

## **APPENDIX O**

2020 & 2040 Build 2A Freeway HCS Operational Analysis

			FREEWAY	WEAV	NG WOR	KKSHEE	T		
Genera	l Informati	on			Site Info	rmation			
Analyst Agency/Cor Date Perfor Analysis Tir	med	AECO AM	М		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sample Analysis Year 2020 Build 2A				& Sample
Project Des	cription SW 10t	h Street SIMF	₹		<u> </u>				
Inputs					•				
Weaving se Freeway fre	mber of lanes, N gment length, L e-flow speed, FI	s S		Segment type Freeway min Freeway max Terrain type	imum speed			Freeway 15 2400 Leve	
Conver	sions to po	1		1		Г	ſ		/ / !- \
\	V (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	4305	0.95	3	0	1.5	1.2	0.985	1.00	4600
V <sub>RF</sub>	355	0.92	2	0	1.5	1.2	0.990	1.00	390
V <sub>FR</sub>	790	0.92	2	0	1.5	1.2	0.990	1.00	867
V <sub>RR</sub>	0	0.95	0	0	1.5	1.2	1.000	1.00	0
V <sub>NW</sub>	4600							V =	5857
V <sub>W</sub>	1257								
VR	0.215		4						
	ration Cha		tics		l. e ·				40571.0
	aneuver lanes,	$N_{WL}$		2 lc		-	hanges, LC <sub>MIN</sub>	I	1257 lc/h
•	e density, ID			0.7 int/mi	Weaving lan		••		1692 lc/h
	F lane changes,	IN			Non-weaving				1467 lc/h
	R lane changes,	1110		1 lc/pc	Total lane ch	,	-		3159 lc/h
	R lane changes	100			Non-weaving				766
Weavin	g Segment	t Speed,	Density, I	_evel of					
•	egment flow rate		;	5777 veh/h	Weaving inte	-			0.283
	egment capacity,	C <sub>w</sub>	1	8765 veh/h	Weaving seg Average wea				54.7 mph
•	egment v/c ratio	D	2	0.659	_	• .	**		57.9 mph
_	egment density,	ט	26	6.8 pc/mi/ln	J J IVW				53.9 mph
Level of Se	IVICE, LUS			С	Maximum we	eaving length	۱, L <sub>MAX</sub>		4686 ft

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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 AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 2-Be Sample 2020 Bui	et Off & On from
Project Description SW 10th	Street SIMR		•		
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4660	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 Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustm	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	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 I	Measures		Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	6 f <sub>HV</sub> × f <sub>p</sub> ) 1660 67.5 24.6 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	$f_{HV} \times f_p$ )	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	-	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		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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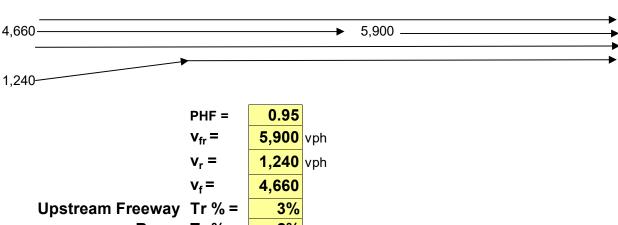
Job: SW 10th Street SIMR

Analyst: AECOM

Location: Seg 3: I-95 Northbound On-Ramp from WB Sample Road

**Analysis Period: AM Peak Hour** 

**Analysis Year:** 2020 Build 2A



2% Ramp Tr % = Downstream Freeway Tr % = 3% Freeway f<sub>HV</sub> =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ 

0.985  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ Ramp  $f_{HV} =$ 0.9901

flat terrain  $E_T$  = 1.5 **RV** % = 0

Driver Population adj.  $f_P =$ 1.000

> $=v_{fr}/(PHF)(f_{HV})(f_P)=$  $V_{fr} =$  $V_r = = = V_r/(PHF)(f_{HV})(f_P) =$

1,318 pc/h  $=v_f/(PHF)(f_{HV})(f_P) =$  $V_f =$ 4,979 pc/h

6,304

pc/h

No. lanes upstream of ramp N =3

No. Ln	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	6,304	0.66	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	4,979	0.69	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,318	0.63	No

		MPS AND	RAMP JUN			<u>EI</u>			
General Infor	mation			Site Infor					
Analyst				eeway/Dir of Tr		95 NB			
Agency or Company	AEC	OM		ınction	S	eg 4-On from Ex	кр		
Date Performed Analysis Time Perioc	d AM			ırisdiction nalysis Year	20	020 Build 2A			
Project Description		et SIMR	7.0	laryolo i oai		JZO Bulla ZA			
nputs									
		Freeway Num	ber of Lanes, N	4				D	A -I:
Upstream Adj Ramp		Ramp Numbe	•	1				Downstre Ramp	am Adj
Yes Or	า	1 '	ane Length, L <sub>A</sub>	1500					
		1	,,	1300				✓ Yes	☐ On
☑ No ☐ Of	f	1	ane Length L <sub>D</sub>	5000				☐ No	✓ Off
= ft		Freeway Volu		5900				L <sub>down</sub> =	2950 ft
<sub>up</sub> = ft		Ramp Volume	• • •	710				down	2550 11
√ <sub>u</sub> = veh/h	1		-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	250 veh/h
u		Ramp Free-Fl	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	o pc/h Une	der Base	Conditions						
(pc/h)	(\/oh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
 Freeway	(Veh/hr) 5900	0.95	Level	3	0	0.985	1.00		6304
Ramp	710	0.93		2	0	0.965	1.00	<del>                                     </del>	779
JpStream	710	0.92	Level		U	0.990	1.00		119
DownStream	250	0.92	Level	2	0	0.990	1.00		274
20111104104111		Merge Areas	20101		·		Diverge Areas		
Stimation of					Estimation				
	V <sub>12</sub> = V <sub>F</sub>	(P)							
_	12 1		- 12 7)			V <sub>12</sub> =	$V_R + (V_F - V_R)$	)P <sub>FD</sub>	
-EQ =	• •	ation 13-6 o	•		L <sub>EQ</sub> =		(Equation 13-	·12 or 13-	13)
) = FM =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equatio	n (Exhibit 1	3-7)
/ <sub>12</sub> =	759 p		10.1110		V <sub>12</sub> =		pc/h		
/ <sub>3</sub> or V <sub>av34</sub>	2772   17)	pc/h (Equati	on 13-14 or 13-		$V_3$ or $V_{av34}$		pc/h (Equation 1	13-14 or 13-	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	s $\square$ No			Is V <sub>3</sub> or V <sub>av34</sub>	> 2,700 pc/h? [	☐Yes ☐ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 '					Is V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V <sub>12</sub> /2 [	☐Yes ☐ No		
			on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
Yes,V <sub>12a</sub> =		13-19)	511 10-10, 10-		11 1 63, v <sub>12a</sub> –	1	3-19)		
Capacity Che	cks				Capacity	Checks			
	Actual	C	apacity	LOS F?		Actual	Ca	pacity	LOS F?
					$V_{F}$		Exhibit 13-	8	
	7083	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	$V_R$	Exhibit 13-	8	
V	7000	EXHIBIT 10 0		110		- 1	Exhibit 13	-	
$V_{FO}$					$V_R$		10		
				*	1		I £1	ice Area	W.
	g Merge In				Flow Enter	ering Dive			\/iolotion?
Flow Entering	<b>g Merge In</b> Actual	Max	Desirable	Violation?		e <b>ring Dive</b> Actual	Max Des		violation?
Flow Entering	Actual 3602	Max Exhibit 13-8	Desirable 4600:All	Violation?	V <sub>12</sub>	Actual	Max Des Exhibit 13-8	irable	
Flow Entering	Actual 3602	Max Exhibit 13-8	Desirable 4600:All	i e	V <sub>12</sub>	Actual	Max Des	irable	
Flow Entering  V <sub>R12</sub> Level of Serv	Actual 3602	Max Exhibit 13-8 <b>mination</b> (	Desirable 4600:All <b>if not F</b> )	i e	V <sub>12</sub> Level of S	Actual Service De	Max Des Exhibit 13-8	irable n (if not	
V <sub>R12</sub> Level of Serv D <sub>R</sub> = 5.475 +	Actual 3602  *Ice Determ 0.00734 v R + 0	Max Exhibit 13-8 <b>mination</b> (	Desirable 4600:All <b>if not F</b> )	i e	V <sub>12</sub> Level of S	Actual Service De	Max Des Exhibit 13-8 eterminatio	irable n (if not	
Flow Entering $V_{R12}$ Level of Serv $D_{R} = 5.475 + D_{R} = 25.4 \text{ (pc/m}$	Actual 3602 Fice Determ 0.00734 v <sub>R</sub> + 0 ni/ln)	Max Exhibit 13-8 <b>mination</b> (	Desirable 4600:All <b>if not F</b> )	i e	V <sub>12</sub> Level of S D <sub>R</sub> = (pc.	Actual Service De R = 4.252 + 0	Max Des Exhibit 13-8 eterminatio	irable n (if not	
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + D_R = 25.4 \text{ (pc/m}$ $OS = C \text{ (Exhibit)}$	Actual 3602  rice Determ 0.00734 v <sub>R</sub> + 0 ni/ln) 13-2)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	i e	V <sub>12</sub> Level of S D <sub>R</sub> = (pc. LOS = (Ex	Actual  Service De  R = 4.252 + 0 /mi/ln)  hibit 13-2)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $O_R = 25.4 \text{ (pc/m}$ $OS = C \text{ (Exhibit)}$ Speed Determ	Actual 3602  **Cec Determ 0.00734 v R + ( ni/ln) 13-2)  **mination	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	i e	V <sub>12</sub> Level of S D <sub>R</sub> = (pc. LOS = (Ex	Actual  Service De  R = 4.252 + 0  /mi/ln)  hibit 13-2)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $O_R = 25.4 \text{ (pc/m}$ $O_R = C \text{ (Exhibit)}$ Speed Determ $O_R = 0.314 \text{ (Exim)}$	Actual 3602 ice Detern 0.00734 v <sub>R</sub> + ( ni/ln) 13-2) mination ibit 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	i e	$V_{12}$ Level of S $D_R = (pc)$ LOS = (Ex  Speed De $D_S = (Ext)$	Actual  Service De  R = 4.252 + 0  /mi/ln)  chibit 13-2)  etermination  nibit 13-12)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 25.4 \text{ (pc/m}$ OS = C (Exhibit  Speed Determ $M_S = 0.314 \text{ (Exister)}$ $G_R = 61.2 \text{ mph}$	Actual 3602  ice Detern 0.00734 v R + ( ni/ln) 13-2) mination (Exhibit 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	i e	$\begin{array}{c} V_{12} \\ \textbf{Level of S} \\ D_R = & (pc. \\ LOS = & (Ex. \\ \textbf{Speed De} \\ D_S = & (Ext. \\ S_R = & mph \end{array}$	Actual  Service De  R = 4.252 + 0  /mi/ln)  shibit 13-2)  etermination  ibit 13-12)  n (Exhibit 13-12)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 25.4 \text{ (pc/m}$ $OS = C \text{ (Exhibit)}$ Speed Determ $M_S = 0.314 \text{ (Exion)}$ $M_S = 61.2 \text{ mph}$ $M_S = 65.9 \text{ mph}$	Actual 3602 ice Detern 0.00734 v <sub>R</sub> + ( ni/ln) 13-2) mination ibit 13-11)	Max Exhibit 13-8 mination (	Desirable 4600:All <b>if not F</b> )	i e	$V_{12}$ Level of $S_R = (pc)$ LOS = (Ex Speed De $D_S = (Ex)$ $S_R = (Ex)$ $S_R = (Ex)$ $S_R = (Ex)$	Actual  Service De  R = 4.252 + 0  /mi/ln)  chibit 13-2)  etermination  nibit 13-12)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	Violation?

		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel I	I-95 NB				
Agency or Company	AEC	MC		nction	;	Seg 5-C	Off to Exp fro	om GPL		
Date Performed				risdiction	,					
Analysis Time Period Project Description		+ CIMD	Ar	nalysis Year		2020 Bı	Jild 2A			
Inputs	SW TUITI SHEE	USIIVIK								
		Freeway Num	nber of Lanes, N	4						
Upstream Adj R	amp	•	er of Lanes, N	1					Downstrea Ramp	m Adj
✓ Yes	On	· ·		ı						
			Lane Length, L <sub>A</sub>	000					☐ Yes	On
□No□	Off		Lane Length L <sub>D</sub>	200					✓ No	Off
	50 ft	Freeway Volu		6610					l =	ft
L <sub>up</sub> = 29	50 ft	Ramp Volume	1.	250					L <sub>down</sub> =	IL
V <sub>11</sub> = 71	0 veh/h		e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
u 71	o venin	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					Б	
Conversion to	o pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6610	0.95	Level	3	0	0.9	985	1.00	706	<u>.</u> 62
Ramp	250	0.92	Level	2	0		990	1.00	27	4
UpStream	710	0.92	Level	2	0	0.9	990	1.00	77	9
DownStream										
L		Merge Areas						verge Areas		
Estimation of	v <sub>12</sub>				Estimati	ion o	f v <sub>12</sub>			
	$V_{12} = V_{F}$	(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	quation 13-1	2 or 13-13)	
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	36 using Equ	ation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		323	4 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	3-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		191	4 pc/h (Equa	ation 13-14	or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h?	s 🗌 No				<sub>34</sub> > 2,70		Yes ☑ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *								Yes ✓ No		
If Yes,V <sub>12a</sub> =	pc/h (	Equation 13	s-16, 13-18, or		If Yes,V <sub>12a</sub> =			h (Equation	13-16, 13-	18, or 13-
	13-19)				.25		19	)		
Capacity Che	·	1 /	,	T 100 F0	Capacity	y Che		1 0	**	L . 00 F0
	Actual		Capacity	LOS F?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Actual	_	pacity	LOS F?
.,					V <sub>F</sub>		7062	Exhibit 13-8		No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	6788	Exhibit 13-8		No
					V <sub>R</sub>		274	Exhibit 13-10	2100	No
Flow Entering	g Merge In	-		_	Flow En	terin	g Diver	ge Influenc		
	Actual	1	Desirable	Violation?			ctual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		234	Exhibit 13-8	4400:All	No
Level of Serv					1			erminatior	•	<del>)</del>
$D_R = 5.475 + 0.0$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub>	- 0.00627 L <sub>A</sub>		[	$D_R = 4$	.252 + 0.0	0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				$D_R = 30$	).3 (pc/	mi/ln)			
LOS = (Exhibit <sup>*</sup>	13-2)				LOS = D	(Exhib	it 13-2)			
Speed Detern	nination				Speed D	eteri	ninatio	า		
M <sub>S</sub> = (Exibit 13					$D_{s} = 0.3$	323 (E)	khibit 13-1	2)	<u></u>	<u></u>
_ ·	ibit 13-11)					.0 mph	(Exhibit 1	3-12)		
	ibit 13-11)					3.2 mph	(Exhibit 1	3-12)		
1 *	ibit 13-13)				ľ	-	` (Exhibit 1	•		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-So 2020 Bu	outh of Off to 10th
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	6360	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> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N Total Ramp Density, TRD	4	ramps/mi	f <sub>LC</sub> TRD Adjustment		mph mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance	Measures		Design (N)		
Operational (LOS)  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> ) 1699 67.1 25.3 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	·	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 freedour 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-		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 7: I-95 NB Off-Ramp to SW 10th St EB & WB **Analysis Period: AM Peak Hour Analysis Year:** 2020 Build 2A 5,370 6.360 990 PHF = 0.95  $v_{fr} =$ **6,360** vph  $v_r =$ **990** vph  $V_f =$ 5,370 3% Upstream Freeway Tr % = 2% Ramp Tr % = 3% Downstream Freeway Tr % =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ Freeway f<sub>HV</sub> = 0.985 **Ramp f**<sub>HV</sub> =  $1/(1+P_T(E_{T}-1)+P_R(E_{R}-1)) =$ 0.9901 flat terrain  $E_{T} =$ 1.5 RV % = 0 Driver Population adj.  $f_P =$ 1.000  $V_{fr} =$  $=v_{fr}/(PHF)(f_{HV})(f_{P})=$ 6,795 pc/h  $V_r = = v_r/(PHF)(f_{HV})(f_P) =$ 1,053 pc/h  $V_f =$  $=V_f/(PHF)(f_{HV})(f_P)=$ 5,737 pc/h No. lanes upstream of ramp N =**Average Freeway Density Upstream of Diverge (see Equation 13-26):**  $D = 0.0175 (V_{fr}/N) =$ 29.7 pc/In LOS in the Diverge Area (from Density and Exhibit 13-2) = No. Ln Capacity Check (see Exhibits 13-2, 13-8 and 13.10) Maximum Actual LOS F? Fwy upstream of ramp (assume 70 mph free-flow speed) = 9,600 6,795 No 3 Fwy downstream of ramp (assume 70 mph free-flow speed) = 5,737 No 7,200 2 Capacity on Off-Ramp (assume 45 mph free-flow speed) = 4,200 1,053 No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 8-Be 2020 Bu	et Off & Off Ramps ild 2A
Project Description SW 10t			D (NI)		i Data
✓ Oper.(LOS)	)		Des.(N)	∟ Pia	nning Data
Flow Inputs  Volume, V  AADT  Peak-Hr Prop. of AADT, K  Peak-Hr Direction Prop, D  DDHV = AADT x K x D	5370	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	
			Up/Down %		
Calculate Flow Adjustr	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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)		
Operational (LOS)  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> ) 1912 64.1 29.8 D	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	·	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 freedour 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-		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	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel	I-95 NE	3			
Agency or Company	AEC	MC		inction		Seg 9-0	Off to Hillsb	oro EB&WB		
Date Performed Analysis Time Period	d AM			risdiction nalysis Year		2020 B	uild 2A			
Project Description		t SIMR	Al	larysis i cai		2020 D	uliu ZA			
Inputs										
Upstream Adj R	)amn	Freeway Num	nber of Lanes, N	3					Downstrea	m Adi
Opstream Auj N	amp	Ramp Numbe	er of Lanes, N	1					Ramp	III Auj
□Yes□	On	Acceleration I	_ane Length, L₄						✓ Yes	<b>☑</b> On
 ☑No	Off		Lane Length L <sub>D</sub>	200						
I INO	_  OII	Freeway Volu	- 5	5370					☐ No	Off
$L_{up} = f$	t	Ramp Volume		1250					L <sub>down</sub> =	2100 ft
		1	Flow Speed, S <sub>FF</sub>	70.0						
V <sub>u</sub> = v	eh/h	•	low Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	1290 veh/h
Conversion to	o nc/h Uni		110	10.0						
	<i> </i>			0/ = 1	0/ 5		<u>.</u>	r l		
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	_	f <sub>HV</sub>	'	v = V/PHF	x T <sub>HV</sub> x T <sub>p</sub>
Freeway	5370	0.95	Level	3	0	0.	985	1.00	573	37
Ramp	1250	0.92	Level	2	0	0.	990	1.00	13	72
UpStream  DownStream	4000	0.92	Lavial	2	0	<del>                                     </del>	000	1.00	4.4.	10
DownStream	1290	Merge Areas	Level	2	0	0.	990	iverge Areas	14	10
Estimation of		merge Areas			Estimat	ion o		iverge Areas		
		/ D \						\/ ± (\/ \/	\D	
-	$V_{12} = V_F$	• • • • • • • • • • • • • • • • • • • •	10.7)					$V_R + (V_F - V_F)$	`	
L <sub>EQ</sub> =	, ,	ition 13-6 or	*		L <sub>EQ</sub> =		•	Equation 13-1	•	
P <sub>FM</sub> =	_	Equation (	EXHIBIT 19-0)		P <sub>FD</sub> =			553 using Equ	uation (Exnit	OIT 13-7)
V <sub>12</sub> =	pc/h	C	44 40 47)		V <sub>12</sub> =			788 pc/h	40.44	40.47)
$V_3$ or $V_{av34}$			-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	<b>&gt; 2 7</b>		149 pc/h (Equa	ation 13-14	or 13-17)
Is $V_3$ or $V_{av34} > 2,70$								Yes ☑ No		
Is $V_3$ or $V_{av34} > 1.5$			-16, 13-18, or					☐ Yes ☑ No c/h (Equation	13_16 13_	18 or 13-
If Yes,V <sub>12a</sub> =	13-19)	Lquation	-10, 10-10, 01		If Yes,V <sub>12a</sub> =	=	19	٠.	10-10, 10-	10, 01 10-
Capacity Che	ecks				Capacit	y Ch	ecks			
	Actual		Capacity	LOS F?			Actual	Ca	pacity	LOS F?
					$V_{F}$		5737	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	4365	Exhibit 13-8	7200	No
					V <sub>R</sub>		1372	Exhibit 13-10	0 2100	No
Flow Entering	g Merge In	fluence A	\rea	*	Flow En	nterin	g Dive	rge Influen	ce Area	-
	Actual	1	Desirable	Violation?		TI TI	Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3788	Exhibit 13-8	4400:AII	No
Level of Serv	ice Detern	nination (	if not F)	•	Level of	f Serv	vice De	terminatio	n (if not l	=)
$D_R = 5.475 + 0.$	.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/ln	1)				D <sub>R</sub> = 35	5.0 (pc	/mi/ln)			
LOS = (Exhibit	13-2)					(Exhib	oit 13-2)			
Speed Deterr	nination				Speed L	Deter	minatio	n		
$M_S = (Exibit 1)$					<del>- ′                                     </del>		xhibit 13-			
1 *	nibit 13-11)					•	(Exhibit	•		
	nibit 13-11)					-	(Exhibit	•		
1 '	nibit 13-11)				_ ·	-	(Exhibit	•		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 10-L 2020 Bu	Bet Off & On Ramps ild 2A
Project Description SW 10t					
✓ Oper.(LOS)	1		Des.(N)	∐Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	4120	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> E <sub>⊤</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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)		
Operational (LOS)  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> ) 1467 69.2 21.2 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	·	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 freedour 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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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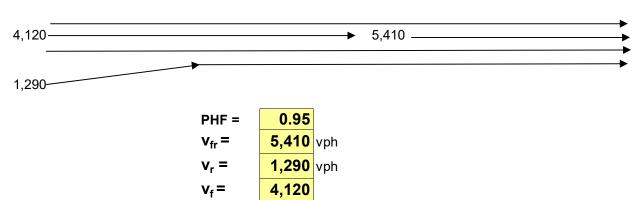
Job: SW 10th Street SIMR

Analyst: AECOM

Location: Seg 11: I-95 Northbound On-Ramp from EB & WB SW 10th St

**Analysis Period: AM Peak Hour** 

**Analysis Year:** 2020 Build 2A



Upstream Freeway Tr % = 3% 2% Ramp Tr % =

Downstream Freeway Tr % = 3%

> Freeway f<sub>HV</sub> =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ 0.985  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ Ramp  $f_{HV} =$ 0.9901

flat terrain  $E_{\tau}$  = 1.5 **RV** % = 0

Driver Population adj.  $f_P =$ 1.000

> $=v_{fr}/(PHF)(f_{HV})(f_P)=$  $V_{fr} =$  $V_r = = = V_r/(PHF)(f_{HV})(f_P) =$  $V_f =$

5,780 pc/h 1,371 pc/h  $=v_f/(PHF)(f_{HV})(f_P) =$ 4,402 pc/h

No. lanes upstream of ramp N =3

No. Ln	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	5,780	0.60	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	4,402	0.61	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,371	0.65	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-l	Bet On Ramps
Analysis Time Period	AM		Analysis Year	2020 Bu	ild 2A
Project Description SW 10th			2 (41)		. 5.
✓ Oper.(LOS)			Des.(N)	∟Pla	inning Data
Flow Inputs	5440		D 111 E 1 DIE	0.05	
Volume, V AADT	5410	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	$f_LW$		mph
Number of Lanes, N	4		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS) 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> ) 1445 69.3 20.9 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ Required Number of Lanes, N	$f_{HV} \times f_p$ )	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	-	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		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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		F	REEWAY	/ WEAV	ING WOF	RKSHEE	T		
Genera	Informati	on			Site Info	rmation			
Analyst Agency/Con Date Perfori Analysis Tin	med	AECO!	Л		Freeway/Dir of Travel Weaving Segment Location Analysis Year  I-95 NB Seg 13-Bet On & Off to Exp 2020 Build 2A				
Project Des	cription SW 10t	h Street SIMF	}		•				
Inputs					1				
Weaving se Freeway fre	mber of lanes, N gment length, L <sub>e</sub> e-flow speed, Fl	S FS		4600ft 70 mph	Segment typ Freeway min Freeway ma: Terrain type	imum speed			Freeway 15 2400 Leve
Conver	sions to po	c/h Unde	r Base Co	ndition	1				
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	E <sub>R</sub>	$f_{HV}$	fp	v (pc/h)
$V_{FF}$	4765	0.95	3	0	1.5	1.2	0.985	1.00	5091
$V_{RF}$	1125	0.92	2	0	1.5	1.2	0.990	1.00	1235
$V_{FR}$	645	0.92	2	0	1.5	1.2	0.990	1.00	708
$V_{RR}$	125	0.92	2	0	1.5	1.2	0.990	1.00	137
$V_{NW}$	7034							V =	7171
$V_W$	137								
VR	0.019								
Configu	ration Cha	aracteris	tics		<u> </u>				
Minimum m	aneuver lanes,	$N_{WL}$		0 lc	Minimum weaving lane changes, ${\rm LC}_{\rm MIN}$				411 lc/h
Interchange				0.7 int/mi	Weaving lan	e changes, L	_C <sub>w</sub>		1037 lc/h
	F lane changes,	141		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3258 lc/h
	R lane changes,	111		0 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4295 lc/h
Minimum R	R lane changes	, LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2265
Weavin	g Segmen	t Speed,	Density, I	_evel of	Service,	and Cap	oacity		
_	gment flow rate			7076 veh/h	Weaving inte	•			0.214
Weaving se	gment capacity	, c <sub>w</sub>	!	9064 veh/h	Weaving seg	•			58.5 mph
_	gment v/c ratio	_	0.4	0.781	Average wea		**		60.3 mph
	egment density,	ט	30	•	Average non-weaving speed, $S_{NW}$ Maximum weaving length, $L_{MAX}$				58.4 mph
Level of Se	ivice, LOS			D	Maximum w	eaving length	າ, L <sub>MAX</sub>		5904 ft

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

	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 14-I	North of Hillsboro
Analysis Time Period	AM		Analysis Year	2020 Bu	ild 2A
Project Description SW 10th	n Street SIMR		2 40		. 5.
✓ Oper.(LOS)			Des.(N)	□ Pla	inning Data
Flow Inputs	5000		D 111 E 1 DIE	0.05	
Volume, V AADT	5890	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	$f_LW$		mph
Number of Lanes, N	4		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			·
LOS and Performance	Measures		Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N x) S	( f <sub>HV</sub> x f <sub>p</sub> ) 1573 68.4 23.0	pc/h/ln mph pc/mi/ln	Design (N) Design LOS v <sub>p</sub> = (V or DDHV) / (PHF x N x S	$f_{HV} \times f_p$ )	pc/h/ln mph
D = v <sub>p</sub> / S LOS	C C	ролпілі	D = v <sub>p</sub> / S Required Number of Lanes, N		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	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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Genera	al Informati			***	ING WORKSHEET Site Information					
Genera	ai iiiiOiiiiati	011								
Analyst Agency/Co Date Perfo Analysis T		AECO PM	М		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sample Analysis Year 2020 Build 2A					
Project Do	scription SW 10t	h Stroot SIMI	)							
Inputs	Scription SVV Tot	II Oli eel Olivii	`							
Weaving configuration One Sided					Segment typ Freeway min Freeway ma Terrain type	nimum speed			Freewa 1 240 Leve	
Conve	rsions to po	c/h Unde	r Base Co	ndition	S					
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>T</sub>	E <sub>R</sub>	$f_{HV}$	fp	v (pc/h)	
$V_{FF}$	3985	0.95	3	0	1.5	1.2	0.985	1.00	4258	
$V_{RF}$	415	0.92	2	0	1.5	1.2	0.990	1.00	456	
$V_{FR}$	1560	0.92	2	0	1.5	1.2	0.990	1.00	1713	
$V_{RR}$	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
$V_{NW}$	4258			•	•	•		V =	6427	
$V_{W}$	2169									
VR	0.337									
Config	uration Cha	aracteris	tics		_					
Minimum I	maneuver lanes,	$N_{WL}$		2 lc	Minimum we	eaving lane c	hanges, LC <sub>MIN</sub>		2169 lc/h	
Interchang	ge density, ID			0.7 int/mi	Weaving lan	ne changes, L	$-C_W$		2604 lc/h	
Minimum	RF lane changes,	$LC_{RF}$		1 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		1397 lc/h	
Minimum	FR lane changes,	$LC_FR$		1 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4001 lc/h	
Minimum	RR lane changes	, LC <sub>RR</sub>		lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		709	
Weavir	ng Segmen	t Speed,	Density, I	_evel of	Service,	and Car	oacity			
Weaving s	segment flow rate	, V		6342 veh/h		ensity factor,			0.340	
Weaving s	segment capacity	, c <sub>w</sub>		7006 veh/h	Weaving segment speed, S				49.5 mpf	
	Weaving segment v/c ratio 0.905				Average weaving speed, $S_{\mathrm{W}}$				56.0 mpt 46.7 mpt	
	Weaving segment density, D 32.5 pc/mi/ln					J I IVV				
	ervice, LOS			D	Maximum w	eaving length	ı, L <sub>MAX</sub>		5989 f	
Chapter 13	segments longer t	and Diverge S	egments".			solated merge	and diverge ar	eas using the	procedures of	
	nes that exceed the rsity of Florida, All		•	ie ievei 01 Sel		10TM Version		Cama	erated: 6/17/20	

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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 2-Be Sample 2020 Bui	et Off & On from
Project Description SW 10th	Street SIMR		•		
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4400	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 Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustn	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured)	3 70.0	ft ramps/mi mph	f <sub>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph
Base free-flow Speed, BFFS		mph			•
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		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	$f_{HV} \times f_p$ )	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	-	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		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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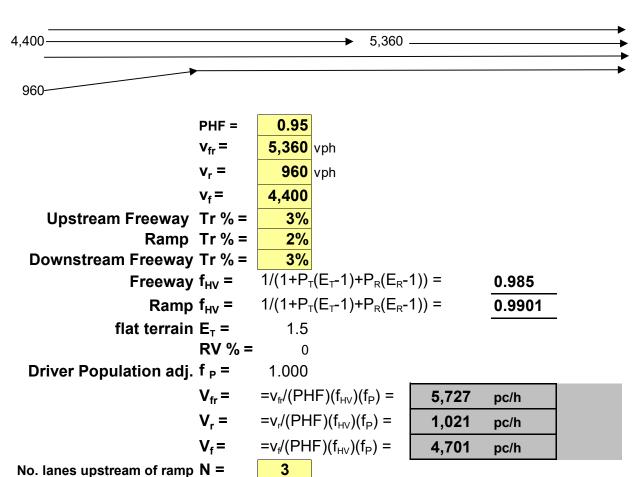
Job: SW 10th Street SIMR

Analyst: AECOM

Location: Seg 3: I-95 Northbound On-Ramp from WB Sample Road

Analysis Period: PM Peak Hour

Analysis Year: 2020 Build 2A



No. Ln	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	5,727	0.60	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	4,701	0.65	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,021	0.49	No

