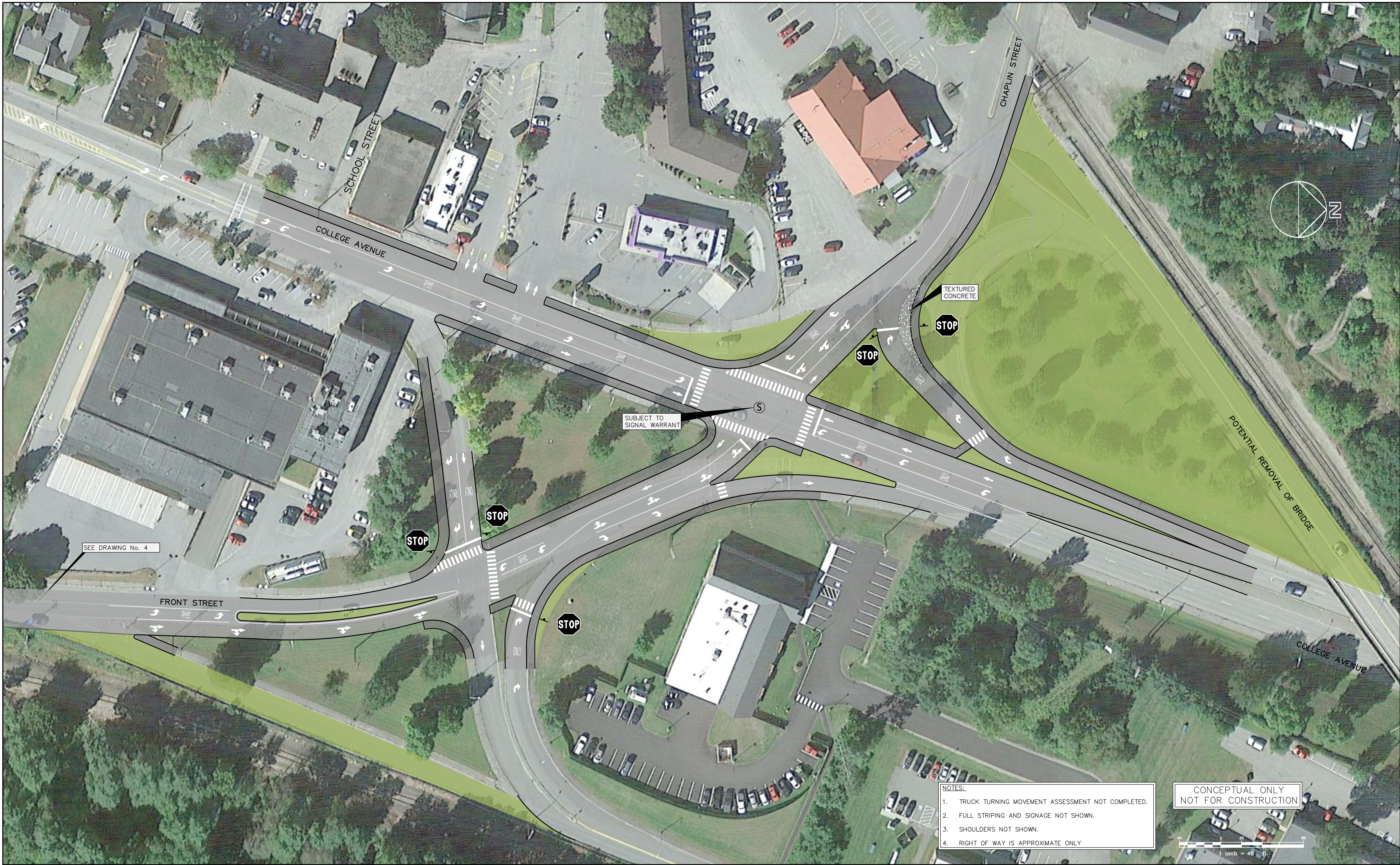


Appendix K

Selected Alternatives

Trip Assignment

Capacity Analyses



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Rev.	Date	Revision

Issued For		Date	By

Design: RED	Draft: LAN	Date: JUNE 2016
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Drawing Name:	CONCEPTUAL LAYOUT
Project:	Waterville Feasibility Study Waterville, Maine
Client:	City of Waterville One Common St, Waterville, Me 04901

Drawing No.
1



C:\CAD Working\3110 Waterville\DWG\3110-CONCEPT-ALL.dwg 11/9/2016 2:17 PM

Rev.	Date	Revision

Issued For	Date	By

Design: RED	Draft: LAN	Date: JUNE 2016
Checked: DGE	Scale: 1" = 25'	Job No.: 3110
File Name: 3110-CONCEPT-ALL.dwg		
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Drawing Name:	CONCEPTUAL LAYOUT
Project:	Waterville Feasibility Study Waterville, Maine
Client:	City of Waterville One Common St, Waterville, Me 04901

Drawing No.
2



C:\CAD Working\3110 Waterville\DWG\3110-CONCEPT-ALL.dwg 11/9/2016 2:17 PM

Rev.	Date	Revision

Issued For		Date	By

Design: RED	Draft: LAN	Date: JUNE 2016
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Drawing Name:	CONCEPTUAL LAYOUT
Project:	Waterville Feasibility Study Waterville, Maine
Client:	City of Waterville One Common St, Waterville, Me 04901

Drawing No.
3



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Rev.	Date	Revision

Issued For	Date	By

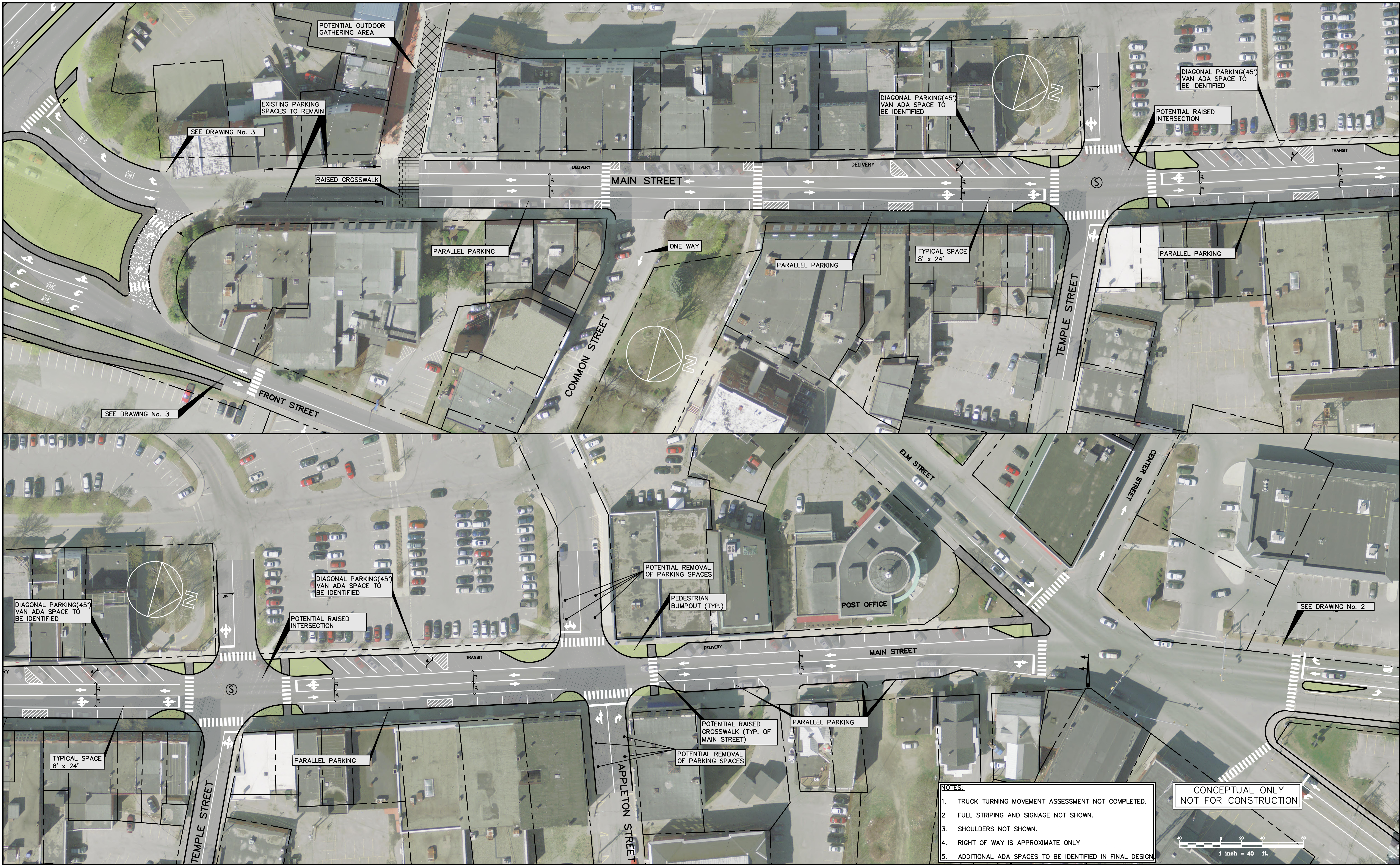
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Drawing Name:	CONCEPTUAL LAYOUT
Project:	Waterville Feasibility Study Waterville, Maine
Client:	City of Waterville One Common St, Waterville, Me 04901

