# 1.1.1 Memória de cálculo da análise de capacidade e níveis de serviço – Cenário FUTURO Com empreendimento em funcionamento e com acréscimo de área – USO PRESTAÇÃO DE SERVIÇOS DE SAÚDE

#### 1.1.1.1 Interseção A – Pico Manhã

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	TWO-	WAY ST	OP CONTI	ROL SUN	MMARY		
Analyst: Agency/Co.:	Proge	plan					
Date Performed:	05/06	/2023					
Analysis Time Period:							
Intersection:	A	Maiiiia					
Jurisdiction:	DER/D	F					
Units: U. S. Metric		_					
Analysis Year:	2023						
Project ID: FUTURA S.	AÚDE						
East/West Street:	MOV01	-MOV04					
North/South Street:	MOV04						
Intersection Orientat	ion: E	W		St	tudy per	iod (hrs)	: 0.25
	Vehic	le Vol	umes and	d Adjus	stments		
Major Street: Approa			stbound	_		Westbound	
Moveme	nt	1	2	3	4	5	6
		L	T	R	L	T	R
Volume			2020	208			
Peak-Hour Factor, PHF Hourly Flow Rate, HFR			0.91 2219	1.00			
Percent Heavy Vehicle			2213	200			
Median Type/Storage	5	Undiv			/		
RT Channelized?		OHGIV	Idea		/		
Lanes			2 (	)			
Configuration			T TF				
Upstream Signal?			No			No	
Minor Street: Approa			rthbound			Southbound	
Moveme	nt	7	8	9	10	11	12
		L	Т	R	L	Т	R
Volume				26			
Peak Hour Factor, PHF				0.91			
Hourly Flow Rate, HFR				28			
Percent Heavy Vehicle	S			0			
Percent Grade (%)			0			0	
Flared Approach: Exi	sts?/S	torage			/		/
Lanes			1	L			
Configuration			R				
					el of Se		h h
Approach E		WB		chbound			hbound
Movement 1		4	7	8	9	10	11 12
Lane Config		I			R		
v (vph)					28		
C(m) (vph)					223		
v/c					0.13		
95% queue length					0.42		
Control Delay					23.4		
LOS					С		
Approach Delay				23.4			
Approach LOS				С			

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Phone: Fax:

TWO-WAY STOP CONTROL(TNSC) ANALYSIS   Analysis   Progeplan   Agency/Co:   Date Performed:	E-Mail:						
Agency/Co:		_TWO-WAY STO	OP CONTR	OL (TWSC	) ANALYS	IS	
DEF/OF   D	Agency/Co.: Date Performed: Analysis Time Period:	05/06/2023 Pico Manha					
Project ID: FUTURA SAÜDE   Bast/West Street: MOV01-MOV04	Jurisdiction:						
Vehicle Volumes and Adjustments	Project ID: FUTURA S East/West Street:	AÚDE MOV01-MOV04	1				
Major Street Movements				St	udy peri	od (hrs)	: 0.25
L T R L T R	Maior Ctroot Marramont			_			
Peak-Hour Factor, PHF	Major Street Movement:						
### According to Configuration	Peak-Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicle:		0.91 555 2219	1.00 52 208	,		_
No	RT Channelized? Lanes	Unail	2 0		/		
L T R L T R	-			l.		No	
Peak Hour Factor, PHF         0.91           Peak-15 Minute Volume         7           Hourly Flow Rate, HFR         28           Percent Grade (%)         0           Percent Grade (%)         0           OF Flared Approach: Exists?/Storage         /           RT Channelized         No           Lanes         1           Configuration         R           Pedestrian Volumes and Adjustments           Movements         13           14         15           16         16           Flow (ped/hr)         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0      0	Minor Street Movement						
Percent Grade (%)	Peak Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR			0.91 7 28			
Pedestrian Volumes and Adjustments  Movements 13 14 15 16  Flow (ped/hr) 0 0 0 0 0  Lane Width (m) 3.6 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 0   Upstream Signal Data  Prog. Sat Arrival Green Cycle Prog. Distance Flow Flow Type Time Length Speed to Signal vph vph sec sec kph meters  S2 Left-Turn Through  S5 Left-Turn Through  Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles  Movement 2 Movement 5  Shared In volume, major th vehicles: Sat flow rate, major rate vehic	Percent Grade (%) Flared Approach: Exi RT Channelized Lanes		1	No	/	0	/
Movements  13 14 15 16  Flow (ped/hr) Lane Width (m) 3.6 3.6 3.6 3.6 3.6 Walking Speed (m/sec) Percent Blockage 1.2 1.2 1.2 1.2 1.2 Percent Blockage  10 0 0 0  Upstream Signal Data  Prog. Sat Arrival Green Cycle Prog. Distance Flow Flow Type Time Length Speed to Signal vph 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: Shared In volume, major th vehicles: Sat flow rate, major rt vehicles: Sat flow rate, major rt vehicles: Sat flow rate, major rt vehicles: Number of major street through lanes:  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation							
Lane Width (m) 3.6 3.6 3.6 3.6 3.6 Walking Speed (m/sec) 1.2 1.2 1.2 1.2 1.2 1.2 Percent Blockage 0 0 0 0 0 0   Upstream Signal Data  Prog. Sat Arrival Green Cycle Prog. Distance Flow Flow Type Time Length Speed to Signal vph vph sec sec kph meters  S2 Left-Turn Through S5 Left-Turn Through Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles  Movement 2 Movement 5  Shared In volume, major th vehicles: Sat flow rate, major tr vehicles: Sat flow rate, major th vehicles: Number of major street through lanes:  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation	Movements	_			-	s	
Walking Speed (m/sec) Percent Blockage  1.2 1.2 1.2 1.2  Upstream Signal Data  Prog. Sat Arrival Green Cycle Prog. Distance Flow Flow Type Time Length Speed to Signal vph vph sec sec kph meters  S2 Left-Turn Through S5 Left-Turn Through Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles  Movement 2 Movement 5  Shared In volume, major th vehicles: Shared In volume, major th vehicles: Sat flow rate, major street through lanes:  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation	Flow (ped/hr)	0	0	0	0		
Upstream Signal Data  Prog. Sat Arrival Green Cycle Prog. Distance Flow Flow Type Time Length Speed to Signal vph vph sec sec kph meters  S2 Left-Turn Through S5 Left-Turn Through Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles  Movement 2 Movement 5  Shared In volume, major th vehicles: Shared In volume, major tr vehicles: Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles: Sat flow rate, major th vehicles: Number of major street through lanes:  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation							
Prog. Sat Flow Type Time Length Speed to Signal vph vph vph Sec sec kph meters  S2 Left-Turn Through S5 Left-Turn Through S6 Left-Turn Through S6 Left-Turn Through S6 Left-Turn Through S7 Left-Turn Through S8 Movement 2 Movement 5  S8 Shared In volume, major th vehicles: S8 Shared In volume, major th vehicles: S8 Start flow rate, major th vehicles: S8 Start flow rate, major th vehicles: S8 Start flow rate, major th vehicles: S9 Start flow rate, major rate vehicles: S9 Start flow rate							
Flow Flow Type Time Length Speed to Signal vph 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: Shared In volume, major rt vehicles: Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles: Number of major street through lanes:  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation		Upst	cream Si	gnal Da	ta		
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 th vehicles: Sat flow rate, major rt vehicles: Number of major street through lanes:  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation	Flow	Flow		Time	Length	Speed	to Signal
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:  Worksheet 4-Critical Gap and Follow-up Time Calculation  Critical Gap Calculation	Through S5 Left-Turn						
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:  Worksheet 4-Critical Gap and Follow-up Time Calculation Critical Gap Calculation	Worksheet 3-Data for (	Computing Ef	ffect of	Delay	to Major	Street '	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:  Worksheet 4-Critical Gap and Follow-up Time Calculation Critical Gap Calculation				Move	ment 2	Movem	ent 5
Critical Gap Calculation	Shared ln volume, major Sat flow rate, major : Sat flow rate, major :	or rt vehicl th vehicles: rt vehicles:	Les: :				
	Worksheet 4-Critical	Gap and Foll	low-up T	ime Cal	culation		
	=		7 8	9	10	11	12

	L	L	L	Т	R	L	Т	R
t(c,base) t(c,hv) P(hv)	1.00	1.00	1.00	1.00	6.2 1.00 0	1.00	1.00	1.00
t(c,g) Percent Grade t(3,lt)			0.20	0.20	0.10 0.00 0.00	0.20	0.20	0.10 0.00
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage		0.00	0.00	0.00	0.00 0.00 6.2	0.00	0.00	0.00
Follow-Up Time C	alcula	tions						
Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base) t(f,HV) P(HV) t(f)	0.90	0.90	0.90	0.90	3.30 0.90 0 3.3	0.90	0.90	0.90
Worksheet 5-Effe	ct of	Upstrear	n Signal	Ls				
Computation 1-Qu	eue Cl	earance	Time at	Upstr	-			
				V (	Movement) V(	nt 2 l,prot)		vement 5 V(1,prot)
Total Saturation Arrival Type Effective Green, Cycle Length, C Rp (from Exhibit Proportion vehic g(q1) g(q2) g(q)	g (se (sec) 16-11 les ar	c) ) riving (	on green					
Computation 2-Pr	oporti	on of TV	NSC Inte		Movemen		Mo	vement 5 V(l,prot)
alpha beta Travel time, t(a Smoothing Factor Proportion of co Max platooned fl Min platooned fl Duration of bloc Proportion time	, F nflict ow, V( ow, V( ked pe	ing flow c,max) c,min) riod, t			0.000	)		0.000
Computation 3-Pl	atoon :	Event Pe	eriods	Res	ult			
p(2) p(5) p(dom) p(subo) Constrained or us	nconst	rained?		0.0				
Proportion unblocked for minor movements, p(x)		(1) Single-	-stage	Sta	(2) Two-Sta	age Proc	(3) cess cage II	
p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12)								
Computation 4 and Single-Stage Pro-								
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 12 T R
V c,x						1214		

```
Рx
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                      8
                                                      10
              Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2
V(c,x)
P(x)
V(c,u,x)
C(r,x)
C(plat,x)
Worksheet 6-Impedance and Capacity Equations
Step 1: RT from Minor St.
                                                                     12
Conflicting Flows
                                                  1214
Potential Capacity
                                                  223
Pedestrian Impedance Factor
                                                  1.00
                                                                   1.00
Movement Capacity
                                                  223
Probability of Queue free St.
                                                                   1.00
                                                 0.87
Step 2: LT from Major St.
                                                                      1
                                                     4
Conflicting Flows
Potential Capacity
                                                                   1.00
                                                 1.00
Pedestrian Impedance Factor
Movement Capacity
Probability of Queue free St.
                                                 1.00
                                                                   1.00
Maj L-Shared Prob Q free St.
Step 3: TH from Minor St.
                                                     8
                                                                     11
Conflicting Flows
Potential Capacity
Pedestrian Impedance Factor
                                                  1.00
                                                                   1.00
Cap. Adj. factor due to Impeding mvmnt
                                                  1.00
                                                                   1.00
Movement Capacity
Probability of Queue free St.
                                                 1.00
                                                                   1.00
Step 4: LT from Minor St.
                                                                     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
                                                                   0.87
Movement Capacity
Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance
Step 3: TH from Minor St.
                                                                     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
```

		_	.00		1.00	1
Result for 2 stage process:						
C t Probability of Queue free St.		1	.00		1.00	ı
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	mrmn+					
Movement Capacity	HIVHIII C					
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	1
Maj. L, Min T Impedance factor		-	-		1.00	
Maj. L, Min T Adj. Imp Factor.					1.00	
Cap. Adj. factor due to Impeding Movement Capacity	mvmnt	1	.00		0.87	'
Results for Two-stage process:						
y S +						
C t						
Worksheet 8-Shared Lane Calculat  Movement	ions 7	8	9	10	11	12
			R	T <sub>1</sub>	Т	R
	L	T	R	L	Т	R
Volume (vph) Movement Capacity (vph)			28 223	L	T	R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)	L	T	28 223			R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effec	t of Flare	T d Minor	28 223 Stree	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effec	L t of Flare	T ed Minor	28 223 Stree	t Appro	paches	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effec Movement C sep	t of Flare	T d Minor	28 223 Stree 9 R	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement C sep Volume	t of Flare	T d Minor	28 223 Stree	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement C sep Volume Delay	t of Flare	T d Minor	28 223 Stree 9 R	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement C sep Volume Delay Q sep	t of Flare	T d Minor	28 223 Stree 9 R	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement C sep Volume Delay Sep Sep +1	t of Flare	T d Minor	28 223 Stree 9 R	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement  C sep Volume Delay Q sep Q sep +1 round (Qsep +1)	t of Flare	T d Minor	28 223 Stree 9 R	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement C sep Volume Delay Q sep Q sep +1 round (Qsep +1) n max C sh	t of Flare	T d Minor	28 223 Stree 9 R	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect Movement  C sep Volume Delay Q sep Q sep +1 round (Qsep +1)  n max C sh SUM C sep	t of Flare	T d Minor	28 223 Stree 9 R	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement  C sep Volume Delay 2 sep 2 sep +1 round (Qsep +1) n max C sh SUM C sep	t of Flare	T d Minor	28 223 Stree 9 R	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect Movement  C sep Volume Delay 2 sep 2 sep +1 cound (Qsep +1)  n max C sh SUM C sep 1 c act	L of Flare	T ed Minor	28 223 Stree 9 R 223 28	t Appro	paches	12
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement C sep Volume Delay Sep Sep +1 Cound (Qsep +1) In max C sh SUM C sep C act Worksheet 10-Delay, Queue Length	t of Flare	rd Minor	28 223 Stree 9 R 223 28	t Appro	paches 11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect Movement  C sep Yolume Delay 2 sep 2 sep +1 round (Qsep +1)  n max C sh SUM C sep 1 c act  Worksheet 10-Delay, Queue Length Movement 1 4	L of Flare	td Minor  8 T	28 223 Stree 9 R 223 28	t Appro	paches	12
Wolume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect Movement  C sep Volume Delay 2 sep 2 sep +1 round (Qsep +1)  n max C sh SUM C sep C act  Worksheet 10-Delay, Queue Length Movement  Lane Config v (vph)	t of Flare	T ed Minor 8 T	28 223 Stree 9 R 223 28 rvice 9 R	t Appro	paches 11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement  C sep Volume Delay 2 sep 2 sep +1 round (Qsep +1)  n max C sh SUM C sep n C act  Worksheet 10-Delay, Queue Length Movement  1 4 Lane Config V (vph) C(m) (vph)	t of Flare	ed Minor  8 T	28 223 Stree 9 R 223 28 rvice 9 R	t Appro	paches 11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect Movement  C sep Volume Delay Q sep Q sep +1 round (Qsep +1)  In max C sh SUM C sep In C act  Worksheet 10-Delay, Queue Length Movement  1 4 Lane Config  V (vph) C(m) (vph) V/c	t of Flare	td Minor 8 T	28 223 Stree 9 R 223 28 rvice 9 R 8 23	t Appro	paches 11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement  C sep Volume Delay 2 sep 2 sep +1 round (Qsep +1)  n max C sh CSUM C sep n C act  Worksheet 10-Delay, Queue Length Movement 1 4 Lane Config 7 (vph) C(m) (vph) 7/C 95% queue length	t of Flare	ed Minor  8 T  el of Se 8	28 223 Stree 9 R 223 28 rvice 9 R 8 23 .13	t Appro	paches 11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)  Worksheet 9-Computation of Effect  Movement  C sep Volume Delay 2 sep 20 sep +1 round (Qsep +1)  In max C sh SUM C sep In C act  Worksheet 10-Delay, Queue Length  Movement  1 4 Lane Config  V (vph) C(m) (vph) V/c 95% queue length Control Delay	t of Flare	ed Minor  8 T  el of Se 8	28 223 Stree 9 R 223 28 rvice 9 R 8 23 .13 .42 3.4	t Appro	paches 11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect Movement  C sep Volume Delay 2 sep 2 sep +1 round (Qsep +1)  n max C sh SUM C sep n C act  Worksheet 10-Delay, Queue Length Movement  1 4 Lane Config V (vph) C(m) (vph)	t of Flare 7 L	ed Minor  8 T  el of Se 8	28 223 Stree 9 R 223 28 rvice 9 R 8 23 .13	t Appro	paches 11 T	12 R

