Kimley-Horn
and Associates, Inc.

April 17, 2012

Suite 200
1920 Wekiva Way
West Palm Beach, Florida
33411

Mr. Manny Synalovski
Manuel Synalovski Associates
1800 Eller Drive, Suite 500
Ft. Lauderdale, Florida 33316

Re: KLA School – North Bay Village
Off-Site Traffic Impact Evaluation
North Bay Village, Florida

Dear Manny:

Kimley-Horn and Associates, Inc. (KHA) has prepared the following evaluation as a supplement to the analysis prepared on April 10, 2012 that addressed on-site queuing and parking impacts of the proposed KLA School facility in North Bay Village. This evaluation has been prepared to address anticipated impacts of traffic generated by the proposed school facility at the intersections in the vicinity of the proposed school.

This document summarizes the data collected, the evaluations undertaken and the results of the analysis.

Study Area

For this evaluation, traffic impacts at the following locations were evaluated:

1. Hispanola Avenue & North Treasure Drive
2. Pirate's Alley & Adventure Avenue
3. JFK Causeway & Adventure Avenue

These intersections are anticipated to be the primary locations impacted by traffic entering and exiting the school facility. Figure 1 illustrates the location of the intersections that were evaluated.

Data Collection

Turning movement counts were conducted at all three intersections during the AM (7 AM – 9 AM) and PM (4 PM – 6 PM) peak periods on Friday, April 13, 2012, except for the PM peak period at JFK Causeway & Adventure Avenue because KHA had a turning movement count that had been collected on October 25, 2011 at that location. The volumes were adjusted to peak season conditions by applying the peak season conversion factor published by the Florida Department of Transportation (FDOT) for this area. Volume summaries are attached to this letter.

TEL 561 845 0665
FAX 561 863 8175

12A(43)

LaRue Planning
& Management Services, Inc.

Memorandum

To: Dennis Kelly, City Manager
Yvonne Hamilton, City Clerk

From: James G. LaRue, AICP

Date: April 16, 2012

Subject: KLA School – Special Use Exception
Revised responses based on review of Traffic and Parking Impact Study, prepared by Kimley-Horn.

The Kimley-Horn traffic memorandum dealing with the parking and traffic generation associated with the proposed KLA pre-school/day nursery allows us to make the following changes to the findings in our Staff Report dated April 9, 2012.

1. Prior to receiving the materials form Kimley-Horn we had initially estimated that 35 off-street parking spaces would be necessary. However, based on there being two staggered arrival and dismissal times during which students will be dropped-off and picked-up, we concur with the Kimley-Horn estimate of the need for 32 parking spaces.

2. Since all arriving vehicles will be parking in the lot to pick-up of drop-off students, it is clear to us that there will be little or no conflict between queuing vehicles and vehicles leaving the parking spaces.

3. We can accept the Traffic Study's findings that there should be no significant impact on traffic levels along Kennedy Causeway. However, we reserve judgment until we have heard the Applicant's responses to our inquiry as to the potential effect upon traffic levels along Hispanola Avenue, North Treasure Drive, Pirates Alley and Adventure Avenue associated with the school's drop-off and pick-up traffic.

12A (44)

Impact Evaluation

Traffic anticipated to be generated by the school facility was assigned to the intersections as summarized in the attached tables. For this analysis, the school trip generation calculations that were documented in the April 10, 2012 analysis were utilized. Operational analyses were then performed for existing conditions without school traffic and future conditions with school traffic using software based upon the analysis methodology contained in the *2010 Highway Capacity Manual*. As summarized in Tables 1 through 3, the intersections will continue to operate at the same level of service in the future as they do today including the addition of school traffic based upon volume projections from the proposed school.

Table 1
Intersection Analysis
Hispanola Avenue & North Treasure Drive

Time Period	Approach	Existing Volumes		Proposed Volumes	
		Delay (sec)	LOS	Delay (sec)	LOS
AM PEAK HOUR	Northbound	11	B	11.2	B
	Southbound	11	B	11	B
	Eastbound	7.4	A	7.4	A
	Westbound	7.3	A	7.3	A
PM PEAK HOUR	Northbound	10	B	10.2	A
	Southbound	9.6	A	9.6	A
	Eastbound	7.3	A	7.3	A
	Westbound	7.2	A	7.2	A

Table 2
Intersection Analysis
Pirate's Alley & Adventure Avenue

Time Period	Approach	Existing Volumes		Proposed Volumes	
		Delay (sec)	LOS	Delay (sec)	LOS
AM PEAK HOUR	Northbound	7.4	A	7.4	A
	Southbound	7.7	A	7.7	A
	Eastbound	9.5	A	9.8	A
	Westbound	9.5	A	9.8	A
PM PEAK HOUR	Northbound	7.4	A	7.4	A
	Southbound	7.5	A	7.5	A
	Eastbound	11.3	B	11.7	B
	Westbound	9.6	A	9.7	A

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Table 3
Intersection Analysis
JFK Causeway & Adventure Avenue

Time Period	Approach	Existing Volumes		Proposed Volumes	
		Delay (sec)	LOS	Delay (sec)	LOS
AM PEAK HOUR	Northbound	26.9	C	27.4	C
	Southbound	-	-	-	-
	Eastbound	21.4	C	21.8	C
	Westbound	13.9	B	14.1	B
	Intersection	**18**	**B**	**18.5**	**B**
PM PEAK HOUR	Northbound	26.6	C	27.5	C
	Southbound	-	-	-	-
	Eastbound	21.5	C	22.2	C
	Westbound	13.9	B	14.2	B
	Intersection	**18.1**	**B**	**18.9**	**B**

Intersection operational output worksheets are attached to this letter.

Summary

As demonstrated in this supplemental analysis, the intersections immediately impacted by traffic generated by the site are anticipated to operate acceptably during the AM and PM peak periods with the inclusion of school traffic volumes. Should you have questions or comments regarding the information contained herein, please call me via phone at 561-840-0248 or via e-mail at chris.heggen@kimley-horn.com.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

Christopher W. Heggen, P.E.
Transportation Engineer

Attachments

K:\WPB_TPTO\85294\cwh\2012\KLA School - North Bay Village\041712ms-KLA-NBV.docx

12 A(45)

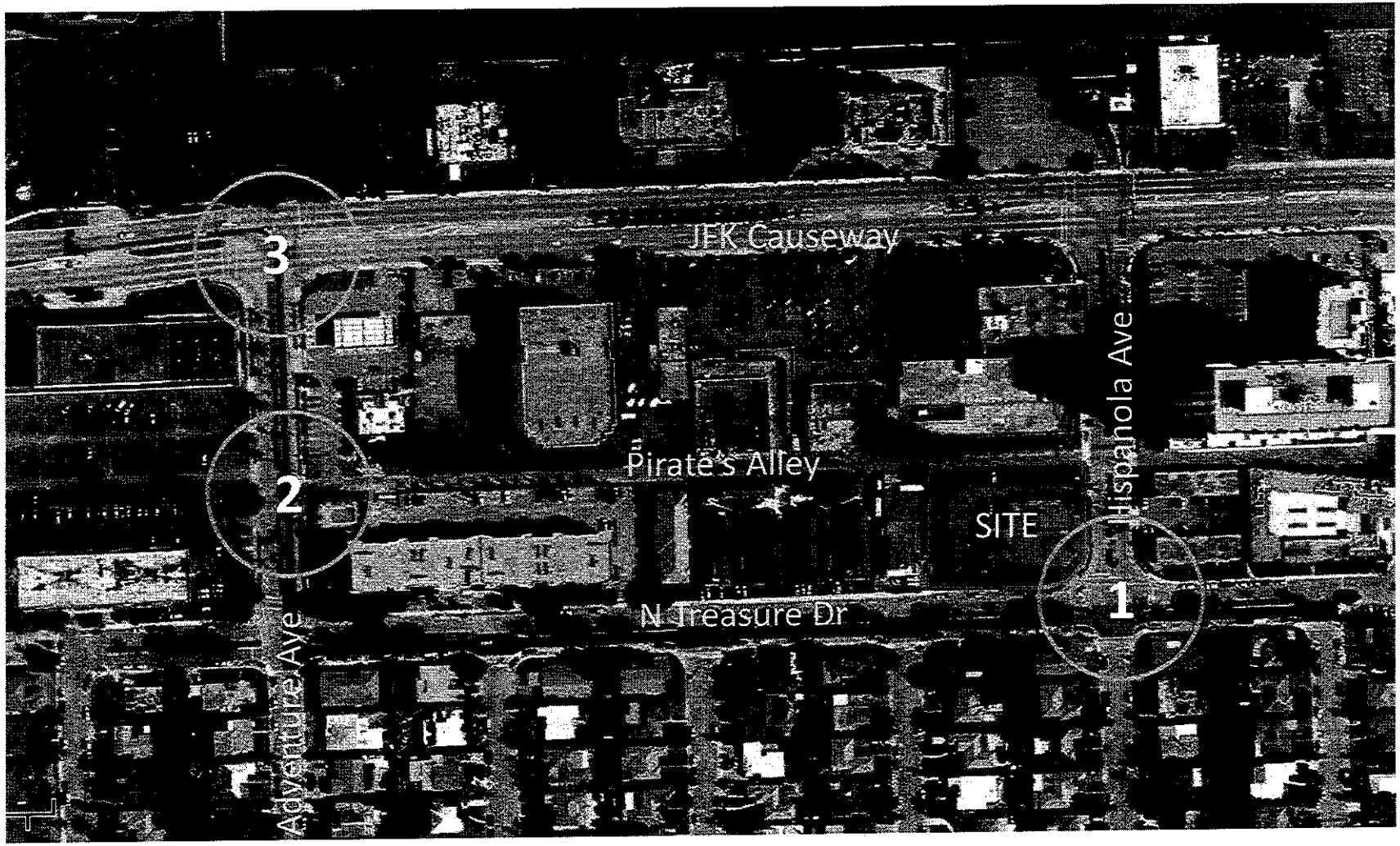


FIGURE 1

KLA School – North Bay Village
Intersection Analysis Locations

12/46

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

JFK/79TH STREET CAUSEWAY & ADVENTURE AVE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: MAXIE ESPINOSA
SIGNALIZED

Site Code : 00120054
Start Date: 04/13/12
File I.D. : JFK_ADVE
Page : 1

ALL VEHICLES

	From North				JFK CAUSEWAY From East				ADVENTURE AVENUE From South				JFK CAUSEWAY From West				
Date 04/13/12	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
07:00	0	0	0	0	3	7	184	0	0	16	0	4	0	0	171	5	390
07:15	0	0	0	0	8	5	261	0	0	23	0	1	0	0	187	10	495
07:30	0	0	0	0	4	7	300	0	0	35	0	3	0	0	254	9	612
07:45	0	0	0	0	5	11	306	0	0	42	0	4	0	0	299	21	688
Hr Total	0	0	0	0	20	30	1051	0	0	116	0	12	0	0	911	45	2185
08:00	0	0	0	0	5	12	312	0	0	43	0	10	0	0	293	26	701
08:15	0	0	0	0	2	10	315	0	0	35	0	10	0	0	315	16	703
08:30	0	0	0	0	7	15	346	0	0	36	0	6	0	0	290	16	716
08:45	0	0	0	0	8	14	304	0	0	43	0	13	0	0	260	20	662
Hr Total	0	0	0	0	22	51	1277	0	0	157	0	39	0	0	1158	78	2782
TOTAL	0	0	0	0	42	81	2328	0	0	273	0	51	0	0	2069	123	4967

12A(47)

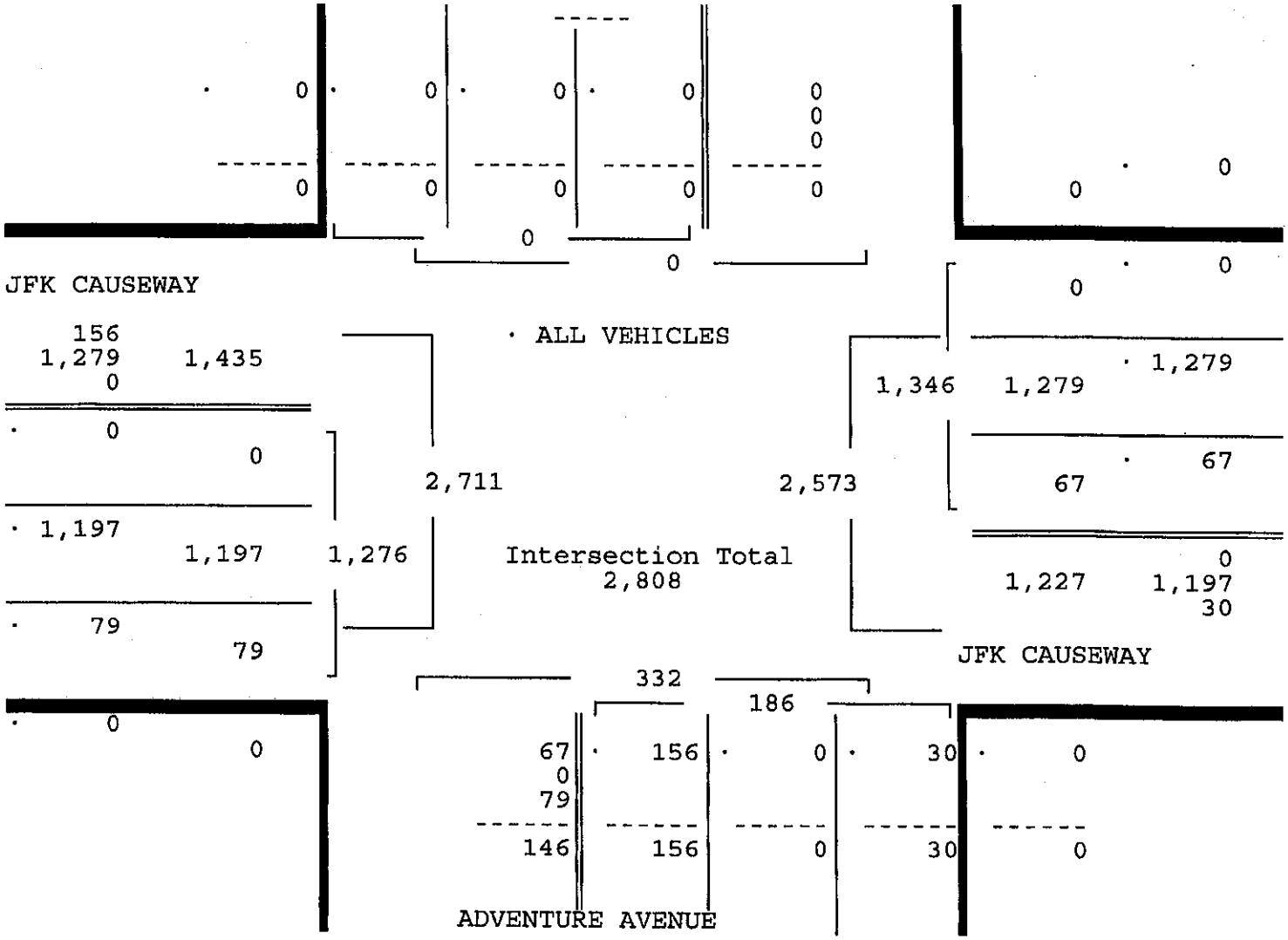
Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