		MPS AND	RAMP JUN			ET			
General Infor	mation			Site Infor					
Analyst				eeway/Dir of Tr		95 NB			
Agency or Company	AEC	OM		ınction	S	eg 4-On from Ex	кр		
Date Performed Analysis Time Perioc	d PM			ırisdiction nalysis Year	20	020 Build 2A			
Project Description		t SIMR	711	idiyolo i cui	20	JZO Dullu ZA			
Inputs									
-		Freeway Num	ber of Lanes, N	4				Dougnatra	om Adi
Upstream Adj Ramp		Ramp Number	r of Lanes. N	1				Downstre Ramp	am Auj
☐ Yes ☐ Or	า	1 '	ane Length, L	1500				-	
			ane Length L <sub>D</sub>	1300				✓ Yes	☐ On
✓ No ☐ Of	f			E260				☐ No	✓ Off
= ft		Freeway Volume		5360				L <sub>down</sub> =	2950 ft
<sub>-up</sub> = ft		Ramp Volume		620				down	2000 10
√ <sub>u</sub> = veh/h	1	1	-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	330 veh/h
		1	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	T -	der Base (	Conditions	1	1		1	r	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	5360	0.95	Level	3	0	0.985	1.00		5727
Ramp	620	0.92	Level	2	0	0.990	1.00	<u> </u>	681
JpStream	<del></del>	<del>                                     </del>	=0.0.	<del>                                     </del>		2.500			
DownStream	330	0.92	Level	2	0	0.990	1.00		362
		Merge Areas		,	Diverge Areas				
Estimation of	F V <sub>12</sub>				Estimation	on of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )				\/ -		\D	
- <sub>EQ</sub> =	12 .	otion 13-6 or	13-7)			.=	$V_R + (V_F - V_R)$	–	
P <sub>FM</sub> =	• •		ion (Exhibit 13-6)	1	L <sub>EQ</sub> = (Equation 13-12 or 13-13)				,
			IOTT (EXTIIDIT 10-0)		P <sub>FD</sub> = using Equation (Exhibit 13-7)				3-7)
/ <sub>12</sub> =	760 p		on 13-14 or 13-		V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	17)	pc/ii (Equalic	JII 13-14 OI 13-		V <sub>3</sub> or V <sub>av34</sub> pc/h (Equation 13-14 or 13-17)				
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	s V No			Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No				
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *					Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes $\square$ No				
			on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
Yes,V <sub>12a</sub> =		13-19)				1	3-19)		
Capacity Che	cks				Capacity	Checks			W.
	Actual	C	apacity	LOS F?		Actual		pacity	LOS F?
					$V_{F}$		Exhibit 13-	8	
$V_{FO}$	6408	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	$V_R$	Exhibit 13-	8	
10					V <sub>R</sub>		Exhibit 13	- [	
	<u> </u>	<u> </u>					10	<u> </u>	
low Entering	1			1 1/:-1-#:0	Flow Ente		rge Influen		W .
	Actual	<del>                                     </del>	Desirable	Violation?	\/	Actual	Max Des	irable I	Violation?
\/	3245	Exhibit 13-8	4600:All	No	V <sub>12</sub>	2 . 2	Exhibit 13-8	().6	<u> </u>
V <sub>R12</sub>		•			t		terminatio	_	t F)
Level of Serv			00627 L <sub>∆</sub>				.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> + 0	0.0078 V <sub>12</sub> - 0.0	7.		ID - /	/mi/ln)			
D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> + 0	0.0078 V <sub>12</sub> - 0.0	A		$D_R = (pc)$	,			
<b>Level of Serv</b> D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> + ( ni/ln)	0.0078 V <sub>12</sub> - 0.0			1	hibit 13-2)			
Level of Serv $D_R = 5.475 + 22.5 \text{ (pc/m}$	0.00734 v <sub>R</sub> + ( ni/ln) 13-2)	0.0078 V <sub>12</sub> - 0.0			LOS = (Ex	· ·	on		
Level of Serv $D_R = 5.475 + 22.5 \text{ (pc/m}$ $D_R = 22.5 \text{ (pc/m}$ $D_R = C \text{ (Exhibit)}$	0.00734 v <sub>R</sub> + ( ni/ln) 13-2) <b>mination</b>	0.0078 V <sub>12</sub> - 0.0			LOS = (Ex Speed De	hibit 13-2)	on		
Level of Serv $D_R = 5.475 + 22.5 \text{ (pc/m}$ $D_S = C \text{ (Exhibit)}$ Speed Determ $M_S = 0.271  (Exil$	0.00734 v <sub>R</sub> + ( ni/ln) 13-2) <b>mination</b> bit 13-11)	0.0078 V <sub>12</sub> - 0.0			LOS = (Ex <b>Speed De</b> $D_s$ = (Exh	chibit 13-2) etermination hibit 13-12)			
$\begin{array}{ccc} \textbf{Level of Serv} \\ & D_{R} = 5.475 + \\ O_{R} = & 22.5 \text{ (pc/m} \\ OS = & C \text{ (Exhibit} \\ \textbf{Speed Detern} \\ \textbf{M}_{S} = & 0.271 \text{ (Exilogeness)} \\ \textbf{G}_{R} = & 62.4 \text{ mph}  (in the least of the least o$	0.00734 v <sub>R</sub> + ( ni/ln) 13-2) <b>mination</b> bit 13-11) (Exhibit 13-11)	0.0078 V <sub>12</sub> - 0.0			LOS = (Ex <b>Speed De</b> $D_s$ = (Exh $S_R$ = mph	chibit 13-2) cetermination ibit 13-12) in (Exhibit 13-12)			
$D_{R} = 5.475 + 0.000$ $D_{R} = 5.475 + 0.000$ $D_{R} = 22.5 \text{ (pc/m}. $ $D_{R} = 22.5 \text{ (pc/m}. $ $D_{R} = 0.000$ $D_{R} $	0.00734 v <sub>R</sub> + ( ni/ln) 13-2) <b>mination</b> bit 13-11)	0.0078 V <sub>12</sub> - 0.0			$\begin{array}{llllllllllllllllllllllllllllllllllll$	chibit 13-2) etermination hibit 13-12)			

		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel	I-95 NE	3			
Agency or Company	AEC	MC		nction		Seg 5-0	Off to Exp f	rom GPL		
Date Performed Analysis Time Period	d PM			risdiction nalysis Year		2020 B	uild 2A			
Project Description		t SIMR	7 11	laryolo i oai		2020 D	ulia Z/ t			
Inputs										
Upstream Adj R	amn .	Freeway Num	ber of Lanes, N	4					Downstrea	m Adi
opstream / taj N	ump	Ramp Numbe	er of Lanes, N	1					Ramp	mirtaj
✓ Yes 🖪	<b>∠</b> On	Acceleration L	_ane Length, L <sub>△</sub>						☐Yes	On
│ │ □No □	Deceleration Lang Langth L			200						
		Freeway Volu	me, V <sub>E</sub>	5980					✓ No	Off
L <sub>up</sub> = 29	50 ft	Ramp Volume		330					L <sub>down</sub> =	ft
	Freeway Free-Flow Speed, S <sub>FF</sub> 70.								\/ -	1- /1-
$V_u = 62$	0 veh/h	•	low Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	veh/h
Conversion t	o pc/h Uni		- 110							
	V			0/ Terrals	0/ D	T	<sub>f</sub> T	f I	v = \//DUE	vf vf
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv	_	f <sub>HV</sub>	·	v = V/PHF	<u> </u>
Freeway	5980	0.95	Level	3	0 0.985 1.00			638		
Ramp	330	0.92	Level	2	0 0.990 1.00			36		
UpStream	620	0.92	Level	2	0 0.990 1.00		1.00	68	1	
DownStream		I I Merge Areas					<u>I</u>	iverge Areas		
Estimation of		orgo / ouc			Estimat	ion o		110190711000		
		( D )						V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	\D	
-	V <sub>12</sub> = V <sub>F</sub>	( ' <sub>FM</sub> <i>)</i> ition 13-6 or	12 7)					R'(VF - VF Equation 13-1	–	
L <sub>EQ</sub> =	• •	Equation (I	,		L <sub>EQ</sub> =		,	-	•	
P <sub>FM</sub> =	pc/h	Equation (i	EXHIBIT 13-0)		P <sub>FD</sub> =			136 using Equ	iauon (Exnic	DIL 13-7)
V <sub>12</sub> = V <sub>3</sub> or V <sub>av34</sub>	•	Equation 12	-14 or 13-17)		V <sub>12</sub> =			90 pc/h	ation 12 11	or 10 17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			-14 01 13-17)		V <sub>3</sub> or V <sub>av34</sub>	> 2 7		99 pc/h (Equa ☑Yes ☑ No	auon 13-14	01 13-17)
Is $V_3$ or $V_{av34} > 2.76$ Is $V_3$ or $V_{av34} > 1.5$										
			-16, 13-18, or		Is $V_3$ or $V_{av34} > 1.5 * V_{12}/2$ Yes $\checkmark$ No pc/h (Equation 13-16, 13-18, or 13-					
If Yes,V <sub>12a</sub> =	13-19)		10, 10 10, 01		If Yes,V <sub>12a</sub> =	=	19	· ·	10 10, 10	10, 01 10
Capacity Che	ecks				Capacity Checks					
	Actual		Capacity	LOS F?			Actual	_	pacity	LOS F?
					$V_{F}$		6389	Exhibit 13-8	9600	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	6027	Exhibit 13-8	9600	No
					$V_R$		362	Exhibit 13-10	2100	No
Flow Entering	g Merge In	fluence A	rea		Flow En	terin	g Diver	ge Influen	ce Area	
	Actual	Max	Desirable	Violation?		/	Actual	Max Desirab	le	Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	2	2990	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)		Level of	f Serv	vice De	terminatio	า (if not 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>			$D_R = 4$	.252 + 0.	0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	1)				$D_R = 28$	8.2 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = D (Exhibit 13-2)					
Speed Deterr	nination				Speed L	Deter	minatio	n		
M <sub>S</sub> = (Exibit 1					D <sub>s</sub> = 0.	331 (E	xhibit 13-	12)		
l *	nibit 13-11)				1	,	(Exhibit	•		
	nibit 13-11)					•	(Exhibit	•		
1 '	nibit 13-13)				1 '		,	,		
	right © 2016 University of Florida. All Rights Reserved					S = 67.2 mph (Exhibit 13-13)  HCS2010 <sup>TM</sup> Version 6.90 Generated: 6/17/2020 9:38				

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-So 2020 Bu	outh of Off to 10th
Project Description SW 10to	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	5650	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	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	4		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance	Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N : S D = v <sub>p</sub> / S LOS		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	·	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	-	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-		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 7: I-95 NB Off-Ramp to SW 10th St EB & WB **Analysis Period: PM Peak Hour Analysis Year:** 2020 Build 2A 5.650 4.640 1,010 PHF = 0.95  $v_{fr} =$ **5,650** vph  $V_r =$ **1,010** vph  $V_f =$ 4.640 3% Upstream Freeway Tr % = 2% Ramp Tr % = 3% Downstream Freeway Tr % =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ Freeway f<sub>HV</sub> = 0.985 **Ramp f**<sub>HV</sub> =  $1/(1+P_T(E_{T}-1)+P_R(E_{R}-1)) =$ 0.9901 flat terrain  $E_{T} =$ 1.5 RV % = 0 Driver Population adj.  $f_P =$ 1.000  $V_{fr} =$  $=v_{fr}/(PHF)(f_{HV})(f_{P})=$ 6,037 pc/h  $V_r = = v_r/(PHF)(f_{HV})(f_P) =$ 1,074 pc/h  $V_f =$  $=V_f/(PHF)(f_{HV})(f_P)=$ 4,957 pc/h No. lanes upstream of ramp N =**Average Freeway Density Upstream of Diverge (see Equation 13-26):**  $D = 0.0175 (V_{fr}/N) =$ 26.4 pc/In LOS in the Diverge Area (from Density and Exhibit 13-2) = C No. Ln Capacity Check (see Exhibits 13-2, 13-8 and 13.10) Maximum Actual LOS F? Fwy upstream of ramp (assume 70 mph free-flow speed) = 9,600 6,037 No 3 Fwy downstream of ramp (assume 70 mph free-flow speed) = 4,957 No 7,200 1 Capacity on Off-Ramp (assume 45 mph free-flow speed) = 2,100 1,074 No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 8-Be 2020 Bu	et Off & Off Ramps ild 2A
Project Description SW 10th			200 (NI)	□ DIa	nning Data
✓ Oper.(LOS)  Flow Inputs			Des.(N)	□Pla	nning Data
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4640	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	
			Up/Down %		
Calculate Flow Adjustr	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	6	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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)		
Operational (LOS)  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	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	$f_{HV} \times f_p$ )	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	-	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		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

Appendix O

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Canaval Inf	rmetie	RAMPS	S AND RAM			RKS	HEET			
General Info	ormation			Site Infor						
Analyst		2014		eeway/Dir of Tr		I-95 NE		EDAMO		
Agency or Compa Date Performed	ny AEC	OM		nction risdiction		Seg 9-	Off to Hillsbo	O ERØMR		
Analysis Time Per	iod PM			alysis Year		2020 B	uild 2A			
Project Description		et SIMR								
nputs										
Upstream Adj	Pamp	Freeway Numb	er of Lanes, N	3					Downstre	am Adi
Opsilealii Auj	ιταιτιρ	Ramp Number	of Lanes, N	1					Ramp	ani Auj
☐Yes	On	Acceleration La		·					•	
_	_	Deceleration La	,,	200					✓ Yes	✓ On
✓ No	Off		5						☐ No	Off
	£.	Freeway Volun		4640				l	=	2100 ft
L <sub>up</sub> =	ft	Ramp Volume,		1230				[	L <sub>down</sub> =	2100 It
V <sub>11</sub> =	veh/h	Freeway Free-	Flow Speed, S <sub>FF</sub>	70.0				,	V <sub>D</sub> =	1560 veh/h
<b>v</b> u	VEII/II	Ramp Free-Flo	w Speed, S <sub>FR</sub>	45.0					ט	
Conversion	to pc/h Un	der Base C	Conditions							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	/ = V/PHI	x f <sub>HV</sub> x f <sub>p</sub>
. ,	(Veh/hr)					4		'		
Freeway	4640	0.95	Level	3	0		985	1.00		957
Ramp	1230	0.92	Level	2	0	0.	990	1.00	1	350
UpStream	4500	0.00				+_		4.00		710
DownStream	1560	0.92	Level	2	0	0.	990	1.00	1	713
Estimation	of v	Merge Areas			Estimati	ion o		rerge Areas		
-Sumation (					LSuman					
	$V_{12} = V_{F}$	<sub>=</sub> ( P <sub>FM</sub> )					V <sub>12</sub> = \	/ <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>FD</sub>	
<sub>EQ</sub> =	(Equ	ation 13-6 or 1	13-7)		L <sub>EQ</sub> =		(Ed	quation 13-1	2 or 13-1	3)
P <sub>FM</sub> =	using	Equation (E	xhibit 13-6)		P <sub>FD</sub> =		0.57	4 using Equ	ation (Exh	nibit 13-7)
′ <sub>12</sub> =	pc/h				V <sub>12</sub> =		3420	pc/h		
$V_3$ or $V_{av34}$	pc/h	(Equation 13-	14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			7  pc/h (Equa	ation 13-1	4 or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,	-		,		Is V <sub>3</sub> or V <sub>av34</sub> > 2,700 pc/h?					
Is V <sub>3</sub> or V <sub>av34</sub> > 1.								Yes ☑ No		
		Equation 13-	16 13-18 or					h (Equation	13-16 13	3-18 or 13-
Yes,V <sub>12a</sub> =	13-19		10, 10 10, 01		If Yes,V <sub>12a</sub> =	:	19)	(=quation	10 10, 10	7 10, 01 10
Capacity Ch	necks				Capacity	y Ch	ecks			
	Actual	Ca	pacity	LOS F?			Actual	Car	acity	LOS F?
					V <sub>F</sub>		4957	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>D</sub>	3607	Exhibit 13-8	7200	No
FO					V <sub>R</sub>	K	1350	Exhibit 13-10		No
		- fl A		<u> </u>		4				
low Enteri	<del></del>			\/ialatian?	FIOW En			e Influenc		_
\ <u>/</u>	Actual		esirable)	Violation?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_	Actual	Max Desirab		Violation?
V <sub>R12</sub>	<u> </u>	Exhibit 13-8	<b>.</b>		V <sub>12</sub>			Exhibit 13-8	4400:All	No No
evel of Ser								ermination		<i>F)</i>
$D_R = 5.475 +$	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	086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
O <sub>R</sub> = (pc/mi/	ľn)				D <sub>R</sub> = 31	.9 (pc	/mi/ln)			
.OS = (Exhib	it 13-2)				LOS = D	(Exhil	bit 13-2)			
Speed Dete	rmination				Speed D	eter	mination	1		
					<del> </del>		xhibit 13-1			
•						•	(Exhibit 1	•		
	xhibit 13-11) xhibit 13-11)						•	•		
. – mnh (⊏			$S_0 = 74$	. <i>i</i> mph	(Exhibit 1	o-1 <i>2)</i>				
		_								
	xhibit 13-13)				S = 62	2.5 mph	(Exhibit 1	3-13)		

	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 10-E 2020 Bu	Bet Off & On Ramps
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	5)		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	3410	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	
DDHV - AADT X K X D		ven/m	Grade % Length Up/Down %	1111	
Calculate Flow Adjust	ments				
	1.00		E <sub>R</sub>	1.2	
f <sub>p</sub>  E <sub>⊤</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		ft	, ,		
Rt-Side Lat. Clearance		ft	f <sub>LW</sub>		mph
Number of Lanes, N	3	TC .	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)  v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	1 x f <sub>HV</sub> x f <sub>p</sub> ) 1214 70.0 17.3 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	$f_{HV} \times f_p$ )	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 freedour 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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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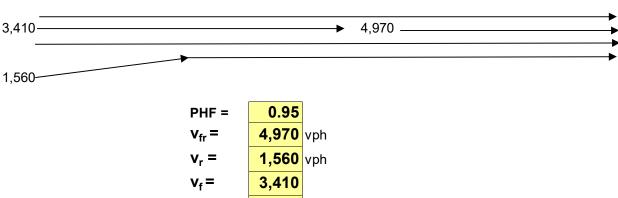
Job: SW 10th Street SIMR

Analyst: AECOM

Location: Seg 11: I-95 Northbound On-Ramp from EB & WB SW 10th St

**Analysis Period: PM Peak Hour** 

**Analysis Year:** 2020 Build 2A



Upstream Freeway Tr % = 3% 2% Ramp Tr % =

Downstream Freeway Tr % = 3%

> Freeway f<sub>HV</sub> =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ 0.985  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ Ramp  $f_{HV} =$ 0.9901

flat terrain  $E_{\tau}$  = 1.5 **RV** % = 0

**Driver Population adj.**  $f_P = 1.000$ 

 $=v_{fr}/(PHF)(f_{HV})(f_P) =$  $V_{fr} =$  $V_r = = = V_r/(PHF)(f_{HV})(f_P) =$  $V_f =$ 

5,310 pc/h 1,659 pc/h  $=v_f/(PHF)(f_{HV})(f_P) =$ 3,643 pc/h

No. lanes upstream of ramp N =3

No. Ln	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	5,310	0.55	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	3,643	0.51	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,659	0.79	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 12-L 2020 Bu	Bet On Ramps ild 2A
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4970	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	
DDITY /VIDTXIXD		V G11/11	Up/Down %	1111	
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		
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)		
Operational (LOS)  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> ) 1328 69.8 19.0 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	$f_{HV} \times f_p$ )	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 freedour 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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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			REEWAY	WEAV	NG WOR	RKSHEE	T			
Genera	I Informati	on			Site Info	rmation				
Agency/Company AECOW  Date Performed						Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 13-Bet On & Off to Exp Analysis Year 2020 Build 2A				
Project De	scription SW 10t	h Street SIMF	₹		<u> </u>					
Inputs										
Weaving n Weaving so Freeway fr	onfiguration umber of lanes, N egment length, L ee-flow speed, Fl	S FS		4600ft 70 mph	Segment typo Freeway min Freeway man Terrain type	imum speed			Freeway 15 2400 Leve	
Convei	v (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	E <sub>R</sub>	l f	fp	v (pc/h)	
V <sub>FF</sub>	4175	0.95	3	0	1.5	1.2	0.985	1.00	V (ρC/11) 4461	
v <sub>ef</sub>	1105	0.92	2	0	1.5	1.2	0.990	1.00	1213	
vre V <sub>fr</sub>	795	0.92	2	0	1.5	1.2	0.990	1.00	873	
V <sub>RR</sub>	125	0.92	2	0	1.5	1.2	0.990	1.00	137	
V <sub>NW</sub>	6547							V =	6684	
V <sub>W</sub>	137									
VR	0.020									
Config	uration Cha	aracteris	tics		_					
Minimum r	maneuver lanes, l	$N_{WL}$		0 lc	Minimum we	aving lane c	hanges, LC <sub>MIN</sub>	I	411 lc/h	
Interchang	e density, ID			0.7 int/mi	Weaving lane changes, $LC_{W}$				1037 lc/h	
Minimum F	RF lane changes,	$LC_RF$		0 lc/pc	Non-weaving lane changes, LC <sub>NW</sub>				3149 lc/h	
Minimum F	R lane changes,	$LC_FR$		0 lc/pc	Total lane changes, LC <sub>ALL</sub> 418				4186 lc/h	
Minimum F	RR lane changes	, LC <sub>RR</sub>		3 lc/pc	Non-weaving vehicle index, I <sub>NW</sub> 21					
Weavir	ng Segment	t Speed,	Density, I	_evel of						
Weaving segment flow rate, v 6596 veh/h				Weaving intensity factor, W Weaving segment speed, S				0.210 59.0 mph		
	egment capacity, egment v/c ratio	, C <sub>w</sub>	;	9060 veh/h 0.728					60.5 mph	
•	egment density,	D	28	3.3 pc/mi/ln	Average non-weaving speed, S <sub>NW</sub>				59.0 mph	
_	ervice, LOS			D					5917 f	
Notes					<u> </u>		INICAL			

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

Agency or Company Date Performed Analysis Time Period $PM$ Analysis Time Period $PM$ Analysis Year $2$ Project Description $SW$ 10th Street SIMR  Project Description $SW$ 10th Street SIMR  Poper.(LOS) Des.(N)  Flow Inputs  Volume, V 5280 veh/h Peak-Hour Factor, PHF 0 AADT veh/day %Trucks and Buses, $P_T$ 3 Peak-Hr Prop. of AADT, $K$ %RVs, $P_R$ 0 General Terrain: $E_R$ $E_R$ 1 Direction Prop, $E_R$ $E_R$ 1 $E_$	020 Build	rth of Hillsboro 2A ing Data			
Agency or Company Date Performed Analysis Time Period $PM$ Analysis Time Period $PM$ Analysis Time Period $PM$ Analysis Year 2 Project Description $SW 10th Street SIMR$   Oper.(LOS)   Des.(N)	eg 14-Nor 020 Build Planni .95 evel	2A			
Project Description $SW$ 10th Street SIMR    Oper.(LOS)   Des.(N)	Planni				
□ Oper.(LOS)	.95 evel ni	ing Data			
Flow InputsVolume, V $5280$ veh/hPeak-Hour Factor, PHF $0$ AADTveh/day%Trucks and Buses, $P_T$ $3$ Peak-Hr Prop. of AADT, K%RVs, $P_R$ $0$ Peak-Hr Direction Prop, DGeneral Terrain: $L$ DDHV = AADT x K x Dveh/hGrade% Length $n$ Up/Down %Calculate Flow Adjustments $f_p$ $1.00$ $E_R$ $1$ $E_T$ $1.5$ $f_{HV} = 1/[1+P_T(E_T-1)+P_R(E_R-1)]$ $0$ Speed InputsCalc Speed Adj and FFSLane Widthft $f_{LW}$ Rt-Side Lat. Clearanceft $f_{LW}$ Number of Lanes, N $4$ $f_{LC}$ Total Ramp Density, TRDramps/miTRD AdjustmentFFS (measured) $70.0$ mphFFS $7$ Base free-flow Speed, BFFSmph	.95 evel ni	ing Data			
Volume, V 5280 veh/h Peak-Hour Factor, PHF 0 veh/day %Trucks and Buses, $P_T$ 3 Peak-Hr Prop. of AADT, K Reak-Hr Direction Prop, D General Terrain: L General Terrain: L Up/Down % Calculate Flow Adjustments $f_p                                    $	evel ni				
AADT veh/day %Trucks and Buses, $P_T$ 3  Peak-Hr Prop. of AADT, K  Peak-Hr Direction Prop, D  DDHV = AADT x K x D  Calculate Flow Adjustments $f_p                                    $	evel ni				
Peak-Hr Direction Prop, D	evel ni .2				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					
	.985				
Lane Width ft  Rt-Side Lat. Clearance ft  Number of Lanes, N 4  Total Ramp Density, TRD ramps/mi  FFS (measured) 70.0 mph  Base free-flow Speed, BFFS mph					
Rt-Side Lat. Clearance ft $f_{LW}$ Number of Lanes, N $f_{LC}$ Total Ramp Density, TRD ramps/mi TRD Adjustment  FFS (measured) $70.0$ mph FFS $7$ Base free-flow Speed, BFFS mph					
Number of Lanes, N 4  Total Ramp Density, TRD ramps/mi TRD Adjustment  FFS (measured) 70.0 mph FFS 7  Base free-flow Speed, BFFS mph					
Total Ramp Density, TRD ramps/mi TRD Adjustment  FFS (measured) 70.0 mph FFS 7  Base free-flow Speed, BFFS mph		mph			
FFS (measured) 70.0 mph FFS 7  Base free-flow Speed, BFFS mph		mph			
Base free-flow Speed, BFFS mph		mph			
	0.0	mph			
LOS and Performance Measures Design (N)					
	Design (N)				
Operational (LOS) $V_{p} = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_{p}) 1410 \qquad pc/h/ln$ $V_{p} = (V \text{ or DDHV}) / (PHF \times N \times f_{p}) 1410 \qquad pc/h/ln$					
S $v_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV})$	x f <sub>p</sub> )	pc/h/ln			
D = v / S  20.3 nc/mi/ln		mph			
LOS $C$ $D = v_p / S$ Required Number of Lanes, N		pc/mi/ln			
Glossary Factor Location					
N - Number of lanes S - Speed					
V - Hourly volume D - Density	f <sub>l</sub>	<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>l</sub>	<sub>LC</sub> - Exhibit 11-9			
LOS - Level of service BFFS - Base free-flow speed fp - Page 11-18	Т	RD - Page 11-11			
DDHV - Directional design hour volume	1-3				

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company	AECOM		Highway/Direction of Travel From/To Jurisdiction	I-95 SB Seg 1-B	et Hillsboro & Palmetto
Date Performed Analysis Time Period	AM		Analysis Year	2020 Bu	iild 2A
Project Description SW 10t	th Street SIMR				
✓ Oper.(LOS)	)		Des.(N)	□Pla	anning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	4560	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	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	4		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N  S D = v <sub>p</sub> / S	x f <sub>HV</sub> x f <sub>p</sub> ) 1218 70.0 17.4	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	$f_{HV} \times f_p$ )	pc/h/ln mph
LOS	В		Required Number of Lanes, N		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 freedour volume	-	$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, 11- $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-2		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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			REEWAY	WEAV			T		
Genera	l Informati	on			Site Info	rmation			
Agency/Company AECOW  Date Performed					Freeway/Dir of Travel I95/SB Weaving Segment Location Seg 2-Bet On from Exp & C Analysis Year 2020 Build 2A				
Project Des	cription SW 10	th Street SIMF	₹		ı				
Inputs									
Weaving se Freeway fre	umber of lanes, legment length, Lee-flow speed, F	rs FS		Two-Sided 4 5200ft 70 mph	Segment typ Freeway min Freeway max Terrain type	imum speed			Freeway 18 2400 Leve
Conver	sions to p	c/h Unde	r Base Co	ndition	S				
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	ER	$f_{HV}$	fp	v (pc/h)
$V_{FF}$	3470	0.95	3	0	1.5	1.2	0.985	1.00	3707
$V_{RF}$	970	0.92	2	0	1.5	1.2	0.990	1.00	1065
$V_{FR}$	1090	0.92	2	0	1.5	1.2	0.990	1.00	1197
$V_{RR}$	110	0.92	2	0	1.5	1.2	0.990	1.00	121
V <sub>NW</sub>	5969							V =	6090
V <sub>W</sub>	121								
VR	0.020								
Configu	uration Ch	aracteris	tics						
Minimum n	naneuver lanes,	$N_{WL}$		0 lc	Minimum we	aving lane c	hanges, LC <sub>MIN</sub>	I	363 lc/h
Interchange	e density, ID			0.7 int/mi	Weaving lane changes, $LC_W$				1031 lc/h
Minimum F	RF lane changes	, LC <sub>RF</sub>		0 lc/pc	Non-weaving lane changes, LC <sub>NW</sub>				3020 lc/h
Minimum F	R lane changes	, LC <sub>FR</sub>		0 lc/pc	Total lane ch	4051 lc/h			
Minimum F	RR lane changes	s, LC <sub>RR</sub>		3 lc/pc	Non-weaving vehicle index, I <sub>NW</sub> 21				
Weavin	g Segmen	t Speed,	Density, I	_evel of	Service,	and Cap	oacity		
Weaving se	egment flow rate	9, V	(	6012 veh/h	Weaving inte	•			0.186
	egment capacity	**	!	9245 veh/h	Weaving seg				60.1 mph
_	egment v/c ratio		-	0.650	Average wea		**		61.4 mph
_	egment density,	ט	25	5.3 pc/mi/ln	"""				60.1 mph
Level of Se	ervice, LOS			С	Maximum we	eaving length	۱, L <sub>MAX</sub>		5911 ft

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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 AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 3-Be 2020 Bul	et Off & On Ramp ild 2A
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4440	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	
DDHV = AADTX K X D		ven/n	Grade % Length Up/Down %	mi	
Calculate Flow Adjust	ments		·		
	1.00		F	1.2	
f <sub>p</sub>  E <sub>T</sub>	1.50		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	0.985	
Speed Inputs	1.0		Calc Speed Adj and FFS		
•			Calc Speed Auj and 113	<u> </u>	
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	70.0	ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph	FFS	70.0	mph
·		mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS) 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> ) 1581 68.3 23.1 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ Required Number of Lanes, N	$f_{HV} \times f_p$ )	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	-	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		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			RKS	HEET			
General Infor	rmation			Site Infor						
Analyst				eeway/Dir of Tr		I-95 SE				
Agency or Company	/ AEC	OM		nction	;	Seg 4-l	Diverge to S	SW 10th St		
Date Performed Analysis Time Perio	d AM			risdiction alysis Year		2020 B	uild 2A			
Project Description		et SIMR	741	aryolo roar		2020 B	uliu Z/ (			
Inputs										
Upstream Adj F	Ramn	Freeway Num	ber of Lanes, N	3					Downstre	am Adi
opoliodiii 7 dj i	vamp	Ramp Numbe	r of Lanes, N	1					Ramp	ann 7 taj
☐Yes	On	Acceleration L	ane Length, L₄						✓ Yes	<b>☑</b> On
✓ No	Off		_ane Length L <sub>n</sub>	200						
V NO		Freeway Volu	me, V <sub>F</sub>	4440					□ No	Off
L <sub>up</sub> = 1	ft	Ramp Volume	, V <sub>P</sub>	1440					L <sub>down</sub> =	2400 ft
		-	-Flow Speed, S <sub>FF</sub>	70.0					\/ <b>-</b>	4040
$V_u = V$	/eh/h	1	ow Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	1310 veh/l
Conversion t	to pc/h Un		110							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		$f_{HV}$	fp	v = \//PH	F x f <sub>HV</sub> x f <sub>p</sub>
. ,	(Veh/hr)							<u>'</u>		
Freeway	4440	0.95	Level	3	0	_	985	1.00		744
Ramp UpStream	1440	0.92	Level	2	0	0.	990	1.00	1	581
DownStream	1310	0.92	Level	2	0	0	990	1.00	1	438
Downouloum		Merge Areas	LCVCI		<u> </u>	0.		iverge Areas	'	<del>1</del> 00
Estimation o					Estimati	ion o				
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>54</sub> )						V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	)P-p	
=		ation 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1	`	3)
<sub>-EQ</sub> =	, -	Equation (E	,		$P_{FD}$ = 0.569 using Equation (Exhibit 13-7)					
P <sub>FM</sub> = / -	pc/h	Lqualion (L	_XIIIDIL 13-0)		$V_{12}$ = 3380 pc/h					
/ <sub>12</sub> =	•	/C	44 42 47)							
/ <sub>3</sub> or V <sub>av34</sub>			-14 or 13-17)		$V_3$ or $V_{av34}$ 1364 pc/h (Equation 13-14 or 13-17) Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No					
Is $V_3$ or $V_{av34} > 2,70$										
Is $V_3$ or $V_{av34} > 1.5$			16 12 10 or					Yes ✓ No	12 16 17	0 10 or 10
Yes,V <sub>12a</sub> =	13-19		-16, 13-18, or		If Yes,V <sub>12a</sub> =		19	c/h (Equation 9)	13-10, 1	5-10, 01 13-
)'' O'		<del></del>					-	,		
capacity Che	ecks				Capacity	y Ch	ecks	Co		
Capacity Che	e <b>cks</b> Actual	C	apacity	LOS F?	Capacity	y Ch	ecks Actual	Ca	pacity	LOS F?
Capacity Che		C	apacity	LOS F?	Capacity V <sub>F</sub>	y Ch		Exhibit 13-8		LOS F?
		C Exhibit 13-8	apacity	LOS F?			Actual		3 7200	
V <sub>FO</sub>			apacity	LOS F?	$V_F$ $V_{FO} = V_F$		Actual 4744	Exhibit 13-8	7200 7200	No
V <sub>FO</sub>	Actual	Exhibit 13-8		LOS F?	$V_{FO} = V_{F}$ $V_{R}$	- V <sub>R</sub>	Actual 4744 3163 1581	Exhibit 13-8 Exhibit 13-8 Exhibit 13-1	7200 7200 7200 72100	No No No
V <sub>FO</sub>	Actual	Exhibit 13-8		LOS F? Violation?	$V_{FO} = V_{F}$ $V_{R}$	- V <sub>R</sub>	Actual 4744 3163 1581	Exhibit 13-8 Exhibit 13-8	7200 7200 7200 72100 72100 72100	No No No
V <sub>FO</sub> Flow Enterin	Actual g Merge Ir	Exhibit 13-8	rea		$V_{FO} = V_{F}$ $V_{R}$	- V <sub>R</sub>	Actual 4744 3163 1581 <b>g Dive</b>	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1  Exhibit 13-1	7200 7200 7200 72100 72100 72100	No No No
V <sub>FO</sub> Flow Enterin	Actual <b>g Merge Ir</b> Actual	Exhibit 13-8  Influence A  Max  Exhibit 13-8	<b>Irea</b> Desirable		$V_{FO} = V_{F}$ $V_{R}$ Flow En	- V <sub>R</sub>	Actual 4744 3163 1581 <b>g Dive</b> Actual	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1  Free Influen Max Desirat Exhibit 13-8	7200 7200 7200 7200 7200 7200 7200 7200	No No No Violation?
V <sub>FO</sub> Flow Entering V <sub>R12</sub> Level of Serv	Actual  g Merge Ir  Actual	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable if not F)		$V_{FO} = V_{FO}$ $V_{RO} = V_{FO}$ Flow En $V_{12}$ Level of	- V <sub>R</sub>	Actual 4744 3163 1581 1581 159 Divel Actual 3380 Vice De	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	7200 7200 7200 72100 72100 72100 74400:All 7400:All	No No No Violation?
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$	Actual  g Merge Ir  Actual  vice Determ00734 v R +	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable if not F)		$V_{FO} = V_{F}$ $V_{RO} = V_{FO}$ Flow En $V_{12}$ Level of	- V <sub>R</sub>	Actual 4744 3163 1581 <b>g Diver</b> Actual 3380  //ice De	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1  Free Influen Max Desirat Exhibit 13-8	7200 7200 7200 72100 72100 72100 74400:All 7400:All	No No No Violation?
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = (pc/mi/lr$	Actual  g Merge Ir  Actual  vice Deterr  .00734 v R +	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable if not F)		$V_F$ $V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = 31$	- V <sub>R</sub> terin  Serv  D <sub>R</sub> = 4  .5 (pc)	Actual 4744 3163 1581  Ig Diver Actual 3380  Vice De 1.252 + 0	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8 Exhibit 13-8 Exhibit 13-8	7200 7200 7200 72100 72100 72100 74400:All 7400:All	No No No Violation?
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = (pc/mi/lr$ $OS = (Exhibit)$	Actual  g Merge Ir  Actual  vice Deterr  .00734 v R +	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable if not F)		$V_{FO} = V_{F}$ $V_{RO} = V_{FO}$ $V_{RO} = V_{RO}$ $V_{12}$ $V_{12}$ $V_{12}$ $V_{12}$ $V_{13}$ $V_{14}$ $V_{15}$ $V_{15}$ $V_{16}$ $V_{17}$ $V_{18}$ $V_{19}$ $V_$	- V <sub>R</sub> - V <sub>R</sub> - V <sub>R</sub> - Serv	Actual 4744 3163 1581 <b>g Diver</b> Actual 3380  /ice De 1.252 + 0 /mi/ln) bit 13-2)	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1  rge Influen Max Desirat Exhibit 13-8 termination .0086 V <sub>12</sub> - 0.	7200 7200 7200 72100 72100 72100 74400:All 7400:All	No No No Violation?
Flow Entering $V_{R12}$ Level of Serve $D_{R} = 5.475 + 0$ $D_{R} = (pc/mi/lr)$ $LOS = (Exhibit)$ Speed Determination	Actual  g Merge Ir Actual  vice Deterr .00734 v R +	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable if not F)		$V_F$ $V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = 31$ $LOS = D$ Speed D	terim  S Serv  D <sub>R</sub> = 4  .5 (pc, (Exhibit)	Actual 4744 3163 1581  Ig Diver Actual 3380 Vice De 1.252 + 0 Vmi/ln) bit 13-2) mination	Exhibit 13-8 Exhibit 13-1  Tge Influen Max Desirat Exhibit 13-8  termination .0086 V <sub>12</sub> - 0.	7200 7200 7200 72100 72100 72100 74400:All 7400:All	No No No Violation?
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serve $D_R = 5.475 + 0$ $D_R = (pc/mi/lr$ $OS = (Exhibit)$ Speed Determine $M_S = (Exibit)$	Actual  g Merge Ir Actual  vice Deterr .00734 v R + n) 13-2) mination 3-11)	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable if not F)		$V_F$ $V_{FO} = V_F$ $V_R$ Flow En $V_{12}$ Level of $D_R = 31$ $LOS = D$ Speed D $D_S = 0.4$	- V <sub>R</sub> - V <sub>R</sub> - V <sub>R</sub> - Serv	Actual 4744 3163 1581 <b>g Diver</b> Actual 3380  //ice De 1.252 + 0 //mi/ln) bit 13-2)  mination	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8	7200 7200 7200 72100 72100 72100 74400:All 7400:All	No No No Violation?
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = (pc/mi/lr$ $D_R = (Exhibit)$ Speed Determal of the service of	Actual  g Merge Ir Actual  vice Deterr .00734 v R + n) 13-2) mination 3-11) hibit 13-11)	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable if not F)		$V_{FO} = V_{FO}$ $V_{FO} = V_{FO}$ $V_{RO} = V_{RO}$ Flow En $V_{12}$ Level of $V_{12}$ $V_{13}$ $V_{14}$ $V_{15}$	terim  S Serv  D <sub>R</sub> = 4 .5 (pc) (Exhibit	Actual 4744 3163 1581  Ig Diver Actual 3380 Vice De 1.252 + 0 Vmi/ln) bit 13-2) mination xhibit 13- (Exhibit	Exhibit 13-8 Exhibit 13-1  Tage Influen Max Desirat Exhibit 13-8  Termination .0086 V <sub>12</sub> - 0.	7200 7200 7200 72100 72100 72100 74400:All 7400:All	No No No Violation?
$V_{FO}$ Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = (pc/mi/lr$ $LOS = (Exhibit)$ Speed Determation $M_S = (Exibit)$	Actual  g Merge Ir Actual  vice Deterr .00734 v R + n) 13-2) mination 3-11)	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable if not F)		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ $V_{R}$ Flow En $V_{12}$ Level of $D_{R} = 31$ $LOS = D$ Speed D $S_{R} = 57$ $S_{0} = 75$	- V <sub>R</sub> - V <sub>R</sub> - V <sub>R</sub> - Serv -	Actual 4744 3163 1581 <b>g Diver</b> Actual 3380  //ice De 1.252 + 0 //mi/ln) bit 13-2)  mination	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8 Exhibit 13-12 Exhibit	7200 7200 7200 72100 72100 72100 74400:All 7400:All	No No No Violation?