Worksheet 11-Shared Major LT Impedance and Delay

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

## 1.1.1.2 Interseção A — Pico Tarde

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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:
                        Α
Jurisdiction:
                         DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: MOV01-MOV04
North/South Street: MOV04
Intersection Orientation: EW
                                                  Study period (hrs): 0.25
                        Vehicle Volumes and Adjustments
Major Street: Approach
                                  Eastbound
                                                             Westbound
                               1
                                    2
T
                                               3
                                                      | 4
| L
                                                                         6
                Movement
                                                                 5
                                                                 Т
                               L
                                               R
                                                                         R
Volume
                                       726
Peak-Hour Factor, PHF
Hourly Flow Rate, HFR
                                              0.91
                                      0.91
                                       797
                                               8
Percent Heavy Vehicles
```

Median Type/St RT Channelized	-	Undi	vided			/				
Lanes			2.	0						
Configuration			Т	TR						
Upstream Signa	11?		No				No			
Minor Street:	Approach	No	orthbou	ınd		S	outhbou	nd		
	Movement	7	8	9		10	11	12		
		L	Т	R	- 1	L	Т	R		
Volume				207						
Peak Hour Fact	or, PHF			0.91						
Hourly Flow Ra	ate, HFR			227						
Percent Heavy	Vehicles			0						
Percent Grade	(%)		0				0			
Flared Approac	ch: Exists?	/Storage	€		/				/	
Lanes				1						
Configuration				R						

 Approach	_Delay, EB	Queue WB	Le	ngt	h, and Leve Northbound		Ser	_	outhbou	nd
Movement	1	4	1	7	8	9	- 1	10	11	12
Lane Config			Ì			R	İ			
v (vph)						227				
C(m) (vph)						653				
v/c						0.35	5			
95% queue length						1.55	5			
Control Delay						13.4	1			
LOS						В				

#### HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail:			Fa	ax:		
	_TWO-WAY ST	OP CONTR	ROL(TWSC)	ANALYSI	:s	
Analyst: Agency/Co.: Date Performed: Analysis Time Period: Intersection: Jurisdiction: Units: U. S. Metric Analysis Year: Project ID: FUTURA SE East/West Street: North/South Street: Intersection Orientat:	A DER/DF  2023 AÚDE MOV01-MOV0 MOV04	•	Stı	udy peric	od (hrs):	0.25
	Vehicle	Volumes	and Adju	ıstments		
Major Street Movement:		2 T	3 R	4 L	5 6 T R	
Volume Peak-Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicle: Median Type/Storage RT Channelized?		726 0.91 199 797  vided	8 0.91 2 8 	-		
Lanes		2 0	)			
Configuration		T TF	2			
Upstream Signal?		No		4	Io	
Minor Street Movements	7 L	8 T	9 R	10 1 L	1 12 T R	
Volume Peak Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicle: Percent Grade (%) Flared Approach: Exis RT Channelized Lanes Configuration		0 re 1 R	207 0.91 57 227 0	, c	)	/
	Pedestrian	Volumes	and Ad-	instmants		
Movements	13	14	15	16	·	
Flow (ped/hr) Lane Width (m) Walking Speed (m/sec) Percent Blockage	0 3.6 1.2		0 3.6 1.2	0 3.6 1.2 0		
	II	tream Si	anal Dat	- 2		
Prog Flow vph		Arrival Type	.gnal Dat Green Time sec		Prog. Speed kph	Distance to Signal meters
S2 Left-Turn Through S5 Left-Turn Through						

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: Worksheet 4-Critical Gap and Follow-up Time Calculation Critical Gap Calculation 9 10 11 12 Movement R L Τ R t(c,base) 6.2 t(c,hv) 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 P(hv) 0 t(c,g) 0.20 0.20 0.10 0.20 0.20 0.10 0.00 0.00 Percent Grade 0.00 0.00 0.00 0.00 0.00 t(3,1t)1-stage 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 t(c,T): 0.00 2-stage 0.00 0.00 1.00 1.00 1.00 1.00 0.00 1-stage t(c) 6.2 2-stage Follow-Up Time Calculations 9 10 12 8 11 Movement 1 4 Τ. T. Τ. Т R L Т R t(f,base) 3.30 0.90 0.90 0.90 0.90 t(f,HV) 0.90 0.90 0.90 0.90 P(HV) 0 3.3 t(f) Worksheet 5-Effect of Upstream Signals Computation 1-Queue Clearance Time at Upstream Signal Movement 2 Movement 5 V(t) V(l,prot) V(t) V(l,prot) V prog Total Saturation Flow Rate, s (vph) Arrival Type Effective Green, g (sec) Cycle Length, C (sec) Rp (from Exhibit 16-11) Proportion vehicles arriving on green P g(q1) g (q2) g (q) Computation 2-Proportion of TWSC Intersection Time blocked Movement 2 Movement 5 V(t) V(l,prot) V(t) V(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

unblocked

for minor

movements, p(x)

(1)

Process

Single-stage

(2)

Stage I

Two-Stage Process

(3)

Stage II

p(4) p(7) p(8)								
p(9) p(10) p(11) p(12)								
Computation 4 and 5 Single-Stage Process Movement	1	4	7	8	9	10	11	12
	L	L	L	Т	R	L	Т	R
V c,x					402			
s Px V c,u,x								
C r,x C plat,x								
Two-Stage Process								
Stage1	7 Stage2 S	Stage1	8 Stage	2 Sta	10 ge1 St	age2	11 Stage1	Stage2
V(c,x)								
s P(x) V(c,u,x)								
C(r,x) C(plat,x)								
Worksheet 6-Impedance	and Capac	city E	quation	s				
Step 1: RT from Minor	St.				9		12	
Conflicting Flows					02			
Potential Capacity Pedestrian Impedance	Factor				53 .00		1.00	
Movement Capacity				6	53			
Probability of Queue	free St.			0	.65		1.00	
Step 2: LT from Major	St.				4		1	
Conflicting Flows								
Potential Capacity Pedestrian Impedance	Factor			1	.00		1.00	
Movement Capacity Probability of Queue	free St.			1	.00		1.00	
Maj L-Shared Prob Q f				_				
Step 3: TH from Minor	St.				8		11	
Conflicting Flows								
Potential Capacity Pedestrian Impedance					.00		1.00	
Cap. Adj. factor due Movement Capacity	to Impedir	ng mvm	nt	1	.00		1.00	
Probability of Queue	free St.			1	.00		1.00	
Step 4: LT from Minor	St.				7		10	
Conflicting Flows								
Potential Capacity Pedestrian Impedance	Factor			1	.00		1.00	
Maj. L, Min T Impedan Maj. L, Min T Adj. Im	ce factor						1.00	
Cap. Adj. factor due Movement Capacity		ng mvm	nt	1	.00		0.65	
Worksheet 7-Computati	on of the	Effec	t of Tw	o-stag	e Gap <i>I</i>	Accepta	nce	
Step 3: TH from Minor	St.				8		11	
Part 1 - First Stage Conflicting Flows Potential Capacity								

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 m Movement Capacity  Part 3 - Single Stage	nvmnt					
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding m Movement Capacity	nvmnt		.00		1.00	
Result for 2 stage process:						
y C t Probability of Queue free St.		1	.00		1.00	
Step 4: LT from Minor St.			7		10	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding m Movement Capacity	nvmnt					
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding m Movement Capacity	nvmnt					
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 m Movement Capacity	nvmnt		.00		1.00 1.00 1.00 0.65	
Results for Two-stage process: a C t						
Worksheet 8-Shared Lane Calculation	ns					
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)			227 653			
Worksheet 9-Computation of Effect	of Flare	d Minor	Street	Approa	aches	
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)			653 227			
n max C sh SUM C sep n C act						

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

Movement Lane Config	1	4	7	8	9 R	10	11	12
v (vph)					227			
C(m) (vph)					653			
v/c					0.35			
95% queue length					1.55			
Control Delay					13.4			
LOS					В			
Approach Delay				13.4				
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		
v(i2), Volume for stream 3 or 6		
s(il), Saturation flow rate for stream 2 or 5		
s(i2), Saturation flow rate for stream 3 or 6 P*(oj)		
d(M,LT), Delay for stream 1 or 4		
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5		

#### 1.1.1.3 Interseção B – 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: B
Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: M2
North/South Street: M7

Intersection (		EW		5	Study	perio	d (hrs)	: 1.00	
	Veh	icle Vo	lumes a	nd Adjı	ıstme	ents			
Major Street:	Approach	E	astboun	d		₩∈	stbound		
	Movement	1	2	3		4	5	6	
		L	Т	R	I	L	T	R	
Volume						9	932		
Peak-Hour Fact	or, PHF					0.91	0.91		
Hourly Flow Ra	ate, HFR					9	1024		
Percent Heavy	Vehicles					12			
Median Type/St	corage	Undi	vided			/			
RT Channelized	1?								
Lanes						0	2		
Configuration						I	T T		
Upstream Signa	al?		No				No		
Minor Street:	Approach	N	orthbou	nd		Sc	uthboun	.d	
	Movement	7	8	9		10	11	12	
		L	Т	R	-	L	T	R	
Volume									
Peak Hour Fact	or, PHF	0.91							
Hourly Flow Ra	ate, HFR	14							
Percent Heavy	Vehicles	0							

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

\_\_\_\_Delay, Queue Length, and Level of Service\_

Approach	EB	WB	Nor	thbound			Sou	thbound	
Movement	1	4	7	8	9		10	11	12
Lane Config		LT	L			-			
v (vph)		9	14						
C(m) (vph)		1560	510						
v/c		0.01	0.03						
95% queue length		0.02	0.08						
Control Delay		7.3	12.3						
LOS		A	В						
Approach Delay				12.3					
Approach LOS				В					

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

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

Analyst: Progeplan

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

В Intersection: DER/DF

Jurisdiction: Units: U. S. Metric

Analysis Year: 2023 Project ID: FUTURA SAÚDE 2023 East/West Street: M2
North/South Street: M7

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				9	932		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				2	256		
Hourly Flow Rate, HFR				9	1024		
Percent Heavy Vehicles				12			
Median Type/Storage	Undi	vided		/			
RT Channelized? Lanes				0	2		
Configuration				T./	тт		
Upstream Signal?		No			No		
opperedm bighai.		110			110		
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	Т	R	
Volume							
Peak Hour Factor, PHF	0.91						
Peak-15 Minute Volume	4						
Hourly Flow Rate, HFR	14						
Percent Heavy Vehicles	0						
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storag	е		/			/
RT Channelized	_						
Lanes	1						
Configuration	L						

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. Distance Prog.

Flow Time to Signal Flow Type Length Speed vph vph sec sec kph meters Left-Turn Through Left-Turn Through

Worksheet	2-Da+a	for	Computing	Effort	o f	Do 1 211	+ 0	Maia	c c+root	Wohialos
worksneet	3-Data	TOT	Computing	ETTECL	OT	ретау	LO	Md O	Street	venitcies

						Movement	. 2	Movemen	it 5
Shared 1	n volume	, majo	r th vel	hicles:				0	
Shared 1	n volume	, majo	r rt vel	hicles:				0	
	rate, m							1700	
	rate, m	_						1700	
Number o	of major	street	through	h lanes	:			2	
Workshee	t 4-Crit	ical G	ap and 1	Follow-	up Time	Calcula	ition		
Critical	. Gap Cal	culati	on						
Movement		1	4	7	8	9	10	11	12
		L	L	L	Т	R	L	Т	R
t(c,base	:)		4.1	7.1					
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			12	0					
t(c,g)				0.20	0.20	0.10	0.20		0.10
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	0.00	1.00	1.00	0.00
t(c)	1-stage		4.2	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)			12	0					
٠,			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(l,prot) V(t) V(l,prot)

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

Computation 2-Proportion of TWSC Intersection Time blocked Movement 2

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

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

0.000 0.000

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

Proportion unblocked for minor movements, p(x)	(1) Single-sta Process	-	(2) Two-Sta ige I	-	(3) ocess Stage		
o(1) o(4) o(7)							
(8)							
(9)							
(10) (11)							
(12)							
1.5							
omputation 4 and 5 ingle-Stage Process							
ovement	1 4	7	8	9	10	11	12
	L L	L	Т	R	L	Т	R
C,X	0	530					
x c,u,x							
C, u, x							
r,x plat,x							
wo-Stage Process							
0+0==1	7	8 8+299	2 0+00-	10	200		1
Stagel	Stage2 Sta	yeı stage 	:2 Stage	er Sta	aye2	stage1	scage2
(c,x)							
()	3000						
(x) (c,u,x)							
'/r v\							
C(r,x) C(plat,x)							
C(plat,x)  Norksheet 6-Impedance		y Equatior	18				
C(plat,x)		y Equatior	15	9		12	
Torksheet 6-Impedance Step 1: RT from Minor Conflicting Flows		y Equatior	ıs	9		12	
Vorksheet 6-Impedance tep 1: RT from Minor Conflicting Flows Potential Capacity	St.	y Equatior					
Vorksheet 6-Impedance tep 1: RT from Minor Conflicting Flows totential Capacity Pedestrian Impedance	St.	y Equatior	ns 1.0			12	
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows otential Capacity edestrian Impedance lovement Capacity	St.	y Equatior	1.0	00		1.00	
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows otential Capacity edestrian Impedance lovement Capacity robability of Queue	Factor free St.	y Equatior		00			
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows otential Capacity edestrian Impedance fovement Capacity robability of Queue tep 2: LT from Major	Factor free St.	y Equatior	1.0	00		1.00	
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows cotential Capacity redestrian Impedance lovement Capacity robability of Queue tep 2: LT from Major conflicting Flows	Factor free St.	y Equatior	1.0	000		1.00	
Corksheet 6-Impedance Conflicting Flows Contential Capacity Codestrian Impedance Covement Capacity Crobability of Queue Conflicting Flows Conflicting Flows Conflicting Flows Conflicting Flows Conflicting Capacity	Factor free St.	y Equatior	1.0	000		1.00	
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows otential Capacity edestrian Impedance lovement Capacity robability of Queue tep 2: LT from Major conflicting Flows otential Capacity edestrian Impedance lovement Capacity edestrian Impedance lovement Capacity	Factor free St.  St.	y Equation	1.0 1.0 0 156 1.0 156	4		1.00	
Corksheet 6-Impedance of the property of the property of the probability of Queue	Factor free St. Factor free St.	y Equation	1.0 1.0 0 156 1.0 156 0.9	4		1.00	
Corksheet 6-Impedance Conflicting Flows Conflicting Flows Conflicting Flows Cotential Capacity Codestrian Impedance Covement Capacity Cobability of Queue Conflicting Flows Cotential Capacity Conflicting Flows Cotential Capacity Codestrian Impedance Covement Capacity Cobability of Queue Covement Capacity Cobability of Queue Color Capacity Cobability of Queue	Factor free St.  Factor free St.  Factor free St. ree St.	y Equation	1.0 1.0 0 156 1.0 156	4		1.00	
Torksheet 6-Impedance  tep 1: RT from Minor  conflicting Flows otential Capacity redestrian Impedance tovement Capacity robability of Queue  tep 2: LT from Major  conflicting Flows rotential Capacity redestrian Impedance tovement Capacity redestrian Impedance tovement Capacity robability of Queue tap L-Shared Prob Q f  tep 3: TH from Minor	Factor free St.  Factor free St.  Factor free St. ree St.	y Equation	1.0 1.0 0 156 1.0 156 0.9	000 4 4 50 00 50 00 50 99 99		1.00	
Corksheet 6-Impedance Step 1: RT from Minor Conflicting Flows Contential Capacity Codestrian Impedance Covement Capacity Crobability of Queue Conflicting Flows Conflicting Flows Conflicting Flows Conflicting Impedance Covement Capacity Codestrian Impedance Covement Capacity Codestrian Impedance Covement Capacity Crobability of Queue Covement Capacity Crobability of Q	Factor free St.  Factor free St.  Factor free St. ree St.	y Equation	1.0 1.0 0 156 1.0 156 0.9	000 4 4 50 00 50 00 50 99 99		1.00	
orksheet 6-Impedance tep 1: RT from Minor onflicting Flows otential Capacity edestrian Impedance ovement Capacity robability of Queue tep 2: LT from Major onflicting Flows otential Capacity edestrian Impedance ovement Capacity edestrian Impedance ovement Capacity robability of Queue aj L-Shared Prob Q f  tep 3: TH from Minor onflicting Flows otential Capacity	Factor free St.  Factor free St.  Factor free St.  Factor free St.	y Equation	1.0 1.0 0 156 1.0 156 0.9	000 4 50 00 50 99 99 8		1.00	
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows otential Capacity dedestrian Impedance tovement Capacity robability of Queue tep 2: LT from Major conflicting Flows otential Capacity dedestrian Impedance tovement Capacity dedestrian Impedance tovement Capacity robability of Queue taj L-Shared Prob Q f tep 3: TH from Minor conflicting Flows otential Capacity dedestrian Impedance	Factor free St.  Factor free St.  Factor free St. ree St.		1.0 1.0 0 156 1.0 156 0.9	000 4 500 000 600 999 999 8		1.00	
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows otential Capacity redestrian Impedance tovement Capacity robability of Queue tep 2: LT from Major conflicting Flows otential Capacity redestrian Impedance tovement Capacity robability of Queue to temporary for Queue tep 3: TH from Minor conflicting Flows otential Capacity redestrian Impedance to tep 3: TH from Minor conflicting Flows otential Capacity redestrian Impedance to the Adj. factor due tovement Capacity	Factor free St.  Factor free St.  Factor free St.  St.		1.0 1.0 0 156 1.0 156 0.9 0.9	60 00 4 60 00 60 99 99 8		1.00 1.00 1.00 1.00 1.00	
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows otential Capacity redestrian Impedance tovement Capacity robability of Queue tep 2: LT from Major conflicting Flows otential Capacity redestrian Impedance tovement Capacity robability of Queue to temporary for Queue tep 3: TH from Minor conflicting Flows otential Capacity redestrian Impedance to tep 3: TH from Minor conflicting Flows otential Capacity redestrian Impedance to the Adj. factor due tovement Capacity	Factor free St.  Factor free St.  Factor free St.  St.		1.0 1.0 0 156 1.0 0.9 0.9	000 4 600 600 600 600 88 800 99 90 90 90 90 90 90 90 90		1.00	
Torksheet 6-Impedance tep 1: RT from Minor Conflicting Flows otential Capacity edestrian Impedance lovement Capacity robability of Queue tep 2: LT from Major Conflicting Flows otential Capacity edestrian Impedance lovement Capacity robability of Queue laj L-Shared Prob Q f tep 3: TH from Minor Conflicting Flows otential Capacity robability of Queue laj L-Shared Prob Q f tep 3: TH from Minor Conflicting Flows otential Capacity edestrian Impedance lovement Capacity robability of Queue lovement Capacity robability of Queue	Factor free St. Factor free St. Factor free St. Factor free St. Factor to Impeding free St.		1.0 1.0 0 156 1.0 0.9 0.9	60 00 4 60 00 60 99 99 8		1.00 1.00 1.00 1.00 1.00	
orksheet 6-Impedance tep 1: RT from Minor onflicting Flows otential Capacity edestrian Impedance ovement Capacity robability of Queue tep 2: LT from Major onflicting Flows otential Capacity edestrian Impedance ovement Capacity edestrian Impedance ovement Capacity robability of Queue aj L-Shared Prob Q f tep 3: TH from Minor onflicting Flows otential Capacity edestrian Impedance ap. Adj. factor due ovement Capacity robability of Queue tep 4: LT from Minor onflicting Flows	Factor free St. Factor free St. Factor free St. Factor free St. Factor to Impeding free St.		1.0 1.0 1.0 0 1.56 1.0 1.56 0.9 0.9	8 00 00 4 50 00 60 99 8 8 00 7		1.00 1.00 1.00 1.00 1.00 0.99	
orksheet 6-Impedance tep 1: RT from Minor onflicting Flows otential Capacity edestrian Impedance ovement Capacity robability of Queue tep 2: LT from Major onflicting Flows otential Capacity edestrian Impedance ovement Capacity robability of Queue aj L-Shared Prob Q f tep 3: TH from Minor onflicting Flows otential Capacity edestrian Impedance aj L-Shared Prob Q f tep 3: TH from Minor onflicting Flows otential Capacity robability of Queue tep 4: LT from Minor onflicting Flows otential Capacity	Factor free St.  Factor free St.  Factor free St.  St.  Factor free St.  St.		1.0 1.0 1.0 0 156 1.0 0.9 0.9 0.9	8 00 00 4 4 60 00 60 60 99 99 8 8		1.00 1.00 1.00 1.00 1.00 1.00 0.99	
Corksheet 6-Impedance of the property of the probability of Queue of the probability o	Factor free St.  Factor free St.  Factor free St.  St.  Factor to Impeding free St.		1.0 1.0 1.0 0 1.56 1.0 1.56 0.9 0.9	8 00 00 4 4 60 00 60 60 99 99 8 8		1.00 1.00 1.00 1.00 1.00 0.99 1.00	
Corksheet 6-Impedance Step 1: RT from Minor Conflicting Flows Pedestrian Impedance Govement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Pedestrian Impedance Govement Capacity Probability of Queue Step 3: TH from Minor Conflicting Flows Pedestrian Impedance Towner Capacity Probability of Queue The Step 3: TH from Minor Conflicting Flows Pedestrian Impedance Cap. Adj. factor due Towner Capacity Probability of Queue Towner Capacity Probability of Queue The Step 4: LT from Minor Conflicting Flows Pedestrian Impedance Towner Capacity Probability of Queue The Step 4: LT from Minor Conflicting Flows Pedestrian Impedance Towner Capacity Pedestrian Imp	Factor free St.  Factor free St.  Factor free St.  St.  Factor to Impeding free St.  St.		1.0 1.0 1.0 0 156 1.0 0.9 0.9 0.9	8 00 00 4 4 60 00 60 60 99 99 8 8		1.00 1.00 1.00 1.00 1.00 0.99 1.00	
Torksheet 6-Impedance tep 1: RT from Minor conflicting Flows otential Capacity redestrian Impedance tovement Capacity robability of Queue tep 2: LT from Major conflicting Flows redestrian Impedance tovement Capacity redestrian Impedance tovement Capacity robability of Queue tap 3: TH from Minor conflicting Flows rotential Capacity redestrian Impedance tap Adj. factor due tovement Capacity redestrian Impedance tap. Adj. factor due tovement Capacity robability of Queue tap 4: LT from Minor conflicting Flows rotential Capacity robability of Queue tep 4: LT from Minor conflicting Flows rotential Capacity redestrian Impedance	Factor free St.  Factor free St.  Factor free St.  St.  Factor to Impeding free St.  St.  Factor to Expedience free St.  Factor to Impeding	mvmnt	1.0 1.0 1.0 0 156 1.0 0.9 0.9 0.9	000 4 500 500 500 99 99 8 8 7 7 8 900 7		1.00 1.00 1.00 1.00 1.00 0.99 1.00	

Step 3: TH from Minor St.			8		11	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity Probability of Queue free St.	mvmnt					
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	mvmnt					
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	mvmnt		.00		1.00	
Result for 2 stage process:						
y C t Probability of Queue free St.		1	.00		1.00	
Step 4: LT from Minor St.			7		10	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity  Part 2 - Second Stage Conflicting Flows	mvmnt					
Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	mvmnt					
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 Movement Capacity	mvmnt	5 1 0	30 13 .00		1.00 0.99 1.00 1.00	
Results for Two-stage process:						
a Y C t		5	10			
Worksheet 8-Shared Lane Calculati	lons					
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)	14 510					
Worksheet 9-Computation of Effect	of Flared	Minor	Street	Approa	aches	
Movement	7 L	8 T	9 R	10 L	11 T	12 R
C sep Volume Delay	510 14					

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)		9	14					
C(m) (vph)		1560	510					
v/c		0.01	0.03					
95% queue length		0.02	0.08					
Control Delay		7.3	12.3					
LOS		A	В					
Approach Delay				12.3				
Approach LOS				В				

Worksheet 11-Shared Major LT Impedance and Delay

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

#### 1.1.1.4 Interseção B — Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

	_TWO-WAY	STOP	CONTROL	SUMMARY	
Analyst:	Progeplar	n			

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

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

Intersection: B
Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: M2
North/South Street: M7

Intersection Orientation: EW Study period (hrs): 1.00

Major Street:	Approach	E	lastboun	d		Wes	tbound	
	Movement	1	2	3	- 1	4	5	6
		L	Т	R		L	Т	R
Volume						12	1989	
Peak-Hour Fact	or, PHF					0.91	0.91	
Hourly Flow Ra	ate, HFR					13	2185	
Percent Heavy	Vehicles					0		
Median Type/St RT Channelized	_	Undi	vided			/		
Lanes						0	2	
Configuration						LT	T	
Upstream Signa	11?		No				No	
Minor Street:	Approach	N	lorthbou	nd		Sou	thbound	

Move	ement	7 L	8 T	9 R	10		12 R	
Volume Peak Hour Factor,	DUT	222 0.91						
Hourly Flow Rate,		243						
Percent Heavy Vehic		1						
Percent Grade (%)			0			0		
Flared Approach:	Exists?/	_	)		/			/
Lanes Configuration		1 I						
1	Delay, Q	ueue Le	enath.	and Lev	el of S	Service		
Approach	EB EB	WB	-	rthboun			uthbound	
Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L					
v (vph)		13	243					
C(m) (vph)		1636	228					
v/c		0.01	1.07					
95% queue length		0.02	23.21					
Control Delay		7.2 A	263.8 F					
Approach Delay		71	-	263.8				
Approach LOS				F				
Phone:					Fax:			
E-Mail:								
	TWO-1	WAY STO	P CONT	ROL (TWS	C) ANAI	LYSIS		
Analyst:	Proge	eplan						
Agency/Co.:								
Date Performed:		6/2023						
Analysis Time Perio	oa: Pico B	Tarde						
Jurisdiction:	DER/	DF						
Units: U. S. Metri								
Analysis Year:	2023							
	A SAÚDE							
East/West Street: North/South Street	M2 : M7							
Intersection Orien		EW		S	tudy pe	eriod (hr	s): 1.0	00
			7 - 7					
Major Street Moveme		hicle V 1	olumes 2	and Ad	justmer. 4	nts	6	
TRAJOT DETECT MOVEIN	-1100	L	T	R	L L	T	R	
Volume					12	1989		
Peak-Hour Factor,	PHF				0.91	0.91		
Peak-15 Minute Vol					3	546		
Hourly Flow Rate, 1	HFR				13	2185		
Percent Heavy Vehi		TT- 3.			0			
Median Type/Storage	9	Undiv	71aed		/			

	_venicle	volumes	and Ad	ıjustmen	ts		
Major Street Movements	1	2	3	4	5	6	
	L	Т	R	L	T	R	
Volume				12	1989		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				3	546		
Hourly Flow Rate, HFR				13	2185		
Percent Heavy Vehicles				0			
Median Type/Storage	Undi	vided		/			
RT Channelized?							
Lanes				0	2		
Configuration				L	ТТ		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	T	R	
olume	222						
Peak Hour Factor, PHF	0.91						
Peak-15 Minute Volume	61						
Hourly Flow Rate, HFR	243						
Percent Heavy Vehicles	1						
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storag	е		/			/
RT Channelized							
Lanes	1						

Configuration								
Movements			ian Vol	umes an 14	d Adjus 15	stments		
				14		10		
Flow (ped/hr) Lane Width (m)				0 3.6	0 3.6	0 3.6		
Walking Speed (1	m/sec)			1.2	1.2	1.2		
Percent Blockage				0	0	0		
	Prog.	Sat	Upstream Arri			Cycle	Prog.	Distance
	Flow	Flo	w Type	е Т	ime I	Length	Speed	to Signal
	vph	vph		S	ec	sec	kph	meters
S2 Left-Turn Through								
S5 Left-Turn								
Through								
Worksheet 3-Dat	a for C	omputin	g Effec	t of De	lay to	Major :	Street V	ehicles
					Movemer	nt 2	Moveme	ent 5
Shared ln volum							0	
Shared in volum							0	
Sat flow rate, in Sat flow rate, in							1700 1700	
Number of major				:			2	
Worksheet 4-Cri	tical G	ap and 1	Follow-	up Time	Calcul	lation		
Critical Gap Ca			7	0	0	1.0	11	1.2
Movement	1 L	4 T.	7 L	8 T	9 R	10 L	11 T	12 R
							<u>.</u>	
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	1.00	1.00	1.00	1.00	1.00	1.00
c(c,q)		U	0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00		0.00
t(3,1t)		0.00	0.70	0.00	0.00	0 0 0	0.00	0.00
t(c,T): 1-stag		0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stag t(c) 1-stag		0.00 4.1	1.00 6.4	1.00	0.00	1.00	1.00	0.00
2-stag		7.1	0.4					
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					
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		0	1					
t(f)		2.2	3.5					
Vorksheet 5-Eff	ect of 1	Jost rea	m Signa	ls				
Computation 1-Q	ueue CI	=arance	ттине а.	. upstr	Moveme		Мс	vement 5
				V (	t) V	(l,prot	) V(t)	V(l,prot)
V prog								
Total Saturation	n Flow 1	Rate, s	(vph)					
Arrival Type								
Effective Green	-	c)						
Cycle Length, C Rp (from Exhibi		)						
Rp (from Exhib) Proportion vehi			on gree	n P				
g(q1)			5100	-				
g (q2)								
g (q)								
Computation 2-P	roporti	on of T	WSC Inte	ersecti	on Time	e bloc	ked	
					Moveme	ent 2	Mo	vement 5
				V (	t) V	(I,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 Stage I movements, p(x) 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 7 9 10 12 Movement 1 4 8 11 L  ${\tt L}$ L Τ R L Τ R 0 V c,x 1118 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. 9 12 Conflicting Flows Potential Capacity 1.00 1.00 Pedestrian Impedance Factor Movement Capacity 1.00 Probability of Queue free St. 1.00 Step 2: LT from Major St. 4 1 Conflicting Flows 0 1636 Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Movement Capacity 1636 Probability of Queue free St. 0.99 1.00 Maj L-Shared Prob Q free St. 0.99 Step 3: TH from Minor St. 11 8

1.00

1.00

Conflicting Flows Potential Capacity

Pedestrian Impedance Factor

Movement 7 L	8 9 1 T R	10 11 12 L T R
Worksheet 8-Shared Lane Calculations		
/ C t	228	
desults for Two-stage process:		
ap. Adj. factor due to Impeding mvmnt ovement Capacity	0.99 228	0.99
aj. L, Min T Impedance factor aj. L, Min T Adj. Imp Factor.		0.99 0.99
edestrian Impedance Factor	1.00	1.00
otential Capacity	230	
art 3 - Single Stage onflicting Flows	1118	
ap. Adj. factor due to Impeding mvmnt ovement Capacity		
Pedestrian Impedance Factor		
onflicting Flows otential Capacity		
art 2 - Second Stage		
Cap. Adj. factor due to Impeding mvmnt fovement Capacity		
Pedestrian Impedance Factor		
Conflicting Flows Potential Capacity		
Part 1 - First Stage		
Step 4: LT from Minor St.	7	10
t Probability of Queue free St.	1.00	1.00
esult for 2 stage process:		
ovement Capacity		
ap. Adj. factor due to Impeding mvmnt	0.99	0.99
edestrian Impedance Factor	1.00	1.00
onflicting flows otential Capacity		
art 3 - Single Stage		
ovement Capacity		
ap. Adj. factor due to Impeding mvmnt		
Potential Capacity Pedestrian Impedance Factor		
Conflicting Flows		
Part 2 - Second Stage		
Probability of Queue free St.		
Novement Capacity		
Cap. Adj. factor due to Impeding mvmnt		
Potential Capacity Pedestrian Impedance Factor		
Conflicting Flows		
Part 1 - First Stage		
Step 3: TH from Minor St.	8	11
Vorksheet 7-Computation of the Effect of T	wo-stage Gap Acc	eptance
lovement Capacity		
Cap. Adj. factor due to Impeding mvmnt	0.99 228	0.99
Maj. L, Min T Adj. Imp Factor.		0.99
Maj. L, Min T Impedance factor	1.00	0.99
Potential Capacity Pedestrian Impedance Factor	230 1.00	1.00
Conflicting Flows	1118	
Step 4: LT from Minor St.	7	10
Probability of Queue free St.	1.00	1.00
Novement Capacity		
ap. Adj. factor due to Impeding mvmnt	0.99	0.99

Volume (vph) 243 Movement Capacity (vph) 228 Shared Lane Capacity (vph)

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	Т	R	L	Т	R
C sep	228					
Volume	243					
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)		13	243						
C(m) (vph)		1636	228						
v/c		0.01	1.07						
95% queue length		0.02	23.21						
Control Delay		7.2	263.8						
LOS		A	F						
Approach Delay				263.8					
Approach LOS				F					

Worksheet 11-Shared Major LT Impedance and Delay

ent 2 Mo	vement 5
00	0.99
	0
	0
	1700
	1700
	0.99
	7.2
	2

#### 1.1.1.5 Interseção C – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

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

East/West Street: MOV01-MOV05-MOV07 MOV08

North/South Street:

Study period (hrs): 1.00 Intersection Orientation: EW

Major Street: Approach

Мо	vement	1 L	2 T	3 R	1	4 L	5 T	6 R	
Volume Peak-Hour Factor, Hourly Flow Rate, Percent Heavy Veh Median Type/Stora RT Channelized? Lanes	HFR icles	39 0.91 42 0 Undiv	1764 0.91 1938  ided		,	/			
Configuration Upstream Signal?		•	T T No				No		
Minor Street: Ap	proach	No	rthboun	d		S	outhbou	ınd	
-	vement	7	8	9	- 1	10	11	12	
110	Venicire	L	T	R	i	L	T	R	
Volume Peak Hour Factor, Hourly Flow Rate, Percent Heavy Veh Percent Grade (%) Flared Approach: Lanes Configuration	HFR icles	Storage	0		/	9 0.91 9 12	0		/
	Delay, Qu	10110 T.0	nath. a	nd Let	7el 0:	f Ser	wice		
Approach	EB	WB		thbour		L DCI		thboun	
Movement	1	4 1	7	8	9	1	10	11	12
Lane Config	LT	4	,	0	9	i	L	11	12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	42 1636 0.03 0.08 7.3						9 234 0.04 0.12 21.0 C	21.0 C	

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax:

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

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

Analysis Time Period: Pico Manha Intersection: C

Intersection: U
Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: MOV01-MOV05-MOV07
North/South Street: MOV08
Intersection Orientation: EW

Study period (hrs): 1.00

Major Street Movements	_Vehicle 1 L	Volumes 2 T	and 2 3 R	Adjustmen 4 L	ts 5 T	6 R	
Volume	39	1764					
Peak-Hour Factor, PHF	0.91	0.91					
Peak-15 Minute Volume	11	485					
Hourly Flow Rate, HFR	42	1938					
Percent Heavy Vehicles	0						
Median Type/Storage	Undi	.vided		/			
RT Channelized?							
Lanes	0	2					
Configuration	I	тт					

Upstream Signal?			No			No	)	
Minor Street Move	ements	7 L	8 T		9 1 R	LO 11	1 12 F R	
Volume Peak Hour Factor, Peak-15 Minute Vo Hourly Flow Rate, Percent Heavy Vel Percent Grade (% Flared Approach: RT Channelized Lanes Configuration	olume , HFR nicles	s?/Stora	0 age		2	).91 2		/
Movements	Pe	edestria 13		mes ar	nd Adju 15	stments		
Flow (ped/hr) Lane Width (m) Walking Speed (m, Percent Blockage	/sec)			.6	0 3.6 1.2 0	0 3.6 1.2 0		
		Uı	ostream	. Signa	al Data	a.		
	Prog. Flow vph	Sat Flow vph	Arriv	ral (		Cycle Length sec	Prog. Speed kph	Distance to Signal meters
S2 Left-Turn Through S5 Left-Turn Through								
Worksheet 3-Data	for Co	mputing	Effect	of De	elay to		Street V	
Shared in volume, Shared in volume, Sat flow rate, ma Sat flow rate, ma Number of major s	, major ajor th ajor rt	rt vehicle vehicle	icles: es: es:		0 0 1700 1700 2			
Worksheet 4-Crit:	ical Ga <sub>l</sub>	o and Fo	ollow-u	ıp Time	e Calcı	ulation		
Critical Gap Calo Movement	culation 1 L	n 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	1.00	7.1 1.00 12	1.00	1.00
t(c,g) Percent Grade t(3,lt)	0.00		0.20	0.20	0.10		0.20	0.10
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	0.00
Follow-Up Time Ca Movement	alculat 1 L	ions 4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base) t(f,HV) P(HV) t(f)	2.20 0.90 0 2.2	0.90	0.90	0.90	0.90	3.50 0.90 12 3.6	0.90	0.90
Worksheet 5-Effec	ct of U	pstream	Signal	.s				
Computation 1-Que	eue Cle	arance '	Time at		Moven	Ignal ment 2 /(1,prot		vement 5 V(l,prot)

```
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
unblocked
                            (1)
                                            (2)
                                                             (3)
                       Single-stage
                                            Two-Stage Process
for minor
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
                                                            10
                                                                   11
                                                                          12
                         L
                                                     R
                                                            L
                                                                    Τ
V c,x
                        0
                                                            1053
S
Рx
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                      8
                                                     10
                                                                      11
              Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2
√(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
Pedestrian Impedance Factor
                                                 1.00
                                                                   1.00
Movement Capacity
Probability of Queue free St.
                                                 1.00
                                                                   1.00
```

Total Saturation Flow Rate, s (vph)

Step 2: LT from Major St.	4	1	
Conflicting Flows		0	_
Potential Capacity		1636	
Pedestrian Impedance Factor Movement Capacity	1.00	1.00 1636	
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	0.97	0.97	
Movement Capacity Probability of Queue free St.	1.00	1.00	
riobability of guede free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows		1053	_
Potential Capacity	1 00	240	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00 0.97	1.00	
Maj. L, Min T Adj. Imp Factor.	0.98		
Cap. Adj. factor due to Impeding mvmnt	0.98	0.97	
Movement Capacity		234	
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			
rovement capacity			
Part 3 - Single Stage			
Conflicting Flows Potential Capacity			
Pedestrian Impedance Factor	1.00	1.00	
Cap. Adj. factor due to Impeding mvmnt	0.97	0.97	
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 mymnt			
Movement Capacity			
Part 2 - Second Stage			
		<del>-</del>	_
Conflicting Flows			_
Potential Capacity			
Potential Capacity Pedestrian Impedance Factor			
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity			_
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt		1053	_
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity		240	_
Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity  Part 3 - Single Stage Conflicting Flows	1.00		_

Maj. L, Min T Adj. Cap. Adj. factor du Movement Capacity	mvmnt	Ē		0.98 0.98		0.97 234			
Results for Two-sta	ge pro	cess:							
a Y									
Ĉ t								234	
Worksheet 8-Shared	Lane Ca	alculati	ons						
Movement				7	8	9	10	11	12
				L	Т	R	L	Т	R
Volume (vph)							9		
Movement Capacity (							234		
Shared Lane Capacit	y (vph)	)							
Worksheet 9-Computa	tion o	f Effect	of I	Flared	Min	or Stree	t Appro	aches	
Movement				7	8	9	10	11	12
				L	Т	R	L	Т	R
C sep							234		
Volume							9		
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)	42						9		
C(m) (vph)	1636						234		
v/c	0.03						0.04		
95% queue length	0.08						0.12		
Control Delay	7.3 A						21.0 C		
Approach Delay	2.1						O	21.0	
Approach LOS								С	
Worksheet 11-Shared	Major	LT Impe	dance	e and	Dela	У			
						Moveme	nt 2	Mover	ment 5
( )						0.0	7	1	0.0

	Movement 2	Movement 5
p(oj)	0.97	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)	0.97	
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	

### 1.1.1.6 Interseção C – Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

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

Analyst:
Agency/Co.:
Date Performed: Progeplan

05/06/2023

Analysis Time Period: Pico Tarde

Intersection:

DER/DF Jurisdiction: 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

	Vehi	.cle Vol	umes and	Adjus	stmer	nts			
Major Street:	Approach	Ea	stbound				Westboun	ıd	
-	Movement	1	2	3	1	4	5	6	
		L	T	R	İ	L	Т	R	
Volume		236	691						
Peak-Hour Fact	or, PHF	0.91	0.91						
Hourly Flow Ra	te, HFR	259	759						
Percent Heavy	Vehicles	21							
Median Type/St	orage	Undiv	ided		,	/			
RT Channelized	1?								
Lanes		0	2						
Configuration		L	т т						
Upstream Signa	11?		No				No		
Minor Street:	Approach	No	rthbound				Southbou	ınd	
	Movement	7	8	9	1	10	11	12	
		L	T	R	i	L	T	R	
Volume						12			
Peak Hour Fact	or, PHF					0.9	1		
Hourly Flow Ra	ite, HFR					13			
Percent Heavy	Vehicles					0			
Percent Grade	(%)		0				0		
Flared Approac	h: Exists?	'Storage			/				/
Lanes							1		
Configuration							L		
	Delav. (	Duene Le	ngth, an	d Leve	el o:	f Se	rvice		
Approach	EB '	WB		hbound				thbound	d
Movement	1	4	7	8	9	1	10	11	12
Lane Config	LT	i				i	L		
		'				,			
v (vph)	259						13		
C(m) (vph)	1507						259		
v/c	0.17						0.05		
95% queue leng	th 0.62						0.16		
Control Delay	7.9						19.6		
LOS	A						С		
Approach Delay	7							19.6	
Approach LOS								С	

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail: \_\_TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_\_\_ Analyst: Progeplan Agency/Co.: Agency/co.:
Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde C Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: Project ID: 2023 East/West Street: MOV01-MOV05-MOV07
North/South Street: MOV08 Study period (hrs): 1.00 Intersection Orientation: EW

Vehicle Volumes and Adjustments

Major Street Mov	ements	1 L	2 T		3 R	4 L	5 T		6 R
Volume Peak-Hour Factor Peak-15 Minute V Hourly Flow Rate Percent Heavy Ve Median Type/Stor.	olume , HFR hicles	236 0.9 65 259 21	0. 19	91 0 9 -	_			_	-
RT Channelized?	aye	01		a		/			
Lanes Configuration			0 2 LT T						
Upstream Signal?			No				No		
Minor Street Mov	ements	7 L	8 T		9 R	10 L	11 T	1	2 R
Volume Peak Hour Factor Peak-15 Minute V Hourly Flow Rate Percent Heavy Ve Percent Grade (% Flared Approach: RT Channelized Lanes Configuration	olume , HFR hicles	s?/Stor	0 cage			12 0.91 3 13 0 /	0		/
Movements	Pe		an Vol .3	umes a 14	nd Adj 15	ustmen 16	its_		
Flow (ped/hr)		0		0	0	0			
Lane Width (m) Walking Speed (m	/sec)			3.6 1.2	3.6 1.2	3.6 1.2			
Percent Blockage		C	)	0	0	0			
	Proq.	U	Jpstrea Arri	_	al Dat Green	a Cycle	- I	Proq.	Distance
	Flow vph	Flow vph	тур Тур		Time sec	Lengt sec	h S	Speed kph	to Signal meters
		vpii			500	500		ı.pıı	MCCCID
CO Toft Dum									
S2 Left-Turn Through S5 Left-Turn Through									
Through S5 Left-Turn	for Com	nputing	g Effec	t of D	elay t	o Majo	or St	treet	Vehicles
Through S5 Left-Turn Through	for Com	nputing	ß Effec	t of D		o Majo	or St	reet	
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m.	, major , major ajor th ajor rt	th veh rt veh vehicl	nicles: nicles: .es: .es:		0 0 170	nent 2	or St		
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m.	, major , major ajor th ajor rt	th veh rt veh vehicl	nicles: nicles: .es: .es:		0 0 170	nent 2	or St		
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m. Sat flow rate, m.	, major , major ajor th ajor rt street t	th veh rt veh vehicl vehicl	nicles: nicles: nicles: nes: nes:	:	0 0 170 170 2	nent 2 0 0			
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Number of major  Worksheet 4-Crit  Critical Gap Cal	, major , major ajor th ajor rt street t ical Gap culation	th veh rt veh vehicl vehicl hrough	nicles: nicles: nes: nes: n lanes	: up Tim	0 0 170 170 2	nent 2	on	Movem	ent 5
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Number of major  Worksheet 4-Crit	, major , major ajor th ajor rt street t	th veh rt veh vehicl vehicl through	nicles: nicles: nicles: nes: nes:	:	0 0 170 170 2	nent 2 0 0	on 0		
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Number of major  Worksheet 4-Crit  Critical Gap Cal	, major , major ajor th ajor rt street t ical Gap culation	th vehicl vehicl hrough	micles: nicles: es: es: lanes	: up Tim	Movem 0 0 170 170 2 e Calc	nent 2 0 0 0 uulatic	on )	Movem	ent 5
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Number of major  Worksheet 4-Crit  Critical Gap Cal Movement  t(c,base) t(c,bv)	, major, major thajor rt street tical Gap culation 1 L 4.1	th vehicl vehicl hrough	micles: nicles: es: es: lanes	: up Tim	0 0 170 170 2 e Calc	0 0 0 1. 0 1. 0 1.	on )	Movem	12 R
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Oumber of major  Worksheet 4-Crit  Critical Gap Call Movement  t(c,base)	, major , major ajor th ajor rt street t ical Gar culation 1 L	th veh rt veh vehicl vehicl hrough	ricles: ricles: es: es: lanes rollow- 7 L 1.00 0.20	: up Tim 8 T 1.00	Movem 0 0 170 170 2 e Calc 9 R 1.0	0 0 0 1 7. 0 1. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 00 20	11 T 1.00	12 R 1.00 0.10
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In 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	, major , major ajor th ajor rt street t ical Gap culation 1 L	th veh rt veh vehicl vehicl hrough	ricles: nicles: es: es: n lanes rollow- 7 L	: up Tim 8 T	Movem 0 0 170 170 2 e Calc 9 R 1.0	0 0 0 I	1 00 20 00	11 T	12 R 1.00 0.10
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Ounder of major  Worksheet 4-Crit  Critical Gap Call Movement  t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,1t) t(c,T): 1-stage	, major, major thajor rt street that cal Gap culation 1 L 1.00 21	th veh rt veh rt vehicl vehicl hhrough and F	ricles: inicles: es: es: 1 lanes  7 L  1.00  0.20  0.00  0.00	: up Tim 8 T 1.00 0.20 0.00	Movem 0 0 170 170 2 e Calc 9 R 1.0 0.1 0.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 00 20 00 70 00	11 T 1.00 0.20 0.00	12 R 1.00 0.10 0.00 0.00
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Oumber 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)	, major, major thajor rt street the culation 1 L 4.1 1.00 21 0.00 0.00 0.00	th vehrt vehicle vehic	ricles: ricles: es: es: lanes rollow- 7 L 1.00 0.20 0.00	: up Tim 8 T 1.00 0.20 0.00	Movem 0 0 170 170 2 e Calc 9 R 1.0 0.1 0.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20 00 70 00 00 00	11 T 1.00 0.20 0.00	12 R 1.00 0.10 0.00 0.00
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m 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	, major, major thajor rt street the culation 1 L 4.1 1.00 21 0.00 0.00 0.00	th veh rt veh rt vehicl vehicl hhrough and F	ricles: inicles: es: es: 1 lanes  7 L  1.00  0.20  0.00  0.00	: up Tim 8 T 1.00 0.20 0.00	Movem 0 0 170 170 2 e Calc 9 R 1.0 0.1 0.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20 00 70 00 00 00	11 T 1.00 0.20 0.00	12 R 1.00 0.10 0.00 0.00
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m 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 2-stage Follow-Up Time C.	, major, major thajor rt street that cal Gar culation L 4.1 1.00 21 0.00 0.00 4.3 alculati	th vehrt vehrel vehicle vehicl	7 L 1.00 0.20 0.00 1.00	:  ### 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	00000000000000000000000000000000000000	1 00 20 00 70 00 00 4	11 T 1.00 0.20 0.00 1.00	12 R 1.00 0.10 0.00 0.00 0.00
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m 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 2-stage	, major, major thajor rt street trical Gap culation 1 L 1.00 21 0.00 0.00 0.00 4.3	th veh rt veh rt vehicl vehicl hrough and F	ricles: inicles: es: es: 1 lanes  7 L  1.00  0.20  0.00  0.00	: up Tim 8 T 1.00 0.20 0.00	Movem 0 0 170 170 2 e Calc 9 R 1.0 0.1 0.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 000 20 000 70 000 4	11 T 1.00 0.20 0.00	12 R 1.00 0.10 0.00 0.00
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m 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 2-stage Follow-Up Time C.	, major, major thajor rt street the street that the street that the street that the street that the street tha	th vehrt vehrcl vehicl vehicl hrough and F	ricles: nicles: es: n lanes  rollow-  7 L  1.00  0.20 0.00  0.00 1.00	:  Up Tim  8 T  1.000 0.200 0.000 1.000	Movem  0 0 170 170 2  e Calc  9 R  1.0 0.1 0.0 0.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 000 20 000 70 000 4	11 T 1.00 0.20 0.00 1.00	12 R 1.00 0.10 0.00 0.00

