CAPE COD COMMISSION

Memorandum

DATE: AUGUST 1, 2013
TO: PAUL TILTON, P.E., SANDWICH DPW DIRECTOR/TOWN ENGINEER
FROM: LEV MALAKHOFF, SR. TRANSPORTATION ENGINEER
RE: ROUTE 130/QUAKER MEETINGHOUSE ROAD INTERSECTION

Paul:

Per your request, Cape Cod Commission (CCC) staff have performed turning movement counts (attached) at the intersection of Route 130 and Quaker Meetinghouse Road/Bill Richards Way during the following time periods corresponding to school operating dates/hours:

A.M. Peak Period
7-9 a.m., Wednesday, June 26, 2013

P.M. Peak Period
2-4 p.m., Monday, June 24, 2013

Additionally, CCC staff have prepared Level of Service (LOS – see table below) analyses using Highway Capacity Software (HCM 2010 version 6.50, attached) and noted an overall LOS of B during the a.m. period and an overall LOS of B during the p.m. period. During the a.m. period, the critical movement was the eastbound traffic from Bill Richards Way with a delay of 25.2 seconds corresponding to a LOS of C. The p.m. period included a critical movement again from Bill Richards Way's eastbound traffic with a delay of 17.3 seconds and LOS B.

	Overall LOS	Critical Movement* Delay (sec/veh)	Critical Movement* LOS
8 a.m. – 9 a.m.	B	25.2	C
3 p.m. – 4 p.m.	B	17.3	B

**Critical Movement is eastbound traffic from Bill Richards Way*

Please contact me if you have any questions.

-Lev

CAPE COD COMMISSION

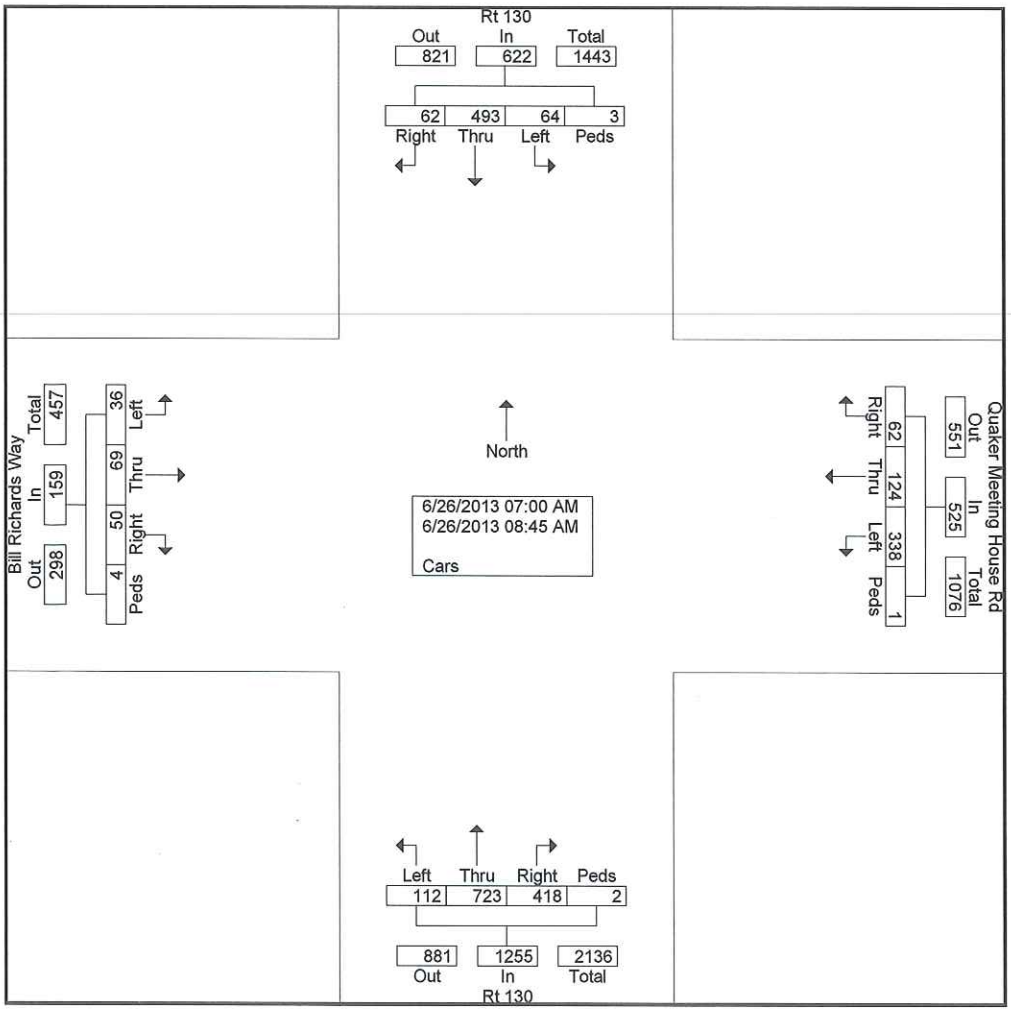
3225 Main St
Barnstable, MA 02630
www.capecodcommission.org

Location: Rt 130 @ Quaker Meeting House
Town: Sandwich
Counted By: PT MS
Counters: 5, 6

File Name : 2614_06262013
Site Code : 2614
Start Date : 6/26/2013
Page No : 1

Groups Printed- Cars

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					Bill Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	10	51	3	1	65	28	6	14	0	48	4	80	48	0	132	1	2	0	0	3	248
07:15 AM	6	62	2	0	70	40	5	8	0	53	1	81	45	0	127	1	2	1	0	4	254
07:30 AM	10	67	7	0	84	49	11	8	0	68	5	76	55	1	137	1	0	1	0	2	291
07:45 AM	9	65	6	0	80	36	22	8	0	66	12	103	61	0	176	2	6	7	0	15	337
Total	35	245	18	1	299	153	44	38	0	235	22	340	209	1	572	5	10	9	0	24	1130
08:00 AM	6	53	17	1	77	38	24	6	0	68	36	104	63	1	204	16	28	14	0	58	407
08:15 AM	10	75	14	1	100	43	20	7	0	70	17	87	56	0	160	4	5	8	1	18	348
08:30 AM	10	49	7	0	66	48	22	5	0	75	23	109	37	0	169	4	3	2	2	11	321
08:45 AM	3	71	6	0	80	56	14	6	1	77	14	83	53	0	150	7	23	17	1	48	355
Total	29	248	44	2	323	185	80	24	1	290	90	383	209	1	683	31	59	41	4	135	1431
Grand Total	64	493	62	3	622	338	124	62	1	525	112	723	418	2	1255	36	69	50	4	159	2561
Apprch %	10.3	79.3	10	0.5		64.4	23.6	11.8	0.2		8.9	57.6	33.3	0.2		22.6	43.4	31.4	2.5		
Total %	2.5	19.3	2.4	0.1	24.3	13.2	4.8	2.4	0	20.5	4.4	28.2	16.3	0.1	49	1.4	2.7	2	0.2	6.2	



