lanes, N	4				mph
FES (massured)	70.0	ramps/mi		70.0	mpn
FFS (measured)	70.0	mph	FFS	70.0	mph
		ттрп			
LOS and Performance	Measures		Design (N)		
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1875 64.7 29.0 D	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service DDHV - Directional design ho	S - Speed D - Density FFS - Free-flow BFFS - Base fre pur volume	speed ee-flow speed	E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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General Infor	mation			Site Inform	nation	-					
				eeway/Dir of Tra		95 SB					
Agency or Company		OM	.lu	lunction		I-95 SB Sog 10 Morgo from Ex to CP					
Date Performed	ALO		Ju	risdiction	0	eg to-merge in					
				alvsis Year	2	040 Build 2					
Project Description	SW 10th Stree	t SIMR									
Inputs											
Instream Adi Ramp		Freeway Num	per of Lanes, N	4				Downstr	eam Adi		
		Ramp Number of Lanes, N 1						Ramp	cani Auj		
🗌 Yes 📃 On		Acceleration L	ane Length, L.	600							
								IM Yes	⊡ On		
I No ☐ Off								🗌 No	✓ Off		
= ft			ne, v <sub>F</sub>	7020				L =	1150 ft		
п			, v <sub>R</sub>	220				-down	1100 11		
/= veh/h		Freeway Free	Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	780 veh/h		
u		Ramp Free-Flow Speed, S <sub>FR</sub> 50.0									
Conversion to	o pc/h Un	der Base (	Conditions				1				
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv	f <sub>HV</sub>	f <sub>p</sub>	v = V/PH	IF x f <sub>HV</sub> x f <sub>p</sub>		
Freeway	7020	0.95	Level	3	0	0.985	1.00	1	7500		
Ramp	220	0.92	Level	2	0	0.990	1.00		242		
UpStream					-						
DownStream	780	0.92	Level	2	0	0.990	1.00		856		
		Merge Areas				a	Diverge Areas	-			
Estimation of	v <sub>12</sub>				Estimatio	on of v <sub>12</sub>					
	$V_{12} = V_{F}$	( P <sub>EM</sub> )				V -	$V \pm 0/V$				
-==	(Eau	ation 13-6 or	13-7)		_	v <sub>12</sub> –			(0)		
EQ P =	0 188	usina Fauat	on (Exhibit 13-6)		L <sub>EQ</sub> =		(Equation 13	3-12 or 13-	-13)		
FM / _	0.100	using Equat			P <sub>FD</sub> =		using Equati	on (Exhibit	13-7)		
/ 12 -	1407	pc/n	10.11.10		V <sub>12</sub> =		pc/h				
$V_3$ or $V_{av34}$	3040 17)	pc/n (Equation	on 13-14 or 13-		$V_3^{}$ or $V_{av34}^{}$		pc/h (Equation	13-14 or 13	-17)		
Is V <sub>2</sub> or V <sub>2224</sub> > 2.70	) pc/h? 🔽 Ye	s 🗌 No			Is $V_3$ or $V_{av34}$	> 2,700 pc/h?	Yes 🗌 No	<b>b</b>			
$I_{\rm s} V_{\rm o} \text{ or } V_{\rm o} > 1.5^{*}$					Is $V_3$ or $V_{av34}$	> 1.5 * V <sub>12</sub> /2	Yes No	)			
av34	3000	nc/h (Equatio	on 13-16 13-		If Yes V =		pc/h (Equation	on 13-16,	13-18, or		
f Yes,V <sub>12a</sub> =	18, or	13-19)			11 103, <b>v</b> 12a	1	3-19)				
Capacity Che	cks				Capacity	Checks					
	Actual	C	apacity	LOS F?		Actual	Ca	apacity	LOS F?		