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 5-Be 2020 Bu	et Off & On Ramps
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	5)	<u> </u>	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	3000	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 = AADTXKXD		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjust	ments		· · · · · · · · · · · · · · · · · · ·		
-	1.00		F	1.2	
f <sub>p</sub>  E <sub>T</sub>	1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	0.985	
	1.0				
Speed Inputs			Calc Speed Adj and FFS	•	
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	70.0	ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS	<u> </u>	mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS) 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> ) 1068 70.0 15.3 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	$f_{HV} \times f_p$ )	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 free	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	RA	MPS AND	RAMP JUN	CTIONS W	ORKSHE	EET				
General Infor		•		Site Infor						
Analyst			Fr	eeway/Dir of Tr		I-95 S	B			
Agency or Company	, AEC	OM		nction	Seg 6-Merge from Hillsboro E			Hillsboro E&V	٧	
Date Performed		risdiction	ocy o Morge nom missoro E				•			
Analysis Time Perio	d AM		Ar	nalysis Year		2020 I	Build 2A			
Project Description	SW 10th Stree	et SIMR								
Inputs		"								
Upstream Adj Ramp		Freeway Num	ber of Lanes, N	3					Downstre	am Adi
opotrodin 7 tdj 1 tdinp		Ramp Numbe	r of Lanes, N	1					Ramp	arri 7 taj
✓ Yes ☐ Or	n		ane Length, L	300						□ o
		1	_ane Length L <sub>D</sub>	000					☐Yes	☐ On
☐ No ☑ Of	ff	1		2000					✓ No	Off
l – 0400	r.	Freeway Volu		3000					. =	ft
L <sub>up</sub> = 2400	π	Ramp Volume		1310					L <sub>down</sub> =	10
V <sub>u</sub> = 1440 -	voh/h	Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
v <sub>u</sub> 1440	Ven/m	Ramp Free-FI	ow Speed, S <sub>FR</sub>	50.0						
Conversion t	o pc/h Un	der Base	Conditions							
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHF	- x f <sub>1.57</sub> x f
	(Veh/hr)					+		· ·	+	'
Freeway	3000	0.95	Level	3	0		).985	1.00	_	3205
Ramp	1310	0.92	Level	2	0	_	).990	1.00	+	438
UpStream	1440	0.92	Level	2	0	0	).990	1.00	1	581
DownStream										
Estimation o		Merge Areas			Fatimati	ion	L	iverge Areas		
Estimation o	1 12				Estimation of v <sub>12</sub>					
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>40</sub> = '	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	n)Prn	
L <sub>EQ</sub> =	1339.8	0 (Equation	13-6 or 13-7)		.2					
P <sub>FM</sub> =	0.586	using Equat	tion (Exhibit 13-6)							
V <sub>12</sub> =	1878		,							
		•	on 13-14 or 13-		$V_{12} = pc/h$					
V <sub>3</sub> or V <sub>av34</sub>	17)	po/// (Equal)	011 10 11 01 10		${ m V_3}$ or ${ m V_{av34}}$			pc/h (Equation		7)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h? <u> </u> Ye	es 🗹 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 2,	700 pc/h? [	☐Yes ☐ No	)	
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5					Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.	5 * V <sub>12</sub> /2	☐Yes ☐ No	)	
			on 13-16, 13-		If Yes,V <sub>12a</sub> =			oc/h (Equatio	on 13-16, 1	3-18, or
If Yes,V <sub>12a</sub> =		13-19)						3-19)		
Capacity Che	ecks				Capacity	y Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	Ca	apacity	LOS F?
					$V_{F}$			Exhibit 13	-8	
V <sub>FO</sub>	4643	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		Exhibit 13	-8	
FO	4040	LAMBIC 10 0		"				Exhibit 13	3-	
					V <sub>R</sub>			10		
Flow Entering	g Merge Ir				Flow En	terii	ng Dive	rge Influei		
	Actual	Max	Desirable	Violation?			Actual	Max Des	sirable	Violation?
$V_{R12}$	3316	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
Level of Serv	rice Deteri	mination (	if not F)		Level of	Ser	vice De	terminatio	on (if not	F)
D <sub>R</sub> = 5.475 +	- 0.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> - 0.0	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> = 28.8 (pc/n	ni/ln)	· <del>-</del>			$D_R = (p$	c/mi/	ln)	· <del>-</del>	_	
LOS = D (Exhibit	,						t 13-2)			
					ł – – – – –			<u> </u>		
Speed Deterr					Speed D			<i>111</i>		
$M_{S} = 0.398  (Exi$	ibit 13-11)						13-12)			
S <sub>R</sub> = 58.8 mph	(Exhibit 13-11)					ph (Ex	hibit 13-12)			
	(Exhibit 13-11)				S <sub>0</sub> = mp	ph (Ex	hibit 13-12)			
•	(Exhibit 13-13)				S = mp	ph (Ex	hibit 13-13)			
	of Florida, All Dia				<u> </u>					d: 6/17/2020

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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 7-Be	et On Ramps		
Analysis Time Period	AM		Analysis Year	2020 Bui	ild 2A		
Project Description SW 10th							
✓ Oper.(LOS)			Des.(N)	∐ Plai	nning Data		
Flow Inputs							
Volume, V AADT	4310	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			
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		ft	$f_{LW}$		mph		
Number of Lanes, N	3		$f_{LC}$		mph		
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph		
FFS (measured)	70.0	mph	FFS	70.0	mph		
Base free-flow Speed, BFFS		mph					
LOS and Performance	Measures		Design (N)				
Operational (LOS)  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> ) 1535 68.7 22.3 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ Required Number of Lanes, N	$f_{HV} \times f_p$ )	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			$E_R$ - Exhibits 11-10, 11-12 $f_{LW}$ - Exhibit $E_T$ - Exhibits 11-10, 11-11, 11-13 $f_{LC}$ - Exhibit $f_p$ - Page 11-18 TRD - Page LOS, S, FFS, $v_p$ - Exhibits 11-2, 11-3				

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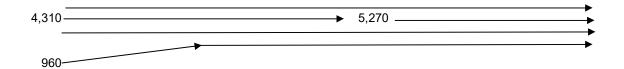
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Job: SW 10th Street SIMR

Analyst: AECOM

Location: Seg 8: I-95 Southbound On-Ramp from SW 10th Street EB & WB

Analysis Period: AM Peak Hour
Analysis Year: 2020 Build 2A



Downstream Freeway Tr % = 
$$3\%$$
  
Freeway  $f_{HV}$  =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) = 0.985$   
Ramp  $f_{HV}$  =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) = 0.9901$ 

flat terrain 
$$E_T = 1.5$$
  
RV % = 0

Driver Population adj. 
$$f_P = 1.000$$

$$V_{fr}$$
 =  $= V_{fr}/(PHF)(f_{HV})(f_P) =$  5,631 pc/h  
 $V_r$  =  $= V_r/(PHF)(f_{HV})(f_P) =$  1,021 pc/h  
 $V_f$  =  $= V_r/(PHF)(f_{HV})(f_P) =$  4,605 pc/h

No. lanes upstream of ramp N = 3

No. Ln	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	5,631	0.59	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	4,605	0.64	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,021	0.49	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 9-Be 2020 Bu	et 10th & Exit to Exp
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	5270	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	
			Up/Down %		
Calculate Flow Adjust	ments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
	7.0		111		
Speed Inputs			Calc Speed Adj and FFS	•	
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)		
Operational (LOS)  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> ) 1408 69.5 20.3 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	$f_{HV} \times f_p$ )	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 freedour 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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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_		MPS AND	RAMP JUN			ET			
General Infor	mation			Site Infor					
Analyst			Fr	eeway/Dir of Ti		95 SB	<u> </u>		
Agency or Company	AEC	MC		ınction	S	eg 10-Merge fro	m Ex to GP		
Date Performed Analysis Time Perioc	۸۸۸ ا			ırisdiction nalysis Year	20	000 Drilly 0V			
Project Description		t SIMR	Al	iaiysis i eai		020 Build 2A			
Inputs	OW TOUT OUCC	COMMIX							
-		Freeway Num	ber of Lanes, N	4					A 11
Jpstream Adj Ramp		Ramp Numbe	•	1				Downstre Ramp	eam Adj
☐ Yes ☐ Or	1	1		•					_
		1	ane Length, L <sub>A</sub>	600				✓ Yes	On
✓ No ☐ Of	f	1	ane Length L <sub>D</sub>					□No	✓ Off
- <b>t</b>		Freeway Volu	'	5270				   . =	1150 ft
<sub>up</sub> = ft		Ramp Volume		320				L <sub>down</sub> =	1130 11
√ <sub>u</sub> = veh/h	l	1	-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	620 veh/h
u vorm		Ramp Free-Fl	ow Speed, S <sub>FR</sub>	50.0				Б	
Conversion to	o pc/h Und	der Base	Conditions						
(pc/h)	(\/oh/hr\	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
 Freeway	(Veh/hr) 5270	0.95	Level	3	0	0.985	1.00		5631
Ramp	320	0.93	Level	2	0	0.903	1.00		351
UpStream	320	0.92	Level		0	0.990	1.00		331
DownStream	620	0.92	Level	2	0	0.990	1.00		681
		Merge Areas					Diverge Areas		
Estimation of					Estimation				
	V <sub>12</sub> = V <sub>F</sub>	(P)							
=	.2 .	າ. ⊧ພ / ation 13-6 o≀	r 13 <sub>-</sub> 7)			.=	$V_R + (V_F - V_R)$	. –	
- <sub>EQ</sub> = P =	• •		tion (Exhibit 13-6)		L <sub>EQ</sub> =		(Equation 13-		,
) = / –			IOTI (EXTIIDIL 13-0)	)	P <sub>FD</sub> =		using Equatio	n (Exhibit 1	3-7)
' <sub>12</sub> =	979 p		on 13-14 or 13-		V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	2320   17)	pc/ii (⊏quaii	011 13-14 01 13-		${ m V_3}$ or ${ m V_{av34}}$		pc/h (Equation 1	3-14 or 13-	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	s 🗹 No			Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\square$ No				
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 '					Is $V_3$ or $V_{av34}$	> 1.5 * V <sub>12</sub> /2 [	☐Yes ☐ No		
			on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
Yes,V <sub>12a</sub> =		13-19)			12a	1	3-19)		
Capacity Che	cks				Capacity	Checks			
	Actual	C	Capacity	LOS F?		Actual		oacity	LOS F?
					$V_{F}$		Exhibit 13-	3	
$V_{FO}$	5982	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	$V_R$	Exhibit 13-	3	
10					V <sub>R</sub>		Exhibit 13	-	
	<u> </u>						10	<u> </u>	
low Entering	1			1 1/:-1-4:0	Flow Ente		rge Influen		10"
	Actual	1 .	Desirable 4600.All	Violation?	V	Actual	Max Des	rable	Violation?
V <sub>R12</sub>	2603	Exhibit 13-8	4600:All	No	V <sub>12</sub>	2 . 2	Exhibit 13-8	/: <b>c</b>	
Level of Serv		•					terminatio	_	( F)
D 5 475	•••	J.0078 V <sub>12</sub> - 0.0	00627 L <sub>A</sub>		1		.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = 5.475 +	ıi/ln)					/mi/ln)			
O <sub>R</sub> = 21.9 (pc/m					LOS = (Ex	hibit 13-2)			
O <sub>R</sub> = 21.9 (pc/m	13-2)				Speed De	eterminatio	on		
O <sub>R</sub> = 21.9 (pc/m					Speed 2				
O <sub>R</sub> = 21.9 (pc/m OS = C (Exhibit Speed Determ	nination				<del>† ′</del>	hibit 13-12)			
$O_R$ = 21.9 (pc/m OS = C (Exhibit) Speed Determ $M_S$ = 0.314 (Exi	nination bit 13-11)				D <sub>s</sub> = (Ext	nibit 13-12) n (Exhibit 13-12)			
$O_R$ = 21.9 (pc/m OS = C (Exhibit <b>Speed Detern</b> $M_S$ = 0.314 (Exi $G_R$ = 61.2 mph	mination bit 13-11) (Exhibit 13-11)				$D_s = (Exh$ $S_R = mph$	n (Exhibit 13-12)			
$O_{R} = 21.9 \text{ (pc/m}$ OS = C  (Exhibit) OS = C  (Exhibit)	nination bit 13-11)				$D_s = (Exh$ $S_R = mph$ $S_0 = mph$	•			

		RAMPS	S AND RAM			RKS	HEET			
General Inform	iation			Site Infor		. 05.0-				
nalyst	A.F.O.	2014		eeway/Dir of Tr		I-95 SB		F		
Agency or Company Date Performed	AEC	OIVI		nction risdiction	,	Seg 11	- Diverge to	Express		
analysis Time Period	AM			nalysis Year	2	2020 B	uild 2A			
Project Description S		et SIMR		, , , , , , , , , , , , , , , , , , , ,						
nputs										
Upstream Adj Rar	np	Freeway Numb	er of Lanes, N	4					Downstre	eam Adi
opoliodin / taj r tai		Ramp Number	of Lanes, N	1					Ramp	zam z taj
✓ Yes	On	Acceleration La	ne Length, L∧						Yes	☐ On
□N <sub>1</sub> , □	O#	Deceleration La	,,	200						
□ No □	ЭП	Freeway Volum	- 0	5590					✓ No	Off
L <sub>up</sub> = 1150	) ft	Ramp Volume,	•	620				I	L <sub>down</sub> =	ft
ир гос			11						uomii	
V <sub>II</sub> = 320	veh/h		Flow Speed, S <sub>FF</sub>	70.0				ľ	$V_D =$	veh/h
		Ramp Free-Flo	- 110	45.0						
Conversion to	•	der Base C	conditions	1	1			ı		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	/ = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
reeway	5590	0.95	Level	3	0	0.	985	1.00	5	5972
Ramp	620	0.92	Level	2	0		990	1.00		681
JpStream	320	0.92	Level	2	0		990	1.00		351
DownStream		1 1	2010.			+ *				
		Merge Areas		•				verge Areas		
Estimation of <b>v</b>	/12				Estimati	on o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>40</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>	
=		ation 13-6 or 1	13-7)		   =			Equation 13-1		3)
EQ =	, ,	Equation (E)	*		L <sub>EQ</sub> =		,	36 using Equ		•
) FM = / -	_	, Equation (E)	KIIIDIL 13-0)		P <sub>FD</sub> =				alion (Exi	111011 13-1)
/ <sub>12</sub> =	pc/h	/F !: 40	4.4 40.47)		V <sub>12</sub> =			38 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	•	(Equation 13-	14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>	0 =		92 pc/h (Equa	ation 13-1	14 or 13-17)
s $V_3$ or $V_{av34} > 2,700$								Yes   ✓ No		
s $V_3$ or $V_{av34} > 1.5 * V_3$					Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5		Yes ☑ No		
Yes,V <sub>12a</sub> =	pc/h ( 13-19)	(Equation 13- <sup>-</sup>	16, 13-18, or		If Yes,V <sub>12a</sub> =		ро 19	c/h (Equation	13-16, 13	3-18, or 13-
Capacity Chec		<i></i>			Capacity	/ Ch		1		
,,	<u></u>					,				
	Actual	Ca	pacity	LOS F?			Actual	Car	acitv	LOS F?
	Actual	Ca	pacity	LOS F?			Actual 5972		pacity 9600	LOS F?
	Actual		pacity	LOS F?	V <sub>F</sub>	<b>-</b> V.	5972	Exhibit 13-8	9600	No
V <sub>FO</sub>	Actual	Ca Exhibit 13-8	pacity	LOS F?	$V_F$ $V_{FO} = V_F$	- V <sub>R</sub>	5972 5291	Exhibit 13-8 Exhibit 13-8	9600 9600	No No
V <sub>FO</sub>		Exhibit 13-8		LOS F?	$V_F$ $V_{FO} = V_F$ $V_R$		5972 5291 681	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10	9600 9600 2100	No No No
	Merge In	Exhibit 13-8	rea		$V_F$ $V_{FO} = V_F$ $V_R$	terin	5972 5291 681 <b>g Diver</b>	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence	9600 9600 2100 <b>e Area</b>	No No No
V <sub>FO</sub>		Exhibit 13-8  offluence Ai  Max D		LOS F?  Violation?	$V_{FO} = V_{FO}$ $V_{RO} = V_{FO}$ $V_{RO} = V_{FO}$	terin	5972 5291 681 <b>g Diver</b> Actual	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence Max Desirab	9600 9600 2100 <b>ce Area</b>	No No No Violation?
V <sub>FO</sub> Flow Entering V <sub>R12</sub>	<b>Merge In</b> Actual	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8	rea Jesirable		$V_{FO} = V_{F}$ $V_{R}$ Flow En	terin	5972 5291 681 <b>g Diver</b> Actual	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence Max Desirab Exhibit 13-8	9600 9600 2100 <b>ce <i>Area</i></b> le 4400:All	No No No Violation?
V <sub>FO</sub> Flow Entering V <sub>R12</sub> Level of Service	Merge In Actual	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		$V_{FO} = V_{F}$ $V_{RO} = V_{FO}$ Flow En	terin 2 Serv	5972 5291 681 <b>g Diver</b> Actual 2988 vice <b>Det</b>	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence Max Desirab Exhibit 13-8 ermination	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?
V <sub>FO</sub> Flow Entering V <sub>R12</sub>	Merge In Actual	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		$V_{FO} = V_{F}$ $V_{RO} = V_{FO}$ Flow En	terin 2 Serv	5972 5291 681 <b>g Diver</b> Actual 2988 vice <b>Det</b>	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence Max Desirab Exhibit 13-8	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?
V <sub>FO</sub> Flow Entering V <sub>R12</sub> Level of Service	Merge In Actual	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		V <sub>F</sub> V <sub>FO</sub> = V <sub>F</sub> V <sub>R</sub> Flow En	terin 2 Serv	5972 5291 681 <b>g Diver</b> Actual 2988 vice <b>Det</b>	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence Max Desirab Exhibit 13-8 ermination	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?
V <sub>FO</sub> Flow Entering  V <sub>R12</sub> Level of Service  D <sub>R</sub> = 5.475 + 0.00	Merge In Actual Ce Detern 0734 v <sub>R</sub> +	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 30$	<b>terin</b> 2  Serv  D <sub>R</sub> = 4  7.7 (pc)	5972 5291 681 <b>g Diver</b> Actual 1988 <b>vice Det</b>	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence Max Desirab Exhibit 13-8 ermination	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?
$V_{FO}$ Flow Entering $V_{R12}$ Level of Service $D_R = 5.475 + 0.00$ $D_R = (pc/mi/ln)$	Merge In Actual Ce Detern 0734 v <sub>R</sub> +	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 30$	terin  Serv  R = 4  7  (Exhibit	5972 5291 681 <b>g Diver</b> Actual 2988 <b>vice Det</b> 4.252 + 0.0 /mi/ln) bit 13-2)	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 <b>ge Influence</b> Max Desirab Exhibit 13-8  Exhibit 13-8 <b>ermination</b> 0086 V <sub>12</sub> - 0.0	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?
$V_{FO}$ V <sub>R12</sub> Level of Service $D_R = 5.475 + 0.00$ $O_R = (pc/mi/ln)$ $OS = (Exhibit 13)$ Speed Determine $OS = (Exhibit 13)$	Merge In Actual Ce Detern 0734 v <sub>R</sub> + 3-2) ination	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 30$ $LOS = D$ Speed D	terin  2 Serv  D <sub>R</sub> = 4 .7 (pc) (Exhibited terms	5972 5291 681 <b>g Diver</b> Actual 2988 <b>rice Det</b> (mi/ln) bit 13-2) <b>minatio</b>	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence Max Desirab Exhibit 13-8 Ermination 0086 V <sub>12</sub> - 0.0	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?
Flow Entering $V_{R12}$ Level of Service $D_R = 5.475 + 0.00$ $D_R = (pc/mi/ln)$ $D_R = (Exhibit 13)$ Speed Determination	Merge In Actual Ce Detern 0734 v <sub>R</sub> + 3-2) ination	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 30$ $LOS = D$ Speed D $D_S = 0.3$	terin  2  Serv  D <sub>R</sub> = 4  7 (pc)  (Exhib	5972 5291 681 <b>g Diver</b> Actual 988  vice Det 4.252 + 0.0 /mi/ln) bit 13-2) minatio	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 <b>ge Influence</b> Max Desirab Exhibit 13-8 <b>ermination</b> 0086 V <sub>12</sub> - 0.0	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?
$V_{FO}$ Flow Entering $V_{R12}$ Level of Service $D_R = 5.475 + 0.00$ $D_R = (pc/mi/ln)$ $D_R = (Exhibit 13)$ Speed Determine $D_R = (Exhibit 13)$ $D_R = (Exhibit 13)$ $D_R = (Exhibit 13)$ $D_R = (Exhibit 13)$	Merge In Actual Ce Detern 0734 v <sub>R</sub> + 3-2) ination 11) bit 13-11)	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		$V_{FO} = V_{FO}$ $V_{FO} = V_{FO}$ $V_{RO} = V_{RO}$ Flow Entropy $V_{12}$ Level of $V_{12}$ $V_{13}$ $V_{14}$ $V_{15}$ $V_{$	terin  2 Serv  0 <sub>R</sub> = 4 .7 (pc/ (Exhib)  0eteri  359 (E9 mph	5972 5291 681 <b>g Diver</b> Actual 2988 <b>rice Det</b> 252 + 0.0 (mi/ln) bit 13-2) <b>minatio</b> xhibit 13-6 (Exhibit 1	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10  ge Influence Max Desirab Exhibit 13-8  ermination 0086 V <sub>12</sub> - 0.0  n  12) 13-12)	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?
Flow Entering $V_{R12}$ Level of Service $D_R = 5.475 + 0.00$ $D_R = (pc/mi/ln)$ $D_R = (Exhibit 13)$ Speed Determination	Merge In Actual  Ce Detern 0734 v <sub>R</sub> +  3-2)  ination  11) bit 13-11) bit 13-11)	Exhibit 13-8  Influence Ar  Max D  Exhibit 13-8  Influence influen	rea lesirable f not F)		$V_{FO} = V_{F}$ $V_{FO} = V_{F}$ $V_{R}$ Flow En: $V_{12}$ Level of $D_{R} = 30$ $LOS = D$ Speed D $D_{S} = 0.3$ $S_{R} = 59$ $S_{0} = 75$	terin  2 Serv  D <sub>R</sub> = 4 .7 (pc/ (Exhib)  Deteri  359 (E9 mph .5 mph	5972 5291 681 <b>g Diver</b> Actual 988  vice Det 4.252 + 0.0 /mi/ln) bit 13-2) minatio	Exhibit 13-8 Exhibit 13-8 Exhibit 13-10 <b>ge Influence</b> Max Desirab Exhibit 13-8 <b>ermination</b> 120 13-12) 13-12)	9600 9600 2100 <b>ce Area</b> le 4400:All	No No No Violation?

Location:	Seg 12: I	-95 SB Off-Ramp to Sample R	Road EB & W	/B
Analysis Period:	AM Peak	Hour		-
Analysis Year:	2020 Bui	ld 2A		
	<b>&gt;</b>	4,970		4,10
				-
		0.05		870
	PHF =	0.95		
	$v_{fr} =$	<b>4,970</b> vph		
	$v_r =$	<b>870</b> vph		
	$v_f =$	4,100		
Upstream Freeway		3%		
•	Tr % =	2%		
Downstream Freeway				
=		$1/(1+P_T(E_T-1)+P_R(E_R-1)) =$		0.985
Ramp	f <sub>HV</sub> =	$1/(1+P_T(E_T-1)+P_R(E_R-1)) =$	:	0.9901
flat terrain	E <sub>T</sub> =	1.5		
	RV % =	0		
Driver Population adj.	f <sub>P</sub> =	1.000		
	$V_{fr} =$	$=v_{fr}/(PHF)(f_{HV})(f_P)=$	5,310	pc/h
	$V_r =$	$=v_r/(PHF)(f_{HV})(f_P)=$	925	pc/h
	$V_f =$	$=v_{\text{H}}(PHF)(f_{\text{HV}})(f_{\text{P}}) =$	4,381	pc/h
No. lanes upstream of ramp	-	4	1,001	porti
No. lance apolicam of ramp	••	-		
Average Freeway D	ensity L	<u> Jpstream of Diverge (see</u>	<b>Equation</b>	<u>13-26):</u>
<b>5</b>		_		
$D = 0.0175 (V_{fr}/N) =$	23.2	pc/ln		
LOS in the Diverse	Aroo (fr	om Donoity and Exhibit (	12 2) =	
LOS in the Diverge	Area (Ir	om Density and Exhibit 1	13-2) –	
L Consolty Charle (as	e Exhib	<u>its 13-2, 13-8 and 13.10)</u>		Actual LOS
			0 000	= 0.40 N
4 Fwy upstream of ramp (a		mph free-flow speed) = 70 mph free-flow speed) =	9,600 7,200	5,310 No 4,381 No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 13-E 2020 Bu	Bet Off & On Ramps
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	5)	[	Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4100	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		·		
-	1.00		F	1.2	
f <sub>p</sub>  E <sub>T</sub>	1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f <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	l r	70.0	mph
Base free-flow Speed, BFFS	3	mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	I x f <sub>HV</sub> x f <sub>p</sub> ) 1460 69.2 21.1 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	$f_{HV} \times f_p$ )	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 freedour 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		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	/ WEAVI	ING WOF	RKSHEE	T		
General Info	ormati				Site Info				
Analyst Agency/Company Date Performed Analysis Time Per		AECO!	М		Freeway/Dir of Travel I-95 SB Weaving Segment Location Seg 14- Bet Sample & Copar Analysis Year 2020 Build 2A				
Project Descriptio	n SW 10t	h Street SIMF	₹		1				
Inputs									
Weaving configure Weaving number Weaving segment Freeway free-flow	of lanes, N t length, L <sub>s</sub> r speed, Fl	S FS		2520ft 70 mph	Terrain type				Freeway 15 2400 Leve
Conversion			1	T .	î .		1 ,	1 ,	( (1)
· '	veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
ГГ	485	0.95	3	0	1.5	1.2	0.985	1.00	3723
IXI	770	0.92	2	0	1.5	1.2	0.990	1.00	1943
ΓN	615	0.92	2	0	1.5	1.2	0.990	1.00	675
$V_{RR}$	0	0.95	0	0	1.5	1.2	1.000	1.00	0
INVV	3723							V =	6341
VV	2618								
	0.413								
Configurati			tics		I				
Minimum maneu		$N_WL$		2 lc		-	hanges, LC <sub>MIN</sub>		lc/h
Interchange dens	•				Weaving lan	=	**		lc/h
Minimum RF lane	_	14			Non-weaving				lc/h
Minimum FR lane				1 lc/pc		nanges, LC <sub>AL</sub>	_		lc/h
Minimum RR lane					Non-weaving		****		
Weaving Se	egmen	t Speed,	Density, I	Level of	i .				
Weaving segmen				6261 veh/h	_	ensity factor, gment speed			mnh
Weaving segmen		, c <sub>w</sub>		5727 veh/h		•			mph mph
Weaving segmen Weaving segmen		n		1.093 pc/mi/ln				mph	
Level of Service,	•	Ь		F F	1				6826 ft
Notes					The state of the s		-, -MAX		002011

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

	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-Bo 2020 Bu	et Hillsboro & Palmetto
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS)	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4530	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	
DDHV - AADTX K X D		ven/n	Grade % Length Up/Down %	IIII	
Calculate Flow Adjusti	monte		-1-		
				1.0	
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	<u> </u>	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	4		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS)  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> ) 1210 70.0 17.3 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	$f_{HV} \times f_p$ )	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 freedour 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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		F	REEWAY	<u>' WEAVI</u>	NG WOF	RKSHEE	T		
General	Informati	on			Site Info	rmation			
Analyst Agency/Con Date Perfori Analysis Tin	med	AECON PM	Л		Freeway/Dir of Travel I95/SB Weaving Segment Location Seg 2-Bet On from Exp & O Analysis Year 2020 Build 2A				
Project Desc	cription SW 10t	h Street SIMF	₹						
Inputs									
Weaving seg Freeway fre	mber of lanes, N gment length, L <sub>o</sub> e-flow speed, FI	s FS		5200ft 70 mph	Segment typo Freeway min Freeway max Terrain type	imum speed			Freeway 19 2400 Leve
Convers	sions to po	:/h Unde	r Base Co	nditions	*				_
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>T</sub>	E <sub>R</sub>	$f_{HV}$	fp	v (pc/h)
$V_{FF}$	3600	0.95	3	0	1.5	1.2	0.985	1.00	3846
$V_{RF}$	970	0.92	2	0	1.5	1.2	0.990	1.00	1065
$V_{FR}$	930	0.92	2	0	1.5	1.2	0.990	1.00	1021
$V_RR$	110	0.92	2	0	1.5	1.2	0.990	1.00	121
$V_{NW}$	5932							V =	6053
$V_{W}$	121								
VR	0.020								
Configu	ration Cha	aracterist	tics		<del> </del>				
Minimum m	aneuver lanes, l	$N_{WL}$		0 lc	Minimum we	aving lane c	hanges, LC <sub>MIN</sub>	١	363 lc/h
Interchange				0.7 int/mi	Weaving lan	e changes, L	_C <sub>w</sub>		1031 lc/h
	F lane changes,	1.0		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3012 lc/h
	R lane changes,	111		0 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4043 lc/h
Minimum R	R lane changes	, LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2159
Weavin	g Segment	t Speed,	Density, I	_evel of	Service,	and Cap	oacity		
	gment flow rate		;	5975 veh/h	Weaving inte	•			0.185
Weaving se	gment capacity,	, c <sub>w</sub>	,	9245 veh/h	Weaving seg	•			60.1 mph
•	gment v/c ratio	_		0.646	Average wea		**		61.4 mph
_	gment density,	D	25	•	Average non		****		60.1 mph
Level of Se	vice, LOS			С	Maximum we	eaving length	າ, L <sub>MAX</sub>		5912 ft

