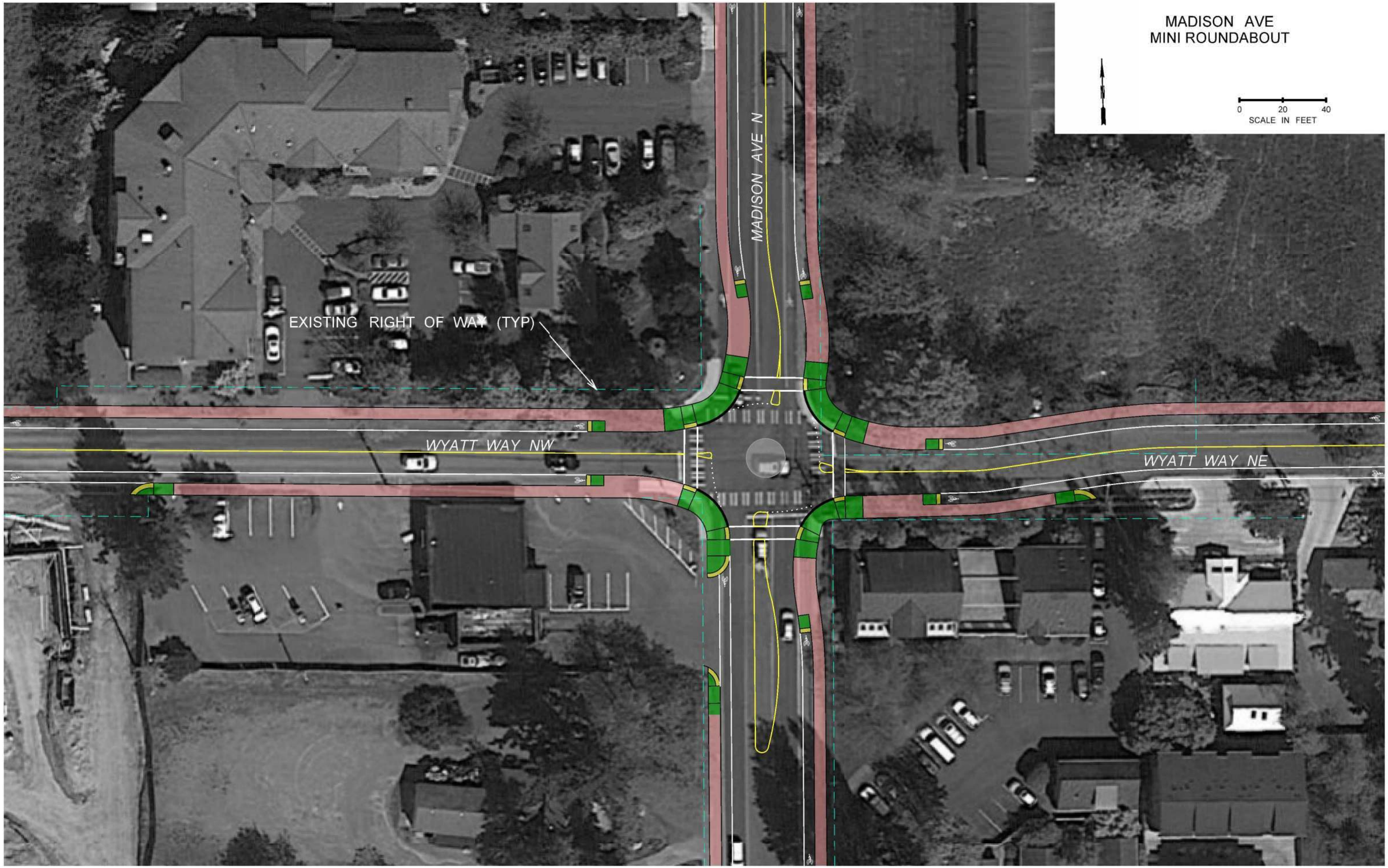
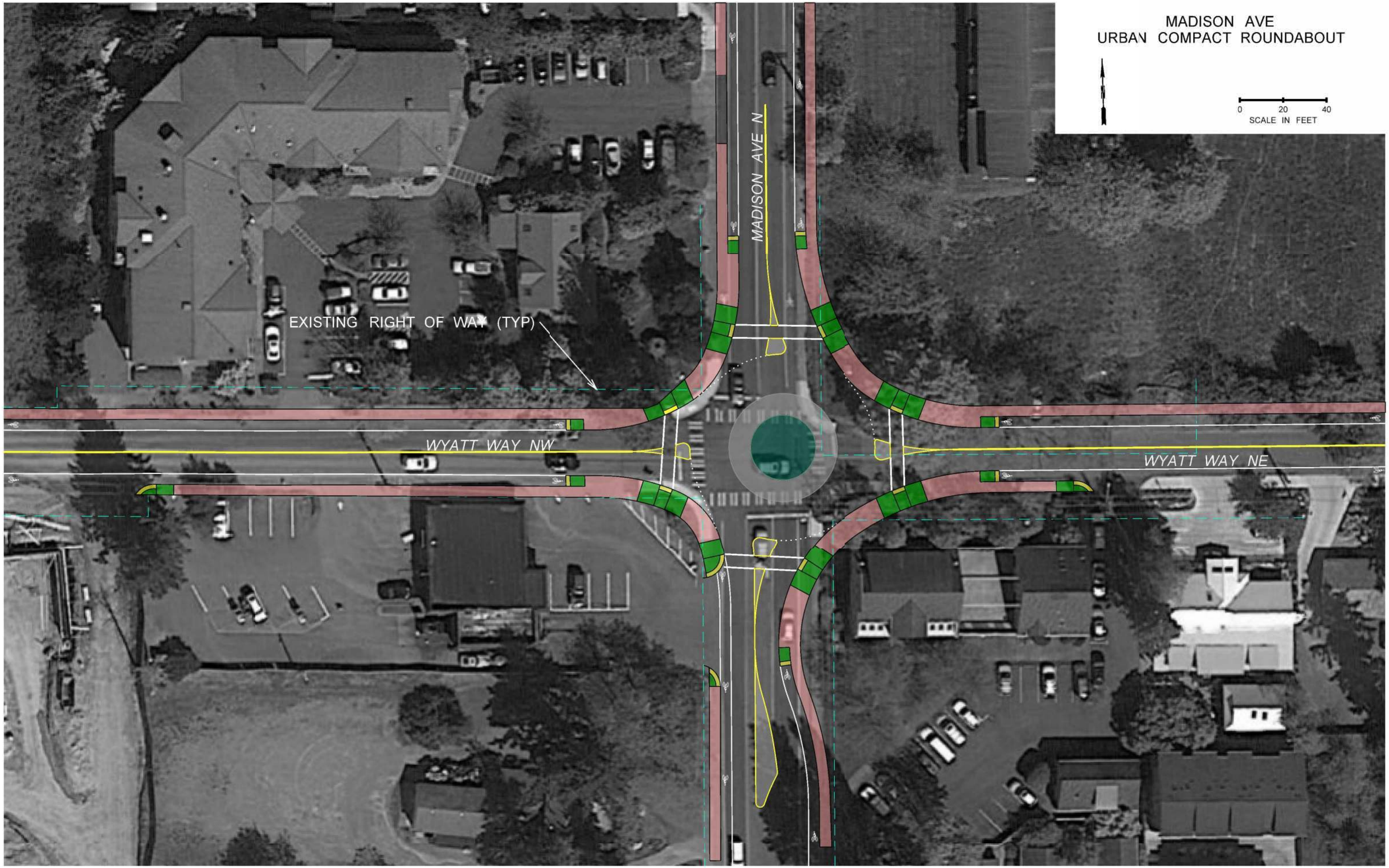
Appendix A
Roundabout Concepts


MADISON AVE
MINI ROUNDABOUT
0
20
40
SCALE IN FEET
MADISON AVE N
EXISTING RIGHT OF WAY (TYP)
WYATT WAY NW
WYATT WAY NE


MADISON AVE
URBAN COMPACT ROUNDABOUT
0
20
40
SCALE IN FEET
MADISON AVE N
EXISTING RIGHT OF WAY (TYP)
WYATT WAY NW
WYATT WAY NE

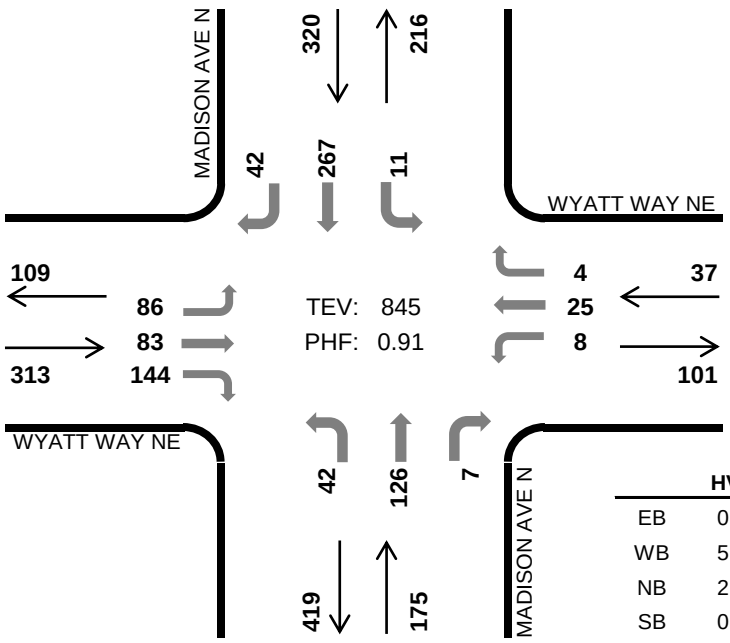
Appendix B
Traffic Count Data

MADISON AVE N
WYATT WAY NE

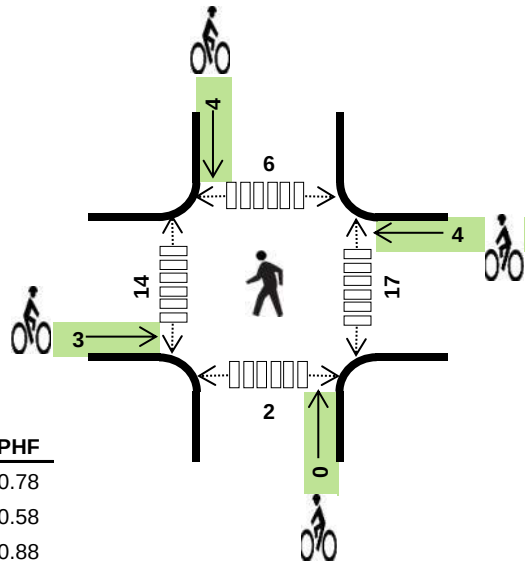
Date: Wed, Jun 11, 2014
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM

N

Peak Hour



	HV %:	PHF
EB	0.3%	0.78
WB	5.4%	0.58
NB	2.9%	0.88
SB	0.9%	0.84
TOTAL	1.3%	0.91



Two-Hour Count Summaries

Interval Start	WYATT WAY NE Eastbound			WYATT WAY NE Westbound			MADISON AVE N Northbound			MADISON AVE N Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	4	4	4	0	3	1	14	19	0	0	23	3	75	
7:15 AM	14	12	21	2	2	2	4	13	0	0	32	4	106	
7:30 AM	8	24	42	1	6	6	11	18	1	2	45	4	168	
7:45 AM	19	22	38	1	15	2	12	31	0	6	69	13	228	577
8:00 AM	**15**	**15**	**26**	**0**	**3**	**0**	**8**	**26**	**1**	**3**	**60**	**7**	**164**	666
8:15 AM	**22**	**34**	**44**	**0**	**6**	**1**	**8**	**33**	**1**	**5**	**57**	**10**	**221**	781
8:30 AM	**27**	**20**	**33**	**5**	**9**	**2**	**11**	**37**	**2**	**2**	**67**	**14**	**229**	842
8:45 AM	**22**	**14**	**41**	**3**	**7**	**1**	**15**	**30**	**3**	**1**	**83**	**11**	**231**	**845**
Count Total	131	145	249	12	51	15	83	207	8	19	436	66	1,422	
Peak Hr	**86**	**83**	**144**	**8**	**25**	**4**	**42**	**126**	**7**	**11**	**267**	**42**	**845**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	0	4	0	*5*	0	0	0	2	*2*	0	0	0	0	*0*
7:15 AM	0	1	0	1	*2*	0	0	0	0	*0*	5	1	0	1	*7*
7:30 AM	2	0	0	1	*3*	0	0	0	2	*2*	3	3	0	0	*6*
7:45 AM	0	0	3	0	*3*	1	0	0	5	*6*	0	0	0	0	*0*
8:00 AM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**1**	***1***	**4**	**4**	**0**	**0**	***8***
8:15 AM	**0**	**1**	**0**	**1**	***2***	**0**	**0**	**0**	**3**	***3***	**7**	**5**	**6**	**1**	***19***
8:30 AM	**1**	**1**	**4**	**1**	***7***	**2**	**1**	**0**	**0**	***3***	**4**	**3**	**0**	**1**	***8***
8:45 AM	**0**	**0**	**0**	**0**	***0***	**1**	**3**	**0**	**0**	***4***	**2**	**2**	**0**	**0**	***4***
Count Total	4	3	12	5	*24*	4	4	0	13	*21*	25	18	6	3	*52*
Peak Hr	**1**	**2**	**5**	**3**	***11***	**3**	**4**	**0**	**4**	***11***	**17**	**14**	**6**	**2**	***39***

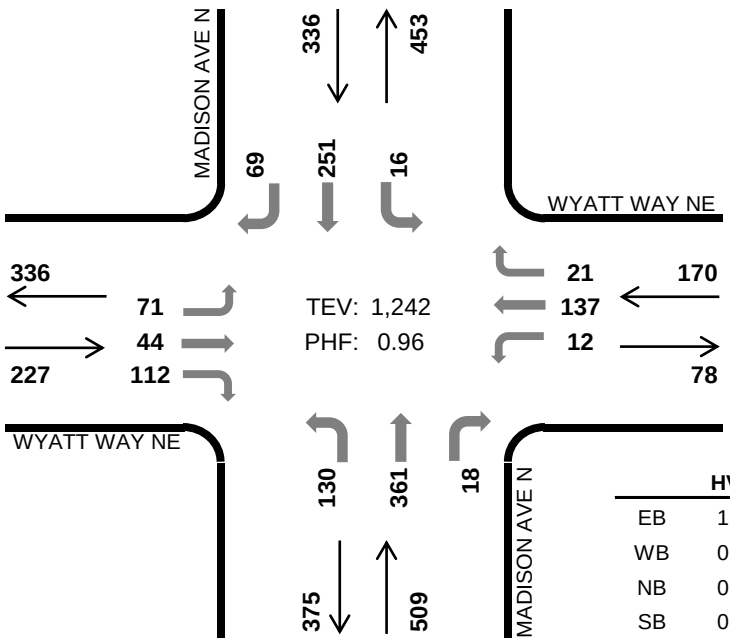
Mark Skaggs: 425 - 250 - 0777 mark.skaggs@idaxdata.com

MADISON AVE N
WYATT WAY NE

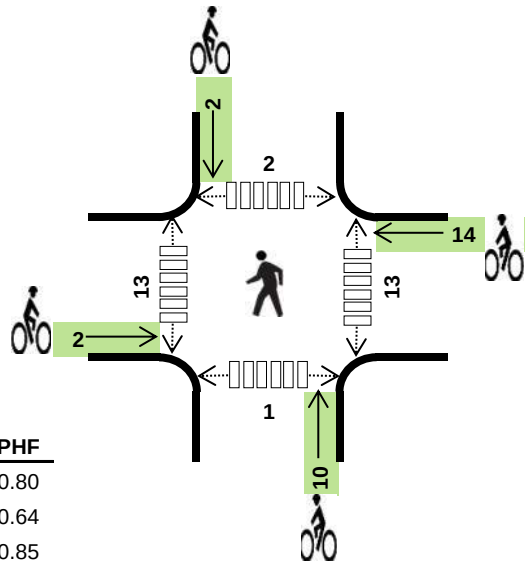
Date: Wed, Jun 11, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour



	HV %:	PHF
EB	1.8%	0.80
WB	0.6%	0.64
NB	0.6%	0.85
SB	0.6%	0.93
TOTAL	0.8%	0.96



Two-Hour Count Summaries

Interval Start	WYATT WAY NE Eastbound			WYATT WAY NE Westbound			MADISON AVE N Northbound			MADISON AVE N Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	25	12	30	2	17	5	24	68	1	3	65	10	262	
4:15 PM	19	12	28	2	26	5	31	68	3	2	59	14	269	
4:30 PM	**16**	**6**	**27**	**4**	**31**	**5**	**45**	**102**	**2**	**3**	**63**	**19**	**323**	
4:45 PM	**21**	**10**	**30**	**5**	**19**	**4**	**23**	**85**	**3**	**6**	**71**	**13**	**290**	1,144
5:00 PM	**24**	**17**	**30**	**1**	**32**	**3**	**28**	**99**	**9**	**3**	**55**	**20**	**321**	1,203
5:15 PM	**10**	**11**	**25**	**2**	**55**	**9**	**34**	**75**	**4**	**4**	**62**	**17**	**308**	**1,242**
5:30 PM	16	9	19	3	21	7	34	56	3	2	53	15	238	1,157
5:45 PM	19	5	19	3	17	4	26	63	1	2	50	18	227	1,094
Count Total	150	82	208	22	218	42	245	616	26	25	478	126	2,238	
Peak Hr	**71**	**44**	**112**	**12**	**137**	**21**	**130**	**361**	**18**	**16**	**251**	**69**	**1,242**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

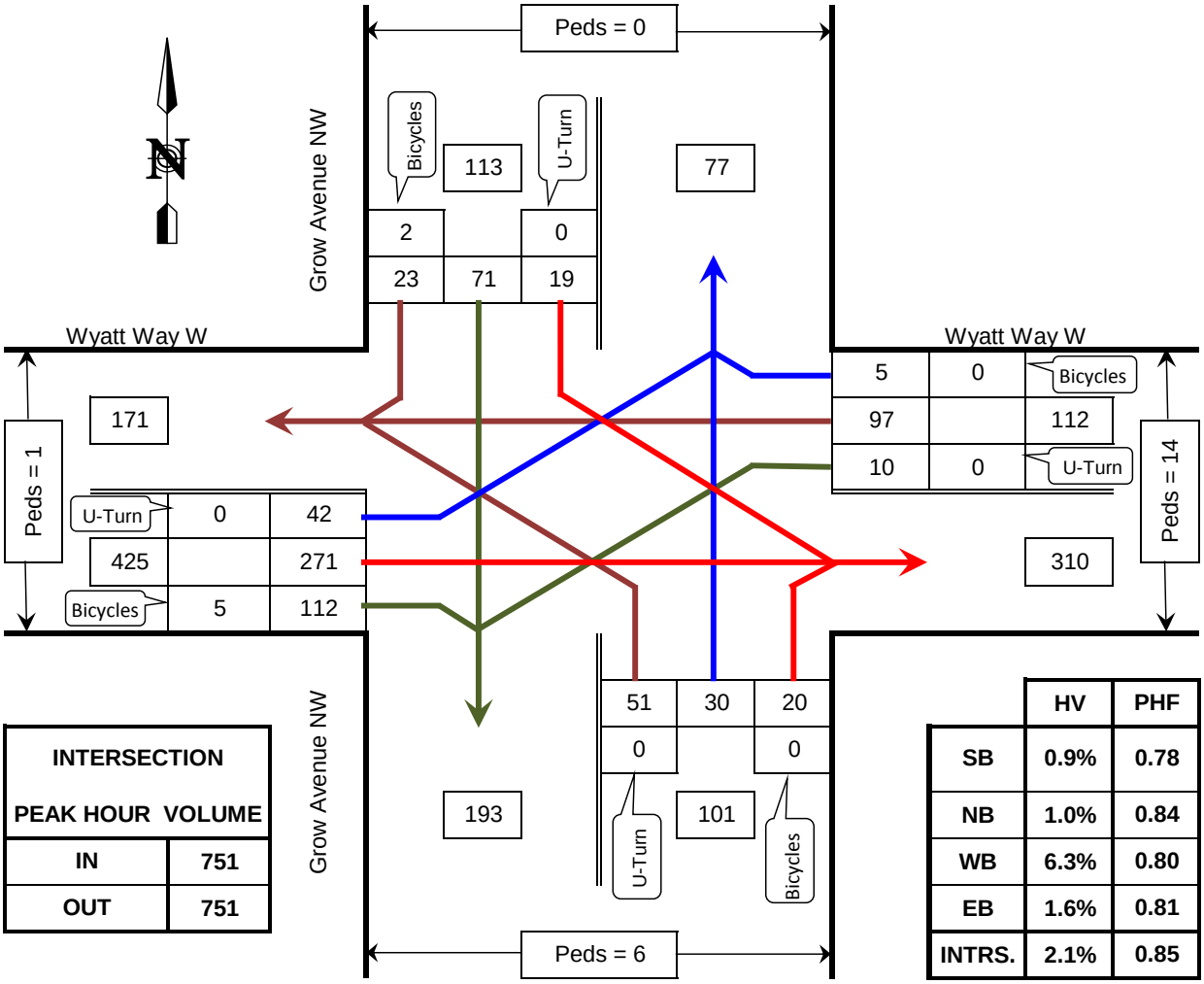
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	1	1	2	*6*	0	0	0	3	*3*	0	9	2	1	*12*
4:15 PM	1	0	1	2	*4*	0	0	0	3	*3*	9	0	0	0	*9*
4:30 PM	**1**	**0**	**2**	**1**	***4***	**0**	**2**	**2**	**0**	***4***	**1**	**1**	**1**	**0**	***3***
4:45 PM	**0**	**0**	**1**	**0**	***1***	**0**	**2**	**2**	**1**	***5***	**2**	**3**	**0**	**1**	***6***
5:00 PM	**3**	**0**	**0**	**0**	***3***	**1**	**1**	**0**	**0**	***2***	**3**	**4**	**0**	**0**	***7***
5:15 PM	**0**	**1**	**0**	**1**	***2***	**1**	**9**	**6**	**1**	***17***	**7**	**5**	**1**	**0**	***13***
5:30 PM	1	0	2	2	*5*	2	1	3	0	*6*	6	1	0	0	*7*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	4	7	0	0	*11*
Count Total	8	2	7	8	*25*	4	15	13	8	*40*	32	30	4	2	*68*
Peak Hr	**4**	**1**	**3**	**2**	***10***	**2**	**14**	**10**	**2**	***28***	**13**	**13**	**2**	**1**	***29***