```
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(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
                                                                     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)
for minor
                         Single-stage
                                               Two-Stage Process
                                           Stage I
movements, p(x)
                           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
                                         7
                                                 8
                                                        9
                                                               10
                                                                              12
                                                                      11
                          \mathbb{L}
                                         L
                                 L
                                                 Τ
                                                        R
                                                                L
                                                                       Т
                                                                               R
V c,x
                         0
                                                               897
S
Рx
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                        8
                                                        10
                                                                          11
               Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2
V(c,x)
                                                           3000
s
P(x)
V(c,u,x)
C(r,x)
```

C(plat,x)

Norksheet 6-Impedance and Capacity Equation	15	
Step 1: RT from Minor St.	9	12
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		1507
Pedestrian Impedance Factor	1.00	1.00
Novement Capacity		1507
Probability of Queue free St. Naj L-Shared Prob Q free St.	1.00	0.83 0.83
aj i sharea rros ç rree se.		0.03
tep 3: TH from Minor St.	8	11
onflicting Flows		
otential Capacity	1 00	4 00
edestrian Impedance Factor	1.00	1.00
ap. Adj. factor due to Impeding mvmnt ovement Capacity	0.83	0.83
robability of Queue free St.	1.00	1.00
tep 4: LT from Minor St.	7	10
onflicting Flows		897
otential Capacity edestrian Impedance Factor	1.00	313 1.00
aj. L, Min T Impedance factor	0.83	1.00
aj. L, Min T Adj. Imp Factor.	0.87	
ap. Adj. factor due to Impeding mvmnt	0.87	0.83
ovement Capacity		259
Norksheet 7-Computation of the Effect of Tw	vo-stage Gap Acce	eptance
Worksheet 7-Computation of the Effect of Tw Step 3: TH from Minor St.	vo-stage Gap Acce	eptance
Step 3: TH from Minor St.		
Step 3: TH from Minor St.  Part 1 - First Stage Conflicting Flows		
Cart 1 - First Stage Conflicting Flows Potential Capacity		
Step 3: TH from Minor St.  Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor		
tep 3: TH from Minor St.  Part 1 - First Stage Conflicting Flows Cotential Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt		
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity		
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		
Cart 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Probability of Queue free St.  Part 2 - Second Stage Conflicting Flows Potential Capacity		
tep 3: TH from Minor St.  Part 1 - First Stage Conflicting Flows Outential Capacity edestrian Impedance Factor Pap. Adj. factor due to Impeding mymnt Covement Capacity Probability of Queue free St.  Part 2 - Second Stage Conflicting Flows Outential Capacity Edestrian Impedance Factor		
tep 3: TH from Minor St.  Part 1 - First Stage Conflicting Flows Outential Capacity Redestrian Impedance Factor Rap. Adj. factor due to Impeding mymnt Rovement Capacity Robability of Queue free St.  Part 2 - Second Stage Conflicting Flows Outential Capacity Redestrian Impedance Factor Rap. Adj. factor due to Impeding mymnt		
tep 3: TH from Minor St.  Part 1 - First Stage conflicting Flows cotential Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt covement Capacity robability of Queue free St.  Part 2 - Second Stage conflicting Flows cotential Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt covement Capacity		
tep 3: TH from Minor St.  Part 1 - First Stage Conflicting Flows Cotential Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Crobability of Queue free St.  Cart 2 - Second Stage Conflicting Flows Cotential Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Capacity Covement Capacity Covement Capacity Covement Capacity Covement Stage Conflicting Flows Conflicting Flows Conflicting Flows		
Part 1 - First Stage Conflicting Flows Cotential Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Crobability of Queue free St.  Cart 2 - Second Stage Conflicting Flows Cotential Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Cart 3 - Single Stage Conflicting Flows Cotential Capacity	8	11
tep 3: TH from Minor St.  Part 1 - First Stage conflicting Flows cotential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt covement Capacity robability of Queue free St.  Part 2 - Second Stage conflicting Flows rotential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt covement Capacity redestrian Flows redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt covement Capacity redestrian Impedance Factor redestrian Impedance Factor redestrian Impedance Factor	1.00	1.00
tep 3: TH from Minor St.  Part 1 - First Stage conflicting Flows cotential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt covement Capacity robability of Queue free St.  Part 2 - Second Stage conflicting Flows cotential Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt covement Capacity rart 3 - Single Stage conflicting Flows cotential Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt covement Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt rap. Adj. factor due to Impeding mymnt	8	11
tep 3: TH from Minor St.  art 1 - First Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity robability of Queue free St.  art 2 - Second Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity	1.00	1.00
tep 3: TH from Minor St.  art 1 - First Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity robability of Queue free St.  art 2 - Second Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity  art 3 - Single Stage onflicting Flows otential Capacity  art 3 - Single Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity esult for 2 stage process:	1.00	1.00
tep 3: TH from Minor St.  Part 1 - First Stage conflicting Flows cotential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt covement Capacity robability of Queue free St.  Part 2 - Second Stage conflicting Flows cotential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt covement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt covement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt covement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt covement Capacity result for 2 stage process:	1.00	1.00
tep 3: TH from Minor St.  Part 1 - First Stage conflicting Flows cotential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt covement Capacity robability of Queue free St.  Part 2 - Second Stage conflicting Flows cotential Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt covement Capacity rart 3 - Single Stage conflicting Flows cotential Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt covement Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt covement Capacity redestrian Impedance Factor rap. Adj. factor due to Impeding mymnt covement Capacity result for 2 stage process:	1.00	1.00 0.83
tep 3: TH from Minor St.  art 1 - First Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity robability of Queue free St.  art 2 - Second Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity  art 3 - Single Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity esult for 2 stage process:	1.00	1.00
tep 3: TH from Minor St.  art 1 - First Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity robability of Queue free St.  art 2 - Second Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity  art 3 - Single Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity esult for 2 stage process:  t robability of Queue free St.	1.00	1.00 0.83
Step 3: TH from Minor St.  Part 1 - First Stage Conflicting Flows Cotential Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Crobability of Queue free St.  Part 2 - Second Stage Conflicting Flows Cotential Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Cedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Covement Capacity Cesult for 2 stage process:  Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 2 stage process: Capacity Cesult for 3 stage Cesult for 3 stage Cesult for 5 stage Cesult for 5 stage Cesult for 5 stage Cesult for 6 stage Cesult for 6 stage Cesult for 6 stage Cesult for 7 stage Cesult for 6 stage Cesult for 6 stage Cesult for 7 stage Cesult for 6 stage Cesult for 7 stage Cesult for 6 stage Cesult for 7 stage Cesult for 6 stage Cesult for 7 stage Cesult for 6 stage Cesult for 6 stage Cesult for 7 stage Cesult for 7 stage Cesult for 8 stage Cesult	1.00 0.83	1.00 0.83
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 Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor fue to Impeding mymnt Movement Capacity Pedestrian Impedance Factor	1.00 0.83	1.00 0.83
Cart 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 Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity Pedestrian Impedance Factor	1.00 0.83	1.00 0.83
tep 3: TH from Minor St.  Part 1 - First Stage conflicting Flows otential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity robability of Queue free St.  Part 2 - Second Stage conflicting Flows otential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity rart 3 - Single Stage conflicting Flows otential Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Impeding mymnt fovement Capacity redestrian Impedance Factor ap. Adj. factor due to Im	1.00 0.83	1.00 0.83

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 St Conflicting Flows Potential Capacity Pedestrian Impedan Maj. L, Min T Impe	ce Facto					1.00		897 313 1.00	)
Maj. L, Min T Adj. Cap. Adj. factor d Movement Capacity	mvmnt			0.87		0.83 259			
Results for Two-st	age prod	cess:							
a Y C t								259	
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	-	)					13 259		
Worksheet 9-Comput	ation of	f Effect	of Fl	ared	Min	or Stree	t Appro	paches	
Movement			7 L		8 T	9 R	10 L	11 T	12 R
C sep Volume Delay Q sep Q sep +1 round (Qsep +1)							259 13		
n max C sh SUM C sep n C act									
Worksheet 10-Delay	, Queue	Length,	and L	evel	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	259 1507 0.17 0.62 7.9 A						13 259 0.05 0.16 19.6 C		

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

Approach Delay Approach LOS

	Movement 2	Movement 5
p(oj)	0.83	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)	0.83	
d(M,LT), Delay for stream 1 or 4	7.9	
N, Number of major street through lanes	2	
d(rank,1) Delay for stream 2 or 5		

19.6 C

#### 1.1.1.7 Interseção D – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Progeplan Analyst: Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Manha Intersection: D Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURA SAÚDE East/West Street: MOV01-MOV05-MOV07 MOV06 North/South Street: Study period (hrs): 1.00 Intersection Orientation: EW Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound Movement 2 4 5 T Т R L | L R Volume 1790 218 Peak-Hour Factor, PHF 0.91 0.91 Hourly Flow Rate, HFR 1967 239 Percent Heavy Vehicles Median Type/Storage Undivided RT Channelized? Lanes 2 0 Configuration Τ  ${\tt TR}$ Upstream Signal? No Minor Street: Approach Northbound Southbound Movement 8 10 11 R Volume Peak Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 3 Percent Heavy Vehicles 34 Percent Grade (%) Flared Approach: Exists?/Storage Lanes Configuration R Delay, Queue Length, and Level of Service WB Northbound Southbound EΒ Approach 4 10 12 Movement. 1 8 11 R Lane Config v (vph) C(m) (vph) 222 0.01 v/c 95% queue length 0.04 Control Delay 21.4 LOS С Approach Delay 21.4 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
Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE

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

Study period (hrs): 1.00 Intersection Orientation: EW

Intersection Orient	ation:	EW			St	tudy p	eriod	(hrs)	: 1.00
	V	ehicle	Volum	168 8	and Ad-	instme	nts		
Major Street Moveme		1	2	.00 0	3	4	5		6
-		L	T		R	L	T	'	R
			170		010				
Volume Peak-Hour Factor, P	III.		179		218				
Peak-15 Minute Volu			492		60				
Hourly Flow Rate, H			196	) /	239				
Percent Heavy Vehic								_	-
Median Type/Storage		Und	ivided	ł		/			
RT Channelized?									
Lanes			2	0					
Configuration			Т	TR					
Upstream Signal?			No				No	1	
Minor Street Moveme	n+a	7	8		9	10	11	1	າ
MINOI SCIEEC MOVEME	1105	L	T		R	L	T		z R
		_	_			_	_		-
Volume					3				
Peak Hour Factor, P.	HF				0.91				
Peak-15 Minute Volu	me				1				
Hourly Flow Rate, H					3				
Percent Heavy Vehic					34				
Percent Grade (%)			0				0		
	xists?	/Stora				/	•		/
RT Channelized		, DCULA	50		No	/			/
Lanes				1	140				
Configuration				R					
						, ,			
Movements	Ped	estria: 13		mes 4	and Ac	djustn 16	_		
110 v CINC11 CO		13	1	. 1	10	Τ (	,		
Flow (ped/hr)		0	C	)	0	0			
Lane Width (m)		3.		.6	3.6	3.	6		
Walking Speed (m/se	C)	1.		2	1.2	1.			
Percent Blockage	~ <i>,</i>	0			0	0	_		
rereemt brockage		U	C	,	U	U			
				_	nal Da				
	og.	Sat	Arriv		Greer	-		Prog.	Distance
Fl	OW	Flow	Туре	3	Time	Ler	ıgth	Speed	to Signal
vp	h	vph			sec	se	eC.	kph	meters
S2 Left-Turn									
Through									
S5 Left-Turn									
Through									
111104911									
Worksheet 3-Data fo	r Comp	uting :	Effect	of	Delay	to Ma	ijor S	treet '	Vehicles
					Move	ement	2	Movem	ent 5
Shared ln volume, m									
Shared ln volume, m	-								
Sat flow rate, majo	r th v	ehicle	s:						
Sat flow rate, majo	r rt v	ehicle	s:						
Number of major str	eet th	rough	lanes:						
<del>-</del>									
Monkahast 4 C '''	1 0-		11		ma c -				
Worksheet 4-Critica	ı Gap	and Fo	TTOM-	ıp Ti	me Cal	∟cu⊥at	lon		
Critical Gap Calcul	ation								
Movement 1		4	7	8	9	9	10	11	12
L		Ĺ	L	Т		2	L	T	R
t(c,base)						. 2			
				1 0	1	^ ^	1 00	1.00	1.00
	00 1	.00	1.00	1.0	, T.	.00	1.00	1.00	1.00
t(c,hv) 1.	00 1	.00	1.00	1.0	34		1.00	1.00	1.00
	00 1		0.20	0.2	34		0.20	0.20	
t(c,hv) 1. P(hv) t(c,g)	00 1				34 20 0.	1			0.10
t(c,hv) 1. P(hv) t(c,g) Percent Grade	00 1		0.20	0.2	34 20 0. 00 0.	1 .10 .00	0.20	0.20	0.10
t(c,hv) 1. P(hv) t(c,g)	00 1		0.20	0.2	34 20 0. 00 0.	1.10	0.20	0.20	0.10

t(c,T):	1-stage 2-stage		0.00	0.00	0.00	0.00	0.00	0.00 1.00	0.00	
c(c)	1-stage 2-stage					6.5				
Follow-Up	Time C			7	0	0	1.0	1 1	1.0	
Movement		1 L	4 L	L	8 T	9 R	10 L	11 T	12 R	
(f,base) (f,HV) P(HV) (f)		0.90	0.90	0.90	0.90	3.30 0.90 34 3.6	0.90	0.90	0.90	)
Jorksheet	5-Effe	ct of T	 Jpstream	m Signal	ls					
Computati										
					V(	Movement) V(	nt 2 l,prot)		vemen V(1	t 5 ,prot)
Total Sat Arrival T Effective Cycle Len Rp (from Proportic g(q1) g(q2) g(q)	Type e Green, ngth, C Exhibit	g (sec (sec) 16-11)	e) )		n P					
Computati	ion 2-Pr	oportio	on of T	WSC Inte	ersecti					
					V(	Movement) V(		V(t)	vement V(1	
peta Travel ti			)							
peta Pravel ti Smoothing Proportic Max plate Juration Proportic	g Factor on of con coned flo coned flo of bloc on time l	, F nflict: ow, V(c ow, V(c ked per olocked	ing flow c, max) c, min) riod, t d, p	(p)		0.00	0		0.000	
Deta Travel ti Emoothing Proportic Max plate Min plate Duration Proportic	g Factor on of con coned flo coned flo of bloc on time l	, F nflict: ow, V(c ow, V(c ked per olocked	ing flow c, max) c, min) riod, t d, p	(p)	Res		0		0.000	
peta Cravel ti Smoothing Proportic Max plate fin plate Curation Proportic Computati D(2) D(5) D(dom) D(subo)	g Factor on of colored floored	, F nflict. ow, V(ow, V(ow, V(oked per polocked	ing floo c,max) c,min) riod, t d, p	(p)	Res 0.0 0.0	ult	0		0.000	
Deta Cravel ti Smoothing Proportic Computati  0(2) 0(5) 0(dom) 0(subo) Constrain	g Factor on of con coned floored floored floor of bloc on time l	, F nflict. ow, V(ow, V(ow, V(oked per polocked	ing floor, max) c, max) c, min) riod, t d, p  Event Person	(p) eriods	0.0	00 00	0		0.000	
Deta Cravel ti Smoothing Proportic Computation Proportic Computati 0(2) 0(5) 0(dom) 0(subo) Constrain	g Factor on of col oned flo oned flo of bloc on time l on 3-Pl	, F nflict. ow, V(ow, V(ow, V(oked per polocked	ing flotc, max) c, min) riod, t d, p  Event Po	(p) eriods	0.0	00 00 00		(3)	0.000	
alpha  peta  Fravel ti  Smoothing  Proportic  Max plate  Ouration  Proportic  Computati  p(2) p(5) p(dom) p(subo)  Constrain  Proportic  unblocked  for minor  movements	g Factor on of column of column of column of the column of block on time limited on a second of block on time limited or under the column of t	, F nflict. ow, V(ow, V(ow, V(oked per polocked	ing floor, max) c, max) c, min) riod, t d, p  Event Person	(p) eriods	0.0	00 00 00	age Pro	(3)		
Deta  Fravel ti  Smoothing  Proportic  Max plate  Ouration  Proportic  Computati  (2) (5) (6) (6) (5) (c) (comb) (constrain  Proportic  Proportic  Constrain	g Factor on of column of column of column of block on time literature of block on time literature of block on time literature of block on time literature of block on time literature of block on description of block on desc	, F nflict. ow, V(ow, V(ow, V(oked per polocked	ing floor, max) c, min) riod, t d, p  Event Po  rained?  (1 Single	(p) eriods	0.0	00 00 00 (2) Two-Sto	age Pro	(3)		
Deta Fravel ti Emoothing Proportic Max plate Ouration Proportic Computati  0(2) 0(5) 0(dom) 0(subo) Constrain Proportic unblocked for minor movements 0(1) 0(4) 0(7) 0(8) 0(9) 0(11) 0(12) Computati	g Factor on of colored floored	, F nflictnow, V(cow, V(cow, V(cow)) atoon I	ing floor, max) c, min) riod, t d, p  Event Po  rained?  (1 Single	(p) eriods	0.0	00 00 00 (2) Two-Sto	age Pro	(3)		
Deta Fravel ti Smoothing Proportic Max plate Min plate Duration Proportic Computati  D(2) D(5) D(5) D(6) D(6) D(8) D(9) D(11) D(12) Computati Single-St	g Factor on of colored floored	, F nflictnow, V(cow, V(cow, V(cow)) atoon I	ing floor, max) c, min) riod, t d, p  Event Po  rained?  (1 Single Proce	eriods ) -stage	0.0 0.0	ult 00 00 (2) Two-Stage I	age Pro S	(3) cess tage II		12
Deta Travel ti Smoothing Proportic  Computati  D(2) D(5) D(5) D(6) D(6) D(6) D(6) D(6) D(6) D(7) D(8) D(11) D(12)  Computati  Comput	g Factor on of colored floored	, F nflictnow, V(cow, V(cow, V(cow)) atoon I	ing floor, max) c, min) riod, t d, p  Event Po  rained?  (1 Single	(p) eriods	0.0	00 00 00 (2) Two-Sto	age Pro	(3)		12 R
Deta Travel ti Emoothing Proportic Duration Proportic Computati D(2) D(5) D(30) D(5) D(40m) D(5) D(5) D(60m) D(5) D(60m)	g Factor on of colored floored	, F nflictnow, V(cow, V(cow, V(cow)) atoon I	ing floor, max) c, min) riod, t d, p  Event Po  rained?  (1 Single Proce	(p) eriods ) -stage ess	0.0 0.0 Sta	ult 000 00 (2) Two-St. ge I	age Pro S	(3) cess tage II	11	
poeta Fravel ti Smoothing Proportic Computati  p(2) p(5) p(dom) p(subo) Constrain  Proportic  proportic  p(4) p(7) p(4) p(7) p(8) p(9) p(10) p(11)	g Factor on of colored floored	, F nflictnow, V(cow, V(cow, V(cow)) atoon I	ing floor, max) c, min) riod, t d, p  Event Po  rained?  (1 Single Proce	(p) eriods ) -stage ess	0.0 0.0 Sta	ult 000 00 (2) Two-St. ge I	age Pro	(3) cess tage II	11	

Two-Stage Process

7 8 10 11 Stage1 Stage2 Stage1 Stage2 Stage2 Stage2

Stagel Stage2 Stage1 Stac	gez Stagei Sta	igez Stagei Stag	gez
V(c,x)			
s P(x)			
V(c,u,x)			
C(r,x)			
C(plat,x)			
Worksheet 6-Impedance and Capacity Equation	ons		
Step 1: RT from Minor St.	9	12	
Conflicting Flows	1103		
Potential Capacity Pedestrian Impedance Factor	222 1.00	1.00	
Movement Capacity	222	1.00	
Probability of Queue free St.	0.99	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	
ina, i omarca from & 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 mymnt	1.00	1.00	
Movement Capacity			
Probability of Queue free St.	1.00	1.00	
Step 4: LT from Minor St.	7	10	
Conflicting Flows			
Potential Capacity	1 00	1 00	
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00	1.00	
Maj. L, Min T Adj. Imp Factor.		1.00	
Cap. Adj. factor due to Impeding mvmnt	1.00	0.99	
Movement Capacity			
Worksheet 7-Computation of the Effect of	Iwo-stage Gap Ac	ceptance	
Step 3: TH from Minor St.	8	11	
Part 1 - First Stage Conflicting Flows			
Potential Capacity			
Pedestrian Impedance Factor			
Cap. Adj. factor due to Impeding mvmnt			
Movement Capacity Probability of Queue free St.			
riobability of gadac fiee be.			
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 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 mvmm Movement Capacity	nt					
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmm Movement Capacity	nt					
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 mvmm Movement Capacity	nt		1.00		1.00 1.00 1.00 0.99	)
Results for Two-stage process: a Y C t						
Worksheet 8-Shared Lane Calculations						
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)			3 222			
Worksheet 9-Computation of Effect of	Flare	ed Minc	r Stree	t Appro	aches	
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)			222			
n max C sh SUM C sep n C act						
Worksheet 10-Delay, Queue Length, and	d Leve	el of S	Service			
Movement 1 4 7 Lane Config		8	9 R	10	11	12
		8 21.4 C	9	10	11	12
Lane Config  v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay		21.4 C	9 R 3 222 0.01 0.04 21.4 C	10	11	12
Lane Config  v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS		21.4 C	9 R 3 222 0.01 0.04 21.4 C			12 nent 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
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### 1.1.1.8 Interseção D - Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

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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:
Project ID: FUTURA SAÚDE
East/West Street:
                      MOV01-MOV05-MOV07
North/South Street:
                      MOV06
Intersection Orientation: EW
                                              Study period (hrs): 1.00
                      Vehicle Volumes and Adjustments
Major Street: Approach
                                Eastbound
                                                        Westbound
                                    2
                                           3
                                                    4
                                                           5
                                                                   6
               Movement
                                    Т
                                           R
                                                           Т
                            L
                                                    L
                                                                   R
                                    703
Volume
                                           6
Peak-Hour Factor, PHF
                                    0.91
                                           0.91
                                    772
Hourly Flow Rate, HFR
                                           6
Percent Heavy Vehicles
Median Type/Storage
                            Undivided
RT Channelized?
                                         0
Lanes
Configuration
                                    Т
                                        TR
Upstream Signal?
                                    No
                                                           No
Minor Street:
               Approach
                                Northbound
                                                        Southbound
               Movement
                                    8
                                           9
                                                    10
                                                           11
                                                                   12
                            L
                                    Т
                                           R
                                                    L
                                                           Т
                                                                   R
Volume
                                           216
Peak Hour Factor, PHF
                                           0.91
Hourly Flow Rate, HFR
                                           237
Percent Heavy Vehicles
                                           0
Percent Grade (%)
                                                           0
Flared Approach: Exists?/Storage
Lanes
                                         1
Configuration
                  Delay, Queue Length, and Level of Service
                           WB
                                     Northbound
                                                             Southbound
Approach
                    EB
                           4
                                                         10
Movement
Lane Config
v (vph)
                                                 237
C(m) (vph)
                                                 664
v/c
                                                 0.36
95% queue length
                                                 1.65
Control Delay
                                                 13.4
LOS
                                                  В
                                          13.4
Approach Delay
Approach LOS
                                           В
```

Phone: Fax: E-Mail:

#### Analyst: Progeplan Agency/Co.: Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: Jurisdiction: DER/DF Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURA SAÚDE MOV01-MOV05-MOV07 East/West Street: North/South Street: MOV06 Intersection Orientation: EW Study period (hrs): 1.00 Vehicle Volumes and Adjustments Major Street Movements 2 3 1 4 Т R Т R L L Volume 703 6 Peak-Hour Factor, PHF 0.91 0.91 Peak-15 Minute Volume 193 2 772 Hourly Flow Rate, HFR 6 Percent Heavy Vehicles Median Type/Storage Undivided RT Channelized? 2 0 Lanes Configuration т TR Upstream Signal? No No Minor Street Movements 8 9 10 11 12 L Т R L Т R Volume 216 Peak Hour Factor, PHF 0.91 Peak-15 Minute Volume 59 Hourly Flow Rate, HFR 237 Percent Heavy Vehicles 0 Percent Grade (%) 0 Flared Approach: Exists?/Storage RT Channelized No Lanes Configuration R Pedestrian Volumes and Adjustments Movements 13 14 15 16 0 Flow (ped/hr) 0 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 \_Upstream Signal Data Sat Arrival Green Cycle Prog. Distance Prog. Type Speed Flow Flow Time Length to Signal vph vph sec sec kph 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: Shared in volume, major rt vehicles: Sat flow rate, major th vehicles: Sat flow rate, major rt vehicles: Number of major street through lanes:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_