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a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

	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 3-Be 2020 Bu	et Off & On Ramp ild 2A
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4570	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	
			Up/Down %		
Calculate Flow Adjust	ments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T-1)+P_R(E_R-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	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		'	Docian (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF x N S)$ $D = v_p / S$ LOS		pc/h/ln mph pc/mi/ln	Design (N)  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	$f_{HV} \times f_p$ )	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 free	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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0		RAMPS	S AND RAM			RKS	HEET			
General Info	ormation			Site Infor						
Analyst	450	2014		eeway/Dir of Tr		I-95 SE		OW 4011- OL		
Agency or Compar Date Performed	ny AEC	OM		nction risdiction	;	Seg 4-I	Diverge to 8	SW 10th St		
Analysis Time Peri	od PM			nalysis Year	:	2020 B	uild 2A			
Project Description		et SIMR		,			<u> </u>			
Inputs										
Upstream Adj	Ramp	Freeway Numb	er of Lanes, N	3					Downstre	am Adi
	•	Ramp Number	of Lanes, N	1					Ramp	ann 7 tag
☐Yes	On	Acceleration La	ane Length, L						✓ Yes	<b>☑</b> On
. In the second		Deceleration La	, , , , , , , , , , , , , , , , , , ,	200						
✓ No	Off	Freeway Volun	- 5	4570					☐ No	Off
L <sub>up</sub> =	ft	Ramp Volume,		1210					L <sub>down</sub> =	2400 ft
ир			13	70.0					domi	
V <sub>u</sub> =	veh/h	-	Flow Speed, S <sub>FF</sub>						V <sub>D</sub> =	1470 veh/h
		Ramp Free-Flo	• 11	45.0						
Conversion		der Base C	conditions	1	1		Г			
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	$f_p$	v = V/PHF	$x f_{HV} x f_{p}$
Freeway	4570	0.95	Level	3	0	0.	985	1.00	48	383
Ramp	1210	0.92	Level	2	0	_	990	1.00		328
UpStream	12.10	0.02	20101		Ť	<u> </u>	-	1.00		,
DownStream	1470	0.92	Level	2	0	0.	990	1.00	16	614
	•	Merge Areas		•				iverge Areas		
Estimation o	of v <sub>12</sub>				Estimati	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	- ( P <sub>EM</sub> )					V <sub>40</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>		
=		ation 13-6 or 1	13_7)		l =			Equation 13-1		8)
<sub>-EQ</sub> = P =	, -	g Equation (E	•		L <sub>EQ</sub> = P =		,	-		•
) = / –	_	g Equation (E.	XIIIDIL 13-0)		P <sub>FD</sub> =			577 using Eq	uation (Exi	IDIL 13-7)
/ <sub>12</sub> =	pc/h	/E !: 40	44 40 47)		V <sub>12</sub> =			79 pc/h		
$V_3$ or $V_{av34}$	· ·	(Equation 13-	14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			04 pc/h (Equ	ation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,7$					0 0.0			Yes ✓ No		
Is $V_3$ or $V_{av34} > 1.5$					Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5		Yes ☑ No		
f Yes,V <sub>12a</sub> =	pc/h 13-19	(Equation 13-	16, 13-18, or		If Yes,V <sub>12a</sub> =		p 19	c/h (Equation งง	13-16, 13	-18, or 13-
Capacity Ch		1			Capacity	v Ch		,,		
	Actual	Ca	apacity	LOS F?			Actual	Са	pacity	LOS F?
					V <sub>F</sub>		4883	Exhibit 13-8		No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$		3555	Exhibit 13-8		No
• FO		EXHIBIT 10 0				*R		Exhibit 13-1	+	
	<u> </u>	<u></u>			V <sub>R</sub>		1328			No
		ntluence Al		Vr.I.CO	Flow En	T T		ge Influen		L Malada A
Flow Enterin		М Г				/	Actual	Max Desirat	1	Violation?
	Actual		)esirable	Violation?	1/		1070	EL:L:140 0		
V <sub>R12</sub>	Actual	Exhibit 13-8		violation?	V <sub>12</sub>		3379	Exhibit 13-8	4400:All	No No
V <sub>R12</sub> Level of Ser	Actual  Vice Deteri	Exhibit 13-8	f not F)	violation?	Level of	Ser	∕ice De	terminatio	n (if not	
V <sub>R12</sub>	Actual  Vice Deteri	Exhibit 13-8	f not F)	Violation?	Level of	Ser	∕ice De		n (if not	
V <sub>R12</sub> Level of Ser D <sub>R</sub> = 5.475 + (	Actual  vice Deteri  0.00734 v <sub>R</sub> +	Exhibit 13-8	f not F)	Violation?	Level of	<b>Ser</b>	∕ice De	terminatio	n (if not	
$V_{R12}$ Level of Ser $D_R = 5.475 + (pc/mi/le)$	Actual  Vice Deterion 0.00734 v R +	Exhibit 13-8	f not F)	Violation?	Level of  D <sub>R</sub> = 31	<b>Serv</b> D <sub>R</sub> = 4 .5 (pc	/ice De:	terminatio	n (if not	
$V_{R12}$ Level of Ser $D_R = 5.475 + 6$ $D_R = (pc/mi/6.0S = (Exhibit)$	Actual  vice Deterion  0.00734 v R +  In)  it 13-2)	Exhibit 13-8	f not F)	Violation?	Level of  D <sub>R</sub> = 31	<b>Ser</b> D <sub>R</sub> = 4 .5 (pc. (Exhil	/ice De: 1.252 + 0. /mi/ln) pit 13-2)	<b>terminatio</b> .0086 V <sub>12</sub> - 0.	n (if not	
$V_{R12}$ <b>Level of Ser</b> $D_R = 5.475 + 6$ $D_R = (pc/mi/6)$ $COS = (Exhibit)$ <b>Speed Deter</b>	Actual  vice Determ 0.00734 v <sub>R</sub> +  In) it 13-2) rmination	Exhibit 13-8	f not F)	Violation?	Level of  D <sub>R</sub> = 31  LOS = D  Speed D	Serv D <sub>R</sub> = 4 .5 (pc. (Exhil	/ice De 1.252 + 0. /mi/ln) pit 13-2) minatio	<b>terminatio</b> 0086 V <sub>12</sub> - 0.	n (if not	
Level of Ser $D_R = 5.475 + 0$ $D_R = (pc/mi/l)$ $D_R = (Exhibit)$ Speed Deter $D_R = (Exhibit)$	Actual  vice Determ  0.00734 v <sub>R</sub> +  In)  it 13-2)  rmination  13-11)	Exhibit 13-8	f not F)	Violation?	Level of	Serv D <sub>R</sub> = 4 .5 (pc. (Exhill <b>Deter</b> 418 (E	/ice De: 1.252 + 0. /mi/ln) bit 13-2) mination xhibit 13-	terminatio .0086 V <sub>12</sub> - 0.	n (if not	
$V_{R12}$ Level of Ser $D_R = 5.475 + 0$ $D_R = (pc/mi/c)$ $D_R = (Exhibit)$ Speed Deter $D_R = (Exhibit)$	Actual  vice Deterion 0.00734 v R + In) it 13-2) rmination 13-11) xhibit 13-11)	Exhibit 13-8	f not F)	Violation?	$\begin{array}{c} \textbf{Level of} \\ \textbf{D}_{\text{R}} = & 31 \\ \textbf{LOS} = & \textbf{D} \\ \textbf{Speed D} \\ \textbf{D}_{\text{S}} = & 0.4 \\ \textbf{S}_{\text{R}} = & 58 \\ \end{array}$	Serv. D <sub>R</sub> = 4 .5 (pc. (Exhill <b>Deter</b> ) 418 (E .3 mph	/ice Dei 1.252 + 0. /mi/ln) bit 13-2) mination xhibit 13- (Exhibit	terminatio 0086 V <sub>12</sub> - 0. on 12) 13-12)	n (if not	
$V_{R12}$ Level of Ser $D_R = 5.475 + 6$ $D_R = (pc/mi/6)$ $D_R = (Exhibit)$ Speed Deter $D_R = (Exhibit)$ $D_R = (Ex$	Actual  vice Determ  0.00734 v <sub>R</sub> +  In)  it 13-2)  rmination  13-11)	Exhibit 13-8	f not F)	Violation?	Level of $D_R = 31$ $LOS = D$ Speed D $D_S = 0.4$ $S_R = 58$ $S_0 = 74$	Service Servic	/ice De: 1.252 + 0. /mi/ln) bit 13-2) mination xhibit 13-	terminatio .0086 V <sub>12</sub> - 0. on 12) 13-12) 13-12)	n (if not	

	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 5-Be 2020 Bu	et Off & On Ramps ild 2A
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	3360	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	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_LW$		mph
Number of Lanes, N	3		f <sub>LC</sub>		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance	Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N s)  S  D = v <sub>p</sub> / S  LOS		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	·	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	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		MPS AND	RAMP JUN			EI			
General Infor	mation			Site Infor					
Analyst				eeway/Dir of Ti		95 SB	=		
Agency or Company Date Performed	, AEC	OM		nction risdiction	S	seg 6-Merge from	n Hillsboro E&W		
Analysis Time Period	d PM			nalysis Year	2	020 Build 2A			
Project Description		et SIMR		, 6.6 . 64.		OZO Balla Z/ (			
nputs									
Jpstream Adj Ramp		Freeway Num	ber of Lanes, N	3				Downstre	om Adi
psiream Auj Kamp		Ramp Number	r of Lanes, N	1				Ramp	ani Auj
✓ Yes 🗌 Or	า		ane Length, L <sub>A</sub>	300				-	
		1	ane Length L <sub>D</sub>	000				☐Yes	☐ On
☐ No   ☑ Of	f	1		2260				✓ No	Off
un = 2400	ft	Freeway Volu		3360				L <sub>down</sub> =	ft
<sub>up</sub> = 2400	11	Ramp Volume		1470				-down	
/ <sub>u</sub> = 1210 v	veh/h	1	-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h
			ow Speed, S <sub>FR</sub>	50.0					
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/PH	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	3360	0.95	Level	3	0	0.985	1.00		3590
Ramp	1470	0.93	Level	2	0	0.990	1.00		1614
UpStream	1210	0.92	Level	2	0	0.990	1.00		1328
DownStream	1210	0.32	Level		1 0	0.330	1.00		1320
20Miloti Gaini		Merge Areas				<u> </u>	Diverge Areas	<u> </u>	
stimation of	f v <sub>12</sub>				Estimation				
	V <sub>12</sub> = V <sub>F</sub>	(P)				·-			
=			13-6 or 13-7)			.=	$V_R + (V_F - V_R)$	–	
-EQ =		, .	•		L <sub>EQ</sub> =		(Equation 13-	12 or 13-	13)
) = / =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)
12 =	2103	•	10.1110		V <sub>12</sub> =		pc/h		
/ <sub>3</sub> or V <sub>av34</sub>	1487 17)	pc/n (Equation	on 13-14 or 13-		$V_3$ or $V_{av34}$		pc/h (Equation 1	13-14 or 13-	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	e V No			Is V <sub>3</sub> or V <sub>av34</sub>	> 2,700 pc/h?	☐Yes ☐ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5					Is V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V <sub>12</sub> /2	Yes No		
			on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
Yes,V <sub>12a</sub> =		13-19)	511 10 10, 10		11 100, V 12a	1	3-19)		
Capacity Che	ecks				Capacity	Checks			
	Actual	С	apacity	LOS F?		Actual	Ca	pacity	LOS F?
					$V_{F}$		Exhibit 13-	8	
		Exhibit 13-8		No	$V_{FO} = V_{F}$ -	V <sub>R</sub>	Exhibit 13-	8	
Vro	5204			1			Exhibit 13	-	
$V_{FO}$	5204	Exhibit 10 0			\/		EXHIDIT		
					V <sub>R</sub>		10		
	g Merge Ir	nfluence A					rge Influen		W.
Flow Entering	<b>g Merge Ir</b> Actual	nfluence A	Desirable	Violation?	Flow Ent	ering Dive	rge Influer Max Des		Violation?
Flow Entering	g Merge Ir Actual 3717	Max Exhibit 13-8	Desirable 4600:All	Violation?	Flow Ent	Actual	10  rge Influer  Max Des  Exhibit 13-8	irable	Violation?
Flow Entering	g Merge Ir Actual 3717	Max Exhibit 13-8	Desirable 4600:All	1	Flow Ent	Actual	rge Influer Max Des	irable	Violation?
V <sub>R12</sub> Level of Serv	g Merge Ir Actual 3717	Max Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	1	Flow Ent	Actual Service De	10  rge Influer  Max Des  Exhibit 13-8	irable n (if not	Violation?
V <sub>R12</sub> Level of Serv D <sub>R</sub> = 5.475 +	g Merge Ir Actual 3717 rice Deterr 0.00734 v <sub>R</sub> +	nfluence A Max I Exhibit 13-8 mination (i	Desirable 4600:All <b>if not F)</b>	1	Flow Ent	Actual Service De	10 rge Influer Max Des Exhibit 13-8	irable n (if not	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_{R} = 5.475 + D_{R} = 31.8 \text{ (pc/m}$	g Merge Ir Actual 3717 rice Deterr 0.00734 v <sub>R</sub> +	nfluence A Max I Exhibit 13-8 mination (i	Desirable 4600:All <b>if not F)</b>	1	Flow Ent	Actual Service De R = 4.252 + 0	10 rge Influer Max Des Exhibit 13-8	irable n (if not	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + D_R = 31.8 \text{ (pc/m}$ $OS = D \text{ (Exhibit)}$	<b>g Merge Ir</b> Actual 3717 <b>rice Detern</b> 0.00734 v <sub>R</sub> + ni/ln) 13-2)	nfluence A Max I Exhibit 13-8 mination (i	Desirable 4600:All <b>if not F)</b>	1	Flow Enter	Actual  Service De  R = 4.252 + (  c/mi/ln)  (hibit 13-2)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = 31.8 \text{ (pc/m}$ $D_R = 0 \text{ (Exhibit)}$ Speed Determ	g Merge Ir Actual 3717 rice Deterr 0.00734 v <sub>R</sub> + ni/ln) 13-2) mination	nfluence A Max I Exhibit 13-8 mination (i	Desirable 4600:All <b>if not F)</b>	1	Flow Ent	Actual  Service De  R = 4.252 + (c/mi/ln)  Achibit 13-2)  Setermination	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $OS = 0 \text{ (Exhibit)}$ Speed Determ $M_S = 0.451 \text{ (Exist)}$	g Merge Ir	nfluence A Max I Exhibit 13-8 mination (i	Desirable 4600:All <b>if not F)</b>	1	Flow Enternation  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc  LOS = (Ex  Speed De  D <sub>s</sub> = (Ext	Actual  Service De  R = 4.252 + (  c/mi/ln)  chibit 13-2)  etermination  hibit 13-12)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 31.8 \text{ (pc/m}$ $OS = D \text{ (Exhibit)}$ Speed Determ $M_S = 0.451 \text{ (Exist)}$ $S_R = 57.4 \text{ mph}$	g Merge Ir	nfluence A Max I Exhibit 13-8 mination (i	Desirable 4600:All <b>if not F)</b>	1	Flow Enternation  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc  LOS = (Ex  Speed De  S <sub>R</sub> = (Exi S <sub>R</sub> = mph	Actual  Service De  R = 4.252 + (  s/mi/ln)  chibit 13-2)  etermination  hibit 13-12)  n (Exhibit 13-12)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable n (if not	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 31.8 \text{ (pc/m)}$ $OS = D \text{ (Exhibit)}$ Speed Determ $M_S = 0.451 \text{ (Exist)}$ $S_R = 57.4 \text{ mph}$ $S_R = 66.4 \text{ mph}$	g Merge Ir	nfluence A Max I Exhibit 13-8 mination (i	Desirable 4600:All <b>if not F)</b>	1	Flow Enter $V_{12}$ Level of $V_{12}$ $V_{12}$ $V_{12}$ $V_{12}$ $V_{12}$ $V_{12}$ $V_{13}$ $V_{14}$ $V_{15}$ $V_{15$	Actual  Service De  R = 4.252 + (  c/mi/ln)  chibit 13-2)  etermination  hibit 13-12)	Max Des Exhibit 13-8 Exermination 0.0086 V <sub>12</sub> - 0	irable n (if not	Violation?

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 7-Be 2020 Bu	et On Ramps ild 2A
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4830	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	
			Up/Down %		
Calculate Flow Adjusti	ments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T-1)+P_R(E_R-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	 }	
Lane Width		ft			
Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	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		<u> </u>	Design (N)		
Operational (LOS) $v_p = (V \text{ or DDHV}) / (PHF \times N)$ S $D = v_p / S$ LOS		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	$f_{HV} \times f_p$ )	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 free	-	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		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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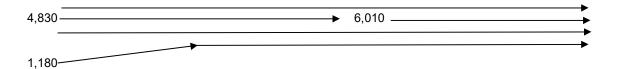
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Job: SW 10th Street SIMR

Analyst: AECOM

Location: Seg 8: I-95 Southbound On-Ramp from SW 10th Street EB & WB

Analysis Period: PM Peak Hour
Analysis Year: 2020 Build 3



Downstream Freeway Tr % = 3%

Freeway  $f_{HV}$  = 1/(1+P<sub>T</sub>(E<sub>T</sub>-1)+P<sub>R</sub>(E<sub>R</sub>-1)) = 0.985 Ramp  $f_{HV}$  = 1/(1+P<sub>T</sub>(E<sub>T</sub>-1)+P<sub>R</sub>(E<sub>R</sub>-1)) = 0.9901

flat terrain  $E_T = 1.5$ RV % = 0

Driver Population adj.  $f_P = 1.000$ 

 $V_{fr} = = V_{fr}/(PHF)(f_{HV})(f_{P}) = V_{r} = = V_{r}/(PHF)(f_{HV})(f_{P}) = V_{f} = = V_{f}/(PHF)(f_{HV})(f_{P}) = V_{f}/(PHF)(f_{HV})(f_{P})(f_{P}) = V_{f}/(PHF)(f_{HV})(f_{P})($ 

6,421 pc/h
1,255 pc/h
5,160 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	6,421	0.67	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,160	0.72	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,255	0.60	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 9-Be 2020 Bu	et 10th & Exit to Exp ild 2A
· '	th Street SIMR				
✓ Oper.(LOS)	)		Des.(N)	∐Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	6010	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 Adjust	ments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	× f <sub>HV</sub> × f <sub>p</sub> ) 1605 68.1 23.6 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	$f_{HV} \times f_p$ )	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 freedour 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		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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	VIPS AND	KAMP JUN	CTIONS W		EI			
mation			Site Infor					
			•					
AEC	MC			S	eg 10-Merge fro	om Ex to GP		
DIA.				21	020 Brilly 2V			
	t SIMR	7.0	lalysis roui		020 Dullu ZA			
	Freeway Num	ber of Lanes, N	4				Downstr	oom Adi
	Ramp Number	r of Lanes. N	1					eam Auj
<u>)</u>			•					
	1	,,	000				<b>Yes</b> Yes	☐ On
f	1	- 5	6010				□No	✓ Off
		'					L <sub>down</sub> =	1150 ft
	1						down	1100 11
							V <sub>D</sub> =	670 veh/h
	I .	111	50.0					
	<u>der Base (</u>	Conditions	ı	1	1	r		
	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	$F x f_{HV} x f_{p}$
6010	0.95	Level	3	0	0.985	1.00		6421
300	0.92		-	0	0.990	<b>\</b>		329
670	0.92	Level	2	0	0.990	1.00		736
	Merge Areas					Diverge Areas		
'V <sub>12</sub>				Estimation	on of v <sub>12</sub>			
V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				\/ =	\/ + (\/ <sub>-</sub> \/	/P	
(Equ	ation 13-6 or	13-7)		_	.=			12\
• •		*				•		•
		(					on (Exnibit	13-7)
-	=	on 13-14 or 13-				•		
17)	, o/ (qua						13-14 or 13-	·17)
0 pc/h?	s 🗹 No							
V <sub>12</sub> /2 <b>✓</b> Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av34</sub>				
2568	pc/h (Equatio	on 13-16, 13-		If Yes,V <sub>12a</sub> =			n 13-16, ′	13-18, or
	13-19)			0		0-10)		
T.	T 6	:	1 100 50	Capacity	Tr.	1 0-	it .	1 100 50
Actual	+ + +	apacity	LUSF?	\/	Actual			LOS F?
1				· · · · · ·	\ <u>\</u>		_	
			I N	IV = V -	V <sub>R</sub>	Exhibit 13-	8	
6750	Exhibit 13-8		No	$V_{FO} = V_{F}$ -				
6750	Exhibit 13-8		No	V <sub>FO</sub> V <sub>F</sub>	- K	Exhibit 13	-	
		roa	NO NO	V <sub>R</sub>		10		<u> </u>
g Merge In	fluence A			V <sub>R</sub>	ering Dive	10 erge Influen	ce Area	ii'
<b>g Merge In</b> Actual	ofluence A	Desirable	Violation?	V <sub>R</sub>		10 erge Influer Max Des	ce Area	Yiolation?
<b>g Merge In</b> Actual 2897	Max I Exhibit 13-8	Desirable 4600:All		V <sub>R</sub> Flow Ente	ering Dive	10  rge Influer  Max Des  Exhibit 13-8	rce Area	Violation?
Merge In Actual 2897 ice Detern	Max I Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>R</sub> Flow Entered	ering Dive Actual Service De	10 rge Influer Max Des Exhibit 13-8	irable	Violation?
<b>9 Merge In</b> Actual 2897 <b>ice Detern</b> 0.00734 v <sub>R</sub> + 0	Max I Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>R</sub> Flow Enter V <sub>12</sub> Level of S	ering Dive Actual Service De	10  rge Influer  Max Des  Exhibit 13-8	irable	Violation?
7 Merge In Actual 2897 ice Detern 0.00734 v R + 0	Max I Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>R</sub> Flow Enter  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc	Actual Service De R = 4.252 + (	10 rge Influer Max Des Exhibit 13-8	irable	Violation?
Actual 2897 ice Detern 0.00734 v R + 0 i/ln) 13-2)	Max I Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>R</sub> Flow Enter  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc LOS = (Ex	ering Dive Actual  Service De R = 4.252 + ( /mi/ln) chibit 13-2)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable	Violation?
7 Merge In Actual 2897 ice Detern 0.00734 v R + 0 i/ln)	Max I Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>R</sub> Flow Enter  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc  LOS = (Ex  Speed De	ering Dive Actual  Service De R = 4.252 + ( /mi/ln) chibit 13-2)	Max Des Exhibit 13-8 Eterminatio 0.0086 V <sub>12</sub> - 0	irable	Violation?
Actual 2897 ice Detern 0.00734 v R + 0 i/ln) 13-2)	Max I Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	V <sub>R</sub> Flow Ento  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc  LOS = (Ex  Speed De  D <sub>s</sub> = (Ext	Actual  Service De  R = 4.252 + (c/mi/ln)  chibit 13-2)  etermination	Max Des Exhibit 13-8 Exerminatio 0.0086 V <sub>12</sub> - 0	irable	Violation?
Actual 2897 ice Detern 0.00734 v R + 0 i/ln) 13-2) mination	Max I Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	$\begin{array}{c} V_{R} \\ \hline \\ V_{12} \\ \hline \\ Level of S \\ \hline \\ D_{R} = (pc) \\ LOS = (Ex) \\ \hline \\ Speed De \\ S_{R} = (pc) \\ \hline \\ S_{R} = (Ex) \\ \hline$	ering Dive Actual  Service De R = 4.252 + ( /mi/ln) chibit 13-2)	Max Des Exhibit 13-8 Exerminatio 0.0086 V <sub>12</sub> - 0	irable	Violation?
Actual 2897 ice Detern 0.00734 v R + 0 ii/ln) 13-2) mination bit 13-11)	Max I Exhibit 13-8	Desirable 4600:All <b>if not F)</b>	Violation?	$V_R$ Flow Enter $V_{12}$ Level of S $D_R = (pc)$ $LOS = (Ex)$ $Speed De$ $D_S = (Ex)$ $S_R = (Ex)$	Actual  Service De  R = 4.252 + (c/mi/ln)  chibit 13-2)  etermination	Max Des Exhibit 13-8 Exerminatio 0.0086 V <sub>12</sub> - 0	irable	Violation?
	AECO PM SW 10th Stree  O pc/h Uno V (Veh/hr) 6010 300 670  V12 = V <sub>F</sub> (Equation (Equat	AECOM  PM  SW 10th Street SIMR  Freeway Num Ramp Number Acceleration L Freeway Volum Ramp Volume Freeway Free Ramp Free-Freeway No 1.22 Vehalts 1.22 Vehalts 1.23 Vehalts 1.24 Vehalts 1.24 Vehalts 1.25 Vehalts 1.26 Vehalts 1.26 Vehalts 1.26 Vehalts 1.27 Veha	AECOM  PM  SW 10th Street SIMR  Freeway Number of Lanes, N  Ramp Number of Lanes, N  Acceleration Lane Length, L  Preeway Volume, V  Ramp Volume, V  Ramp Volume, V  Ramp Free-Flow Speed, S  Ramp F	Freeway/Dir of Tr Junction Jurisdiction Analysis Year  SW 10th Street SIMR  Freeway Number of Lanes, N 4 Ramp Number of Lanes, N 1 Acceleration Lane Length, L <sub>A</sub> 600 Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>F</sub> 6010 Ramp Volume, V <sub>R</sub> 300 Freeway Free-Flow Speed, S <sub>FF</sub> 70.0 Ramp Free-Flow Speed, S <sub>FR</sub> 50.0  Deceleration Lane Length L <sub>D</sub> Freeway Free-Flow Speed, S <sub>FR</sub> 50.0  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>R</sub> 300 Freeway Free-Flow Speed, S <sub>FR</sub> 50.0  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>R</sub> 300 Freeway Free-Flow Speed, S <sub>FR</sub> 50.0  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>R</sub> 300 Freeway Volume, V <sub>R</sub> 300 Freeway Free-Flow Speed, S <sub>FR</sub> 50.0  Deceleration Lane Length L <sub>D</sub> Freeway Volume, V <sub>R</sub> 300 Freeway Volume, V <sub>R</sub> 6010 Freeway Volume, V <sub>R</sub> 300 Freeway	AECOM	AECOM   Freeway/Dir of Travel   I-95 SB   Seg 10-Merge from Jurisdiction   Seg 10-Merge from Jurisdiction   Analysis Year   2020 Build 2A    SW 10th Street SIMR   Freeway Number of Lanes, N   4   Acceleration Lane Length, L <sub>A</sub>   600   Deceleration Lane Length L <sub>D</sub>   Freeway Volume, V <sub>F</sub>   6010   Ramp Volume, V <sub>F</sub>   6010   Ramp Volume, V <sub>F</sub>   300   Freeway Free-Flow Speed, S <sub>FF</sub>   70.0   Ramp Free-Flow Speed, S <sub>FF</sub>   50.0    Deceleration Lane Length L <sub>D</sub>   Freeway Free-Flow Speed, S <sub>FF</sub>   50.0   Freeway Free-Flow Speed, S <sub>FR</sub>   50.0    Deceleration Lane Length L <sub>D</sub>   Freeway Free-Flow Speed, S <sub>FF</sub>   70.0   Ramp Free-Flow Speed, S <sub>FF</sub>   50.0   Freeway Free-Flow Speed, S <sub>FF</sub>   50.0   Freeway Free-Flow Speed, S <sub>FR</sub>   50	AECOM	AECOM

^ <i>'</i>	.f.,	RAMPS	S AND RAM			RKS	HEET			
General In	tormation			Site Infor						
Analyst	. = c			eeway/Dir of Tr		I-95 SE		_		
Agency or Comp Date Performed	•	ЮM		nction risdiction	,	Seg 11	- Diverge to E	xpress		
Analysis Time P				nalysis Year		2020 B	uild 2A			
	ion SW 10th Street	et SIMR	7.4.	iaiyolo i oai		2020 B	una Z/ (			
Inputs										
Upstream A	 ∖di Ramn	Freeway Numb	per of Lanes, N	4					Downstre	am Adi
Opsileani A	ay ramp	Ramp Number	of Lanes, N	1					Ramp	ani Auj
Yes	✓ On	Acceleration La							·	
		Deceleration La	7.	200					☐ Yes	On
□No	Off	Freeway Volun	5	6310					✓ No	
L <sub>up</sub> =	1150 ft	Ramp Volume,		670				l	-down =	ft
-up	1100 11								down	
V <sub></sub> =	300 veh/h	· ·	Flow Speed, S <sub>FF</sub>	70.0					√ <sub>D</sub> =	veh/h
		Ramp Free-Flo	111	45.0						
<u>Conversio</u>	n to pc/h Un	der Base C	Conditions	1				1		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	/ = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6310	0.95	Level	3	0	0.	985	1.00	67	742
Ramp	670	0.92	Level	2	0		990	1.00		36
UpStream	300	0.92	Level	2	0		990	1.00		29
DownStream		1 0.02	20101		Ť	<del>  "</del>		1.00		
		Merge Areas		•			Div	erge Areas		
Estimation	of v <sub>12</sub>				Estimati	on o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>40</sub> = V	<sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	)P <sub>ED</sub>	
=		ation 13-6 or 1	13_7)		  ==			uation 13-12	. –	8)
- <sub>EQ</sub> =	, -	g Equation(E	*		L <sub>EQ</sub> =		•	-		•
P <sub>FM</sub> =	-	, Equation (E	XIIIDIL 13-0)		P <sub>FD</sub> =			6 using Equ	auon (Exi	IDIL 13-1)
/ <sub>12</sub> =	pc/h	/E /: 40	44 40 47)		V <sub>12</sub> =			pc/h		
/ <sub>3</sub> or V <sub>av34</sub>		(Equation 13-	14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			pc/h (Equa	ition 13-1	4 or 13-17)
	2,700 pc/h? ☐ Y∈							Yes ☑ No		
Is $V_3$ or $V_{av34}$ >	1.5 * V <sub>12</sub> /2		10 10 10		Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.5	* V <sub>12</sub> /2			10 10
f Yes,V <sub>12a</sub> =	pc/h 13-19	(Equation 13-	16, 13-18, or		If Yes,V <sub>12a</sub> =		pc/ 19)	h (Equation	13-16, 13	-18, or 13-
Capacity C		<u>/</u>			Capacity	v Ch				
	Actual	Ca	apacity	LOS F?			Actual	Cap	acity	LOS F?
			•		V <sub>F</sub>		6742	Exhibit 13-8	9600	No
		1 1			$V_{FO} = V_{F}$	- V <sub>-</sub>	6006	Exhibit 13-8	9600	No
V		Fxhihit 13-8				∥ ں ۔	5000	oit 10 0	3000	+
$V_{FO}$		Exhibit 13-8					726	Evhihit 12 10	2100	
	ving Mayor !		<b>***</b>		V <sub>R</sub>		736	Exhibit 13-10	<u> </u>	No
	ring Merge In	nfluence A		Violation?	V <sub>R</sub>	terin	g Diverg	e Influenc	e Area	
Flow Enter	ring Merge II	nfluence A	<b>rea</b> Desirable	Violation?	V <sub>R</sub>	terin	g Diverg	e Influence Max Desirabl	e Area	Violation?
Flow Enter	Actual	nfluence A	Desirable	Violation?	V <sub>R</sub> Flow En	terin	g Diverg Actual	Max Desirabl Exhibit 13-8	e Area e 4400:All	Violation?
Flow Enter V <sub>R12</sub> Level of Se	Actual ervice Deterr	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	V <sub>R</sub> Flow En V <sub>12</sub> Level of	terin	g Diverg Actual 3355 vice Dete	Max Desirable Exhibit 13-8	ce Area e 4400:All	Violation?
V <sub>R12</sub> Level of Se	Actual ervice Deterr + 0.00734 v <sub>R</sub> +	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	V <sub>R</sub> Flow En  V <sub>12</sub> Level of	terin 3 Serv	g Diverg Actual 3355 vice Dete	Max Desirabl Exhibit 13-8	ce Area e 4400:All	Violation?
Flow Enter $V_{R12}$ Level of Set $D_R = 5.475 = 0$ $Q_R = (pc/n)$	Actual  ervice Deteri + 0.00734 v <sub>R</sub> + mi/ln)	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	V <sub>R</sub> Flow En  V <sub>12</sub> Level of  D <sub>R</sub> = 34	<b>terin Serv</b> O <sub>R</sub> = 4	Actual 3355 vice Dete	Max Desirable Exhibit 13-8	ce Area e 4400:All	Violation?
Flow Enter $V_{R12}$ Level of So $D_R = 5.475$ $D_R = (pc/n)$ $OS = (Exhiral extension of the content of the c$	Actual  ervice Deteri + 0.00734 v <sub>R</sub> + ni/ln) ibit 13-2)	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	V <sub>R</sub> Flow En  V <sub>12</sub> Level of  D <sub>R</sub> = 34	<b>terin Serv</b> O <sub>R</sub> = 4	g Diverg Actual 3355 vice Dete	Max Desirable Exhibit 13-8	ce Area e 4400:All	Violation?
Flow Enter $V_{R12}$ Level of So $D_R = 5.475$ $D_R = (pc/n)$ $OS = (Exhiral extension of the content of the c$	Actual  ervice Deteri + 0.00734 v <sub>R</sub> + mi/ln)	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	V <sub>R</sub> Flow En  V <sub>12</sub> Level of  D <sub>R</sub> = 34	Service (Exhibit	g Diverg Actual 3355 vice Dete 4.252 + 0.00 (mi/ln) bit 13-2)	Max Desirable Exhibit 13-8 Permination 1086 V <sub>12</sub> - 0.0	ce Area e 4400:All	Violation?
Flow Enter $V_{R12}$ Level of Set $D_R = 5.475$ $D_R = (pc/m)$ $OS = (Exhipter)$ Speed Det	Actual  ervice Deteri + 0.00734 v <sub>R</sub> + ni/ln) ibit 13-2)	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	V <sub>R</sub> Flow En  V <sub>12</sub> Level of  D <sub>R</sub> = 34  LOS = D  Speed D	terin Serv D <sub>R</sub> = 4 .2 (pc) (Exhib	g Diverg Actual 3355 vice Dete 4.252 + 0.00 (mi/ln) bit 13-2)	Max Desirable Exhibit 13-8 Primination 1086 V <sub>12</sub> - 0.0	ce Area e 4400:All	Violation?
Flow Enter $V_{R12}$ Level of So $D_R = 5.475 \cdot 0$ $D_R = (pc/m)$ $D_R = (Exhinormal Enter En$	Actual  ervice Deteri + 0.00734 v <sub>R</sub> + mi/ln) ibit 13-2) termination bit 13-11)	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	V <sub>R</sub> Flow En  V <sub>12</sub> Level of  D <sub>R</sub> = 34  LOS = D  Speed D  D <sub>s</sub> = 0.3	terin 3 5 Serv 0 <sub>R</sub> = 4 2 (pc, (Exhib) 0eter 364 (E	g Diverg Actual 3355 vice Dete 252 + 0.00 /mi/ln) bit 13-2) mination	Max Desirable Exhibit 13-8  ermination 086 V <sub>12</sub> - 0.0	ce Area e 4400:All	Violation?
Flow Enter $V_{R12}$ Level of So $D_R = 5.475$ $D_R = (pc/m)$ $D_R = (Exhiption of the content of the conten$	Actual  ervice Deteri + 0.00734 v <sub>R</sub> +  mi/ln) ibit 13-2) termination  bit 13-11) (Exhibit 13-11)	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	$V_R$ Flow En $V_{12}$ Level of $D_R = 34$ $LOS = D$ Speed D $D_S = 0.3$ $S_R = 59$	terin  Serv  Calculation  (Exhibit to the content of the content o	Actual 3355 Actual	Max Desirable Exhibit 13-8 Exmination 086 V <sub>12</sub> - 0.0	ce Area e 4400:All	Violation?
Flow Enter $V_{R12}$ Level of So $D_R = 5.475$ $O_R = (pc/n)$ $OS = (Exhinity)$ Speed Det $OS_R = (Exhinity)$	Actual  ervice Deteri + 0.00734 v <sub>R</sub> + mi/ln) ibit 13-2) termination bit 13-11)	nfluence A Max D Exhibit 13-8 mination (i	Desirable  f not F)	Violation?	$V_{R}$ Flow En $V_{12}$ Level of $D_{R} = 34$ $LOS = D$ Speed D $S_{R} = 0.3$ $S_{R} = 59$ $S_{0} = 74$	terin  S Serv  D <sub>R</sub> = 4  .2 (pc  (Exhib)  Deteri  364 (E  .8 mph  .7 mph	Actual 3355 Vice Dete 2.252 + 0.00 Vimi/In) Dit 13-2) Mination Exhibit 13-12	Max Desirable Exhibit 13-8 Exhi	ce Area e 4400:All	Violation?