Mark Skaggs: 425 - 250 - 0777 mark.skaggs@idaxdata.com

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:00 AM - 9:00 AM PEAK HOUR: 7:45 AM TO 8:45 AM



INTERSECTION PEAK HOUR VOLUME	
IN	751
OUT	751

	HV	PHF
SB	0.9%	0.78
NB	1.0%	0.84
WB	6.3%	0.80
EB	1.6%	0.81
INTRS.	2.1%	0.85

PHF = Peak Hour Factor
HV = Heavy Vehicle

Wyatt Way W @ Grow Avenue NW

Bainbridge Island, WA

COUNTED BY:	SN	DATE OF COUNT:	Wed. 2/10/16
REDUCED BY:	CN	TIME OF COUNT:	7:00 AM - 9:00 AM
REDUCTION DATE:	Thu. 2/11/16	WEATHER:	Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Wyatt Way W @ Grow Avenue NW
Bainbridge Island, WA

DATE OF COUNT: Wed. 2/10/16
TIME OF COUNT: 7:00 AM - 9:00 AM

COUNTED BY: SN
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON Grow Avenue NW							FROM SOUTH ON Grow Avenue NW							FROM EAST ON Wyatt Way W							FROM WEST ON Wyatt Way W							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
05:15 AM	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**
05:30 AM	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**
05:45 AM	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**
06:00 AM	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**
06:15 AM	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**
06:30 AM	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**
06:45 AM	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**
07:00 AM	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**
07:15 AM	0	0	0	0	0	4	1	0	0	0	0	2	3	0	2	0	4	0	0	15	0	0	0	1	0	1	16	3	**45**
07:30 AM	0	0	1	0	6	0	0	1	3	2	0	4	5	2	1	0	0	0	4	5	1	0	0	0	0	2	43	16	**88**
07:45 AM	0	2	0	0	2	16	6	3	6	1	0	10	10	1	0	0	0	0	0	16	3	0	3	3	0	5	76	34	**179**
08:00 AM	0	0	0	0	4	16	4	1	0	0	0	13	4	4	0	0	5	0	2	25	1	0	2	1	0	10	72	34	**189**
08:15 AM	0	1	0	0	1	16	4	1	0	1	0	11	5	7	4	0	0	0	2	17	2	1	0	0	0	6	53	14	**138**
08:30 AM	0	0	0	0	8	17	7	2	0	0	0	12	12	6	7	0	1	0	1	25	2	0	1	3	0	20	75	36	**221**
08:45 AM	0	1	1	0	6	22	8	2	0	0	0	15	9	3	3	0	1	0	5	30	0	0	2	3	0	6	71	28	**203**
09:00 AM	0	0	2	0	7	19	4	2	0	0	0	18	5	2	0	0	1	0	5	22	1	0	0	1	0	2	58	23	**166**
PEAK HOUR TOTALS	**0**	**2**	**1**	**0**	**19**	**71**	**23**	**6**	**0**	**1**	**0**	**51**	**30**	**20**	**14**	**0**	**7**	**0**	**10**	**97**	**5**	**1**	**5**	**7**	**0**	**42**	**271**	**112**	**INTERSECTION**
ALL MOVEMENTS				**113**							**101**							**112**							**425**				**751**
% HV			**0.9%**							**1.0%**							**6.3%**							**1.6%**				**2.1%**
PEAK HOUR FACTOR				**0.78**							**0.84**							**0.80**							**0.81**				**0.85**

HV = Heavy Vehicle
PHF = Peak Hour Factor

7:00 AM - 9:00 AM PEAK HOUR: 7:45 AM TO 8:45 AM

REDUCED BY: CN

DATE OF REDUCTION: 2/11/2016

ROLLING HOUR COUNT

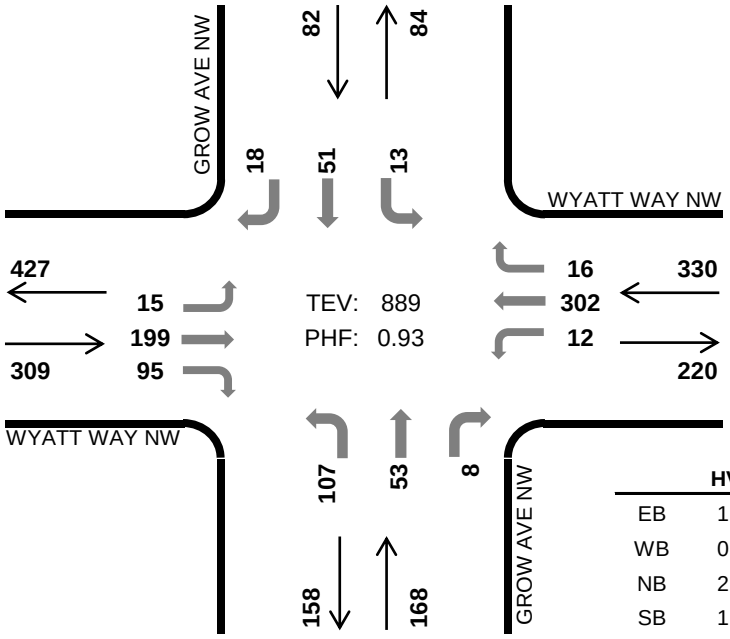
	FROM NORTH ON Grow Avenue NW							FROM SOUTH ON Grow Avenue NW							FROM EAST ON Wyatt Way W							FROM WEST ON Wyatt Way W							INTERVAL TOTALS
TIME INTERVAL	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
5:00 AM - 6:00 AM	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
5:15 AM - 6:15 AM	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
5:30 AM - 6:30 AM	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
5:45 AM - 6:45 AM	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
6:00 AM - 7:00 AM	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
6:15 AM - 7:15 AM	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
6:30 AM - 7:30 AM	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
6:45 AM - 7:45 AM	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
7:00 AM - 8:00 AM	0	2	1	0	12	36	11	5	9	3	0	29	22	7	3	0	9	0	6	61	5	0	5	5	0	18	207	87	501
7:15 AM - 8:15 AM	0	3	1	0	13	48	14	6	9	4	0	38	24	14	5	0	5	0	8	63	7	1	5	4	0	23	244	98	594
7:30 AM - 8:30 AM	0	3	0	0	15	65	21	7	6	2	0	46	31	18	11	0	6	0	5	83	8	1	6	7	0	41	276	118	727
7:45 AM - 8:45 AM	0	2	1	0	19	71	23	6	0	1	0	51	30	20	14	0	7	0	10	97	5	1	5	7	0	42	271	112	751
8:00 AM - 9:00 AM	0	2	3	0	22	74	23	7	0	1	0	56	31	18	14	0	3	0	13	94	5	1	3	7	0	34	257	101	728

GROW AVE NW
WYATT WAY NW

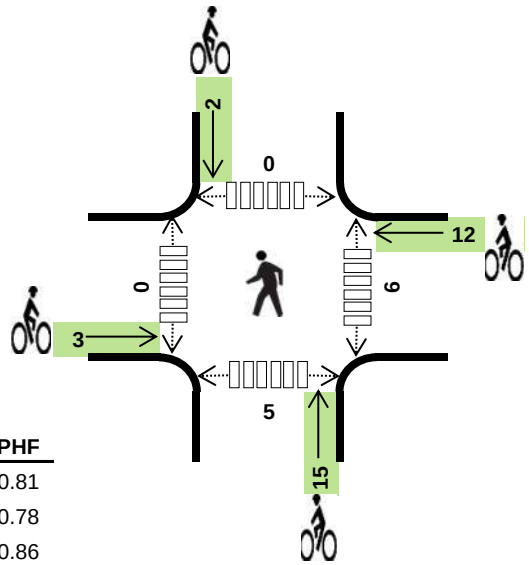
Date: Wed, Jun 11, 2014
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour



	HV %:	PHF
EB	1.6%	0.81
WB	0.6%	0.78
NB	2.4%	0.86
SB	1.2%	0.73
TOTAL	1.3%	0.93



Two-Hour Count Summaries

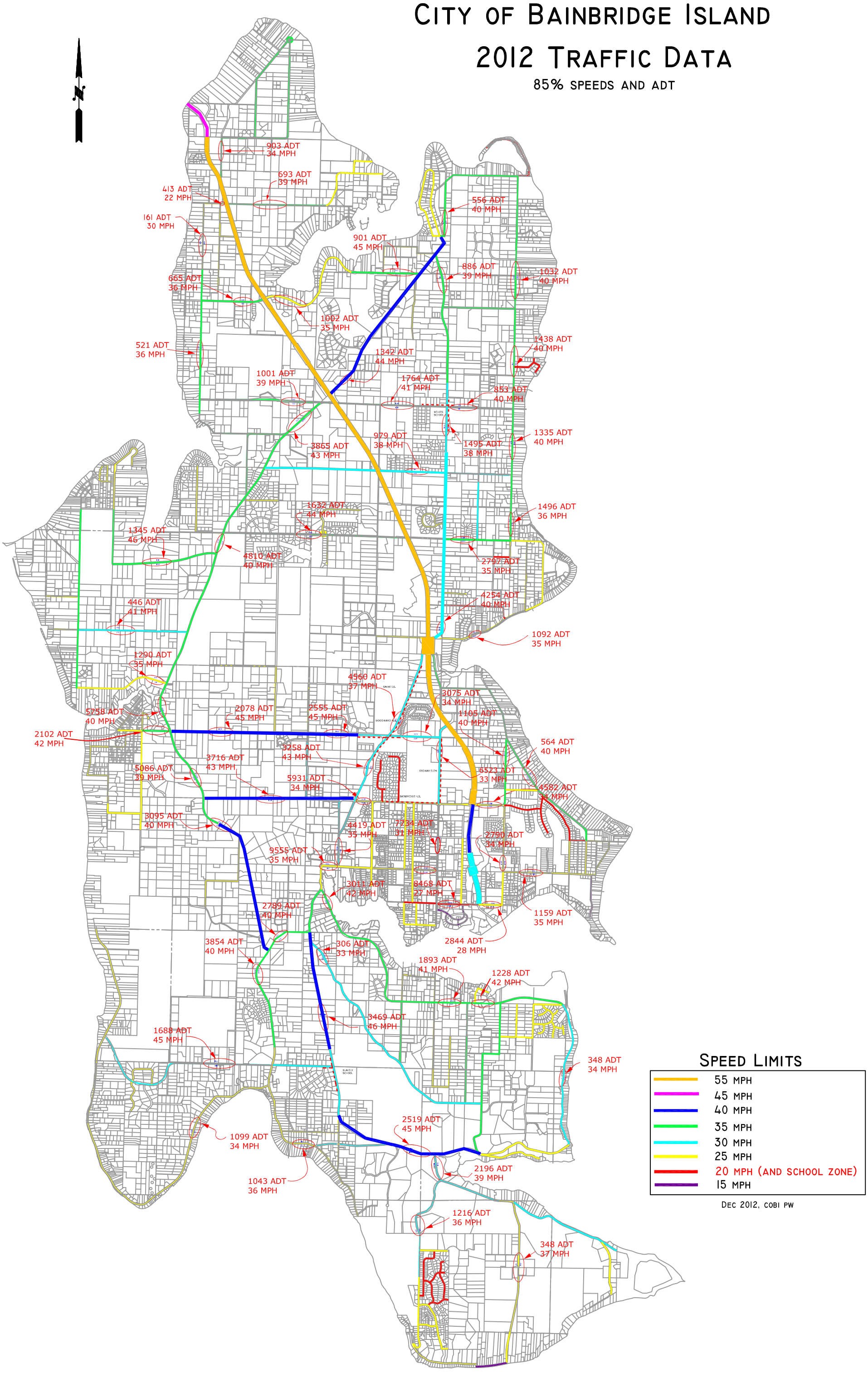
Interval Start	WYATT WAY NW Eastbound			WYATT WAY NW Westbound			GROW AVE NW Northbound			GROW AVE NW Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	3	57	16	1	46	4	21	10	2	1	10	3	174	
4:15 PM	8	47	19	1	64	5	33	13	5	6	16	2	219	
4:30 PM	**1**	**42**	**13**	**4**	**83**	**3**	**32**	**15**	**2**	**3**	**13**	**3**	**214**	
4:45 PM	**6**	**50**	**28**	**2**	**54**	**2**	**28**	**11**	**2**	**8**	**15**	**5**	**211**	818
5:00 PM	**3**	**62**	**30**	**5**	**64**	**7**	**20**	**14**	**2**	**1**	**13**	**5**	**226**	870
5:15 PM	**5**	**45**	**24**	**1**	**101**	**4**	**27**	**13**	**2**	**1**	**10**	**5**	**238**	**889**
5:30 PM	1	43	14	1	70	2	31	14	2	2	12	4	196	871
5:45 PM	2	41	18	3	55	5	18	10	2	3	12	3	172	832
Count Total	29	387	162	18	537	32	210	100	19	25	101	30	1,650	
Peak Hr	**15**	**199**	**95**	**12**	**302**	**16**	**107**	**53**	**8**	**13**	**51**	**18**	**889**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	0	2	0	*4*	2	0	0	0	*2*	2	2	0	0	*4*
4:15 PM	1	1	1	0	*3*	3	0	2	0	*5*	0	0	0	0	*0*
4:30 PM	**1**	**2**	**4**	**0**	***7***	**0**	**0**	**2**	**1**	***3***	**3**	**0**	**0**	**0**	***3***
4:45 PM	**0**	**0**	**0**	**1**	***1***	**0**	**1**	**2**	**1**	***4***	**1**	**0**	**0**	**2**	***3***
5:00 PM	**3**	**0**	**0**	**0**	***3***	**1**	**1**	**0**	**0**	***2***	**2**	**0**	**0**	**3**	***5***
5:15 PM	**1**	**0**	**0**	**0**	***1***	**2**	**10**	**11**	**0**	***23***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	2	2	1	*5*	3	1	2	0	*6*	1	0	0	0	*1*
5:45 PM	2	0	0	0	*2*	0	0	0	1	*1*	0	0	0	0	*0*
Count Total	10	5	9	2	*26*	11	13	19	3	*46*	9	2	0	5	*16*
Peak Hr	**5**	**2**	**4**	**1**	***12***	**3**	**12**	**15**	**2**	***32***	**6**	**0**	**0**	**5**	***11***

Mark Skaggs: 425 - 250 - 0777 mark.skaggs@idaxdata.com

City of Bainbridge Island
2012 Traffic Data
85% speeds and ADT



Appendix C
Sim Traffic

Intersection: 17: Grow Ave NW & Wyatt Way NW/Wyatt Way NE

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	104	54	56	55
Average Queue (ft)	83	37	40	38
95th Queue (ft)	108	52	58	56
Link Distance (ft)	774	846	257	1266
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Madison Ave N & Wyatt Way NE

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	LTR
Maximum Queue (ft)	95	54	30	77	96
Average Queue (ft)	57	29	24	47	60
95th Queue (ft)	86	53	41	73	91
Link Distance (ft)	846	447		630	1316
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			200		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 0

Intersection: 17: Grow Ave NW & Wyatt Way NW/Wyatt Way NE

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	100	74	93	55
Average Queue (ft)	59	56	57	35
95th Queue (ft)	81	77	92	48
Link Distance (ft)	774	846	257	1266
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Madison Ave N & Wyatt Way NE

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	LTR
Maximum Queue (ft)	101	56	53	116	175
Average Queue (ft)	61	46	44	73	90
95th Queue (ft)	77	63	60	111	139
Link Distance (ft)	846	447		630	1316
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			200		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 0

Intersection: 17: Grow Ave NW & Wyatt Way NW/Wyatt Way NE

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	170	55	56	55
Average Queue (ft)	106	41	33	37
95th Queue (ft)	154	58	60	55
Link Distance (ft)	775	849	259	1266
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Madison Ave N & Wyatt Way NE

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	LTR
Maximum Queue (ft)	118	55	30	71	104
Average Queue (ft)	75	25	25	43	66
95th Queue (ft)	112	55	42	68	100
Link Distance (ft)	849	449		630	1318
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			200		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 0

Intersection: 17: Grow Ave NW & Wyatt Way NW/Wyatt Way NE

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	188	118	120	54
Average Queue (ft)	92	77	76	40
95th Queue (ft)	178	116	135	57
Link Distance (ft)	774	846	257	1266
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: Madison Ave N & Wyatt Way NE

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	LTR
Maximum Queue (ft)	111	93	225	288	139
Average Queue (ft)	76	65	66	161	99
95th Queue (ft)	109	94	178	265	146
Link Distance (ft)	846	447		630	1268
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			200		
Storage Blk Time (%)				11	
Queuing Penalty (veh)				17	

Network Summary

Network wide Queuing Penalty: 17

Appendix D
Sidra Outputs

MOVEMENT SUMMARY

Site: Madison Ave - 2014 AM Mini-Roundabout

Wyatt Way & Madison Ave N
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Madison Ave N											
3	L2	42	1.0	0.187	5.7	LOS A	1.0	25.3	0.41	0.26	23.3
8	T1	126	1.0	0.187	5.7	LOS A	1.0	25.3	0.41	0.26	23.5
18	R2	7	1.0	0.187	5.7	LOS A	1.0	25.3	0.41	0.26	23.1
Approach		175	1.0	0.187	5.7	LOS A	1.0	25.3	0.41	0.26	23.4
East: Wyatt Way											
1	L2	8	1.0	0.043	4.5	LOS A	0.2	5.2	0.43	0.27	23.9
6	T1	25	1.0	0.043	4.5	LOS A	0.2	5.2	0.43	0.27	23.5
16	R2	4	1.0	0.043	4.5	LOS A	0.2	5.2	0.43	0.27	23.3
Approach		37	1.0	0.043	4.5	LOS A	0.2	5.2	0.43	0.27	23.6
North: Madison											
7	L2	11	1.0	0.303	6.4	LOS A	1.8	44.6	0.28	0.14	23.7
4	T1	267	1.0	0.303	6.4	LOS A	1.8	44.6	0.28	0.14	23.5
14	R2	42	1.0	0.303	6.4	LOS A	1.8	44.6	0.28	0.14	22.6
Approach		320	1.0	0.303	6.4	LOS A	1.8	44.6	0.28	0.14	23.4
West: Wyatt Way											
5	L2	86	2.0	0.368	8.5	LOS A	2.2	55.0	0.56	0.44	22.3
2	T1	83	2.0	0.368	8.5	LOS A	2.2	55.0	0.56	0.44	22.1
12	R2	144	2.0	0.368	8.5	LOS A	2.2	55.0	0.56	0.44	21.7
Approach		313	2.0	0.368	8.5	LOS A	2.2	55.0	0.56	0.44	22.0
All Vehicles		845	1.4	0.368	7.0	LOS A	2.2	55.0	0.42	0.28	22.9

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Madison Ave - 2014 AM Urban Compact Roundabout

Wyatt Way & Madison Ave N
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Madison Ave N											
3	L2	42	1.0	0.165	4.9	LOS A	0.9	22.3	0.39	0.24	24.3
8	T1	126	1.0	0.165	4.9	LOS A	0.9	22.3	0.39	0.24	24.1
18	R2	7	1.0	0.165	4.9	LOS A	0.9	22.3	0.39	0.24	23.5
Approach		175	1.0	0.165	4.9	LOS A	0.9	22.3	0.39	0.24	24.1
East: Wyatt Way											
1	L2	8	1.0	0.038	4.1	LOS A	0.2	4.7	0.42	0.25	24.7
6	T1	25	1.0	0.038	4.1	LOS A	0.2	4.7	0.42	0.25	24.1
16	R2	4	1.0	0.038	4.1	LOS A	0.2	4.7	0.42	0.25	23.8
Approach		37	1.0	0.038	4.1	LOS A	0.2	4.7	0.42	0.25	24.2
North: Madison											
7	L2	11	1.0	0.281	5.8	LOS A	1.6	40.6	0.26	0.13	24.4
4	T1	267	1.0	0.281	5.8	LOS A	1.6	40.6	0.26	0.13	24.1
14	R2	42	1.0	0.281	5.8	LOS A	1.6	40.6	0.26	0.13	23.2
Approach		320	1.0	0.281	5.8	LOS A	1.6	40.6	0.26	0.13	24.0
West: Wyatt Way											
5	L2	86	2.0	0.342	7.7	LOS A	2.0	50.5	0.53	0.41	23.2
2	T1	83	2.0	0.342	7.7	LOS A	2.0	50.5	0.53	0.41	22.8
12	R2	144	2.0	0.342	7.7	LOS A	2.0	50.5	0.53	0.41	22.2
Approach		313	2.0	0.342	7.7	LOS A	2.0	50.5	0.53	0.41	22.6
All Vehicles		845	1.4	0.342	6.2	LOS A	2.0	50.5	0.40	0.26	23.6

