

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

Intersection: Jurisdiction:

Units: U. S. Metric Analysis Year:

Project ID: East/West Street:

North/South Street: М7

Study period (hrs): 0.25 Intersection Orientation:  ${\tt EW}$ 

Vehicle Volumes and Adjustments

DER/DF

2023

Major Street: Approach	Ea	stboun	d		We	stbound		
Movement	1	2	3		4	5	6	
	L	Т	R	I	L	T	R	
Volume					9	757		
Peak-Hour Factor, PHF					0.91	0.91		
Hourly Flow Rate, HFR					9	831		
Percent Heavy Vehicles					12			
Median Type/Storage	Undiv	ided			/			
RT Channelized?								
Lanes					0	2		
Configuration					L	ТТ		
Upstream Signal?		No				No		
Minor Street: Approach	Northbound			Southbound				
Movement	7	8	9		10	11	12	
	L	T	R	- 1	L	Т	R	
Volume	39							
Peak Hour Factor, PHF	1.00							
Hourly Flow Rate, HFR	39							
Percent Heavy Vehicles								
Percent Grade (%)		0				0		
Flared Approach: Exists?/	'Storage			/				/
Lanes	ī							
Configuration	T.							

Approach	_Delay, EB	Queue Le WB		and Leve		Ser	vice	Southbound	
	1		7 1101				1.0		
Movement	1	4	/	8	9	- 1	10	11	12
Lane Config		LT	L						
v (vph)		9	39						
C(m) (vph)		1560	581						
v/c		0.01	0.07						
95% queue length		0.02	0.22						
Control Delay		7.3	11.6						
LOS		A	B						
Approach Delay				11.6					
Approach LOS				В					

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 05/06/2023

Intersection:  ${\tt Jurisdiction:}$ Units: U. S. Metric

Analysis Year: Project ID:

DER/DF

2023



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

Study period (hrs): 0.25

	Vehicle	Volumes	and Adj	ustments	3		
Major Street Movements	_ 1	2	3	4	5	6	
,	L	T	R	L	T	R	
Volume				9	7.5.7		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				2	208		
				9			
Hourly Flow Rate, HFR					831		
Percent Heavy Vehicles				12			
Median Type/Storage	Undi	vided		/			
RT Channelized?				_			
Lanes				0	2		
Configuration				LT	T		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	T	R	
	-	-		_	-		
Volume	39						
Peak Hour Factor, PHF	1.00						
Peak-15 Minute Volume	10						
Hourly Flow Rate, HFR	39						
=	33						
Percent Heavy Vehicles		0			0		
Percent Grade (%)	0 /01	-		,	U		,
Flared Approach: Exist RT Channelized	s?/Storac	le		/			/
Lanes	1						
Configuration	I						
P	edestriar	Volumes	and Ad	justment	.s		
Movements	13	14	15	16			
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	. 1.2	0	0			
rercent brockage	O	0	U	U			
		tream Si					
Prog.	Sat	Arrival	Green	-			)istance
Flow	Flow	Type	Time	Length	-		o Signal
vph	vph		sec	sec	kph	l	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: Shared in 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							-/
Movement	1	4	7	8	9	10	1.1	12
PIO VEIREITE	L	L	L	T	R	L	Ť	R
t(c,base)		4.1	7.1				<b>\</b>	
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)		12						
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	Jp Time C	alculat	ions 4	7	8	9	10	11	12	
		L	L	L	Т	R	L	Т	R	
t(f,base t(f,HV) P(HV)	;)	0.90	2.20 0.90 12	3.50	0.90	0.90	0.90	0.90	0.90	
t(f)			2.3	3.5						
Workshee	t 5-Effe	ct of (	Jpstream	m 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 n Exhibit on vehic	g (sec (sec) 16-11)	e)		n P					
Computat	ion 2-Pr	oportio	on of TV	WSC Int	ersecti V(	Moveme		Mo	vement 5 V(1,prot)	)
Smoothin Proporti Max plat Min plat Duration	ime, t(a in Factor on of co coned flooned floored floo	, F nflicti ow, V(c ow, V(c ked per	ing flow c,max) c,min) ciod, t			0.00	0		0.000	
Computat	ion 3-Pl	atoon E	Event Pe	eriods	Res	ult				
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 Pro	(3) cess tage II	$\overline{}$	
p(1) p(4) p(7) p(8) p(9) p(10) p(11)										
p(12) Computat	ion 4 an Stage Pro		1 L	4 L	7 L	8 T	9 R	10 L	11 12 T R	
V c,x				0	433					_//,_/
Px V c,u,x										
C r,x										



С	plat	., x

C plat, x			
Two-Stage Process			
7		0 1:	
Stage1 Stage2 Stage1	Stage2 Stage1	Stage2 Stage1	Stage2
V(c,x)			
s 3000			
P(x)			
V(c,u,x)			
( ) ( ) ( )			
C(r,x)			
C(plat,x)			
Worksheet 6-Impedance and Capacity E	quations		
Step 1: RT from Minor St.	9	12	
step 1. Ki from Minor St.	ý	12	
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity	4		
Probability of Queue free St.	1.00	1.00	
Step 2: LT from Major St.	4		
Conflicting Flows	0		
Potential Capacity	1560		
Pedestrian Impedance Factor	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			
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvm		0.99	
Movement Capacity		0.99	
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows	433		
Potential Capacity	584		
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 mvm		1.00	
Movement Capacity	581		
	t of Two-stage Ga	p Acceptance	
Step 3: TH from Minor St.	8	11	
Part 1 - First Stage			
Conflicting Flows	} /	\ \	
D	<i>i /</i>	1 1	/

1.00

1.00

Step 3: TH from Minor St.

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

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	
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			133			
Potential Capacity Pedestrian Impedance Factor			.00		1.00	
Maj. L, Min T Impedance factor		1			0.99	
Maj. L, Min T Adj. Imp Factor.					1.00	
Cap. Adj. factor due to Impeding Movement Capacity	g mvmnt		).99 581		1.00	
Results for Two-stage process:			· 			
a a results for two-stage process:						
Y .						
Ct		5	581			
Worksheet 8-Shared Lane Calculat	cions					
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph)	39 501					
Movement Capacity (vph) Shared Lane Capacity (vph)	581					
Worksheet 9-Computation of Effect	t of Flare	d Minor	Street	Approa	aches	
Movement	7	8	9	10	11	12
	L	T	R	L	Т	R
Csen	5Ω1					
C sep Volume	581 39		/	1		
Delay						
Q sep						
Q sep +1 round (Qsep +1)						
Todiid (goop 11)		- 1 - 1			11	/
n max						7
C sh						
SUM C sep	1					
C act					7	
		1			1_/	> [_
Worksheet 10-Delay, Queue Length	n, and Leve	el of Se	ervice		١ / (	
Movement 1 4	7	8	9	10	11	12
Lane Config LT	L	-	-	-\		<u></u>
v (vph) 9	39					
C(m) (vph) 1560	581					
v/c 0.01	0.07					
0.5 V. autous Jonath 0.00						
95% queue length 0.02 Control Delay 7.3	0.22 11.6					



LOS A B

Approach Delay 11.6 Approach LOS B

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

# 1.1.2.4 Interseção B – 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: B
Jurisdiction: DER/DF
Units: U. S. Metric

Units: U. S. Metric
Analysis Year: 2023
Project ID:
East/West Street: M2
North/South Street: M7
Intersection Orientation: EV

Intersection Orientation: EW Study period (hrs): 0.25

				and Adju	stmer			
Major Street:			astbou				estbound	
	Movement	1	2	3		4	5	6
		L	Т	R		L	T	R
olume						12	2003	
eak-Hour Fact	or, PHF					0.91	0.91	
ourly Flow Ra	te, HFR					13	2201	
ercent Heavy	Vehicles							
edian Type/Ŝt	orage	Undiv	rided		,	/		
T Channelized								
anes						0	2	
onfiguration						/ 1	LT T	
pstream Signa	1?		No				No	
inor Street:	Approach	No	orthbo	und		So	outhbound	i /
	Movement	7	8	9		10	11	12
		L	T	R )		L	Т	R
								1 L /
lume		29						
ak Hour Fact	or, PHF	1.00			-\			
ourly Flow Ra	te, HFR	29					_	
ercent Heavy	Vehicles	20			7 '			7
ercent Grade	(%)		0		7		0	
lared Approac	h: Exists?	/Storage	)		/			
anes		1						\
onfiguration		]						'
=								1 1
	Delay,	Queue Le	ength,	and Lev	el of	f Serv		
proach	EB	WB	N	orthboun	d		South	nbound
ovement	1	4	7	8	9	- 1	10 1	11 12
ane Config		LT	L					
(vph)		1.3	2.9					<del></del>
(m) (vph)		1560	207					
u) (vPII)		1000	201					



v/c 95% queue length 0.01 0.14 0.03 0.48 Control Delay 7.3 25.2 LOS Α D

Approach Delay 25.2 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:

Jurisdiction: DER/DF

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

East/West Street: North/South Street: M2 М7 Intersection Orientation: EW

Study period (hrs): 0.25

	_Vehicle	Volumes	and	Adjustment	cs		
Major Street Movements	_ 1	2	3	4	5	6	
	L	T	R	L	Т	R	
Volume				12	2003		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				3	550		
Hourly Flow Rate, HFR				13	2201		
Percent Heavy Vehicles							
Median Type/Storage RT Channelized?	Und	ivided		/			
Lanes				0	2		
Configuration				L7	гт		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	T	R	

Volume Peak Hour Factor, PHF 1.00 Peak-15 Minute Volume Hourly Flow Rate, HFR 29 Percent Heavy Vehicles
Percent Grade (%) 20 Flared Approach: Exists?/Storage RT Channelized Lanes

Configuration L

	_Pedestrian	Volumes	and Adj	justment	s	>	
Movements	13	14	15	16	_		
Flow (ped/hr) Lane Width (m)	0	0 3.6	0 3.6	0 3.6			
Walking Speed (m/sec) Percent Blockage			1.2	1.2			

0

	Up	stream Si	gnal Dat	a		
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 Left-Turn Through

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

					I	Movement	t 2	Movemen	nt 5
Shared :	ln volume	, majo	r th vel	nicles:				0	
Shared 3	ln volume	, majo	r rt vel	nicles:				0	
Sat flow	v rate, m	ajor ti	h vehic	les:				1700	
Sat flow	v rate, m	ajor r	t vehic	les:				1700	
Number o	of major	street	through	n lanes	:			2	
Workshee	et 4-Crit	ical G	ap and	Follow-	up Time	Calcula	ation		
	l Gap Cal	culati	on						
Movement	5	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)				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
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.2	6.6					
	2-stage								
	Jp Time C								
Movement	Ī.	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)				20					
			2.3	3.7					

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

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

Computation 3-Platoon Event Periods

Result

0.000

0.000



p(2) p(5) p(dom) p(subo) Constrained or uncons	strained?		0.000						ngomaria o m
Proportion unblocked for minor movements, p(x)	(1) Single-s Proces	-	(2) Two- Stage I	Stage Pr	(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		4 7 L L	8 T	9 R	10 L	11 T	12 R	-	
V c,x s Px V c,u,x	0	112	26					-	
C r,x C plat,x								_	
Two-Stage Process Stage1	7 Stage2 S	8 Stagel St	tage2 St	10 agel St	.age2 St	11 age1			
V(c,x) s P(x) V(c,u,x)	3000							-	
C(r,x) C(plat,x)								_	
Worksheet 6-Impedance	e and Capac	ity Equat	tions						
Step 1: RT from Minor	St.			9		12		-	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue				1.00	<u> </u>	1.00		-	
Step 2: LT from Major	s St.			4	_	1		-	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q i	free St.			0 1560 1.00 1560 0.99		1.00			$\overline{}$
Step 3: TH from Minor	St.			8		11			
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Probability of Queue	to Impedin	g mvmnt		1.00 0.99		1.00 0.99 1.00			
Step 4: LT from Minor	St.			7		10			
Conflicting Flows Potential Capacity				1126 209					)



Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00	1.00 0.99	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt	0.99	0.99 0.99	
Movement Capacity	207	0.99	
Worksheet 7-Computation of the Effect of	Two-stage Gap A	cceptance	-
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: 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 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	1126 209 1.00 0.99 207	1.00 0.99 0.99 0.99	
Results for Two-stage process:	4		
a Y		$ / \langle \ \ \ \ \ \  $	
t	207	7/7	)))[
Worksheet 8-Shared Lane Calculations			7)
Movement 7 L	8 9 T R	10 11 12 L T R	
Volume (vph) 29 Movement Capacity (vph) 207 Shared Lane Capacity (vph)			



Manager 1			7				1.0	11	10
Movement			, L	8 T		9 R	10 L	II T	12 R
			ь	1		K	ь	1	А
C sep			20	7					
Volume			29						
Delay									
Q sep									
Q sep +1									
round (Qsep +1)									
n max									
C sh									
SUM C sep									
n									
n C act									
	, Queue	Length,	, and Le	evel of	Servi				
C act	, Queue	Length,	, and Le	evel of	Servi	ce 10		11	12
C act Worksheet 10-Delay								11	12
C act Worksheet 10-Delay Movement Lane Config		4 LT	7 L					11	12
C act  Worksheet 10-Delay  Movement  Lane Config  v (vph)		4 LT	7 L					11	12
C act  Worksheet 10-Delay  Movement  Lane Config  v (vph) C(m) (vph)		4 LT 13 1560	7 L 29 207					11	12
C act Worksheet 10-Delay Movement Lane Config v (vph) C(m) (vph) v/c		13 1560 0.01	7 L 29 207 0.14					11	12
C act  Worksheet 10-Delay  Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue length		4 LT 13 1560 0.01 0.03	7 L 29 207 0.14 0.48					11	12
C act  Worksheet 10-Delay  Movement Lane Config  v (vph) (c (m) (vph) v/c 95% queue length Control Delay		4 LT 13 1560 0.01 0.03 7.3	7 L 29 207 0.14 0.48 25.2					11	12
C act  Worksheet 10-Delay  Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS		4 LT 13 1560 0.01 0.03	7 L 29 207 0.14 0.48	8				11	12
C act  Worksheet 10-Delay  Movement Lane Config  v (vph) (c (m) (vph) v/c 95% queue length Control Delay		4 LT 13 1560 0.01 0.03 7.3	7 L 29 207 0.14 0.48 25.2					11	12

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

# 1.1.2.5 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: Project ID: 2023

MOV01-MOV05-MOV07

East/West Street: North/South Street: MOV08 Intersection Orientation: EW

Study period (hrs): 1.00

\_Vehicle Volumes and Adjustments\_ Major Street: Approach Eastbound Westbound 2 T 3 5 T | 4 6 Movement l L L R



Volume		39	1790						
Peak-Hour Factor	PHF	0.91	0.91						
Hourly Flow Rate,	HFR	42	1967						
Percent Heavy Vel	nicles								
Median Type/Stora	age	Undiv	ided			/			
RT Channelized?	_								
Lanes		0	2						
Configuration		L	ТТ						
Upstream Signal?			No				No		
-									
Minor Street: Ap	proach	No	rthbou	ind		S	outhbo	und	
Mo	ovement	7	8	9		10	11	12	
		L	T	R	1	L	Т	R	
Volume						9			
Peak Hour Factor,	PHF					0.91			
Hourly Flow Rate,	HFR					9			
Percent Heavy Vel	nicles					12			
Percent Grade (%)	ı		0				0		
Flared Approach:									
riarca Approacii.	Exists?	/Storage			/				/
Lanes	Exists?	/Storage			/	1			/
	Exists?	/Storage			/		L		/
Lanes	Exists?	/Storage			/				/
Lanes							L		/
Lanes Configuration		/Storage	ngth,				L 		
Lanes Configuration Approach	Delay,	Queue Le WB	ngth,	rthboun	d		L rvice	uthboun	
Lanes Configuration	Delay,	Queue Le	ngth,				L 	uthboun 11	d 12
Lanes Configuration Approach	Delay,	Queue Le WB	ngth,	rthboun	d		L rvice		
Approach Movement Lane Config	Delay, EB 1 LT	Queue Le WB	ngth,	rthboun	d		L viceSo 10 L		
Approach Movement Lane Config  v (vph)	Delay, EB 1 LT	Queue Le WB	ngth,	rthboun	d		EviceSo		
Approach Movement Lane Config  v (vph) C(m) (vph)	Delay,EB1LT	Queue Le WB	ngth,	rthboun	d		EviceSo 10 L 9 229		
Approach Movement Lane Config  v (vph) C(m) (vph) v/c	Delay, EB 1 LT 42 1566 0.03	Queue Le WB	ngth,	rthboun	d		L SviceSo 10 L 9 229 0.04		
Approach Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue length	Delay, EB 1 LT 42 1566 0.03 0.08	Queue Le WB	ngth,	rthboun	d		L SviceSo 10 L 9 229 0.04 0.12		
Approach Movement Lane Config  v (vph) C(m) (vph) v/c	Delay, EB 1 LT 42 1566 0.03	Queue Le WB	ngth,	rthboun	d		L SviceSo 10 L 9 229 0.04		
Approach Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue length	Delay, EB 1 LT 42 1566 0.03 0.08	Queue Le WB	ngth,	rthboun	d		L SviceSo 10 L 9 229 0.04 0.12		
Approach Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue length Control Delay	Delay, EB 1 LT 42 1566 0.03 0.08 7.4	Queue Le WB	ngth,	rthboun	d		Tvice		
Approach Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS	Delay, EB 1 LT 42 1566 0.03 0.08 7.4	Queue Le WB	ngth,	rthboun	d		Tvice	11	

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: 2023 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 2 1 3 4 6 Т R L Volume 39 1790 0.91 Peak-Hour Factor, PHF 0.91 Peak-15 Minute Volume 492 11 Hourly Flow Rate, HFR 42 1967 Percent Heavy Vehicles --Median Type/Storage Undivided RT Channelized?



Janes Configuration		0	LT T				N7 -				
Jpstream Signal?  Minor Street Mov		7	No 8		)		No 11	12			
.12 302000 1101		L	Т		?	L	Т	R			
olume Peak Hour Factor	- DUF					9 0.91					
Peak-15 Minute V	/olume					2					
Hourly Flow Rate Percent Heavy Ve	ehicles					9 12					
Percent Grade (% Flared Approach:		s?/Stora	0 age			/	0		/		
RT Channelized Lanes						1					
Configuration						L					
	P	edestria			_		s				
Movements		13	; 1	L 4	15	16					
Flow (ped/hr) Lane Width (m)		0 3.		) 3.6	0 3.6	0 3.6					
Walking Speed (m		1.	. 2 1	1.2	1.2	1.2					
Percent Blockage		0			0	0					
				n Signa							
	Prog. Flow	Sat Flow	Arriv Type		Green Time	Cycle Length	Pro Spe		Distance to Signal		
	vph	vph	21		sec	sec	-	h	meters		
Through S5 Left-Turn Through				- of Do	.10 +	o Możom	C+ no				
S5 Left-Turn	for Cor	mputing	Effect	of De		o Major ent 2		eet Ve			
S5 Left-Turn Through  Worksheet 3-Data	e, major	th vehi	cles:	c of De	Movem						
S5 Left-Turn Through  Worksheet 3-Data  Shared ln volume Shared ln volume	e, major	th vehi	cles:	of De	Movem	ent 2					
Shared in volume Shared in volume Stared in volume Stared in volume Start flow rate, man at flow rate,	e, major e, major najor th	th vehi rt vehi vehicle vehicle	cles: cles: es:		Movem 0 0	ent 2					
Shared In volume Shared In volume Sat flow rate, mumber of major	e, major e, major najor th najor rt street t	th vehi rt vehi vehicle vehicle through	cles: cles: es: es: lanes:	:	0 0 170 170 2	0 0	Мс				
St Left-Turn Through  Worksheet 3-Data  Shared in volume Shared in volume Sat flow rate, m Sat flow rate, m Sumber of major  Worksheet 4-Crit  Critical Gap Cal	e, major e, major najor th najor rt street t	th vehi rt vehicle vehicle through	cles: cles: es: es: lanes:	: up Time	Movem 0 0 170 170 2	ent 2 0 0 ulation	Mo	ovemer	at 5		
S5 Left-Turn Through  Worksheet 3-Data  Shared ln volume Shared ln volume Sat flow rate, m Sat flow rate, m Sumber of major  Worksheet 4-Crit  Critical Gap Cal	e, major e, major najor th najor rt street t	th vehi rt vehi vehicle vehicle through	cles: cles: es: es: lanes:	:	0 0 170 170 2	0 0	Mo				
S5 Left-Turn Through  Worksheet 3-Data  Shared ln volume Shared ln volume Sat flow rate, m Sat flow rate, m Sumber of major  Worksheet 4-Crit  Critical Gap Cal  Movement  C(c,base) C(c,hv)	e, major e, major th najor th street t cical Gap	th vehi rt vehi vehicle vehicle through  p and Fo	cles: cles: es: es: lanes:	: up Time	Movem 0 0 170 170 2	0 0 0 ulation 10 L	Mo	ovemer	12		
S5 Left-Turn Through  Worksheet 3-Data  Shared ln volume Shared ln volume Sat flow rate, m Sat flow rate, m Sumber of major  Worksheet 4-Crit  Critical Gap Cal Movement  t(c,base) t(c,hv) P(hv)	e, major e, major th major rt street t  tical Gap  Lculation 1 L	th vehi rt vehi vehicle vehicle through  p and Fo  1.00	cles: cles: es: es: lanes:	: up Time 8 T	0 0 170 170 2 Calc	0 0 0 ulation 10 1 7.1 0 1.0	1 0 1	1 T	12 R		
S5 Left-Turn Through  Worksheet 3-Data  Shared in volume Shared in volume Shared in volume Sat flow rate, m Number of major  Worksheet 4-Crit  Critical Gap Cal Movement  t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade	e, major e, major th najor rt street t  cical Gap  Cculation 1 L  4.1 1.00	th vehi rt vehi vehicle vehicle through  p and Fo  1.00	cles: ccles: cles: ps: cles: c	: up Time 8 T	0 0 170 170 2 • Calc	0 0 0 ulation 10 1.0 0 1.0 0 1.2 0 0.2 0 0.0	10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ovemer	12 R		
S5 Left-Turn Through  Worksheet 3-Data  Shared ln volume Shared ln volume Sat flow rate, m Sat flow rate, m Sat flow rate, m Sat flow rate, m Critical Gap Cal Movement  t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage	e, major e, major th major rt street t  cical Gap  Lculation 1 L  4.1 1.00	th vehi rt vehi vehicle vehicle through  p and Fo  1.00	7 L 1.00 0.20 0.00 0.00	8 T 1.00 0.20 0.00	0 0 170 170 2 e Calce 9 R 1.0 0.1 0.0	0 0 0 ulation 10 1.0 1.0 0 0.2 0 0.0 0 0.7 0 0.0	100 100 CC 000 C	1 T	12 R 1.00 0.10 0.00		
S5 Left-Turn Through  Worksheet 3-Data  Shared ln volume Shared ln volume Sat flow rate, m Sat flow rate, m Sumber of major  Worksheet 4-Crit  Critical Gap Cal  Movement  C(c,base) C(c,hv) P(hv) C(c,g) Percent Grade C(3,lt) C(c,T): 1-stage 2-stage	e, major e, major th major rt street t  cical Gap  Lculation 1 L  4.1 1.00	th vehi rt vehi vehicle vehicle through  p and Fo  1.00	Cles: ccles: cs: es: lanes: lanes: 1.00 0.20 0.00	**************************************	0 0 170 170 2 e Calce 9 R	0 0 0 ulation 10 1 0 1.0 12 0 0.2 0 0.0 0 0.7 0 0.0 0 0.1	100 1100 000 000 000 000 000 000 000 00	1 T	12 R 1.00 0.10 0.00		
S5 Left-Turn Through  Worksheet 3-Data  Shared ln volume Shared ln volume Sat flow rate, m Sat flow rate, m Sat flow rate, m Critical Gap Cal Movement  t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage 2-stage	e, major e, major th najor th street t  cical Gap  Lculation 1 L  4.1 1.00	th vehi rt vehi vehicle vehicle through  p and Fo  1.00	7 L 1.00 0.20 0.00 0.00	8 T 1.00 0.20 0.00	0 0 170 170 2 e Calce 9 R 1.0 0.1 0.0	0 0 0 ulation 10 1.0 1.0 0 0.2 0 0.0 0 0.7 0 0.0	100 1100 000 000 000 000 000 000 000 00	1 T	12 R 1.00 0.10 0.00		
S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m	e, major e, major the major rt street to tical Gap  Loulation 1 1 1.00  0.00 e 0.00 e 0.00 e 0.00 e 4.2 e	th vehi rt vehi vehicle vehicle through  p and Fo  1.00  0.00 0.00  ions	7 L 1.00 0.20 0.00 1.00	Exp Time  8 T  1.00 0.20 0.00 0.00 1.00	Movem  0 0 170 170 2  e Calc  9 R  1.0 0.1 0.0 0.0	0 0 0 0 ulation 10 1.0 1.0 0 0.2 0 0.2 0 0.0 0 0.7 0 0.0 0 0.5	100 100 000 000 000 000 000 1100 000 00	1 T 00	12 R 1.00 0.10 0.00 0.00		~ <i>&lt;</i>
S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m	e, major e, major the major rt street to tical Gap  Loulation 1 L 4.1 1.00  0.00 0.00 0.00 0.00 0.00 0.4.2	th vehi rt vehi vehicle vehicle through  p and Fo  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 0 170 170 2 e Calce 9 R 1.0 0.1 0.0	0 0 0 ulation 10 1 0 1.0 12 0 0.2 0 0.0 0 0.7 0 0.0 0 0.1	100 100 000 000 000 000 000 1100 000 00	1 T	12 R 1.00 0.10 0.00		
S5 Left-Turn Through  Worksheet 3-Data  Worksheet 3-Data  Shared ln volume Sat flow rate, m Sat flow rate, m Number of major  Worksheet 4-Crit  Critical Gap Cal 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	e, major e, major th major rt street t  cical Gap  Lculation 1 L  4.1 1.00  0.00 e 0.00 e 0.00 e 4.2 e  Calculat:	th vehi rt vehi vehicle vehicle through  p and Fo  1.00  0.00 0.00  ions 4	7 L 1.00 0.20 0.00 1.00	: 8 T 1.00 0.20 0.00 1.00	Movem 0 0 170 170 2 e Calce 9 R 1.0 0.1 0.0 0.0 9	0 0 0 ulation 10 1,0 1,0 0 0.0 0 0.0 0 0.7 0 0.0 0 1.0 6.5	100 1100 000 000 000 000 1100 1100 110	1 T 00 0.20 0.00	12 R 1.00 0.10 0.00 0.00		
S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m	e, major e, major th najor rt street t  cical Gap  Lulation 1 L  4.1 1.00  0.00 e 0.00 e 0.00 e 4.2 e  Calculat:	th vehi rt vehi vehicle vehicle through  p and Fo  1.00  0.00 0.00  ions 4 L	7 L 1.00 0.20 0.00 1.00	: 8 T 1.00 0.20 0.00 1.00	Movem 0 0 170 170 2 e Calce 9 R 1.0 0.1 0.0 0.0 9	0 0 0 0 ulation 10 1.0 0.2 0 0.2 0 0.0 0 0.7 0 0.0 0 1.0 6.5	Mc	1 T 00 0.20 0.00	12 R 1.00 0.10 0.00 0.00		
Shared In volume Shared In volume Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Sumber of major  Worksheet 4-Crit Critical Gap Cal Movement  C(c,base) C(c,hv) C(c,hv) C(c,c) Cercent Grade C(3,lt) C(c,T): 1-stage C-stage C(c,T): 1-stage C-stage C(c,T): 1-stage C-stage C(c,T): 1-stage C(c,T): 1-st	e, major e, major the major rt street to stree	th vehi rt vehi vehicle vehicle through  p and Fo  1.00  0.00 0.00  ions 4 L	7 L 1.00 0.20 0.00 1.00	: 8 T 1.00 0.20 0.00 1.00	Movem 0 0 170 170 2 e Calce 9 R 1.0 0.1 0.0 0.0 9 R	0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0	11 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 T 00 ).20 ).00 00	12 R 1.00 0.10 0.00 0.00 0.00		
Shared In volume Shared In volume Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Sumber of major  Worksheet 4-Crit Critical Gap Cal Movement  C(c,base) C(c,hv) C(c,g) Percent Grade C(3,lt) C(c,T): 1-stage 2-stage C(c,T): 1-stage C-stage Company Comp	e, major e, major the major rt street to stree	th vehi rt vehi vehicle vehicle through  p and Fo  1.00  0.00 0.00  ions 4 L	7 L 1.00 0.20 0.00 1.00	: 8 T 1.00 0.20 0.00 1.00	Movem 0 0 170 170 2 e Calce 9 R 1.0 0.1 0.0 0.0 9 R	0 0 0 0 ulation 10 1.0 0.2 0 0.2 0 0.0 0 0.7 0 0.0 0 1.0 6.5	11 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 T 00 ).20 ).00 00	12 R 1.00 0.10 0.00 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 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 Movement 1 4 8 9 10 11 12 Т R Т L L L L R V c,x 1067 s Рx V c,u,x Cr,x C plat,x Two-Stage Process 11 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		
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		1566
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1566
Probability of Queue free St.	1.00	0.97
Maj L-Shared Prob Q free St.		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		1067
Potential Capacity		235
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.97	
Maj. L, Min T Adj. Imp Factor.	0.98	
Cap. Adj. factor due to Impeding mvmnt	0.98	0.97
Movement Capacity		229