JFK/79TH STREET CAUSEWAY & ADVENTURE AVE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: MAXIE ESPINOSA
SIGNALIZED

Site Code : 00120054
Start Date: 04/13/12
File I.D. : JFK_ADVE
Page : 2

ALL VEHICLES

	From North				JFK CAUSEWAY From East				ADVENTURE AVENUE From South				JFK CAUSEWAY From West				
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
Date 04/13/12																	
Peak Hour Analysis By Entire Intersection for the Period: 07:00 to 09:00 on 04/13/12																	
Peak start	07:45				07:45				07:45				07:45				
Volume	0	0	0	0	19	48	1279	0	0	156	0	30	0	0	1197	79	
Percent	0%	0%	0%	0%	1%	4%	95%	0%	0%	84%	0%	16%	0%	0%	94%	6%	
Pk total	0				1346				186				1276				
Highest	07:00				08:30				08:00				08:15				
Volume	0	0	0	0	7	15	346	0	0	43	0	10	0	0	315	16	
Hi total	0				368				53				331				
PHF	.0				.91				.88				.96				



12A(48)

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

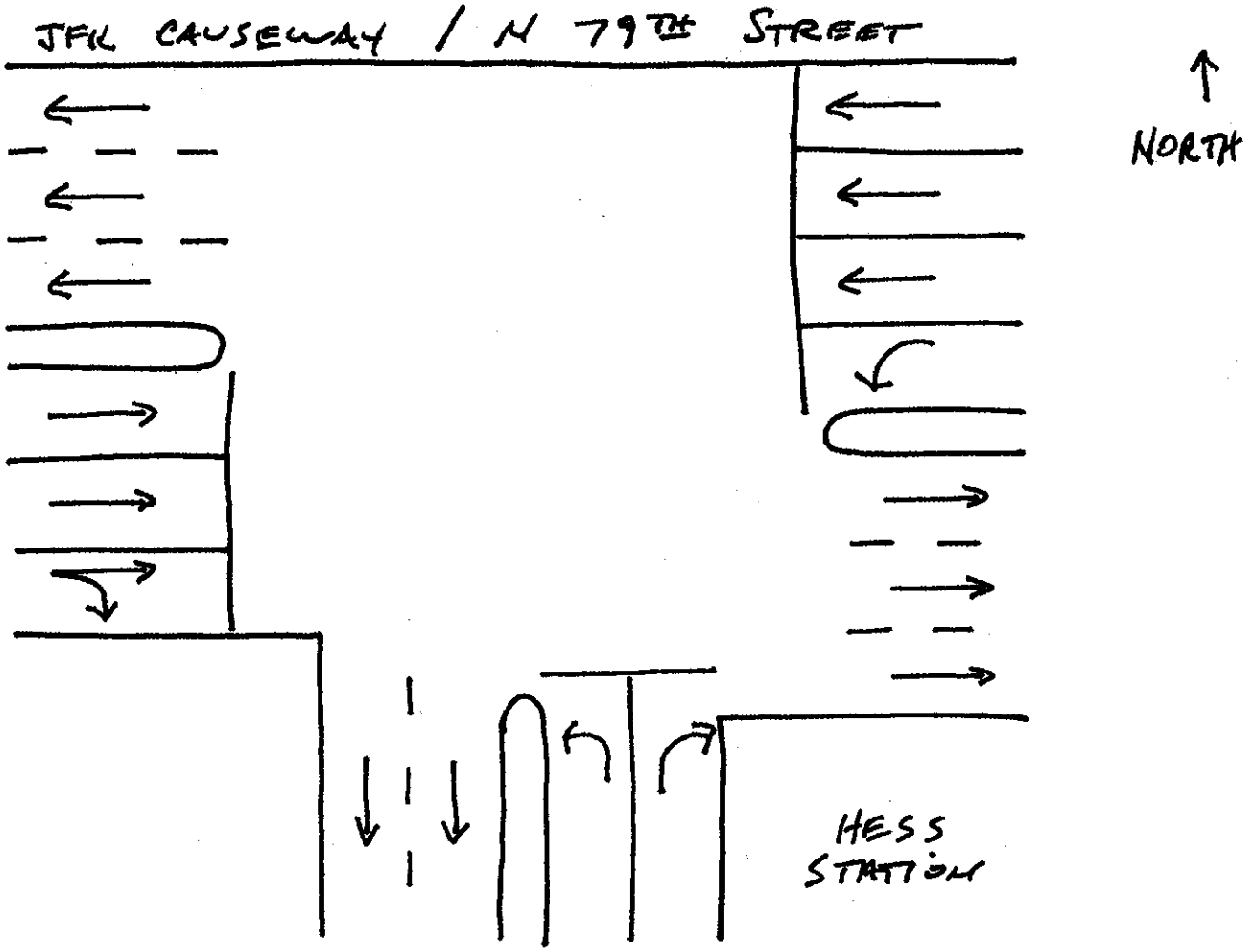
JFK/79TH STREET CAUSEWAY & ADVENTURE AVE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: MAXIE ESPINOSA
SIGNALIZED

Site Code : 00120054
Start Date: 04/13/12
File I.D. : JFK_ADVE
Page : 1

PEDESTRIANS

	----- From North				JFK CAUSEWAY From East				ADVENTURE AVENUE From South				JFK CAUSEWAY From West				
Date 04/13/12	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Total
07:00	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2
Hr Total	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	4
08:00	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
08:15	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	6	10
08:30	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	5
08:45	0	0	0	2	0	0	0	0	0	0	0	5	0	0	0	2	9
Hr Total	0	0	0	9	0	0	0	0	0	0	0	9	0	0	0	8	26
TOTAL	0	0	0	9	0	0	0	0	0	0	0	12	0	0	0	9	30

12A(49)



NORTH BAY VILLAGE, FLORIDA
APRIL 13TH, 2012
DRAWN BY: KEVIN MCNALLY

SIGNALIZED

12A(50)

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

PIRATES ALLEY & ADVENTURE AVENUE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: MARISA CRUZ
NOT SIGNALIZED

Site Code : 00120054
Start Date: 04/13/12
File I.D. : PIRAADVE
Page : 1

ALL VEHICLES

	ADVENTURE AVENUE From North				PIRATES ALLEY From East				ADVENTURE AVENUE From South				PARKING LOT From West				
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
Date 04/13/12																	
07:00	0	7	4	0	0	0	0	2	0	0	12	3	0	1	0	0	29
07:15	1	5	8	0	0	0	0	0	0	0	17	2	0	0	0	0	33
07:30	2	5	9	0	0	2	0	4	0	0	33	0	0	0	0	2	57
07:45	2	11	14	2	0	2	0	5	0	1	34	0	0	0	0	0	71
Hr Total	5	28	35	2	0	4	0	11	0	1	96	5	0	1	0	2	190
08:00	3	10	21	1	0	2	0	5	0	0	35	1	0	1	0	2	81
08:15	1	6	16	1	0	1	0	1	0	0	38	3	0	2	0	0	69
08:30	2	13	5	6	0	2	0	5	0	1	28	1	0	0	0	0	63
08:45	2	8	12	6	0	3	1	8	0	3	39	1	0	0	0	2	85
Hr Total	8	37	54	14	0	8	1	19	0	4	140	6	0	3	0	4	298
* BREAK *																	
16:00	4	10	18	2	0	4	0	6	0	0	13	4	0	6	0	1	68
16:15	6	18	19	1	0	2	0	4	0	0	18	3	0	4	0	2	77
16:30	4	10	13	2	0	11	0	1	0	2	21	2	0	1	0	0	67
16:45	3	6	20	0	0	1	0	2	0	0	17	3	0	3	0	0	55
Hr Total	17	44	70	5	0	18	0	13	0	2	69	12	0	14	0	3	267
17:00	8	13	24	0	0	2	0	9	0	0	12	3	0	10	1	0	82
17:15	7	9	18	0	0	3	1	4	1	1	22	2	0	5	0	1	74
17:30	6	7	24	0	0	1	0	2	1	1	16	0	0	2	1	0	61
17:45	5	6	24	0	0	4	1	3	0	1	19	2	0	4	0	1	70
Hr Total	26	35	90	0	0	10	2	18	2	3	69	7	0	21	2	2	287
TOTAL	56	144	249	21	0	40	3	61	2	10	374	30	0	39	2	11	1042

12A(51)

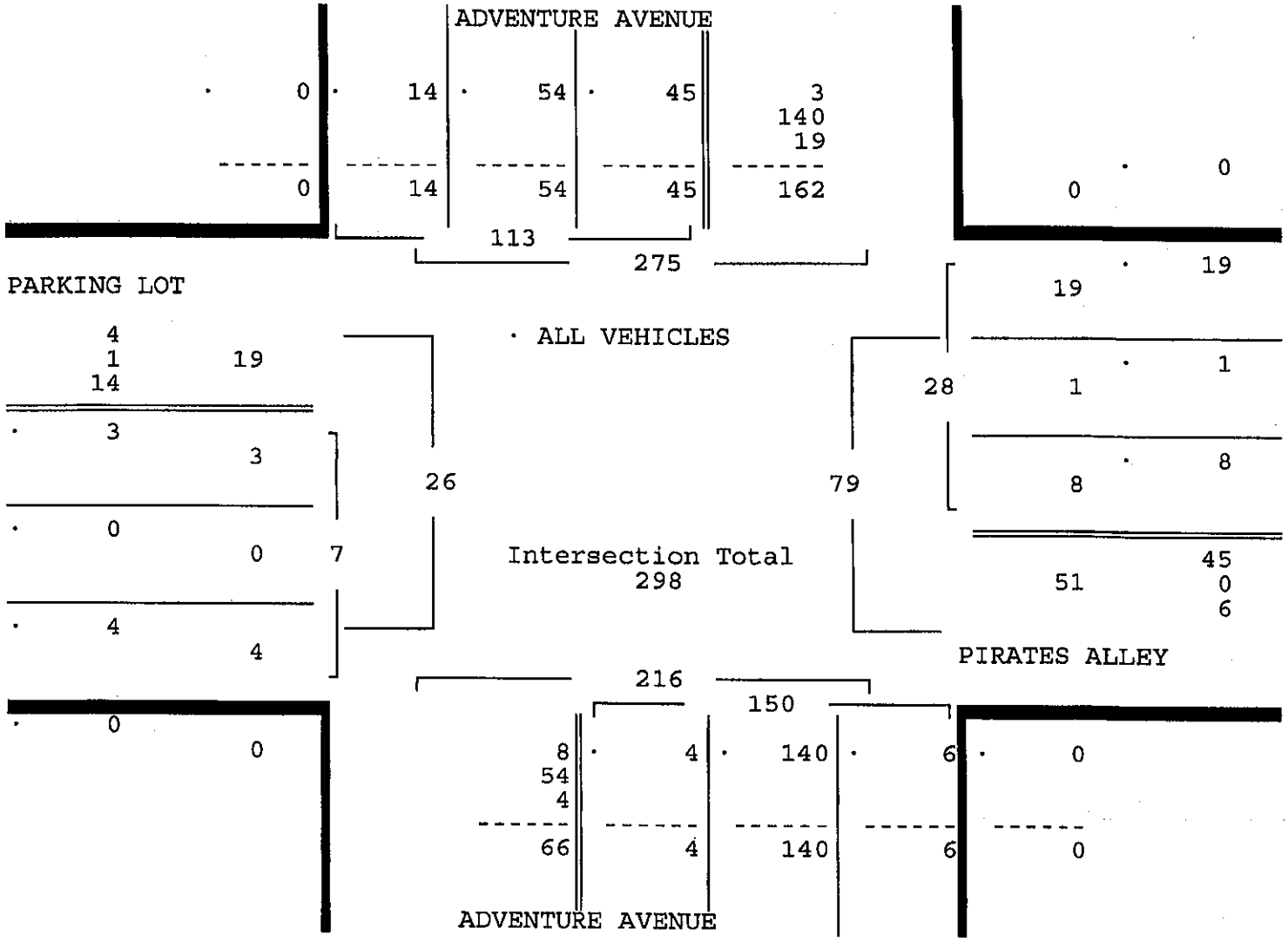
PIRATES ALLEY & ADVENTURE AVENUE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: MARISA CRUZ
NOT SIGNALIZED

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

Site Code : 00120054
Start Date: 04/13/12
File I.D. : PIRAADVE
Page : 2

ALL VEHICLES

	ADVENTURE AVENUE From North				PIRATES ALLEY From East				ADVENTURE AVENUE From South				PARKING LOT From West				
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
Date 04/13/12																	
Peak Hour Analysis By Entire Intersection for the Period: 07:00 to 09:00 on 04/13/12																	
Peak start 08:00					08:00				08:00				08:00				
Volume	8	37	54	14	0	8	1	19	0	4	140	6	0	3	0	4	
Percent	7%	33%	48%	12%	0%	29%	4%	68%	0%	3%	93%	4%	0%	43%	0%	57%	
Pk total	113				28				150				7				
Highest	08:00				08:45				08:45				08:00				
Volume	3	10	21	1	0	3	1	8	0	3	39	1	0	1	0	2	
Hi total	35				12				43				3				
PHF	.81				.58				.87				.58				



12A(52)

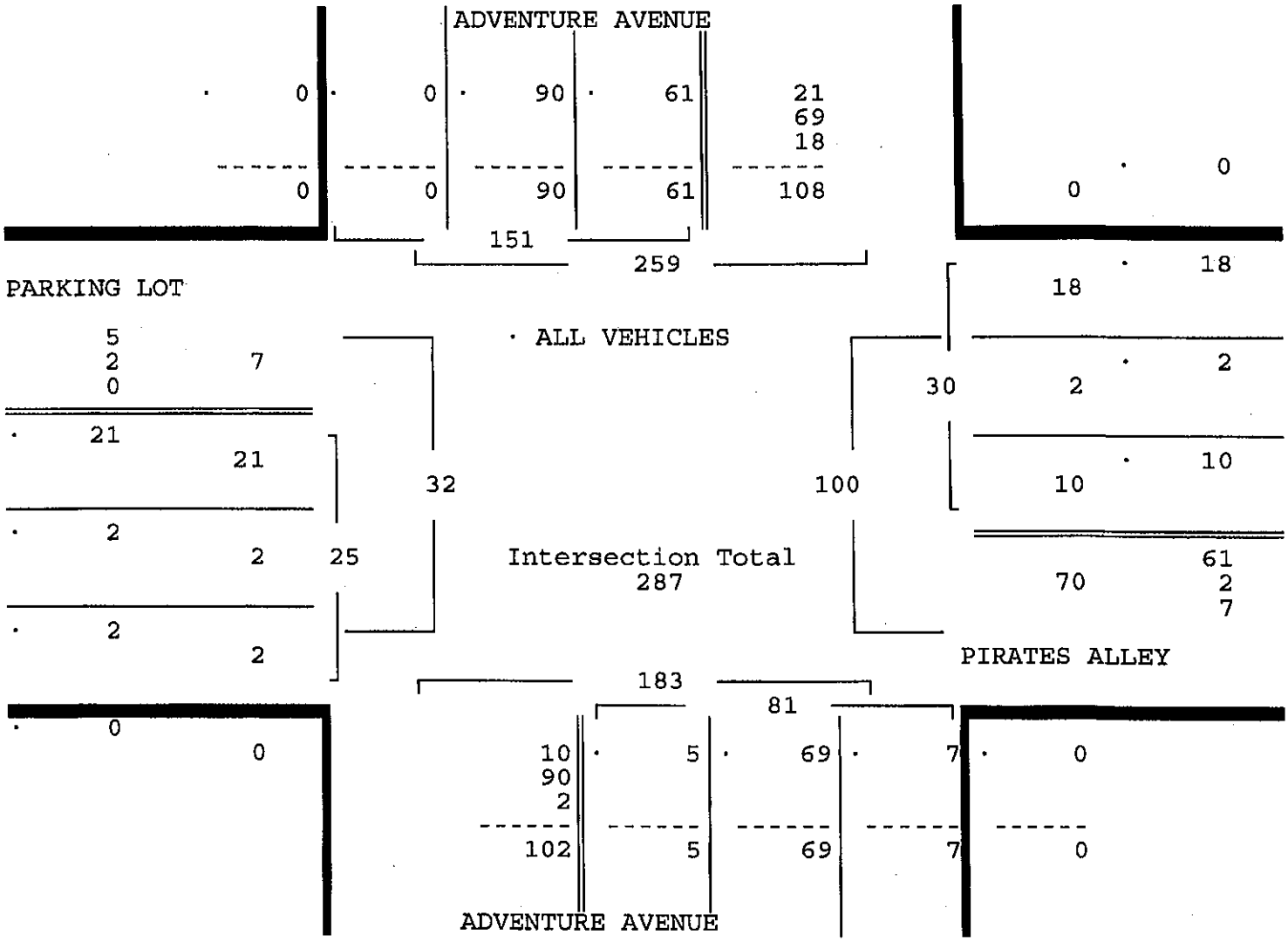
PIRATES ALLEY & ADVENTURE AVENUE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: MARISA CRUZ
NOT SIGNALIZED