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Madison Ave - 2014 PM Mini-Roundabout

Wyatt Way & Madison Ave N
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Madison Ave N											
3	L2	130	1.0	0.580	11.6	LOS B	4.9	123.6	0.55	0.35	21.6
8	T1	361	1.0	0.580	11.6	LOS B	4.9	123.6	0.55	0.35	22.1
18	R2	81	1.0	0.580	11.6	LOS B	4.9	123.6	0.55	0.35	21.7
Approach		572	1.0	0.580	11.6	LOS B	4.9	123.6	0.55	0.35	22.0
East: Wyatt Way											
1	L2	21	1.0	0.271	9.2	LOS A	1.6	39.9	0.72	0.66	22.9
6	T1	137	1.0	0.271	9.2	LOS A	1.6	39.9	0.72	0.66	22.2
16	R2	12	1.0	0.271	9.2	LOS A	1.6	39.9	0.72	0.66	22.3
Approach		170	1.0	0.271	9.2	LOS A	1.6	39.9	0.72	0.66	22.3
North: Madison											
7	L2	16	1.0	0.394	8.9	LOS A	2.4	61.2	0.58	0.47	23.0
4	T1	251	1.0	0.394	8.9	LOS A	2.4	61.2	0.58	0.47	22.9
14	R2	69	1.0	0.394	8.9	LOS A	2.4	61.2	0.58	0.47	21.8
Approach		336	1.0	0.394	8.9	LOS A	2.4	61.2	0.58	0.47	22.7
West: Wyatt Way											
5	L2	71	2.0	0.273	7.3	LOS A	1.5	39.3	0.54	0.42	22.6
2	T1	44	2.0	0.273	7.3	LOS A	1.5	39.3	0.54	0.42	22.4
12	R2	112	2.0	0.273	7.3	LOS A	1.5	39.3	0.54	0.42	22.0
Approach		227	2.0	0.273	7.3	LOS A	1.5	39.3	0.54	0.42	22.3
All Vehicles		1305	1.2	0.580	9.8	LOS A	4.9	123.6	0.58	0.43	22.2

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Madison Ave - 2014 PM Urban Compact Roundabout

Wyatt Way & Madison Ave N
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Madison Ave N											
3	L2	130	1.0	0.515	9.2	LOS A	4.0	102.0	0.48	0.29	22.9
8	T1	361	1.0	0.515	9.2	LOS A	4.0	102.0	0.48	0.29	23.0
18	R2	81	1.0	0.515	9.2	LOS A	4.0	102.0	0.48	0.29	22.5
Approach		572	1.0	0.515	9.2	LOS A	4.0	102.0	0.48	0.29	22.9
East: Wyatt Way											
1	L2	21	1.0	0.236	7.7	LOS A	1.4	35.1	0.69	0.61	23.8
6	T1	137	1.0	0.236	7.7	LOS A	1.4	35.1	0.69	0.61	23.1
16	R2	12	1.0	0.236	7.7	LOS A	1.4	35.1	0.69	0.61	23.0
Approach		170	1.0	0.236	7.7	LOS A	1.4	35.1	0.69	0.61	23.2
North: Madison											
7	L2	16	1.0	0.361	7.9	LOS A	2.2	55.3	0.55	0.43	23.9
4	T1	251	1.0	0.361	7.9	LOS A	2.2	55.3	0.55	0.43	23.5
14	R2	69	1.0	0.361	7.9	LOS A	2.2	55.3	0.55	0.43	22.5
Approach		336	1.0	0.361	7.9	LOS A	2.2	55.3	0.55	0.43	23.4
West: Wyatt Way											
5	L2	71	2.0	0.253	6.7	LOS A	1.4	36.4	0.52	0.39	23.5
2	T1	44	2.0	0.253	6.7	LOS A	1.4	36.4	0.52	0.39	23.1
12	R2	112	2.0	0.253	6.7	LOS A	1.4	36.4	0.52	0.39	22.4
Approach		227	2.0	0.253	6.7	LOS A	1.4	36.4	0.52	0.39	22.9
All Vehicles		1305	1.2	0.515	8.2	LOS A	4.0	102.0	0.53	0.39	23.1

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Madison Ave - 2035 AM Mini-Roundabout

Wyatt Way & Madison Ave N
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Madison Ave N											
3	L2	43	1.0	0.191	5.7	LOS A	1.0	25.9	0.42	0.27	23.3
8	T1	128	1.0	0.191	5.7	LOS A	1.0	25.9	0.42	0.27	23.5
18	R2	7	1.0	0.191	5.7	LOS A	1.0	25.9	0.42	0.27	23.0
Approach		178	1.0	0.191	5.7	LOS A	1.0	25.9	0.42	0.27	23.4
East: Wyatt Way											
1	L2	8	1.0	0.043	4.6	LOS A	0.2	5.2	0.44	0.27	23.9
6	T1	25	1.0	0.043	4.6	LOS A	0.2	5.2	0.44	0.27	23.5
16	R2	4	1.0	0.043	4.6	LOS A	0.2	5.2	0.44	0.27	23.3
Approach		37	1.0	0.043	4.6	LOS A	0.2	5.2	0.44	0.27	23.6
North: Madison											
7	L2	11	1.0	0.309	6.5	LOS A	1.8	45.8	0.29	0.14	23.6
4	T1	272	1.0	0.309	6.5	LOS A	1.8	45.8	0.29	0.14	23.5
14	R2	43	1.0	0.309	6.5	LOS A	1.8	45.8	0.29	0.14	22.6
Approach		326	1.0	0.309	6.5	LOS A	1.8	45.8	0.29	0.14	23.4
West: Wyatt Way											
5	L2	87	2.0	0.374	8.7	LOS A	2.2	56.3	0.56	0.45	22.3
2	T1	84	2.0	0.374	8.7	LOS A	2.2	56.3	0.56	0.45	22.1
12	R2	146	2.0	0.374	8.7	LOS A	2.2	56.3	0.56	0.45	21.6
Approach		317	2.0	0.374	8.7	LOS A	2.2	56.3	0.56	0.45	21.9
All Vehicles		858	1.4	0.374	7.0	LOS A	2.2	56.3	0.42	0.29	22.9

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Madison Ave - 2035 AM Urban Compact Roundabout

Wyatt Way & Madison Ave N
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Madison Ave N											
3	L2	43	1.0	0.169	4.9	LOS A	0.9	22.9	0.39	0.24	24.3
8	T1	128	1.0	0.169	4.9	LOS A	0.9	22.9	0.39	0.24	24.1
18	R2	7	1.0	0.169	4.9	LOS A	0.9	22.9	0.39	0.24	23.5
Approach		178	1.0	0.169	4.9	LOS A	0.9	22.9	0.39	0.24	24.1
East: Wyatt Way											
1	L2	8	1.0	0.038	4.1	LOS A	0.2	4.7	0.42	0.25	24.7
6	T1	25	1.0	0.038	4.1	LOS A	0.2	4.7	0.42	0.25	24.1
16	R2	4	1.0	0.038	4.1	LOS A	0.2	4.7	0.42	0.25	23.8
Approach		37	1.0	0.038	4.1	LOS A	0.2	4.7	0.42	0.25	24.2
North: Madison											
7	L2	11	1.0	0.287	5.9	LOS A	1.7	41.7	0.27	0.13	24.4
4	T1	272	1.0	0.287	5.9	LOS A	1.7	41.7	0.27	0.13	24.1
14	R2	43	1.0	0.287	5.9	LOS A	1.7	41.7	0.27	0.13	23.2
Approach		326	1.0	0.287	5.9	LOS A	1.7	41.7	0.27	0.13	24.0
West: Wyatt Way											
5	L2	87	2.0	0.348	7.8	LOS A	2.0	51.7	0.54	0.42	23.2
2	T1	84	2.0	0.348	7.8	LOS A	2.0	51.7	0.54	0.42	22.8
12	R2	146	2.0	0.348	7.8	LOS A	2.0	51.7	0.54	0.42	22.2
Approach		317	2.0	0.348	7.8	LOS A	2.0	51.7	0.54	0.42	22.6
All Vehicles		858	1.4	0.348	6.3	LOS A	2.0	51.7	0.40	0.27	23.5

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Madison Ave - 2035 PM Mini-Roundabout

Wyatt Way & Madison Ave N
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Madison Ave N											
3	L2	152	1.0	0.686	15.6	LOS B	7.3	182.8	0.73	0.56	20.6
8	T1	459	1.0	0.686	15.6	LOS B	7.3	182.8	0.73	0.56	21.3
18	R2	28	1.0	0.686	15.6	LOS B	7.3	182.8	0.73	0.56	20.9
Approach		639	1.0	0.686	15.6	LOS B	7.3	182.8	0.73	0.56	21.1
East: Wyatt Way											
1	L2	22	1.0	0.400	13.5	LOS B	2.7	67.5	0.84	0.87	21.9
6	T1	171	1.0	0.400	13.5	LOS B	2.7	67.5	0.84	0.87	21.1
16	R2	15	1.0	0.400	13.5	LOS B	2.7	67.5	0.84	0.87	21.4
Approach		208	1.0	0.400	13.5	LOS B	2.7	67.5	0.84	0.87	21.2
North: Madison											
7	L2	16	1.0	0.544	12.5	LOS B	4.2	106.8	0.72	0.66	22.2
4	T1	341	1.0	0.544	12.5	LOS B	4.2	106.8	0.72	0.66	22.1
14	R2	80	1.0	0.544	12.5	LOS B	4.2	106.8	0.72	0.66	20.9
Approach		437	1.0	0.544	12.5	LOS B	4.2	106.8	0.72	0.66	21.9
West: Wyatt Way											
5	L2	85	2.0	0.411	10.2	LOS B	2.6	66.6	0.68	0.59	21.9
2	T1	78	2.0	0.411	10.2	LOS B	2.6	66.6	0.68	0.59	21.7
12	R2	146	2.0	0.411	10.2	LOS B	2.6	66.6	0.68	0.59	21.2
Approach		309	2.0	0.411	10.2	LOS B	2.6	66.6	0.68	0.59	21.5
All Vehicles		1593	1.2	0.686	13.4	LOS B	7.3	182.8	0.73	0.64	21.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Madison Ave - 2035 PM Urban Compact Roundabout

