

										origoninaria	21110
p(10) p(11)											
p(12)									_		
Computation 4 and 5 Single-Stage Process											
Movement	1	4	7	8	9	10	11	12			
	L	L	L	Т	R	L	Т	R			
V c,x					1010				_		
s Px											
V c,u,x											
C r,x C plat,x									_		
Two-Stage Process									_		
Stage1	7 Stage2	Stage1	8 Stage	2 Stag	10 e1 S	tage2		l1 Stage2			
V(c,x)									_		
S											
P(x) V(c,u,x)											
									_		
C(r,x) C(plat,x)											
									_		
Worksheet 6-Impedance	e and Ca	pacity E	quation	ıS							
Step 1: RT from Minor	r St.				9		12	2	_		
Conflicting Flows				10					_		
Potential Capacity Pedestrian Impedance	Factor			29 1.			1.00)			
Movement Capacity	ractor			29			1.00	,			
Probability of Queue	free St			0.			1.00)			
Step 2: LT from Major	r St.				4		1	L	_		
Conflicting Flows									_		
Potential Capacity							1 00				
Pedestrian Impedance Movement Capacity	Factor			1.	00		1.00)			
Probability of Queue	free St	_		1.	00		1.00)			
Maj L-Shared Prob Q											
Step 3: TH from Mino:	r St.				8		11	L	_		
Conflicting Flows									_		
Potential Capacity	.				0.0						
Pedestrian Impedance Cap. Adj. factor due		dina mvm	ınt	1. 1.			1.00				
Movement Capacity	-	-			/	\					
Probability of Queue	free St	•		1.	00		1.00)			
Step 4: LT from Mino:	r St.				7		10		_		
Conflicting Flows				7/			11		-\		
Potential Capacity									\		
Pedestrian Impedance Maj. L, Min T Impedan		nr.		1.	00		1.00				
Maj. L, Min T Adj. Ir				\			1.00)	
Cap. Adj. factor due			ınt	1.	00		0.89)	_ \		
Movement Capacity					_		\ /	~ ト		\	
Worksheet 7-Computat:	ion of th	ne Effec	t of Tw	ro-stage	Gap	Accept	ance	(- Л	1	_
					8		11		_ /		
Step 3: TH from Mino:	L DE.				•		1/1		_//	/	J
Part 1 - First Stage											
Conflicting Flows Potential Capacity							7			1	
Pedestrian Impedance	Factor							_	_	1	
Cap. Adj. factor due		ding mvm	ınt)	



Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Cap. Adj. factor due to Impeding mymnt 1.00 1.00 Movement Capacity Result for 2 stage process: а У Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 10 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity 1.00 Pedestrian Impedance Factor 1.00 Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. 1.00 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.89 Movement Capacity Results for Two-stage process: а У Ĉt Worksheet 8-Shared Lane Calculations Movement 8 10 11 12 Т R Τ R L Volume (vph) 32 294 Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 8 9 10 11 12 Т L R Τ R L C sep 294 Volume 32 Delay Q sep Q sep +1 round (Qsep +1) n max

C sh



SUM C sep n C act

Worksheet 10-Delay,	Queue	Length,	and	Level of	Service				
Movement Lane Config	1	4	7	8	9 R	10	11	12	
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS				18.7 C	32 294 0.11 0.37 18.7 C				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	1.00
v(il), Volume for stream 2 or 5		
v(i2), Volume for stream 3 or 6		
s(il), Saturation flow rate for stream 2 or 5		
s(i2), Saturation flow rate for stream 3 or 6		
P*(oj)		
d(M,LT), Delay for stream 1 or 4		
N, Number of major street through lanes		
d(rank,1) Delay for stream 2 or 5		

1.1.3.2 Interseção A – Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

	TWO-WAY S	TOP CON	ITROL S	JMMAI	RY		
Analyst:	Progeplan						
Agency/Co.:	. = / /						
Date Performed:	05/06/2023						
Analysis Time Period							
Intersection:	Α						
Jurisdiction:	DER/DF						
Units: U. S. Metric	0000						
Analysis Year:	2023					_	
Project ID: AMPLIAÇÂ East/West Street:	NOVO1-MOV0				/	\	
,		4			/	\	
North/South Street: Intersection Oriental				7 + 1 - 1 -	10 0 K d	ad (br	1 00
intersection Oriental	TOU: FM		()	s cua	y peri	ou (nrs): 1.00
	Vehicle Vo	1111112 3	nd Adi	10+m/	ante		
Major Street: Approx		astboun		15 CILL		est.boun	d
Moveme		2.	3		4	5	۵ (ه
110 V CIII	T.	T	R		T.	Т	R
		_		_ \		_	
Volume		731	8	_			
Peak-Hour Factor, PHI	Ţ.	0.91	0.9	1			\rightarrow
Hourly Flow Rate, HFI		803	8	1			
Percent Heavy Vehicle							1/>
Median Type/Storage	Undi	vided			1		
RT Channelized?				_	<u> </u>		/ \
Lanes		2	0				[[
Configuration		T	TR			(\ \
Upstream Signal?		No				No	
Minor Street: Approx	ach N	orthbou	ınd		S	outhbou	nd
Moveme	ent 7	8	9		10	11	12
	L	T	R		L	T	R
Volume							



Peak Hour Factor, PHF 0.91
Hourly Flow Rate, HFR 13
Percent Heavy Vehicles 0
Percent Grade (%) 0

Flared Approach: Exists?/Storage

Lanes 1 Configuration R

Delay, Queue Length, and Level of Service Southbound Approach EB WB Northbound 9 Movement 1 4 8 10 11 Lane Config R v (vph) 13 C(m) (vph) 649 v/c 0.02 95% queue length 0.06 Control Delay 10.7 LOS В Approach Delay 10.7 Approach LOS В

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail: Fax:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Analyst: Progeplan
Agency/Co.:
Date Performed: 05/06/2023
Analysis Time Period: Pico Tarde
Intersection: A
Jurisdiction: DER/DF
Units: U. S. Metric

Analysis Year: 2023

Project ID: AMPLIAÇÃO CNPQ - FUTURA East/West Street: MOV01-MOV04 North/South Street: MOV04

Intersection Orientation: EW

Study period (hrs): 1.00

0

	_Vehicle V	olumes/	and Ad	justmen	ts		
Major Street Movements	1	2	3	4	5	6	
	L	T	R	L	T	R	
					/\-		
Volume		731	8		/ \		
Peak-Hour Factor, PHF		0.91	0.91				
Peak-15 Minute Volume		201	2 (Ť)	
Hourly Flow Rate, HFR		803	8				
Percent Heavy Vehicles			\			\ - /	
Median Type/Storage	Undiv	rided	/	/ /		\ \ \ \	
RT Channelized?							
Lanes		2	0				
Configuration		T T	R	\			
Upstream Signal?		No		- \	No		
1							
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume							
Peak Hour Factor, PHF			0.91				
Peak-15 Minute Volume			3		\		- /
Hourly Flow Rate, HFR			13			_ \\ // _	J
Percent Heavy Vehicles			0				
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storage	}		/		/	
RT Channelized			No				
Lanes			1				



Configuration R

lovements					a Aajus 15	stments_ 16		
low (ped/hr)					0	0		
ane Width (m) alking Speed	(m/soc)				3.6 1.2	3.6 1.2		
ercent Blockag					0	0		
		1	Upstrea	m Signa	l Data			
	Prog.	Sat	Arri	_	_	Cycle	Prog.	Distance
	Flow	Flo	w Typ			Length	Speed	to Signa
	vph	vph		S	ec	sec	kph	meters
2 Left-Turn								
Through								
5 Left-Turn								
Through								
orksheet 3-Dat	a for C	omnu+in	r Effor	t of Do	lav +0	Major	Street "	
Jiksheet 3-Dat	_a 101 C	JIIPUCIII	g Ellec	t or be	iay to	Major 3	otieet v	enicies
					Movemer	nt 2	Moveme	ent 5
hared ln volum	ne, maio:	r th vel	hicles:					
hared ln volum	_							
at flow rate,								
at flow rate,								
umber of major	street	through	h lanes	:				
orksheet 4-Cri	itical G	ap and :	Follow-	up Time	Calcul	lation		
			Follow-	up Time	Calcul	lation		
citical Gap Ca			Follow-	up Time	Calcul	lation 10	11	12
citical Gap Ca	alculation	on					11 T	12 R
ritical Gap Ca ovement	alculation 1	on 4	7	8	9 R	10		
ritical Gap Ca	alculation 1 L	on 4 L	7 L	8 T	9 R 6.2	10 L	Т	R
Torksheet 4-Cri Tritical Gap Ca Tovement (c,base) (c,hv)	alculation 1	on 4	7	8	9 R 6.2 1.00	10		
ritical Gap Calovement (c,base) (c,hv)	alculation 1 L	on 4 L	7 L	8 T	9 R 6.2 1.00	10 L	1.00	1.00
ritical Gap Ca ovement (c,base) (c,hv) (hv) (c,g)	alculation 1 L	on 4 L	7 L	8 T	9 R 6.2 1.00	10 L	Т	R
ritical Gap Ca lovement (c,base)	alculation 1 L	on 4 L	7 L 1.00	8 T 1.00	9 R 6.2 1.00 0	10 L 1.00	1.00 0.20	1.00 0.10
ritical Gap Ca ovement (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt)	alculation 1 L	on 4 L	7 L 1.00	8 T 1.00	9 R 6.2 1.00 0 0.10 0.00	10 L 1.00	1.00 0.20	1.00 0.10
ritical Gap Caovement (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag	1.00 1.00 1.00	1.00	7 L 1.00 0.20 0.00	8 T 1.00 0.20 0.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00	10 L 1.00 0.20 0.00	1.00 0.20 0.00	1.00 0.10 0.00
(c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag	1.00 1.00 ge 0.00 ge 0.00 ge 0.00	1.00	7 L 1.00 0.20 0.00	8 T 1.00 0.20 0.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00	10 L 1.00 0.20 0.00	1.00 0.20 0.00	1.00 0.10 0.00
(c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag	1.00 1.00 ge 0.00 ge 0.00 ge 0.00	1.00	7 L 1.00 0.20 0.00	8 T 1.00 0.20 0.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00	10 L 1.00 0.20 0.00	1.00 0.20 0.00	1.00 0.10 0.00
(c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag	1.00 ge 0.00 ge 0.00 ge ge	1.00 0.00 0.00	7 L 1.00 0.20 0.00 0.00	8 T 1.00 0.20 0.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00	1.00 0.20 0.00	1.00 0.10 0.00
(c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag	1.00 ge 0.00 ge 0.00 ge ge Calculation	1.00 0.00 0.00	7 L 1.00 0.20 0.00	1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00	10 L 1.00 0.20 0.00	1.00 0.20 0.00	1.00 0.10 0.00
(c,base) (c,hv) (hv) (c,g) (c,T): 1-stag 2-stag (c) 2-stag Dllow-Up Time	alculation 1 L L 1.00 ge 0.00 ge 0.00 ge ge Calculation Calculation 1 control to the control to	1.00 0.00 0.00 0.00	7 L 1.00 0.20 0.00 0.00	8 T 1.00 0.20 0.00 0.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00	1.00 0.20 0.00 0.00	1.00 0.10 0.00 0.00 0.00
(c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag ollow-Up Time ovement	1.00 ge 0.00 ge 0.00 ge ge Calculation	1.00 0.00 0.00 0.00	7 L 1.00 0.20 0.00 0.00	1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00	1.00 0.20 0.00 0.00	1.00 0.10 0.00 0.00 0.00
(c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag collow-Up Time evement (f,base)	1.00 ge 0.00 ge 0.00 ge ge Calculation	1.00 0.00 0.00 0.00	7 L 1.00 0.20 0.00 0.00	1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00	1.00 0.20 0.00 0.00	1.00 0.10 0.00 0.00 0.00
critical Gap Cap present (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag collow-Up Time present (f,base) (f,HV)	1.00 ge 0.00 ge 0.00 ge ge Calculation	0.00 0.00 0.00 tions 4 L	7 L 1.00 0.20 0.00 0.00 1.00	8 T 1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R
ritical Gap Ca ovement (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag ollow-Up Time ovement (f,base) (f,HV) (HV)	1.00 ge 0.00 ge 0.00 ge ge Calculation	0.00 0.00 0.00 tions 4 L	7 L 1.00 0.20 0.00 0.00 1.00	8 T 1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R
ritical Gap Ca ovement (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag	1.00 ge 0.00 ge 0.00 ge ge Calculation	0.00 0.00 0.00 tions 4 L	7 L 1.00 0.20 0.00 0.00 1.00	8 T 1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R
ritical Gap Ca ovement (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag (ollow-Up Time ovement (f,base) (f,HV) (HV) (f)	1.00 ge 0.00 ge 0.00 ge ge Calculation L	0.00 0.00 0.00 0.00	7 L 1.00 0.20 0.00 0.00 1.00	8 T 1.00 0.20 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R
ritical Gap Capvement (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag ollow-Up Time ovement (f,base) (f,HV) (HV)	1.00 ge 0.00 ge 0.00 ge ge Calculation L	0.00 0.00 0.00 0.00	7 L 1.00 0.20 0.00 0.00 1.00	8 T 1.00 0.20 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R
(c,base) (c,hv) (hv) (c,g) (c,T): 1-stag 2-stag (c) 1-stag 2-stag (d) (e,T): 1-stag (f,base) (f,HV) (HV) (f)	alculation 1 L 1.00 ge 0.00 ge	1.00 1.00 0.00 0.00 tions 4 L 0.90	7 L 1.00 0.20 0.00 0.00 1.00	8 T 1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R
ritical Gap Ca ovement (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stag 2-stag (c) 1-stag 2-stag ollow-Up Time ovement (f,base) (f,HV) (HV)	1.00 ge 0.00 ge 0.00 ge ge Calculation	0.00 0.00 0.00 tions 4 L	7 L 1.00 0.20 0.00 0.00 1.00	8 T 1.00 0.20 0.00 0.00 1.00	9 R 6.2 1.00 0 0.10 0.00 0.00 0.00 0.00 6.2	10 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 0.00 1.00	R 1.00 0.10 0.00 0.00 0.00 12 R

V prog
Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P g(q1)
g(q2)
g(q)



Computation 2-Proportion of TWSC Intersection Time blocked Movement 2 Movement 5 V(t) = V(1,prot) - V(t) - V(1,prot)

alpha beta Travel time, t(a) (sec) Smoothing Factor, F Proportion of conflicting flow, f Max platooned flow, V(c, max) Min platooned flow, V(c,min) Duration of blocked period, t(p) 0.000 0.000 Proportion time blocked, p Computation 3-Platoon Event Periods Result p(2) 0.000 p(5) 0.000 p (dom) p(subo) Constrained or unconstrained? Proportion unblocked (1) (2) (3) for minor Single-stage Two-Stage Process movements, p(x) Process Stage I Stage II p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12) Computation 4 and 5 Single-Stage Process 8 9 10 11 12 Movement 1 L Т L L R L Τ R V c,x 406 S Рx V c,u,x Cr,x C plat,x Two-Stage Process 10 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 V(c,x) P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance and Capacity Equations Step 1: RT from Minor St. 9 12 Conflicting Flows 406 Potential Capacity 649 1.00 Pedestrian Impedance Factor 1.00 Movement Capacity 649 Probability of Queue free St. 0.98 1.00 Step 2: LT from Major St. 4 Conflicting Flows Potential Capacity 1.00 1.00 Pedestrian Impedance Factor Movement Capacity



Probability of Queue free St. Maj L-Shared Prob Q free St.	1.00	1.00	
Step 3: TH from Minor St.	8	11	_
Conflicting Flows Potential Capacity Pedestrian Impedance Factor	1.00	1.00	-
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	1.00	
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	_
Conflicting Flows Potential Capacity			_
Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor		1.00	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt	1.00	1.00 0.98	
Movement Capacity	1.00	0.96	
Worksheet 7-Computation of the Effect of	Two-stage Can Acce	ntance	-
<u>-</u>			_
Step 3: TH from Minor St.	8	11	_
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.			
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity			-
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	1.00	-
Result for 2 stage process:			_
а У			
C t Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	-
			_
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity		300	
Part 3 - Single Stage Conflicting Flows Potential Capacity	1.00	100	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00	1.00 1.00	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt	1.00	1.00	



Movement Capacity

Results for Two-stage process:
a
Y
C t

Worksheet 8-Shared Lane Calculations

Movement 7 8 9 10 11 12 L T R L T R

Volume (vph) 13 649
Shared Lane Capacity (vph)

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement 7 8 9 10 11 12
L T R L T R

C sep 649
Volume 13
Delay
Q sep
Q sep +1
round (Qsep +1)
n max

n max C sh SUM C sep n C act

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config					R			
v (vph)					13			
C(m) (vph)					649			
v/c					0.02			
95% queue length					0.06			
Control Delay					10.7			
LOS					В			
Approach Delay				10.7				
Approach LOS				В				

Movement 2

1.00

Movement 5

1.00

Worksheet 11-Shared Major LT Impedance and Delay

p(oj)
v(i1), Volume for stream 2 or 5
v(i2), Volume for stream 3 or 6
s(i1), Saturation flow rate for stream 2 or 5
s(i2), Saturation flow rate for stream 3 or 6
P*(oj)
d(M,LT), Delay for stream 1 or 4
N, Number of major street through lanes
d(rank,1) Delay for stream 2 or 5

1.1.3.3 Interseção B – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Progeplan



05/06/2023 Date Performed: Analysis Time Period: Pico Manha

Intersection:

В Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: Project ID: FUTURA 2023 East/West Street: M2 North/South Street: М7

Intersection Orientation: ${\tt EW}$

Vehicle Volumes and Adjustments

Study period (hrs): 1.00

Major Street:	Approach	Ea	stbound	i -		Wes	stbound		
=	Movement	1	2	3		4	5	6	
		L	T	R	Ì	L	T	R	
Volume						9	763		
Peak-Hour Fact	or, PHF					0.91	0.91		
Hourly Flow Ra	te, HFR					9	838		
Percent Heavy	Vehicles					12			
Median Type/St RT Channelized		Undiv	ided			/			
Lanes						0	2		
Configuration						L	ГТ		
Upstream Signa	1?		No				No		
Minor Street:	Approach	No	rthbour	nd		Sot	ıthboun	.d	
	Movement	7	8	9		10	11	12	
		L	Т	R	I	L	T	R	
Volume		42							
Peak Hour Fact	or, PHF	0.91							
Hourly Flow Ra	te, HFR	46							
Percent Heavy		0							
Percent Grade	(%)		0				0		
Flared Approac	h: Exists?	?/Storage	!		/				/
Lanes		1							
Configuration		I	ı						
				1 7		<i>-</i>			
7		Queue Le				i Servi		1.1 1	
Approach	EB	WB		rthboun				hbound	
Movement	1	4	7	8	9	-	10	11	12
Lane Config		LT	L			ı			
v (vph)		9	46						
C(m) (vph)		1560	578						
v/c		0.01	0.08						
95% queue leng		0.02	0.26						
Control Doloss		7 2	11 0						

HCS+: Unsignalized Intersections Release 5.6

11.8

В

11.8

В

7.3

Phone: E-Mail:

Control Delay

Approach Delay

Approach LOS

LOS

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Fax:

Analyst: Progeplan Agency/Co.:

Project ID: FUTURA

Date Performed: 05/06/2023 Analysis Time Period: Pico Manha 05/06/2023 Intersection: DER/DF Jurisdiction: Units: U. S. Metric 2023 Analysis Year:



East/West Street: M2 North/South Street: M7 Intersection Orientation: EW

ntersection Orientation: EW Study period (hrs): 1.00

	Vehicle '	Volumes a	and Adiu	ıstments		
Major Street Movements	_ 1	2	3	4	5	6
J	L	Т	R	L	T	R
Volume				9	763	
Peak-Hour Factor, PHF				0.91	0.91	
Peak-15 Minute Volume				2	210	
Hourly Flow Rate, HFR				9	838	
Percent Heavy Vehicles				12		
Median Type/Storage RT Channelized?	Undi	vided		/		
Lanes				0	2	
Configuration				LT	T	
Upstream Signal?		No			No	
Minor Street Movements	7	8	9	10	11	12
	L	Т	R	L	Т	R
Volume	42					
Peak Hour Factor, PHF	0.91					
Peak-15 Minute Volume	12					
Hourly Flow Rate, HFR	46					
Percent Heavy Vehicles	0					
Percent Grade (%)		0			0	
Flared Approach: Exist RT Channelized	s?/Storage	е		/		/
Lanes	1					
Configuration	L					
	edestrian	Volumos	and Adi	inatmont		
F Movements	edestrian 13	14	15	16	5	
Flow (ped/hr)	0	0	0	0		
Lane Width (m)	3.6		3.6	3.6		
Walking Speed (m/sec)	1.2		1.2	1.2		
Percent Blockage	0	0	0	0		
	IIne:	tream Sid	mal Dat	· a		
Proq.		Arrival	Green		Prog.	Distance
Flow		Type	Time	Length	_	
	Flow				-1	
vph	vph F.Tow	1700	sec	sec	kph	meters
vph			sec	sec	kph	meters
vph			sec	sec	kph	meters
vph S2 Left-Turn			sec	sec	kph	meters

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles: Shared ln volume, major rt vehicles: Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles: Number of major street through lanes:		0 0 1700 1700 2

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical	Gap Cal	culatio	n					1	///
Movement		1	4	7	8	9	10	11	12
		L	L	L	T	R	L	T	R
t(c,base)		4.1	7.1				<u> </u>	
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			12	0					\ \ _
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent	Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,1t)			0.00	0.70					
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



t(c)	2-stage 1-stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00	engenharia e me
	2-stage									
Follow-U Movement	Jp Time C	alculat 1 L	ions 4 L	7 L	8 T	9 R	10 L	11 T	12 R	
t(f,base t(f,HV) P(HV) t(f)	;)	0.90	2.20 0.90 12 2.3	3.50 0.90 0 3.5	0.90	0.90	0.90	0.90	0.90	
Workshee	t 5-Effe	ct of (Jpstrear	n Signa	ls					
Computat	ion 1-Qu	eue Cle	earance	Time a	t Upstr	Moveme	nt 2		vement 5 V(1,prot))
Arrival Effectiv Cycle Le Rp (from	turation Type re Green, ength, C a Exhibit on vehic	g (sec (sec) 16-11)	e)		n P					
Computat	ion 2-Pr	oportio	on of TV	VSC Int	ersecti V(Moveme		Mo	vement 5 V(l,prot))
Smoothin Proporti Max plat Min plat Duration	ime, t(a ag Factor on of co coned fl coned fl a of bloc on time	, F nflict: ow, V(o ow, V(o ked per	ing flow c,max) c,min) ciod, t			0.00	0	ı	0.000	
	ion 3-Pl	atoon I	Event Pe	eriods	Res					
p(2) p(5) p(dom) p(subo) Constrai	ned or u	nconsti	rained?		0.0					
Proporti unblocke for mind movement	ed or		(1) Single- Proce	-stage		(2) Two-St ge I	age Proc	(3) cess tage II	$\overline{}$	
p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12)								\rangle \rangl		
	ion 4 an Stage Pro		1 L	4 L	7 L	8 T	9 R	10 L	11 12 R	
v c,x s Px V c,u,x				J	40/				}	
C r,x									1	



C .	plat	, X

C plat,x			
Two-Stage Process			-
7 8 Stagel Stage2 Stagel Stage	10 e2 Stage1 St	11 tage2 Stage1 Stage2	
V(c,x)			-
s 3000			
P(x) V(c,u,x)			
C(r,x) C(plat,x)			_
Worksheet 6-Impedance and Capacity Equation	ns		-
Step 1: RT from Minor St.	9	12	-
Conflicting Flows Potential Capacity			-
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity			
Probability of Queue free St.	1.00	1.00	_
Step 2: LT from Major St.	4	1	_
Conflicting Flows	0		
Potential Capacity Pedestrian Impedance Factor	1560 1.00	1.00	
Movement Capacity	1560		
Probability of Queue free St.	0.99	1.00	
Maj L-Shared Prob Q free St.	0.99		
Step 3: TH from Minor St.	8	11	-
Conflicting Flows			-
Potential Capacity	1 00	1 00	
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt	1.00 0.99	1.00 0.99	
Movement Capacity	0.33	0.93	
Probability of Queue free St.	1.00	1.00	_
Step 4: LT from Minor St.	7	10	_
Conflicting Flows	437		
Potential Capacity Pedestrian Impedance Factor	581 1.00	1.00	
Maj. L, Min T Impedance factor	1.00	0.99	
Maj. L, Min T Adj. Imp Factor.		1.00	
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	0.99 578	1.00	
			-
Worksheet 7-Computation of the Effect of Tw			_
Step 3: TH from Minor St.	8	11	_
Part 1 - First Stage Conflicting Flows			
Potential Capacity] [\ \ \	\
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt			1
Movement Capacity	\		
Probability of Queue free St.	7/	\rightarrow	
Part 2 - Second Stage			
Conflicting Flows Potential Capacity		\ \ \ / /	/////
Pedestrian Impedance Factor			4
Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
Part 3 - Single Stage		7/	_//
Conflicting Flows Potential Capacity			- {
Pedestrian Impedance Factor	1.00	1.00	~ l
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99	