Drawing No.
4



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Rev.	Date	Revision

Issued For	Date	By

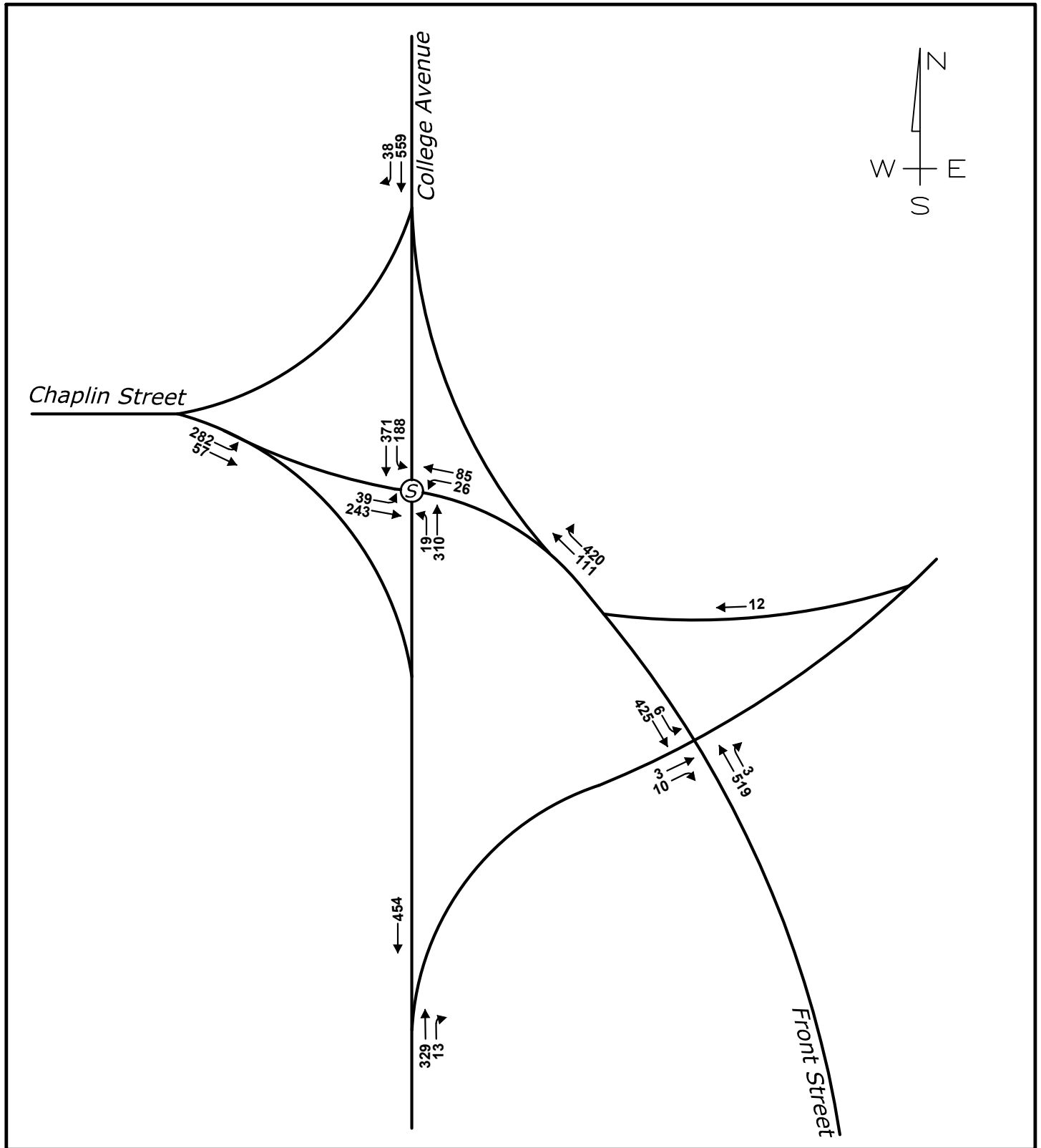
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Drawing Name:	CONCEPTUAL LAYOUT
Project:	Waterville Feasibility Study
Client:	City of Waterville
	One Common St, Waterville, Me 04901

Drawing No.
5



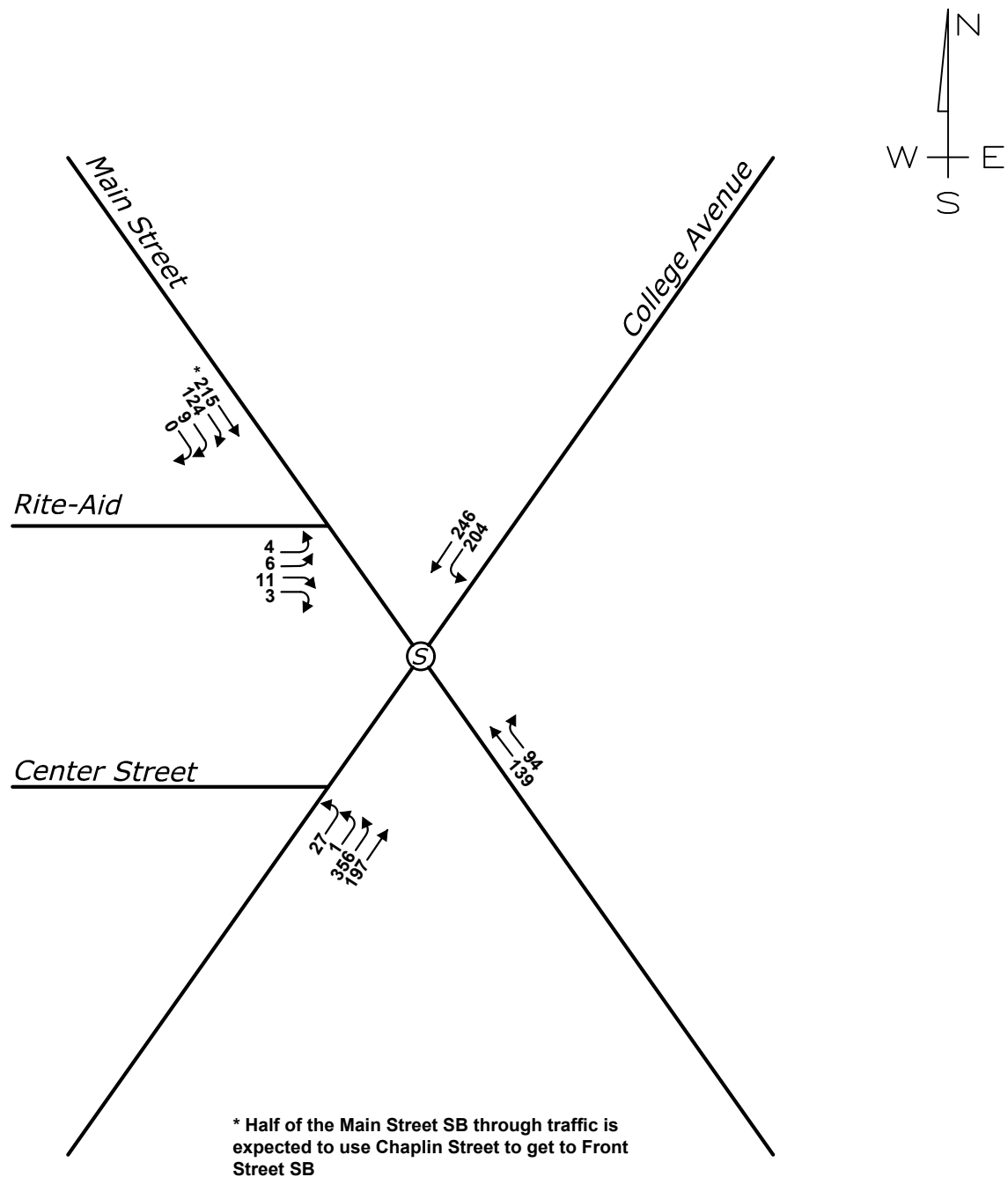
DOWNTOWN TRANSPORTATION STUDY
WATERVILLE, MAINE

Design: ET Scale: NONE
Draft: LAN Date: JUNE 2016
Checked: RED File Name: 3110-TRAFF2.dwg

SIGNALIZED INTERSECTION 2037 PM POSTDEVELOPMENT FRONT ST & MAIN ST 2-WAY ASSUMED VOLUMES - FRONT MAJOR

Figure No.