Worksheet 7-Computation of the Effect of Two-stage  $\operatorname{Gap}$  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 1.00 0.97

1.00

1.00

10



## Movement Capacity

Part 2 - Second Stage						
Conflicting Flows						
Potential Capacity Pedestrian Impedance Factor						
Cap. Adj. factor due to Impeding mvm	nnt					
Movement Capacity						
Part 3 - Single Stage					1067	
Conflicting Flows					1067	
Potential Capacity		1	0.0		235	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor			00 ).97		1.00	
Maj. L, Min T Adj. Imp Factor.			).98			
Cap. Adj. factor due to Impeding mvm	nnt		.98		0.97	
Movement Capacity					229	
Results for Two-stage process:						
a Y						
C t					229	
Morkshoot 8-Sharod Tana Calaulatiana						
Worksheet 8-Shared Lane Calculations						
Movement	7	8	9	10	11	12
	L	Т	R	L	Т	R
Volume (vph)				9		
Movement Capacity (vph)				9 229		
Shared Lane Capacity (vph)				227		
Markahaat Q-Computation of Effect of	= Elaw-	d Min	C+	+ 70000	ahaa	
Worksheet 9-Computation of Effect of	. rıare	a Minor	stree	L Approa	ucnes	
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
				220		
C sep Volume				229 9		
volume Delay				IJ		
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh						
SUM C sep						
n C act						
C act						
Worksheet 10-Delay, Queue Length, an	nd Leve	ı of Se	ervice			
Movement 1 4 7	7	8	9	10	11	12
Lane Config LT				L		
(				0		
v (vph) 42 C(m) (vph) 1566				9 229		
v/c (m) (vpn) 1566 v/c 0.03		7	/	0.04	\	
95% queue length 0.08		ا ل		0.04	1 6	/
Control Delay 7.4				21.4		
LOS A	(			C C		
Approach Delay					21.4	\
Approach LOS					70	
					1_/	$\rightarrow$ $\vdash$
Worksheet 11-Shared Major LT Impedan	nce and	Delan			\ /	
worksheet ii-shared Major Li impedan	ice alla	петаў	<u> </u>		-	
			Moveme	nt 2	Moveme	nt 5
- ( )				_		10
o(oj) v(il), Volume for stream 2 or 5			0.9	1	1.0	10

0.97

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)



 $\mbox{d}\left(\mbox{M,LT}\right)$  , Delay for stream 1 or 4 7.4  ${\rm N}\text{,}\ {\rm Number}$  of major street through lanes d(rank,1) Delay for stream 2 or 5

## 1.1.2.6 Interseção C – 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: Jurisdiction: DER/DF

Units: U. S. Metric Analysis Year: 2023

Project ID:

East/West Street: MOV01-MOV05-MOV07
North/South Street: MOV08

Intersection Orientation: EW Study period (hrs): 1.00

Major Street:		cle Volı. Ea:	stbound			_	Westbound	d	
_	Movement	1	2	3		4	5	6	
		L	T	R	İ	L	Т	R	
Volume		29	703						
Peak-Hour Fact	cor, PHF	0.91	0.91						
Hourly Flow Ra	ate, HFR	31	772						
Percent Heavy	Vehicles	21							
Median Type/St RT Channelized		Undiv	ided			/			
Lanes		0	2						
Configuration		L'	гт						
Upstream Signa	al?		No				No		
Minor Street:	Approach	No	rthboun	d			Southbour	nd	
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume						12			
Peak Hour Fact	cor, PHF					0.9	91		
Hourly Flow Ra	ate, HFR					13			
Percent Heavy	Vehicles					0			
Percent Grade	(%)		0				0		
Flared Approac	ch: Exists?/	'Storage			/				/
Lanes							1		
Configuration							L		
						$ \mathcal{I} $			
	Delay, Q					f S∈			
Approach	EB	WB		thboun				thbound	
Movement	1	4	7	8	9		10	11 /	12
Lane Config	LT	I					L	11	/
v (vph)	31						13		
C(m) (vph)	1507				- \		560		
v/c	0.02				_ \		0.02	_	
95% queue leng	gth 0.06						0.07	<b>&gt;</b>	
Control Delay	•						11.6	1	
LOS	A						B	1 /	> -
Approach Delay	J							11.6	/
Approach LOS								В	
11								-	1
									1

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: Jurisdiction:

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

Project ID:

East/West Street: MOV01-MOV05-MOV07 North/South Street: MOV08

Intersection Orientation: EW

Study period (hrs): 1.00

	_Vehicle	Volumes	and A	djustmen	ts		
Major Street Movements	_ 1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	29	703					
Peak-Hour Factor, PHF	0.91	0.91					
Peak-15 Minute Volume	8	193					
Hourly Flow Rate, HFR	31	772					
Percent Heavy Vehicles	21						
Median Type/Storage	Und:	ivided		/			
RT Channelized?							
Lanes	0	2					
Configuration	]	T T					
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	T	R	
Volume				12			
Peak Hour Factor, PHF				0.91			
Peak-15 Minute Volume				3			
Hourly Flow Rate, HFR				13			
Percent Heavy Vehicles				0			
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storag	ge		/			/
RT Channelized							
Lanes				1			
Configuration				L			

	Pedestrian	Volumes	and Ad	justments	
Movements	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	

	Up	stream Si	gnal Dat	a		
Prog.	Sat	Arrival				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

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	.)	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		
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	4.3					6.4		
	2-stage								
Follow-U	p Time C	alcula	tions						
Movement		1	4	7	8	9	10	11	12
		L	L	L	T	R	L	T	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)		21					0		
t(f)		2.4					3.5		

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal
Movement 2 Movement 5

V(t) V(1,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)
g(q)

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

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

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)



n (0)									
p(9) p(10) p(11)									
0 (12)									
Computation 4 and 5 Single-Stage Process									
Novement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R	
7 C, X	0					448			_
c,u,x									
r,x plat,x									_
wo-Stage Process									_
	7 Stage2	Stage1	8 Stage	e2 Sta	10 ge1 St	tage2 S	11 Stage1		
(C, X)					2/	000			_
s ?(x) ?(c,u,x)					31	300			
C(r,x) C(plat,x)									_
Jorksheet 6-Impedance	and Capa	acity Ed	guation						_
tep 1: RT from Minor					9		12		_
Conflicting Flows									_
Potential Capacity Pedestrian Impedance	Factor			1	.00		1.00		
Novement Capacity Probability of Queue	free St.			1	.00		1.00		
Step 2: LT from Major	St.				4		1		_
Conflicting Flows							0		_
Potential Capacity				1	0.0		1507		
Pedestrian Impedance Movement Capacity	Factor			1	.00		1.00 1507		
Probability of Queue				1	.00		0.98		
Maj L-Shared Prob Q f	ree St.						0.98		
Step 3: TH from Minor	St.				8		11		_
Conflicting Flows Potential Capacity									_
Pedestrian Impedance		_			.00		1.00		
Cap. Adj. factor due Movement Capacity	to Imped:	ing mvmr	nt	0	.98		0.98		
Probability of Queue	free St.			1	.00		1.00		
Step 4: LT from Minor	St.			7	7		10		<u> </u>
Conflicting Flows							448		- \
Potential Capacity Pedestrian Impedance	Factor			1	.00		572 1.00		
Maj. L, Min T Impedan		r			.98		1.00	<u></u>	
Maj. L, Min T Adj. Im	p Factor	•			.98		/		
Cap. Adj. factor due Movement Capacity	to Imped:	ing mvmr	nt	0	.98		0.98 560	>	///
Vorksheet 7-Computati	on of the	e Effect	t of Tw	ıo-stag	e Gap i	Acceptar	nce		ナ
Step 3: TH from Minor	St.				8		11		_//
Part 1 - First Stage							<del></del>		-/ {
Conflicting Flows Potential Capacity							- 1		_
Pedestrian Impedance	Factor								
inpoduited									



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

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 mymnt Movement Capacity

Part 3 - Single Stage Conflicting Flows

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

Cap. Adj. factor due to Impeding mymnt Movement Capacity

Part 3 - Single Stage Conflicting Flows 448 Potential Capacity 572 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 560 Results for Two-stage process:

a y C t 560

Worksheet 8-Shared Lane Calculations

n max

Movement 8 11 12 10 Т L L R Т R 13 Volume (vph) Movement Capacity (vph) 560 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 560 Volume 13 Delay Q sep Q sep +1 round (Qsep +1)



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) 31 13 C(m) (vph) 1507 560 0.02 0.02 95% queue length 0.06 Control Delay 7.4 11.6 LOS Α Approach Delay 11.6 Approach LOS

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 d(rank,1) Delay for stream 2 or 5	2	

## 1.1.2.7 Interseção D – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

	TWO-WAY STOP CONTI	ROL SUMMARY	
Analyst:	Progeplan		
Agency/Co.:			
Date Performed:	05/06/2023		
Analysis Time Period:			
Intersection:	D		
Jurisdiction:	DER/DF		
Units: U. S. Metric	2222		
Analysis Year: Project ID:	2023		
East/West Street:	MOV01-MOV05-MOV07		
North/South Street:			
Intersection Orientat	ion: EW	Study period (hrs)	: 1.00
	Vehicle Volumes and	d Adjustments	
Major Street: Approa	ch Eastbound	Westbound	
Moveme	ent 1 2	3   4 5	6/
	L T	R L T	R
Volume	1790	10	
Peak-Hour Factor, PHF		0.91	
Hourly Flow Rate, HFR		10	
Percent Heavy Vehicle			>
Median Type/Storage	Undivided		
RT Channelized?			
Lanes	2 (		
Configuration	T TI		$^{\prime}$ $^{\prime}$
Upstream Signal?	No	No	( )
Minor Street: Approa			
Moveme	ent 7 8	9   10 11	12
	L T	R   L T	R
Volume		3	
Peak Hour Factor, PHF		0.91	
Hourly Flow Rate, HFR	i.	3	



Percent Heavy Vehicles Percent Grade (%) 34

0 Flared Approach: Exists?/Storage

1 Lanes Configuration R

Approach	EB	WB			Northbound	l		S	outhbou	nd
Movement	1	4		7	8	9		10	11	12
Lane Config						R	-			
v (vph)						3				
C(m) (vph)						261				
v/c						0.01				
95% queue length						0.03				
Control Delay						19.0				
LOS						С				
Approach Delay					19.0					
Approach LOS					С					

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: D DER/DF Jurisdiction:

Units: U. S. Metric

Analysis Year: 2023

Project ID:

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

Intersection Orientation: EW

Study period (hrs): 1.00

	_Vehicle '	Volumes	and Ad	justmen	ts			
Major Street Movements	_ 1	2	3	4	5	6		
	L	Т	R	L	Т	R		
Volume		1790	10					
Peak-Hour Factor, PHF		0.91	0.91		/ \			
Peak-15 Minute Volume		492	3		/ \			
Hourly Flow Rate, HFR		1967	10 /		L			
Percent Heavy Vehicles			(					
Median Type/Storage	Undi	vided		1		_ /	/	
RT Channelized?			\			\ /		
Lanes		2	0 /	/		1 1	/ \	
Configuration		T T	R 🚽			1 5	\ /	
Upstream Signal?		No			No			
-			1	\				
Minor Street Movements	7	8	9	10	11	12		
	L	T	R	L	T	R		
								<b>/</b>
Volume			3			\ /		- \
Peak Hour Factor, PHF			0.91			$\bigcirc$ 1	/ \ \ \ \ \	L
Peak-15 Minute Volume			1				\ <del>\ \ \ \</del>	
Hourly Flow Rate, HFR			3			\	. \	
Percent Heavy Vehicles			34		\ \		(	
Percent Grade (%)		0			0			
Flared Approach: Exist	s?/Storage	9		/				
RT Channelized			No			<b>\</b>		
Lanes			1				1	
Configuration		R						
						l		



Movements			.3	14	15	justment 16			
Flow (ped/hr)		(	)	0	0	0			
Lane Width (m)			3.6	3.6	3.6	3.6			
Walking Speed (m	/sec)		.2	1.2	1.2	1.2			
Percent Blockage		(	)	0	0	0			
		Ţ	Jpstre	eam Si	gnal Da	ta			
	Prog. Flow	Sat Flow		rival	Green Time	-	-	Distance	
	vph	vph		ype	sec	Length sec	kph	to Signal meters	
S2 Left-Turn									
Through									
S5 Left-Turn Through									
Norksheet 3-Data	for Co	omputing	g Effe	ect of					
					Move	ment 2	Moveme	ent 5	
Shared ln volume Shared ln volume									
Sat flow rate, m	_			٠.					
Sat flow rate, m	ajor rt	vehic	es:						
Number of major	street	through	ı lane	es:					
orksheet 4-Crit	ical G	ap and I	Follor	w-up T	ime Cal	culation			
Critical Gap Cal									
Movement	1	4	7	8	9		11	12	
	L	L	L	Т	R	L	Т	R	
(c,base)					6.3	2			
(c, hv)	1.00	1.00	1.0	0 1.		00 1.0	0 1.00	1.00	
?(hv)			0.20	0.:	34 20 0.1	10 0.2	0 0.20	0.10	
t(c,g) Percent Grade			0.00					0.00	
(3,1t)					0.				
(c,T): 1-stage		0.00	0.00					0.00	
2-stage t(c) 1-stage	0.00	0.00	1.00	0 1.0	00 0. 6.		0 1.00	0.00	
2-stage					0.	J			
Follow-Up Time C	alculat	ions							
Movement	1	4	7	8 T	9	10	11	12	
	L	L	L	т	R	L	Т	R	
t(f,base)	0 00	0 00	0 0	n n	3.		0 00	0.00	
t(f,HV) P(HV)	0.90	0.90	0.90	0.	90 0.1 34	/	0.90	0.90	
t(f)					3.				
					$\overline{}$				
Worksheet 5-Effe	ct of (	Jpstrear	n Sign	nals				( /	
Computation 1-Qu	eue Cle	earance	Time	at Up		-			
					Mov V(t)	ement 2 V(l,pro		vement 5 V(1,prot)	
V prog								$\rightarrow$	
Total Saturation	Flow H	Rate, s	(vph	)		7			
Arrival Type						1 /		\ / / _	
Effective Green,		=)						'	
Cycle Length, C									
Kp (from Exhibit								1 1	
Rp (from Exhibit Proportion vehic			n gr	een P			\	\ \	
roportion vehic (q1)			on gre	een P				7 //	
			on gre	een P				1/	

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) (see Smoothing Factor, F	ec)										
Proportion of conflic	ting flo	ow, f									
Max platooned flow, N		,									
Min platooned flow, V	/(c,min)										
Duration of blocked p		:(p)		0 0							
Proportion time block	kea, p			0.0	000		0.000				
Computation 3-Platoor	n Event I	Periods	R€	esult					_		
p(2)			0.	.000					_		
p(5)			0.	.000							
p (dom)											
p(subo) Constrained or uncons	strained?	?									
Proportion									_		
unblocked	(1	L)		(2)		(3)					
for minor	Single	e-stage		Two-S	Stage Pi	rocess					
movements, p(x)	Prod	cess	St	tage I		Stage 1	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	L	L	T	R	L	T	R			
V c,x					988				_		
S											
Px V c,u,x											
									_		
C r,x C plat,x											
Two-Stage Process									_		
_	7		8		10		11				
Stagel	Stage2	Stagel	Stag	ge2 Sta	agel St	tage2 S	Stage1	Stage2			
V(c,x)									_		
P(x)					_	_					
V(c,u,x)						\					
C(r,x)						_			_		
C(plat,x)						~~`					
				<del></del>			\ <del>\</del>		_		
Worksheet 6-Impedance	and Car	pacity E	quatio	ons			11	/	\		
Step 1: RT from Minor	St.				9		12	<b>—</b>	- \		
Conflicting Flows					988		<u> </u>				
Potential Capacity					261		/		//		
Pedestrian Impedance	F'actor				L.00		1.00	>  -	///	\	
Movement Capacity Probability of Queue	free St.				261 0.99		1.00		11	1 [	
Step 2: LT from Major	St.				4		1		- ナ		
Conflicting Flows							_ \		_//		J
Potential Capacity Pedestrian Impedance	Factor			1	1.00		1.00				
Movement Capacity	ractor						1.00				
Probability of Queue	free St.			1	1.00		1.00		_	1	
Maj L-Shared Prob Q f	ree St.									)	
								_			



Step 3: TH from Minor St.	8	11	_
conflicting Flows			_
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt	1.00	1.00	
ovement Capacity robability of Queue free St.	1.00	1.00	
tep 4: LT from Minor St.	7	10	_
onflicting Flows otential Capacity edestrian Impedance Factor aj. L, Min T Impedance factor	1.00	1.00	_
aj. L, Min T Adj. Imp Factor. ap. Adj. factor due to Impeding mvmnt ovement Capacity	1.00	1.00	
Vorksheet 7-Computation of the Effect of	Two-stage Gap Acc	eptance	_
tep 3: TH from Minor St.	8 8	11	_
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement 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			_
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Rovement Capacity	1.00	1.00	_
Result for 2 stage process:			_
robability of Queue free St.	1.00	1.00	_
tep 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	5		
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity		300	
	— /		- 446
art 3 - Single Stage onflicting Flows otential Capacity edestrian Impedance Factor laj. L, Min T Impedance factor	1.00	1.00	// _



Results for Two-stage process: У С t Worksheet 8-Shared Lane Calculations Movement 8 9 10 11 12 Т R Τ R Volume (vph) Movement Capacity (vph) 261 Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 10 12 L Т R L Τ R C sep 261 Volume 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 4 8 9 Movement 1 10 11 12 Lane Config R v (vph) 3 C(m) (vph) 261 v/c 0.01 95% queue length 0.03 Control Delay 19.0 LOS С Approach Delay 19.0 Approach LOS С

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

### 1.1.2.8 Interseção D – Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

Movement 2

1.00

Movement 5

1.00

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



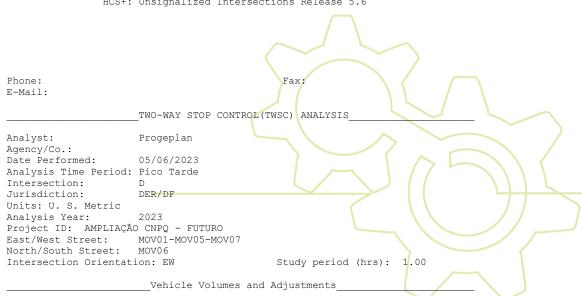
Analysis Year: 2023

Project ID: AMPLIAÇÃO CNPQ - FUTURO East/West Street: MOV01-MOV05-MOV07 North/South Street: MOV06

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

Veh	icle Volu	mes and	Adjus	tme	nts			
Major Street: Approach	Eas	tbound				Westbound		
Movement	1	2	3		4	5	6	
	L	Т	R		L	T	R	
Volume		703	6					
Peak-Hour Factor, PHF		0.91	0.91					
Hourly Flow Rate, HFR		772	6					
Percent Heavy Vehicles								
Median Type/Storage	Undivi	ded			/			
RT Channelized?	OHOLVI	aca			,			
Lanes		2 0						
Configuration		T TR						
2						27 -		
Upstream Signal?		No				No		
Minan Character 2	27	± 1- 1 1				Southbound	,	
Minor Street: Approach		thbound						
Movement	7	8	9	!	10	11	12	
	L	T	R	ı	L	Т	R	
Volume			8					
Peak Hour Factor, PHF			0.91					
Hourly Flow Rate, HFR			8					
-			0					
Percent Heavy Vehicles		0	U			0		
Percent Grade (%)	/ a ·	U		,		U		,
Flared Approach: Exists?	Storage	_		/				/
Lanes		1						
Configuration		R						
Delay	Queue Len	oth and	d T.evre	1 0	f S4	arvice		
Approach EB	WB		hbound		_ 50		bound	
Movement 1	4 1		8	9			.1	12
Lane Config	4	,	0	R		1 10 1	. 1	12
Lane Config	ı			L		I		
v (vph)				8				
C(m) (vph)				66	4			
v/c				0.0	0.1			
95% queue length				0.				
Control Delay				10				
-					. J			
LOS			10 =	В				
Approach Delay			10.5					
Approach LOS			В					

HCS+: Unsignalized Intersections Release 5.6





Major Street Movements	1 L	2 T	3 R	4 L	5 T	6 R	
Volume Peak-Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicles Median Type/Storage RT Channelized? Lanes Configuration Upstream Signal?	Undiv	703 0.91 193 772  vided 2 C T TF		/	 No		
Minor Street Movements	7 L	8 T	9 R	10 L	11 T	12 R	
Volume Peak Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Flared Approach: Exists? RT Channelized Lanes Configuration	/Storage	0 e 1 R	8 0.91 2 8 0	/	0		/
PecPec	lestrian 13	Volumes	and Ad	justmen 16	ts		
Flow (ped/hr) Lane Width (m) Walking Speed (m/sec) Percent Blockage	0 3.6 1.2 0	0 3.6 1.2 0	0 3.6 1.2 0	0 3.6 1.2 0			
	Upst	ream Si	gnal Da	t.a			
Prog. Flow vph		Arrival Type	Green Time sec		-	d to	tance Signal ters
S2 Left-Turn Through S5 Left-Turn Through							
Worksheet 3-Data for Comp	outing E	ffect of					
			Move	ment 2	Mov	ement 5	
Shared In volume, major to Shared In volume, major to Sat flow rate, major the Sat flow rate, major rt wounder of major street the	t vehicles: ehicles: ehicles:	les:					<u> </u>

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical	L Gap Cal	culati	on			\			
Movement	5	1	4	7	8	9	10	11	12
		L	L	L	Т	R	L	T	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			1/
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		\	1 /
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					6.2			
	2-stage								
Follow-I	Jp Time C	alcula	tions						
LOTIOM C	ob itime c	атсита	CIOHS						