CAPE COD COMMISSION

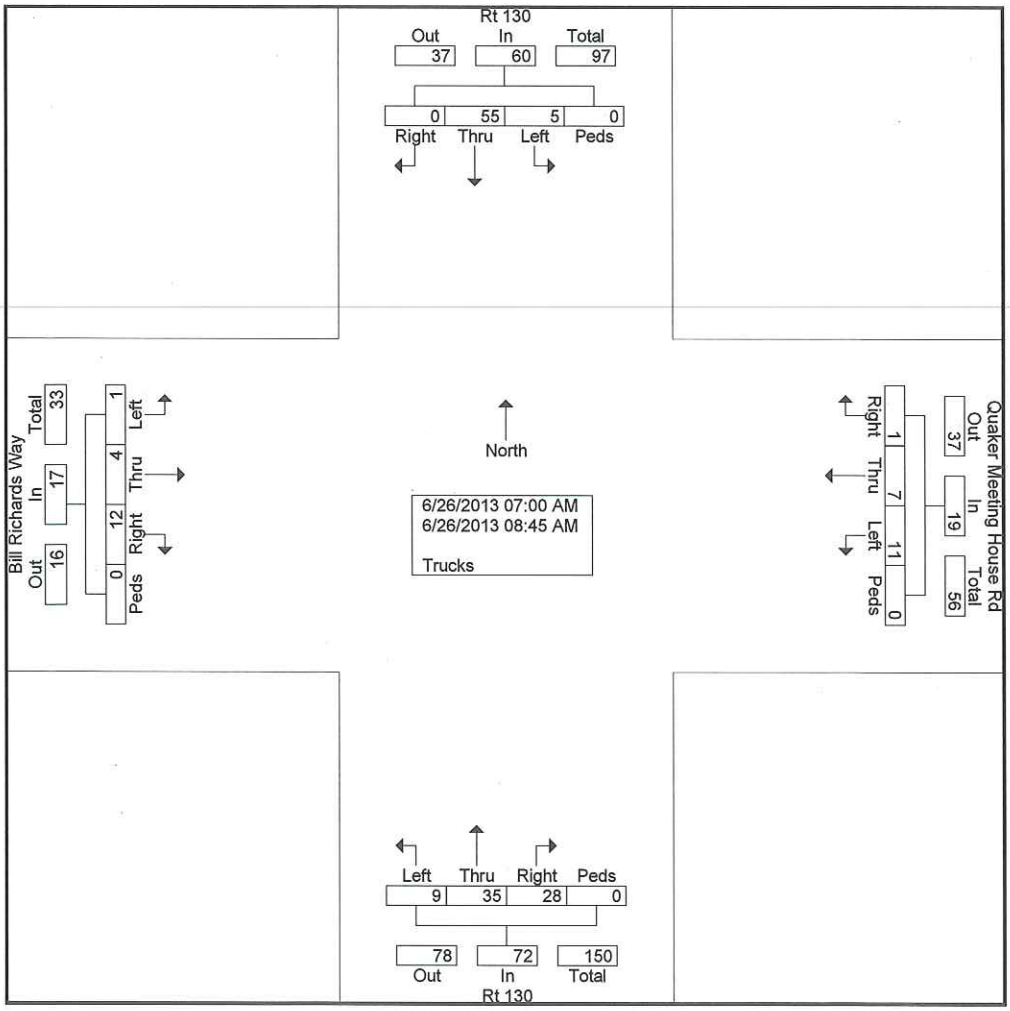
3225 Main St
Barnstable, MA 02630
www.capecodcommission.org

Location: Rt 130 @ Quaker Meeting House
Town: Sandwich
Counted By: PT MS
Counters: 5, 6

File Name : 2614_06262013
Site Code : 2614
Start Date : 6/26/2013
Page No : 1

Groups Printed- Trucks

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					Bill Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	1	4	0	0	5	0	0	1	0	1	0	5	5	0	10	0	0	0	0	0	16
07:15 AM	1	6	0	0	7	1	0	0	0	1	0	4	1	0	5	0	0	0	0	0	13
07:30 AM	0	4	0	0	4	1	0	0	0	1	0	3	8	0	11	0	0	0	0	0	16
07:45 AM	1	3	0	0	4	3	0	0	0	3	0	4	2	0	6	0	0	0	0	0	13
Total	3	17	0	0	20	5	0	1	0	6	0	16	16	0	32	0	0	0	0	0	58
08:00 AM	0	10	0	0	10	1	2	0	0	3	4	6	3	0	13	1	2	5	0	8	34
08:15 AM	0	6	0	0	6	2	0	0	0	2	0	4	5	0	9	0	0	1	0	1	18
08:30 AM	2	11	0	0	13	1	3	0	0	4	0	6	2	0	8	0	0	0	0	0	25
08:45 AM	0	11	0	0	11	2	2	0	0	4	5	3	2	0	10	0	2	6	0	8	33
Total	2	38	0	0	40	6	7	0	0	13	9	19	12	0	40	1	4	12	0	17	110
Grand Total	5	55	0	0	60	11	7	1	0	19	9	35	28	0	72	1	4	12	0	17	168
Apprch %	8.3	91.7	0	0		57.9	36.8	5.3	0		12.5	48.6	38.9	0		5.9	23.5	70.6	0		
Total %	3	32.7	0	0	35.7	6.5	4.2	0.6	0	11.3	5.4	20.8	16.7	0	42.9	0.6	2.4	7.1	0	10.1	



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3225 Main St
Barnstable, MA 02630
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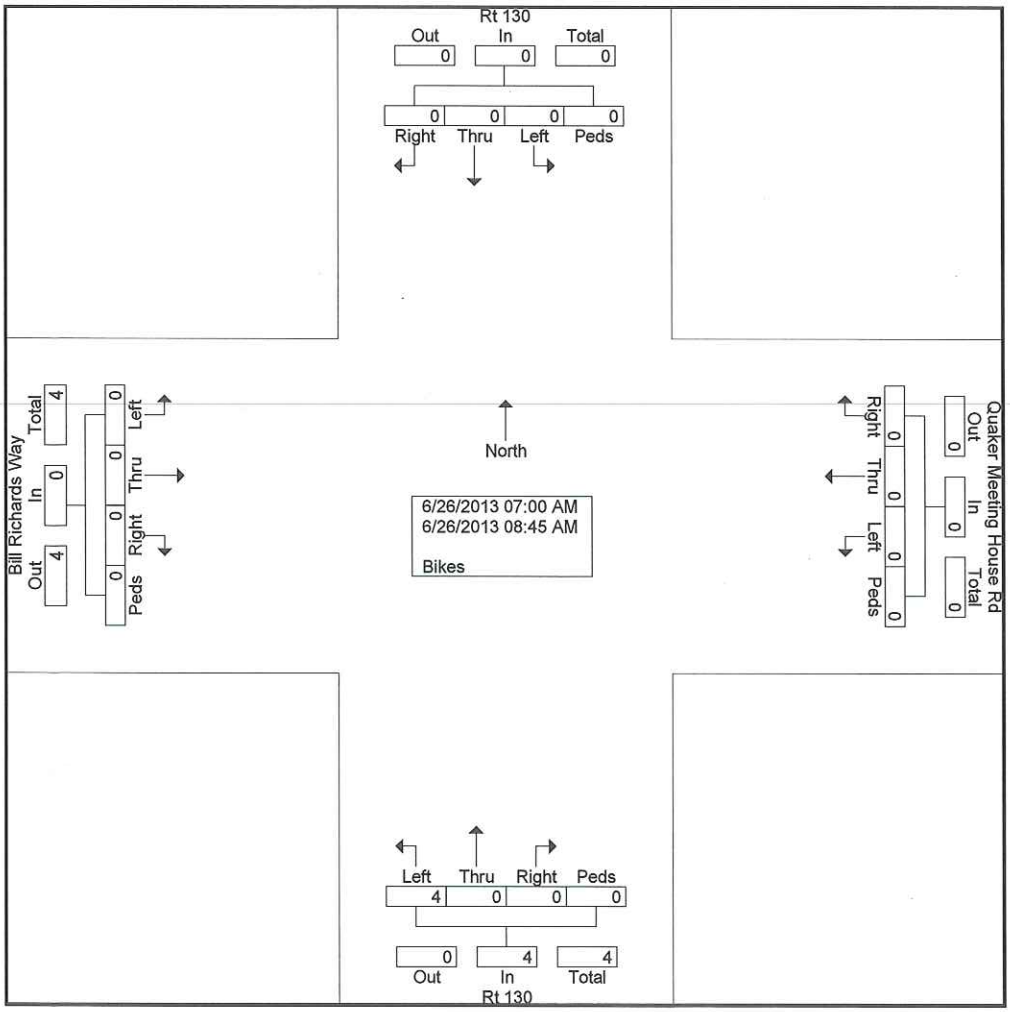
Location: Rt 130 @ Quaker Meeting House
Town: Sandwich
Counted By: PT MS
Counters: 5, 6