7



DOWNTOWN TRANSPORTATION STUDY WATERVILLE, MAINE

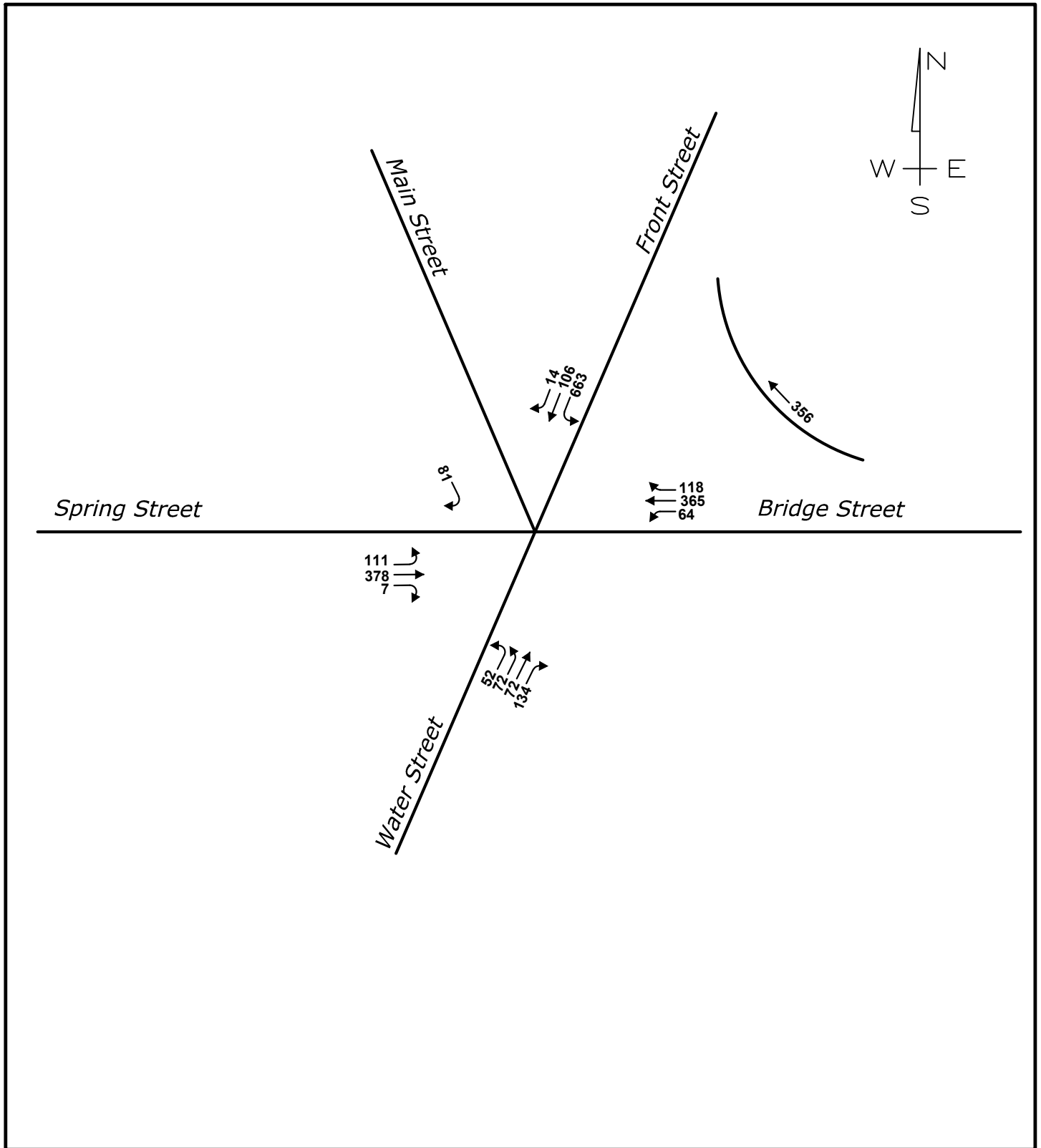
Design: ET
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Date: JUNE 2016
File Name: 3110-TRAFF2.dwg



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**DOWNTOWN TRANSPORTATION STUDY
WATERVILLE, MAINE**

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1840	1787	1848	1824	1718	1805
Vehs Exited	1837	1777	1848	1821	1719	1801
Starting Vehs	27	24	32	28	30	28
Ending Vehs	30	34	32	31	29	31
Denied Entry Before	1	1	1	0	1	1
Denied Entry After	0	0	1	2	0	0
Travel Distance (mi)	684	666	688	680	639	672
Travel Time (hr)	31.3	30.3	30.8	31.2	29.5	30.6
Total Delay (hr)	6.8	6.5	6.4	7.0	6.6	6.7
Total Stops	1010	970	1006	1069	977	1006
Fuel Used (gal)	24.7	24.2	24.8	24.5	23.0	24.2

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1840	1787	1848	1824	1718	1805
Vehs Exited	1837	1777	1848	1821	1719	1801
Starting Vehs	27	24	32	28	30	28
Ending Vehs	30	34	32	31	29	31
Denied Entry Before	1	1	1	0	1	1
Denied Entry After	0	0	1	2	0	0
Travel Distance (mi)	684	666	688	680	639	672
Travel Time (hr)	31.3	30.3	30.8	31.2	29.5	30.6
Total Delay (hr)	6.8	6.5	6.4	7.0	6.6	6.7
Total Stops	1010	970	1006	1069	977	1006
Fuel Used (gal)	24.7	24.2	24.8	24.5	23.0	24.2

3: College Ave & Chaplin Street/Front Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.0	0.0	0.0	1.4	0.7
Total Del/Veh (s)	13.9	5.8	14.6	9.0	10.0
Denied Entry Before	0	0	0	1	1
Denied Entry After	0	0	0	0	0

5: College Ave & Colby Street Performance by approach

Approach	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.1
Total Del/Veh (s)	0.5	1.5	1.1
Denied Entry Before	0	0	0
Denied Entry After	0	0	0

6: Front Street & Colby Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.4	0.0	0.2
Total Del/Veh (s)	5.3	1.6	0.6	1.5	1.1
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Total Network Performance

Denied Del/Veh (s)		0.8
Total Del/Veh (s)		12.3
Denied Entry Before		1
Denied Entry After		0

Intersection: 3: College Ave & Chaplin Street/Front Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	T	L	T
Maximum Queue (ft)	198	55	131	130	39	188	120	167
Average Queue (ft)	90	22	47	40	11	97	54	83
95th Queue (ft)	155	49	97	98	32	158	98	140
Link Distance (ft)	569			283		359		771
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		80	160		320		220	
Storage Blk Time (%)	9	0	0	0				0
Queuing Penalty (veh)	5	0	2	0				0

Intersection: 5: College Ave & Colby Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 6: Front Street & Colby Street

Movement	EB	EB	SB
Directions Served	T	R	L
Maximum Queue (ft)	30	29	22
Average Queue (ft)	2	8	1
95th Queue (ft)	14	29	11
Link Distance (ft)	230		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	50
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 7

Intersection: 3: College Ave & Chaplin Street/Front Street

Phase	1	2	4	5	6	8
Movement(s) Served	SBL NBTL EBTL	NBL	SBTL WBTL			
Maximum Green (s)	8.0	19.0	18.0	4.0	23.0	18.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Recall	None	Min	None	None	Min	None
Avg. Green (s)	7.3	12.9	13.6	4.0	21.4	13.6
g/C Ratio	-0.01	NA	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	25	0	3	89	3	3
Cycles @ Minimum (%)	1	3	1	11	0	1
Cycles Maxed Out (%)	42	15	33	11	41	33
Cycles with Peds (%)	0	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1602	1686	1684	1576	1582	1627
Vehs Exited	1604	1694	1688	1547	1574	1622
Starting Vehs	60	60	52	45	54	53
Ending Vehs	58	52	48	74	62	58
Denied Entry Before	0	0	0	1	0	0
Denied Entry After	0	0	0	0	0	0
Travel Distance (mi)	974	1047	1040	968	980	1002
Travel Time (hr)	66.5	71.5	68.6	61.2	62.7	66.1
Total Delay (hr)	24.9	26.7	24.4	19.9	20.6	23.3
Total Stops	1686	1689	1678	1481	1510	1608
Fuel Used (gal)	37.2	39.8	39.2	36.0	36.1	37.7