					V <sub>F</sub>		Exhibit 13	-8			
Vro	7742	Exhibit 13-8		No	V <sub>FO</sub> = V <sub>F</sub> -	V <sub>R</sub>	Exhibit 13	-8			
- FO					1.0 1		Exhibit 1	3-			
					<sup>V</sup> R		10				
Flow Entering	n Merge In	fluence A	rea		Flow Ent	ering Dive	erge Influe	nce Are	a		
	Actual	Max I	Desirable	Violation?	N (	Actual	Max De	sirable	Violation?		
V <sub>R12</sub>	3242	Exhibit 13-8	4600:All	NO	V <sub>12</sub>		Exhibit 13-8				
_evel of Servi	ce Detern	nination (i	<u>r not F)</u>		Level of	Service De	eterminatio	on (If no	(TF)		
D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> + (	0.0078 V <sub>12</sub> - 0.0	10627 L <sub>A</sub>		D	<sub>R</sub> = 4.252 + (	0.0086 V <sub>12</sub> - 0	J.009 L <sub>D</sub>			
0 <sub>R</sub> = 26.9 (pc/m	i/ln)				D <sub>R</sub> = (pc	/mi/ln)					
LOS = C (Exhibit 13-2)					LOS = (Exhibit 13-2)						
	Speed Determination						Speed Determination				
Speed Detern	 Μ <sub>ο</sub> =0.361 (Exibit 13-11)					$D_{e} = (Exhibit 13-12)$					
<b>Speed Detern</b> M <sub>e</sub> = 0.361 (Fxik	oit 13-11)			1		$S_{n} = mph (Fxhibit 13-12)$					
Speed Detern $A_{\rm S} = 0.361$ (Exit	oit 13-11) Exhibit 13-11)				S <sub>R</sub> = mpt	n (Exhibit 13-12	)				
Speed Determ $M_{\rm S} = 0.361$ (Exit $S_{\rm R} = 59.9$ mph (	bit 13-11) Exhibit 13-11) Exhibit 12-11)				S <sub>R</sub> = mpł S <sub>A</sub> = mnł	n (Exhibit 13-12 n (Exhibit 13-12	)				
<b>Speed Detern</b> $M_{S} = 0.361$ (Exit $S_{R} = 59.9$ mph ( $S_{0} = 63.7$ mph ( $S_{0} = 62.1$ mph (	bit 13-11) Exhibit 13-11) Exhibit 13-11) Exhibit 13-13)				S <sub>R</sub> = mpt S <sub>0</sub> = mpt S = mat	i (Exhibit 13-12) i (Exhibit 13-12 i (Exhibit 13-12	) )				

RAMPS AND RAMP JUNCTIONS WORKSHEET												
General Infor	mation			Site Infor	mation							
Analyst	Freeway/Dir				avel	I-95 SE	}					
Agency or Company	ncy or Company AECOM			Junction		Seg 11	- Diverge to	o Express				
Date Performed			Ju	risdiction								
Analysis Time Period	M PM		An	alysis Year		2040 B	uild 2					
Project Description	SW 10th Stree	t SIMR										
inputs									1			
Upstream Adj R	amp	Freeway Nurr	iber of Lanes, N	4					Downstrea	m Adj		
		Ramp Number of Lanes, N							Ramp			
res 🖻		Acceleration I	_ane Length, L <sub>A</sub>						🗌 Yes	On		
□ No □	Off	Deceleration Lane Length L <sub>D</sub> 2								Off		
		Freeway Volu	ime, V <sub>F</sub>	7240								
L <sub>up</sub> = 11	50 ft	Ramp Volume	e, V <sub>R</sub>	780					L <sub>down</sub> =	ft		
		Freeway Free	-Flow Speed, S <sub>EE</sub>	70.0								
$V_u = 22$	0 veh/h	Ramp Free-F	low Speed, S <sub>ED</sub>	45.0					V <sub>D</sub> =	ven/h		
Conversion t	o pc/h Un	der Base	Conditions						1			
(no/h)	V		Torroin	0/ Truck	0/ Dv	1	f	f		v fv f		
(pc/n)	(Veh/hr)	PHF	remain	% ITUCK	%RV		'HV	ľр		<b>^ '</b> HV <b>^ '</b> p		
Freeway	7240	0.95	Level	3	0	0.	985	1.00	77	35		
Ramp	780	0.92	Level	2	0	0.	990	1.00	85	6		
UpStream	220	0.92	Level	2	0	0.	990	1.00	24	2		
DownStream								N A				
Estimation of	F vz	werge Areas			Diverge Areas							
Estimation of	v <sub>12</sub>											
