MEMORANDUM

To: Ms. Nora Loughnane,
Town Planner, Town of Westwood

Fr: Jeffrey S. Dirk, PE, PTOE, FITE
Nancy B. Doherty, PE

Re: **University Station – Preliminary Impact Analysis of Full I-95/I-93 Interchange Project on University Avenue**

Dt: February 19, 2013

Tetra Tech and Vanasse & Associates, Inc. (Tt/VAI) have prepared supplemental information and analyses in response to a comment received from Beta Group, Inc. (BETA) at our meeting with the Town and BETA on January 18, 2013. Specifically, the question was asked how the Canton Street/University Avenue and University Avenue corridor would operate, as currently designed, with the full implementation of the proposed I-95/I-93/ University Avenue/Dedham Street Interchange/I-95 Widening Project (I-95/I-93 Interchange Project) to be constructed by MassDOT.

As a result of this analysis, it has been concluded that University Station project and the associated transportation infrastructure improvements have been designed to function in the context of the future completion of the elements of the MassDOT I-95/I-93 Interchange Project. Noted improvements in overall operating conditions will occur along the University Avenue corridor after completion of the MassDOT project, with additional traffic demands expected to occur at the University Avenue/Canton Street intersection as a result of the completion of the Dedham Street off-ramp from I-95 northbound. The following details the elements of this supplemental analysis.

University Avenue and its intersections with Canton Street, the University Station project (hereafter referred as the "University Station Project") driveways and Blue Hill Drive/Green Lodge Street were designed to accommodate implantation of Phase I of the I-95/I-93 Interchange Project. The Phase I project as expected to be constructed by 2022 will include the following elements:

- Re-alignment of the Route I-95/Route 128 southbound ramps to Blue Hill Drive/University Avenue in Westwood.
- Construction of a new I-95 northbound off-ramp to Dedham Street in Canton.
- Construction of the Dedham Street corridor improvements between Shawmut Road in Canton and University Avenue in Westwood/Norwood, including improvements at the Canton Street/University Avenue intersection.

At this time, funding for the construction of the I-95/I-93 Interchange Project has not been programed to the extent that the completion of this project would be anticipated to occur within the 2022 horizon year that was assessed in the November 2012 Traffic Impact Assessment

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prepared in support of the Project (the "November 2012 TIS"). However, for purpose of this preliminary analysis and as requested by BETA, the 2022 No-Build traffic volumes presented in the November 2012 TIS were used as the basis to perform the requested evaluation.

Upon completion of the I-95/I-93 Interchange Project, traffic volumes and trip patterns along University Avenue and intersecting roadways will be redistributed as a result of the following modifications:

1. The University Avenue on-ramp to I-95 southbound (Route 128) will be removed, eliminating the existing connections from University Avenue to I-93 northbound and to I-95 southbound. Also, there will be no access from I-95 northbound to University Avenue (via I-95/Route 128);

2. The existing connection from University Avenue to I-93 northbound will be replaced with a new on-ramp which will generally follow the existing Green Lodge Street alignment and the University Avenue/Blue Hill Drive/Green Lodge Street will be redesigned to accommodate this modification. The specific elements of the redesign are not known at this time; however, it is expected that the northbound approach to the intersection will include a short left turn pocket to accommodate access to the driveways serving 400 Blue Hill Drive, a through lane and two right turn lanes. In addition, the concurrent pedestrian phasing will likely be replaced with an exclusive pedestrian phase; and

3. Access to/from points south on I-95 will be via Dedham Street, the existing southbound on-ramp and the proposed northbound off-ramp.

As requested, the University Avenue corridor intersections were reanalyzed with the aforementioned modifications. This involved both a re-assignment of the 2022 No-Build peak hour traffic volumes and a re-assignment of University Station Project traffic.

A manual reassignment of 2022 No-Build peak hour traffic volumes was undertaken using the existing and future travel pathways depicted on the sketches provided in Attachment A to forecast how traffic patterns are expected to change as a result of the I-95/I-93 Interchange Project. Traffic volumes for each pathway were estimated based on the 2022 No-Build weaving volumes between the I-95/I-93 and I-95/University Avenue interchanges shown on Figures 15, 16 and 17 of the November 2012 TIS.

The University Station Project trips distributions were also adjusted to reflect the new connections to the regional highway system. All Project trips arriving from the south on I-95 (26 percent of office/hotel trips, 7 percent of residential trips, 15 percent of retail trips and 18 percent of Wegman's trips) were assigned to the proposed I-95 northbound off-ramp on Dedham Street and to the westbound right turn at Canton Street. The return trips to I-95 for points to the south of the Project site were assigned to the University Avenue southbound left turn movement to Canton Street and the right turn movement at the I-95 southbound on-ramp. Figure 1A depicts the University Station Project trip distributions for the hotel, office and residential components

with the I-95/I-93 Interchange Project complete, with Figure 1B depicting the trip distributions for the retail and Wegman's components.

In addition, it was requested by BETA that a review of the University Station's Project trip distributions at the University Avenue/Everett Street intersection be reviewed. Based on this review and as discussed with BETA, the University Station Project trip assignment to the intersection was reduced to approximately one percent. This adjustment resulted in a decrease in University Station Project traffic on Canton Street east of University Avenue and a corresponding increase in traffic on University Avenue south of Canton Street.

The estimated 2022 Build peak hour traffic volumes for the University Avenue corridor are shown on Figure 2. These volumes include the adjusted 2022 No-Build volumes and University Station Project trips. With the new connections to the highway system, traffic volumes along the northerly segment of the corridor have decreased while volumes along the southerly segment of the corridor have increased. At the Canton Street/University Avenue intersection, the westbound right turn volume in the morning peak hour increased from approximately 700 trips without the I-95/I-93 Interchange Project to 1,100 trips with the I-95/I-93 Interchange Project. In the afternoon peak hour, the southbound left turn volume increased from approximately 650 trips to 1,100 trips.

Intersection capacity analyses for the University Avenue intersections with Canton Street, Harvard Street, South Site Drive, North Site Drive and Relocated Rosemont Street were conducted with the same lane arrangements as shown on Figure 10 in the November 2012 TIS. The traffic signal timing for the pedestrian phases at the Relocated Rosemont, North Site Drive and South Site Drive intersections were increased from 29 seconds to 33 seconds to accommodate the crosswalks at those intersections on the southbound approaches.

The University Avenue/Blue Hill Drive intersection (in the future, the University Avenue/I-95 southbound off-ramp/I-93 northbound on-ramp intersection) was analyzed assuming the lane use modifications on the northbound approach (a left turn pocket, a through lane and two right turn lanes) and with an exclusive pedestrian phase. With the large volume of northbound right turns onto the I-93 northbound on-ramp, concurrent pedestrian phasing cannot be accommodated. The detailed analysis results are provided in Attachment B and summarized in Table 1. For context, the intersection analysis that was provided in the January 11, 2013 supplemental traffic memorandum are also provided in Table 1 to provide a general comparison of how the corridor would operate with and without the I-95/I-93 Interchange Improvement Project.

Based on a review of Table 1, the most significant change in operating conditions was found to occur at the Canton Street/University Avenue intersection, where longer southbound queues and higher volume to capacity ratios were identified for the westbound right turn lane.

The intersections located in the northerly segment of University Avenue, including those at Relocated Rosemont Road and Blue Hill Drive (I-93 On-ramp), are expected to operate at better levels of service in 2022 with the improvements to the I-95/I-93 interchange as traffic volumes at those intersections are projected to decrease as compared to a 2022 scenario in which the I-95/I-93 interchange improvements are not in place. Intersections in the mid-section of the corridor,

including the North Site Drive and the South Site Drive, are expected to operate at similar levels of service with or without the I-95/I-93 interchange improvements. At the southerly end of the corridor, the Canton Street/University Avenue intersection are forecasted to carry a higher volume of traffic with the I-95/I-93 interchange improvements and this intersection is expected to operate at an overall LOS D during the morning peak hour, LOS E during the afternoon peak hour and LOS C for the Saturday mid-day peak hour.

Summary

Tt/VAI have completed an assessment of traffic volumes and operating conditions along the University Avenue corridor with the full completion of the MassDOT I-95/I-93 Interchange Project. This analysis is responsive to the request of BETA and has demonstrated that the University Station project and the associated transportation infrastructure improvements have been designed to function in the context of the future completion of the elements of the MassDOT I-95/I-93 Interchange Project. Noted improvements in overall operating conditions will occur along the University Avenue corridor after completion of the MassDOT project, with additional traffic demands expected to occur at the University Avenue/Canton Street intersection as a result of the completion of the Dedham Street off-ramp from I-95 northbound.

Attachments:
Figures
Attachment A – I-95/I-93 Interchange Reassignment of 2022 No-Build Peak Hour Volumes
Attachment B – University Avenue Corridor Intersection Capacity Analyses

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Table 1 2022 Build Condition – University Avenue Corridor Capacity Analyses Summary with and without I-95/I-93 Interchange Improvements

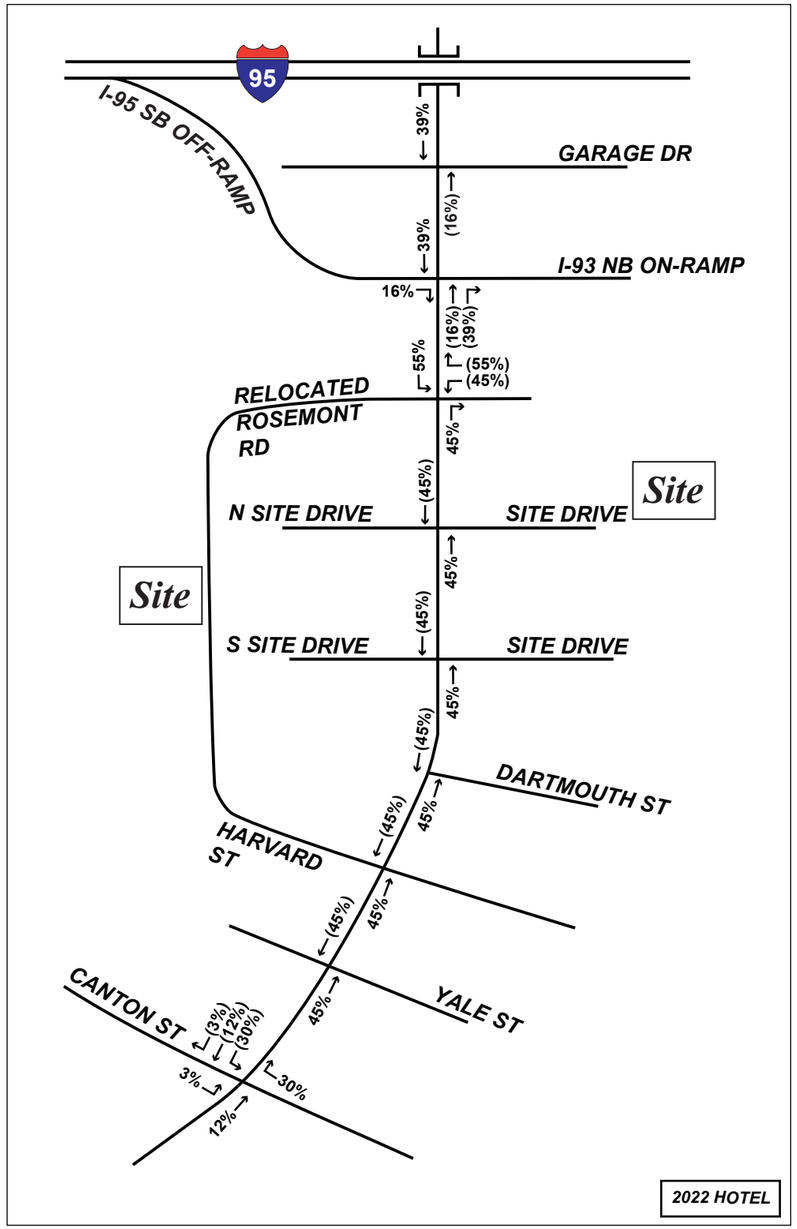
	2022 Morning Peak Hour										2022 Afternoon Peak Hour										2022 Saturday Peak Hour									
	Without Interchange Improvement					With Interchange Improvement					Without Interchange Improvement					With Interchange Improvement					Without Interchange Improvement					With Interchange Improvement				
Location	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**
University Avenue/MBTA Drive/Office Drive																													
Office Drive EB LTR	0.04	26	C	1	9	0.09	59	E	2	20	0.04	20	B	2	21	0.07	40	D	4	44	0.03	25	C	1	9	0.06	53	D	1	20
MBTA Dr. WB L	0.09	26	C	2	11	0.17	60	E	5	21	0.65	27	C	58	#120	0.76	60	E	132	197	0.05	26	C	1	8	0.10	54	D	3	14
MBTA Dr. WB TR	0.00	25	C	0	0	0	58	E	0	0	0.08	20	B	0	16	0.08	40	D	0	9	0.00	25	C	0	0	0	53	D	0	0
University Ave. NB L	0.11	1	A	0	m6	0.07	0	A	0	m0	0.03	3	A	2	m1	0.02	2	A	1	m2	0.01	1	A	0	m1	0.01	0	A	0	m0
University Ave. NB TR	0.53	2	A	0	116	0.50	1	A	0	0	0.68	9	A	321	302	0.61	4	A	44	116	0.47	2	A	0	62	0.42	1	A	3	8
University Ave. SB LTR	0.48	2	A	0	108	0.28	1	A	0	54	0.43	5	A	75	107	0.32	5	A	95	160	0.40	2	A	0	81	0.32	1	A	0	65
Intersection	**0.51**	**2**	**A**			**0.49**	**2**	**A**			**0.67**	**10**	**A**			**0.64**	**13**	**B**			**0.45**	**2**	**A**			**0.41**	**2**	**A**		
University Avenue/Blue Hill Drive																													
B.H.D./Ramp EB L	0.74	49	D	148	212	0.80	60	E	163	245	0.21	45	D	24	48	0.20	47	D	23	52	0.25	45	D	19	39	0.33	50	D	19	47
B.H.D./Ramp EB T	0.22	34	C	55	89	0.24	40	D	62	105	0.23	45	D	48	77	0.28	48	D	47	86	0.26	44	D	41	65	0.40	50	D	41	81
B.H.D/Ramp EB R	0.32	1	A	0	0	0.32	1	A	0	0	0.35	1	A	0	0	0.35	1	A	0	0	0.41	1	A	0	0	0.41	1	A	0	0
G.L./Ramp WB L	0.11	33	C	18	40	0.14	39	D	23	51	0.33	46	D	49	80	0.60	56	E	73	125	0.12	43	D	12	28	0.20	49	D	12	34
G.L/Ramp W TR	0.11	33	C	17	52	0.04	38	D	0	0	0.33	46	D	61	102	0.04	46	D	0	0	0.26	44	D	30	70	0.05	47	D	0	0
University Ave. NB L	0.59	32	C	125	132	0.38	44	D	15	35	1.03	53	D	~630	#775	0.11	45	D	3	m4	0.85	26	C	384	68	0.18	34	C	4	m7
University Ave. NB T						0.56	13	B	52	312						0.59	6	A	10	640						0.44	5	A	36	164
University Ave. NB R	0.52	10	A	54	323	0.13	4	A	0	0	0.57	7	A	115	258	0.50	10	B	11	97	0.42	3	A	27	120	0.33	6	A	1	28
University Ave. SB L	0.13	16	B	14	33	0.17	14	B	13	72	0.27	31	C	16	m50	0.31	11	B	11	121	0.13	19	B	15	47	0.12	7	A	5	52
University Ave. SB TR	0.49	19	B	201	257	0.27	14	B	64	208	0.68	33	C	235	#432	0.29	8	A	38	261	0.50	23	C	187	315	0.28	7	A	35	203
Intersection	**0.60**	**19**	**B**			**0.59**	**16**	**B**			**0.77**	**32**	**C**			**0.56**	**10**	**B**			**0.61**	**18**	**B**			**0.44**	**8**	**A**		
University Avenue/Rel. Rosemont Road																													
Rel.Rosem Rd. EB L	0.44	52	D	35	77	0.39	56	E	35	75	0.83	67	E	185	#317	0.84	73	E	155	#283	0.47	53	D	34	75	0.44	53	D	32	72
Rel.Rosem Rd. EB LTR	0.29	50	D	22	62	0.26	54	D	21	61	0.82	65	E	180	#308	0.81	69	E	148	#273	0.31	51	D	21	61	0.27	51	D	17	56
Site Drive WB LT	0.29	49	D	27	62	0.35	54	D	36	76	0.61	60	E	72	#131	0.83	88	F	90	#201	0.65	59	E	65	#138	0.77	71	E	80	#176
Site Drive WB R	0.06	47	D	0	51	0.05	51	D	0	50	0.13	51	D	0	75	0.11	52	D	0	71	0.13	48	D	0	73	0.12	47	D	0	68
University Ave. NB L	0.03	11	B	1	m10	0.02	12	B	2	m13	0.16	16	B	6	m16	0.15	20	B	6	m19	0.19	17	B	11	m30	0.19	8	A	5	m31
University Ave. NB TR	0.31	11	B	81	160	0.31	12	B	86	185	0.76	20	C	283	m#679	0.63	20	B	183	#548	0.55	17	B	183	m341	0.51	9	A	72	m311
University Ave. SB L	0.36	5	A	13	51	0.33	9	A	28	93	0.68	62	E	74	m#228	0.62	33	C	46	#204	0.69	49	D	68	#237	0.62	27	C	42	#217
University Ave. SB T	0.40	3	A	40	99	0.34	6	A	88	149	0.67	9	A	83	#745	0.64	21	C	206	#675	0.57	5	A	53	145	0.56	8	A	161	230
University Ave. SB R	0.33	4	A	6	30	0.20	1	A	0	8	0.05	0	A	0	m1	0.04	2	A	0	5	0.04	0	A	0	0	0.03	1	A	0	0
Intersection	**0.40**	**10**	**A**			**0.35**	**12**	**B**			**0.76**	**25**	**C**			**0.69**	**29**	**C**			**0.66**	**18**	**B**			**0.61**	**15**	**B**		
University Avenue/North Site Drive																													
North Site Dr. EB L	0.55	50	D	68	125	0.54	54	D	73	130	0.93	77	E	256	#440	0.89	71	E	241	#409	0.94	73	E	267	#461	1	94	F	~256	#455
North Site Dr. EB LTR	0.39	48	D	43	98	0.30	51	D	34	87	0.86	66	E	225	#393	0.80	59	E	197	#342	0.88	61	E	235	#412	0.93	75	E	222	#405
Site Drive WB LTR	0.33	52	D	22	65	0.41	57	E	31	77	0.70	72	E	63	#153	0.79	83	F	75	#181	0.37	52	D	25	69	0.41	53	D	28	72
University Ave. NB L	0.12	7	A	8	38	0.11	7	A	9	40	0.40	12	B	18	m51	0.54	24	C	21	m#158	0.50	17	B	16	m#141	0.50	18	B	30	m#96
University Ave. NB TR	0.32	7	A	70	177	0.34	8	A	84	186	0.57	11	B	197	383	0.59	15	B	92	#570	0.48	12	B	51	352	0.45	11	B	65	425
University Ave. SB L	0.08	3	A	5	17	0.07	4	A	8	23	0.14	7	A	10	m2	0.13	13	B	6	m11	0.12	13	B	6	m22	0.11	24	C	10	m38
University Ave. SB T	0.41	5	A	68	262	0.34	6	A	111	161	0.57	14	B	399	35	0.68	20	B	261	#643	0.62	15	B	108	#521	0.58	27	C	188	#550
University Ave. SB R	0.10	4	A	0	18	0.10	7	A	11	54	0.27	32	C	111	0	0.27	11	B	45	m44	0.35	17	B	0	346	0.34	43	D	0	211
Intersection	**0.42**	**11**	**B**			**0.37**	**13**	**B**			**0.66**	**27**	**C**			**0.74**	**27**	**C**			**0.69**	**26**	**C**			**0.67**	**37**	**D**		

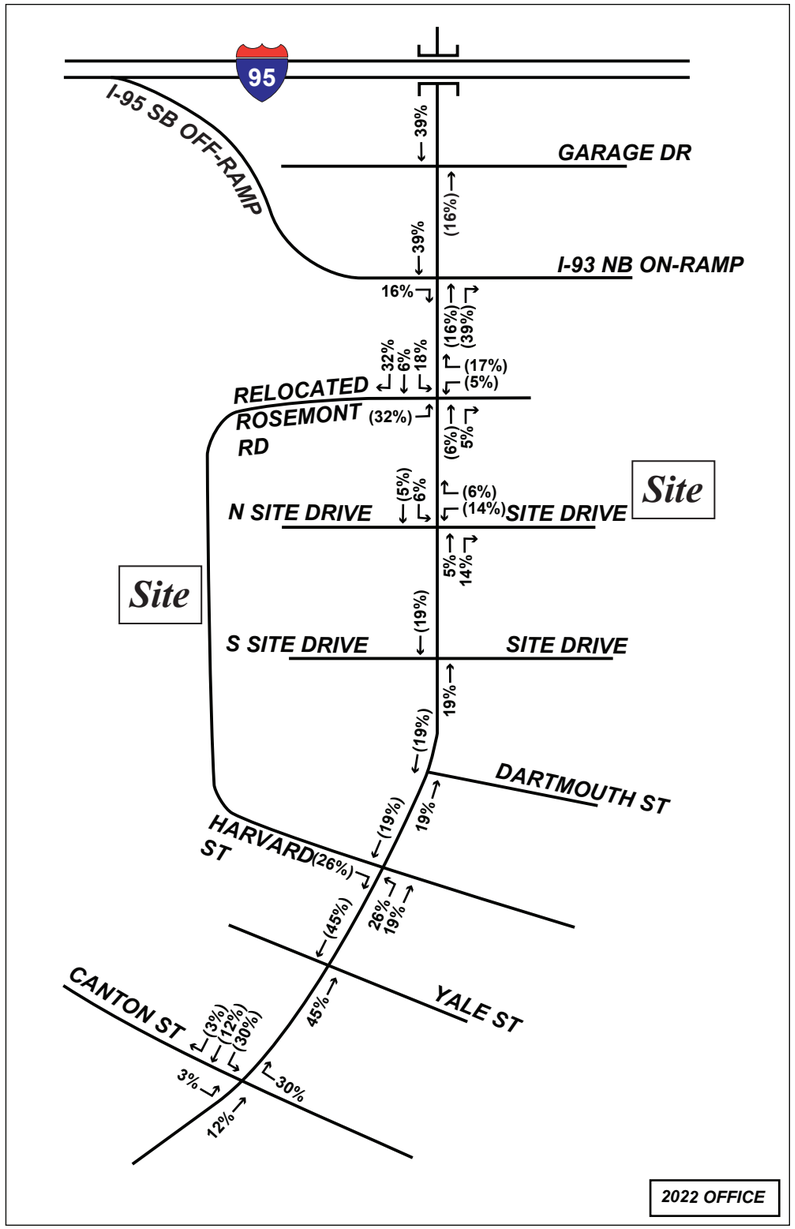
Table 1 2022 Build Condition – University Avenue Corridor Capacity Analyses Summary with and without I-95/I-93 Interchange Improvements (Continued)