Movement	Canacity	,

							_
Result for 2 stage process:							
У							
c t							
Probability of Queue free St.		1	.00		1.00		
Step 4: LT from Minor St.			7		10		_
							_
Part 1 - First Stage Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor							
Cap. Adj. factor due to Impedia	ng mvmnt						
Movement Capacity							
Part 2 - Second Stage							_
Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor Cap. Adj. factor due to Impedia	na mimn+						
Movement Capacity	iig iiiviiiiic						
Part 3 - Single Stage							_
Conflicting Flows		4	37				
Potential Capacity		5	81				
Pedestrian Impedance Factor		1	.00		1.00		
Maj. L, Min T Impedance factor					0.99		
Maj. L, Min T Adj. Imp Factor.	n a m	^	0.0		1.00		
Cap. Adj. factor due to Impedia Movement Capacity	ng mvmnt		.99 78		1.00		
							_
Results for Two-stage process:							
У							
C t		5	78				
Worksheet 8-Shared Lane Calcula	ations						
Movement	7 L	8 T	9 R	10 L	11 T	12 R	_
							_
Volume (vph)	46 578						
Movement Capacity (vph) Shared Lane Capacity (vph)	376						
							_
Worksheet 9-Computation of Effe	ect of Flare	d Minor	Street	Approa	aches		
Movement	7	8	9	10	11	12	_
	L	Т	R	L	Т	R	
C sep	578						_
Volume	46		/	\			
Delay							
Q sep Q sep +1							
g sep +1 round (Qsep +1)							
(2011)		//			1 1	/	\
n max							- \
C sh							
SUM C sep	\	\					
1					\rightarrow		
C act		\			< ^		<u> </u>
				_	1-/	} 	1///
Worksheet 10-Delay, Queue Leng	th, and Leve	l of Se	rvice		ا ل		7117
Movement 1 4		8	9	10	11	12	- //
Lane Config LT	L						
v (vph) 9	46				7		
C(m) (vph) 156							
v/c 0.00							_
95% queue length 0.00 Control Delay 7.3							
Control Delay 7.3	11.8						\ \ \



LOS Α В

11.8 Approach Delay Approach LOS В

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.99
v(il), Volume for stream 2 or 5		0
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.99
d(M,LT), Delay for stream 1 or 4		7.3
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5		2

1.1.3.4 Interseção B — Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Progeplan Amalyst: Progeplan
Agency/Co:
Date Performed: 05/06/2023
Analysis Time Period: Pico Tarde Intersection: В Jurisdiction:
Units: U. S. Metric
Analysis Year:
Project ID: FUTURA
East/West Street:
North/South Street: DER/DF 2023 M2 North/South Street: M7

Study period (hrs): 1.00 Intersection Orientation: EW

	Vel	nicle Vo	lumes a	and Adiu	stmer	nts		
Major Street:			astbour	_			stbound	
-	Movement	1	2	3		4	5	6
		L	T	R	1	L	Т	R
Volume						12	2008	
Peak-Hour Fact	or, PHF					0.91	0.91	
Hourly Flow Ra	te, HFR					13	2206	
Percent Heavy	Vehicles					0		
Median Type/St	orage	Undi	vided		/	/		
RT Channelized	1?							
Lanes						0	2	
Configuration				_		JI	T T	
Upstream Signa	1?		No				No	
Minor Street:	Approach	No	orthbou	ınd		Sc	uthboun	d /
	Movement	7	8	9	- V	10	11	12
		L	Т	R		L	T	R
Volume		32			+			
Peak Hour Fact	or, PHF	1.00			\			
Hourly Flow Ra	•	32			1)			>
Percent Heavy		20			7			
Percent Grade			0				0	1 /> -
Flared Approac	h: Exists	?/Storage	9		/			\
Lanes		ī						'
Configuration		1	L					1 1
	,							
				, _				_ / /
		Queue Le				Serv		
Approach	EB	WB		orthboun				nbound
Movement	1	4	7	8	9	l l	10	11 12
Lane Config		LT	L			ı		
		13	32					
Λ (ΛΕΙΙ)		13	JZ					



1636 206 C(m) (vph) v/c 0.01 0.16 0.55 0.02 7.2 95% queue length Control Delay LOS Α D

Approach Delay 25.7 Approach LOS D

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Analyst: Progeplan

Agency/Co.:

Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: В

DER/DF

Jurisdiction:
Units: U. S. Metric
Analysis Year:
Project ID: FUTURA
East/West Street: 2023 М2 North/South Street: М7

Intersection Orientation: ${\tt EW}$ Study period (hrs): 1.00

11100100001011 01101104010				ocaa, po	22200 (11	10,. 1.	, 0
	Vehicle	Volumes	and Ac	djustmer	nts		
Major Street Movements	_ 1	2	3	4	5	6	
3	L	T	R	L	T	R	
Volume				12	2008		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				3	552		
Hourly Flow Rate, HFR				13	2206		
Percent Heavy Vehicles				0			
Median Type/Storage	Undi	vided		/			
RT Channelized?							
Lanes				0	2		
Configuration				I	т т		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume	32				/ \		
Peak Hour Factor, PHF	1.00				/ \		
Peak-15 Minute Volume	8						
Hourly Flow Rate, HFR	32		(
Percent Heavy Vehicles	20		\			\ /	
Percent Grade (%)		0		\	0	\ \ \	
Flared Approach: Exist	s?/Storag	е		//		1 1	/ /
						1 1	<i>*</i>

RT Channelized Lanes 1 Configuration

	Pedestrian	Volumes	and Ad	justments	3	
Movements	_ 13	14	15	16		
Flow (ped/hr)	0	0	0	0		
Lane Width (m)	3.6	3.6	3.6	3.6		1 1
Walking Speed (m/sec)	1.2	1.2	1.2	1.2	\	
Percent Blockage	0	0	0	0		

Upstream Signal Data Sat Arrival Green Cycle Prog. Flow Type Time Length Speed Prog. Distance Flow to Signal



vph vph sec sec kph meters

S2 Left-Turn Through S5 Left-Turn Through

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

						Movement	2	Movemen	it 5
Shared 1:	n volume	, majo:	r th vel	hicles:				0	
Shared ln volume, major rt vehicles: 0									
Sat flow rate, major th vehicles: 1700									
Sat flow rate, major rt vehicles: 1700									
Number o	f major	street	through	h lanes	:			2	
Workshee	t 4-Crit	ical G	ap and	Follow-	up Time	Calcula	tion		
Critical		culation	on						
Movement		1	4	7	8	9	10	11	12
		L	L	L	Т	R	L	Т	R
t(c,base)		4.1	7.1					
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			0	20					
t(c,g)				0.20	0.20	0.10	0.20		0.10
Percent (Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,1t)			0.00	0.70					
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.1	6.6					
	2-stage								
Follow-U	p Time C	alcula	tions						
Movement		1	4	7	8	9	10	11	12
		L	L	L	Т	R	L	Т	R
t(f,base)		2.20	3.50					
t(f,HV)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
			0	20					
P(HV)			0	20					

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal Movement 2 Movement 5 $V(t) \quad V(1, prot) \quad V(t) \quad V(1, prot)$

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P g(q1)
g(q2)

Computation 2-Proportion of TWSC Intersection Time blocked

Movement 2 Movement 5 V(t) V(1,prot) V(t) V(1,prot)

alpha
beta
Travel time, t(a) (sec)
Smoothing Factor, F
Proportion of conflicting flow, f
Max platooned flow, V(c,max)
Min platooned flow, V(c,min)
Duration of blocked period, t(p)
Proportion time blocked, p

g (q)

0.000 0.000

Computation 3-Platoon Event Periods

Result



p(2) p(5) p(dom) p(subo)				000					_	
Constrained or uncons	trained?	?								
Proportion unblocked for minor movements, p(x)	_	l) e-stage cess	St	(2) Two-S age I	tage Pi	(3) rocess Stage	II		-	
p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12)									_	
Computation 4 and 5 Single-Stage Process Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R	-	
V c,x s Px V c,u,x		0	1129						_	
C r,x C plat,x									_	
	7 Stage2	Stage	8 1 Stag	e2 Sta	10 ge1 St	tage2	1: Stage1		_	
V(c,x) s P(x) V(c,u,x)	3000								_	
C(r,x) C(plat,x)									_	
Worksheet 6-Impedance	and Car	pacity 1	Equatio	ns					_	
Step 1: RT from Minor	St.				9		12		_	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue					.00	$\overline{}$	1.00		_	
Step 2: LT from Major	St.				4		1		_	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f	free St.		(1 1 1 0	636 .00 636 .99		1.00			
Step 3: TH from Minor	St.			\longrightarrow	8		11	> =		<
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity		ling mv	nnt		.00		1.00		-)))	
Probability of Queue	free St.			1	.00		1.00			
Step 4: LT from Minor	St.				7		10		-\	
Conflicting Flows				1	129					



			ongorinaria o mon
Potential Capacity	208		
Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.		0.99 0.99	
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99	
Movement Capacity	206		
Worksheet 7-Computation of the Effect of Tw	o-stage Gap Acc	eptance	
Step 3: TH from Minor St.	8	11	
Part 1 - First Stage			
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Probability of Queue free St.			
Part 2 - Second Stage			
Conflicting Flows			
Potential Capacity Podestrian Impedance Factor			
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Part 3 - Single Stage			
Conflicting Flows			
Potential Capacity		4.00	
Pedestrian Impedance Factor Cap Adi factor due to Impeding mymnt	1.00	1.00 0.99	
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	0.99	∪.∀₹	
Result for 2 stage process:			
a			
y C t			
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Part 1 - First Stage			
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
Part 2 - Second Stage			
Conflicting Flows			
Potential Capacity Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity		\	
Part 3 - Single Stage			
Conflicting Flows	1129	()	
Potential Capacity Podestrian Impodence Factor	208	1/00	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00	1.00	\
Maj. L, Min T Adj. Imp Factor.	<i>/</i>	0.99	\
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99	
Movement Capacity	206)
Results for Two-stage process:	7	77 ,	
a			\ \ \ \
y C t	206	$\bigvee II$))
Worksheet 8-Shared Lane Calculations			
Movement 7	8 9	10 11 12	
L	T R	L T R	
Volume (vph) 32			\
Movement Capacity (vph) 206			



Shared Lane Capacity (vph)

Control Delay

Approach Delay

Approach LOS

LOS

Volume

Peak-Hour Factor, PHF

Movement				7	8	9	10	11	12
				L	Т	R	L	Т	R
C sep			2	206					
Volume Delay			3	32					
Q sep									
Q sep +1									
round (Qsep +1)									
n max									
C sh									
SUM C sep									
n									
C act									
Worksheet 10-Dela	ay, Queue	Length,	and	Level	of	Service			
Movement	1	4	7	8		9	10	11	12
Lane Config		LT	L						
v (vph)		13	32						
C(m) (vph)		1636	206						
v/c			0.16						
95% queue length		0.02	0.55	5					

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.99
v(il), Volume for stream 2 or 5		0
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.99
d(M,LT), Delay for stream 1 or 4		7.2
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5		2

25.7

25.7

D

D

7.2

Α

1.1.3.5 Interseção C – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Manha Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURO East/West Street: MOV01-MOV05-MOV07 North/South Street: MOV08 Intersection Orientation: EW Study period (hrs): Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound Movement 2 4 5 6 | L Т $_{\rm L}$ R R

42

0.91

0.91



Hourly Flow Rate, HFR 46 1967 Percent Heavy Vehicles 0 --Median Type/Storage Undivided RT Channelized? 0 2 Lanes LT T Configuration Upstream Signal? No No Minor Street: Approach Northbound Southbound Movement 8 1 10 11 12 Т R L Т R Volume 9 Peak Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 9 Percent Heavy Vehicles 12 Percent Grade (%) Flared Approach: Exists?/Storage Lanes 1 Configuration

Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound 8 Movement 1 4 11 Lane Config LT | L v (vph) 46 9 C(m) (vph) 1636 226 0.04 0.03 v/c 95% queue length 0.09 0.12 Control Delay 7.3 21.6 LOS С Α Approach Delay 21.6 С Approach LOS

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023

Analysis Time Period: Pico Manha Intersection: Jurisdiction:

DER/DF Units: U. S. Metric Analysis Year: 2023

Project ID: FUTURO

East/West Street: MOV01-MOV05-MOV07

North/South Street: MOV08 Study period (hrs):

Intersection Orientation: EW Vehicle Volumes and Adjustments Major Street Movements 2 3 1 4 L Т R L Т R Volume 42 1790 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume 12 492 Hourly Flow Rate, HFR 46 1967 Percent Heavy Vehicles Ω Median Type/Storage Undivided RT Channelized? 2 Lanes LT T Configuration Upstream Signal? No No



	ments	7 L	8 T		9 R	10 I	11 T	12 R				
						9					-	
Peak Hour Factor, Peak-15 Minute Vol						0.91						
Peak-15 Minute vol Hourly Flow Rate,						2 9						
Percent Heavy Vehi						12	_					
Percent Grade (%) Flared Approach:	Fviet	s2/Stor	0			/)		/			
RT Channelized	DAISC.	3.75001	age			,			/			
Lanes						1_						
Configuration						L					_	
Morromonto	Pe		an Vol	umes a	and Adj 15	justments 16	5				-	
Movements												
Flow (ped/hr)		0	. 6	0 3.6	0 3.6	0 3.6						
Lane Width (m) Walking Speed (m/s	sec)		.2	1.2	1.2	1.2						
Percent Blockage	500,	0		0	0	0						
			in a t roa	m Cia	nal Da+						-	
Ţ	Prog.	U Sat	Arri	_	nal Dat Green		Prog		Distanc	e	-	
	Flow vph	Flow vph	Тур	e	Time sec	Length sec	Spee kph		to Sign meters			
S2 Left-Turn											-	
Through S5 Left-Turn Through												
Shared In volume	maior	th weh	icles		Moven	nent 2		emen	t 5		-	
Shared ln volume, Sat flow rate, maj Sat flow rate, maj	major jor th jor rt	rt veh vehicl vehicl	icles: es: es:		0 0 170	nent 2		emen	t 5		-	
Shared ln volume, Sat flow rate, maj Sat flow rate, maj Number of major st	major jor th jor rt treet	rt veh vehicl vehicl through	icles: es: es: lanes	s:	0 0 170 170 2	nent 2		emen	t 5		-	
Shared ln volume, Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic	major jor th jor rt treet	rt veh vehicl vehicl through	icles: es: es: lanes	s:	0 0 170 170 2	nent 2		emen	t 5		-	
Shared In volume, Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic	major jor th jor rt treet t	rt veh vehicl vehicl through	icles: es: es: lanes	up Ti	Moven 0 0 170 170 2	nent 2	Mov					
Shared ln volume, Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic	major jor th jor rt treet	rt veh vehicl vehicl through	icles: es: es: lanes	s:	0 0 170 170 2	nent 2			12 R			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base)	major th jor rt treet the cal Gap ulation 1 L	rt veh vehicl vehicl through p and F	icles: es: es: lanes	:: -up Ti	Movem 0 0 170 170 2 me Calc	nent 2 00 00 culation 10 L	Mov 11 T		12			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv)	major th jor th treet the cal Gap ulation 1 L 4.1 1.00	rt veh vehicl vehicl through p and F	icles: es: es: lanes	:: -up Ti	Movem 0 0 170 1770 2 me Calc	00 00 culation 10 L 7.1	Mov 11 T		12			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) p(hv)	major th jor rt treet the cal Gap ulation 1 L	rt veh vehicl vehicl through p and F	icles: es: es: lanes Collow- 7 L 1.00	8 T	Movem 0 0 170 170 2 mme Calc	00 00 00 culation 10 L 7.1 00 1.00	11 T	00	12 R			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) f(c,hv) f(c,g) Percent Grade	major por the port of the port	rt veh vehicl vehicl through p and F	icles: es: es: lanes Collow- 7 L	eup Tir	Movem 0 0 170 170 2 me Calc 9 R 0 1.0	nent 2 000 000 culation 10 L 7.1 1,000 12 10 0.20 000 0.00	111 T	00	12 R		-	
t(c,hv) 1 P(hv) (t(c,g) Percent Grade t(3,lt) (major th jor th jor rt treet the cal Gap ulation 1 L 4.1 1.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rt veh vehicl vehicl through p and F L 1.00	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00	8 T 1.00	Movem 0 0 170 170 2 me Calc 9 R 0 1.00 0.10	000 000 culation 10 L 7.1 100 1.00 12 10 0.20 0.70	111 T	000	12 R 1.00 0.10 0.00			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage (major th jor th treet the cal Gap ulation 1 L 4.1 1.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rt veh vehicl vehicl through p and F n 4 L 1.00	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00 0.00	8 T 1.00	Movem 0 0 170 1770 2 me Calc 9 R 0 1.00 0.00 0.00	000 000 200 200 200 200 100 12 100 100 0.00 0.	111 T O O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O	000	12 R 1.00 0.10 0.00			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage (2-stage (1-stage (4))	major th jor th jor rt treet the cal Gap ulation 1 L 4.1 1.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rt veh vehicl vehicl through p and F L 1.00	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00	8 T 1.00	Movem 0 0 170 1770 2 me Calc 9 R 0 1.00 0.00 0.00	000 000 200 200 200 200 100 12 100 100 0.00 0.	111 T O O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O	000	12 R 1.00 0.10 0.00			
Shared In volume, Sat flow rate, mag Sat flow rate, mag Number of major st Worksheet 4-Critical Critical Gap Calcu Movement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage (2) 2-stage (4) 2-stage (4) 2-stage (5)	major the property of the prop	rt veh vehicl vehicl through p and F L 1.00	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00 0.00	8 T 1.00	Movem 0 0 170 1770 2 me Calc 9 R 0 1.00 0.00 0.00	000 000 culation 10 L 7.1 000 1,00 12 00 0.00 0.70 0.00 0.00 0.00 0.00	111 T O O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O	000	12 R 1.00 0.10 0.00			
Shared In volume, Sat flow rate, mag Sat flow rate, mag Sat flow rate, mag Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage (2-stage (2-stage Follow-Up Time Cal	major the property of the prop	rt veh vehicl vehicl through p and F L 1.00	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00 0.00 1.00	1.00 0.22 0.00 1.00	Movem 0 0 170 170 2 me Calc 9 R 0 0.10 0 0.00 0 0.00	nent 2 00 00 culation 10 L 7.1 00 1,00 12 10 0.20 0.70 0.00 0.70 0.00 6.5	111 T	000	12 R 1.00 0.10 0.00 0.00 0.00			
Shared In volume, Sat flow rate, mag Sat flow rate, mag Sat flow rate, mag Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage (2-stage (2-stage Follow-Up Time Cal	major the property of the prop	rt veh vehicl vehicl through p and F L 1.00	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00 0.00	8 T 1.00	Movem 0 0 170 1770 2 me Calc 9 R 0 1.00 0.00 0.00	000 000 culation 10 L 7.1 000 1,00 12 00 0.00 0.70 0.00 0.00 0.00 0.00	111 T O O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O.O	000	12 R 1.00 0.10 0.00			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) f(c,hv) f(c,g) Percent Grade t(3,lt) t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time Cal Movement	major the property of the prop	rt veh vehicl vehicl through p and F n 4 L 1.00 0.00 0.00 ions 4 L	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 1.00	Movem 0 0 170 170 2 me Calc 9 R 0 1.00 0.10 0 0.00 0.00 9 R	nent 2 00 00 culation 10 1 7.1 100 1.00 12 10 0.20 00 0.00 0.70 0.00 0.00 6.5	111 T 0 0.0 0.0 0.0 0.1 111 T 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	000	12 R 1.00 0.10 0.00 0.00 0.00			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage (2) 2-stage Follow-Up Time Cal Movement t(f,base) t(f,base) 2 t(f,base)	major th jor th jor rt treet the cal Gap ulation 1 L 4.1 1.00 0 0 0.00 4.1 lculat.	rt veh vehicl vehicl vehicl through p and F n 4 L 1.00	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 1.00	Movem 0 0 170 170 2 me Calc 9 R 0 0.0 0.0 0.0 0.0 9 R	nent 2 00 00 culation 10 1 7.1 100 1.00 12 10 0.20 00 0.00 0.70 0.00 0.00 6.5	111 T 0 0.0 0.0 0.0 0.1 111 T 0	000	12 R 1.00 0.10 0.00 0.00 0.00			
Shared In volume, Sat flow rate, mag Sat flow rate, mag Sat flow rate, mag Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage (2-stage t(c) 1-stage 4 2-stage Follow-Up Time Cal Movement t(f,base) t(f,HV) P(HV)	major the major	rt veh vehicl vehicl through p and F n 4 L 1.00 0.00 0.00 ions 4 L	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00 0.00 1.00	1.00 0.20 0.00 1.00	Movem 0 0 170 170 2 me Calc 9 R 0 1.00 0.10 0 0.00 0.00 9 R	nent 2 00 00 culation 10 L 7.1 00 1,00 12 10 0.20 0.70 0.00 0.70 0.00 6.5	111 T 0 0.0 0.0 0.0 0.1 111 T 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	000	12 R 1.00 0.10 0.00 0.00 0.00			
Shared In volume, Sat flow rate, maj Sat flow rate, maj Sat flow rate, maj Number of major st Worksheet 4-Critic Critical Gap Calcu Movement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time Cal Movement t(f,base) t(f,hV) P(HV) t(f) 2	major por the property of the	rt veh vehicl vehicl through p and F n 4 L 1.00 0.00 0.00 0.00 0.00	icles: es: es: lanes collow- 7 L 1.00 0.20 0.00 1.00 7 L	8 T 1.00 0.20 0.00 1.00	Movem 0 0 170 170 2 me Calc 9 R 0 1.00 0.10 0 0.00 0.00 9 R	nent 2 000 culation 10 L 7.1 00 1.00 12 10 0.20 0.70 00 1.00 6.5	111 T 0 0.0 0.0 0.0 0.1 111 T 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	000	12 R 1.00 0.10 0.00 0.00 0.00			
Shared In volume, Sat flow rate, mag Sat flow rate, mag Sat flow rate, mag Sat flow rate, mag Number of major st Worksheet 4-Critic Critical Gap Calcumovement t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage (1) 2-stage (2) 2-stage Follow-Up Time Calmovement t(f,base) t(f,base) t(f,hv) P(HV) (0)	major the property of the prop	rt veh vehicl vehicl through p and F n 4 L 1.00 0.00 0.00 0.00 0.00 0.00 0.00 pstream	icles: es: es: lanes Collow- 7 L 1.00 0.20 0.00 1.00 7 L 0.90	1.00 0.22 0.00 1.00	Movem 0 0 170 170 2 me Calc 9 R 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	nent 2 000 culation 10 L 7.1 00 1.00 12 10 0.20 0.70 00 1.00 6.5	111 T 0 0.0 0.0 0.0 0.1 111 T 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	000	12 R 1.00 0.10 0.00 0.00 0.00			



V(t) V(l,prot) V(t) V(l,prot)

```
V prog
Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g (q2)
g (q)
Computation 2-Proportion of TWSC Intersection Time blocked
                                               Movement 2
                                                                   Movement 5
                                            V(t)
                                                  V(l,prot) V(t)
                                                                      V(1,prot)
alpha
beta
Travel time, t(a) (sec)
Smoothing Factor, F
Proportion of conflicting flow, f
Max platooned flow, V(c,max)
Min platooned flow, V(c,min)
Duration of blocked period, t(p)
                                                  0.000
                                                                     0.000
Proportion time blocked, p
Computation 3-Platoon Event Periods
                                           Result
p(2)
                                           0.000
p(5)
                                           0.000
p(dom)
p(subo)
Constrained or unconstrained?
Proportion
unblocked
                                               (2)
                                                                (3)
                             (1)
for minor
                        Single-stage
                                               Two-Stage Process
movements, p(x)
                                                             Stage II
                           Process
                                           Stage I
p(1)
p(4)
p(7)
p(8)
p(9)
p(10)
p(11)
p(12)
Computation 4 and 5
Single-Stage Process
Movement
                          1
                                  4
                                         7
                                                 8
                                                        9
                                                               10
                                                                       11
                                                                              12
                          L
                                                 Т
                                                        R
                                                                L
                                                                        Τ
                                                                               R
V c,x
                                                               1075
s
Рx
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                                        10
               Stage1 Stage2 Stage1 Stage2 Stage1
                                                          Stage2
                                                                   Stage1
                                                                            Stage2
V(c,x)
                                                           3000
P(x)
V(c,u,x)
C(r,x)
C(plat,x)
Worksheet 6-Impedance and Capacity Equations
                                                                         12
Step 1: RT from Minor St.
```



			ongomana on
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor Movement Capacity	1.00	1.00	
Probability of Queue free St.	1.00	1.00	
Step 2: LT from Major St.	4	1	
Conflicting Flows		0	
Potential Capacity Pedestrian Impedance Factor	1.00	1636 1.00	
Movement Capacity	1.00	1636	
Probability of Queue free St. Maj L-Shared Prob Q free St.	1.00	0.97 0.97	
Step 3: TH from Minor St.	8	11	
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	0.97	0.97	
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows		1075	
Potential Capacity	1 00	233	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00 0.97	1.00	
Maj. L, Min T Adj. Imp Factor.	0.98		
Cap. Adj. factor due to Impeding mymnt	0.98	0.97	
Movement Capacity		226	
Worksheet 7-Computation of the Effect of	Two-stage Gap Acc	eptance	
Step 3: TH from Minor St.	8	11	•
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.			
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Part 3 - Single Stage	/	\	
Conflicting Flows			
Potential Capacity	1.00	1 00	
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt	1.00 0.97	1.00 0.97	`
Movement Capacity			\
Result for 2 stage process:			
У			_)
Ct		ノノニー	
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	111
Part 1 - First Stage Conflicting Flows			
Potential Capacity Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
Part 2 - Second Stage			



Conflicting Flows
Potential Capacity
Pedestrian Impedance Factor
Cap. Adj. factor due to Impeding mvmnt
Movement Capacity