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1602	1686	1684	1576	1582	1627
Vehs Exited	1604	1694	1688	1547	1574	1622
Starting Vehs	60	60	52	45	54	53
Ending Vehs	58	52	48	74	62	58
Denied Entry Before	0	0	0	1	0	0
Denied Entry After	0	0	0	0	0	0
Travel Distance (mi)	974	1047	1040	968	980	1002
Travel Time (hr)	66.5	71.5	68.6	61.2	62.7	66.1
Total Delay (hr)	24.9	26.7	24.4	19.9	20.6	23.3
Total Stops	1686	1689	1678	1481	1510	1608
Fuel Used (gal)	37.2	39.8	39.2	36.0	36.1	37.7

3: Center Street/College Avenue & Elm Street/Main Street & Rite-Aid Performance by approach

Approach	EB	NB	SB	NW	SW	All
Denied Del/Veh (s)	0.1	0.2	1.4	0.2	0.2	0.4
Total Del/Veh (s)	44.2	47.6	42.0	46.0	50.3	46.9
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	49.5
Denied Entry Before	0
Denied Entry After	0

Intersection: 3: Center Street/College Avenue & Elm Street/Main Street & Rite-Aid

Movement	EB	EB	NB	NB	SB	SB	NW	SW	SW
Directions Served	<L	R>	<LT	R	L	TR	R>	<	L
Maximum Queue (ft)	44	52	478	230	321	165	236	218	343
Average Queue (ft)	11	14	230	97	143	94	103	79	174
95th Queue (ft)	36	42	417	187	277	179	203	161	328
Link Distance (ft)	219	219	2116	2116	1051		1032	1843	1843
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)						140			
Storage Blk Time (%)					13	1			
Queuing Penalty (veh)					18	3			

Network Summary

Network wide Queuing Penalty: 20

Intersection: 3: Center Street/College Avenue & Elm Street/Main Street & Rite-Aid

Phase	1	2	3	10	14
Movement(s) Served	EBL	NBTL	SWL	SBTL	NWR
Maximum Green (s)	14.0	20.0	17.0	16.0	16.0
Minimum Green (s)	4.0	4.0	4.0	1.0	4.0
Recall	None	None	None	None	None
Avg. Green (s)	6.5	19.6	16.3	15.7	15.7
g/C Ratio	-0.01	NA	NA	NA	NA
Cycles Skipped (%)	63	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0
Cycles Maxed Out (%)	0	87	83	87	87
Cycles with Peds (%)	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	2485	2681	2490	2482	2493	2526
Vehs Exited	2493	2696	2498	2468	2489	2529
Starting Vehs	53	53	55	39	45	49
Ending Vehs	45	38	47	53	49	47
Denied Entry Before	1	1	1	0	1	0
Denied Entry After	1	3	0	1	1	0
Travel Distance (mi)	796	863	799	793	800	810
Travel Time (hr)	51.1	56.7	50.1	50.6	51.3	52.0
Total Delay (hr)	22.6	25.7	21.4	22.1	22.6	22.9
Total Stops	1978	2168	1976	1992	2002	2022
Fuel Used (gal)	34.2	37.2	33.8	33.9	34.1	34.6

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	2485	2681	2490	2482	2493	2526
Vehs Exited	2493	2696	2498	2468	2489	2529
Starting Vehs	53	53	55	39	45	49
Ending Vehs	45	38	47	53	49	47
Denied Entry Before	1	1	1	0	1	0
Denied Entry After	1	3	0	1	1	0
Travel Distance (mi)	796	863	799	793	800	810
Travel Time (hr)	51.1	56.7	50.1	50.6	51.3	52.0
Total Delay (hr)	22.6	25.7	21.4	22.1	22.6	22.9
Total Stops	1978	2168	1976	1992	2002	2022
Fuel Used (gal)	34.2	37.2	33.8	33.9	34.1	34.6

3: Front Street & Spring Street/Bridge Street Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.8	1.5	3.0	0.6	1.3
Total Del/Veh (s)	33.0	25.1	28.5	29.7	28.6
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Total Network Performance

Denied Del/Veh (s)	1.3
Total Del/Veh (s)	30.7
Denied Entry Before	0
Denied Entry After	0

Intersection: 3: Front Street & Spring Street/Bridge Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	L
Maximum Queue (ft)	168	230	194	140	329	334	110	149	146	124	302	285
Average Queue (ft)	78	136	93	64	173	156	55	75	53	39	205	164
95th Queue (ft)	139	210	176	134	272	281	143	132	110	83	286	253
Link Distance (ft)		652	652		1030	1030			592		671	671
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	225			70			60	170		80		
Storage Blk Time (%)		0		9	45	24	0	0	5	1		3
Queuing Penalty (veh)		0		22	29	84	0	0	12	1		4

Intersection: 3: Front Street & Spring Street/Bridge Street

Movement	SB
Directions Served	TR
Maximum Queue (ft)	180
Average Queue (ft)	80
95th Queue (ft)	160
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	170
Storage Blk Time (%)	0
Queuing Penalty (veh)	1

Network Summary

Network wide Queuing Penalty: 154

Intersection: 3: Front Street & Spring Street/Bridge Street

Phase	1	2	3	4	5	6	7	8
Movement(s) Served	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Maximum Green (s)	13.0	30.0	17.0	32.0	15.0	28.0	33.0	16.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Recall	None	None	None	None	None	C-Min	None	None
Avg. Green (s)	9.5	26.9	15.7	27.0	10.5	25.1	31.8	9.6
g/C Ratio	-0.01	NA	-0.01	-0.01	-0.01	NA	NA	-0.01
Cycles Skipped (%)	9	0	6	6	3	0	0	13
Cycles @ Minimum (%)	0	0	0	0	0	0	0	0
Cycles Maxed Out (%)	0	11	6	6	3	100	14	0
Cycles with Peds (%)	0	0	0	0	0	0	0	0