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>FM</sub> )			$V_{12} = V_{R} + (V_{F} - V_{R})P_{FD}$							
L <sub>EQ</sub> =	(Equa	tion 13-6 or	13-7)		L <sub>EQ</sub> =		(	Equation 13-	12 or 13-13	)		
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	436 using Ec	uation (Exhi	oit 13-7)		
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		38	355 pc/h				
$V_3$ or $V_{av34}$	pc/h (	Equation 13	-14 or 13-17)		$V_3$ or $V_{av34}$		19	40 pc/h (Equ	uation 13-14	or 13-17)		
Is $V_3$ or $V_{2\sqrt{34}} > 2,70$	0 pc/h? 🗌 Ye	s 🗌 No			Is V <sub>2</sub> or V <sub>2V</sub>	34 > 2,7	00 pc/h? ∏	∏Yes √No		,		
$I_{\rm S} V_{2} \text{ or } V_{2} > 1.5^{3}$	*V <sub>40</sub> /2 □Ye	s 🗌 No			Is V <sub>2</sub> or V <sub>2</sub>	> 1.5	* V <sub>40</sub> /2	Yes VNo				
	pc/h (	Equation 13	-16, 13-18, or		lf Vee V		p	c/h (Equation	n 13-16, 13-	18, or 13-		
11 Yes, v <sub>12a</sub> =	13-19)	•			II Yes, v <sub>12a</sub> =	-	19	9) ``				
Capacity Che	ecks			1 <sup>1</sup>	Capacity Checks							
	Actual	(	Capacity	LOS F?			Actual	C	apacity	LOS F?		
					V <sub>F</sub>		7735	Exhibit 13-	-8 9600	No		
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	6879	Exhibit 13-	-8 9600	No		
					V <sub>R</sub>		856	Exhibit 13-	10 2100	No		
Flow Entering	a Merae In	fluence A	rea		Flow En	terin	a Dive	rae Influer	nce Area			
	Actual	Max	Desirable	Violation?	_		Actual	Max Desira	ible	Violation?		
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3855	Exhibit 13-8	4400:All	No		
Level of Service Determination (if not F)						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 <sub>R</sub> = (pc/mi/ln)						$D_R = 38.9 (pc/mi/ln)$						
LOS = (Exhibit 13-2)						LOS = E (Exhibit 13-2)						
Speed Determination						Speed Determination						
						D = 0.375 (Evhibit 13.12)						
$w_{S} = (LADIL 13-11)$					$P_{s} = 50.5 \text{ mph} (Exhibit 13-12)$							
$S_R$ = mpn (EXNIDIT 13-11)					$\sim_{\rm R}$ 59.5 mph (Exhibit 15-12)							
$S_0 = mph (Exhibit 13-11)$					$S_0^-$ 73	.a mbu		10-12)				
S = mpn (Exh	iidit 13-13)				5 = 65	o.2 mph	(Exhibit	13-13)				
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	BASIC F	REEWAY SE	GMENTS WORKSHEET					
General Information			Site Information					
Analyst Agency or Company AECOM Date Performed			Highway/Direction of Travel From/To Jurisdiction	Fravel I-95 SB Seg 13-Bet Off & On Ramps				
Analysis Time Period	PM		Analysis Year	2040 Bu	ild 2			
Project Description SW 10					unning Data			
Elow Inputs	)		Jes.(N)		inning Data			
	E100	veb/b	Deek Lleur Fester, DUF	0.05				
AADT	5180	veh/day	%Trucks and Buses, P <sub>T</sub>	0.95 3				
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P <sub>R</sub> General Terrain: Grade % Length Up/Down %	0 Level mi				
Calculate Flow Adjust	ments							
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2				
Ε <sub>T</sub>	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					
Lane Width Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured)	3 70.0	ft ft ramps/mi mph	f <sub>∟w</sub> f <sub>∟C</sub> TRD Adjustment FFS	70.0	mph mph mph mph			