± ±						
Part 3 - Single Stage						
Conflicting Flows					1075	
Potential Capacity					233	
Pedestrian Impedance Factor		1	.00		1.00	
			.00		1.00	
Maj. L, Min T Impedance factor						
Maj. L, Min T Adj. Imp Factor.			.98			
Cap. Adj. factor due to Impeding	mvmnt	Ü	.98		0.97	
Movement Capacity					226	
Results for Two-stage process:						
a						
У						
C t					226	
Worksheet 8-Shared Lane Calculat.	ions					
Movement	7	8	9	10	11	12
	L	Т	R	L	Т	R
Volume (vph)				9		
Movement Capacity (vph)				226		
Shared Lane Capacity (vph)						
Worksheet 9-Computation of Effec		d Minor	Street	. Approa	.ches	
worksheet 3-computation of Effec	t of Flare	a Millor				
					11	12
	7	8	9	10	11	12
					11 T	12 R
Movement	7	8	9	10 L		
Movement C sep	7	8	9	10 L		
Movement S sep Volume	7	8	9	10 L		
C sep Volume Delay	7	8	9	10 L		
C sep Volume Delay Q sep	7	8	9	10 L		
C sep Volume Delay Q sep Q sep +1	7	8	9	10 L		
C sep Volume Delay 2 sep 2 sep +1	7	8	9	10 L		
Movement C sep Volume Delay Q sep Q sep +1 round (Qsep +1)	7	8	9	10 L		
Movement C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh	7	8	9	10 L		
Movement C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh	7	8	9	10 L		
Movement C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep	7	8	9	10 L		
Movement C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act	7	8	9	10 L		

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config	LT							
v (vph)	46					9		
C(m) (vph)	1636					226		
v/c	0.03			(0.04		
95% queue length	0.09			\		0.12		
Control Delay	7.3				, /	21.6	\	
LOS	A				/ /	С	- 1 1	/
Approach Delay							21.6	_ /
Approach LOS					- (C	
				1	\			

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement
p(oj)	0.97	1.00
v(il), Volume for stream 2 or 5	0	1 1
v(i2), Volume for stream 3 or 6	0	\ \
s(il), Saturation flow rate for stream 2 or 5	1700	_ \ '
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.97	
d(M,LT), Delay for stream 1 or 4	7.3	
N, Number of major street through lanes	2	
d(rank,1) Delay for stream 2 or 5		



1.1.3.6 Interseção C – Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Progeplan

Analyst: Progeplan
Agency/Co.:
Date Performed: 05/06/2023
Analysis Time Period: Pico Tarde
Intersection: C

 ${\tt Jurisdiction:}$ DER/DF

Units: U. S. Metric Analysis Year: 2023

Project ID: FUTURA

MOV01-MOV05-MOV07 East/West Street:

North/South Street: MOV08

Study period (hrs): 1.00 Intersection Orientation: EW

	Vehi	.cle Vol	ımes ar	nd Adin	ıstme	nts			
Major Street:	Approach		stbound	_			estbound		
-	Movement	1	2	3		4	5	6	
		L	T	R	- 1	L	T	R	
Volume		32	703						
Peak-Hour Fact	or, PHF	0.91	0.91						
Hourly Flow Ra	te, HFR	35	772						
Percent Heavy	Vehicles	21							
Median Type/St	orage	Undiv	ided			/			
RT Channelized	?								
Lanes		0	2						
Configuration		L	гт						
Upstream Signa	1?		No				No		
Minor Street:	Approach	Noi	rthbour	nd		S	outhbour	nd	
	Movement	7	8	9	- 1	10	11	12	
		L	Т	R	I	L	T	R	
Volume						12			
Peak Hour Fact	or, PHF					0.91			
Hourly Flow Ra	te, HFR					13			
Percent Heavy	Vehicles					0			
Percent Grade	(%)		0				0		
Flared Approac	h: Exists?/	Storage			/				/
Lanes						1			
Configuration							Ĺ		

	_Delay,	Queue	Le	ngt	h, and Leve	el of	Service		
Approach	EB	WB			Northbound	d		Southbour	ıd
Movement	1	4		7	8	9	10	11	12
Lane Config	LT						/ L		
							<u> </u>		
v (vph)	35						13		
C(m) (vph)	1507						553		
v/c	0.02				\		0.02	2	
95% queue length	0.07				/	/	0.0	7	/
Control Delay	7.4						11.	7	_ /
LOS	A					- (В		
Approach Delay					(\		11.7	
Approach LOS						, \		В	
								1	

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail: Fax:



TWO-WAY STOP CONTROL (TWSC) ANALYSIS Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Tarde Intersection: C Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURA East/West Street: MOV01-MOV05-MOV07 North/South Street: MOV08 Intersection Orientation: EW Study period (hrs): 1.00 Vehicle Volumes and Adjustments Major Street Movements 1 2 L R Volume 32 703 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume Hourly Flow Rate, HFR 35 772 Percent Heavy Vehicles 21 Median Type/Storage Undivided RT Channelized? Lanes 2 Configuration LT T Upstream Signal? No No Minor Street Movements 8 10 11 12 Т R R L Т Volume 12 Peak Hour Factor, PHF 0.91 Peak-15 Minute Volume 3 13 Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) 0 0 Flared Approach: Exists?/Storage RT Channelized Lanes 1 Configuration L Pedestrian Volumes and Adjustments Movements 13 14 15 16 Flow (ped/hr) 0 0 0 Lane Width (m) 3.6 3.6 3.6 3.6 Walking Speed (m/sec) 1.2 1.2 1.2 1.2 Percent Blockage 0 0 0 0 Upstream Signal Data Sat Arrival Green Cycle Prog. Prog. Distance Time Flow Flow Type Length Speed to Signal vph vph sec meters sec kph Left-Turn Through Left-Turn Through Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles Movement 2 Movement 5 Shared ln volume, major th vehicles:

0 1700

2

1700

Worksheet 4-Critical Gap and Follow-up Time Calculation

Shared ln volume, major rt vehicles:

Number of major street through lanes:

Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles:



Critical Ga	p Calo	culati	on							
Movement		1	4	7	8	9	10	11	12	
		L	L	L	T	R	L	Т	R	
t(c,base)		4.1					7.1			
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
P(hv)		21		0.00	0 00	0.10	0	0 00	0.10	
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10	
Percent Gra t(3,1t)	ide	0.00		0.00	0.00	0.00	0.70	0.00	0.00	
t(c,T): 1-	stage		0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00	
	stage stage	4.3					6.4			
Follow-Up T	'ime Ca	alcula	tions							
Movement		1	4	7	8	9	10	11	12	
		L	L	L	T	R	L	T	R	
t(f,base)		2.20	0 00	0 00	0 00	0 00	3.50	0 00	0 00	
t(f,HV) P(HV)		0.90 21	0.90	0.90	0.90	0.90	0.90 0	0.90	0.90	
t(f)		2.4					3.5			
- \+/										
Worksheet 5	-Effec	ct of	Upstream	m Signa	ls					
Computation	1-Que	eue Cl	earance	Time a	t Upstr					
						Movemen			vement 5	
					V (t) V(l,prot)	V(t)	V(l,prot)	
V prog										
g (q2)										
Computation	2-Pro	porti	on of T	WSC Int	ersecti				amant E	
					V (Movement) V(nt Z l,prot)		vement 5 V(1,prot)	
					,		,1,			
alpha										
beta										
Travel time)							
Smoothing F Proportion			ing fla	ıı €						
Proportion Max platoon				~, ±						
Min platoon										
Duration of				(p)						
Proportion	time b	olocke	d, p			0.000	0 /	\	0.000	
Computation	3-Pla	atoon 1	Event Pe	eriods	Res	ult		—		
p(2)					0.0	00				
p(5)					0.0					
p(dom)								\	/ /	
p(subo)						/				
Constrained	l or ur	nconst	rained?			\				
Proportion					-					
unblocked			(1))		(2)		(3)	\ \\	
for minor			Single				age Pro			
movements,	p(x)		Proce	_	Sta	ge I		tage II		\ \ \ '
									\	1 1
p(1)										
p(4)									()	/ /
p(7)								\		/ /
p(8)										/ -
p(9) p(10)										
p(10) p(11)										1
p(11)										1
,==,)



									engennario	emei
Computation 4 and 5 Single-Stage Process	s									
Movement	1	4	7	8	9	10	11	12		
	L	L	L	Т	R	L	Т	R		
V c,x	0					456			_	
s Px										
V c,u,x										
C r,x C plat,x									_	
Two-Stage Process									_	
Stage:	7 1 Stage2	Stage	8 1 Stag	e2 Sta	10 ge1 St	tage2 S	11 Stage1			
V(c,x)					2/	200			_	
s P(x)					31	000				
V(c,u,x)										
C(r,x) C(plat,x)									_	
Worksheet 6-Impedance	ce and Ca	pacity	Equation	ns					_	
Step 1: RT from Mino	or St.				9		12		_	
Conflicting Flows									-	
Potential Capacity Pedestrian Impedance	e Factor			1	.00		1.00			
Movement Capacity Probability of Queue				1	.00		1.00			
		•							_	
Step 2: LT from Majo	or St.				4		1			
Conflicting Flows							0		_	
Potential Capacity Pedestrian Impedance	e Factor			1	.00		1507			
Movement Capacity							1507			
Probability of Queue Maj L-Shared Prob Q		•		1	.00		0.98			
					8		11		_	
Step 3: TH from Mind	or St.				8				_	
Conflicting Flows Potential Capacity										
Pedestrian Impedance	e Factor			1	.00		1.00			
Cap. Adj. factor due Movement Capacity	e to Imped	ding mv	mnt	0	.98		0.98			
Probability of Queue	e free St			1	.00		1.00			
Step 4: LT from Mino	or St.				7	\neg	10		_	
Conflicting Flows						-	456		_	
Potential Capacity					_		566			
Pedestrian Impedance Maj. L, Min T Impeda		~ ×			.00		1.00			
Maj. L, Min T Adj.					.98		\	/	\	
Cap. Adj. factor due	e to Imped	ding mv	mnt	0	.98		0.98		\	
Movement Capacity							553			
Worksheet 7-Computation	tion of th	he Effe	ct of T	wo-stag	e Gap i	Acceptar	nce			
Step 3: TH from Mind	or St.			-t	8		1/1	7		
Part 1 - First Stage	e					\rightarrow			- 	$\overline{}$
Conflicting Flows Potential Capacity						(\		//)
Pedestrian Impedance							_ \		ノノー	J
Cap. Adj. factor due Movement Capacity	e to Imped	ding mv	mnt							
Probability of Queue	e free St						1		_ [
Part 2 - Second Stac	ge								=\	
	<i>-</i>									



Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity 1.00 1.00 Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt 0.98 0.98 Movement Capacity Result for 2 stage process: У Сt Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 10 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows 456 Potential Capacity 566 Pedestrian Impedance Factor 1.00 1.00 0.98 $\mbox{{\sc Maj.}}$ L, $\mbox{{\sc Min}}$ T Impedance factor Maj. L, Min T Adj. Imp Factor. 0.98 Cap. Adj. factor due to Impeding mvmnt 0.98 0.98 Movement Capacity 553 Results for Two-stage process: а У c t 553 Worksheet 8-Shared Lane Calculations Movement 8 10 11 Т R L Volume (vph) 13 Movement Capacity (vph)
Shared Lane Capacity (vph) 553 Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 9 12 8 10 11 L Т R L Т R C sep 553 Volume 13 Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep

C act



Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config	LT					L		
v (vph)	35					13		
C(m) (vph)	1507					553		
v/c	0.02					0.02		
95% queue length	0.07					0.07		
Control Delay	7.4					11.7		
LOS	A					В		
Approach Delay							11.7	
Approach LOS							В	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.98	1.00
v(il), Volume for stream 2 or 5	0	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.98	
d(M,LT), Delay for stream 1 or 4	7.4	
N, Number of major street through lanes	2	
d(rank,1) Delay for stream 2 or 5		

1.1.3.7 Interseção D – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Progeplan

Agency/Co.:

05/06/2023 Date Performed: Analysis Time Period: Pico Manha Intersection:

Jurisdiction: DER/DF Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA
East/West Street: MOV01-MOV05-MOV07
North/South Street: MOV06

Study period (hrs): 1.00 Intersection Orientation: EW

	Vel	hicle Vol	umes ar	nd Adjus	tments		
Major Street:	Approach	Ea	stbound	1	₩e	stbound	
	Movement	1	2	3	4	5 6	
		L	Т	R	L /	T R	
Volume			1790	16			
Peak-Hour Fact	or, PHF		0.91	0.91			
Hourly Flow Ra	ate, HFR		1967	17			
Percent Heavy	Vehicles			/	/	\ -+	/ \
Median Type/St	corage	Undiv	ided		/	1 \	/ \
RT Channelized	1?				1		
Lanes			2	0	\		
Configuration			T ?	'R			
Upstream Signa	al?		No			No	
					7		
Minor Street:	Approach	No	rthbour	nd	Sc	uthbound	
	Movement	7	8	9	10	11 12	/ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
		L	Т	R	L	T R	
Volume				6			
Peak Hour Fact	or, PHF			0.91			
Hourly Flow Ra	ate, HFR			6			
Percent Heavy	Vehicles			34			
Percent Grade	(%)		0			0	\
Flared Approac	ch: Exists	?/Storage			/		/
Lanes				1		- 1	
201100							
Configuration			F	-			



Approach	Delay, EB	Queue WB	ье	ngt	h, and Leve Northbound		ser	_	outhbour	nd
Movement	1	4	ı	7	8	9	- 1	10	11	12
Lane Config			İ			R	İ			
v (vph)						6				
C(m) (vph)						260				
v/c						0.02				
95% queue length						0.07	7			
Control Delay						19.2				
LOS						С				
Approach Delay					19.2					
Approach LOS					С					

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail:

_____TWO-WAY STOP CONTROL(TWSC) ANALYSIS____

Fax:

Analyst: Progeplan
Agency/Co.:
Date Performed: 05/06/2023
Analysis Time Period: Pico Manha
Intersection: D
Jurisdiction: DER/DF

Jurisdiction: DER/I
Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA

East/West Street: MOV01-MOV05-MOV07
North/South Street: MOV06

North/South Street: MOV06 Intersection Orientation: EW

Study period (hrs): 1.00

Major Street Movements	nicle 1	2	3	4	5	6	
Hajor bereet Hovemenes	L	T	R	L	T	R	
Volume		1790	16				
Peak-Hour Factor, PHF		0.91	0.91				
Peak-15 Minute Volume		492	4				
Hourly Flow Rate, HFR		1967	17				
Percent Heavy Vehicles				,			
Median Type/Storage	Undi	vided		/			
RT Channelized?					/ \		
Lanes		_	0		/ \		
Configuration		T T	K /				
Upstream Signal?		No			No		/
Minor Street Movements	7	8	9	10	11	12	
Minor Street Movements	, T,	8 T	9 R /	T.	T	R	(/ \
	ш	1	Α]	1	1	T	[/ \
Volume			6			-	
Peak Hour Factor, PHF			0.91	\			
Peak-15 Minute Volume			2	- \			
Hourly Flow Rate, HFR			6			/ /	
Percent Heavy Vehicles			34	7		ſ	
Percent Grade (%)		0			0	- 1	
Flared Approach: Exists?/S	Storag	e					
RT Channelized			No				
Lanes			1				
Configuration		R			\		
		Volume			nts		}
Movements	13	14	15	16			
D1 (0	0	0	0			1
Flow (ped/hr)	U	U	U	U			



3.6 3.6 1.2 1.2 Lane Width (m) 3.6 3.6 1.2 Walking Speed (m/sec) 1.2 Percent Blockage 0

	Prog.	Sat	Arrival	Green	Cycle	Prog.	Distance
	Flow vph	Flow vph	Туре	Time sec	Length sec	Speed kph	to Signal meters
2 Left-Turn							
Through							
5 Left-Turn							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

Movement 2 Movement 5

Shared In volume, major th vehicles: Shared ln volume, major rt vehicles: Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles: Number of major street through lanes:

Through

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical	Gap Cal	culation	on						
Movement		1	4	7	8	9	10	11	12
		L	L	L	T	R	L	Т	R
t(c,base)					6.2			
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)						34			
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent	Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,1t)						0.00			
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage					6.5			
	2-stage	;							
Follow-U	p Time C	alcula	tions						
Movement		1	4	7	8	9	10	11	12
		L	L	L	T	R	L	Т	R
t(f,base	.)					3.30			
t (f, HV) P (HV) t (f)		0.90	0.90	0.90	0.90	0.90 34 3.6	0.90	0.90	0.90

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

Movement 2 Movement 5 V(t) V(l,prot) V(t) V(1,prot)

V prog Total Saturation Flow Rate, s (vph) Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11) Proportion vehicles arriving on green P g(q1) g(q2)

Computation 2-Proportion of TWSC Intersection Time blocked Movement 2

Movement 5

V(t) V(l,prot) V(t) V(1,prot)

alpha beta Travel time, t(a) (sec)

g (q)



Smoothing Factor, F
Proportion of conflicting flow, f
Max platooned flow, V(c,max)
Min platooned flow, V(c,min)
Duration of blocked period, t(p)
Proportion time blocked, p

	ration of blocked period, t(p) coportion time blocked, p			0.000			0.000			
Computation 3-Platoon	n Event Pe	riods	Res	sult					_	
p(2)				000					-	
p(5) p(dom)			0.0	000						
p(subo)										
Constrained or uncons	strained?									
Proportion									_	
unblocked for minor	(1)			(2)	7.t	(3)				
movements, p(x)	Single- Proce		Sta	TWO-S age I	Stage Pr	ocess Stage I	I			
									_	
p(1) p(4)										
p(7)										
p (8)										
p(9) p(10)										
p(10) p(11)										
o (12)										
Computation 4 and 5									-	
Single-Stage Process										
Movement	1	4	7	8	9	10	11	12		
	L	L	L	Т	R	L	Т	R		
V C,X					992				_	
S										
?x / c,u,x										
									_	
C r,x C plat,x										
Two-Stage Process									_	
-	7		8		10		13			
Stage1	Stage2	Stage1	Stage	e2 Sta	ige1 St	age2 S	stage1	Stage2		
V(c,x)									_	
S D (**)										
P(x) V(c,u,x)										
									_	
C(r,x)										
C(plat,x)									_	
7						1				
Norksheet 6-Impedance	e and Capa	CITY E	quation	ns						
Step 1: RT from Minor	st.				9		12		_	
Conflicting Flows				-\-	992				_	
Potential Capacity					60		1 /	/	\	
Pedestrian Impedance	Factor				.00		1.00		\	
Movement Capacity Probability of Queue	free St				260 .98		1.00			
Step 2: LT from Major	St.				4		1			
Conflicting Flows							\ 	> -	-///	1
Potential Capacity							ן נ	/	111	
Pedestrian Impedance	Factor			1	.00	\rightarrow	1.00		++	
Movement Capacity Probability of Queue	free S+			1	.00		1.00	\	//	
Probability of Queue Maj L-Shared Prob Q :				1			1.00			
								_	_///	
Step 3: TH from Minor	s St.				8		11			
Conflicting Flows									<u> </u>	
Potential Capacity										



			engenharia e me
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt	1.00	1.00	
Movement Capacity Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows			
Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00	1.00	
Maj. L, Min T Adj. Imp Factor.	1 00	1.00	
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	0.98	
Worksheet 7-Computation of the Effect of Tw	wo-stage Gap Acc	ceptance	
Step 3: TH from Minor St.	8	11	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.			
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	1.00	
Result for 2 stage process:			
а У			
C t Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity		\	
Part 2 - Second Stage			
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt			\
Movement Capacity			
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor Maj. I, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	1.00 1.00 0.98	
Results for Two-stage process:			
y C t			



Worksheet	8-Shared	Lane	Calculations

Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)			6 260			
Worksheet 9-Computation of Effect	of Flar	red Min	or Stree	t Appro	paches	
Movement	7 L	8 T	9 R	10 L	11 T	12 R
C sep Volume Delay Q sep Q sep +1 round (Qsep +1)			260			
n max C sh SUM C sep n C act						
Worksheet 10-Delay, Queue Length,	and Lev	rel of	Service			
Movement 1 4 Lane Config	7	8	9 R	10	11	12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS		19.2 C	6 260 0.02 0.07 19.2			

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	1.00
v(il), Volume for stream 2 or 5		
v(i2), Volume for stream 3 or 6		
s(il), Saturation flow rate for stream 2 or 5		
s(i2), Saturation flow rate for stream 3 or 6		
P*(oj)	/ \	
d(M,LT), Delay for stream 1 or 4	/ \	
N, Number of major street through lanes		
d(rank,1) Delay for stream 2 or 5		<i>)</i>

1.1.3.8 Interseção D – Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Progeplan
Agency/Co.:
Date Performed: 05/06/2023
Analysis Time Period: Pico Tarde
Intersection: D
Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID: AMPLIAÇÃO CNPQ - FUTURO

rroject 1D: AMPLIAÇÃO CNPQ - FUTURO
East/West Street: MOV01-MOV05-MOV07
North/South Street: MOV06

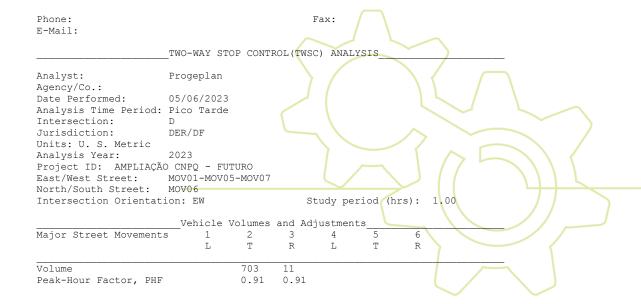
North/South Street: MOV06 Intersection Orientation: EW

Study period (hrs): 1.00



	Vehi	.cle Vo	lumes and	d Adju:	stments			
Major Street:	Approach	E	astbound			Westboun	d	
	Movement	1	2	3	4	5	6	
		L	T	R	L	T	R	
Volume			703	11				
Peak-Hour Fact	or, PHF		0.91	0.91				
Hourly Flow Ra	te, HFR		772	12				
Percent Heavy	Vehicles							
Median Type/St	orage	Undi	vided		/			
RT Channelized								
Lanes			2 ()				
Configuration			T TI					
Upstream Signa	12		No			No		
opocicum bigna	±•		110			110		
Minor Street:	Approach	N	orthbound	d	:	Southbou	nd	
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume				11				
Peak Hour Fact	or, PHF			0.91				
Hourly Flow Ra	te, HFR			12				
Percent Heavy	Vehicles			0				
Percent Grade	(%)		0			0		
Flared Approac	h: Exists?	Storag	e		/		/	
Lanes				1				
Configuration			R					
001111941401011								
			ength, a					
Approach	EB	WB		thbound			thbound	
Movement	1	4	7	8	9	10	11 12	
Lane Config					R			
v (vph)					12			
C(m) (vph)					661			
v/c	-1-				0.02			
95% queue leng	τn				0.06			
Control Delay					10.5			
LOS					В			
Approach Delay				10.5				
Approach LOS				В				

HCS+: Unsignalized Intersections Release 5.6





Peak-15 Minute Volume		193	3				
Hourly Flow Rate, HFR		772	12				
Percent Heavy Vehicles							
Median Type/Storage	Undiv	ided		/			
RT Channelized? Lanes		2 ()				
Configuration		T TF					
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
Volume			11				
Peak Hour Factor, PHF			0.91				
Peak-15 Minute Volume			3				
Hourly Flow Rate, HFR			12				
Percent Heavy Vehicles			0				
Percent Grade (%)	,	0			0		
	?/Storage			/			/
RT Channelized			No				
Lanes		_ 1	-				
Configuration		R					
Pos	logtrian				+ 0		
Movements	destrian 13	14	15	16			
Flow (ped/hr)	0	0	0	0			
Lane Width (m)	3.6	3.6	3.6	3.6			
Walking Speed (m/sec)	1.2	1.2	1.2	1.2			
Percent Blockage	0	0	0	0			
	Upst.	ream Si	gnal Da	t.a			
Prog.		rrival	Green		Pro	g.	Distance
Flow	Flow	Type	Time	Lengt	h Spe	ed	to Signal
vph	vph		sec	sec	kp!	h	meters
32 Left-Turn							
Through							
S5 Left-Turn							
Through							
Worksheet 3-Data for Comp	outing Ef	fect of	Delay	to Majo	r Stre	et Ve	hicles
			Move	ment 2	Мо	vemen	t 5
Ohana da da ara d	11 1 2						
Shared in volume, major t							
Shared ln volume, major m Sat flow rate, major th w		es:					
,ac rrow race, major til v	C111CTC2.						

Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles: Number of major street through lanes:

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical	Gap Cal	lculati	on							_
Movement		1	4	7	8	9	10	11	12	
		L	L	L	Т	R	L	Т	R	
						/ /		\	\ /	
t(c,base)					6.2				_
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
P(hv)					\	0				
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10	
Percent	Grade			0.00	0.00	0.00	0.00	0.00	0.00	
t(3,1t)						0.00				
t(c,T):	1-stage	e 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00/	
	2-stage	e 0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	
t(c)	1-stage	€				6.2				
	2-stage	9							1 1	
								\		
Follow-U	Jp Time (Calcula	tions						.	_
Movement		1	4	7	8	9	10	11	12	
		L	L	L	Т	R	L	T	R	
t(f,base	÷)					3.30				_
t(f,HV)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	



```
P(HV)
                                                  Ω
                                                  3.3
t(f)
Worksheet 5-Effect of Upstream Signals
Computation 1-Queue Clearance Time at Upstream Signal
                                                 Movement 2
                                                                     Movement 5
                                              V(t)
                                                    V(l,prot) V(t) V(l,prot)
V prog
Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g (q2)
g (q)
Computation 2-Proportion of TWSC Intersection Time blocked
                                                 Movement 2
                                                                     Movement 5
                                              V(t)
                                                     V(l,prot) V(t)
                                                                         V(1,prot)
alpha
beta
Travel time, t(a) (sec)
Smoothing Factor, F
Smoothing Factor, F
Proportion of conflicting flow, f
Max platooned flow, V(c,max)
Min platooned flow, V(c,min)
Duration of blocked period, t(p)
                                                   0.000
                                                                        0.000
Proportion time blocked, p
Computation 3-Platoon Event Periods
                                             Result
p(2)
                                             0.000
p(5)
                                             0.000
p(dom)
p(subo)
Constrained or unconstrained?
Proportion
unblocked
                              (1)
                                                 (2)
                                                                  (3)
for minor
                         Single-stage
                                                 Two-Stage Process
movements, p(x)
                            Process
                                             Stage I
                                                               Stage II
p(1)
p(4)
p(7)
p(8)
p(9)
p(10)
p(11)
p(12)
Computation 4 and 5
Single-Stage Process
                                           7
                                                          9
                                                                 10
Movement
                           1
                                                                                 12
                           L
                                   L
                                          L
                                                          R
                                                                  L
                                                                          Т
V c,x
                                                         392
S
Рx
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                                          10
               Stagel Stagel Stagel Stagel Stagel Stagel
                                                                              Stage2
V(c,x)
P(x)
```

V(c,u,x)



Worksheet 6-Impedance and Capacity Equations Step 1: RT from Minor St. 9 12 Conflicting Flows 392 Potential Capacity 661 Probability of Queue free St. 1.00 1.00 Step 2: LT from Major St. 4 1 Conflicting Flows 7 Probability of Queue Free St. 1.00 1.00 Step 2: LT from Major St. 4 1 Conflicting Flows 7 Probability of Queue Free St. 1.00 1.00 Raj 1-Shared Prob Q free St. 1.00 1.00 Raj 1-Shared Prob Q free St. 1.00 1.00 Raj 1-Shared Prob Q free St. 1.00 1.00 Cap. Adj. factor due to Impeding mwmnt 1.00 1.00 Step 4: LT from Minor St. 7 10 Conflicting Flows Potential Capacity Probability of Queue free St. 1.00 1.00 Raj 1., Min T Adj. Imp Factor 1.00 1.00 Raj 1., Min T Adj. Imp Factor 1.00 1.00 Raj 1., Min T Adj. Imp Factor 1.00 1.00 Raj 1., Min T Adj. Imp Factor 1.00 1.00 Raj 1., Min T Adj. Imp Factor 1.00 1.00 Raj 1., Kin T Adj. Imp Factor 1.00 1.00 Raj 1., Ractor due to Impeding mwmnt 1.00 0.38 Movement Capacity Probability of Queue free St. 8 11 Fart 1 - First Stage Conflicting Flows Potential Capacity Probability of Queue free St. 8 11 Fart 2 - Second Stage Conflicting Flows Potential Capacity Probability of Queue free St. 8 11 Fart 3 - Single Stage Conflicting Flows Potential Capacity Probability of Queue free St. 8 11 Fart 1 - First Stage Conflicting Flows Potential Capacity Probability of Queue free St. 8 11 Fart 1 - First Stage Conflicting Flows Potential Capacity Probability of Queue free St. 8 11 Fart 1 - First Stage Conflicting Flows Potential Capacity Potential Capa	C(r,x) C(plat,x)			_
Conflicting Flows	Worksheet 6-Impedance and Capacity Equation	ons		_
Pacential Capacity Percedestrian Impedance Factor Novement Capacity Probability of Queue free St. Step 2: LT from Major St. 4 1 Conflicting Flows Potential Capacity Percedestrian Impedance Factor Novement Capacity Probability of Queue free St. 1.00 1.00 Resident Capacity Probability of Queue free St. 1.00 1.00 Resident Capacity Probability of Queue free St. 8 11 Conflicting Flows Potential Capacity Probability of Queue free St. 8 11 Conflicting Flows Potential Capacity Probability of Queue free St. 8 11 Conflicting Flows Potential Capacity Probability of Queue free St. 1.00 1.00 Resident Flows Resid	Step 1: RT from Minor St.	9	12	
Pedestrian Impedance Factor Movement Capacity Probability of Queue free St. 1.00 Step 2: LT from Major St. 4 1 Conflicting Flows Protential Capacity Probability of Queue free St. 8 1.00 Step 3: LT from Major St. 8 1.00 Movement Capacity Probability of Queue free St. 1.00 Movement Capacity Probability of Queue free St. 8 11 Conflicting Flows Potential Capacity Probability of Queue free St. 8 11 Conflicting Flows Potential Capacity Probability of Queue free St. 1.00 Movement Capacity Probability of Queue free St. 1.00 Movement Capacity Probability of Queue free St. 1.00 Conflicting Flows Potential Capacity Probability of Queue free St. 1.00 Conflicting Flows Potential Capacity Probability of Queue free St. 1.00 Maj. L, Min T Impedance Factor Maj. L, Min T Maj. Imp Factor. 1.00 May. L, Min T Adj. Imp Factor. 1.00 Movement Capacity Movement Capacity Potential Capacity Potential Capacity Potential Capacity Potential Capacity Potential Capacity Potential Capacity Probability of Queue free St. Part 1 - First Stage Conflicting Flows Potential Capacity P	Conflicting Flows	392		_
Movement Capacity Movement Cap			1 00	
Probability of Queue free St. 0.98 1.00 Step 2: IT from Major St. 4 1 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 May 1Shared Prob Q free St. 1.00 1.00 May 1Shared Prob Q free St. 1.00 1.00 May 1Shared Prob Q free St. 1.00 1.00 Step 3: TH from Minor St. 8 11 Conflicting Flows Probability of Queue free St. 1.00 1.00 Tapa, Add). Factor due to Impeding mvmnt 1.00 1.00 Step 4: IT from Minor St. 7 10 Conflicting Flows Potential Capacity Probability of Queue free St. 1.00 1.00 Step 4: IT from Minor St. 7 10 Conflicting Flows Potential Capacity Probability of Queue factor 1.00 1.00 Maj. L, Min T Impedance Factor 1.00 Maj. L, Min T Add; Imp Factor 1.00 Maj. L, Min T Add; Imp Factor 1.00 Maj. L, Min T Add; Imp Factor 1.00 May, L, Min T May Imp Factor 1.00 May, L, Min T May Imp Factor 1.00 May, L, Min T Impedance Factor 1.00 Tap. Add). factor due to Impeding mvmnt 1.00 0.98 Movement Capacity Norksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Probability of Queue free St. Part 3 - Single Stage Conflicting Flows Potential Impedance Factor 1.00 Tap. Add). factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor 1.00 Tap. Add). factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor 1.00 Tap. Add). factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor 1.00 Tap. Add). factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor 1.00 Tap. Add). factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor 1.00 Tap. Add). Factor due to Impeding mvmnt 1.00 Tap. Add). Factor due to Impeding mvmnt 1.00 Tap. Add). Factor due to Impeding mvmnt 1.00 Tap. Add). Factor due to Impeding mvmnt 1.00 Tap. Add). Factor due to Impeding mvmnt 1.00 Tap. Add). Factor due to Impedi			1.00	
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Movement Capacity Probability of Queue free St. And In-Shared Prob Q free St. Step 3: TH from Minor St. Step 3: TH from Minor St. Conflicting Flows Potential Capacity Pedestrian Impedance Factor Capacity Probability of Queue free St. 1.00 Conflicting Flows Potential Capacity Pedestrian Impedance Factor Capacity Probability of Queue free St. 1.00 Conflicting Flows Potential Capacity Probability of Queue free St. 1.00 Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L. Min T Impedance Factor Maj. L. Min T Impedance Factor Maj. L. Min T Adj. Imp Factor. 1.00 Maj. L. Min T Adj. Imp Factor. 1.00 Maj. L. Min T Adj. Imp Factor. Maj. L. Min T Adj. Imp Factor. 1.00 Maj. L. Min T Adj. Imp Factor. Maj. L. Min T Empedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Morksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impeding mwmnt Movement Capacity Pedestrian Impedance Factor Capa. Adj. factor due to Impedin		0.98	1.00	
Potential Capacity Poedestrian Impedance Pactor Movement Capacity Probability of Queue free St. 1.00	Step 2: LT from Major St.	4	1	
Pedestrian Impedance Factor Movement Capacity Probability of Queue free St. Step 3: TH from Minor St. Step 3: TH from Minor St. Step 3: TH from Minor St. Step 3: TH from Minor St. Step 3: TH from Minor St. Step 3: TH from Minor St. Step 3: TH from Minor St. Step 3: TH from Minor St. Step 4: LT from Minor St. Step 5: TH from Minor St. Step 3: Th from Minor St. Step 4: Th from Minor St.	Conflicting Flows			_
Movement Capacity Probability of Queue free St. 1.00 1.00 1.00		1 00	1 00	
Maj L-Shared Prob Q free St. Step 3: TH from Minor St. 8 11 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Ado, Add, factor due to Impeding mvmnt 1.00 1.00 Movement Capacity Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 7 10 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance Factor 1.00 1.00 Maj. L, Min T Add, Imp Factor. 1.00 Ada, L, Min T Add, Imp Factor. 1.00 Step 4: The Factor due to Impeding mvmnt 1.00 1.00 Maj. L, Min T Add, Imp Factor. 1.00 Maj. L, Min T Add, Imp Factor. 1.00 Movement Capacity Morksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Capa. Add, factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Capa. Add, factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Capa. Add, factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Capa. Add, factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Stage Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Stage Stage Conflicting Flows Potential Capacity Part 3 - Stage Stage Conflicting Flows Potential Capacity Part 3 - Stage Stage Conflicting Flows Potential Capacity Part 3 - Stage Process: A		1.00	1.00	
Step 3: TH from Minor St. 8 11 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 1.00 Step 4: LT from Minor St. 7 10 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance Factor 1.00 Maj. L, Min T Adj. Imp Factor. 1.00 May. L, Min T Adj. Imp Factor. 1.00 May. May In Adj. Imp Factor 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.98 Movement Capacity Morksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due Tompedance Capacity Capacity Capacity Capacity Capacity Capacity Capacity Capacity Cap	Probability of Queue free St.	1.00	1.00	
Conflicting Flows Potential Capacity Pedestrian Impedance Factor	Maj L-Shared Prob Q free St.			
Potential Capacity Pedestrian Impedance Pactor 1.00 1.00 Zap. Adj. factor due to Impeding mwnnt 1.00 1.00 Movement Capacity Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 7 10 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Maj. 1., Min T Minor St. 1.00 Cap. Adj. factor due to Impeding mwnnt 1.00 0.98 Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. factor due to Impeding mwnnt Movement Capacity Pedestrian Impedance Pactor Cap. Adj. f	Step 3: TH from Minor St.	8	11	
Pedestrian Impedance Pactor 1.00 1.00 1.00 App. Adj, factor due to Impeding mymnt 1.00 1.00 Movement Capacity Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 7 10 Conflicting Flows Pedestrian Impedance Factor Waj. L, Min T Impedance Factor Waj. L, Min T Impedance factor Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 Step 3: TH from Minor St. 8 Step 3: TH from Minor St. 8 Step 3: TH from Minor St. 8 Fart 1 - First Stage Conflicting Flows Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 Fart 1 - First Stage Conflicting Flows Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Wovement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Wovement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Wovement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj, factor due to Impeding				_
Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. 1.00 Step 4: LT from Minor St. 7 10 Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Probability of Queue free St. Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Potential Capacity Potential Capacity Potential Capacity Potential Capacity Po		1 00	1 00	
Movement Capacity Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 7 10 Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. 1.00 Cap. Adj. factor due to Impeding mvmnt Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt				
Step 4: LT from Minor St. 7 10 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance factor 1.00 Maj. L, Min T Adj. Imp Factor. 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.98 Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Potential Capacity Potentia	Movement Capacity	1 00	1 00	
Conflicting Flows Pedestrian Impedance Factor Maj. L, Min T Impedance factor Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. Part 1 - First Stage Conflicting Flows Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian	Probability of Queue free St.	1.00	1.00	_
Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance factor 1.00 Maj. L, Min T Adj. Imp Factor. 1.00 Aaj. L, Min T Adj. Imp Factor. 1.00 Aaj. Adj. factor due to Impeding mvmnt 1.00 0.98 Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor Movement Capacity Pedestrian I	Step 4: LT from Minor St.	7	10	
Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance factor 1.00 Maj. L, Min T Adj. Imp Factor. 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.98 Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: A				_
Maj. L, Min T Impedance factor 1.00 Maj. L, Min T Adj. Imp Factor. 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.98 Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Petential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Petential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Perestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt		1 00	1 00	
Cap. Adj. factor due to Impeding mvmnt 1.00 0.98 Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a Y C t Probability of Queue free St. 1.00		1.00		
Movement Capacity Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00				
Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor 1.00 1.00 Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00		1.00	0.98	
Step 3: TH from Minor St. 8 11 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor 1.00 1.00 Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. 1.00 1.00	Worksheet 7-Computation of the Effect of	Two-stage Gan Acc	entance	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a Y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1			- 	_
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor I.00 Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor I.00 Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. I.00 I.00	Step 3: TH from Minor St.	8	11	
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1				
Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1				
Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y Ct Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1				
Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt 1.00 1.00 Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00 1.00				
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a Y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1			\	
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1				_
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00 1.00				
Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00		\		
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00				
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a Y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00				_ \
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Result for 2 stage process: a Y C t Probability of Queue free St. 1.00 1.00 1.00 1.00 1.00 1.00				
Cap. Adj. factor due to Impeding mvmnt 1.00 Movement Capacity Result for 2 stage process: a Y C t Probability of Queue free St. 1.00 1.00		1.00	1.00	
a y C t Probability of Queue free St. 1.00 1.00	Cap. Adj. factor due to Impeding mvmnt)))[
y C t Probability of Queue free St. 1.00 1.00	Result for 2 stage process:	(- 7//
C t Probability of Queue free St. 1.00 1.00	a	\		//
	C t	1 00	1 00	
Step 4: LT from Minor St. 7				
	Step 4: LT from Minor St.	7	10	$\overline{}$



Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. 1.00 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.98 Movement Capacity Results for Two-stage process: а У С t Worksheet 8-Shared Lane Calculations Movement. 8 9 10 11 12 L Т R L Т R Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) 661 Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 8 9 10 11 L Τ R L Τ R C sep 661 Volume 12 Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep C act Worksheet 10-Delay, Queue Length, and Level of Service 10 12 Movement Lane Config R v (vph) 12 C(m) (vph) 661 0.02 v/c 95% queue length Control Delay 10.5 LOS В Approach Delay 10.5 Approach LOS В

Movement 2

1.00

Movement 5

1.00

Worksheet 11-Shared Major LT Impedance and Delay

p(oj)

Part 1 - First Stage



```
v(i1), Volume for stream 2 or 5 v(i2), Volume for stream 3 or 6 \,
s(i1), Saturation flow rate for stream 2 or 5 s(i2), Saturation flow rate for stream 3 or 6
P*(oj)
d(M,LT), Delay for stream 1 or 4
N, Number of major street through lanes
d(rank,1) Delay for stream 2 or 5
```

1.1.3.9 Interseção E – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Progeplan

Agency/Co.:

Date Performed: 05/06/2023 Analysis Time Period: Pico Manha

Intersection: Jurisdiction: DER/DF

Units: U. S. Metric

Analysis Year: 2023

Project ID: FUTURA

East/West Street: M2-M7+M8-M11+M12-M13
North/South Street: M13

Intersection Orientation: EW Study period (hrs): 1.00

			lumes a	_	ıstme			
Major Street:	Approach	E	astboun	d		W∈	estbound	l
	Movement	1	2	3		4	5	6
		L	Т	R	I	L	Т	R
Volume						5	724	
Peak-Hour Fact	or, PHF					0.91	0.91	
Hourly Flow Ra	ate, HFR					5	795	
Percent Heavy	Vehicles					0		
Median Type/St	-	Undi			/			
Lanes						0	2	
Configuration						I	LT T	
Upstream Signa	11?		No				No	
Minor Street:	Approach	N	orthbou	nd		Sc	outhboun	ıd
	Movement	7	8	9	- 1	10	11	12
		L	Т	R	- 1	L	T	R

	MOVEMENT	L	T	R	L	T	R	
Volume Peak Hour Facto Hourly Flow Rat Percent Heavy V Percent Grade (Flared Approach Lanes Configuration	e, HFR ehicles %)	12 1.00 12 11	0	K	/	0	K	/

	Delav,	Queue Le	ngth,	and Leve	l of Ser	vice		J
Approach	EB T	WB		rthbound	\		nbound	
Movement	1	4	7	8	9	10	11 12	
Lane Config		LT	L					
v (vph)		5	12				T / /	
C(m) (vph)		1636	581				'	
v/c		0.00	0.02				1 1	
95% queue length		0.01	0.06			(1 1	
Control Delay		7.2	11.3					
LOS		A	В				7 /	
Approach Delay				11.3				
Approach LOS				В			I	



HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail:			F	ax:			
	_TWO-WAY SI	OP CONTI	ROL(TWSC) ANAI	YSIS		
Analyst:	Progeplan						
Agency/Co.: Date Performed: Analysis Time Period: Intersection: Jurisdiction:	05/06/2023 Pico Manha G DER/DF						
Units: U. S. Metric Analysis Year:	2023						
Project ID: FUTURA East/West Street: North/South Street: Intersection Orientat.	M2-M7+M8-M M13 ion: EW	111+M12-N		udy pe	eriod (h	nrs): 1	.00
	Vohialo	Volumos	and Adi		+ 0		
Major Street Movement	Vehicle	2	3	4	5	6	
	L	T	R	L	T	R	
Volume Peak-Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR				5 0.91 1 5	724 0.91 199 795		
Percent Heavy Vehicle: Median Type/Storage RT Channelized?		vided		0 /			
Lanes				0_	2 .T T		
Configuration Upstream Signal?		No		1	No		
Minor Street Movement		8	9	10	11	12	
	L	T	R	L	T	R	
Volume Peak Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicle	12 1.00 3 12 s 11						
Percent Grade (%) Flared Approach: Exist RT Channelized		0 re		/	0		/
Lanes Configuration	1 I	ı					
	Pedestriar	Volumes	s and Ad	iustme	ents		
Movements	13	14	15	16			
Flow (ped/hr) Lane Width (m) Walking Speed (m/sec) Percent Blockage	0 3.6 1.2		0 3.6 1.2 0	0 3.6 1.2 0			
	IIne	tream S:	ignal Da	ta		/>	
Prog Flow vph	. Sat	Arrival Type			th Spe	ed to	stance Signal eters
S2 Left-Turn Through S5 Left-Turn Through							



						Movemen	t 2	Movemen	nt 5	
Shared 1 Sat flow Sat flow	n volume n volume rate, ma rate, ma f major s	, majo: ajor tl ajor r	r rt veh h vehicl t vehicl	nicles: les: les:				0 0 1700 1700 2		_
Workshee	t 4-Crit	ical G	ap and I	Follow-	up Time	Calcula	ation			_
Critical	Gap Cal	culation	on							_
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R	
t(c,base t(c,hv) P(hv))	1.00	4.1 1.00 0	7.1 1.00 11	1.00	1.00	1.00	1.00	1.00	
t(c,g) Percent t(3,lt)	Grade		0.00	0.20 0.00 0.70	0.20	0.10	0.20	0.20	0.10	
t(c,T):	1-stage 2-stage 1-stage 2-stage		0.00 0.00 4.1	0.00 1.00 6.5	0.00	0.00	0.00	0.00	0.00	
Follow-U	p Time Ca	alcula	tions							_
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R	
t(f,base t(f,HV) P(HV) t(f))	0.90	2.20 0.90 0 2.2	3.50 0.90 11 3.6	0.90	0.90	0.90	0.90	0.90	
V prog Total Sa Arrival Effectiv Cycle Le Rp (from	e Green, ngth, C	g (se (sec)	c)	(vph)	∨(Movement) V(vement 5 V(1,prot)	_
	on vehic			on green	n P					
Computat	ion 2-Pro	pporti	on of TV	VSC Inte	ersecti V(Movemen		Mor	vement 5 V(1,prot)	_
Smoothin Proporti Max plat Min plat Duration		F nflict: Dw, V(c Dw, V(c ked pe:	ing flow c,max) c,min) riod, t			0.000			0.000	
Computat p(2)	ion 3-Pla	atoon 1	Event Pe	eriods	Res 0.0		_			-) [
p(5) p(dom) p(subo)	ned or u	aconst-	rainodo		0.0	00				
Proporti unblocke	on		(1)			(2)		(3)	7	
for mino	r		Single-	-stage		Two-Sta	age Pro	cess		



movements, p(x)	Process	Stage I	Stage	II	engenharia (
p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12)					
Computation 4 and 5 Single-Stage Process Movement	1 4 L L	7 8 L T	9 10 R L	11 12 T R	_
V c,x s Px V c,u,x	0	407			_
C r,x C plat,x					_
Two-Stage Process Stage1	7 Stage2 Stage	8 1 Stage2 Stag	10 gel Stage2	11 Stagel Stage2	
V(c,x) s P(x) V(c,u,x)	3000				_
C(r,x) C(plat,x)					
Worksheet 6-Impedance	e and Capacity	Equations			_
Step 1: RT from Minor	St.		9	12	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity	Factor	1.	.00	1.00	_
Probability of Queue	free St.	1	.00	1.00	
Step 2: LT from Major	St.		4	1	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f	free St.	1 10 1.	536 .00 536 .00	1.00	
Step 3: TH from Minor			8	11	
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Probability of Queue	to Impeding mv	mnt 1.	.00	1.00	
Step 4: LT from Minor			7	10	= /
Conflicting Flows Potential Capacity Pedestrian Impedance Maj. L, Min T Impedar Maj. L, Min T Adj. Im Cap. Adj. factor due	nce factor np Factor.	58 1	07 33 .00	1.00 1.00 1.00 1.00	
Movement Capacity Worksheet 7-Computati	on of the Effe		31 ————————————————————————————————————	ance	



Step 3: TH from Minor St.	8	11	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.			
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	1.00	
Result for 2 stage process:			
Y C t			
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity			
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity	407 583 1.00	1.00 1.00 1.00 1.00	
Results for Two-stage process:			
y C t	581	\sim)
Worksheet 8-Shared Lane Calculations			
	7 8 9 L T R	10 11 12 L T R	
Volume (vph) 12 Movement Capacity (vph) 58 Shared Lane Capacity (vph)	2 81	3/75	
Worksheet 9-Computation of Effect of F	lared Minor Street	Approaches	
	7 8 9 L T R	10 11 12 L T R	
C sep 58 Volume 12	81 2		



Delay Q sep Q sep +1 round (Qsep +1)

n max C sh SUM C sep n C act

Worksheet 10-Delay Onene Length and Level of Service

Worksheet 10-Delay,	Queue	Length,	and L	evel of	Service			
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L					
v (vph)		5	12					
C(m) (vph)		1636	581					
v/c		0.00	0.02					
95% queue length		0.01	0.06					
Control Delay		7.2	11.3					
LOS		A	В					
Approach Delay				11.3				
Approach LOS				В				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	1.00
v(il), Volume for stream 2 or 5		0
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		1.00
d(M,LT), Delay for stream 1 or 4		7.2
N, Number of major street through lanes		2
d(rank,1) Delay for stream 2 or 5		

1.1.3.10 Interseção E — Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: East/West Street: M2-M7+M8-M11 North/South Street: M11 Intersection Orientation: EW Study period (hrs): Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound Movement 2 5 6 R 1985 Volume Peak-Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Median Type/Storage RT Channelized? 0.91 0.91 2181 4 0 Undivided 0 2 LT T 0 Lanes Configuration



Upstream Signal?			No				No		
Minor Street: App	proach	No	rthbour	nd		5	Southbou	ınd	
Mo	vement	7	8	9	- 1	10	11	12	
		L	T	R		L	T	R	
 Volume		9							
Peak Hour Factor,	PHF	1.00							
Hourly Flow Rate,	HFR	9							
Percent Heavy Veh		0							
Percent Grade (%)			0				0		
Flared Approach:	Exists	?/Storage			/			/	
Lanes		ĺ							
		L							
Configuration	Dolay			and Low		f 901			
Approach	EB	Queue Le WB	ngth, a	rthboun	ıd	f Sei	Soi	ıthbound	
		Queue Le	ngth, a			f Ser		ithbound	
Approach Movement	EB	Queue Le WB	ngth, a	rthboun	ıd	f Ser	Soi		
Approach Movement Lane Config v (vph)	EB	Queue Le WB 4 LT	ngth, a Nor 7 L	rthboun	ıd	f Ser	Soi		· · · · · ·
Approach Movement Lane Config v (vph) C(m) (vph)	EB	Queue Le WB 4 LT 4 1636	ngth, a No. 7 L 9 237	rthboun	ıd	f Ser	Soi		· · · · · · · · · · · · · · · · · · ·
Approach Movement Lane Config v (vph) C(m) (vph)	EB	Queue Le WB 4 LT 4 1636 0.00	ngth, a No. 7 L 9 237 0.04	rthboun	ıd	f Ser	Soi		
Approach Movement Lane Config v (vph) C(m) (vph)	EB	Queue Le WB 4 LT 4 1636 0.00 0.01	ngth, a No. 7 L 9 237 0.04 0.12	rthboun	ıd	f Ser	Soi		
Approach	EB	Queue Le WB 4 LT 4 1636 0.00	ngth, a No. 7 L 9 237 0.04	rthboun	ıd	f Ser	Soi		!
Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS	EB	Queue Le WB 4 LT 4 1636 0.00 0.01	ngth, a No. 7 L 9 237 0.04 0.12	rthboun 8	ıd	f Ser	Soi		· · · · · · · · · · · · · · · · · · ·
Approach Movement Lane Config v (vph) C(m) (vph) v/c 95% queue length	EB	Queue Le WB 4 LT 4 1636 0.00 0.01 7.2	ngth, a No. 7 L 9 237 0.04 0.12 20.8	rthboun	ıd	f Ser	Soi		

HCS+: Unsignalized Intersections Release 5.6

Phone:

E-Mail:

Volume

Peak Hour Factor, PHF

TWO-WAY STOP CONTROL(TWSC) ANALYSIS Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Tarde Intersection: Ε Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: East/West Street: M2-M7+M8-M11 North/South Street: M11 Intersection Orientation: EW Study period (hrs): 1.00 Vehicle Volumes and Adjustments Major Street Movements 1 2 Т R L Τ Volume 1985 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume 545 Hourly Flow Rate, HFR Percent Heavy Vehicles Median Type/Storage 2181 Undivided RT Channelized? 2 Lanes Configuration LT T Upstream Signal? No No Minor Street Movements 8 T 10 11 12 9

R

L

Τ

R

L

9 1.00 Fax:



Peak-15 Minute Volume 2 Hourly Flow Rate, HFR 9 0 Percent Heavy Vehicles

RT Channelized

Percent Blockage

Lanes 1 Configuration L

Percent Grade (%) 0 Flared Approach: Exists?/Storage

0

Pedestrian Volumes and Adjustments Movements 13 14 15 Flow (ped/hr) 0 Lane Width (m) 3.6 3.6 3.6 3.6 Walking Speed (m/sec) 1.2 1.2 1.2 1.2

0

0

Upstream Signal Data Sat Arrival Green Cycle Prog. Prog. Distance Flow Flow Time Speed to Signal Type Length vph vph sec sec kph meters

0

Left-Turn Through

Left-Turn Through

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		0
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		2

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical	. Gap Calcula	ation						
Movement	: 1	4	7	8	9	10	11	12
	L	L	L	Т	R	L	T	R
t(c,base	e)	4.1	7.1					
t(c,hv)	1.0	00 1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)		0	0					
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent	Grade		0.00	0.00	0.00	0.00	0.00	0.00
t(3,1t)		0.00	0.70					
t(c,T):	1-stage 0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage 0.0	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage 2-stage	4.1	6.4					

Follow-Up	Time Calcula	tions			\			
Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	Т	R
t(f,base)		2.20	3.50					
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		0	0		_ \			·
t(f)		2.2	3.5				_//	
					7			_

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

Movement 2 Mt) V(1,prot) V(t) V(t)

Movement 5 V(1,prot)

V prog
Total Saturation Flow Rate, s (vph)

Effective Green, g (sec)



Rp (from Exhibit 16-11) Proportion vehicles arriving on green P g(q1) g(q2) g (q) Computation 2-Proportion of TWSC Intersection Time blocked Movement 2 Movement 5 V(t) V(1,prot) V(t) V(1,prot) alpha beta Travel time, t(a) (sec) Smoothing Factor, F Proportion of conflicting flow, f Max platooned flow, V(c,max) Min platooned flow, V(c,min) Duration of blocked period, t(p) Proportion time blocked, p 0.000 0.000 Computation 3-Platoon Event Periods Result p(2) 0.000 p(5) 0.000 p (dom) p(subo) Constrained or unconstrained? Proportion unblocked (1) (2) (3) Two-Stage Process for minor Single-stage Stage I Stage II movements, p(x)Process p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12) Computation 4 and 5 Single-Stage Process Movement 1 4 7 8 9 10 11 12 L L L R L Τ R V c,x 0 1098 Рx V c,u,x Cr,x C plat,x Two-Stage Process 10 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 V(c,x) 3000 P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance and Capacity Equations Step 1: RT from Minor St. 9 12 Conflicting Flows Potential Capacity 1.00 1.00 Pedestrian Impedance Factor Movement Capacity 1.00 Probability of Queue free St. 1.00

Cycle Length, C (sec)



Step 2: LT from Major St.	4	1	-
Conflicting Flows	0		-
Potential Capacity	1636		
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity	1636		
Probability of Queue free St.	1.00	1.00	
Maj L-Shared Prob Q free St.	1.00		
Step 3: TH from Minor St.	8	11	-
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mymnt	1.00	1.00	
Movement Capacity			
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	-
Conflicting Flows	1098		-
Potential Capacity	238	1 00	
Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor		1.00	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mymnt	1.00	1.00	
Movement Capacity	237	1.00	
Worksheet 7-Computation of the Effect of Tw	wo-stage Gan Acce	ent ance	-
Step 3: TH from Minor St.			-
			-
Part 1 - First Stage Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mymnt			
Movement Capacity			
Probability of Queue free St.			
Part 2 - Second Stage			-
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			_
Part 3 - Single Stage Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mymnt	1.00	1.00	
Movement Capacity			
Result for 2 stage process:			-
a		_ /	
y o +			
C t	1.00	1.00	\
Probability of Queue free St.			_ \
Step 4: LT from Minor St.	7	10	
Part 1 - First Stage	7/	\wedge	
Conflicting Flows)		
Potential Capacity Pedestrian Impedance Factor		1 /> -	111
Cap. Adj. factor due to Impeding mymnt		\ \ \ / /	/////
Movement Capacity			4
Part 2 - Second Stage		+	- //
Conflicting Flows	J		//
Potential Capacity			
Pedestrian Impedance Factor			_ (
Cap. Adj. factor due to Impeding mymnt			1
Movement Capacity			√
			. \]



							ongomiana o mo
Part 3 - Single Stage			1000				
Conflicting Flows Potential Capacity			1098 238				
Pedestrian Impedance Factor			1.00		1.00		
Maj. L, Min T Impedance factor					1.00		
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impedir	ıa mvmnt		1.00		1.00		
Movement Capacity	- 5		237				
Results for Two-stage process:							_
a Y							
C t			237				
Worksheet 8-Shared Lane Calcula	ations						_
Movement	7 L	8 T	9 R	10 L	11 T	12 R	_
77-7							_
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)	9 237						
Worksheet 9-Computation of Effe	ect of Flare	ed Minc	or Stree	t Appro	aches		_
Movement	7 L	8 T	9 R	10 L	11 T	12 R	-
C sep	237						_
Volume	9						
Delay Q sep							
Q sep +1							
round (Qsep +1)							
n max							_
C sh							
SUM C sep							
C act							
Worksheet 10-Delay, Queue Lengt	ch, and Leve	el of S	Service				_
							_
Movement 1 4 Lane Config LT	7 L	8	9	10	11	12	
							_
v (vph) 4 C(m) (vph) 1636	9 5 237						
v/c 0.00							
95% queue length 0.01							
Control Delay 7.2 LOS A	20.8 C						
Approach Delay		20.8	/	\			
Approach LOS		C	\				
		$\overline{}$			$\overline{}$		_
Worksheet 11-Shared Major LT In	npedance and	d Delay	ī /		\		7
		- - - - - - - - - - - - - -	Moveme	nt 2	Movem	ent 5	- \
							_ \
<pre>p(oj) v(il), Volume for stream 2 or 5</pre>	,		1.0	0	0	00	_ `)
v(i2), Volume for stream 3 or 6					0		
s(il), Saturation flow rate for						00	
s(i2), Saturation flow rate for P*(oj)	stream 3 c	or 6	1 /		177	00	/////
d(M,LT), Delay for stream 1 or	4			\longrightarrow	7.		4
N, Number of major street throu	ıgh lanes				2	\	
d(rank,1) Delay for stream 2 or	5 				_		<u> </u>
							///
1.1.3.11 Interseção F – Pico	Manhã					_	\sim 1
HCS+: Unsignal	ized Inters	section	ns Relea:	se 5.6			



TWO-WAY STOP CONTROL SUMMARY

Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Manha Intersection:

Jurisdiction: Units: U. S. Metric

Analysis Year:

Project ID: FUTURA

East/West Street: M01-M05-M07+M08+M06-M11 North/South Street: M12

DER/DF

2023

Intersection Orientation: EW Study period (hrs): 1.00

Major Street:	Approach	Eas	stbound			Wes	stbound	d	
-	Movement	1	2	3		4	5	6	
		L	T	R	Ī	L	T	R	
Volume		9	1796						
Peak-Hour Fact	or, PHF	0.91	0.91						
Hourly Flow Ra	ate, HFR	9	1973						
Percent Heavy	Vehicles	12							
Median Type/St	corage	Undivi	ded			/			
RT Channelized	1?								
Lanes		0	2						
Configuration		LT	. T						
Upstream Signa	11?		No				No		
Minor Street:	Approach	Non	thboun	d		Soi	ıthboui	nd	
	Movement	7	8	9		10	11	12	
		L	T	R		L	Т	R	
Volume						5			
Peak Hour Fact	or, PHF					0.91			
Hourly Flow Ra	ate, HFR					5			
Percent Heavy	Vehicles					0			
Percent Grade	(%)		0				0		
Flared Approac	ch: Exists?/	'Storage			/				/
Lanes						1			
201100									

	Delay,	Queue	Le	ngt	h, and	d Leve	of	Ser	vice		
Approach	EB	WB			North	nbound	l		Sc	outhboun	d
Movement	1	4		7	8	3	9		10	11	12
Lane Config	LT		-						L		
v (vph)	9		_						5		
C(m) (vph)	1560								268		
v/c	0.01								0.02		
95% queue length	0.02								0.06		
Control Delay	7.3								18.7		
LOS	A							_/	C		
Approach Delay										18.7	
Approach LOS										С	

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Fax:

Progeplan Analyst: Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Manha



Intersection: F

DER/DF Jurisdiction:

Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA

East/West Street: M01-M05-M07+M08+M06-M11
North/South Street: M12

Study period (hrs): 1.00 Intersection Orientation: EW

intersection offenda	CIOII. EW		اد	luay per	(I	110).	1.00
	Vehicle	Volumes	and Ad-	instment	- q		
Major Street Movement		2	3	4	5	6	
Major Screet Movement	L	T	R	L	T	R	
	ь	1	I.	п	1	Α.	
Volume	9	1796					
Peak-Hour Factor, PHI	0.91	0.91					
Peak-15 Minute Volume		493					
Hourly Flow Rate, HFF		1973					
Percent Heavy Vehicle							
Median Type/Storage		vided		/			
RT Channelized?	onai	vided		/			
Lanes	0	2					
Configuration	I	TT					
Upstream Signal?		No			No		
Minor Street Movement		8	9	10	11	12	
	L	T	R	L	Т	R	
 Volume				5			
Volume Peak Hour Factor, PHI	7			0.91			
Peak-15 Minute Volume				1			
Hourly Flow Rate, HFI				5			
Percent Heavy Vehicle	es	_		0			
Percent Grade (%)		0			0		
Flared Approach: Exi	ists?/Storag	ie		/			/
RT Channelized							
Lanes				1			
Configuration				L			
Movements	Pedestriar 13	1 Volumes	and Ad	ijustmer 16	nts		
Piovements	13	14	13	10			
Flow (ped/hr)	0	0	0	0			
Lane Width (m)	3.6	3.6	3.6	3.6			
Walking Speed (m/sec)			1.2	1.2			
Percent Blockage	0	0	0	0			
rerecite brockage	O	O	O	O			
		stream Si	-				
Prog	-	Arrival	Green	_		og.	Distance
Flor	v Flow	Type	Time	Lengt	th Spe	eed	to Signal
vph	vph		sec	sec	kŗ	ph	meters
S2 Left-Turn							
Through					/ \		
S5 Left-Turn				/	\		
Through				\		<u> </u>	
							/
Worksheet 3-Data for	Computing E	ffoot of	Dolay	to Majo	or Stro	20+ W	objeles —
WOIRSHEEL 3 Data 101	Computing E	TIECC OI	Delay	co Majo	OI DUIG	sec ve	enicies
			Move	ement 2	Мо	oveme	nt 5
Ch 1 1 1		1					$\overline{}$
Shared in volume, mag			0	\			
Shared in volume, mag	•		0				>
Sat flow rate, major				700		- /	
Sat flow rate, major				700		- 1	
Number of major stree	st through 1	ange.	2	1			

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation Movement

Number of major street through lanes:

1 4 L L 8 T 10 11 12 R L Т R

t(c,base) 4.1 7.1 1.00 1.00 1.00 1.00 1.00 1.00 1.00 t(c,hv) 1.00



P(hv)		12					0			
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10	
Percent (t(3,1t)	Grade	0.00		0.00	0.00	0.00	0.00	0.00	0.00	
t(c,T):	1-stage		0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	2-stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00	
t(c)	1-stage 2-stage	4.2					6.4			
Follow-Up	p Time C	alcula	tions							
Movement		1	4	7	8	9	10	11	12	
		L	L	L	Т	R	L	Т	R	
t(f,base))	2.20					3.50			
t(f,HV)		0.90 12	0.90	0.90	0.90	0.90	0.90 0	0.90	0.90	
P(HV) t(f)		2.3					3.5			
Worksheet	t 5-Effe	ct of T	Upstream	m Signa	ls					
Computat	ion 1-Qu	eue Cle	earance	Time a	t Upstr	eam Sig	nal			
					77/	Moveme			vement 5	
					V(L) ∨ (.	l,prot)	V (T)	V(l,prot)	
V prog										
Total Sat		Flow 1	Rate, s	(vph)						
Arrival : Effective	4 1	a (se	c)							
Cycle Ler		_	-,							
Rp (from	Exhibit	16-11								
Proportio	on vehic	les ar	riving (on gree	n P					
g(q1)										
g (q2)										
g (q)										
Computat:	ion 2-Pr	oportio	on of T	WSC Inte	ersecti	on Time	blocke	ed		
						Moveme:	nt 2	Mo	vement 5	
					V (t) V(l,prot)	V(t)	V(l,prot)	
alpha										
beta										
Travel to)							
Smoothing				-						
Proportion Max plate				w, i						
Max plato Min plato										
Duration				(a)						
Proportio				(F)		0.00	0		0.000	
Computat:	ion 3-Pla	atoon 1	Event P	eriods	Res	u⊥t				
p(2)					0.0					
p(5)					0.0	00		\		
p (dom)							/	\		
p(subo) Constrai:	ned or 111	nconst	rained?					L.		
						$\overline{}$				
Proportio						.\				
unblocked			(1			(2)		(3)	((
for minor			Single		C+-		age Prod		L /	
movements	∍, þ(X)		Proc	=55	sta	ge I	51	tage II		
p(1)					1					
p(4)						_ '			\rightarrow	
p(7) n(8)								- 1		
p(8) p(9)								, Ι	17 4	
p(3) p(10)									//	
p(11)						_				
p(12)										
Computati	ion 4 and	٦ 5							-++	
Computat. Single-St									1 /	
Movement	J0		1	4	7	8	9	10	11 12	
			L	L	L	T	R	L	T R	

V c,x



S Рx V c,u,x Cr,x C plat,x Two-Stage Process 10 8 11 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 V(c,x) 3000 P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance and Capacity Equations Step 1: RT from Minor St. 9 12 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Movement Capacity Probability of Queue free St. 1.00 1.00 Step 2: LT from Major St. 4 1 Conflicting Flows 0 1560 Potential Capacity Pedestrian Impedance Factor 1.00 1.00 1560 Movement Capacity Probability of Queue free St. 1.00 0.99 Maj L-Shared Prob Q free St. 0.99 Step 3: TH from Minor St. 11 8 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Cap. Adj. factor due to Impeding mymnt 0.99 0.99 Movement Capacity Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 10 Conflicting Flows 1004 Potential Capacity 270 Pedestrian Impedance Factor 1.00 Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. 0.99 1.00 Cap. Adj. factor due to Impeding mymnt 0.99 1.00 Movement Capacity 268 Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance Step 3: TH from Minor St. 8 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor

Cap. Adj. factor due to Impeding mymnt

Movement Capacity



	Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mv Movement Capacity	mnt		.00		1.00			
C t Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 7 10 Part 1 - First Stage Conflicting Flows Potential Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 4 - Single Stage Conflicting Flows Part 4 - Single Stage Conflicting Flows Part 5 - Single Stage Conflicting Flows Part 5 - Single Stage Part 5 - Single Stag	Result for 2 stage process:							-	
Step 4: LT from Minor St. 7 10 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap, Add; factor due to Impeding mymnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 1 - First Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Conflicting Flows Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 3 - Single Stage Potential Capacity Part 4 - Potential Capacity	Ct			0.0		1 00			
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Raj. L, Min T Impedance factor 0.99 Raj. L, Min T Adj. Imp Factor. 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.99 Movement Capacity 268 Results for Two-stage process: a Y C t 268 Worksheet 8-Shared Lane Calculations Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) C sep Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement (vph) Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement (vph) Mo	Propability of Queue free St.		1	00		1.00			
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Potential Capa	Step 4: LT from Minor St.			7		10			
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Plows Potential Capacity Part 3 - Single Stage Conflicting Plows Potential Capacity P	Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mv	rmnt						-	
Conflicting Flows 1004 Potential Capacity 270 Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance Factor 0.99 Maj. L, Min T Adj. Imp Factor. 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.99 Movement Capacity 268 Results for Two-stage process: a	Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mv	mnt						-	
Cap. Adj. factor due to Impeding mvmnt 1.00 0.99 Movement Capacity 268 Results for Two-stage process: a y C t 268 Worksheet 8-Shared Lane Calculations Movement 7 8 9 10 11 12 L T R L T R Volume (vph) 5 Movement Capacity (vph) 268 Shared Lane Capacity (vph) 268 Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 7 8 9 10 41 12 L T R C sep Volume Delay Q sep 1 C sep Q sep 1 C sep Q sep 1 C sep Q sep 1 C act Worksheet 10-Delay, Queue Length, and Level of Service	Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor		0	.99		270		-	
Second S	Cap. Adj. factor due to Impeding mv	mnt							
Worksheet 8-Shared Lane Calculations								-	
Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 7 8 9 10 11 12 L T R L T R C sep Volume Delay Q sep 4 5 Volume Delay Q sep 10 11 12 C sh SUM C sep C act Worksheet 10-Delay, Queue Length, and Level of Service						268			
Movement 7 8 9 10 11 12 L T R L T R Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 7 8 9 10 11 12 L T R L T R C sep Volume Delay Q sep 4 5 Volume Delay Q sep 10 11 12 C sh SUM C sep C act Worksheet 10-Delay, Queue Length, and Level of Service	Worksheet 8-Shared Lane Calculation							_	
Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 7 8 9 10 11 12 L T R L T R C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Level of Service		7						-	
Movement To a sep	Movement Capacity (vph)							-	
C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Level of Service	Worksheet 9-Computation of Effect o	of Flare	ed Minor	Stree	t Approa	ches		-	
Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Level of Service	Movement							-	
n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Level of Service	Volume Delay Q sep Q sep +1	(
C act Worksheet 10-Delay, Queue Length, and Level of Service	n max C sh SUM C sep				\	5 (> =		
								T	
Movement 1 4 7 8 9 10 11 12	Worksheet 10-Delay, Queue Length, a	ınd Leve	el of Se	rvice		7			_
	Movement 1 4	7	8	9	10	11	12	-	



5 v (vph) 9 1560 268 C(m) (vph) 0.02 v/c 0.01 0.06 95% queue length 0.02 Control Delay 7.3 18.7 LOS Α С Approach Delay Approach LOS

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.99	1.00
v(il), Volume for stream 2 or 5	0	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.99	
d(M,LT), Delay for stream 1 or 4	7.3	
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5	2	

18.7

С

1.1.3.12 Interseção F - Pico Tarde

Lane Config

LT

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Progeplan Analyst: Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURO East/West Street: M01-M05-M07+M08+M06-M11 North/South Street: M12 Intersection Orientation: EW Study period (hrs): 1.00

Vehicle Volumes and Adjustments Approach Eastbound Westbound Major Street: 5 2 Movement Т Т R | L Τ. R Volume 720 6 0.91 Peak-Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 6 791 Percent Heavy Vehicles 0 Median Type/Storage Undivided RT Channelized? 0 2 LT T Lanes 0 Configuration Upstream Signal? No No Minor Street: Approach Northbound Southbound Movement 8 10 11 12 Т R L Τ R Volume 4 Peak Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 4 Percent Heavy Vehicles 0 Percent Grade (%) Flared Approach: Exists?/Storage Lanes Configuration Delay, Queue Length, and Level of Service WB Southbound Approach EB Northbound Movement 1 4 8 10 11

| L



v (vph)	6	4
C(m) (vph)	1636	602
v/c	0.00	0.01
95% queue length	0.01	0.02
Control Delay	7.2	11.0
LOS	A	В
Approach Delay		11.0
Approach LOS		В

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax:

E-Mail:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Analyst: Progeplan Agency/Co.:
Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: F DER/DF

Intersection.
Jurisdiction:
Units: U. S. Metric
Analysis Year:
Project ID: FUTURO

2023

Project ID: FUTURO								
East/West Street: M	01-M05-M0	7+M08+M	06-M11					
North/South Street: M	12							
Intersection Orientation	n: EW		5	Study pe	eriod (h	rs):	1.00	
	Vehicle	Volumes	and Ad	djustmer	nts			
Major Street Movements	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	6	720						
Peak-Hour Factor, PHF	0.91	0.91						
Peak-15 Minute Volume	2	198						
Hourly Flow Rate, HFR	6	791						
Percent Heavy Vehicles	0							
Median Type/Storage	Undi	vided		/				
RT Channelized?								
Lanes	0	2						
Configuration	L	т т						
Upstream Signal?		No			No			
Minor Street Movements	7	8	9	10	11	12		
	L	T	R	L	/ T	R		
Volume				1	-			
Peak Hour Factor, PHF				4 0.91				
Peak-15 Minute Volume								
Hourly Flow Rate, HFR			\	1 4				
Percent Heavy Vehicles				0		\ 1		' \
Percent Grade (%)		0		Y	0	- 1	L /	
Flared Approach: Exist:	22/Storag	-		/	O		1	
RT Channelized	s:/Storag	<u> </u>		\'				
Lanes				_ \1		_		
Configuration				_/ /-		ノフ		
Comingulation				7				
					7		77	
Pe	edestrian	Volume	s and A	Adjustme	ents			
Movements	13	14	15	16				
							1 1	
Flow (ped/hr)	0	0	0	0				
Lane Width (m)	3.6	3.6	3.6	3.6	5			
Walking Speed (m/sec)	1.2	1.2	1.2	2 1.2	2	\		
Percent Blockage	0	0	0	0				
							1	

Upstream Signal Data



Prog.	Sat	Arrival	Green	Cycle	Prog.	Distance
Flow	Flow	Type	Time	Length	Speed	to Signal
vph	vph		sec	sec	kph	meters

S2 Left-Turn Through S5 Left-Turn Through

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared In volume, major th vehicles:	0	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	2	

Worksheet 4-Critical Gap and Follow-up Time Calculation

	. Gap Cal								
Movement		1	4	7	8	9	10	11	12
		L	L	L	T	R	L	T	R
t(c,base	:)	4.1					7.1		
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)		0					0		
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent	Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,1t)		0.00					0.70		
	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- (-,-,-	2-stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		0.00	1.00	1.00	0.00	6.4	1.00	0.00
C (C)	2-stage						0.4		
	z-stage								
Follow-U	p Time C	alculat	ions						
Movement	-	1	4	7	8	9	10	11	12
		T.	L	L	Т	R	T ₁	Т	R
		_	-	-	-		_	-	
t(f,base	:)	2.20					3.50		
t(f,HV)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		0					0		
t(f)		2.2					3.5		
O (±)							0.0		

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal Movement 2 Movement 5 V(t) V(l,prot) V(t) V(l,prot)

V prog Total Saturation Flow Rate, s (vph) Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11) Proportion vehicles arriving on green P g (q1) g(q2)

Computation 2-Proportion of TWSC Intersection Time blocked

Movement 2 Movement 5 V(t) V(l,prot) V(t) V(1,prot)

alpha beta Travel time, t(a) (sec) Smoothing Factor, ${\tt F}$ Proportion of conflicting flow, f Max platooned flow, V(c,max) Min platooned flow, V(c,min) Duration of blocked period, t(p)Proportion time blocked, p

g (q)

0.000

0.000



p(2)								
p(5) p(dom) p(subo) Constrained or uncons	trained?		0.0					
Proportion unblocked	(1	`		(2)		(3)		
for minor movements, p(x)		-stage	Sta	Two-St ge I	age Pi		I	
p(1)								
p(4) p(7)								
p(8) p(9)								
p(10)								
p(11) p(12)								
Computation 4 and 5								
Single-Stage Process Movement	1	4	7	8	9	10	11	12
	L	L	L	Т	R	L	Т	R
V c,x	0					407		
Px								
V c,u,x								
C r,x C plat,x								
Two-Stage Process								
	7 Stage2	Stage1	8 Stage	2 Stag	10 rel St	tage2 S	11 tage1	
V(C, X)								
s P(x) V(c,u,x)					30	000		
C(r,x)								
C(plat,x)								
Worksheet 6-Impedance	and Car	acity Eq	uation	.s				
morning of impodumee								
Step 1: RT from Minor					9		12	
Step 1: RT from Minor					9		12	
Conflicting Flows Potential Capacity						$\overline{}$		
Conflicting Flows Potential Capacity Pedestrian Impedance				1.	9	_	1.00	
Conflicting Flows Potential Capacity Pedestrian Impedance	Factor							
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity	Factor				00		1.00	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows	Factor				00		1.00	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity	Factor free St.			1.	00		1.00 1.00 1 0 1636	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity	Factor free St. St.			1.	00 00 4		1.00 1.00 1 0 1636 1.00 1636	<i></i>
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance	Factor free St. Factor free St.			1.	00		1.00 1.00 1 0 1636 1.00	<i>J</i>
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue	Factor free St. Factor free St. ree St.			1.	00 00 4		1.00 1.00 1 0 1636 1.00 1636 1.00	<i>J</i>
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f Step 3: TH from Minor Conflicting Flows	Factor free St. Factor free St. ree St.			1.	00 00 4 00 00		1.00 1.00 1 0 1636 1.00 1636 1.00	<i>y</i> =
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f Step 3: TH from Minor Conflicting Flows Potential Capacity	Factor free St. Factor free St. St.			1.	000 000 4 000 000 8		1.00 1.00 1 0 1636 1.00 1.00 1.00	<i>J</i>
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f Step 3: TH from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due	Factor free St. Factor free St. The St. Factor free St. Factor		t	1.	00 00 4 00 00		1.00 1.00 1 0 1636 1.00 1636 1.00	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f Step 3: TH from Minor Conflicting Flows Potential Capacity Probability of Queue Maj L-Shared Prob Q f	Factor free St. Factor free St. St.	ling mvmn	t	1.	00 00 4 00 00 8		1.00 1.00 1 0 1636 1.00 1.00 1.00	<i>y</i> =