Critical Gap Cal			7	0	0	1.0	1.1	1.0
Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
	-	_		-	11		-	11
(c,base)					6.2			
(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)			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
:(s,: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	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage					6.2			
2-stage	÷							
Follow-Up Time C		tions 4	7	8	9	10	11	12
Movement	1 L	L	L	T	R	L	Т	R
	-	-		-	11	-	-	10
(f,base)					3.30			
(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)					0			
c(f)					3.3			
Norksheet 5-Effe	ct of	Upstream	m Signal	Ls				
Computation 1-Qu	leue Cl	earance	Time at	. Upstre	eam Sicr	nal		
	200 01				Moveme		Mo	vement 5
				V (		l,prot)	V(t)	
/ prog								
Cotal Saturation	Flow :	Rate, s	(vph)					
Arrival Type								
Effective Green,		c)						
Cycle Length, C		,						
Rp (from Exhibit		)						
Proportion vehic				_				
-	les ar		on greer	n P				
g(q1)	les ar		on greer	n P				
g(q1) g(q2)	les ar		on greer	n P				
g(q1)	les ar		on greer	n P				
g(q1) g(q2)		riving (			on Time	blocke		
g(q1) g(q2)		riving (		ersecti	Movemen	nt 2	Mo	vement 5
g(q1) g(q2)		riving (			Movemen		Mo	vement 5 V(1,prot)
g(q1) g(q2) g(q) Computation 2-Pr		riving (		ersecti	Movemen	nt 2	Mo	
g(q1) g(q2) g(q) Computation 2-Pr		riving (		ersecti	Movemen	nt 2	Mo	
g(q1) g(q2) g(q) Computation 2-Pr	roporti	riving o		ersecti	Movemen	nt 2	Mo	
g(q1) g(q2) g(q) Computation 2-Pr alpha beta Fravel time, t(a	roporti	riving o		ersecti	Movemen	nt 2	Mo	
g(q1) g(q2) g(q) Computation 2-Pr alpha beta Fravel time, t(a	roporti	on of T	WSC Inte	ersecti	Movemen	nt 2	Mo	
g(q1) g(q2) g(q) Computation 2-Pr alpha beta Fravel time, t(a Smoothing Factor Proportion of co	oportion) (sec	on of T	WSC Inte	ersecti	Movemen	nt 2	Mo	
g(q1) g(q2) g(q) Computation 2-Pr alpha beta Fravel time, t(a Exportion of co	(sec	on of Ti	WSC Inte	ersecti	Movemen	nt 2	Mo	
g(q1) g(q2) g(q) Computation 2-Pr alpha beta Fravel time, t(a Exportion of co Max platooned fl	o) (sec	on of Ti	WSC Inte	ersecti	Movemen	nt 2	Mo	
g(q1) g(q2) g(q) Computation 2-Pr Alpha Deta Cravel time, t(a Smoothing Factor Proportion of co Max platooned fl din platooned fl	coportion  (sec., F.  ow, V( ow, V( cked pe	on of Ti  ing flor c,max) c,min) riod, t	WSC Inte	ersecti	Movemen	nt 2 1,prot)	Mo' V(t)	
g(q1) g(q2) g(q) Computation 2-Pr alpha beta Cravel time, t(a Comportion of co dax platooned fl fin platooned fl Duration of bloc Proportion time	(sec ) (sec ), F enflict .ow, V( .ow, V( .cked pe	on of Ti  ing flor c,max) c,min) riod, t d, p	WSC Inte	V(	Movement) V(2	nt 2 1,prot)	Mo' V(t)	V(l,prot)
g(q1) g(q2) g(q) Computation 2-Pr alpha beta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl fin platooned fl Duration of bloc Proportion time	(sec ) (sec ), F enflict .ow, V( .ow, V( .cked pe	on of Ti  ing flor c,max) c,min) riod, t d, p	WSC Inte	ersecti	Movement) V(2	nt 2 1,prot)	Mo' V(t)	V(l,prot)
g(q1) g(q2) g(q) Computation 2-Pr alpha Pravel time, t(a Emoothing Factor Proportion of co Max platooned fl Min platooned fl Duration of bloc Proportion time Computation 3-Pl	(sec ) (sec ), F enflict .ow, V( .ow, V( .cked pe	on of Ti  ing flor c,max) c,min) riod, t d, p	WSC Inte	V(	0.000	nt 2 1,prot)	Mo' V(t)	V(l,prot)
g(q1) g(q2) g(q) Computation 2-Pr alpha Deta Gravel time, t(a Emoothing Factor Proportion of co Max platooned fl Ouration of bloc Proportion time Computation 3-Pl	(sec ) (sec ), F enflict .ow, V( .ow, V( .cked pe	on of Ti  ing flor c,max) c,min) riod, t d, p	WSC Inte	V(	0.000	nt 2 1,prot)	Mo' V(t)	V(l,prot)
g(q1) g(q2) g(q) Computation 2-Pr  alpha beta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl Duration of bloc Proportion time Computation 3-Pl D(2) D(5) D(dom)	(sec ) (sec ), F enflict .ow, V( .ow, V( .cked pe	on of Ti  ing flor c,max) c,min) riod, t d, p	WSC Inte	V(	0.000	nt 2 1,prot)	Mo' V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  Alpha Deta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl Min platooned fl Ouration of bloc Proportion time  Computation 3-Pl  D(2) D(5) D(dom) D(subo)	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti	WSC Inte	V(	0.000	nt 2 1,prot)	Mo'V(t)	V(l,prot)
g(q1) g(q2) g(q2) g(q)  Computation 2-Pr  Alpha Deta Cravel time, t(and Section of continuous fluid platoned fluid	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti	WSC Inte	V(	0.000	nt 2 1,prot)	Mo'V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  alpha beta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl fin platooned fl Ouration of bloc Proportion time  Computation 3-Pl  b(2) b(dom) b(dom) constrained or u	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti	WSC Inte	V(	0.000	nt 2 1,prot)	Mo'V(t)	V(l,prot)
g(q1) g(q2) g(q) Computation 2-Pr alpha Deta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl Duration of bloc Proportion time Computation 3-Pl D(2) D(5) D(dom) D(subo) Constrained or u	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing flor c,max) c,min) riod, t d, p  Event Perained?	WSC Inte	Resi	0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q) Computation 2-Pr  Alpha Deta Gravel time, t(a Emoothing Factor Proportion of co Max platooned fl Duration of bloo Proportion time Computation 3-Pl D(2) D(5) D(dom) D(subo) Constrained or u	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of The one of The o	WSC Inte	Resi	0.000 ult 000 (2)	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q2) g(q)  Computation 2-Pr  Alpha Deta Pravel time, t(a Emoothing Factor Proportion of co dax platooned fl Duration of blood Proportion time  Computation 3-Pl  D(2) D(5) D(dom) D(subo) Constrained or un Proportion Inblocked For minor	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing flor c,max) c,min) riod, t d, p  Event Perained?	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  Alpha Deta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl Duration of blood Proportion time  Computation 3-Pl  D(2) D(5) D(dom) D(subo) Constrained or un Proportion Inblocked For minor	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000 ult 000 (2)	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q) Computation 2-Pr alpha beta Fravel time, t(a Smoothing Factor Proportion of co	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  Alpha Deta Fravel time, t(a Smoothing Factor Proportion of co Max platooned fl function of bloc Proportion time  Computation 3-Pl  D(2) D(5) D(dom) D(subo) Constrained or un  Proportion unblocked for minor movements, p(x)	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  Alpha Deta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl function of bloc Proportion time  Computation 3-Pl  (2) (2) (3) (4) (5) (5) (6) (6) (5) (6) (6) (7) (7) (8) (8) (8) (9) (9) (9) (1)	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  alpha beta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl Ouration of bloo Proportion time  Computation 3-Pl  o(2) o(5) o(dom) o(subo) Constrained or u  Proportion Inblocked For minor Involvements, p(x)  o(1) o(4)	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  Alpha Deta Fravel time, t(a Emoothing Factor Proportion of co Max platooned fl Duration of blood Proportion time  Computation 3-Pl  D(2) D(5) D(dom) D(subo) Constrained or un Proportion Inblocked For minor Movements, p(x) D(1) D(4) D(7) D(8)	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
alpha Deta Computation 2-Pr  Alpha Deta Cravel time, t(a Comportion of co Cax platooned fl Computation 3-Pl Computation 3-Pl Computation of bloc Croportion time Computation 3-Pl Computation 3-Pl Computation of bloc Computation 3-Pl Computation	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  Alpha Deta Fravel time, t(a Emoothing Factor Proportion of co Max platoned fl Duration of bloc Proportion time  Computation 3-Pl  D(2) D(5) D(dom) D(subo) Constrained or un Proportion Inblocked For minor Involved For minor Involved Invol	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)
g(q1) g(q2) g(q)  Computation 2-Pr  Alpha Deta Fravel time, t(a Smoothing Factor Proportion of co Max platooned fl function of bloc Proportion time  Computation 3-Pl  (2) (5) (6) (5) (6) (6) (6) (6) (7) (6) (8) (9) (9) (10)	(sec ) (sec ), F onflict ow, V( ow, V( sked pe blocked atoon	on of Ti  ing floo c,max) c,min) riod, t d, p  Event Po  rained?  (1 Single	WSC Inte	Rest	0.000  0.000  0.000  0.000  0.000  0.000	nt 2 1,prot)	Mo V(t)	V(l,prot)

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
V c,x					389			
S Px								
V c,u,x								
C r,x C plat,x								
Two-Stage Process								
Stage1	7 Stage2	Stage1	8 L Stage2	Stag	el St	age2	11 Stage1	Stage2
V(C, X)								
S P(x)								
V(c,u,x)								
C (m)								
C(r,x) C(plat,x)								
Worksheet 6-Impedanc	e and Cap	acity E	Equations					
Step 1: RT from Mino	r St.				9		12	
Conflicting Flows				38 66				
Potential Capacity Pedestrian Impedance	Factor			1.	_		1.00	
Movement Capacity				66				
Probability of Queue	free St.			0.	64		1.00	
Step 2: LT from Majo	r St.				4		1	
Conflicting Flows Potential Capacity	Factor			1.	0.0		1.00	
Pedestrian Impedance Movement Capacity	ractor			1.	00		1.00	
Probability of Queue Maj L-Shared Prob Q				1.	00		1.00	
Step 3: TH from Mino	r St.				8		11	
Conflicting Flows								
Potential Capacity Pedestrian Impedance	Factor			1.	00		1.00	
Cap. Adj. factor due		ling mvn	nnt	1.			1.00	
Movement Capacity	froo St			1.	0.0		1.00	
Probability of Queue	iiee st.			μ.			1.00	
Step 4: LT from Mino	r St.				7		10	
Conflicting Flows Potential Capacity								
Pedestrian Impedance				1.	00		1.00	
Maj. L, Min T Impeda Maj. L, Min T Adj. I							1.00	
Cap. Adj. factor due			nnt	1.	00		0.64	
Movement Capacity								
Worksheet 7-Computat	ion of th	e Effec	ct of Two	-stage	Gap A	.ccepta	ance	
Step 3: TH from Mino					8		11	
Part 1 - First Stage Conflicting Flows								
Potential Capacity								
Pedestrian Impedance								
Cap. Adj. factor due Movement Capacity	to Imped	ing mvn	nnt					
Probability of Queue	free St.							
Part 2 - Second Stag								
Conflicting Flows Potential Capacity								
Pedestrian Impedance								
Cap. Adj. factor due Movement Capacity	to Imped	ling mvm	nnt					

Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	g mvmnt		.00		1.00	
Result for 2 stage process:						
y C t						
Probability of Queue free St.		1	.00		1.00	
Step 4: LT from Minor St.			7		10	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	g mvmnt					
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	g mvmnt					
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor		1	00		1.00	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding Movement Capacity	g mvmnt	1	.00		1.00 0.64	
Results for Two-stage process: a y C t  Worksheet 8-Shared Lane Calculate						
Movement	7	8	9	10	11	12
	L	Т	R	L	Т	R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)			237 664			
Worksheet 9-Computation of Effect	ct of Flar	ed Minor	Stree	t Appro	aches	
Movement	7 L	8 T	9 R	10 L	11 T	12 R
C sep Volume Delay Q sep Q sep +1			664 237			
round (Qsep +1)						
n max C sh SUM C sep n C act						
Worksheet 10-Delay, Queue Length	n, and Lev	rel of Se	rvice			
Movement 1 4 Lane Config	7	8	9 R	10	11	12
v (vph) C(m) (vph) v/c		6	37 664 0.36			
95% queue length		1	.65			

Control Delay 13.4 LOS В

Approach Delay 13.4 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		
v(i2), Volume for stream 3 or 6		
s(il), Saturation flow rate for stream 2 or 5		
s(i2), Saturation flow rate for stream 3 or 6 $P*(oj)$		
d(M,LT), Delay for stream 1 or 4		
N, Number of major street through lanes		
d(rank,1) Delay for stream 2 or 5		

# 1.1.1.9 Interseção E – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY\_

Analyst: Progeplan

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

Intersection: G

Jurisdiction: DER/DF

Units: U. S. Metric

Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: M2-N 2023

M2-M7+M8-M11+M12-M13

North/South Street: M13	
Intersection Orientation: EW Study period (hrs): 1.00	
Vehicle Volumes and Adjustments	
Major Street: Approach Eastbound Westbound	
Movement 1 2 3   4 5 6	
L T R   L T R	
Volume 5 892	
Peak-Hour Factor, PHF 0.91 0.91	
Hourly Flow Rate, HFR 5 980	
Percent Heavy Vehicles 0	
Median Type/Storage Undivided /	
RT Channelized?	
Lanes 0 2	
Configuration LT T	
Upstream Signal? No No	
Minor Street: Approach Northbound Southbound	
Movement 7 8 9   10 11 12	
L T R   L T R	
Volume 6	
Peak Hour Factor, PHF 0.91	
Hourly Flow Rate, HFR 6	
Percent Heavy Vehicles 11	
Percent Grade (%) 0 0	
Flared Approach: Exists?/Storage / /	
Lanes 1	
Configuration L	
Delay, Queue Length, and Level of Service	
Approach EB WB Northbound Southbound	
Movement 1 4   7 8 9   10 11 12	
Lane Config LT   L	
v (vph) 5 6	
\ <u>1</u> /	
C UII VVIII 1030 313	
C(m) (vph) 1636 513 v/c 0.00 0.01	

Approach Delay 12.1 Approach LOS В

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Analyst: Progeplan

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

DER/DF Jurisdiction:

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

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

Study period (hrs): 1.00

	_	Volumes		-			
Major Street Movements	1	2	3	4	5	6	
	L	Т	R	L	Т	R	
Volume				5	892		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				1	245		
Hourly Flow Rate, HFR				5	980		
Percent Heavy Vehicles				0			
Median Type/Storage RT Channelized?	Undi	vided		/			
Lanes				0	2		
Configuration				I	тт		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
/olume	6						
Peak Hour Factor, PHF	0.91						
Peak-15 Minute Volume	2						
Hourly Flow Rate, HFR	6						
Percent Heavy Vehicles	11						
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storac	re		/			/
RT Channelized		,					
Lanes	1						
Configuration	I						

Movements		14		ustments16
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. Flow vph	Sat Flow vph			4	_	Distance to Signal meters					

Left-Turn

Through

S5 Left-Turn Through

					I	Movemen	t 2	Movemen	nt 5
Shared lr Shared lr Sat flow Sat flow Number of	rate, m	, majo: ajor tl ajor r	r rt vel h vehic t vehic	nicles: les: les:	:			0 0 1700 1700 2	
Worksheet	4-Crit	ical G	ap and 1	Follow-	up Time	Calcul	ation		
Critical	Gap Cal	culati	on						
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base) t(c,hv) P(hv)		1.00	4.1 1.00 0	7.1 1.00 11	1.00	1.00	1.00	1.00	1.00
t(c,g) Percent G	Grade		0 00	0.20 0.00 0.70	0.20	0.10	0.20	0.20 0.00	0.10 0.00
t(3,1t) t(c,T):	1-stage 2-stage 1-stage 2-stage	0.00	0.00 0.00 0.00 4.1	0.00 1.00 6.5	0.00	0.00	0.00	0.00	0.00
Follow-Up		alcula	tions						
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base) t(f,HV) P(HV) t(f)		0.90	2.20 0.90 0 2.2	3.50 0.90 11 3.6	0.90	0.90	0.90	0.90	0.90
Worksheet Computati						Moveme			vement 5 V(1,prot)
V prog Total Sat Arrival T Effective Cycle Ler Rp (from Proportic g(q1) g(q2) g(q)	Type Green, ngth, C Exhibit	g (seo (sec) 16-11	c) )		n P				
Computati	on 2-Pr	oporti	on of T	WSC Inte	ersection				
					V (1	Movement) V(		Mor V(t)	vement 5 V(1,prot)
alpha beta Travel ti Smoothing Proportic Max plato Min plato Duration Proportic	g Factor on of co ooned flo ooned flo of bloc	, F nflict ow, V( ow, V( ked pe	ing flow c,max) c,min) riod, t			0.00	0	(	0.000
Computati	on 3-P1	atoon 1	Event Pe	eriods	Resi	ılt			
p(2) p(5) p(dom) p(subo) Constrair	ned or u	nconst	rained?		0.00				
Proportion unblocked for minor movements	l :		(1 Single	-stage		(2) Two-Sta	age Pro	(3) cess tage II	

(1)									
p(1)									
p(4)									
p(7)									
p(8) p(9)									
p(10) p(11)									
p(11) p(12)									
ρ(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		0	500						
6		U	300						
ex									
/ c,u,x									
Cr,x									
C plat,x									
Two-Stage Process									
7			8		10		1		
Stage1	Stage2	Stage1	Stage2	Sta	ge1 St	tage2	Stage1	Stage2	
7 ( ~ )									
V(c,x)	2000								
S D(w)	3000								
P(x)									
V(c,u,x)									
C(r,x)									
C(plat,x)									
Worksheet 6-Impedance	and Cap	acity E	quations						
Step 1: RT from Minor	St.				9		12		
000p 1. KI 110M 1111101					,				
Conflicting Flows									
Potential Capacity									
Pedestrian Impedance F	`actor			1	.00		1.00		
Movement Capacity							1 00		
Probability of Queue f	ree St.			1	.00		1.00		
Step 2: LT from Major	C+				4		1		
scep 2. Li iiom Majoi	SC.				4		1		
Conflicting Flows				0					
Potential Capacity				1	636				
Pedestrian Impedance F	actor			1	.00		1.00		
Movement Capacity				1	636				
Probability of Queue f	ree St.				.00		1.00		
Maj L-Shared Prob Q fr				1	.00				
74 2. mv C	Q+								
Step 3: TH from Minor	St.				8		11		
Conflicting Flows									
Potential Capacity									
Pedestrian Impedance F	actor			1	.00		1.00		
Cap. Adj. factor due t		ing mvm	nt		.00		1.00		
Movement Capacity	1- 2 0	,	-	_					
Probability of Queue f	ree St.			1	.00		1.00		
Step 4: LT from Minor	St.				7		10		
Conflicting Flows				51	00				
Potential Capacity					15				
Pedestrian Impedance F	actor				.00		1.00		
Maj. L, Min T Impedance r		r		_			1.00		
Maj. L, Min T Adj. Imp							1.00		
Cap. Adj. factor due t			nt	1	.00		1.00		
Movement Capacity			-		13		00		
Norksheet 7-Computation	n of th	e Effec	t of Two	-stag	e Gap A	Accept	ance		
ton 3. TH from Minor	C+				8		11		
tep 3: TH from Minor	J.				U		11		
Part 1 - First Stage									

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 m Movement Capacity	vmnt					
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding m Movement Capacity	vmnt		00		1.00	
Result for 2 stage process:						
У						
C t Probability of Queue free St.		1	.00		1.00	
Step 4: LT from Minor St.			7		10	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding m Movement Capacity	vmnt					
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding m Movement Capacity	vmnt					
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 m Movement Capacity	vmnt	5 1 1	00 00		1.00 1.00 1.00 1.00	
Results for Two-stage process:						
a y C t		5	513			
Worksheet 8-Shared Lane Calculation	ns					
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)	6 513					
Worksheet 9-Computation of Effect	of Flare	d Minor	Street	t Approa	aches	
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)	513 6					
n max C sh SUM C sep n						

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

Movement	1	4	7	8	9	10	11	12
Lane Config		LT	L					
v (vph)		5	6					
C(m) (vph)		1636	513					
v/c		0.00	0.01					
95% queue length		0.01	0.04					
Control Delay		7.2	12.1					
LOS		A	В					
Approach Delay				12.1				
Approach LOS				В				

Worksheet 11-Shared Major LT Impedance and Delay

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

# 1.1.1.10 Interseção E — Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY\_

Analyst: Progeplan Agency/Co.:
Date Performed: 05/06/2023 Analysis Time Period: Pico Tarde Intersection: E Jurisdiction: Units: U. S. Metric DER/DF Analysis Year: 2023 Project ID: FUTURA SAÚDE 2023 East/West Street: M2-M7+M8-M11 North/South Street: M11

Intersection Orientation: EW Study period (hrs): 1.00

INCELSECTION C	/IICIICACIOII.			_	cuay	PCIIC	u (1113)	. 1.0	5
	Vehi	cle Vol	umes ar	nd Adju	ıstme				
Major Street:	Approach	Ea	stbound	1		W∈	stbound		
	Movement	1	2	3	- 1	4	5	6	
		L	T	R		L	Т	R	
Volume						4	1966		
Peak-Hour Fact	Peak-Hour Factor, PHF					0.91	0.91		
Hourly Flow Ra					4	2160			
Percent Heavy	Percent Heavy Vehicles					0			
Median Type/Storage RT Channelized?		Undiv	ided			/			
Lanes	•					0	2		
Configuration						T	TT		
Upstream Signa	11?		No				No		
Minor Street:	Approach	No	rthbour	nd		Sc	uthbound		
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume		208							
Peak Hour Fact	or, PHF	0.91							
Hourly Flow Ra	ite, HFR	228							
Percent Heavy	Vehicles	0							
Percent Grade			0				0		
Flared Approac	ch: Exists?/	Storage 1			/				/
Configuration		L							

7 mm ma a ala	EB	Queue Le	-	thbound		5001		outhbou	
Approach		WB							
Movement	1	4	7	8	9		10	11	12
Lane Config		LT	L						
v (vph)		4	228						
C(m) (vph)		1636	240						
v/c		0.00	0.95						
95% queue length		0.01	15.73						
Control Delay		7.2	141.4						
LOS		A	F						
Approach Delay				141.4					
Approach LOS				F					

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

E DER/DF Intersection: Jurisdiction: Units: U. S. Metric Analysis Year: 2023 Project ID: FUTURA SAÚDE

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

Intersection Orientation: EW

Study period (hrs): 1.00

	Vehicle	Volumes	and A	djustmen	ts		
Major Street Movements	1	2	3	4	5	6	
	L	Т	R	L	Т	R	
Volume				4	1966		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				1	540		
Hourly Flow Rate, HFR				4	2160		
Percent Heavy Vehicles				0			
Median Type/Storage RT Channelized?	Undi	vided		/			
Lanes				0	2		
Configuration				•	rт		
Upstream Signal?		No			No		
opscream signar.		110			140		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
Volume	208						
Peak Hour Factor, PHF	0.91						
Peak-15 Minute Volume	57						
Hourly Flow Rate, HFR	228						
Percent Heavy Vehicles	0						
Percent Grade (%)		0			0		
Flared Approach: Exists	s?/Storao	·e		/			/
RT Channelized							
Lanes	1						
Configuration	I						

	_Pedestrian <sup>v</sup>	Volumes	and Adj	ustments
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

		Prog. Flow vph	Sat Flow vph	Arriv Type	1	Green Time sec	Cycle Length sec	Prog. Speed kph	Distance to Signal meters
S2 Left- Throu S5 Left-	ıgh Turn								
Throu	.gh 								
Worksheet	3-Data	for Co	mputing	Effect	of D	elay to	Major :	Street V	ehicles
						Moveme	ent 2	Moveme	ent 5
Shared ln Shared ln Sat flow	volume, rate, ma	, major ajor th	rt veh vehicl	icles: es:				0 0 1700	
Sat flow Number of		-						1700 2	)
Worksheet	4-Crit:	ical Ga	ap and F	ollow-u	p Tim	e Calcı	lation		
Critical	Gap Calo	culatio	on.						
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
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	1.00 0 0.20	1.00				1.00
t(c,g) Percent G +(3 1+)	rade		0.00	0.20	0.20				0.10
	1-stage 2-stage		0.00	0.00	0.00				0.00
t(c)	1-stage 2-stage	0.00	4.1	6.4	1.00	0.00	1.00	1.00	0.00
Follow-Up	Time Ca								
Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)			2.20	3.50					
t(f,HV) P(HV)		0.90	0.90 0	0.90 0	0.90	0.90	0.90	0.90	0.90
t(f)			2.2	3.5					
Worksheet	5-Effec	ct of t	Jpstream	ı Signal	s				
Computati	on 1-Que	eue Cle	earance	Time at	_	Mover	nent 2		ovement 5 V(1,prot)
V prog						, '	. ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,
v prog Total Sat Arrival T Effective	'ype			(vph)					
Cycle Len Rp (from Proportio	gth, C Exhibit	(sec) 16-11)		n green	P				
g (q1) g (q2) g (q)									
Computati	on 2-Pro	pportic	on of TW	ISC Inte	rsect		ne bloci		ovement 5

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

0.0

0.000

0.000

p(2) p(5) p(dom) p(subo)			0.0					
Constrained or uncons	trained?							
Proportion unblocked for minor movements, p(x)	(1 Single Proc	-stage	Sta	(2) Two-S	tage Pr	(3) cocess Stage II	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 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
V c,x s Px V c,u,x		0	1088					
C r,x C plat,x								
Two-Stage Process								
Stage1	7 Stage2	Stage:	8 1 Stage	2 Sta	10 ge1 St	age2 St	11 tage1	Stage2
V(c,x) s P(x) V(c,u,x)	3000							
C(r,x) C(plat,x)								
Worksheet 6-Impedance	and Cap	acity I	Equation	ıs				
Step 1: RT from Minor	St.				9		12	
Conflicting Flows Potential Capacity Pedestrian Impedance 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 Maj L-Shared Prob Q f	free St.			1 1 1	636 .00 636 .00		1.00	
Step 3: TH from Minor	St.				8		11	
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Probability of Queue	to Imped	ing mvr	mnt	1	.00		1.00 1.00	
Step 4: LT from Minor					7		10	
Conflicting Flows Potential Capacity Pedestrian Impedance Maj. L, Min T Impedanc Maj. L, Min T Adj. Imp	Factor ce facto			2	088		1.00 1.00 1.00	

Cap. Adj. factor due to Impeding mvmnt	1.00	1.00
Movement Capacity	240	

Step 3: TH from Minor St.			8		11	
step 3: In Irom Minor St.			° 			
Part 1 - First Stage Conflicting Flows						
Potential Capacity						
Pedestrian Impedance Factor						
Cap. Adj. factor due to Impeding	mvmnt					
Iovement Capacity						
Probability of Queue free St.						
art 2 - Second Stage						
onflicting Flows						
otential Capacity edestrian Impedance Factor						
ap. Adj. factor due to Impeding	mvmnt.					
ovement Capacity						
art 3 - Single Stage						
onflicting Flows						
otential Capacity		1	.00		1.00	
edestrian Impedance Factor ap. Adj. factor due to Impeding :	myzmn t		.00		1.00	
ovement Capacity		_			1.00	
esult for 2 stage process:						
t						
robability of Queue free St.		1	.00		1.00	
tep 4: LT from Minor St.			7		10	
art 1 - First Stage						
onflicting Flows						
otential Capacity						
edestrian Impedance Factor ap. Adj. factor due to Impeding:	mrzmn+					
lovement Capacity	III V IIII C					
art 2 - Second Stage						
Conflicting Flows						
otential Capacity						
edestrian Impedance Factor						
ap. Adj. factor due to Impeding	mvmnt					
ovement Capacity						
art 3 - Single Stage		1	000			
onflicting Flows otential Capacity			088 41			
edestrian Impedance Factor			.00		1.00	
aj. L, Min T Impedance factor		_	• • •		1.00	
aj. L, Min T Adj. Imp Factor.					1.00	
ap. Adj. factor due to Impeding	mvmnt		.00		1.00	
ovement Capacity		2	40			
esults for Two-stage process:						
t		2	40			
orksheet 8-Shared Lane Calculati	ons					
ovement	7	8	9	10	11	12
	L	T	R	L	Т	R
olume (vph)	228					
ovement Capacity (vph) hared Lane Capacity (vph)	240					
-12 (-1						
orksheet 9-Computation of Effect	of Flared	l Minor	Street	Approa	ches	
ovement	7	8	9	10	11	12
	L	Т	R	L	T	R

240 C sep 228 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

Movement LT Lane Config L v (vph) 4 228 C(m) (vph) 1636 240 0.95 v/c 0.00 95% queue length 15.73 0.01 Control Delay 7.2 141.4 LOS F Α Approach Delay 141.4 Approach LOS F

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

# 1.1.1.11 Interseção F – 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: F Jurisdiction: DER/DF

Units: U. S. Metric

Analysis Year: Project ID: FUTURA SAÚDE

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

Intersection Orientation: EW Study period (hrs): 1.00

Major Street:		cle Volı	umes and stbound	Adju	stme	nts	Westbound	
najor bereet.	Movement	1	2	3	ı	4	5	6
		L	T	R	i	L	T	R
Volume		9	1944					
Peak-Hour Fact	or, PHF	0.91	0.91					
Hourly Flow Ra	ate, HFR	9	2136					
Percent Heavy	Vehicles	12						
Median Type/St	corage	Undiv	ided			/		
RT Channelized	1?							
Lanes		0	2					
Configuration		L'	ГТ					
Upstream Signa	11?		No				No	

Minor Street:	Approach	No	rthbou	nd		0	Southbou	ınd	
	Movement	7	8	9	- 1	10	11	12	
		L	T	R	- 1	L	T	R	
Volume						5			
Peak Hour Facto	or, PHF					0.9	1		
Hourly Flow Rat	te, HFR					5			
Percent Heavy V	Vehicles					0			
Percent Grade	(%)		0				0		
Flared Approach	n: Exists?/	'Storage			/				/
Lanes							1		
Configuration							L		
Approach Movement Lane Config	Delay, Ç EB 1 LT	Queue Le WB 4		and Lev rthboun 8		f Sei		ithbound	d 12
v (vph)	9						5		
C(m) (vph)	1560						241		
v/c	0.01						0.02		
95% queue lengt	th 0.02						0.06		
Control Delay	7.3						20.3		
LOS	A						С		
Approach Delay								20.3	
Approach LOS								C	

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail: Fax:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS\_

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

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

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

Intersection Orientation: EW Study period (hrs): 1.00

intersection offentatio	11. EW			study pe	:1100 (1	IIS).	1.00
	Vehicle V	Volumes	and A	djustmen	its		
Major Street Movements	_ 1	2	3	4	5	6	
-	L	Т	R	L	T	R	
Volume	9	1944					
Peak-Hour Factor, PHF	0.91	0.91					
Peak-15 Minute Volume	2	534					
Hourly Flow Rate, HFR	9	2136					
Percent Heavy Vehicles	12						
Median Type/Storage	Undi	vided		/			
RT Channelized?							
Lanes	0	2					
Configuration	L'	ГТ					
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
Volume				5			
Peak Hour Factor, PHF				0.91			
Peak-15 Minute Volume				1			
Hourly Flow Rate, HFR				5			
Percent Heavy Vehicles				0			
Percent Grade (%)		0			0		
Flared Approach: Exist RT Channelized	s?/Storage	Э		/			/

Configuration						L		
		edestr:	ian Vol	umes an	nd Adjus	stments		
Movements				14	15	16		
Flow (ped/hr) Lane Width (m)				0	0 3.6	0 3.6		
Walking Speed (m	/sec)			1.2	1.2	1.2		
Percent Blockage				0	0	0		
	Prog.	[ Sat	_	_	al Data_ Green (	Cycle	Prog.	Distance
	Flow vph	Flow vph	w Type	e :		-	Speed kph	to Signal meters
S2 Left-Turn Through S5 Left-Turn Through								
Worksheet 3-Data	for Co	mputing	g Effec	t of De	elay to	Major S	treet V	ehicles
					Movemer	nt 2	Moveme	nt 5
Shared in volume					0			
Shared ln volume Sat flow rate, m	_				0 1700			
Sat flow rate, m					1700			
Number of major				:	2			
Worksheet 4-Crit	ical Ga	ip and I	Follow-	up Time	e Calcul	lation		
Critical Gap Cal Movement	culatio	on 4	7	8	9	10	11	12
40 Velilerre	L	L	L	T	R	L	Т	R
t(c,base)	4.1					7.1		
c(c, hv)	1.00 12	1.00	1.00	1.00	1.00	1.00	1.00	1.00
?(hv) :(c <b>,</b> g)	12		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
(3,1t)	0.00					0.70		
c(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage						6.4		
2-stage	:							
Follow-Up Time C Movement	alculat		7	8	9	10	11	12
	L	L	L	T	R	L	Т	R
(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)	12					0		
c(f)	2.3					3.5		
Worksheet 5-Effe	ct of U	Jost rear	n Signa	1s				
Computation 1-Qu					roam Sid	nal		
computation i Qu	.cuc cic	arance	TIME a	с орзс.	Moveme	-	Мо	vement 5
				V		(1,prot)		
/ prog								
v prog Total Saturation	Flow F	Rate, s	(vph)					
Arrival Type		, .	· 1/					
Effective Green,		:)						
Cycle Length, C								
Rp (from Exhibit			~	~ D				
Proportion vehic g(q1)	tes arr	ving (	on gree	II P				
g (q1) g (q2)								
g (d)								
-								

alpha								
Travel time, t(a) (see Smoothing Factor, F								
Proportion of conflic Max platooned flow, \ Min platooned flow, \	/(c,max)	w, f						
Duration of blocked proportion time block	period, t	(p)		0.0	0.0		0.000	
Computation 3-Platoor		oriods	Pos	sult				
p(2)			0.0					
p(5) p(dom)				000				
p(subo) Constrained or uncons	strained?							
Proportion		`		(2)		(2)		
unblocked for minor	-	-stage			tage Pr			
movements, p(x)	Proc	ess 	Sta	age I		Stage I		
p(1) p(4)								
p(7) p(8)								
p(9) p(10)								
p(10) p(11)								
p(12)								
Computation 4 and 5 Single-Stage Process								
Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
V c,x	0					1086		
s Px								
V c,u,x								
C r,x C plat,x								
Two-Stage Process	7 Stage2	Stage1	8 Stage	e2 Sta	10 gel St	age2 S	11 Stage1	Stage2
V(c,x)								
S					30	000		
P(x) V(c,u,x)								
C(r,x) C(plat,x)								
Worksheet 6-Impedance	e and Cap	acity E	quation	ns				
Step 1: RT from Minor	r 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	r St.				4		1	
Conflicting Flows							0	
Potential Capacity Pedestrian Impedance	Factor			1	.00		1560 1.00	
Movement Capacity							1560	
Probability of Queue Maj L-Shared Prob Q 1				1	.00		0.99 0.99	
Step 3: TH from Minor	r St.				8		11	
Conflicting Flows								
Potential Capacity								

Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99
Movement Capacity	****	****
Probability of Queue free St.	1.00	1.00
tep 4: LT from Minor St.	7	10
conflicting Flows		1086
Potential Capacity	1 00	242
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	1.00	0.99
lovement Capacity	1.00	241
ovement capacity		211
Worksheet 7-Computation of the Effect of Tw	ro-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		
Novement Capacity		
Probability of Queue free St.		
Part 2 - Second Stage		
Part 2 - Second Stage Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Tap. Adj. factor due to Impeding mvmnt		
Novement Capacity		
Part 3 - Single Stage		
Part 3 - Single Stage Conflicting Flows		
onificting flows Optential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.99	0.99
Novement Capacity	<del>-</del>	<del>-</del>
Result for 2 stage process:		
a e e e e e e e e e e e e e e e e e e e		
<u> </u>		
C t Probability of Queue free St.	1.00	1.00
. TODADITICY OF QUOUC FIEE DC.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Redestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Don't O Cogond Ct		
Part 2 - Second Stage Conflicting Flows		
Potential Capacity		
Redestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Novement Capacity		
Cingle Chage		
Part 3 - Single Stage Conflicting Flows		1086
Potential Capacity		242
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.99	2.00
Maj. L, Min T Adj. Imp Factor.	1.00	
Cap. Adj. factor due to Impeding mymnt	1.00	0.99
Movement Capacity		241
Results for Two-stage process:		
Results for two-stage process:		
Y		
Ct		241
Worksheet 8-Shared Lane Calculations		
Novement 7	8 9 1	10 11 12

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

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

C sep 24
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

12 Movement 10 11 Lane Config LT L 9 5 v (vph) 1560 C(m) (vph) 241 v/c 0.01 0.02 95% queue length 0.06 0.02 20.3 Control Delay 7.3 LOS Α Approach Delay 20.3 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		

# 1.1.1.12 Interseção F — 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: F
Jurisdiction: DER/DF
Units: U. S. Metric

Analysis Year: 2023 Project ID: FUTURA SAÚDE

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

North/South Street: M12

Intersection Orientation: EW Study period (hrs): 1.00

\_\_\_\_\_\_Vehicle Volumes and Adjustments\_

 Major Street:
 Approach Movement
 Eastbound
 Westbound

 L
 T
 R
 I
 L
 T
 R

Volume Peak-Hour Factor Hourly Flow Rat Percent Heavy V Median Type/Stor RT Channelized? Lanes Configuration	te, HFR Vehicles orage	6 0.91 6 0 Undiv	905 0.91 994  rided 2		,	′			
Upstream Signal	?		No				No		
Minor Street:	Approach	No	rthboun	d		5	Southbou	ınd	
	Movement	7	8	9	1	10	11	12	
		L	T	R		L	T	R	
Volume						4			
Peak Hour Facto	× DUE					4			
Hourly Flow Rat	,					4	-		
Percent Heavy V						0			
Percent Grade (			0			O	0		
Flared Approach	. ,	Storage	-		/		O		/
Lanes	. 2112000.7	occiago	•		,	1			,
Configuration						_	L		
	Delay, Q	ueue Le	ength, a	nd Lev	rel of	Ser	vice		
Approach	EB E	WB		thboun				thbound	i
Movement	1	4	7	8	9		10	11	12
Lane Config	LT	Ī				Ī	L		
v (vph)	6						4		
C(m) (vph)	1636						526		
v/c	0.00						0.01		
95% queue lengt							0.02		
Control Delay	7.2						11.9		
LOS	A						В		
Approach Delay							-	11.9	
Approach LOS								В	

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

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

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

Jurisdiction: DER/DF Units: U. S. Metric Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: M01-M05-M07+M08+M06-M11
North/South Street: M12
Intersection Orientation: EW S

Study period (hrs): 1.00

	Vehicle	Volumes	and A	djustmer	ıts		
Major Street Movements	_ 1	2	3	4	5	6	
	L	T	R	L	Т	R	
Volume	6	905					
Peak-Hour Factor, PHF	0.91	0.91					
Peak-15 Minute Volume	2	249					
Hourly Flow Rate, HFR	6	994					
Percent Heavy Vehicles	0						
Median Type/Storage RT Channelized?	Undi	vided		/			
Lanes	0	2					
Configuration	I	T T					
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	

		L	Т		R	L	Т	R	
Volume						4			
Peak Hour Factor Peak-15 Minute V Hourly Flow Rate	olume , HFR					0.91 1 4			
Percent Heavy Ve Percent Grade (% Flared Approach: RT Channelized	)	?/Stor	0 age			0	0		/
Lanes Configuration						1 L			
	Pe					justmen	its		
Movements		1	3	14	15	16			
Flow (ped/hr) Lane Width (m) Walking Speed (m Percent Blockage	/sec)		.6	0 3.6 1.2 0	0 3.6 1.2 0	0 3.6 1.2 0			
		TI	pstream	m Siar	nal Da	ta			
	Prog. Flow vph	Sat Flow vph	Arri	val	Green Time sec		h Sp	og. eed ph	Distance to Signal meters
S2 Left-Turn Through S5 Left-Turn Through									
Worksheet 3-Data	for Com	puting	Effec	t of I		to Majo		eet V	
Shared in volume Shared in volume Sat flow rate, m Sat flow rate, m Number of major	, major ajor th ajor rt	rt veh vehicl vehicl	icles: es: es:	:	0 0 17 17 2				
Worksheet 4-Crit	ical Gap	and F	ollow-	up Tir	ne Cal	culatio	n		
Critical Gap Cal	culation								
Movement	1 L	4 L	7 L	8 T	9 R	10 I		11 T	12 R
t(c,base) t(c,hv) P(hv)	4.1 1.00 0	1.00	1.00	1.00	) 1.	7. 00 1. 0		1.00	1.00
t(c,g) Percent Grade t(3,lt)	0.00		0.20	0.20		00 0.		0.20	0.10
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage	0.00	0.00	0.00	0.00			00	0.00	0.00
Follow-Up Time C									1.0
Movement	1 L	4 L	7 L	8 T	9 R	10 I		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.			0.90	0.90
Worksheet 5-Effe									
Computation 1-Qu	eue Clea	rance	Time a	_		Signal ement 2 V(l,pr		Mo V(t)	vement 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)
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
                                                               (3)
unblocked
                            (1)
                                              (2)
                        Single-stage
                                              Two-Stage Process
for minor
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
                                                       9
                                                              10
                                                                     11
                                                                             12
                         L
                                 L
                                                       R
                                                              L
                                                                      Τ
                                                                              R
V c,x
                        0
                                                              509
s
Рx
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                                       10
                                       8
               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
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
                                                                     0
Conflicting Flows
```

Potential Capacity Pedestrian Impedance Factor Movement Capacity	1.00	1636 1.00 1636
Probability of Queue free St. Maj L-Shared Prob Q free St.	1.00	1.00
Step 3: TH from Minor St.	8	11
Conflicting Flows Potential Capacity		
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt	1.00	1.00
Movement Capacity Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows Potential Capacity		509 528
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.	1.00	
Cap. Adj. factor due to Impeding mymnt	1.00	1.00
Movement Capacity		526
Worksheet 7-Computation of the Effect of '	Iwo-stage Gap Acce	ptance
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 mymnt Movement Capacity		
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	1.00
Result for 2 stage process:		
а У		
C t Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity		
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mymnt Movement Capacity		
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor	1.00	509 528 1.00
Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.	1.00	
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00	1.00 526

Results for Two-sta	ge pro	cess:							
a									
У									
Ct								526	
Worksheet 8-Shared	Lane Ca	alculati	ons						
Movement			7		8	9	10	11	12
Movement			, L		o T	R	L	Т	R
			Ц		1	А	ь	1	К
Volume (vph)							4		
Movement Capacity (	vph)						526		
Shared Lane Capacit		)					020		
Sharea Eane Sapasie	1 (1511)	'							
Worksheet 9-Computa	tion o	f Effect	of Fl	ared	Mir	nor Stree	t Appro	paches	
Movement			7		8	9	10	11	12
			L		Т	R	L	Т	R
<u> </u>							526		
C sep							4		
Volume							4		
Delay									
Q sep									
Q sep +1									
round (Qsep +1)									
n max									
C sh									
SUM C sep									
n Q									
C act									
Worksheet 10-Delay,	Oueue	Length.	and T	evel	of	Service			
,	2	,							
Movement	1	4	7	8		9	10	11	12
Lane Config	LT						L		
v (vph)	6						4		
C(m) (vph)	1636						526		
v/c	0.00						0.01		
95% queue length	0.01						0.02		
Control Delay	7.2						11.9		
LOS	A						В		
Approach Delay								11.9	
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	

# 1.1.1.13 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: FUTURA SAÚDE

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

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

	Ve:	hicle Vol	umes a	nd Adjus	stme	nts			
Major Street:	Approach		stboun				Vestbound		
	Movement	1	2	3		4	5	6	
		L	T	R	i	L	T	R	
Volume						30	896		
Peak-Hour Facto						0.91			
Hourly Flow Rat						32	984		
Percent Heavy V						4			
Median Type/Sto	-	Undiv	rided			/			
RT Channelized?									
Lanes						(	) 2		
Configuration							LT T		
Upstream Signal	?		No				No		
				1				1	
	Approach		rthbou				Southbour		
	Movement	7	8	9		10	11	12	
		L	Т	R	ı	L	Т	R	
Volume		2							
Peak Hour Facto	r. PHF	1.00							
Hourly Flow Rat	,	2							
Percent Heavy V		0							
Percent Grade (		O	0				0		
Flared Approach		2/0+0=0			,		U		/
	: EXISTS	_			/				/
Lanes		1							
Configuration		I	1						
		Queue Le				f Ser			
Approach	EB	WB		rthbound				hbound	
Movement	1	4	7	8	9		10	11	12
Lane Config		LT	L						
v (vph)		32	2						
C(m) (vph)		1610	486						
v/c		0.02	0.00						
95% queue lengt	h	0.06	0.01						
Control Delay		7.3	12.4						
LOS		Α.	В.						
Approach Delay		А	ם	12.4					
Approach LOS				В					
That nacii nos				D					

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

TWO-WAY STOP CONTROL (TWSC) ANALYSIS

Analyst: Progeplan

Agency/Co.:

Agency/co.:
Date Performed: 05/06/2023

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

Units: U. S. Metric

2023 Analysis Year: Project ID: FUTURA SAÚDE

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

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

\_\_Vehicle Volumes and Adjustments\_ Major Street Movements 1 2 3 Т L R L Т R 30 896 Volume

Peak-Hour Factor, PHF 0.91 0.91

Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicles Median Type/Storage RT Channelized? Lanes		 ndivideo	 d	8 32 4	9 / 0 2		
Configuration Upstream Signal?		No			LT T		
Minor Street Movements	7 L	8 T	9 R	10 L		1 1 T	2 R
Volume	2						
Peak Hour Factor, PHF Peak-15 Minute Volume Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%)	1.0	0		,	0		/
RT Channelized	001,0001	_		,			,
Lanes Configuration		1 L					
Movements	Pedestri			_	tments		
Flow (ped/hr)					0		
Lane Width (m) Walking Speed (m/sec)					3.6 1.2		
Percent Blockage	(				0		
		In at room	n Ciana				
Prog.		_	n Signa. val G	_	ycle	Prog.	Distance
Flow vph	Flow vph	и Туре		ime L	ength sec	Speed kph	to Signal meters
Through							
S5 Left-Turn Through  Worksheet 3-Data for C	omputing	g Effect	t of De	lay to	 Major	Street	Vehicles
Through	omputing	g Effect		lay to			Vehicles
Through	r th veh r rt veh h vehicl	nicles: nicles: .es:	]				nent 5
Through  Worksheet 3-Data for C  Shared In volume, majo Shared In volume, majo Sat flow rate, major t Sat flow rate, major r	r th veh r rt veh h vehicl t vehicl through	nicles: nicles: es: es: n lanes:	:	Movemen	t 2	0 0 170	nent 5
Shared In volume, major Shared In volume, major Sat flow rate, major r Sat flow rate, major r Number of major street	r th vehr r rt veh h vehicl through	nicles: nicles: .es: .es: n lanes:	:	Movemen Calcul	t 2	0 0 170	nent 5
Shared In volume, major Shared In volume, major Sat flow rate, major to Sat fl	r th ver r rt ver h vehicl t vehicl through	nicles: nicles: es: es: n lanes:	:	Movemen	t 2	0 0 170	nent 5
Shared In volume, major Shared In volume, major Shared In volume, major Sat flow rate, major to Sat fl	r th vehr r rt veh h vehicl through ap and F on 4 L 1 1.00	ricles: inicles: inic	: up Time	Movemen  Calcul	ation	Movem 0 0 170 170 2	12 R
Shared In volume, major Shared In volume, major Shared In volume, major Sat flow rate, major rown Number of major street  Worksheet 4-Critical Gap Calculating Movement  L  t(c,base) t(c,buy) 1.00 P(hy) t(c,g)	r th vehr r rt veh h vehicl through ap and F	ricles: .es: .es: .a lanes: .follow-t	: up Time 8 T	Calcul 9 R	ation 10 L	Movem 0 0 170 170 2 11 T 1.000	12 R
Through  Worksheet 3-Data for Control of Con	r th vehr r rt veh h vehicl through ap and F	ricles: hicles: les: les: hicles: Tollow-tol	: up Time 8 T	Calcul 9 R	ation 10 L	Movem 0 0 170 170 2 11 T 1.000	12 R
Through  Worksheet 3-Data for Control of the state of the	r th vehr r rt veh h vehicl through ap and F on 4 L 1 1.00	ricles: .es: .es: .a lanes: .follow-t	: up Time 8 T	Calcul 9 R 1.00	ation  10 L  1.00 0.20	Movem 0 0 170 170 2  11 T 1.000 0.20 0.000	12 R 1.00 0.10 0.00
Through  Worksheet 3-Data for Control of Shared In volume, major Shared In volume, major Sat flow rate, major rown Number of major street  Worksheet 4-Critical Control of Sat flow rate, major rown Number of Major street  Worksheet 4-Critical Control of Sat flow rate, major rown Number of Major street  Total Gap Calculating Movement 1  L  t(c,base) t(c,base) t(c,hv) 1.00 P(hv) t(c,g) Percent Grade t(3,lt) t(c,T): 1-stage 0.00 2-stage 0.00	r th vehr r rt veh h vehicl through ap and F on 4 L 1 1.00 4	7.1 1.00 0 0.20 0.00 1.00	::  ### T    1.00    0.20    0.00    1.00     1.00	Calcul 9 R 1.00 0.10 0.00	ation  10 L  1.00 0.20 0.00	Movem 0 0 170 170 2  11 T  1.00 0.20 0.00	12 R 0 1.00 0 0.10 0 0.00
Through  Worksheet 3-Data for Company of the state of the	r th vehr r rt veh h vehicl through ap and F on 4 L 1 1.00 4	7.1 1.00 0 0.20 0.00 0.70 0.00	:  2p Time  8 T  1.00  0.20  0.00  0.00	Calcul 9 R 1.00 0.10 0.00	ation  10 L  1.00 0.20 0.00 0.00	Movem 0 0 170 170 2  11 T  1.00 0.20 0.00	12 R 0 1.00 0 0.10 0 0.00
Through  Worksheet 3-Data for Control of Shared In volume, major shared In volume, major sat flow rate, major rown Number of major street  Worksheet 4-Critical Good of Shared In volume, major street  Worksheet 4-Critical Good of Shared In volume, major street  Worksheet 4-Critical Good of Shared In volume, major street  The street In the shared In th	r th vehr r rt veh h vehicl t vehicl through ap and H on 4.1 1.00 4	7.1 1.00 0 0.20 0.00 1.00	:  2p Time  8 T  1.00  0.20  0.00  0.00	Calcul 9 R 1.00 0.10 0.00	ation  10 L  1.00 0.20 0.00 0.00	Movem 0 0 170 170 2  11 T  1.00 0.20 0.00	12 R 0 1.00 0 0.10 0 0.00
Through  Worksheet 3-Data for Control of Shared In volume, major shared In volume, major start flow rate, major rough flow for street worksheet 4-Critical Government In the street street flow for street street flow flow flow flow flow flow flow flow	r th vehr r rt veh h vehicl t vehicl through ap and H on 4.1 1.00 4	7.1 1.00 0 0.20 0.00 1.00	:  2p Time  8 T  1.00  0.20  0.00  0.00	Calcul 9 R 1.00 0.10 0.00	ation  10 L  1.00 0.20 0.00 0.00	Movem 0 0 170 170 2  11 T  1.00 0.20 0.00	12 R 0 1.00 0 0.10 0 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(1,prot) V(t) V(1,prot)
alpha
beta
Travel time, t(a) (sec)
Smoothing Factor, F
Proportion of conflicting flow, f
Max platooned flow, V(c,max)
Min platooned flow, V(c,min)
Duration of blocked period, t(p)
                                                   0.000
                                                                       0.000
Proportion time blocked, p
Computation 3-Platoon Event Periods
                                            Result
p(2)
                                            0.000
p(5)
                                            0.000
p(dom)
p(subo)
Constrained or unconstrained?
Proportion
unblocked
                              (1)
                                                (2)
                                                                  (3)
for minor
                         Single-stage
                                                 Two-Stage Process
movements, p(x)
                            Process
                                            Stage I
                                                              Stage II
p(1)
p(4)
p(7)
p(8)
p(9)
p(10)
p(11)
p(12)
Computation 4 and 5
Single-Stage Process
                                          7
                                                               10
                                                                                12
Movement
                           1
                                  4
                                                  8
                                                                      11
                           L
                                                  Т
                                                          R
                                                                         Т
                                                                                 R
                                  L
                                          L
                                                                 L
V c,x
                                         556
s
Рx
V c,u,x
C r,x
C plat,x
Two-Stage Process
                                                          10
               Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage2
\overline{\mathbb{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	5	1 00	1 00
Probability of Queue	TIGE 21.	1.00	1.00
Step 2: LT from Major	s St.	4	1
Conflicting Flows		0	
Potential Capacity		1610	
Pedestrian Impedance	Factor	1.00	1.00
Movement Capacity		1610	
Probability of Queue		0.98	1.00
Maj L-Shared Prob Q 1	free St.	0.98	
Step 3: TH from Minor	St.	8	11
Conflicting Flows			
Potential Capacity			
Pedestrian Impedance		1.00	1.00
Cap. Adj. factor due	to Impeding mvmnt	0.98	0.98
Movement Capacity Probability of Queue	free St.	1.00	1.00
Step 4: LT from Minor	s St.	7	10
Conflicting Flows		556	
Potential Capacity		496	
Pedestrian Impedance	Factor	1.00	1.00
Maj. L, Min T Impedar	nce factor		0.98
Maj. L, Min T Adj. Ir			0.98
Cap. Adj. factor due	to Impeding mvmnt	0.98	0.98
Movement Capacity		486	
Worksheet 7-Computation	ion of the Effect of T	'wo-stage Gan Acco	entance
Step 3: TH from Minor	s St.	8	11
Part 1 - First Stage			
Conflicting Flows			
Potential Capacity Pedestrian Impedance	Factor		
Cap. Adj. factor due			
Movement Capacity	co impeding monnie		
Probability of Queue	free St.		
	9		
Conflicting Flows	=		
Conflicting Flows Potential Capacity			
Conflicting Flows Potential Capacity Pedestrian Impedance	Factor		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due	Factor		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity	Factor to Impeding mvmnt		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Part 3 - Single Stage	Factor to Impeding mvmnt		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows	Factor to Impeding mvmnt		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity	Factor to Impeding mvmnt	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance	Factor to Impeding mvmnt  Factor	1.00 0.98	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due	Factor to Impeding mvmnt  Factor	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity	Factor to Impeding mvmnt  Factor to Impeding mvmnt		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage pages	Factor to Impeding mvmnt  Factor to Impeding mvmnt		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage pra	Factor to Impeding mvmnt  Factor to Impeding mvmnt		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage products Adj.	Factor to Impeding mvmnt  Factor to Impeding mvmnt		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage process Of the Capacity Result for 2 stage process Of the Capacity Result for 2 stage process Of the Capacity Result for 2 stage process Of the Capacity	Factor to Impeding mvmnt  Factor to Impeding mvmnt cocess:		
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage practice Ty C t Probability of Queue	Factor to Impeding mvmnt  Factor to Impeding mvmnt  roccess:	0.98	0.98
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage pra a y C t Probability of Queue  Step 4: LT from Minor	Factor to Impeding mvmnt  Factor to Impeding mvmnt  roccess:	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage properties Agy C t Probability of Queue  Step 4: LT from Minor Part 1 - First Stage	Factor to Impeding mvmnt  Factor to Impeding mvmnt  roccess:	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage pra a y C t Probability of Queue  Step 4: LT from Minor Part 1 - First Stage Conflicting Flows	Factor to Impeding mvmnt  Factor to Impeding mvmnt  roccess:	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage pra a y C t Probability of Queue  Step 4: LT from Minor Part 1 - First Stage Conflicting Flows Potential Capacity	Factor to Impeding mvmnt  Factor to Impeding mvmnt  roccess:  free St.	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage practice Ty C t Probability of Queue  Step 4: LT from Minor Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance	Factor to Impeding mvmnt  Factor to Impeding mvmnt  cocess:  free St.  Factor	1.00	1.00
Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Result for 2 stage pra a y C t Probability of Queue  Step 4: LT from Minor Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due	Factor to Impeding mvmnt  Factor to Impeding mvmnt  cocess:  free St.  Factor	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage proceed to the component of the component	Factor to Impeding mvmnt  Factor to Impeding mvmnt  Focess:  free St.  r St.  Factor to Impeding mvmnt	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage pra y C t Probability of Queue  Step 4: LT from Minor Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Part 2 - Second Stage	Factor to Impeding mvmnt  Factor to Impeding mvmnt  Focess:  free St.  r St.  Factor to Impeding mvmnt	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage practice Cap. Adj. factor due Movement For 2 stage practice Cap. Adj. factor due Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Part 2 - Second Stage Conflicting Flows	Factor to Impeding mvmnt  Factor to Impeding mvmnt  Focess:  free St.  r St.  Factor to Impeding mvmnt	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Result for 2 stage properties Cap. Adj. factor due Movement Capacity  Result for 2 stage properties Cap. Adj. factor due Capacity Probability of Queue  Step 4: LT from Minor Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity	Factor to Impeding mvmnt  Factor to Impeding mvmnt  Factor to St.  Factor to Impeding mvmnt	1.00	1.00
Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity  Result for 2 stage practical action of the probability of Queue  Step 4: LT from Minor Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity	Factor to Impeding mvmnt  Factor to Impeding mvmnt  Factor to Impeding mvmnt  Factor to Impeding mvmnt	1.00	1.00

Part 3 - Single Stag	je						
Conflicting Flows				556			
Potential Capacity				496			
Pedestrian Impedance	Factor			1.00		1.00	
Maj. L, Min T Impeda	nce factor					0.98	
Maj. L, Min T Adj. I	mp Factor.					0.98	
Cap. Adj. factor due		g mvmnt		0.98		0.98	
Movement Capacity	<u>.</u>	-		486			
Results for Two-stag	nrocess:						
a	e process.						
У							
C t				486			
Worksheet 8-Shared I	ano Calculat	tions					
					1.0	1.1	1.0
Movement		7 L	8 T	9 R	10 L	11 T	12 R
		ш	Τ.	I.	ш	Ţ	Γ.
Volume (vph)		2					
Movement Capacity (v	rph)	486					
Shared Lane Capacity	-						
	· · · · ·						
Worksheet 9-Computat	ion of Effe	ct of Flare	ed Min	or Stree	t Appro	oaches	
Movement		7	8	9	10	11	12
		L	Т	R	L	Т	R
C sep		486					
Volume		2					
Delay							
Q sep							
_							
Q sep +1							
round (Qsep +1)							
n max							
C sh							
SUM C sep							
n							
C act							
Worksheet 10-Delay,	Queue Lengtl	h, and Leve	el of	Service			
Movement	1 4	7	8	9	10	11	12
Lane Config	LT	L					
v (vph)	32	2					
· ·	1610	486					
C(m) (vph)							
V/C	0.02	0.00					
95% queue length	0.06						
Control Delay	7.3	12.4					
LOS	A	В					
Approach Delay			12.4				
Approach LOS			В				
Worksheet 11-Shared	Major LT Imp	pedance and	d Dela	У			
				Moveme	nt 2	Movem	ent 5
n ( n ÷ )				1 ^			0.0
p(oj)	<u> </u>			1.0	U	0.	98
v(il), Volume for st						0	
v(i2), Volume for st						0	
s(il), Saturation fl	ow rate for	stream 2 o	or 5			170	00
s(i2), Saturation fl						170	
P*(oj)	000 101					0.	
=	+ x a a m 1	1					
d(M,LT), Delay for s						7.3	3
N, Number of major s						2	
d(rank.1) Delay for	stream 2 or	5					

## 1.1.1.14 Interseção G − Pico Tarde

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

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

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

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

Intersection Orientation: EW Study period (hrs): 1.00

Vehicle Volumes and Adjustments

Major Street: Approach	Ea	stboun	d		We:	stbound		
Movement	1	2	3		4	5	6	
	L	T	R		L	T	R	
Volume					35	1969		
Peak-Hour Factor, PHF					0.91	0.91		
Hourly Flow Rate, HFR					38	2163		
Percent Heavy Vehicles					0			
Median Type/Storage	Undiv	rided			/			
RT Channelized?								
Lanes					0	2		
Configuration					L'	гт		
Upstream Signal?		No				No		
Minor Street: Approach	No	rthbou	nd		So1	uthboun	d	
Movement	7	8	9	-	10	11	12	
	L	T	R	İ	L	T	R	
Volume	214							
Peak Hour Factor, PHF	0.91							
Hourly Flow Rate, HFR	235							
Percent Heavy Vehicles	0							
Percent Grade (%)		0				0		
Flared Approach: Exists?	/Storage	;		/	,			/
Lanes	1							
Configuration	I							

		Queue Le	J .			Serv			
Approach	EB	WB	Nor	thbound	į		Sc	outhbour	nd
Movement	1	4	7	8	9		10	11	12
Lane Config		LT	L						
v (vph)		38	235						
C(m) (vph)		1636	214						
v/c		0.02	1.10						
95% queue length		0.07	24.75						
Control Delay		7.3	312.8						
LOS		A	F						
Approach Delay				312.8					
Approach LOS				F					

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

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

Analyst: Progeplan Agency/Co.:

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

DER/DF Jurisdiction:

Units: U. S. Metric

Analysis Year: 202 Project ID: FUTURA SAÚDE 2023 East/West Street: M2-M7+M8-M11+M12-M13
North/South Street: M13

North/South Street: M13
Intersection Orientation: EW Study period (hrs): 1.00

		Vobial	0 770]	maa and	7 dina	tmonto			
Major Street Mov	rements		2	mes and 3	_	4	°	6	
		L	Т	F		L	T	R	
Volume						35	1969		
Peak-Hour Factor	, PHF					.91	0.91		
Peak-15 Minute V					1	.0	541		
Hourly Flow Rate	, HFR				3	8	2163		
Percent Heavy Ve	hicles				(	)			
Median Type/Stor	age	Un	divide	d		/			
RT Channelized?									
Lanes						0	2		
Configuration						LT	T		
Upstream Signal?	)		No				No		
Minor Street Mov	rements	7	8			.0	11	12	
		L	Т	F		L	Т	R	
Volume		214							
Peak Hour Factor	DUE	0.9							
			1						
Peak-15 Minute V Hourly Flow Rate		59 235							
_									
Percent Heavy Ve Percent Grade (%		0	0				0		
Flared Approach:		g2/G+~~				/	U		/
RT Channelized	שמבאנו	J:/ JLUI	aye			/			/
Lanes			1						
Configuration			L						
Confriguracion			ш						
	P	edestri	an Vol	umes an	d Adjı	stment	s		
Movements		1	3	14	15	16			
Flow (ped/hr)		0		0	0	0			
Lane Width (m)		3	. 6	3.6	3.6	3.6			
Walking Speed (m	n/sec)	1	.2	1.2	1.2	1.2			
Percent Blockage		0		0	0	0			
,									
		U	pstrea	m Signa	l Data	1			
	Prog.	U Sat	pstrea Arri	_	l Data	Cycle	Pr	og.	Distance
	Prog. Flow		Arri	val G				og.	Distance to Signal
	_	Sat	Arri	val G e I	reen	Cycle	n Sp	-	
	Flow	Sat Flow	Arri	val G e I	reen ime	Cycle Length	n Sp	eed	to Signal
S2 Left-Turn	Flow	Sat Flow	Arri	val G e I	reen ime	Cycle Length	n Sp	eed	to Signal
S2 Left-Turn Through	Flow	Sat Flow	Arri	val G e I	reen ime	Cycle Length	n Sp	eed	to Signal
Through	Flow	Sat Flow	Arri	val G e I	reen ime	Cycle Length	n Sp	eed	to Signal
Through	Flow	Sat Flow	Arri	val G e I	reen ime	Cycle Length	n Sp	eed	to Signal
Through S5 Left-Turn	Flow	Sat Flow	Arri	val G e I	reen ime	Cycle Length	n Sp	eed	to Signal
Through S5 Left-Turn	Flow	Sat Flow	Arri	val G e I	reen ime	Cycle Length	n Sp	eed	to Signal
Through S5 Left-Turn	Flow vph	Sat Flow vph	Arri Typ	val Ge I	reen ime ec	Cycle Length sec	n Sp	eed ph	to Signal meters
Through S5 Left-Turn Through	Flow vph	Sat Flow vph	Arri Typ	val Ge I	reen ime ec	Cycle Length sec	n Sp k	eed ph eet Ve	to Signal meters
Through S5 Left-Turn Through	Flow vph	Sat Flow vph	Arri Typ	val Ge I	reen ime ec	Cycle Length sec	n Sp k	eed ph	to Signal meters
Through S5 Left-Turn Through  Worksheet 3-Data	Flow vph	Sat Flow vph	Arri Typ	val Ge T	reen ime ec	Cycle Length sec	n Sp k	eed ph  eet Ve	to Signal meters
Through S5 Left-Turn Through Worksheet 3-Data	Flow vph a for Co.	Sat Flow vph	Arri Type Effec	val Ge T s	reen ime ec	Cycle Length sec	n Sp k	eet Veoreneer 0	to Signal meters
Through S5 Left-Turn Through Worksheet 3-Data Shared ln volume Shared ln volume	Flow vph a for Co.	Sat Flow vph	Arri Type Effec icles:	val Ge T s	reen ime ec	Cycle Length sec	n Sp k	eet Veorement	to Signal meters
Through S5 Left-Turn Through Worksheet 3-Data Shared ln volume Shared ln volume Sat flow rate, m	Flow vph a for Co.	Sat Flow vph mputing th veh rt veh vehicl	Arri Typ	val Ge T s	reen ime ec	Cycle Length sec	n Sp k	eet Veovemen	to Signal meters
Through S5 Left-Turn Through Worksheet 3-Data Shared ln volume Shared ln volume	Flow vph a for Co.	Sat Flow vph mputing th veh rt veh vehicl	Arri Typ	val Ge T s	reen ime ec	Cycle Length sec	n Sp k	eet Veorement	to Signal meters
Through S5 Left-Turn Through Worksheet 3-Data Shared in volume Shared in volume Sat flow rate, m	Flow vph  a for Co.  c, major c, major thajor rt	Sat Flow vph  mputing  th veh rt veh vehicl	Arri Typ  Effec  icles: icles: es:	val Ge Ts	reen ime ec	Cycle Length sec	n Sp k	eet Veovemen	to Signal meters
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m	Flow vph  a for Co.  c, major c, major thajor rt	Sat Flow vph  mputing  th veh rt veh vehicl	Arri Typ  Effec  icles: icles: es:	val Ge Ts	reen ime ec	Cycle Length sec	n Sp k	eet Veovemen 0 0 1700 1700	to Signal meters
Through S5 Left-Turn Through  Worksheet 3-Data  Shared in volume Shared in volume Sat flow rate, m Sat flow rate, m Number of major	flow vph a for Co.  e, major e, major the tajor rt street	Sat Flow vph  mputing  th veh rt veh vehicl through	Effec icles: icles: es: es: lanes	val Ge T s	reen ime ec lay to	Cycle Length sec	n Sp k	eet Veovemen 0 0 1700 1700	to Signal meters
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m	flow vph a for Co.  e, major e, major the tajor rt street	Sat Flow vph  mputing  th veh rt veh vehicl through	Effec icles: icles: es: es: lanes	val Ge T s	reen ime ec lay to	Cycle Length sec	n Sp k	eet Veovemen 0 0 1700 1700	to Signal meters
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Number of major Worksheet 4-Crit	flow vph a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.  a for Co.	Sat Flow vph  mputing  th veh rt veh vehicl through	Effec icles: icles: es: es:	val Ge T s	reen ime ec	Cycle Length sec	n Sp k	eet Veovemen 0 0 1700 1700	to Signal meters
Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Number of major  Worksheet 4-Crit  Critical Gap Cal	flow vph  a for Co.  a, major  a, major the street  cical Gal  culatio	Sat Flow vph  mputing  th veh rt veh vehicl through  p and F	Arri Typ  Effec  icles: icles: es: es: lanes	val Ge T s	reen ime ec lay to	Cycle Length sec	n Sp k	eet Veovemen 0 1700 1700 2	to Signal meters  ehicles nt 5
Through S5 Left-Turn Through Worksheet 3-Data Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Number of major Worksheet 4-Crit	Flow vph  a for Container, major that alor rt street  cical Ga  culation	Sat Flow vph  mputing  th veh rt veh vehicl vehicl through  p and F	Effec  icles: icles: es: es: lanes	val Ge T s	reen ime ec lay to Moveme	Cycle Length sec	n Sp k	eet Veovemen 0 0 1700 1700 2	to Signal meters  ehicles nt 5
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Through S5 Left-Turn Through  Worksheet 3-Data  Shared ln volume 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,bay) P(hv) t(c,g) Percent Grade	flow vph  a for Co.  a, major  a, major the contained the	Sat Flow Vph  The veh rt veh vehicl vehicl through  A L  4.1 1.00 0	Effecticles: icles: icles: icles: lanes follow-  7 L  7.1 1.00 0 0.20 0.00	val Ge T s	reen ime ec lay to Moveme	Cycle Length sec  D Major Part 2  Colonial Colon	n Sp k	eet Veovemen 0 0 1700 1700 2 11 T	to Signal meters  ehicles nt 5
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Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In volume Sat flow rate, m Sat flow rate, m Output Sat flow rate, m Sat flow rate, m Output Sat flow rate, m Sat flow rat	Flow vph  a for Co.  a, major  a, major the street  cical Ga  culation  1  L  1.00	mputing  th veh rt veh vehicl through  p and F  1.00 0 0.00 0.00 0.00 0.00	Effec  icles: icles: icles: es: es: lanes  ollow-  7 L  7.1 1.00 0 0.20 0.00 0.70 0.00 1.00	val Ge T s	lay to Moveme  Calcu  9 R  1.00 0.10 0.00	Cycle Length sec	n Sp k	eet Veovement	to Signal meters  ehicles nt 5  12 R  1.00 0.10 0.00
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Through S5 Left-Turn Through  Worksheet 3-Data  Shared In volume Shared In 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	Flow vph  a for Co.  a	mputing  th veh rt veh vehicl through  p and F  1.00 0 0.00 0.00 0.00 0.00	Effec  icles: icles: icles: es: es: lanes  ollow-  7 L  7.1 1.00 0 0.20 0.00 0.70 0.00 1.00	val Ge T s s s s s s s s s s s s s s s s s s	reen ime ec lay to Moveme 2 lay to 0.100.00000000000000000000000000000000	Cycle Length sec	n Sp k	eet Veovemen 0 0 1700 1700 2 11 T 1.00 0.20 0.00 0.00	to Signal meters  ehicles nt 5  12 R  1.00 0.10 0.00 0.00

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Follow-Up Time Calculations
                                               9
                                                     10
                                                                   12
Movement
                  1
                         4
                                        8
                                                            11
                  L
                         L
                                 L
                                               R
                                                             Τ
                                                                    R
                                3.50
t(f,base)
                        2.20
t(f,HV)
                 0.90
                        0.90
                                0.90
                                       0.90
                                              0.90
                                                     0.90
                                                            0.90
                                                                   0.90
P(HV)
                        0
                                0
t(f)
                        2.2
                                3.5
Worksheet 5-Effect of Upstream Signals
Computation 1-Queue Clearance Time at Upstream Signal
                                             Movement 2
                                                               Movement 5
                                          V(t)
                                                V(l,prot) V(t)
                                                                  V(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)
                                                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
unblocked
                                            (2)
                            (1)
                                                            (3)
for minor
                                             Two-Stage Process
                       Single-stage
movements, p(x)
                         Process
                                         Stage I
                                                         Stage II
p(1)
p(4)
p(7)
p(8)
p(9)
p(10)
p(11)
p(12)
Computation 4 and 5
Single-Stage Process
                                       7
                        1
                                4
                                              8
                                                     9
                                                           10
                                                                  11
                                                                          12
Movement
                        L
                                L
                                       L
                                              Τ
                                                     R
                                                            L
                                                                   Т
                                                                           R
V c,x
                                      1157
                              0
Px
V c,u,x
Cr,x
C plat,x
Two-Stage Process
                                      8
                                                     10
              Stage1 Stage2 Stage1 Stage2 Stage1 Stage2 Stage1 Stage2
V(c,x)
                      3000
```