Controller Summary

Average Cycle Length (s): NA

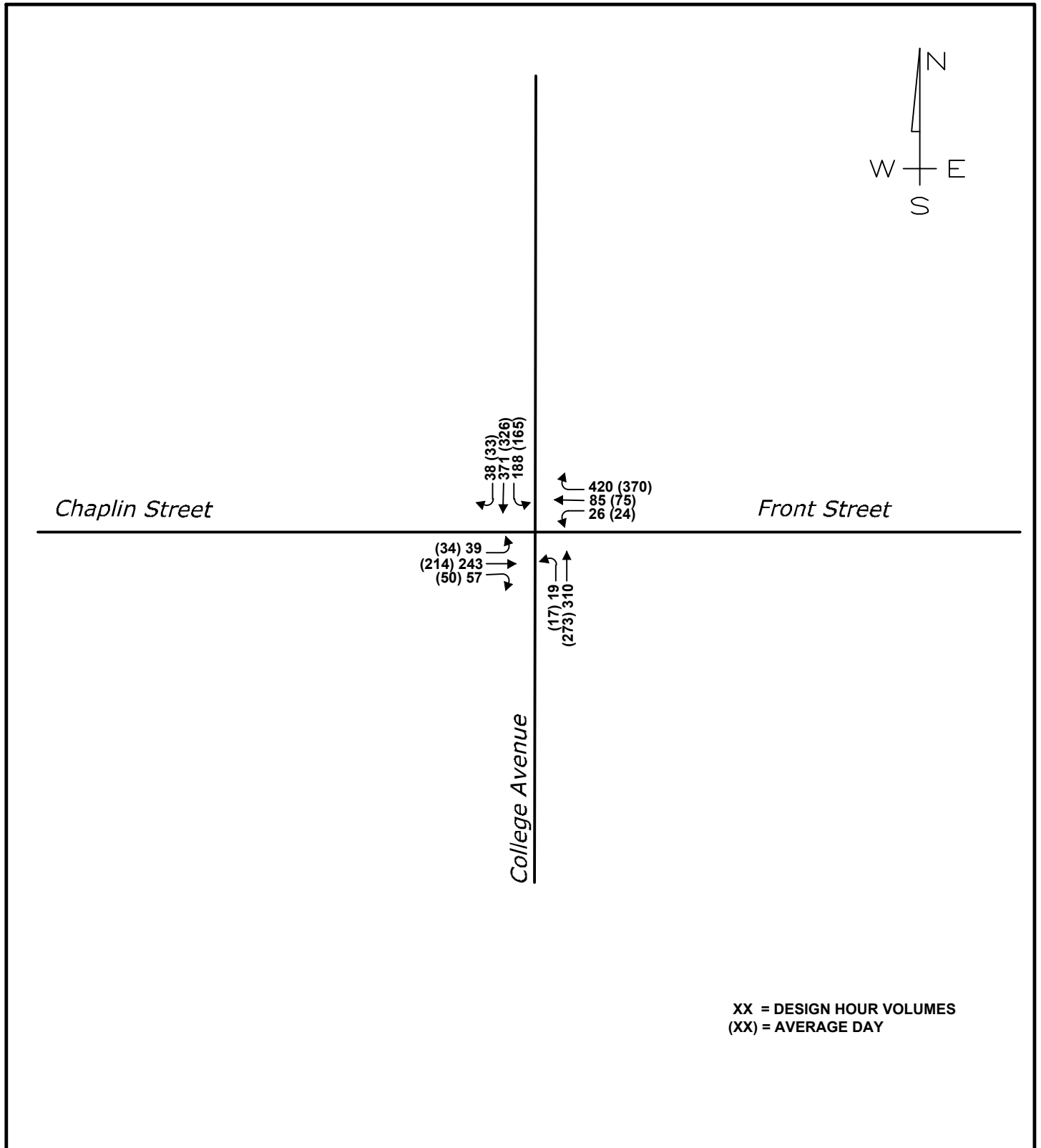
Number of Complete Cycles : 0

Appendix L

Trip Assignment

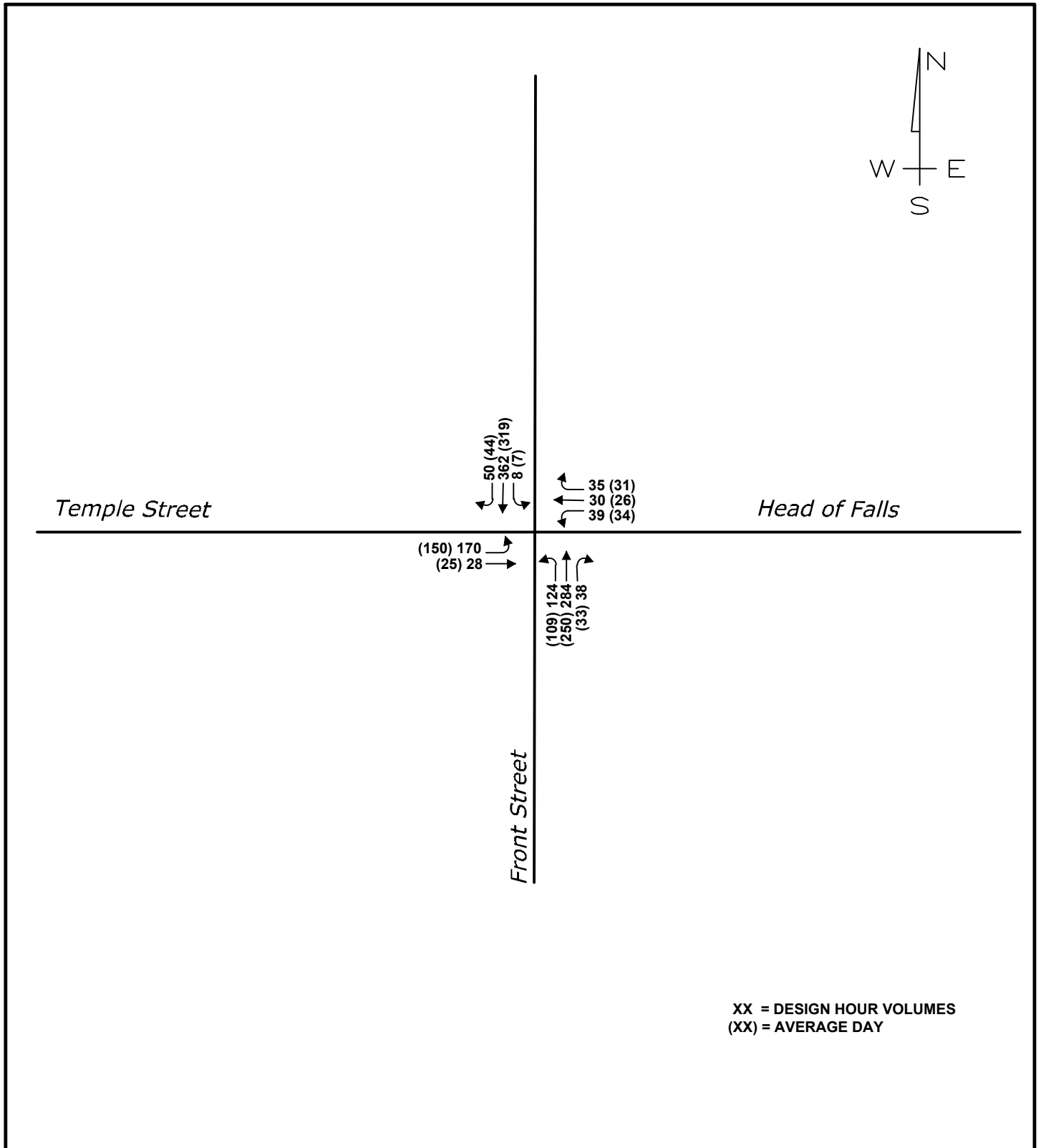
Figure 4C-3

Capacity Analyses



**DOWNTOWN TRANSPORTATION STUDY
WATERVILLE, MAINE**

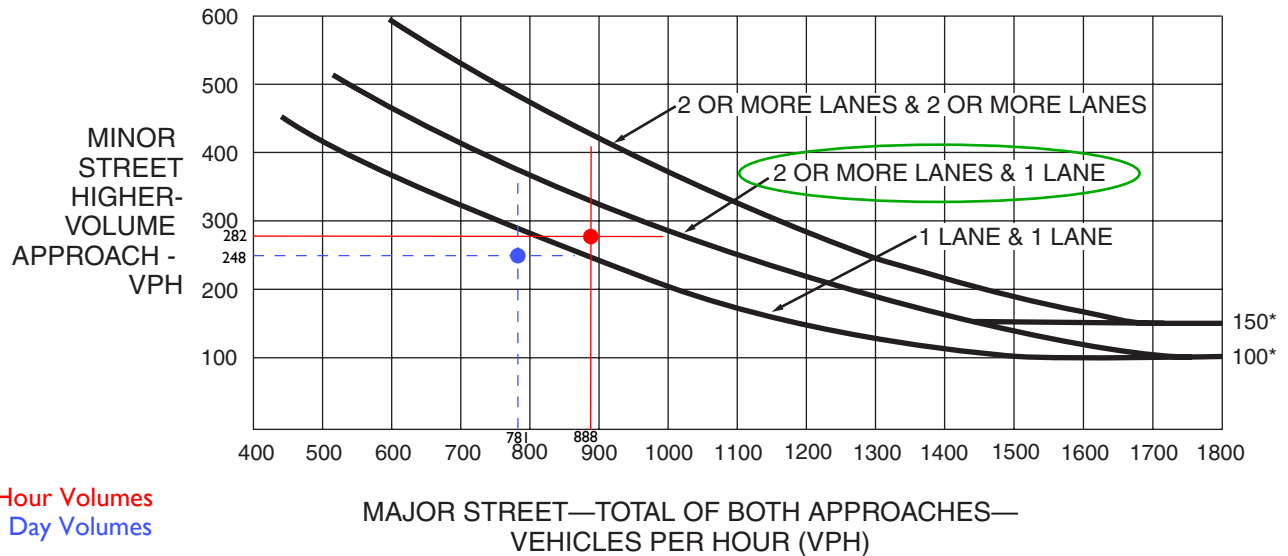
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Checked: RED File Name: 3110-TRAFF2.dwg