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

Site Code : 00120054
Start Date: 04/13/12
File I.D. : PIRAADVE
Page : 3

ALL VEHICLES

	ADVENTURE AVENUE From North				PIRATES ALLEY From East				ADVENTURE AVENUE From South				PARKING LOT From West				
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
Date 04/13/12																	
Peak Hour Analysis By Entire Intersection for the Period: 16:00 to 18:00 on 04/13/12																	
Peak start 17:00					17:00				17:00				17:00				
Volume	26	35	90	0	0	10	2	18	2	3	69	7	0	21	2	2	
Percent	17%	23%	60%	0%	0%	33%	7%	60%	2%	4%	85%	9%	0%	84%	8%	8%	
Pk total	151				30				81				25				
Highest	17:00				17:00				17:15				17:00				
Volume	8	13	24	0	0	2	0	9	1	1	22	2	0	10	1	0	
Hi total	45				11				26				11				
PHF	.84				.68				.78				.57				



12A(53)

NORTH TREASURE DRIVE & HISPANOLA AVENUE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: CARLOS PALOMINO
NOT SIGNALIZED

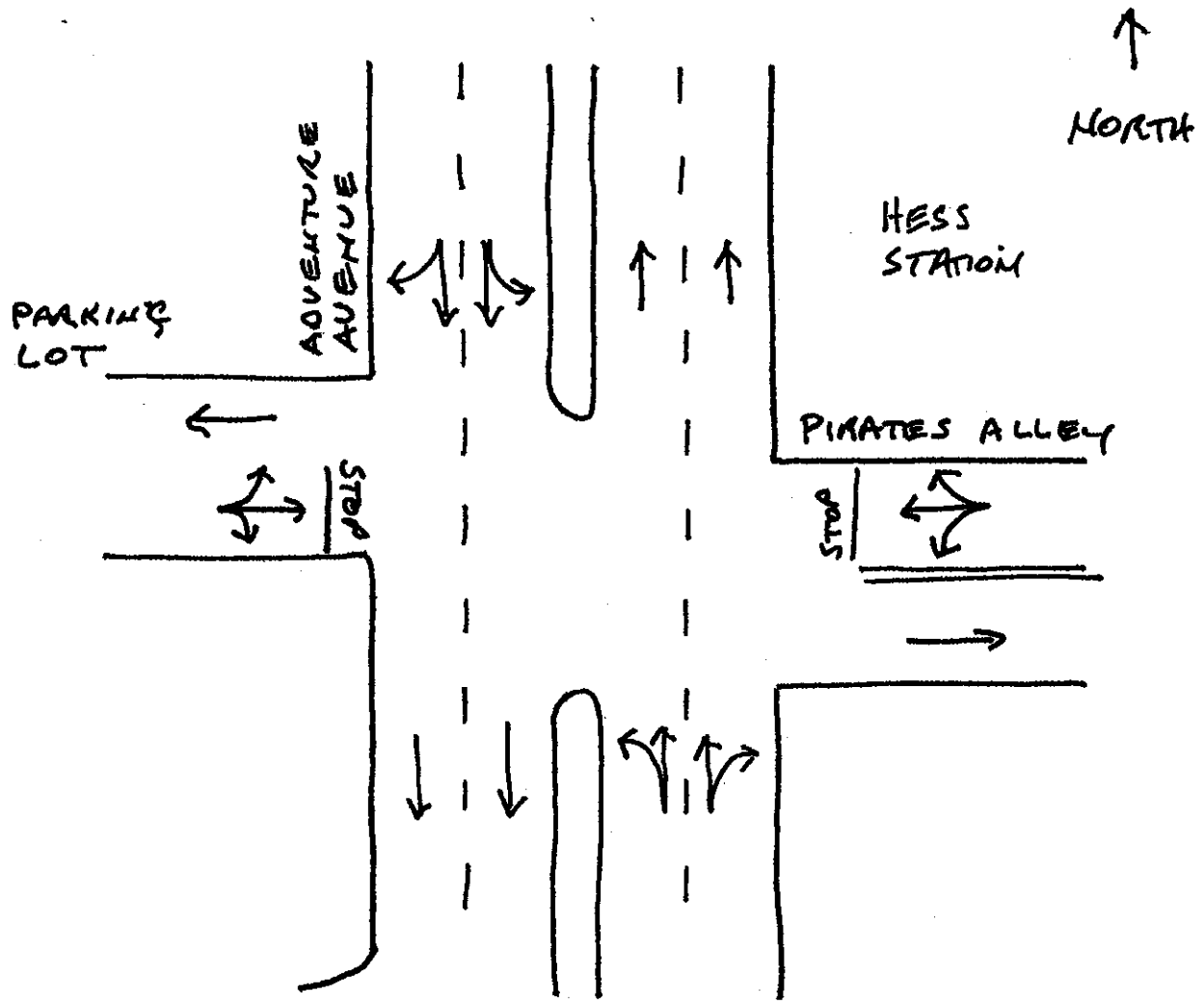
Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

Site Code : 00120054
Start Date: 04/13/12
File I.D. : TREAHISP
Page : 1

PEDESTRIANS

	HISPANOLA AVENUE From North				N TREASURE DRIVE From East				HISPANOLA AVENUE From South				N TREASURE DRIVE From West				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Total
Date 04/13/12																	
07:00	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
07:15	0	0	0	1	0	0	0	3	0	0	0	2	0	0	0	0	6
07:30	0	0	0	3	0	0	0	2	0	0	0	2	0	0	0	1	8
07:45	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	6
Hr Total	0	0	0	8	0	0	0	5	0	0	0	6	0	0	0	3	22
08:00	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0	6
08:15	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	1	6
08:30	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	6
08:45	0	0	0	3	0	0	0	2	0	0	0	2	0	0	0	1	8
Hr Total	0	0	0	11	0	0	0	4	0	0	0	9	0	0	0	2	26
* BREAK *																	
16:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	4
Hr Total	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	1	6
17:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	1	4
TOTAL	0	0	0	22	0	0	0	11	0	0	0	18	0	0	0	7	58

12A (54)



NORTH BAY VILLAGE, FLORIDA
APRIL 13TH, 2012
DRAWN BY: KEVIN MCHALLY

NOT SIGNALIZED

12A(55)

NORTH TREASURE DRIVE & HISPANOLA AVENUE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: CARLOS PALOMINO
NOT SIGNALIZED

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

Site Code : 00120054
Start Date: 04/13/12
File I.D. : TREAHISP
Page : 1

ALL VEHICLES

	HISPANOLA AVENUE From North				N TREASURE DRIVE From East				HISPANOLA AVENUE From South				N TREASURE DRIVE From West				
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
Date 04/13/12																	
07:00	0	6	3	1	0	0	1	1	0	1	10	1	0	3	2	1	30
07:15	0	3	5	2	1	0	3	5	0	1	4	0	0	3	1	0	28
07:30	0	2	7	1	0	0	3	16	0	1	10	0	0	5	2	0	47
07:45	1	8	17	2	0	0	4	13	0	2	8	0	0	7	4	2	68
Hr Total	1	19	32	6	1	0	11	35	0	5	32	1	0	18	9	3	173
08:00	1	11	13	1	0	0	2	12	0	4	17	1	0	2	5	4	73
08:15	0	14	18	2	0	0	2	14	0	0	22	2	0	5	0	2	81
08:30	0	8	7	5	0	1	2	9	0	3	26	0	0	7	1	0	69
08:45	0	2	4	2	0	0	1	5	0	3	10	1	0	2	1	1	32
Hr Total	1	35	42	10	0	1	7	40	0	10	75	4	0	16	7	7	255
* BREAK *																	
16:00	0	3	7	10	0	0	2	5	0	0	4	0	0	2	0	1	34
16:15	0	6	9	9	0	0	1	4	0	1	6	0	0	4	1	3	44
16:30	0	6	7	11	0	0	1	11	0	1	5	0	0	6	1	1	50
16:45	2	5	9	8	0	0	1	3	0	1	5	0	0	2	1	0	37
Hr Total	2	20	32	38	0	0	5	23	0	3	20	0	0	14	3	5	165
17:00	3	5	3	8	0	0	0	3	0	1	4	0	0	3	2	0	32
17:15	2	5	4	11	1	0	1	6	0	1	0	0	0	8	3	0	42
17:30	6	1	8	9	0	0	0	2	0	0	3	1	0	4	2	1	37
17:45	4	5	10	11	0	0	0	10	0	0	3	1	0	2	3	2	51
Hr Total	15	16	25	39	1	0	1	21	0	2	10	2	0	17	10	3	162
TOTAL	19	90	131	93	2	1	24	119	0	20	137	7	0	65	29	18	755

12A(56)

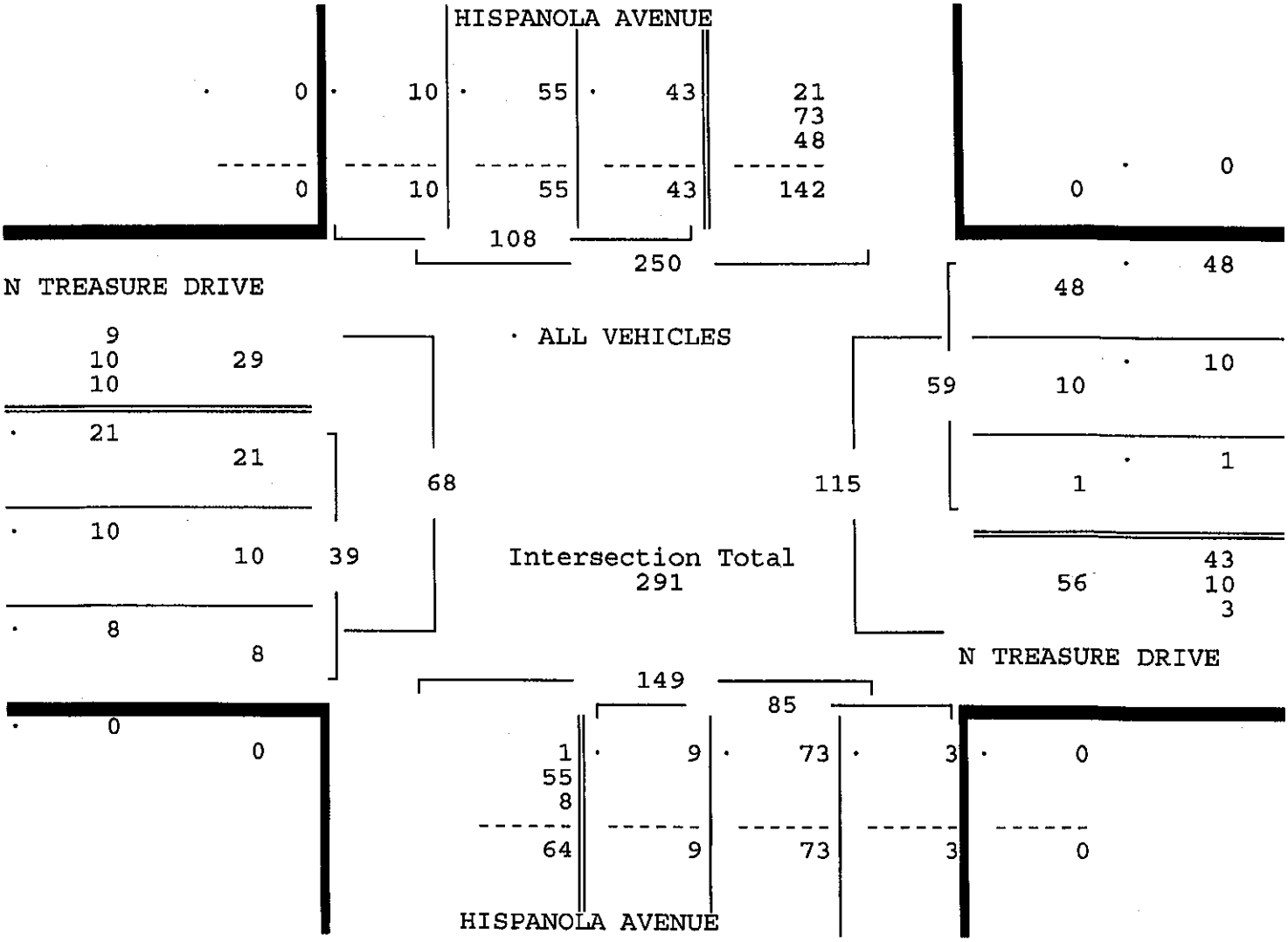
NORTH TREASURE DRIVE & HISPANOLA AVENUE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: CARLOS PALOMINO
NOT SIGNALIZED

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

Site Code : 00120054
Start Date: 04/13/12
File I.D. : TREAHISP
Page : 2

ALL VEHICLES

	HISPANOLA AVENUE From North				N TREASURE DRIVE From East				HISPANOLA AVENUE From South				N TREASURE DRIVE From West				
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
Date 04/13/12																	
Peak Hour Analysis By Entire Intersection for the Period: 07:00 to 09:00 on 04/13/12																	
Peak start	07:45				07:45				07:45				07:45				
Volume	2	41	55	10	0	1	10	48	0	9	73	3	0	21	10	8	
Percent	2%	38%	51%	9%	0%	2%	17%	81%	0%	11%	86%	4%	0%	54%	26%	21%	
Pk total	108				59				85				39				
Highest	08:15				07:45				08:30				07:45				
Volume	0	14	18	2	0	0	4	13	0	3	26	0	0	7	4	2	
Hi total	34				17				29				13				
PHF	.79				.87				.73				.75				



12A(57)