			_
Conflicting Flows		407	
Potential Capacity Pedestrian Impedance Factor	1.00	604 1.00	
Maj. L, Min T Impedance factor	1.00	1.00	
Maj. L, Min T Adj. Imp Factor.	1.00		
Cap. Adj. factor due to Impeding mvmnt	1.00	1.00	
Movement Capacity		602	
Worksheet 7-Computation of the Effect of :	Two-stage Gap Acc	eptance	_
Step 3: TH from Minor St.	8	11	_
Part 1 - First Stage			_
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Probability of Queue free St.			
Part 2 - Second Stage			_
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Part 3 - Single Stage			_
Conflicting Flows			
Potential Capacity Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mymnt	1.00	1.00	
Movement Capacity			
Result for 2 stage process:			_
a Y			
y C t			
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	_
Part 1 - First Stage			_
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Part 2 - Second Stage			_
Conflicting Flows			
Potential Capacity Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mymnt		\	
Movement Capacity			
Part 3 - Single Stage			_
Conflicting Flows) /	407 604	
Potential Capacity Pedestrian Impedance Factor	1.00	1.00	\
Maj. L, Min T Impedance factor	1.00	1.00	
Maj. L, Min T Adj. Imp Factor.	1.00		
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	1.00	
			_ \
Results for Two-stage process: a			////
У			4
C t 		602	- //)
Worksheet 8-Shared Lane Calculations			
Movement 7		10 11 12	
L	T R	L T R	7
			_ \



Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)

602

Worksheet 9-Co	mputation	of Effect	of	Flared	Minor	Street	Appr	oaches	
Movement				7	8	9	10	11	12
				L	Т	R	L	T	R
C sep							602		
Volume							4		
Delay									
Q sep									
Q sep +1									
round (Qsep +1)								
n max									
C sh									
SUM C sep									
n									
C act									
Worksheet 10-D	elay, Queu	e Length,	and	Level	of Se	rvice			
Movement	1	4	7	8		9	10	11	12
Lane Config	LT						L		
v (vph)	6						4		
C(m) (vph)	1636						602		
v/c	0.00						0.01		
95% queue leng							0.02		
Control Delay	7.2						11.0		
LOS	A						В		
Approach Delay								11.0	
Approach LOS								В	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	1.00
v(il), Volume for stream 2 or 5	0	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	1.00	
d(M,LT), Delay for stream 1 or 4	7.2	
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5	2	

1.1.3.13 Interseção G – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

_TWO-WAY STOP CONTROL SUMMARY

Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Manha Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURO

East/West Street: M2-M7+M8-M11+M12-M13

North/South Street: M13 Intersection Orientation: EW

Study period (hrs):

Vehicle Volumes and Adjustments

Westbound Eastbound

2 3 | 4 Major Street: Approach Movement 5



Volume						30	727		
Peak-Hour Factor,	PHF					0.91	0.91		
Hourly Flow Rate,	HFR					32	798		
Percent Heavy Veh	icles					4			
Median Type/Storac		Undiv	ided			/			
RT Channelized?	<i>J</i> -								
Lanes						0	2		
Configuration							LT T		
Upstream Signal?			No				No		
-1									
Minor Street: App	proach	No	rthbou	nd		S	outhbour	nd	
Mor	vement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume		2							
Peak Hour Factor,	PHF	1.00							
Hourly Flow Rate,	HFR	2							
Percent Heavy Veh:	icles	0							
Percent Grade (%)			0				0		
Flared Approach:	Exists?	/Storage			/				/
Lanes		ī							
Configuration		I	1						
	Doloss	O T.	n = + h	T	.1 .	£ Com			
Approach	_Delay, EB	Queue Le WB		and Lev rthboun		ı ser		hboun	
Movement	1	4 I	7	8	u 9	1	10	11	12
Lane Config	1	LT I	T.	O	9		10	11	12
Lane Config		TI I	ь			1			
v (vph)		32	2						
C(m) (vph)		1610	550						
v/c		0.02	0.00						
95% queue length		0.06	0.01						
Control Delay		7.3	11.6						
LOS		Α.	В.						
Approach Delay		17	ם	11.6					
Approach LOS				В					
APPLUACII 100				D					

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail: TWO-WAY STOP CONTROL (TWSC) ANALYSIS Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Manha Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: Project ID: FUTURO 2023 East/West Street: M2-M7+M8-M11+M12-M13 North/South Street: M13 Intersection Orientation: EW Study period (hrs): 1.00 Vehicle Volumes and Adjustments Major Street Movements 2 1 3 4 6 Т L Т R Volume 30 727 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume 8 200 32 Hourly Flow Rate, HFR 798 Percent Heavy Vehicles 4 Median Type/Storage Undivided RT Channelized?



Configuration Upstream Signal?		No		0 2 LT T			
Minor Street Movements	; 7 L	8 T	9 R	10 1 L	1 12 T R		
Volume Peak Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Flared Approach: Exis RT Channelized Lanes Configuration				/)	/	
	Pedestrian	Volumes	and Adj	ustments	5		
Iovements	13	14	15	16			
Flow (ped/hr) Lane Width (m) Walking Speed (m/sec) Percent Blockage	0 3.6 1.2		0 3.6 1.2	0 3.6 1.2 0			
	IIns:	tream Sic	mal Dat	а			
Prog. Flow vph		Arrival Type	Green Time sec		Prog. Speed kph	Distance to Signal meters	
Through S5 Left-Turn Through Worksheet 3-Data for C	Computing E	ffect of	Delav t	o Maior	Street V	ehicles	_
Shared in volume, major that the state of th	or th vehicler rt vehicles t vehicles	les: les: :		ent 2	0 0 1700 1700 2	nt 5	
Shared ln volume, majo Shared ln volume, majo Sat flow rate, major r Sat flow rate, major r Sumber of major street	or th vehicler rt vehicles t vehicles through 1.	les: les: : : : anes:	Movem	ent 2	Moveme 0 0 1700 1700	nt 5	
Shared In volume, major chared In volume, major to sat flow rate, major row number of major street Worksheet 4-Critical Gritical Gap Calculati	or th vehic. or rt vehic. th vehicles t vehicles through 1. Gap and Fol.	les: les: : : : anes:	Movem	ent 2	Moveme 0 0 1700 1700	nt 5	
Shared In volume, major Shared In volume, major Sat flow rate, major to Sat flow rate, major roumber of major street Worksheet 4-Critical Gap Calculation Movement 1 L t(c,base) t(c,hv) 1.00 P(hv) t(c,g) Percent Grade t(3,lt)	or th vehicles through 1. Gap and Fol. A.1 7 1.00 1 4 0 0 0.00 0	les: les: :: :anes: low-up Ti 7 8 L T .1 .00 1.0 .20 0.2 .00 0.0	Movem ime Calc 9 R 00 1.0 20 0.1	ulation 10 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Moveme 0 0 1700 1700 2 11 T 1.00 0.20 0.00	12 R 1.00 0.10 0.00	
Shared In volume, major Shared In volume, major Shared In volume, major of Sat flow rate, major of Sat	or th vehicles or trends to the vehicles or trends to the vehicles or through 1. Gap and Folton 4 L 4.1 7 1.00 1 4 0 0 0.00 0 0.00 0 0.00 0 0.00 0	les: les: : : : : : anes: 7	Movem ime Calc 9 R 00 1.0 0.0 0.0 0.0 0.0	ulation 10 1.00 0 0.20 0 0.00 0 0.00	Moveme 0 0 1700 1700 2 11 T 1.00 0.20 0.00 0.00	12 R 1.00	
Shared In volume, major Shared In volume, major Shared In volume, major Sat flow rate, major of Sat fl	or th vehicles or rt vehicles through l. Gap and Fol. On 4 L 4.1 7 1.00 1 4 0 0.00 0 0.00 0 0.00 1 4.1 6	les: les: : : : : anes: 10w-up Ti 7	Movem ime Calc 9 R 00 1.0 0.0 0.0 0.0 0.0	ulation 10 1.00 0 0.20 0 0.00 0 0.00	Moveme 0 0 1700 1700 2 11 T 1.00 0.20 0.00 0.00	12 R 1.00 0.10 0.00 0.00	



Computation 1-Queue Clearance Time at Upstream Signal Movement 2 Movement 5 V(t) V(l,prot) V(t) V(l,prot)V prog Total Saturation Flow Rate, s (vph) Arrival Type Effective Green, g (sec) Cycle Length, C (sec) Rp (from Exhibit 16-11) Proportion vehicles arriving on green P g(q1) g (q2) g (q) Computation 2-Proportion of TWSC Intersection Time blocked Movement 2 Movement 5 V(t) V(l,prot) V(t) V(l,prot)alpha beta Travel time, t(a) (sec) Smoothing Factor, F Proportion of conflicting flow, f Max platooned flow, V(c,max) Min platooned flow, V(c,min) Duration of blocked period, t(p) 0.000 Proportion time blocked, p 0.000 Computation 3-Platoon Event Periods Result 0.000 p(2) p(5) 0.000 p(dom) p(subo) Constrained or unconstrained? Proportion unblocked (1)(2) (3) for minor Single-stage Two-Stage Process movements, p(x)Process Stage I Stage II p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12) Computation 4 and 5 Single-Stage Process Movement 1 4 7 8 9 10 11 12 L Т R Т L L L R V c,x 463 s Рx V c,u,x Cr,x C plat,x Two-Stage Process 11 10 Stagel Stagel Stagel Stagel Stage2 Stage1 Stage2 V(c,x) 3000 P(x) V(c,u,x)C(r,x) C(plat,x)



Workshoot	6-Impedance	and Ca	nacity	Faustions
MOTVPHECT	0 Impedance	and Co	ιραυπιν	Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 2: LT from Major St.	4	1
Conflicting Flows	0	
Potential Capacity	1610	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1610	
Probability of Queue free St.	0.98	1.00
Maj L-Shared Prob Q free St.	0.98	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.98	0.98
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows	463	
Potential Capacity	561	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.98
Maj. L, Min T Adj. Imp Factor.		0.98
Cap. Adj. factor due to Impeding mvmnt	0.98	0.98
Movement Capacity	550	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

11 Step 3: TH from Minor St. 8

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity

Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity

Result for 2 stage process: а У С t Probability of Queue free St. Step 4: LT from Minor St.

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt



1.00







Movement Capacity

Movement Capacity							
Part 2 - Second Stage Conflicting Flows							_
Potential Capacity							
Pedestrian Impedance Factor							
Cap. Adj. factor due to Impedia Movement Capacity	ng mvmnt						
Part 3 - Single Stage							_
Conflicting Flows		46	3				
Potential Capacity		56					
Pedestrian Impedance Factor		1.	00		1.00		
Maj. L, Min T Impedance factor					0.98		
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impedia	na mymnt	0	98		0.98		
Movement Capacity		55			0.30		
Results for Two-stage process:							
a y							
c t		5.5	0				
Manhahart O Chanad Tana Caland							_
Worksheet 8-Shared Lane Calcula				1.0	11	1.0	_
Movement	7 L	8 T	9 R	10 L	11 T	12 R	
Volume (vph)	2						_
Movement Capacity (vph)	550						
Shared Lane Capacity (vph)							
Worksheet 9-Computation of Effe	ect of Flared	d Minor	Street	: Approa	aches		_
Movement	7	8	9	10	11	12	_
	L	T	R	L	T	R	
C sep	550						_
Volume	2						
Delay							
Q sep							
Q sep +1 round (Qsep +1)							
n max							_
C sh							
SUM C sep							
n ~							
C act							_
Worksheet 10-Delay, Queue Leng	th, and Level	of Ser	vice	\neg			
Movement 1 4	7 8	3 9		10	11	12	_
Lane Config LT	L			_ `			
v (vph) 32	2						_
C(m) (vph) 1610		\			\		
v/c 0.02					11	/	\
95% queue length 0.00							
Control Delay 7.3 LOS A	11.6 B	\					
Approach Delay	\	6					
Approach LOS	E				7		
		1			1_/	\	
Worksheet 11-Shared Major LT In	mpedance and	Delay			1		
		M	lovemer	nt 2	Moveme	ent 5	- 77
p(oj)			1.00		0.9	98	-//
v(il), Volume for stream 2 or					0		
v(i2), Volume for stream 3 or					0	20	
s(il), Saturation flow rate for					170		\
s(i2), Saturation flow rate fo: P*(oj)	stream 3 or	. 0			170		_/
r (○J)					0.3		



7.3

 $\mbox{d}\left(\mbox{M,LT}\right)$, Delay for stream 1 or 4 ${\rm N}\text{,}\ {\rm Number}\ {\rm of}\ {\rm major}\ {\rm street}\ {\rm through}\ {\rm lanes}$ d(rank,1) Delay for stream 2 or 5

1.1.3.14 Interseção G - Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Progeplan

Agency/Co.:

05/06/2023 Date Performed: Analysis Time Period: Pico Tarde

Intersection: G Jurisdiction: DER/DF

Units: U. S. Metric Analysis Year: 2023

Project ID:

Figure 10.
East/West Street: M2-M7+M8-M11+M12-M13
North/South Street: M13

Intersection Orientation: EW Study period (hrs): 1.00

Major Street:			astboun	_	AdjustmentsWestbound					
major screet.	Movement	1	2	3		4	5	6		
	Movement	L	T	R	i	L	T	R		
Volume						35	1978			
Peak-Hour Fact	or, PHF					0.91				
Hourly Flow Ra	ite, HFR					38	2173			
Percent Heavy	Vehicles					0				
Median Type/St	orage	Undi	vided			/				
RT Channelized	1?									
Lanes						0	2			
Configuration						I	ТТ			
Upstream Signa	1?		No				No			
Minor Street:			orthbou				uthboun			
	Movement	7	8	9	- 1	10	11	12		
		L	Т	R		L	Т	R		
Volume		6								
Peak Hour Fact	or, PHF	1.00								
Hourly Flow Ra	ite, HFR	6								
Percent Heavy	Vehicles	0								
Percent Grade	(%)		0				0			
Flared Approac	h: Exists?	/Storag	е		/				/	
Lanes		1								
Configuration			L							
							\			

	Delay,	Queue Le	ength,	and Leve	el of Ser	vice		
Approach	EB	WB	No	rthbound	i	Sout	hbound	
Movement	1	4	7	8	9	10	11 / 12	
Lane Config		LT	L				\ [/ '
v (vph)		38	6					
C(m) (vph)		1636	213		\			
v/c		0.02	0.03			,		
95% queue length		0.07	0.09				>	
Control Delay		7.3	22.4		7		< ~	
LOS		A	С		1 .		1 / >	
Approach Delay				22.4			\ / /	
Approach LOS				С			7	
							1 1	

HCS+: Unsignalized Intersections Release 5.6



Phone: Fax: E-Mail: TWO-WAY STOP CONTROL (TWSC) ANALYSIS Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Tarde Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: East/West Street: M2-M7+M8-M11+M12-M13 North/South Street: M13 Intersection Orientation: EW Study period (hrs): 1.00 _Vehicle Volumes and Adjustments_ Major Street Movements 1 2 3 4 Volume 35 1978 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume 10 543 Hourly Flow Rate, HFR 38 2173 Percent Heavy Vehicles 0 Median Type/Storage Undivided RT Channelized? 0 2 Lanes Т Configuration LT No Upstream Signal? No Minor Street Movements 10 8 11 12 L Т Volume Peak Hour Factor, PHF 1.00 Peak-15 Minute Volume Hourly Flow Rate, HFR 6 Percent Heavy Vehicles 0 Percent Grade (%) 0 Flared Approach: Exists?/Storage RT Channelized Lanes Configuration L Pedestrian Volumes and Adjustments Movements 13 14 15 Flow (ped/hr) 0 0 Lane Width (m) 3.6 3.6 3.6 3.6 Walking Speed (m/sec) 1.2 1.2 1.2 1.2 Percent Blockage 0 0/ 0 _Upstream Signal Data Sat Arrival Prog. Green Cycle Prog. Distance Flow Type Flow Time Length Speed to Signal sec kph meters vph vph sec S2 Left-Turn Through S5 Left-Turn Through Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles Movement 2 Movement 5 Shared In volume, major th vehicles:

0 1700

1700

Shared In volume, major rt vehicles:

Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles:



Number of major street through lanes:

2

Critical	L Gap Cal	culatio	on						
Movement	:	1	4	7	8	9	10	11	12
		L	L	L	T	R	L	T	R
t(c,base	e)		4.1	7.1					
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			0	0					
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent	Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,1t)			0.00	0.70					
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.1	6.4					
	2-stage								
Follow-T	Jp Time Ca	alcula	tions						
Movement	5	1	4	7	8	9	10	11	12
		L	L	L	T	R	L	T	R
t(f,base	e)		2.20	3.50					
t(f,HV)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)			0	0					
t(f)			2.2	3.5					

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

Movement 2 Movement 5 V(t) V(l,prot) V(t) V(l,prot)

V prog Total Saturation Flow Rate, s (vph) Arrival Type Effective Green, g (sec) Cycle Length, C (sec) Rp (from Exhibit 16-11) Proportion vehicles arriving on green P g(q1) g(q2)

Computation 2-Proportion of TWSC Intersection Time blocked

Movement 2

0.000

Movement 5 V(t) V(l,prot) V(t) V(l,prot)

0.000

alpha beta Travel time, t(a) (sec) Smoothing Factor, F

Proportion of conflicting flow, f Max platooned flow, V(c, max) Min platooned flow, V(c,min) Duration of blocked period, t(p) Proportion time blocked, p

Computation 3-Platoon Event Periods Result 0.000 p(2) p(5) 0.000 p(dom)

p(subo) Constrained or unconstrained?

Proportion			
unblocked	(1)	(2)	(3)
for minor	Single-stage	Two-Stage	Process
movements, p(x)	Process	Stage I	Stage II

p(1) p(4) p(7)

g (q)

p(8)



p(9) p(10) p(11) p(12)								
Computation 4 and 5								
Single-Stage Process Movement	1	4	7	8	9	10	11	12
Movement	L	4 L	L	o T	R	L	Т	R
V c,x		0	1162					
Px								
V c,u,x								
C r,x C plat,x								
Two-Stage Process								
iwo-stage Frocess	7		8		10		11	
Stage1	Stage2	Stage1	Stage2	Stage	el Sta	age2 S	Stagel S	Stage2
V(c,x) s	3000							
P(x)	5000							
V(c,u,x)								
C(r, v)								
C(r,x) C(plat,x)								
- · ·								
Worksheet 6-Impedance	e and Cap	acity E	quations					
Step 1: RT from Minor	St.				9		12	
Conflicting Flows								
Potential Capacity								
Pedestrian Impedance	Factor			1.0	0.0		1.00	
Movement Capacity Probability of Queue	froo St			1.0	0.0		1.00	
riobability of Queue	TIEE DC.			Τ.(, ,		1.00	
Step 2: LT from Major	St.				4		1	
Conflicting Flows				0				
Potential Capacity				163	36			
Pedestrian Impedance	Factor			1.0			1.00	
Movement Capacity Probability of Queue	fron C+			163			1.00	
Maj L-Shared Prob Q				0.9			1.00	
Step 3: TH from Minor	st.				8		11	
Conflicting Flows								
Potential Capacity					_			
Pedestrian Impedance			- 4-	1.0	/	\	1.00	
Cap. Adj. factor due Movement Capacity	to Impea	ing mvm	nt	0.9	98		0.98	
Probability of Queue	free St.			1.0	00	_	1.00	
Cton A. III from Minor	o C+			\	7		10	
Step 4: LT from Minor	St.			1/	1		110	/ \
Conflicting Flows				116				 \
Potential Capacity	Faatam			218			1.00	
Pedestrian Impedance Maj. L, Min T Impedar		r		1.0	JU		0.98	
Maj. L, Min T Adj. In							0.98	
Cap. Adj. factor due			nt	0.9			0.98	
Movement Capacity				213	3	7	\ / /	
				_		\rightarrow	- 	
Worksheet 7-Computati	ion of th	e Effec	t of Two	-stage	Gap A	cceptar	nce \	
Step 3: TH from Minor	^ St				8	-	11	
Scop S. III IIOM MINO					J			

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor



Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Cap. Adj. factor due to Impeding mvmnt 0.98 0.98 Movement Capacity Result for 2 stage process: а У Ĉt Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 10 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows 1162 Potential Capacity 218 Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance factor 0.98 Maj. L, Min T Adj. Imp Factor. 0.98 Cap. Adj. factor due to Impeding mvmnt 0.98 0.98 Movement Capacity 213 Results for Two-stage process: а Сt 213 Worksheet 8-Shared Lane Calculations Movement 8 11 12 10 Т L R L Т R Volume (vph) 6 Movement Capacity (vph) 213 Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement. 8 9 10 11 L Т R R L Т C sep 213 Volume 6 Delay Q sep Q sep +1 round (Qsep +1)

n max



C sh SUM C sep n C act

Worksheet 10-Delay, Queue Length, and Level of Service 9 Movement 10 11 12 LT Lane Config L v (vph) 38 C(m) (vph) 213 1636 v/c 0.02 0.03 95% queue length 0.07 0.09 Control Delay 7.3 22.4 LOS Α Approach Delay 22.4 Approach LOS

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.98
v(il), Volume for stream 2 or 5		0
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.98
d(M,LT), Delay for stream 1 or 4		7.3
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5		2

1.1.3.15 Interseção H – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Analyst: Progeplan Agency/Co.:
Date Performed:

05/06/2023 Analysis Time Period: Pico Manha Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: Project ID: FUTURA East/West Street: 2023

M01-M05-M07+M08+M06-M11+M12

North/South Street: M14

Intersection C		EW		S	tudy per	iod (hrs): 1.00)	
	Veh	icle Voi	Lumes ar	nd Adju	stments				
Major Street:	Approach	Εá	astbound	l J		Westboun	d /		
-	Movement	1	2	3	4	5	6		
		L	Т	R	L	Т	R	/ \	
Volume		1	1801						
Peak-Hour Fact	or, PHF	0.91	0.91	1	\				
Hourly Flow Ra	te, HFR	1	1979		_ \		_		
Percent Heavy	Vehicles	0				/	/		
Median Type/St	orage	Undi	vided		1/		1 /		
RT Channelized	١?						\ /	7	
Lanes		0	2) /	/	
Configuration	_		LT T		$\overline{}$				_
Upstream Signa	1?		No			No		\	
Minor Street:	Approach	No	orthbour			Southbou	nd		/
	Movement	7	8	9	10	11	12		
		L	T	R	l L	Т	R		
Volume					30		-+		
Peak Hour Fact	or, PHF				0.9	1			
Hourly Flow Ra	te, HFR				32				



Percent Heavy Vehicles Percent Grade (%) 4 0 Flared Approach: Exists?/Storage Lanes 1 Configuration L

Delay, Queue Length, and Level of Service

Northbound Southbound Northbound Approach | 10 9 Movement 1 4 8 11 12 Lane Config $_{
m LT}$ | L v (vph) 32 C(m) (vph) 1636 271 v/c 0.00 0.12 95% queue length 0.00 0.40 Control Delay 7.2 20.1 LOS Approach Delay 20.1 Approach LOS С

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Progeplan Analyst: Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Manha Intersection: Н DER/DF Jurisdiction: Units: U. S. Metric

Analysis Year:

2023 Project ID: FUTURA

East/West Street:

M01-M05-M07+M08+M06-M11+M12

North/South Street: M14 Intersection Orientation: EW

Study period (hrs): 1.00

incersection offendation			50	day pc	1100 (11	13). 1.	00		
	Vehicle	Volumes	and Ad	ustmen	ts				
Major Street Movements	1	2	3	4	5	6		-	
-	L	Т	R	L	T	R			
Volume	1	1801						-	
Peak-Hour Factor, PHF	0.91	0.91			/ \				
Peak-15 Minute Volume	0	495			/ \				
Hourly Flow Rate, HFR	1	1979							
Percent Heavy Vehicles	0		(
Median Type/Storage	Undi	vided		1		\ /			
RT Channelized?			\					\	
Lanes	0	2	/	/		1 1	/	\	
Configuration	L	ТТ					/	\	
Upstream Signal?		No		- \	No				
								_)
Minor Street Movements	7	8	9	10	11	12			
	L	Т	R	L	T	R	_		
Volume				30		-+	\rightarrow \vdash	<u> </u>	
Peak Hour Factor, PHF				0.91) /	/	7 1 1 1	
Peak-15 Minute Volume				8					_
Hourly Flow Rate, HFR				32			\]]	
Percent Heavy Vehicles				4	\ \	\		//	_ /
Percent Grade (%)		0			0				
Flared Approach: Exists	?/Storag	е		/			/		
RT Channelized	_								
Lanes				1					
Configuration				L				~	
								_ \	