File Name : 2614_06262013
Site Code : 2614
Start Date : 6/26/2013
Page No : 1

Groups Printed- Bikes

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					Bill Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
07:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
*** BREAK ***																					
08:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
Grand Total	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	4
Apprch %	0	0	0	0		0	0	0	0		100	0	0	0		0	0	0	0		
Total %	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100	0	0	0	0	0	



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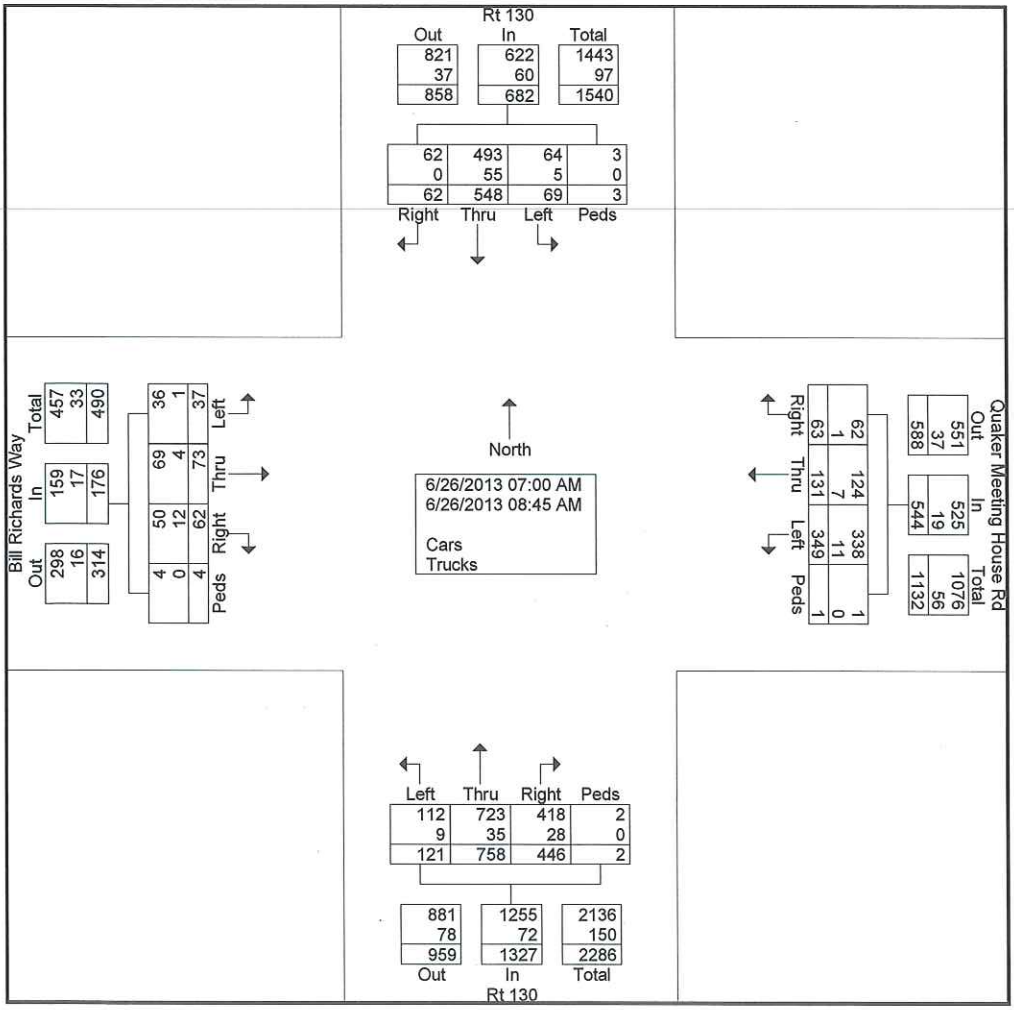
File Name : 2614_06262013
Site Code : 2614
Start Date : 6/26/2013
Page No : 1

Groups Printed- Cars - Trucks

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					Bill Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	11	55	3	1	70	28	6	15	0	49	4	85	53	0	142	1	2	0	0	3	264
07:15 AM	7	68	2	0	77	41	5	8	0	54	1	85	46	0	132	1	2	1	0	4	267
07:30 AM	10	71	7	0	88	50	11	8	0	69	5	79	63	1	148	1	0	1	0	2	307
07:45 AM	10	68	6	0	84	39	22	8	0	69	12	107	63	0	182	2	6	7	0	15	350
Total	38	262	18	1	319	158	44	39	0	241	22	356	225	1	604	5	10	9	0	24	1188
08:00 AM	6	63	17	1	87	39	26	6	0	71	40	110	66	1	217	17	30	19	0	66	441
08:15 AM	10	81	14	1	106	45	20	7	0	72	17	91	61	0	169	4	5	9	1	19	366
08:30 AM	12	60	7	0	79	49	25	5	0	79	23	115	39	0	177	4	3	2	2	11	346
08:45 AM	3	82	6	0	91	58	16	6	1	81	19	86	55	0	160	7	25	23	1	56	388
Total	31	286	44	2	363	191	87	24	1	303	99	402	221	1	723	32	63	53	4	152	1541
																					(1533)
Grand Total	69	548	62	3	682	349	131	63	1	544	121	758	446	2	1327	37	73	62	4	176	2729
Apprch %	10.1	80.4	9.1	0.4		64.2	24.1	11.6	0.2		9.1	57.1	33.6	0.2		21	41.5	35.2	2.3		
Total %	2.5	20.1	2.3	0.1	25	12.8	4.8	2.3	0	19.9	4.4	27.8	16.3	0.1	48.6	1.4	2.7	2.3	0.1	6.4	
Cars	64	493	62	3	622	338	124	62	1	525	112	723	418	2	1255	36	69	50	4	159	2561
% Cars	92.8	90	100	100	91.2	96.8	94.7	98.4	100	96.5	92.6	95.4	93.7	100	94.6	97.3	94.5	80.6	100	90.3	93.8
Trucks	5	55	0	0	60	11	7	1	0	19	9	35	28	0	72	1	4	12	0	17	168
% Trucks	7.2	10	0	0	8.8	3.2	5.3	1.6	0	3.5	7.4	4.6	6.3	0	5.4	2.7	5.5	19.4	0	9.7	6.2