**DOWNTOWN TRANSPORTATION STUDY
WATERVILLE, MAINE**

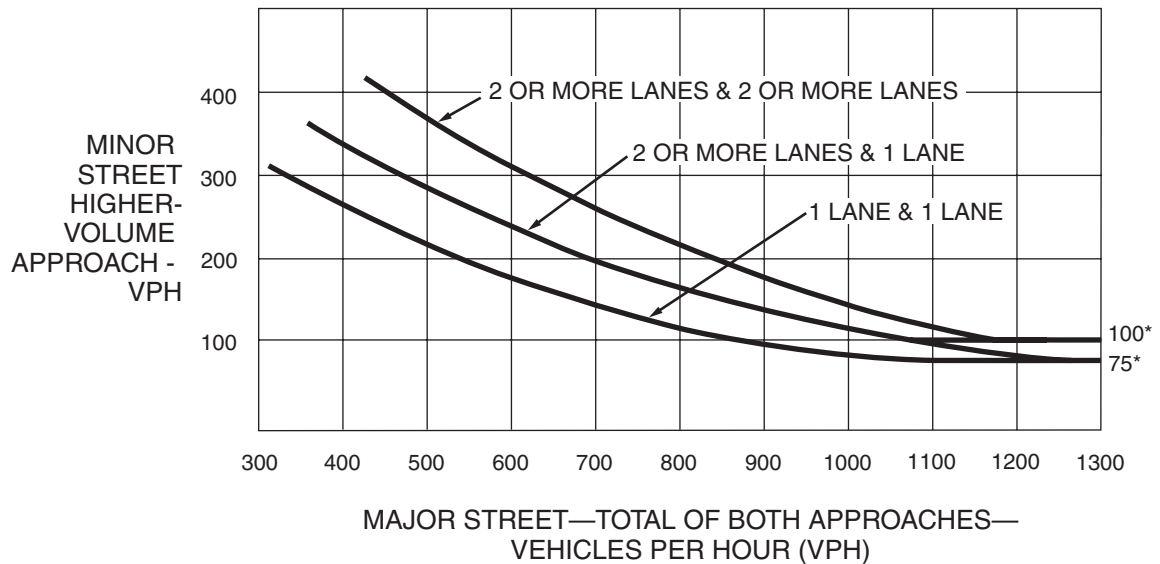
Front St / College Ave
2037 Postdevelopment Peak Hour
Main St and Front St 2-Way
Front St Major

Figure 4C-3. Warrant 3, Peak Hour



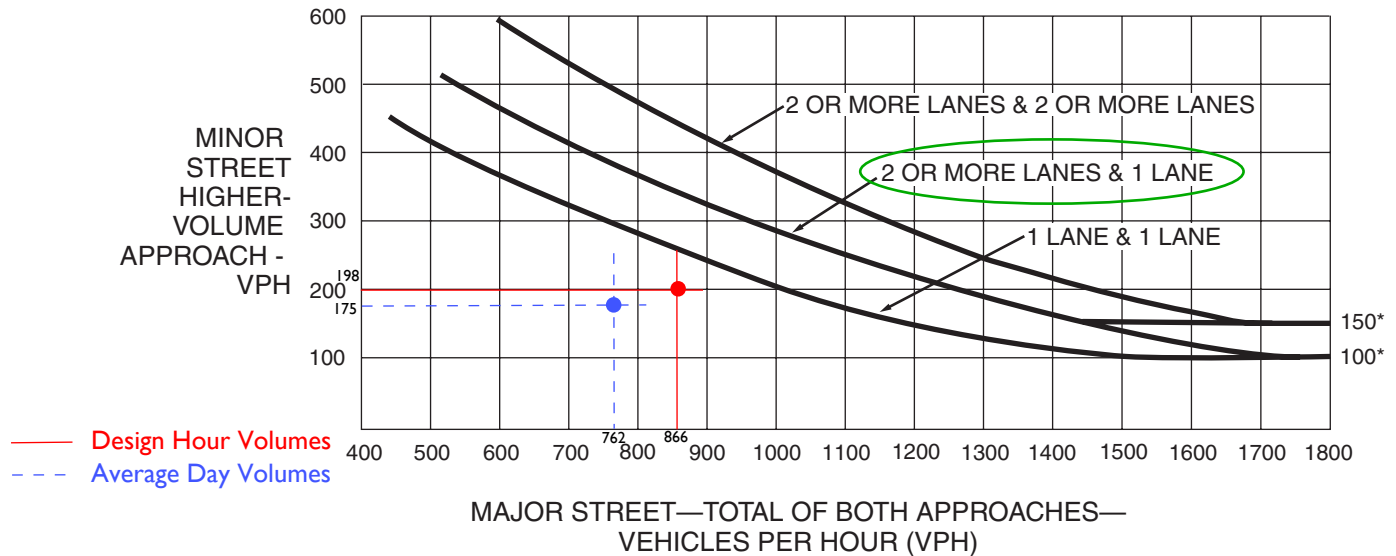
*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



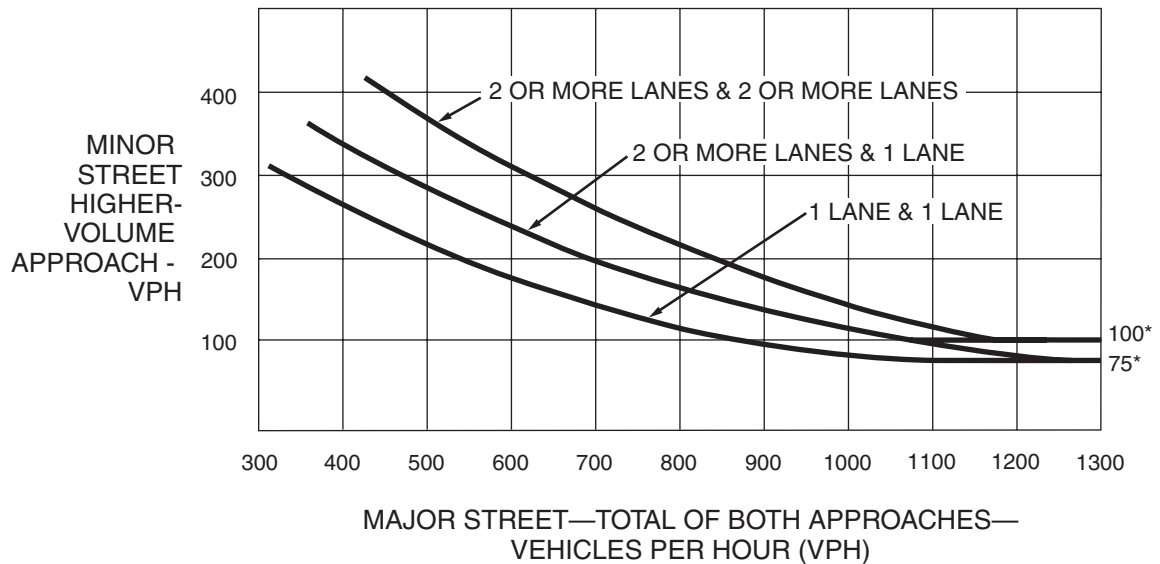
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Front St / Temple St
2037 Postdevelopment Peak Hour
Main St and Front St 2-Way
Front St Major
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1774	1879	1873	1747	1706	1795
Vehs Exited	1788	1865	1870	1736	1699	1792
Starting Vehs	30	17	20	18	19	19
Ending Vehs	16	31	23	29	26	24
Denied Entry Before	1	0	1	2	2	0
Denied Entry After	0	2	2	0	0	0
Travel Distance (mi)	412	434	434	401	397	416
Travel Time (hr)	27.7	39.7	24.8	23.7	19.5	27.1
Total Delay (hr)	12.6	23.8	8.9	8.9	5.0	11.8
Total Stops	769	658	854	732	690	739
Fuel Used (gal)	18.1	21.3	18.1	16.7	15.7	18.0

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1774	1879	1873	1747	1706	1795
Vehs Exited	1788	1865	1870	1736	1699	1792
Starting Vehs	30	17	20	18	19	19
Ending Vehs	16	31	23	29	26	24
Denied Entry Before	1	0	1	2	2	0
Denied Entry After	0	2	2	0	0	0
Travel Distance (mi)	412	434	434	401	397	416
Travel Time (hr)	27.7	39.7	24.8	23.7	19.5	27.1
Total Delay (hr)	12.6	23.8	8.9	8.9	5.0	11.8
Total Stops	769	658	854	732	690	739
Fuel Used (gal)	18.1	21.3	18.1	16.7	15.7	18.0

3: College Ave & Chaplin Street/Front Street Performance by approach

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	8.3	0.8	0.0	0.1	9.2
Vehicles Entered	342	525	327	601	1795
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Total Network Performance

Stop Delay (hr)	9.5
Vehicles Entered	1795
Denied Entry Before	0
Denied Entry After	0

Intersection: 3: College Ave & Chaplin Street/Front Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	L	T	L	T
Maximum Queue (ft)	457	180	126	103	24	12	77	7
Average Queue (ft)	259	90	52	38	5	0	28	0
95th Queue (ft)	545	219	102	86	20	5	56	4
Link Distance (ft)	512			337		541		771
Upstream Blk Time (%)	13							
Queuing Penalty (veh)	0							
Storage Bay Dist (ft)		80	160		320		220	
Storage Blk Time (%)	63	0	0					
Queuing Penalty (veh)	36	1	1					