Orksheet 6-Impedance and Capacity Equation	ns	
tep 1: RT from Minor St.	9	12
Conflicting Flows		
otential Capacity	1 00	1 00
edestrian Impedance Factor Novement Capacity	1.00	1.00
robability of Queue free St.	1.00	1.00
tep 2: LT from Major St.	4	1
onflicting Flows	0	
otential Capacity	1636	
edestrian Impedance Factor	1.00	1.00
ovement Capacity	1636	1 00
robability of Queue free St.	0.98	1.00
aj L-Shared Prob Q free St.	0.98	
tep 3: TH from Minor St.	8	11
onflicting Flows otential Capacity		
edestrian Impedance Factor	1.00	1.00
ap. Adj. factor due to Impeding mvmnt	0.98	0.98
ovement Capacity	J.J.	0.50
robability of Queue free St.	1.00	1.00
tep 4: LT from Minor St.	7	10
onflicting Flows	1157	
otential Capacity	219	
edestrian Impedance Factor	1.00	1.00
aj. L, Min T Impedance factor		0.98
		0.98
ap. Adj. factor due to Impeding mvmnt	0.98 214	0.98
laj. L, Min T Adj. Imp Factor. ap. Adj. factor due to Impeding mvmnt lovement Capacity	0.98 214	
ap. Adj. factor due to Impeding mvmnt ovement Capacity	214	0.98
ap. Adj. factor due to Impeding mvmnt	214	0.98
Pap. Adj. factor due to Impeding mvmnt lovement Capacity  Forksheet 7-Computation of the Effect of Twitten 3: TH from Minor St.  Fart 1 - First Stage	214 wo-stage Gap Acce	0.98
Tap. Adj. factor due to Impeding mvmnt dovement Capacity  Torksheet 7-Computation of the Effect of Twittep 3: TH from Minor St.  Tart 1 - First Stage donflicting Flows dotential Capacity	214 wo-stage Gap Acce	0.98
ap. Adj. factor due to Impeding mvmnt ovement Capacity  orksheet 7-Computation of the Effect of Tw  tep 3: TH from Minor St.  art 1 - First Stage onflicting Flows otential Capacity edestrian Impedance Factor	214 wo-stage Gap Acce	0.98
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ap. Adj. factor due to Impeding mvmnt ovement Capacity  orksheet 7-Computation of the Effect of Tw  tep 3: TH from Minor St.  art 1 - First Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity robability of Queue free St.  art 2 - Second Stage onflicting Flows	214 wo-stage Gap Acce	0.98
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ap. Adj. factor due to Impeding mvmnt ovement Capacity  orksheet 7-Computation of the Effect of Tw  tep 3: TH from Minor St.  art 1 - First Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity robability of Queue free St.  art 2 - Second Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity esult for 2 stage process:	214 vo-stage Gap Acce 8	0.98 eptance 11
ap. Adj. factor due to Impeding mvmnt ovement Capacity  orksheet 7-Computation of the Effect of Tw  tep 3: TH from Minor St.  art 1 - First Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity robability of Queue free St.  art 2 - Second Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity  art 3 - Single Stage onflicting Flows otential Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity edestrian Impedance Factor ap. Adj. factor due to Impeding mvmnt ovement Capacity esult for 2 stage process:	214 vo-stage Gap Acce 8	0.98 eptance 11
ap. Adj. factor due to Impeding mvmnt ovement Capacity  proksheet 7-Computation of the Effect of Tw  tep 3: TH from Minor St.  art 1 - First Stage  onflicting Flows  otential Capacity  edestrian Impedance Factor  ap. Adj. factor due to Impeding mvmnt  ovement Capacity  robability of Queue free St.  art 2 - Second Stage  onflicting Flows  otential Capacity  edestrian Impedance Factor  ap. Adj. factor due to Impeding mvmnt  ovement Capacity  edestrian Impedance Factor  ap. Adj. factor due to Impeding mvmnt  ovement Capacity  eart 3 - Single Stage  onflicting Flows  otential Capacity  edestrian Impedance Factor  ap. Adj. factor due to Impeding mvmnt  ovement Capacity  edestrian Impedance Factor  ap. Adj. factor due to Impeding mvmnt  ovement Capacity  esult for 2 stage process:	214 vo-stage Gap Acce 8	0.98 eptance 11 1.00 0.98

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

Movement Capacity							
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Fac	tor						
Cap. Adj. factor due to Movement Capacity		mvmnt					
Part 3 - Single Stage Conflicting Flows				1157 219			
Potential Capacity Pedestrian Impedance Fac Maj. L, Min T Impedance Maj. L, Min T Adj. Imp F	factor			1.00		1.00 0.98 0.98	3
Cap. Adj. factor due to Movement Capacity		mvmnt		0.98 214		0.98	
Results for Two-stage pr	ocess:						
y C t				214			
Worksheet 8-Shared Lane	Calculati	ons					
Movement		7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vp	h)	235 214					
Worksheet 9-Computation	of Effect	of Fla	red Mi	nor Stree	et 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)		214 235					
n max C sh SUM C sep n C act							
Worksheet 10-Delay, Queu	e Length,	and Lev	vel of	Service			
Movement 1 Lane Config	4 LT	7 L	8	9	10	11	12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS	38 1636 0.02 0.07 7.3 A	235 214 1.10 24.75 312.8 F					
Approach Delay Approach LOS			312.8 F				
Worksheet 11-Shared Majo	r LT Impe	dance a	nd Del	ay			

## 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

#### 1.1.1.15 Interseção H – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

\_TWO-WAY STOP CONTROL SUMMARY\_

Analyst: Progeplan Agency/Co.: 05/06/2023 Date Performed: Analysis Time Period: Pico Manha Intersection: Η DER/DF  ${\tt Jurisdiction:}$ 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): 1.00

			mes and	Adjus	tme	nts_			
Major Street:			tbound				Westbound		
	Movement	1	2	3		4	5	6	
		L	T	R		L	T	R	
** 3		1	1769						
Volume		-							
Peak-Hour Fact	•	0.91							
Hourly Flow Ra		1	1943						
Percent Heavy	Vehicles	0							
Median Type/St	orage	Undivi	.ded			/			
RT Channelized	?								
Lanes		0	2						
Configuration		LT	' T						
Upstream Signa	1?		No				No		
of									
Minor Street:	Approach	Nor	thbound				Southbound	1	
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume						30			
Peak Hour Fact	or, PHF					0.9	91		
Hourly Flow Ra	te, HFR					32			
Percent Heavy						4			
Percent Grade			0				0		
Flared Approac	. ,	torage	-		/		-		/
Lanes	HAISCS./C	rcorage			,		1		/
Configuration							L		
CONTINUE							ш		

Approach	_Delay, EB	Queue WB	Le	ngt		d Leve		Ser		uthboun	d
Movement	1	4		7	8	3	9		10	11	12
Lane Config	LT							-	L		
v (vph)	1		_						32		
C(m) (vph)	1636								277		
v/c	0.00								0.12		
95% queue length	0.00								0.39		
Control Delay	7.2								19.7		
LOS	A								С		
Approach Delay										19.7	
Approach LOS										С	

HCS+: Unsignalized Intersections Release 5.6

Phone: Fax: E-Mail:

Analyst: Progeplan

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

Intersection: Н DER/DF Jurisdiction:

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

2023

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

East/West Street: North/South Street: M14

Critical Gap Calculation

Movement

t(c,base)

1 L

4.1

L

					1	hrs):	1.00
		Volumes	_				
Major Street Movements	1	2	3	4	5	6	
	L	Т	R	L	Т	R	
Volume	1	1769					
Peak-Hour Factor, PHF	0.91	0.91					
Peak-15 Minute Volume	0	486					
Hourly Flow Rate, HFR	1	1943					
Percent Heavy Vehicles	0						
Median Type/Storage RT Channelized?	Undi	vided		/			
Lanes	0	2					
Configuration	I	T T					
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	T	R	
Volume				30			
Volume Peak Hour Factor, PHF				0.91			
Peak-15 Minute Volume				8			
Hourly Flow Rate, HFR				32			
Percent Heavy Vehicles				4			
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storaç	re		/			/
RT Channelized							
Lanes				1			
Configuration				L			
P Movements	edestrian 13	Volumes	and Ac	ljustmen 16	ts		
-10 v Cinciles	10	14	10	10			
Flow (ped/hr)	0	0	0	0			
Lane Width (m)	3.6		3.6	3.6			
Walking Speed (m/sec)	1.2		1.2	1.2			
Percent Blockage	0	0	0	0			
	 gaU	tream Si	gnal Da				
Prog.	Sat	Arrival	Green		Pr	og.	Distance
Flow	Flow	Type	Time	Lengtl		eed	to Signal
vph	vph		sec	sec	k	ph	meters
S2 Left-Turn							
Through							
Through							
Through S5 Left-Turn							
Through S5 Left-Turn Through	mouting	ffect of	Delay	to Majo	r Str		
Through S5 Left-Turn Through	mputing E	ffect of	Delay	to Majo:	r Str	reet Ve	ehicles
Through S5 Left-Turn Through	mputing E	iffect of		to Majo		reet Ve	
Through S5 Left-Turn Through  Worksheet 3-Data for Co			Move				
Through S5 Left-Turn Through Worksheet 3-Data for Co	th vehic	:les:	Move 0				
Through S5 Left-Turn Through Worksheet 3-Data for Co Shared ln volume, major Shared ln volume, major	th vehic	:les:	Move 0 0	ement 2			
Through S5 Left-Turn Through  Worksheet 3-Data for Co  Shared ln volume, major Shared ln volume, major Sat flow rate, major th	th vehic rt vehic vehicles	:les:	0 0 17				
Through S5 Left-Turn Through  Worksheet 3-Data for Co  Shared ln volume, major Shared ln volume, major Sat flow rate, major th Sat flow rate, major rt	th vehic rt vehic vehicles vehicles	eles:	0 0 17	ement 2			
Through S5 Left-Turn Through Worksheet 3-Data for Co Shared ln volume, major Shared ln volume, major	th vehic rt vehic vehicles vehicles	eles:	Move 0 0 17	ement 2			

9

R

Т

10

L

7.1

11

Τ

12

R

	1.00	1.00	1.00	1 00	1 00	1 00	1 00	1 0/	)
· · ·	)		1.00	1.00	1.00	1.00	1.00	1.00	
(c,g)	-		0.20	0.20	0.10	0.20	0.20	0.10	
	0.00		0.00	0.00	0.00	0.00 0.70	0.00	0.00	)
(c,T): 1-stage ( 2-stage (		0.00	0.00	0.00	0.00	0.00	0.00	0.00	
(c) 1-stage 4 2-stage						6.4			
ollow-Up Time Cal	lculat	ions 4	7	8	9	10	11	12	
ovement	L	L	L	T	R	L	Т	R	
	2.20	0.90	0.90	0.90	0.90	3.50	0.90	0.90	
P(HV)	)	0.50	0.50	0.50	0.50	4	0.50	0.50	,
(f) 2	2.2					3.5			
Worksheet 5-Effect	t of U	Jpstrea	m Signa	ls					
Computation 1-Que	ue Cle	arance	Time a	t Upstr	eam Sig		Mo	vement	 : 5
				V (1		l,prot)		V(1,	
Total Saturation Farrival Type Effective Green, G Cycle Length, C (s Rp (from Exhibit 1 Proportion vehicle G(q1) G(q2)	g (sec sec) 16-11)	:)		n P					
(d)									
			MCC Total	ersection	on Time	block	ed		
Computation 2-Prop	portic	on of T	WSC IIIC	0100001			Mo	vizaman t	- 5
Computation 2-Propage alpha poeta			WSC 11116	V (	Moveme			vement V(1,	
alpha Deta Fravel time, t(a) Emoothing Factor, Proportion of conf Max platooned flow Ouration of blocke	(sec) F flicti w, V(c w, V(c	ng flo	w, f		Moveme	nt 2 1,prot)	V(t)		
alpha Deta Fravel time, t(a) Smoothing Factor, Proportion of conf Max platooned flow Ouration of blocke Proportion time bl	(sec) F flicti w, V(cook, V(cook)	ng flo c,max) c,min) ciod, t	w, f		Movemet) V(	nt 2 1,prot)	V(t)	V(1,	
alpha Deta Fravel time, t(a) Emoothing Factor, Proportion of conf Max platooned flow Duration of blocke Proportion time bl Computation 3-Plat	(sec) F flicti w, V(cook, V(cook)	ng flo c,max) c,min) ciod, t	w, f	Rest	Movemet) V(	nt 2 1,prot)	V(t)	V(1,	
alpha Deta Fravel time, t(a) Emoothing Factor, Proportion of confidax platooned flow Min platooned flow Duration of blocke Proportion time bl Computation 3-Plat De(2) De(dom)	(sec) F flicti w, V(cook, V(cook)	ng flo c,max) c,min) ciod, t	w, f	V (	Movemet) V(	nt 2 1,prot)	V(t)	V(1,	
alpha  Deta  Fravel time, t(a)  Smoothing Factor,  Proportion of conf Max platooned flow  Ouration of blocke  Proportion time bl  Computation 3-Plat  D(2)  D(5)  D(dom)  D(subo)	(sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	ng flo ,max) ,min) iod, t i, p	w, f	Rest	Movemet) V(	nt 2 1,prot)	V(t)	V(1,	
alpha Deta Fravel time, t(a) Smoothing Factor, Proportion of conf Max platooned flow Ouration of blocke Proportion time bl Computation 3-Plat Do(2) Do(5) Do(60m) Do(subo) Constrained or und	(sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	ing flo (,max) (,min) (riod, t d, p	w, f (p) eriods	Rest 0.00 0.00	Moveme t) V( 0.00	nt 2 1,prot)	V(t)	V(1,	
alpha Deta Pravel time, t(a) Emoothing Factor, Proportion of confidax platooned flow Min platooned flow Duration of blocke Proportion time bl Computation 3-Plat D(2) D(5) D(dom) D(subo) Constrained or und Proportion Inblocked For minor	(sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	.ng flo .,max) .,min) .iod, t d, p	w, f (p) eriods ) -stage	Rest 0.00 0.00	Moveme t) V( 0.00 ult 00 00	nt 2 1,prot)	V(t)	V(1,	
alpha peta Fravel time, t(a) Emoothing Factor, Proportion of conf dax platooned flow Min platooned flow Duration of blocke Proportion time bl Computation 3-Plat D(2) D(5) D(dom) D(subo) Constrained or und Proportion Inblocked For minor	(sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	.ng flo c,max) c,min) ciod, t d, p Event P	w, f (p) eriods ) -stage	Rest	Moveme t) V( 0.00 ult 00 00	nt 2 1,prot)	V(t)	0.000	
alpha peta Fravel time, t(a) Smoothing Factor, Proportion of conf Max platoned flow Ouration of blocke Proportion time bl Computation 3-Plat  0(2) 0(5) 0(dom) 0(subo) Constrained or und Proportion Inblocked For minor Involvements, p(x)	(sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	.ng flo .,max) .,min) .iod, t d, p	w, f (p) eriods ) -stage	Rest	Moveme t) V( 0.00 ult 00 00 (2) Two-St	nt 2 1,prot)	(3)	0.000	
alpha Deta Fravel time, t(a) Emoothing Factor, Proportion of conf Max platooned flow Ouration of blocke Proportion time bl Computation 3-Plat Do(2) Do(5) Do(dom) Do(subo) Constrained or und Proportion Inblocked For minor Involvements, p(x) Do(1) Do(4) Do(7)	(sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	.ng flo .,max) .,min) .iod, t d, p	w, f (p) eriods ) -stage	Rest	Moveme t) V( 0.00 ult 00 00 (2) Two-St	nt 2 1,prot)	(3)	0.000	
alpha peta Pravel time, t(a) Emoothing Factor, Proportion of conf dax platoned flow Min platoned flow Duration of blocke Proportion time bl Computation 3-Plat  0(2) 0(5) 0(dom) 0(subo) Constrained or und Proportion Inblocked For minor Involved For minor Involved I	(sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	.ng flo .,max) .,min) .iod, t d, p	w, f (p) eriods ) -stage	Rest	Moveme t) V( 0.00 ult 00 00 (2) Two-St	nt 2 1,prot)	(3)	0.000	
alpha  peta Pravel time, t(a) Emoothing Factor, Proportion of conf dax platooned flow Min platooned flow Ouration of blocke Proportion time bl  Computation 3-Plat  (2) (5) (dom) (subo) Constrained or und Proportion Inblocked For minor Involved (sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	.ng flo .,max) .,min) .iod, t d, p	w, f (p) eriods ) -stage	Rest	Moveme t) V( 0.00 ult 00 00 (2) Two-St	nt 2 1,prot)	(3)	0.000		
alpha Deta Pravel time, t(a) Emoothing Factor, Proportion of confidence of the confi	(sec) F flicti W, V(cook W, V(cook Cook Cook Cook Cook Cook Cook Cook	.ng flo .,max) .,min) .iod, t d, p	w, f (p) eriods ) -stage	Rest	Moveme t) V( 0.00 ult 00 00 (2) Two-St	nt 2 1,prot)	(3)	0.000	
alpha Deta Pravel time, t(a) Emoothing Factor, Proportion of confidex platoened flow Duration of blocke Proportion time bl Computation 3-Plat De(2) De(5) De(dom) De(subo) Constrained or und Proportion Unblocked for minor Unblo	(sec) F flicti W, V(cook N, V(cook Toon F	.ng flo .,max) .,min) .iod, t d, p	w, f (p) eriods ) -stage	Rest	Moveme t) V( 0.00 ult 00 00 (2) Two-St	nt 2 1,prot)	(3)	0.000	
alpha Deta Fravel time, t(a) Smoothing Factor, Proportion of conf Max platooned flow Duration of blocke Proportion time bl Computation 3-Plat  Details	(sec) F flicti W, V(cook N, V(cook Toon F	ng flo (,max) (,min) (,iod, t ) (,p  Event P  (1 Single Proc	w, f (p) eriods ) -stage	Resi 0.00 0.00	Movement) V(  0.00  ult  00  00  (2)  Two-St.ge I	nt 2 1,prot)	(3) cess tage II	0.000	prot)
alpha Deta Pravel time, t(a) Emoothing Factor, Proportion of confidax platooned flow Min platooned flow Ouration of blocke Proportion time bl  Computation 3-Plat  D(2) D(5) D(dom) D(subo) Constrained or und  Proportion Inblocked for minor Invested More (1) D(4) D(7) D(8) D(9) D(10) D(11) D(12) Computation 4 and Gingle-Stage Proces	(sec) F flicti W, V(cook N, V(cook Toon F	.ng flo .,max) .,min) .iod, t d, p	w, f (p) eriods ) -stage	Rest	Moveme t) V( 0.00 ult 00 00 (2) Two-St	nt 2 1,prot)	(3)	0.000	
alpha Deta Pravel time, t(a) Emoothing Factor, Proportion of confidex platoened flow Duration of blocke Proportion time bl Computation 3-Plat De(2) De(5) De(dom) De(subo) Constrained or und Proportion Unblocked for minor Unblo	(sec) F flicti W, V(cook N, V(cook Toon F	ng flo (,max) (,min) (iod, t ) (vent P  Cained? (1 Single Proc	w, f (p) eriods )-stage ess	Resi 0.00 0.00 Stag	Moveme t) V(  0.00  ult  000  (2)  Two-St ge I	nt 2 1,prot)	(3) cess tage II	0.000	prot)
Alpha Deta Pravel time, t(a) Emoothing Factor, Proportion of confidex platooned flow Muration of blocke Proportion time bl Computation 3-Plat D(2) D(5) D(dom) D(subo) Constrained or unce Proportion Emblocked For minor Emblocke	(sec) F flicti W, V(cook N, V(cook Toon F	.ng flo c,max) c,min) ciod, t d, p Event P Single Proc	w, f (p) eriods )-stage ess	Resi 0.00 0.00 Stag	Moveme t) V(  0.00  ult  000  (2)  Two-St ge I	nt 2 1,prot)	(3) cess tage II	0.000	prot)