Movements	1		ian voi 13	14	15	16		
Flow (ped/hr)			0	0	0	0		
Lane Width (m)			3.6	3.6	3.6	3.6		
Walking Speed (m			1.2	1.2	1.2	1.2		
Percent Blockage		(0	0	0	0		
		Ţ	Upstrea	ım Sigr	nal Data	1		
	Prog.	Sat	Arri	lval	Green	Cycle	Prog.	
	Flow vph	Flow vph		oe .	Time sec	Length sec	Speed kph	to Signal meters
S2 Left-Turn								
Through S5 Left-Turn Through								
Worksheet 3-Data	for Co	mputin	g Effec	ct of I	Delay to	Major	Street V	ehicles
					Moveme	ent 2	Moveme	ent 5
Shared ln volume					0			
Shared in volume					0	1		
Sat flow rate, m Sat flow rate, m					1700 1700			
Number of major				s:	2			
Washahaat A Quit	1 C.			m:		.1		
Vorksheet 4-Crit				uh III	ue caici			
Critical Gap Cal Movement	culatio 1	on 4	7	8	9	10	11	12
10 v CiliCii C	L	L	L	T	R	L	Т	R
(c,base)	4.1					7.1		
(c, hv)	1.00	1.00	1.00	1.00	1.00		1.00	1.00
P(hv) t(c,g)	0		0.20	0.20	0.10	4 0.20	0.20	0.10
Percent Grade			0.20	0.00				0.10
(3,1t)	0.00					0.70		
t(c,T): 1-stage		0.00	0.00	0.00				0.00
2-stage t(c) 1-stage		0.00	1.00	1.00	0.00	1.00 6.4	1.00	0.00
2-stage						0.4		
Follow-Up Time C	alculat	ions						
Movement	1	4	7	8	9	10	11	12
	L	L	L	Т	R	L	T	R
t(f,base)	2.20	0 00	0.00	0.00		3.50	0.00	0.00
t(f,HV) P(HV)	0.90 0	0.90	0.90	0.90	0.90	0.90	0.90	0.90
t(f)	2.2					3.5		
					\			
Worksheet 5-Effe	ct of (Jpstream	m Signa	als				(
Computation 1-Qu	eue Cle	earance	Time a	at Upst				
				(nent 2 /(1,prot	Mc) V(t)	vement 5 V(1,prot
						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
V prog Total Saturation	Flow F	Rate, s	(vph)		7		- 1	
Arrival Type						_	¬	I I I
Effective Green,		:)			() [[
Cycle Length, C Rp (from Exhibit								
Proportion vehic			on gree	en P			1	//
g (q1)		-	-					- / /
g (q2)								

Computation 2-Proportion of TWSC Intersection Time blocked Movement 2

g (q2) g (q)

Movement 5



V(t) V(1,prot) V(t) V(1,prot)

alpha									_	
beta Travel time, t(a) (se	ec)									
Smoothing Factor, F										
Proportion of conflic		ow, f								
Max platooned flow, V Min platooned flow, V										
Duration of blocked p	eriod,	t(p)								
Proportion time block	ed, p			0.0	000		0.000			
Computation 3-Platoon	Event	Periods	R	esult					_	
p(2)			0	.000					_	
p(5)			0	.000						
p(dom) p(subo)										
Constrained or uncons	trained	?								
Proportion									_	
unblocked	(1)		(2)		(3)				
for minor		e-stage	_		Stage P					
movements, p(x)	Pro	cess	S	tage I		Stage :	II			
p(1)									_	
p(4) p(7)										
p(8)										
p(9)										
p(10)										
p(11) p(12)										
Computation 4 and 5									_	
Single-Stage Process	1	4	7	0	0	1.0	1 1	1.0		
Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R		
V c,x	0					991			_	
S S	O					991				
Px										
V c,u,x										
C r,x C plat,x									_	
									_	
Two-Stage Process	7		8		10		11	-		
Stage1	Stage2	Stage1	Sta	ge2 Sta	igel St	tage2 S	Stage1	Stage2		
V(c,x)									_	
s P(x)					30	000				
V(c,u,x)										
									_	
C(r,x) C(plat,x)										
				$\overline{}$	$\overline{}$		$\overline{}$		_	
Worksheet 6-Impedance	and Ca	pacity E	Gquati	ons) [/	\	
Step 1: RT from Minor	St.		(9		12		- \	
Conflicting Flows					\leftarrow					
Potential Capacity							/			
Pedestrian Impedance Movement Capacity	Factor			1	.00		1.00	> レ	<) \	
Probability of Queue	free St			1	.00		1.00		111	
Step 2: LT from Major	St.				4		1		- T	
Conflicting Flows							0		-ノノ	
Potential Capacity	Factor			-1	0.0		1636			
Pedestrian Impedance Movement Capacity	ractor			1	.00		1.00 1636			
Probability of Queue	free St			1	.00		1.00	_	~ I	
Maj L-Shared Prob Q f							1.00			



Step 3: TH from Minor St.	8	11	
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt	1.00	1.00	
Movement Capacity Probability of Queue free St.	1.00	1.00	
riosastire, or gasas free se.	2.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows		991	
Potential Capacity		271	
Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor	1.00		
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt	1.00	1.00	
Movement Capacity	1.00	271	
Worksheet 7-Computation of the Effect of	: Two-stage Gap Acc	eptance	
Step 3: TH from Minor St.	8	11	
Part 1 - First Stage			
Conflicting Flows			
Potential Capacity Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Probability of Queue free St.			
Part 2 - Second Stage			
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
novement capacity			
Part 3 - Single Stage			
Conflicting Flows			
Potential Capacity Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mymnt	1.00	1.00	
Movement Capacity			
7 11 5			
Result for 2 stage process:			
У			
Ĉ t			
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
beep 1. Bi from minor be.		10	
Part 1 - First Stage			
Conflicting Flows			
Potential Capacity Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mymnt			\
Movement Capacity		\ \ \	\
Part 2 - Second Stage Conflicting Flows			
Potential Capacity			_)
Pedestrian Impedance Factor		ノノー	
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity			
Part 3 - Single Stage			
Conflicting Flows	(991	
Potential Capacity		271	
Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.	1.00		///
Cap. Adj. factor due to Impeding mymnt	1.00	1.00	1
Movement Capacity		271	< 1



Results for Two-stage process: У С t 271 Worksheet 8-Shared Lane Calculations 10 12 Movement 8 9 11 Т R L Τ R Volume (vph) 32 Movement Capacity (vph) 271 Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 9 11 12 L Т R L Т R C sep 271 Volume 32 Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Level of Service 9 Movement 10 11 12 Lane Config LT L v (vph) 32 1 1636 C(m) (vph) 271 v/c 0.00 0.12 0.40 95% queue length 0.00 7.2 Control Delay LOS Α С 20.1 Approach Delay Approach LOS С

Worksheet 11-Shared Major LT Impedance and Delay

	Movement	2 Movement 5
p(oj) v(il), Volume for stream 2 or 5 v(i2), Volume for stream 3 or 6 s(i1), Saturation flow rate for stream 2 or s(i2), Saturation flow rate for stream 3 or P*(oj) d(M,LT), Delay for stream 1 or 4 N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5	1.00 0 0 0 1700	1.00

1.1.3.16 Interseção H – Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: Jurisdiction: DER/DF



Units: U. S. Metric Analysis Year: 2023

Project ID: FUTURA

M01-M05-M07+M08+M06-M11+M12 East/West Street:

North/South Street: M14

Intersection Orientation: EW Study period (hrs): 1.00

	Vehi	icle Vol	umes and	Adjus	tme	nts			
Major Street:	Approach	Ea	stbound	-			Westbour	nd	
	Movement	1	2	3	- 1	4	5	6	
		L	T	R		L	Т	R	
Volume		6	724						
Peak-Hour Fact	or, PHF	0.91	0.91						
Hourly Flow Ra	te, HFR	6	795						
Percent Heavy	Vehicles	0							
Median Type/St	orage	Undiv	ided			/			
RT Channelized	?								
Lanes		0	2						
Configuration		L	т т						
Upstream Signa	1?		No				No		
Minor Street:	Approach		rthbound				Southbou		
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume						35			
Peak Hour Fact	•					0.9	1		
Hourly Flow Ra						38			
Percent Heavy	Vehicles					0			
Percent Grade			0				0		
Flared Approact	h: Exists?/	/Storage			/				/
Lanes							1		
Configuration							L		
	Delay, 🤇		ngth, an			f Se	rvice		
Approach	EB	WB		hbound				ıthboun	
Movement	1	4	7	8	9	- 1	10	11	12
Lane Config	LT					- 1	L		
v (vph)	6						38		
C(m) (vph)	1636						600		
v/c	0.00						0.06		
95% queue leng							0.20		
Control Delay	7.2						11.4		
LOS	A						В		
Approach Delay								11.4	

HCS+: Unsignalized Intersections Release 5.6

В

1.00

Phone: E-Mail:

Approach LOS

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Fax:

Progeplan Analyst: Analysis Time Period: Pico Tarde
Intersection: H DER/DF Jurisdiction: Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURA

East/West Street: M01-M05-M07+M08+M06-M11+M12
North/South Street: M14

Intersection Orientation: EW Study period (hrs):



Major Street Movements	Vehicle 1	2	3	4	5	6	
Derece Provements	L	T	R	L	T	R	
Volume	6	724					
Peak-Hour Factor, PHF	0.91	0.91					
Peak-15 Minute Volume	2	199					
Hourly Flow Rate, HFR	6	795					
Percent Heavy Vehicles	0						
Median Type/Storage	Undi	vided		/			
RT Channelized?							
Lanes	0	2					
Configuration	L	тт					
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	Τ	R	
Volume				35			
Peak Hour Factor, PHF				0.91			
Peak-15 Minute Volume				10			
Hourly Flow Rate, HFR				38			
Percent Heavy Vehicles				0			
Percent Grade (%)		0			0		
Flared Approach: Exis	ts?/Storag	е		/			/
RT Channelized	-						
Lanes				1			
Configuration				L			
Movements	Pedestrian 13	14	15	16			
Flow (ped/hr)	0	0	0	0			
Lane Width (m)	3.6		3.6				
Walking Speed (m/sec) Percent Blockage	1.2	1.2	1.2	1.2			
	Ups	tream Si	gnal D	ata			
Prog.	Sat	Arrival	Gree	n Cycl		_	istance
Flow	Flow	Type	Time	_	_		Signal
vph	vph		sec	sec	K	oh r	neters
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							
Worksheet 3-Data for Co	omputing E	ffect of	 Delav	to Mai	or Stre	eet Vehi	icles
				ement 2		ovement	
Chanad In walterna	c +hch:-	100.	0				
Shared in volume, majo: Shared in volume, majo:			0		/ \		
Sat flow rate, major t				700	1		
Sat flow rate, major r				700)
Number of major street			2				
		low-up T	ime Ca	lculati	on		< /
Worksheet 4-Critical G	ap and Fol	iow up i		1			
Critical Gap Calculation	on		\leftarrow	+			
Critical Gap Calculation	on	7 8		9 1		11 / 1	12
Critical Gap Calculation	on 4) : L	11 1	12 R
Critical Gap Calculation Movement 1 L	on 4	7 8		R	Ľ.	/ 7	
Critical Gap Calculation Movement 1 L t(c,base) 4.1	on 4 L	7 8 L T		R 7	,1	1	
t(c,base) 4.1	on 4 L	7 8 L T		R 7	.1	T	R

0.00

t(c,g)

Percent Grade t(3,1t)

rercent Grade
t(3,1t) 0.00
t(c,T): 1-stage 0.00
2-stage 0.00
t(c) 1-stage 4.1

2-stage

0.20

0.00

0.00

0.20

0.00

0.00

0.10

0.00

0.00

0 0.20 0.00 0.70

0.00 1.00 6.4

0.20

0.00

0.00

0.10

0.00

0.00



									engenna
Follow-Up Time Movement	e Calcula 1	tions 4	7	8	9	10	11	12	
	L	Ĺ	L	T	R	L	T	R	
t(f,base) t(f,HV)	2.20	0.90	0.90	0.90	0.90	3.50	0.90	0.90	_
P(HV)	0 2.2					0			
t(f) 									_
Worksheet 5-Ef	ffect of	Upstream	m Signal	ls					
Computation 1-	-Queue Cl	earance	Time at	t Upstr	Moveme	ent 2		vement 5	_
				∨(t) V	(1,prot)	V(t)	V(1,prot)	_
/ prog Fotal Saturati	ion Flow	Rate, s	(vph)						
Arrival Type Effective Gree	en, q (se	c)							
Cycle Length,	C (sec)								
Rp (from Exhik Proportion veh			on areer	n P					
g(q1)	ar		91001						
g (q2) g (q)									
Computation 2-	-Proporti	on of T	WSC Inte	ersecti	on Time	e blocke	ed		_
				V (Movement) V			vement 5 V(1,prot)	
alpha					-				_
beta									
Travel time, t)							
Smoothing Fact Proportion of		ing flor	w, f						
Max platooned			, -						
Min platooned	flow, V(c,min)							
Duration of bl Proportion tim			(p)		0.00	00		0.000	
Computation 3-			eriods	Res	ult				_
p(2)				0.0					_
p(5)				0.0					
p(dom)									
p(subo)									
Constrained or	unconst	rained?							_
Proportion unblocked		(1))		(2)		(3)		
for minor		Single				age Pro			
movements, p(x	۲)	Proce		Sta	ge I	St	tage II		
p(1)							$\overline{}$		_
p(4) p(7)					^				
p(8)									
p(9)									
p(10)					> /			<	
p(11) p(12)					/ (
Computation 4				$\overline{}$					_
Single-Stage E	Process	1	Λ	7	0	9	10	11 12	
Movement		1 L	4 L	7 L	8 T	R	TO T	11 12 T R	
V c,x		0			-		409	-//	- / / / /
s								((4+
Px V c,u,x									
C r,x									-// /-
C plat,x									
Two-Stage Proc								1 ~	=
	7			8		10		11	



Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2

Stagel Stage2 Stage1	Stage2 Stage1	Stage2 Stage1	Stage2
(c,x)			
		3000	
? (x) 7 (c, u, x)			
(C, u, x)			
(r,x)			
plat,x)			
rksheet 6-Impedance and Capacity Eq	guations		
tep 1: RT from Minor St.	9	12	2
onflicting Flows			
otential Capacity			
edestrian Impedance Factor	1.00	1.00)
vement Capacity obability of Queue free St.	1.00	1.00)
obability of Queue free St.	1.00	1.00	,
ep 2: LT from Major St.	4	1	-
onflicting Flows		0	
otential Capacity		1636	
edestrian Impedance Factor ovement Capacity	1.00	1.00 1636	
obability of Queue free St.	1.00	1.00	
j L-Shared Prob Q free St.		1.00	
ep 3: TH from Minor St.	8	11	
nflicting Flows			
onflicting Flows otential Capacity			
edestrian Impedance Factor	1.00	1.00)
ap. Adj. factor due to Impeding mvmn	1.00	1.00)
ovement Capacity cobability of Queue free St.	1.00	1.00)
tep 4: LT from Minor St.	7	10)
onflicting Flows		409 602	
otential Capacity edestrian Impedance Factor	1.00	1.00)
aj. L, Min T Impedance factor	1.00		
aj. L, Min T Adj. Imp Factor.	1.00		
ap. Adj. factor due to Impeding mvmn ovement Capacity	1.00	1.00 600)
orksheet 7-Computation of the Effect	of Two-stage Ga	ap Acceptance	
tep 3: TH from Minor St.	8	11	-
art 1 - First Stage		/ \	
onflicting Flows otential Capacity	~ -		
edestrian Impedance Factor			
ap. Adj. factor due to Impeding mvmn	it /		
ovement Capacity	\	\ \	
cobability of Queue free St.] [1 L	/
art 2 - Second Stage			
onflicting Flows	\ \		
otential Capacity	7		
edestrian Impedance Factor ap. Adj. factor due to Impeding mvmn	it		
ovement Capacity		<u> </u>	7
art 3 - Single Stage			
art 3 - Single Stage onflicting Flows			1
otential Capacity		/	
edestrian Impedance Factor	1.00	1.00	
ap. Adj. factor due to Impeding mvmn	1.00	1.00	
ovement Capacity		7	
esult for 2 stage process:			
			_



У							
C t Probability of Queue free St.	1	.00		1.00			
Step 4: LT from Minor St.		7		10		_	
Part 1 - First Stage						_	
Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor							
Cap. Adj. factor due to Impeding mymnt							
Movement Capacity							
Part 2 - Second Stage						_	
Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor							
Cap. Adj. factor due to Impeding mymnt							
Movement Capacity							
Part 3 - Single Stage						-	
Conflicting Flows				409			
Potential Capacity				602			
Pedestrian Impedance Factor		.00		1.00			
Maj. L, Min T Impedance factor		.00					
Maj. L, Min T Adj. Imp Factor.		.00		1 00			
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1	.00		1.00 600			
						_	
Results for Two-stage process:							
a							
Y C t				600			
						_	
Worksheet 8-Shared Lane Calculations							
Movement 7	8	9	10	11	12	_	
Movement 7 L	8 T	9 R	10 L	11 T	12 R	_	
L			L				
Volume (vph)			1 38			-	
Volume (vph) Movement Capacity (vph)			L			-	
Volume (vph) Movement Capacity (vph)			1 38			-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)	T	R	38 600	Т		-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla:	T red Minor	R	38 600 Approa	T	R	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla:	red Minor	R Street	38 600 Approa	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla:	T red Minor	R	38 600 Approa	T	R	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla: Movement 7 L C sep	red Minor	R Street	10 L 600	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla: Movement 7 L C sep Volume	red Minor	R Street	10 L	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay	red Minor	R Street	10 L 600	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep	red Minor	R Street	10 L 600	T aches	R12	- - -	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1	red Minor	R Street	10 L 600	T aches	R12	- - -	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1	red Minor	R Street	10 L 600	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max	red Minor	R Street	10 L 600	T aches	R12	- - -	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh	red Minor	R Street	10 L 600	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep	red Minor	R Street	10 L 600	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla: Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n	red Minor	R Street	10 L 600	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep	red Minor	R Street	10 L 600	T aches	R12		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla: Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n	red Minor	R Street	10 L 600	T aches	R12		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla: Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n	red Minor	Street 9 R	10 L 600	T aches	R12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Leventre	red Minor 8 T	Street 9 R	10 L 600 38	T iches	12 R		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Fla: Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Leve Movement 1 4 7	red Minor 8 T	Street 9 R	10 L 600 38	T aches	R12		~ <i>{</i>
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Leve Movement 1 4 7	red Minor 8 T	Street 9 R	10 600 38	T iches	12 R		~ {
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Leve Movement 1 4 7 Lane Config LT v (vph) 6	red Minor 8 T	Street 9 R	10 L 600 38	T iches	12 R		~ <u>{</u>
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Leve Movement 1 4 7 Lane Config LT v (vph) 6 C(m) (vph) 6 C(m) (vph) 1636	red Minor 8 T	Street 9 R	10 L 600 38	T iches	12 R		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement C sep Volume Delay Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Lev Movement 1 4 7 Lane Config LT v (vph) 6 C(m) (vph) 1636 v/c 0.00	red Minor 8 T	Street 9 R	10 L 600 38 10 L 38 600 0.06	T iches	12 R		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Length Movement 1 4 7 Lane Config LT v (vph) 6 C(m) (vph) 1636 v/c 0.00 95% queue length 0.01	red Minor 8 T	Street 9 R	10 L 6000 38	T iches	12 R		~ <u>{</u>
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Length Movement 1 4 7 Lane Config LT v (vph) 6 C(m) (vph) 1636 v/c 0.00 95% queue length 0.01 Control Delay 7.2	red Minor 8 T	Street 9 R	10 L 600 38 10 L 600 38	T iches	12 R		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Leve Movement 1 4 7 Lane Config LT v (vph) 6 C(m) (vph) 1636 v/c 0.00 95% queue length 0.01 Control Delay 7.2 LOS A	red Minor 8 T	Street 9 R	10 L 6000 38	T iches	12 R		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flam Movement 7 L C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep n C act Worksheet 10-Delay, Queue Length, and Lev Movement 1 4 7 Lane Config LT v (vph) 6 C(m) (vph) 1636 v/c 0.00 95% queue length 0.01 Control Delay 7.2	red Minor 8 T	Street 9 R	10 L 600 38 10 L 600 38	T ches	12 R		



Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	1.00
v(il), Volume for stream 2 or 5	0	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	1.00	
d(M,LT), Delay for stream 1 or 4	7.2	
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5	2	

1.1.3.17 Interseção I – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Analyst: Progeplan

Agency/Co.:

Date Performed: 05/06/2023 Analysis Time Period: Pico Manha

Intersection: Jurisdiction: DER/DF

Units: U. S. Metric Analysis Year: Project ID: FUTURA East/West Street: 2023

MOV01-MOV04-MOV10

North/South St Intersection (110 1 10	St	tudy	perio	d (hrs)	: 1.00
	Vehi	cle Vol	umes and	d Adius	stme	nts		
Major Street:			stbound	_			stbound	1
, 01 001000.	Movement	1	2	3	- 1	4	5	6
		L	T	R	i	L	T	R
Volume		14	1807					
Peak-Hour Fact	or, PHF	0.91	0.91					
Hourly Flow Ra	ate, HFR	15	1985					
Percent Heavy		0						
Median Type/St		Undiv	ided			/ _	_	
RT Channelized							\	
Lanes		0	2			/	\	
Configuration		17	тт					
Upstream Signa	11?		No	(No	
11								
Minor Street:	Approach	No	rthbound	i		So	uthbour	nd
	Movement	7	8	9		10	11	12
		L	Т	R	- (L	T	R
					- (
Volume				 		12		
Peak Hour Fact	or, PHF				' '	0.91		
Hourly Flow Ra	ate, HFR					13		
Percent Heavy						17		
Percent Grade			0				0	
Flared Approac	, ,	Storage)
Lanes						1		
Configuration						T.		1 1
00						_	\	\ \
	Delay, Q	ueue Lei	ngth, ar	nd Leve	el o	f Serv	ice	
Approach	EB	WB		hbound				hbound
Movement	1	4 1	7	8	9	1	10	11 12
Lane Config	LT	-		-	_		L	
		'				'	_	



v (vph) C(m) (vph)	15 1636	13 243
v/c	0.01	0.05
95% queue length	0.03	0.17
Control Delay	7.2	20.7
LOS	A	C
Approach Delay		20.7
Approach LOS		С

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Analyst: Progeplan

Analysis Time Period: Pico Manha Intersection: I

Jurisdiction: DER/DF

Units: U. S. Metric Analysis Year: Project ID: FUTURA East/West Street: 2023

	OV01-MOV0 OV10 n: EW	4-MOV10		Study pe	eriod	(hrs):	1.00	
						, -,-		
	_			Adjustmer				
Major Street Movements	1 T.	2 T	3 R	4 L	5 T	6 R		
		_	11		_	10		
Volume	14	1807						
Peak-Hour Factor, PHF	0.91	0.91						
Peak-15 Minute Volume	4	496						
Hourly Flow Rate, HFR	15	1985						
Percent Heavy Vehicles	0							
Median Type/Storage	Undi	vided		/				
RT Channelized?								
Lanes	0	2						
Configuration	I	ТТ						
Upstream Signal?		No			No			
Minor Street Movements	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume				12	/	 		
Peak Hour Factor, PHF				0.91	J			
Peak-15 Minute Volume			(3				
Hourly Flow Rate, HFR				13				
Percent Heavy Vehicles				17				
Percent Grade (%)		0		/ /	0	\	\ /	\
Flared Approach: Exists	:?/Storag	re		/ /			//	\
RT Channelized				\				
Lanes			1	1				
Configuration				— / I			,	
						/ (
Pe	edestrian	Volume	s and	d Adjustme	ents		17 -	
Movements	13	14		.5 16			11	
Flow (ped/hr)	0	0	() 0			-+	
Lane Width (m)	3.6	3.6	3	3.6 3.6	5			
Walking Speed (m/sec)	1.2			.2 1.2				

Movements	_Pedestrian 13	Volumes 14		justment: 16	5	// '
Flow (ped/hr)	0	0	0	0		1 1
Lane Width (m)	3.6			3.6	\	
Walking Speed (m/sec)	1.2	1.2	1.2	1.2		
Percent Blockage	0	0	0	0		

Upstream Signal Data Arrival Green Cycle Prog. Prog. Sat Distance



Flow Flow Type Time Length Speed to Signal vph vph sec sec kph meters

S2 Left-Turn Through S5 Left-Turn Through

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared In volume, major th vehicles:	0	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	2	

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical	Gap Cal	culatio	on						
Movement	-	1	4	7	8	9	10	11	12
		L	L	L	T	R	L	Т	R
t(c,base	<u> </u>	4.1					7.1		
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)		0					17		
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent t(3,1t)		0.00		0.00	0.00	0.00	0.00	0.00	0.00
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage	4.1					6.6		
	2-stage								
Follow-U	Jp Time C	alculat	tions						
Movement	:	1	4	7	8	9	10	11	12
		L	L	L	T	R	L	Т	R
t(f,base	÷)	2.20					3.50		
t(f,HV)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		0					17		
t(f)		2.2					3.7		

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal Movement 2 Movement 5 $V(t) \quad V(1, prot) \quad V(t) \quad V(1, prot)$

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked

alpha
beta
Travel time, t(a) (sec)
Smoothing Factor, F
Proportion of conflicting flow, f
Max platooned flow, V(c,max)
Min platooned flow, V(c,min)
Duration of blocked period, t(p)
Proportion time blocked, p