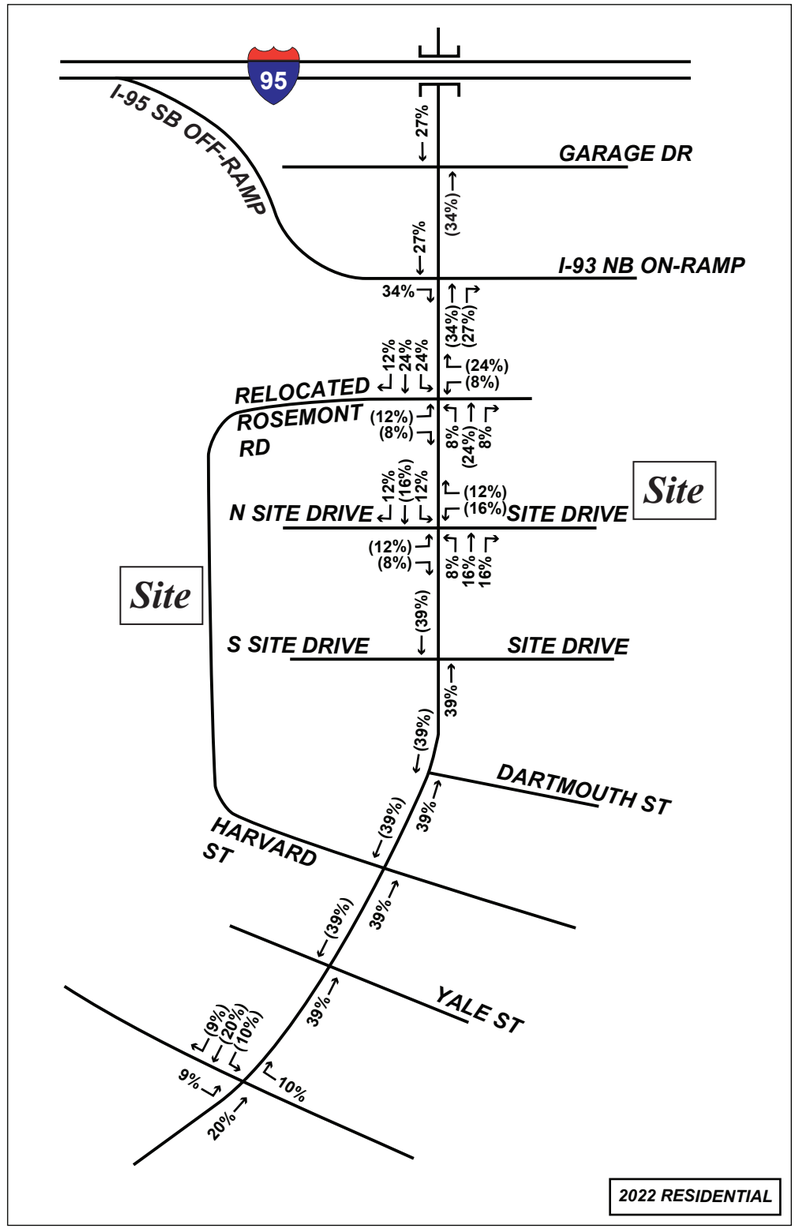
	2022 Morning Peak Hour										2022 Afternoon Peak Hour										2022 Saturday Peak Hour									
	Without Interchange Improvement					With Interchange Improvement					Without Interchange Improvement					With Interchange Improvement					Without Interchange Improvement					With Interchange Improvement				
Location	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**	**V/C**	**Del.**	**LOS**	**50th Q**	**95th Q**
University Avenue/South Site Drive																													
South Site Dr. EB L	0.42	50	D	43	90	0.39	54	D	42	86	0.84	67	E	205	#378	0.80	63	E	~188	#371	0.82	55	E	223	#417	0.82	58	E	~211	#392
South Site Dr. EB LT	0.42	50	D	43	90	0.40	54	D	43	88	0.84	67	E	205	#378	0.80	63	E	~188	#371	0.82	55	E	224	#418	0.82	58	E	~212	#395
South Site Dr. EB R	0.05	39	D	0	26	0.06	43	D	0	27	0.24	23	C	14	45	0.26	22	C	9	44	0.26	17	B	16	39	0.30	16	B	10	39
Site Dr. WB LTR	0.06	54	D	1	14	0.06	59	E	2	15	0.12	56	E	6	33	0.13	56	E	7	34	0.13	51	D	6	34	0.15	51	D	7	36
University Ave. NB L	0.31	6	A	15	108	0.28	6	A	16	123	0.69	18	B	119	#401	0.72	28	C	173	#510	0.71	19	B	142	#448	0.71	18	B	140	#534
University Ave. NB TR	0.26	6	A	35	194	0.29	6	A	40	243	0.41	12	B	145	338	0.39	12	B	119	319	0.24	12	B	66	168	0.26	12	B	67	187
University Ave. SB L	0.01	2	A	0	m1	0.01	2	A	0	m2	0.07	8	A	2	m9	0.07	19	B	3	m7	0.08	22	C	3	m11	0.09	20	C	8	m21
University Ave. SB T	0.33	3	A	24	38	0.27	3	A	19	40	0.55	11	B	41	m#367	0.71	24	C	205	#430	0.46	22	C	41	m#225	0.56	30	C	143	m#272
University Ave. SB R	0.12	0	A	0	0	0.11	0	A	0	0	0.31	40	D	0	m374	0.29	37	D	1	m157	0.38	99	F	278	m525	0.37	205	F	204	m445
Intersection	**0.33**	**9**	**A**			**0.29**	**9**	**A**			**0.68**	**26**	**C**			**0.7**	**28**	**C**			**0.70**	**42**	**D**			**0.69**	**61**	**E**		
University Avenue/Harvard Street																													
Harvard St. EB LT	0.18	21	C	5	23	0.17	21	C	5	22	0.63	55	D	83	147	0.64	57	E	80	143	0.58	39	D	52	100	0.55	38	D	48	95
Harvard St. EB R	0.13	13	B	9	23	0.13	9	A	9	25	0.83	54	D	216	305	0.85	45	D	327	427	0.33	26	C	33	82	0.53	28	C	73	126
Drive WB LTR	0.01	20	C	0	4	0.01	20	B	0	4	0.06	44	D	6	33	0.06	46	D	6	34	0.01	32	C	0	7					
University Ave. NB L	0.69	7	A	0	#190	0.84	16	B	30	#377	0.42	5	A	27	51	0.43	13	B	40	115	0.46	4	A	28	63	0.54	5	A	31	70
University Ave. NB TR	0.53	4	A	0	260	0.60	5	A	0	325	0.75	9	A	349	599	0.75	9	A	348	552	0.59	6	A	158	325	0.64	6	A	182	381
University Ave. SB LTR	0.55	10	A	43	#242	0.65	14	B	58	#224	0.48	10	B	187	310	0.69	22	C	356	505	0.38	8	A	104	190	0.43	9	A	123	237
Intersection	**0.61**	**8**	**A**			**0.73**	**12**	**B**			**0.75**	**18**	**B**			**0.77**	**22**	**C**			**0.58**	**10**	**B**			**0.63**	**11**	**B**		
University Avenue/Canton Street																													
Canton St. EB L	0.61	44	D	38	#139	0.50	40	D	26	78	0.77	44	D	114	#297	0.68	35	D	89	#245	0.47	21	C	54	#151	0.36	24	C	34	105
Canton St. EB TR	0.81	63	E	71	#180	0.65	49	D	70	#167	0.98	**	E	233	#491	0.94	59	E	229	#477	0.32	28	C	31	80	0.33	29	C	31	80
Canton St. WB L	0.86	32	C	269	#694	0.86	31	C	266	#689	0.84	44	E	85	#260	0.92	72	E	85	#271	0.41	24	C	37	111	0.36	21	C	37	111
Canton St. WB T	0.95	54	D	360	#809	0.86	38	D	349	#790	0.76	91	D	126	#318	0.58	39	D	117	#249	0.58	35	C	42	#129	0.38	28	C	42	#129
Canton St. WB R	0.49	1	A	0	0	0.77	4	A	0	0	0.40	1	A	0	0	0.51	1	A	0	0	0.37	1	A	0	0	0.44	1	A	0	0
University Ave. NB L	0.65	51	D	28	#118	0.77	77	E	30	#126	0.17	28	C	13	47	0.22	33	C	15	51	0.05	20	C	3	19	0.05	20	B	3	19
University Ave. NB T	0.71	41	D	170	#390	0.89	60	E	201	#480	0.82	43	D	232	#528	1.16	135	F	~330	#702	0.73	30	C	121	#350	0.81	34	C	147	#433
University Ave. NB R	0.14	9	A	0	17	0.14	10	A	0	18	0.63	26	C	84	234	0.83	45	D	159	#424	0.08	15	B	0	19	0.08	14	B	0	19
University Ave. SB L	0.86	65	E	91	#217	0.99	88	F	114	#271	0.96	44	E	214	#453	1.19	132	F	~411	#746	0.73	31	C	88	#230	1.01	69	E	128	#344
University Ave. SB TR	0.91	47	D	320	#747	0.96	58	E	332	#768	0.76	19	C	272	#710	0.74	22	C	274	#712	0.60	14	B	110	360	0.58	14	B	113	363
Intersection	**0.91**	**36**	**D**			**0.86**	**36**	**D**			**0.80**	**40**	**D**			**1.01**	**65**	**E**			**0.59**	**19**	**B**			**0.67**	**28**	**C**		

Note: v/c = volume-to-capacity ratio, Del. = Average delay expressed in seconds per vehicle, LOS= Level of Service, 50th Percentile Queue in feet, 95th Percentile Queue in feet
m = Queue metered by upstream signal, # = 95th percentile volume exceeds capacity, queue may be longer, ~ = Volume exceeds capacity, queue is theoretically infinite"

P:/3569/127-3569-12003/SupportDocs/Reports/Source/1212/New Volume Interchange.ai







Not To Scale

Legend	
XX	Entering
(XX)	Exiting

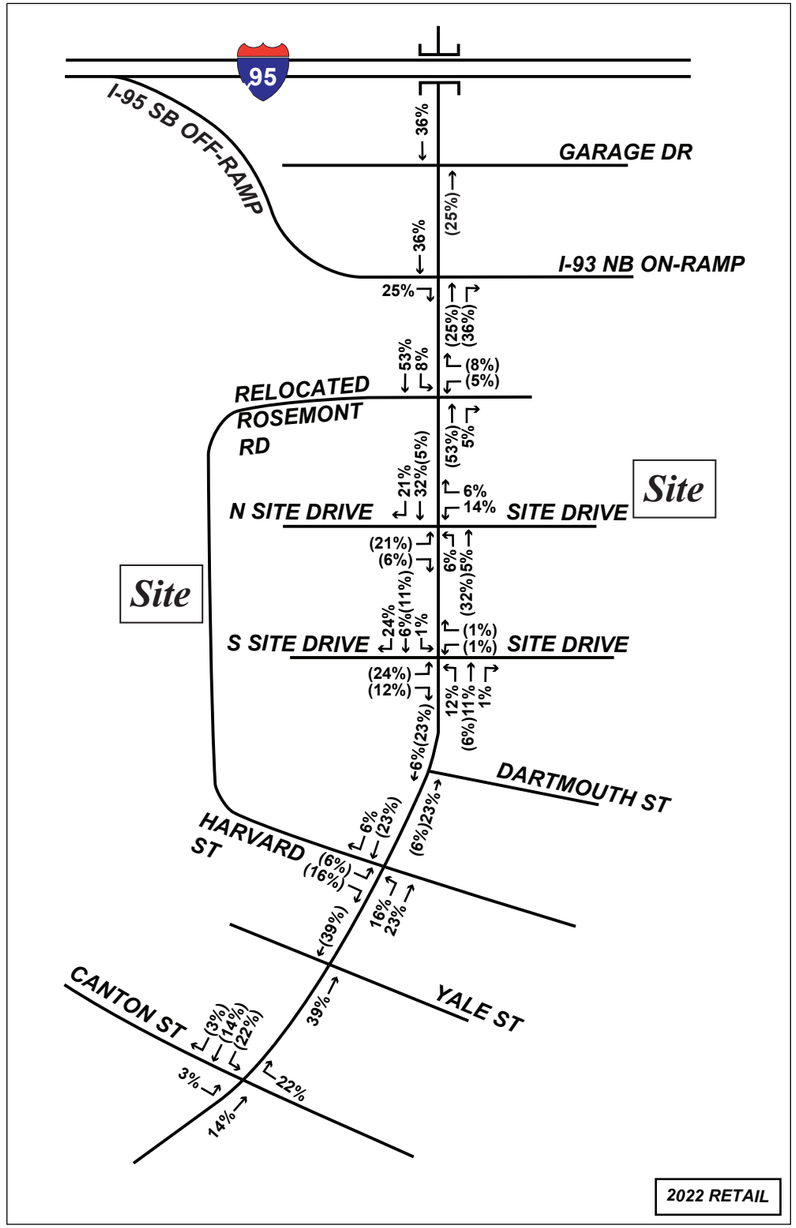
TETRA TECH | VAi

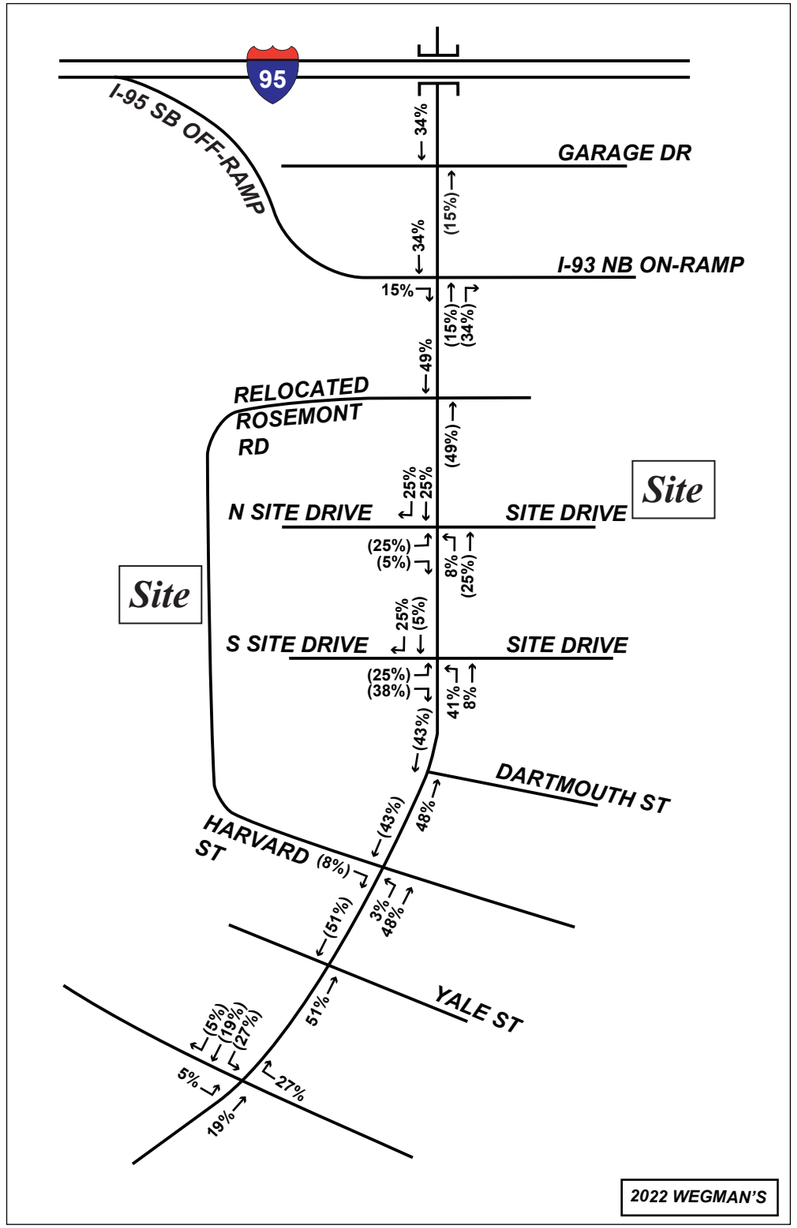
University Station
Westwood, Massachusetts

Project Trip Distributions with the I-95/I-93 Interchange Project

Figure 1A

P:/3569/127-3569-12003/SupportDocs/Reports/Source/1212/New Volume Interchange.ai





Not To Scale

Legend	
XX	Entering
(XX)	Exiting

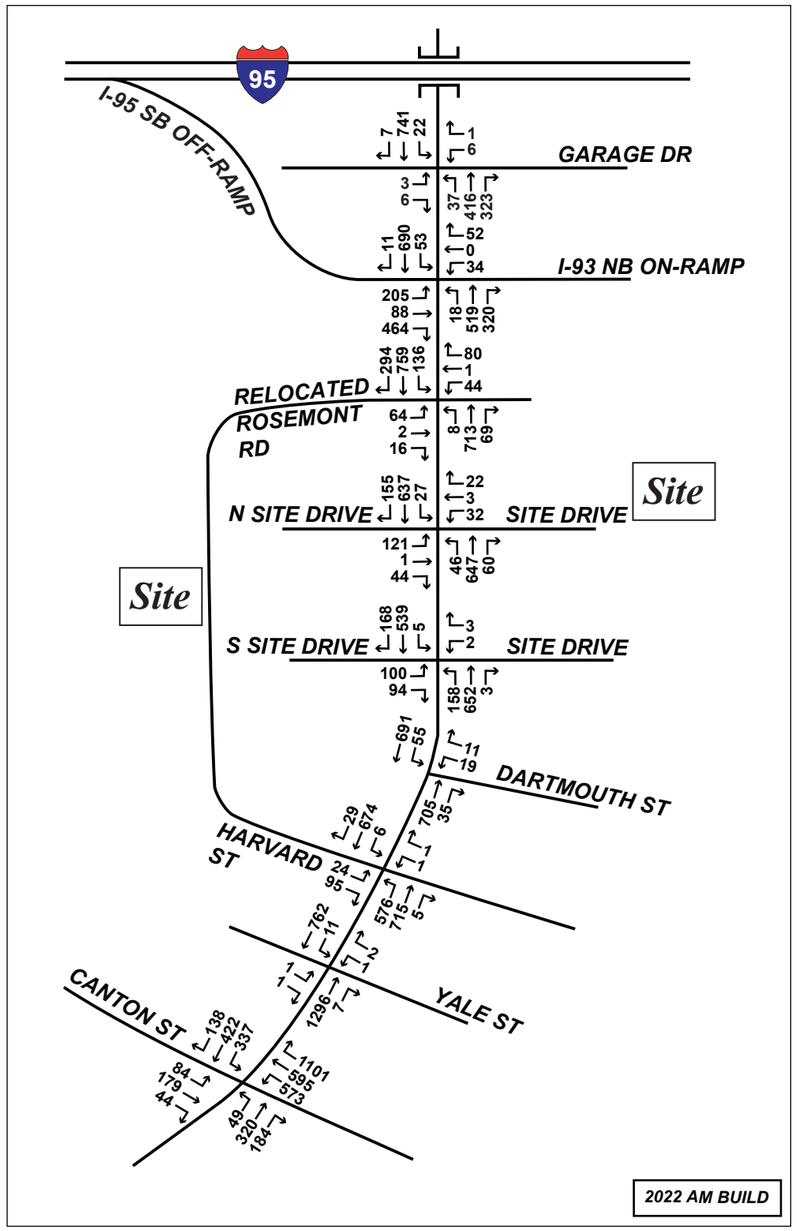
TETRA TECH | VAi

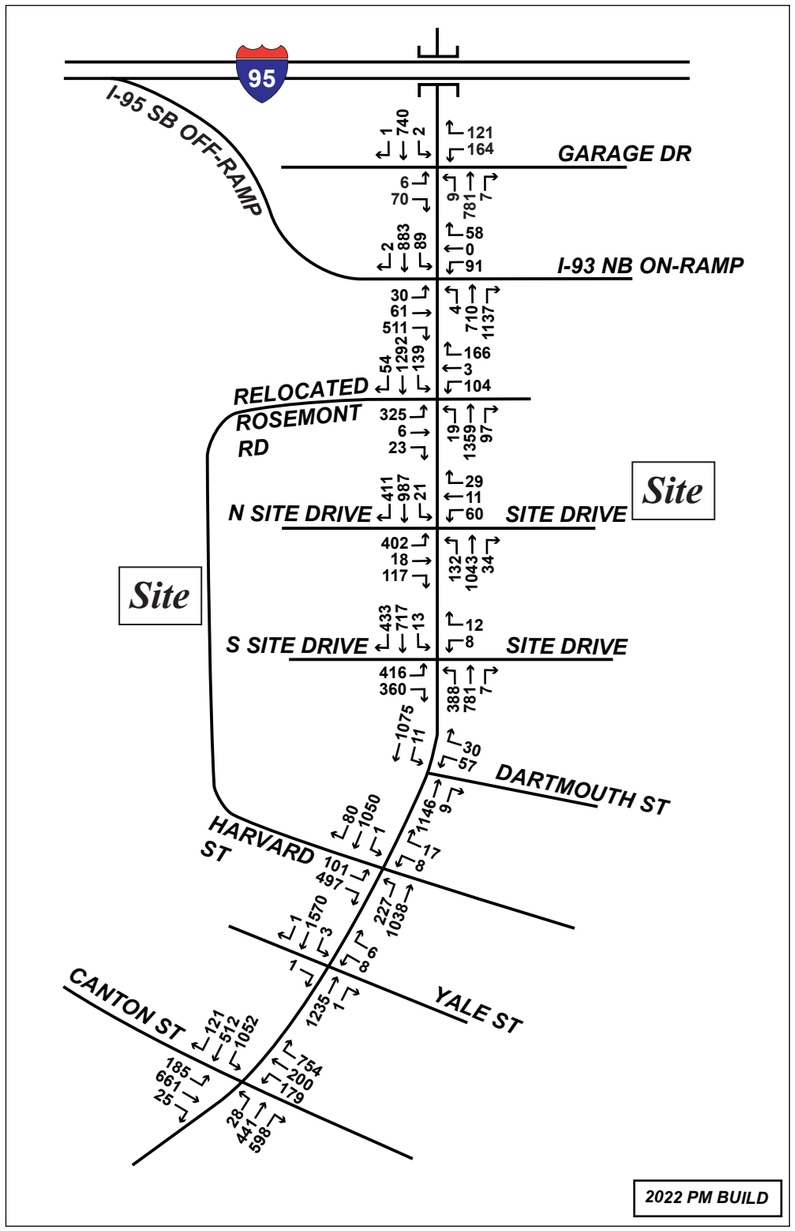
University Station
Westwood, Massachusetts

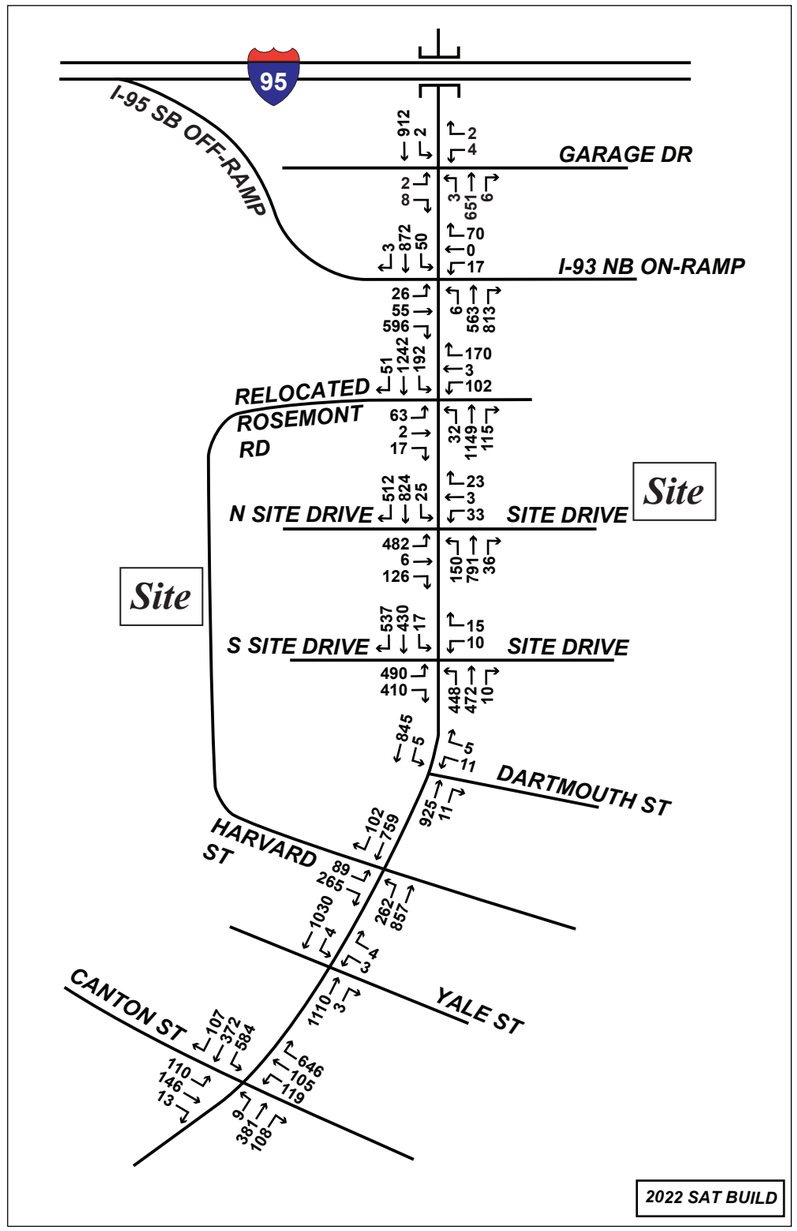
Project Trip Distributions with the I-95/I-93 Interchange Project

Figure 1B

P:/3569/127-3569-12003/SupportDocs/Reports/Source/1212/New Volume Interchange.ai







Not To Scale

TETRA TECH | VAI

University Station
Westwood, Massachusetts

2022 Build Peak Hour Volumes with the I-95/I-93 Interchange Project

Figure 2

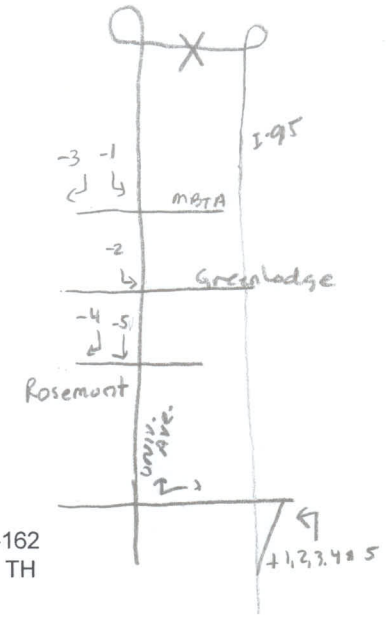
Attachment A

I-95/I-93 Interchange Reassignment of 2022 No-Build Peak Hour Volumes

2022 No-Build AM Peak Hour - Reassignments due to I-95/I-93 Interchange

Reassignemnt due to removal of access from I-95 NB to University Avenue at Route 128
INBOUND

	Vol. on NB Off-Ramp to University Avenue and Driveways	From I-95 NB (eliminated)	From I-93 SB (remains)
Weaving Volumes	714	338	376
Split		47%	53%



University Avenue at Blue Hill Drive

	Vol.*	%	Divert To Canton St. Ramp
1. SB LT at MBTA Dr.	45	50.2%	23
2. SB LT at Green Lodge	33	50.2%	17
3. SB RT to 400 B.H.A.	14	50.2%	7
4. SB RT at Rosemont	323	50.2%	**162**
5. SB to other	417	31.0%	129
	832		338

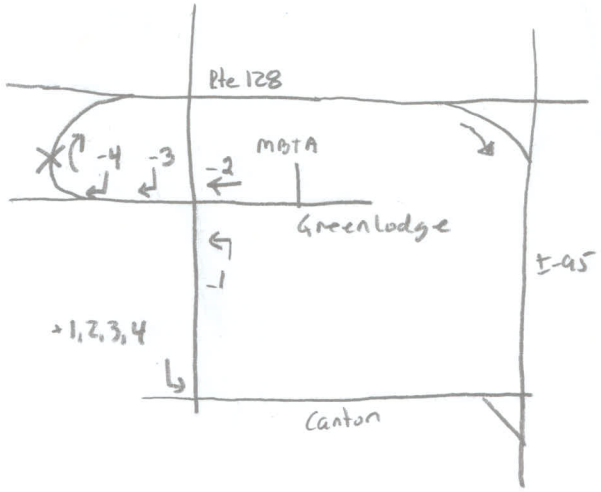
417=579-162
579 is SB TH

Reassignment due to removal of University Avenue on-ramp to I-95/Rte 128 SB
OUTBOUND

	Vol. on I-95 SB On-Ramp	To 95 SB	To 93 NB
Weaving Volumes	140	25	115
Split		18%	82%

At University Avenue/Blue Hill Drive

	Vol.*	To 400 B.H.A.	To Ramp	To 95 SB	To 93 NB	To 95 SB	To 93 NB
1. NB LT	86	18	68	18.0%	82.0%	12	56
2. WB TH	28		28	18.0%	82.0%	5	23
3. SB RT	52	11	41	18.0%	82.0%	7	34
4. 400 B.H.D. Drives	3		3	18.0%	82.0%	1	2
	169	29	140			25	115