Job: SW 10th Street SIMR Analyst: AECOM Location: Seg 12: I-95 SB Off-Ramp to Sample Road EB & WB **Analysis Period: PM Peak Hour Analysis Year:** 2020 Build 2A 5.640 4.560 1,080 PHF = 0.95  $v_{fr} =$ **5,640** vph  $V_r =$ **1,080** vph  $V_f =$ 4.560 3% **Upstream Freeway Tr % =** 2% Ramp Tr % = 3% Downstream Freeway Tr % =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ Freeway f<sub>HV</sub> = 0.985 **Ramp f**<sub>HV</sub> =  $1/(1+P_T(E_{T}-1)+P_R(E_{R}-1)) =$ 0.9901 flat terrain  $E_{T} =$ 1.5 RV % = 0 Driver Population adj.  $f_P =$ 1.000  $V_{fr} =$  $=v_{fr}/(PHF)(f_{HV})(f_{P})=$ 6,026 pc/h  $V_r = = v_r/(PHF)(f_{HV})(f_P) =$ 1,148 pc/h  $V_f =$  $=V_f/(PHF)(f_{HV})(f_P)=$ 4,872 pc/h No. lanes upstream of ramp N =**Average Freeway Density Upstream of Diverge (see Equation 13-26):**  $D = 0.0175 (V_{fr}/N) =$ 26.4 pc/In LOS in the Diverge Area (from Density and Exhibit 13-2) = C No. Ln Capacity Check (see Exhibits 13-2, 13-8 and 13.10) Maximum Actual LOS F? Fwy upstream of ramp (assume 70 mph free-flow speed) = 9,600 6,026 No 3 Fwy downstream of ramp (assume 70 mph free-flow speed) = 4,872 No 7,200 1 Capacity on Off-Ramp (assume 45 mph free-flow speed) = 2,100 1,148 No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 13-E 2020 Bui	Bet Off & On Ramps
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4560	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	
DDHV = AADTX K X D		ven/n	Grade % Length Up/Down %	mi	
Calculate Flow Adjust	ments		·		
	1.00		F	1.2	
f <sub>p</sub>  E <sub>T</sub>	1.50		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	0.985	
	1.0		111		
Speed Inputs			Calc Speed Adj and FFS	•	
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	70.0	ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS	i	mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS)  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> ) 1624 67.9 23.9 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	$f_{HV} \times f_p$ )	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 free	-	$E_R$ - Exhibits 11-10, 11-12 $E_T$ - Exhibits 11-10, 11-11, 11- $f_p$ - Page 11-18 LOS, S, FFS, $v_p$ - Exhibits 11-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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			REEWAY	' WEAVI	NG WOR	RKSHEE	<u>T                                    </u>		
Genera	l Informati	on			Site Info	rmation			
Analyst Agency/Cor Date Perfor Analysis Tir	med	AECO PM	М		Freeway/Dir Weaving Seg Analysis Yea	gment Locati		SB 4- Bet Samp Build 2A	le & Copans
Project Des	cription SW 10t	h Street SIMF	₹						
Inputs					•				
Weaving se Freeway fre	imber of lanes, N gment length, L ee-flow speed, Fl	S S		2520ft 70 mph	Segment type Freeway min Freeway max Terrain type	imum speed			Freeway 15 2400 Leve
Conver	sions to po	1		1	1		Ι,	Ι,	( (1)
\ /	V (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	3915	0.95	3	0	1.5	1.2	0.985	1.00	4183
V <sub>RF</sub>	1380	0.92	2	0	1.5	1.2	0.990	1.00	1515
V <sub>FR</sub>	645	0.92	2	0	1.5	1.2	0.990	1.00	708
$V_{RR}$	0	0.95	0	0	1.5	1.2	1.000	1.00	0
$V_{NW}$	4183							V =	6406
V <sub>W</sub>	2223								
VR	0.347	<u> </u>	4.						
	ration Cha		tics		l				2222   11
	naneuver lanes,	$N_{WL}$		2 lc		-	hanges, LC <sub>MIN</sub>	I	2223 lc/h
	e density, ID			0.7 int/mi	Weaving lan		••		2672 lc/h
	F lane changes,	T G			Non-weaving				1457 lc/h
	R lane changes,	111		1 lc/pc	Total lane ch	,			4129 lc/h
	R lane changes				Non-weaving				738
Weavin	g Segmen	t Speed,	Density, I	_evel of	·				
•	egment flow rate			6323 veh/h	Weaving inte	•			0.334
	egment capacity	C <sub>w</sub>		6814 veh/h	Weaving seg Average wea				49.3 mph
•	egment v/c ratio	D	0.4	0.928		• .	**		56.2 mph
_	egment density,	ט	32	2.5 pc/mi/ln	Average non				46.3 mph
Level of Se	i vice, LUS			D	Maximum we	eaving length	า, L <sub>MAX</sub>		6094 ft

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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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			REEWAY	WEAV	NG WOR	RKSHEE			
Genera	l Informati	on			Site Info	rmation			
Analyst Agency/Co Date Perfo Analysis Ti	rmed	AECON AM	Л		Freeway/Dir Weaving Seg Analysis Yea	gment Locati		IB -Bet Copans Build 2A	& Sample
Project De	scription SW 10t	h Street SIMF	?						
Inputs					•				
Weaving n Weaving s	onfiguration umber of lanes, N egment length, L ee-flow speed, Fl	3		One-Sided 4 2380ft 70 mph	Segment typo Freeway min Freeway max Terrain type	imum speed			Freeway 19 2400 Leve
Conve	sions to po	c/h Unde	r Base Co	ndition	S				
	V (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	ER	$f_{HV}$	fp	v (pc/h)
$V_{FF}$	4420	0.95	3	0	1.5	1.2	0.985	1.00	4722
$V_{RF}$	420	0.92	2	0	1.5	1.2	0.990	1.00	461
$V_{FR}$	980	0.92	2	0	1.5	1.2	0.990	1.00	1076
$V_RR$	0	0.95	0	0	1.5	1.2	1.000	1.00	0
$V_{NW}$	4722							V =	6259
$V_W$	1537								
VR	0.246								
Config	uration Cha	aracteris	tics						
Minimum r	naneuver lanes,	$N_{WL}$		2 lc	Minimum we	aving lane c	hanges, LC <sub>MIN</sub>	I	1537 lc/h
_	e density, ID			0.7 int/mi	Weaving lan	e changes, L	.C <sub>w</sub>		1972 lc/h
	RF lane changes,	IM		1 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		1492 lc/h
	R lane changes,	111		1 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		3464 lc/h
Minimum F	RR lane changes	, LC <sub>RR</sub>		lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		787
Weavir	ig Segmen	t Speed,	Density, I	_evel of	Service,	and Cap	acity		
•	egment flow rate			6175 veh/h	Weaving inte	•			0.304
	egment capacity	C <sub>W</sub>		8666 veh/h	Weaving seg				52.7 mph
_	egment v/c ratio	D	24	0.712	Average wea		**		57.2 mph
	egment density,	ט	29	9.7 pc/mi/ln	Average non	• .	1444		51.4 mph
Level OI S	ervice, LOS			D	Maximum we	eaving length	I, L <sub>MAX</sub>		5007 ft

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

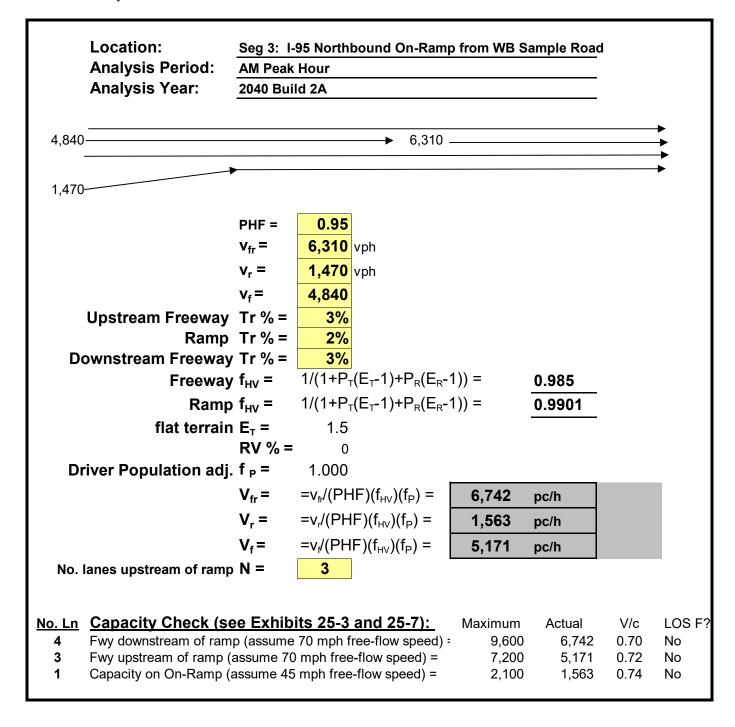
	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 2-Be Sample 2040 Bui	et Off & On from
Project Description SW 10th	Street SIMR		•		
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4840	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 Up/Down %	0.95 3 0 Level mi	
Calculate Flow Adjustn	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	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 I	Measures		Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	( 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 $v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ Required Number of Lanes, N	$f_{HV} \times f_p$ )	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	-	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		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



		MPS AND	RAMP JUN			<u>El</u>			
General Infor	mation			Site Infor					
Analyst				eeway/Dir of Ti		95 NB			
Agency or Company	AEC	OM		Inction	S	eg 4-On from E	Ф		
Date Performed Analysis Time Perioc	d AM			ırisdiction nalysis Year	20	040 Build 2A			
Project Description		et SIMR	7.0	laryolo i oai		040 Dulla ZA			
Inputs	011 1041 04100								
-		Freeway Num	ber of Lanes, N	4				D	A -I:
Upstream Adj Ramp		Ramp Number	•	1				Downstre Ramp	am Adj
Yes Or	1	1 '	ane Length, L <sub>A</sub>	1500					
_			,,	1300				✓ Yes	☐ On
☑ No ☐ Of	f		ane Length L <sub>D</sub>	0040				☐ No	✓ Off
= ft		Freeway Volui		6310				l. =	2950 ft
<sub>-up</sub> = ft		Ramp Volume		860				L <sub>down</sub> =	2550 It
√ <sub>u</sub> = veh/h	1		-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	310 veh/h
u	•	Ramp Free-Flo	ow Speed, S <sub>FR</sub>	50.0				٥	
Conversion to	o pc/h Un	der Base (	Conditions						
(pc/h)	(\/oh/hr\	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
 Freeway	(Veh/hr) 6310	0.95	Level	3	0	0.985	1.00		6742
Ramp	860	0.93		2	0	0.983	1.00	'	944
UpStream	000	0.92	Level		U	0.990	1.00		944
DownStream	310	0.92	Level	2	0	0.990	1.00		340
20111104104111	<u> </u>	Merge Areas	20101		Ť		Diverge Areas	<u> </u>	0.10
Estimation of					Estimation				
	V <sub>12</sub> = V <sub>F</sub>	(P)			1				
_		ation 13-6 or	. 10 7)			.=	$V_R + (V_F - V_R)$		
- <sub>EQ</sub> =	• •		•		L <sub>EQ</sub> =		(Equation 13-	12 or 13-1	13)
) = / =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equatio	n (Exhibit 1	3-7)
′ <sub>12</sub> =	673 p		10.1110		V <sub>12</sub> =		pc/h		
/ <sub>3</sub> or V <sub>av34</sub>	3034 17)	pc/h (Equation	on 13-14 or 13-		$V_3$ or $V_{av34}$		pc/h (Equation 1	3-14 or 13-	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	s 🗆 No			Is V <sub>3</sub> or V <sub>av34</sub>	> 2,700 pc/h? [	∃Yes □ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 '					Is V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V <sub>12</sub> /2 [	☐Yes ☐ No		
			on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
Yes,V <sub>12a</sub> =		13-19)	511 10 10, 10		11 100, v <sub>12a</sub>	1	3-19)		
Capacity Che	ecks				Capacity	Checks			
	Actual	C	apacity	LOS F?		Actual	Car	oacity	LOS F?
					$V_{F}$		Exhibit 13-	8	
$V_{FO}$	7686	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	$V_R$	Exhibit 13-	8	
FO					V <sub>R</sub>		Exhibit 13	-	
							10		
	1			1	Flow Enter		rge Influen		W .
Flow Entering	Actual	<del>                                     </del>	Desirable	Violation?	.,	Actual	Max Des	irable	Violation?
		Exhibit 13-8	4600:All	No	V <sub>12</sub>		Exhibit 13-8		
V <sub>R12</sub>	3963		if not E)		Level of S	Service De	terminatio	n (if not	t F)
Flow Entering  V <sub>R12</sub> Level of Serv		nination (i	THOLF			4.050 . 0	.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
V <sub>R12</sub> Level of Serv	ice Detern	<b>mination (i</b> 0.0078 V <sub>12</sub> - 0.0			D	<sub>R</sub> = 4.252 + 0	12		
V <sub>R12</sub> Level of Serv D <sub>R</sub> = 5.475 +	0.00734 v <sub>R</sub> +	•			1	<sub>R</sub> = 4.252 + 0 /mi/ln)	12		
$V_{R12}$ Level of Serv $D_R = 5.475 + 28.2 \text{ (pc/m}$	0.00734 v <sub>R</sub> +	•			$D_R = (pc)$		12		
$V_{R12}$ Level of Serv $D_R = 5.475 + C_R = 28.2 \text{ (pc/m}$ .OS = D (Exhibit	ice Deterr 0.00734 v <sub>R</sub> + hi/ln) 13-2)	•			D <sub>R</sub> = (pc	/mi/ln)			
$V_{R12}$ Level of Serv $D_R = 5.475 + 28.2 \text{ (pc/m}$ .OS = D (Exhibit	0.00734 v <sub>R</sub> + 0.0074	•			D <sub>R</sub> = (pc, LOS = (Ex <b>Speed De</b>	/mi/ln) thibit 13-2) <b>eterminati</b>			
$V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $O_R = 28.2 \text{ (pc/m}$ $O_R = D \text{ (Exhibit)}$ Speed Determ $M_S = 0.376 \text{ (Exilor)}$	ice Deterr 0.00734 v <sub>R</sub> + 1 ni/ln) 13-2) mination bit 13-11)	•			$D_R = (pc)$ $LOS = (Ex)$ $Speed De$ $D_S = (Ex)$	/mi/ln) thibit 13-2) <b>eterminatio</b> nibit 13-12)			
$V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = 28.2 \text{ (pc/m}$ $D_R = 0.376 \text{ (Exilos)}$ $D_R = 0.376 \text{ (Exilos)}$	ice Deterr 0.00734 v <sub>R</sub> + 1 ni/ln) 13-2) mination bit 13-11) (Exhibit 13-11)	•			$D_R$ = (pc. LOS = (Ex. Speed De D <sub>S</sub> = (Ex. S <sub>R</sub> = mph	/mi/ln) thibit 13-2) etermination hibit 13-12) n (Exhibit 13-12)			
$V_{R12}$ Level of Serv $D_R = 5.475 + 20.0$ $D_R = 28.2 \text{ (pc/m}$ $D_R $	ice Deterr 0.00734 v <sub>R</sub> + 1 ni/ln) 13-2) mination bit 13-11)	•			$D_R$ = (pc. LOS = (Ex Speed De D <sub>S</sub> = (Ext S <sub>R</sub> = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = (pc. LOS = mpt S <sub>0</sub> = mpt S <sub>0</sub> = (pc. LOS = mpt	/mi/ln) thibit 13-2) <b>eterminatio</b> nibit 13-12)			

		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	MC		nction		Seg 5-0	Off to Exp f	rom GPL		
Date Performed Analysis Time Period	d AM			risdiction nalysis Year		2040 B	ild 0.V			
Project Description		t SIMR	Al	iaiysis reai		2040 B	uliu ZA			
Inputs	OVV TOUT OUCC	CONVIC								
		Freeway Num	nber of Lanes, N	4					D	A .!!
Upstream Adj R	amp	Ramp Numbe		1				<b>I</b>	Downstrea Ramp	m Aaj
✓ Yes 🔽	On	· ·	_ane Length, L <sub>Δ</sub>	'						
			Lane Length L <sub>n</sub>	200					Yes	On
□ No □	Off		- 5	200					✓ No	Off
1 - 20	EO #	Freeway Volu	•	7170					l. =	ft
L <sub>up</sub> = 29	50 ft	Ramp Volume	11	310					L <sub>down</sub> =	
V <sub>11</sub> = 86	0 veh/h	•	e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
			low Speed, S <sub>FR</sub>	45.0						
Conversion t		der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		${\sf f}_{\sf HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	7170	0.95	Level	3	0	0.	985	1.00	766	 31
Ramp	310	0.92	Level	2	0		990	1.00	34	0
UpStream	860	0.92	Level	2	0	0.	990	1.00	94	4
DownStream										
		Merge Areas				_		iverge Areas		
Estimation of	<sup>f</sup> v <sub>12</sub>				Estimat	ion o	f v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(1	Equation 13-1	2 or 13-13)	)
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.	436 using Equ	uation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		35	32 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		20	64 pc/h (Equa	ation 13-14	or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	00 pc/h?	s 🗌 No				, <sub>34</sub> > 2,7		Yes <b>☑</b> No		ŕ
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5								Yes <b>☑</b> No		
If Yes,V <sub>12a</sub> =	pc/h (		-16, 13-18, or		If Yes,V <sub>12a</sub> =			c/h (Equation	13-16, 13-	18, or 13-
	13-19)						19	9)		
Capacity Che		1 .		1	Capacit	y Ch		1 ^		1
	Actual		Capacity	LOS F?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		Actual	<del>-  </del>	pacity	LOS F?
					V <sub>F</sub>		7661	Exhibit 13-8	-	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	7321	Exhibit 13-8	+	No
					$V_R$		340	Exhibit 13-10	2100	No
Flow Entering	g Merge In	fluence A	\rea		Flow Er	nterin	g Dive	rge Influen	ce Area	
	Actual	i i	Desirable	Violation?		/	Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3532	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern	nination (	if not F)		Level of	f Serv	∕ice De	terminatio	n (if not l	<del>-</del> )
$D_R = 5.475 + 0.$	00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> ·	- 0.00627 L <sub>A</sub>			$D_R = 4$	1.252 + 0	.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/In	)				$D_R = 32$	2.8 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = D	(Exhil	oit 13-2)			
Speed Deterr	nination				Speed L	Deter	minatio	n		
M <sub>S</sub> = (Exibit 1					D <sub>s</sub> = 0.	.329 (E	xhibit 13-	12)		
l *	nibit 13-11)				1	•	(Exhibit	•		
	nibit 13-11)						(Exhibit	,		
1 '	nibit 13-11)				1	-	(Exhibit	•		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-Se 2040 Bu	outh of Off to 10th
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	5)		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	6860	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	
DDHV = AADTX K X D		ven/n	Grade % Length Up/Down %	mi	
Calculate Flow Adjust	ments		·		
	1.00		F	1.2	
f <sub>p</sub>  E <sub>T</sub>	1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	0.985	
Speed Inputs	7.0		Calc Speed Adj and FFS		
•			Odic Opeca Aaj dila 110		
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	70.0	ramps/mi	TRD Adjustment	70.0	mph
FFS (measured) Base free-flow Speed, BFFS		mph mph	FFS	70.0	mph
•			<b>D</b> . (A))		
LOS and Performance	Measures		Design (N)		
Operational (LOS) 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> ) 1832 65.4 28.0 D	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	$f_{HV} \times f_p$ )	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	-	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		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 7: I-95 NB Off-Ramp to SW 10th St EB & WB **Analysis Period: AM Peak Hour Analysis Year:** 2040 Build 2A 6.860 5,620 1,240 PHF = 0.95  $v_{fr} =$ **6,860** vph  $V_r =$ **1,240** vph  $V_f =$ 5,620 3% **Upstream Freeway Tr % =** 2% Ramp Tr % = 3% Downstream Freeway Tr % =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ Freeway f<sub>HV</sub> = 0.985 **Ramp f**<sub>HV</sub> =  $1/(1+P_T(E_{T}-1)+P_R(E_{R}-1)) =$ 0.9901 flat terrain  $E_{T} =$ 1.5 RV % = 0 Driver Population adj.  $f_P =$ 1.000  $V_{fr} =$  $=v_{fr}/(PHF)(f_{HV})(f_{P})=$ 7,329 pc/h  $V_r = = v_r/(PHF)(f_{HV})(f_P) =$ 1,318 pc/h  $V_f =$  $=V_f/(PHF)(f_{HV})(f_P)=$ 6,005 pc/h No. lanes upstream of ramp N =**Average Freeway Density Upstream of Diverge (see Equation 13-26):**  $D = 0.0175 (V_{fr}/N) =$ 32.1 pc/In LOS in the Diverge Area (from Density and Exhibit 13-2) = No. Ln Capacity Check (see Exhibits 13-2, 13-8 and 13.10) Maximum LOS F? Actual Fwy upstream of ramp (assume 70 mph free-flow speed) = 9,600 7,329 No 3 Fwy downstream of ramp (assume 70 mph free-flow speed) = 6,005 No 7,200 2 Capacity on Off-Ramp (assume 45 mph free-flow speed) = 4,200 1,318 No

	BASIC F	REEWAY SE	GMENTS WORKSHEET				
General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 8-Be 2040 Bu	et Off & Off Ramps ild 2A		
Project Description SW 10th							
✓ Oper.(LOS)			Des.(N)	∐Pla	nning Data		
Flow Inputs					_		
Volume, V AADT Peak-Hr Prop. of AADT, K	5620	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> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985			
Speed Inputs			Calc Speed Adj and FFS				
Lane Width		ft					
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph		
Number of Lanes, N	3		$f_{LC}$		mph		
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph		
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph		
LOS and Performance	Measures		Design (N)				
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N s S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 2002 62.5 32.0 D	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	·	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 freedour 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-		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			RKS	HEET			
General Info	rmation			Site Infor						
Analyst				eeway/Dir of Tr	avel	I-95 NE				
Agency or Compar Date Performed	ny AEC	COM		nction risdiction		Seg 9-	Off to Hillsh	oro EB&WB		
Analysis Time Peri	od AM			alysis Year		2040 E	Build 2A			
Project Description		et SIMR	7.1.	iaryolo i oar		2010 2	Juliu Zi (			
nputs										
Upstream Adj	Ramn	Freeway Num	ber of Lanes, N	3					Downstre	am Adi
opstroam / taj	rtamp	Ramp Numbe	r of Lanes, N	1					Ramp	ani 7 taj
☐Yes	On	Acceleration L	ane Length, L <sub>A</sub>						✓ Yes	<b>☑</b> On
. III.	□ o#		ane Length L <sub>D</sub>	200						
✓ No	Off	Freeway Volu	- 5	5620					☐ No	Off
L <sub>up</sub> =	ft	Ramp Volume		1370					L <sub>down</sub> =	2100 ft
ир			11							
V <sub>u</sub> =	veh/h	-	-Flow Speed, S <sub>FF</sub>	70.0					$V_D =$	1640 veh/h
<u> </u>			ow Speed, S <sub>FR</sub>	45.0						
Conversion		der Base (	Conditions		1		1			
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
reeway	5620	0.95	Level	3	0	0.	.985	1.00	6	005
Ramp	1370	0.92	Level	2	0		.990	1.00		504
UpStream										
DownStream	1640	0.92	Level	2	0	0.	.990	1.00	1	800
		Merge Areas						Diverge Areas		
Estimation	of v <sub>12</sub>				Estimat	ion c	of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )			$V_{12} = V_R + (V_F - V_R)P_{FD}$					
- <sub>EQ</sub> =		ation 13-6 or	13-7)		L <sub>EQ</sub> = (Equation 13-12 or 13-13)					
P <sub>FM</sub> =	, ,	Equation (E	*		P <sub>FD</sub> = 0.541 using Equation (Exhibit 13-7)					
<sub>12</sub> =	pc/h	, Equation (L	zambit 10 0)		$V_{12} = 3938 \text{ pc/h}$					
	•	/Equation 12	-14 or 13-17)					•	ation 10 1	14 05 12 17\
/ <sub>3</sub> or V <sub>av34</sub>			-14 01 13-17)		$V_3$ or $V_{av34}$ 2067 pc/h (Equation 13-14 or 13-17) Is $V_3$ or $V_{av34} > 2,700$ pc/h? $\square$ Yes $\checkmark$ No					
Is $V_3$ or $V_{av34} > 2$ ,					Is $V_3$ or $V_{av34} > 2.7700$ pc/m Yes $\checkmark$ No					
Is $V_3$ or $V_{av34} > 1$ .			-16, 13-18, or		no/h /Equation 12 16 12 19 or 12					
Yes,V <sub>12a</sub> =	13-19		-10, 13-10, 01		If Yes,V <sub>12a</sub> =	=	19	-· · ·	13-10, 1	D-10, UI 13-
Capacity Ch	ecks	,			Capacit	y Ch	ecks	•		
	Actual	С	apacity	LOS F?			Actual	Cap	pacity	LOS F?
					V <sub>F</sub>		6005	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	4501	Exhibit 13-8	7200	No
10					V <sub>R</sub>	IX	1504	Exhibit 13-10	_	No
low Enteri	aa Maraa li	nfluonoo A	r00		Flow Entering Diverge Influence Area					
TOW LINEIN	Actual		Desirable	Violation?	FIOW EI		Actual	Max Desirab		Violation?
V <sub>R12</sub>	7 totaai	Exhibit 13-8	Booliablo	violation.	V <sub>12</sub>	_	3938	Exhibit 13-8	4400:All	No
Level of Ser	vice Deter		if not E)		<del></del>			termination		
D <sub>R</sub> = 5.475 +								.0086 V <sub>12</sub> - 0.0	_ •	1)
		0.0070 V <sub>12</sub> -	0.00027 L <sub>A</sub>					.0000 v <sub>12</sub> - 0.0	009 LD	
$D_R = (pc/mi/ln)$					D <sub>R</sub> = 36.3 (pc/mi/ln)					
LOS = (Exhibit 13-2)					LOS = E (Exhibit 13-2)					
Speed Determination					Speed L					
M <sub>S</sub> = (Exibit 13-11)					$D_s = 0$	.433 (E	xhibit 13-	-12)		
$M_{\rm S} = (Exibit)$	-					$S_R$ = 57.9 mph (Exhibit 13-12)				
-	khibit 13-11)									
S <sub>R</sub> = mph (Ex	khibit 13-11) khibit 13-11)					2.6 mph	n (Exhibit	13-12)		
$S_R$ = mph (Ex	•				$S_0 = 72$		n (Exhibit n (Exhibit	•		

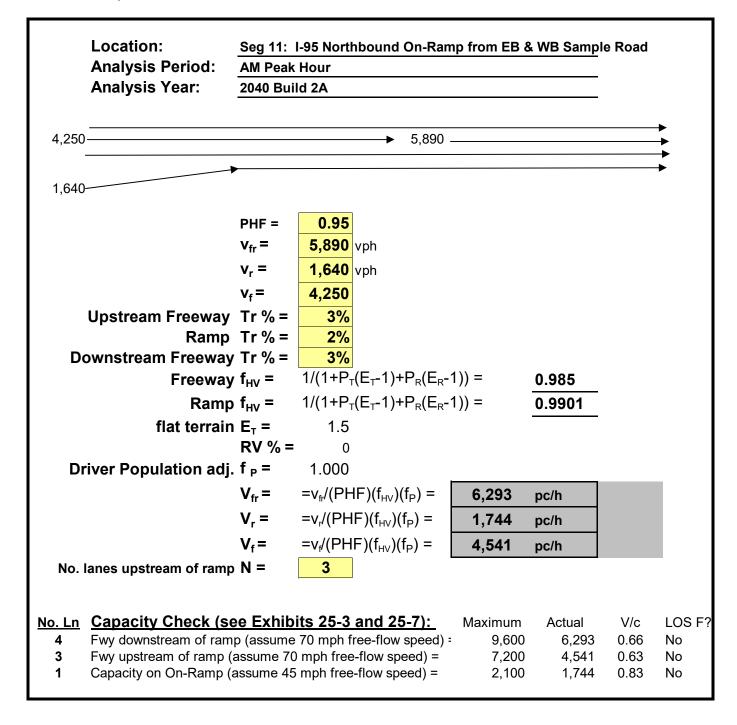
	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 10-E 2040 Bu	Bet Off & On Ramps
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					_
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4250	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	
DDIIV - AADI XIXD		VG11/11	Up/Down %	1111	
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			
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)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	× f <sub>HV</sub> × f <sub>p</sub> ) 1514 68.9 22.0 C	pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ 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 freeur 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 11-5		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



	BASIC F	REEWAY SE	GMENTS WORKSHEET				
General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 12-E 2040 Bu	Bet On Ramps		
	th Street SIMR		,		···		
✓ Oper.(LOS			Des.(N)	□Pla	nning Data		
Flow Inputs							
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	5890	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			
			Up/Down %				
Calculate Flow Adjust	ments						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.985			
Speed Inputs			Calc Speed Adj and FFS				
Lane Width		ft					
Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	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)				
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ Required Number of Lanes, N	$f_{HV} \times f_p$ )	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	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11		