Network Summary

Network wide Queuing Penalty: 38

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1574	1637	1620	1536	1505	1574
Vehs Exited	1585	1631	1624	1525	1500	1574
Starting Vehs	23	11	18	11	15	16
Ending Vehs	12	17	14	22	20	15
Denied Entry Before	1	0	1	1	1	0
Denied Entry After	1	0	1	1	1	0
Travel Distance (mi)	366	378	375	356	350	365
Travel Time (hr)	17.5	18.8	17.5	16.7	16.0	17.3
Total Delay (hr)	4.1	4.9	3.7	3.5	3.1	3.9
Total Stops	611	657	653	570	557	611
Fuel Used (gal)	14.4	15.0	14.6	13.7	13.5	14.2

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1574	1637	1620	1536	1505	1574
Vehs Exited	1585	1631	1624	1525	1500	1574
Starting Vehs	23	11	18	11	15	16
Ending Vehs	12	17	14	22	20	15
Denied Entry Before	1	0	1	1	1	0
Denied Entry After	1	0	1	1	1	0
Travel Distance (mi)	366	378	375	356	350	365
Travel Time (hr)	17.5	18.8	17.5	16.7	16.0	17.3
Total Delay (hr)	4.1	4.9	3.7	3.5	3.1	3.9
Total Stops	611	657	653	570	557	611
Fuel Used (gal)	14.4	15.0	14.6	13.7	13.5	14.2

3: College Ave & Chaplin Street/Front Street Performance by approach

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	1.5	0.5	0.0	0.1	2.1
Vehicles Entered	287	473	286	528	1574
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Total Network Performance

Stop Delay (hr)	2.3
Vehicles Entered	1574
Denied Entry Before	0
Denied Entry After	0

Intersection: 3: College Ave & Chaplin Street/Front Street

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	LT	R	L	T	L
Maximum Queue (ft)	216	132	92	98	24	4	66
Average Queue (ft)	94	31	40	25	3	0	24
95th Queue (ft)	176	84	74	68	15	3	50
Link Distance (ft)	512			337		541	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		80	160		320		220
Storage Blk Time (%)	18	0					
Queuing Penalty (veh)	9	0					

Network Summary

Network wide Queuing Penalty: 9

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1206	1229	1208	1164	1125	1187
Vehs Exited	1214	1225	1212	1160	1119	1186
Starting Vehs	13	7	9	6	6	8
Ending Vehs	5	11	5	10	12	8
Denied Entry Before	1	1	0	0	0	0
Denied Entry After	0	0	1	1	1	1
Travel Distance (mi)	211	215	211	201	195	207
Travel Time (hr)	11.5	13.9	11.3	11.2	10.2	11.6
Total Delay (hr)	3.8	6.0	3.7	3.9	3.1	4.1
Total Stops	353	386	357	330	352	356
Fuel Used (gal)	9.3	9.9	9.1	8.9	8.4	9.1

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1206	1229	1208	1164	1125	1187
Vehs Exited	1214	1225	1212	1160	1119	1186
Starting Vehs	13	7	9	6	6	8
Ending Vehs	5	11	5	10	12	8
Denied Entry Before	1	1	0	0	0	0
Denied Entry After	0	0	1	1	1	1
Travel Distance (mi)	211	215	211	201	195	207
Travel Time (hr)	11.5	13.9	11.3	11.2	10.2	11.6
Total Delay (hr)	3.8	6.0	3.7	3.9	3.1	4.1
Total Stops	353	386	357	330	352	356
Fuel Used (gal)	9.3	9.9	9.1	8.9	8.4	9.1

3: Temple St/Head of Falls & Front St Performance by approach

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	2.4	0.4	0.1	0.0	2.9
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	1	0	1

Total Network Performance

Stop Delay (hr)	3.0
Denied Entry Before	0
Denied Entry After	1

Intersection: 3: Temple St/Head of Falls & Front St

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LT	LTR	L	TR	L	TR
Maximum Queue (ft)	286	114	74	4	28	11
Average Queue (ft)	114	48	27	0	3	1
95th Queue (ft)	245	87	55	3	18	9
Link Distance (ft)	633	385	425			354
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				50	50	
Storage Blk Time (%)			1			0
Queuing Penalty (veh)			3			0

Network Summary

Network wide Queuing Penalty: 3

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	1019	1074	1040	1032	985	1030
Vehs Exited	1020	1072	1045	1027	982	1028
Starting Vehs	7	5	8	3	3	5
Ending Vehs	6	7	3	8	6	5
Denied Entry Before	1	0	0	1	0	0
Denied Entry After	0	0	0	0	0	0
Travel Distance (mi)	158	166	162	160	152	159
Travel Time (hr)	7.8	9.3	8.1	7.9	7.8	8.2
Total Delay (hr)	2.0	3.1	2.2	2.1	2.2	2.3
Total Stops	302	344	316	288	297	310
Fuel Used (gal)	6.8	7.5	7.0	6.8	6.6	6.9

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	1019	1074	1040	1032	985	1030
Vehs Exited	1020	1072	1045	1027	982	1028
Starting Vehs	7	5	8	3	3	5
Ending Vehs	6	7	3	8	6	5
Denied Entry Before	1	0	0	1	0	0
Denied Entry After	0	0	0	0	0	0
Travel Distance (mi)	158	166	162	160	152	159
Travel Time (hr)	7.8	9.3	8.1	7.9	7.8	8.2
Total Delay (hr)	2.0	3.1	2.2	2.1	2.2	2.3
Total Stops	302	344	316	288	297	310
Fuel Used (gal)	6.8	7.5	7.0	6.8	6.6	6.9

3: Temple St/Head of Falls & Front St Performance by approach

Approach	EB	WB	NB	SB	All
Stop Delay (hr)	1.0	0.3	0.0	0.0	1.3
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Total Network Performance

Stop Delay (hr)	1.4
Denied Entry Before	0
Denied Entry After	0

Intersection: 3: Temple St/Head of Falls & Front St

Movement	EB	WB	NB	SB	SB
Directions Served	LT	LTR	L	L	TR
Maximum Queue (ft)	185	93	67	28	10
Average Queue (ft)	75	40	26	3	0
95th Queue (ft)	148	73	52	16	4
Link Distance (ft)	324	385	425		354
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)				50	
Storage Blk Time (%)			1		
Queuing Penalty (veh)			2		

Network Summary

Network wide Queuing Penalty: 2

Appendix M

Opinions of Construction Cost

Gorrill Palmer
Conceptual Opinion of Probable Cost

11/23/2016

Job: **Waterville Feasibility Study**
Project Location: **Waterville, Maine**
Comments: **Conceptual Costs for Sheet 1**
Date: 11/21/2016
References:

Calculated By: TL
Checked By: JW, DE

- Notes:
1. Conceptual Opinion of Probable Cost, based on concept plans dated 11/09/2016
 2. Costs defined below include construction only and do not include engineering, inspection and conceptual right of way costs.
 3. Construction costs based on aerial images and not based on topographic survey. Revised costs to be developed during the preliminary design using survey information.
 4. Utility, Environmental, Landscaping, and Lighting costs are not included.
 5. Removal of bridge and approach roadways not included.
 6. Work assumes no right of way impacts.
 7. Work assumes 1.5" pavement overlay of existing roadway surface.