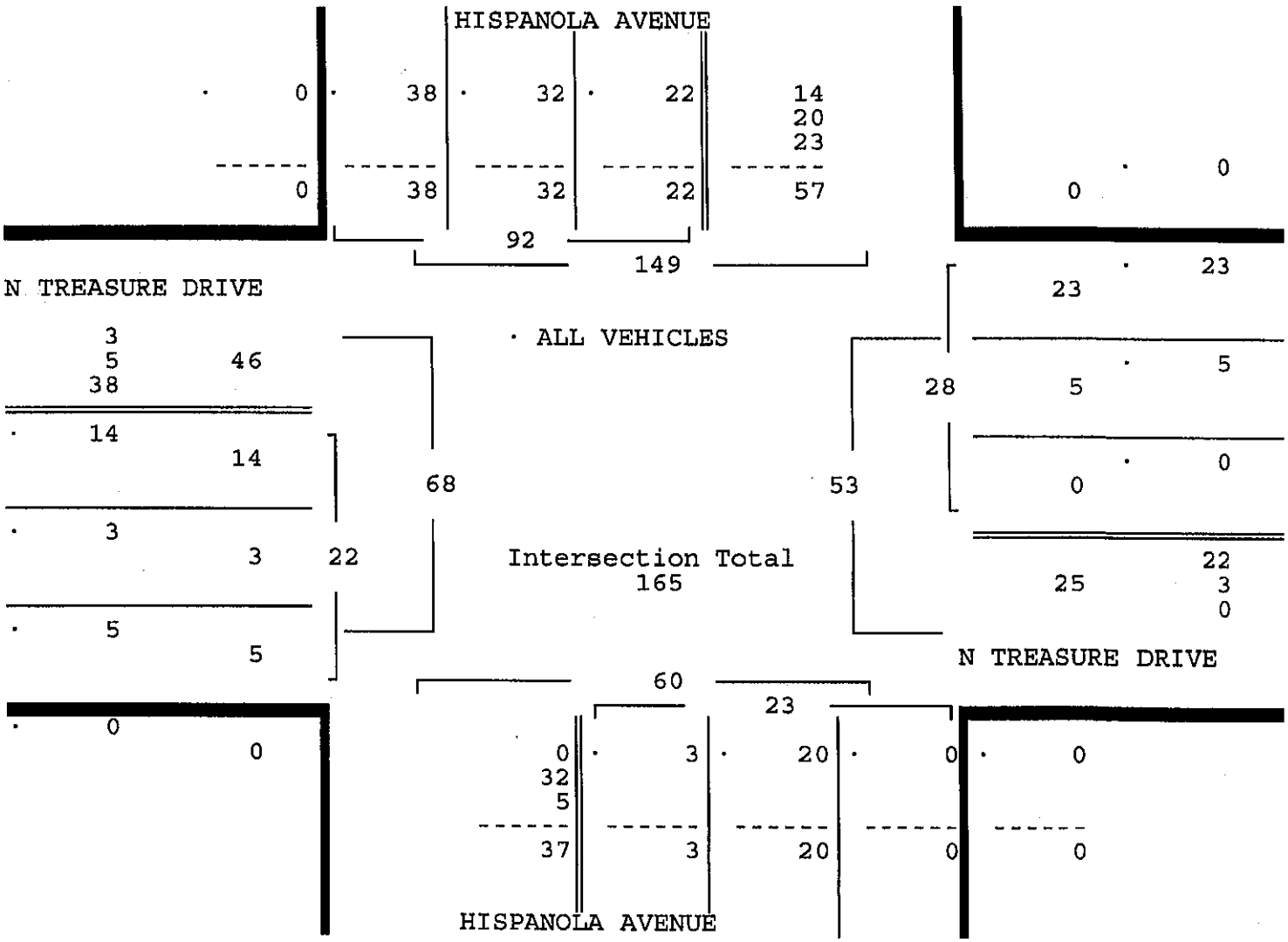
NORTH TREASURE DRIVE & HISPANOLA AVENUE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: CARLOS PALOMINO
NOT SIGNALIZED

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

Site Code : 00120054
Start Date: 04/13/12
File I.D. : TREAHISP
Page : 3

ALL VEHICLES

	HISPANOLA AVENUE From North				N TREASURE DRIVE From East				HISPANOLA AVENUE From South				N TREASURE DRIVE From West				
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
Date 04/13/12																	
Peak Hour Analysis By Entire Intersection for the Period: 16:00 to 18:00 on 04/13/12																	
Peak start 16:00					16:00				16:00				16:00				
Volume	2	20	32	38	0	0	5	23	0	3	20	0	0	14	3	5	
Percent	2%	22%	35%	41%	0%	0%	18%	82%	0%	13%	87%	0%	0%	64%	14%	23%	
Pk total	92				28				23				22				
Highest	16:15				16:30				16:15				16:15				
Volume	0	6	9	9	0	0	1	11	0	1	6	0	0	4	1	3	
Hi total	24				12				7				8				
PHF	.96				.58				.82				.69				



12A(58)

Traffic Survey Specialists, Inc.
624 Gardenia Terrace
Delray Beach, Florida 33444
Phone (561) 272-3255

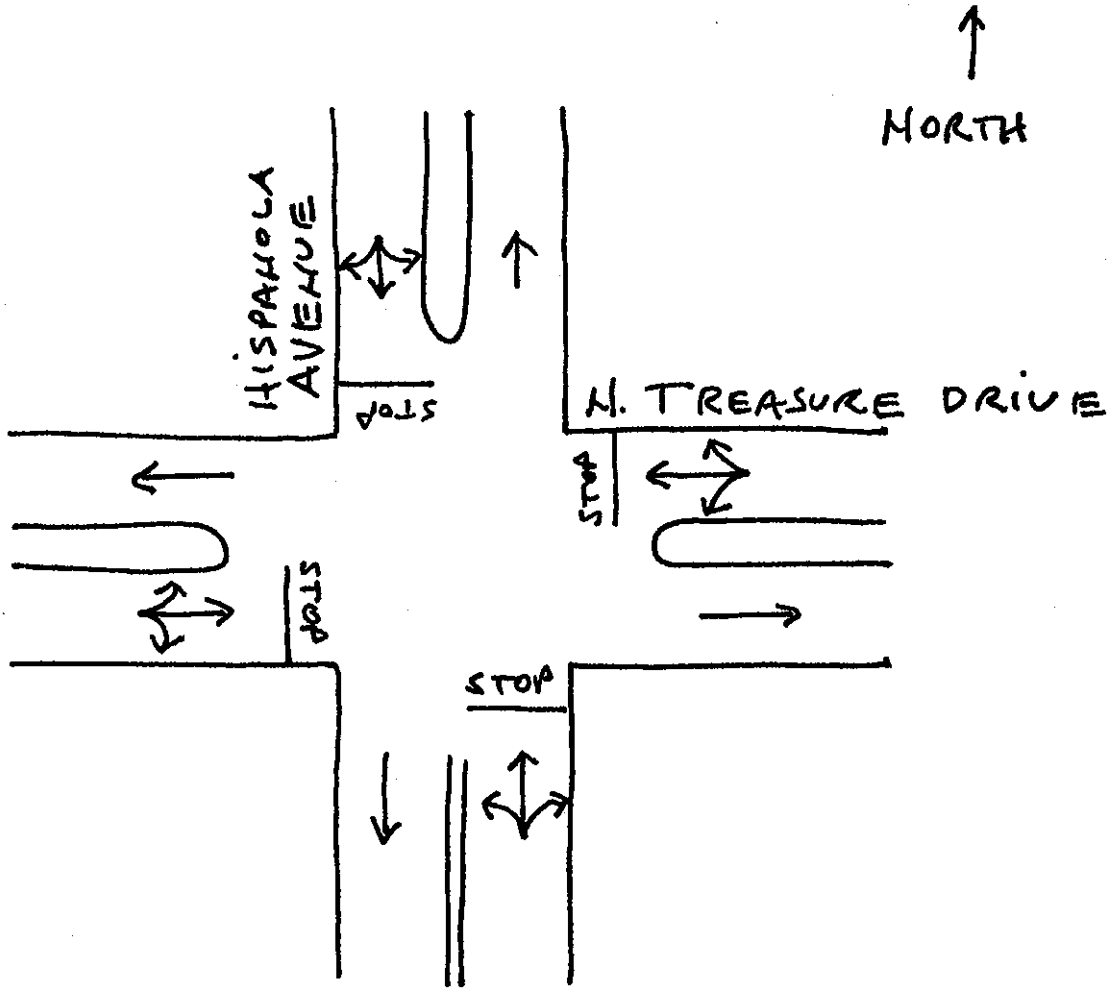
NORTH TREASURE DRIVE & HISPANOLA AVENUE
NORTH BAY VILLAGE, FLORIDA
COUNTED BY: CARLOS PALOMINO
NOT SIGNALIZED

Site Code : 00120054
Start Date: 04/13/12
File I.D. : TREAHISP
Page : 1

PEDESTRIANS

	HISPANOLA AVENUE From North				N TREASURE DRIVE From East				HISPANOLA AVENUE From South				N TREASURE DRIVE From West				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Total
Date 04/13/12																	
07:00	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
07:15	0	0	0	1	0	0	0	3	0	0	0	2	0	0	0	0	6
07:30	0	0	0	3	0	0	0	2	0	0	0	2	0	0	0	1	8
07:45	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	6
Hr Total	0	0	0	8	0	0	0	5	0	0	0	6	0	0	0	3	22
08:00	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0	6
08:15	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	1	6
08:30	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	6
08:45	0	0	0	3	0	0	0	2	0	0	0	2	0	0	0	1	8
Hr Total	0	0	0	11	0	0	0	4	0	0	0	9	0	0	0	2	26
* BREAK *																	
16:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	4
Hr Total	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	1	6
17:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hr Total	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	1	4
TOTAL	0	0	0	22	0	0	0	11	0	0	0	18	0	0	0	7	58

12A(59)



NORTH BAY VILLAGE, FLORIDA
APRIL 13TH 2012
DRAWN BY: KEVIN McHALLY

NOT SIGNALIZED

12A(60)

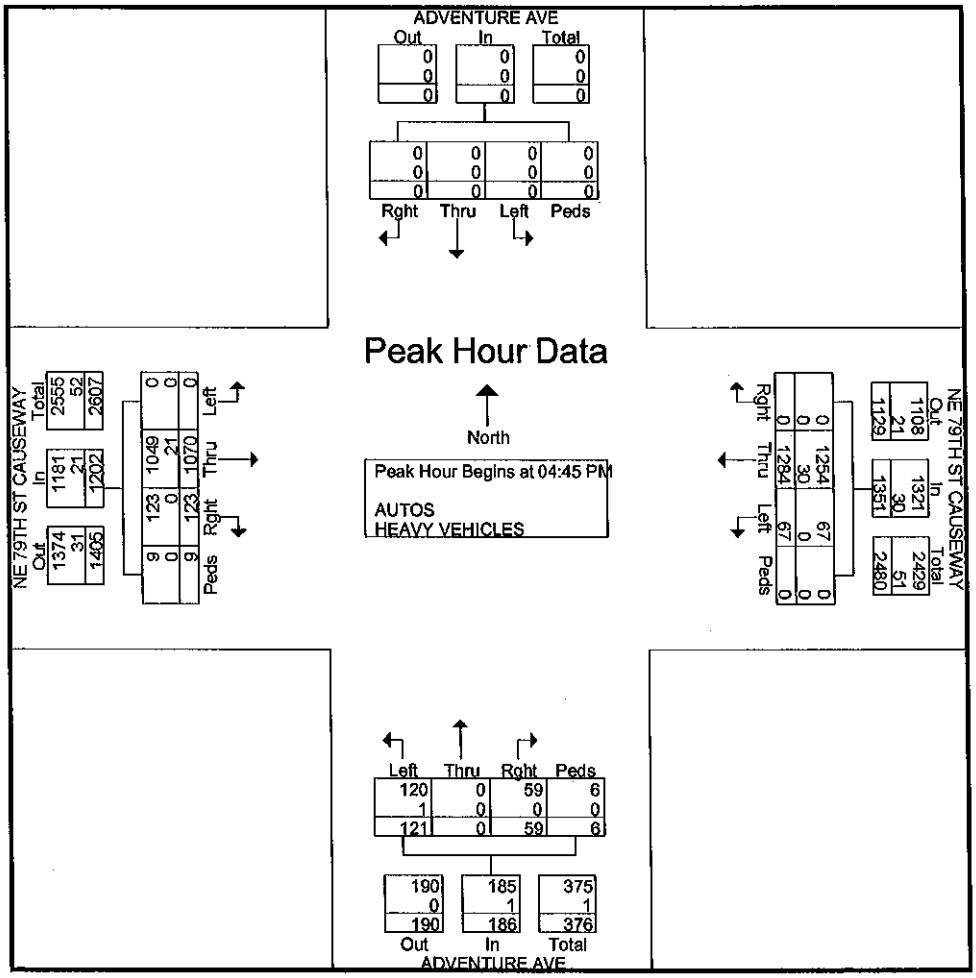
Crosroads Engineering Data, Inc.

13284 SW 120th Street
Miami, Florida, 33186
Tel: 305-233-3997 Fax: 305-233-7720

CLIENT : KIMLEY HORN
JOB NO : 2011-066
PROJECT : ISLES OF DREAMS
COUNTY : MIAMI-DADE

File Name : ADVENTURE AVE @NE 79TH ST CAUSEWAY
Site Code : 00000000
Start Date : 10/25/2011
Page No : 2

	ADVENTURE AVE From North					NE 79TH ST CAUSEWAY From East					ADVENTURE AVE From South					NE 79TH ST CAUSEWAY From West					
Start Time	Rght	Thru	Left	Peds	App. Total	Rght	Thru	Left	Peds	App. Total	Rght	Thru	Left	Peds	App. Total	Rght	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	0	345	14	0	359	9	0	20	0	29	32	301	0	2	335	723
05:00 PM	0	0	0	0	0	0	307	14	0	321	15	0	43	1	59	36	240	0	2	278	658
05:15 PM	0	0	0	0	0	0	328	17	0	345	17	0	32	4	53	23	259	0	0	282	680
05:30 PM	0	0	0	0	0	0	304	22	0	326	18	0	26	1	45	32	270	0	5	307	678
Total Volume	0	0	0	0	0	0	1284	67	0	1351	59	0	121	6	186	123	1070	0	9	1202	2739
% App. Total	0	0	0	0		0	95	5	0		31.7	0	65.1	3.2		10.2	89	0	0.7		
PHF	.000	.000	.000	.000	.000	.000	.930	.761	.000	.941	.819	.000	.703	.375	.788	.854	.889	.000	.450	.897	.947
AUTOS	0	0	0	0	0	0	1254										1049				
% AUTOS	0	0	0	0	0	0	97.7	100	0	97.8	100	0	99.2	100	99.5	100	98.0	0	100	98.3	98.1
HEAVY VEHICLES	0	0	0	0	0	0	30	0	0	30	0	0	1	0	1	0	21	0	0	21	52
% HEAVY VEHICLES	0	0	0	0	0	0	2.3	0	0	2.2	0	0	0.8	0	0.5	0	2.0	0	0	1.7	1.9



12A(61)

INTERSECTION VOLUMES ANALYSIS SHEET
KLA - NORTH BAY VILLAGE
JFK/79TH STREET & ADVENTURE WAY
Existing Geometry

Growth Rate =	0.50%	
Peak Season =	1.01	1.04
Buildout Year =	2014	2014
Years =	2	3