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			FREEWAY	WEAV	NG WOR	RKSHEE	T		
Genera	l Informati	on			Site Info	rmation			
Analyst Agency/Cor Date Perfor Analysis Tir	med	AECO AM	M		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 13-Bet On & Off to Exp Analysis Year 2040 Build 2A				Off to Exp
Project Des	cription SW 10t	h Street SIMI	₹		l				
Inputs									
Weaving se Freeway fre	mber of lanes, f gment length, L e-flow speed, F	s FS		4600ft 70 mph	Segment type Freeway min Freeway max Terrain type	imum speed			Freeway 15 2400 Leve
Conver	sions to po	1		1			Τ,	Τ,	( ")
. ,	V (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	5140	0.95	3	0	1.5	1.2	0.985	1.00	5492
$V_{RF}$	1050	0.92	2	0	1.5	1.2	0.990	1.00	1153
$V_{FR}$	750	0.92	2	0	1.5	1.2	0.990	1.00	823
$V_{RR}$	290	0.92	2	0	1.5	1.2	0.990	1.00	318
V <sub>NW</sub>	7468				V =				7786
$V_W$	318								
VR	0.041								
Configu	ration Cha	aracteris	tics		1				
Minimum m	aneuver lanes,	$N_{WL}$		0 lc	Minimum weaving lane changes, LC <sub>MIN</sub>				954 lc/h
•	e density, ID			0.7 int/mi	Weaving lane changes, LC <sub>W</sub>				1580 lc/h
	F lane changes	INI		0 lc/pc	Non-weaving lane changes, LC <sub>NW</sub>				3354 lc/h
Minimum F	R lane changes	, LC <sub>FR</sub>		0 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4934 lc/h
Minimum R	R lane changes	, LC <sub>RR</sub>		3 lc/pc	Non-weaving vehicle index, I <sub>NW</sub> 240				
Weavin	g Segmen	t Speed,	Density, I	_evel of	Service,	and Cap	oacity		
Weaving segment flow rate, v 7683 veh/h							0.239		
Treating deginent supersty, o <sub>w</sub>				1				54.0 mph	
Weaving segment viciatio 0.000								59.4 mph	
						53.8 mph			
Level of Service, LOS E					Maximum weaving length, L <sub>MAX</sub> 6107 f				

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

	BASIC F	REEWAY SE	GMENTS WORKSHEET				
General Information			Site Information				
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 14-N 2040 Bui	North of Hillsboro		
	th Street SIMR		,				
✓ Oper.(LOS	5)		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	6190	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			
			Up/Down %				
Calculate Flow Adjust	ments						
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T-1)+P_R(E_R-1)]$	1.2 0.985			
Speed Inputs			Calc Speed Adj and FFS				
Lane Width		ft					
Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	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)				
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS		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 h	S - Speed D - Density FFS - Free-flow BFFS - Base freedour 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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11		

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		F	REEWAY	/ WEAVI	NG WOR	KSHEE	Т			
Genera	al Information				Site Information					
Analyst Agency/Co Date Perfo Analysis Ti	rmed	AECON PM	Л	Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 1-Bet Copans & Sample Analysis Year 2040 Build 2A						
Project De	scription SW 10tl	n Street SIMR	1							
Inputs					1					
Weaving n Weaving s Freeway fr	onfiguration umber of lanes, N egment length, L <sub>s</sub> ee-flow speed, FF	S FS		2380ft 70 mph	Segment typo Freeway min Freeway max Terrain type	imum speed			Freeway 15 2400 Leve	
Conve	rsions to po		1	1	1		1 ,	1 ,	( ")	
	V (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)	
V <sub>FF</sub>	4145	0.95	3	0	1.5	1.2	0.985	1.00	4429	
$V_{RF}$	495	0.92	2	0	1.5	1.2	0.990	1.00	543	
$V_{FR}$	1820	0.92	2	0	1.5	1.2	0.990	1.00	1998	
$V_{RR}$	0	0.95	0	0	1.5	1.2	1.000	1.00	0	
$V_{NW}$	4429				V = 6				6970	
$V_W$	2541									
VR	0.365									
Config	uration Cha	aracterist	ics		1					
Minimum r	maneuver lanes, <b>i</b>	$V_WL$		2 lc	Minimum weaving lane changes, LC <sub>MIN</sub> Weaving lane changes, LC <sub>M</sub>					
_	ge density, ID			0.7 int/mi	Weaving lane changes, LC <sub>W</sub>					
	RF lane changes,	IN		1 lc/pc	Non-weaving lane changes, LC <sub>NW</sub>					
	FR lane changes,	111		1 lc/pc	Total lane changes, LC <sub>ALL</sub>					
Minimum I	RR lane changes,	$LC_{RR}$		lc/pc	Non-weaving vehicle index, I <sub>NW</sub> 78					
Weavir	ng Segment	Speed,	Density, I	_evel of	Service,	and Cap	oacity			
Weaving segment flow rate, v 6880 veh/h Weaving segment capacity, c <sub>w</sub> 6486 veh/h			Weaving segment speed, S				mph			
vveaving segment v/c ratio								mph		
_	segment density, I	J		pc/mi/ln					mph	
	ervice, LOS			F	Maximum we	eaving length	ı, L <sub>MAX</sub>		6287 ft	
Notes										

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a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

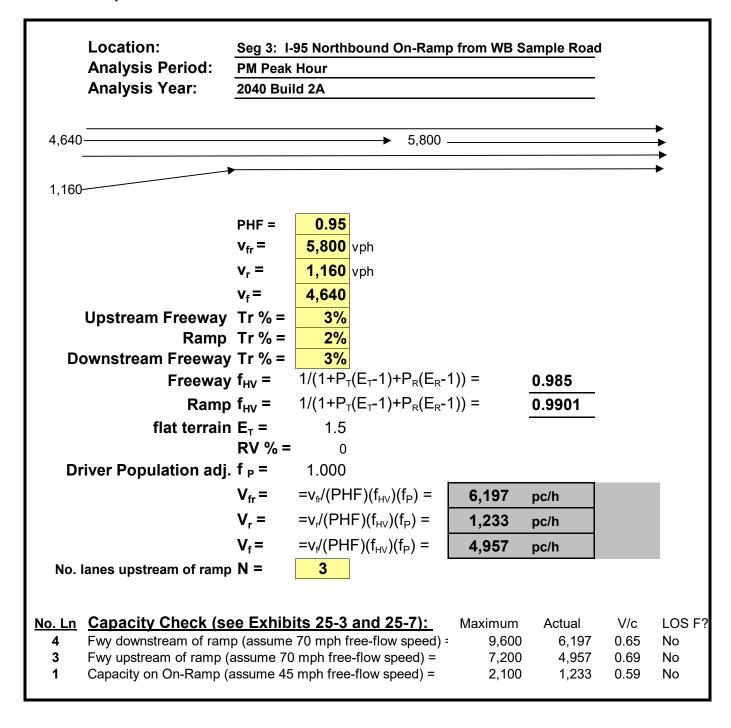
	BASIC F	REEWAY SE	GMENTS WORKSHEET			
General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 2-Bet Off & On from Sample 2040 Build 2A		
Project Description SW 10th	Street SIMR		•			
✓ Oper.(LOS)			Des.(N)	□Pla	nning Data	
Flow Inputs						
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	4640	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 Up/Down %	0.95 3 0 Level mi		
Calculate Flow Adjustm	nents					
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2 0.985		
Speed Inputs			Calc Speed Adj and FFS	3		
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>LW</sub> f <sub>LC</sub> TRD Adjustment FFS	70.0	mph mph mph mph	
Base free-flow Speed, BFFS		mph				
LOS and Performance I	Measures		Design (N)			
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S LOS	( f <sub>HV</sub> x f <sub>p</sub> ) 1652 67.6 24.4 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	$f_{HV} \times f_p$ )	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	-	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		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



	RA	MPS AND	RAMP JUN	CTIONS W	ORKSHE	EET				
General Info				Site Infor						
Analyst			Fr	eeway/Dir of Tr	avel	I-95 N	IB			
Agency or Company	y AEC	OM		ınction			-On from Ex	(p		
Date Performed	,			Jurisdiction				r		
Analysis Time Perio	od PM		Ar	Analysis Year 2040 Build 2A						
Project Description	SW 10th Stree	et SIMR								
Inputs										
l Upstream Adj Ramp	)	Freeway Num	nber of Lanes, N	4					Downstre	am Adi
opoliodiii 7 dij 1 diiip	,	Ramp Numbe	er of Lanes, N	1					Ramp	ani 7 taj
☐ Yes ☐ O	n	Acceleration I	Lane Length, L <sub>Δ</sub>	1500						П <b>о</b>
_		1	Lane Length L <sub>D</sub>	1000					✓ Yes	☐ On
✓ No □ O	ff	1		5000					☐ No	✓ Off
		Freeway Volu	•	5800					. =	2950 ft
L <sub>up</sub> = ft		Ramp Volume	11	730					L <sub>down</sub> =	2930 II
  V <sub>u</sub> = veh/l	h	Freeway Free	e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	420 veh/h
veri/i	''	Ramp Free-F	low Speed, S <sub>FR</sub>	50.0					0	120 7011/11
Conversion	to pc/h Un	der Base	Conditions						•	
(pc/h)	V	PHF	Terrain	%Truck	%Rv		f <sub>HV</sub>	f <sub>p</sub>	v = V/PHI	F x f <sub>HV</sub> x f <sub>p</sub>
. ,	(Veh/hr)				ļ	-				<u>'</u>
Freeway	5800	0.95	Level	3	0	_	0.985	1.00	+	6197
Ramp	730	0.92	Level	2	0	(	0.990	1.00		801
UpStream		1	<del></del>			+				
DownStream	420	0.92	Level	2	0	(	0.990	1.00		461
Estimation o		Merge Areas			Ectimoti	ion	of v	Diverge Areas		
Estimation o					Estimati	1011	01 V <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>40</sub> = '	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	s)Per	
L <sub>EQ</sub> =	(Equ	ation 13-6 o	r 13-7)		  =			Equation 13		13)
P <sub>FM</sub> =	0.118	using Equa	tion (Exhibit 13-6)	)	L <sub>EQ</sub> = P =			using Equation		•
V <sub>12</sub> =	729 p	oc/h	,		P <sub>FD</sub> =				ו ווטוו וב	J-1)
			on 13-14 or 13-		V <sub>12</sub> =			pc/h		4-1
V <sub>3</sub> or V <sub>av34</sub>	17)				V <sub>3</sub> or V <sub>av34</sub>	_		pc/h (Equation		17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,7	00 pc/h? 🗹 Ye	s 🗌 No				٠.		□Yes □ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5	* V <sub>12</sub> /2	es 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>34</sub> > 1.		☐Yes ☐ No		
If Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =	:		pc/h (Equatic 3-19)	on 13-16, 1	3-18, or
124		13-19)						S-19)		
Capacity Ch	ecks				Capacity	y Cł	necks			
	Actual	(	Capacity	LOS F?			Actual	_	pacity	LOS F?
					$V_{F}$			Exhibit 13-	-8	
$V_{FO}$	6998	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V <sub>R</sub>		Exhibit 13-	-8	
FO					V <sub>R</sub>			Exhibit 13	3-	
								10		
Flow Enterin	<del>-</del>	0		T	Flow En	teri		rge Influei		4.
	Actual	1 1	Desirable	Violation?		+	Actual	Max Des	sirable	Violation?
V <sub>R12</sub>	3576	Exhibit 13-8	4600:All	No	V <sub>12</sub>			Exhibit 13-8		
Level of Serv								terminatio	•	t <b>F</b> )
$D_{R} = \overline{5.475}$	+ 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> = 25.1 (pc/r	mi/ln)				$D_R = (p$	c/mi/	/ln)			
LOS = C (Exhibit	•						it 13-2)			
Speed Deter					Speed D					
					1 '			<i>/</i> 11		
,	ribit 13-11)						13-12)			
$S_R$ = 61.3 mph (Exhibit 13-11) $S_R$ = mph (Exhibit 13-12)										
	(Exhibit 13-11)				°	ph (Ex	(hibit 13-12)			
S = 63.4 mph	(Exhibit 13-13)				S = m	ph (Ex	(hibit 13-13)			
what @ 2016 I Imis compile :	of Florida, All Dia	dete December				NA			0	tod: 6/17/2020

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		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel	I-95 NB				
Agency or Company	AEC	MC		nction		Seg 5-0	Off to Exp fro	om GPL		
Date Performed	. 514			risdiction		0040 B	"			
Analysis Time Period Project Description		+ CIMD	Ar	nalysis Year		2040 B	uild 2A			
Inputs	SW TUITI SHEE	USIIVIK								
		Freeway Num	nber of Lanes, N	4						
Upstream Adj R	amp	•	er of Lanes, N	1					Downstrea Ramp	m Adj
✓ Yes	On	i i		ı						
			Lane Length, L <sub>A</sub>	000					Yes	On
□No□	Off		Lane Length L <sub>D</sub>	200					✓ No	Off
	50 ft	Freeway Volu		6530					l =	ft
L <sub>up</sub> = 29	50 ft	Ramp Volume		420					L <sub>down</sub> =	10
V <sub>11</sub> = 73	0 veh/h		e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
- u	0 1011/11	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					D	
Conversion to	o pc/h Und	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	6530	0.95	Level	3	0	_	985	1.00	697	<u>.                                    </u>
Ramp	420	0.92	Level	2	0	_	990	1.00	46	1
UpStream	730	0.92	Level	2	0	_	990	1.00	80	1
DownStream										
		Merge Areas						verge Areas		
Estimation of	v <sub>12</sub>				Estimati	ion o	f v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					$V_{12} = 0$	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	quation 13-1	2 or 13-13)	
P <sub>FM</sub> =	using	Equation (	Exhibit 13-6)		P <sub>FD</sub> =		0.4	36 using Equ	ıation (Exhib	oit 13-7)
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		330	2 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		183	7 pc/h (Equa	ation 13-14	or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h?	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	34 > 2,70	00 pc/h? 🔲	Yes ☑ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	3 <sub>4</sub> > 1.5	* V <sub>12</sub> /2	Yes ✓ No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub> =	:		/h (Equation	13-16, 13-	18, or 13-
	13-19)						19			
Capacity Che	·	1 (	`anasit.	LOS F?	Capacity	y Cne		Con	a a situ	LIGOTO
	Actual		Capacity	LUSF?	V <sub>F</sub>		Actual 6977	Exhibit 13-8	pacity 9600	LOS F?
		E 1 11 11 40 0							_	No
V <sub>FO</sub>		Exhibit 13-8			$V_{FO} = V_{F}$	- v <sub>R</sub>	6516	Exhibit 13-8	+	No
					V <sub>R</sub>		461	Exhibit 13-10	2100	No
Flow Entering		-		T	Flow En			ge Influenc		
	Actual	1	Desirable	Violation?			ctual	Max Desirab		Violation?
V <sub>R12</sub>	. 5	Exhibit 13-8			V <sub>12</sub>		302	Exhibit 13-8	4400:All	No No
Level of Serv					1			ermination	_	<del>-)</del>
$D_R = 5.475 + 0.0$		0.0078 V <sub>12</sub> ·	- 0.00627 L <sub>A</sub>					0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln	)				l ''	).8 (pc/	mi/ln)			
LOS = (Exhibit <sup>*</sup>	,				LOS = D	(Exhib	oit 13-2)			
Speed Detern	nination				Speed D	Deter	minatio	า		
M <sub>S</sub> = (Exibit 13	3-11)				,	339 (E	khibit 13-1	2)		
_	ibit 13-11)				$S_R = 60$	).5 mph	(Exhibit 1	3-12)		
	ibit 13-11)				$S_0 = 73$	3.5 mph	(Exhibit 1	3-12)		
1 *	ibit 13-13)				S = 66	6.7 mph	(Exhibit 1	3-13)		
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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 6-Sc 2040 Bu	outh of Off to 10th ild 2A
· '	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	∐Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	6110	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	
			Up/Down %		
Calculate Flow Adjust	ments				
f <sub>p</sub>	1.00		E <sub>R</sub>	1.2	
P  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	<u> </u>	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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	i	mph			·
LOS and Performance	Measures		Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	× f <sub>HV</sub> × f <sub>p</sub> ) 1632 67.8 24.1 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	$f_{HV} \times f_p)$	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 freedour 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-		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 7: I-95 NB Off-Ramp to SW 10th St EB & WB **Analysis Period: PM Peak Hour Analysis Year:** 2040 Build 2A **4**,910 6.110 1,200 PHF = 0.95  $v_{fr} =$ **6,110** vph  $V_r =$ **1,200** vph  $V_f =$ 4.910 3% Upstream Freeway Tr % = 2% Ramp Tr % = 3% Downstream Freeway Tr % =  $1/(1+P_T(E_T-1)+P_R(E_R-1)) =$ Freeway f<sub>HV</sub> = 0.985 **Ramp f**<sub>HV</sub> =  $1/(1+P_T(E_{T}-1)+P_R(E_{R}-1)) =$ 0.9901 flat terrain  $E_{T} =$ 1.5 RV % = 0 Driver Population adj.  $f_P =$ 1.000  $V_{fr} =$  $=v_{fr}/(PHF)(f_{HV})(f_{P})=$ 6,528 pc/h  $V_r = = = V_r/(PHF)(f_{HV})(f_P) =$ 1,276 pc/h  $V_f =$  $=V_f/(PHF)(f_{HV})(f_P)=$ 5,246 pc/h No. lanes upstream of ramp N =**Average Freeway Density Upstream of Diverge (see Equation 13-26):**  $D = 0.0175 (V_{fr}/N) =$ 28.6 pc/ln LOS in the Diverge Area (from Density and Exhibit 13-2) = No. Ln Capacity Check (see Exhibits 13-2, 13-8 and 13.10) Maximum LOS F? Actual Fwy upstream of ramp (assume 70 mph free-flow speed) = 9,600 6,528 No 3 Fwy downstream of ramp (assume 70 mph free-flow speed) = 5,246 No 7,200 2 Capacity on Off-Ramp (assume 45 mph free-flow speed) = 4,200 1,276 No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 8-Be 2040 Bu	et Off & Off Ramps ild 2A
Project Description SW 10th			2 (41)		. 5.
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs Volume, V AADT Peak-Hr Prop. of AADT, K	4910	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> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured) Base free-flow Speed, BFFS	70.0	mph mph	FFS	70.0	mph
LOS and Performance	Measures		Design (N)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N s  S  D = v <sub>p</sub> / S  LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1749 66.5 26.3 D	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	·	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	-	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-		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 WC	RKS	HEET			
General Infor	mation			Site Infor	mation					
Analyst Agency or Company Date Performed	AEC	OM	Ju	eeway/Dir of Tr inction irisdiction	avel	I-95 NE Seg 9-0		oro EB&WB		
Analysis Time Period	d PM			nalysis Year		2040 B	uild 2A			
Project Description		t SIMR		, ,						
Inputs										
Upstream Adj R	lamp	,	nber of Lanes, N er of Lanes, N	3					Downstrea Ramp	m Adj
□Yes□	On	· ·	ane Length, L <sub>A</sub>	'					✓ Yes	<b>☑</b> On
✓ No	Off		Lane Length L <sub>D</sub>	200					 □ No	Off
L <sub>up</sub> = f	it	Freeway Volu Ramp Volume		4910 1360					L <sub>down</sub> =	2100 ft
		1	e-Flow Speed, S <sub>ee</sub>	70.0					domi	
V <sub>u</sub> = v	eh/h	•	low Speed, S <sub>FR</sub>	45.0					V <sub>D</sub> =	1800 veh/h
Conversion t	o pc/h Und		110							
(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	4910	0.95	Level	3	0	0.	985	1.00	524	46
Ramp	1360	0.92	Level	2	0	0.	990	1.00	149	93
UpStream	4000	0.00				+	000	4.00	40.	70
DownStream	1800	0.92 Merge Areas	Level	2	0	0.	990	1.00 Diverge Areas	197	76
Estimation of		merge Areas			Estimat	ion o		iverge Aleas		
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>=+</sub> , )						V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	.)P	
L <sub>EQ</sub> =		tion 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1		•
P <sub>FM</sub> =	, ,	Equation (	*		P <sub>FD</sub> =		,	560 using Equ	•	
V <sub>12</sub> =	pc/h	_4			V <sub>12</sub> =			95 pc/h	action (Exim	J. 10 1 /
V <sub>3</sub> or V <sub>av34</sub>	•	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>			51 pc/h (Equa	ation 13-14	or 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			- ,			<sub>.24</sub> > 2,7		Yes ☑ No		,
Is $V_3$ or $V_{av34} > 1.5$								Yes ☑ No		
If Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub> :			c/h (Equation	13-16, 13-	18, or 13-
Capacity Che	ecks				Capacit	y Ch	ecks			
	Actual		Capacity	LOS F?			Actual	Ca	pacity	LOS F?
					V <sub>F</sub>		5246	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	3753	Exhibit 13-8	7200	No
					V <sub>R</sub>		1493	Exhibit 13-10	2100	No
Flow Entering	g Merge In	fluence A	\rea		Flow Er	nterin	g Diver	ge Influen		
	Actual	i i	Desirable	Violation?		_	Actual	Max Desirab		Violation?
V <sub>R12</sub>	<u> </u>	Exhibit 13-8			V <sub>12</sub>		3595	Exhibit 13-8	4400:All	No
Level of Serv					+			termination		<del>-)</del>
$D_R = 5.475 + 0.00$	• • •	0.0078 V <sub>12</sub> ·	- 0.00627 L <sub>A</sub>					.0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/ln LOS = (Exhibit	,				I ''	3.4 (pc	•			
· ` ` · · · · · · · · · · · · · · · · ·						•	oit 13-2)	-		
Speed Deterr M <sub>S</sub> = (Exibit 1					Speed $D_s = 0$		<i>minatio</i> xhibit 13-			
1 *	nibit 13-11)				1	•	(Exhibit	•		
	nibit 13-11)						(Exhibit	•		
1 7	nibit 13-13)				1 *	2.2 mph	(Exhibit	13-13)		
vriaht © 2016 Universit	v of Florida All R	iahts Reserved			HCS2010 <sup>TI</sup>		•		Canaratad: 6	5/17/2020 2:5°

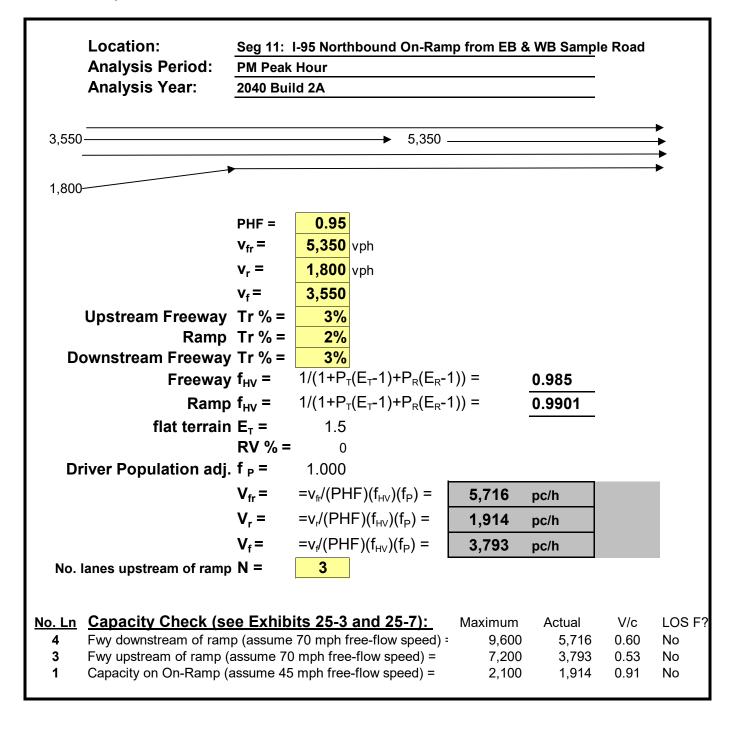
	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 NB Seg 10-E 2040 Bu	Bet Off & On Ramps ild 2A
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	3550	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				
	1.00		E <sub>R</sub>	1.2	
f <sub>p</sub>  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	<u> </u>	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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)  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> ) 1264 70.0 18.1 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	$f_{HV} \times f_p$ )	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 freedour 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		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



	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 12-E 2040 Bul	Bet On Ramps
	th Street SIMR		<b>,</b>		···
✓ 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	5350	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	
			Up/Down %		
Calculate Flow Adjust	ments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	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)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS		pc/h/ln mph pc/mi/ln	Design (N) Design LOS $v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ Required Number of Lanes, N	$f_{HV} \times f_p$ )	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 free	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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			FREEWAY	WEAV	NG WOR	RKSHEE	T		
Genera	l Informati	on			Site Info	rmation			
Analyst Agency/Co Date Perfor Analysis Tii	med	AECO PM	M		Freeway/Dir of Travel I-95 NB Weaving Segment Location Seg 13-Bet On & Off to Exp Analysis Year 2040 Build 2A				
Project Des	cription SW 10t	h Street SIMI	₹		l				
Inputs									
Weaving se Freeway fre	umber of lanes, Negment length, Lee-flow speed, F	S FS		Segment type Freeway min Freeway max Terrain type	imum speed			Freeway 15 2400 Leve	
Conver	sions to po	1		1		F			/ / !- \
\	V (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	4465	0.95	3	0	1.5	1.2	0.985	1.00	4771
V <sub>RF</sub>	1145	0.92	2	0	1.5	1.2	0.990	1.00	1257
V <sub>FR</sub>	885	0.92	2	0	1.5	1.2	0.990	1.00	972
$V_{RR}$	245	0.92	2	0	1.5	1.2	0.990	1.00	269
$V_{NW}$	7000							V =	7269
V <sub>W</sub>	269								
VR	0.037		4*						
	ration Cha		tics		I. e. ·				807 lc/h
	naneuver lanes,	$N_WL$		0 lc	The state of the s				
•	e density, ID			0.7 int/mi	Weaving lan		••		1433 lc/h
	RF lane changes,	14			Non-weaving				3250 lc/h
	R lane changes,	110		0 lc/pc	Total lane ch	,	· <u>-</u>		4683 lc/h
	R lane changes				Non-weaving				2254
Weavin	g Segmen	t Speed,	Density, I	_evel of					
•	egment flow rate			7173 veh/h	Weaving inte	•			0.229
	egment capacity	, C <sub>W</sub>		9013 veh/h	Weaving seg				55.6 mph
•	egment v/c ratio	<b>D</b>	0.4	0.796	Average weaving speed, S <sub>W</sub>				59.7 mph
•	egment density,	ט	32	2.7 pc/mi/ln	Average non-weaving speed, $S_{NW}$ Maximum weaving length, $L_{MAX}$				55.5 mph
Level of Se	ivice, LUS			D	Maximum we	eaving length	า, L <sub>MAX</sub>		6071 ft

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

	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 14-I	North of Hillsboro
Analysis Time Period	PM		Analysis Year	2040 Bu	ild 2A
	h Street SIMR				
✓ Oper.(LOS)			Des.(N)	∐Pla	inning Data
Flow Inputs					
Volume, V AADT	5610	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	$f_{LW}$		mph
Number of Lanes, N	4		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS		mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N x S D = v <sub>p</sub> / S	x f <sub>HV</sub> x f <sub>p</sub> ) 1498 69.0 21.7	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	$f_{HV} \times f_p)$	pc/h/ln mph pc/mi/ln
LOS	С		Required Number of Lanes, N		ρο/
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	-	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		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-1

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	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 1-Be 2040 Bu	et Hillsboro & Palmetto
Project Description SW 10th	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	4810	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	nents				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N s S D = v <sub>p</sub> / S LOS	x f <sub>HV</sub> x f <sub>p</sub> ) 1285 69.9 18.4 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	$f_{HV} \times f_p$ )	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	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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			REEWAY	WEAV	NG WOF	RKSHEE	T			
Genera	l Informati	on			Site Info	rmation				
Analyst Agency/Co Date Perfoi Analysis Tii	med	AECO AM	М		Freeway/Dir of Travel I95/SB Weaving Segment Location Seg 2-Bet On from Exp & Off Analysis Year 2040 Build 2A					
Project Des	scription SW 10	th Street SIMI	₹		1					
Inputs					<u> </u>					
Weaving se	onfiguration umber of lanes, egment length, L ee-flow speed, F	·S		Segment typ Freeway min Freeway max Terrain type	imum speed			Freeway 19 2400 Leve		
Conver	sions to p	c/h Unde	r Base Co	ndition	S					
	V (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	ER	$f_{HV}$	fp	v (pc/h)	
$V_{FF}$	3520	0.95	3	0	1.5	1.2	0.985	1.00	3761	
$V_{RF}$	1140	0.92	2	0	1.5	1.2	0.990	1.00	1252	
$V_{FR}$	1290	0.92	2	0	1.5	1.2	0.990	1.00	1416	
$V_{RR}$	130	0.92	2	0	1.5	1.2	0.990	1.00	143	
V <sub>NW</sub>	6429							V =	6572	
V <sub>W</sub>	143									
VR	0.022									
Configu	uration Ch	aracteris	tics							
Minimum n	naneuver lanes,	$N_{WL}$		0 lc	Minimum we	aving lane c	hanges, LC <sub>MIN</sub>	I	429 lc/h	
	e density, ID			0.7 int/mi	Weaving lan	e changes, L	.C <sub>w</sub>		1097 lc/h	
Minimum F	RF lane changes	, LC <sub>RF</sub>		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3123 lc/h	
Minimum F	R lane changes	, LC <sub>FR</sub>		0 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4220 lc/h	
Minimum F	RR lane changes	s, LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2340	
Weavin	g Segmen	t Speed,	Density, I	_evel of	·					
_	egment flow rate		(	6488 veh/h	Weaving inte	•			0.192	
7257 Veri/II					A				59.1 mph	
Weaving segment we ratio									61.2 mph	
_	egment density, ervice, LOS	U	2.	7.8 pc/mi/ln C	••••				59.0 mph	
Level OI OF	i vice, LOS			C	ıvıaxımum we	eaving lengtr	I, L <sub>MAX</sub>		5929 ft	

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 3-Be 2040 Bu	et Off & On Ramp ild 2A
'	th Street SIMR				
✓ Oper.(LOS	5)		Des.(N)	∐ Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4660	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> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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) 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> ) 1660 67.5 24.6 C	pc/h/ln mph pc/mi/ln	$\frac{\text{Design (N)}}{\text{Design LOS}}$ $v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ 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 free	-	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		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	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	Travel I-95 SB					
Agency or Company	AEC	OM		nction		Seg 4-I	Diverge to S	SW 10th St		
Date Performed				risdiction		0040.5				
Analysis Time Period Project Description		+ CIMD	Ar	nalysis Year		2040 B	uild 2A			
Inputs	SW TOUT SHEE	SI SIIVIN								
		Freeway Nun	nber of Lanes, N	3						
Upstream Adj R	amp		er of Lanes, N	1					Downstrea Ramp	am Adj
□Yes□	On			ı					-	
			Lane Length, L <sub>A</sub>	000					Yes	<b>☑</b> On
☑ No □	Off		Lane Length L <sub>D</sub>	200					☐ No	Off
		Freeway Volu	•	4660						0400 ft
L <sub>up</sub> = f	l	Ramp Volum		1890					L <sub>down</sub> =	2400 ft
V <sub>11</sub> = V <sub>1</sub>	eh/h	Freeway Free	e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	1660 veh/h
l vu v	511/11	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					ט	
Conversion to	o pc/h Uni	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>D</sub>
Freeway	4660	0.95	Level	3	0	0.	985	1.00	49	79
Ramp	1890	0.92	Level	2	0		990	1.00	20	
UpStream	1000	0.02	20701			<del>- "</del>	500	1.00	20	70
DownStream	1660	0.92	Level	2	0	0.	990	1.00	18	22
		Merge Areas		•		"		iverge Areas		
Estimation of	<sup>F</sup> V <sub>12</sub>				Estimat	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	)P <sub>ED</sub>	
L <sub>EQ</sub> =		tion 13-6 or	13-7)		L <sub>EQ</sub> =			Equation 13-1		)
P <sub>FM</sub> =	using Equation (Exhibit 13-6)			$P_{FD}$ = 0.540 using Equation (Exhibit 13-				•		
V <sub>12</sub> =	pc/h	_qaa.ioii (	_x		V <sub>12</sub> =			43 pc/h	addon (Exili	bit 10 1 j
V <sub>3</sub> or V <sub>av34</sub>	pc/h (Equation 13-14 or 13-17)							36 pc/h (Equa	ation 13 1/	1 or 13 17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			-1 <del>4</del> 01 10-17)		V <sub>3</sub> or V <sub>av34</sub>	> 2 7		30 pc/ii (∟qua ]Yes ☑No	auon 13-12	+01 13-17)
Is $V_3$ or $V_{av34} > 2,70$ Is $V_3$ or $V_{av34} > 1.5$								Yes ✓ No		
			3-16, 13-18, or					res <b>v</b> ino c/h (Equation	13-16 13-	.18 or 13-
If Yes,V <sub>12a</sub> =	13-19)		7 10, 10 10, 01		If Yes,V <sub>12a</sub> =	=	19		10 10, 10	10, 01 10
Capacity Che	cks				Capacit	y Ch	ecks			
	Actual	(	Capacity	LOS F?			Actual	Ca	pacity	LOS F?
					$V_{F}$		4979	Exhibit 13-8	7200	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	2904	Exhibit 13-8	7200	No
					V <sub>R</sub>		2075	Exhibit 13-10	0 2100	No
Flow Entering	n Merae In	fluence A	lrea	<u> </u>	<u> </u>	terin	a Diver	ge Influen	ce Area	
rion Emering	Actual	-	Desirable	Violation?	1000 200		Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>		643	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern				<del></del>			terminatio		1
$D_R = 5.475 + 0.$					1			0086 V <sub>12</sub> - 0.0	•	· /
D <sub>R</sub> = (pc/mi/ln	• • •	12	-Д			-к 3.8 (рс/		12	Б	
	•				I		•			
`						•	oit 13-2)			
Speed Determ					Speed L					
$M_S = (Exibit 13)$	,				ľ	•	xhibit 13-	•		
l '` '	ibit 13-11)				1		(Exhibit	*		
	ibit 13-11)				l *		(Exhibit	*		
S = mph (Exh	ibit 13-13)				S = 60	).5 mph	(Exhibit	13-13)		
yright © 2016 University	v of Florida. All F	Riahts Reserved			HCS2010 <sup>™</sup>	A Versi	nn 6 90		Generated:	6/17/2020 7:2