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Location: Rt 130 @ Quaker Meeting House
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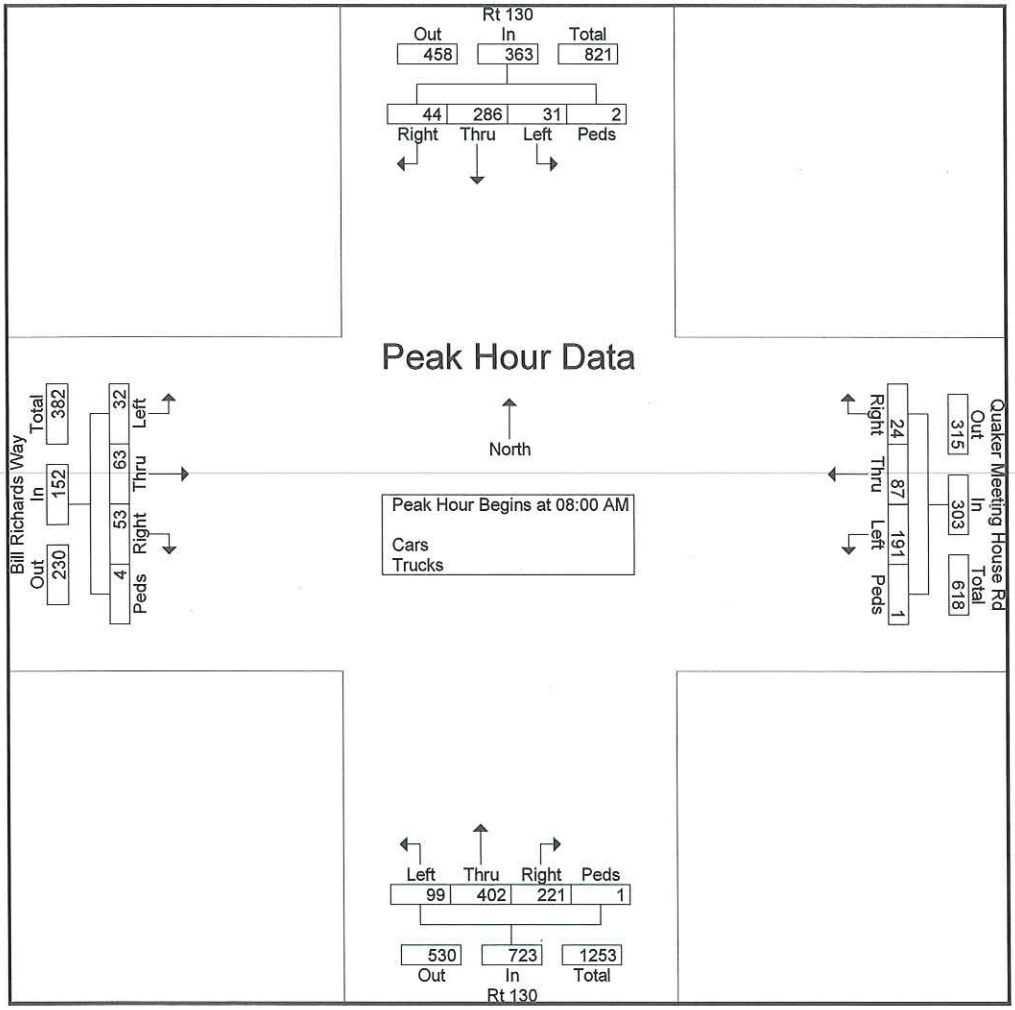
Counters: 5, 6

File Name : 2614_06262013
Site Code : 2614
Start Date : 6/26/2013
Page No : 2

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					Bill Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	6	63	**17**	**1**	87	39	**26**	6	0	71	**40**	110	**66**	**1**	**217**	**17**	**30**	19	0	**66**	**441**
08:15 AM	10	81	14	1	**106**	45	20	**7**	0	72	17	91	61	0	169	4	5	9	1	19	366
08:30 AM	**12**	60	7	0	79	49	25	5	0	79	23	**115**	39	0	177	4	3	2	**2**	11	346
08:45 AM	3	**82**	6	0	91	**58**	16	6	**1**	**81**	19	86	55	0	160	7	25	**23**	1	56	388
Total Volume	31	286	44	2	363	191	87	24	1	303	99	402	221	1	723	32	63	53	4	152	1541
% App. Total	8.5	78.8	12.1	0.6		63	28.7	7.9	0.3		13.7	55.6	30.6	0.1		21.1	41.4	34.9	2.6		
PHF	.646	.872	.647	.500	.856	.823	.837	.857	.250	.935	.619	.874	.837	.250	.833	.471	.525	.576	.500	.576	.874



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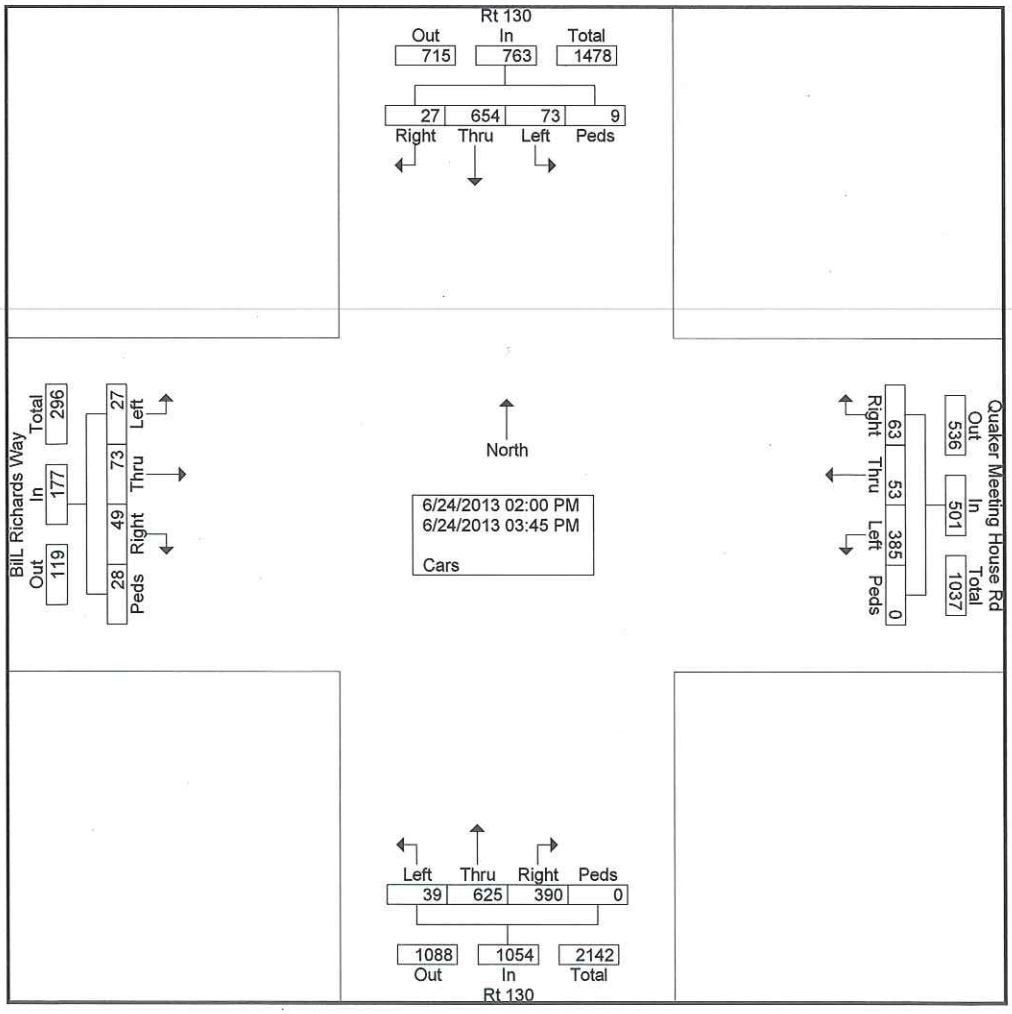
3225 Main St
Barnstable, MA 02630
www.capecodcommission.org