Movement  t(f,base) t(f,HV) 0 P(HV) t(f)  Worksheet 5-Effect  Computation 1-Queue  V prog Total Saturation Floarrival Type Effective Green, g Cycle Length, C (see Rp (from Exhibit 16 Proportion vehicles g(q1) g(q2) g(q)  Computation 2-Proposition  alpha beta Travel time, t(a) (see Rp (from Exhibit 16 Proportion of confilmax platooned flow, Min platooned flow, Duration of blocked Proportion time blocked Proportion time blocked Proportion of confilmax platooned flow, Duration of blocked Proportion time blocked Proportion time blocked Proposition (See Proposition See	D  of Upstream  Clearance T  ow Rate, s ( (sec) c) -11) arriving on	Signals Time at T vph)	Jpstrear Mc V(t)	m Signa	t 2	0.90 Mox V(t)	12 R 0.90	
t(f,HV) 0.P(HV) t(f)  Worksheet 5-Effect of the computation 1-Queue  V prog Total Saturation Float Arrival Type Effective Green, g Cycle Length, C (see Rp (from Exhibit 16-Proportion vehicles g(q1) g(q2) g(q)  Computation 2-Proposition of the computation of confilmax platooned flow, Duration of blocked Proportion time blocked Proportion time blocked Proportion of computation 3-Platon p(2) p(5) p(dom)	of Upstream  Clearance T  ow Rate, s ( (sec) c) -11) arriving on	Signals Time at T vph)	Jpstrear Mc V(t)	0.90 0.3.3 m Signa	al t 2	MoX	rement 5	
P(HV) t(f)  Worksheet 5-Effect of the computation 1-Queue  V prog Total Saturation Float Arrival Type Effective Green, g Cycle Length, C (see Rp (from Exhibit 16-Proportion vehicles g(q1) g(q2) g(q)  Computation 2-Proposition of confidence of the computation of confidence of the computation of confidence of the computation of blocked Proportion time blocked Proportion of computation 3-Platon p(2) p(5) p(dom)	of Upstream  Clearance T  ow Rate, s ( (sec) c) -11) arriving on	Signals Time at T vph)	Jpstream Mc V(t)	3.3 m Signa	al t 2	MoX	rement 5	)
Worksheet 5-Effect of Computation 1-Queue  V prog Total Saturation Floatrival Type Effective Green, g Cycle Length, C (see Rp (from Exhibit 16 Proportion vehicles g(q1) g(q2) g(q)  Computation 2-Proposition of Confidence of Computation of Confidence of Computation of Computation of Computation of Computation of Computation of Computation 3-Platon p(2) p(5) p(dom)	Clearance T  ow Rate, s ( (sec) c) -11) arriving on	vph)	Jpstream Mc V(t)	m Signa	t 2			
Worksheet 5-Effect of Computation 1-Queue  V prog Total Saturation Floatrival Type Effective Green, g Cycle Length, C (see Rp (from Exhibit 16-Proportion vehicles g(q1) g(q2) g(q)  Computation 2-Proposition of Confidence of Computation of Confidence of Computation of Computation of Computation 3-Plator (Computation 3-Plator (Pictor) p(2) p(5) p(dom)	Clearance T  ow Rate, s ( (sec) c) -11) arriving on	vph)	Jpstrear Mc V(t)	m Signa	t 2			
Computation 1-Queue  V prog Total Saturation Floarrival Type Effective Green, g Cycle Length, C (see Rp (from Exhibit 16 Proportion vehicles g(q1) g(q2) g(q)  Computation 2-Proposition of Computation of Computation of Computation of Computation of Computation of blocked Proportion time blocked Proportion of Computation 3-Platon p(2) p(5) p(dom)	Clearance T  ow Rate, s ( (sec) c) -11) arriving on	vph)	V(t)	ovement	t 2			
V prog Total Saturation Floarrival Type Effective Green, g Cycle Length, C (see Rp (from Exhibit 16 Proportion vehicles g(q1) g(q2) g(q)  Computation 2-Proposition See See See See See See See See See Se	ow Rate, s ( (sec) c) -11) arriving on	vph)	V(t)	ovement	t 2			
Total Saturation Flo Arrival Type Effective Green, g Cycle Length, C (see Rp (from Exhibit 16: Proportion vehicles g(q1) g(q2) g(q)  Computation 2-Proposition  alpha beta Travel time, t(a) (See Smoothing Factor, F Proportion of confil Max platooned flow, Min platooned flow, Duration of blocked Proportion time blocked Proportion time blocked Proposition 3-Platon p(2) p(5) p(dom)	(sec) c) -11) arriving on	green l	2					
alpha beta Travel time, t(a) (: Smoothing Factor, F Proportion of confil Max platooned flow, Min platooned flow, Duration of blocked Proportion time bloc  Computation 3-Plator  p(2) p(5) p(dom)	rtion of TWS	C Inter						
alpha beta Travel time, t(a) (3 Smoothing Factor, F Proportion of confl. Max platooned flow, Min platooned flow, Duration of blocked Proportion time bloc  Computation 3-Platon  p(2) p(5) p(dom)	rtion of iws	C III.ers		mima.	b l o also			
beta Travel time, t(a) (: Smoothing Factor, F Proportion of confl. Max platooned flow, Min platooned flow, Duration of blocked Proportion time bloc  Computation 3-Plator  p(2) p(5) p(dom)				ovement	t 2		vement 5 V(1,prot)	)
Proportion time bloc  Computation 3-Plator  p(2) p(5) p(dom)	icting flow, V(c,max)	f						
p(2) p(5) p(dom)		)		0.000		C	0.000	
p(5) p(dom)	on Event Per	iods	Result					
p (dom)			0.000					
			0.000					
Constrained or uncor	nstrained?							
Proportion unblocked	(1)		(2)			(3)		
for minor	Single-s	_	Τv	wo-Stag	ge Proc	cess		
movements, p(x)	Proces		Stage	I	St	age II		
p(1) p(4) p(7) p(8)								
p(9) p(10) p(11)				\ \				
p(12)  Computation 4 and 5								_\ _
Single-Stage Process	S							
Movement				В Г	9 R	10 L	11 12 T R	
V c,x					389	( †	17-	
s Px								
V c,u,x					(			$\mathcal{I}\mathcal{I}$
C r,x C plat,x								
Two-Stage Process	7	8			10		11	



V(c,x)			
S P (v)			
P(x)			
V(c,u,x)			
C(r,x)			
C(plat,x)			
Worksheet 6-Impedance and Capacity Equati	ons		
	9	1.2	
Step 1: RT from Minor St.	9	12	
Conflicting Flows	389		
Potential Capacity	664		
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity Probability of Queue free St.	664 0.99	1.00	
riobability of gadac fied be.	0.33	1.00	
Step 2: LT from Major St.	4	1	
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity	1 00	1 00	
Probability of Queue free St. Maj L-Shared Prob Q free St.	1.00	1.00	
maj L-Shared Flob Q free St.			
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	
riobability 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.		1.00	
Cap. Adj. factor due to Impeding mymnt	1.00	0.99	
Movement Capacity			
Worksheet 7-Computation of the Effect of	Two-stage Gan Acce	entance	
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			
Pont 2 Gingle Ottor			////
Part 3 - Single Stage Conflicting Flows		$\searrow$	
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt	1.00	1.00	
Movement Capacity			
Result for 2 stage process:		<del>}</del>	
a			<
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 mvm Movement Capacity	ınt						_	
Part 2 - Second Stage							_	
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvm Movement Capacity	ınt							
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 mvm Movement Capacity	ınt	1.			1.00 1.00 1.00 0.99			
Results for Two-stage process: a							_	
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)	L	Т	R 8 664	Ĺ	T		-	
Volume (vph) Movement Capacity (vph)	L Flare	T T d Minor	R 8 664 Street	L Approx	aches	12	- - -	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of	L Flare	T d Minor	8 664 Street	L Approx	T	R	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of Movement  C sep Volume Delay	L Flare	T T d Minor	R 8 664 Street	L Approx	aches	12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of Movement  C sep Volume	L Flare	T T d Minor	8 664 Street	L Approx	aches	12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of  Movement  C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max	L Flare	T T d Minor	8 664 Street	L Approx	aches	12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of  Movement  C sep Volume Delay Q sep Q sep +1 round (Qsep +1)	L Flare	T T d Minor	8 664 Street	L Approx	aches	12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of Movement  C sep Volume Delay Q sep Q sep +1 round (Qsep +1)  n max C sh SUM C sep	L Flare	T T d Minor	8 664 Street	L Approx	aches	12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of  Movement  C sep Volume Delay Q sep Q sep +1 round (Qsep +1)  n max C sh SUM C sep	L Flare	d Minor	8 664 Street 9 R 664 8	L Approx	aches	12		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of Movement  C sep Volume Delay Q sep Q sep +1 round (Qsep +1)  n max C sh SUM C sep n C act	L Flare	d Minor	R 8 664 Street 9 R 664 8	L Approx	aches  11 T	12	-	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of  Movement  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, an	L Flare	d Minor  8 T	R 8 664 Street 9 R 664 8	L Approx	aches  11 T	12 R		
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect of  Movement  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, an  Movement 1 4 7  Lane Config v (vph) C(m) (vph)	L Flared 7 L	d Minor  8 T	R 8 664 Street 9 R 664 8	L Approx	aches  11 T	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		
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		
a (lame, 1) belay for beleam 2 of 5		

## 1.1.2.9 Interseção E – Pico Manhã

Approach Delay

			ns Release						
	TV	O-WAY	STOP CON'	TROL S	UMMAR	Y			
Analyst:	Pro	geplar	า						
Agency/Co.:									
Date Performed:	05/	06/202	23						
Analysis Time Per	iod: Pio	o Manh	na						
Intersection:	G								
Jurisdiction:	DEF	/DF							
Units: U. S. Metr	ic								
Analysis Year:	202	3							
Project ID:									
East/West Street:	M2-	M7+M8-	-M11+M12-I	M13					
North/South Stree	t: M13								
Intersection Orie	ntation:	EW			Study	peri	od (hrs	): 1.00	
	Veł	icle V	Jolumes a	nd Adj	ustme	nts			
Major Street: Ap	proach		Eastbound	d		W	estboun	d	
Mo	vement	1	2	3	- 1	4	5	6	
		T,	Т		i	T.	Т	R	

	Ve	hicle Vo	lumes a	nd Adju	stments		
Major Street:	Approach	Εá	astboun	d	_	Westbound	
	Movement	1	2	3	4	5	6
		L	T	R	L	Т	R
Volume					5	718	
Peak-Hour Fact	or, PHF				0.9	1 0.91	
Hourly Flow Ra	te, HFR				5	789	
Percent Heavy					0		
Median Type/Št		Undi	vided		/		
RT Channelized					,		
Tanes	•					0 2	
Configuration						TIT T	
	10		No				
Upstream Signa	TT:		No			No	
Minor Street:	Approach	No	orthbou	nd		Southboun	d
	Movement	7	8	9	10	11	12
		L	T	R	i L/	Т	R
 Volume		9					$\overline{}$
Peak Hour Fact	or, PHF	1.00					/
Hourly Flow Ra		9		\			/ _
Percent Heavy		11					\
Percent Grade		11	0	/		0	11/
Flared Approac	( - /	2/Storage	-		1	Ü	
Lanes	EAISUS	:/Storage	~		\'		
Configuration		_	L	\	\		
			L		1/		>
	Delay	Queue Le	angth	and Lov	rel of so	rvice	
Approach	Delay, EB	WB		ana mev rthboun			hbound
		wв 4 I		rtnboun 8	ıu ,		)   .
Movement	1		7	8	9	10	11 12
Lane Config		LT	L		I		( )
v (vph)		5	9				
C(m) (vph)		1636	584				$\neg$
v/c		0.00	0.02				
95% queue leng	rth	0.01	0.05				
Control Delay		7.2	11.3				
T <sub>i</sub> OS		A	В				
Annroach Delay	,		~	11 3			

11.3



В 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:

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

North/South Street: M13

Intersection Orientation: EW Study period (hrs): 1.00

	Vehicle	Volumes	and A	Adjustment	ts		
Major Street Movements	_ 1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume				5	718		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				1	197		
Hourly Flow Rate, HFR				5	789		
Percent Heavy Vehicles				0			
Median Type/Storage RT Channelized?	Und	ivided		/			
Lanes				0	2		
Configuration				L'	гт		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	Т	R	

Volume Peak Hour Factor, PHF 1.00 Peak-15 Minute Volume Hourly Flow Rate, HFR 9 Percent Heavy Vehicles Percent Grade (%) 11 0

Flared Approach: Exists?/Storage RT Channelized

Lanes

1 Configuration

	Pedestrian	Volumes	and Adju	stment
Movements	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

_	Ups	stream Sign	nal Data			
Prog.	Sat	Arrival	Green	Cycle	Prog.	Distance
Flow	Flow	Type	Time	Length	Speed	to Signal
wnh	wph		sec	SEC	knh	meters

S2 Left-Turn

Through

S5 Left-Turn Through



Worksheet 3-Data	for Computing	Effect of	Delaw to	Maior	Stroot	Wahialas

						Movement	2	Movemen	nt 5
Shared ln	volume	, majo	r th vel	hicles:				0	
Shared ln								0	
Sat flow r								1700	
Sat flow r	ate, ma	ajor r	t vehic	les:				1700	
Number of	major s	street	through	h lanes				2	
Worksheet	4-Crit:	ical G	ap and :	Follow-	up Time	Calcula	tion		
 Critical G	ap 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)			0	11					
t(c <b>,</b> g)				0.20	0.20	0.10	0.20		0.10
Percent Gr	ade			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
	-stage -stage		4.1	6.5					
Follow-Up	Time Ca	alcula	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
			0	11					
P(HV)			2.2	3.6					

Computation 1-Queue Clearance Time at Upstream Signal

Movement 2 Movement 5 V(t) V(1,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(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 0.000 p(2) p(5) 0.000 p(dom)

p(subo)

g (q)

Constrained or unconstrained?



Proportion	/1	`	,	21		(3)	
unblocked for minor	(1 Sinale	.) :-stage		2) Two-Sta	ge Proce	(3)	
movements, p(x)	Proc	_	Stag		-	ige 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 1	.0 11	12
	L	L	L	T	R	L T	R
V c,x		0	404				
S							
Px							
V c,u,x							
C r,x							
C plat,x							
Two-Stage Process	_						_
ā	7	Q	8		10		1
Stagel	Stage2	Stage1	Stage2	Stage	ı Stage	e2 Stage1	Stage2
V(c,x)							
S	3000						
P(x)							
V(c,u,x)							
C(r,x)							
C(plat,x)							
Worksheet 6-Impedance Step 1: RT from Minor		acity E	quations		9	12	
Conflicting Flows							
Potential Capacity				1 0		1 00	
Pedestrian Impedance Movement Capacity	Factor			1.0	)	1.00	
Probability of Queue	fron St						
riobability or Queue	iiee sc.			1 0	)	1 00	
Step 2: LT from Major				1.0	)	1.00	
	r St.				1	1.00	
	r St.			0	1		
Potential Capacity				0 163	6	1	
Potential Capacity Pedestrian Impedance				0 163 1.0	6 0		
Potential Capacity Pedestrian Impedance Movement Capacity	Factor			0 163 1.0 163	606	1.00	
Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue	Factor free St.		(	0 163 1.0 163 1.0	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1	
Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue	Factor free St.		(	0 163 1.0 163	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00	
Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f	Factor free St. free St.		(	0 163 1.0 163 1.0	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00	
Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f Step 3: TH from Minor	Factor free St. free St.		(	0 163 1.0 163 1.0	600000000000000000000000000000000000000	1.00	
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. free St.			0 163 1.0 163 1.0	600000000000000000000000000000000000000	1.00	
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. free St.			0 163 1.0 163 1.0	6 0 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00	
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	Factor free St. r St. Factor			0 163 1.0 163 1.0 1.0	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00	
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. r St. Factor		nt	0 163 1.0 163 1.0	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00	
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 Movement Capacity	Factor free St. r St. Factor to Imped	ling mvm	nt	0 163 1.0 163 1.0 1.0 1.0	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1.000	
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. r St. Factor to Imped	ling mvm	nt	0 163 1.0 163 1.0 1.0	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1.00	
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 Movement Capacity Probability of Queue	Factor free St. r St. Factor to Imped	ling mvm	nt	0 163 1.0 163 1.0 1.0 1.0	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.000	7
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 Movement Capacity Probability of Queue Step 4: LT from Minor	Factor free St. r St. Factor to Imped	ling mvm	nt	0 163 1.0 1.0 1.0 1.0 1.0	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00 1.00 1.00 1.00 1.00	7
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 Movement Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows	Factor free St. r St. Factor to Imped	ling mvm	nt	0 163 1.0 163 1.0 1.0 1.0 1.0	3 5 5 5 5 7	1.00 1.00 1.00 1.00 1.00	7
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 Movement Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity	Factor free St. r St. Factor to Imped free St. r St.	ling mvm	nt	0 163 1.0 163 1.0 1.0 1.0 1.0	3 3 3 3 7	1.000 1.000 1.000 1.000 1.000	
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 Movement Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity Probability of Queue	Factor free St. r St. Factor to Imped free St. r St.	ling mvm	nt	0 163 1.0 163 1.0 1.0 1.0 1.0	3 3 3 3 7	1.000 1.000 1.000 1.000 1.000	
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 Movement Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Maj. L, Min T Impedar	Factor free St. r St.  Factor to Imped free St. r St.	ling mvm	nt	0 163 1.0 163 1.0 1.0 1.0 1.0	3 3 3 3 7	1.00 1.00 1.00 1.00 1.00 1.00	
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 Movement Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Maj. L, Min T Impedar Maj. L, Min T Adj. Im	Factor free St.  Factor to Imped free St.  Factor free St.	ling mvm		0 163 1.0 1.0 1.0 1.0 1.0 404 586 1.0	3 3 3 3 7	1.00 1.00 1.00 1.00 1.00 1.00 1.00	
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 Movement Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity Probability of Impedance Cap. Adj. factor due Movement Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Maj. L, Min T Impedar Maj. L, Min T Adj. In Cap. Adj. factor due	Factor free St.  Factor to Imped free St.  Factor free St.	ling mvm		1.00 1.00 1.00 1.00 1.00 1.00 1.00	3 3 3 3 7	1.00 1.00 1.00 1.00 1.00 1.00	
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 Movement Capacity Probability of Queue Step 4: LT from Minor Conflicting Flows Potential Capacity Probability of Queue	Factor free St.  Factor to Imped free St.  Factor free St.	ling mvm		0 163 1.0 1.0 1.0 1.0 1.0 404 586 1.0	3 3 3 3 7	1.00 1.00 1.00 1.00 1.00 1.00 1.00	



Step 3: Nr From Kinnor St. 8 11  Bart 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 Port 3 - Single Stage Conflicting Flows Potential Capacity Part 3 - Single Stage Conflicting Flows Potential 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 Step 4: LT from Minor 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 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 - Stord due to Impeding mymnt Movement Capacity Part 3 - Stord of Stage Conflicting Flows Potential Capacity Part 3 - Stord of Stage Conflicting Flows Potential Capacity Part 3 - Stord of Stage Conflicting Flows Potential Capacity Part 3 - Stord of Stage Conflicting Flows Potential Capacity Po	ton 3. TH from Minor C+		1 1	
conflicting Flows  otherial Capacity edestrian Impedance Factor app. Adj. factor due to Impeding mymnt  ovenent Capacity  redestrian Impedance Factor application Flows  otherial Capacity  redestrian Impedance Factor  application Flows  otherial Capacity  result for 2 stage process:  it  trobability of Queue free St.  it  trobability of Queue free St.  it  robability of Queue free St.  it  trobability of Queue free St.  it  it  it  it  it  it  it  it  it	ttep 3: TH from Minor St.	8	11	
Downent Capacity  Torbability of Queue free St.  Tart 2 - Second Stage Conflicting Flows Contential Capacity  Tart 3 - Single Stage Conflicting Flows Cotential Capacity  Tart 3 - Single Stage Conflicting Flows Cotential Capacity  Tart 3 - Single Stage Conflicting Flows Cotential Capacity  Tart 3 - Single Stage Conflicting Flows Cotential Capacity  Tart 3 - Single Stage Conflicting Flows Cotential Capacity  Tart 1 - First Stage Conflicting Flows  Tart 2 - Second Stage Conflicting Flows  Toverent Capacity  Tart 3 - Single Stage Conflicting Flows  Toverent Capacity  Tart 3 - Single Stage  Torbital Capacity  Tart 3 - Single Stage  Tart 4 - First Stage  Tart 4 - First Stage  Tart 5 - Single Stage  Tart 6 - First Stage  Tart 7 - Tart 7	conflicting Flows Potential Capacity Pedestrian Impedance Factor	nt		
onflicting Flows otential Capacity  destrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity  art 3 - Single Stage onflicting Flows otential Capacity  destrian Impedance Factor ap. Adj. factor due to Impeding mvmnt  1.00 1.00  ap. Adj. factor due to Impeding mvmnt  1.00 1.00  ap. Adj. factor due to Impeding mvmnt  1.00 1.00  besult for 2 stage process:  trobability of Queue free St. 1.00 1.00  tep 4: LT from Minor St. 7 10  art 1 - First Stage onflicting Flows otential Capacity  art 2 - Second Stage onflicting Flows otential Capacity  art 2 - Second Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows  secults of Two-stage process:  t 584  orksheet 8-Shared Lane Calculations ovement 7 8 9 10 11 12  R  orksheet 8-Shared Lane Calculations ovement Capacity (vph) 584	lovement Capacity	iic		
Conflicting Flows  Protectatial Capacity  Pedestrian Impedance Factor  Step 4: LT from Minor St.  Part 1 - First Stage  Conflicting Flows  Protectial Capacity  Protectial Capaci	Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvm	nt		_
Pedestrian Impedance Factor 1.00 1.00 Agap. Adj. factor due to Impeding mvmnt 1.00 1.00 Agap. Adj. factor due to Impeding mvmnt 1.00 1.00 Agap. Adj. factor due to Impeding mvmnt 1.00 1.00 Agapt 1 - First Stage Conflicting Flows Agapt 2 - Second Stage Conflicting Flows Agapt 2 - Second Stage Conflicting Flows Agapt 3 - Single Stage Conflicting Flows Agapt 4 - Single Stage Conflicting Flows Agapt 5 - Single Stage Agapt 5 - Single Stage Conflicting Flows Agapt 5 - Single Stage Agapt 5 - Single Stage Agapt 5 - Single Stage Agapt 6 - Single Stage Agapt 7 -	Conflicting Flows			
Result for 2 stage process:    Comparison of	Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvm			
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 Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Pedestrian Impedance Factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity  Sesults for Two-stage process:  A				
Step 4: LT from Minor St. 7 10  Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Tap. 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 Part 3 - Single Stage Conflicting Flows Potential Capacity 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  Part 3 - Single Stage Conflicting Flows Potential Capacity Potential Capac	a 7			
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 Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity  Part 3 - Single Stage Conflicting Flows Pedestrian Impedance Factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity  Results for Two-stage process: a  Y C t  Worksheet 8-Shared Lane Calculations  Movement Capacity (vph)  9  Movement Capacity (vph)  9  Movement Capacity (vph)  9  Movement Capacity (vph)	Probability 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 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 Maj. L, Min T Impedance Factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity  Movement Capacity  Norksheet 8-Shared Lane Calculations Movement Capacity (vph)  Movement Capacity (vph)  9  Movement Capacity (vph)  9  Movement Capacity (vph)	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 Flows 404 Potential Capacity 586 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 Movement Capacity 584  Results for Two-stage process: a  Y C t 584  Worksheet 8-Shared Lane Calculations  Movement 7 8 9 10 11 12 L T R L T R  Volume (vph) 9 Movement Capacity (vph) 584	Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvm	nt		
Conflicting Flows 404 Potential Capacity 586 Pedestrian Impedance Factor 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 Movement Capacity 584  Results for Two-stage process:  A	Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvm.	nt		_
Results for Two-stage process:  a y C t 584  Worksheet 8-Shared Lane Calculations  Movement 7 8 9 10 11 12 L T R L T R  Volume (vph) 9 Movement Capacity (vph) 584	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 mvm.	586 1.00 nt 1.00	1.00	_
Worksheet 8-Shared Lane Calculations  Movement 7 8 9 10 11 12  L T R L T R  Volume (vph) 9  Movement Capacity (vph) 584	Results for Two-stage process:	304		
7 8 9 10 11 12 L T R L T R  Volume (vph) 9  Movement Capacity (vph) 584		584		
L T R L T R  Volume (vph) 9  Movement Capacity (vph) 584	Norksheet 8-Shared Lane Calculations		17	
Movement Capacity (vph) 584	Movement			
	Movement Capacity (vph)	-		///_



Т т. R Τ. Т R C sep 584 Volume 9 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 10 12 Lane Config LT L v (vph) C(m) (vph) 1636 584 v/c 0.00 0.02 95% queue length 0.05 0.01 Control Delay 7.2 11.3 LOS Α 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 d(rank,1) Delay for stream 2 or 5		2

### 1.1.2.10 Interseção E - Pico Tarde

 ${\tt HCS+:} \ {\tt Unsignalized} \ {\tt Intersections} \ {\tt Release} \ {\tt 5.6}$ 

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 1.00 Intersection Orientation: EW Study period (hrs): \_Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound 1 2 3 4 5 6 Movement. Т Т R L L R Volume 1980 4 Peak-Hour Factor, PHF Hourly Flow Rate, HFR 0.91 0.91 4 2175 0 Percent Heavy Vehicles Median Type/Storage Undivided



RT Channelized?

0 2 LT T 0 Lanes Configuration Upstream Signal? No No

Minor Street:	Approach	No	rthbou	ınd		S	outhbou	nd	
М	Movement	7	8	9		10	11	12	
		L	Т	R	I	L	T	R	
Volume		6							
Peak Hour Fact	or, PHF	1.00							
Hourly Flow Ra	te, HFR	6							
Percent Heavy	Vehicles	0							
Percent Grade	(%)		0				0		
Flared Approac	h: Exists?	/Storage			/				/
Lanes		1							
Configuration		I							

Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound 10 Movement 1 4 8 11 12 Lane Config LT L v (vph) 4 238 0.03 0.08 20.5 C(m) (vph) 1636 v/c 95% queue length Control Delay 0.00 0.01 7.2 LOS Α С Approach Delay Approach LOS 20.5 С

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail:		Fa	х:	
	_TWO-WAY STOP CO	ONTROL (TWSC)	ANALYSIS	
Analyst:	Progeplan			
Agency/Co.:				
Date Performed:	05/06/2023			
Analysis Time Period:	Pico Tarde			
Intersection:	E			
Jurisdiction:	DER/DF			
Units: U. S. Metric			/ \	
Analysis Year:	2023		/ \	
Project ID:				
East/West Street:	M2-M7+M8-M11	(	· ·	)
North/South Street:	M11			
Intersection Orientat	ion: EW	Stu	dy period (hrs):	: 1.00
			/	\ \
	Vehicle Volum	mes and Adju		
Major Street Movement	s 1 2		4 5 6	5
	L T	R	L T F	3
Volume			4 1980	
Peak-Hour Factor, PHF			0.91 0.91	
Peak-15 Minute Volume			1 544	
Hourly Flow Rate, HFR			4 2175	)
Percent Heavy Vehicle	s		0	-
Median Type/Storage	Undivide	d	/	\ \
RT Channelized?			\	\ \
Tanog			0 2	

0 2

10 L

LT T

No

11 T

12 R

No

8 T

9 R

Lanes

Configuration
Upstream Signal?