Wyatt Way & Madison Ave N
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Madison Ave N											
3	L2	152	1.0	0.606	11.7	LOS B	5.3	134.2	0.63	0.43	22.3
8	T1	459	1.0	0.606	11.7	LOS B	5.3	134.2	0.63	0.43	22.5
18	R2	28	1.0	0.606	11.7	LOS B	5.3	134.2	0.63	0.43	22.0
Approach		639	1.0	0.606	11.7	LOS B	5.3	134.2	0.63	0.43	22.4
East: Wyatt Way											
1	L2	22	1.0	0.342	10.7	LOS B	2.2	55.7	0.81	0.77	23.1
6	T1	171	1.0	0.342	10.7	LOS B	2.2	55.7	0.81	0.77	22.3
16	R2	15	1.0	0.342	10.7	LOS B	2.2	55.7	0.81	0.77	22.3
Approach		208	1.0	0.342	10.7	LOS B	2.2	55.7	0.81	0.77	22.4
North: Madison											
7	L2	16	1.0	0.497	10.6	LOS B	3.5	88.5	0.67	0.58	23.2
4	T1	341	1.0	0.497	10.6	LOS B	3.5	88.5	0.67	0.58	22.9
14	R2	80	1.0	0.497	10.6	LOS B	3.5	88.5	0.67	0.58	21.8
Approach		437	1.0	0.497	10.6	LOS B	3.5	88.5	0.67	0.58	22.7
West: Wyatt Way											
5	L2	85	2.0	0.379	9.0	LOS A	2.4	61.0	0.65	0.55	22.8
2	T1	78	2.0	0.379	9.0	LOS A	2.4	61.0	0.65	0.55	22.4
12	R2	146	2.0	0.379	9.0	LOS A	2.4	61.0	0.65	0.55	21.8
Approach		309	2.0	0.379	9.0	LOS A	2.4	61.0	0.65	0.55	22.3
All Vehicles		1593	1.2	0.606	10.7	LOS B	5.3	134.2	0.67	0.54	22.5

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix E
Synchro Outputs

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	401	64	48	151	381
v/c Ratio	0.64	0.11	0.12	0.21	0.52
Control Delay	12.0	7.6	8.4	8.1	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	7.6	8.4	8.1	11.0
Queue Length 50th (ft)	32	5	5	14	41
Queue Length 95th (ft)	89	15	21	47	107
Internal Link Dist (ft)	830	402		579	1265
Turn Bay Length (ft)			200		
Base Capacity (vph)	953	917	611	1112	1112
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.07	0.08	0.14	0.34

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	83	144	8	25	4	42	126	7	11	267	42
Future Volume (vph)	86	83	144	8	25	4	42	126	7	11	267	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frpb, ped/bikes		0.99			1.00		1.00	1.00			1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00			1.00	
Frt		0.94			0.99		1.00	0.99			0.98	
Flt Protected		0.99			0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1735			1757		1741	1827			1835	
Flt Permitted		0.89			0.89		0.55	1.00			0.99	
Satd. Flow (perm)		1573			1588		1010	1827			1819	
Peak-hour factor, PHF	0.78	0.78	0.78	0.58	0.58	0.58	0.88	0.88	0.88	0.84	0.84	0.84
Adj. Flow (vph)	110	106	185	14	43	7	48	143	8	13	318	50
RTOR Reduction (vph)	0	73	0	0	5	0	0	5	0	0	13	0
Lane Group Flow (vph)	0	328	0	0	59	0	48	146	0	0	368	0
Confl. Peds. (#/hr)	6		2	2		6	14		17	17		14
Confl. Bikes (#/hr)			3			4						4
Heavy Vehicles (%)	0%	0%	0%	5%	5%	5%	3%	3%	3%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.6			11.6		13.0	13.0			13.0	
Effective Green, g (s)		11.6			11.6		13.0	13.0			13.0	
Actuated g/C Ratio		0.36			0.36		0.40	0.40			0.40	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		559			565		402	728			725	
v/s Ratio Prot								0.08				
v/s Ratio Perm		c0.21			0.04		0.05				c0.20	
v/c Ratio		0.59			0.11		0.12	0.20			0.51	
Uniform Delay, d1		8.5			7.0		6.2	6.4			7.4	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.6			0.1		0.1	0.1			0.6	
Delay (s)		10.1			7.1		6.3	6.5			8.0	
Level of Service		B			A		A	A			A	
Approach Delay (s)		10.1			7.1			6.5			8.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	32.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	284	266	153	446	361
v/c Ratio	0.52	0.45	0.25	0.44	0.37
Control Delay	9.4	11.8	8.5	8.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	11.8	8.5	8.9	7.8
Queue Length 50th (ft)	19	33	15	48	34
Queue Length 95th (ft)	55	56	51	130	105
Internal Link Dist (ft)	830	402		579	1265
Turn Bay Length (ft)			200		
Base Capacity (vph)	913	1073	727	1198	1151
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.25	0.21	0.37	0.31

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	44	112	21	137	12	130	361	18	16	251	69
Future Volume (vph)	71	44	112	21	137	12	130	361	18	16	251	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frpb, ped/bikes		0.99			1.00		1.00	1.00			1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	
Frt		0.93			0.99		1.00	0.99			0.97	
Flt Protected		0.98			0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1693			1850		1786	1865			1817	
Flt Permitted		0.83			0.95		0.60	1.00			0.97	
Satd. Flow (perm)		1419			1760		1135	1865			1775	
Peak-hour factor, PHF	0.80	0.80	0.80	0.64	0.64	0.64	0.85	0.85	0.85	0.93	0.93	0.93
Adj. Flow (vph)	89	55	140	33	214	19	153	425	21	17	270	74
RTOR Reduction (vph)	0	96	0	0	7	0	0	4	0	0	18	0
Lane Group Flow (vph)	0	188	0	0	259	0	153	442	0	0	343	0
Confl. Peds. (#/hr)				13			1					1
Confl. Bikes (#/hr)			2						10			
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.6			8.6		16.2	16.2			16.2	
Effective Green, g (s)		8.6			8.6		16.2	16.2			16.2	
Actuated g/C Ratio		0.26			0.26		0.49	0.49			0.49	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		372			461		560	921			876	
v/s Ratio Prot								c0.24				
v/s Ratio Perm		0.13			c0.15		0.13				0.19	
v/c Ratio		0.51			0.56		0.27	0.48			0.39	
Uniform Delay, d1		10.3			10.5		4.9	5.5			5.2	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.1			1.6		0.3	0.4			0.3	
Delay (s)		11.4			12.0		5.1	5.9			5.5	
Level of Service		B			B		A	A			A	
Approach Delay (s)		11.4			12.0			5.7			5.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	32.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

18: Madison Ave N & Wyatt Way NE

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	407	64	49	153	388
v/c Ratio	0.73	0.13	0.12	0.19	0.48
Control Delay	16.0	8.4	8.8	8.3	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	8.4	8.8	8.3	10.9
Queue Length 50th (ft)	50	8	5	17	49
Queue Length 95th (ft)	88	15	23	51	120
Internal Link Dist (ft)	830	402		579	1265
Turn Bay Length (ft)			200		
Base Capacity (vph)	776	730	426	796	800
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.52	0.09	0.12	0.19	0.48

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	84	146	8	25	4	43	128	7	11	272	43
Future Volume (vph)	87	84	146	8	25	4	43	128	7	11	272	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frpb, ped/bikes		0.99			1.00		1.00	1.00			0.99	
Flpb, ped/bikes		1.00			1.00		0.99	1.00			1.00	
Frt		0.94			0.99		1.00	0.99			0.98	
Flt Protected		0.99			0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1619			1640		1622	1705			1712	
Flt Permitted		0.89			0.90		0.54	1.00			0.99	
Satd. Flow (perm)		1465			1489		918	1705			1700	
Peak-hour factor, PHF	0.78	0.78	0.78	0.58	0.58	0.58	0.88	0.88	0.88	0.84	0.84	0.84
Adj. Flow (vph)	112	108	187	14	43	7	49	145	8	13	324	51
RTOR Reduction (vph)	0	79	0	0	5	0	0	4	0	0	11	0
Lane Group Flow (vph)	0	328	0	0	59	0	49	149	0	0	377	0
Confl. Peds. (#/hr)	6		2	2		6	14		17	17		14
Confl. Bikes (#/hr)			3			4						4
Heavy Vehicles (%)	0%	0%	0%	5%	5%	5%	3%	3%	3%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.0			13.0		18.3	18.3			18.3	
Effective Green, g (s)		13.0			13.0		18.3	18.3			18.3	
Actuated g/C Ratio		0.33			0.33		0.47	0.47			0.47	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		484			492		427	793			791	
v/s Ratio Prot								0.09				
v/s Ratio Perm		c0.22			0.04		0.05				c0.22	
v/c Ratio		0.68			0.12		0.11	0.19			0.48	
Uniform Delay, d1		11.3			9.2		5.9	6.1			7.2	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		3.8			0.1		0.5	0.5			2.1	
Delay (s)		15.1			9.3		6.5	6.7			9.3	
Level of Service		B			A		A	A			A	
Approach Delay (s)		15.1			9.3			6.6			9.3	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

18: Madison Ave N & Wyatt Way NE

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	387	324	179	573	470
v/c Ratio	0.69	0.54	0.46	0.70	0.59
Control Delay	16.0	14.6	13.4	14.7	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	14.6	13.4	14.7	11.9
Queue Length 50th (ft)	52	57	25	91	65
Queue Length 95th (ft)	110	78	71	190	158
Internal Link Dist (ft)	830	402		579	1217
Turn Bay Length (ft)			200		
Base Capacity (vph)	804	918	553	1176	1134
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.35	0.32	0.49	0.41

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	78	146	22	171	15	152	459	28	16	341	80
Future Volume (vph)	85	78	146	22	171	15	152	459	28	16	341	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frpb, ped/bikes		0.99			1.00		1.00	1.00			1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	
Frt		0.94			0.99		1.00	0.99			0.98	
Flt Protected		0.99			0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1702			1852		1786	1862			1824	
Flt Permitted		0.84			0.94		0.47	1.00			0.98	
Satd. Flow (perm)		1448			1756		878	1862			1783	
Peak-hour factor, PHF	0.80	0.80	0.80	0.64	0.64	0.64	0.85	0.85	0.85	0.93	0.93	0.93
Adj. Flow (vph)	106	98	182	34	267	23	179	540	33	17	367	86
RTOR Reduction (vph)	0	68	0	0	6	0	0	4	0	0	17	0
Lane Group Flow (vph)	0	319	0	0	318	0	179	569	0	0	453	0
Confl. Peds. (#/hr)				13			1					1
Confl. Bikes (#/hr)			2						10			
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.5			13.5		17.3	17.3			17.3	
Effective Green, g (s)		13.5			13.5		17.3	17.3			17.3	
Actuated g/C Ratio		0.35			0.35		0.45	0.45			0.45	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		503			610		391	830			794	
v/s Ratio Prot								c0.31				
v/s Ratio Perm		c0.22			0.18		0.20				0.25	
v/c Ratio		0.63			0.52		0.46	0.69			0.57	
Uniform Delay, d1		10.6			10.1		7.5	8.6			8.0	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		2.6			0.8		0.9	2.4			1.0	
Delay (s)		13.2			10.9		8.3	10.9			9.0	
Level of Service		B			B		A	B			A	
Approach Delay (s)		13.2			10.9			10.3			9.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	86	83	144	8	25	4	42	126	7	11	267	42
Future Volume (vph)	86	83	144	8	25	4	42	126	7	11	267	42
Peak Hour Factor	0.78	0.78	0.78	0.58	0.58	0.58	0.88	0.88	0.88	0.84	0.84	0.84
Hourly flow rate (vph)	110	106	185	14	43	7	48	143	8	13	318	50