Location: Rt 130 @ Quaker Meeting House
Town: Sandwich
Counted By: PT MS
Counters: 5 6

File Name : 2614_06242013
Site Code : 2164
Start Date : 6/24/2013
Page No : 1

Groups Printed- Cars

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					BilL Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
02:00 PM	7	56	1	8	72	42	3	8	0	53	2	73	43	0	118	0	2	2	24	28	271
02:15 PM	11	77	2	0	90	58	10	9	0	77	6	59	57	0	122	1	2	4	0	7	296
02:30 PM	6	69	7	0	82	47	13	10	0	70	9	73	41	0	123	3	13	9	0	25	300
02:45 PM	13	100	2	0	115	49	4	10	0	63	3	78	37	0	118	7	13	7	2	29	325
Total	37	302	12	8	359	196	30	37	0	263	20	283	178	0	481	11	30	22	26	89	1192
03:00 PM	9	78	5	1	93	45	15	4	0	64	12	69	44	0	125	2	6	2	0	10	292
03:15 PM	8	85	4	0	97	37	8	11	0	56	5	102	48	0	155	4	18	9	0	31	339
03:30 PM	10	100	2	0	112	50	0	4	0	54	2	68	50	0	120	6	18	13	2	39	325
03:45 PM	9	89	4	0	102	57	0	7	0	64	0	103	70	0	173	4	1	3	0	8	347
Total	36	352	15	1	404	189	23	26	0	238	19	342	212	0	573	16	43	27	2	88	1303
Grand Total	73	654	27	9	763	385	53	63	0	501	39	625	390	0	1054	27	73	49	28	177	2495
Apprch %	9.6	85.7	3.5	1.2		76.8	10.6	12.6	0		3.7	59.3	37	0		15.3	41.2	27.7	15.8		
Total %	2.9	26.2	1.1	0.4	30.6	15.4	2.1	2.5	0	20.1	1.6	25.1	15.6	0	42.2	1.1	2.9	2	1.1	7.1	



CAPE COD COMMISSION

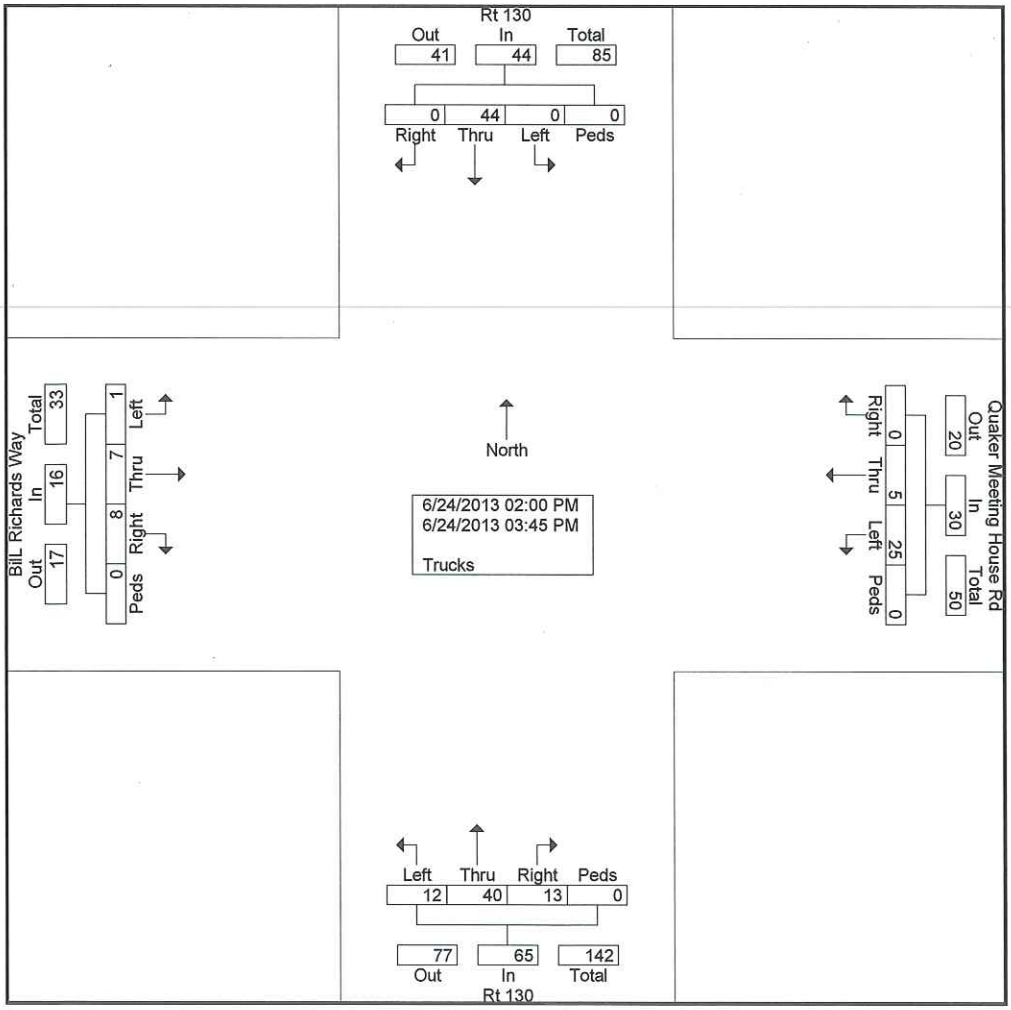
3225 Main St
Barnstable, MA 02630
www.capecodcommission.org

' ›cation: Rt 130 @ Quaker Meeting House
›wn: Sandwich
Counted By: PT MS
Counters: 5 6

File Name : 2614_06242013
Site Code : 2164
Start Date : 6/24/2013
Page No : 1

Groups Printed- Trucks

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					BilL Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
02:00 PM	0	4	0	0	4	3	0	0	0	3	0	6	5	0	11	0	0	0	0	0	18
02:15 PM	0	6	0	0	6	1	1	0	0	2	2	8	2	0	12	0	0	0	0	0	20
02:30 PM	0	5	0	0	5	5	1	0	0	6	5	12	5	0	22	0	0	0	0	0	33
02:45 PM	0	12	0	0	12	4	0	0	0	4	0	5	1	0	6	0	4	4	0	8	30
Total	0	27	0	0	27	13	2	0	0	15	7	31	13	0	51	0	4	4	0	8	101
03:00 PM	0	3	0	0	3	5	2	0	0	7	5	4	0	0	9	0	0	0	0	0	19
03:15 PM	0	5	0	0	5	1	1	0	0	2	0	3	0	0	3	1	3	4	0	8	18
03:30 PM	0	3	0	0	3	3	0	0	0	3	0	1	0	0	1	0	0	0	0	0	7
03:45 PM	0	6	0	0	6	3	0	0	0	3	0	1	0	0	1	0	0	0	0	0	10
Total	0	17	0	0	17	12	3	0	0	15	5	9	0	0	14	1	3	4	0	8	54
Grand Total	0	44	0	0	44	25	5	0	0	30	12	40	13	0	65	1	7	8	0	16	155
Apprch %	0	100	0	0		83.3	16.7	0	0		18.5	61.5	20	0		6.2	43.8	50	0		
Total %	0	28.4	0	0	28.4	16.1	3.2	0	0	19.4	7.7	25.8	8.4	0	41.9	0.6	4.5	5.2	0	10.3	