Minor Street Movements



 $\overline{\text{Volume}}$ 1.00 Peak Hour Factor, PHF Peak-15 Minute Volume 2 6 Hourly Flow Rate, HFR Percent Heavy Vehicles 0 Percent Grade (%) 0 0 Flared Approach: Exists?/Storage RT Channelized Lanes Configuration L

Pedestrian Volumes and Adjustments\_ Movements 13 14 15 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

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

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 Calcu	latio	n							
Movement	-	1	4	7	8	9	10	11	12	
		L	L	L	T	R	L	T	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	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	2-stage 0		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-U	Jp Time Cal	culat	ions			7				
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) 0 0 2.2 3.5 t(f)

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

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

Movement 5 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
                                                                   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
                                             (2)
unblocked
                            (1)
                                                              (3)
for minor
                        Single-stage
                                             Two-Stage Process
movements, p(x)
                                          Stage I
                          Process
                                                           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
                                               8
                                                       9
                                                             10
                                                                    11
                                                                            12
                                        L
                                                       R
                                                                     Τ
                                                                             R
V c,x
                                0
                                       1095
Рx
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                                      10
                                                                 Stage1
              Stage1 Stage2 Stage1 Stage2 Stage1 Stage2
                                                                          Stage2
V(c,x)
                       3000
S
P(x)
V(c,u,x)
\overline{C(r,x)}
C(plat,x)
Worksheet 6-Impedance and Capacity Equations
Step 1: RT from Minor St.
                                                      9
                                                                       12
Conflicting Flows
```

Potential Capacity



			engenharia e
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 Probability of Queue free St.	1636 1.00	1.00	
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 mymnt	1.00	1.00	
Movement Capacity			
Probability of Queue free St.	1.00	1.00	
Chan A. III from Minor Ch	7	10	_
Step 4: LT from Minor St.	1	10	
Conflicting Flows	1095		-
Potential Capacity	239		
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 mymnt	1.00	1.00	
Movement Capacity	238		
Worksheet 7-Computation of the Effect of		ceptance	_
Step 3: TH from Minor St.	8	11	
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 1.00	_
Result for 2 stage process:		$\overline{}$	_
a	/ /	\ \ \	\
У			
C t Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Part 1 - First Stage			<u> </u>
		\ \ \ / /	7111
Conflicting Flows			
Conflicting Flows Potential Capacity			4
Potential Capacity Pedestrian Impedance Factor			7
Potential Capacity			
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt			
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 2 - Second Stage			



Movement Capacity						
Part 3 - Single Stage Conflicting Flows		1	1095			
Potential Capacity			239			
edestrian Impedance Factor		1	1.00		1.00	
aj. L, Min T Impedance factor					1.00	
aj. L, Min T Adj. Imp Factor. ap. Adj. factor due to Impeding mv	vmnt.	1	1.00		1.00	
ovement Capacity			238			
esults for Two-stage process:						
t		,	238			
rksheet 8-Shared Lane Calculation	ns					
ovement	7	8	9	10	11	12
	L	Т	R	L	Т	R
lume (vph)	6 238					
ovement Capacity (vpn) nared Lane Capacity (vph)	238					
rksheet 9-Computation of Effect of	of Flare	ed Minor	Street	t Appro	aches	
ovement	7	8	9	10	11	12
	L	Т	R	L	Т	R
sep	238					
lume	6					
elay						
sep						
sep +1						
=						
=						
ound (Qsep +1)						
max sh						
max sh						
max sh M C sep						
max sh M C sep						
max sh M C sep act	and Leve	l of Se	ervice			
max sh M C sep act rksheet 10-Delay, Queue Length, a		el of Se	ervice	10	11	12
max sh M C sep act  rksheet 10-Delay, Queue Length, avement 1 4				10	11	12
max sh JM C sep act  orksheet 10-Delay, Queue Length, act  overwent 1 4 ane Config LT	7			10	11	12
max sh JM C sep act  orksheet 10-Delay, Queue Length, a ovement 1 4 one Config LT  (vph) 4 6 (vph) 4 6 (vph) 1636 2	7 L 6 238			10	11	12
max sh  MM C sep  act  orksheet 10-Delay, Queue Length, a  ovement 1 4  une Config LT  (vph) 4 6  (m) (vph) 1636 2  orksheet 10-Delay, Queue Length, a	7 L 6 238 0.03			10	11	12
max sh M C sep act  rksheet 10-Delay, Queue Length, avement 1 4 ne Config LT  (vph) 4 6 m) (vph) 1636 2 c 0.00 (8 queue length 0.01	7 L 6 238 0.03 0.08			10	11	12
max sh  MM C sep  act  orksheet 10-Delay, Queue Length, act  orksheet	7 L 6 238 0.03 0.08 20.5			10	11	12
max sh M C sep act  rksheet 10-Delay, Queue Length, a vement 1 4 ne Config LT  (vph) 4 6 (vph) 1636 2 c 0.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7 L 6 238 0.03 0.08 20.5			10	11	12
max sh M C sep act  rksheet 10-Delay, Queue Length, a  vement 1 4 ne Config LT  (vph) 4 6 (vph) 4 6 0.00 0 c 0.00 0 c queue length 0.01 0 ntrol Delay 7.2 2 proach Delay	7 L 6 238 0.03 0.08 20.5 C	8		10	11	12
max sh M C sep  act  rksheet 10-Delay, Queue Length, avement 1 4 ne Config LT  (vph) 4 6 (vph) 4 6 0.00 0 0 0.00 0 0 queue length 0.01 0 ntrol Delay 7.2 2 proach Delay	7 L 6 238 0.03 0.08 20.5 C	8		10	11	12
max sh M C sep act  rksheet 10-Delay, Queue Length, avement 1 4 ne Config LT  (vph) 4 6 0 0.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7 L 6 238 0.03 0.08 20.5 C	8 8 C C	9	10	11	12
max sh M C sep act  rksheet 10-Delay, Queue Length, avement 1 4 ne Config LT  (vph) 4 6 0 0.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7 L 6 238 0.03 0.08 20.5 C	8 8 C C	9	10	11	12
max sh M C sep act  rksheet 10-Delay, Queue Length, avement 1 4 ne Config LT  (vph) 4 6 0.00 (% queue length 0.01 (ntrol Delay 7.2 28 proach Delay proach LOS	7 L 6 238 0.03 0.08 20.5 C	8 8 C C	9		11 Moveme	
max sh UM C sep  act  orksheet 10-Delay, Queue Length, act  ovement 1 4 ane Config LT  (vph) 4 6 (m) (vph) 1636 2 /c 0.00 0 5% queue length 0.01 0 ontrol Delay 7.2 2 OS A pproach Delay pproach LOS  orksheet 11-Shared Major LT Impeda	7 L 6 238 0.03 0.08 20.5 C	8 8 C C	9 Movemen	nt 2	Moveme	ent 5
max sh UM C sep  act  orksheet 10-Delay, Queue Length, act  ovement 1 4 ane Config LT  (vph) 4 6 (m) (vph) 1636 2 (c 0.00 0 5% queue length 0.01 0 ontrol Delay 7.2 2 opproach Delay pproach LOS	7 L 6 238 0.03 0.08 20.5 C	8 8 C C	9	nt 2	2	ent 5
max sh  JM C sep  act  prksheet 10-Delay, Queue Length, and present and config LT  (vph) 4 6 (vph) 1636 2 (vp	7 L 6 238 0.03 0.08 20.5 C	0.5 C	9 Movemen	nt 2	Movemes 1.0 0 0	ent 5
max sh  IM C sep  act  orksheet 10-Delay, Queue Length, a  ovement 1 4  ane Config LT  (vph) 4 6  (m) (vph) 1636 2  (c 0.00 0  % queue length 0.01 ( ontrol Delay 7.2 2  orksheet 11-Shared Major LT Impeda  orksheet 11-Shared Major LT Impeda  (oj) (ii), Volume for stream 2 or 5 (iii), Saturation flow rate for str	7 L 6 238 0.03 0.08 20.5 C	8 0.5 C Delay	9 Movemen	nt 2	Moveme 1.00 0 0 170	ent 5
max sh  IM C sep  act  orksheet 10-Delay, Queue Length, a  ovement 1 4  ane Config LT  (vph) 4 6  (m) (vph) 1636 2  orksqueue length 0.01 ( orksqueue	7 L 6 238 0.03 0.08 20.5 C	8 0.5 C Delay	9 Movemen	nt 2	Moveme 1.0 0 0 170 170	ent 5
max sh  MC sep  act  orksheet 10-Delay, Queue Length, act  ovement 1 4  one Config LT  (vph) 4 6  m) (vph) 1636 2  ork queue length 0.01 0  ork queue length 7.2 2  orksheet 10-Delay 7.2 2  ork queue length 10.01 0  ork queue length 10.01 0  ork queue length 10.01 0  orksheet 11-Shared Major LT Impeda	7 L 6 238 0.03 0.08 20.5 C	8 0.5 C Delay	9 Movemen	nt 2	Moveme 1.0 0 0 170 170 1.0	ent 5
max sh M C sep act  rksheet 10-Delay, Queue Length, a  vement 1 4 ne Config LT  (vph) 4 6 m) (vph) 1636 2 c 0.00 0 % queue length 0.01 0 ntrol Delay 7.2 2 S A  proach Delay proach LOS  rksheet 11-Shared Major LT Impeda  oi), Volume for stream 2 or 5 i2), Volume for stream 3 or 6 i1), Saturation flow rate for striai), Saturation flow rate for striai), Saturation flow rate for striai	7 L 6 238 0.03 0.08 20.5 C 2 ance and	8 0.5 C Delay	9 Movemen	nt 2	Moveme 1.0 0 0 170 170	ent 5
max sh M C sep act  rksheet 10-Delay, Queue Length, a vement 1 4 ne Config LT  (vph) 4 6 m) (vph) 1636 2 c 0.00 ( % queue length 0.01 ( ntrol Delay 7.2 2 S A proach Delay proach LOS  rksheet 11-Shared Major LT Impeda  oj) il), Volume for stream 2 or 5 i2), Volume for stream 3 or 6 i1), Saturation flow rate for strice), Saturation flow rate for strice), (oj) M,LT), Delay for stream 1 or 4	7 L 6 238 0.03 0.08 20.5 C 2 ance and	8 0.5 C Delay	9 Movemen	nt 2	Moveme 1.0 0 0 1.70 1.0 7.2	ent 5



### 1.1.2.11 Interseção F - Pico Manhã

HCS+: Unsignalized Intersections Release 5.6 TWO-WAY STOP CONTROL SUMMARY Progeplan Analyst: Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Manha Intersection: F DER/DF Jurisdiction: Units: U. S. Metric 2023 Analysis Year: Project ID: East/West Street: M01-M05-M07+M08+M06-M11 East/West Street: M01-North/South Street: M12 Intersection Orientation: EW Study period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound 2 5 6 L Т R | L Т R Volume Peak-Hour Factor, PHF 0.91 0.91 Hourly Flow Rate, HFR 9 1970 Percent Heavy Vehicles 12 Median Type/Storage Undivided RT Channelized? Lanes 0 Configuration LT T Upstream Signal? No No Minor Street: Approach Northbound Southbound 10 12 Movement. 8 11 R L Т R Volume 5 0.91 Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles 5 0 Percent Grade (%) 0 Flared Approach: Exists?/Storage Lanes 1

Delay, Queue Length, and Level of Service Southbound Approach EΒ WB Northbound 9 10 12 Movement 1 4 8 11 Lane Config  $_{
m LT}$ L v (vph) 1560 269 C(m) (vph) v/c 0.01 0.02 95% queue length 0.02 0.06 Control Delay 7.3 18.6 LOS С Approach Delay 18.6 Approach LOS С

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail:

 ${\tt Configuration}$ 

Fax:

L



\_TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_\_ Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Manha Intersection: F Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: East/West Street: M01-M05-M07+M08+M06-M11North/South Street: M12 Intersection Orientation: EW Study period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Movements 1 2 3 Volume 9 1793 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume 493 Hourly Flow Rate, HFR 1970 Percent Heavy Vehicles 12 Median Type/Storage Undivided RT Channelized? Lanes 2 Configuration LT T Upstream Signal? No No Minor Street Movements 10 11 12 Τ R R T. Т Volume 5 Peak Hour Factor, PHF 0.91 Peak-15 Minute Volume 1 5 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
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 C Movement	Calculation 1 L	on 4 L	7 L	8 T	9 R	10 L	11 T	12 R		
t(c,base) t(c,hv) P(hv)	4.1 1.00 12	1.00	1.00	1.00	1.00	7.1 1.00 0	1.00	1.00	-	
t(c,g) Percent Grade			0.20	0.20	0.10	0.20	0.20	0.10 0.00		
	ige 0.00 ige 4.2	0.00	0.00	0.00	0.00	0.70 0.00 1.00 6.4	0.00	0.00		
Follow-Up Time	Calculat	tions 4	7	8	9	10	11	12	_	
	L	L	L	T	R	L	T	 R	_	
t(f,base) t(f,HV) P(HV) t(f)	2.20 0.90 12 2.3	0.90	0.90	0.90	0.90	3.50 0.90 0 3.5	0.90	0.90	_	
Worksheet 5-Ef	fect of T	Upstream	m Signa	ls					_	
Computation 1-	-Queue Cle	earance	Time a	t Upstr	_				_	
				V (	Moveme: t) V(	nt 2 l,prot)		vement 5 V(l,prot)		
Rp (from Exhib Proportion veh g(q1) g(q2) g(q)	nicles ar	riving (	_						_	
Computation 2-	-Proportio	on of T	WSC Inte	ersecti V(	Moveme		Mo	vement 5 V(1,prot)	_	
alpha beta Travel time, t Smoothing Fact Proportion of Max platooned Min platooned Duration of bl Proportion tim	cor, F conflict: flow, V(o flow, V(o	ing flow c,max) c,min) riod, t			0.00	0	\	0.000	-	
Computation 3-	-Platoon 1	Event Pe	eriods	Res	ult		<b>\</b>		_	
p(2) p(5) p(dom) p(subo) Constrained or	unconst	rained?		0.0						
Proportion unblocked for minor movements, p(x	:)	(1) Single	-stage	Sta	(2) Two-Sta	age Proc	(3) cess tage II	75		(
p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12)									7	



								origonina	11001
Computation 4 and 5 Single-Stage Process									
Movement		1 7	8 T	9 R	10	11 T	12		
	. Т	ىل د	Т	K	L	Т	R		
V c,x	0				1003			_	
Px									
V c,u,x									
C r,x C plat,x								-	
Thus Chara Drassas								_	
	7 Stage2 St	8 tage1 Sta	ıge2 Stage	10 e1 St	age2 S	11 stage1			
V(c,x)								_	
s P(x)				30	000				
√(c,u,x)									
C(r,x) C(plat,x)								_	
Worksheet 6-Impedance	and Capaci	itv Equati	ons					_	
Step 1: RT from Minor			-	9		12		_	
								_	
Conflicting Flows Potential Capacity									
Pedestrian Impedance	Factor		1.0	0.0		1.00			
Movement Capacity Probability of Queue	free St.		1.0	0.0		1.00			
Step 2: LT from Major	St.			4		1		_	
Conflicting Flows						0		_	
Potential Capacity						1560			
Pedestrian Impedance Movement Capacity	Factor		1.0	J U		1.00 1560			
Probability of Queue			1.0	0.0		0.99			
Maj L-Shared Prob Q f								_	
Step 3: TH from Minor	St.			8		11		_	
Conflicting Flows Potential Capacity									
Pedestrian Impedance			1.0			1.00			
Cap. Adj. factor due	to Impeding	g mvmnt	0.9	99		0.99			
Movement Capacity Probability of Queue	free St.		1.0	0.0		1.00			
Step 4: LT from Minor	St.			7	$\neg$	10		-	
Conflicting Flows				$\overline{\mathcal{A}}$	_	1003		-	
Potential Capacity						271			
Pedestrian Impedance Maj. L, Min T Impedan			1.0			1.00			
Maj. L, Min T Adj. Im Maj. L, Min T Adj. Im			1.0			\	/	\	
Cap. Adj. factor due		g mvmnt	1.0			0.99	/	\	
Movement Capacity						269			
Worksheet 7-Computati	on of the E	Effect of	Two-stage	Gap A	Acceptar	ıce			
Step 3: TH from Minor	St.			8	_	11	>  -	1///	
Part 1 - First Stage				_	$\rightarrow$			- ++-	_
Conflicting Flows						\ \	\	] ]	
Potential Capacity Pedestrian Impedance	Factor					\			
Cap. Adj. factor due		g mvmnt				一 )		// /	
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 1.00 1.00 Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt 0.99 0.99 Movement Capacity Result for 2 stage process: У c t 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 1003 Potential Capacity 271 Pedestrian Impedance Factor 1.00 1.00 0.99  $\mbox{{\sc Maj.}}$  L,  $\mbox{{\sc Min}}$  T Impedance factor Maj. L, Min T Adj. Imp Factor. 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 0.99 Movement Capacity 269 Results for Two-stage process: а У c t 269 Worksheet 8-Shared Lane Calculations Movement 8 10 11 Т R L Τ Volume (vph) Movement Capacity (vph) 269 Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 9 12 8 10 11 L Т R L Т R C sep 269 Volume 5 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)	9					5		
C(m) (vph)	1560					269		
v/c	0.01					0.02		
95% queue length	0.02					0.06		
Control Delay	7.3					18.6		
LOS	A					С		
Approach Delay							18.6	
Approach LOS							С	

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	2	
d(rank,1) Delay for stream 2 or 5		

### 1.1.2.12 Interseção F — Pico Tarde

 ${\tt HCS+:} \ {\tt Unsignalized} \ {\tt Intersections} \ {\tt Release} \ {\tt 5.6}$ 

\_\_TWO-WAY STOP CONTROL SUMMARY\_\_

Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Analysis lime folic:
Intersection: F
Turisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023

Project ID:

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

Study period (hrs): 1.00 Intersection Orientation: EW

Veh	icle Volumes	and Adjus	tments	\		
Major Street: Approach	Eastbou	ınd _	West	tbound		_
Movement	1 2	3	4	5 6		
	L T	R	i L	T R	/ _	
Volume	6 717	<del> </del>		$\overline{}$		-\
Peak-Hour Factor, PHF	0.91 0.9	1		\ \		\
Hourly Flow Rate, HFR	6 787					
Percent Heavy Vehicles	0	(	\			
Median Type/Storage	Undivided		/	_		_ ` )
RT Channelized?						
Lanes	0 2				_	
Configuration	LT T			. \	/>  -	<u> </u>
Upstream Signal?	No			No	/ /	/ / / /
_					1 1	
Minor Street: Approach	Northbo	und	Sout	thbound		_
Movement	7 8	9	10	11 12	2\ \	// /
	L T	R	L	T R		
Volume			4			
Peak Hour Factor, PHF			0.91			1
Hourly Flow Rate, HFR			4			<u> </u>
Percent Heavy Vehicles			0			
Percent Grade (%)	0			0	<b>\</b>	



Flared Approach: Exists?/Storage 1 L Lanes Configuration

Approach	_Delay,	Queue WB	Le	ngt	h, and Leve Northbound		Ser		uthbound	d
Movement	1	4		7	8	9	- 1	10	11	12
Lane Config	LT						I	L		
v (vph)	6							4		
C(m) (vph)	1636							604		
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:

DER/DF

\_TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_\_\_

Analyst: Progeplan

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

Intersection:
Jurisdiction:

Units: U. S. Metric Analysis Year: 2023

Project ID:

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

North/South Street: M12
Intersection Orientation: EW

Intersection Orientatio	n: EW		S	tudy pe	riod (f	nrs): 1.	00	
	Vehicle '	Volumes	and Ad	justmen	its			
Major Street Movements	_ 1	2	3	4	5	6		_
-	L	T	R	L	T	R		
Volume	6	717						-
Peak-Hour Factor, PHF	0.91	0.91						
Peak-15 Minute Volume	2	197						
Hourly Flow Rate, HFR	6	787			/ \			
Percent Heavy Vehicles	0				/ \			
Median Type/Storage RT Channelized?	Undi	vided					)	
Lanes	0	2				\ /		
Configuration	L	ГТ	<b>\</b>			\		
Upstream Signal?		No			No	1 /		\
Minor Street Movements	7	8	9	10	11	12		
	L	T	R	L	Т	R		
Volume				4		$\nearrow \nearrow$		_
Peak Hour Factor, PHF				0.91			$\wedge$ $\vdash$	_ \ \
Peak-15 Minute Volume				1		\ /		111
Hourly Flow Rate, HFR				4		( ) /	/	_ / / /
Percent Heavy Vehicles				0				$\rightarrow$
Percent Grade (%)		0			0	\	\	/ /
Flared Approach: Exist	s?/Storag	е		/	\	\	<u>/</u>	
RT Channelized								
Lanes				1				//
Configuration				I	ı	· ·		
								_
P	edestrian	Volume	s and A	diustme	nts			1



Movements		13	3 :	14	15	16		
Flow (ped/hr) Lane Width (m) Walking Speed (m, Percent Blockage	/sec)		.6 3	3.6 1.2	0 3.6 1.2 0	0 3.6 1.2 0		
		II	nstream	m Siar	nal Data			
	Prog. Flow vph	Sat Flow vph	Arriv	val	Green Time sec	Cycle Length sec	Prog. Speed kph	Distance to Signal meters
S2 Left-Turn Through S5 Left-Turn Through								
Worksheet 3-Data	for Com	nputing	Effect	t of I	Delay t	o Major	Street V	Vehicles
					Movem	ent 2	Moveme	ent 5
Shared in volume, Shared in volume, Sat flow rate, ma Sat flow rate, ma Number of major s	major ajor th	rt vehicle	icles: es:	:	0 0 170 170 2			
Worksheet 4-Crit			ollow-u	up Tin	ne Calc	ulation		
Critical Gap Calo Movement	culatior 1 L	1 4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base) t(c,hv) P(hv)	4.1 1.00 0	1.00	1.00	1.00	1.0	7.1 0 1.00 0	1.00	1.00
t(c,g) Percent Grade	0.00		0.20	0.20		0.00	0.00	0.10 0.00
t(3,lt) t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage	0.00	0.00	0.00	0.00			0.00	0.00
Follow-Up Time Ca Movement	alculati 1 L	ons 4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base) t(f,HV) P(HV) t(f)	2.20 0.90 0 2.2	0.90	0.90	0.90	0.9	3.50 0 0.90 0 3.5		0.90
Worksheet 5-Effe	ct of Up	stream	Signa	ls				
Computation 1-Que	eue Clea	arance !	Time at	_	Move	ignal ment 2 V(l,prot		vement 5 V(1,prot)
V prog Total Saturation Arrival Type Effective Green, Cycle Length, C Rp (from Exhibit Proportion vehic: g(q1) g(q2) g(q)	g (sec) (sec) 16-11)			n P				

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

Movement 5 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) 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 9 10 11 12 1 L L R L Τ R V c,x 405 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)  $\overline{C(r,x)}$ C(plat,x) Worksheet 6-Impedance and Capacity Equations Step 1: RT from Minor St. 9 12 Conflicting Flows Potential Capacity 1.00 Pedestrian Impedance Factor 1.00 Movement Capacity Probability of Queue free St. 1.00 1.00 Step 2: LT from Major St. 4 1 Conflicting Flows 0 1636 Potential Capacity 1.00 Pedestrian Impedance Factor 1.00 Movement Capacity 1636 1.00 Probability of Queue free St. 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	1 00	1 00	
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
step 4. II from Minor St.	,	10	
Conflicting Flows		405	
Potential Capacity		606	
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 mymnt	1.00	1.00	
Movement Capacity		604	
Worksheet 7-Computation of the Effect of T	wo-stage Gap Aco	ceptance	
Step 3: TH from Minor St.	8	11	
		<u> </u>	
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	1.00	1.00	
Movement Capacity			
Result for 2 stage process:			
a			
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	$\sim$ $\perp$		
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			1 1 1
Conflicting Flows		405	\
Potential Capacity		606	7
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 mymnt	1.00	1.00	
Movement Capacity		604	1
Possilte for Two-stage process.			1
Results for Two-stage process:			1
a			



y C t								604	
Worksheet 8-Shared	Lane Ca	alculati	ons						
Movement			I		8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity Shared Lane Capacit		)					4 604		
Worksheet 9-Computa	ation o	f Effect	of Fl	ared	Min	or Stree	t Appro	oaches	
Movement			I		8 T	9 R	10 L	11 T	12 R
C sep Volume Delay Q sep Q sep +1 round (Qsep +1)							604		
n max C sh SUM C sep n C act									
Worksheet 10-Delay,	Queue	Length,	and I	Level	of	Service			
Movement Lane Config	1 LT	4	7	8		9	10 L	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						4 604 0.01 0.02 11.0 B	11.0 B	

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	<b>~</b> )
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	/	\ \ \

# 1.1.2.13 Interseção G – 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: G
Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023



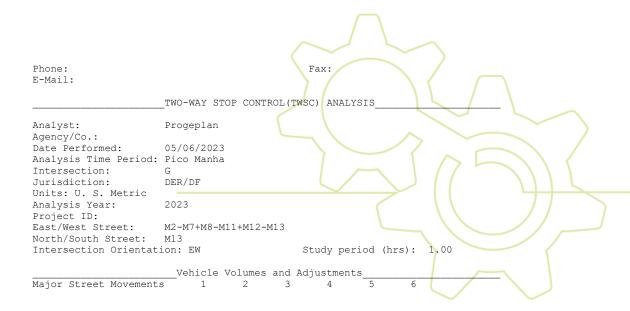
Project ID:

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

Study period (hrs): 1.00 Intersection Orientation: EW

	Veh	icle Vol	umes an	d Adjus	stme	nts				
Major Street:	Approach		stbound	_		_	Westbound			
-	Movement	1	2	3	- 1	4	5	6		
		L	Т	R	i	L	T	R		
Volume						30	721			
Peak-Hour Fact	or, PHF					0.9	0.91			
Hourly Flow Ra	te, HFR					32	792			
Percent Heavy						4				
Median Type/St		Undiv	ided			/				
RT Channelized										
Lanes							0 2			
Configuration							LT T			
Upstream Signa	12		No				No			
opooroum orgina	· <b>-</b> •		1.0				1.0			
Minor Street:	Approach	No	rthboun	d			Southbound			
	Movement	7	8	9		10	11	12		
		L	T	R		L	T	R		
Volume		2								
Peak Hour Fact		1.00								
Hourly Flow Ra		2								
Percent Heavy		0								
Percent Grade	(%)		0				0			
Flared Approac	h: Exists?	//Storage	:		/				/	
Lanes		1								
Configuration		I	ı							
	Delav	Queue Le	nath a	nd Leve	<u> </u>	f Sc	rvice			
Approach	EB	WB		thbound		1 50		hbounc	۹	
Movement	1	4 1	7	8	9	1		11	12	
Lane Config	-	LT I	L	Ü		i	10			
Edite Confire		22				'				
v (vph)		32	2							
C(m) (vph)		1610	552							
v/c		0.02	0.00							
95% queue leng	th	0.06	0.01							
Control Delay		7.3	11.5							
LOS		A	В							
Approach Delay				11.5						
Approach LOS				В						
11										

HCS+: Unsignalized Intersections Release 5.6





		L	Т	R	L	Т	R	
Volume					30	721		
Peak-Hour Factor	, PHF				0.91	0.91		
Peak-15 Minute V	olume				8	198		
Hourly Flow Rate	, HFR				32	792		
Percent Heavy Vel					4			
Median Type/Store		Uno	divided		/			
RT Channelized?	- , -				,			
Lanes					0	2		
Configuration						TT		
Jpstream Signal?			No		_	No		
.1								
Minor Street Move	ements	7	8	9	10	11	12	
		L	T	R	L	Т	R	
olume		2						
eak Hour Factor	, PHF	1.0	0					
Peak-15 Minute V	olume	0						
Hourly Flow Rate	, HFR	2						
Percent Heavy Vel		0						
ercent Grade (%			0			0		
Plared Approach:		s?/Stora	age		/			/
RT Channelized			_		•			
Lanes			1					
Configuration			L					
,01111901001011			_					
	P€	edestri	an Volum	es and A	djustme	nts_		
fovements		1			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			
_								
		Uj	pstream	Signal I	ata			
	Prog.	Sat	Arriva	1 Gree	en Cycl	e Prog	. Dista	nce
			_		T	th Spee	d to Sid	gnal
	Flow	Flow	Type	Tim∈	e Leng	rii spee		
	Flow vph	Flow vph	Type	Time sec	e Leng sec			rs
			Type					rs
S2 Left-Turn			Type					rs 
S2 Left-Turn Through			Type					rs 
Through			Type					rs 
Through			Type 					rs 
Through S5 Left-Turn			Type					rs 
Through S5 Left-Turn			Type					rs 
Through S5 Left-Turn Through	vph	vph		sec	sec	kph	n mete	
Through S5 Left-Turn Through	vph	vph		sec	sec	kph	n mete	
Through S5 Left-Turn Through	vph	vph		sec	sec	or Stree	n mete	
Through S5 Left-Turn	vph	vph		sec	sec	or Stree	mete:	
Through S5 Left-Turn Through Worksheet 3-Data Shared ln volume	<pre>ph for Com , major</pre>	vph mputing th veh	Effect	sec	sec	or Stree	mete:	
Through S5 Left-Turn Through  Worksheet 3-Data	<pre>ph for Com , major</pre>	vph mputing th veh	Effect	sec	sec	or Stree	mete:	
Through S5 Left-Turn Through Worksheet 3-Data Shared ln volume Shared ln volume	for Com	wph mputing th veh.	Effect icles:	sec	sec	or Stree	mete:	
Through S5 Left-Turn Through Worksheet 3-Data	for Com , major , major ajor th	wph mputing th veh rt veh vehicle	Effect icles: icles: es:	sec	sec	or Stree	mete:	
Through S5 Left-Turn Through Worksheet 3-Data Shared in volume Shared in volume Start flow rate, m.	for Com , major , major ajor th ajor rt	th veh. rt veh. vehicle	Effect icles: icles: es:	sec	sec	or Stree	rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m.	for Com , major , major ajor th ajor rt	th veh. rt veh. vehicle	Effect icles: icles: es:	sec	sec	or Stree	rement 5	
Through 55 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Number of major	for Com , major , major th ajor th street t	th veh. rt veh. vehicle	Effect icles: icles: es: es: lanes:	of Delay	to Maj	or Stree	rement 5	
Through 65 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sumber of major	for Com , major , major th ajor th street t	th veh. rt veh. vehicle	Effect icles: icles: es: es: lanes:	of Delay	to Maj	or Stree	rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major	for Com , major , major th ajor rt street t	wph mputing th veh rt veh vehicle chrough	Effect icles: icles: es: es: lanes:	of Delay	to Maj	or Stree	rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major	for Com , major , major th ajor rt street t	wph mputing th veh rt veh vehicle chrough	Effect icles: icles: es: es: lanes:	of Delay	r to Maj	or Stree	meter vehicles vement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major Worksheet 4-Crit Critical Gap Cale	for Com , major , major th ajor rt street t	wph mputing th veh rt veh vehicle chrough	Effect icles: icles: es: es: lanes:	of Delay	r to Maj	or Stree	mete:  et Vehicle:  rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major Worksheet 4-Crit Critical Gap Cale	for Com , major , major th ajor rt street t ical Gag	wph mputing th veh rt veh vehicle chrough and Fe	Effect icles: icles: es: es: lanes:	of Delay Mov	y to Maj yement 2	or Stree	rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major Worksheet 4-Crit Critical Gap Cale	for Com , major , major ajor th ajor rt street t ical Gag culation	th veh rt veh vehicle through	Effect icles: icles: es: es: es: ollow-up	of Delay Mov	y to Maj yement 2	or Stree	mete:  of Vehicles  rement 5	
Through St Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sumber of major Worksheet 4-Crit. Critical Gap Calculations	for Com , major , major ajor th ajor rt street t ical Gag culation	th veh rt veh vehicle through	Effect icles: icles: es: es: es: ollow-up	of Delay Mov	y to Maj yement 2	or Stree	rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major Worksheet 4-Crit. Critical Gap Calc Movement	for Com , major , major ajor th ajor rt street t ical Gag culation	th veh. rt veh. vehicle hrough	Effect  icles: icles: es: es: lanes:	of Delay Mov	y to Maj yement 2	or Stree	rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Shared In volume Shared In volume Start flow rate, m. Start flow r	for Com  , major , major th ajor th street t  ical Gag culation 1 L	th veh. rt veh. vehicle through  and Fe  4.1	Effect icles: icles: es: es: lanes:  ollow-up  7 L  7.1 1.00	of Delay Mov	y to Maj yement 2	or Stree	rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major Worksheet 4-Crit. Critical Gap Call Movement  C(c,base) C(c,hv) P(hv)	for Com  , major , major th ajor th street t  ical Gag culation 1 L	th veh. rt veh. vehicle through  and Fe  4  L  4.1 1.00	Effect icles: icles: es: es: lanes:  ollow-up  7 L  7.1 1.00 0	of Delay Mov	r to Maj rement 2	or Stree	rement 5	
Through 55 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sumber of major Worksheet 4-Crit. Critical Gap Cal Movement  C(c,base) C(c,hv) C(c,g)	for Com  , major , major th ajor th street t  ical Gag culation 1 L	th veh. rt veh. vehicle through  and Fe  4  L  4.1 1.00	Effect  icles: icles: es: es: lanes:  7 L  7.1 1.00 0 0.20	of Delay Mov Time Ca 8 T 1.00 1	r to Maj rement 2	or Stree  Mov  0 0 11 1 2 0 1.00 1.20 0.20	mete:  t Vehicles  rement 5  700  700  12  R  00 1.00  20 0.10	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sumber of major Worksheet 4-Crit. Critical Gap Calc Movement  t(c,base) t(c,hv) P(hv) P(c,g) Percent Grade	for Com  , major , major th ajor th street t  ical Gag culation 1 L	th vehicle vehicle through and February 4.1	Effect  icles: icles: es: es: lanes:  7.1 1.00 0 0.20 0.00	of Delay Mov Time Ca 8 T 1.00 1	y to Maj yement 2 alculati 9 1 R	or Stree  Mov  0 0 11 1 2 0 1.00 1.20 0.20	rement 5	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major: Worksheet 4-Crit. Critical Gap Calc Movement  t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt)	for Com , major , major th ajor th street t  ical Gag culation 1 L	th veh. rt veh. vehicle through  and Fe  4.1 1.00 4	Effect  icles: icles: es: es: 1anes:  7.1 1.00 0 0.20 0.00 0.70	Mov	y to Maj yement 2 alculati 9 R 10.10 0	or Stree	mete:  ret Vehicle: rement 5  700 700  12 R  00 1.00 20 0.10 00 0.00	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Shared In volume Shared In volume Sat flow rate, m. Sumber of major Worksheet 4-Crit. Critical Gap Call Movement  E(c,base) E(c,hv) E(hv) E(c,g) Percent Grade E(3,lt) E(c,T): 1-stage	for Com  , major , major th ajor th street the control of the cont	th veh. rt veh. vehicle through  and Fe  4.1 1.00 4	Effect  icles: icles: es: es: lanes:  7.1 1.00 0 0.20 0.00 0.70 0.00	of Delay Mov  Time Ca  8 T  1.00 1 0.20 0 0.00 0	y to Maj yement 2 alculati 9 1 R00 1	or Street  Mov  0 11 1 2 0 1 1 1 2 0 0 0 0 0 0 0 0 0 0	mete:  rement 5  700  700  12  R  00 1.00  20 0.10 00 0.00 00 0.00	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major Worksheet 4-Crit. Critical Gap Calc Movement  t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage 2-stage	for Com  , major , major th ajor th street the control of the cont	th veh rt veh vehicle through  and Fe  4.1 1.00 4 0.00 0.00 0.00 0.00	Effect icles: icles: es: es: lanes:  7 L 7.1 1.00 0 0.20 0.00 0.70 0.00 1.00	of Delay Mov  Time Ca  8 T  1.00 1 0.20 0 0.00 0	y to Maj yement 2 alculati 9 1 R00 1	or Street  Mov  00  11 12  00  1.00  0.00  0.00  0.00	mete:  ret Vehicle: rement 5  700 700  12 R  00 1.00 20 0.10 00 0.00	
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m. Sumber of major Worksheet 4-Crit. Critical Gap Call Movement  t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage	for Com  , major , major ajor th ajor rt street to  ical Gag culation 1 L  1.00  0.00 0.00	th veh. rt veh. vehicle through  and Fe  4.1 1.00 4	Effect  icles: icles: es: es: lanes:  7.1 1.00 0 0.20 0.00 0.70 0.00	of Delay Mov  Time Ca  8 T  1.00 1 0.20 0 0.00 0	y to Maj yement 2 alculati 9 1 R00 1	or Street  Mov  0 11 1 2 0 1 1 1 2 0 0 0 0 0 0 0 0 0 0	mete:  rement 5  700  700  12  R  00 1.00  20 0.10 00 0.00 00 0.00	