2022 No-Build PM Peak Hour - Reassignments due to I-95/I-93 Interchange

Reassignemnt due to removal of access from I-95 NB to University Avenue at Route 128
INBOUND

	Vol. on NB Off-Ramp to University Avenue and Driveways	From I-95 NB (eliminated)	From I-93 SB (remains)
Weaving Volumes	239	104	135
Split		44%	56%

University Avenue at Blue Hill Drive

	Vol.*	%	Divert To Canton St. Ramp
1. SB LT at MBTA Dr.	4	50.2%	2
2. SB LT at Green Lod(	29	50.2%	15
3. SB RT to 400 B.H.A.	2	50.2%	1
4. SB RT at Rosemont	45	50.2%	**23**
5. SB to other	251	25.5%	64
	331		104

251=274-23
274 is SB TH

Reassignment due to removal of University Avenue on-ramp to I-95/Rte 128 SB
OUTBOUND

	Vol. on I-95 SB On-Ramp	To 95 SB	To 93 NB
Weaving Volumes	723	243	480
Split		34%	66%

At University Avenue/Blue Hill Drive

	Vol.*	To 400 B.H.A.	To Ramp	To 95 SB	To 93 NB	To 95 SB	To 93 NB
1. NB LT	509	3	506	25.0%	75.0%	127	380
2. WB TH	56	0	56	53.5%	46.5%	30	26
3. SB RT	119	2	117	53.5%	46.5%	63	54
4. 400 B.H.D. Drives	45	0	45	53.5%	46.5%	24	21
	729	5	724			243	481

2022 No-Build SAT Peak Hour - Reassignments due to I-95/I-93 Interchange

Reassignemnt due to removal of access from I-95 NB to University Avenue at Route 128
INBOUND

	Vol. on NB Off-Ramp to University Avenue and Driveways	From I-95 NB (eliminated)	From I-93 SB (remains)
Weaving Volumes	139	33	106
Split		24%	76%

University Avenue at Blue Hill Drive

	Vol.*	%	Divert To Canton St. Ramp
1. SB LT at MBTA Dr.	2	40.0%	1
2. SB LT at Green Lodg	35	40.0%	14
3. SB RT to 400 B.H.A.	0	40.0%	0
4. SB RT at Rosemont	23	40.0%	**9**
5. SB to other	72	12.0%	9
	132		33

72=81-9
81 is SB TH

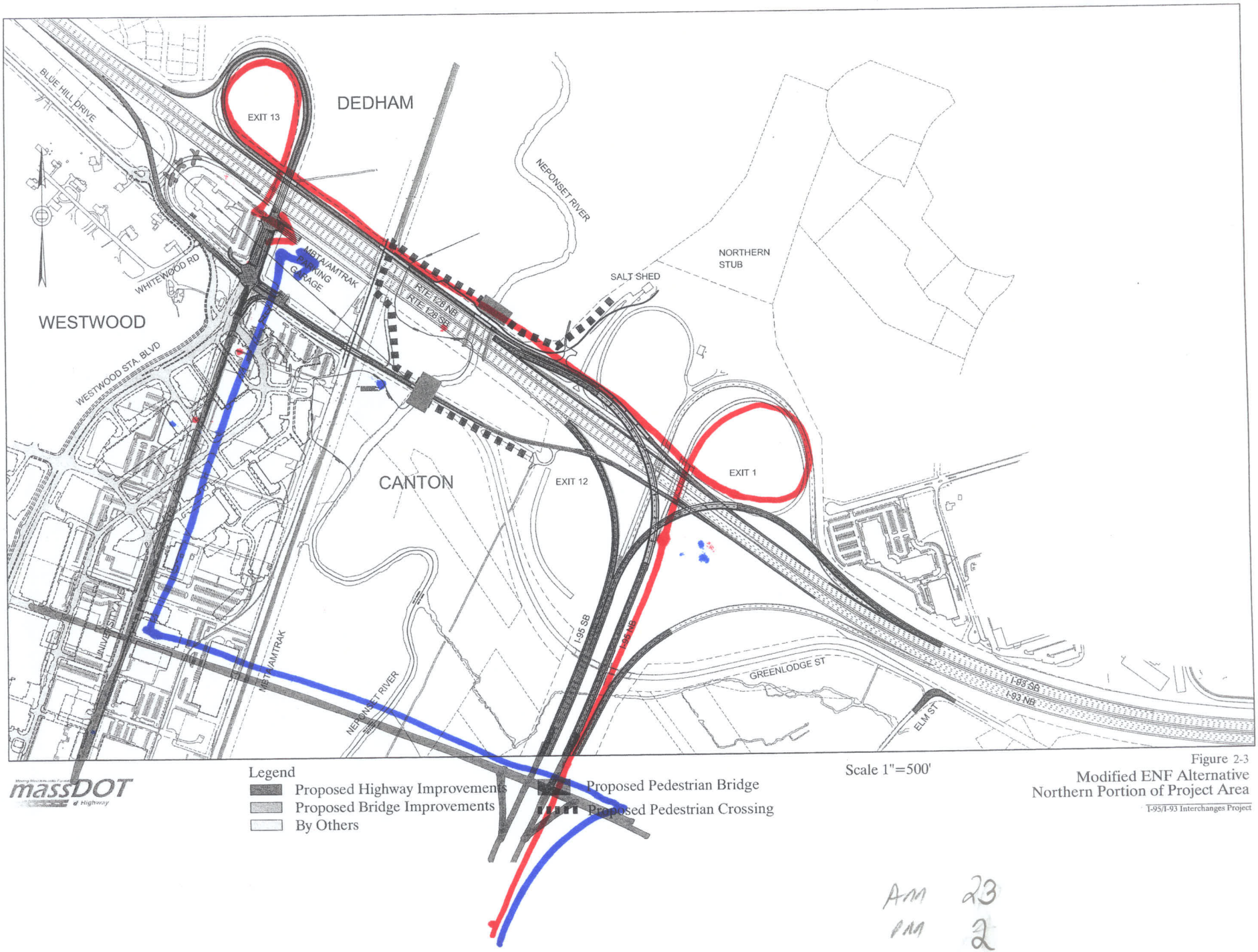
Reassignment due to removal of University Avenue on-ramp to I-95/Rte 128 SB
OUTBOUND

	Vol. on I-95 SB On-Ramp	To 95 SB	To 93 NB
Weaving Volumes	120	1	119
Split		1%	99%

At University Avenue/Blue Hill Drive

	Vol.*	To 400 B.H.A.	To Ramp	To 95 SB	To 93 NB	To 95 SB	To 93 NB
1. NB LT	56	6	50	2.0%	98.0%	1	49
2. WB TH	41		41	0.0%	100.0%	0	41
3. SB RT	27	3	24	0.0%	100.0%	0	24
4. 400 B.H.D. Drives	5		5	0.0%	100.0%	0	5
	129	9	120			1	119

INBOUND TO MBTA DRIVE (2)



massDOT Highway

Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

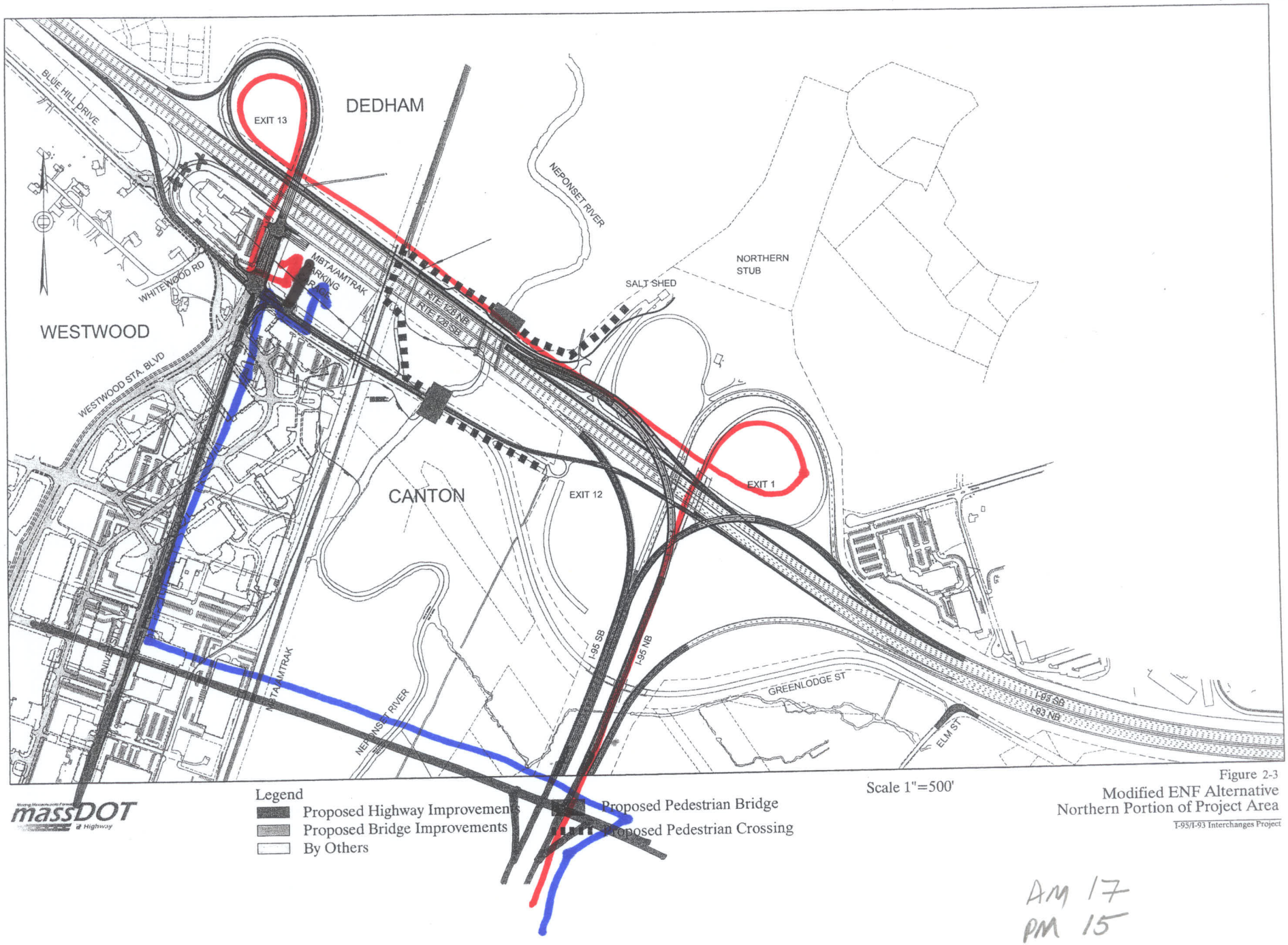
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 23
PM 2
SAT 1

INBOUND TO GREENLODGE MBTA DI

(3)



Legend

- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

Scale 1"=500'

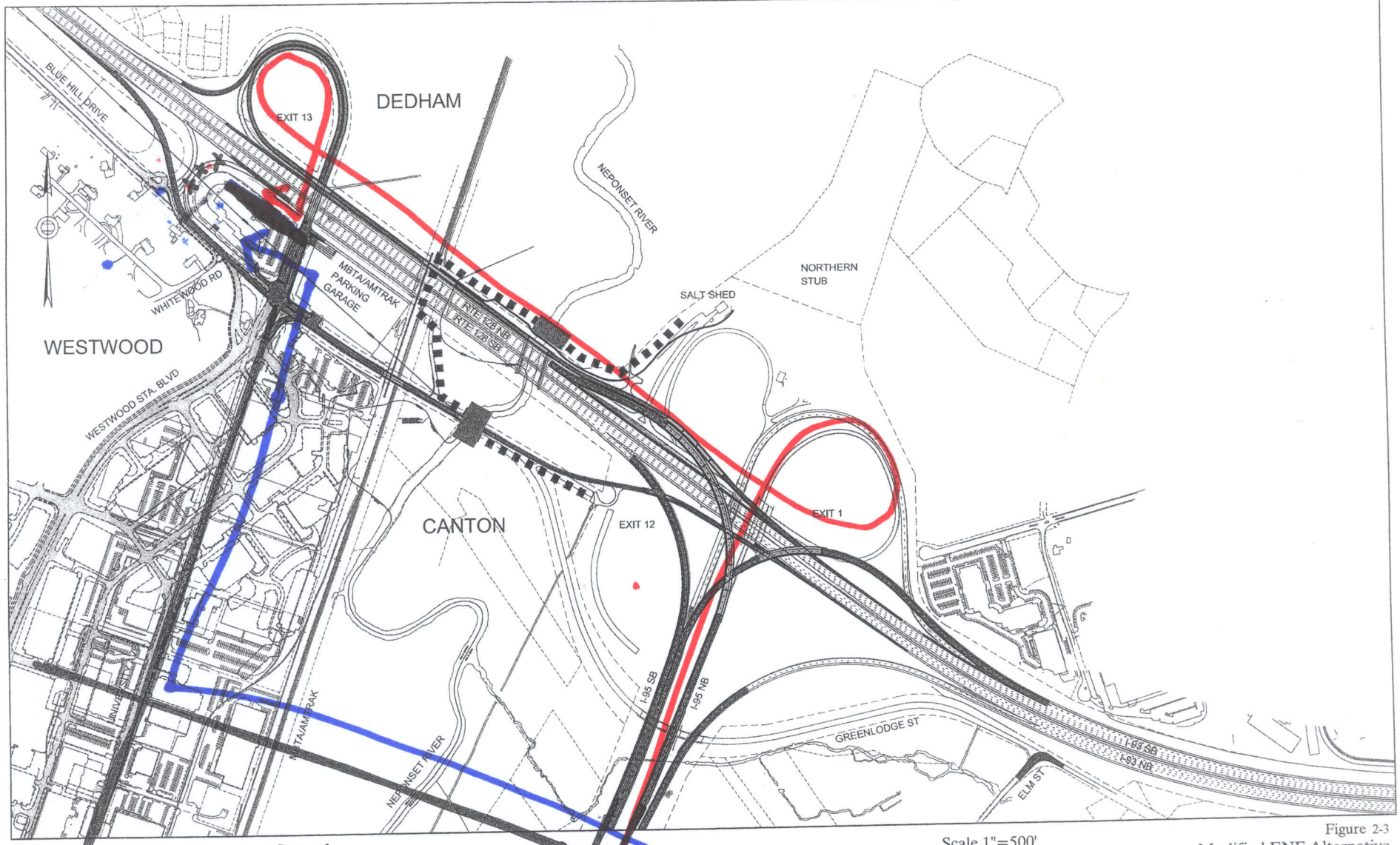
massDOT Highway

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 17
PM 15
SAT 14

INBOUND TO 900 BLUE HILL DRIVE

(9)



Scale 1"=500'

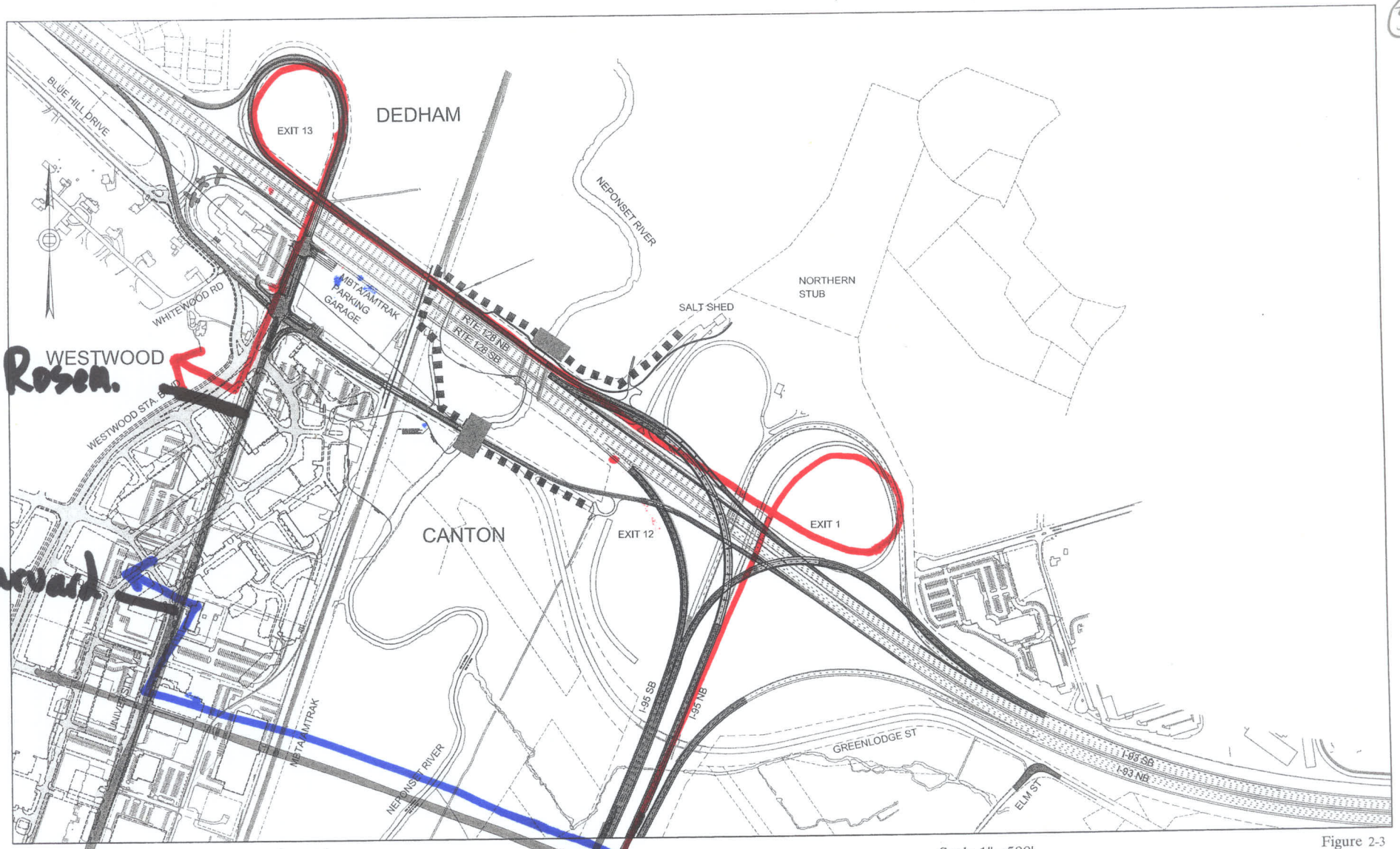
Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 7
PM 1
SAT 0

INBOUND TO ROSEMONT

(5)



massDOT Highway

Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

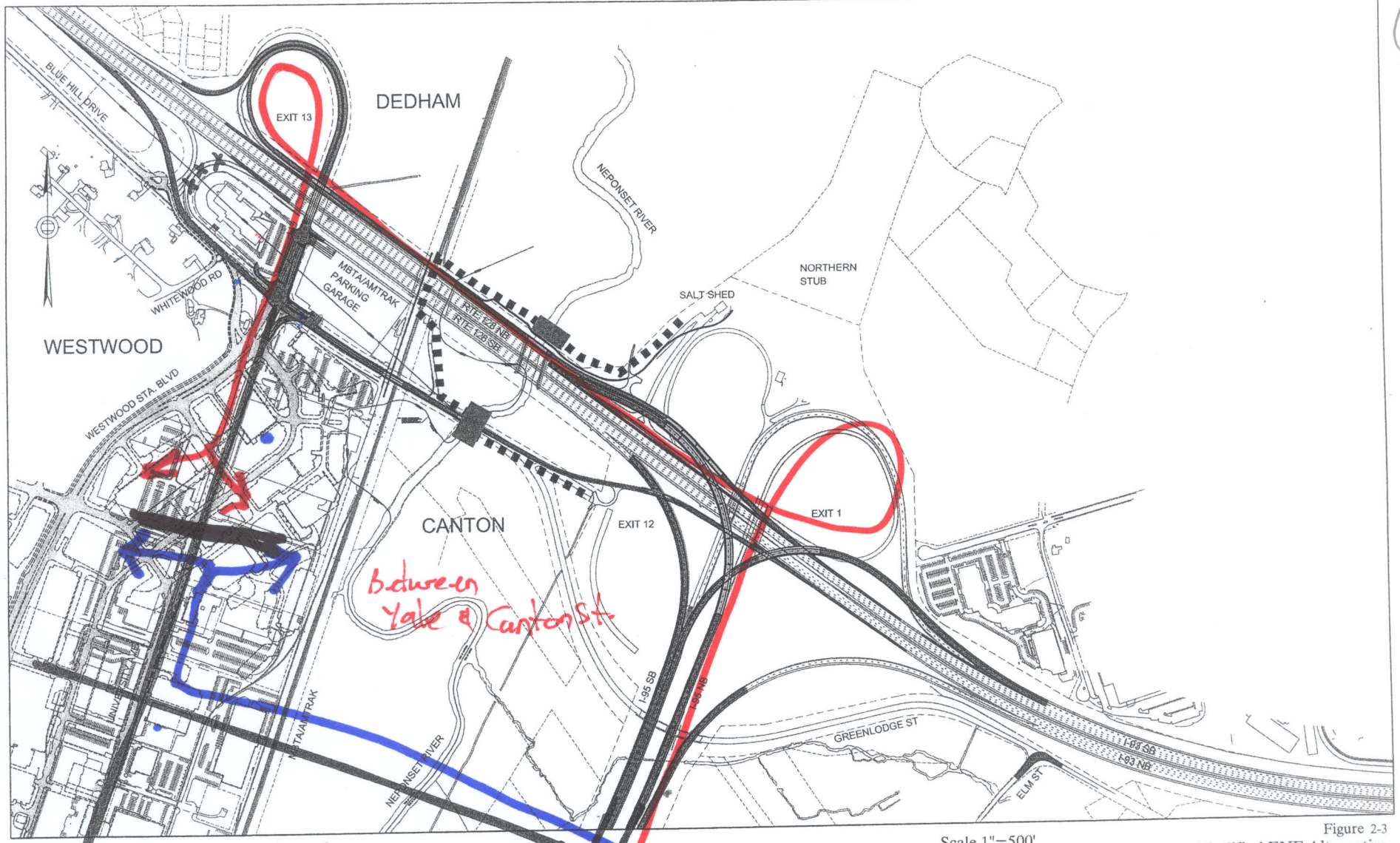
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 162
PM 23
SAT 9

INBOUND TO UNIVERSITY AVE MISC-

(b)



Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

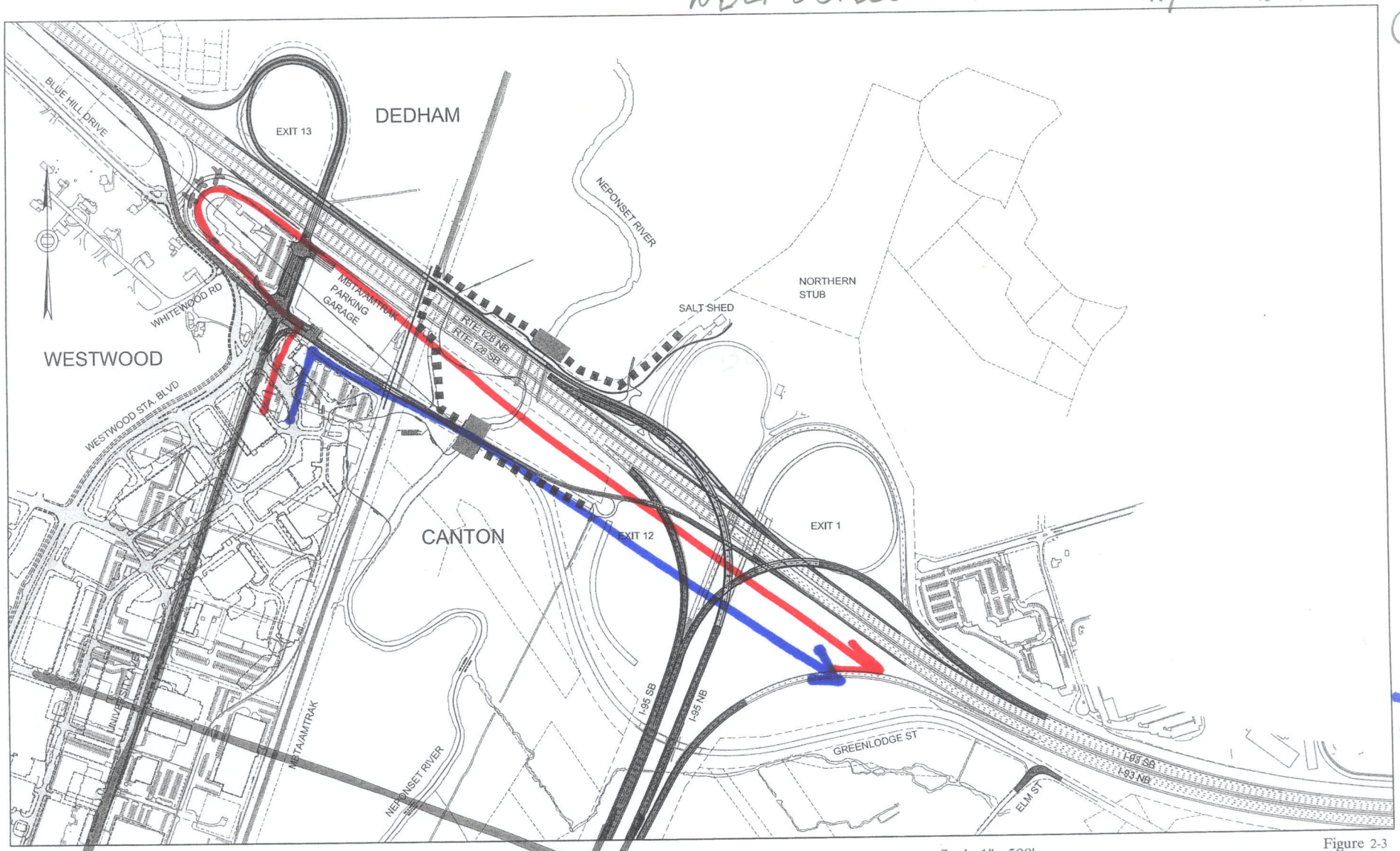
Scale 1"=500'

massDOT Highway

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 129
PM 64
SAT 9

NBLT OUTBOUND University Ave. NB To 93 N (7)



massDOT

Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

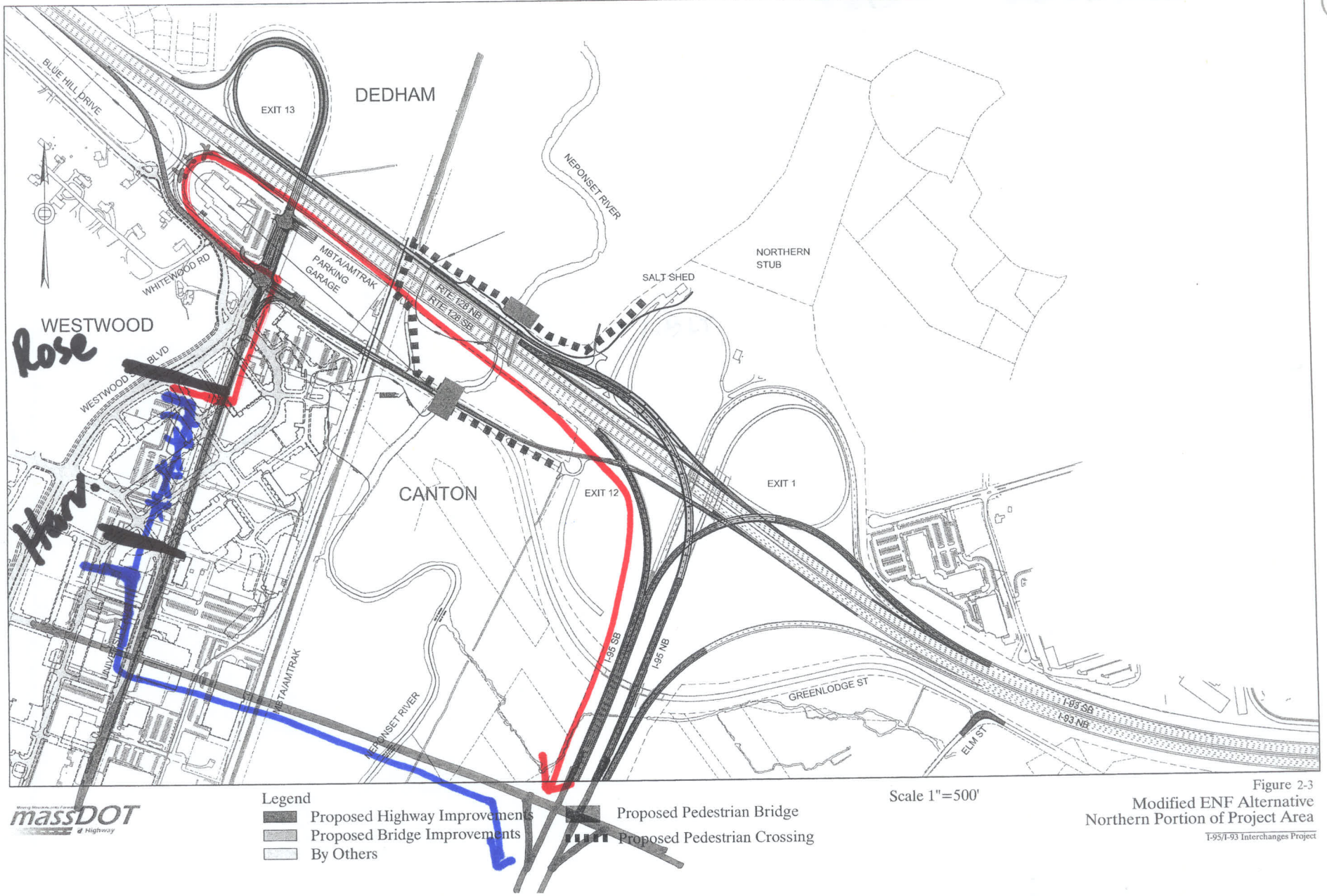
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
T-95/I-93 Interchanges Project

AM 56
PM 380
SAT 49

NBLT OUTBOUND ROSEMONT TO 95

(8)



Legend

- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

Scale 1"=500'

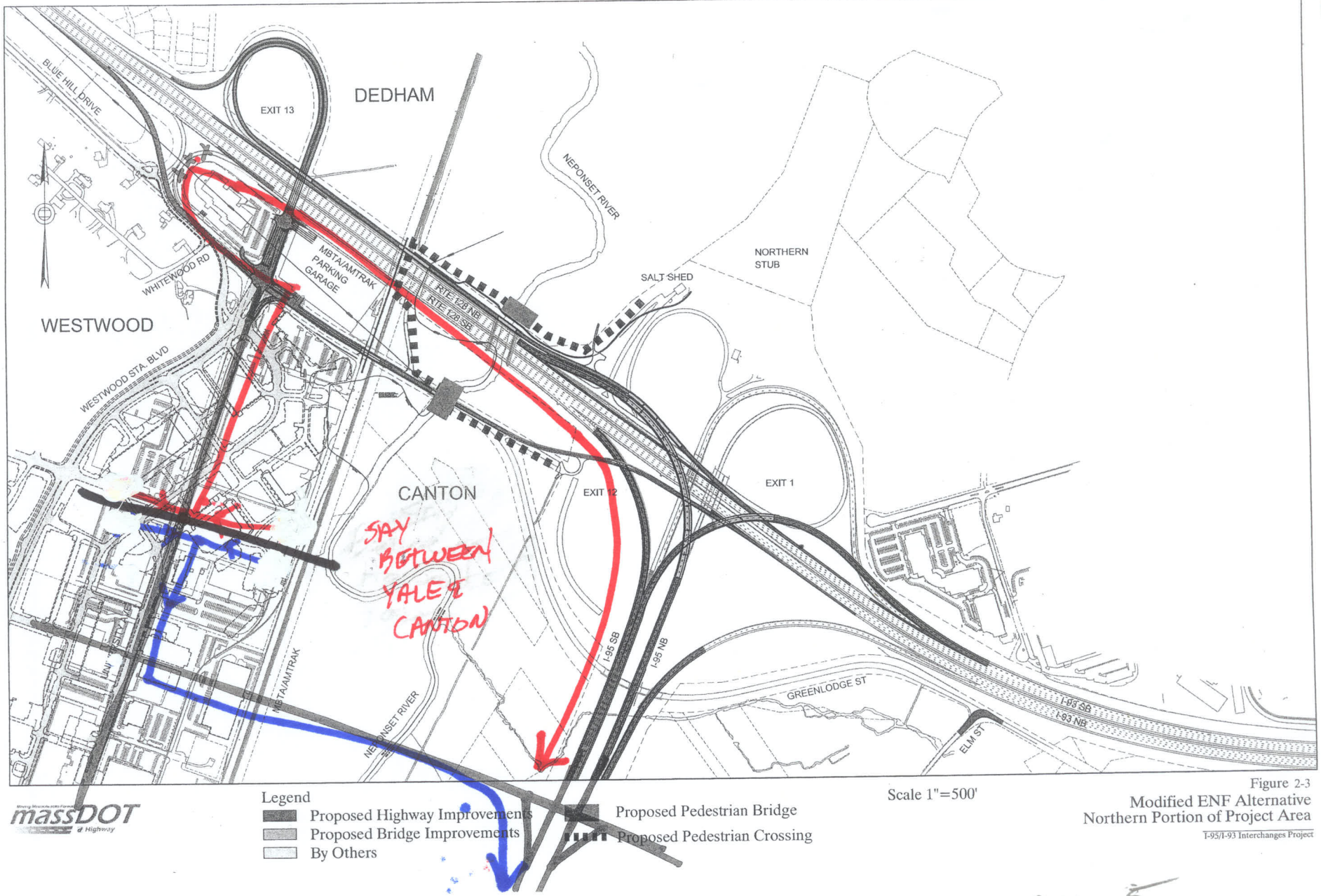
massDOT

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 5
PM 50
SAT 1

NB LT OUTBOUND MISC. TO 95S

(9)



Legend

- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

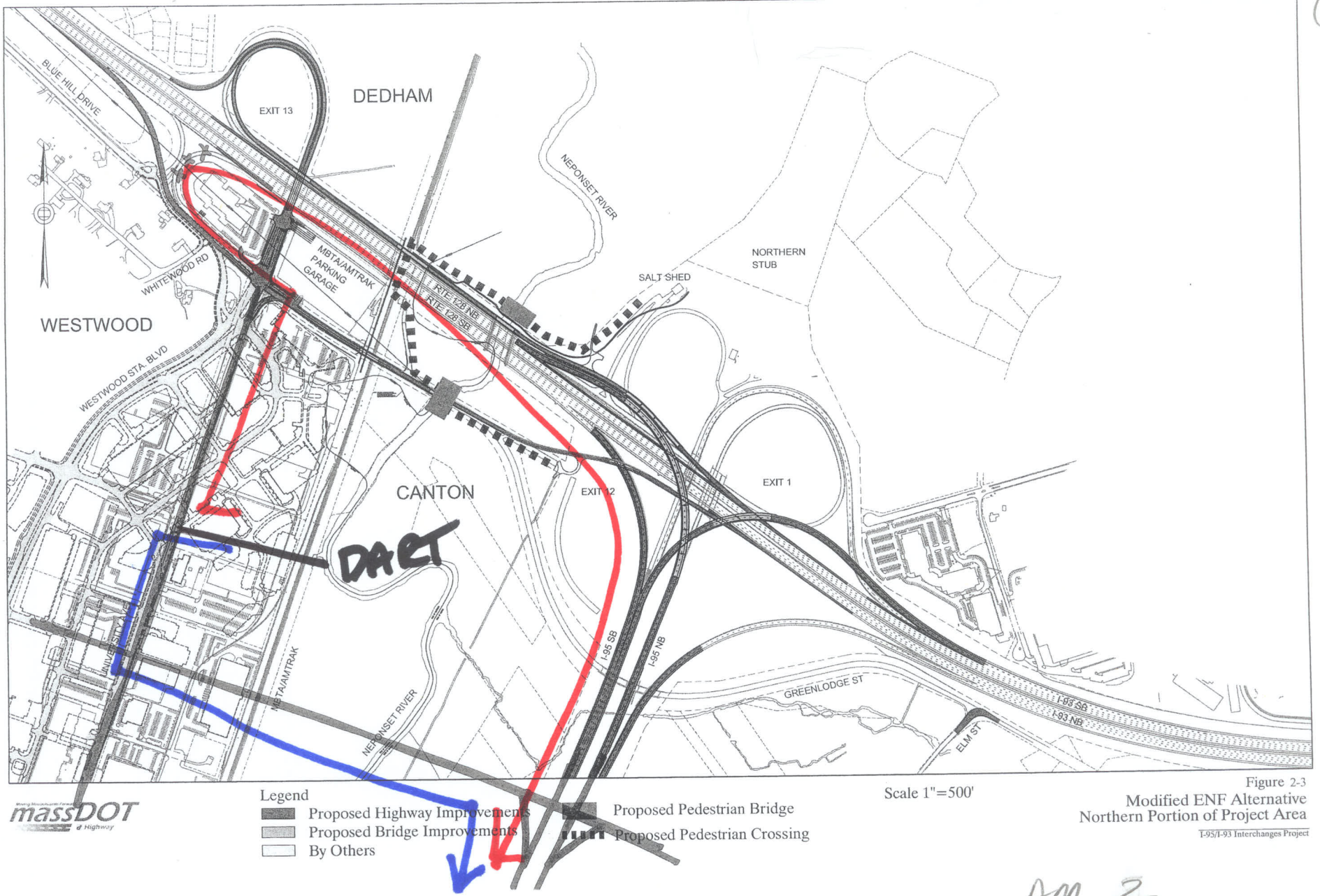
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 5
PM 57
SAT 0

NBLT OUTBOUND DARTMOUTH TO 95S

16



massDOT Highway

Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

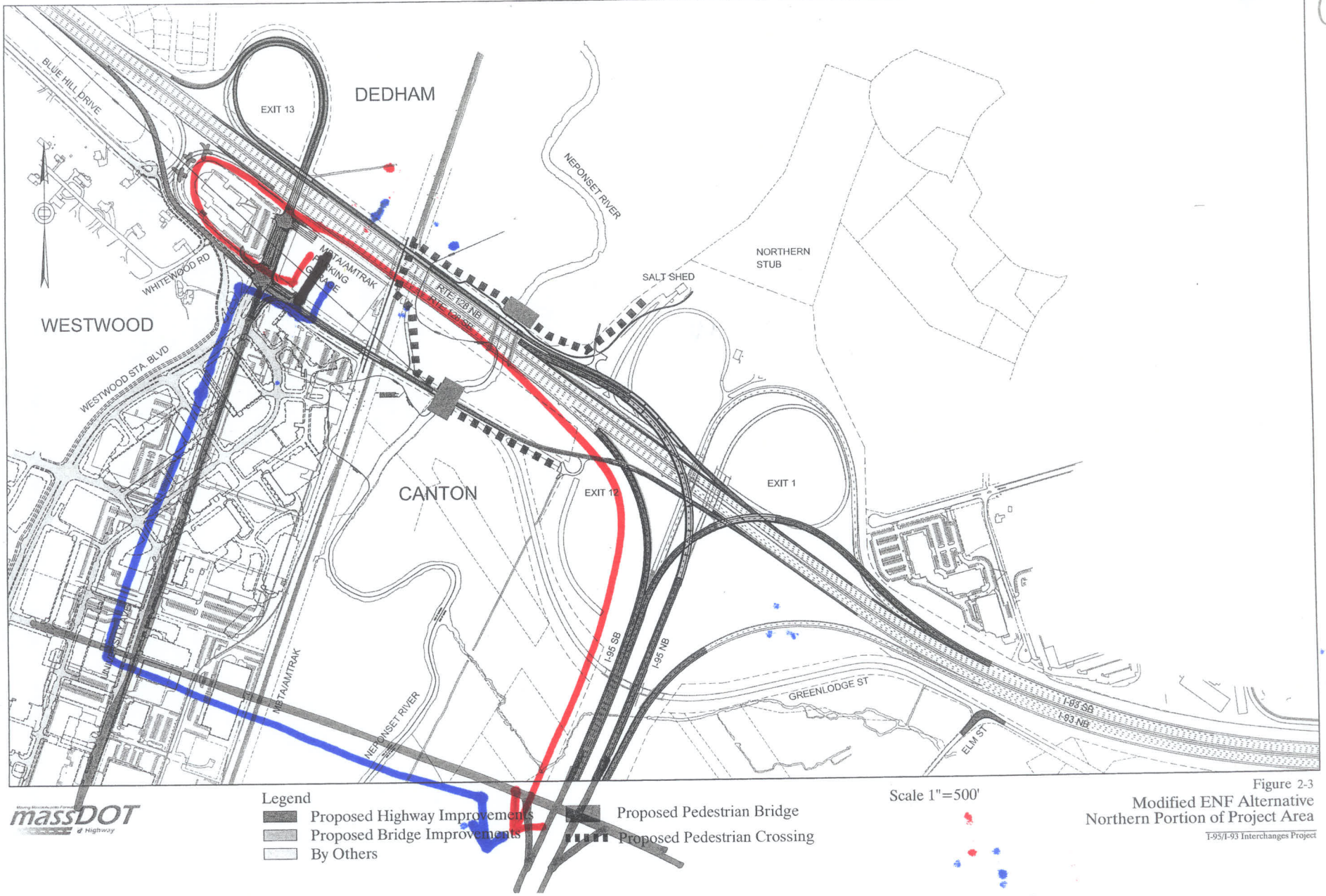
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 2
PM 20
SAT 0

WBTH OUTBOUND Greenlodge MBTA to 95S

11



massDOT d Highway

Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

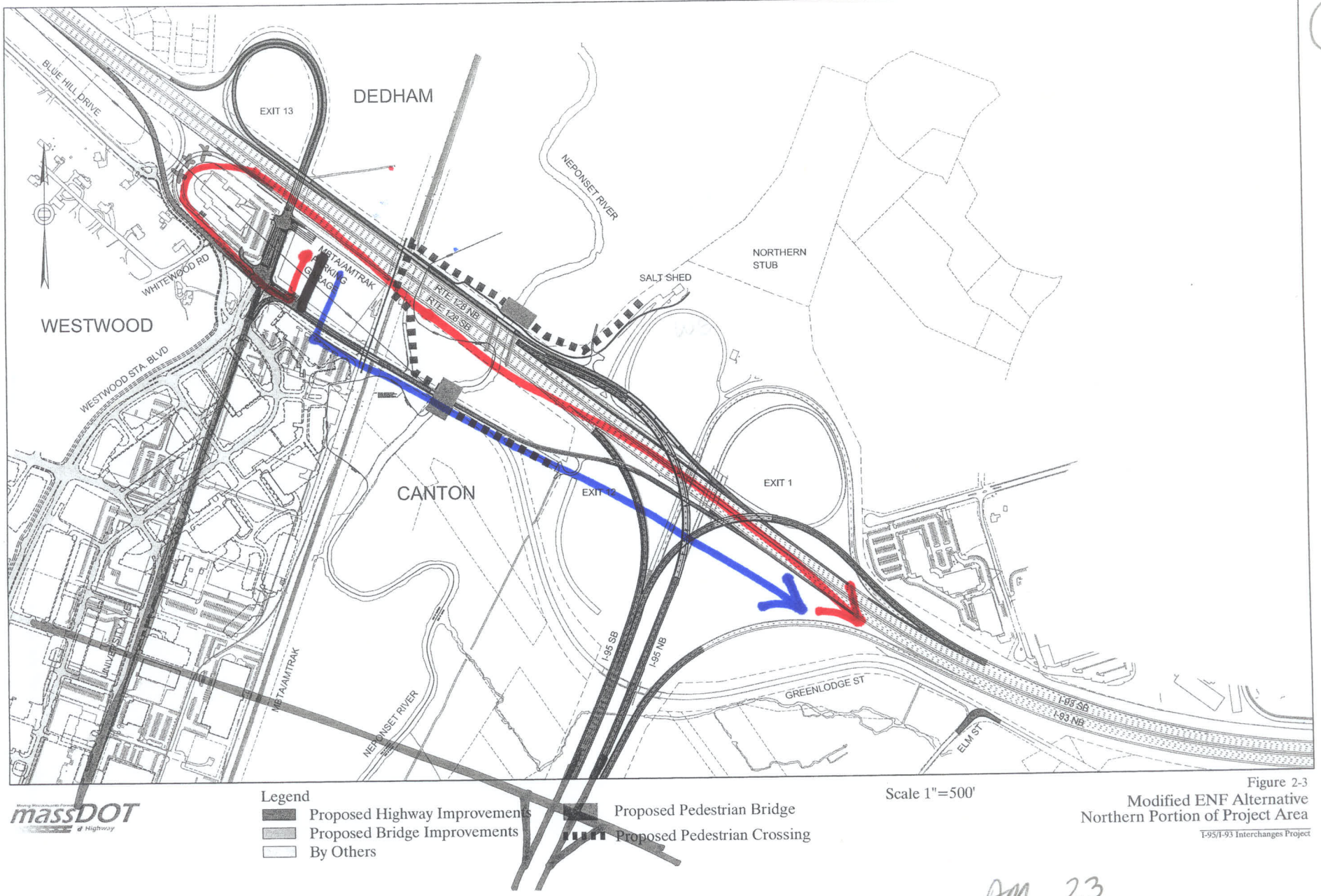
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 5
PM 30
SAT 0

WB TH OUTBOUND From Greenlodge MBTA to 93N

12



massDOT
a Highway

Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

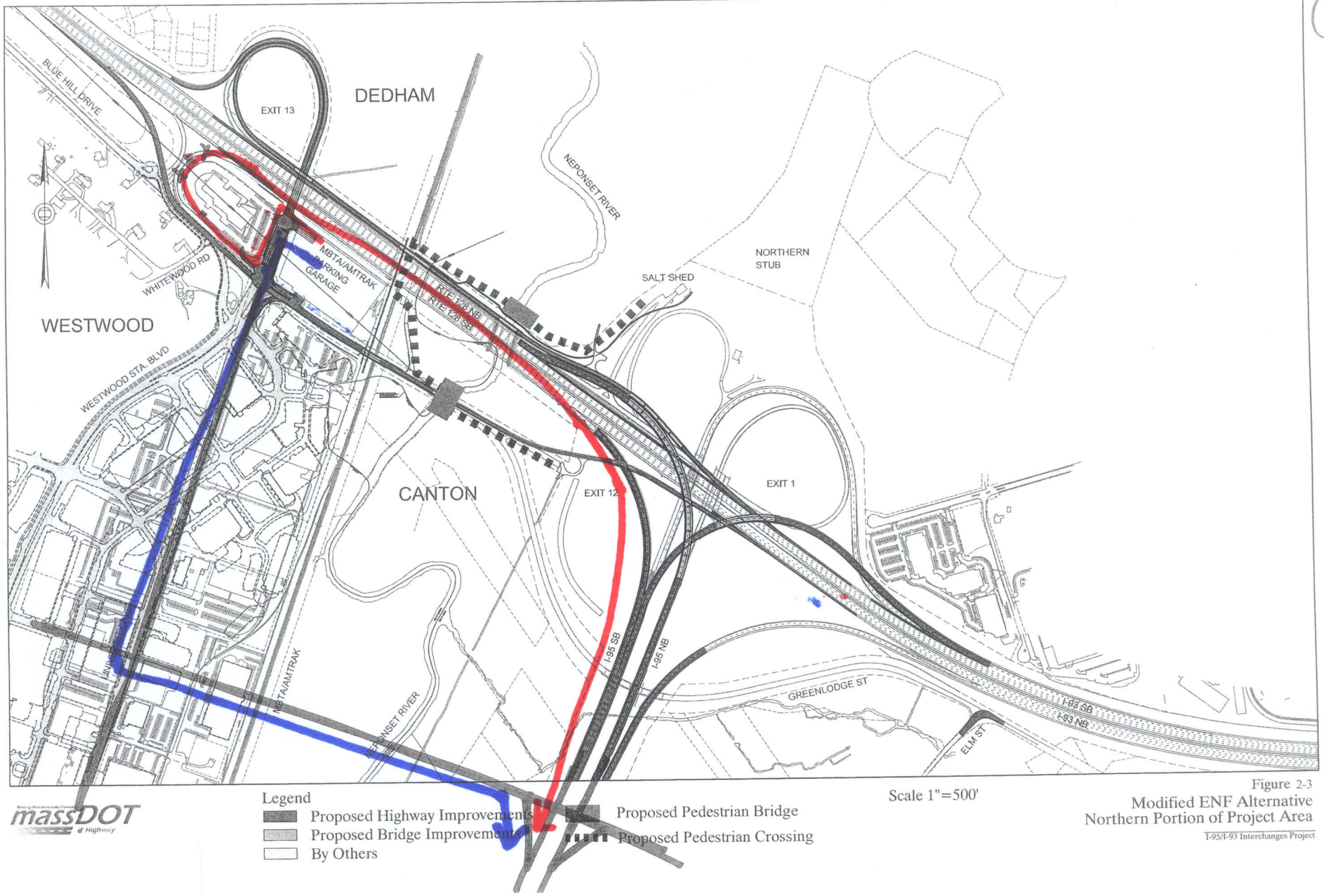
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 23
PM 26
SAT 41

SBRT OUTBOUND FROM MBTA TO 95S

13



Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

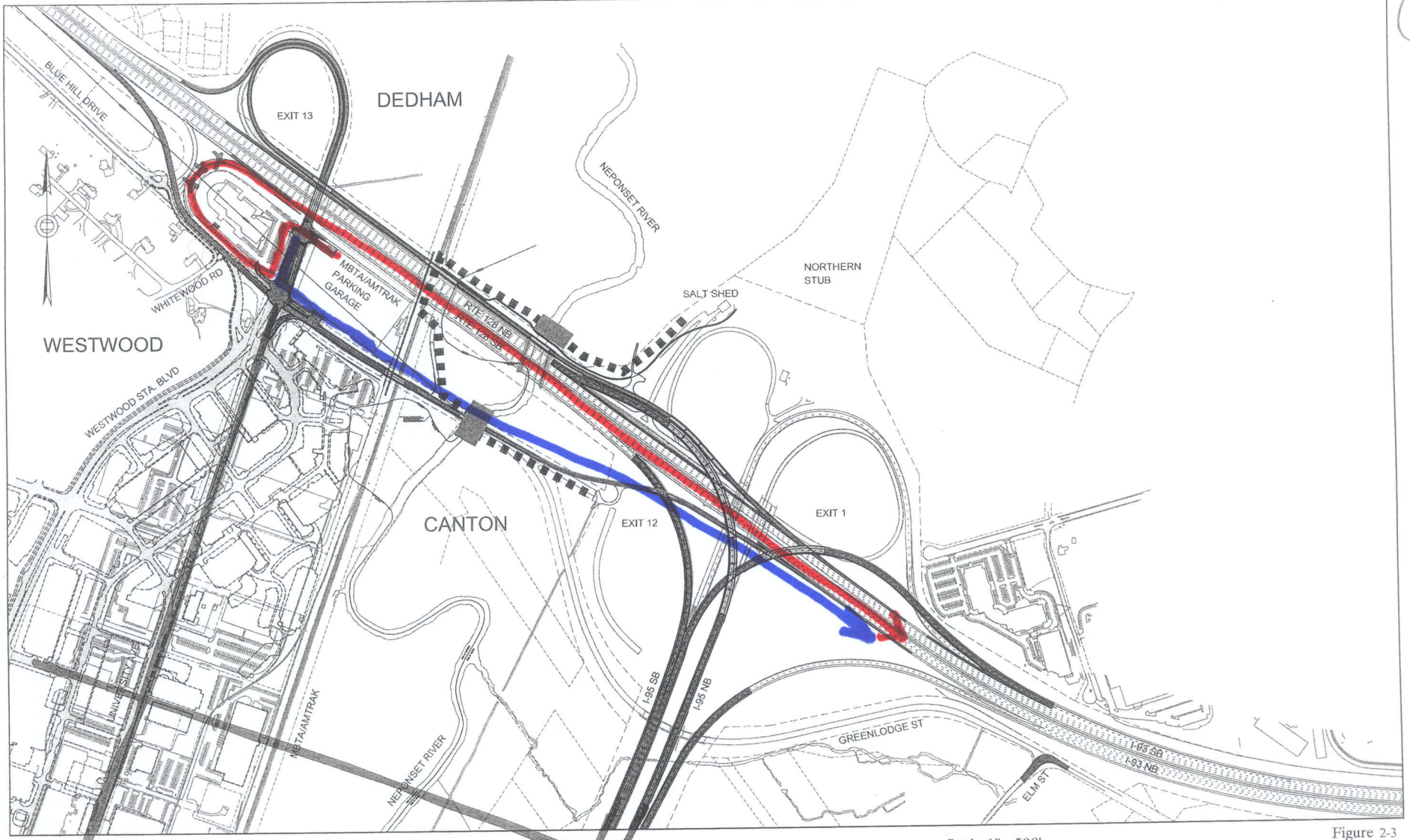
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 7
PM 63
SAT 0