Cr,x C plat,x Two-Stage Process 8 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. 12 Conflicting Flows Potential Capacity 1.00 1.00 Pedestrian Impedance Factor Movement Capacity 1.00 1.00 Probability of Queue free St. Step 2: LT from Major St. 4 1 Conflicting Flows 0 1636 Potential Capacity 1.00 Pedestrian Impedance Factor 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 Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Cap. Adj. factor due to Impeding mvmnt 1.00 1.00 Movement Capacity Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 10 Conflicting Flows 973 Potential Capacity 277 Pedestrian Impedance Factor 1.00 1.00 Maj. L, Min T Impedance factor 1.00 Maj. L, Min T Adj. Imp Factor.
Cap. Adj. factor due to Impeding mymnt 1.00 1.00 1.00 Movement Capacity 277 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 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:
У
С t
                                                    1.00
Probability of Queue free St.
                                                                       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 mymnt
Movement Capacity
Part 3 - Single Stage
Conflicting Flows
                                                                       973
                                                                       277
Potential Capacity
                                                    1.00
                                                                       1.00
Pedestrian Impedance Factor
\operatorname{Maj.} L, \operatorname{Min} T Impedance factor
                                                    1.00
Maj. L, Min T Adj. Imp Factor.
Cap. Adj. factor due to Impeding mymnt
                                                    1.00
                                                                       1.00
                                                    1.00
Movement Capacity
                                                                       277
Results for Two-stage process:
а
У
С t
                                                                       277
Worksheet 8-Shared Lane Calculations
Movement
                                                 8
                                                         9
                                                                10
                                                                       11
                                                                               12
                                          L
                                                 Т
                                                         R
                                                                L
                                                                        Т
                                                                                R
Volume (vph)
                                                                32
Movement Capacity (vph)
                                                               277
Shared Lane Capacity (vph)
Worksheet 9-Computation of Effect of Flared Minor Street Approaches
Movement
                                                                       11
                                                                               12
                                                 Т
                                                         R
                                                                        Т
                                          L
                                                                L
                                                                                R
C sep
                                                               277
                                                               32
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
                                              8
                                                     9
Movement
                              4
                                                             10
                                                                     11
                                                                            12
                       1
Lane Config
                       LT
                                                              L
                                                             32
v (vph)
                                                             277
                      1636
C(m) (vph)
                      0.00
                                                             0.12
95% queue length
                      0.00
                                                             0.39
Control Delay
                      7.2
                                                             19.7
LOS
                       Α
                                                              С
Approach Delay
                                                                     19.7
Approach LOS
```

	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		

## 1.1.1.16 Interseção H — Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY\_\_\_

Analyst: Progeplan

Agency/Co.:

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

Intersection: Jurisdiction:

DER/DF Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: M01-

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

North/South Street: M14

Peak-Hour Factor, PHF         0.91         0.91           Hourly Flow Rate, HFR         6         998           Percent Heavy Vehicles         0              Median Type/Storage         Undivided         /         /         RT Channelized?           Lanes         0         2         Configuration         LT T         No         No           Upstream Signal?         No         No         No         No         No           Minor Street:         Approach         Northbound         Southbound         Southbound           Movement         7         8         9           10         11         12           L         T         R           L         T         R           Volume         35         38         Percent Heavy Vehicles         0         0         1           Percent Grade (%)         0         0         0         0         0         Flared Approach:         Exists?/Storage         /         /         /         /         /           Lanes         1         1         2         Delay, Queue Length, and Level of Service         Approach         Approach         EB         WB         Northbound	Intersection (	Orientation:	EW		5	Study	perio	d (hrs)	: 1.00	
Major Street:         Approach Movement         Eastbound 1 2 3   4 5 6 6   6   1 T R         Westbound 5 6   6   6   1 T R           Volume Peak-Hour Factor, PHF Hourly Flow Rate, HFR 6 998 Percent Heavy Vehicles 0 Median Type/Storage Undivided / RT Channelized?         0 2		** 1			1 7 1'					
Movement   1	M					ıstmen		- 1- 1		
L T R   L T R   L T R   Volume   6 909   998	Major Street:									
Volume Peak-Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles O Median Type/Storage Undivided RT Channelized? Lanes O 2 Configuration Upstream Signal? No No  Minor Street: Approach Movement ROUPH Movement ROUPH Movement ROUPH		Movement			-	,	-	-	-	
Peak-Hour Factor, PHF         0.91         0.91           Hourly Flow Rate, HFR         6         998           Percent Heavy Vehicles         0              Median Type/Storage         Undivided         /         /         RT Channelized?           Lanes         0         2         Configuration         LT T         No         No           Upstream Signal?         No         No         No         No         No           Minor Street:         Approach         Northbound         Southbound         Southbound           Movement         7         8         9           10         11         12           L         T         R           L         T         R           Volume         35         38         Percent Heavy Vehicles         0         0         1           Percent Grade (%)         0         0         0         0         0         Flared Approach:         Exists?/Storage         /         /         /         /         /           Lanes         1         1         2         Delay, Queue Length, and Level of Service         Approach         Approach         EB         WB         Northbound			Ь	T	R	- 1	Ь	Т	R	
Hourly Flow Rate, HFR 6 998  Percent Heavy Vehicles 0 Median Type/Storage Undivided / RT Channelized?  Lanes 0 2  Configuration Upstream Signal? No No No Minor Street: Approach Northbound Southbound Movement 7 8 9 10 11 12  L T R L T R L T R  Volume 35  Peak Hour Factor, PHF 0.91  Hourly Flow Rate, HFR 38  Percent Heavy Vehicles 0  Flared Approach: Exists?/Storage / 0  Lanes 1  Configuration L  Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound Novement 1 4 1 7 8 9 10 11 12	Volume		6	909						
Percent Heavy Vehicles         0 </td <td>Peak-Hour Fact</td> <td>or, PHF</td> <td>0.91</td> <td>0.91</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Peak-Hour Fact	or, PHF	0.91	0.91						
Median Type/Storage         Undivided         /           RT Channelized?         0         2           Configuration         LT T         Upstream Signal?         No           Minor Street:         Approach Movement         Northbound Southbound Southbound Find The Properties of the Properties of	Hourly Flow Ra	ate, HFR	6	998						
RT Channelized?  Lanes	Percent Heavy	Vehicles	0							
RT Channelized?  Lanes	Median Type/St	corage	Undiv	ided		/				
Delay, Queue Length, and Level of Service   Approach   Delay, Queue Length, and Level of Service   Approach   Delay Devament   Delay Devamen										
Minor Street: Approach	Lanes		0	2						
Minor Street: Approach	Configuration		L	ТТ						
Movement 7 8 9   10 11 12  L T R   L T R  Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Percent Grade (%) O Flared Approach: Exists?/Storage Lanes Configuration  Delay, Queue Length, and Level of Service Approach EB WB Northbound Movement 1 4   7 8 9   10 11 12	Upstream Signa	11?		No				No		
Movement 7 8 9   10 11 12  L T R   L T R  Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Percent Grade (%) Percent Grade (%)  Delay, Queue Length, and Level of Service  Approach EB WB Northbound Movement  1 4   7 8 9   10 11 12	Minor Street:	Approach	No	rthboun	d		Soı	ıthbour	 1d	
Volume 35 Peak Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 38 Percent Heavy Vehicles 0 Percent Grade (%) 0 0 Flared Approach: Exists?/Storage / / Lanes 1 Configuration L  Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound Movement 1 4   7 8 9   10 11 12			7	8	9	1	10	11	12	
Peak Hour Factor, PHF 0.91 Hourly Flow Rate, HFR 38 Percent Heavy Vehicles 0 Percent Grade (%) 0 0 Flared Approach: Exists?/Storage / / Lanes 1 Configuration L  Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound Movement 1 4   7 8 9   10 11 12			L	Т	R	İ	L	T	R	
Hourly Flow Rate, HFR 38  Percent Heavy Vehicles 0  Percent Grade (%) 0 0  Flared Approach: Exists?/Storage / / Lanes 1  Configuration L  Delay, Queue Length, and Level of Service  Approach EB WB Northbound Southbound  Movement 1 4   7 8 9   10 11 12	 Volume						35			
Percent Heavy Vehicles         0           Percent Grade (%)         0         0           Flared Approach:         Exists?/Storage         /         /           Lanes         1         1           Configuration         L         L           Delay, Queue Length, and Level of Service         Approach         EB         WB         Northbound         Southbound           Movement         1         4         7         8         9         10         11         12	Peak Hour Fact	or, PHF					0.91			
Percent Heavy Vehicles         0           Percent Grade (%)         0         0           Flared Approach:         Exists?/Storage         /         /           Lanes         1         1           Configuration         L         L           Delay, Queue Length, and Level of Service         Approach         EB         WB         Northbound         Southbound           Movement         1         4         7         8         9         10         11         12	Hourly Flow Ra	ate, HFR					38			
Flared Approach: Exists?/Storage / / Lanes 1 Configuration L  Delay, Queue Length, and Level of Service  Approach EB WB Northbound Southbound Movement 1 4   7 8 9   10 11 12	-						0			
Flared Approach: Exists?/Storage / / Lanes 1 Configuration L  Delay, Queue Length, and Level of Service  Approach EB WB Northbound Southbound Movement 1 4   7 8 9   10 11 12	4			0				0		
Delay, Queue Length, and Level of Service   Approach   EB   WB   Northbound   Southbound   Movement   1   4   7   8   9   10   11   12		. ,	/Storage			/				/
	Lanes					,	1			•
ApproachEBWBNorthboundSouthboundMovement14  789  101112	Configuration						L			
ApproachEBWBNorthboundSouthboundMovement14  789  101112		Dolar (		nath a	nd Tor		Corre			
Movement 1 4   7 8 9   10 11 12	Annroach						serv.		hhound	
										1.0
	Movement Lane Config	т.т <sup>.</sup>	4	1	0	9	,		11	12

Approach	_Delay, EB	WB	ье	ng t	•	nu Lev thboun		ser		uthboun	d
Movement	1	4		7		8	9	- 1	10	11	12
Lane Config	LT								L		
v (vph)	6								38		
C(m) (vph)	1636								524		
v/c	0.00								0.07		
95% queue length	0.01								0.23		
Control Delay	7.2								12.4		
LOS	A								В		
Approach Delay										12.4	
Approach LOS										В	

Phone: E-Mail:			F	ax:			
	TWO-WAY ST	OP CONTR	OL (TWSC	) ANAL	YSIS		
malyst: gency/Co.: wate Performed: nalysis Time Period: ntersection: urisdiction: nits: U. S. Metric nalysis Year: roject ID: FUTURA SA ast/West Street:	H DER/DF 2023	7+M08+M0	6-M11+M	12			
orth/South Street: ntersection Orientati	M14 on: EW		St	udy pe	riod (h	nrs):	1.00
	Vehicle '	Volumes	and Adj	ustmen	ts		
Major Street Movements	1 L	2 T	3 R	4 L	5 T	6 R	
Tolume Peak-Hour Factor, PHF Peak-15 Minute Volume Rourly Flow Rate, HFR Percent Heavy Vehicles Redian Type/Storage RT Channelized?	Undi			/			
anes onfiguration pstream Signal?	T. 0	2 T T No			No		
inor Street Movements	7 L	8 T	9 R	10 L	11 T	12 R	
olume eak Hour Factor, PHF eak-15 Minute Volume ourly Flow Rate, HFR ercent Heavy Vehicles ercent Grade (%) lared Approach: Exis T Channelized anes onfiguration		0 e		35 0.91 10 38 0 /	0		/
ovements	Pedestrian 13	Volumes	and Ad	justme 16	nts		
Clow (ped/hr) Lane Width (m) Lalking Speed (m/sec) Lercent Blockage	0 3.6 1.2		0 3.6 1.2	0 3.6 1.2			
	Ups	tream Si	gnal Da	ta			
Prog. Flow vph	Sat . Flow vph	Arrival Type	Green Time sec	Cycl Leng sec	th Spe	_	Distance to Signal meters
2 Left-Turn Through 5 Left-Turn Through							
Torksheet 3-Data for C	omputing E	ffect of					
			Move	ment 2	Mo	ovemen	t 5
hared ln volume, majo hared ln volume, majo			0				

Sat flow rate, Sat flow rate, Number of majo	major r	t vehic	les:	:	1700 1700 2			
Worksheet 4-Cr			Follow-	up Time	Calcul	ation		
Critical Gap C		on						
Movement	1	4	7	8	9	10	11	12
	L	L	L	Т	R	L	Т	R
t(c,base)	4.1					7.1		
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0
- 43	_					_		

t(c,base	e)	4.1					7.1			
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
P(hv)		0					0			
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10	
Percent	Grade			0.00	0.00	0.00	0.00	0.00	0.00	
t(3,1t)		0.00					0.70			
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	
t(c)	1-stage	4.1					6.4			
	2-stage									
Follow-U	Jp Time C	alculat	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	

t(f,HV) P(HV) 0.90 0.90 2.2 3.5 t(f)

Worksheet 5-Effect of Upstream Signals

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

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

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

alpha beta Travel time, t(a) (sec) Smoothing Factor, F 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-Pla	atoon Event Periods	Result		
p(2) p(5)		0.000		
p(dom) p(subo) Constrained or ur	nconstrained?			
Proportion unblocked	(1)	(2)	(3)	
<pre>for minor movements, p(x)</pre>	Single-stage Process	Two-Sta Stage I	age Process Stage II	

p(1)

p(4)

p(7)

p(8) p(9)

p(10)

Computation 4 and 5								
Single-Stage Process								
Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	Т	R
/ c, x	0					511		
3	•							
?x								
c,u,x								
Cr,x								
C plat,x								
'wo-Stage Process								
=	7		8		10		1	1
Stage1	Stage2	Stage1	. Stage2	Stage	1 St	age2	Stage1	Stage2
7/2 33								
/(c,x)					3 (	000		
? (x)								
(C, u, x)								
C(r,x)		-						
C(plat,x)								
Vorksheet 6-Impedance	and Car	oacitv F	Equations					
	24 041	- 20107 1	1000-10110					
Step 1: RT from Minor	St.				9		12	
Conflicting Flows								
Potential Capacity				1 0	^		1 00	
Pedestrian Impedance	Factor			1.0	U		1.00	
Movement Capacity Probability of Queue	free St			1.0	Ω		1.00	
				1.0	~		1.00	
Step 2: LT from Major	St.				4		1	
Conflicting Flows							0	
Potential Capacity					_		1636	
Pedestrian Impedance	Factor			1.0	0		1.00	
Movement Capacity	c 01			1 0	^		1636	
Probability of Queue		•		1.0	U		1.00	
Maj L-Shared Prob Q f	iee st.						1.00	
Step 3: TH from Minor	St.				8		11	
Conflicting Flows								
Potential Capacity					_			
Pedestrian Impedance				1.0			1.00	
Cap. Adj. factor due	_	ding mvm	nnt	1.0	U		1.00	
Movement Capacity Probability of Queue				1.0	Ω		1.00	
	CC DC.	•		1.0	•		1.00	
Step 4: LT from Minor	St.				7		10	
Conflicting Flows							511	
Potential Capacity					_		526	
Pedestrian Impedance				1.0			1.00	
Maj. L, Min T Impedan				1.0				
Maj. L, Min T Adj. Im			+	1.0			1 00	
Cap. Adj. factor due	ro imped	ııng mvm	ПIС	1.0	U		1.00	
Movement Capacity							524	
Jorksheet 7-Computati	on of th	ne Effec	ct of Two	-stage	Gap A	ccept	ance	
Step 3: TH from Minor	St.				8		11	
Domb 1 Dines Co								
Part 1 - First Stage								
Conflicting Flows								
Potential Capacity	Factor							
Pedestrian Impedance Cap. Adj. factor due		ding mirm	nn t					
Movement Capacity	co rmbec	aring illvil						
robability of Queue	free St	_						
TODADITICY OF Queue		•						
Part 2 - Second Stage								

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

novement supusity							
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	mvmnt			1.00		1.00	
Result for 2 stage process:							
а У							
C t Probability of Queue free St.				1.00		1.00	
Step 4: LT from Minor St.				7		10	
Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	mvmnt						
Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding Movement Capacity	mvmnt						
Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.				1.00 1.00 1.00		511 526 1.00	
Cap. Adj. factor due to Impeding Movement Capacity	mvmnt			1.00		1.00 524	
Results for Two-stage process:							
a Y C t						524	
Worksheet 8-Shared Lane Calculat:	ions						
Movement		7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)					38 524		
Worksheet 9-Computation of Effect	t of F	lared	Mino	or Stree	t Appro	aches	
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)					524 38		
n max C sh SUM C sep n C act							
Worksheet 10-Delay, Queue Length	, and 1	Level	of S	Service			
Movement 1 4 Lane Config LT	7	8		9	10 L	11	12

v (vph)	6	38
C(m) (vph)	1636	524
v/c	0.00	0.07
95% queue length	0.01	0.23
Control Delay	7.2	12.4
LOS	A	В
Approach Delay		12.4
Approach LOS		В

Worksheet 11-Shared Major LT Impedance and Delay

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

### 1.1.1.17 Interseção I – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Analyst:
Agency/Co.:
Date Performed: Progeplan 05/06/2023 Analysis Time Period: Pico Manha Intersection: I

Intersection: 1
Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: MOV01-MOV04-MOV10
North/South Street: MOV10

North/South Street: MOV1 Intersection Orientation:			St	udy	perio	od (hrs)	: 1.00	
Vehi	cle Volu	mes and	Adius	tme	nts			
Major Street: Approach		tbound		01110		estbound		
Movement	1	2	3	1	4	5	6	
110 V CINCITE	T,	T	R	i	T.	Т	R	
	1	-	11	'		-	11	
Volume	14	1988						
Peak-Hour Factor, PHF	0.91	0.91						
Hourly Flow Rate, HFR	15	2184						
Percent Heavy Vehicles	0							
Median Type/Storage	Undivi				/			
RT Channelized?	Ullaivi	.ueu			/			
Lanes	0	2						
	Ü	∠ ' T						
Configuration	LT	_						
Upstream Signal?		No				No		
Minor Street: Approach	No.	t.hbound				out.hboun		
Movement	7	8	9		10	11	12	
Movement	L	T	R		T.	Т	R	
	ы	1	K	- 1	ь	1	R	
Volume					207			
Peak Hour Factor, PHF					0.91			
Hourly Flow Rate, HFR					227			
Percent Heavy Vehicles					1			
Percent Grade (%)		0			_	0		
Flared Approach: Exists?/	C+ 0 20 0 00	U		,		U	,	
Lanes	Storage			/	1		/	
Configuration					-	L		
Delay, Q	ueue Ler	ath, an	d Leve	:l o	f Serv	vice		
Approach EB	WB		hbound		_ 501		hbound	
Movement 1	4 1		8	9	1	10	11 12	
Lane Config LT		•	-	_		_ ~		
	1				1	T.		
	I				I	L		

C(m) (vph) v/c 95% queue length Control Delay LOS	1636 0.01 0.03 7.2	227 1.00 18.45 189.8
Approach Delay Approach LOS	-	189.8 F

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

2023

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

Study period (hrs): 1.00 Intersection Orientation: EW

	_Vehicle	Volumes	and Ac	djustmen	ts		
Major Street Movements	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	14	1988					
Peak-Hour Factor, PHF	0.91						
Peak-15 Minute Volume	4	546					
Hourly Flow Rate, HFR	15	2184					
Percent Heavy Vehicles	0						
Median Type/Storage RT Channelized?	Undi	vided		/			
Lanes	0	2					
Configuration	L	ТТ					
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume				207			
Peak Hour Factor, PHF				0.91			
Peak-15 Minute Volume				57			
Hourly Flow Rate, HFR				227			
Percent Heavy Vehicles				1			
Percent Grade (%)		Ο		_	0		
Flared Approach: Exist	e2/Storag	0		/	U		/
RT Channelized	.s./scorag	C		/			/
Lanes				1			
				T,			
Configuration				Ь			

	_Pedestrian		-	_
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 Sic	gnal Dat	a		
Prog.	Sat	Arrival	Green	Cycle	Prog.	Distance
Flow vph	Flow vph	Type	Time sec	Length sec	Speed kph	to Signal meters

S2 Left-Turn Through

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

Worksheet 3-Data	for Co	mputing	g Effect	of De	lay to M	Major St	treet Ve	ehicles
				1	Movement	2	Movemen	nt 5
Shared in volume Shared in volume Sat flow rate, m Sat flow rate, m Number of major	, major ajor th ajor rt	rt vehici vehici	nicles: les: les:		0 0 1700 1700 2			
Worksheet 4-Crit	ical Ga	p and I	Follow-u	ıp Time	Calcula	ation		
Critical Gap Cal Movement	culatio 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 0	1.00	1.00	1.00	1.00	7.1 1.00	1.00	1.00
t(c,g) Percent Grade t(3,lt)	0.00		0.20	0.20	0.10	0.20 0.00 0.70	0.20	0.10 0.00
t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage	0.00 0.00 4.1	0.00	0.00	0.00	0.00	0.00 1.00 6.4	0.00	0.00
Follow-Up Time C Movement	alculat 1 L	ions 4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base) t(f,HV) P(HV) t(f)	2.20 0.90 0 2.2	0.90	0.90	0.90	0.90	3.50 0.90 1 3.5	0.90	0.90
Worksheet 5-Effe	ct of U	ipstrear	m Signal	S				
Computation 1-Qu	eue Cle	arance	Time at	_	Movemer			vement 5 V(1,prot)
Total Saturation Arrival Type Effective Green, Cycle Length, C Rp (from Exhibit Proportion vehice g(q1) g(q2) g(q)	g (sec (sec) 16-11)	:)		1 P				
Computation 2-Pr	oportio	n of TV	WSC Inte	ersection	Movemer	nt 2	Mor	vement 5 V(1,prot)
alpha beta Travel time, t(a Smoothing Factor Proportion of co Max platooned fl Min platooned fl Duration of bloc Proportion time	, F nflicti ow, V(c ow, V(c ked per	(,max) (,min) (iod, t			0.000	)	(	0.000
Computation 3-Pl	atoon E	vent Pe	eriods	Resi	ılt			
p(2) p(5) p(dom) p(subo) Constrained or u	nconstr	rained?		0.00				

Proportion

unblocked for minor movements, p(x)	(1) Single- Proce	-stage	St	(2) Two-S age I	tage P	(3) rocess Stage I	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 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
V c,x s Px V c,u,x	0					1122		
C r,x C plat,x								
Two-Stage Process								
Stage1	7 Stage2	Stage1	8 Stag	re2 Sta	10 gel S	tage2 S	11 tage1	Stage2
V(c,x)					2	000		
P(x) V(c,u,x)					3	000		
C(r,x) C(plat,x)								
Wankahaat 6 Impadanaa	and Can	oitu E						
Worksheet 6-Impedance		acity E	quatic					
Step 1: RT from Minor	. St.				9		12	
Conflicting Flows Potential Capacity								
Pedestrian Impedance Movement Capacity	Factor			1	.00		1.00	
Probability of Queue	free St.			1	.00		1.00	
Step 2: LT from Major	St.				4		1	
Conflicting Flows Potential Capacity							0 1636	
Pedestrian Impedance	Factor			1	.00		1.00	
Movement Capacity Probability of Queue	free St.			1	.00		1636 0.99	
Maj L-Shared Prob Q f	free St.						0.99	
Step 3: TH from Minor	St.				8		11	
Conflicting Flows								
Potential Capacity Pedestrian Impedance				1	.00		1.00	
Cap. Adj. factor due Movement Capacity	to Impedi	ing mvm	nt	0	.99		0.99	
Probability of Queue	free St.			1	.00		1.00	
Step 4: LT from Minor	St.				7		10	
Conflicting Flows							1122	
Potential Capacity Pedestrian Impedance	Factor			1	.00		229 1.00	
Maj. L, Min T Impedan	nce factor			0	.99			
Maj. L, Min T Adj. Im Cap. Adj. factor due Movement Capacity			nt		.99 .99		0.99 227	
Worksheet 7-Computati	on of the	e Effec	t of T	wo-stag	e Gap .	Acceptan	ce	
Step 3: TH from Minor	St.				8		11	

Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Probability of Queue free St. Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor 1.00 1.00 Cap. Adj. factor due to Impeding mvmnt 0.99 0.99 Movement Capacity Result for 2 stage process: а У Ĉt Probability of Queue free St. 1.00 1.00 Step 4: LT from Minor St. 10 Part 1 - First Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 2 - Second Stage Conflicting Flows Potential Capacity Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmnt Movement Capacity Part 3 - Single Stage Conflicting Flows 1122 Potential Capacity 229 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 mymnt 0.99 0.99 Movement Capacity 227 Results for Two-stage process: а У Ĉt 227 Worksheet 8-Shared Lane Calculations 12 Movement 10 11 8 Т R T. L Τ R Volume (vph) 227 227 Movement Capacity (vph) Shared Lane Capacity (vph) Worksheet 9-Computation of Effect of Flared Minor Street Approaches Movement 8 9 10 11 12 т. Т R L Т R C sep 227 Volume 227 Delay Q sep Q sep +1 round (Qsep +1)

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

Movement	1	4	7	8	9	10	11	12
Lane Config	LT					L		
v (vph)	15					227		
C(m) (vph)	1636					227		
v/c	0.01					1.00		
95% queue length	0.03					18.45	5	
Control Delay	7.2					189.8	3	
LOS	A					F		
Approach Delay							189.8	3
Approach LOS							F	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
g(j)	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		

### 1.1.1.18 Interseção I — Pico Tarde

HCS+: Unsignalized Intersections Release 5.6

\_TWO-WAY STOP CONTROL SUMMARY\_

Progeplan Analyst:

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

Jurisdiction:

Units: U. S. Metric Analysis Year:

Project ID:

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

2023

Intersection Orientation: EW Study period (hrs): 1.00

	Vob:	ala Mal		a a a i		n+ a			
Major Street:	veni Approach		umes and stbound	ı Aaju	istme:		estbound		
	Movement	1	2	3	- 1	4	5	6	
		L	T	R	İ	L	T	R	
Volume		6	707						
Peak-Hour Fact	or, PHF	0.91	0.91						
Hourly Flow Ra	te, HFR	6	776						
Percent Heavy	Vehicles	0							
Median Type/St RT Channelized	-	Undiv	ided			/			
Lanes		0	2						
Configuration		L	т т						
Upstream Signa	1?		No				No		
Minor Street:	Approach	No	rthbound	d		S	outhbou	nd	
	Movement	7	8	9		10	11	12	
		L	T	R	I	L	Т	R	
Volume						10			
Peak Hour Fact	or, PHF					0.91			
Hourly Flow Ra	te, HFR					10			
Percent Heavy	Vehicles					6			
Percent Grade	(%)		0				0		
Flared Approac	h: Exists?/	Storage			/				/

Delay, Queue Length, and Level of Service Approach Southbound EB WB Northbound 9 10 Movement 1 4 8 11 12 Lane Config  ${\rm LT}$ L v (vph) 10 1636 596 C(m) (vph) v/c 0.00 0.02 95% queue length 0.01 0.05 Control Delay 7.2 11.1 LOS Α В Approach Delay 11.1 Approach LOS

HCS+: Unsignalized Intersections Release 5.6

Phone: E-Mail: Fax:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS\_

Analyst: Progeplan

Agency/Co.:

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

Intersection:

Jurisdiction: DER/DF

Units: U. S. Metric Analysis Year: 2023

Project ID:

MOV01-MOV04-MOV10 East/West Street:

North/South Street: MOV10

Intersection Orientation: EW Study period (hrs): 1.00

	Vehicle	Volumes	and Ac	djustmen	its		
Major Street Movements	_ 1	2	3	4	5	6	
	L	T	R	L	Т	R	
Volume	6	707					
Peak-Hour Factor, PHF	0.91	0.91					
Peak-15 Minute Volume	2	194					
Hourly Flow Rate, HFR	6	776					
Percent Heavy Vehicles	0						
Median Type/Storage RT Channelized?	Undi	vided		/			
Lanes	0	2					
Configuration	I	ТТ					
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	Т	R	
Volume				10			
Peak Hour Factor, PHF				0.91			
Peak-15 Minute Volume				3			
Hourly Flow Rate, HFR				10			
Percent Heavy Vehicles				6			
Percent Grade (%)		0			0		
Flared Approach: Exist	s?/Storag	e		/			/
RT Channelized							
Lanes				1			
Configuration				T			

Movements	_Pedestrian 13			justments_ 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	

referre blockage

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

S2 Left-Turn

Through S5 Left-Turn

Through

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

Movement 2	Movement 5
0	
0	
1700	
1700	
2	
	0 0 1700

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical	Gap Cal	culati	on						
Movement		1	4	7	8	9	10	11	12
		L	L	L	T	R	L	T	R
t(c,base	:)	4.1					7.1		
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)		0					6		
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent	Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,1t)		0.00					0.70		
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage	4.1					6.5		
	2-stage								
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)		0					6		
t(f)		2.2					3.6		
P(HV)		0	0.90	0.90	0.90	0.90	6	0.90	0.90

Worksheet 5-Effect of Upstream Signals

```
Computation 1-Queue Clearance Time at Upstream Signal

Movement 2 Movement 5

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

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

g (q1) g (q2)

g (q)

Computation 2-Proportion of TWSC Intersection Time blocked  $$\operatorname{\mathtt{Movement}}$$  2

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

Computation 3-Platoon	Event P	eriods	Re	sult				
p(2)				000				
p(5)			0.	000				
p (dom)								
p(subo) Constrained or uncons	trained?							
Proportion								
unblocked	(1			(2)	+ D-	(3)		
for minor movements, p(x)	Single Proce	-	C+	TWO-S age I	tage Pr	socess Stage I	т	
movements, p(x)	1100	C33	50	age I		Stage 1	1	
p(1) p(4) p(7) p(8) p(9) p(10) p(11) p(12)								
Computation A and 5								
Computation 4 and 5 Single-Stage Process								
Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
						400		
V c,x	0					400		
Px								
V c,u,x								
C n								
C r,x C plat,x								
Two-Stage Process	 7		0		1.0		1	1
	Stage2	Stage1	8 Stag	e2 Sta	10 ae1 St	age2 S		1 Stage2
V(c,x)								
S								
D / \					30	000		
P(x) V(c,u,x)					30	000		
• •					30	000		
V(c,u,x) C(r,x)	and Capa	acity E	quatio	ns	30	000		
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance		acity E	quatio:	ns			122	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor		acity E	quatio:	ns	9		12	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows		acity E	quatio	ns		000	12	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity	St.	acity E	quatio:		9			
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows	St.	acity E	quatio.				12	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance	St.	acity E	quatio.	1	9			
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity	St. Factor free St.	acity E	quatio:	1	9		1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue	St. Factor free St.	acity E	quatio	1	9 .00		1.00	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity	St. Factor free St.	acity E	quatio:	1 1	9 .00 .00 4		1.00 1.00 1 0 1636	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance	St. Factor free St.	acity E	quatio	1 1	9 .00	000	1.00 1.00 1 0 1636 1.00	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity	St. Factor free St. St.	acity E	quatio	1 1	9 .00 .00 4 .00	000	1.00 1.00 1 0 1636 1.00 1636	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance	St. Factor free St. St. Factor free St.	acity E	quatio	1 1	9 .00 .00 4		1.00 1.00 1 0 1636 1.00	
V(c,u,x)  C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Movement Capacity Probability of Queue Maj L-Shared Prob Q f	St.  Factor free St.  St.  Factor free St. ree St.	acity E	quatio	1 1	9 .00 .00 4 .00 .00	000	1.00 1.00 1 0 1636 1.00 1636 1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f  Step 3: TH from Minor	St.  Factor free St.  St.  Factor free St. ree St.	acity E	quatio	1 1	9 .00 .00 4 .00		1.00 1.00 1 0 1636 1.00 1636 1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f  Step 3: TH from Minor  Conflicting Flows	St.  Factor free St.  St.  Factor free St. ree St.	acity E	quatio.	1 1	9 .00 .00 4 .00 .00		1.00 1.00 1 0 1636 1.00 1636 1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f  Step 3: TH from Minor  Conflicting Flows Potential Capacity	St.  Factor free St.  St.  Factor free St. st.  St.	acity E	quatio	1 1 1 1	9 .00 .00 4 .00 .00		1.00 1.00 1 0 1636 1.00 1636 1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f  Step 3: TH from Minor  Conflicting Flows	St.  Factor free St.  St.  Factor free St. ree St.  St.			1 1 1 1 1 1	9 .00 .00 4 .00 .00	000	1.00 1.00 1 0 1636 1.00 1636 1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance Step 1: RT from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f Step 3: TH from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Conflicting Flows Potential Capacity Pedestrian Impedance Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity	St.  Factor free St.  Factor free St.  St.  Factor free St.  The st.  St.			1 1 1 1 1 1 1	9 .00 .00 4 .00 .00		1.00 1.00 1 0 1636 1.00 1636 1.00 1.00 11	
C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f  Step 3: TH from Minor  Conflicting Flows Potential Capacity Probability of Queue Maj L-Shared Prob Q f  Step 3: TH from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Cap. Adj. factor due Movement Capacity Probability of Queue	St.  Factor free St.  St.  Factor free St.  St.  Factor free St.  free St.  free St.			1 1 1 1 1 1 1	9 .00 .00 4 .00 .00 8	000	1.00 1.00 1 0 1636 1.00 1.00 11 1.00 1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance Step 1: RT from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f Step 3: TH from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Conflicting Flows Potential Capacity Probability of Queue Movement Capacity Probability of Queue Step 4: LT from Minor	St.  Factor free St.  St.  Factor free St.  St.  Factor free St.  free St.  free St.			1 1 1 1 1 1 1	9 .00 .00 4 .00 .00	000	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance  Step 1: RT from Minor  Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue  Step 2: LT from Major  Conflicting Flows Potential Capacity 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 Conflicting Flows	St.  Factor free St.  St.  Factor free St.  St.  Factor free St.  free St.  free St.			1 1 1 1 1 1 1	9 .00 .00 4 .00 .00 8	000	1.00 1.00 1.00 1636 1.00 1636 1.00 1.00 1.00 1.00 1.00 1.00 1.00	
C(r,x) C(plat,x)  Worksheet 6-Impedance Step 1: RT from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Step 2: LT from Major Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f Step 3: TH from Minor Conflicting Flows Potential Capacity Pedestrian Impedance Conflicting Flows Potential Capacity Probability of Queue Movement Capacity Probability of Queue Step 4: LT from Minor	St.  Factor free St.  St.  Factor free St.  St.  Factor free St.  St.  St.			1 1 1 1 1 1 1	9 .00 .00 4 .00 .00 8	000	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	