Follow-Up Time Calculations
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) P(HV)	0.90	0.90 4	0.90 0	0.90	0.90	0.90	0.90	0.90	
(f)		2.2	3.5						
rksheet 5-Ef	fect of	Upstream	m Signa	ls					
mputation 1-	-Queue Cl	earance	Time a	t Upstr	eam Sig		Mo	vement 5	
				V(		1,prot)			.)
prog									
otal Saturati rrival Type ffective Gree	en, g (se		(vph)						
ycle Length, o (from Exhib roportion veh	oit 16-11		on gree	n P					
q1) q2) q)									
omputation 2-	-Proporti	on of T	WSC Int	ersecti					
				V (	Moveme t) V(			vement 5 V(l,prot	.)
lpha									
eta ravel time, t moothing Fact roportion of	or, F		w, f						
x platooned n platooned									
ration of bl coportion tim	ocked pe	riod, t	(p)		0.00	0		0.000	
omputation 3-	-Platoon 1	Event Pe	eriods	Res	ult				
2)				0.0					
(5) (dom)				0.0	00				
subo)									
nstrained or	unconst	rained?							
oportion					·		(2)		
blocked r minor		(1) Single			(2) Two-St	age Pro	(3) cess		
rements, p(x	()	Proce		Sta	ge I	_	tage II		
1)									
(4) (7)							1		
(8)						/	\		
(9)									
(10)								)	
(11) (12)					> /				
omputation 4	and 5				$\mathcal{H}$				\
ingle-Stage F ovement		1	1	7		0	1.0	11 10	
vement		1 L	4 L	7 L	8 T	9 R	10 L	11 12 T R	
C,X			0	460	<del></del>			<u> </u>	
ζ.									11
c,u,x						<u></u>	$\rightarrow$		
r,x								-+-	— <i>/</i>
plat,x								1/	
o-Stage Proc						1.0		111	
_	7		Stage1	8 Stage	2 Stag	10 rel Stad	ge2 St	11 agel Stag	je2



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 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 11 Step 3: TH from Minor St. Conflicting Flows Potential Capacity 1.00 1.00 Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt 0.98 0.98 Movement Capacity 1.00 1.00 Probability of Queue free St. 10 Step 4: LT from Minor St. Conflicting Flows 460 Potential Capacity 563 Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance factor 0.98 Maj. L, Min T Adj. Imp Factor. 0.98 0.98 Cap. Adj. factor due to Impeding mvmnt 0.98 Movement Capacity 552 Worksheet 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 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 0.98 Cap. Adj. factor due to Impeding mvmnt 0.98 Movement Capacity

Result for 2 stage process:

a y C t



Probability of Queue free St.		1	.00		1.00	
tep 4: LT from Minor St.			7		10	
rt 1 - First Stage						
onflicting Flows						
otential Capacity edestrian Impedance Factor						
ap. Adj. factor due to Impeding	mvmnt					
ovement Capacity						
art 2 - Second Stage						
onflicting Flows						
otential Capacity edestrian Impedance Factor						
ap. Adj. factor due to Impeding	mymnt					
ovement Capacity						
art 3 - Single Stage						
onflicting Flows		4	60			
otential Capacity			63			
edestrian Impedance Factor		1	.00		1.00	
aj. L, Min T Impedance factor aj. L, Min T Adj. Imp Factor.					0.98 0.98	
ap. Adj. factor due to Impeding	mvmnt	0	.98		0.98	
ovement Capacity		5	52			
esults for Two-stage process:						
t		5	52			
rksheet 8-Shared Lane Calculati	ons					
ovement	7	8	9	10	11	12
	L	Т	R	L	Т	R
lume (vph) vement Capacity (vph) ared Lane Capacity (vph)	2 552					
orksheet 9-Computation of Effect	of Flare	d Minor	Street		.ches	
ovement	7	8	9	10	11	12
venienc	L	T	R	L	Т	R
sep	552					
lume lay	2					
sep						
sep +1						
ound (Qsep +1)						
max				$\overline{}$		
sh			<b>_</b>			
JM C sep						
act						
acc		1 /			<b>\</b>	
orksheet 10-Delay, Queue Length,	and Leve	1 of Se	rvice			
Novement 1 4	7	8	9	10	11	12
ane Config LT	L			10	7	
(amb)					1-	>—
(vph) 32 (m) (vph) 1610	2 552	- 1			) / /	/
(m) (vpn) 1610 /c 0.02	0.00		<u> </u>		- [ [	
5% queue length 0.06	0.01					
ontrol Delay 7.3	11.5			\		
OS A pproach Delay	B 1	1.5			¬ \	
pproach LOS		1.5 B				
<del>-</del> 						
		D = 3				
rksheet 11-Shared Major LT Impe	uance and	ретау				



	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

# 1.1.2.14 Interseção G – 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: G Jurisdiction: Units: U. S. Metric DER/DF Analysis Year: Project ID: 2023

LOS

Approach Delay

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

Intersection Orientation: EW

Study period (hrs): 1.00

Incersection off	encacion.	EW		50	uuy	berro	J (III.S).	. 1.00
	Veh	icle Vol	umes an	d Adjus	tme	nts		
Major Street: A	pproach	Ea	stbound	_		Wes	stbound	
M	ovement	1	2	3	- 1	4	5	6
		L	T	R	i	L	T	R
Volume						35	1978	
Peak-Hour Factor	, PHF					0.91	0.91	
Hourly Flow Rate	, HFR					38	2173	
Percent Heavy Ve	hicles					0		
Median Type/Stor	age	Undiv	rided			/		
RT Channelized?	-							
Lanes						0	2	
Configuration						L:	ГТ	
Upstream Signal?			No				No	
-F								
Minor Street: A	pproach	No	rthboun	d		Soı	ıthbound	l
	ovement	7	8	9	- 1	10	11	12
		L	Т	R	i	L /	Т	R
							1	
Volume		6						
Peak Hour Factor	, PHF	1.00						
Hourly Flow Rate		6						/ _
Percent Heavy Ve		0		7			\	( /
Percent Grade (%			0		- /		0	\ \
Flared Approach:	•	/Storage	2		/			
Lanes		1			- \			
Configuration		т.		1	_ \			
001111901001011		_	-		\ '			>
					7			
	Delav,	Queue Le	ength, a	nd Leve	1 0	f Servi	ice	
Approach	EB ,	WB		thbound				bound
Movement	1	4 1	7	8	9	/ i ·		1 12
Lane Config		LT I	L	-				-
24 00119			_			'		\ \
v (vph)		38	6				<del></del>	
C(m) (vph)		1636	213					7 / \
v/c		0.02	0.03					
95% queue length		0.02	0.09					7
Control Delay		7.3	22.4					1
tor		7.5	22.4					

22.4

A C



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 Tarde Intersection: G 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	Adjustment	s		
Major Street Movements	_ 1	2	3	4	5	6	
	L	T	R	L	T	R	
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 RT Channelized?	Und	ivided		/			
Lanes				0	2		
Configuration				LT	T		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	Т	R	

Volume Peak Hour Factor, PHF 1.00 Peak-15 Minute Volume Hourly Flow Rate, HFR 6 Percent Heavy Vehicles 0 Percent Grade (%) Flared Approach: Exists?/Storage RT Channelized

Lanes Configuration

Pedestrian Volumes and Adjustments 15 Movements 13 14 16 Flow (ped/hr) 0 0 Lane Width (m) 3.6 3.6 3.6 3.6 Walking Speed (m/sec) Percent Blockage 1.2 1.2 1.2 1.2 0 0 0 0

	Up	stream Si	gnal Dat	a		
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-Da	ta for	Computing	Fffoct	οf	Delatz	+0	Maior	Stroot	Vahiclas

				]	Movemen	t 2	Movemen	nt 5
Shared ln volu	me, majo	r th ve	nicles:				0	
Shared ln volu	me, majo	r rt vel	nicles:				0	
Sat flow rate,	major t	h vehic	les:				1700	
Sat flow rate,	major r	t vehic	les:				1700	
Number of majo	r street	through	n lanes	:			2	
		, ,	- 11	m ·	a 1 1			
Worksheet 4-Cr	itical G	ap and .	F.OTTOM-	up Time	Calcula	ation		
Critical Gap C	alculati							
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	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-sta	ge 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-sta	ge 0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-sta	ge	4.1	6.4					
2-sta	ge							
Follow-Up Time	Calcula	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					
- , , ,	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
t(f,HV)		0	0					
t(f,HV) P(HV)								

Computation 1-Queue Clearance Time at Upstream Signal

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

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

Constrained or unconstrained?



Proportion								
unblocked	(1			2)		(3)		
for minor movements, p(x)	Single Proc	-stage	Stag	Two-Sta e T	-	ocess Stage	тт	
p(1) p(4)								
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	T	R
V c,x		0	1162					
S								
Px								
V c,u,x								
C r,x								
C plat,x								
Wo-Stage Process	7		0		1.0			1
Stage1	7 L Stage2	Stage1	8 Stage2	Stage	10 :1 St	age2	11 Stagel	
V(C,X) s	3000							
P(x)	3000							
/(c,u,x)								
C(plat,x)								
	ce and Cap	eacity E	quations					
Worksheet 6-Impedanc		eacity E	quations		9		12	
Worksheet 6-Impedance		eacity E	quations		9		12	
Worksheet 6-Impedand Step 1: RT from Mind Conflicting Flows		pacity E	quations		9		12	
Worksheet 6-Impedance Step 1: RT from Minc Conflicting Flows Potential Capacity Pedestrian Impedance	or St.	eacity E	quations	1.0			12	
Worksheet 6-Impedance Step 1: RT from Mino Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity	or St.		quations	1.0	0		1.00	
Worksheet 6-Impedance Step 1: RT from Mino Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity	or St.		quations		0			
Worksheet 6-Impedance Step 1: RT from Mino Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue	e Factor		quations	1.0	0		1.00	
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 Factor		quations	1.0	0		1.00	
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 Factor		quations	1.0	0 0		1.00	
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	or St.  e Factor e free St.  or St.		quations	1.0	0 0 4		1.00	
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 Pedestrian Impedance Movement Capacity	e Factor e free St. or St.		quations	1.0 1.0 1.0 0 163 1.0 163	0 0 4		1.00	
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 Pedestrian Impedance Movement Capacity Probability of Queue	or St.  e Factor  e free St.  or St.		quations	1.0 1.0 1.0 0 163 1.0 163	00 4 4 6 6 0 6 6 8 8		1.00	
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 Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q	or St.  e Factor  e free St.  or St.		quations	1.0 1.0 1.0 0 163 1.0 163	00 4 4 6 6 0 6 6 8 8		1.00	
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 Pedestrian Impedance Movement Capacity Probability of Queue Movement Capacity Probability of Queue Maj L-Shared Prob Q	e Factor e free St.  Factor e free St.  free St.		quations	1.0 1.0 1.0 0 163 1.0 163	00 4 4 6 6 0 6 6 8 8		1.00	
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 Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q Step 3: TH from Mino	e Factor e free St.  Factor e free St.  free St.		quations	1.0 1.0 1.0 0 163 1.0 163	0 0 4		1.00 1.00 1 1.00	
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 Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q Step 3: TH from Mino Conflicting Flows	e Factor e free St.  Factor e free St.  free St.		quations	1.0 1.0 1.0 0 163 1.0 163	0 0 4		1.00 1.00 1 1.00	
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 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	or St.  e Factor e free St.  or St.  e Factor e free St. free St.			1.0 1.0 1.0 0 163 1.0 163 0.9	0 0 4 4 6 0 6 6 8 8 8 8 8		1.00 1.00 1 1.00	
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 Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q Step 3: TH from Mino Conflicting Flows Potential Capacity Pedestrian Impedance Capacity Pedestrian Impedance Capacity Pedestrian Impedance Capacity Pedestrian Impedance Cap. Adj. factor due	or St.  e Factor e free St.  or St.  e Factor e free St. free St.			1.0 1.0 0 163 1.0 163 0.9 0.9	0 0 4 4 6 0 6 6 8 8 8 8 8		1.00 1.00 1 1.00 1.00	
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 Pedestrian Impedance Movement 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 Pedestrian Impedance Cap. Adj. factor due Movement Capacity	e Factor e Factor e Factor e Factor e Factor e Factor e free St. or St.	ling mvm		1.0 1.0 1.63 1.0 163 0.9 0.9	0 0 4 6 6 0 6 8 8 8 8		1.00 1.00 1.00 1.00 1.00	
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 Pedestrian Impedance Movement 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 Pedestrian Impedance Cap. Adj. factor due Movement Capacity	e Factor e Factor e Factor e Factor e Factor e Factor e free St. or St.	ling mvm		1.0 1.0 1.0 0 163 1.0 163 0.9	0 0 4 6 6 0 6 8 8 8 8		1.00 1.00 1 1.00 1.00	<i></i>
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 Pedestrian Impedance Movement 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 Pedestrian Impedance Cap. Adj. factor due Movement Capacity Probability of Queue	e Factor e free St. or St. e Factor e free St. free St. or St. e Factor e free St. e Factor e to Imped	ling mvm		1.0 1.0 1.63 1.0 163 0.9 0.9	0 0 4 6 6 0 6 8 8 8 8		1.00 1.00 1.00 1.00 1.00	
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 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 Pedestrian Impedance Cap. Adj. factor due Movement Capacity Probability of Queue Step 4: LT from Mino Step 4: LT from Mino	e Factor e free St. or St. e Factor e free St. free St. or St. e Factor e free St. e Factor e to Imped	ling mvm		1.0 1.0 1.0 1.0 1.63 0.9 0.9	0 0 4 6 6 0 6 8 8 8 8		1.00 1.00 1.00 1.00 1.00 0.98 1.00	
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 Pedestrian Impedance Movement Capacity Probability of Queue	e Factor e free St. or St. e Factor e free St. free St. or St. e Factor e free St. e Factor e to Imped	ling mvm		1.0 1.0 1.63 1.0 163 0.9 0.9	0 0 4 4 6 6 0 6 8 8 8 8 8		1.00 1.00 1.00 1.00 1.00 0.98 1.00	
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 Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q Step 3: TH from Mino Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Probability of Queue Step 4: LT from Mino Conflicting Flows Potential Capacity Probability of Queue Step 4: LT from Mino Conflicting Flows Potential Capacity Pedestrian Impedance	e Factor e free St. or St. e Factor e free St. free St. or St. e Factor e free St. or St.	ling mvm		1.00 1.00 1.63 1.00 1.63 0.90 0.90 1.00	0 0 4 6 6 0 6 8 8 8 8 8		1.00 1.00 1.00 1.00 1.00 0.98 1.00	
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 Pedestrian Impedance Movement 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 Probability of Queue Step 4: LT from Mino Conflicting Flows Potential Capacity Probability of Queue Step 4: LT from Mino Conflicting Flows Potential Capacity Pedestrian Impedance Maj. L, Min T Impedance Maj. L, Min T Impedance	e Factor e free St. or St. e Factor e free St. free St. or St. e Factor e free St. or St. e Factor e for Imped	ling mvm		1.0 1.0 1.63 1.0 1.63 0.9 0.9	0 0 4 6 6 0 6 8 8 8 8 8		1.00 1.00 1.00 1.00 1.00 0.98 1.00 10	
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 Pedestrian Impedance Movement 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 Probability of Queue Step 4: LT from Mino Conflicting Flows Potential Capacity Probability of Queue Step 4: LT from Mino Conflicting Flows Potential Capacity Pedestrian Impedance Maj. L, Min T Impede Maj. L, Min T Imped Maj. L, Min T Imped Maj. L, Min T Adj. 1	e Factor e Factor e Factor e Factor e Factor e free St. free St. or St. e Factor e to Imped e free St. or St.	ling mvm	nt	1.00 1.00 1.00 1.00 1.00 1.00 0.90 1.00 1.0	0 0 0 4 4 6 6 0 6 8 8 8 8 8 0 7 7 5 2 0 0		1.00 1.00 1.00 1.00 1.00 0.98 1.00 0.98 0.98	
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 Pedestrian Impedance Movement 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 Probability of Queue Step 4: LT from Mino Conflicting Flows Potential Capacity Probability of Queue Step 4: LT from Mino Conflicting Flows Potential Capacity Pedestrian Impedance Maj. L, Min T Impedance Maj. L, Min T Impedance	e Factor e Factor e Factor e Factor e Factor e free St. free St. or St. e Factor e to Imped e free St. or St.	ling mvm	nt	1.0 1.0 1.63 1.0 1.63 0.9 0.9	0 0 4 6 0 6 8 8 8 8 0 7		1.00 1.00 1.00 1.00 1.00 0.98 1.00 10	



there or mu forces Miles or		1.1	
tep 3: TH from Minor St.	8	11	
eart 1 - First Stage Conflicting Flows Cotential Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymm Covement Capacity	nt		_
robability of Queue free St.			
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymn Movement Capacity	nt		_
Part 3 - Single Stage			
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmn Movement Capacity	nt 0.98	0.98	
Result for 2 stage process:			
1			
C t	4 00	4 00	
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 mvmm Movement Capacity	it		
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmn Movement Capacity	nt		_
Part 3 - Single Stage Conflicting Flows	1162		
Potential Capacity	218		
Pedestrian Impedance Factor  Maj. L, Min T Impedance factor  Maj. L, Min T Adj. Imp Factor.  Map. Adj. factor due to Impeding mymn  Movement Capacity	1.00 at 0.98 213	1.00 0.98 0.98 0.98	
Results for Two-stage process:	<b>\</b>		
i. 7	11		\
E t	213		
Towleshoot O Change Tarre C 1 2 1 1		$\overline{}$	
Norksheet 8-Shared Lane Calculations		$-1/\Lambda$	
fovement	7 8 9 L T R	10 11 12 L T R	7)
Volume (vph) Movement Capacity (vph) Chared Lane Capacity (vph)	6 213		
Norksheet 9-Computation of Effect of	Flared Minor Street	Annroaches	



Т т. R L Т R C sep 213 Volume 6 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 10 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 LOS С 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

#### 1.1.2.15 Interseção H - Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

1.00

TWO-WAY STOP CONTROL SUMMARY

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

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

Project ID:

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

North/South Street: M14

Intersection Orientation: EW Study period (hrs):

\_Vehicle Volumes and Adjustments\_ Major Street: Westbound Approach Eastbound 1 1 4 6 Movement 2 5 Τ Т  ${\tt L}$ R | L R Volume 1798

Peak-Hour Factor, PHF 0.91 0.91



1975 Hourly Flow Rate, HFR 1 Percent Heavy Vehicles 0 --Median Type/Storage Undivided RT Channelized? 0 2 Lanes LT T Configuration Upstream Signal? No No Northbound Southbound Minor Street: Approach | 10 Movement 8 11 12 Т R L Т Volume 30 Peak Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 32 Percent Heavy Vehicles 4 Percent Grade (%) Flared Approach: Exists?/Storage Lanes 1 Configuration

Delay, Queue Length, and Level of Service Southbound Approach EB WB Northbound 1 8 11 Movement 4 Lane Config LT | L v (vph) 32 271 C(m) (vph) 1636 0.00 0.12 v/c 95% queue length 0.00 0.40 Control Delay 20.1 7.2 LOS С Α Approach Delay 20.1 Approach LOS С

HCS+: Unsignalized Intersections Release 5.6

Study period (hrs):

R

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:

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

North/South Street: M14

Intersection Orientation: EW

 $\frac{}{\text{Major Street Movements}} \stackrel{\text{Vehicle Volumes and Adjustments}}{1} \stackrel{\text{2}}{2} \stackrel{\text{3}}{3} \stackrel{\text{4}}{4}$ 

najor berees nevements	L	T	R	L	Т
Volume	1	1798			
Peak-Hour Factor, PHF	0.91	0.91			
Peak-15 Minute Volume	0	494			
Hourly Flow Rate, HFR	1	1975			
Percent Heavy Vehicles	0				
Median Type/Storage RT Channelized?	Undi	vided		/	
Lanes	0	2			
Configuration	L	т т			
Upstream Signal?		No			No



		_									
Minor Street Move	ements	7 L	8 T		9 R	10 1 L	.1 1 T	.2 R			
						2.0				-	
Volume	DUE					30 0.91					
Peak Hour Factor, Peak-15 Minute Vo						8					
Hourly Flow Rate,						32					
Percent Heavy Veh						4					
Percent Grade (%)			0			(	)				
Flared Approach:	Exist	s?/Stor	age			/			/		
RT Channelized											
Lanes						1					
Configuration						L				_	
lovements	P	edestria 1		umes a	and Adj 15	ustments	5			-	
										-	
Flow (ped/hr)		0		0 3.6	0 3.6	0 3.6					
Lane Width (m) Walking Speed (m/	(500)			1.2	1.2	1.2					
ercent Blockage	360)	0		0	0	0					
	Prog.	U] Sat	pstrea Arri	_	nal Dat Green	Cycle	Prog.	Distan	ce	-	
	Flow	Flow			Time	Length	_	to Sign			
	vph	vph			sec	sec	kph	meter			
2 Left-Turn										-	
Through											
S5 Left-Turn											
Through											
										-	
ankaha-+ 2 5 :			rff	t of I	Delay t	o Maior	Street	Vehicles			
orksneet 3-Data	ior Co	mputing	Ellec	01 1	JOIN, C						
orksneet 3-Data	ior Col	mputing	Filec			nent 2		ment 5		-	
Worksheet 3-Data	ior Col	mputing	FILEC							-	
Norksheet 3-Data										-	
Shared in volume,	, major	th veh	icles:		Movem 0 0	ment 2				-	
Shared in volume, Shared in volume, Sat flow rate, ma	, major , major ajor th	th veh	icles: icles:		Movem 0 0 170	ment 2				-	
Shared In volume, Shared In volume, Sat flow rate, ma	, major , major ajor th	th vehicle vehicle	icles: icles: es: es:		0 0 170	ment 2				-	
Shared ln volume,	, major , major ajor th	th vehicle vehicle	icles: icles: es: es:		Movem 0 0 170	ment 2				-	
Shared in volume, Shared in volume, Sat flow rate, ma Sat flow rate, ma Sumber of major s	, major , major ajor th ajor rt street	th veh. rt veh. vehicle vehicle through	icles: icles: es: es: lanes	:	0 0 170 170 2	nent 2					
Shared in volume, Shared in volume, Sat flow rate, ma Sat flow rate, ma Sumber of major s	, major , major ajor th ajor rt street	th veh. rt veh. vehicle vehicle through	icles: icles: es: es: lanes	:	0 0 170 170 2	nent 2					
Chared In volume, Chared In volume, Chared In volume, Chart flow rate, ma Chart flow r	major major thajor rtstreet	th veh. rt veh. vehicle vehicle through	icles: icles: es: es: lanes	: up Tir	Movem 0 0 170 170 2	nent 2		ment 5		-	
Chared In volume, Chared In volume, Chared In volume, Chart flow rate, ma Chart flow r	major, major thajor rtstreet	th veh. rt veh. vehicle vehicle through p and Fe	icles: icles: es: es: lanes ollow-	: up Tir	Movem 0 0 170 170 2	nent 2	Moven	nent 5		-	
Chared In volume, thared In volume, thared In volume, that flow rate, make the flow rate flow ra	, major , major th ajor th ajor rt street ical Ga	th veh. rt veh. vehicle vehicle through	icles: icles: es: es: lanes	: up Tir	Movem 0 0 170 170 2	nent 2	Moven	ment 5		-	
Chared in volume, thared in volume, thared in volume, that flow rate, make the flow rate, and flow rate, make the flow rate, m	major, major thajor thajor rtstreet	th veh. rt veh. vehicle vehicle through p and Fe	icles: icles: es: es: lanes ollow-	: up Tir	Movem 0 0 170 170 2	nent 2	Moven	nent 5		-	
hared in volume, hared in volume, at flow rate, ma at flow rate, ma umber of major so forksheet 4-Critical Gap Calcovement	, major, major thajor rt street culation 1 L	th veh. rt veh. vehicle vehicle through  p and Fe	icles: icles: icles: es: es: lanes ollow-	: up Tir 8 T	Movem 0 0 170 170 2 me Calc	nent 2  00 00 culation 10 L	Moven 11 T	12 R		-	
Chared In volume, thared In volume, thared In volume, that flow rate, make the flow ra	, major, major thajor rt street culation 1 L 4.1	th veh. rt veh. vehicle vehicle through p and Fe	icles: icles: es: es: lanes ollow-	: up Tir	Movem 0 0 170 170 2 me Calc	200 200 200 200 200 200 200 200 200 200	Moven 11 T	12 R		-	
hared in volume, hared in volume, at flow rate, mat	, major, major thajor rt street culation 1 L	th veh. rt veh. vehicle vehicle through  p and Fe	icles: icles: es: es: lanes ollow- 7 L	: up Tir 8 T	Movem 0 0 170 170 2 mne Calc	00 00 culation 10 L	11 T	12 R		-	
Chared in volume, Corksheet 4-Critic Critical Gap Calc Covement  (c,base) (c,hv) (hv) (c,g)	, major, major thajor rt street culation 1 L 4.1	th veh. rt veh. vehicle vehicle through  p and Fe	icles: icles: es: es: lanes ollow- 7 L 1.00 0.20	: up Tir 8 T	Movem  0 0 170 170 2  me Calc  9 R  0 1.0	000 000 culation 10 L 7.1 00 1.00 4	11 T 1.00	12 R		-	
Chared in volume, Corksheet 4-Critic Critical Gap Calc Covement  (c,base) C(c,base) C(c,hv) C(c,g) Cercent Grade	, major, major thajor rt street culation 1 L 4.1 1.00	th veh. rt veh. vehicle vehicle through  p and Fe	icles: icles: es: es: lanes ollow- 7 L	: up Tir 8 T	Movem  0 0 170 170 2  me Calc  9 R  0 1.0	000 000 culation 10 L 7.1 00 1.00 4	11 T 1.000 0.20 0.000 0.000	12 R		-	
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Sumber of major s  Worksheet 4-Critic Critical Gap Calc Sovement  C(c,base) C(c,hv) C(hv) C(c,g) Cercent Grade E(3,1t)	, major, major thajor rt street culation 1 L 4.1 1.00 0	th veh. rt veh. vehicle vehicle through  p and Fe	icles: icles: es: es: lanes ollow- 7 L 1.00 0.20	: up Tir 8 T	Movem  0 0 170 170 2  me Calc  9 R  0 1.00 0.10 0.00 0.00	7.1 100 1,00 4 00 0.20 0.70 0.70 0.00	11 T 1.00 0.20 0.00 0.00	12 R 0 1.00 0 0.10 0 0.00			
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Sumber of major s  Worksheet 4-Critic Critical Gap Calc Movement  C(c,base) C(c,hv) C(hv) C(c,g) Cercent Grade C(3,1t) C(c,T): 1-stage 2-stage	major major thajor rt street culation 1 L 4.1 1.00 0	th vehicle vehicle through p and Fe	icles: icles: icles: es: es: lanes ollow- 7 L 1.00 0.20 0.00	:  8 T  1.00 0.20 0.00	Movem  0 0 170 170 2  me Calc  9 R  0 1.00 0.10 0.00 0.00	Total 2	11 T 1.00 0.20 0.000 0.000 0.000	12 R 0 1.00 0 0.10 0 0.00 0 0.00		-	
Chared In volume, thared In volume, thared In volume, that flow rate, make the flow ra	major major thajor rt street culation 1 L 4.1 1.00 0	th veh rt veh vehicle vehicle through p and Fe n 4 L	icles: icles: es: es: lanes ollow- 7 L 1.00 0.20 0.00 0.00	:  up Tir  8 T  1.00  0.20  0.00	Movem  0 0 170 170 2  me Calc  9 R  0 1.00 0.10 0.00 0.00	7.1 100 1,00 4 00 0.20 0.70 0.70 0.00	11 T 1.00 0.20 0.000 0.000 0.000	12 R 0 1.00 0 0.10 0 0.00			
Chared In volume, thared In volume, thared In volume, that flow rate, may at flow ra	major major thajor rt street culation 1 L 4.1 1.00 0	th veh rt veh vehicle vehicle through p and Fe n 4 L	icles: icles: es: es: lanes ollow- 7 L 1.00 0.20 0.00 0.00	:  up Tir  8 T  1.00  0.20  0.00	Movem  0 0 170 170 2  me Calc  9 R  0 1.00 0.10 0.00 0.00	Total 2	11 T 1.00 0.20 0.000 0.000 0.000	12 R 0 1.00 0 0.10 0 0.00			
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Sumber of major s  Worksheet 4-Critic Critical Gap Calc Governent  C(c,base) (c,hv) (hv) (c(c,g) Percent Grade (3,1t) (c(,T): 1-stage 2-stage 1-stage 2-stage	major, major thajor rtstreet culation 1 L 4.1 1.00 0 0.00 0.00 0.00 4.1	th veh rt veh vehicle vehicle through p and Fe n 4 L	icles: icles: es: es: lanes ollow- 7 L 1.00 0.20 0.00 0.00	:  up Tir  8 T  1.00  0.20  0.00	Movem  0 0 170 170 2  me Calc  9 R  0 1.00 0.10 0.00 0.00	Total 2	11 T 1.00 0.20 0.000 0.000 0.000	12 R 0 1.00 0 0.10 0 0.00			
Chared In volume, Shared In vo	major, major thajor rt street culation 1 L 4.1 1.00 0 0 0.00 0.00 4.1	th veh rt veh vehicle vehicle through  p and Fen 4 L  1.00  0.00 0.00	icles: icles: icles: es: es: lanes ollow- 7 L 1.00 0.20 0.00 0.00 1.00	:  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 0.00 0.00 0.00	7.1 00 1.00 4 00 0.20 0.70 0.00 0.00 0.70 0.00 0.00 6.4	11 T 1.00 0.20 0.00 0.1.00	12 R 0 1.00 0 0.10 0 0.00 0 0.00			
Chared In volume, thared In volume, thared In volume, thared In volume, that flow rate, may at flow ra	major, major thajor rt street culation 1 L 4.1 1.00 0 0 0.00 4.1 alculat 1	th veh rt veh vehicle vehicle through p and Fe n 4 L 1.00	icles: icles: es: es: lanes ollow- 7 L 1.00 0.20 0.00 0.00 1.00	:  Up Tir  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 0.00 0.00	7.1 100 1,00 4 200 0.20 0.00 0.70 0.00 0.00 0.00 0.00 1.00 6.4	11 T 1.00 0.20 0.000 0.000 0.000	12 R 0 1.00 0 0.10 0 0.00 0 0.00			$\rightarrow$
Chared In volume, thared In volume, thared In volume, thared In volume, that flow rate, may at flow ra	major, major thajor rt street culation 1 L 4.1 1.00 0 0 0.00 0.00 4.1	th veh rt veh vehicle vehicle through  p and Fen 4 L  1.00  0.00 0.00	icles: icles: icles: es: es: lanes ollow- 7 L 1.00 0.20 0.00 0.00 1.00	:  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 0.00 0.00 0.00	7.1 00 1.00 4 00 0.20 0.70 0.00 0.00 0.70 0.00 0.00 6.4	11 T 1.00 0.20 0.00 1.00	12 R 0 1.00 0 0.10 0 0.00 0 0.00			
Chared In volume, Corksheet 4-Critic Critical Gap Calc Covement  C(c,base) C(c,base) C(c,cy) C(c	major, major thajor rt street culation 1 L 4.1 1.00 0 0 0.00 4.1 alculat 1	th veh rt veh vehicle vehicle through p and Fe n 4 L 1.00	icles: icles: icles: es: es: 1anes ollow-  7 L  1.00 0.20 0.00 0.00 1.00	:  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 0.00 0.00	7.1 100 1,00 4 200 0.20 0.00 0.70 0.00 0.00 0.00 0.00 1.00 6.4	11 T 1.00 0.20 0.00 0.00 1.00 11 T	12 R 0 1.00 0 0.10 0 0.00 0 0.00 12 R			
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Sumber of major s  Worksheet 4-Critic Critical Gap Calc Movement  C(c,base) (c(c,base) (c(c,base) (c(c,base) (c(c,c)) Cercent Grade (3,1t) (c(c,c)) Cercent Grade (13,1t) (c(c,c)) Cercent Grade (14,0t) Cercent Grade (15,0t) Cercent Grade (16,0t) Cercent Grade (16,0t) Cercent Grade (17,0t) Cercent Grade (18,0t)	major major thajor rt street culation 1 L 4.1 1.00 0 0.00 0.00 4.1 L L L L L L L L L L L L L L L L L L L	th veh rt veh vehicle vehicle through p and Fe n 4 L 1.00	icles: icles: es: es: lanes ollow- 7 L 1.00 0.20 0.00 0.00 1.00	:  8 T  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 0.0 9 R	Total 2	11 T 1.00 0.20 0.00 0.00 1.00 11 T	12 R 0 1.00 0 0.10 0 0.00 0 0.00 12 R			
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Sat flow rate, ma Sumber of major s  Worksheet 4-Critic  Critical Gap Calc Movement  C(c,base) C(c,hv) C(c,g) Percent Grade C(s,t): 1-stage 2-stage 1-stage C-stage Collow-Up Time Ca Movement  C(f,base)	major, major thajor rtstreet culation 1 L 4.1 1.00 0 0 0.00 4.1 L L 2.20 0.90 0	th veh. rt veh. rt veh. vehicle vehicle through  p and Fe  1.00  0.00  0.00  0.00  ions 4 L	icles: icles: icles: es: es: 1anes ollow-  7 L  1.00 0.20 0.00 0.00 1.00	:  8 T  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 0.0 9 R	7.1 100 1,00 4 00 0.20 00 0.70 00 0.00 0.70 00 0.00 0.70 0.00 0.00 0.70 0.00 0.00 0.70 0.00 0.90 0.4	11 T 1.00 0.20 0.00 0.00 1.00 11 T	12 R 0 1.00 0 0.10 0 0.00 0 0.00 12 R			
Chared In volume, thared In volume, thared In volume, thared In volume, that flow rate, may at flow ra	major, major thajor rtstreet culation L L 4.1 1.00 0 0.00 0.00 4.1 L 2.20 0.90	th veh. rt veh. rt veh. vehicle vehicle through  p and Fe  1.00  0.00  0.00  0.00  ions 4 L	icles: icles: icles: es: es: 1anes ollow-  7 L  1.00 0.20 0.00 0.00 1.00	:  8 T  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 0.0 9 R	Total Control	11 T 1.00 0.20 0.00 0.00 1.00 11 T	12 R 0 1.00 0 0.10 0 0.00 0 0.00 12 R			
Chared In volume, Control In Control Con	major major thajor rt street dical Gazen	th veh. rt veh. vehicle vehicle through  p and Fe  1.00  0.00 0.00  ions 4 L  0.90	icles: icles: icles: es: es: lanes  ollow-  7 L  1.00 0.20 0.00 1.00  7 L	: up Tir 8 T 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 0.0 9 R	7.1 100 1,00 4 00 0.20 00 0.70 00 0.00 0.70 00 0.00 0.70 0.00 0.00 0.70 0.00 0.00 0.70 0.00 0.90 0.4	11 T 1.00 0.20 0.00 0.00 1.00 11 T	12 R 0 1.00 0 0.10 0 0.00 0 0.00 12 R			
hared In volume, hared In volume, hared In volume, at flow rate, ma at flow rate, ma umber of major s  orksheet 4-Criti  ritical Gap Calc ovement  (c,base) (c,hv) (hv) (c,g) ercent Grade (3,1t) (c,T): 1-stage 2-stage (c) 1-stage 2-stage ollow-Up Time Ca ovement  (f,base) (f,HV) (HV)	major major thajor rt street dical Gazen	th veh. rt veh. vehicle vehicle through  p and Fe  1.00  0.00 0.00  ions 4 L  0.90	icles: icles: icles: es: es: lanes  ollow-  7 L  1.00 0.20 0.00 1.00  7 L	: up Tir 8 T 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 0.0 9 R	7.1 100 1,00 4 00 0.20 00 0.70 00 0.00 0.70 00 0.00 0.70 0.00 0.00 0.70 0.00 0.00 0.70 0.00 0.90 0.4	11 T 1.00 0.20 0.00 0.00 1.00 11 T	12 R 0 1.00 0 0.10 0 0.00 0 0.00 12 R			
hared ln volume, hared ln volume, at flow rate, ma at flow rate, ma at flow rate, ma umber of major s  orksheet 4-Criti  ritical Gap Calc ovement  (c,base) (c,hv) (hv) (c,g) ercent Grade (3,lt) (c,T): 1-stage 2-stage (c) 1-stage 2-stage ollow-Up Time Ca ovement  (f,base) (f,HV) (HV) (f)	major, major thajor rt street culation 1 L 4.1 1.00 0 0 0.00 4.1 L 2.20 0.90 0 2.2 ct of U	th veh rt veh vehicle vehicle through  p and Fen 4 L  1.00  0.00 0.00 0.00  ions 4 L  0.90  pstream	icles: icles: icles: es: es: lanes  ollow-  7 L  1.00 0.20 0.00 1.00  7 L  0.90  Signa	:  8 T  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 0.0 0.0 0.0	Thent 2  000  000  culation  10  1,000  4,000  0,700  0,000  1,000  6,4  10  L  3,500  0,900  4,3,5	11 T 1.00 0.20 0.00 0.00 1.00 11 T	12 R 0 1.00 0 0.10 0 0.00 0 0.00 12 R			



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
                                                               989
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.
```