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 5-Be 2040 Bu	et Off & On Ramps ild 2A
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	5)		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	2770	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	
DDIIV - AADI XIXX		VC(1//11	Up/Down %	1111	
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		
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)  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> ) 987 70.0 14.1 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	·	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	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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<u> </u>		MPS AND	KAMP JUN						
General Infor	mation			Site Infor					
Analyst				eeway/Dir of Ti		95 SB			
Agency or Company Date Performed	, AEC	OM		inction irisdiction	S	eg 6-Merge tro	m Hillsboro E&W		
Analysis Time Period	d AM			nalysis Year	2	040 Build 2A			
Project Description		et SIMR	<i>.</i>	,		o to Balla 271			
nputs									
Jpstream Adj Ramp		Freeway Numl	ber of Lanes, N	3				Downstre	am Adi
pstream Auj Namp		Ramp Number	r of Lanes, N	1				Ramp	ani Auj
✓ Yes   ☐ Or	า	1 '	ane Length, L <sub>A</sub>	300					
		Deceleration L	**	000				☐Yes	☐ On
☐ No   ☑ Of	f	1	- 5	2770				✓ No	Off
<sub>up</sub> = 2400	ft	Freeway Volur		2770				L <sub>down</sub> =	ft
<sub>-up</sub> = 2400	IL	Ramp Volume		1660				-down	
√ <sub>u</sub> = 1890 √	veh/h	1	-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	veh/h
u		Ramp Free-Flo	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	o pc/h Un	der Base (	Conditions						
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	2770	0.95	Level	3	0	0.985	1.00		2960
Ramp	1660	0.92	Level	2	0	0.990	1.00	<del>                                     </del>	1822
UpStream	1890	0.92	Level	2	0	0.990	1.00		2075
DownStream	1030	0.32	Level		0	0.330	1.00	<del> </del>	2013
20Miloti Gain		Merge Areas		<u> </u>		<u> </u>	Diverge Areas	·	
Estimation of	$\overline{f}_{V_{12}}$				Estimation				
	V <sub>12</sub> = V <sub>F</sub>	(P)				·-			
_	12 1		12 C or 12 7)			V <sub>12</sub> =	$V_R + (V_F - V_R)$		
- <sub>EQ</sub> =		• •	13-6 or 13-7)		L <sub>EQ</sub> =		(Equation 13-	·12 or 13-	13)
P = FM =			ion (Exhibit 13-6)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)
′ <sub>12</sub> =	1734	=	10.1110		V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	1226 17)	pc/n (Equation	on 13-14 or 13-		$V_3$ or $V_{av34}$		pc/h (Equation 1	13-14 or 13-	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	ys ▼No			Is V <sub>3</sub> or V <sub>av34</sub>	> 2,700 pc/h?	☐Yes ☐ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 '					Is V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V <sub>12</sub> /2	☐Yes ☐ No		
		pc/h (Equatio	on 13-16 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
Yes,V <sub>12a</sub> =		· 13-19)	511 10 10, 10		11 100, v <sub>12a</sub>	1	13-19)		
Capacity Che	ecks				Capacity	Checks			
	Actual	C	apacity	LOS F?		Actual		pacity	LOS F?
	1	1 1			$V_{F}$		Exhibit 13-	8	
								8	
V <sub>FO</sub>	4782	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	$V_{R}$	Exhibit 13-		
V <sub>FO</sub>	4782	Exhibit 13-8		No	$V_{FO} = V_{F} - V_{FO}$	V <sub>R</sub>	Exhibit 13- Exhibit 13		
				No	V <sub>R</sub>		Exhibit 13 10	-	
	g Merge Ir	nfluence A			V <sub>R</sub>	ering Dive	Exhibit 13 10 erge Influer	- nce Area	W .
Flow Entering	<b>g Merge Ir</b> Actual	nfluence A	Desirable	Violation?	V <sub>R</sub>		Exhibit 13 10 erge Influer Max Des	- nce Area	Violation?
Flow Entering	g Merge Ir Actual 3556	Max Exhibit 13-8	Desirable 4600:All		V <sub>R</sub> Flow Ent	ering Dive	Exhibit 13 10 erge Influer Max Des Exhibit 13-8	- Ince Area	Violation?
Flow Entering	g Merge Ir Actual 3556	Max Exhibit 13-8	Desirable 4600:All	Violation?	V <sub>R</sub> Flow Ent	ering Dive	Exhibit 13 10 erge Influer Max Des	- Ince Area	Violation?
Flow Entering  V <sub>R12</sub> Level of Serv	g Merge Ir Actual 3556	Max Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>R</sub> Flow Ent	ering Dive Actual Service De	Exhibit 13 10 erge Influer Max Des Exhibit 13-8	rce Area	Violation?
V <sub>R12</sub> Level of Serv D <sub>R</sub> = 5.475 +	g Merge Ir Actual 3556 rice Deterri	Max E Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>R</sub> Flow Ent	ering Dive Actual Service De	Exhibit 13 10  erge Influer Max Des Exhibit 13-8 eterminatio	rce Area	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_{R} = 5.475 + D_{R} = 30.5 \text{ (pc/m}$	g Merge Ir Actual 3556 rice Deterr 0.00734 v <sub>R</sub> +	Max E Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>R</sub> Flow Enter  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc	ering Dive Actual Service De R = 4.252 + 0	Exhibit 13 10  erge Influer Max Des Exhibit 13-8 eterminatio	rce Area	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + D_R = 30.5 \text{ (pc/m}$ $OS = D \text{ (Exhibit)}$	<b>g Merge Ir</b> Actual 3556 <b>rice Detern</b> 0.00734 v <sub>R</sub> + ni/ln) 13-2)	Max E Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>R</sub> Flow Enter  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc LOS = (Ex	ering Dive Actual  Service De R = 4.252 + ( //mi/ln) khibit 13-2)	Exhibit 13 10 erge Influer Max Des Exhibit 13-8 eterminatio	rce Area	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = 30.5 (pc/m)$ $D_R = 0 (Exhibit)$ Speed Determ	g Merge Ir Actual 3556 rice Deterr 0.00734 v <sub>R</sub> + ni/ln) 13-2) mination	Max E Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>R</sub> Flow Enter  V <sub>12</sub> Level of S  D  D <sub>R</sub> = (pc  LOS = (Ex  Speed De	ering Dive Actual  Service De R = 4.252 + ( /mi/ln) khibit 13-2)	Exhibit 13 10 erge Influer Max Des Exhibit 13-8 eterminatio	rce Area	Violation'
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 0.05 = 0.05 = 0.05$ Speed Determ $M_S = 0.428$ (Exi	g Merge Ir	Max E Exhibit 13-8	Desirable 4600:All if not F)	Violation?	V <sub>R</sub> Flow Enter  V <sub>12</sub> Level of S  D <sub>R</sub> = (pc  LOS = (Ex  Speed De  D <sub>s</sub> = (Ex	ering Dive Actual  Service De R = 4.252 + (c/mi/ln) chibit 13-2) eterminati hibit 13-12)	Exhibit 13 10  erge Influer Max Des Exhibit 13-8 eterminatio 0.0086 V <sub>12</sub> - 0	rce Area	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 30.5 \text{ (pc/m}$ $OS = D \text{ (Exhibit)}$ Speed Determ $M_S = 0.428 \text{ (Exi}$ $S_R = 58.0 \text{ mph}$	g Merge Ir	Max E Exhibit 13-8	Desirable 4600:All if not F)	Violation?	$V_R$ Flow Enter $V_{12}$ Level of S $D_R = (pc)$ $LOS = (Ex)$ Speed De $D_S = (Ex)$ $S_R = (Ex)$	ering Dive Actual  Service De R = 4.252 + ( /mi/ln) chibit 13-2) eterminati hibit 13-12) n (Exhibit 13-12	Exhibit 13 10  Erge Influer Max Des Exhibit 13-8 Exermination 0.0086 V <sub>12</sub> - 0	rce Area	Violation?
Flow Entering $V_{R12}$ Level of Serv $D_R = 5.475 + 30.5 \text{ (pc/m)}$ $OS = D \text{ (Exhibit)}$ Speed Determ $M_S = 0.428 \text{ (Exist)}$ $S_R = 58.0 \text{ mph}$ $S_R = 67.4 \text{ mph}$	g Merge Ir	Max E Exhibit 13-8	Desirable 4600:All if not F)	Violation?	$V_R$ Flow Ent $V_{12}$ Level of S $D_R = (pc$ $LOS = (Ext $ $S_R = mpt$ $S_0 = mpt$	ering Dive Actual  Service De R = 4.252 + (c/mi/ln) chibit 13-2) eterminati hibit 13-12)	Exhibit 13 10  Erge Influer Max Des Exhibit 13-8 Exhibit	rce Area	Violation?

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 7-Be 2040 Bul	et On Ramps ild 2A
Project Description SW 10	oth Street SIMR				
✓ Oper.(LOS	8)		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	4430	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	
DDIIV WOTAIN		V G11/11	Up/Down %	1111	
Calculate Flow Adjust	ments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft	, ,		
Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	3 70.0	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)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS		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	·	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 freedour 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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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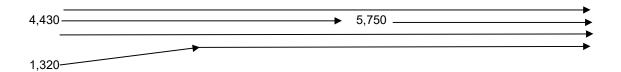
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Job: SW 10th Street SIMR

Analyst: AECOM

Location: Seg 8: I-95 Southbound On-Ramp from SW 10th Street EB & WB

Analysis Period: AM Peak Hour
Analysis Year: 2040 Build 2A



Downstream Freeway Tr % = 
$$\frac{3\%}{1/(1+P_T(E_T-1)+P_R(E_R-1))}$$
 =

Ramp 
$$f_{HV} = 1/(1+P_T(E_{T}-1)+P_R(E_{R}-1)) = 0.9901$$
  
flat terrain  $E_T = 1.5$ 

0.985

pc/h

pc/h

pc/h

RV % = 0Driver Population adj.  $f_P = 1.000$ 

$$V_{fr} = = v_{fr}/(PHF)(f_{HV})(f_P) = 6,143$$
 $V_r = = v_r/(PHF)(f_{HV})(f_P) = 1,403$ 
 $V_f = = v_f/(PHF)(f_{HV})(f_P) = 4,733$ 

No. lanes upstream of ramp N =	3
	_

No. Ln	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	6,143	0.64	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	4,733	0.66	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,403	0.67	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 9-Be 2040 Bu	et 10th & Exit to Exp
Project Description SW 10ti	h Street SIMR				
✓ Oper.(LOS)			Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	5750	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> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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)		
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> ) 1536 68.7 22.4 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	·	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	-	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 11-5		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		MPS AND	RAMP JUN			<b>L</b> Τ			
General Infor	mation			Site Infor					
Analyst				eeway/Dir of Tr		95 SB			
Agency or Company Date Performed	AEC	OM		Inction	S	eg 10-Merge fro	om Ex to GP		
Date Periormed Analysis Time Period	d AM			ırisdiction nalysis Year	20	040 Build 2A			
Project Description		t SIMR	7.0	laryolo i oai		040 Dulla ZA			
nputs									
		Freeway Num	ber of Lanes, N	4				Downstre	am Adi
Jpstream Adj Ramp		Ramp Numbe	r of Lanes. N	1				Ramp	am Auj
☐ Yes ☐ Or	1	· '	ane Length, L	600					
			_ane Length L <sub>D</sub>	000				✓ Yes	☐ On
☑ No ☐ Of	f			E7E0				☐ No	✓ Off
un = ft		Freeway Volu	'	5750				L <sub>down</sub> =	1150 ft
<sub>up</sub> = ft		Ramp Volume		400				down	1100 10
/ <sub>u</sub> = veh/h	1		-Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	760 veh/h
		1	ow Speed, S <sub>FR</sub>	50.0					
Conversion to	r	der Base	Conditions	1	1	T .	ı .	ı	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	5750	0.95	Level	3	0	0.985	1.00		6143
Ramp	400	0.92	Level	2	0	0.990	1.00		439
JpStream		1002			Ť	0.000			
DownStream	760	0.92	Level	2	0	0.990	1.00		834
		Merge Areas		•			Diverge Areas	•	
Estimation of	<sup>F</sup> V <sub>12</sub>				Estimation	on of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )				\/ -	\/ . (\/ \/	\D	
- <sub>EQ</sub> =		ັ⊤™່∕ ation 13-6 o	r 13-7)			.=	$V_R + (V_F - V_R)$		
P <sub>FM</sub> =	• •		ion (Exhibit 13-6)	1	L <sub>EQ</sub> =		(Equation 13-		•
	1001		IOTI (EXTIIDIC 10-0)		P <sub>FD</sub> =		using Equatio	n (Exhibit 1	3-7)
' <sub>12</sub> =		•	on 13-14 or 13-		V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	17)	pc/ii (Equali	011 13-14 01 13-		$V_3$ or $V_{av34}$		pc/h (Equation 1	3-14 or 13-	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	,	s ☑No			Is $V_3$ or $V_{av34}$	> 2,700 pc/h? [	☐Yes ☐ No		
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *					Is V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V <sub>12</sub> /2 [	□Yes □ No		
Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	3-18, or
· <del></del>	18, or	13-19)					3-19)		
Capacity Che	cks				Capacity	Checks			
	Actual		Capacity	LOS F?		Actual		pacity	LOS F?
					V <sub>F</sub>		Exhibit 13-	8	
$V_{FO}$	6582	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	$V_R$	Exhibit 13-	8	
. 0					$V_R$		Exhibit 13	-	
		<u> </u>					10		
low Entering	1			\/iolotion2	Flow Ente		rge Influen Max Desi		W .
	Actual 2896	Exhibit 13-8	Desirable 4600:All	Violation?	V	Actual	Exhibit 13-8	lable	Violation?
V <sub>R12</sub>				No	V <sub>12</sub>	Comico Di		/: <b></b>	<u> </u>
					t		eterminatio	_	( F)
Level of Serv	$0.00734  V_R + C$	J.0078 V <sub>12</sub> - 0.	00627 L <sub>A</sub>				0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
D <sub>R</sub> = 5.475 +						/mi/ln)			
$D_{R} = 5.475 + 24.1 \text{ (pc/m}$	•				LOS = (Ex	hibit 13-2)			
$D_{R} = 5.475 + 24.1 \text{ (pc/m}$	•						On.		
$D_{R} = 5.475 + 24.1 \text{ (pc/m}$	13-2)				Speed De	<u>eterminati</u>	<u> </u>		
$D_R = 5.475 + $ $D_R = 24.1 \text{ (pc/m}$ $D_R = C \text{ (Exhibit)}$ $D_R = C \text{ (Exhibit)}$	13-2) mination				<del>† ′</del>	<b>eterminati</b> hibit 13-12)	<u> </u>		
$D_R = 5.475 + $ $D_R = 24.1 \text{ (pc/m}$ $D_R = C \text{ (Exhibit)}$	13-2) <b>mination</b> bit 13-11)				D <sub>s</sub> = (Ext				
$D_{R} = 5.475 + 0.00$ $D_{R} = 24.1 \text{ (pc/m}$ $D_{R} = 24.1 \text{ (pc/m}$ $D_{R} = 0.332 \text{ (Eximple of the context)}$ $D_{R} = 0.332 \text{ (Eximple of the context)}$ $D_{R} = 0.332 \text{ (Eximple of the context)}$	13-2) <b>mination</b> bit 13-11) (Exhibit 13-11)				D <sub>s</sub> = (Ext S <sub>R</sub> = mph	hibit 13-12) n (Exhibit 13-12)	)		
$D_{R} = 5.475 + 24.1 \text{ (pc/m}$ $D_{R} = 24.1 \text{ (pc/m}$ $D_{R} = C \text{ (Exhibit)}$ $D_{R} = C \text{ (Exhibit)}$ $D_{R} = 0.332 \text{ (Eximple of the context)}$ $D_{R} = 0.332 \text{ (Eximple of the context)}$ $D_{R} = 0.332 \text{ (Eximple of the context)}$	13-2) <b>mination</b> bit 13-11)				$D_s = (Exh$ $S_R = mph$ $S_0 = mph$	hibit 13-12)	)		

		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 SB	}			
Agency or Company	AEC	MC		nction		Seg 11	- Diverge to	Express		
Date Performed Analysis Time Period	d AM			risdiction nalysis Year		2040 B	OV			
Project Description		t SIMR	Al	iaiysis reai		2040 B	uliu ZA			
Inputs	OW TOUT OUCC	CONVIC								
	<b>.</b>	Freeway Num	nber of Lanes, N	4					D t	A .!!
Upstream Adj R	amp	Ramp Numbe		1					Downstrea Ramp	m Aaj
✓ Yes	<b>∠</b> On	· ·	_ane Length, L <sub>Δ</sub>	'						
			- 7	200					Yes	On
□ No □	Off		Lane Length L <sub>D</sub>	200					✓ No	Off
	ΓΛ <del>4</del>	Freeway Volu	•	6150					l. =	ft
L <sub>up</sub> = 11	50 ft	Ramp Volume	11	760					L <sub>down</sub> =	10
V <sub>11</sub> = 40	00 veh/h	•	e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
- u 10	70 1011/11	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					5	
Conversion t		der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6150	0.95	Level	3	0	0.	985	1.00	657	71
Ramp	760	0.92	Level	2	0	0.	990	1.00	83	4
UpStream	400	0.92	Level	2	0	0.	990	1.00	43	9
DownStream										
		Merge Areas				_		iverge Areas		
Estimation of	f v <sub>12</sub>				Estimat	ion o	f v <sub>12</sub>			
	$V_{12} = V_{F}$	(P <sub>FM</sub> )					V <sub>12</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	P <sub>FD</sub>	
L <sub>EQ</sub> =	(Equa	ition 13-6 or	13-7)		L <sub>EQ</sub> =		(E	Equation 13-1	2 or 13-13)	
P <sub>FM</sub> =	using	Equation (	P <sub>FD</sub> =		0.4	136 using Equ	uation (Exhib	oit 13-7)		
V <sub>12</sub> =	pc/h				V <sub>12</sub> =		33	35 pc/h		
V <sub>3</sub> or V <sub>av34</sub>	pc/h (	Equation 13	-14 or 13-17)		V <sub>3</sub> or V <sub>av34</sub>		16	18 pc/h (Equa	ation 13-14	or 13-17)
Is $V_3$ or $V_{av34} > 2,70$	00 pc/h?	s 🗌 No				34 > 2,7		]Yes ☑ No		ŕ
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5	* V <sub>12</sub> /2	s 🗌 No						Yes <b>☑</b> No		
If Yes,V <sub>12a</sub> =	pc/h (		-16, 13-18, or		If Yes,V <sub>12a</sub> =			c/h (Equation	13-16, 13-	18, or 13-
	13-19)						19	9)		
Capacity Che	1	1 .		1	Capacit	y Che		1 ^		1
	Actual		Capacity	LOS F?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-	Actual	<del>- 1</del>	pacity	LOS F?
					V <sub>F</sub>		6571	Exhibit 13-8		No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	5737	Exhibit 13-8	-	No
					$V_R$		834	Exhibit 13-10	2100	No
Flow Entering	g Merge In	fluence A	\rea		Flow Er	nterin	g Diver	ge Influen	ce Area	
	Actual	i i	Desirable	Violation?			Actual	Max Desirab		Violation?
V <sub>R12</sub>		Exhibit 13-8			V <sub>12</sub>	3	3335	Exhibit 13-8	4400:All	No
Level of Serv	rice Detern	nination (	if not F)		Level of	f Serv	vice De	terminatio	n (if not F	<del>-</del> )
$D_R = 5.475 + 0.$	.00734 v <sub>R</sub> +	0.0078 V <sub>12</sub> ·	- 0.00627 L <sub>A</sub>			$D_R = 4$	.252 + 0.	0086 V <sub>12</sub> - 0.0	009 L <sub>D</sub>	
D <sub>R</sub> = (pc/mi/In	1)				$D_R = 34$	4.0 (pc/	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = D	(Exhib	oit 13-2)			
Speed Deterr	nination				Speed L	Deter	minatio	n		
M <sub>S</sub> = (Exibit 1					<del>  '                                   </del>		xhibit 13-			
l *	nibit 13-11)				1		(Exhibit	•		
	nibit 13-11)					•	(Exhibit	•		
1 '	nibit 13-11)				1	-	(Exhibit	,		
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Job: SW 10th Street S	MR					
Analyst: AECOM						
Location:	Seg 12: I	-95 SB Of	f-Ramp to Sample F	Road EB & V	<b>V</b> B	
Analysis Period:	AM Peak	Hour			_	
Analysis Year:	2040 Bui	ld 2A			_	
		5,390				<b>→</b> 4,360
		-,				<b>&gt;</b>
					1,030	
	PHF =	0.95		-	, , , , , , , ,	
	v <sub>fr</sub> =	5,390				
	v <sub>r</sub> =	1,030	-			
	$\mathbf{v_f} =$	4,360	• •			
Upstream Freeway	•	3%				
-	Tr % =	2%				
Downstream Freeway		3%				
			 (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1)) =	<u> </u>	0.985	
-					-	-
<u>-</u>			$(E_{T}-1)+P_{R}(E_{R}-1))=$	-	0.9901	=
flat terrair	•	1.5				
Duite and Daniel of the second	RV % =	•				
Driver Population adj	<u>-</u>	1.000	-			1
	$V_{fr} =$	=v <sub>fr</sub> /(PH	$F)(f_{HV})(f_{P}) = $	5,759	pc/h	
	$V_r =$	=v <sub>r</sub> /(PHI	$F)(f_{HV})(f_{P}) =$	1,095	pc/h	
	$V_f =$	=v <sub>f</sub> /(PHI	$=)(f_{HV})(f_{P})=$	4,658	pc/h	
No. lanes upstream of ram	N =	4	•			•
			_			
Average Freeway I	Density L	<u>Jpstrean</u>	<u>n of Diverge (see</u>	<u>Equation</u>	<u> 13-26):</u>	
D = 0.0175 (V <sub>fr</sub> /N) =	25.2	pc/In				
$D = 0.0173 \left( V_{fr}/N \right) =$	25.2	рслп				
LOS in the Diverge	Δrea (fr	om Dens	sity and Exhibit '	13-2) =		
Loo in the biverge	Aica (ii	C		10 2)		
			•			
No. Ln Capacity Check (s				Maximum	Actual	LOS F?
4 Fwy upstream of ramp				9,600	5,759	
<ul><li>3 Fwy downstream of ram</li><li>1 Capacity on Off-Ramp</li></ul>		•		7,200 2,100	4,658 1,095	
. Capacity on On-Itamp	assume 40	, inpiritioe	now opeca) –	2,100	1,000	.10

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM AM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 13-E 2040 Bu	Bet Off & On Ramps
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4360	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> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T-1)+P_R(E_R-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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)		
Operational (LOS) v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS	× f <sub>HV</sub> × f <sub>p</sub> ) 1553 68.6 22.7 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	·	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 freeur 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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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			REEWAY	WEAV			T		
Genera	al Information	on			Site Info	rmation			
Analyst Agency/Co Date Perfo Analysis Ti	rmed	AECON AM	Л		Freeway/Dir of Travel I-95 SB Weaving Segment Location Seg 14- Bet Sample & Copan Analysis Year 2040 Build 2A				
Project De	scription SW 10th	h Street SIMR	<u> </u>		<u> </u>				
Inputs									
Weaving n Weaving s	onfiguration umber of lanes, N egment length, L <sub>s</sub> ree-flow speed, FF	S		One-Sided 4 2520ft 70 mph	Segment typo Freeway min Freeway max Terrain type	imum speed			Freeway 15 2400 Leve
Conve	rsions to po	c/h Unde	r Base Co	ndition	S				
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	ER	$f_{HV}$	fp	v (pc/h)
$V_{FF}$	3630	0.95	3	0	1.5	1.2	0.985	1.00	3878
$V_{RF}$	1960	0.92	2	0	1.5	1.2	0.990	1.00	2152
$V_{FR}$	730	0.92	2	0	1.5	1.2	0.990	1.00	801
$V_RR$	0	0.95	0	0	1.5	1.2	1.000	1.00	0
$V_{NW}$	3878							V =	6831
$V_W$	2953								
VR	0.432								
Config	uration Cha	aracterist	ics						
Minimum r	maneuver lanes, I	$N_{WL}$		2 lc	Minimum we	aving lane c	hanges, LC <sub>MIN</sub>		lc/h
-	ge density, ID			0.7 int/mi	Weaving lan	e changes, L	$C_{W}$		lc/h
	RF lane changes,	IN			Non-weaving	-	1111		lc/h
	FR lane changes,	111		1 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		lc/h
Minimum I	RR lane changes,	LC <sub>RR</sub>		lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		
Weavir	ng Segment	Speed,	Density, I	_evel of	T	_			
Weaving s	segment flow rate, segment capacity,			6745 veh/h 5470 veh/h 1.233	Weaving into Weaving seg Average wea	gment speed	, S		mph mph
_	/eaving segment v/c ratio 1.2 /eaving segment density, D pc/mi					<sup>7</sup>   "			
_	ervice, LOS			F	Maximum we		1111		mph 7046 fl
Notes					<u> </u>	<u> </u>	· IVIAA		

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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-Be 2040 Bu	et Hillsboro & Palmetto
	th Street SIMR		,		-
✓ Oper.(LOS	5)	]	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	4960	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	
			Up/Down %		
Calculate Flow Adjust	ments				
f <sub>p</sub> E <sub>T</sub>	1.00 1.5		$E_R$ $f_{HV} = 1/[1+P_T(E_T-1)+P_R(E_R-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance Number of Lanes, N Total Ramp Density, TRD FFS (measured) Base free-flow Speed, BFFS	4 70.0	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)		
Operational (LOS)  v <sub>p</sub> = (V or DDHV) / (PHF x N S D = v <sub>p</sub> / S LOS		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	$f_{HV} \times f_p$ )	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	-	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-		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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			FREEWAY	/ WEAV	NG WOR	RKSHEE	T		
Genera	l Informati	on			Site Info	rmation			
Analyst Agency/Cor Date Perfor Analysis Tir	med	AECO PM	М		Freeway/Dir of Travel I95/SB Weaving Segment Location Seg 2-Bet On from Exp & Off Analysis Year 2040 Build 2A				
Project Des	cription SW 10t	h Street SIMI	R						
Inputs					•				
Weaving se Freeway fre	mber of lanes, N gment length, L e-flow speed, F	s FS		Two-Sided 4 5200ft 70 mph	Segment typo Freeway min Freeway max Terrain type	imum speed			Freeway 15 2400 Leve
Conver	sions to po	1		1			Ι,	Ι,	( (1)
.,	V (veh/h)	PHF	Truck (%)	RV (%)	E <sub>T</sub>	E <sub>R</sub>	f <sub>HV</sub>	fp	v (pc/h)
V <sub>FF</sub>	3825	0.95	3	0	1.5	1.2	0.985	1.00	4087
$V_{RF}$	1125	0.92	2	0	1.5	1.2	0.990	1.00	1235
$V_{FR}$	1135	0.92	2	0	1.5	1.2	0.990	1.00	1246
$V_{RR}$	125	0.92	2	0	1.5	1.2	0.990	1.00	137
V <sub>NW</sub>	6568							V =	6705
V <sub>W</sub>	137								
VR	0.020								
Configu	ration Cha	aracteris	tics		1				
Minimum m	aneuver lanes,	$N_{WL}$		0 lc		-	hanges, LC <sub>MIN</sub>	I	411 lc/h
·	e density, ID			0.7 int/mi	Weaving lan	e changes, L	$_{C_{W}}$		1079 lc/h
	F lane changes,	14		0 lc/pc	Non-weaving	g lane chang	es, LC <sub>NW</sub>		3154 lc/h
Minimum F	R lane changes,	$LC_FR$		0 lc/pc	Total lane ch	nanges, LC <sub>AL</sub>	L		4233 lc/h
Minimum R	R lane changes	, LC <sub>RR</sub>		3 lc/pc	Non-weaving	g vehicle inde	ex, I <sub>NW</sub>		2391
Weavin	g Segmen	t Speed,	Density, I	_evel of	Service,	and Cap	oacity		
Weaving se	egment flow rate	, V		6619 veh/h	Weaving inte	•			0.192
Weaving se	egment capacity	, c <sub>w</sub>		9241 veh/h	Weaving seg				59.0 mph
U	egment v/c ratio	_		0.716					61.1 mph
•	Neaving segment density, D 28.4 pc/mi Level of Service, LOS					· · · · · · · · · · · · · · · · · · ·			
I AVALAT SA	rvice. LOS			D	Maximum we	eaving length	1, L,,,,		5916 ft

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".