Base free-flow Speed, BFFS		mph			·			
LOS and Performance	Measures		Design (N)					
<u>Operational (LOS)</u> v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1845 65.2 28.3 D	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S Required Number of Lanes, N	f <sub>HV</sub> x f <sub>p</sub> )	pc/h/ln mph pc/mi/ln			
Glossary			Factor Location					
N - Number of lanesS- SpeedV- Hourly volumeD- Densityvp- Flow rateFFS - Free-flow speedLOS- Level of serviceBFFS - Base free-flow speedDDHV - Directional design hour volume			E <sub>R</sub> - Exhibits 11-10, 11-12 E <sub>T</sub> - Exhibits 11-10, 11-11, 11- f <sub>p</sub> - Page 11-18 LOS, S, FFS, v <sub>p</sub> - Exhibits 11-2	13 2, 11-3	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11			

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		F	REEWAY	( WEAV	ING WOF	RKSHEE	Г			
General Information					Site Information					
Analyst Agency/Company AECOM Date Performed Analysis Time Period PM				Freeway/Dir Weaving Seg Analysis Yea	e & Copans					
Project Desc	cription SW 10th	n Street SIMF	R							
Inputs					r					
Weaving configuration Weaving number of lanes, N Weaving segment length, L <sub>s</sub> Freeway free-flow speed, FFS			One-Sided 4 2520ft 70 mph	Segment typ Freeway min Freeway ma: Terrain type		Freeway 15 2400 Leve				
Convers	sions to po	/h Unde	r Base Co	ondition	s			1	-	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	4415	0.95	3	0	1.5	1.2	0.985	1.00	4717	
V <sub>RF</sub>	1590	0.92	2	0	1.5	1.2	0.990	1.00	1746	
V <sub>FR</sub>	765	0.92	2	0	1.5	1.2	0.990	1.00	840	
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
V <sub>NW</sub>	4717					7303				
V <sub>W</sub>	2586									
VR	0.354									
Configu	ration Cha	racterist	tics		1					
Minimum maneuver lanes, N <sub>WL</sub>				2 lc	Minimum we		lc/h			
Interchange density, ID				0.7 int/mi	Weaving lan	e changes, L	C <sub>w</sub>		lc/h	
Minimum RF lane changes, LC <sub>RF</sub>				1 lc/pc	Non-weaving		lc/h			
Minimum FR lane changes, LC <sub>FR</sub>				1 lc/pc	Total lane ch	lc/h				
Minimum RR lane changes, LC <sub>RR</sub> lc/p					Non-weaving vehicle index, I <sub>NW</sub>					
Weaving	g Segment	Speed,	Density, I	_evel of	Service,	and Cap	acity			
Weaving segment flow rate, v Weaving segment capacity, c <sub>w</sub>				7208 veh/h 6678 veh/h	Weaving inte Weaving seg		mph			
Weaving segment v/c ratio 1.07				1.079	Average wea	mph				
Weaving segment density, D			pc/mi/ln	Average non-weaving speed, S <sub>NW</sub>				mph		
Level of Service, LUS				F	Maximum weaving length, L <sub>MAX</sub> 617					
Notes a. Weaving se	egments longer th	an the calcula	ted maximum le	ength should I	be treated as is	olated merge	and diverge ar	eas using the	procedures of	
Chapter 13, " b. For volume	Freeway Merge a es that exceed the	nd Diverge Se weaving segr	gments". nent capacity, tł	ne level of ser	rvice is "F".	_	-	-		

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