Conflicting Flows			-
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
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		1636	
Pedestrian Impedance Factor	1.00	1.00	
Movement Capacity	1.00	1636	
Probability of Queue free St.	1.00	1.00	
Maj L-Shared Prob Q free St.	1.00	1.00	
Step 3: TH from Minor St.	8	11	
<u>-</u> 		_ <del></del>	-
Conflicting Flows			
Potential Capacity Redestrian Impedance Factor	1.00	1.00	
-			
ap. Adj. factor due to Impeding mvmnt	1.00	1.00	
Novement Capacity	1.00	1.00	
			_
ttep 4: LT from Minor St.	7	10	
Conflicting Flows		989	-
Otential Capacity		271	
edestrian 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	
lovement Capacity		271	
Worksheet 7-Computation of the Effect of T	wo-stage Gap A	cceptance	-
Step 3: TH from Minor St.	8	11	
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			
Novement Capacity			
1 1			
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	
lovement Capacity	1 7 3 3	\ \ \ \ \ \ \ \	\
			_
Result for 2 stage process:	· \		
	\		
t	3 00		
robability of Queue free St.	1.00	1.00	11/
tep 4: LT from Minor St.	7/	10	1117
Part 1 - First Stage			] ]
Conflicting Flows		1 \	/ /
Potential Capacity			// _
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity		[	1
1			~ l
Part 2 - Second Stage			



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

Movement Capacity						
Part 3 - Single Stage						
Conflicting Flows					989	
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.		1	.00			
Cap. Adj. factor due to Impeding	mvmnt	1	.00		1.00	
Movement Capacity					271	
Results for Two-stage process:						
a						
У						
C t					271	
Worksheet 8-Shared Lane Calculat	ions					
Movement	7	8	9	10	11	12
	L	T	R	L	Т	R
Volume (vph)				32		
Movement Capacity (vph)				271		
Shared Lane Capacity (vph)						
Worksheet 9-Computation of Effec	t of Flare	d Minor	Stree	t Approa	ches	
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep				271		
Volume				32		
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
C sh						
C sh SUM C sep						
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	LT					L		
v (vph)	1					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	A			/	/	С	- 1 1	/
Approach Delay							20.1	_ /
Approach LOS					- (		C	
				1	\			

### Worksheet 11-Shared Major LT Impedance and Delay

	1	
	Movement 2	Movement
p(oj)	1.00	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)	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		



#### 1.1.2.16 Interseção H - Pico Tarde

HCS+: Unsignalized Intersections Release 5.6 TWO-WAY STOP CONTROL SUMMARY Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: Н Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: M01-M05-M07+M08+M06-M11+M12East/West Street: North/South Street: M14 Intersection Orientation: EW Study period (hrs): 1.00 Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound 1 Movement 2 4 5 L Т R Т R 721 Volume Peak-Hour Factor, PHF 0.91 0.91 Hourly Flow Rate, HFR 792 Percent Heavy Vehicles 0 Median Type/Storage Undivided RT Channelized? Lanes 2 Configuration LT T Upstream Signal? No No Minor Street: Approach Northbound Southbound 8 10 11 12 Movement L Volume 35 Peak Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 38 Percent Heavy Vehicles
Percent Grade (%) 0 0 Flared Approach: Exists?/Storage 1 Lanes Configuration T. Delay, Queue Length, and Level of Service Northbound Southbound Approach EΒ WB 9 10 12 Movement 1 4 8 11 Lane Config LT L v (vph) 38 C(m) (vph) 1636 601 v/c 0.00 0.06

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail:

95% queue length

Control Delay

Approach Delay

Approach LOS

LOS

0.01

7.2

Α

Fax:

0.20

11.4

В

11.4

В



TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_ Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Tarde Intersection: Н Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: East/West Street:  ${\tt M01-M05-M07+M08+M06-M11+M12}$ North/South Street: M14 Intersection Orientation: EW Study period (hrs): 1.00 Vehicle Volumes and Adjustments Major Street Movements 1 2 Volume 721 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume 198 Hourly Flow Rate, HFR 792 Percent Heavy Vehicles Median Type/Storage Undivided RT Channelized? Lanes 2 Configuration LT T Upstream Signal? No No Minor Street Movements 8 10 11 12 Τ R R L Т 35 Volume Peak Hour Factor, PHF 0.91 Peak-15 Minute Volume 10 Hourly Flow Rate, HFR 38 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 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 5

	Movement 2
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



										eng
Critical Movement	Gap Cal	culation 1	on 4	7	8	9	10	11	12	
		L	L	L	T	R	L	Т	R	
(c,base	)	4.1	1.00	1.00	1.00	1.00	7.1	1.00	1.00	
(hv) (c,g) Percent	Grade	0		0.20	0.20	0.10	0 0.20 0.00	0.20	0.10 0.00	
(3,1t) (c,T):	1-stage 2-stage 1-stage	0.00	0.00	0.00	0.00	0.00	0.70 0.00 1.00 6.4	0.00	0.00	
. (0)	2-stage						0.4			
	p Time C								1.0	_
ovement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R	
(f,base (f,HV)	)	2.20 0.90 0	0.90	0.90	0.90	0.90	3.50 0.90 0	0.90	0.90	_
(f)		2.2					3.5			
 Workshee	t 5-Effe	ct of	Upstrea	m Signa	ls					_
	ion 1-Qu					eam Sig	nal			_
					∨(	Moveme	nt 2		vement 5 V(l,prot)	
g(q1) g(q2) g(q) Computat	ion 2-Pr	oporti	on of T	WSC Int	ersecti	on Time	blocke	ed		
отрисис	1011 2 11	oporci	JII OI I	WDC IIIC		Moveme		Мо	vement 5 V(1,prot)	
Smoothin Proporti Max plat Min plat Duration	ime, t(a g Factor on of co coned fl coned fl of bloc on time	, F nflict ow, V(o ow, V(o ked pe	ing floce, max) c, min) riod, t			0.00	0	\	0.000	_
Computat	ion 3-Pl	atoon 1	Event P	eriods	Res	ult		<b>\</b>		
o(2) o(5) o(dom) o(subo) Constrai	ned or u	nconst	rained?		0.0					
Proporti unblocke for mino movement	d r		(1 Single Proc	-stage		(2) Two-St ge I	age Proc	(3) cess tage II	75	
(4) (7) (8) (9)										رال
o (10) o (11) o (12)									1	-\ \



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					408			_
s									
Px									
V c,u,x									
C r,x C plat,x									_
Two-Stage Process									_
IWO-Stage FIOCess	7		8		10		13	L	
Stage1	Stage2	Stage1	Stage	e2 Stag	e1 St	age2 S	tage1	Stage2	
V(c,x)					2.0	000			_
s P(x)					31	100			
V(c,u,x)									
									_
C(r,x) C(plat,x)									
Worksheet 6-Impedance	e and Cap	acity E	guation	 ns					_
Step 1: RT from Minor				-	9		12		_
Conflicting Flows					-				_
Potential Capacity									
Pedestrian Impedance	Factor			1.	00		1.00		
Movement Capacity Probability of Queue	free St			1.	0.0		1.00		
							1.00		_
Step 2: LT from Major	r St.				4		1		_
Conflicting Flows							0		
Potential Capacity Pedestrian Impedance	Factor			1.	0.0		1636		
Movement Capacity	- 40 COT			Τ.	5 0		1636		
Probability of Queue				1.	00		1.00		
Maj L-Shared Prob Q	free St.						1.00		
Step 3: TH from Minor	r St.				8		11		_
Conflicting Flows Potential Capacity									_
Pedestrian Impedance	Factor			1.	00		1.00		
Cap. Adj. factor due		ing mvm	nt	1.			1.00		
Movement Capacity					0.0		1 00		
Probability of Queue	free St.			1.	UU		1.00		
Step 4: LT from Minor	r St.				7	$\overline{}$	10		_
Conflicting Flows							408		_
Potential Capacity					0.0	~~~	603		
Pedestrian Impedance Maj. L, Min T Impedan		r		1.			1.00		
Maj. L, Min T Impedar Maj. L, Min T Adj. Ir				7 1/.			<b>\</b>	/	\
Cap. Adj. factor due			nt	<i></i>			1.00	/	\
Movement Capacity							601	<b>\</b>	
Worksheet 7-Computat:	ion of the	e Effec	t of Tr	wo-stage	Gap P	cceptar	ice		
Step 3: TH from Minor					8		11	> _	-///
					<u> </u>		# (		- 1117
Part 1 - First Stage Conflicting Flows							- (	\	77
Potential Capacity						1	\		
Pedestrian Impedance							_ \		ノノー
Cap. Adj. factor due	to Imped	ing mvm	nt						
Movement Capacity Probability of Queue	free St.						7		
									_
Part 2 - Second Stage	Э								