SBRT OUTBOUND FROM MBTA TO 93N

14



Legend

- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

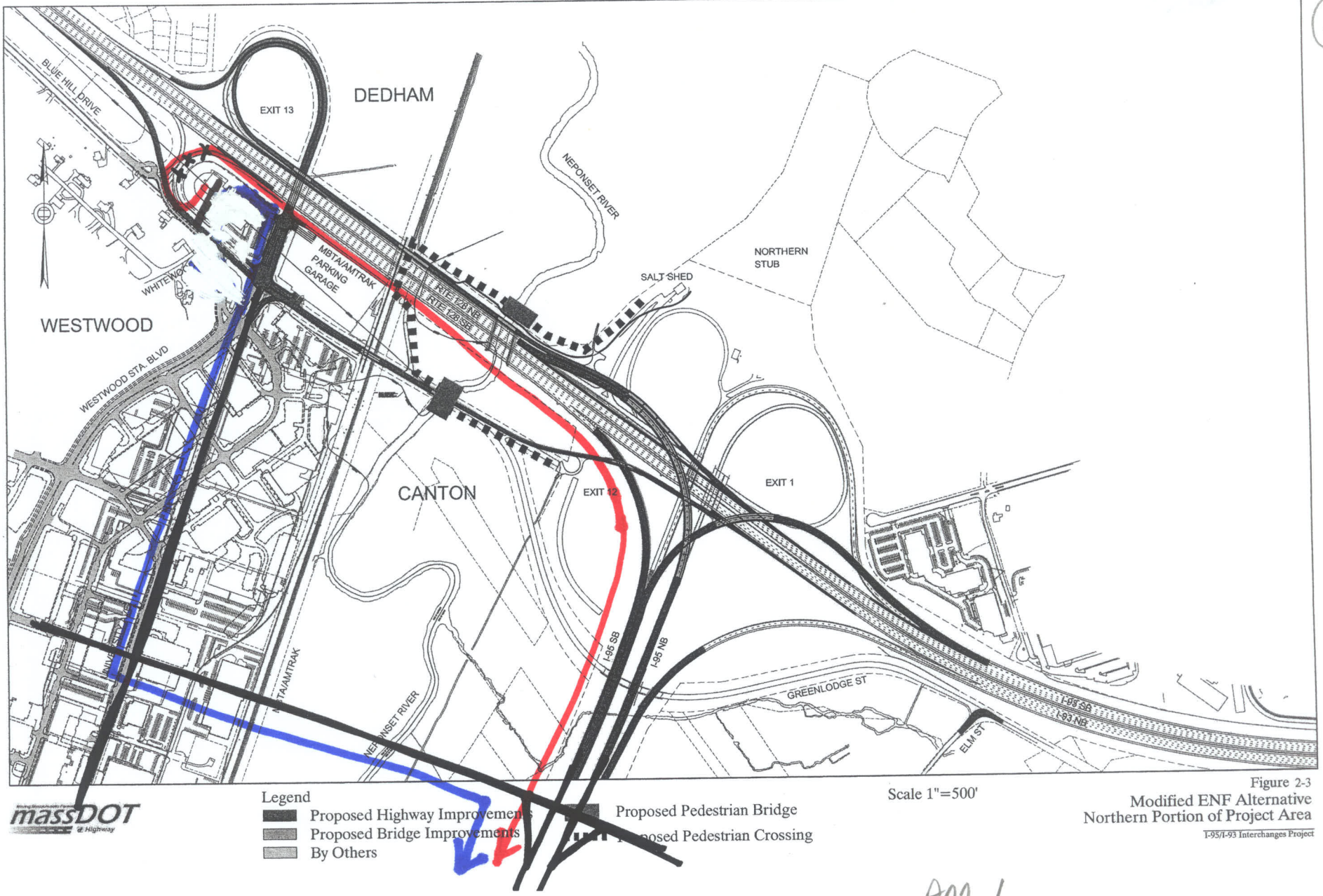
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 34
PM 54
SAT 24

OUTBOUND 400 B.H.A. TO I-95S

15



massDOT

Legend

- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

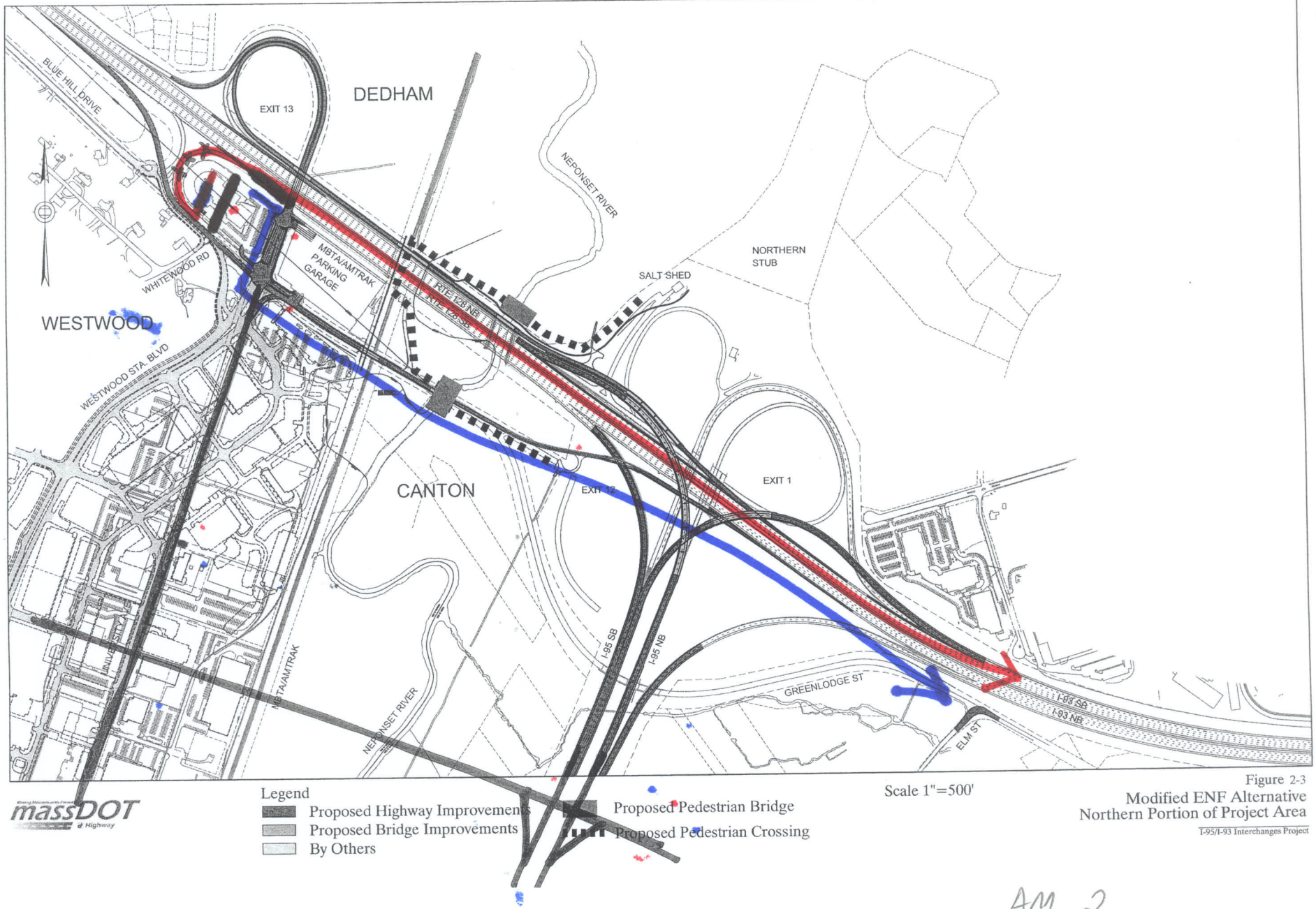
Scale 1"=500'

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 1
PM 24
SAT 0

OUTBOUND From 400 BHA to 93N

16



Legend
- Proposed Highway Improvements
- Proposed Bridge Improvements
- By Others
- Proposed Pedestrian Bridge
- Proposed Pedestrian Crossing

Scale 1"=500'

massDOT

Figure 2-3
Modified ENF Alternative
Northern Portion of Project Area
I-95/I-93 Interchanges Project

AM 2
PM 21
SAT 5

Attachment B

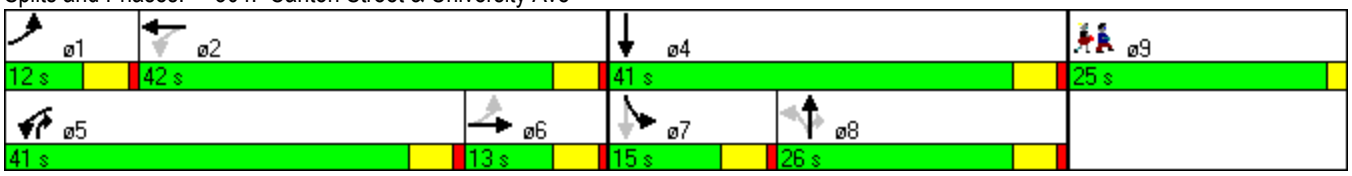
University Avenue Corridor Intersection Capacity Analyses

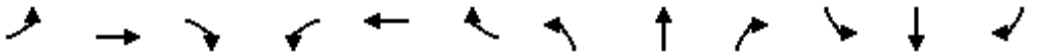
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	84	179	573	595	1101	49	320	184	337	422	
Lane Group Flow (vph)	91	243	623	647	1197	53	348	200	366	609	
Turn Type	pm+pt		pm+pt		Free	Perm		pm+ov	Prot		
Protected Phases	1	6	5	2			8	5	7	4	9
Permitted Phases	6		2		Free	8		8		7	
Detector Phase	1	6	5	2		8	8	5	7	4	
Switch Phase											
Minimum Initial (s)	4.0	7.0	4.0	7.0		3.0	3.0	4.0	4.0	3.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0	12.0	12.0	12.0	12.0	25.0
Total Split (s)	12.0	13.0	41.0	42.0	0.0	26.0	26.0	41.0	15.0	41.0	25.0
Total Split (%)	10.0%	10.8%	34.2%	35.0%	0.0%	21.7%	21.7%	34.2%	12.5%	34.2%	21%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	None	None	None	None	None
Act Effct Green (s)	17.0	9.1	50.4	40.9	100.0	22.2	22.2	62.9	11.1	37.3	
Actuated g/C Ratio	0.17	0.09	0.50	0.41	1.00	0.22	0.22	0.63	0.11	0.37	
v/c Ratio	0.46	0.73	0.84	0.84	0.77	0.76	0.87	0.21	0.96	0.94	
Control Delay	28.9	55.6	33.5	40.5	3.8	96.2	60.8	1.6	82.7	53.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.9	55.6	33.5	40.5	3.8	96.2	60.8	1.6	82.7	53.8	
LOS	C	E	C	D	A	F	E	A	F	D	
Approach Delay		48.4		20.9			44.2			64.7	
Approach LOS		D		C			D			E	
Queue Length 50th (ft)	26	70	266	349	0	30	201	0	114	332	
Queue Length 95th (ft)	78	#167	#689	#790	0	#126	#480	18	#271	#768	
Internal Link Dist (ft)		800		114			1633			620	
Turn Bay Length (ft)	150				350	50		260	350		
Base Capacity (vph)	202	332	742	768	1553	70	402	957	381	651	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.45	0.73	0.84	0.84	0.77	0.76	0.87	0.21	0.96	0.94	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 100		
Natural Cycle: 150		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.96		
Intersection Signal Delay: 36.0	Intersection LOS: D	
Intersection Capacity Utilization 85.4%	ICU Level of Service E	
Analysis Period (min) 15		

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 304: Canton Street & University Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	179	44	573	595	1101	49	320	184	337	422	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	12	12	12	12	12	12	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1678	3474		1787	1881	1553	1671	1810	1404	3433	1721	
Flt Permitted	0.42	1.00		0.30	1.00	1.00	0.18	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	740	3474		568	1881	1553	317	1810	1404	3433	1721	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	195	48	623	647	1197	53	348	200	366	459	150
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	84	0	9	0
Lane Group Flow (vph)	91	226	0	623	647	1197	53	348	116	366	600	0
Heavy Vehicles (%)	4%	3%	26%	1%	1%	4%	8%	5%	15%	2%	3%	2%
Turn Type	pm+pt			pm+pt		Free	Perm		pm+ov	Prot		
Protected Phases	1	6		5	2			8	5	7	4	
Permitted Phases	6			2		Free	8		8		7	
Actuated Green, G (s)	14.8	9.2		50.5	39.9	102.6	21.2	21.2	57.5	10.1	36.3	
Effective Green, g (s)	16.8	10.2		51.5	40.9	102.6	22.2	22.2	59.5	11.1	37.3	
Actuated g/C Ratio	0.16	0.10		0.50	0.40	1.00	0.22	0.22	0.58	0.11	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	182	345		728	750	1553	69	392	814	371	626	
v/s Ratio Prot	0.03	0.07		c0.31	c0.34			0.19	0.05	0.11	c0.35	
v/s Ratio Perm	0.05			0.12		c0.77	0.17		0.03			
v/c Ratio	0.50	0.65		0.86	0.86	0.77	0.77	0.89	0.14	0.99	0.96	
Uniform Delay, d1	37.9	44.5		21.0	28.3	0.0	37.8	39.0	9.9	45.7	31.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	4.4		9.7	10.1	3.8	39.2	20.8	0.1	42.7	25.7	
Delay (s)	40.1	48.9		30.7	38.3	3.8	77.0	59.8	9.9	88.4	57.6	
Level of Service	D	D		C	D	A	E	E	A	F	E	
Approach Delay (s)		46.5			19.6			44.7			69.2	
Approach LOS		D			B			D			E	

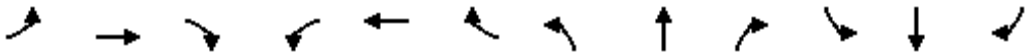
Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	102.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	24	0	95	1	0	576	715	6	674
Lane Group Flow (vph)	0	26	103	0	2	626	782	0	772
Turn Type	Perm		pm+ov	Perm		pm+pt		Perm	
Protected Phases		4	5		8	5	2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	5	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	12.0	21.0	21.0	12.0	21.0	21.0	21.0
Total Split (s)	21.0	21.0	18.0	21.0	21.0	18.0	39.0	21.0	21.0
Total Split (%)	35.0%	35.0%	30.0%	35.0%	35.0%	30.0%	65.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	0.5	1.0	1.0	0.5	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Max	Min	Min
Act Effct Green (s)		8.8	20.8		8.6	37.2	38.9		17.5
Actuated g/C Ratio		0.19	0.46		0.19	0.82	0.85		0.38
v/c Ratio		0.09	0.14		0.01	0.77	0.52		0.61
Control Delay		17.0	4.9		14.5	18.9	6.4		16.7
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0
Total Delay		17.0	4.9		14.5	18.9	6.4		16.7
LOS		B	A		B	B	A		B
Approach Delay		7.4			14.5		11.9		16.7
Approach LOS		A			B		B		B
Queue Length 50th (ft)		5	9		0	30	0		58
Queue Length 95th (ft)		22	25		4	#377	325		#224
Internal Link Dist (ft)		673			220		177		692
Turn Bay Length (ft)									
Base Capacity (vph)		598	755		379	809	1501		1262
Starvation Cap Reductn		0	0		0	0	0		0
Spillback Cap Reductn		0	0		0	0	0		0
Storage Cap Reductn		0	0		0	0	0		0
Reduced v/c Ratio		0.04	0.14		0.01	0.77	0.52		0.61

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 45.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 71.0%	ICU Level of Service C
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 306: Harvard St. & University Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	0	95	1	0	1	576	715	5	6	674	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	3.0		4.0		3.0	4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			0.95	
Frt		1.00	0.85		0.93		1.00	1.00			0.99	
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	
Satd. Flow (prot)		1736	1615		1160		1805	1758			3450	
Flt Permitted		0.85	1.00		0.83		0.22	1.00			0.95	
Satd. Flow (perm)		1555	1615		985		414	1758			3269	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	0	103	1	0	1	626	777	5	7	733	32
RTOR Reduction (vph)	0	0	19	0	1	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	26	84	0	1	0	626	782	0	0	768	0
Heavy Vehicles (%)	4%	0%	0%	0%	0%	98%	0%	8%	0%	16%	4%	0%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		3.7	18.2		3.7		35.1	35.1			16.6	
Effective Green, g (s)		4.7	20.2		4.7		36.1	36.1			17.6	
Actuated g/C Ratio		0.10	0.41		0.10		0.74	0.74			0.36	
Clearance Time (s)		5.0	4.0		5.0		4.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		150	669		95		748	1300			1179	
v/s Ratio Prot			0.04				c0.27	0.44				
v/s Ratio Perm		c0.02	0.01		0.00		c0.35				0.23	
v/c Ratio		0.17	0.13		0.01		0.84	0.60			0.65	
Uniform Delay, d1		20.3	8.8		19.9		8.2	3.0			13.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.6	0.1		0.0		8.1	2.1			1.3	
Delay (s)		20.8	8.9		20.0		16.3	5.0			14.3	
Level of Service		C	A		B		B	A			B	
Approach Delay (s)		11.3			20.0			10.0			14.3	
Approach LOS		B			B			B			B	

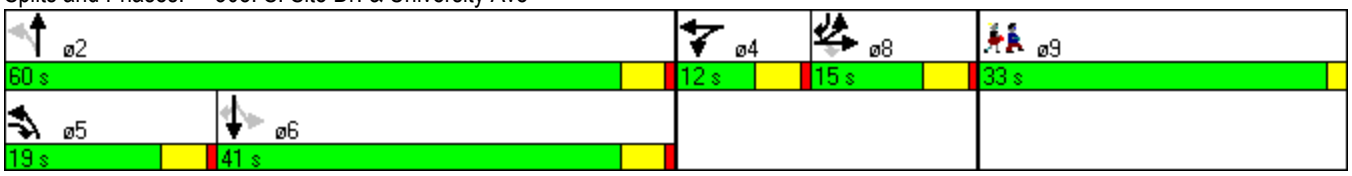
Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	48.8	Sum of lost time (s)	7.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations										
Volume (vph)	100	0	94	0	158	652	5	539	168	
Lane Group Flow (vph)	54	55	102	5	172	712	5	586	183	
Turn Type	Split		pm+ov		pm+pt		Perm		pm+ov	
Protected Phases	8	8	5	4	5	2		6	8	9
Permitted Phases			8		2		6		6	
Detector Phase	8	8	5	4	5	2	6	6	8	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	15.0	15.0	19.0	12.0	19.0	60.0	41.0	41.0	15.0	33.0
Total Split (%)	12.5%	12.5%	15.8%	10.0%	15.8%	50.0%	34.2%	34.2%	12.5%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag			Lead		Lead		Lag	Lag		
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	9.7	9.7	22.4	6.9	93.3	93.3	79.8	79.8	92.8	
Actuated g/C Ratio	0.08	0.08	0.19	0.06	0.78	0.78	0.66	0.66	0.77	
v/c Ratio	0.39	0.40	0.27	0.05	0.27	0.27	0.01	0.25	0.14	
Control Delay	60.1	60.4	6.7	41.2	8.2	7.3	5.0	3.8	0.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	60.1	60.4	6.7	41.2	8.2	7.3	5.0	3.8	0.3	
LOS	E	E	A	D	A	A	A	A	A	
Approach Delay		34.4		41.2		7.5		3.0		
Approach LOS		C		D		A		A		
Queue Length 50th (ft)	42	43	0	2	16	40	0	19	0	
Queue Length 95th (ft)	86	88	27	15	123	243	m2	40	0	
Internal Link Dist (ft)		398		229		446		832		
Turn Bay Length (ft)			100		350		200		200	
Base Capacity (vph)	159	159	451	116	689	2646	477	2309	1295	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.34	0.35	0.23	0.04	0.25	0.27	0.01	0.25	0.14	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 118 (98%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 39.6%	ICU Level of Service A
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 308: S. Site Dr. & University Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	0	94	2	0	3	158	652	3	5	539	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1698	1599		1695		1787	3404		1787	3471	1599
Flt Permitted	0.95	0.95	1.00		0.98		0.38	1.00		0.38	1.00	1.00
Satd. Flow (perm)	1698	1698	1599		1695		713	3404		717	3471	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	0	102	2	0	3	172	709	3	5	586	183
RTOR Reduction (vph)	0	0	86	0	3	0	0	0	0	0	0	55
Lane Group Flow (vph)	54	55	16	0	2	0	172	712	0	5	586	128
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	6%	1%	1%	4%	1%
Turn Type	Split		pm+ov	Split			pm+pt			Perm		pm+ov
Protected Phases	8	8	5	4	4		5	2			6	8
Permitted Phases			8				2			6		6
Actuated Green, G (s)	8.7	8.7	17.2		1.3		86.8	86.8		73.3	73.3	82.0
Effective Green, g (s)	9.7	9.7	19.2		2.3		87.8	87.8		74.3	74.3	84.0
Actuated g/C Ratio	0.08	0.08	0.16		0.02		0.73	0.73		0.62	0.62	0.70
Clearance Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	137	137	256		32		607	2491		444	2149	1119
v/s Ratio Prot	0.03	c0.03	0.01		c0.00		0.02	c0.21			0.17	0.01
v/s Ratio Perm			0.01				0.19			0.01		0.07
v/c Ratio	0.39	0.40	0.06		0.06		0.28	0.29		0.01	0.27	0.11
Uniform Delay, d1	52.4	52.4	42.8		57.8		5.3	5.5		8.8	10.5	5.9
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		0.27	0.27	0.03
Incremental Delay, d2	1.9	1.9	0.1		0.8		0.3	0.3		0.0	0.3	0.0
Delay (s)	54.2	54.3	42.9		58.6		5.5	5.8		2.4	3.2	0.2
Level of Service	D	D	D		E		A	A		A	A	A
Approach Delay (s)		48.8			58.6			5.7			2.5	
Approach LOS		D			E			A			A	

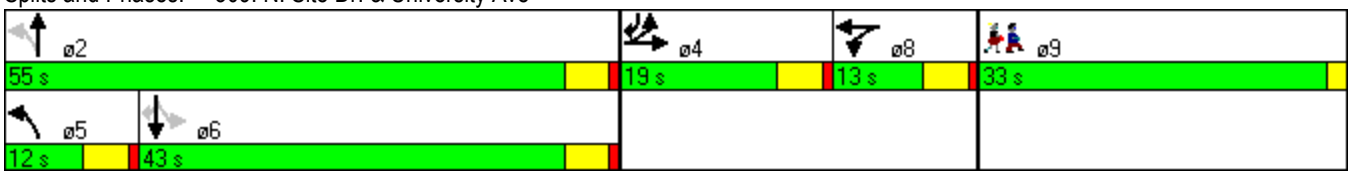
Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

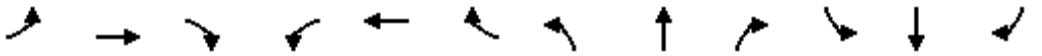
c Critical Lane Group

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations									
Volume (vph)	121	1	3	46	647	27	637	155	
Lane Group Flow (vph)	94	87	62	50	768	29	692	168	
Turn Type	Split			pm+pt		Perm		pm+ov	
Protected Phases	4	4	8	5	2		6	4	9
Permitted Phases				2		6		6	
Detector Phase	4	4	8	5	2	6	6	4	
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	2.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	19.0	19.0	13.0	12.0	55.0	43.0	43.0	19.0	33.0
Total Split (%)	15.8%	15.8%	10.8%	10.0%	45.8%	35.8%	35.8%	15.8%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag				Lead		Lag	Lag		
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	12.4	12.4	8.3	82.8	82.8	73.5	73.5	90.7	
Actuated g/C Ratio	0.10	0.10	0.07	0.69	0.69	0.61	0.61	0.76	
v/c Ratio	0.53	0.43	0.44	0.10	0.33	0.07	0.32	0.13	
Control Delay	61.8	34.0	48.3	11.3	9.6	6.5	6.6	2.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	61.8	34.0	48.3	11.3	9.6	6.5	6.6	2.3	
LOS	E	C	D	B	A	A	A	A	
Approach Delay		48.5	48.3		9.7		5.8		
Approach LOS		D	D		A		A		
Queue Length 50th (ft)	73	34	31	9	84	8	111	11	
Queue Length 95th (ft)	130	87	77	40	186	23	161	54	
Internal Link Dist (ft)		406	599		832		647		
Turn Bay Length (ft)				200		150		200	
Base Capacity (vph)	212	238	151	502	2293	420	2168	1277	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.44	0.37	0.41	0.10	0.33	0.07	0.32	0.13	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 100 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 43.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 309: N. Site Dr. & University Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	1	44	32	3	22	46	647	60	27	637	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.92			0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.98			0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1613			1751		1805	3321		1805	3539	1615
Flt Permitted	0.95	0.98			0.97		0.32	1.00		0.36	1.00	1.00
Satd. Flow (perm)	1698	1613			1751		611	3321		685	3539	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	132	1	48	35	3	24	50	703	65	29	692	168
RTOR Reduction (vph)	0	38	0	0	19	0	0	3	0	0	0	53
Lane Group Flow (vph)	94	49	0	0	43	0	50	765	0	29	692	115
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	8%	0%	0%	2%	0%
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	4	4		8	8		5	2			6	4
Permitted Phases							2			6		6
Actuated Green, G (s)	11.4	11.4			6.2		79.2	79.2		68.9	68.9	80.3
Effective Green, g (s)	12.4	12.4			7.2		80.2	80.2		69.9	69.9	82.3
Actuated g/C Ratio	0.10	0.10			0.06		0.67	0.67		0.58	0.58	0.69
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	175	167			105		471	2220		399	2061	1161
v/s Ratio Prot	c0.06	0.03			c0.02		0.01	c0.23			0.20	0.01
v/s Ratio Perm							0.07			0.04		0.06
v/c Ratio	0.54	0.30			0.41		0.11	0.34		0.07	0.34	0.10
Uniform Delay, d1	51.1	49.8			54.4		7.5	8.6		10.9	13.0	6.4
Progression Factor	1.00	1.00			1.00		0.95	0.85		0.34	0.39	1.05
Incremental Delay, d2	3.2	1.0			2.6		0.1	0.4		0.3	0.4	0.0
Delay (s)	54.2	50.8			57.0		7.3	7.7		4.0	5.5	6.7
Level of Service	D	D			E		A	A		A	A	A
Approach Delay (s)		52.6			57.0			7.7			5.7	
Approach LOS		D			E			A			A	