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	401	64	48	151	381
Volume Left (vph)	110	14	48	0	13
Volume Right (vph)	185	7	0	8	50
Hadj (s)	-0.22	0.06	0.55	0.01	-0.05
Departure Headway (s)	5.5	6.5	7.1	6.5	5.7
Degree Utilization, x	0.61	0.12	0.09	0.27	0.60
Capacity (veh/h)	623	458	466	504	599
Control Delay (s)	16.7	10.3	9.6	10.7	17.0
Approach Delay (s)	16.7	10.3	10.5		17.0
Approach LOS	C	B	B		C

Intersection Summary			
Delay	15.2		
Level of Service	C		
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	71	44	112	21	137	12	130	361	18	16	251	69
Future Volume (vph)	71	44	112	21	137	12	130	361	18	16	251	69
Peak Hour Factor	0.80	0.80	0.80	0.64	0.64	0.64	0.85	0.85	0.85	0.93	0.93	0.93
Hourly flow rate (vph)	89	55	140	33	214	19	153	425	21	17	270	74

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	284	266	153	446	361
Volume Left (vph)	89	33	153	0	17
Volume Right (vph)	140	19	0	21	74
Hadj (s)	-0.20	0.00	0.52	-0.02	-0.10
Departure Headway (s)	7.9	8.2	8.3	7.8	7.7
Degree Utilization, x	0.62	0.60	0.35	0.96	0.77
Capacity (veh/h)	430	414	425	446	455
Control Delay (s)	23.1	22.8	14.6	59.2	32.2
Approach Delay (s)	23.1	22.8	47.8		32.2
Approach LOS	C	C	E		D

Intersection Summary			
Delay	35.0		
Level of Service	E		
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	87	84	146	8	25	4	43	128	7	11	272	43
Future Volume (vph)	87	84	146	8	25	4	43	128	7	11	272	43
Peak Hour Factor	0.78	0.78	0.78	0.58	0.58	0.58	0.88	0.88	0.88	0.84	0.84	0.84
Hourly flow rate (vph)	112	108	187	14	43	7	49	145	8	13	324	51

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	407	64	49	153	388
Volume Left (vph)	112	14	49	0	13
Volume Right (vph)	187	7	0	8	51
Hadj (s)	-0.22	0.06	0.55	0.01	-0.06
Departure Headway (s)	5.5	6.6	7.1	6.6	5.8
Degree Utilization, x	0.63	0.12	0.10	0.28	0.62
Capacity (veh/h)	619	452	463	499	596
Control Delay (s)	17.4	10.5	9.7	10.9	17.8
Approach Delay (s)	17.4	10.5	10.6		17.8
Approach LOS	C	B	B		C

Intersection Summary			
Delay	15.8		
Level of Service	C		
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	85	78	146	22	171	15	152	459	28	16	341	80
Future Volume (vph)	85	78	146	22	171	15	152	459	28	16	341	80
Peak Hour Factor	0.80	0.80	0.80	0.64	0.64	0.64	0.85	0.85	0.85	0.93	0.93	0.93
Hourly flow rate (vph)	106	98	183	34	267	23	179	540	33	17	367	86

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	387	324	179	573	470
Volume Left (vph)	106	34	179	0	17
Volume Right (vph)	183	23	0	33	86
Hadj (s)	-0.19	0.00	0.52	-0.02	-0.09
Departure Headway (s)	8.9	9.4	9.8	9.3	9.1
Degree Utilization, x	0.96	0.85	0.49	1.00	1.00
Capacity (veh/h)	398	375	355	573	470
Control Delay (s)	66.2	47.4	20.7	75.7	76.3
Approach Delay (s)	66.2	47.4	62.6		76.3
Approach LOS	F	E	F		F

Intersection Summary			
Delay	64.1		
Level of Service	F		
Intersection Capacity Utilization	91.8%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	15	199	95	12	302	16	107	53	8	13	51	18
Future Volume (vph)	15	199	95	12	302	16	107	53	8	13	51	18
Peak Hour Factor	0.81	0.81	0.81	0.78	0.78	0.78	0.86	0.86	0.86	0.73	0.73	0.73
Hourly flow rate (vph)	19	246	117	15	387	21	124	62	9	18	70	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	382	423	195	113
Volume Left (vph)	19	15	124	18
Volume Right (vph)	117	21	9	25
Hadj (s)	-0.14	-0.01	0.13	-0.08
Departure Headway (s)	5.5	5.6	6.5	6.6
Degree Utilization, x	0.59	0.66	0.35	0.21
Capacity (veh/h)	616	618	483	449
Control Delay (s)	16.2	18.7	13.1	11.3
Approach Delay (s)	16.2	18.7	13.1	11.3
Approach LOS	C	C	B	B

Intersection Summary			
Delay	16.1		
Level of Service	C		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Grow Ave NW			
Wyatt Way NW			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	199	95	12	302	16	107	53	8	13	51	18
Future Volume (Veh/h)	15	199	95	12	302	16	107	53	8	13	51	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.78	0.78	0.78	0.86	0.86	0.86	0.73	0.73	0.73
Hourly flow rate (vph)	19	246	117	15	387	21	124	62	9	18	70	25
Pedestrians		5						6				
Lane Width (ft)		12.0						12.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					910							
pX, platoon unblocked												
vC, conflicting volume	408			369			841	786	310	810	834	402
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	408			369			841	786	310	810	834	402
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			43	80	99	93	76	96
cM capacity (veh/h)	1151			1189			216	313	726	245	295	647

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	382	423	195	113
Volume Left	19	15	124	18
Volume Right	117	21	9	25
cSH	1151	1189	248	323
Volume to Capacity	0.02	0.01	0.79	0.35
Queue Length 95th (ft)	1	1	146	38
Control Delay (s)	0.6	0.4	57.5	22.0
Lane LOS	A	A	F	C
Approach Delay (s)	0.6	0.4	57.5	22.0
Approach LOS			F	C

Intersection Summary			
Average Delay	12.7		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Grow Ave NW			
Wyatt Way NW			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	19	274	97	12	346	21	116	63	8	17	56	23
Future Volume (vph)	19	274	97	12	346	21	116	63	8	17	56	23
Peak Hour Factor	0.81	0.81	0.81	0.78	0.78	0.78	0.86	0.86	0.86	0.73	0.73	0.73
Hourly flow rate (vph)	23	338	120	15	444	27	135	73	9	23	77	32

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	481	486	217	132
Volume Left (vph)	23	15	135	23
Volume Right (vph)	120	27	9	32
Hadj (s)	-0.11	-0.01	0.13	-0.09
Departure Headway (s)	6.2	6.2	7.4	7.6
Degree Utilization, x	0.82	0.84	0.45	0.28
Capacity (veh/h)	481	486	442	424
Control Delay (s)	31.7	34.1	16.3	13.4
Approach Delay (s)	31.7	34.1	16.3	13.4
Approach LOS	D	D	C	B

Intersection Summary			
Delay	28.2		
Level of Service	D		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Grow Ave NW			
Wyatt Way NW			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	274	97	12	346	21	116	63	8	17	56	23
Future Volume (Veh/h)	19	274	97	12	346	21	116	63	8	17	56	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.78	0.78	0.78	0.86	0.86	0.86	0.73	0.73	0.73
Hourly flow rate (vph)	23	338	120	15	444	27	135	73	9	23	77	32
Pedestrians		5						6			5	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					910							
pX, platoon unblocked												
vC, conflicting volume	476			464			1013	956	404	982	1002	468
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	476			464			1013	956	404	982	1002	468
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			8	70	99	86	67	95
cM capacity (veh/h)	1082			1097			147	247	643	168	233	593

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	481	486	217	132
Volume Left	23	15	135	23
Volume Right	120	27	9	32
cSH	1082	1097	176	253
Volume to Capacity	0.02	0.01	1.23	0.52
Queue Length 95th (ft)	2	1	298	69
Control Delay (s)	0.6	0.4	195.2	33.8
Lane LOS	A	A	F	D
Approach Delay (s)	0.6	0.4	195.2	33.8
Approach LOS			F	D

Intersection Summary			
Average Delay	36.0		
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Grow Ave NW			
Wyatt Way NW			

Appendix F
Collision Summary Report

Wyatt Way NW - Madison Ave N to Lovell Ave NW - Collision Report (2013-2015)

PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PEDS	#PEDAL	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	Crash Diagram
GROW AVE NW	500	WYATT WAY NW					10/22/2014	11:27	No Injury	0	0	2	0	0	Wet	Daylight	Entering at angle	
GROW AVE NW	400	WYATT WAY NW					1/26/2014	13:49	No Injury	0	0	2	0	0	Dry	Daylight	Entering at angle	
GROW AVE NW		WYATT WAY NW					8/8/2014	16:00	Possible Injury	1	0	2	0	0	Dry	Daylight	Entering at angle	
MADISON AVE N	200	WYATT WAY NW					8/4/2013	16:25	No Injury	0	0	2	0	0	Dry	Daylight	Entering at angle	
MADISON AVE N	400	WYATT WAY NW					2/7/2015	18:29	No Injury	0	0	2	0	0	Wet	Dark-Street Lights On	Entering at angle	
MADISON AVE N	500	WYATT WAY NW					8/23/2013	9:29	No Injury	0	0	2	0	0	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	
MADISON AVE N	200	WYATT WAY NW					8/29/2014	8:55	No Injury	0	0	2	0	0	Wet	Daylight	Entering at angle	
MADISON AVE N	200	WYATT WAY NW					7/31/2015	17:06	No Injury	0	0	2	0	0	Dry	Daylight	Entering at angle	

Appendix G
Roundabout Construction Cost Estimates

City of Bainbridge Island

Wyatt Way NW & Madison Ave N (Compact Roundabout)