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 1.00 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 408 Potential Capacity 603 Pedestrian Impedance Factor 1.00 1.00 1.00  $\mbox{{\sc Maj.}}$  L,  $\mbox{{\sc Min}}$  T Impedance factor Maj. L, Min T Adj. Imp Factor. 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 1.00 Movement Capacity 601 Results for Two-stage process: а У c t 601 Worksheet 8-Shared Lane Calculations Movement 8 10 11 Т R L Volume (vph) 38 Movement Capacity (vph)
Shared Lane Capacity (vph) 601 Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 9 12 8 10 11 L Т R L Т R C sep 601 Volume 38 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

				9	10	11	12
LT					L		
					38		
636					601		
.00					0.06		
.01					0.20		
.2					11.4		
A					В		
						11.4	
						В	
	636 .00 .01	636 .00 .01	636 .00 .01	636 .00 .01	636 .00 .01	38 636 .00 .01 .01 .2	38 636 .00 .01 .01 .2 A B

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		

## 1.1.2.17 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 I DER/DF Intersection:

Jurisdiction:

Units: U. S. Metric

Analysis Year: 2023 Project ID:

East/West Street: MOV01-MOV04-MOV10
North/South Street: MOV10

Intersection Orientation: EW

Study period (hrs): 1.00

	Veh:	icle Vol	umes an	d Adjus	stments_/		
Major Street:	Approach	Ea	stbound		/W∈	stbound	
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume		14	1807	\			
Peak-Hour Fact	cor, PHF	0.91	0.91	- 1			\
Hourly Flow Ra	ate, HFR	15	1985		- /		
Percent Heavy	Vehicles	0					<u></u>
Median Type/St	corage	Undiv	ided		/		
RT Channelized	1?						
Lanes		0	2				
Configuration		L'	т т		7		
Upstream Signa	al?		No			No	
Minor Street:	Approach _	No	rthboun	d	Sc	outhboun	d
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R /
Volume					6		
Peak Hour Fact	or, PHF				0.91		
Hourly Flow Ra	ate, HFR				6		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Percent Heavy					17		
Percent Grade	(%)		0			0	
Flared Approac	ch: Exists?	/Storage			/		



Lanes 1 Configuration

Approach	EB	WB		Northboun	d		Soi	uthboun	d
Movement	1	4	7	8	9		10	11	12
Lane Config	LT					-	L		
v (vph)	15		 				6		
C(m) (vph)	1636						243		
v/c	0.01						0.02		
95% queue length	0.03						0.08		
Control Delay	7.2						20.2		
LOS	A						С		
Approach Delay								20.2	
Approach LOS								С	

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 Manha Intersection: Т  ${\tt Jurisdiction:}$ DER/DF Units: U. S. Metric Analysis Year: 2023

Project ID:

East/West Street: MOV01-MOV04-MOV10
North/South Street: MOV10

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

	Vehicle	Volumes	and Ad	justmen	ts		
Major Street Movements	1	2	3	4	5	6	· <del></del>
	L	T	R	L	T	R	
Volume	14	1807					<del></del>
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 RT Channelized?	Undi	vided		/	/ \		
Ri Channelized: Lanes	0	2					
Configuration	-	тт					
Upstream Signal?	11	No	\		No		
opstream bignar.		140		/ /	140	\ \	<b>1</b> / \
Minor Street Movements	7	8	9	10	11	12	<del></del> \
TITIOT BETEEE HOVEMENES	T.	T	R	L	T	R	
			(	\_			
Volume				6			
Peak Hour Factor, PHF				0.91 2 6		/ /	
Peak-15 Minute Volume				2		ſ	
Hourly Flow Rate, HFR				6		- 1	
Percent Heavy Vehicles				17			
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storag	e		/			\ \ / / / / /
RT Channelized	_				<b>\</b>		
Lanes				1			
Configuration				I	ı		
							<del></del>
E	edestrian	Volume		djustme	nts		
Movements	13	14	15	16			



	12 R
Upstream Signal Data	to Signal meters  hicles t 5
Prog. Sat Arrival Green Cycle Prog. Flow Flow Type Time Length Speed wph vph vph sec sec kph  S2 Left-Turn Through S5 Left-Turn Through  Worksheet 3-Data for Computing Effect of Delay to Major Street Veilength Shared In volume, major th vehicles:  S6 Sat flow rate, major th vehicles:  S6 Sat flow rate, major th vehicles:  S6 Sat flow rate, major rt vehicles:  S7 Sat flow rate, major rt vehicles:  S7 Sat flow rate, major street through lanes:  S7 Sat flow rate, major street through lanes:  S8 Sat flow rate, major rt vehicles:  S8 Sat flow rate, major rt vehicles:  S8 S8 S9 S0 S1	to Signal meters  hicles t 5
Prog. Sat Arrival Green Cycle Prog. Flow Flow Type Time Length Speed wph vph vph sec sec kph  22 Left-Turn Through 35 Left-Turn Through  Norksheet 3-Data for Computing Effect of Delay to Major Street Vel  Movement 2 Movement  Shared In volume, major th vehicles: 0 Shared In volume, major th vehicles: 0 Sat flow rate, major th vehicles: 1700 Sat flow rate, major rt vehicles: 1700 Sumber of major street through lanes: 2  Norksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation  Movement 1 4 7 8 9 10 11 L L T R L T  E(c,base) 4.1 L L T R L T  E(c,base) 4.1 L C(c,base) 4.1 L C(c	to Signal meters  hicles t 5
Flow rough Type Time Length Speed with view of the rough to the rough	to Signal meters  hicles t 5
vph vph sec sec kph  22 Left-Turn Through 25 Left-Turn Through 26 Left-Turn Through  Norksheet 3-Data for Computing Effect of Delay to Major Street Vei  Movement 2 Movement  Shared In volume, major th vehicles: Shared In volume, major rt vehicles: Shared In volume, major rt vehicles: Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles: Sumber of major street through lanes:  Norksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation  Movement  1 4 7 8 9 10 11 L L T R L T  E(c,base) 4.1 L L T R L T  E(c,base) 4.1 L C(c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00  P(hv) 0 17 E(c,g) 0.20 0.20 0.10 0.20 0.20	meters hicles t 5
Through  So Left-Turn Through  Through  Worksheet 3-Data for Computing Effect of Delay to Major Street Veing Movement 2 Movement  Shared In volume, major th vehicles: Shared In volume, major th vehicles: Shared In volume, major th vehicles: Shared In volume, major the vehicles: Shared In volume, m	nicles t 5
Through  So Left-Turn Through  Worksheet 3-Data for Computing Effect of Delay to Major Street Ver  Movement 2 Movement  Shared In volume, major th vehicles:  Shared In volume, major rt vehicles:  Sat flow rate, major th vehicles:  Sat flow rate, major rt vehicles:  Sat flow rate, major th vehicles:  1700  South Poly Sat Flow Poly Sat Fl	12 R
Morksheet 3-Data for Computing Effect of Delay to Major Street Versions Movement 2 Movement Shared In volume, major th vehicles:  Shared In volume, major th vehicles:  Shared In volume, major th vehicles:  Sat flow rate, major th vehicles:  Sat flow rate, major rt vehicles:  Sat flow rate, major rt vehicles:  Shared In volume, major th vehicles:  1700  Shared In volume, maj	12 R
Through  Worksheet 3-Data for Computing Effect of Delay to Major Street Velocities    Movement 2 Movement    Shared In volume, major th vehicles: 0   Shared In volume, major rt vehicles: 1700   Sat flow rate, major rt vehicles: 1700   Southward of major street through lanes: 2    Worksheet 4-Critical Gap and Follow-up Time Calculation    Critical Gap Calculation   Movement	12 R
Morksheet 3-Data for Computing Effect of Delay to Major Street Versions    Movement 2 Movement 3 Movement 4 Movement 4 Movement 4 Movement 5 Movement 4 Movement 6 Movement 6 Movement 7 Movement 7 Movement 8 Movement 8 Movement 9 Mo	12 R
Movement 2 Movement Shared In volume, major th vehicles: 0 Shared In volume, major rt vehicles: 0 Sat flow rate, major th vehicles: 1700 Sat flow rate, major rt vehicles: 1700 Sumber of major street through lanes: 2  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation Movement 1 4 7 8 9 10 11 L L T R L T  C(c,base) 4.1 L L T R L T  C(c,base) 4.1 C(c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00 P(hv) 0 17 C(c,g) 0.20 0.20 0.10 0.20 0.20	12 R
Movement 2 Movement Shared In volume, major th vehicles: 0 Shared In volume, major rt vehicles: 0 Sat flow rate, major th vehicles: 1700 Sat flow rate, major rt vehicles: 1700 Sumber of major street through lanes: 2  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation Movement 1 4 7 8 9 10 11 L L T R L T  C(c,base) 4.1 L L T R L T  C(c,base) 4.1 C(c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00 P(hv) 0 17 C(c,g) 0.20 0.20 0.10 0.20 0.20	12 R
Chared In volume, major th vehicles: 0 Shared In volume, major rt vehicles: 0 Sat flow rate, major rt vehicles: 1700 Sat flow rate, major rt vehicles: 1700 Sumber of major street through lanes: 2   Norksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation  Movement 1 4 7 8 9 10 11  L L T R L T  C(c,base) 4.1  C(c,base) 4.1  C(c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00  C(hv) 0 17  C(c,g) 0.20 0.20 0.10 0.20 0.20	12 R
Shared In 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 Calculation Movement 1 4 7 8 9 10 11 L L L T R L T  E(c,base) 4.1 L (c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00 P(hv) 0 17 E(c,g) 0.20 0.20 0.10 0.20 0.20	R
Sat flow rate, major th vehicles: 1700 Sat flow rate, major rt vehicles: 1700 Sumber of major street through lanes: 2  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation  Movement 1 4 7 8 9 10 11  L L L T R L T  C(c,base) 4.1  L(c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00  C(hv) 0 17  C(c,g) 0.20 0.20 0.10 0.20 0.20	R
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 Calculation  Movement 1 4 7 8 9 10 11  L L L T R L T  C(c,base) 4.1  C(c,base) 4.1  C(c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00  P(hv) 0 17  C(c,g) 0.20 0.20 0.10 0.20 0.20	R
Number of major street through lanes:       2         Norksheet 4-Critical Gap and Follow-up Time Calculation         Critical Gap Calculation         Movement       1	R
Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation  Movement	R
Critical Gap Calculation  Average State of the content of the cont	R
Movement     1     4     7     8     9     10     11       L     L     L     T     R     L     T         E(c,base)     4.1     7.1       E(c,hv)     1.00     1.00     1.00     1.00     1.00       E(hv)     0     17       E(c,g)     0.20     0.20     0.10     0.20     0.20	R
Movement     1 4 7 8 9 10 11 L       L L L T R L T       1 (c,base)     4.1 7.1 (c,hv)       1 (0,hv)     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	R
C(c,base) 4.1 7.1 C(c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00 P(hv) 0 17 C(c,g) 0.20 0.20 0.10 0.20 0.20	
(c,hv)     1.00     1.00     1.00     1.00     1.00     1.00       (hv)     0     17       (c,g)     0.20     0.20     0.10     0.20     0.20	1.00
(c,hv)     1.00     1.00     1.00     1.00     1.00     1.00       (hv)     0     17       (c,g)     0.20     0.20     0.10     0.20     0.20	1 00
(hv) 0 17 (c,g) 0.20 0.20 0.10 0.20 0.20	1.00
(c,g) 0.20 0.20 0.10 0.20 0.20	1.00
Percent Grade 0.00 0.00 0.00 0.00 0.00	0.10
	0.00
c(3,1t) 0.00 0.70 0.70 0.70 0.70 0.70 0.70 0.7	0 00
c(c,T): 1-stage 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	0.00
c(c) 1-stage 4.1 6.6	0.00
2-stage	
Collow-Up Time Calculations	
Movement 1 4 7 8 9 10 11	12
L L T R L T	R
z(f,base) 2.20 3.50	
E(f,HV) 0.90 0.90 0.90 0.90 0.90 0.90	0.90
P(HV) 0 17	
2.2 3.7	
Worksheet 5-Effect of Upstream Signals	
Computation 1-Queue Clearance Time at Upstream Signal Movement 2 Mov	ement 5
V(t) V(l,prot) V(t)	V(1,prot)
(=/==35) ((5)	
/ prog	
Total Saturation Flow Rate, s (vph)	
Arrival Type	
Effective Green, g (sec) Cycle Length, C (sec)	~ [
Rp (from Exhibit 16-11)	17
Proportion vehicles arriving on green P	1 /
· (~1)	1.1
	1 1
g(d <sub>2</sub> )	

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

Movement 5 t) V(1,prot)

alpha



beta Travel time, t(a) (sec)
Smoothing Factor, F
Proportion of conflicting flow, f

Proportion of confl Max platooned flow, Min platooned flow, Duration of blocked	V(c,max) V(c,min)								
Proportion time blo			0.0	000		0.000			
Computation 3-Plato	oon Event Per	iods	Result					-	
p(2) p(5) p(dom) p(subo)			0.000					-	
Constrained or unco	onstrained?								
Proportion unblocked	(1)		(2)		(2)			-	
for minor	Single-s	tage	(2) Two-9	Stage Pi	(3) rocess				
movements, p(x)	Proces	_	Stage I	,	Stage 1	II			
p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12)								-	
Computation 4 and 5								-	
Single-Stage Proces Movement	1		7 8 L T	9 R	10 L	11 T	12 R		
V c,x	0				1022			-	
S									
Px									
V c,u,x									
C plat,x Two-Stage Process Stage	7 e1 Stage2 S	8 tage1	Stage2 Sta	10 age1 St	tage2	1: Stage1		-	
V(c,x)								-	
S				30	000				
P(x) V(c,u,x)									
C(r,x)								-	
C(plat,x)					\				
Worksheet 6-Impedar	nce and Capac	ity Equ	ations					-	
Step 1: RT from Mir	nor St.		<u> </u>	9		12		Ī	
Conflicting Flows						14		- \	
Potential Capacity									
Pedestrian Impedano Movement Capacity	ce Factor			1.00		1.00		_ ~	
Movement Capacity Probability of Quei	ue free St.			1.00		1.00			
							> _	11	
Step 2: LT from Maj	jor St.			4				111	
Conflicting Flows					$\overline{}$	0		7	厂
Potential Capacity Pedestrian Impedance	re Factor			1.00		1636 1.00	\	//	
Movement Capacity	100001		-			1636		//	
Probability of Queo Maj L-Shared Prob (			Í	1.00		0.99 0.99		/ (	
Step 3: TH from Mir	nor St.			8		11		_	
							_/	_ \	



			engennaria e me
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99	
Movement Capacity	1 00	1 00	
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
step 4. hr from minor st.	,	10	
Conflicting Flows		1022	
Potential Capacity		245	
Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor	0.99		
Maj. L, Min T Adj. Imp Factor.	0.99		
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99	
Movement Capacity		243	
Manhabaat 7 Computation of the Effect of M	tro otogo Con Ago	.ontongo	
Worksheet 7-Computation of the Effect of T	wo-stage Gap Acc	eptance	
Step 3: TH from Minor St.	8	11	
boop of in from innor bo.	Ŭ		
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			
movement capacity			
Part 3 - Single Stage			
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99	
Movement Capacity			
Result for 2 stage process:			
a			
У			
C t Probability of Queue free St.	1.00	1.00	
riobability 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			
riovemente capacity			
Part 2 - Second Stage			
Conflicting Flows		\ \ \ / \	
Potential Capacity	<b>1</b>		\
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mymnt	\		
Movement Capacity			
		// _	
Part 3 - Single Stage			
Conflicting Flows		1022	\
Potential Capacity		245	111 6
Pedestrian Impedance Factor	1.00	1.00	4
Maj. L, Min T Impedance factor	0.99		
Maj. L, Min T Adj. Imp Factor.	0.99		// /
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99	
Movement Capacity		243	//
Davide for more than			
Results for Two-stage process:			1
a 			
У			<b>\</b>



Ct								243	
Worksheet 8-Shared	Lane Ca	alculati	ons						
Movement			7 L		8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity Shared Lane Capaci							6 243		
Worksheet 9-Comput	ation of	Effect	of Fla	ared 1	Mino	r Stree	t Appro	oaches	
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)							243 6		
n max C sh SUM C sep n C act									
Worksheet 10-Delay	, Queue	Length,	and Le	evel (	of S	ervice			
Movement Lane Config	1 LT	4	7	8		9	10 L	11	12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	15 1636 0.01 0.03 7.2 A						6 243 0.02 0.08 20.2 C	20.2 C	

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	2	
d(rank,1) Delay for stream 2 or 5		

### 1.1.2.18 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: I
Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID:

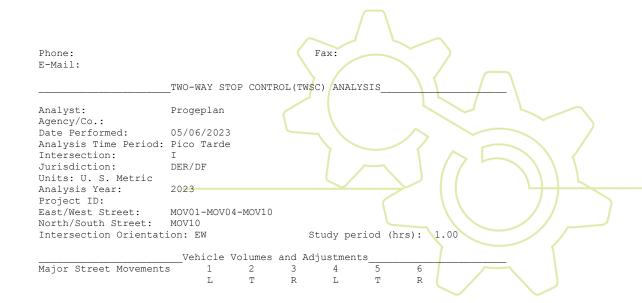


East/West Street: MOV01-MOV04-MOV10
North/South Street: MOV10

Study period (hrs): 1.00 Intersection Orientation: EW

	Vehi	cle V	olumes and	Adjus	tme	nts			
Major Street:			Eastbound	-			Westbound	 d	
-	Movement	1	2	3		4	5	6	
		L	T	R	i	L	Т	R	
					·				
Volume		6	707						
Peak-Hour Fact	or, PHF	0.9	0.91						
Hourly Flow Ra	te, HFR	6	776						
Percent Heavy	Vehicles	0							
Median Type/St	orage	Und	livided			/			
RT Channelized	?								
Lanes			0 2						
Configuration			LT T						
Upstream Signa	1?		No				No		
Minor Street:	Approach		Northbound				Southbour	nd	
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume						19			
Peak Hour Fact						0.9	1		
Hourly Flow Ra						20			
Percent Heavy						6			
Percent Grade			0				0		
Flared Approac	h: Exists?/	Stora	.ge		/				/
Lanes							1		
Configuration							L		
	D 1 0		T 1	1 -	,				
7 1-			Length, an			I Se		-1-1	
Approach	EB	WB		hbound				thbound	
Movement	1	4	7	8	9	!	10	11	12
Lane Config	LT		1			- 1	L		
v (vph)	6						20		
C(m) (vph)	1636						596		
v/c	0.00						0.03		
95% queue leng							0.03		
Control Delay	7.2						11.2		
-									
LOS	A						В	11.2	
Approach Delay									
Approach LOS								В	

HCS+: Unsignalized Intersections Release 5.6





Volume Peak-Hour Factor, Peak-15 Minute Vol Hourly Flow Rate, Percent Heavy Vehi Median Type/Storac RT Channelized? Lanes Configuration Upstream Signal?	lume HFR icles	6 0.91 2 6 0 Undiv	707 0.91 194 776  rided 2		/	 No			_
Minor Street Movem	nents	7 L	8 T	9 R	10 L	11 T	12 R		_
Volume Peak Hour Factor, Peak-15 Minute Vol Hourly Flow Rate, Percent Heavy Vehi Percent Grade (%) Flared Approach: RT Channelized Lanes Configuration	lume HFR icles		0		19 0.91 5 20 6 /	0		/	_
Movements	Ped	estrian 13	Volumes	and Ac	ljustmen 16	ts			_
Flow (ped/hr) Lane Width (m) Walking Speed (m/s Percent Blockage	sec)	0 3.6 1.2 0	0 3.6 1.2	0 3.6 1.2	0 3.6 1.2				_
I	Prog. Flow		ream Si rrival Type	gnal Da Greer Time sec	Cycle	h Spe	_	Distance to Signal meters	_
S2 Left-Turn Through S5 Left-Turn Through									_
Worksheet 3-Data 1	For Comp	uting Ef	fect of						_
Shared In volume, Shared In volume, Sat flow rate, mag Sat flow rate, mag Number of major st	major r jor th v jor rt v creet th	t vehicles: ehicles: ehicles: rough la	es: ines:	0 0 17 17 2	200 200 culatio		ovemen	7	_
Critical Gap Calcu	ılation			$\longrightarrow$	-		$\rightarrow$	$\langle - / -$	-\
Movement		4 7 L I			10 R L		11 T	12 R	
t(c,hv) P(hv) t(c,g) Percent Grade	0.00 -	0. 0.	20 0. 00 0.	20 0.	7. 00 1. 6 10 0. 00 0. 0.	00 3 20 0 00 0 70	1.00 0.20 0.00	1.00 0.10 0.00 0.00	
2-stage ( t(c) 1-stage 2 2-stage		.00 1.	00 1.	.00 0.	00 1.		1.00	0.00	
Follow-Up Time Cal Movement	1	ns 4 7 L I			) 10 R L		11 T	12 R	



				_
t(f,base) t(f,HV)	2.20 0.90 0.90 0.9	3.5 0.90 0.90 0.9		
P(HV)	0	6		
c(f)	2.2	3.6		_
Vorksheet 5-E	ffect of Upstream Sig	nals		
Computation 1	-Queue Clearance Time	Movement 2	Movement 5 t) V(t) V(1,prot)	_
V prog				_
Arrival Type Effective Gree		)		
Cycle Length, Rp (from Exhil Proportion vel		een P		
g (q1) g (q2) g (q)				
	-Proportion of TWSC I	Movement 2	Movement 5	_
- 1 - 1 - 1		V(t) V(1,pro	t) V(t) V(1,prot)	_
alpha beta Traval tima	t (a) (aos)			
Min platooned	flow, V(c,min)			
Proportion ti	locked period, t(p) me blocked, p	0.000	0.000	
Computation 3	-Platoon Event Period	s Result		_
p(2)		0.000		_
p(5) p(dom)		0.000		
p(subo) Constrained o	r unconstrained?			
				_
Proportion unblocked	(1)	(2)	(3)	
for minor	Single-stag	_		
movements, p(	x) Process	Stage I	Stage II	_
p(1) p(4)				
p(7) p(8)				
p(9)		/	\	
p(10) p(11)				
p(11) p(12)				
Computation 4		<del></del>		-\
Single-Stage : Movement	Process 1 4	7 8 9	10 11 12	
	L L	L T R	L T R	_ >
V c,x	0		400	
Px V c,u,x				
C r,x C plat,x				- //
Two-Stage Pro	cess			
	7 Stage1 Stage2 Stag	8 10 e1 Stage2 Stage1 S	11 tage2 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. 9 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 Conflicting Flows 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 1.00 1.00 Pedestrian Impedance Factor 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. 1.0 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 mymnt 1.00 1.00 Movement Capacity 596 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 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 1.00 Pedestrian Impedance Factor 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 1.00 Movement Capacity Result for 2 stage process: а Ct

1.00

1.00

Probability of Queue free St.