AM Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT
Existing Volume on 4/13/2012	156	0	30	0	0	0	0	1,197	79	67	1,279	0
Peak Season Volume	158	0	30	0	0	0	0	1,209	80	68	1,292	0
Traffic Volume Growth	2	0	0	0	0	0	0	12	1	1	13	0
Background Traffic Volumes	160	0	30	0	0	0	0	1,221	81	69	1,305	0
Project Traffic												
Inbound Traffic Assignment								45.0%				
Inbound Traffic Volumes								31				
Outbound Traffic Assignment	45.0%		45.0%									
Outbound Traffic Volumes	28		28									
Project Traffic	28		28					31				
RTOR Reduction												
TOTAL TRAFFIC	**188**	**0**	**58**	**0**	**0**	**0**	**0**	**1,252**	**81**	**69**	**1,305**	**0**

PM Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT
Existing Volume on 10/2011	121	0	59	0	0	0	0	1,070	123	67	1,284	0
Peak Season Volume	126	0	61	0	0	0	0	1,113	128	70	1,335	0
Traffic Volume Growth	2	0	1	0	0	0	0	17	2	1	20	0
Background Traffic Volumes	128	0	62	0	0	0	0	1,130	130	71	1,355	0
Project Traffic												
Inbound Traffic Assignment								45.0%				
Inbound Traffic Volumes								26				
Outbound Traffic Assignment	45.0%		45.0%									
Outbound Traffic Volumes	29		29									
Project Traffic	29		29					26				
RTOR Reduction												
TOTAL TRAFFIC	**157**	**0**	**91**	**0**	**0**	**0**	**0**	**1,156**	**130**	**71**	**1,355**	**0**

12A(62)

DRAFT - 4/17/2012

INTERSECTION VOLUMES ANALYSIS SHEET
KLA - NORTH BAY VILLAGE
PIRATES ALLEY & ADVENTURE AVENUE
Existing Geometry

Growth Rate =	0.50%	
Peak Season =	1.01	1.01
Buildout Year =	2014	2014
Years =	2	2

AM Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT
Existing Volume on 4/13/2012	4	140	6	45	54	14	3	0	4	8	1	19
Peak Season Volume	4	141	6	45	55	14	3	0	4	8	1	19
Traffic Volume Growth	0	1	0	0	1	0	0	0	0	0	0	0
Background Traffic Volumes	4	142	6	45	56	14	3	0	4	8	1	19
Project Traffic												
Inbound Traffic Assignment												
Inbound Traffic Volumes												
Outbound Traffic Assignment										10.0%		90.0%
Outbound Traffic Volumes										6		56
Project Traffic										6		56
RTOR Reduction												
TOTAL TRAFFIC	**4**	**142**	**6**	**45**	**56**	**14**	**3**	**0**	**4**	**14**	**1**	**75**

PM Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT
Existing Volume on 4/13/2012	5	69	7	61	90	0	21	2	2	10	2	18
Peak Season Volume	5	70	7	62	91	0	21	2	2	10	2	18
Traffic Volume Growth	0	1	0	1	1	0	0	0	0	0	0	0
Background Traffic Volumes	5	71	7	63	92	0	21	2	2	10	2	18
Project Traffic												
Inbound Traffic Assignment												
Inbound Traffic Volumes												
Outbound Traffic Assignment										10.0%		90.0%
Outbound Traffic Volumes										6		58
Project Traffic										6		58
RTOR Reduction												
TOTAL TRAFFIC	**5**	**71**	**7**	**63**	**92**	**0**	**21**	**2**	**2**	**16**	**2**	**76**

12A(63)

INTERSECTION VOLUMES ANALYSIS SHEET
KLA - NORTH BAY VILLAGE
NORTH TREASURE DRIVE & HISPANOLA AVENUE
Existing Geometry

Growth Rate =	0.50%	
Peak Season =	1.01	1.01
Buildout Year =	2014	2014
Years =	2	2

AM Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT
Existing Volume on 4/13/2012	9	73	3	43	55	10	21	10	7	1	10	48
Peak Season Volume	9	74	3	43	56	10	21	10	7	1	10	48
Traffic Volume Growth	0	1	0	0	1	0	0	0	0	0	0	0
Background Traffic Volumes	9	75	3	43	57	10	21	10	7	1	10	48
Project Traffic												
Inbound Traffic Assignment	9.0%					90.0%					1.0%	
Inbound Traffic Volumes	6					62					1	
Outbound Traffic Assignment												
Outbound Traffic Volumes												
Project Traffic	6					62					1	
RTOR Reduction												
TOTAL TRAFFIC	**15**	**75**	**3**	**43**	**57**	**72**	**21**	**10**	**7**	**1**	**11**	**48**

PM Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT	LT	Thru	RT
Existing Volume on 4/13/2012	3	20	0	22	32	38	14	3	5	0	5	23
Peak Season Volume	3	20	0	22	32	38	14	3	5	0	5	23
Traffic Volume Growth	0	0	0	0	0	0	0	0	0	0	0	0
Background Traffic Volumes	3	20	0	22	32	38	14	3	5	0	5	23
Project Traffic												
Inbound Traffic Assignment	9.0%					90.0%					1.0%	
Inbound Traffic Volumes	5					51					1	
Outbound Traffic Assignment												
Outbound Traffic Volumes												
Project Traffic	5					51					1	
RTOR Reduction												
TOTAL TRAFFIC	**8**	**20**	**0**	**22**	**32**	**89**	**14**	**3**	**5**	**0**	**6**	**23**

12A(64)

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KHA Analyst	Intersection	Pirates Alley & Adventure Ave
Agency/Co.	Kimley-Horn and Associates	Jurisdiction	
Date Performed	4/16/2012	Analysis Year	2012
Analysis Time Period	AM Peak Hour - Existing Volume		

Project Description	
East/West Street: Pirates Alley	North/South Street: Adventure Avenue
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	4	140	6	45	54	14
Peak-Hour Factor, PHF	0.87	0.87	0.87	0.81	0.81	0.81
Hourly Flow Rate, HFR (veh/h)	4	160	6	55	66	17
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration	LT		TR	LT		TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	3	0	4	8	1	19
Peak-Hour Factor, PHF	0.58	0.58	0.58	0.58	0.58	0.58
Hourly Flow Rate, HFR (veh/h)	5	0	6	13	1	32
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT		LTR			LTR	
v (veh/h)	4	55		46			11	
C (m) (veh/h)	1512	1410		838			807	
v/c	0.00	0.04		0.05			0.01	
95% queue length	0.01	0.12		0.17			0.04	
Control Delay (s/veh)	7.4	7.7		9.5			9.5	
LOS	A	A		A			A	
Approach Delay (s/veh)	--	--	9.5			9.5		
Approach LOS	--	--	A			A		

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12A(65)

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KHA Analyst	Intersection	Pirates Alley & Adventure Ave
Agency/Co.	Kimley-Horn and Associates	Jurisdiction	
Date Performed	4/16/2012	Analysis Year	2014
Analysis Time Period	AM Peak Hour - Total Volume		

Project Description	
East/West Street: Pirates Alley	North/South Street: Adventure Avenue
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	4	142	6	45	56	14
Peak-Hour Factor, PHF	0.87	0.87	0.87	0.81	0.81	0.81
Hourly Flow Rate, HFR (veh/h)	4	163	6	55	69	17
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration	LT		TR	LT		TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	3	0	4	14	1	75
Peak-Hour Factor, PHF	0.58	0.58	0.58	0.58	0.58	0.58
Hourly Flow Rate, HFR (veh/h)	5	0	6	24	1	129
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT		LTR			LTR	
v (veh/h)	4	55		154			11	
C (m) (veh/h)	1508	1406		896			768	
v/c	0.00	0.04		0.17			0.01	
95% queue length	0.01	0.12		0.62			0.04	
Control Delay (s/veh)	7.4	7.7		9.8			9.8	
LOS	A	A		A			A	
Approach Delay (s/veh)	--	--	9.8			9.8		
Approach LOS	--	--	A			A		

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12A(66)

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KHA Analyst	Intersection	Pirates Alley & Adventure Ave
Agency/Co.	Kimley-Horn and Associates	Jurisdiction	
Date Performed	4/16/2012	Analysis Year	2012
Analysis Time Period	PM Peak Hour - Existing Volume		

Project Description	
East/West Street: Pirates Alley	North/South Street: Adventure Avenue
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	5	69	7	61	90	0
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.84	0.84	0.84
Hourly Flow Rate, HFR (veh/h)	6	88	8	72	107	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration	LT		TR	LT		TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	21	2	2	10	2	18
Peak-Hour Factor, PHF	0.57	0.57	0.57	0.68	0.68	0.68
Hourly Flow Rate, HFR (veh/h)	36	3	3	14	2	26
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT		LTR			LTR	
v (veh/h)	6	72		42			42	
C (m) (veh/h)	1482	1496		820			617	
v/c	0.00	0.05		0.05			0.07	
95% queue length	0.01	0.15		0.16			0.22	
Control Delay (s/veh)	7.4	7.5		9.6			11.3	
LOS	A	A		A			B	
Approach Delay (s/veh)	--	--	9.6			11.3		
Approach LOS	--	--	A			B		

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12A(67)

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KHA Analyst	Intersection	Pirates Alley & Adventure Ave
Agency/Co.	Kimley-Horn and Associates	Jurisdiction	
Date Performed	4/16/2012	Analysis Year	2014
Analysis Time Period	PM Peak Hour - Total Volume		

Project Description

East/West Street: Pirates Alley	North/South Street: Adventure Avenue
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	5	71	7	63	92	0
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.84	0.84	0.84
Hourly Flow Rate, HFR (veh/h)	6	91	8	75	109	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration	LT		TR	LT		TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	21	2	2	16	2	76
Peak-Hour Factor, PHF	0.57	0.57	0.57	0.68	0.68	0.68
Hourly Flow Rate, HFR (veh/h)	36	3	3	23	2	111
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT		LTR			LTR	
v (veh/h)	6	75		136			42	
C (m) (veh/h)	1479	1492		909			582	
v/c	0.00	0.05		0.15			0.07	
95% queue length	0.01	0.16		0.52			0.23	
Control Delay (s/veh)	7.4	7.5		9.7			11.7	
LOS	A	A		A			B	
Approach Delay (s/veh)	--	--	9.7			11.7		
Approach LOS	--	--	A			B		

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12A(68)

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KHA Analyst	Intersection	Treasure Drive & Hispanola Ave
Agency/Co.	Kimley-Horn and Associates	Jurisdiction	
Date Performed	4/16/2012	Analysis Year	2012
Analysis Time Period	AM Peak Hour - Existing Volume		

Project Description	
East/West Street: Treasure Drive	North/South Street: Hispanola Avenue
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	21	10	7	1	10	48
Peak-Hour Factor, PHF	0.75	0.75	0.75	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	28	13	9	1	11	55
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9	73	3	43	55	10
Peak-Hour Factor, PHF	0.73	0.73	0.73	0.79	0.79	0.79
Hourly Flow Rate, HFR (veh/h)	12	99	4	54	69	12
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	28	1		115			135	
C (m) (veh/h)	1536	1593		717			725	
v/c	0.02	0.00		0.16			0.19	
95% queue length	0.06	0.00		0.57			0.68	
Control Delay (s/veh)	7.4	7.3		11.0			11.1	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--	11.0			11.1		
Approach LOS	--	--	B			B		

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12A(69)

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KHA Analyst	Intersection	Treasure Drive & Hispanola Ave
Agency/Co.	Kimley-Horn and Associates	Jurisdiction	
Date Performed	4/16/2012	Analysis Year	2014
Analysis Time Period	AM Peak Hour - Total Volume		

Project Description	
East/West Street: Treasure Drive	North/South Street: Hispanola Avenue
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	21	10	7	1	11	48
Peak-Hour Factor, PHF	0.75	0.75	0.75	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	28	13	9	1	12	55
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	15	73	3	43	55	72
Peak-Hour Factor, PHF	0.73	0.73	0.73	0.79	0.79	0.79
Hourly Flow Rate, HFR (veh/h)	20	99	4	54	69	91
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	28	1		123			214	
C (m) (veh/h)	1535	1593		701			814	
v/c	0.02	0.00		0.18			0.26	
95% queue length	0.06	0.00		0.63			1.06	
Control Delay (s/veh)	7.4	7.3		11.2			11.0	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--	11.2			11.0		
Approach LOS	--	--	B			B		

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12A(70)

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KHA Analyst	Intersection	Treasure Drive & Hispanola Ave
Agency/Co.	Kimley-Horn and Associates	Jurisdiction	
Date Performed	4/16/2012	Analysis Year	2012
Analysis Time Period	PM Peak Hour - Existing Volume		

Project Description

East/West Street: Treasure Drive	North/South Street: Hispanola Avenue
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	14	3	5	0	5	23
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.58	0.58	0.58
Hourly Flow Rate, HFR (veh/h)	20	4	7	0	8	39
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	3	20	0	22	32	38
Peak-Hour Factor, PHF	0.82	0.82	0.82	0.96	0.96	0.96
Hourly Flow Rate, HFR (veh/h)	3	24	0	22	33	39
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	20	0		27			94	
C (m) (veh/h)	1560	1608		745			872	
v/c	0.01	0.00		0.04			0.11	
95% queue length	0.04	0.00		0.11			0.36	
Control Delay (s/veh)	7.3	7.2		10.0			9.6	
LOS	A	A		B			A	
Approach Delay (s/veh)	--	--	10.0			9.6		
Approach LOS	--	--	B			A		

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12A(71)

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	KHA Analyst	Intersection	Treasure Drive & Hispanola Ave
Agency/Co.	Kimley-Horn and Associates	Jurisdiction	
Date Performed	4/16/2012	Analysis Year	2014
Analysis Time Period	PM Peak Hour - Total Volume		

Project Description	
East/West Street: Treasure Drive	North/South Street: Hispanola Avenue
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	14	3	5	0	6	23
Peak-Hour Factor, PHF	0.69	0.69	0.69	0.58	0.58	0.58
Hourly Flow Rate, HFR (veh/h)	20	4	7	0	10	39
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	8	20	0	22	32	89
Peak-Hour Factor, PHF	0.82	0.82	0.82	0.96	0.96	0.96
Hourly Flow Rate, HFR (veh/h)	9	24	0	22	33	92
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	20	0		33			147	
C (m) (veh/h)	1558	1608		730			926	
v/c	0.01	0.00		0.05			0.16	
95% queue length	0.04	0.00		0.14			0.56	
Control Delay (s/veh)	7.3	7.2		10.2			9.6	
LOS	A	A		B			A	
Approach Delay (s/veh)	--	--	10.2			9.6		
Approach LOS	--	--	B			A		

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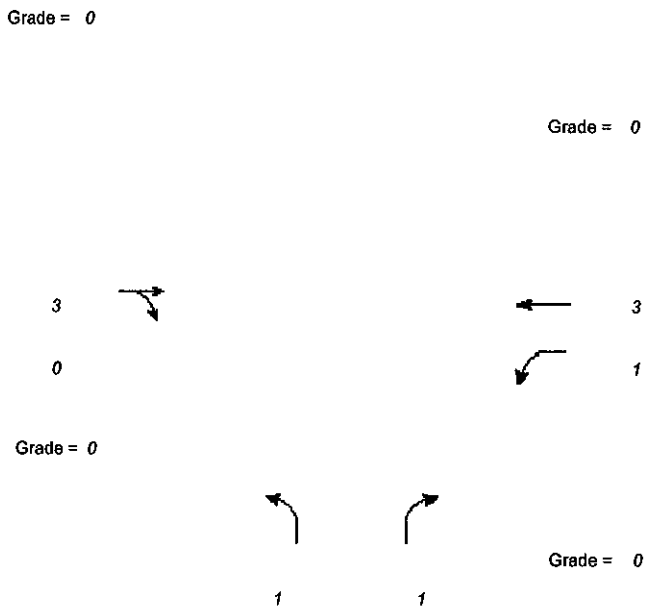
12A(72)