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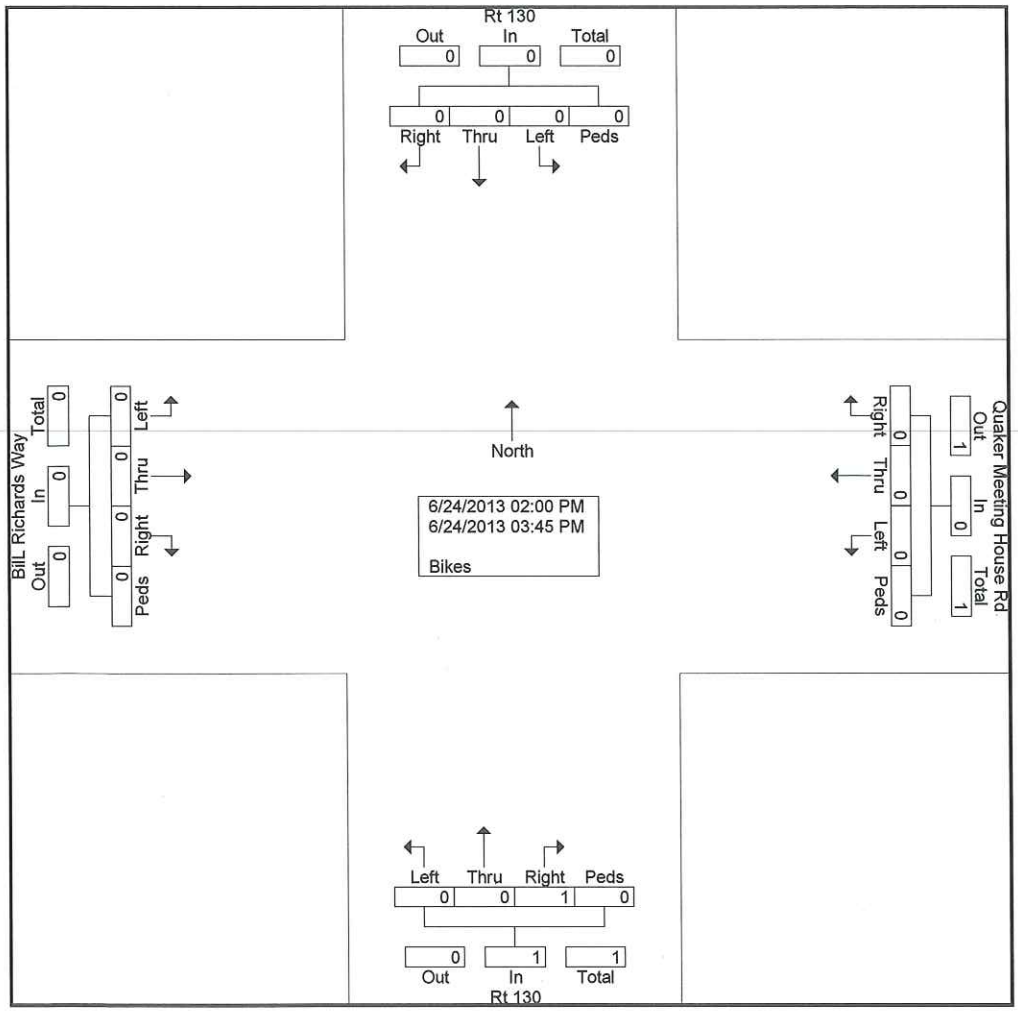
Location: Rt 130 @ Quaker Meeting House
Town: Sandwich
Counted By: PT MS
Counters: 5 6

File Name : 2614_06242013
Site Code : 2164
Start Date : 6/24/2013
Page No : 1

Groups Printed- Bikes

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					BilL Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
*** BREAK ***																					
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
*** BREAK ***																					
Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
*** BREAK ***																					
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
Apprch %	0	0	0	0		0	0	0	0		0	0	100	0		0	0	0	0		
Total %	0	0	0	0	0	0	0	0	0	0	0	0	100	0	100	0	0	0	0	0	



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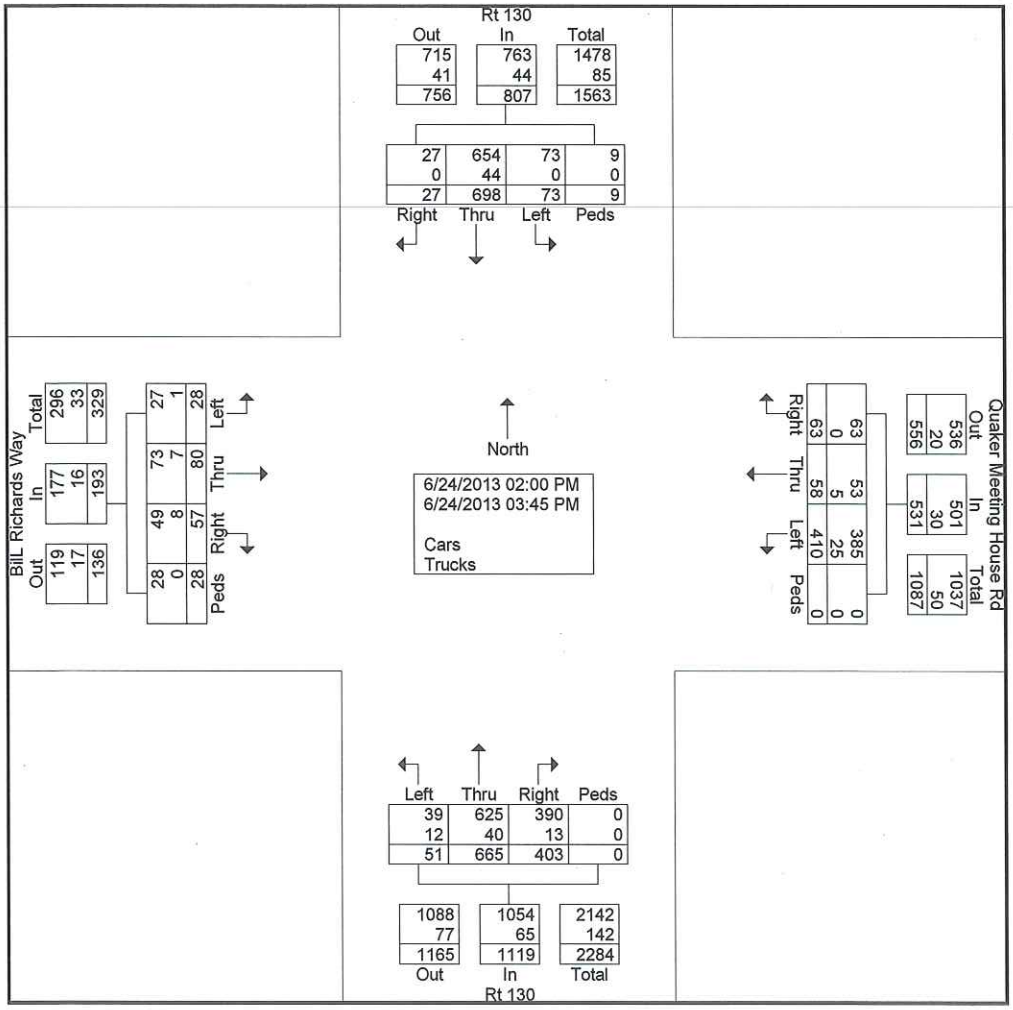
Groups Printed- Cars - Trucks