Step 4: LT from Min	nor St.			7		10	
t 1 - First Stag flicting Flows	le						
otential Capacity							
edestrian Impedano							
ap. Adj. factor du ovement Capacity	ue to Impeding	g mvmnt					
art 2 - Second Sta onflicting Flows	ıge						
Potential Capacity							
Pedestrian Impedanc							
Cap. Adj. factor du	ie to Impeding	, mvmnt					
Movement Capacity							
Part 3 - Single Sta	ige					400	
Conflicting Flows Potential Capacity						598	
Pedestrian Impedanc	ce Factor		1	.00		1.00	
Maj. L, Min T Imped				.00			
Maj. L, Min T Adj.		. m.m.n.+		.00		1.00	
Cap. Adj. factor du Movement Capacity	ie to impeding	J IIIVIIIII C	_			596	
Results for Two-sta	age process:						
a	ige process.						
y C t						596	
						J J U	
Worksheet 8-Shared	Lane Calculat	ions					
Movement		7	8	9	10	11	12
		L	Т	R	L	T	R
olume (vph)					20		
Movement Capacity (	(vph)				596		
Worksheet 9-Computa	tion of Effec						10
Movement		7 L	8 T	9 R	10 L	11 T	12 R
Sep					596		
Volume Delay					20		
Delay Q sep							
Q sep +1							
round (Qsep +1)							
n max					7		
C sh SUM C sep			~				
n			(		_ `	)	
C act							
				<del>/                                    </del>		<del>\                                    </del>	-/
Worksheet 10-Delay,	Queue Length	, and Leve	l of Se	ervice			
Movement	1 4	7	8	9	10	11	12
Lane Config	LT				L	>	
(vph)	6				20	<u> </u>	5 [
(m) (vph)	1636		- 1		596	1 /	
v/c 95% queue length	0.00			<u> </u>	0.03	7	
Control Delay	7.2				11.2	( )	
LOS	A				В	\	
Approach Delay						11.2	
Approach LOS						В	
orksheet 11-Shared	l Major LT Imp	edance 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		

### 1.1.2.19 Interseção J – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

\_TWO-WAY STOP CONTROL SUMMARY\_

Study period (hrs): 1.00

Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Manha Intersection: DER/DF Jurisdiction: Units: U. S. Metric Analysis Year: 2023 Project ID: East/West Street: M2-M10 East/West Street: M2-North/South Street: M9

Intersection Orientation: EW

Major Street:			astboun	_		stments Westbound				
	Movement	1 2		3	1	4	5	6		
		L	Т	R	i	L	T	R		
Volume						6	751			
Peak-Hour Fact	or, PHF					0.91	0.91			
Hourly Flow Ra					6	825				
Percent Heavy	Vehicles					17				
Median Type/Storage		Undi	vided			/				
RT Channelized	1?									
Lanes		0 2								
Configuration						LT T				
Upstream Signa	11?	No			No					
Minor Street:	Approach	N	orthbou	nd	Southbound					
	Movement	7	8	9	- 1	10	11	12		
		L	T	R	-	L	T	R		
 Volume		14							-	
Peak Hour Factor, PHF		1.00								
Hourly Flow Rate, HFR		14				/				
						<b>*</b>				

VOIMILE		T 4	
Peak Hour Factor,	PHF	1.00	
Hourly Flow Rate,	HFR	14	
Percent Heavy Veh:	icles	0	
Percent Grade (%)			0
Flared Approach:	Exists?/St	corage	
Lanes		1	
Configuration		L	

	Delay,	Queue Le	ength,	and Level	l of Serv	rice	
Approach	EB	WB	No	rthbound		South	bound
Movement	1	4	7	8	9 1	10 1	,1 :
Lane Config		LT	L				_
v (vph)		6	14				) [ ]
C(m) (vph)		1530	589		$\overline{}$		
v/c		0.00	0.02				- 1 1
95% queue length		0.01	0.07			\	\ \
Control Delay		7.4	11.3				
LOS		A	В				7 )
Approach Delay				11.3			
Approach LOS				В			



HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail:			F	ax:				
	_TWO-WAY STO	OP CONTR	OL(TWSC)	) ANALY	sis			_
Analyst:	Progeplan							
Agency/Co.: Date Performed: Analysis Time Period: Intersection: Jurisdiction:	05/06/2023 Pico Manha J DER/DF							
Units: U. S. Metric Analysis Year:	2023							
Project ID: East/West Street: North/South Street: Intersection Orientat	M2-M10 M9 ion: EW		Sti	ıdy per	riod (h	rs): 1.	00	
	Vehicle V	701 umos	and Adi	1etmont	. 6			
Major Street Movement		2 T	3 R	4 L	5 T	6 R		_
Volume Peak-Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicle Median Type/Storage RT Channelized?		 vided		6 0.91 2 6 17	751 0.91 206 825			_
Lanes Configuration Upstream Signal?		No		0 L1	2 T T No			
Minor Street Movement	s 7 L	8 T	9 R	10 L	11 T	12 R		_
Volume Peak Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicle Percent Grade (%) Flared Approach: Exi RT Channelized Lanes Configuration		0		/	0		/	_
Movements	_Pedestrian 13	Volumes 14	and Ad	justmer 16	nts		<b>)</b>	_
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	0 3.6 1.2 0		1		
	Upst	tream Si	gnal Da	ta		/>		
Prog Flow vph		Arrival Type	Green Time sec	Cycle Lengt sec		ed to	tance Signal ters	
S2 Left-Turn Through S5 Left-Turn Through								
Worksheet 3-Data for	Computing E		Dolarr	to Majo	x C+x0	ot Vobia	100	_



					!	Movemen	t 2	Moveme	nt 5		
Shared in Shared in Sat flow in Sat flow in Number of	volume, rate, ma rate, ma	, majo: ajor tl ajor r	r rt veh h vehicl t vehicl	nicles: les: les:				0 0 1700 1700 2		_	
Worksheet	4-Crit	ical G	ap and I	Follow-	up Time	Calcul	ation			_	
Critical (	Gap Calo	culatio	on							_	
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R		
		ш	ш	ш.	±	11	ш	<u> </u>	10		
t(c,base)		1 00	4.1	7.1	1 00	1 00	1 00	1 00	1 00		
t(c,hv) P(hv)		1.00	1.00 17	1.00	1.00	1.00	1.00	1.00	1.00		
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10		
Percent G	rade			0.00	0.00	0.00	0.00	0.00	0.00		
t(3,1t)		0 00	0.00	0.70	0 00	0 00	0 00	0 00	0.00		
	l-stage 2-stage		0.00	0.00	0.00	0.00	0.00	0.00	0.00		
t(c) 1	1-stage 1-stage 2-stage	0.00	4.3	6.4	1.00	0.00	1.00	1.00	0.00		
Follow-Up	Time Ca	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 2.4	0							
t(f)			2.4	3.5							
V prog Total Satı		Flow 1	Rate, s	(vph)	V (		l,prot) 	· (c)	V(1,prot)	_	
Arrival Ty Effective Cycle Leng Rp (from F Proportion g(q1) g(q2) g(q)	Green, gth, C Exhibit	(sec) 16-11	)	on gree	n P						
Computation	on 2-Pro	porti	on of TV	WSC Int	ersecti					_	
					V (	Moveme t) V(	l,prot)	<b>\</b>	V(1,prot)		
alpha											
beta Travel tim Smoothing	Factor,	, F		_		1					
Proportion Max platoo Min platoo	oned flo	ow, V(	c,max) c,min)					_			
Duration of Proportion		_		(p)		0.00	0	1	0.000		
Computation	on 3-Pla	atoon 1	Event Pe	eriods	Res				17		
p(2) p(5) p(dom) p(subo)					0.0					<i>JT_</i>	
Constraine	ed or u	nconst	rained?								
Proportion	n									- [	
unblocked			(1)			(2)		(3)		$\neg$	
for minor			Single-	-stage		Two-St	age Pro	cess			



movements, p(x)	Process	Stage I	Stage	II	engenharia e
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	424			
C r,x C plat,x					_
Two-Stage Process Stage1	7 Stage2 Stage	8 1 Stage2 Sta	10 ge1 Stage2	11 Stage1 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	Factor	1	.00	1.00	
Movement Capacity Probability of Queue			.00	1.00	
Step 2: LT from Major	St.		4	1	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue	free St.	1 1 1	530 .00 530 .00	1.00	_
Maj L-Shared Prob Q f			.00	11	_
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Probability of Queue	Factor 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. In Cap. Adj. factor due	nce factor mp Factor.	5 1 mnt 1	24 91 .00	1.00 1.00 1.00 1.00	
Movement Capacity  Worksheet 7-Computati	ion of the Effe		89 —————— e Gap Accepta	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 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 mymnt Movement Capacity			
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity	1.00	1.00	
Result for 2 stage process:			
Y C t	1.00	1.00	
Probability of Queue free St.	7	1.00	
Step 4: LT from Minor St.			
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 Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mymnt Movement Capacity	424 591 1.00 1.00 589	1.00 1.00 1.00 1.00	
Results for Two-stage process:			•
y C t	589	$\sim$	<u> </u>
Worksheet 8-Shared Lane Calculations			
Movement 7	, , , ,	10 11 12 L T R	
Volume (vph) 14 Movement Capacity (vph) 58 Shared Lane Capacity (vph)		SINF	
Worksheet 9-Computation of Effect of Fl	ared Minor Street	Approaches	
Movement 7		10 11 12 L T R	
C sep 58 Volume 14			



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	1	4	7	8	9	10	11	12
Lane Config		LT	L					
v (vph)		6	14					
C(m) (vph)		1530	589					
v/c		0.00	0.02					
95% queue length		0.01	0.07					
Control Delay		7.4	11.3					
LOS		A	В					
Approach Delay				11.3				
Approach LOS				В				

Worksheet 11-Shared Major LT Impedance and Delay

v(i2), Volume for stream 3 or 6 $s(i1)$ , Saturation flow rate for stream 2 or 5	1.00	1.00 0 0
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		-
• • • •		-
• • •		1700
s(i2), Saturation flow rate for stream 3 or 6		1/00
		1700
P*(oj)		1.00
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		

### 1.1.2.20 Interseção J – 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: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: M2-M10 East/West Street: North/South Street: М9 Intersection Orientation: EW

Study period (hrs): 1.00

Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound Movement 2 3 4 5 6 L Т R L R Volume 19 1984 Peak-Hour Factor, PHF 0.91 0.91 Hourly Flow Rate, HFR 20 2180 Percent Heavy Vehicles 6 Median Type/Storage Undivided RT Channelized? 0 2 Lanes Configuration LT T Upstream Signal? No No Minor Street: Approach Northbound Southbound



Mo	vement	7 L	8 T	9 R		10 L	11 T	12 R	
Volume		6							
Peak Hour Factor,	PHF	0.91							
Hourly Flow Rate,		6							
Percent Heavy Veh		0							
Percent Grade (%)			0				0		
Flared Approach:	Exists	?/Storage			/				/
Lanes		ĺ							
Configuration		L	ı						
Annroach		Queue Le				f Sei		u+hbour	nd.
Movement	_Delay, EB 1	Queue Le WB 4   LT		and Lev rthboun 8		f Ser		uthbour 11	12
Approach Movement Lane Config	EB	WB 4	Noi 7	rthboun	ıd	f Sei	So		
Movement Lane Config  v (vph)	EB	WB 4   LT	Noi 7 L	rthboun	ıd	f Ser	So		
Movement Lane Config v (vph) C(m) (vph)	EB	WB 4   LT   20 1597	7 L	rthboun	ıd	f Sei	So		
Movement Lane Config	EB	WB 4   LT   20 1597	No: 7 L 6 224	rthboun	ıd	f Ser	So		
Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue length	EB	WB 4   LT   20 1597 0.01	7 L 6 224 0.03 0.08	rthboun	ıd	f Ser	So		
Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue length Control Delay	EB	WB 4   LT   20 1597 0.01 0.04	7 L 6 224 0.03 0.08	rthboun	ıd	f Ser	So		
Movement Lane Config  v (vph) C(m) (vph) v/c	EB	WB 4   LT   20 1597 0.01 0.04 7.3	Non 7 L 6 224 0.03 0.08 21.5	rthboun	ıd	f Ser	So		

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: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: Project ID: 2023 East/West Street: M2-M10 North/South Street:

Intersection Orientatio	n: EW		Stu	dy per	iod (hrs):	1.00
	_Vehicle V	olumes	and Adju	stment	s	
Major Street Movements	_ 1	2	3	4	5 6	
	L	Т	R	L	T R	
Volume				19	1984	
Peak-Hour Factor, PHF			/	0.91	0.91	\ / \
Peak-15 Minute Volume				5	545	
Hourly Flow Rate, HFR				20	2180	
Percent Heavy Vehicles			<b> </b>	6		
Median Type/Storage	Undiv	ided		/		
RT Channelized?						
Lanes				0	2	
Configuration				LT		
Upstream Signal?		No			No	
Minor Street Movements	7	8	9	10	11 12	
	L	Т	R	L	T R	
Volume						
	6 0.91					
Peak Hour Factor, PHF	2					
Peak-15 Minute Volume						
Hourly Flow Rate, HFR	6					
Percent Heavy Vehicles	0					



Percent Grade (%) 0 0
Flared Approach: Exists?/Storage // //
RT Channelized
Lanes 1
Configuration L

Pedestrian Volumes and Adjustments Movements 13 14 15 0 0 0 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 0 0

Upstream Signal Data Prog. Sat Arrival Green Cycle Distance Prog. Flow Flow Type Time Length Speed to Signal kph vph vph sec sec 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 Calcula	ation						
Movement	: 1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
t(c,base	<del>)</del>	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)		6	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	4.2	6.4					
	2 stage						\	

Follow-Up Ti	me Calculat	tions					\
Movement	1	4	7	8	9	10	11 12
	L	L	L	Т	R	L	T 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)		6	0				
t(f)		2.3	3.5				

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

Movement 2 Movement 5 V(t) V(1,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) g (q) Computation 2-Proportion of TWSC Intersection Time blocked  $\begin{array}{cccc} \text{Movement 2} & \text{Movement 5} \\ \text{V(t)} & \text{V(1,prot)} & \text{V(t)} & \text{V(1,prot)} \end{array}$ 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) 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 12 Movement 1 4 9 10 11 L L L L Т R V c,x 0 1130 Рx V c,u,x Cr,x C plat,x Two-Stage Process 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. 12 9 Conflicting Flows Potential Capacity 1.00 1.00 Pedestrian Impedance Factor

1.00

4

1.00

1

Movement Capacity

Probability of Queue free St.

Step 2: LT from Major St.



			engenharia e meio
Conflicting Flows	0		
Potential Capacity	1597		
Pedestrian Impedance Factor Movement Capacity	1.00 1597	1.00	
Probability of Queue free St.	0.99	1.00	
Maj L-Shared Prob Q free St.	0.99		
Other 2: Mil Surve Miner Ot	8	11	
Step 3: TH from Minor St.	0	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	0.33	
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows	1130		
Potential Capacity	227		
Pedestrian Impedance Factor	1.00	1.00	
Maj. L, Min T Impedance factor		0.99	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt	0.99	0.99 0.99	
Movement Capacity	224	0.99	
Worksheet 7-Computation of the Effect of T	Wo-stage Gap Acce	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	0.99	0.99	
Movement Capacity			
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	<del> </del>	<del></del>	
Conflicting Flows			
Potential Capacity			)
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt		// ~	
Movement Capacity			
			\
Part 2 - Second Stage		$\searrow$ $\sqcap$	
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor	(	\ \	//
Cap. Adj. factor due to Impeding mymnt	\		
Movement Capacity			
Part 3 - Single Stage		<del>}</del>	
Conflicting Flows	1130		1
Potential Capacity	227		



Pedestrian Impedance Fa Maj. L, Min T Impedance Maj. L, Min T Adj. Imp Cap. Adj. factor due to Movement Capacity	factor Factor.	mvmnt		1.00 0.99 224		1.00 0.99 0.99	)
Results for Two-stage p	rocess:						
Y C t				224			
Worksheet 8-Shared Lane	Calculat:	ions 7	0		1.0	11	
lovement		L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (v	ph)	6 224	<u> </u>				
Worksheet 9-Computation	of Effec	t of Fla	red Mir	or Stre	et Appr	oaches	
Movement		7	8	9	10	11	12
		L	Т	R	L	T	R
C sep Volume Delay D sep D sep +1 Cound (Qsep +1)		224 6					
SUM C sep 1 2 act 	ue Length	, and Le	evel of	Service			
Movement 1 Lane Config	4 LT	7 L	8	9	10	11	12
(vph)	20 1597	6 224					
C(m) (vph) 7/c	0.01	0.03					
5% queue length	0.04 7.3	0.08 21.5					
ontrol Delay OS	7.3 A	C C					
pproach Delay			21.5				
oproach LOS			С				
orksheet 11-Shared Maj	or LT Imp	edance a	and Dela	У			
			-	Movem	ent 2	Movem	nent 5
(ii), Volume for streat (i2), Volume for streat (i2), Volume for streat (i1), Saturation flow (i2), Saturation flow (i2), Saturation flow (i2), Volume for streat (M,LT), Delay for streat ((rank,1) Delay for streat	m 3 or 6 rate for and for 4 am 1 or 4 et through	stream 3 h lanes		1.	00	0 0 17 17 0.	99



# 1.1.3 Memória de cálculo da análise de capacidade e níveis de serviço – Cenário FUTURO Com empreendimento em funcionamento e com acréscimo de área – USO INSTITUCIONAL

#### 1.1.3.1 Interseção A – 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: MOV01-MOV04 North/South Street: MOV04 Study period (hrs): 1.00 Intersection Orientation: EW Vehicle Volumes and Adjustments Westbound Major Street: Approach Eastbound 5 Movement Т Т R L | L R 1819 Volume 1.00 Peak-Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 1998 23 Percent Heavy Vehicles Median Type/Storage Undivided RT Channelized? Lanes 2 0 Т Configuration TR Upstream Signal? No No Minor Street: Approach Northbound Southbound Movement 8 10 11 12 Τ R L Τ R Volume 30 Peak Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 32 Percent Heavy Vehicles 0 Percent Grade (%) 0 Flared Approach: Exists?/Storage 1 Lanes Configuration R Delay, Queue Length, and Level of Service WB Southbound Approach EB Northbound Movement 1 4 10 12 8 11 Lane Config R v (vph) 32 C(m) (vph) 294 0.11 v/c 95% queue length 0.37 Control Delay 18.7 С LOS Approach Delay 18.7 Approach LOS C

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 East/West Street: MOV01-MOV04 North/South Street: MOV04 Intersection Orientation: EW Study period (hrs): 1.00 Vehicle Volumes and Adjustments Major Street Movements 1 2 3 R Volume 1819 23 Peak-Hour Factor, PHF 0.91 1.00 Peak-15 Minute Volume 500 6 Hourly Flow Rate, HFR 1998 23 Percent Heavy Vehicles Median Type/Storage Undivided RT Channelized? Lanes 2 0 Configuration Т TR Upstream Signal? No No Minor Street Movements 9 12 8 10 11 Т R L Τ R Volume 30 Peak Hour Factor, PHF 0.91 Peak-15 Minute Volume 8 32 Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) 0 0 Flared Approach: Exists?/Storage RT Channelized No Lanes 1 Configuration R Pedestrian Volumes and Adjustments Movements 13 14 15 Flow (ped/hr) Lane Width (m) 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 Cycle Prog. Green Prog. Distance Flow Flow Type Time Length Speed to Signal sec vph vph kph meters sec 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: Shared In volume, major rt vehicles: Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles:

Number of major street through lanes:



	Gap Cal				_				
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
(c,base	1					6.2			
(c,basc (c,hv)	,	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
(hv)				0 00	0.00	0	0.00	0 00	0.10
c(c,g) Percent	Grade			0.20	0.20	0.10	0.20	0.20	0.10
(3 <b>,</b> 1t)						0.00			
c(c,T):	1-stage 2-stage		0.00	0.00	0.00	0.00	0.00	0.00	0.00
c(c)	1-stage		0.00	1.00	1.00	6.2	1.00	1.00	0.00
	2-stage								
ollow-U	p Time C	alcula	tions						
Movement		1 T.	4 L	7 L	8 T	9 P	10 L	11 T	12 R
		ь	ъ	Ъ	T.	R	Ъ	T,	N
(f,base	)	0.00	0.00	0.00	0.00	3.30	0.00	0.00	0.00
(f,HV) (HV)		0.90	0.90	0.90	0.90	0.90 0	0.90	0.90	0.90
(f)						3.3			
orkshee	t 5-Effe	ct of T	Upstream	m Signal	ls				
omputat	ion 1-Qu	eue Cle	earance	Time at	t Upstr	eam Sig	nal		
1	2-				_	Moveme	nt 2		vement 5
					∨ (	t) V(	l,prot)	∨(t)	V(1,prot)
Arrival Effectiv Cycle Le Rp (from Proporti		(sec) 16-11	c) )	(vph) on green	n P				
Arrival Effectiv Cycle Le Rp (from	Type e Green, ngth, C Exhibit	(sec) 16-11	c) )		n P				
Arrival Effectiv Eycle Le Rp (from Proporti g(q1) g(q2) g(q)	Type e Green, ngth, C Exhibit	(sec) 16-11; les ar	c) ) riving (	on green					
Arrival Effectiv Cycle Le Rp (from Proporti g(q1) g(q2) g(q)	Type e Green, ngth, C Exhibit on vehic	(sec) 16-11; les ar	c) ) riving (	on green	ersecti	Moveme	nt 2	Мо	vement 5
Arrival Effectiv Cycle Le Rp (from Proporti g(q1) g(q2) g(q)	Type e Green, ngth, C Exhibit on vehic	(sec) 16-11; les ar	c) ) riving (	on green		Moveme		Мо	
Arrival Effectiv Cycle Le Rp (from Proporti g(q1) g(q2) g(q)	Type e Green, ngth, C Exhibit on vehic	(sec) 16-11; les ar	c) ) riving (	on green	ersecti	Moveme	nt 2	Мо	
Arrival Effectiv Cycle Le Rp (from Proporti g(q1) g(q2) g(q2) Gomputat Alpha Deta Fravel t	Type e Green, ngth, C Exhibit on vehic ion 2-Pr	(sec) 16-11 les ar: oportion	c) ) riving of To	on green	ersecti	Moveme	nt 2	Мо	
Arrival Effectiv Cycle Le Ry (from Proporti g(q1) g(q2) g(q) Computat alpha beta Fravel t Smoothin	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor	oportion  (sec)  16-11  les ar:  oportion  (sec)	c) ) riving (	on green	ersecti	Moveme	nt 2	Мо	
Arrival Effectiv Cycle Le Rp (from Proporti g(q1) g(q2) g(q) Computat  Alpha Deta Fravel t Emoothin Proporti Max plat	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl	oportion  ) (sec), F nflict: ow, V(	c) ) riving of The control of The co	on green	ersecti	Moveme	nt 2	Мо	
Arrival Effectiv Cycle Le Ep (from Froporti g(q1) g(q2) g(q) Computat  Alpha Deta Eravel t Emoothin Proporti Max plat	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl	oportion  ) (sec., F nflict: ow, V(ow, V(o	on of Ti	on green	ersecti	Moveme	nt 2	Мо	
Arrival Effectiv Cycle Le Rp (from Proporti g(q1) g(q2) g(q) Computat  Alpha Deta Fravel t Emoothin Max plat Min plat Duration	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl	oportion ) (sec) , F nflict ow, V(c) ked pe:	c)  riving of Ti  on of Ti  ing floo c,max) c,min) riod, t	on green	ersecti	Moveme	nt 2 1,prot)	Mo V(t)	
Arrival Effectiv Cycle Le Ry (from Proporti g(q1) g(q2) g(q2) g(q)  Computat  Alpha Deta Fravel t Smoothin Proporti Max plat din plat Ouration Proporti	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl of bloc	oportion  (sec)  16-11  les ar:  oportion  (sec)  , F  nflict: ow, V((ow, V((ow	c)  riving or riving or riving flow c, max) c, max) c, min) riod, t	wsc Inte	ersecti	Moveme: t) V(	nt 2 1,prot)	Mo V(t)	V(l,prot)
Arrival Effectiv Cycle Le Ry (from Proporti g(q1) g(q2) g(q2) g(q)  Computat  Alpha Deta Fravel t Smoothin Proporti Max plat din plat Ouration Proporti	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oof bloc on time	oportion  (sec)  16-11  les ar:  oportion  (sec)  , F  nflict: ow, V((ow, V((ow	c)  riving or riving or riving flow c, max) c, max) c, min) riod, t	wsc Inte	v(	Movement) V(	nt 2 1,prot)	Mo V(t)	V(l,prot)
Arrival Effectiv Cycle Le Exp (from G(q1) g(q2) g(q2) Gomputat  Alpha Deta Fravel t Emoothin Proporti Max plat Min plat Duration Proporti Computat	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oof bloc on time	oportion  (sec)  16-11  les ar:  oportion  (sec)  , F  nflict: ow, V((ow, V((ow	c)  riving or riving or riving flow c, max) c, max) c, min) riod, t	wsc Inte	V(	Movement) V(	nt 2 1,prot)	Mo V(t)	V(l,prot)
Arrival Effectiv Cycle Le Ry (from Proporti g(q1) g(q2) g(q) Computat  Alpha Deta Fravel t Smoothin Proporti Max plat Duration Proporti Computat	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oof bloc on time	oportion  (sec)  16-11  les ar:  oportion  (sec)  , F  nflict: ow, V((ow, V((ow	c)  riving or riving or riving flow c, max) c, max) c, min) riod, t	wsc Inte	V(	Movement) V(	nt 2 1,prot)	Mo V(t)	V(l,prot)
Arrival Effectiv Cycle Le Ry (from Proporti g(q1) g(q2) g(q2) g(q) Computat  Effectiv Computat	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oof bloc on time	oportion  (sec) 16-11 les ar:  oportion  (sec) , F nflict: ow, V(ow, V(ow, V(ow) ked pei blocked atoon 1	on of The control of	wsc Inte	V(	Movement) V(	nt 2 1,prot)	Mo V(t)	V(l,prot)
Arrival Effectiv Cycle Le Ep (from Eq (q1) Eq (q2) Eq (q2) Eq (q2) Eq (q3) Eq (q3) Eq (q3) Eq (q4) Eq (q4) Eq (q5) Eq (q5) Eq (q5) Eq (q6) Eq	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oof bloc on time  ion 3-Pl  ned or u	oportion  (sec) 16-11 les ar:  oportion  (sec) , F nflict: ow, V(ow, V(ow, V(ow) ked pei blocked atoon 1	on of The control of	wsc Inte	V(	Movement) V(	nt 2 1,prot)	Mo V(t)	V(l,prot)
Arrival Effectiv Cycle Le Ry (from Proporti g(q1) g(q2) g(q) Computat  Alpha Deta Fravel t Smoothin Proporti Max plat Duration Proporti Computat	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl ooned fl of bloc on time ion 3-Pl  ned or u on d	oportion  (sec) 16-11 les ar:  oportion  (sec) , F nflict: ow, V(ow, V(ow, V(ow) ked pei blocked atoon 1	riving or riving of Times of T	wsc Inte	Res:	0.00 ult 000 (2)	nt 2 1,prot)	Mo V(t)	V(l,prot)
Arrival Effective Eycle Le Eycle (from Eycle) Eycle (q1) Eycle Eyc	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oon bloc on time ion 3-Pl  ned or u on d r	oportion  (sec) 16-11 les ar:  oportion  (sec) , F nflict: ow, V(ow, V(ow, V(ow) ked pei blocked atoon 1	riving on of To	WSC Inte	Res:	0.00  ult  00  (2)  Two-St.	nt 2 1,prot)	Mo V(t)	V(1,prot)
Arrival Effective Eycle Le Eycle (from Eycle) Eycle (q1) Eycle Eyc	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oon bloc on time ion 3-Pl  ned or u on d r	oportion  (sec) 16-11 les ar:  oportion  (sec) , F nflict: ow, V(ow, V(ow, V(ow) ked pei blocked atoon 1	riving or riving of Times of T	WSC Inte	Res:	0.00 ult 000 (2)	nt 2 1,prot)	Mo V(t)	V(1,prot)
Arrival Effectiv Eycle Le Exp (from Ey (q1) Ey (q2) Ey (q2) Ey (q2) Exp (q3) Exp (q3	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oon bloc on time ion 3-Pl  ned or u on d r	oportion  (sec) 16-11 les ar:  oportion  (sec) , F nflict: ow, V(ow, V(ow, V(ow) ked pei blocked atoon 1	riving on of To	WSC Inte	Res:	0.00  ult  00  (2)  Two-St.	nt 2 1,prot)	Mo V(t)	V(1,prot)
Arrival Effective Eycle Le Eycle Le Ey (from Proporti g(q1) g(q2) g(q)  Computat  Exavel t Ex	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oon bloc on time ion 3-Pl  ned or u on d r	oportion  (sec) 16-11 les ar:  oportion  (sec) , F nflict: ow, V(ow, V(ow, V(ow) ked pei blocked atoon 1	riving on of To	WSC Inte	Res:	0.00  ult  00  (2)  Two-St.	nt 2 1,prot)	Mo V(t)	V(1,prot)
Arrival Effectiv Eycle Le Eycle (from Eycle (from Eycle (from Eycle (gr) Eycl	Type e Green, ngth, C Exhibit on vehic  ion 2-Pr  ime, t(a g Factor on of co ooned fl ooned fl oon bloc on time ion 3-Pl  ned or u on d r	oportion  (sec) 16-11 les ar:  oportion  (sec) , F nflict: ow, V(ow, V(ow, V(ow) ked pei blocked atoon 1	riving on of To	WSC Inte	Res:	0.00  ult  00  (2)  Two-St.	nt 2 1,prot)	Mo V(t)	V(1,prot)