LONG REPORT

General Information		Site Information	
Analyst	KHA Analyst	Intersection	JFK & Adventure Avenue
Agency or Co.	Kimley-Horn and Associates	Area Type	All other areas
Date Performed	4/16/2012	Jurisdiction	
Time Period	AM Peak Hour - Existing Volume	Analysis Year	2012

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)		1197	79	67	1279		156		30			
% Heavy Veh		2	2	2	2		2		2			
PHF		0.96	0.96	0.91	0.91		0.88		0.88			
Actuated (P/A)		A	A	A	A		A		A			
Startup Lost Time		2.0		2.0	2.0		2.0		2.0			
ExtenSion of Effective Green		2.0		2.0	2.0		2.0		2.0			
Arrival type		3		3	3		3		3			
Unit Extension		3.0		3.0	3.0		3.0		3.0			
Ped/Bike/RTOR Volume	0	0	60	0	0		0	0	10	0	0	
Lane Width		12.0		12.0	12.0		12.0		12.0			
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0		0	0		0		0			
Pedestrian Timing	3.2			3.2			3.2			3.2		

	WB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 9.0	G = 51.0	G =	G =	G = 37.0	G =	G =	G =
	Y = 3	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25					Cycle Length C = 110.0			

12A(73)

VOLUME ADJUSTMENT AND SATURATION FLOW RATE WORKSHEET

General Information

Project Description

Volume Adjustment

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume		1197	79	67	1279		156		30			
PHF		0.96	0.96	0.91	0.91		0.88		0.88			
Adjusted Flow Rate		1247	20	74	1405		177		23			
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1267		74	1405		177		23			
Proportion of LT or RT		--	0.016	1.000	--	0.000		--	1.000		--	
Saturation Flow Rate												
Base Satflow		1900		1900	1900		1900		1900			
Number of Lanes		3	0	1	3		1		1			
f_W		1.000		1.000	1.000		1.000		1.000			
f_{HV}		0.980		0.980	0.980		0.980		0.980			
f_g		1.000		1.000	1.000		1.000		1.000			
f_p		1.000		1.000	1.000		1.000		1.000			
f_{bb}		1.000		1.000	1.000		1.000		1.000			
f_a		1.000		1.000	1.000		1.000		1.000			
f_{LU}		0.908		1.000	0.908		1.000		1.000			
f_{LT}		1.000	--	0.950	1.000	--	0.950		--			--
Secondary f_{LT}			--	0.131	0.131	--			--			--
f_{RT}	--	0.998		--	1.000		--		0.850	--		
f_{Lpb}		1.000	--	1.000	1.000	--	1.000		--			--
f_{Rpb}	--	1.000		--	1.000		--		1.000	--		
Adjusted Satflow		5062		1770	5074		1770		1583			
Secondary Adjusted Satflow			--	244	664	--			--			--

12A(74)

CAPACITY AND LOS WORKSHEET

General Information

Project Description

Capacity Analysis

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1267		74	1405		177		23			
Satflow Rate		5062		1770	5074		1770		1583			
Lost Time		2.0		2.0	2.0		2.0		2.0			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Lane Group Capacity		2347		269	2906		595		532			
v/c Ratio		0.54		0.28	0.48		0.30		0.04			
Flow Ratio		0.25		0.04	0.28		0.10		0.01			
Critical Lane Group		Y		Y	N		Y		N			
Sum Flow Ratios	0.39											
Lost Time/Cycle	15.00											
Critical v/c Ratio	0.45											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1267		74	1405		177		23			
Lane Group Capacity		2347		269	2906		595		532			
v/c Ratio		0.54		0.28	0.48		0.30		0.04			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Uniform Delay d_1		21.1		12.0	13.9		26.9		24.6			
Delay Factor k		0.14		0.11	0.11		0.11		0.11			
Incremental Delay d_2		0.3		0.6	0.1		0.3		0.0			
PF Factor		1.000		1.000	1.000		1.000		1.000			
Control Delay		21.4		12.5	14.0		27.2		24.6			
Lane Group LOS		C		B	B		C		C			
Approach Delay	21.4			13.9			26.9					
Approach LOS	C			B			C					
Intersection Delay	18.0			Intersection LOS						B		

12A(75)

SUPPLEMENTAL UNIFORM DELAY WORKSHEET FOR LEFT TURNS FROM EXCLUSIVE LANES WITH PROTECTED AND PERMITTED PHASES

General Information

Project Description

v/c Ratio Computation

	EB	WB	NB	SB
Cycle Length, C (s)		*110.0*		
Prot. Phase Eff. Green Interval, g (s)		*9.0*		
Opposed Queue Eff. Green Interval, g_q (s)		*20.56*		
Unopposed green interval, g_u (s)		*35.44*		
Red Time, r(s)		*45.0*		
Arrival Rate, q_a (veh/s)		*0.02*		
Protected Phase Departure Rate, s_p (veh/s)		*0.492*		
Perm. Phase Departure Rate, s_s (veh/s)		*0.11*		
X_{perm}		*0.30*		
X_{prot} (N/A for Lagging Left-turns)		*0.25*		

Uniform Queue Size and Delay Computations

Queue at Start of Green Arrow, Q_a		*0.93*		
Queue at Start of Unsaturated Green, Q_u		*0.42*		
Residual Queue, Q_r		*0.00*		
Uniform Delay, d_1		*12.0*		

Uniform Queue Size and Delay Equations

	Case	Q_a	Q_u	Q_r	d_1
If X_{perm} <= 1.0 & X_{prot} <= 1.0	1	$q_a r$	$q_a g_q$	0	$[0.5/(q_a C)][rQ_a + Q_a^{2/(s_p - q_s)} + g_q Q_u + Q_u^{2/(s_s - q_a)}$
If X_{perm} <= 1.0 & X_{prot} > 1.0	2	$q_a r$	$Q_r + q_a g_q$	$Q_a - g(s_p - q_a)$	$[0.5/(q_a C)][rQ_a + g(Q_a + Q_r) + g_q (Q_r + Q_u) + Q_u^{2/(s_s - q_a)}$
If X_{perm} > 1.0 & X_{prot} <= 1.0	3	$Q_r + q_a r$	$q_a g_q$	$Q_u - g_u(s_s - q_a)$	$[0.5/(q_a C)][g_q Q_u + g_u(Q_a + Q_r) + r(Q_r + Q_a) + Q_a^{2/(s_p - q_a)}$
If X_{perm} <= 1.0 (lagging lefts)	4	0	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + Q_u^{2/(s_s - q_a)}$
If X_{perm} > 1.0 (lagging lefts)	5	$Q_u - g_u(s_s - q_a)$	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + g_u(Q_u + Q_a) + Q_a^{2/(s_p - q_a)}$

12A(76)

BACK-OF-QUEUE WORKSHEET

General Information

Project Description

Average Back of Queue

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Lane Group		TR		L	T		L		R			
Initial Queue/Lane		0.0		0.0	0.0		0.0		0.0			
Flow Rate/Lane		1267		74	1405		177		23			
Satflow/Lane		1858		455	1862		1770		1583			
Capacity/Lane		2347		269	2906		595		532			
Flow Ratio		0.3		0.2	0.3		0.1		0.0			
v/c Ratio		0.54		0.28	0.48		0.30		0.04			
I Factor		1.000		1.000	1.000		1.000		1.000			
Arrival Type		3		3	3		3		3			
Platoon Ratio		1.00		1.00	1.00		1.00		1.00			
PF Factor		1.00		1.00	1.00		1.00		1.00			
Q_1		10.2		0.9	9.3		4.0		0.5			
k_B		0.7		0.3	0.8		0.6		0.5			
Q_2		0.8		0.1	0.7		0.2		0.0			
Q Average		11.0		1.1	10.0		4.2		0.5			
Percentile Back of Queue (95th percentile)												
$f_{B\%}$		1.8		2.1	1.8		2.0		2.1			
BOQ, $Q_{\%}$		20.1		2.2	18.5		8.3		1.0			
Queue Storage Ratio												
Q Spacing		25.0		25.0	25.0		25.0		25.0			
Q Storage		0		0	0		0		0			
Average R_Q												
95% $R_{Q\%}$												

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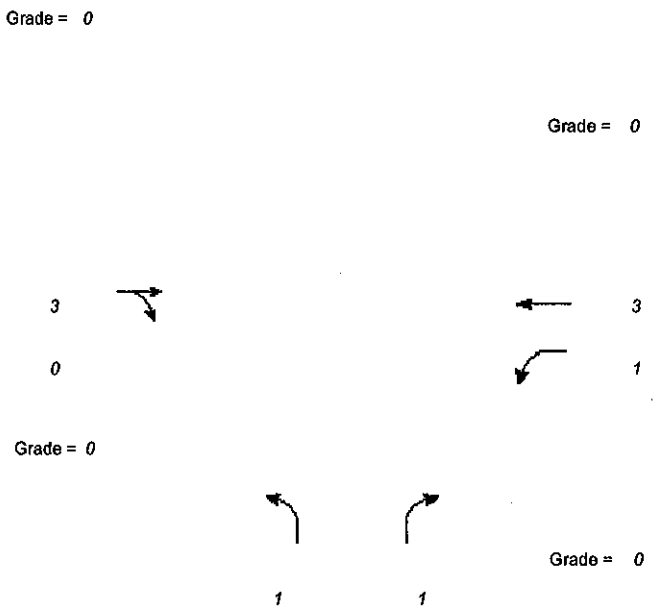
12A(77)

LONG REPORT

General Information		Site Information	
Analyst	KHA Analyst	Intersection	JFK & Adventure Avenue
Agency or Co.	Kimley-Horn and Associates	Area Type	All other areas
Date Performed	4/16/2012	Jurisdiction	
Time Period	AM Peak Hour - Total Volume	Analysis Year	2014

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)		1252	81	69	1305		188		58			
% Heavy Veh		2	2	2	2		2		2			
PHF		0.96	0.96	0.91	0.91		0.88		0.88			
Actuated (P/A)		A	A	A	A		A		A			
Startup Lost Time		2.0		2.0	2.0		2.0		2.0			
ExtenSion of Effective Green		2.0		2.0	2.0		2.0		2.0			
Arrival type		3		3	3		3		3			
Unit Extension		3.0		3.0	3.0		3.0		3.0			
Ped/Bike/RTOR Volume	0	0	60	0	0		0	0	10	0	0	
Lane Width		12.0		12.0	12.0		12.0		12.0			
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0		0	0		0		0			
Pedestrian Timing	3.2			3.2			3.2			3.2		

	WB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 9.0	G = 51.0	G =	G =	G = 37.0	G =	G =	G =
	Y = 3	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 110.0		

12A(78)

VOLUME ADJUSTMENT AND SATURATION FLOW RATE WORKSHEET

General Information

Project Description

Volume Adjustment

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume		1252	81	69	1305		188		58			
PHF		0.96	0.96	0.91	0.91		0.88		0.88			
Adjusted Flow Rate		1304	22	76	1434		214		55			
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1326		76	1434		214		55			
Proportion of LT or RT		--	0.017	1.000	--	0.000		--	1.000		--	
Saturation Flow Rate												
Base Satflow		1900		1900	1900		1900		1900			
Number of Lanes		3	0	1	3		1		1			
f_W		1.000		1.000	1.000		1.000		1.000			
f_{HV}		0.980		0.980	0.980		0.980		0.980			
f_g		1.000		1.000	1.000		1.000		1.000			
f_p		1.000		1.000	1.000		1.000		1.000			
f_{bb}		1.000		1.000	1.000		1.000		1.000			
f_a		1.000		1.000	1.000		1.000		1.000			
f_{LU}		0.908		1.000	0.908		1.000		1.000			
f_{LT}		1.000	--	0.950	1.000	--	0.950		--			--
Secondary f_{LT}			--	0.118	0.118	--			--			--
f_{RT}	--	0.998		--	1.000		--		0.850	--		
f_{Lpb}		1.000	--	1.000	1.000	--	1.000		--			--
f_{Rpb}	--	1.000		--	1.000		--		1.000	--		
Adjusted Satflow		5061		1770	5074		1770		1583			
Secondary Adjusted Satflow			--	221	601	--			--			--

12A(79)

CAPACITY AND LOS WORKSHEET

General Information

Project Description

Capacity Analysis

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1326		76	1434		214		55			
Satflow Rate		5061		1770	5074		1770		1583			
Lost Time		2.0		2.0	2.0		2.0		2.0			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Lane Group Capacity		2346		258	2906		595		532			
v/c Ratio		0.57		0.29	0.49		0.36		0.10			
Flow Ratio		0.26		0.04	0.28		0.12		0.03			
Critical Lane Group		Y		Y	N		Y		N			
Sum Flow Ratios	0.43											
Lost Time/Cycle	15.00											
Critical v/c Ratio	0.49											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1326		76	1434		214		55			
Lane Group Capacity		2346		258	2906		595		532			
v/c Ratio		0.57		0.29	0.49		0.36		0.10			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Uniform Delay d_1		21.4		12.4	14.0		27.6		25.1			
Delay Factor k		0.16		0.11	0.11		0.11		0.11			
Incremental Delay d_2		0.3		0.6	0.1		0.4		0.1			
PF Factor		1.000		1.000	1.000		1.000		1.000			
Control Delay		21.8		13.0	14.1		27.9		25.2			
Lane Group LOS		C		B	B		C		C			
Approach Delay	21.8			14.1			27.4					
Approach LOS	C			B			C					
Intersection Delay	18.5			Intersection LOS						B		

12A (80)

SUPPLEMENTAL UNIFORM DELAY WORKSHEET FOR LEFT TURNS FROM EXCLUSIVE LANES WITH PROTECTED AND PERMITTED PHASES

General Information

Project Description

v/c Ratio Computation

	EB	WB	NB	SB
Cycle Length, C (s)	110.0			
Prot. Phase Eff. Green Interval, g (s)		9.0		
Opposed Queue Eff. Green Interval, g_q (s)		21.87		
Unopposed green interval, g_u (s)		34.13		
Red Time, r(s)		45.0		
Arrival Rate, q_a (veh/s)		0.02		
Protected Phase Departure Rate, s_p (veh/s)		0.492		
Perm. Phase Departure Rate, s_s (veh/s)		0.10		
X_{perm}		0.34		
X_{prot} (N/A for Lagging Left-turns)		0.26		

Uniform Queue Size and Delay Computations

Queue at Start of Green Arrow, Q_a		0.95		
Queue at Start of Unsaturated Green, Q_u		0.46		
Residual Queue, Q_r		0.00		
Uniform Delay, d_1		12.4		