0.000 0

0.000



Computation 3-Platoon	n Event P									
p(2) p(5) p(dom) p(subo)				000					_	
Constrained or uncons	strained?									
Proportion unblocked for minor movements, p(x)	(1 Single Proc	-stage	S+	(2) Two-St	age Pr	(3) cocess Stage I	·т		_	
p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12)									_	
Computation 4 and 5									_	
Single-Stage Process Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R		
V c,x s Px V c,u,x	0					1022			_	
C r,x									_	
C plat,x										
Two-Stage Process	7	Ct ago 1	8	202 8+20	10		11		_	
Two-Stage Process Stage1	7 Stage2	Stage1		re2 Stag		age2 S			_	
Two-Stage Process Stage1 V(c,x) s P(x)		Stage1		e2 Stag	re1 St	age2 S			_	
Two-Stage Process		Stage1		re2 Stag	re1 St				_	
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x)	Stage2		Stag		re1 St				_	
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x) C(plat,x)	Stage2		Stag		re1 St					
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance Step 1: RT from Minor Conflicting Flows Potential Capacity Pedestrian Impedance	Stage2		Stag	ns 1.	30 30 9		tage1			
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance Step 1: RT from Mino: Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue	e and Cap r St. Factor free St.	acity E	Stag	ns	9 00 00		12 1.00		_	
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance Step 1: RT from Mino: Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Majo: Conflicting Flows	e and Cap r St. Factor free St.	acity E	Stag	ns 1.	30 30 9		12 1.00 1.00			
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance Step 1: RT from Mino: Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Majo:	e and Cap r St. Factor free St. r St.	acity E	Stag	1.	9 00 00		12 1.00 1.00	Stage2		
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance Step 1: RT from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Probability of Queue Movement Capacity Pedestrian Impedance Movement Capacity Probability of Queue Movement Capacity Probability of Queue Maj L-Shared Prob Q	e and Cap r St. Factor free St. Factor free St. free St.	acity E	Stag	1.	9 00 4		12 1.00 1.00 1.636 1.00 1.636 0.99	Stage2		
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance Step 1: RT from Mino: Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Majo: Conflicting Flows Potential Capacity Probability of Queue Step 3: TH from Mino: Conflicting Flows Potential Capacity Probability of Queue Movement Capacity Probability of Queue Movement Capacity Probability of Queue Movement Capacity Probability of Queue Maj L-Shared Prob Q: Step 3: TH from Mino: Conflicting Flows Potential Capacity Pedestrian Impedance	e and Cap r St. Factor free St. r St. Factor free St. r St.	acity E	quatio	1. 1. 1.	9 00 00 4 00 00 8		12 1.00 1.00 1636 1.00 1636 0.99 11	Stage2		
Two-Stage Process Stage1 V(c,x) s P(x) V(c,u,x) C(r,x) C(plat,x) Worksheet 6-Impedance Step 1: RT from Mino: Conflicting Flows Potential Capacity Probability of Queue Step 2: LT from Majo: Conflicting Flows Potential Capacity Probability of Queue Maj L-Shared Prob Q: Step 3: TH from Mino: Conflicting Flows Potential Capacity Probability of Queue Maj L-Shared Prob Q: Step 3: TH from Mino: Conflicting Flows Potential Capacity	e and Cap r St. Factor free St. r St. Factor free St. r St.	acity E	quatio	1. 1. 1. 0.	9 00 00 4 00 00 8		12 1.00 1.00 1.00 0.1636 1.00 0.1636 0.99 0.99	Stage2		



			ongomiana o molo
Conflicting Flows		1022	
Potential Capacity	1 00	245	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00 0.99	1.00	
Maj. L, Min T Adj. Imp Factor.	0.99		
Cap. Adj. factor due to Impeding mymnt	0.99	0.99	
Movement Capacity		243	
Worksheet 7-Computation of the Effect of	Two-stage Gap Acc	eptance	_
Step 3: TH from Minor St.	8	11	_
Part 1 - First Stage			_
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.			
Part 2 - Second Stage			_
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt Movement Capacity			
Part 3 - Single Stage			_
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	0.99	0.99	
Result for 2 stage process:			_
У			
Ct			
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	_
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity			_
Part 2 - Second Stage			_
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt Movement Capacity		\	
Part 3 - Single Stage			_
Conflicting Flows		1022	
Potential Capacity) //	245	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00	1.00	\
Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.	0.99		
Cap. Adj. factor due to Impeding mymnt	0.99	0.99	
Movement Capacity	7	243	
Results for Two-stage process:			
a			////
y C t		243	44
	(- // \
Worksheet 8-Shared Lane Calculations			
Movement 7 L	8 9 T R	10 11 12 L T R	
Volume (vph)		13	=\
-			



Movement Capacity (vph) Shared Lane Capacity (vph) 243

T-7 1 1 + O	0	- E DEE	- £ 17	202	0+	7 1	

Worksheet 9-Computa	tion o	f Effect	of	Flared	Minor	Street	Appro	oaches	
Movement				7	8	9	10	11	12
				L	Т	R	L	Т	R
C sep							243		
Volume							13		
Delay									
Q sep									
Q sep +1 round (Qsep +1)									
Tound (Qsep 11)									
n max									
C sh									
SUM C sep									
n									
C act									
Worksheet 10-Delay,	Queue	Length,	and	l Level	of Se	rvice			
Movement	1	4	7	8		9	10	11	12
Lane Config	LT						L		
v (vph)	15						13		
C(m) (vph)	1636						243		
v/c	0.01						0.05		
95% queue length	0.03						0.17		
Control Delay	7.2 A						20.7 C		
Approach Delay	Α						C	20.7	
Approach LOS								C C	
11								-	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.99	1.00
v(il), Volume for stream 2 or 5	0	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.99	
d(M,LT), Delay for stream 1 or 4	7.2	
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5	2	

1.1.3.18 Interseção I – Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: DER/DF

Jurisdiction:
Units: U. S. Metric
Analysis Year:
Project ID: FUTURA
East/West Street: 2023

MOV01-MOV04-MOV10

North/South Street: MOV10 Intersection Orientation: EW Study period (hrs):

Vehicle Volumes and Adjustments

Major Street: Approach Eastbound Movement 1 2 Westbound | 4 3



		L	Т	R	I	L	Т	R
Volume Peak-Hour Factor, Hourly Flow Rate, Percent Heavy Veh Median Type/Stora RT Channelized?	HFR icles	6 0.91 6 0 Undiv				/		
Lanes Configuration Upstream Signal?		D'	2 I T No				No	
Minor Street: Ap	proach	No	rthbound	l		So	uthbour	nd
Мо	vement	7 L	8 T	9 R		10 L	11 T	12 R
Volume Peak Hour Factor, Hourly Flow Rate, Percent Heavy Veh Percent Grade (%) Flared Approach: Lanes Configuration	HFR icles	Storage	0		/	24 0.91 26 6	0	/
Approach Movement Lane Config	_Delay, Qu EB 1 LT	ueue Lei WB 4		d Leve hbound 8		I		chbound 11 12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	6 1636 0.00 0.01 7.2 A						26 596 0.04 0.14 11.3	11.3 B

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Phone: Fax: E-Mail:

Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: Project ID: FUTURA 2023 East/West Street: MOV01-MOV04-MOV10 North/South Street: MOV10 1.00 Intersection Orientation: EW Study period (hrs): Vehicle Volumes and Adjustments Major Street Movements 1 2 3 6 Τ L R L R Volume 707 6 0.91 0.91 Peak-Hour Factor, PHF Peak-15 Minute Volume 194 2 Hourly Flow Rate, ${\tt HFR}$ 6 776 --Percent Heavy Vehicles 0 Median Type/Storage Undivided



RT Channelized?							
Lanes	0	2					
Configuration	L	тт					
Upstream Signal?		No			No		
Minor Street Movements	7 L	8 T	9 R	10 L	11 T	12 R	
Volume				24			
Peak Hour Factor, PHF				0.91			
Peak-15 Minute Volume				7			
Hourly Flow Rate, HFR				26			
Percent Heavy Vehicles				6			
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storag	е		/			/
RT Channelized	-						
Lanes				1			
Configuration				I	ı		
Movements I	Pedestrian 13	Volumes 14	and Ad 15	justme 16	nts		
JO A CHICHER	13	14	10	TΩ			
Flow (ped/hr)	0	0	0	0			
Lane Width (m)	3.6	3.6	3.6	3.6			
Walking Speed (m/sec)	1.2		1.2	1.2			
Percent Blockage	0	0	0	0			
Prog. Flow	Sat . Flow	tream Si Arrival Type	Green Time	Cycl Leng	th Spe	og. eed	Distance to Signal
vph	vph		sec	sec	: к]	ph	meters
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							
Warkshoot 2-Data for Co	mnuting E	ffoot of	Dolass	+ o Mo÷	or C+r	00+ 7	ohi aloa
Worksheet 3-Data for Co		Tiect of					
			MOAE	ment 2	. M	oveme	are o
Shared ln volume, major	th vehic	les:	0				
Shared ln volume, major			0				
Sat flow rate, major th			17	00			
Sat flow rate, major rt			17				
Number of major street			2				
Worksheet 4-Critical Ga	ap and Fol	low-up T	ime Cal	culati	.on		
Critical Gap Calculation	on						
Movement 1		7 8	9	1	.0	11	12
L		L T			L	T	R
t(c,base) 4.1			-	7	.1	\ <u></u>	\rightarrow
t(c,hv) 1.00	1.00 1	.00 1.	00 1.			1.00	1.00
C (C, 11v)	1.00 I		· ·	J 1		± • • •	±, 00

t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)		0				\ /	6		
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent	Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,1t)		0.00					0.70		
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage	4.1				/ '	6.5		
	2-stage					1			
	_							\ \ \	
Follow-U	p Time C	alculat	ions						
Movement		1	-4	7	8	9	10	11	12
		_	_						
		L	L	L	T	R	L	T	R
		L	L	L	Т	R	L	T	R
t(f,base)	L 2.20		L	Т	R	1 3.50	T	R
t(f,base t(f,HV))		0.90	0.90	0.90	0.90		0.90	R 0.90
)	2.20					3.50		
t(f,HV))	2.20					3.50 0.90		
t(f,HV) P(HV))	2.20 0.90 0					3.50 0.90 6		



Worksheet 5-Effect of Upstream Signals

```
Computation 1-Queue Clearance Time at Upstream Signal
                                             Movement 2
                                                                 Movement 5
                                           V(t)
                                                 V(l,prot) V(t) V(l,prot)
V prog
Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g (q2)
g (q)
Computation 2-Proportion of TWSC Intersection Time blocked
                                              Movement 2
                                                                 Movement 5
                                           V(t) V(l,prot) V(t) V(l,prot)
alpha
beta
Travel time, t(a) (sec)
Smoothing Factor, F
Proportion of conflicting flow, f
Max platooned flow, V(c,max)
Min platooned flow, V(c,min)
Duration of blocked period, t(p)
Proportion time blocked, p
                                                0.000
                                                                   0.000
Computation 3-Platoon Event Periods
                                          Result
                                          0.000
p(2)
p(5)
                                          0.000
p(dom)
p(subo)
Constrained or unconstrained?
Proportion
unblocked
                            (1)
                                              (2)
                                                              (3)
for minor
                        Single-stage
                                              Two-Stage Process
movements, p(x)
                          Process
                                          Stage I
                                                           Stage II
p(1)
p(4)
p(7)
p(8)
p(9)
p(10)
p(11)
p(12)
Computation 4 and 5
Single-Stage Process
Movement
                                               8
                                                             10
                                                                    11
                                                                            12
                         L
                                        L
                                                                             R
V c,x
                                                             400
s
Рx
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                                                       11
                                                      10
              Stage1 Stage2 Stage1 Stage2 Stage1 Stage2
                                                                 Stage1
                                                                         Stage2
\overline{V(c,x)}
                                                         3000
P(x)
V(c,u,x)
C(r,x)
C(plat,x)
```



Step 1: RT from Minor St.	9	12
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 2: LT from Major St.	4	1
Conflicting Flows		0
Potential Capacity		1636
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1636
Probability of Queue free St.	1.00	1.00
Maj L-Shared Prob Q free St.		1.00
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	1.00	1.00
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		400
Potential Capacity		598
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	1.00	
Maj. L, Min T Adj. Imp Factor.	1.00	
Cap. Adj. factor due to Impeding mvmnt	1.00	1.00
Movement Capacity		596

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St. 11 8

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity

Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity

Result for 2 stage process: а У С t Probability of Queue free St.

Step 4: LT from Minor St.

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor

1.00 1.00 1.00 1.00

1.00

10

1.00



Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows 400 Potential Capacity 598 Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. 1.00 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 1.00 596 Movement Capacity Results for Two-stage process: а У Ĉ t 596 Worksheet 8-Shared Lane Calculations Movement 9 10 11 12 8 Т L R L Т R Volume (vph) 26 596 Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 8 9 10 11 12 Т L R L Τ R 596 Csep Volume 26 Delay Q sep Q sep +1 round (Qsep +1) n max C sh SUM C sep C act Worksheet 10-Delay, Queue Length, and Level of Service 12 Movement 10 11 Lane Config LT v (vph) 1636 C(m) (vph) 596 v/c 0.00 0.04 95% queue length 0.01 0.14 Control Delay 7.2 11.3 LOS В Α 11.3 Approach Delay Approach LOS В Worksheet 11-Shared Major LT Impedance and Delay Movement 2 Movement 5 1.00 p(oj) 1.00 v(i1), Volume for stream 2 or 5 v(i2), Volume for stream 3 or 6 0 0

1700

1700

s(il), Saturation flow rate for stream 2 or 5 s(i2), Saturation flow rate for stream 3 or 6



P*(oj) 1.00 7.2 d(M,LT), Delay for stream 1 or 4 N, Number of major street through lanes 2 d(rank,1) Delay for stream 2 or 5

1.1.3.19 Interseção J – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023

Analysis Time Period: Pico Manha Intersection: Jurisdiction: DER/DF

Units: U. S. Metric

Analysis Year: 2023

Project ID: FUTURA

East/West Street: M2-M10 North/South Street: M9 Intersection Orientation: EW

Study period (hrs): 1.00

Major Street:	Vehi		olumes an Eastbound	_	stme		tbound	
najor bereee.	Movement.	1	2	3	- 1	4	5	6
		L	T	R	i	L	T	R
Volume						12	751	
Peak-Hour Fact	or, PHF					0.91	0.91	
Hourly Flow Ra	te, HFR					13	825	
Percent Heavy	Vehicles					17		
Median Type/St RT Channelized	-	Und	vided			/		
Lanes						0	2	
Configuration						LT	T	
Upstream Signa	1?		No				No	

Minor Street:	Approach	No	rthbou	nd		So	outhbou	nd	
	Movement	7	8	9	1	10	11	12	
		L	T	R	-	L	T	R	
Volume		17							
Peak Hour Fact	or, PHF	1.00							
Hourly Flow Ra	ate, HFR	17							
Percent Heavy	Vehicles	0							
Percent Grade	(%)		0				0		
Flared Approac	ch: Exists?	/Storage	9		/				/
Lanes		1							
Configuration		I				/	\		

Approach Movement Lane Config	_Delay, EB 1	Queue Le WB 4 LT		and Level rthbound 8 9		thbound 11 12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay		13 1530 0.01 0.03 7.4 A	17 575 0.03 0.09 11.5 B	11.5	~	305
Approach LOS				В		

HCS+: Unsignalized Intersections Release 5.6



Phone: Fax: E-Mail: TWO-WAY STOP CONTROL(TWSC) ANALYSIS_ Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Manha Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURA M2-M10 East/West Street: North/South Street: Intersection Orientation: EW Study period (hrs): 1.00 Vehicle Volumes and Adjustments Major Street Movements 1 2 3 4 L Volume 12 751 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume 3 206 Hourly Flow Rate, HFR 13 825 Percent Heavy Vehicles 17 Median Type/Storage Undivided RT Channelized? 2 0 Lanes LT T Configuration Upstream Signal? No No Minor Street Movements 11 8 L Τ R L Τ R Volume 17 Peak Hour Factor, PHF 1.00 Peak-15 Minute Volume 4 17 Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) 0 0 Flared Approach: Exists?/Storage RT Channelized Lanes Configuration L Pedestrian Volumes and Adjustments Movements 13 14 15 16 Flow (ped/hr) 0 Lane Width (m) 3.6 3.6 3.6 3.6 Walking Speed (m/sec) 1.2 1.2 1.2 1.2 Percent Blockage 0 0 Upstream Signal Data Sat Arrival Prog. Green Cycle Prog. Distance Type Time Length Flow to Signal Flow Speed vph vph kph sec sec meters Left-Turn Through Left-Turn S.5 Through Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles Movement 2 Movement 5

0

1700

Shared In volume, major th vehicles:

Shared in volume, major rt vehicles: Sat flow rate, major th vehicles:



Sat flow rate, major rt vehicles: Number of major street through lanes: 1700 2

Critical	Gap Cal	culati	on						
Movement		1	4	7	8	9	10	11	12
		L	L	L	Т	R	L	Т	R
t(c,base)		4.1	7.1					
t(c,hv) P(hv)		1.00	1.00 17	1.00	1.00	1.00	1.00	1.00	1.00
t(c,q)				0.20	0.20	0.10	0.20	0.20	0.10
Percent	Grade			0.00	0.00	0.00		0.00	0.00
t(3,1t)			0.00	0.70					
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.3	6.4					
	2-stage								
Follow-U	p Time C	alcula	tions						
Movement		1	4	7	8	9	10	11	12
		L	L	L	Т	R	L	Т	R
t(f,base)		2.20	3.50					
t(f,HV)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)			17	0					
t(f)			2.4	3.5					

Computation 1-Queue Clearance Time at Upstream Signal

Movement 2 Movement 5 V(t) V(l,prot) V(t) V(l,prot)

V prog Total Saturation Flow Rate, s (vph) Arrival Type Effective Green, g (sec) Cycle Length, C (sec) Rp (from Exhibit 16-11) Proportion vehicles arriving on green P g(q1) g(q2)

Computation 2-Proportion of TWSC Intersection Time blocked

Movement 2 Movement 5 V(t) V(l,prot) V(t) V(l,prot)

0.000

0.000

alpha beta Travel time, t(a) (sec) Smoothing Factor, F Proportion of conflicting flow, f Max platooned flow, V(c,max) Min platooned flow, V(c,min) Duration of blocked period, t(p) Proportion time blocked, p

Computation 3-Platoon Event Periods Result 0.000 p(2) p(5) 0.000

p (dom) p(subo)

Constrained or unconstrained?

Proportion unblocked (3) (1) Two-Stage Process Single-stage for minor movements, p(x) Process Stage I Stage II

p(1)

g (q)

p(4)

p(7)



p(8) p(9) p(10) p(11) p(12)				
Computation 4 and 5 Single-Stage Process Movement 1 4 L L	7 L	8 9 T R	10 11 L T	12 R
V c,x 0	438			
S	450			
Px V c,u,x				
C r,x C plat,x				
Two-Stage Process				
7 Stage1 Stage2 Sta	8 ige1 Stage2	10 Stagel S	1: Stage2 Stage1	
V(c,x)				
s 3000 P(x)				
V(c,u,x)				
C(r,x) C(plat,x)				
Worksheet 6-Impedance and Capacitation Step 1: RT from Minor St.	y Equations	9	12	
Conflicting Flows Potential Capacity Pedestrian Impedance Factor		1.00	1.00	
Movement Capacity Probability of Queue free St.		1.00	1.00	
Step 2: LT from Major St.		4	1	
Conflicting Flows		0		
Potential Capacity Pedestrian Impedance Factor		1530 1.00	1.00	
Movement Capacity		1530	1.00	
Probability of Queue free St.		0.99	1.00	
Maj L-Shared Prob Q free St.		0.99		
Step 3: TH from Minor St.		8	11	
Conflicting Flows Potential Capacity		1	$\overline{}$	
Pedestrian Impedance Factor		1.00	1.00	
Cap. Adj. factor due to Impeding	mvmnt	0.99	0.99	
Movement Capacity Probability of Queue free St.		1.00	1.00	
		<u> </u>		
Step 4: LT from Minor St. Conflicting Flows		438	10	\
Potential Capacity		580		
Pedestrian Impedance Factor		1.00	1.00	
Maj. L, Min T Impedance factor			0.99	
Mal. L. Mill I Adl. ind ractor.		<i>I</i>		
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding Movement Capacity	mvmnt	0.99 575	0.99	
Cap. Adj. factor due to Impeding		575	0.99	

Part 1 - First Stage Conflicting Flows Potential Capacity



Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St.

art 2 - Second Stage		
onflicting Flows		
otential Capacity		
edestrian Impedance Factor		
ap. Adj. factor due to Impeding mvmnt		
ovement Capacity		
art 3 - Single Stage		
onflicting Flows		
otential Capacity		
edestrian Impedance Factor	1.00	1.00
ap. Adj. factor due to Impeding mvmnt	0.99	0.99
ovement Capacity		
esult for 2 stage process:		
t		
robability of Queue free St.	1.00	1.00
ep 4: LT from Minor St.	7	10
ep 4. II IIOM FINOI St.	1	10
art 1 - First Stage		
onflicting Flows		
tential Capacity		
edestrian Impedance Factor		
p. Adj. factor due to Impeding mvmnt		
vement Capacity		
art 2 - Second Stage		
onflicting Flows		
tential Capacity		
destrian Impedance Factor		
p. Adj. factor due to Impeding mvmnt		
vement Capacity		
rt 3 - Single Stage		
onflicting Flows	438	
tential Capacity	580	
destrian Impedance Factor	1.00	1.00
j. L, Min T Impedance factor	1.00	0.99
j. L, Min T Adj. Imp Factor.		0.99
		0.99
	0.99	
p. Adj. factor due to Impeding mvmnt	0.99 575	
p. Adj. factor due to Impeding mvmnt vement Capacity		
p. Adj. factor due to Impeding mvmnt vement Capacity		
p. Adj. factor due to Impeding mvmnt vement Capacity		
p. Adj. factor due to Impeding mvmnt ovement Capacity sults for Two-stage process:	575	
ap. Adj. factor due to Impeding mvmnt ovement Capacity esults for Two-stage process:		
esults for Two-stage process:	575	\
p. Adj. factor due to Impeding mvmnt ovement Capacity esults for Two-stage process:	575	
t prksheet 8-Shared Lane Calculations	575	
p. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: t rksheet 8-Shared Lane Calculations	575	10 11 12 L T R
p. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: t rksheet 8-Shared Lane Calculations vement 7 L	575	10 11 12
p. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: t rksheet 8-Shared Lane Calculations vement 7 L lume (vph) 17	575	10 11 12
p. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: t rksheet 8-Shared Lane Calculations vement 7 L lume (vph) 17 vement Capacity (vph) 575	575	10 11 12
p. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: t rksheet 8-Shared Lane Calculations vement 7 L lume (vph) 17 vement Capacity (vph) 575	575	10 11 12
c. Adj. factor due to Impeding mvmnt vement Capacity Sults for Two-stage process: c. c. c. c. c. c. c. c. c. c. c. c. c. c	575	10 11 12
c. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: cksheet 8-Shared Lane Calculations vement 7 L Lume (vph) 17 vement Capacity (vph) 575 ared Lane Capacity (vph)	575 575 8 9 T R	10 11 12 L T R
pp. Adj. factor due to Impeding mvmnt ovement Capacity sults for Two-stage process: t prksheet 8-Shared Lane Calculations ovement 7 L Olume (vph) ovement Capacity (vph) ared Lane Capacity (vph) orksheet 9-Computation of Effect of Flare	575 575 8 9 T R	10 11 12 L T R
ap. Adj. factor due to Impeding mvmnt ovement Capacity esults for Two-stage process: t prksheet 8-Shared Lane Calculations evement 7 L colume (vph) 17 by company (vph) 575 mared Lane Capacity (vph) 575 prksheet 9-Computation of Effect of Flare ovement 7	575 575 8 9 T R	10 11 12 L T R
pp. Adj. factor due to Impeding mvmnt ovement Capacity sults for Two-stage process: t prksheet 8-Shared Lane Calculations ovement 7 L Olume (vph) ovement Capacity (vph) lared Lane Capacity (vph) orksheet 9-Computation of Effect of Flare	575 575 8 9 T R	10 11 12 L T R
pp. Adj. factor due to Impeding mvmnt ovement Capacity sults for Two-stage process: t prksheet 8-Shared Lane Calculations evement T L clume (vph) present Capacity (vph) prksheet 9-Computation of Effect of Flare evement 7 L	575 575 8 9 T R	10 11 12 L T R
pp. Adj. factor due to Impeding mvmnt ovement Capacity sults for Two-stage process: t prksheet 8-Shared Lane Calculations evement 7 L sults for Two-stage process: 7 L supplies the supplies of the supplies	575 575 8 9 T R	10 11 12 L T R
p. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: t rksheet 8-Shared Lane Calculations vement 7 L lume (vph) 17 vement Capacity (vph) 575 ared Lane Capacity (vph) rksheet 9-Computation of Effect of Flare vement 7 L sep 575 lume 17	575 575 8 9 T R	10 11 12 L T R
ch. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: character 8-Shared Lane Calculations vement 7 L Lume (vph) vement Capacity (vph) ared Lane Capacity (vph) crksheet 9-Computation of Effect of Flare vement 7 L sep Lume 17 L sep Lume 17 L sep Lume 17 L	575 575 8 9 T R	10 11 12 L T R
c. Adj. factor due to Impeding mvmnt vement Capacity Sults for Two-stage process: Cksheet 8-Shared Lane Calculations vement 7 L Lume (vph) 17 vement Capacity (vph) 575 ared Lane Capacity (vph) cksheet 9-Computation of Effect of Flare vement 7 L sep 575 Lume 17 Lay sep 17	575 575 8 9 T R	10 11 12 L T R
p. Adj. factor due to Impeding mvmnt vement Capacity sults for Two-stage process: t rksheet 8-Shared Lane Calculations vement 7 L lume (vph) 17 vement Capacity (vph) 575 ared Lane Capacity (vph) rksheet 9-Computation of Effect of Flare vement 7 L sep 575	575 575 8 9 T R	10 11 12 L T R



n max C sh SUM C sep n C act

Approach LOS

Minor Street:

Approach

Movement

Worksheet 10-Delay, Queue Length, and Level of Service 4 11 Movement Lane Config LT v (vph) 13 17 C(m) (vph) 1530 575 v/c 0.01 0.03 95% queue length 0.03 0.09 Control Delay 7.4 11.5 Α В Approach Delay 11.5

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.99
v(il), Volume for stream 2 or 5		0
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.99
d(M,LT), Delay for stream 1 or 4		7.4
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5		2

1.1.3.20 Interseção J – Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Southbound

11

Τ

12

R

10

| L

Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Tarde Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURA East/West Street: M2-M10 North/South Street: М9 Intersection Orientation: EW Study period (hrs): Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound 2 5 Movement L Т R L Т Volume 19 1987 0.91 Peak-Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 2183 20 Percent Heavy Vehicles 6 Median Type/Storage Undivided RT Channelized? 2 0 Lanes Configuration LT T Upstream Signal? No No

Northbound

8

Т

R

L