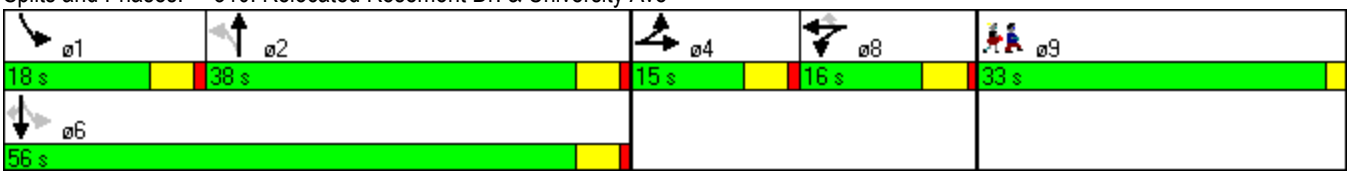
Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

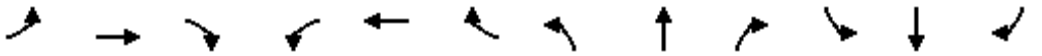
c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations										
Volume (vph)	64	2	1	80	8	713	136	759	294	
Lane Group Flow (vph)	45	44	49	87	9	850	148	825	320	
Turn Type	Split			Perm	Perm		pm+pt		Perm	
Protected Phases	4	4	8			2	1	6		9
Permitted Phases				8	2		6		6	
Detector Phase	4	4	8	8	2	2	1	6	6	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	15.0	15.0	16.0	16.0	38.0	38.0	18.0	56.0	56.0	33.0
Total Split (%)	12.5%	12.5%	13.3%	13.3%	31.7%	31.7%	15.0%	46.7%	46.7%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag					Lag	Lag	Lead			
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max	None
Act Effct Green (s)	9.2	9.2	9.5	9.5	71.0	71.0	84.8	84.8	84.8	
Actuated g/C Ratio	0.08	0.08	0.08	0.08	0.59	0.59	0.71	0.71	0.71	
v/c Ratio	0.34	0.31	0.35	0.42	0.02	0.30	0.32	0.33	0.26	
Control Delay	59.2	41.5	58.3	16.9	22.0	14.7	13.6	7.1	0.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	59.2	41.5	58.3	16.9	22.0	14.7	13.6	7.1	0.7	
LOS	E	D	E	B	C	B	B	A	A	
Approach Delay		50.4	31.8			14.7		6.3		
Approach LOS		D	C			B		A		
Queue Length 50th (ft)	35	21	36	0	2	86	28	88	0	
Queue Length 95th (ft)	75	61	76	50	m13	185	93	149	8	
Internal Link Dist (ft)		158	215			647		613		
Turn Bay Length (ft)					50				200	
Base Capacity (vph)	156	165	179	238	379	2873	511	2500	1223	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.29	0.27	0.27	0.37	0.02	0.30	0.29	0.33	0.26	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 88 (73%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 43.5%	ICU Level of Service A
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 310: Relocated Rosemont Dr. & University Ave

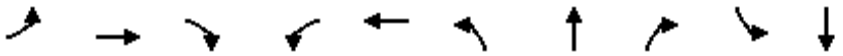




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	2	16	44	1	80	8	713	69	136	759	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.94			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97			0.95	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1637			1793	1599	1787	4849		1787	3539	1599
Flt Permitted	0.95	0.97			0.95	1.00	0.34	1.00		0.27	1.00	1.00
Satd. Flow (perm)	1698	1637			1793	1599	641	4849		513	3539	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	2	17	48	1	87	9	775	75	148	825	320
RTOR Reduction (vph)	0	16	0	0	0	80	0	6	0	0	0	101
Lane Group Flow (vph)	45	28	0	0	49	7	9	844	0	148	825	219
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	6%	1%	1%	2%	1%
Turn Type	Split			Split		Perm	Perm			pm+pt		Perm
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	7.1	7.1			8.5	8.5	67.4	67.4		81.2	81.2	81.2
Effective Green, g (s)	8.1	8.1			9.5	9.5	68.4	68.4		82.2	82.2	82.2
Actuated g/C Ratio	0.07	0.07			0.08	0.08	0.57	0.57		0.69	0.69	0.69
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	115	110			142	127	365	2764		455	2424	1095
v/s Ratio Prot	c0.03	0.02			c0.03			0.17		0.03	c0.23	
v/s Ratio Perm						0.00	0.01			0.20		0.14
v/c Ratio	0.39	0.26			0.35	0.05	0.02	0.31		0.33	0.34	0.20
Uniform Delay, d1	53.6	53.1			52.3	51.1	11.3	13.4		7.1	7.8	6.9
Progression Factor	1.00	1.00			1.00	1.00	1.02	0.89		1.21	0.67	0.11
Incremental Delay, d2	2.2	1.2			1.5	0.2	0.1	0.3		0.4	0.4	0.4
Delay (s)	55.8	54.3			53.8	51.3	11.6	12.3		9.0	5.5	1.1
Level of Service	E	D			D	D	B	B		A	A	A
Approach Delay (s)		55.1			52.2			12.3			4.9	
Approach LOS		E			D			B			A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

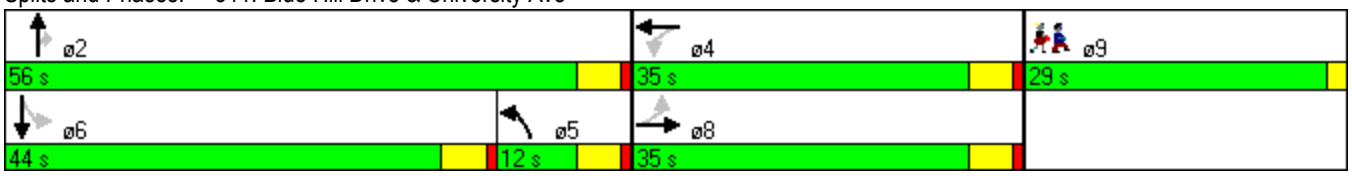
c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	205	88	464	34	0	18	519	320	53	690	
Lane Group Flow (vph)	223	96	504	37	57	20	564	348	58	762	
Turn Type	Perm		Free	Perm		Prot		Perm	Perm		
Protected Phases		8			4	5	2			6	9
Permitted Phases	8		Free	4				2	6		
Detector Phase	8	8		4	4	5	2	2	6	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0		3.0	3.0	4.0	5.0	5.0	6.0	6.0	4.0
Minimum Split (s)	35.0	35.0		35.0	35.0	12.0	35.0	35.0	12.0	12.0	29.0
Total Split (s)	35.0	35.0	0.0	35.0	35.0	12.0	56.0	56.0	44.0	44.0	29.0
Total Split (%)	29.2%	29.2%	0.0%	29.2%	29.2%	10.0%	46.7%	46.7%	36.7%	36.7%	24%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag						Lag			Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	25.3	25.3	120.0	25.3	25.3	7.4	75.1	75.1	70.3	70.3	
Actuated g/C Ratio	0.21	0.21	1.00	0.21	0.21	0.06	0.63	0.63	0.59	0.59	
v/c Ratio	0.79	0.24	0.32	0.14	0.08	0.19	0.55	0.19	0.16	0.25	
Control Delay	64.6	39.2	0.6	37.5	0.2	41.1	16.9	1.1	22.6	17.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	64.6	39.2	0.6	37.5	0.2	41.1	17.0	1.1	22.6	17.3	
LOS	E	D	A	D	A	D	B	A	C	B	
Approach Delay		22.4			14.9		11.6			17.6	
Approach LOS		C			B		B			B	
Queue Length 50th (ft)	163	62	0	23	0	15	52	0	13	64	
Queue Length 95th (ft)	245	105	0	51	0	35	312	0	72	208	
Internal Link Dist (ft)		626			596		613			325	
Turn Bay Length (ft)	100		200	100		50			110		
Base Capacity (vph)	344	491	1553	315	784	112	1025	1842	361	2996	
Starvation Cap Reductn	0	0	0	0	0	0	18	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.65	0.20	0.32	0.12	0.07	0.18	0.56	0.19	0.16	0.25	

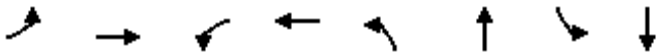
Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 2 (2%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow		
Natural Cycle: 100		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.79		
Intersection Signal Delay: 16.9	Intersection LOS: B	
Intersection Capacity Utilization 60.3%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 311: Blue Hill Drive & University Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	88	464	34	0	52	18	519	320	53	690	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	3.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.88	1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.96		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.98	1.00	1.00	0.97	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1748	1900	1553	1750	1545		1687	1638	2752	1747	5115	
Flt Permitted	0.72	1.00	1.00	0.66	1.00		0.95	1.00	1.00	0.34	1.00	
Satd. Flow (perm)	1324	1900	1553	1213	1545		1687	1638	2752	618	5115	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	96	504	37	0	57	20	564	348	58	750	12
RTOR Reduction (vph)	0	0	0	0	45	0	0	0	134	0	0	0
Lane Group Flow (vph)	223	96	504	37	12	0	20	564	214	58	762	0
Confl. Peds. (#/hr)	10		25	25		10			15	15		
Heavy Vehicles (%)	1%	0%	2%	0%	4%	0%	7%	4%	0%	3%	1%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	1	0	0	0	0
Parking (#/hr)								0				
Turn Type	Perm		Free	Perm			Prot		Perm	Perm		
Protected Phases		8			4		5	2			6	
Permitted Phases	8		Free	4					2	6		
Actuated Green, G (s)	24.3	24.3	120.0	24.3	24.3		2.8	72.9	72.9	65.1	65.1	
Effective Green, g (s)	25.3	25.3	120.0	25.3	25.3		3.8	73.9	73.9	66.1	66.1	
Actuated g/C Ratio	0.21	0.21	1.00	0.21	0.21		0.03	0.62	0.62	0.55	0.55	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	279	401	1553	256	326		53	1009	1695	340	2818	
v/s Ratio Prot		0.05			0.01		0.01	c0.34			0.15	
v/s Ratio Perm	c0.17		c0.32	0.03					0.08	0.09		
v/c Ratio	0.80	0.24	0.32	0.14	0.04		0.38	0.56	0.13	0.17	0.27	
Uniform Delay, d1	44.9	39.4	0.0	38.5	37.7		56.9	13.5	9.6	13.4	14.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.69	0.79	0.42	0.97	0.98	
Incremental Delay, d2	14.7	0.3	0.6	0.3	0.0		4.3	2.2	0.1	1.1	0.2	
Delay (s)	59.7	39.7	0.6	38.8	37.7		43.8	12.8	4.2	14.0	14.1	
Level of Service	E	D	A	D	D		D	B	A	B	B	
Approach Delay (s)		21.1			38.1			10.2			14.1	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	3	0	6	0	37	416	22	741
Lane Group Flow (vph)	0	10	7	1	40	803	0	837
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	14.0	14.0	14.0	14.0	106.0	106.0	106.0	106.0
Total Split (%)	11.7%	11.7%	11.7%	11.7%	88.3%	88.3%	88.3%	88.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		7.1	7.3	7.3	116.7	116.7		116.7
Actuated g/C Ratio		0.06	0.06	0.06	0.97	0.97		0.97
v/c Ratio		0.09	0.06	0.00	0.07	0.47		0.26
Control Delay		35.8	53.7	0.0	0.2	0.8		0.6
Queue Delay		0.0	0.0	0.0	0.0	0.1		0.0
Total Delay		35.8	53.7	0.0	0.2	0.9		0.6
LOS		D	D	A	A	A		A
Approach Delay		35.8		47.0		0.8		0.6
Approach LOS		D		D		A		A
Queue Length 50th (ft)		2	5	0	0	0		0
Queue Length 95th (ft)		20	21	0	m0	0		54
Internal Link Dist (ft)		177		292		325		532
Turn Bay Length (ft)					100			
Base Capacity (vph)		147	158	640	611	1692		3188
Starvation Cap Reductn		0	0	0	0	90		0
Spillback Cap Reductn		0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0		0
Reduced v/c Ratio		0.07	0.04	0.00	0.07	0.50		0.26

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 58 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 1.2	Intersection LOS: A
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 312: MBTA Dr. & University Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	0	6	6	0	1	37	416	323	22	741	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00			0.95	
Frt		0.91		1.00	0.85		1.00	0.93			1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1662		1805	1615		1770	1736			3565	
Flt Permitted		1.00		1.00	1.00		0.34	1.00			0.92	
Satd. Flow (perm)		1687		1900	1615		627	1736			3275	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	0	7	7	0	1	40	452	351	24	805	8
RTOR Reduction (vph)	0	7	0	0	1	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	3	0	7	0	0	40	789	0	0	837	0
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	4%	0%	0%	1%	2%
Parking (#/hr)	0											
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.5		1.5	1.5		108.5	108.5			108.5	
Effective Green, g (s)		2.5		2.5	2.5		109.5	109.5			109.5	
Actuated g/C Ratio		0.02		0.02	0.02		0.91	0.91			0.91	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		35		40	34		572	1584			2988	
v/s Ratio Prot					0.00			c0.45				
v/s Ratio Perm		0.00		c0.00			0.06				0.26	
v/c Ratio		0.09		0.17	0.00		0.07	0.50			0.28	
Uniform Delay, d1		57.6		57.7	57.5		0.5	0.8			0.6	
Progression Factor		1.00		1.00	1.00		0.07	0.02			1.00	
Incremental Delay, d2		1.1		2.1	0.0		0.2	1.0			0.2	
Delay (s)		58.7		59.8	57.5		0.2	1.0			0.9	
Level of Service		E		E	E		A	A			A	
Approach Delay (s)		58.7			59.5			0.9			0.9	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM Average Control Delay	1.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

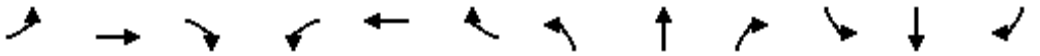
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	185	661	179	200	754	28	441	598	1052	512	
Lane Group Flow (vph)	201	745	195	217	820	30	479	650	1143	689	
Turn Type	pm+pt		pm+pt		Free	Perm		pm+ov	Prot		
Protected Phases	1	6	5	2			8	5	7	4	9
Permitted Phases	6		2		Free	8		8			
Detector Phase	1	6	5	2		8	8	5	7	4	
Switch Phase											
Minimum Initial (s)	4.0	7.0	4.0	7.0		3.0	3.0	4.0	4.0	3.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0	12.0	12.0	12.0	12.0	25.0
Total Split (s)	13.0	25.0	12.0	24.0	0.0	26.0	26.0	12.0	32.0	58.0	25.0
Total Split (%)	10.8%	20.8%	10.0%	20.0%	0.0%	21.7%	21.7%	10.0%	26.7%	48.3%	21%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	None	None	None	None	None
Act Effct Green (s)	30.3	21.2	28.2	20.2	100.0	22.2	22.2	33.6	28.2	54.5	
Actuated g/C Ratio	0.30	0.21	0.28	0.20	1.00	0.22	0.22	0.34	0.28	0.54	
v/c Ratio	0.67	0.93	0.91	0.57	0.51	0.22	1.15	0.84	1.17	0.73	
Control Delay	40.4	58.2	72.3	44.5	1.2	39.8	127.3	23.7	120.1	24.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.4	58.2	72.3	44.5	1.2	39.8	127.3	23.7	120.1	24.6	
LOS	D	E	E	D	A	D	F	C	F	C	
Approach Delay		54.4		20.1			66.9			84.2	
Approach LOS		D		C			E			F	
Queue Length 50th (ft)	89	229	85	117	0	15	~330	159	~411	274	
Queue Length 95th (ft)	#245	#477	#271	#249	0	51	#702	#424	#746	#712	
Internal Link Dist (ft)		800		114			1633			620	
Turn Bay Length (ft)	150				350	50		260	350		
Base Capacity (vph)	302	802	215	380	1599	139	418	775	979	939	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.67	0.93	0.91	0.57	0.51	0.22	1.15	0.84	1.17	0.73	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 59.6	Intersection LOS: E
Intersection Capacity Utilization 96.1%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 304: Canton Street & University Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	661	25	179	200	754	28	441	598	1052	512	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	12	12	12	12	12	12	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1711	3775		1752	1881	1599	1480	1881	1583	3467	1712	
Flt Permitted	0.38	1.00		0.20	1.00	1.00	0.40	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	690	3775		365	1881	1599	628	1881	1583	3467	1712	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	718	27	195	217	820	30	479	650	1143	557	132
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	256	0	6	0
Lane Group Flow (vph)	201	743	0	195	217	820	30	479	394	1143	683	0
Heavy Vehicles (%)	2%	1%	8%	3%	1%	1%	22%	1%	2%	1%	4%	5%
Bus Blockages (#/hr)	0	1	0	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt			pm+pt		Free	Perm		pm+ov	Prot		
Protected Phases	1	6		5	2			8	5	7	4	
Permitted Phases	6			2		Free	8		8			
Actuated Green, G (s)	28.3	20.2		26.3	19.2	101.6	21.3	21.3	28.4	27.2	53.5	
Effective Green, g (s)	30.3	21.2		28.3	20.2	101.6	22.3	22.3	30.4	28.2	54.5	
Actuated g/C Ratio	0.30	0.21		0.28	0.20	1.00	0.22	0.22	0.30	0.28	0.54	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	297	788		212	374	1599	138	413	474	962	918	
v/s Ratio Prot	0.06	c0.20		c0.07	0.12			c0.25	0.07	c0.33	0.40	
v/s Ratio Perm	0.14			0.18		c0.51	0.05		0.18			
v/c Ratio	0.68	0.94		0.92	0.58	0.51	0.22	1.16	0.83	1.19	0.74	
Uniform Delay, d1	29.0	39.6		32.7	36.9	0.0	32.5	39.6	33.2	36.7	18.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.0	19.3		39.7	2.3	1.2	0.8	95.7	11.8	95.2	3.3	
Delay (s)	35.0	58.9		72.4	39.1	1.2	33.3	135.3	45.0	131.9	21.5	
Level of Service	D	E		E	D	A	C	F	D	F	C	
Approach Delay (s)		53.9			19.1			82.0			90.4	
Approach LOS		D			B			F			F	

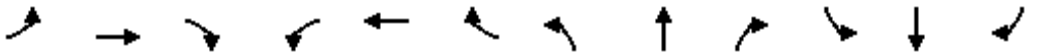
Intersection Summary			
HCM Average Control Delay	64.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	101.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	101	0	497	8	0	227	1038	1	1050
Lane Group Flow (vph)	0	110	540	0	27	247	1128	0	1229
Turn Type	Perm		pm+ov	Perm		pm+pt		Perm	
Protected Phases		4	5		8	5	2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	5	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	12.0	12.0	12.0	12.0	21.0	21.0	21.0
Total Split (s)	21.0	21.0	39.0	21.0	21.0	39.0	99.0	60.0	60.0
Total Split (%)	17.5%	17.5%	32.5%	17.5%	17.5%	32.5%	82.5%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	0.5	1.0	1.0	0.5	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0
Lead/Lag			Lead			Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Max	Min	Min
Act Effct Green (s)		14.3	47.8		14.3	96.0	95.0		62.5
Actuated g/C Ratio		0.12	0.41		0.12	0.82	0.81		0.53
v/c Ratio		0.64	0.79		0.14	0.43	0.75		0.69
Control Delay		66.7	36.6		26.0	9.9	9.8		24.2
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0
Total Delay		66.7	36.6		26.0	9.9	9.8		24.2
LOS		E	D		C	A	A		C
Approach Delay		41.7			26.0		9.8		24.2
Approach LOS		D			C		A		C
Queue Length 50th (ft)		80	327		6	40	348		356
Queue Length 95th (ft)		143	427		34	115	552		505
Internal Link Dist (ft)		673			220		177		692
Turn Bay Length (ft)									
Base Capacity (vph)		204	769		232	663	1510		1770
Starvation Cap Reductn		0	0		0	0	0		0
Spillback Cap Reductn		0	0		0	0	0		0
Storage Cap Reductn		0	0		0	0	0		0
Reduced v/c Ratio		0.54	0.70		0.12	0.37	0.75		0.69

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 21.6	Intersection LOS: C
Intersection Capacity Utilization 108.5%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 306: Harvard St. & University Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	0	497	8	0	17	227	1038	0	1	1050	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	3.0		4.0		3.0	4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			0.95	
Frt		1.00	0.85		0.91		1.00	1.00			0.99	
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	
Satd. Flow (prot)		1805	1615		1635		1770	1863			3470	
Flt Permitted		0.74	1.00		0.90		0.12	1.00			0.95	
Satd. Flow (perm)		1405	1615		1495		232	1863			3312	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	0	540	9	0	18	247	1128	0	1	1141	87
RTOR Reduction (vph)	0	0	26	0	16	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	110	514	0	11	0	247	1128	0	0	1225	0
Heavy Vehicles (%)	0%	0%	0%	12%	0%	0%	2%	2%	0%	98%	3%	1%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		13.3	41.8		13.3		94.1	94.1			61.6	
Effective Green, g (s)		14.3	43.8		14.3		95.1	95.1			62.6	
Actuated g/C Ratio		0.12	0.37		0.12		0.81	0.81			0.53	
Clearance Time (s)		5.0	4.0		5.0		4.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		171	603		182		574	1509			1766	
v/s Ratio Prot			c0.21				0.11	c0.61				
v/s Ratio Perm		0.08	0.10		0.01		0.24				0.37	
v/c Ratio		0.64	0.85		0.06		0.43	0.75			0.69	
Uniform Delay, d1		49.1	33.8		45.6		12.3	5.4			20.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		8.0	11.2		0.1		0.5	3.4			1.2	
Delay (s)		57.1	45.1		45.8		12.8	8.8			21.5	
Level of Service		E	D		D		B	A			C	
Approach Delay (s)		47.1			45.8			9.5			21.5	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	117.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	108.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations										
Volume (vph)	416	0	360	0	388	781	13	717	433	
Lane Group Flow (vph)	226	226	391	22	422	857	14	779	471	
Turn Type	Split		pm+ov		pm+pt		Perm		pm+ov	
Protected Phases	8	8	5	4	5	2		6	8	9
Permitted Phases			8		2		6		6	
Detector Phase	8	8	5	4	5	2	6	6	8	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	19.0	19.0	25.0	12.0	25.0	56.0	31.0	31.0	19.0	33.0
Total Split (%)	15.8%	15.8%	20.8%	10.0%	20.8%	46.7%	25.8%	25.8%	15.8%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag			Lead		Lead		Lag	Lag		
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	20.0	20.0	55.6	7.2	78.4	78.4	42.0	42.0	63.6	
Actuated g/C Ratio	0.17	0.17	0.46	0.06	0.65	0.65	0.35	0.35	0.53	
v/c Ratio	0.80	0.80	0.42	0.19	0.71	0.37	0.06	0.65	0.44	
Control Delay	70.8	70.8	3.7	35.9	28.7	12.3	20.5	23.1	4.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	70.8	70.8	3.7	35.9	28.7	12.3	20.5	23.1	4.0	
LOS	E	E	A	D	C	B	C	C	A	
Approach Delay		39.7		35.9		17.7		15.9		
Approach LOS		D		D		B		B		
Queue Length 50th (ft)	~188	~188	9	7	173	119	3	205	1	
Queue Length 95th (ft)	#371	#371	44	34	#510	319	m7	#430	m157	
Internal Link Dist (ft)		398		229		446		832		
Turn Bay Length (ft)			100		350		200		200	
Base Capacity (vph)	283	283	940	125	594	2311	217	1203	1069	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.80	0.80	0.42	0.18	0.71	0.37	0.06	0.65	0.44	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 125	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 22.6	Intersection LOS: C
Intersection Capacity Utilization 69.5%	ICU Level of Service C
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	

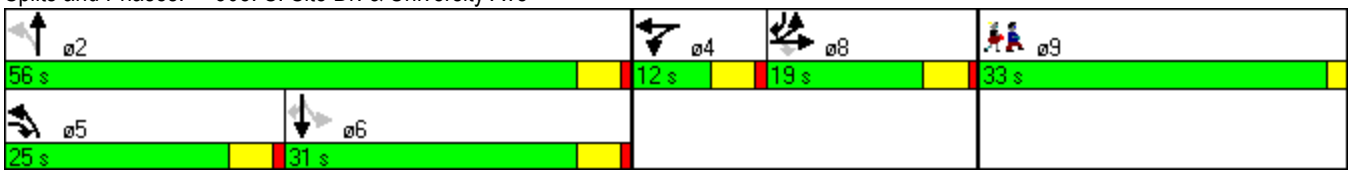
Queue shown is maximum after two cycles.