Uniform Queue Size and Delay Equations

	Case	Q_a	Q_u	Q_r	d_1
If X_{perm} <= 1.0 & X_{prot} <= 1.0	1	$q_a r$	$q_a g_q$	0	$[0.5/(q_a C)][rQ_a + Q_a^{2/(s_p - q_s)} + g_q Q_u + Q_u^{2/(s_s - q_a)}$
If X_{perm} <= 1.0 & X_{prot} > 1.0	2	$q_a r$	$Q_r + q_a g_q$	$Q_a - g(s_p - q_a)$	$[0.5/(q_a C)][rQ_a + g(Q_a + Q_r) + g_q (Q_r + Q_u) + Q_u^{2/(s_s - q_a)}$
If X_{perm} > 1.0 & X_{prot} <= 1.0	3	$Q_r + q_a r$	$q_a g_q$	$Q_u - g_u(s_s - q_a)$	$[0.5/(q_a C)][g_q Q_u + g_u(Q_a + Q_r) + r(Q_r + Q_a) + Q_a^{2/(s_p - q_a)}$
If X_{perm} <= 1.0 (lagging lefts)	4	0	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + Q_u^{2/(s_s - q_a)}$
If X_{perm} > 1.0 (lagging lefts)	5	$Q_u - g_u(s_s - q_a)$	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + g_u(Q_u + Q_a) + Q_a^{2/(s_p - q_a)}$

12A(81)

BACK-OF-QUEUE WORKSHEET

General Information

Project Description

Average Back of Queue

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Lane Group		TR		L	T		L		R			
Initial Queue/Lane		0.0		0.0	0.0		0.0		0.0			
Flow Rate/Lane		1326		76	1434		214		55			
Satflow/Lane		1857		435	1862		1770		1583			
Capacity/Lane		2346		258	2906		595		532			
Flow Ratio		0.3		0.2	0.3		0.1		0.0			
v/c Ratio		0.57		0.29	0.49		0.36		0.10			
I Factor		1.000		1.000	1.000		1.000		1.000			
Arrival Type		3		3	3		3		3			
Platoon Ratio		1.00		1.00	1.00		1.00		1.00			
PF Factor		1.00		1.00	1.00		1.00		1.00			
Q_1		10.8		1.0	9.6		4.9		1.2			
k_B		0.7		0.3	0.8		0.6		0.5			
Q_2		0.9		0.1	0.8		0.3		0.1			
Q Average		11.7		1.1	10.4		5.3		1.2			
Percentile Back of Queue (95th percentile)												
$f_{B\%}$		1.8		2.1	1.8		1.9		2.1			
BOQ, $Q_{\%}$		21.2		2.3	19.0		10.2		2.5			
Queue Storage Ratio												
Q Spacing		25.0		25.0	25.0		25.0		25.0			
Q Storage		0		0	0		0		0			
Average R_Q												
95% $R_{Q\%}$												

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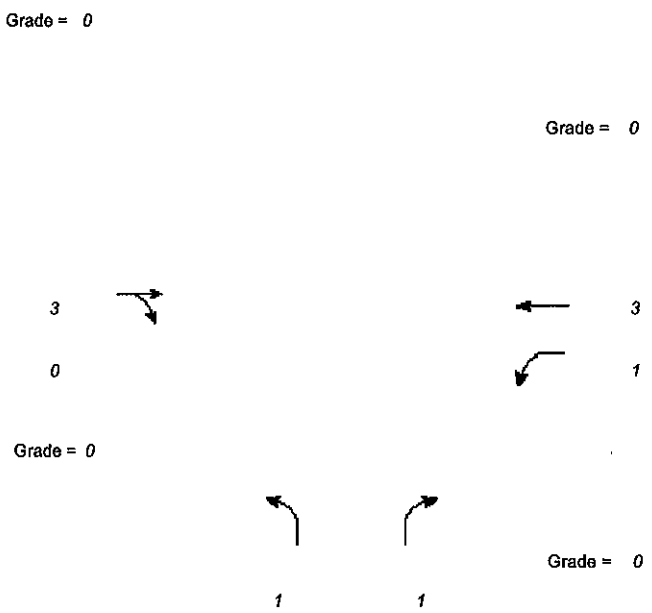
12A(82)

LONG REPORT

General Information		Site Information	
Analyst	KHA Analyst	Intersection	JFK & Adventure Avenue
Agency or Co.	Kimley-Horn and Associates	Area Type	All other areas
Date Performed	4/16/2012	Jurisdiction	
Time Period	PM Peak Hour - Existing Volume	Analysis Year	2012

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)		1070	123	67	1284		121		59			
% Heavy Veh		2	2	2	2		2		2			
PHF		0.89	0.85	0.76	0.93		0.70		0.82			
Actuated (P/A)		A	A	A	A		A		A			
Startup Lost Time		2.0		2.0	2.0		2.0		2.0			
ExtenSion of Effective Green		2.0		2.0	2.0		2.0		2.0			
Arrival type		3		3	3		3		3			
Unit Extension		3.0		3.0	3.0		3.0		3.0			
Ped/Bike/RTOR Volume	0	0	60	0	0		0	0	10	0	0	
Lane Width		12.0		12.0	12.0		12.0		12.0			
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0		0	0		0		0			
Pedestrian Timing	3.2			3.2			3.2			3.2		

	WB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 9.0	G = 51.0	G =	G =	G = 37.0	G =	G =	G =
	Y = 3	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 110.0		

12A(83)

VOLUME ADJUSTMENT AND SATURATION FLOW RATE WORKSHEET

General Information

Project Description

Volume Adjustment

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume		1070	123	67	1284		121		59			
PHF		0.89	0.85	0.76	0.93		0.70		0.82			
Adjusted Flow Rate		1202	74	88	1381		173		60			
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1276		88	1381		173		60			
Proportion of LT or RT		--	0.058	1.000	--	0.000		--	1.000		--	

Saturation Flow Rate

Base Satflow		1900		1900	1900		1900		1900			
Number of Lanes		3	0	1	3		1		1			
f_W		1.000		1.000	1.000		1.000		1.000			
f_{HV}		0.980		0.980	0.980		0.980		0.980			
f_g		1.000		1.000	1.000		1.000		1.000			
f_p		1.000		1.000	1.000		1.000		1.000			
f_{bb}		1.000		1.000	1.000		1.000		1.000			
f_a		1.000		1.000	1.000		1.000		1.000			
f_{LU}		0.908		1.000	0.908		1.000		1.000			
f_{LT}		1.000	--	0.950	1.000	--	0.950		--			--
Secondary f_{LT}			--	0.129	0.129	--			--			--
f_{RT}	--	0.991		--	1.000		--		0.850	--		
f_{Lpb}		1.000	--	1.000	1.000	--	1.000		--			--
f_{Rpb}	--	1.000		--	1.000		--		1.000	--		
Adjusted Satflow		5030		1770	5074		1770		1583			
Secondary Adjusted Satflow			--	240	654	--			--			--

12A(84)

CAPACITY AND LOS WORKSHEET

General Information

Project Description

Capacity Analysis

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1276		88	1381		173		60			
Satflow Rate		5030		1770	5074		1770		1583			
Lost Time		2.0		2.0	2.0		2.0		2.0			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Lane Group Capacity		2332		267	2906		595		532			
v/c Ratio		0.55		0.33	0.48		0.29		0.11			
Flow Ratio		0.25		0.05	0.27		0.10		0.04			
Critical Lane Group		Y		Y	N		Y		N			
Sum Flow Ratios	0.40											
Lost Time/Cycle	15.00											
Critical v/c Ratio	0.46											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1276		88	1381		173		60			
Lane Group Capacity		2332		267	2906		595		532			
v/c Ratio		0.55		0.33	0.48		0.29		0.11			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Uniform Delay d_1		21.2		12.2	13.8		26.8		25.2			
Delay Factor k		0.15		0.11	0.11		0.11		0.11			
Incremental Delay d_2		0.3		0.7	0.1		0.3		0.1			
PF Factor		1.000		1.000	1.000		1.000		1.000			
Control Delay		21.5		13.0	13.9		27.1		25.3			
Lane Group LOS		C		B	B		C		C			
Approach Delay	21.5			13.9			26.6					
Approach LOS	C			B			C					
Intersection Delay	18.1			Intersection LOS						B		

12A(85)

SUPPLEMENTAL UNIFORM DELAY WORKSHEET FOR LEFT TURNS FROM EXCLUSIVE LANES WITH PROTECTED AND PERMITTED PHASES

General Information

Project Description

v/c Ratio Computation

	EB	WB	NB	SB
Cycle Length, C (s)		*110.0*		
Prot. Phase Eff. Green Interval, g (s)		*9.0*		
Opposed Queue Eff. Green Interval, g_q (s)		*20.76*		
Unopposed green interval, g_u (s)		*35.24*		
Red Time, r(s)		*45.0*		
Arrival Rate, q_a (veh/s)		*0.02*		
Protected Phase Departure Rate, s_p (veh/s)		*0.492*		
Perm. Phase Departure Rate, s_s (veh/s)		*0.11*		
X_{perm}		*0.37*		
X_{prot} (N/A for Lagging Left-turns)		*0.30*		

Uniform Queue Size and Delay Computations

Queue at Start of Green Arrow, Q_a		*1.10*		
Queue at Start of Unsaturated Green, Q_u		*0.51*		
Residual Queue, Q_r		*0.00*		
Uniform Delay, d_1		*12.2*		

Uniform Queue Size and Delay Equations

	Case	Q_a	Q_u	Q_r	d_1
If X_{perm} <= 1.0 & X_{prot} <= 1.0	1	$q_a r$	$q_a g_q$	0	$[0.5/(q_a C)][rQ_a + Q_a^{2/(S_p - q_s)} + g_q Q_u + Q_u^{2/(S_s - q_a)}$
If X_{perm} <= 1.0 & X_{prot} > 1.0	2	$q_a r$	$Q_r + q_a g_q$	$Q_a - g(s_p - q_a)$	$[0.5/(q_a C)][rQ_a + g(Q_a + Q_r) + g_q(Q_r + Q_u) + Q_u^{2/(S_s - q_a)}$
If X_{perm} > 1.0 & X_{prot} <= 1.0	3	$Q_r + q_a r$	$q_a g_q$	$Q_u - g_u(s_s - q_a)$	$[0.5/(q_a C)][g_q Q_u + g_u(Q_a + Q_r) + r(Q_r + Q_a) + Q_a^{2/(S_p - q_a)}$
If X_{perm} <= 1.0 (lagging lefts)	4	0	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + Q_u^{2/(S_s - q_a)}$
If X_{perm} > 1.0 (lagging lefts)	5	$Q_u - g_u(s_s - q_a)$	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + g_u(Q_u + Q_a) + Q_a^{2/(S_p - q_a)}$

12A(86)

BACK-OF-QUEUE WORKSHEET

General Information

Project Description

Average Back of Queue

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Lane Group		TR		L	T		L		R			
Initial Queue/Lane		0.0		0.0	0.0		0.0		0.0			
Flow Rate/Lane		1276		88	1381		173		60			
Satflow/Lane		1846		452	1862		1770		1583			
Capacity/Lane		2332		267	2906		595		532			
Flow Ratio		0.3		0.2	0.3		0.1		0.0			
v/c Ratio		0.55		0.33	0.48		0.29		0.11			
I Factor		1.000		1.000	1.000		1.000		1.000			
Arrival Type		3		3	3		3		3			
Platoon Ratio		1.00		1.00	1.00		1.00		1.00			
PF Factor		1.00		1.00	1.00		1.00		1.00			
Q_1		10.3		1.1	9.1		3.9		1.3			
k_B		0.7		0.3	0.8		0.6		0.5			
Q_2		0.8		0.2	0.7		0.2		0.1			
Q Average		11.1		1.3	9.8		4.1		1.3			
Percentile Back of Queue (95th percentile)												
$f_{B\%}$		1.8		2.1	1.8		2.0		2.1			
BOQ, $Q_{\%}$		20.3		2.7	18.1		8.1		2.7			
Queue Storage Ratio												
Q Spacing		25.0		25.0	25.0		25.0		25.0			
Q Storage		0		0	0		0		0			
Average R_Q												
95% $R_{Q\%}$												

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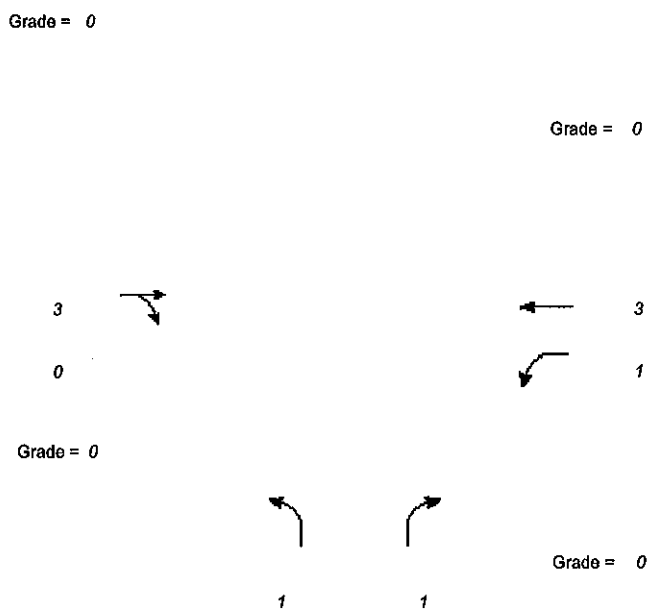
12A(87)

LONG REPORT

General Information		Site Information	
Analyst	KHA Analyst	Intersection	JFK & Adventure Avenue
Agency or Co.	Kimley-Horn and Associates	Area Type	All other areas
Date Performed	4/16/2012	Jurisdiction	
Time Period	PM Peak Hour - Existing Volume	Analysis Year	2012

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)		1070	123	67	1284		121		59			
% Heavy Veh		2	2	2	2		2		2			
PHF		0.89	0.85	0.76	0.93		0.70		0.82			
Actuated (P/A)		A	A	A	A		A		A			
Startup Lost Time		2.0		2.0	2.0		2.0		2.0			
ExtenSion of Effective Green		2.0		2.0	2.0		2.0		2.0			
Arrival type		3		3	3		3		3			
Unit Extension		3.0		3.0	3.0		3.0		3.0			
Ped/Bike/RTOR Volume	0	0	60	0	0		0	0	10	0	0	
Lane Width		12.0		12.0	12.0		12.0		12.0			
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0		0	0		0		0			
Pedestrian Timing	3.2			3.2			3.2			3.2		

	WB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 9.0	G = 51.0	G =	G =	G = 37.0	G =	G =	G =
	Y = 3	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 110.0		

12A(88)

VOLUME ADJUSTMENT AND SATURATION FLOW RATE WORKSHEET

General Information

Project Description

Volume Adjustment

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume		1070	123	67	1284		121		59			
PHF		0.89	0.85	0.76	0.93		0.70		0.82			
Adjusted Flow Rate		1202	74	88	1381		173		60			
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1276		88	1381		173		60			
Proportion of LT or RT		--	0.058	1.000	--	0.000		--	1.000		--	
Saturation Flow Rate												
Base Satflow		1900		1900	1900		1900		1900			
Number of Lanes		3	0	1	3		1		1			
f_W		1.000		1.000	1.000		1.000		1.000			
f_{HV}		0.980		0.980	0.980		0.980		0.980			
f_g		1.000		1.000	1.000		1.000		1.000			
f_p		1.000		1.000	1.000		1.000		1.000			
f_{bb}		1.000		1.000	1.000		1.000		1.000			
f_a		1.000		1.000	1.000		1.000		1.000			
f_{LU}		0.908		1.000	0.908		1.000		1.000			
f_{LT}		1.000	--	0.950	1.000	--	0.950		--			--
Secondary f_{LT}			--	0.129	0.129	--			--			--
f_{RT}	--	0.991		--	1.000		--		0.850	--		
f_{Lpb}		1.000	--	1.000	1.000	--	1.000		--			--
f_{Rpb}	--	1.000		--	1.000		--		1.000	--		
Adjusted Satflow		5030		1770	5074		1770		1583			
Secondary Adjusted Satflow			--	240	654	--			--			--