Worksheet 9-Computation of Effect of	Flar	ed Minor	Stree	t Approa	ches	
Volume (vph) Movement Capacity (vph) Shared Lane Capacity (vph)				596		
Movement (uph)	L	8 T	9 R	10 L 10	11 T	12 R
Worksheet 8-Shared Lane Calculations	7			1.0	11	1.2
y C t					596	
a						
Movement Capacity  Results for Two-stage process:					596 	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmr	nt		.00		1.00	
Maj. L, Min T Impedance factor		1	.00			
Potential Capacity Pedestrian Impedance Factor		1	.00		598 1.00	
Part 3 - Single Stage Conflicting Flows					400	
Movement Capacity						
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmr	nt					
Conflicting Flows Potential Capacity						
Part 2 - Second Stage						
redestrian impedance factor Cap. Adj. factor due to Impeding mvmr Movement Capacity	nt					
Potential Capacity Pedestrian Impedance Factor						
Part 1 - First Stage Conflicting Flows						
Step 4: LT from Minor St.			7		10	
Probability of Queue free St.		1	.00		1.00	
Y C t						
Result for 2 stage process: a						
Movement Capacity						
Cap. Adj. factor due to Impeding mvmr	nt		.00		1.00	
Potential Capacity Pedestrian Impedance Factor		1	.00		1.00	
Part 3 - Single Stage Conflicting Flows						
Movement Capacity						
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmr	nt					
Conflicting Flows Potential Capacity						
Part 2 - Second Stage						
Movement Capacity Probability of Queue free St.						
Pedestrian Impedance Factor Cap. Adj. factor due to Impeding mvmr	nt					
Potential Capacity						
Part 1 - First Stage Conflicting Flows						
Step 3: TH from Minor St.			8		11	
Worksheet 7-Computation of the Effect	t of	Two-stag	e Gap	Acceptan	ice	
Movement Capacity					596	
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmm	nt		.00		1.00	

L	T	R	L	T	R

C sep	596
Volume	10
Delay	
Q sep	
0 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)	6					10		
C(m) (vph)	1636					596		
v/c	0.00					0.02		
95% queue length	0.01					0.05		
Control Delay	7.2					11.1		
LOS	A					В		
Approach Delay							11.1	
Approach LOS							В	

Worksheet 11-Shared Major LT Impedance and Delay

Movement 2	Movement 5
1.00	1.00
0	
0	
1700	
1700	
1.00	
7.2	
2	
_	0 0 1700 1700 1.00 7.2

### 1.1.1.19 Interseção J – Pico Manhã

HCS+: Unsignalized Intersections Release 5.6

\_TWO-WAY STOP CONTROL SUMMARY\_

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

Units: U. S. Metric Analysis Year: Project ID: FUTURA SAÚDE East/West Street: M2-M10
North/South Street: M9 Intersection Orientation: EW

Study period (hrs): 1.00

Major Street:			lumes an	_	stme		stbound		
,	Movement	1	2	3	1	4	5	6	
		L	Т	R	i	L	Т	R	
Volume						208	751		
Peak-Hour Fact	or, PHF					0.91	0.91		
Hourly Flow Ra	ate, HFR					228	825		
Percent Heavy	Vehicles								
Median Type/St	corage	Undi	.vided			/			
RT Channelized	1?								
Lanes						0	2		
Configuration						L'	ГТ		

Minor Street:	Approach	No	rthbour	nd		5	Southbou	und	
	Movement	7	8	9		10	11	12	
		L	Т	R	-	L	T	R	
Volume		14							
Peak Hour Fact	or, PHF	1.00							
Hourly Flow Ra	te, HFR	14							
Percent Heavy	Vehicles	0							
Percent Grade	(%)		0				0		
Flared Approac	h: Exists	?/Storage	;		/				/
Lanes		1							
Configuration		I	1						
	Delay,	Queue Le	ength, a	and Lev	el o	f Ser	rvice		
Approach Movement Lane Config	Delay, EB	Queue Le WB 4   LT		and Lev rthboun 8		f Sei		uthboun 11	12
Movement	EB	WB 4	No:	rthboun	d	f Ser	Soi		
Movement Lane Config	EB	WB 4   LT	Noi 7 L	rthboun	d	f Sei	Soi		
Movement Lane Config v (vph)	EB	WB 4   LT   228 1530	7 L	rthboun	d	f Ser	Soi		
Movement Lane Config v (vph) C(m) (vph)	EB 1	WB 4   LT   228 1530 0.15	No.	rthboun	d	f Ser	Soi		
Movement Lane Config  v (vph) C(m) (vph) v/c	EB 1	WB 4   LT   228 1530 0.15	No. 7 L 14 277 0.05	rthboun	d	f Sei	Soi		
Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue leng	EB 1	WB 4   LT   228 1530 0.15 0.52	No. 7 L 14 277 0.05 0.16	rthboun	d	f Ser	Soi		
Movement Lane Config  v (vph) C(m) (vph) v/c 95% queue leng Control Delay	EB 1	WB 4   LT   228 1530 0.15 0.52 7.8	No. 7 L 14 277 0.05 0.16 18.7	rthboun	d	f Ser	Soi		

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Phone: Fax: E-Mail:

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

Analyst: Progeplan Agency/Co.:

Date Performed: 05/06/2023

Date Performed: 05/06/2023
Analysis Time Period: Pico Manha
Intersection: J
Jurisdiction: DER/DF

Jurisdiction: Units: U. S. Metric

Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: M2-M10
North/South Street: M9
Intersection Orientation: EW

tersection Orientation: EW Study period (hrs): 1.00

	Vehicle '	Volumes	and A	diustmen	ts		
Major Street Movements	1	2	3	4	5	6	
	L	Т	R	L	T	R	
Volume				208	751		
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				57	206		
Hourly Flow Rate, HFR				228	825		
Percent Heavy Vehicles							
Median Type/Storage RT Channelized?	Undi	vided		/			
Lanes				0	2		
Configuration				L	т т		
Upstream Signal?		No			No		
Minor Street Movements	7	8	9	10	11	12	
	L	Т	R	L	T	R	
Volume	14						
Peak Hour Factor, PHF	1.00						
Peak-15 Minute Volume	4						
Hourly Flow Rate, HFR	14						
Percent Heavy Vehicles	0						
Percent Grade (%)		0			0		

Flared Approach: Exists?/Storage RT Channelized

Configuration			1					
			L					
		Padastr	ian Vol	umas an	d Adius	stments		
Movements	<u>'</u>				15	16		
Flow (ped/hr)			) (	0	0	0		
Lane Width (m)					3.6	3.6		
Walking Speed (m	n/sec)				1.2	1.2		
Percent Blockage					0	0		
				m Signa	-			
	Prog.	Sat				_	Prog.	Distance
	Flow vph	Flow vph			ime : ec	Length sec	Speed kph	to Signal meters
S2 Left-Turn								
Through								
S5 Left-Turn								
Through								
Worksheet 3-Data	for Co	omput i n	r Effoci	t of Do	1 av. +o	Major 9	troot V	ohiclos
					Moveme	nt 2	Moveme	nt 5
Shared in volume							0	
Shared in volume							0	
Sat flow rate, m	_						1700	
Sat flow rate, m							1700	
Number of major	street	cnrough	ı ıanes				2	
Worksheet 4-Crit	cical Ga	ap and I	Follow-	up Time	Calcu	lation		
Critical Gap Cal	culatio							
Movement	1	4	7	8	9	10	11	12
	L	L	L	Т	R	L	Т	R
t(c,base)		4.1	7.1			ب		
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			0	0				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	0.00
t(3,1t)	0 00	0.00	0.70	0 00	0 00	0 00	0 00	0.00
t(c,T): 1-stage		0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage		0.00	1.00	1.00	0.00	1.00	1.00	0.00
		4.3	6.4					
_	٤							
z-stage								
2-stage Follow-Up Time C	Calculat		7	R	9	1.0	11	12
2-stage Follow-Up Time C	Calculat	4	7 L	8 T	9 R	10 L	11 T	12 R
2-stage Follow-Up Time C	Calculat		7 L		9 R	10 L		12 R
2-stage Follow-Up Time C Movement	Calculat	4						
2-stage Follow-Up Time C Movement t(f,base)	Calculat	4 L	L			L		
2-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV)	Calculat 1 L	4 L 2.20 0.90	3.50 0.90 0	Т	R	L	T	R
2-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV)	Calculat 1 L	2.20	3.50 0.90	Т	R	L	T	R
2-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)	Calculat 1 L 0.90	2.20 0.90 2.4	3.50 0.90 0 3.5	0.90	R	L	T	R
2-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)	Calculat 1 L 0.90	2.20 0.90 2.4	3.50 0.90 0 3.5	0.90	R	L	T	R
2-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe	Calculat 1 L 0.90	2.20 0.90 2.4	3.50 0.90 0 3.5	0.90	R 0.90	0.90	T 0.90	0.90
2-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe	Calculat 1 L 0.90	2.20 0.90 2.4	3.50 0.90 0 3.5	0.90	R 0.90 eam Sig	0.90	T 0.90	0.90 vement 5
2-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe  Computation 1-Qu	Calculat 1 L 0.90	2.20 0.90 2.4	3.50 0.90 0 3.5	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5
Z-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe  Computation 1-Qu	Calculat  1 L  0.90  ect of taleue Clean	4 L 2.20 0.90 2.4 Upstream	3.50 0.90 0 3.5	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5
Z-stage Follow-Up Time Component  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe Computation 1-Qu V prog Total Saturation	Calculat  1 L  0.90  ect of taleue Clean	4 L 2.20 0.90 2.4 Upstream	3.50 0.90 0 3.5	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5
Z-stage Follow-Up Time Component  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe Computation 1-Qu V prog Total Saturation Arrival Type	O.90  ect of U	4 L 2.20 0.90 2.4 Upstreamearance	3.50 0.90 0 3.5	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5
Z-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe  Computation 1-Qu  V prog Total Saturation Arrival Type Effective Green,	O.90  ect of the deue Clean Flow H	4 L 2.20 0.90 2.4 Upstreamearance	3.50 0.90 0 3.5	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5
Z-stage Follow-Up Time Computation 1-Qu V prog Total Saturation	O.90  ect of the rection of the rect	4 L 2.20 0.90 2.4 Upstreamearance	3.50 0.90 0 3.5	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5
Z-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe  Computation 1-Qu  V prog Total Saturation Arrival Type Effective Green, Cycle Length, C	O.90  ect of U  n Flow I  g (sec (sec) : 16-11;	4 L 2.20 0.90 2.4 Upstreamearance Rate, s	3.50 0.90 0 3.5 m Signa. Time a	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5
Z-stage  Follow-Up Time Computed to the computation 1-Question 1-Q	O.90  ect of U  n Flow I  g (sec (sec) : 16-11;	4 L 2.20 0.90 2.4 Upstreamearance Rate, s	3.50 0.90 0 3.5 m Signa. Time a	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5
Z-stage Follow-Up Time C Movement  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effe  Computation 1-Qu  V prog Total Saturation Arrival Type Effective Green, Cycle Length, C Rp (from Exhibit	O.90  ect of U  n Flow I  g (sec (sec) : 16-11;	4 L 2.20 0.90 2.4 Upstreamearance Rate, s	3.50 0.90 0 3.5 m Signa. Time a	T 0.90	R 0.90 eam Sig	L 0.90 gnal ent 2	T 0.90	0.90 vement 5

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

alpha beta Travel time, t(a) (se Smoothing Factor, F Proportion of conflic Max platooned flow, V Min platooned flow, V Duration of blocked p Proportion time block	ting fl (c,max) (c,min) eriod,			0.0	00		0.000	
Computation 3-Platoon	Event	Periods	Re	sult				
p(2) p(5) p(dom) p(subo) Constrained or uncons	trained	?		000				
Proportion unblocked for minor movements, p(x)	Singl	1) e-stage cess	St	(2) Two-S	tage Pr	(3) rocess 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	L	L	T	R	L	Т	R
V c,x s Px V c,u,x C r,x		0	868					
C plat,x								
Two-Stage Process								
Stage1	7 Stage2	Stage1	8 . Stag	e2 Sta	10 ge1 St	tage2 S	11 Stagel	Stage2
V(c,x)								
s P(x) V(c,u,x)	3000							
C(r,x) C(plat,x)								
Worksheet 6-Impedance	and Ca	pacity E	Equation	ns				
Step 1: RT from Minor	St.				9		12	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity	Factor			1	.00		1.00	
Probability of Queue	free St			1	.00		1.00	
Step 2: LT from Major	St.				4		1	
Conflicting Flows Potential Capacity Pedestrian Impedance Movement Capacity Probability of Queue Maj L-Shared Prob Q f	Factor free St			1 1 0	530 .00 530 .85		1.00	

Conflicting Flows		
Potential Capacity Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	0.85	0.85
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows	868	
Potential Capacity Pedestrian Impedance Factor	325 1.00	1.00
Maj. L, Min T Impedance factor Maj. L, Min T Adj. Imp Factor.		0.85 0.89
Cap. Adj. factor due to Impeding mvmnt Movement Capacity	0.85 277	0.89
Worksheet 7-Computation of the Effect of Tw	o-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 Cap. Adj. factor due to Impeding mvmnt Movement Capacity	1.00 0.85	1.00 0.85
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	868	
Potential Capacity	325	1.00
Pedestrian Impedance Factor Maj. L, Min T Impedance factor	1.00	1.00 0.85
Maj. L, Min T Adj. Imp Factor. Cap. Adj. factor due to Impeding mvmnt Movement Capacity	0.85 277	0.89 0.89
Results for Two-stage process:		
a y C t	277	

Movement		7 L	8 T	9 R	10 L	11 T	12 R
Volume (vph)		14					
Movement Capacity (vph)		27	7				
Shared Lane Capacity (v		2,	•				
Worksheet 9-Computation	of Effect	of Fla	ared Mi	nor Stre	et Appr	oaches	
Movement		7	8	9	10	11	12
		L	Т	R	L	Т	R
C sep		27	7				
Volume		14					
Delay							
Q sep							
Q sep +1 round (Qsep +1)							
n max							
C sh							
SUM C sep							
n C act							
Worksheet 10-Delay, Que	ue Length	and Le	evel of	Service			
Movement 1	4	7	8	9	10	11	12
Lane Config	LT	L					
v (vph)	228	14					
C(m) (vph)	1530	277					
v/c	0.15	0.05					
95% queue length	0.52	0.16					
	7.8	18.7					
Control Delay	7.0						
LOS	A	С					
			18.7 C				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.85
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)		0.85
d(M,LT), Delay for stream 1 or 4		7.8
N, Number of major street through lanes d(rank,1) Delay for stream 2 or 5		2

# 1.1.1.20 Interseção J — Pico Tarde

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TWO-WAY STOP CONTROL SUMMARY\_\_\_\_\_

Analyst: Progeplan Agency/Co.:

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

Jurisdiction: DER/DF
Units: U. S. Metric
Analysis Year: 2023
Project ID: FUTURA SAÚDE
East/West Street: M2-M10
North/South Street: M9
Intersection Orientation: EW

cion: EW Study period (hrs): 1.00

Vehicle Volumes and AdjustmentsMajor Street:Approach<br/>MovementEastboundWestbound123| 456

	L	T	R	- 1	L	T	R	
Volume					1.0	2192		
Peak-Hour Factor, PHF					0.91			
Hourly Flow Rate, HFR					10	2408		
Percent Heavy Vehicles					6			
Median Type/Storage	Undiv	rided			/			
RT Channelized?								
Lanes					(	2		
Configuration						LT T		
Upstream Signal?		No				No		
Minor Street: Approach	No.	rthbou	nd			Southbou	nd	
Movement	7	8	9	- 1	10	11	12	
	L	T	R		L	T	R	
Volume	6							
Peak Hour Factor, PHF	0.91							
Hourly Flow Rate, HFR	6							
Percent Heavy Vehicles	0							
Percent Grade (%)		0				0		
Flared Approach: Exists	?/Storage			/				/
Lanes	í							
Configuration	I							
Approach EB	Queue Le		and Lev rthboun		i Sei		thboun	
Movement 1	4 1	7	8	. 9	1	10	11	12
Lane Config	LT I	L	Ü		i			
	·							
v (vph)	10	6						
C(m) (vph)	1597	199						
v/c	0.01	0.03						
95% queue length	0.02	0.09						
Control Delay	7.3	23.7						
LOS	A	С	22 7					
Approach LOS			23.7 C					
Approach LOS			C					

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: J Jurisdiction: Units: U. S. Metric

DER/DF 2023 Units: U. S. Medic Analysis Year: 2023 Project ID: FUTURA SAÚDE East/West Street: M2-M10 North/South Street: M9

Intersection Orientation: EW Study period (hrs): 1.00

	Vehicle	Volumes	and i	Adjustment:	3		
Major Street Movements	_ 1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume				10	2192		 
Peak-Hour Factor, PHF				0.91	0.91		
Peak-15 Minute Volume				3	602		
Hourly Flow Rate, HFR				10	2408		
Percent Heavy Vehicles				6			
Median Type/Storage	Und	ivided		/			
RT Channelized?							
Lanes				0	2		
Configuration				LT	T		
Upstream Signal?		No			No		

Minor Street Move	ments	7 L	8 T		9 1	L0 1	1 12 T R	
Volume Peak Hour Factor,		6	1					
Peak-15 Minute Vo. Nourly Flow Rate,		2 6						
Percent Heavy Veh		0						
Percent Grade (%)			0			0		
Flared Approach: RT Channelized	Exist	s?/Stor	_			/		/
Lanes			1					
Configuration			L 					
Movements	Pe			umes an	nd Adjı 15	ustments		
71 or (mod/hm)				0				
Flow (ped/hr) Lane Width (m)		0		0 3.6	0 3.6	0 3.6		
Walking Speed (m/	sec)			1.2	1.2	1.2		
Percent Blockage		0		0	0	0		
			-	m Signa				
	Prog. Flow	Sat Flow			Green Time	Cycle Length	Prog. Speed	Distance to Signal
	vph	vph	ı ıyp		sec	sec	kph	meters
32 Left-Turn								
Through								
S5 Left-Turn Through								
Worksheet 3-Data	for Cor	mputing	Effec	t of De	elay to	Major	Street V	ehicles
.oznonoco o zaca	IOI COI							
					Moveme	ent 2	Moveme	nt 5
Shared ln volume, Shared ln volume, Sat flow rate, ma	major major jor th	th veh	icles: es:		Moveme	ent 2	0 0 1700	
Shared in volume, Shared in volume, Sat flow rate, ma	major major jor th jor rt	th veh rt veh vehicl	icles: es: es:		Moveme	ent 2	0	
Shared ln volume, Shared ln volume, Sat flow rate, ma Sat flow rate, ma Number of major s	major major jor th jor rt treet	th veh rt veh vehicl vehicl	icles: es: es: lanes	:			0 0 1700 1700	
Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major so Worksheet 4-Critic	major major jor th jor rt treet t	th veh rt veh vehicl vehicl through	icles: es: es: lanes	:			0 0 1700 1700	
Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major so Worksheet 4-Critic	major major th jor rt treet the cal Gapulation 1	th veh rt veh vehicl vehicl through	icles: es: es: lanes	: up Time	e Calcu	ulation	0 0 1700 1700 2	12
Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major so Worksheet 4-Critic	major major th jor rt treet t	th veh rt vehicl vehicl through	icles: es: es: lanes	: up Time	e Calcu	ulation	0 0 1700 1700 2	
Shared ln volume, Shared ln volume, Sat flow rate, ma Sat flow rate, ma Number of major s Worksheet 4-Critic Critical Gap Calco	major major th jor rt treet the cal Gapulation 1	th veh rt veh vehicl vehicl through	icles: es: es: lanes	: up Time	e Calcu	ulation	0 0 1700 1700 2	12
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  E(c,base) E(c,hv)	major major th jor rt treet the cal Gapulation 1	th veh rt veh vehicl vehicl through and F	ricles: es: es: lanes Collow- 7 L 7.1 1.00	: up Time	e Calcu	ulation 10 L	0 0 1700 1700 2	12
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Sumber of major so Worksheet 4-Critic Critical Gap Calco Movement  ((c,base) ((c,hv) ((hv)	major major th jor rt treet t	th veh rt veh vehicl vehicl through p and F	ricles: es: es: lanes Collow- 7 L 7.1 1.00	: up Time 8 T	e Calcu 9 R	10 L	0 0 1700 1700 2	12 R
Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major s Worksheet 4-Critic Critical Gap Calc Movement  (c, base) (c, hv) (c(, by) (c(, g))	major major th jor rt treet t	th veh rt veh vehicl vehicl through and F	7.1 1.00 0 0.20	:  ***********************************	9 R 1.00	10 L 0 1.00	0 0 1700 1700 2 11 T	12 R 1.00 0.10
Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major s  Worksheet 4-Critic Critical Gap Calc Movement  E(c,base) E(c,bv) E(hv) E(c,g) Percent Grade	major major th jor rt treet t	th veh rt veh vehicl vehicl through and F	ricles: es: es: lanes Collow- 7 L 7.1 1.00	: up Time 8 T	e Calcu 9 R	10 L 0 1.00	0 0 1700 1700 2	12 R
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major s  Worksheet 4-Critic Critical Gap Calc Movement  (c,base) (c,hv) (c,hv) (c,g) Percent Grade (3,lt)	major major th jor rt treet t  cal Gap ulation 1 L	th veh rt veh vehicl vehicl through o and F	ricles: es: es: lanes rollow- 7 L 7.1 1.00 0 0.20 0.00	:  ***********************************	9 R 1.00	10 L 0 1.00 0 0.20 0 0.00	0 0 1700 1700 2 11 T	12 R 1.00 0.10
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) Percent Grade C(3,lt) C(c,T): 1-stage 2-stage	major major th jor rt treet to cal Gapulation 1 L 1.00	th veh rt veh vehicl vehicl through and F	Tollow-  7 L  7.1 1.00 0 0.20 0.00 0.70 0.00 1.00	:  **T  1.00  0.20  0.00	9 R 1.00 0.10	lation 10 L 0 1.00 0 0.20 0 0.00 0 0.00	11 T 1.00 0.20 0.00	12 R 1.00 0.10 0.00
Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major s  Worksheet 4-Critic Critical Gap Calc Movement  E(c,base) E(c,hv) E(hv) E(c,g) Percent Grade E(3,lt) E(c,T): 1-stage 2-stage	major major th jor rt treet to cal Gapulation 1 L 1.00	th veh rt veh vehicl vehicl through p and F L 4.1 1.00 6	ricles: es: es: lanes rollow- 7 L 7.1 1.00 0 0.20 0.00 0.70 0.00	:  **T  1.00  0.20  0.00  0.00	9 R 1.00 0.10 0.00	lation 10 L 0 1.00 0 0.20 0 0.00 0 0.00	11 T 1.00 0.20 0.00	12 R 1.00 0.10 0.00 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(c,hv) C(c,g) Cercent Grade C(3,lt) C(c,T): 1-stage 2-stage 2-stage 2-stage	major major th jor rt treet t  cal Gap ulation 1 L	th veh rt veh vehicl vehicl through o and F L 4.1 1.00 6	Tollow-  7 L  7.1 1.00 0 0.20 0.00 0.70 0.00 1.00 6.4	:  **T  1.00  0.20  0.00  0.00	9 R 1.00 0.10 0.00	lation 10 L 0 1.00 0 0.20 0 0.00 0 0.00	11 T 1.00 0.20 0.00	12 R 1.00 0.10 0.00 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(c,hv) C(c,g) Cercent Grade C(3,lt) C(c,T): 1-stage 2-stage 2-stage Collow-Up Time Ca	major major th jor rt treet to cal Gapulation 1 L 1.00	th veh rt veh vehicl vehicl through p and F L 4.1 1.00 6	ricles: es: es: lanes rollow- 7 L 7.1 1.00 0 0.20 0.00 0.70 0.00 1.00 6.4	:  **Bup Time*  8	9 R 1.00 0.10 0.00	lation 10 L 0 1.00 0 0.20 0 0.00 0 1.00	11 T 1.00 0.20 0.00 0.00	12 R 1.00 0.10 0.00 0.00 0.00
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major s  Worksheet 4-Critic Critical Gap Calc Movement  C(c,base) C(c,base) C(c,hv) C(c,g) Cercent Grade C(3,lt) C(c,T): 1-stage 2-stage 2-stage C-stage Collow-Up Time Ca	major major th jor rt treet the cal Gapulation 1 L 1.00	th veh rt veh vehicl vehicl through p and F L 4.1 1.00 6	Tollow-  7 L  7.1 1.00 0 0.20 0.00 0.70 0.00 1.00 6.4	:  **T  1.00  0.20  0.00  1.00	9 R 1.00 0.10 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 1.00	11 T 1.00 0.20 0.00 0.00	12 R 1.00 0.10 0.00 0.00 0.00
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  E(c,base) E(c,hv) P(hv) E(c,g) Percent Grade E(3,lt) E(c,T): 1-stage 2-stage 1-stage 2-stage Follow-Up Time Ca  Movement	major major th jor rt treet to cal Gapulation 1 L 1.00	th veh rt veh vehicl vehicl through p and F L 4.1 1.00 6	ricles: es: es: lanes rollow- 7 L 7.1 1.00 0 0.20 0.00 0.70 0.00 1.00 6.4	:  **Bup Time*  8	9 R 1.00 0.10 0.00 0.00	lation 10 L 0 1.00 0 0.20 0 0.00 0 1.00	11 T 1.00 0.20 0.00 0.00	12 R 1.00 0.10 0.00 0.00 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(c,hv) C(c,g) Cercent Grade C(3,lt) C(c,T): 1-stage 2-stage 2-stage C-stage C-stage C-stage C-stage Collow-Up Time Ca Movement  C(f,base) C(f,base) C(f,base) C(f,base) C(f,base)	major major th jor rt treet to cal Gapulation 1 L 1.00	th veh rt veh vehicl vehicl through o and F L 4.1 1.00 6	7.1 1.00 0.20 0.70 0.70 0.4 7 L	:  **Bup Time*  8	9 R 1.00 0.10 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 1.00 10 L	11 T 1.00 0.20 0.00 0.00	12 R 1.00 0.10 0.00 0.00 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(c,g) Percent Grade C(3,lt) C(c,T): 1-stage 2-stage 1-stage 2-stage Collow-Up Time Ca Movement  C(f,base) C(f,hase) C(f,base) C(f,hase) C(f,hase) C(f,hase) C(f,hase)	major major the property of th	th veh rt veh rt vehicl vehicl through p and F L 4.1 1.00 6 0.00 0.00 4.2 ions 4 L 2.20 0.90 6	Tollow-  7 L  7.1 1.00 0 0.20 0.70 0.00 1.00 6.4	:  **up Time*  **8	9 R 1.00 0.10 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 1.00 10 L	11 T 1.00 0.20 0.00 1.00	12 R 1.00 0.10 0.00 0.00 0.00
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major s  Worksheet 4-Critic Critical Gap Calc Movement  E(c,base) E(c,hv) E(c,hv) E(c,g) Eercent Grade E(3,lt) E(c,T): 1-stage 2-stage 1-stage 2-stage Follow-Up Time Ca Movement  E(f,base) E(f,HV) E(HV)	major major the property of th	th veh rt veh vehicl vehicl through o and F L 4.1 1.00 6	7.1 1.00 0.20 0.00 0.70 0.00 1.00 6.4	:  **up Time*  **8	9 R 1.00 0.10 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 1.00 10 L	11 T 1.00 0.20 0.00 1.00	12 R 1.00 0.10 0.00 0.00 0.00
Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Sat flow rate, ma Number of major s  Worksheet 4-Critic  Critical Gap Calc  Movement  C(c,base) C(c,hv) P(hv) C(c,g) Percent Grade C(3,lt) C(c,T): 1-stage 2-stage C(c) 1-stage 2-stage Follow-Up Time Ca  Movement  C(f,base) C(f,HV) P(HV) C(f,D) C	major major the property of th	th veh rt veh rt veh vehicl vehicl through p and F L 4.1 1.00 6 0.00 0.00 4.2 ions 4 L 2.20 0.90 6 2.3	7.1 1.00 0.20 0.70 0.00 1.00 6.4	:  **up Time*  **8	9 R 1.00 0.10 0.00 0.00	10 L 0 1.00 0 0.20 0 0.00 0 1.00 10 L	11 T 1.00 0.20 0.00 1.00	12 R 1.00 0.10 0.00 0.00 0.00
Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Sat flow rate, ma Number of major s  Worksheet 4-Criti Critical Gap Calc Movement  t(c,base) t(c,hv) P(hv) t(c,g) Percent Grade t(3,1t) t(c,T): 1-stage 2-stage t(c) 1-stage 2-stage Follow-Up Time Ca Movement  t(f,base)	major major the property of th	th veh rt veh rt veh vehicl vehicl through p and F L 4.1 1.00 6 0.00 0.00 4.2 ions 4 L 2.20 0.90 6 2.3 postream	7 L 7.1 1.00 0 0.20 0.00 1.00 6.4 7 L 3.50 0.90 0 3.5	:  up Time  8	9 R 1.00 0.10 0.00 0.00	10 L 1.00 0.20 0.00 1.00 L L 0.90	11 T 1.00 0.20 0.00 1.00	12 R 1.00 0.10 0.00 0.00 0.00
Shared In volume, Shared In volume, Shared In volume, Sat flow rate, ma Sat flow rate, ma Number of major s  Worksheet 4-Critic 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 t(c) 1-stage 2-stage Follow-Up Time Ca Movement  t(f,base) t(f,HV) P(HV) t(f)  Worksheet 5-Effec	major major the property of th	th veh rt veh rt veh vehicl vehicl through p and F L 4.1 1.00 6 0.00 0.00 4.2 ions 4 L 2.20 0.90 6 2.3 postream	7 L 7.1 1.00 0 0.20 0.00 1.00 6.4 7 L 3.50 0.90 0 3.5	:  **T  1.00  0.20  0.00  1.00  8  T  0.90  1s  t Upst:	9 R 1.00 0.10 0.00 0.00 9 R 0.90	10 L 1.00 0.20 0.00 1.00 L L 0.90	0 0 1700 1700 2 11 T 1.00 0.20 0.00 0.00 1.00	12 R 1.00 0.10 0.00 0.00 0.00