	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 3-Be 2040 Bu	et Off & On Ramp ild 2A
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4950	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	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS	;	mph			·
LOS and Performance	Measures		Design (N)		
Operational (LOS) 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> ) 1763 66.3 26.6 D	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 h	S - Speed D - Density FFS - Free-flow BFFS - Base free	-	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		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			RKS	HEET			
General Inform	nation			Site Infor						
Analyst				eeway/Dir of Tr		I-95 SE				
Agency or Company Date Performed	AEC	OM		nction risdiction	,	Seg 4-I	Diverge to	SW 10th St		
Analysis Time Period	PM			nsulction alysis Year	,	2040 B	uild 2A			
Project Description		t SIMR	7 11	idiyələ i cai		2040 D	uliu ZA			
Inputs	011 1001 000	A CHAIR C								
-		Freeway Nun	nber of Lanes, N	3					D	A al:
Upstream Adj Ra	amp	Ramp Numbe		1					Downstre Ramp	am Adj
□Yes □	On	·	ane Length, L	'						_
			,,	000					✓ Yes	✓ On
✓ No	Off		Lane Length L <sub>D</sub>	200					□No	Off
l – #		Freeway Volu	•	4950						2400 ft
$L_{up} = ft$		Ramp Volum		1710					L <sub>down</sub> =	2400 II
V <sub>II</sub> = ve	eh/h	Freeway Free	-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	1740 veh/h
v <sub>u</sub> ve	51 1/ 1 1	Ramp Free-F	low Speed, $S_{FR}$	45.0					D	
Conversion to	pc/h Un	der Base	Conditions							
(pc/h)	() / a la / la a)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	fp	v = V/PHF	x f <sub>HV</sub> x f <sub>p</sub>
, ,	(Veh/hr) 4950	0.95	Lovel	3	0	4	985	1.00		289
Freeway		+	Level			_				
Ramp UpStream	1710	0.92	Level	2	0	0.	990	1.00	10	377
DownStream	1740	0.92	Level	2	0	0	990	1.00	10	910
Downoucum		Merge Areas	Level			0.		Diverge Areas	1,	310
Estimation of		morgo / nous			Estimati	on o				
		/ D \						- \/ + (\/ \/	\D	
	$V_{12} = V_{F}$	• • • • • • • • • • • • • • • • • • • •	10.7)					V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>		
-EQ =	, ,	ation 13-6 or	•		L <sub>EQ</sub> =		•	Equation 13-1		•
P <sub>FM</sub> =	_	Equation (	Exhibit 13-6)		P <sub>FD</sub> =			541 using Eq	uation (Exh	ibit 13-7)
/ <sub>12</sub> =	pc/h				V <sub>12</sub> =		37	724 pc/h		
$ m V_3$ or $ m V_{av34}$	pc/h (	Equation 13	-14 or 13-17)		$\rm V_3$ or $\rm V_{av34}$			565 pc/h (Equ	ation 13-1	4 or 13-17)
Is $V_3$ or $V_{av34} > 2,700$	) pc/h?	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>4</sub> > 2,7	'00 pc/h? [	☐ Yes 🗹 No		
Is $V_3$ or $V_{av34} > 1.5$ *	V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av3</sub>	<sub>4</sub> > 1.5	* V <sub>12</sub> /2	☐ Yes ☑ No		
f Yes,V <sub>12a</sub> =			-16, 13-18, or		If Yes,V <sub>12a</sub> =			c/h (Equation	13-16, 13	-18, or 13-
Capacity Chec	13-19	)			Capacity			9)		
sapacity chec		<u>.</u>			ICabacity		CCNS			
	∆ctual		`anacity	LOS F2		1	Actual	Ca	nacity	1 LOS F2
	Actual	(	Capacity	LOS F?			Actual		pacity	LOS F?
V	Actual		Capacity	LOS F?	V <sub>F</sub>	V	5289	Exhibit 13-8	7200	No
V <sub>FO</sub>	Actual	Exhibit 13-8	Capacity	LOS F?	$V_F$ $V_{FO} = V_F$	- V <sub>R</sub>	5289 3412	Exhibit 13-8 Exhibit 13-8	3 7200 3 7200	No No
		Exhibit 13-8	•	LOS F?	$V_F$ $V_{FO} = V_F$ $V_R$		5289 3412 1877	Exhibit 13-8 Exhibit 13-8 Exhibit 13-1	7200 7200 7200 7200 72100	No
	Merge Ir	Exhibit 13-8	Area		$V_F$ $V_{FO} = V_F$ $V_R$	terin	5289 3412 1877 <b>g Dive</b>	Exhibit 13-8 Exhibit 13-8 Exhibit 13-1 rge Influen	7200 7200 7200 72100 72100	No No No
Flow Entering		Exhibit 13-8  offluence A  Max	•	LOS F?  Violation?	$V_{F}$ $V_{FO} = V_{F}$ $V_{R}$ Flow En	terin	5289 3412 1877 <b>19 Dive</b> Actual	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 rge Influen Max Desirat	7200 7200 7200 72100 72100 72100 72100	No No No Violation?
Flow Entering	Merge Ir Actual	Exhibit 13-8  Influence A  Max  Exhibit 13-8	<b>Area</b> Desirable		$V_{FO} = V_{F}$ $V_{R}$ Flow En	terin	5289 3412 1877 <b>Ig Dive</b> l Actual	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8	7200 7200 7200 7200 721000 721	No No No Violation?
Flow Entering  V <sub>R12</sub> Level of Servi	Merge Ir Actual Ce Deterr	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_{FO} = V_{F}$ $V_{RO} = V_{FO}$ Flow En	terin	5289 3412 1877 <b>og Dive</b> Actual 3724 <b>vice De</b>	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8 Exhibit 13-8	7200 7200 7200 7200 7200 72100 7200	No No No Violation?
Flow Entering	Merge Ir Actual Ce Deterr	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_{FO} = V_{F}$ $V_{RO} = V_{FO}$ Flow En	terin	5289 3412 1877 <b>og Dive</b> Actual 3724 <b>vice De</b>	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8	7200 7200 7200 7200 7200 72100 7200	No No No Violation?
Flow Entering $V_{R12}$ Level of Servii $D_{R} = 5.475 + 0.0$	Actual  Ce Deterr 00734 v R +	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_F$ $V_{FO} = V_F$ $V_R$ Flow En	Serv	5289 3412 1877 <b>og Dive</b> Actual 3724 <b>vice De</b>	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8 Exhibit 13-8	7200 7200 7200 7200 7200 72100 7200	No No No Violation?
Flow Entering $V_{R12}$ Level of Servi $D_{R} = 5.475 + 0.0$ $D_{R} = (pc/mi/ln)$	Actual  Ce Deterr 00734 v R +	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 34$	<b>Serv</b> 0 <sub>R</sub> = 4	5289 3412 1877 <b>18 Dive</b> Actual 3724 <b>Vice De</b> 4.252 + 0	Exhibit 13-8 Exhibit 13-1 Exhibit 13-1 Exhibit 13-1 Exhibit 13-8 Exhibit 13-8	7200 7200 7200 7200 7200 72100 7200	No No No Violation?
Flow Entering $V_{R12}$ Level of Servii $D_{R} = 5.475 + 0.0$ $D_{R} = (pc/mi/ln)$ $.0S = (Exhibit 1)$	Actual  Ce Deterr 00734 v R +	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 34$	Servent Serven	5289 3412 1877  18 Diverse Diverse December 1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0  1,252 + 0	Exhibit 13-8 Exhibit 13-1  rge Influen  Max Desirat  Exhibit 13-8  termination  .0086 V <sub>12</sub> - 0.	7200 7200 7200 7200 7200 72100 7200	No No No Violation?
Flow Entering  V <sub>R12</sub> Level of Servi  D <sub>R</sub> = 5.475 + 0.0  D <sub>R</sub> = (pc/mi/ln)  OS = (Exhibit 1	Actual  Actual  Ce Deterr  00734 v <sub>R</sub> +  3-2)  aination	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 34$ $LOS = D$ Speed D	Services (Exhibited Peter)	5289 3412 1877 19 Dive Actual 3724 Vice De 1.252 + 0 /mi/ln) bit 13-2)	Exhibit 13-8 Exhibit 13-1 rge Influen Max Desirat Exhibit 13-8 termination .0086 V <sub>12</sub> - 0.	7200 7200 7200 7200 7200 72100 7200	No No No Violation?
Flow Entering $V_{R12}$ Level of Servion $D_R = 5.475 + 0.00$ $D_R = (pc/mi/ln)$ $LOS = (Exhibit 1)$ Speed Determing $M_S = (Exibit 13)$	Actual  Actual  Ce Deterr  00734 v <sub>R</sub> +  3-2)  nination	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 34$ $LOS = D$ Speed D $D_S = 0.4$	terin Serv D <sub>R</sub> = 4 .5 (pc. (Exhill	5289 3412 1877  18 Divernation  3724  1.252 + 0  1/mi/ln)  1/mi/ln)  1/mi/ln)  1/mi/ln)  1/mi/ln)  1/mi/ln)  1/mi/ln)	Exhibit 13-8 Exhibit 13-1  rge Influen  Max Desirat Exhibit 13-8 Exermination .0086 V <sub>12</sub> - 0.	7200 7200 7200 7200 7200 72100 7200	No No No Violation?
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0.0$ $D_R = (pc/mi/ln)$ $D_R = (Exhibit 1)$ Speed Determ $M_S = (Exhibit 13)$ $D_R = (Exhibit 13)$ $D_R = (Exhibit 13)$	Merge In Actual  Cee Detern 00734 v R + 3-2) 0111111111111111111111111111111111111	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_F$ $V_{FO} = V_F$ $V_R$ Flow End $V_{12}$ Level of $D_R = 34$ $LOS = D$ $Speed D$ $D_S = 0.4$ $S_R = 56$	Services (Exhibited to 19 mph	5289 3412 1877 19 Dive Actual 3724 Vice De 1.252 + 0 /mi/ln) bit 13-2) minatic xhibit 13-	Exhibit 13-8 Exhibit 13-1  rge Influen Max Desirat Exhibit 13-8  terminatio .0086 V <sub>12</sub> - 0.	7200 7200 7200 7200 7200 72100 7200	No No No Violation?
Flow Entering $V_{R12}$ Level of Servi $D_R = 5.475 + 0.0$ $D_R = (pc/mi/ln)$ $D_R = (Exhibit 1)$ Speed Determ $M_S = (Exhibit 1)$ $D_R = (Exhibit 1)$	Merge In Actual  Cee Detern 00734 v R + 3-2) 0111111111111111111111111111111111111	Exhibit 13-8  Influence A  Max  Exhibit 13-8  Inination (	Area Desirable		$V_{FO} = V_{FO}$ $V_{FO} = V_{FO}$ $V_{RO} = V_{RO}$ Flow Entropy $V_{12}$ Level of $V_{12}$ Los = 0.4 $V_{13} = 0.4$ $V_{14} = 0.4$ $V_{15} = 0.4$	terin Service .5 (pc. (Exhill eter 467 (E. .9 mph	5289 3412 1877  18 Divernation  3724  1.252 + 0  1/mi/ln)  1/mi/ln)  1/mi/ln)  1/mi/ln)  1/mi/ln)  1/mi/ln)  1/mi/ln)	Exhibit 13-8 Exhibit 13-1  rge Influen  Max Desirat Exhibit 13-8 Eterminatio .0086 V <sub>12</sub> - 0.	7200 7200 7200 7200 7200 72100 7200	No No No Violation?

Appendix O

	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 5-Be 2040 Bu	et Off & On Ramps ild 2A
'	th Street SIMR				
✓ Oper.(LOS	5)		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	3240	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	
DDIIV - AADI XIXX D		VG11/11	Up/Down %	1111	
Calculate Flow Adjust	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	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph
Number of Lanes, N	3		$f_{LC}$		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph
Base free-flow Speed, BFFS	3	mph			
LOS and Performance	Measures		Design (N)		
Operational (LOS) 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	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 h	S - Speed D - Density FFS - Free-flow BFFS - Base freeur 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 11-5		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		MPS AND	RAMP JUN			<u> LI</u>			
General Infor	mation			Site Infor					
Analyst				eeway/Dir of Ti		95 SB			
Agency or Company	AEC	OM		inction	S	eg 6-Merge fro	m Hillsboro E&W		
Date Performed Analysis Time Perioc	d PM			ırisdiction nalysis Year	21	040 Build 2A			
Project Description		et SIMR	711	idiyələ i cui		040 Dullu ZA			
nputs									
		Freeway Num	ber of Lanes, N	3				Downstroom	Λdi
Jpstream Adj Ramp		Ramp Numbe		1				Downstream Ramp	Auj
☑ Yes ☐ Or	1	1	ane Length, L <sub>A</sub>	300					7.0
			ane Length L <sub>D</sub>	300				□Yes	On
☐ No ☑ Of	f	Freeway Volu	- 5	3240				✓ No	Off
= 2400	ft	1						L <sub>down</sub> =	ft
<sub>-up</sub> = 2400		Ramp Volume		1740				down	
/ <sub>u</sub> = 1710 \	veh/h	•	-Flow Speed, S <sub>FF</sub>	70.0				$V_D = V$	eh/h
		1	ow Speed, S <sub>FR</sub>	50.0					
Conversion to		der Base (	Conditions	1	1	ı	1	1	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PHF x	$f_{HV} x f_p$
Freeway	3240	0.95	Level	3	0	0.985	1.00	346	2
Ramp	1740	0.92	Level	2	0	0.990	1.00	1910	
UpStream	1710	0.92	Level	2	0	0.990	1.00	187	
DownStream									
		Merge Areas					Diverge Areas		
Estimation of	<sup>f</sup> v <sub>12</sub>				Estimation	on of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>FM</sub> )				V =	· V <sub>R</sub> + (V <sub>F</sub> - V <sub>R</sub>	\P	
- <sub>EQ</sub> =	1495.8	1 (Equation	13-6 or 13-7)		_	<b>*</b> 12	(Equation 13-		
P <sub>FM</sub> =	0.586	using Equat	ion (Exhibit 13-6)	)	L <sub>EQ</sub> =		•	•	
/ <sub>12</sub> =	2028		,		P <sub>FD</sub> =		using Equation	on (⊏xnibit 13-7)	
		-	on 13-14 or 13-		V <sub>12</sub> =		pc/h	10 11 10 17	
/ <sub>3</sub> or V <sub>av34</sub>	17)				V <sub>3</sub> or V <sub>av34</sub>	0.700 #.0	pc/h (Equation 1	13-14 or 13-17)	
Is $V_3$ or $V_{av34} > 2,70$							Yes No		
s $V_3$ or $V_{av34} > 1.5$	*V <sub>12</sub> /2	s 🗌 No			Is $V_3$ or $V_{av34}$	> 1.5 ^ V <sub>12</sub> /2	Yes No	- 40 40 40 4	0
Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =	1	pc/h (Equatio 13-19)	n 13-16, 13-1	8, or
Capacity Che		13-19)			Capacity				
apacity Cite	Actual	1 0	apacity	LOS F?	Capacity	Actual	l Ca	pacity	LOS F?
	Notadi	Ĭ	apaoity	LOOT:	V <sub>F</sub>	7101001	Exhibit 13-		LOO1:
						\/	Exhibit 13-		
$V_{FO}$	5372	Exhibit 13-8		No	$V_{FO} = V_{F}$	<sup>V</sup> R	Exhibit 13	_	
					$V_R$		10	-	
	g Merge Ir	ifluence A	rea		Flow Enter	ering Dive	erge Influer	ce Area	
-low Entering			Desirable	Violation?		Actual	Max Des	W.	Violation?
low Entering	Actual		1000 111	No	V <sub>12</sub>		Exhibit 13-8		
Flow Entering	1	Exhibit 13-8	4600:All	110		· -	eterminatio	n (if not F)	
Flow Entering  V <sub>R12</sub> Level of Serv	Actual 3938			140	Level of	Service Di	ctciiiiiiatio		
V <sub>R12</sub> Level of Serv	Actual 3938 ice Deterr		if not F)	140			0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
V <sub>R12</sub> Level of Serv D <sub>R</sub> = 5.475 +	Actual 3938 ice Deterr 0.00734 v <sub>R</sub> +	nination (	if not F)	140	D	<sub>R</sub> = 4.252 + (		.009 L <sub>D</sub>	
$V_{R12}$ Level of Serv $D_R = 5.475 + 33.4 \text{ (pc/m}$	Actual 3938 <i>ice Deteri</i> 0.00734 v <sub>R</sub> +	nination (	if not F)	1 10	D <sub>R</sub> = (pc	<sub>R</sub> = 4.252 + ( /mi/ln)		.009 L <sub>D</sub>	
$V_{R12}$ Level of Serv $D_R = 5.475 + C_R = 33.4 \text{ (pc/m}$ .OS = D (Exhibit	Actual 3938 ice Deterr 0.00734 v <sub>R</sub> + ni/ln) 13-2)	nination (	if not F)	140	D <sub>R</sub> = (pc LOS = (Ex	<sub>R</sub> = 4.252 + ( /mi/ln) (hibit 13-2)	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
$V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $O_R = 33.4 \text{ (pc/m}$ $O_R = D \text{ (Exhibit)}$ Speed Determ	Actual 3938 ice Deter 0.00734 v <sub>R</sub> + ni/ln) 13-2) mination	nination (	if not F)	140	D <sub>R</sub> = (pc LOS = (Ex <b>Speed De</b>	<sub>R</sub> = 4.252 + ( /mi/ln) khibit 13-2) <b>eterminati</b>	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
$V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $OS = D$ (Exhibit  Speed Determine the service of the service) (Exhibit of the	Actual 3938 ice Deteri 0.00734 v <sub>R</sub> + ni/ln) 13-2) mination bit 13-11)	nination (	if not F)	140	$D_{R} = 0$ $D_{R} = 0$ $D_{S} = 0$ $D_{S} = 0$ $D_{S} = 0$	R = 4.252 + ( /mi/ln) (hibit 13-2) (eterminati hibit 13-12)	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
$V_{R12}$ Level of Serv $D_R = 5.475 + 0$ $D_R = 33.4 \text{ (pc/m}$ $D_R = 0.491 \text{ (Exilored)}$ $D_R = 0.491 \text{ (Exilored)}$	Actual 3938 ice Deteri 0.00734 v <sub>R</sub> + ni/ln) 13-2) mination bit 13-11) (Exhibit 13-11)	nination (	if not F)	140	$\begin{array}{c} D \\ D_R = & (pc \\ LOS = & (Ex \\ \hline Speed De \\ D_S = & (Ext \\ S_R = & mpt \end{array}$	R = 4.252 + ( /mi/ln) chibit 13-2) e <b>terminati</b> hibit 13-12) n (Exhibit 13-12	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	
$V_{R12}$ <b>Level of Serv</b> $D_R = 5.475 + 0.00$ $D_R = 0.491 \text{ (Exilibit)}$	Actual 3938 ice Deteri 0.00734 v <sub>R</sub> + ni/ln) 13-2) mination bit 13-11)	nination (	if not F)	140	$\begin{array}{c} D_{\rm R} = & {\rm pc} \\ D_{\rm R} = & {\rm (pc} \\ {\rm LOS} = & {\rm (Ex} \\ \hline {\rm \textit{Speed De}} \\ D_{\rm s} = & {\rm (Ext} \\ S_{\rm R} = & {\rm mpt} \\ S_{\rm 0} = & {\rm mpt} \\ \end{array}$	R = 4.252 + ( /mi/ln) (hibit 13-2) (eterminati hibit 13-12)	0.0086 V <sub>12</sub> - 0	.009 L <sub>D</sub>	

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 7-Be 2040 Bu	et On Ramps ild 2A
Project Description SW 10	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	4980	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		<u> </u>		
_	1.00			1.2	
f <sub>p</sub>  E <sub>T</sub>	1.50		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	0.985	
Speed Inputs			Calc Speed Adj and FFS		
•					
Lane Width		ft	\		mnh
Rt-Side Lat. Clearance	2	ft	f <sub>LW</sub>		mph
Number of Lanes, N Total Ramp Density, TRD	3	ramps/mi	f <sub>LC</sub> TRD Adjustment		mph
FFS (measured)	70.0	mph	FFS	70.0	mph mph
Base free-flow Speed, BFFS		mph		70.0	Прп
LOS and Performance	Measures		Design (N)		
Operational (LOS)	med3dre3		Design (N) Design LOS		
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> ) 1774 66.2 26.8 D	pc/h/ln mph pc/mi/ln	$v_p = (V \text{ or DDHV}) / (PHF \times N \times S)$ $D = v_p / S$ Required Number of Lanes, N	$f_{HV} \times f_p$ )	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	-	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		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 Southbound On-Ramp from SW 10th Street EB & WB Analysis Period: PM Peak Hour

Analysis Year: 2040 Build 2A



Ramp Tr % = 2%
Downstream Freeway Tr % = 3%

Freeway  $f_{HV}$  = 1/(1+P<sub>T</sub>(E<sub>T</sub>-1)+P<sub>R</sub>(E<sub>R</sub>-1)) = 0.985 Ramp  $f_{HV}$  = 1/(1+P<sub>T</sub>(E<sub>T</sub>-1)+P<sub>R</sub>(E<sub>R</sub>-1)) = 0.9901

flat terrain  $E_T = 1.5$ RV % = 0

**Driver Population adj.**  $f_P = 1.000$ 

 $V_{fr} = = V_{fr}/(PHF)(f_{HV})(f_{P}) = V_{r} = = V_{r}/(PHF)(f_{HV})(f_{P}) = V_{f} = = V_{f}/(PHF)(f_{HV})(f_{P}) = V_{f}/(PHF)(f_{HV})(f_{P})(f_{P}) = V_{f}/(PHF)(f_{HV})(f_{P})($ 

6,902 pc/h
1,573 pc/h
5,321 pc/h

No. lanes upstream of ramp N = 3

No. Ln	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	6,902	0.72	No
3	Fwy upstream of ramp (assume 70 mph free-flow speed) =	7,200	5,321	0.74	No
1	Capacity on On-Ramp (assume 45 mph free-flow speed) =	2,100	1,573	0.75	No

	BASIC F	REEWAY SE	GMENTS WORKSHEET		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	AECOM PM		Highway/Direction of Travel From/To Jurisdiction Analysis Year	I-95 SB Seg 9-Be 2040 Bu	et 10th & Exit to Exp ild 2A
'	th Street SIMR				
✓ Oper.(LOS	)		Des.(N)	□Pla	nning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D	6460	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> E <sub>T</sub>	1.00 1.5		$E_{R}$ $f_{HV} = 1/[1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1)]$	1.2 0.985	
Speed Inputs			Calc Speed Adj and FFS	3	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	$f_{LW}$		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	3	mph			·
LOS and Performance	Measures		Design (N)		
Operational (LOS) 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> ) 1726 66.8 25.8 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	$f_{HV} \times f_p$ )	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 freeur 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 11-5		f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11

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		MPS AND	RAMP JUN			ET			
General Infor	mation			Site Infor					
Analyst			Fr	eeway/Dir of Tr		95 SB			
Agency or Company	AEC	MC		ınction	S	eg 10-Merge fr	om Ex to GP		
Date Performed Analysis Time Perioc	l PM			ırisdiction nalysis Year	21	040 Build 2A			
Project Description		t SIMR	Λι	ialysis i cai		040 Dullu ZA			
nputs	OVV TOUT OUTO	CONVIC							
-		Freeway Num	ber of Lanes, N	4				D	A !:
Jpstream Adj Ramp		Ramp Number	•	1				Downstre Ramp	eam Adj
☐ Yes ☐ Or	1	I '	ane Length, L <sub>A</sub>	600					_
		1	,,	000				✓ Yes	☐ On
✓ No ☐ Of	f		ane Length L <sub>D</sub>	0.400				☐ No	✓ Off
= ft		Freeway Volui		6460				L <sub>down</sub> =	1150 ft
<sub>up</sub> = ft		Ramp Volume		390				down	1100 10
/ <sub>u</sub> = veh/h		1	Flow Speed, S <sub>FF</sub>	70.0				V <sub>D</sub> =	750 veh/h
		1	ow Speed, S <sub>FR</sub>	50.0					
Conversion to		der Base (	Conditions				•		
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	$f_{HV}$	f <sub>p</sub>	v = V/PH	F x f <sub>HV</sub> x f <sub>p</sub>
Freeway	6460	0.95	Level	3	0	0.985	1.00		6902
Ramp	390	0.92	Level	2	0	0.990	1.00		428
UpStream		1 1			Ť	0.000			
DownStream	750	0.92	Level	2	0	0.990	1.00		823
		Merge Areas		•			Diverge Areas		
Estimation of	v <sub>12</sub>				Estimation	on of v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	( P <sub>EM</sub> )				\/ -	\/ \ \ (\/ \/	\D	
- <sub>EQ</sub> =		ation 13-6 or	13-7)			v <sub>12</sub> –	$V_R + (V_F - V_R)$		4.0\
P <sub>FM</sub> =	• •		ion (Exhibit 13-6)	1	L <sub>EQ</sub> =		(Equation 13-		•
' <sub>12</sub> =	1134		OTT (EXTILIZE TO 0)		P <sub>FD</sub> =		using Equation	n (Exhibit 1	3-7)
			on 13-14 or 13-		V <sub>12</sub> =		pc/h		
$V_3$ or $V_{av34}$	17)	po/ii (Equatio	)   10-1 <del>4</del> 0  10-		${ m V_3}$ or ${ m V_{av34}}$		pc/h (Equation 1	13-14 or 13-	17)
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70	0 pc/h? <b>☑</b> Ye	s 🗌 No			Is V <sub>3</sub> or V <sub>av34</sub>	> 2,700 pc/h?	☐Yes ☐ No		
ls V <sub>3</sub> or V <sub>av34</sub> > 1.5 *	V <sub>12</sub> /2	s 🗌 No			Is V <sub>3</sub> or V <sub>av34</sub>	> 1.5 * V <sub>12</sub> /2	☐Yes ☐ No		
Yes,V <sub>12a</sub> =			on 13-16, 13-		If Yes,V <sub>12a</sub> =		pc/h (Equatio	n 13-16, 1	13-18, or
		13-19)					3-19)		
Capacity Che	T.	T .		T	Capacity				1
	Actual		apacity	LOS F?	1/	Actual		pacity	LOS F?
					V <sub>F</sub>		Exhibit 13-		
$V_{FO}$	7330	Exhibit 13-8		No	$V_{FO} = V_{F}$ -	V <sub>R</sub>	Exhibit 13-		
					$V_R$		Exhibit 13	-	
low Entoring	Morae In	fluoroo A	<u> </u>			oring Dive	10		<u> </u>
low Entering	Actual		<b>rea</b> Desirable	Violation?	FIOW Ent	Actual	erge Influer		Violation?
V <sub>R12</sub>	3188	Exhibit 13-8	4600:All	No	V <sub>12</sub>	Actual	Exhibit 13-8	li abie	Violations
Level of Serv	l			110		Sarvica D	eterminatio	n (if no:	<u> </u>
	0.00734 v <sub>R</sub> + 0	•			t		0.0086 V <sub>12</sub> - 0		. <i></i> )
••	• • •	0.0070 v <sub>12</sub> - 0.0	10027 L <sub>A</sub>				0.0000 v <sub>12</sub> - 0	.009 L <sub>D</sub>	
$P_{R} = 26.4  (pc/m)$	•					/mi/ln)			
	•				`	(hibit 13-2)			
	nination				<del>† ′</del>	eterminati	on		
OS = C (Exhibit	iiiiatioii				$D_s = (Ext)$	hibit 13-12)			
					- s (=/:	,			
Speed Determ						n (Exhibit 13-12	)		
Speed Determine $M_S = 0.356$ (Exilor Response)	bit 13-11) (Exhibit 13-11)				S <sub>R</sub> = mph	,			
Speed Determ $M_S = 0.356$ (Exil $G_R = 60.0$ mph ( $G_0 = 64.3$ mph (	bit 13-11)				$S_R = mph$ $S_0 = mph$	n (Exhibit 13-12	)		

2040 Build 2A Freeway HCS Operational Analysis

		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor	mation					
Analyst			Fr	eeway/Dir of Tr	avel	I-95 SB				
Agency or Company	AEC	MC		nction		Seg 11-	Diverge to	Express		
Date Performed	I DM			risdiction		2040 D.	אס אוי.			
Analysis Time Period Project Description		t SIMP	AI	nalysis Year		2040 Bı	JIIQ ZA			
Inputs	344 1011131166	t Oliviix								
		Freeway Num	nber of Lanes, N	4					5 ,	
Upstream Adj R	amp	•	er of Lanes, N	1					Downstrea Ramp	m Adj
✓ Yes	On	· ·	Lane Length, L <sub>Δ</sub>	1						_
			- //	000					Yes	On
□No□	Off		Lane Length L <sub>D</sub>	200					✓ No	Off
1 - 44	ΓΛ <b>£</b> 4	Freeway Volu		6850					l. =	ft
L <sub>up</sub> = 11	50 ft	Ramp Volume	1.	750					L <sub>down</sub> =	
V <sub></sub> = 39	0 veh/h		e-Flow Speed, S <sub>FF</sub>	70.0					V <sub>D</sub> =	veh/h
u 90	0 1011111	Ramp Free-F	low Speed, S <sub>FR</sub>	45.0					5	
Conversion to	o pc/h Und	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		$f_{HV}$	f <sub>p</sub>	v = V/PHF	x f <sub>HV</sub> x f <sub>n</sub>
Freeway	6850	0.95	Level	3	0	4	985	1.00	73	'
Ramp	750	0.92	Level	2	0		990	1.00	82	
UpStream	390	0.92	Level	2	0	_	990	1.00	42	
DownStream	000	0.02	20101		<u> </u>	<del>  •••</del>	,,,,	1.00	12	
		Merge Areas						verge Areas		
Estimation of	V <sub>12</sub>				Estimati	ion o	f v <sub>12</sub>			
	V <sub>12</sub> = V <sub>F</sub>	(P <sub>EM</sub> )					V <sub>10</sub> =	V <sub>R</sub> + (V <sub>F</sub> - V <sub>F</sub>	,)P <sub>-D</sub>	
L <sub>EQ</sub> =		` ™′ ition 13-6 or	13-7)		L <sub>EQ</sub> =			iquation 13-1		
-EQ P <sub>FM</sub> =	, -	Equation (	•		P <sub>FD</sub> =		,	36 using Equ	•	
' <sub>FM</sub> V <sub>12</sub> =	pc/h	Lquation (	EXHIBIT 10 0)		V <sub>12</sub> =			55 pc/h	adion (Exilia	nt 10-7)
V <sub>3</sub> or V <sub>av34</sub>	-	Equation 13	3-14 or 13-17)		V <sub>12</sub> V <sub>3</sub> or V <sub>av34</sub>			32 pc/h (Equa	otion 12 11	or 12 17\
Is V <sub>3</sub> or V <sub>av34</sub> > 2,70			)-14 OI 13-17)			> 2.70		Yes <b>V</b> No	allOII 13-14	01 13-17)
Is V <sub>3</sub> or V <sub>av34</sub> > 1.5 *			3-16, 13-18, or					Yes ☑ No :/h (Equation	13_16 13_	18 or 13-
If Yes,V <sub>12a</sub> =	13-19)		-10, 10-10, 01		If Yes,V <sub>12a</sub> =	:	19	. ' '	10-10, 10-	10, 01 10-
Capacity Che	cks				Capacity	y Che	ecks			
	Actual	(	Capacity	LOS F?			Actual	Ca	pacity	LOS F?
					$V_{F}$		7319	Exhibit 13-8	9600	No
$V_{FO}$		Exhibit 13-8			$V_{FO} = V_{F}$	- V <sub>R</sub>	6496	Exhibit 13-8	9600	No
					V <sub>R</sub>		823	Exhibit 13-10	2100	No
Flow Entering	n Merge In	fluence /	lroa	<u> </u>	+	torin		ge Influenc		
TOW LINETHIS	Actual	-	Desirable	Violation?	1 10W EII		ctual	Max Desirab		Violation?
V <sub>R12</sub>	7 10 10 0.1	Exhibit 13-8	20000.0		V <sub>12</sub>	_	655	Exhibit 13-8	4400:All	No
Level of Serv	ice Detern		if not F)		<del> </del>			erminatio		
$D_R = 5.475 + 0.$					1			0086 V <sub>12</sub> - 0.0	_	,
* *		0.0070 112	0.00027					12	<b>-</b> D	
	,				I ''	'.0 (pc/	,			
LOS = (Exhibit	,					•	it 13-2)			
Speed Detern	nination				Speed D					
M <sub>S</sub> = (Exibit 13	3-11)				,	•	khibit 13-1	•		
S <sub>R</sub> = mph (Exh	ibit 13-11)					-	(Exhibit 1	•		
	ibit 13-11)				$S_0 = 74$	l.3 mph	(Exhibit 1	3-12)		
S = mph (Exh	ibit 13-13)				S = 65	5.4 mph	(Exhibit 1	3-13)		
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Location:	Seg 12: I	-95 SB Off-Ramp to Sample R	Road EB & W	В			
<b>Analysis Period:</b>							
Analysis Year:	2040 Build 2A						
				<b></b>			
	<b></b>	6,100		<b>→</b> 4,			
	PHF =	0.95		1,300			
	v <sub>fr</sub> =	<b>6,100</b> vph					
	$v_r =$	<b>1,300</b> vph					
	$v_f =$	4,800					
<b>Upstream Freeway</b>	Tr % =	3%					
Ramp	Tr % =	2%					
<b>Downstream Freeway</b>							
Freeway	f <sub>HV</sub> =	$1/(1+P_T(E_T-1)+P_R(E_R-1)) =$	:	0.985			
Ramp	f <sub>HV</sub> =	$1/(1+P_T(E_{T}-1)+P_R(E_{R}-1)) =$	•	0.9901			
flat terrain	E <sub>T</sub> =	1.5	-				
	RV % =	0					
Driver Population adj.	$f_P =$	1.000					
	$V_{fr} =$	$=v_{fr}/(PHF)(f_{HV})(f_P)=$	6,517	pc/h			
	$V_r =$	$=v_r/(PHF)(f_{HV})(f_P)=$	1,382	pc/h			
	$V_f =$	$=v_{\text{H}}(PHF)(f_{\text{HV}})(f_{\text{P}}) =$	5,128	pc/h			
No. lanes upstream of ramp	•	4	<u>,                                      </u>				
	•.			40.00			
Average Freeway D	ensity (	Jpstream of Diverge (see	Equation	<u>13-26):</u>			
$D = 0.0175 (V_{fr}/N) =$	28.5	pc/In					
LOS in the Diverge	Area (fr	om Density and Exhibit 1	13-2) =				
		D					
o. Ln Capacity Check (se	e Exhib	its 13-2, 13-8 and 13.10)	Maximum	Actual LO			
		) mph free-flow speed) =	9,600	6,517 No			
		70 mph free-flow speed) =	7,200	5,128 No			

BASIC FREEWAY SEGMENTS 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	I-95 SB Seg 13-Bet Off & On Ramps			
Analysis Time Period	PM		Analysis Year	2040 Bu	ild 2A			
•	th Street SIMR							
✓ Oper.(LOS)	)		Des.(N)	☐ Planning Data				
Flow Inputs								
Volume, V AADT	4800	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				
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					
Lane Width		ft						
Rt-Side Lat. Clearance		ft	$f_{LW}$		mph			
Number of Lanes, N	3		$f_{LC}$		mph			
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph			
FFS (measured)	70.0	mph	FFS	70.0	mph			
Base free-flow Speed, BFFS		mph						
LOS and Performance	Measures		Design (N)					
Operational (LOS) $f_p = (V \text{ or DDHV}) / (PHF \times N \times f_{HV} \times f_p) 1709$ $f_p = (F \times f_{$			Design (N) Design LOS  v <sub>p</sub> = (V or DDHV) / (PHF x N x S	$f_{HV} \times f_p)$	pc/h/ln mph			
D = v <sub>p</sub> / S LOS	25.5 C	pc/mi/ln	$D = v_p / S$ pc/mi/ln Required Number of Lanes, N					
Glossary			Factor Location					
N - Number of lanes	S - Speed							
V - Hourly volume v <sub>p</sub> - Flow rate LOS - Level of service	D - Density FFS - Free-flow BFFS - Base fre	-	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	f <sub>LW</sub> - Exhibit 11-8 f <sub>LC</sub> - Exhibit 11-9 TRD - Page 11-11				
DDHV - Directional design ho	our volume		LOS, S, FFS, v <sub>p</sub> - Exhibits 11-	∠, 11-3				

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			REEWAY	WEAV			<u> </u>		
General Information				Site Information					
Analyst Agency/Company AECOM Date Performed Analysis Time Period PM			Freeway/Dir of Travel Weaving Segment Location Analysis Year  I-95 SB Seg 14- Bet Sample & Co 2040 Build 2A				le & Copans		
Project Des	cription SW 10tl	n Street SIMF	?						
Inputs									
Weaving number of lanes, N 4 Weaving segment length, $L_s$ 2520ft Freeway free-flow speed, FFS 70 mph				Freeway minimum speed, S <sub>MIN</sub>				Freeway 19 2400 Leve	
Conver	sions to po	h Unde	r Base Co	ndition	S				
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε <sub>Τ</sub>	ER	$f_{HV}$	fp	v (pc/h)
$V_{FF}$	4035	0.95	3	0	1.5	1.2	0.985	1.00	4311
$V_{RF}$	1560	0.92	2	0	1.5	1.2	0.990	1.00	1713
$V_{FR}$	765	0.92	2	0	1.5	1.2	0.990	1.00	840
$V_RR$	0	0.95	0	0	1.5	1.2	1.000	1.00	0
$V_NW$	4311							V =	6864
$V_{W}$	2553								
VR	0.372								
Configu	ration Cha	aracteris	tics		1				
Minimum maneuver lanes, N <sub>WL</sub> 2 Ic			Minimum weaving lane changes, $LC_{MIN}$				lc/h		
			Weaving lane changes, LC <sub>w</sub>				lc/h		
Minimum RF lane changes, LC <sub>RF</sub> 1 lc/pc			Non-weaving lane changes, LC <sub>NW</sub>				lc/h		
				Total lane changes, LC <sub>ALL</sub>				lc/h	
Minimum R	R lane changes,	ne changes, LC <sub>RR</sub> Ic/pc			Non-weaving vehicle index, I <sub>NW</sub>				
Weavin	g Segment	Speed,	Density, I	_evel of	i i				
Weaving se	gment flow rate gment capacity, gment v/c ratio			6775 veh/h 6357 veh/h 1.066	Weaving into Weaving seg Average wea	gment speed	, S		mph mph
			Average non-weaving speed, $S_{\rm NW}$			mph			
Level of Se	evel of Service, LOS F			Maximum weaving length, L <sub>MAX</sub>			6368 ff		

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas 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".