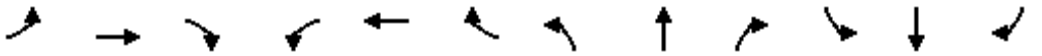
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 308: S. Site Dr. & University Ave

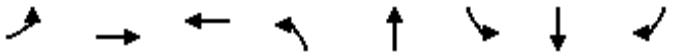




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	416	0	360	8	0	12	388	781	7	13	717	433
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1698	1599		1696		1787	3535		1787	3438	1599
Flt Permitted	0.95	0.95	1.00		0.98		0.15	1.00		0.33	1.00	1.00
Satd. Flow (perm)	1698	1698	1599		1696		290	3535		621	3438	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	452	0	391	9	0	13	422	849	8	14	779	471
RTOR Reduction (vph)	0	0	209	0	12	0	0	0	0	0	0	242
Lane Group Flow (vph)	226	226	182	0	10	0	422	857	0	14	779	229
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	1%	1%	5%	1%
Turn Type	Split		pm+ov	Split			pm+pt			Perm		pm+ov
Protected Phases	8	8	5	4	4		5	2			6	8
Permitted Phases			8				2			6		6
Actuated Green, G (s)	19.0	19.0	50.4		4.0		73.8	73.8		37.4	37.4	56.4
Effective Green, g (s)	20.0	20.0	52.4		5.0		74.8	74.8		38.4	38.4	58.4
Actuated g/C Ratio	0.17	0.17	0.44		0.04		0.62	0.62		0.32	0.32	0.49
Clearance Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	283	283	698		71		585	2203		199	1100	778
v/s Ratio Prot	c0.13	0.13	0.07		c0.01		c0.19	0.24			0.23	0.05
v/s Ratio Perm			0.04				c0.25			0.02		0.09
v/c Ratio	0.80	0.80	0.26		0.13		0.72	0.39		0.07	0.71	0.29
Uniform Delay, d1	48.1	48.1	21.5		55.4		23.2	11.2		28.4	35.9	18.5
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		0.66	0.58	2.01
Incremental Delay, d2	14.5	14.5	0.2		0.9		4.4	0.5		0.5	2.8	0.2
Delay (s)	62.5	62.5	21.7		56.3		27.5	11.8		19.3	23.6	37.3
Level of Service	E	E	C		E		C	B		B	C	D
Approach Delay (s)		43.6			56.3			17.0			28.7	
Approach LOS		D			E			B			C	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



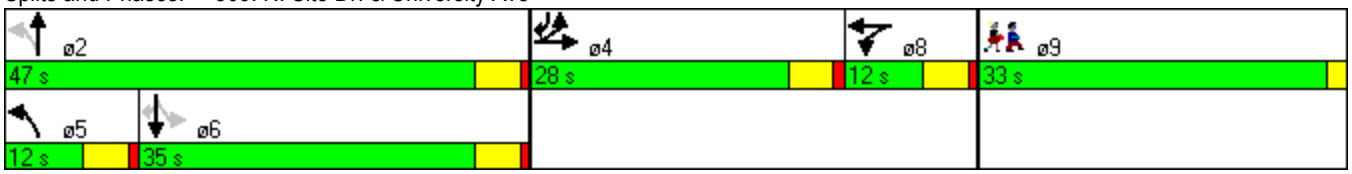
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations									
Volume (vph)	402	18	11	132	1043	21	987	411	
Lane Group Flow (vph)	302	282	109	143	1171	23	1073	447	
Turn Type	Split			pm+pt		Perm		pm+ov	
Protected Phases	4	4	8	5	2		6	4	9
Permitted Phases				2		6		6	
Detector Phase	4	4	8	5	2	6	6	4	
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	2.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	28.0	28.0	12.0	12.0	47.0	35.0	35.0	28.0	33.0
Total Split (%)	23.3%	23.3%	10.0%	10.0%	39.2%	29.2%	29.2%	23.3%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag				Lead		Lag	Lag		
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	23.7	23.7	8.3	69.4	69.4	55.4	55.4	83.1	
Actuated g/C Ratio	0.20	0.20	0.07	0.58	0.58	0.46	0.46	0.69	
v/c Ratio	0.89	0.81	0.81	0.53	0.57	0.13	0.66	0.36	
Control Delay	75.2	59.6	88.8	26.5	16.6	16.7	21.5	2.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	75.2	59.6	88.8	26.5	16.6	16.7	21.5	2.6	
LOS	E	E	F	C	B	B	C	A	
Approach Delay		67.7	88.8		17.7		15.9		
Approach LOS		E	F		B		B		
Queue Length 50th (ft)	241	197	75	21	92	6	261	45	
Queue Length 95th (ft)	#409	#342	#181	m#158	#570	m11	#643	m44	
Internal Link Dist (ft)		406	599		832		647		
Turn Bay Length (ft)				200		150		200	
Base Capacity (vph)	343	352	134	270	2039	175	1618	1250	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.88	0.80	0.81	0.53	0.57	0.13	0.66	0.36	

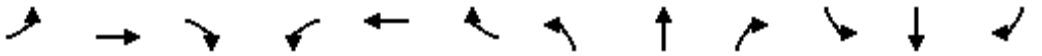
Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62 (52%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 68.8%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 309: N. Site Dr. & University Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	402	18	117	60	11	29	132	1043	34	21	987	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.93			0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.98			0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1636			1772		1805	3525		1805	3505	1615
Flt Permitted	0.95	0.98			0.97		0.13	1.00		0.20	1.00	1.00
Satd. Flow (perm)	1715	1636			1772		241	3525		381	3505	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	437	20	127	65	12	32	143	1134	37	23	1073	447
RTOR Reduction (vph)	0	25	0	0	12	0	0	1	0	0	0	149
Lane Group Flow (vph)	302	257	0	0	97	0	143	1170	0	23	1073	298
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	4	4		8	8		5	2			6	4
Permitted Phases							2			6		6
Actuated Green, G (s)	22.7	22.7			7.3		66.8	66.8		52.8	52.8	75.5
Effective Green, g (s)	23.7	23.7			8.3		67.8	67.8		53.8	53.8	77.5
Actuated g/C Ratio	0.20	0.20			0.07		0.56	0.56		0.45	0.45	0.65
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	339	323			123		266	1992		171	1571	1097
v/s Ratio Prot	c0.18	0.16			c0.05		0.04	c0.33			c0.31	0.05
v/s Ratio Perm							0.26			0.06		0.13
v/c Ratio	0.89	0.80			0.79		0.54	0.59		0.13	0.68	0.27
Uniform Delay, d1	46.9	45.8			55.0		17.6	17.0		19.4	26.3	9.1
Progression Factor	1.00	1.00			1.00		1.25	0.81		0.59	0.67	1.18
Incremental Delay, d2	24.0	12.7			27.5		1.8	1.1		1.2	1.8	0.1
Delay (s)	70.9	58.6			82.5		23.8	14.9		12.7	19.5	10.9
Level of Service	E	E			F		C	B		B	B	B
Approach Delay (s)		64.9			82.5			15.9			16.9	
Approach LOS		E			F			B			B	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.2
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

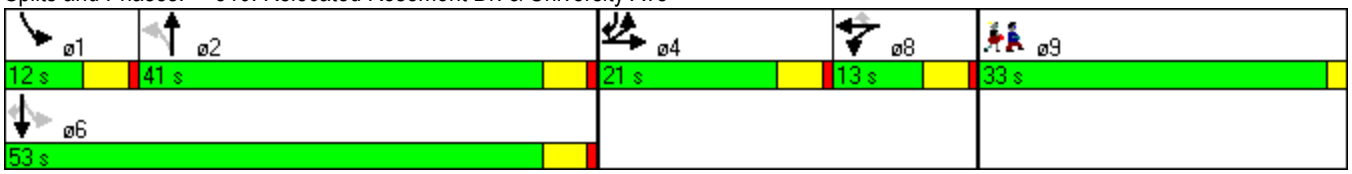
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations										
Volume (vph)	325	6	3	166	19	1359	139	1292	54	
Lane Group Flow (vph)	194	191	116	180	21	1582	151	1404	59	
Turn Type	Split			Perm	Perm		pm+pt		pm+ov	
Protected Phases	4	4	8			2	1	6	4	9
Permitted Phases				8	2		6		6	
Detector Phase	4	4	8	8	2	2	1	6	4	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	21.0	21.0	13.0	13.0	41.0	41.0	12.0	53.0	21.0	33.0
Total Split (%)	17.5%	17.5%	10.8%	10.8%	34.2%	34.2%	10.0%	44.2%	17.5%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag					Lag	Lag	Lead			
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	16.4	16.4	9.3	9.3	60.7	60.7	75.6	75.6	96.1	
Actuated g/C Ratio	0.14	0.14	0.08	0.08	0.51	0.51	0.63	0.63	0.80	
v/c Ratio	0.83	0.82	0.83	0.62	0.15	0.61	0.62	0.63	0.05	
Control Delay	79.0	75.4	96.0	17.6	27.5	21.2	36.9	22.8	1.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	
Total Delay	79.0	75.4	96.0	17.6	27.5	21.2	36.9	22.8	1.1	
LOS	E	E	F	B	C	C	D	C	A	
Approach Delay		77.2	48.4			21.2		23.3		
Approach LOS		E	D			C		C		
Queue Length 50th (ft)	155	148	90	0	6	183	46	206	0	
Queue Length 95th (ft)	#283	#273	#201	71	m19	#548	#204	#675	5	
Internal Link Dist (ft)		158	215			647		613		
Turn Bay Length (ft)					50				200	
Base Capacity (vph)	241	242	140	290	142	2576	245	2231	1298	
Starvation Cap Reductn	0	0	0	0	0	0	0	92	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.80	0.79	0.83	0.62	0.15	0.61	0.62	0.66	0.05	

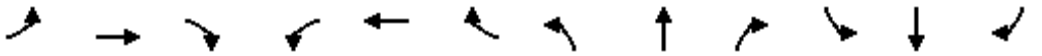
Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 48 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 105		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.83		
Intersection Signal Delay: 29.7	Intersection LOS: C	
Intersection Capacity Utilization 65.6%	ICU Level of Service C	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 310: Relocated Rosemont Dr. & University Ave





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	6	23	104	3	166	19	1359	97	139	1292	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.98			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96			0.95	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1682			1794	1599	1787	5085		1787	3539	1599
Flt Permitted	0.95	0.96			0.95	1.00	0.15	1.00		0.08	1.00	1.00
Satd. Flow (perm)	1698	1682			1794	1599	280	5085		152	3539	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	7	25	113	3	180	21	1477	105	151	1404	59
RTOR Reduction (vph)	0	4	0	0	0	166	0	5	0	0	0	13
Lane Group Flow (vph)	194	187	0	0	116	14	21	1577	0	151	1404	46
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	1%
Turn Type	Split			Split		Perm	Perm			pm+pt		pm+ov
Protected Phases	4	4		8	8			2		1	6	4
Permitted Phases						8	2			6		6
Actuated Green, G (s)	15.4	15.4			8.3	8.3	58.2	58.2		73.1	73.1	88.5
Effective Green, g (s)	16.4	16.4			9.3	9.3	59.2	59.2		74.1	74.1	90.5
Actuated g/C Ratio	0.14	0.14			0.08	0.08	0.49	0.49		0.62	0.62	0.75
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	232	230			139	124	138	2509		242	2185	1259
v/s Ratio Prot	c0.11	0.11			c0.06			0.31		0.06	c0.40	0.01
v/s Ratio Perm						0.01	0.07			0.33		0.02
v/c Ratio	0.84	0.81			0.83	0.11	0.15	0.63		0.62	0.64	0.04
Uniform Delay, d1	50.5	50.3			54.6	51.5	16.7	22.3		17.1	14.6	3.7
Progression Factor	1.00	1.00			1.00	1.00	1.09	0.85		1.66	1.33	0.44
Incremental Delay, d2	22.2	19.1			33.0	0.4	1.7	0.9		4.8	1.4	0.0
Delay (s)	72.7	69.4			87.5	51.9	19.8	20.0		33.3	20.8	1.7
Level of Service	E	E			F	D	B	B		C	C	A
Approach Delay (s)		71.1			65.9			20.0			21.3	
Approach LOS		E			E			B			C	

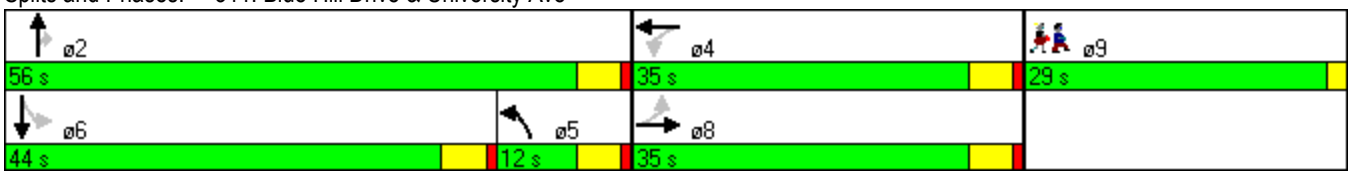
Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

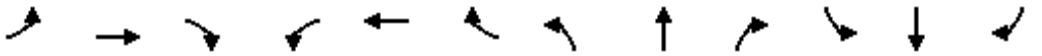
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	30	61	511	91	0	4	710	1137	89	883	
Lane Group Flow (vph)	33	66	555	99	63	4	772	1236	97	962	
Turn Type	Perm		Free	Perm		Prot		Perm	Perm		
Protected Phases		8			4	5	2			6	9
Permitted Phases	8		Free	4				2	6		
Detector Phase	8	8		4	4	5	2	2	6	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0		3.0	3.0	4.0	5.0	5.0	6.0	6.0	4.0
Minimum Split (s)	35.0	35.0		35.0	35.0	12.0	35.0	35.0	12.0	12.0	29.0
Total Split (s)	35.0	35.0	0.0	35.0	35.0	12.0	56.0	56.0	44.0	44.0	29.0
Total Split (%)	29.2%	29.2%	0.0%	29.2%	29.2%	10.0%	46.7%	46.7%	36.7%	36.7%	24%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag						Lag			Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	15.3	15.3	120.0	15.3	15.3	7.0	85.1	85.1	82.7	82.7	
Actuated g/C Ratio	0.13	0.13	1.00	0.13	0.13	0.06	0.71	0.71	0.69	0.69	
v/c Ratio	0.19	0.28	0.35	0.59	0.10	0.04	0.58	0.56	0.29	0.27	
Control Delay	47.2	48.5	0.6	62.5	0.3	41.0	8.2	4.4	16.9	10.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.1	
Total Delay	47.2	48.5	0.6	62.5	0.3	41.0	8.6	4.6	16.9	10.3	
LOS	D	D	A	E	A	D	A	A	B	B	
Approach Delay		7.8			38.3		6.2			10.9	
Approach LOS		A			D		A			B	
Queue Length 50th (ft)	23	47	0	73	0	3	10	11	11	38	
Queue Length 95th (ft)	52	86	0	125	0	m4	640	97	121	261	
Internal Link Dist (ft)		626			596		613			325	
Turn Bay Length (ft)	100		200	100		50			110		
Base Capacity (vph)	345	481	1568	341	744	120	1334	2212	332	3505	
Starvation Cap Reductn	0	0	0	0	0	0	175	353	0	1367	
Spillback Cap Reductn	0	0	43	0	0	0	0	0	0	19	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.14	0.36	0.29	0.08	0.03	0.67	0.66	0.29	0.45	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 112 (93%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 65.6%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 311: Blue Hill Drive & University Ave

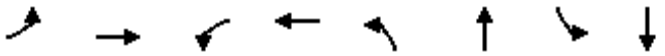




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	61	511	91	0	58	4	710	1137	89	883	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	3.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.88	1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.94		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.96	1.00	1.00	0.95	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1740	1863	1568	1708	1521		1805	1881	2756	1749	5084	
Flt Permitted	0.72	1.00	1.00	0.71	1.00		0.95	1.00	1.00	0.26	1.00	
Satd. Flow (perm)	1311	1863	1568	1284	1521		1805	1881	2756	482	5084	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	66	555	99	0	63	4	772	1236	97	960	2
RTOR Reduction (vph)	0	0	0	0	55	0	0	0	280	0	0	0
Lane Group Flow (vph)	33	66	555	99	8	0	4	772	956	97	962	0
Confl. Peds. (#/hr)	10		25	25		10			15	15		
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	1%	0%	3%	2%	0%
Turn Type	Perm		Free	Perm			Prot		Perm	Perm		
Protected Phases		8			4		5	2			6	
Permitted Phases	8		Free	4					2	6		
Actuated Green, G (s)	14.3	14.3	120.0	14.3	14.3		1.4	82.9	82.9	76.5	76.5	
Effective Green, g (s)	15.3	15.3	120.0	15.3	15.3		2.4	83.9	83.9	77.5	77.5	
Actuated g/C Ratio	0.13	0.13	1.00	0.13	0.13		0.02	0.70	0.70	0.65	0.65	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	167	238	1568	164	194		36	1315	1927	311	3283	
v/s Ratio Prot		0.04			0.01		0.00	c0.41			0.19	
v/s Ratio Perm	0.03		c0.35	c0.08					0.35	0.20		
v/c Ratio	0.20	0.28	0.35	0.60	0.04		0.11	0.59	0.50	0.31	0.29	
Uniform Delay, d1	46.9	47.3	0.0	49.5	45.9		57.8	9.2	8.3	9.4	9.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.76	0.49	1.15	0.91	0.89	
Incremental Delay, d2	0.6	0.6	0.6	6.1	0.1		1.0	1.5	0.7	2.5	0.2	
Delay (s)	47.4	48.0	0.6	55.6	46.0		45.0	5.9	10.3	11.1	8.4	
Level of Service	D	D	A	E	D		D	A	B	B	A	
Approach Delay (s)		7.8			51.9			8.7			8.7	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	6	0	164	0	9	781	2	740
Lane Group Flow (vph)	0	83	178	132	10	857	0	807
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	38.0	38.0	38.0	38.0	82.0	82.0	82.0	82.0
Total Split (%)	31.7%	31.7%	31.7%	31.7%	68.3%	68.3%	68.3%	68.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		22.5	22.5	22.5	89.5	89.5		89.5
Actuated g/C Ratio		0.19	0.19	0.19	0.75	0.75		0.75
v/c Ratio		0.23	0.76	0.29	0.02	0.61		0.32
Control Delay		11.1	66.1	2.4	3.0	4.4		6.1
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		11.1	66.1	2.4	3.0	4.4		6.1
LOS		B	E	A	A	A		A
Approach Delay		11.1		38.9		4.3		6.1
Approach LOS		B		D		A		A
Queue Length 50th (ft)		4	132	0	1	44		95
Queue Length 95th (ft)		44	197	9	m2	116		160
Internal Link Dist (ft)		177		292		325		532
Turn Bay Length (ft)					100			
Base Capacity (vph)		506	352	599	453	1401		2543
Starvation Cap Reductn		0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0		0
Reduced v/c Ratio		0.16	0.51	0.22	0.02	0.61		0.32

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 10.5	Intersection LOS: B
Intersection Capacity Utilization 63.9%	ICU Level of Service B
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 312: MBTA Dr. & University Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	0	70	164	0	121	9	781	7	2	740	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00			0.95	
Frt		0.88		1.00	0.85		1.00	1.00			1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1626		1805	1615		1770	1878			3573	
Flt Permitted		0.98		0.65	1.00		0.33	1.00			0.95	
Satd. Flow (perm)		1594		1241	1615		607	1878			3409	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	76	178	0	132	10	849	8	2	804	1
RTOR Reduction (vph)	0	62	0	0	107	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	21	0	178	25	0	10	857	0	0	807	0
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	1%	2%	2%	1%	2%
Parking (#/hr)	0											
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.5		21.5	21.5		88.5	88.5			88.5	
Effective Green, g (s)		22.5		22.5	22.5		89.5	89.5			89.5	
Actuated g/C Ratio		0.19		0.19	0.19		0.75	0.75			0.75	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		299		233	303		453	1401			2543	
v/s Ratio Prot					0.02			c0.46				
v/s Ratio Perm		0.01		c0.14			0.02				0.24	
v/c Ratio		0.07		0.76	0.08		0.02	0.61			0.32	
Uniform Delay, d1		40.1		46.2	40.2		3.9	7.1			5.1	
Progression Factor		1.00		1.00	1.00		0.51	0.31			1.00	
Incremental Delay, d2		0.1		13.8	0.1		0.1	1.7			0.3	
Delay (s)		40.2		60.0	40.3		2.1	3.9			5.4	
Level of Service		D		E	D		A	A			A	
Approach Delay (s)		40.2			51.7			3.9			5.4	
Approach LOS		D			D			A			A	

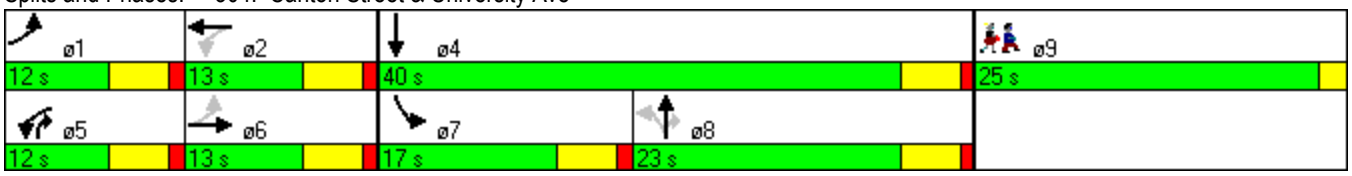
Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

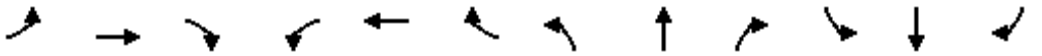
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	110	146	119	105	646	9	381	108	584	372	
Lane Group Flow (vph)	120	173	129	114	702	10	414	117	635	520	
Turn Type	pm+pt		pm+pt		Free	Perm		pm+ov	Prot		
Protected Phases	1	6	5	2			8	5	7	4	9
Permitted Phases	6		2		Free	8		8			
Detector Phase	1	6	5	2		8	8	5	7	4	
Switch Phase											
Minimum Initial (s)	4.0	7.0	4.0	7.0		3.0	3.0	4.0	4.0	3.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0	12.0	12.0	12.0	12.0	25.0
Total Split (s)	12.0	13.0	12.0	13.0	0.0	23.0	23.0	12.0	17.0	40.0	25.0
Total Split (%)	13.3%	14.4%	13.3%	14.4%	0.0%	25.6%	25.6%	13.3%	18.9%	44.4%	28%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	Lead		
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	None	None	None	None	None
Act Effct Green (s)	16.9	8.9	17.9	11.5	69.7	19.3	19.3	30.8	13.2	36.6	
Actuated g/C Ratio	0.24	0.13	0.26	0.16	1.00	0.28	0.28	0.44	0.19	0.53	
v/c Ratio	0.34	0.36	0.37	0.36	0.44	0.05	0.79	0.16	0.97	0.57	
Control Delay	24.0	30.7	24.7	34.6	0.9	23.9	38.1	3.0	61.0	15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.0	30.7	24.7	34.6	0.9	23.9	38.1	3.0	61.0	15.9	
LOS	C	C	C	C	A	C	D	A	E	B	
Approach Delay		28.0		8.2			30.3			40.7	
Approach LOS		C		A			C			D	
Queue Length 50th (ft)	34	31	37	42	0	3	147	0	128	113	
Queue Length 95th (ft)	105	80	111	#129	0	19	#433	19	#344	363	
Internal Link Dist (ft)		800		114			1635			620	
Turn Bay Length (ft)	150				350	50		260	350		
Base Capacity (vph)	361	490	345	313	1599	204	527	747	652	920	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.33	0.35	0.37	0.36	0.44	0.05	0.79	0.16	0.97	0.57	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 69.7			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 27.0		Intersection LOS: C	
Intersection Capacity Utilization 62.5%		ICU Level of Service B	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 304: Canton Street & University Ave





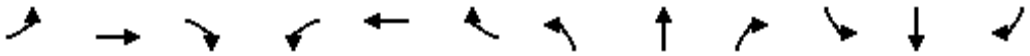
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	146	13	119	105	646	9	381	108	584	372	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	12	12	12	12	12	12	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1728	3679		1736	1900	1599	1480	1900	1538	3433	1733	
Flt Permitted	0.68	1.00		0.56	1.00	1.00	0.47	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1243	3679		1021	1900	1599	734	1900	1538	3433	1733	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	159	14	129	114	702	10	414	117	635	404	116
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	72	0	9	0
Lane Group Flow (vph)	120	166	0	129	114	702	10	414	45	635	511	0
Heavy Vehicles (%)	1%	3%	8%	4%	0%	1%	22%	0%	5%	2%	2%	4%
Turn Type	pm+pt			pm+pt		Free	Perm		pm+ov	Prot		
Protected Phases	1	6		5	2			8	5	7	4	
Permitted Phases	6			2		Free	8		8			
Actuated Green, G (s)	14.6	9.0		17.6	10.5	72.3	18.4	18.4	25.5	12.2	35.6	
Effective Green, g (s)	16.6	10.0		19.6	11.5	72.3	19.4	19.4	27.5	13.2	36.6	
Actuated g/C Ratio	0.23	0.14		0.27	0.16	1.00	0.27	0.27	0.38	0.18	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	330	509		357	302	1599	197	510	585	627	877	
v/s Ratio Prot	0.03	0.05		0.04	0.06			c0.22	0.01	c0.18	0.29	
v/s Ratio Perm	0.05			0.06		c0.44	0.01		0.02			
v/c Ratio	0.36	0.33		0.36	0.38	0.44	0.05	0.81	0.08	1.01	0.58	
Uniform Delay, d1	23.1	28.1		20.8	27.2	0.0	19.6	24.7	14.3	29.5	12.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.6	0.8	0.9	0.1	9.5	0.1	39.2	1.0	
Delay (s)	23.7	28.5		21.4	28.0	0.9	19.7	34.3	14.3	68.7	13.5	
Level of Service	C	C		C	C	A	B	C	B	E	B	
Approach Delay (s)		26.5			6.9			29.7			43.8	
Approach LOS		C			A			C			D	