12A(89)

CAPACITY AND LOS WORKSHEET

General Information

Project Description

Capacity Analysis

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1276		88	1381		173		60			
Satflow Rate		5030		1770	5074		1770		1583			
Lost Time		2.0		2.0	2.0		2.0		2.0			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Lane Group Capacity		2332		267	2906		595		532			
v/c Ratio		0.55		0.33	0.48		0.29		0.11			
Flow Ratio		0.25		0.05	0.27		0.10		0.04			
Critical Lane Group		Y		Y	N		Y		N			
Sum Flow Ratios	0.40											
Lost Time/Cycle	15.00											
Critical v/c Ratio	0.46											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1276		88	1381		173		60			
Lane Group Capacity		2332		267	2906		595		532			
v/c Ratio		0.55		0.33	0.48		0.29		0.11			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Uniform Delay d_1		21.2		12.2	13.8		26.8		25.2			
Delay Factor k		0.15		0.11	0.11		0.11		0.11			
Incremental Delay d_2		0.3		0.7	0.1		0.3		0.1			
PF Factor		1.000		1.000	1.000		1.000		1.000			
Control Delay		21.5		13.0	13.9		27.1		25.3			
Lane Group LOS		C		B	B		C		C			
Approach Delay	21.5			13.9			26.6					
Approach LOS	C			B			C					
Intersection Delay	18.1			Intersection LOS						B		

12A(90)

SUPPLEMENTAL UNIFORM DELAY WORKSHEET FOR LEFT TURNS FROM EXCLUSIVE LANES WITH PROTECTED AND PERMITTED PHASES

General Information

Project Description

v/c Ratio Computation

	EB	WB	NB	SB
Cycle Length, C (s)		*110.0*		
Prot. Phase Eff. Green Interval, g (s)		*9.0*		
Opposed Queue Eff. Green Interval, g_q (s)		*20.76*		
Unopposed green interval, g_u (s)		*35.24*		
Red Time, r(s)		*45.0*		
Arrival Rate, q_a (veh/s)		*0.02*		
Protected Phase Departure Rate, s_p (veh/s)		*0.492*		
Perm. Phase Departure Rate, s_s (veh/s)		*0.11*		
X_{perm}		*0.37*		
X_{prot} (N/A for Lagging Left-turns)		*0.30*		

Uniform Queue Size and Delay Computations

Queue at Start of Green Arrow, Q_a		*1.10*		
Queue at Start of Unsaturated Green, Q_u		*0.51*		
Residual Queue, Q_r		*0.00*		
Uniform Delay, d_1		*12.2*		

Uniform Queue Size and Delay Equations

	Case	Q_a	Q_u	Q_r	d_1
If X_{perm} <= 1.0 & X_{prot} <= 1.0	1	$q_a r$	$q_a g_q$	0	$[0.5/(q_a C)][rQ_a + Q_a^{2/(s_p - q_s)} + g_q Q_u + Q_u^{2/(s_s - q_a)}$
If X_{perm} <= 1.0 & X_{prot} > 1.0	2	$q_a r$	$Q_r + q_a g_q$	$Q_a - g(s_p - q_a)$	$[0.5/(q_a C)][rQ_a + g(Q_a + Q_r) + g_q (Q_r + Q_u) + Q_u^{2/(s_s - q_a)}$
If X_{perm} > 1.0 & X_{prot} <= 1.0	3	$Q_r + q_a r$	$q_a g_q$	$Q_u - g_u(s_s - q_a)$	$[0.5/(q_a C)][g_q Q_u + g_u(Q_a + Q_r) + r(Q_r + Q_a) + Q_a^{2/(s_p - q_a)}$
If X_{perm} <= 1.0 (lagging lefts)	4	0	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + Q_u^{2/(s_s - q_a)}$
If X_{perm} > 1.0 (lagging lefts)	5	$Q_u - g_u(s_s - q_a)$	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + g_u(Q_u + Q_a) + Q_a^{2/(s_p - q_a)}$

12A(91)

BACK-OF-QUEUE WORKSHEET

General Information

Project Description

Average Back of Queue

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Lane Group		TR		L	T		L		R			
Initial Queue/Lane		0.0		0.0	0.0		0.0		0.0			
Flow Rate/Lane		1276		88	1381		173		60			
Satflow/Lane		1846		452	1862		1770		1583			
Capacity/Lane		2332		267	2906		595		532			
Flow Ratio		0.3		0.2	0.3		0.1		0.0			
v/c Ratio		0.55		0.33	0.48		0.29		0.11			
I Factor		1.000		1.000	1.000		1.000		1.000			
Arrival Type		3		3	3		3		3			
Platoon Ratio		1.00		1.00	1.00		1.00		1.00			
PF Factor		1.00		1.00	1.00		1.00		1.00			
Q_1		10.3		1.1	9.1		3.9		1.3			
k_B		0.7		0.3	0.8		0.6		0.5			
Q_2		0.8		0.2	0.7		0.2		0.1			
Q Average		11.1		1.3	9.8		4.1		1.3			
Percentile Back of Queue (95th percentile)												
$f_{B\%}$		1.8		2.1	1.8		2.0		2.1			
BOQ, $Q_{\%}$		20.3		2.7	18.1		8.1		2.7			
Queue Storage Ratio												
Q Spacing		25.0		25.0	25.0		25.0		25.0			
Q Storage		0		0	0		0		0			
Average R_Q												
95% $R_{Q\%}$												

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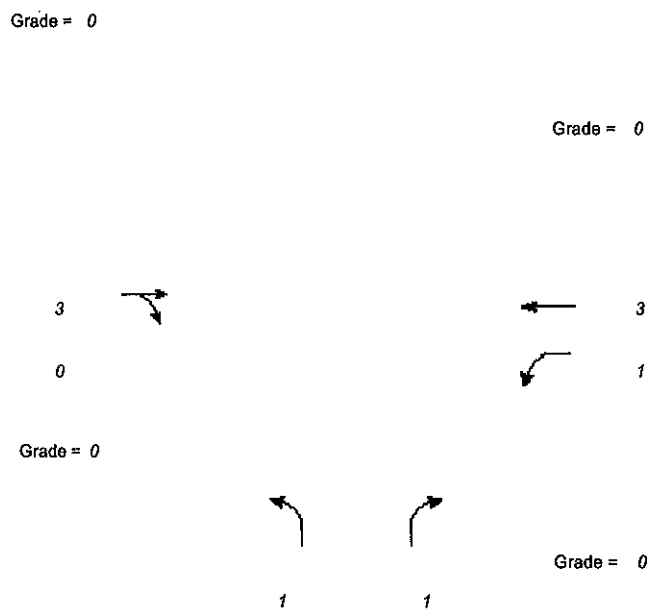
12A(92)

LONG REPORT

General Information		Site Information	
Analyst	KHA Analyst	Intersection	JFK & Adventure Avenue
Agency or Co.	Kimley-Horn and Associates	Area Type	All other areas
Date Performed	4/16/2012	Jurisdiction	
Time Period	PM Peak Hour - Total Volume	Analysis Year	2014

Intersection Geometry



Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)		1156	130	71	1355		157		91			
% Heavy Veh		2	2	2	2		2		2			
PHF		0.89	0.85	0.76	0.93		0.70		0.82			
Actuated (P/A)		A	A	A	A		A		A			
Startup Lost Time		2.0		2.0	2.0		2.0		2.0			
ExtenSion of Effective Green		2.0		2.0	2.0		2.0		2.0			
Arrival type		3		3	3		3		3			
Unit Extension		3.0		3.0	3.0		3.0		3.0			
Ped/Bike/RTOR Volume	0	0	60	0	0		0	0	10	0	0	
Lane Width		12.0		12.0	12.0		12.0		12.0			
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0		0	0		0		0			
Pedestrian Timing	3.2			3.2			3.2			3.2		

	WB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 9.0	G = 51.0	G =	G =	G = 37.0	G =	G =	G =
	Y = 3	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 110.0		

12A(93)

VOLUME ADJUSTMENT AND SATURATION FLOW RATE WORKSHEET

General Information

Project Description

Volume Adjustment

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume		1156	130	71	1355		157		91			
PHF		0.89	0.85	0.76	0.93		0.70		0.82			
Adjusted Flow Rate		1299	82	93	1457		224		99			
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1381		93	1457		224		99			
Proportion of LT or RT		--	0.059	1.000	--	0.000		--	1.000		--	
Saturation Flow Rate												
Base Satflow		1900		1900	1900		1900		1900			
Number of Lanes		3	0	1	3		1		1			
f_W		1.000		1.000	1.000		1.000		1.000			
f_{HV}		0.980		0.980	0.980		0.980		0.980			
f_g		1.000		1.000	1.000		1.000		1.000			
f_p		1.000		1.000	1.000		1.000		1.000			
f_{bb}		1.000		1.000	1.000		1.000		1.000			
f_a		1.000		1.000	1.000		1.000		1.000			
f_{LU}		0.908		1.000	0.908		1.000		1.000			
f_{LT}		1.000	--	0.950	1.000	--	0.950		--			--
Secondary f_{LT}			--	0.108	0.108	--			--			--
f_{RT}	--	0.991		--	1.000		--		0.850	--		
f_{Lpb}		1.000	--	1.000	1.000	--	1.000		--			--
f_{Rpb}	--	1.000		--	1.000		--		1.000	--		
Adjusted Satflow		5029		1770	5074		1770		1583			
Secondary Adjusted Satflow			--	200	546	--			--			--

12A(94)

CAPACITY AND LOS WORKSHEET

General Information

Project Description

Capacity Analysis

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1381		93	1457		224		99			
Satflow Rate		5029		1770	5074		1770		1583			
Lost Time		2.0		2.0	2.0		2.0		2.0			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Lane Group Capacity		2332		247	2906		595		532			
v/c Ratio		0.59		0.38	0.50		0.38		0.19			
Flow Ratio		0.27		0.05	0.29		0.13		0.06			
Critical Lane Group		Y		Y	N		Y		N			
Sum Flow Ratios	0.45											
Lost Time/Cycle	15.00											
Critical v/c Ratio	0.53											

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Lane Group		TR		L	T		L		R			
Adjusted Flow Rate		1381		93	1457		224		99			
Lane Group Capacity		2332		247	2906		595		532			
v/c Ratio		0.59		0.38	0.50		0.38		0.19			
Green Ratio		0.46		0.59	0.57		0.34		0.34			
Uniform Delay d_1		21.8		13.1	14.1		27.7		25.8			
Delay Factor k		0.18		0.11	0.11		0.11		0.11			
Incremental Delay d_2		0.4		1.0	0.1		0.4		0.2			
PF Factor		1.000		1.000	1.000		1.000		1.000			
Control Delay		22.2		14.0	14.2		28.1		26.0			
Lane Group LOS		C		B	B		C		C			
Approach Delay	22.2			14.2			27.5					
Approach LOS	C			B			C					
Intersection Delay	18.9			Intersection LOS						B		

12A(95)

SUPPLEMENTAL UNIFORM DELAY WORKSHEET FOR LEFT TURNS FROM EXCLUSIVE LANES WITH PROTECTED AND PERMITTED PHASES

General Information

Project Description

v/c Ratio Computation

	EB	WB	NB	SB
Cycle Length, C (s)		*110.0*		
Prot. Phase Eff. Green Interval, g (s)		*9.0*		
Opposed Queue Eff. Green Interval, g_q (s)		*23.13*		
Unopposed green interval, g_u (s)		*32.87*		
Red Time, r(s)		*45.0*		
Arrival Rate, q_a (veh/s)		*0.03*		
Protected Phase Departure Rate, s_p (veh/s)		*0.492*		
Perm. Phase Departure Rate, s_s (veh/s)		*0.09*		
X_{perm}		*0.47*		
X_{prot} (N/A for Lagging Left-turns)		*0.32*		

Uniform Queue Size and Delay Computations

Queue at Start of Green Arrow, Q_a		*1.16*		
Queue at Start of Unsaturated Green, Q_u		*0.60*		
Residual Queue, Q_r		*0.00*		
Uniform Delay, d_1		*13.1*		

Uniform Queue Size and Delay Equations

	Case	Q_a	Q_u	Q_r	d_1
If X_{perm} <= 1.0 & X_{prot} <= 1.0	1	$q_a r$	$q_a g_q$	0	$[0.5/(q_a C)][rQ_a + Q_a^2/(s_p - q_s) + g_q Q_u + Q_u^2/(s_s - q_a)$
If X_{perm} <= 1.0 & X_{prot} > 1.0	2	$q_a r$	$Q_r + q_a g_q$	$Q_a - g(s_p - q_a)$	$[0.5/(q_a C)][rQ_a + g(Q_a + Q_r) + g_q(Q_r + Q_u) + Q_u^2/(s_s - q_a)$
If X_{perm} > 1.0 & X_{prot} <= 1.0	3	$Q_r + q_a r$	$q_a g_q$	$Q_u - g_u(s_s - q_a)$	$[0.5/(q_a C)][g_q Q_u + g_u(Q_a + Q_r) + r(Q_r + Q_a) + Q_a^2/(s_p - q_a)$
If X_{perm} <= 1.0 (lagging lefts)	4	0	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + Q_u^2/(s_s - q_a)$
If X_{perm} > 1.0 (lagging lefts)	5	$Q_u - g_u(s_s - q_a)$	$q_a(r + g_q)$	0	$[0.5/(q_a C)][r + g_q)Q_u + g_u(Q_u + Q_a) + Q_a^2/(s_p - q_a)$

12A(96)

BACK-OF-QUEUE WORKSHEET

General Information

Project Description

Average Back of Queue

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Lane Group		TR		L	T		L		R			
Initial Queue/Lane		0.0		0.0	0.0		0.0		0.0			
Flow Rate/Lane		1381		93	1457		224		99			
Satflow/Lane		1846		417	1862		1770		1583			
Capacity/Lane		2332		247	2906		595		532			
Flow Ratio		0.3		0.2	0.3		0.1		0.1			
v/c Ratio		0.59		0.38	0.50		0.38		0.19			
I Factor		1.000		1.000	1.000		1.000		1.000			
Arrival Type		3		3	3		3		3			
Platoon Ratio		1.00		1.00	1.00		1.00		1.00			
PF Factor		1.00		1.00	1.00		1.00		1.00			
Q_1		11.4		1.2	9.8		5.2		2.1			
k_B		0.7		0.3	0.8		0.6		0.5			
Q_2		1.0		0.2	0.8		0.3		0.1			
Q Average		12.4		1.4	10.6		5.5		2.3			
Percentile Back of Queue (95th percentile)												
$f_{B\%}$		1.8		2.1	1.8		1.9		2.0			
BOQ, $Q_{\%}$		22.4		2.9	19.4		10.8		4.6			
Queue Storage Ratio												
Q Spacing		25.0		25.0	25.0		25.0		25.0			
Q Storage		0		0	0		0		0			
Average R_Q												
95% $R_{Q\%}$												

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12A(97)