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					BilL Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
02:00 PM	7	60	1	8	76	45	3	8	0	56	2	79	48	0	129	0	2	2	24	28	289
02:15 PM	11	83	2	0	96	59	11	9	0	79	8	67	59	0	134	1	2	4	0	7	316
02:30 PM	6	74	7	0	87	52	14	10	0	76	14	85	46	0	145	3	13	9	0	25	333
02:45 PM	13	112	2	0	127	53	4	10	0	67	3	83	38	0	124	7	17	11	2	37	355
Total	37	329	12	8	386	209	32	37	0	278	27	314	191	0	532	11	34	26	26	97	1293
03:00 PM	9	81	5	1	96	50	17	4	0	71	17	73	44	0	134	2	6	2	0	10	311
03:15 PM	8	90	4	0	102	38	9	11	0	58	5	105	48	0	158	5	21	13	0	39	357
03:30 PM	10	103	2	0	115	53	0	4	0	57	2	69	50	0	121	6	18	13	2	39	332
03:45 PM	9	95	4	0	108	60	0	7	0	67	0	104	70	0	174	4	1	3	0	8	357
Total	36	369	15	1	421	201	26	26	0	253	24	351	212	0	587	17	46	31	2	96	1357 (1354)
Grand Total	73	698	27	9	807	410	58	63	0	531	51	665	403	0	1119	28	80	57	28	193	2650
Apprch %	9	86.5	3.3	1.1		77.2	10.9	11.9	0		4.6	59.4	36	0		14.5	41.5	29.5	14.5		
Total %	2.8	26.3	1	0.3	30.5	15.5	2.2	2.4	0	20	1.9	25.1	15.2	0	42.2	1.1	3	2.2	1.1	7.3	
Cars	73	654	27	9	763	385	53	63	0	501	39	625	390	0	1054	27	73	49	28	177	2495
% Cars	100	93.7	100	100	94.5	93.9	91.4	100	0	94.4	76.5	94	96.8	0	94.2	96.4	91.2	86	100	91.7	94.2
Trucks	0	44	0	0	44	25	5	0	0	30	12	40	13	0	65	1	7	8	0	16	155
% Trucks	0	6.3	0	0	5.5	6.1	8.6	0	0	5.6	23.5	6	3.2	0	5.8	3.6	8.8	14	0	8.3	5.8



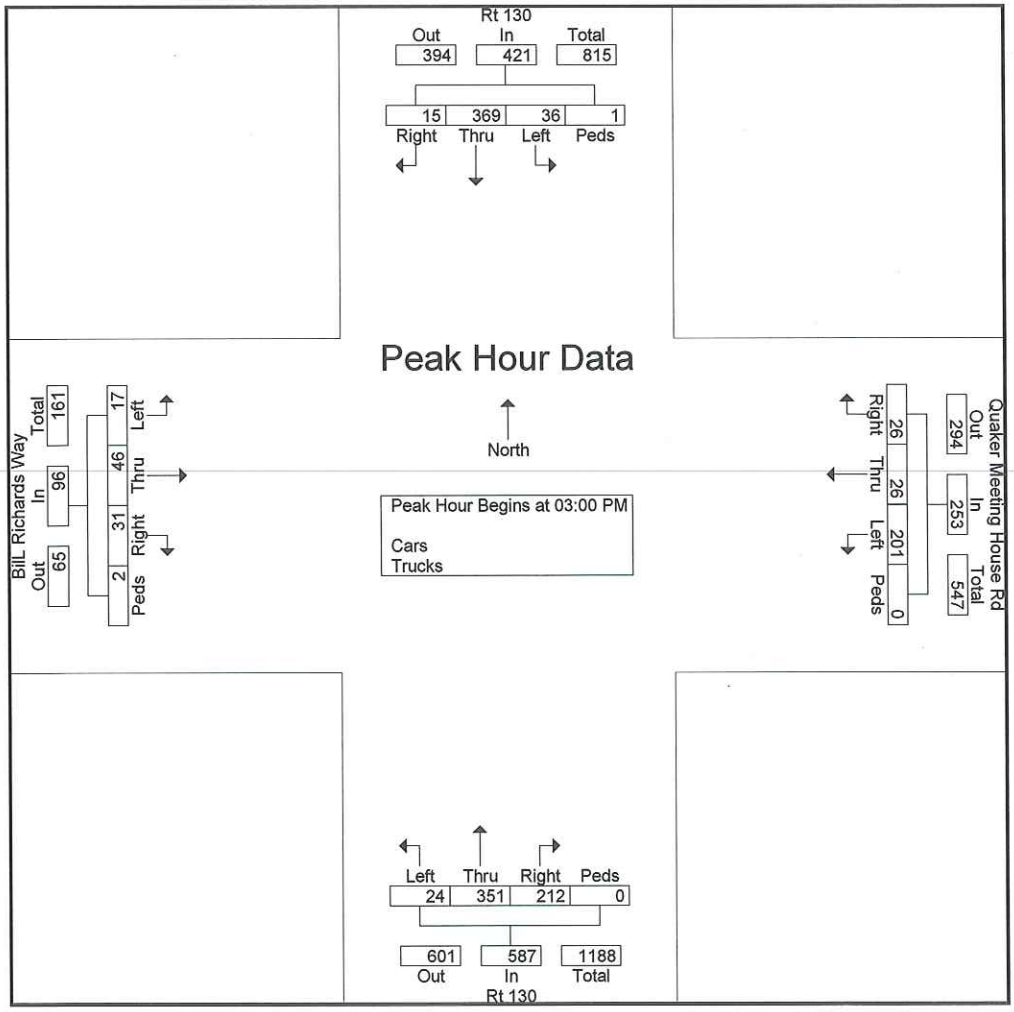
CAPE COD COMMISSION

3225 Main St
Barnstable, MA 02630
www.capecodcommission.org

Location: Rt 130 @ Quaker Meeting House
Town: Sandwich
Counted By: PT MS
Counters: 5 6

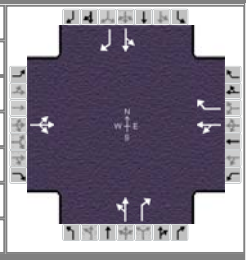
File Name : 2614_06242013
Site Code : 2164
Start Date : 6/24/2013
Page No : 2