Intersection Summary			
HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	NBL	NBT	SBT	ø8
Lane Configurations							
Volume (vph)	89	0	265	262	857	759	
Lane Group Flow (vph)	0	97	288	285	932	936	
Turn Type	Perm		pm+ov	pm+pt			
Protected Phases		4	5	5	2	6	8
Permitted Phases	4		4	2			
Detector Phase	4	4	5	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	12.0	12.0	21.0	21.0	21.0
Total Split (s)	22.0	22.0	21.0	21.0	68.0	47.0	22.0
Total Split (%)	24.4%	24.4%	23.3%	23.3%	75.6%	52.2%	24%
Yellow Time (s)	4.0	4.0	3.5	3.5	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	0.5	0.5	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	3.0	3.0	4.0	4.0	
Lead/Lag			Lead	Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	Max	Min	None
Act Effct Green (s)		12.0	24.5	65.6	65.6	50.4	
Actuated g/C Ratio		0.15	0.30	0.80	0.80	0.61	
v/c Ratio		0.48	0.55	0.53	0.62	0.43	
Control Delay		41.0	17.0	6.7	7.4	10.8	
Queue Delay		0.0	0.0	0.0	0.0	0.0	
Total Delay		41.0	17.0	6.7	7.4	10.8	
LOS		D	B	A	A	B	
Approach Delay		23.0			7.3	10.8	
Approach LOS		C			A	B	
Queue Length 50th (ft)		48	73	31	182	123	
Queue Length 95th (ft)		95	126	70	381	237	
Internal Link Dist (ft)		673			177	692	
Turn Bay Length (ft)							
Base Capacity (vph)		306	643	652	1504	2169	
Starvation Cap Reductn		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	
Reduced v/c Ratio		0.32	0.45	0.44	0.62	0.43	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 82	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 84.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 306: Harvard St. & University Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	0	265	0	0	0	262	857	0	0	759	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	3.0				3.0	4.0			4.0	
Lane Util. Factor		1.00	1.00				1.00	1.00			0.95	
Frt		1.00	0.85				1.00	1.00			0.98	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1736	1495				1770	1881			3515	
Flt Permitted		0.76	1.00				0.24	1.00			1.00	
Satd. Flow (perm)		1383	1495				449	1881			3515	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	0	288	0	0	0	285	932	0	0	825	111
RTOR Reduction (vph)	0	0	82	0	0	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	97	206	0	0	0	285	932	0	0	927	0
Heavy Vehicles (%)	4%	0%	8%	0%	0%	0%	2%	1%	0%	0%	1%	0%
Turn Type	Perm		pm+ov	Perm			pm+pt			Perm		
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		9.5	19.6				63.6	63.6			49.5	
Effective Green, g (s)		10.5	21.6				64.6	64.6			50.5	
Actuated g/C Ratio		0.13	0.26				0.78	0.78			0.61	
Clearance Time (s)		5.0	4.0				4.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		175	389				525	1462			2136	
v/s Ratio Prot			0.07				0.07	c0.50			0.26	
v/s Ratio Perm		c0.07	0.07				0.35					
v/c Ratio		0.55	0.53				0.54	0.64			0.43	
Uniform Delay, d1		34.1	26.4				4.0	4.1			8.7	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		3.8	1.3				1.1	2.1			0.1	
Delay (s)		37.9	27.7				5.1	6.2			8.8	
Level of Service		D	C				A	A			A	
Approach Delay (s)		30.3			0.0			6.0			8.8	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	83.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations										
Volume (vph)	490	0	410	0	448	472	17	430	537	
Lane Group Flow (vph)	266	267	446	27	487	524	18	467	584	
Turn Type	Split		pm+ov		pm+pt		Perm		pm+ov	
Protected Phases	8	8	5	4	5	2		6	8	9
Permitted Phases			8		2		6		6	
Detector Phase	8	8	5	4	5	2	6	6	8	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	20.0	20.0	26.0	12.0	26.0	45.0	19.0	19.0	20.0	33.0
Total Split (%)	18.2%	18.2%	23.6%	10.9%	23.6%	40.9%	17.3%	17.3%	18.2%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag			Lead		Lead		Lag	Lag		
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	21.0	21.0	58.2	7.2	67.4	67.4	29.3	29.3	51.9	
Actuated g/C Ratio	0.19	0.19	0.53	0.07	0.61	0.61	0.27	0.27	0.47	
v/c Ratio	0.82	0.83	0.43	0.21	0.69	0.24	0.08	0.49	0.55	
Control Delay	66.1	66.4	3.2	32.7	22.2	12.4	20.8	28.9	17.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	66.1	66.4	3.2	32.7	22.2	12.4	20.8	28.9	17.4	
LOS	E	E	A	C	C	B	C	C	B	
Approach Delay		37.5		32.7		17.1		22.5		
Approach LOS		D		C		B		C		
Queue Length 50th (ft)	~211	~212	10	7	140	67	8	143	204	
Queue Length 95th (ft)	#392	#395	39	36	#534	187	m21	m#272	m445	
Internal Link Dist (ft)		398		229		446		832		
Turn Bay Length (ft)			100		350		200		350	
Base Capacity (vph)	323	323	1043	138	705	2163	230	953	1063	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.82	0.83	0.43	0.20	0.69	0.24	0.08	0.49	0.55	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 92 (84%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 25.6	Intersection LOS: C
Intersection Capacity Utilization 71.4%	ICU Level of Service C
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	

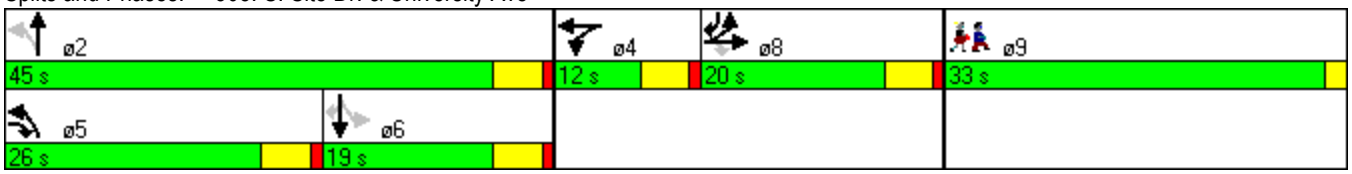
Queue shown is maximum after two cycles.

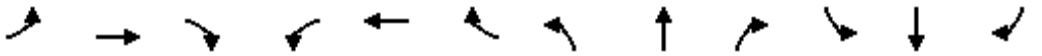
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 308: S. Site Dr. & University Ave

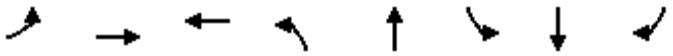




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	490	0	410	10	0	15	448	472	10	17	430	537
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1698	1599		1696		1787	3529		1787	3574	1599
Flt Permitted	0.95	0.95	1.00		0.98		0.27	1.00		0.46	1.00	1.00
Satd. Flow (perm)	1698	1698	1599		1696		502	3529		861	3574	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	533	0	446	11	0	16	487	513	11	18	467	584
RTOR Reduction (vph)	0	0	209	0	15	0	0	1	0	0	0	336
Lane Group Flow (vph)	266	267	237	0	12	0	487	523	0	18	467	248
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	2%	1%	1%	1%	1%
Turn Type	Split		pm+ov	Split			pm+pt			Perm		pm+ov
Protected Phases	8	8	5	4	4		5	2			6	8
Permitted Phases			8				2			6		6
Actuated Green, G (s)	20.0	20.0	53.1		4.0		62.8	62.8		24.7	24.7	44.7
Effective Green, g (s)	21.0	21.0	55.1		5.0		63.8	63.8		25.7	25.7	46.7
Actuated g/C Ratio	0.19	0.19	0.50		0.05		0.58	0.58		0.23	0.23	0.42
Clearance Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	324	324	801		77		690	2047		201	835	679
v/s Ratio Prot	0.16	c0.16	0.09		c0.01		c0.22	0.15			0.13	0.07
v/s Ratio Perm			0.06				c0.19			0.02		0.09
v/c Ratio	0.82	0.82	0.30		0.15		0.71	0.26		0.09	0.56	0.37
Uniform Delay, d1	42.7	42.7	16.1		50.5		15.1	11.4		33.0	37.2	21.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		0.59	0.75	9.50
Incremental Delay, d2	15.3	15.5	0.2		0.9		3.3	0.3		0.7	2.2	0.3
Delay (s)	57.9	58.2	16.3		51.4		18.4	11.7		20.3	30.0	205.0
Level of Service	E	E	B		D		B	B		C	C	F
Approach Delay (s)		39.0			51.4			14.9			125.4	
Approach LOS		D			D			B			F	

Intersection Summary			
HCM Average Control Delay	61.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations									
Volume (vph)	482	6	3	150	791	25	824	512	
Lane Group Flow (vph)	341	327	64	163	899	27	896	557	
Turn Type	Split			pm+pt		Perm		pm+ov	
Protected Phases	4	4	8	5	2		6	4	9
Permitted Phases				2		6		6	
Detector Phase	4	4	8	5	2	6	6	4	
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	2.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	26.0	26.0	12.0	12.0	39.0	27.0	27.0	26.0	33.0
Total Split (%)	23.6%	23.6%	10.9%	10.9%	35.5%	24.5%	24.5%	23.6%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag				Lead		Lag	Lag		
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	22.0	22.0	7.6	63.9	63.9	49.4	49.4	75.4	
Actuated g/C Ratio	0.20	0.20	0.07	0.58	0.58	0.45	0.45	0.69	
v/c Ratio	1.00	0.93	0.45	0.49	0.43	0.10	0.55	0.45	
Control Delay	94.5	74.5	44.3	22.8	11.7	33.3	28.5	7.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	94.5	74.5	44.3	22.8	11.7	33.3	28.5	7.1	
LOS	F	E	D	C	B	C	C	A	
Approach Delay		84.7	44.3		13.4		20.6		
Approach LOS		F	D		B		C		
Queue Length 50th (ft)	~256	222	28	30	65	10	188	0	
Queue Length 95th (ft)	#455	#405	72	m#96	425	m38	#550	211	
Internal Link Dist (ft)		406	599		832		647		
Turn Bay Length (ft)				200		150		200	
Base Capacity (vph)	340	350	149	335	2084	271	1623	1250	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.00	0.93	0.43	0.49	0.43	0.10	0.55	0.45	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 44 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 31.8	Intersection LOS: C
Intersection Capacity Utilization 65.2%	ICU Level of Service C
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	

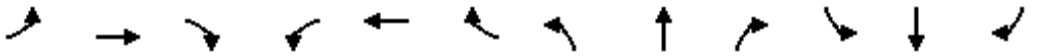
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 309: N. Site Dr. & University Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	482	6	126	33	3	23	150	791	36	25	824	512
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.94			0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97			0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1636			1751		1805	3587		1805	3610	1568
Flt Permitted	0.95	0.97			0.97		0.18	1.00		0.32	1.00	1.00
Satd. Flow (perm)	1698	1636			1751		337	3587		602	3610	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	524	7	137	36	3	25	163	860	39	27	896	557
RTOR Reduction (vph)	0	23	0	0	22	0	0	2	0	0	0	209
Lane Group Flow (vph)	341	304	0	0	42	0	163	897	0	27	896	348
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%
Turn Type	Split			Split			pm+pt			Perm		pm+ov
Protected Phases	4	4		8	8		5	2			6	4
Permitted Phases							2			6		6
Actuated Green, G (s)	21.0	21.0			5.5		60.3	60.3		45.8	45.8	66.8
Effective Green, g (s)	22.0	22.0			6.5		61.3	61.3		46.8	46.8	68.8
Actuated g/C Ratio	0.20	0.20			0.06		0.56	0.56		0.43	0.43	0.63
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	340	327			103		328	1999		256	1536	1038
v/s Ratio Prot	c0.20	0.19			c0.02		0.05	c0.25			c0.25	0.07
v/s Ratio Perm							0.23			0.04		0.16
v/c Ratio	1.00	0.93			0.41		0.50	0.45		0.11	0.58	0.34
Uniform Delay, d1	44.0	43.2			49.9		15.0	14.4		19.0	24.1	9.8
Progression Factor	1.00	1.00			1.00		1.12	0.69		1.25	1.07	4.39
Incremental Delay, d2	49.5	31.6			2.7		1.0	0.6		0.7	1.4	0.2
Delay (s)	93.5	74.8			52.6		17.8	10.5		24.4	27.3	43.0
Level of Service	F	E			D		B	B		C	C	D
Approach Delay (s)		84.4			52.6			11.6			33.1	
Approach LOS		F			D			B			C	

Intersection Summary			
HCM Average Control Delay	37.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.2
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

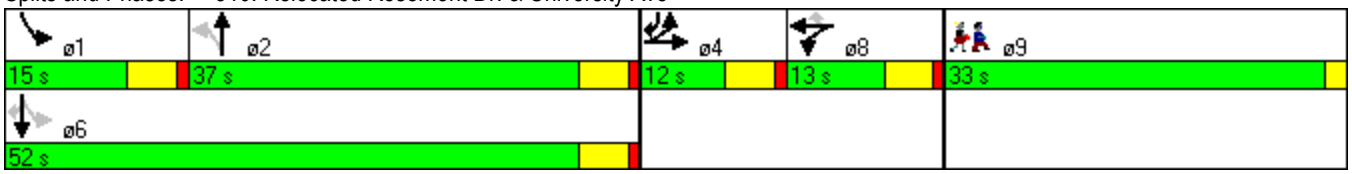
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR	ø9
Lane Configurations										
Volume (vph)	63	2	3	170	32	1149	192	1242	51	
Lane Group Flow (vph)	45	43	114	185	35	1374	209	1350	55	
Turn Type	Split			Perm	Perm		pm+pt		pm+ov	
Protected Phases	4	4	8			2	1	6	4	9
Permitted Phases				8	2		6		6	
Detector Phase	4	4	8	8	2	2	1	6	4	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	33.0
Total Split (s)	12.0	12.0	13.0	13.0	37.0	37.0	15.0	52.0	12.0	33.0
Total Split (%)	10.9%	10.9%	11.8%	11.8%	33.6%	33.6%	13.6%	47.3%	10.9%	30%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag					Lag	Lag	Lead			
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	7.7	7.7	9.1	9.1	59.8	59.8	76.7	76.7	88.4	
Actuated g/C Ratio	0.07	0.07	0.08	0.08	0.54	0.54	0.70	0.70	0.80	
v/c Ratio	0.38	0.33	0.77	0.61	0.18	0.49	0.61	0.54	0.04	
Control Delay	58.3	39.5	81.4	16.5	10.6	9.7	30.0	9.2	0.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	58.3	39.5	81.4	16.5	10.6	9.7	30.0	9.3	0.6	
LOS	E	D	F	B	B	A	C	A	A	
Approach Delay		49.1	41.2			9.7		11.7		
Approach LOS		D	D			A		B		
Queue Length 50th (ft)	32	17	80	0	5	72	42	161	0	
Queue Length 95th (ft)	72	56	#176	68	m31	m311	#217	230	0	
Internal Link Dist (ft)		158	215			647		613		
Turn Bay Length (ft)					50				200	
Base Capacity (vph)	123	135	149	302	197	2785	349	2517	1299	
Starvation Cap Reductn	0	0	0	0	0	0	0	126	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.37	0.32	0.77	0.61	0.18	0.49	0.60	0.56	0.04	

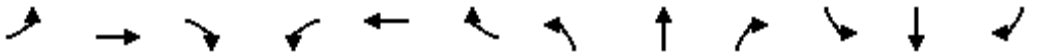
Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 76 (69%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 14.4	Intersection LOS: B
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 310: Relocated Rosemont Dr. & University Ave

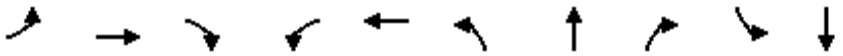




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	2	17	102	3	170	32	1149	115	192	1242	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.94			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97			0.95	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1698	1631			1794	1599	1787	5112		1787	3610	1599
Flt Permitted	0.95	0.97			0.95	1.00	0.19	1.00		0.12	1.00	1.00
Satd. Flow (perm)	1698	1631			1794	1599	363	5112		232	3610	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	2	18	111	3	185	35	1249	125	209	1350	55
RTOR Reduction (vph)	0	17	0	0	0	170	0	7	0	0	0	13
Lane Group Flow (vph)	45	26	0	0	114	15	35	1367	0	209	1350	42
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	0%	1%	1%	0%	1%
Turn Type	Split			Split		Perm	Perm			pm+pt		pm+ov
Protected Phases	4	4		8	8			2		1	6	4
Permitted Phases						8	2			6		6
Actuated Green, G (s)	5.6	5.6			8.1	8.1	56.2	56.2		73.1	73.1	78.7
Effective Green, g (s)	6.6	6.6			9.1	9.1	57.2	57.2		74.1	74.1	80.7
Actuated g/C Ratio	0.06	0.06			0.08	0.08	0.52	0.52		0.67	0.67	0.73
Clearance Time (s)	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	102	98			148	132	189	2658		339	2432	1231
v/s Ratio Prot	c0.03	0.02			c0.06			0.27		c0.07	0.37	0.00
v/s Ratio Perm						0.01	0.10			c0.34		0.02
v/c Ratio	0.44	0.27			0.77	0.12	0.19	0.51		0.62	0.56	0.03
Uniform Delay, d1	49.9	49.4			49.4	46.7	14.0	17.3		11.4	9.4	4.0
Progression Factor	1.00	1.00			1.00	1.00	0.42	0.47		2.06	0.72	0.22
Incremental Delay, d2	3.0	1.5			21.5	0.4	1.7	0.6		3.2	0.9	0.0
Delay (s)	52.9	50.8			71.0	47.1	7.6	8.6		26.7	7.6	0.9
Level of Service	D	D			E	D	A	A		C	A	A
Approach Delay (s)		51.9			56.2			8.6			9.8	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

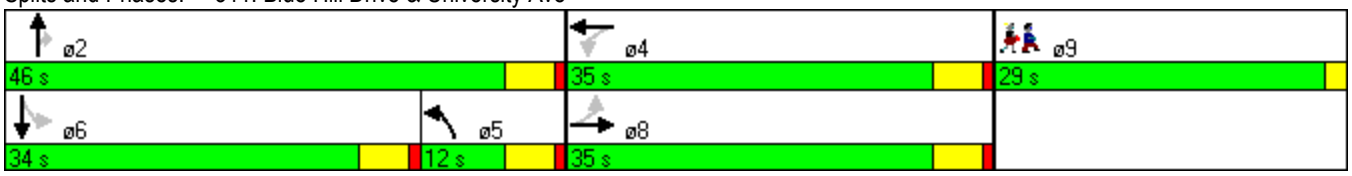
c Critical Lane Group

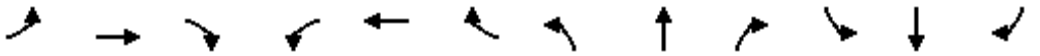


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø9
Lane Configurations											
Volume (vph)	26	55	596	17	0	6	563	813	50	872	
Lane Group Flow (vph)	28	60	648	18	76	7	612	884	54	951	
Turn Type	Perm		Free	Perm		Prot		Perm	Perm		
Protected Phases		8			4	5	2			6	9
Permitted Phases	8		Free	4				2	6		
Detector Phase	8	8		4	4	5	2	2	6	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0		3.0	3.0	4.0	5.0	5.0	6.0	6.0	4.0
Minimum Split (s)	35.0	35.0		35.0	35.0	12.0	35.0	35.0	12.0	12.0	29.0
Total Split (s)	35.0	35.0	0.0	35.0	35.0	12.0	46.0	46.0	34.0	34.0	29.0
Total Split (%)	31.8%	31.8%	0.0%	31.8%	31.8%	10.9%	41.8%	41.8%	30.9%	30.9%	26%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag						Lag			Lead	Lead	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	9.9	9.9	110.0	9.8	9.8	7.0	83.5	83.5	81.1	81.1	
Actuated g/C Ratio	0.09	0.09	1.00	0.09	0.09	0.06	0.76	0.76	0.74	0.74	
v/c Ratio	0.28	0.35	0.41	0.17	0.12	0.06	0.43	0.39	0.11	0.25	
Control Delay	52.7	52.0	0.8	48.6	0.4	30.0	7.0	1.7	11.8	8.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.7	52.0	0.8	48.6	0.4	30.0	7.0	1.7	11.8	8.9	
LOS	D	D	A	D	A	C	A	A	B	A	
Approach Delay		7.0			9.6		4.0			9.0	
Approach LOS		A			A		A			A	
Queue Length 50th (ft)	19	41	0	12	0	4	36	1	5	35	
Queue Length 95th (ft)	47	81	0	34	0	m7	164	28	52	203	
Internal Link Dist (ft)		626			596		613			325	
Turn Bay Length (ft)	100		200	100		50			110		
Base Capacity (vph)	318	535	1568	338	822	131	1427	2275	512	3785	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.09	0.11	0.41	0.05	0.09	0.05	0.43	0.39	0.11	0.25	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow, Master Intersection	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 6.3	Intersection LOS: A
Intersection Capacity Utilization 55.7%	ICU Level of Service B
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 311: Blue Hill Drive & University Ave

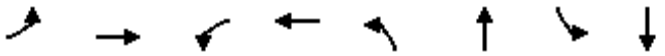




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	55	596	17	0	70	6	563	813	50	872	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	3.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.88	1.00	0.91	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.92		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.94	1.00	1.00	0.91	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.85		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1535	1900	1568	1483	1483		1805	1881	2757	1800	5133	
Flt Permitted	0.67	1.00	1.00	0.72	1.00		0.95	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	1082	1900	1568	1120	1483		1805	1881	2757	696	5133	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	60	648	18	0	76	7	612	884	54	948	3
RTOR Reduction (vph)	0	0	0	0	70	0	0	0	226	0	0	0
Lane Group Flow (vph)	28	60	648	18	6	0	7	612	658	54	951	0
Confl. Peds. (#/hr)	10		25	25		10			15	15		
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Parking (#/hr)	0			0								
Turn Type	Perm		Free	Perm			Prot		Perm	Perm		
Protected Phases		8			4		5	2			6	
Permitted Phases	8		Free	4					2	6		
Actuated Green, G (s)	7.7	7.7	110.0	7.7	7.7		1.4	79.5	79.5	73.1	73.1	
Effective Green, g (s)	8.7	8.7	110.0	8.7	8.7		2.4	80.5	80.5	74.1	74.1	
Actuated g/C Ratio	0.08	0.08	1.00	0.08	0.08		0.02	0.73	0.73	0.67	0.67	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	86	150	1568	89	117		39	1377	2018	469	3458	
v/s Ratio Prot		0.03			0.00		0.00	c0.33			0.19	
v/s Ratio Perm	0.03		c0.41	0.02					0.24	0.08		
v/c Ratio	0.33	0.40	0.41	0.20	0.05		0.18	0.44	0.33	0.12	0.28	
Uniform Delay, d1	47.9	48.2	0.0	47.4	46.8		52.8	5.9	5.2	6.4	7.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.61	0.64	1.10	0.94	0.95	
Incremental Delay, d2	2.2	1.7	0.8	1.1	0.2		1.9	0.9	0.4	0.5	0.2	
Delay (s)	50.1	49.9	0.8	48.5	47.0		34.0	4.7	6.1	6.5	7.0	
Level of Service	D	D	A	D	D		C	A	A	A	A	
Approach Delay (s)		6.7			47.3			5.7			7.0	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

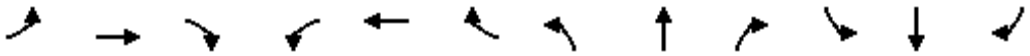


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	2	0	4	0	3	651	2	912
Lane Group Flow (vph)	0	11	4	2	3	715	0	993
Turn Type	Perm		Perm		Perm		Perm	
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	13.0	13.0	13.0	13.0	97.0	97.0	97.0	97.0
Total Split (%)	11.8%	11.8%	11.8%	11.8%	88.2%	88.2%	88.2%	88.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		7.0	7.0	7.0	106.8	106.8		106.8
Actuated g/C Ratio		0.06	0.06	0.06	0.97	0.97		0.97
v/c Ratio		0.10	0.03	0.00	0.01	0.39		0.30
Control Delay		30.0	48.5	0.0	0.0	0.8		0.7
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		30.0	48.5	0.0	0.0	0.8		0.7
LOS		C	D	A	A	A		A
Approach Delay		30.0		32.3		0.8		0.7
Approach LOS		C		C		A		A
Queue Length 50th (ft)		1	3	0	0	3		0
Queue Length 95th (ft)		20	14	0	m0	8		65
Internal Link Dist (ft)		177		292		325		532
Turn Bay Length (ft)					100			
Base Capacity (vph)		142	155	472	520	1824		3310
Starvation Cap Reductn		0	0	0	0	50		0
Spillback Cap Reductn		0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0		0
Reduced v/c Ratio		0.08	0.03	0.00	0.01	0.40		0.30

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 32 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.39	
Intersection Signal Delay: 1.0	Intersection LOS: A
Intersection Capacity Utilization 44.6%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 312: MBTA Dr. & University Ave



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	8	4	0	2	3	651	6	2	912	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00			0.95	
Frt		0.89		1.00	0.85		1.00	1.00			1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1642		1805	1615		1770	1879			3574	
Flt Permitted		0.98		1.00	1.00		0.29	1.00			0.95	
Satd. Flow (perm)		1632		1900	1615		536	1879			3411	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	9	4	0	2	3	708	7	2	991	0
RTOR Reduction (vph)	0	9	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2	0	4	0	0	3	715	0	0	993	0
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	1%	0%	0%	1%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.4		1.4	1.4		98.6	98.6			98.6	
Effective Green, g (s)		2.4		2.4	2.4		99.6	99.6			99.6	
Actuated g/C Ratio		0.02		0.02	0.02		0.91	0.91			0.91	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		36		41	35		485	1701			3089	
v/s Ratio Prot					0.00			c0.38				
v/s Ratio Perm		0.00		c0.00			0.01				0.29	
v/c Ratio		0.06		0.10	0.00		0.01	0.42			0.32	
Uniform Delay, d1		52.7		52.7	52.6		0.5	0.8			0.7	
Progression Factor		1.00		1.00	1.00		0.15	0.38			1.00	
Incremental Delay, d2		0.7		1.0	0.0		0.0	0.7			0.3	
Delay (s)		53.4		53.8	52.6		0.1	1.0			1.0	
Level of Service		D		D	D		A	A			A	
Approach Delay (s)		53.4			53.4			1.0			1.0	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	1.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group