May 3, 2016

CONSTRUCTION COST ESTIMATE

No.	Sect. No.	Item	Quantity	Unit	Unit Cost	Total Cost
1	1-09	Mobilization & Demobilization (8% of Construction Subtotal)	1	LS	$41,000.00	$41,000.00
2	1-05	Construction Surveying (5%)	1	LS	$26,000.00	$26,000.00
3	1-07	SPCC Plan	1	LS	$200.00	$200.00
4	1-07	Potholing	1	FA	$5,000.00	$5,000.00
5	1-09	Force Account	1	FA	$5,000.00	$5,000.00
6	1-10	Traffic Control Labor Supervisor	1	LS	$15,000.00	$15,000.00
7	1-10	Traffic Control Labor	1,200	HR	$42.00	$50,400.00
8	1-10	Temporary Traffic Control Devices	1	LS	$20,000.00	$20,000.00
9	1-10	Portable Changeable Message Sign	4	EA	$6,000.00	$24,000.00
10	1-10	Operation of Portable Changeable Message Sign	2,200	HR	$3.50	$7,700.00
11	2-01	Clearing and Grubbing	1	LS	$10,000.00	$10,000.00
12	2-02	Removal of Structures and Obstructions	1	LS	$15,000.00	$15,000.00
13	2-02	Removing Asphalt Concrete Pavement	560	SY	$8.00	$4,480.00
14	2-02	Saw cutting	2,000	LF	$5.00	$10,000.00
15	2-03	Roadway Excavation, Including Haul	455	CY	$23.00	$10,465.00
16	2-03	Unsuitable Foundation Excavation, Including Haul	100	CY	$25.00	$2,500.00
17	2-03	Gravel Borrow, Including Haul	400	TON	$17.00	$6,800.00
18	2-09	Shoring or Extra Excavation Class B	540	LF	$1.00	$540.00
19	4-04	Crushed Surfacing Top Course	100	TON	$25.00	$2,500.00
20	4-04	Crushed Surfacing Base Course	200	TON	$25.00	$5,000.00
21	5-04	HMA CL 1/2 In. PG 64-22	220	TON	$100.00	$22,000.00
22	5-04	Incidental HMA for driveways, Class B	10	TON	$120.00	$1,200.00
23	7-04	Solid Wall PVC Storm Sewer Pipe 12" Diam	650	LF	$35.00	$22,750.00
24	7-05	Catch Basin Type I	6	EA	$1,000.00	$6,000.00
25	7-05	Catch Basin Type II, 48 In. Dia.	1	EA	$3,000.00	$3,000.00
26	7-05	Catch Basin Type II, 54 In. Dia.	1	EA	$4,500.00	$4,500.00
27	7-12	Adjust Valve Box	6	EA	$350.00	$2,100.00
28	7-14	Hydrant Assembly	2	EA	$4,000.00	$8,000.00
29	8-01	Temporary Water Pollution/Erosion Control	1	LS	$10,000.00	$10,000.00
30	8-01	Temporary Water Pollution/Erosion Control Plan	1	LS	$2,500.00	$2,500.00
31	8-01	Temporary Reinforced Silt Fencing	1,100	LF	$7.00	$7,700.00
32	8-03	Landscape (including irrigation, etc.)	1	LS	$35,000.00	$35,000.00
33	8-04	Cement Concrete Curb & Gutter	1,200	LF	$25.00	$30,000.00
34	8-04	Cement Concrete Traffic Curb	120	LF	$20.00	$2,400.00
35	8-04	Roundabout Truck Apron Cement Concrete Curb	450	LF	$25.00	$11,250.00
36	8-04	Roundabout Central Island Cement Concrete Curb	120	LF	$30.00	$3,600.00

CONSTRUCTION COST ESTIMATE						
No.	Sect. No.	Item	Quantity	Unit	Unit Cost	Total Cost
37	8-06	Cement Conc. Driveway Entrance	50	SY	$50.00	$2,500.00
38	8-13	Adjust Monument Case and Cover	1	EA	$700.00	$700.00
39	8-14	Sidewalk Curb Ramp Type 1	8	EA	$1,700.00	$13,600.00
40	8-14	Cement Concrete Bicycle Ramp	8	EA	$1,500.00	$12,000.00
41	8-14	Cement Concrete Sidewalk	600	SY	$35.00	$21,000.00
42	8-14	Stamped concrete, central & splitter islands	250	SY	$75.00	$18,750.00
43	8-18	Mailbox Support	4	EA	$400.00	$1,600.00
44	8-20	Illumination System (underground)	1	LS	$50,000.00	$50,000.00
45	8-21	Permanent Signing	1	LS	$10,000.00	$10,000.00
46	8-22	Plastic Crosswalk Stripe	650	SF	$10.00	$6,500.00
47	8-22	Plastic Traffic Letter	16	EA	$100.00	$1,600.00
48	8-22	Plastic Line	1100	LF	$2.00	$2,200.00
49	8-22	Plastic Wide Line	540	LF	$2.00	$1,080.00
50	8-22	Plastic Bicycle Lane Symbol	4	EA	$250.00	$1,000.00
51	8-23	Temporary Pavement Marking	1,200	LF	$0.60	$720.00
52	8-23	Removing Temporary Pavement Marking	1,200	LF	$0.60	$720.00
			TOTAL CONSTRUCTION COST			**$577,555.00**
			20% Miscellaneous & Contingency			**$115,511.00**
			Total Construction Cost			**$693,066.00**
Assumptions						
	No Design Engineering					
	No Utility relocation					
	No Construction management					
	No Environmental					
	No Right of Way					

City of Bainbridge Island

Wyatt Way NW & Madison Ave N (Mini Roundabout)

May 3, 2016

CONSTRUCTION COST ESTIMATE

No.	Sect. No.	Item	Quantity	Unit	Unit Cost	Total Cost
1	1-09	Mobilization & Demobilization (8% of Construction Subtotal)	1	LS	$36,000.00	$36,000.00
2	1-05	Construction Surveying (5%)	1	LS	$23,000.00	$23,000.00
3	1-07	SPCC Plan	1	LS	$200.00	$200.00
4	1-07	Potholing	1	FA	$5,000.00	$5,000.00
5	1-09	Force Account	1	FA	$5,000.00	$5,000.00
6	1-10	Traffic Control Labor Supervisor	1	LS	$15,000.00	$15,000.00
7	1-10	Traffic Control Labor	1,400	HR	$42.00	$58,800.00
8	1-10	Temporary Traffic Control Devices	1	LS	$20,000.00	$20,000.00
9	1-10	Portable Changeable Message Sign	4	EA	$6,000.00	$24,000.00
10	1-10	Operation of Portable Changeable Message Sign	2,200	HR	$3.50	$7,700.00
11	2-01	Clearing and Grubbing	1	LS	$7,000.00	$7,000.00
12	2-02	Removal of Structures and Obstructions	1	LS	$5,000.00	$5,000.00
13	2-02	Removing Asphalt Concrete Pavement	300	SY	$8.00	$2,400.00
14	2-02	Saw cutting	2,400	LF	$5.00	$12,000.00
15	2-03	Roadway Excavation, Including Haul	400	CY	$23.00	$9,200.00
16	2-03	Unsuitable Foundation Excavation, Including Haul	75	CY	$25.00	$1,875.00
17	2-03	Gravel Borrow, Including Haul	300	TON	$17.00	$5,100.00
18	2-09	Shoring or Extra Excavation Class B	540	LF	$1.00	$540.00
19	4-04	Crushed Surfacing Top Course	100	TON	$25.00	$2,500.00
20	4-04	Crushed Surfacing Base Course	200	TON	$25.00	$5,000.00
21	5-04	HMA CL 1/2 In. PG 64-22	220	TON	$100.00	$22,000.00
22	5-04	Incidental HMA for driveways, Class B	10	TON	$120.00	$1,200.00
23	7-04	Solid Wall PVC Storm Sewer Pipe 12" Diam	650	LF	$35.00	$22,750.00
24	7-05	Catch Basin Type I	6	EA	$1,000.00	$6,000.00
25	7-05	Catch Basin Type II, 48 In. Dia.	1	EA	$3,000.00	$3,000.00
26	7-05	Catch Basin Type II, 54 In. Dia.	1	EA	$4,500.00	$4,500.00
27	7-12	Adjust Valve Box	6	EA	$350.00	$2,100.00
28	7-14	Hydrant Assembly	1	EA	$4,000.00	$4,000.00
29	8-01	Temporary Water Pollution/Erosion Control	1	LS	$5,000.00	$5,000.00
30	8-01	Temporary Water Pollution/Erosion Control Plan	1	LS	$2,500.00	$2,500.00
31	8-01	Temporary Reinforced Silt Fencing	1,000	LF	$7.00	$7,000.00
32	8-03	Hardscape (Textured Concrete)	1	LS	$5,000.00	$5,000.00
33	8-04	Cement Concrete Curb & Gutter	1,200	LF	$25.00	$30,000.00
34	8-04	Cement Concrete Traffic Curb	120	LF	$20.00	$2,400.00
35	8-04	Roundabout Truck Apron Cement Concrete Curb	340	LF	$25.00	$8,500.00
36	8-04	Roundabout Central Island Cement Concrete Curb	60	LF	$30.00	$1,800.00

CONSTRUCTION COST ESTIMATE						
No.	Sect. No.	Item	Quantity	Unit	Unit Cost	Total Cost
37	8-06	Cement Conc. Driveway Entrance	50	SY	$50.00	$2,500.00
38	8-13	Adjust Monument Case and Cover	1	EA	$700.00	$700.00
39	8-14	Sidewalk Curb Ramp Type 1	8	EA	$1,700.00	$13,600.00
40	8-14	Cement Concrete Bicycle Ramp	8	EA	$1,500.00	$12,000.00
41	8-14	Cement Concrete Sidewalk	600	SY	$35.00	$21,000.00
42	8-14	Stamped Concrete Central & Splitter Islands	100	SY	$75.00	$7,500.00
43	8-18	Mailbox Support	4	EA	$400.00	$1,600.00
44	8-20	Illumination System (underground)	1	LS	$50,000.00	$50,000.00
45	8-21	Permanent Signing	1	LS	$10,000.00	$10,000.00
46	8-22	Plastic Crosswalk Stripe	650	SF	$10.00	$6,500.00
47	8-22	Plastic Traffic Letter	16	EA	$100.00	$1,600.00
48	8-22	Plastic Line	1100	LF	$2.00	$2,200.00
49	8-22	Plastic Wide Line	540	LF	$2.00	$1,080.00
50	8-22	Plastic Bicycle Lane Symbol	4	EA	$250.00	$1,000.00
51	8-23	Temporary Pavement Marking	1,200	LF	$0.60	$720.00
52	8-23	Removing Temporary Pavement Marking	1,200	LF	$0.60	$720.00
			TOTAL CONSTRUCTION COST			**$505,785.00**
			20% Miscellaneous & Contingency			**$101,157.00**
			Total Construction Cost			**$606,942.00**
Assumptions						
	No Design Engineering					
	No Utility relocation					
	No Construction management					
	No Environmental					
	No Right of Way					