	Rt 130 From North					Quaker Meeting House Rd From East					Rt 130 From South					BilL Richards Way From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:00 PM																					
03:00 PM	9	81	**5**	**1**	96	50	**17**	4	0	**71**	**17**	73	44	0	134	2	6	2	0	10	311
03:15 PM	8	90	4	0	102	38	9	**11**	0	58	5	**105**	48	0	158	5	**21**	**13**	0	**39**	**357**
03:30 PM	**10**	**103**	2	0	**115**	53	0	4	0	57	2	69	50	0	121	**6**	18	13	**2**	39	332
03:45 PM	9	95	4	0	108	**60**	0	7	0	67	0	104	**70**	0	**174**	4	1	3	0	8	357
Total Volume	36	369	15	1	421	201	26	26	0	253	24	351	212	0	587	17	46	31	2	96	1357
% App. Total	8.6	87.6	3.6	0.2		79.4	10.3	10.3	0		4.1	59.8	36.1	0		17.7	47.9	32.3	2.1		
PHF	.900	.896	.750	.250	.915	.838	.382	.591	.000	.891	.353	.836	.757	.000	.843	.708	.548	.596	.250	.615	.950



HCS 2010 Signalized Intersection Results Summary

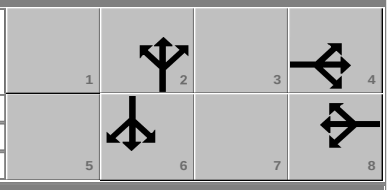
General Information				Intersection Information	
Agency	Cape Cod Commission			Duration, h	0.25
Analyst	LAM	Analysis Date	Jul 15, 2013	Area Type	Other
Jurisdiction	Sandwich	Time Period	a.m. Peak Hour	PHF	0.87
Intersection	Quaker Meetinghouse/Sch	Analysis Year	2013	Analysis Period	1> 8:00
File Name	Rt130-QMHR_am-NEW.xus				
Project Description	8 a.m.- 9 a.m.				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	32	63	53	191	87	24	99	402	221	31	286	44

Signal Information			
Cycle, s	54.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	21.3	6.9	11.8	0.0	0.0	0.0
Yellow	4.0	3.0	3.0	0.0	0.0	0.0
Red	2.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		11.0		7.0		7.0
Phase Duration, s		10.9		15.8		27.3		27.3
Change Period, ($Y+R_c$), s		4.0		4.0		6.0		6.0
Max Allow Headway (*MAH*), s		3.2		3.1		3.2		3.2
Queue Clearance Time (g_s), s		7.3		11.4		20.7		10.8
Green Extension Time (g_e), s		0.2		0.4		0.6		2.5
Phase Call Probability		0.92		0.99		1.00		1.00
Max Out Probability		0.00		0.07		1.00		0.14

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		170			320	28		576	254		364	51
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1683			1749	1579		1583	1486		1590	1610
Queue Service Time (g_s), s		5.3			9.4	0.8		9.9	6.8		0.0	1.1
Cycle Queue Clearance Time (g_c), s		5.3			9.4	0.8		18.7	6.8		8.8	1.1
Green Ratio (*g/C*)		0.13			0.22	0.22		0.39	0.39		0.39	0.39
Capacity (*c*), veh/h		216			382	345		703	585		700	634
Volume-to-Capacity Ratio (*X*)		0.787			0.836	0.080		0.819	0.434		0.521	0.080
Available Capacity (c_a), veh/h		561			583	526		724	605		720	656
Back of Queue (*Q*), veh/ln (50th percentile)		2.0			3.8	0.2		6.7	1.9		2.8	0.3
Queue Storage Ratio (*RQ*) (50th percentile)		0.11			0.20	0.06		0.35	0.33		0.15	0.03
Uniform Delay (d_1), s/veh		22.8			20.2	16.8		15.4	12.0		12.6	10.2
Incremental Delay (d_2), s/veh		2.4			3.9	0.0		6.7	0.2		0.3	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0	0.0		0.0	0.0		0.0	0.0
Control Delay (*d*), s/veh		25.2			24.1	16.8		22.1	12.2		12.8	10.3
Level of Service (LOS)		C			C	B		C	B		B	B
Approach Delay, s/veh / LOS	25.2	C		23.5	C		19.0	B		12.5	B	
Intersection Delay, s/veh / LOS	19.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.2	B	2.1	B
Bicycle LOS Score / LOS	0.8	A	1.1	A	1.9	A	1.2	A

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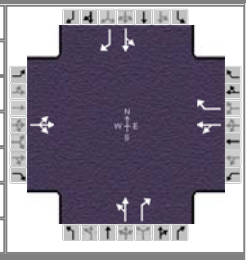
HCS 2010 Signalized Intersection Results Summary

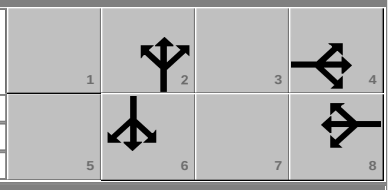
General Information				Intersection Information	
Agency	Cape Cod Commission			Duration, h	0.25
Analyst	LAM	Analysis Date	Jul 15, 2013	Area Type	Other
Jurisdiction	Sandwich	Time Period	a.m. Peak Hour	PHF	0.95
Intersection	Quaker Meetinghouse/Sch	Analysis Year	2013	Analysis Period	1> 8:00
File Name	Rt130-QMHR_pm-NEW.xus				
Project Description	3 p.m. - 4 p.m.				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	17	46	31	201	26	26	24	351	212	36	369	15

Signal Information			
Cycle, s	37.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	12.7	3.9	7.0	0.0	0.0	0.0
Yellow	4.0	3.0	3.0	0.0	0.0	0.0
Red	2.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		11.0		7.0		7.0
Phase Duration, s		7.9		11.0		18.7		18.7
Change Period, ($Y+R_c$), s		4.0		4.0		6.0		6.0
Max Allow Headway (*MAH*), s		3.2		3.1		3.2		3.2
Queue Clearance Time (g_s), s		4.2		7.1		10.7		9.8
Green Extension Time (g_e), s		0.1		0.4		2.0		2.0
Phase Call Probability		0.64		0.94		1.00		1.00
Max Out Probability		0.00		0.00		0.08		0.06

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		99			239	27		395	223		426	16
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1632			1669	1610		1501	1529		1743	1610
Queue Service Time (g_s), s		2.2			5.1	0.5		0.9	4.3		0.0	0.2
Cycle Queue Clearance Time (g_c), s		2.2			5.1	0.5		8.7	4.3		7.8	0.2
Green Ratio (*g/C*)		0.10			0.19	0.19		0.34	0.34		0.34	0.34
Capacity (*c*), veh/h		168			313	302		609	516		693	544
Volume-to-Capacity Ratio (*X*)		0.588			0.763	0.091		0.649	0.432		0.615	0.029
Available Capacity (c_a), veh/h		780			798	769		966	893		1103	940
Back of Queue (*Q*), veh/ln (50th percentile)		0.7			1.6	0.2		2.1	1.0		2.2	0.1
Queue Storage Ratio (*RQ*) (50th percentile)		0.04			0.09	0.04		0.13	0.18		0.12	0.01
Uniform Delay (d_1), s/veh		16.1			14.5	12.6		11.1	9.7		10.8	8.3
Incremental Delay (d_2), s/veh		1.2			1.5	0.0		0.4	0.2		0.3	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0	0.0		0.0	0.0		0.0	0.0
Control Delay (*d*), s/veh		17.3			16.0	12.7		11.6	9.9		11.2	8.4
Level of Service (LOS)		B			B	B		B	A		B	A
Approach Delay, s/veh / LOS	17.3	B		15.6	B		11.0	B		11.1	B	
Intersection Delay, s/veh / LOS	12.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.2	B	2.1	B
Bicycle LOS Score / LOS	0.7	A	0.9	A	1.5	A	1.2	A

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