SHEET 1					
Item	Item Description	Unit	Unit Price	Quantity	Amount
203.20	COMMON EXCAVATION	CY	\$ 20.00	5700	\$ 114,000.00
304.10	AGGREGATE SUBBASE COURSE - GRAVEL	CY	\$ 30.00	4000	\$ 120,000.00
403.208	HOT MIX ASPHALT 12.5 MM	TON	\$ 125.00	2300	\$ 287,500.00
403.209	HOT MIX ASPHALT 9.5 MM (INCID.)	TON	\$ 175.00	300	\$ 52,500.00
502.342	STRUCTURAL CONCRETE ROADWAY TRUCK APRON	CY	\$ 400.00	15	\$ 6,000.00
603.175	18" RCP CLASS III	LF	\$ 115.00	500	\$ 57,500.00
604.252	CATCH BASIN TYPE A5-C	EA	\$ 3,400.00	23	\$ 78,200.00
605.11	12" UNDERDRAIN TYPE C	LF	\$ 45.00	1200	\$ 54,000.00
609.11	VERTICAL CURB TYPE 1	LF	\$ 35.00	5200	\$ 182,000.00
615.07	LOAM	CY	\$ 50.00	500	\$ 25,000.00
627.733	4" WHITE OR YELLOW PAVEMENT MARKING LINE	LF	\$ 0.70	9800	\$ 6,860.00
627.75	WHITE OR YELLOW PAVEMENT OR CURB MARKING	SF	\$ 3.00	3300	\$ 9,900.00
643.XX	TRAFFIC SIGNAL	LS	\$ 200,000.00	1	\$ 200,000.00
652.00	MAINTENANCE OF TRAFFIC	LS	\$ 40,000.00	1	\$ 40,000.00
659.01	MOBILIZATION	LS	\$ 100,000.00	1	\$ 100,000.00
SUBTOTAL					\$ 1,333,460.00
CONTINGENCY (20%)					\$ 266,692.00
CONSTRUCTION COST					\$ 1,600,152.00

Gorrill Palmer
Conceptual Opinion of Probable Cost

11/23/2016

Job: **Waterville Feasibility Study**
Project Location: **Waterville, Maine**
Comments: **Conceptual Costs for Sheet 2**
Date: 11/21/2016
References:

Calculated By: TL
Checked By: JW, DE

- Notes:
1. Conceptual Opinion of Probable Cost, based on concept plans dated 11/09/2016.
 2. Costs defined below include construction only and do not include engineering, inspection and conceptual right of way costs.
 3. Construction costs based on aerial images and not based on topographic survey. Revised costs to be developed during the preliminary design using survey information.
 4. Utility, Environmental, Landscaping, and Lighting costs are not included.
 5. Work assumes no right of way impacts.
 6. Work assumes no pavement overlay of intersection.

SHEET 2					
Item	Item Description	Unit	Unit Price	Quantity	Amount
203.20	COMMON EXCAVATION	CY	\$ 20.00	135	\$ 2,700.00
304.10	AGGREGATE SUBBASE COURSE - GRAVEL	CY	\$ 30.00	105	\$ 3,150.00
403.208	HOT MIX ASPHALT 12.5 MM	TON	\$ 125.00	20	\$ 2,500.00
403.209	HOT MIX ASPHALT 9.5 MM (INCID.)	TON	\$ 175.00	14	\$ 2,450.00
604.252	CATCH BASIN TYPE A5-C	EA	\$ 3,400.00	1	\$ 3,400.00
605.11	12" UNDERDRAIN TYPE C	LF	\$ 45.00	50	\$ 2,250.00
609.11	VERTICAL CURB TYPE 1	LF	\$ 35.00	250	\$ 8,750.00
615.07	LOAM	CY	\$ 50.00	15	\$ 750.00
627.733	4' WHITE OR YELLOW PAVEMENT MARKING LINE	LF	\$ 0.70	1800	\$ 1,260.00
627.75	WHITE OR YELLOW PAVEMENT OR CURB MARKING	SF	\$ 3.00	1350	\$ 4,050.00
643.XX	TRAFFIC SIGNAL, MAST ARM AND FOUNDATION	LS	\$ 30,000.00	1	\$ 30,000.00
652.00	MAINTENANCE OF TRAFFIC	LS	\$ 5,000.00	1	\$ 5,000.00
659.01	MOBILIZATION	LS	\$ 6,000.00	1	\$ 6,000.00
SUBTOTAL					\$ 72,260.00
CONTINGENCY (20%)					\$ 14,452.00
CONSTRUCTION COST					\$ 86,712.00

Gorrill Palmer
Conceptual Opinion of Probable Cost

11/23/2016

Job: **Waterville Feasibility Study**
Project Location: **Waterville, Maine**
Comments: **Conceptual Costs for Sheet 3**
Date: 11/21/2016
References:

Calculated By: TL
Checked By: JW, DE

- Notes:
1. Conceptual Opinion of Probable Cost, based on concept plans dated 11/09/2016.
 2. Costs defined below include construction only and do not include engineering, inspection and conceptual right of way costs.
 3. Construction costs based on aerial images and not based on topographic survey. Revised costs to be developed during the preliminary design using survey information.
 4. Utility, Environmental, Landscaping, and Lighting costs are not included.
 5. Work assumes no Right of way impacts.
 6. Work assumes 1.5" pavement overlay of existing roadway surface.

SHEET 3					
Item	Item Description	Unit	Unit Price	Quantity	Amount
203.20	COMMON EXCAVATION	CY	\$ 20.00	3550	\$ 71,000.00
304.10	AGGREGATE SUBBASE COURSE - GRAVEL	CY	\$ 30.00	2600	\$ 78,000.00
403.208	HOT MIX ASPHALT 12.5 MM	TON	\$ 125.00	1550	\$ 193,750.00
403.209	HOT MIX ASPHALT 9.5 MM (INCID.)	TON	\$ 175.00	180	\$ 31,500.00
502.342	STRUCTURAL CONCRETE ROADWAY TRUCK APRON	CY	\$ 400.00	40	\$ 16,000.00
603.18	18" RCP CLASS III	LF	\$ 115.00	590	\$ 67,850.00
604.25	CATCH BASIN TYPE A5-C	EA	\$ 3,400.00	21	\$ 71,400.00
605.11	12" UNDERDRAIN TYPE C	LF	\$ 45.00	1620	\$ 72,900.00
609.11	VERTICAL CURB TYPE 1	LF	\$ 35.00	3900	\$ 136,500.00
615.07	LOAM	CY	\$ 50.00	240	\$ 12,000.00
627.733	4" WHITE OR YELLOW PAVEMENT MARKING LINE	LF	\$ 0.70	5900	\$ 4,130.00
627.75	WHITE OR YELLOW PAVEMENT OR CURB MARKING	SF	\$ 3.00	3200	\$ 9,600.00
643.XX	TRAFFIC SIGNAL	LS	\$ 200,000.00	1	\$ 200,000.00
652.00	MAINTENANCE OF TRAFFIC	LS	\$ 40,000.00	1	\$ 40,000.00
659.01	MOBILIZATION	LS	\$ 90,000.00	1	\$ 90,000.00
SUBTOTAL					\$ 1,094,630.00
CONTINGENCY (20%)					\$ 218,926.00
CONSTRUCTION COST					\$ 1,313,556.00

Gorrill Palmer
Conceptual Opinion of Probable Cost

11/23/2016

Job: **Waterville Feasibility Study**
Project Location: **Waterville, Maine**
Comments: **Conceptual Cost for Sheet 4**
Date: 11/21/2016
References:

Calculated By: TL
Checked By: JW, DE

- Notes:
1. Conceptual Opinion of Probable Cost, based on concept plans dated 11/09/2016.
 2. Costs defined below include construction only and do not include engineering, inspection and conceptual right of way costs.
 3. Construction costs based on aerial images and not based on topographic survey. Revised costs to be developed during the preliminary design using survey information.
 4. Utility, Environmental, Landscaping, and Lighting costs are not included.
 5. Right of way costs are not included but ARE expected
 6. Work assumes no pavement overlay of existing roadway.

SHEET 4					
Item	Item Description	Unit	Unit Price	Quantity	Amount
203.20	COMMON EXCAVATION	CY	\$ 20.00	850	\$ 17,000.00
304.10	AGGREGATE SUBBASE COURSE - GRAVEL	CY	\$ 30.00	675	\$ 20,250.00
403.1021	TEXTURED ASPHALT PAVEMENT	SY	\$ 50.00	85	\$ 4,250.00
403.208	HOT MIX ASPHALT 12.5 MM	TON	\$ 125.00	270	\$ 33,750.00
403.209	HOT MIX ASPHALT 9.5 MM (INCID.)	TON	\$ 175.00	50	\$ 8,750.00
604.252	CATCH BASIN TYPE A5-C	EA	\$ 3,400.00	8	\$ 27,200.00
605.11	12" UNDERDRAIN TYPE C	LF	\$ 45.00	900	\$ 40,500.00
609.11	VERTICAL CURB TYPE 1	LF	\$ 35.00	1400	\$ 49,000.00
615.07	LOAM	CY	\$ 50.00	65	\$ 3,250.00
627.733	4" WHITE OR YELLOW PAVEMENT MARKING LINE	LF	\$ 0.70	9600	\$ 6,720.00
627.75	WHITE OR YELLOW PAVEMENT OR CURB MARKING	SF	\$ 3.00	1700	\$ 5,100.00
643.XX	TRAFFIC SIGNAL	LS	\$ 200,000.00	1	\$ 200,000.00
647.XX	RAILROAD CROSSING IMPROVEMENTS	LS	\$ 375,000.00	1	\$ 375,000.00
652.00	MAINTENANCE OF TRAFFIC	LS	\$ 20,000.00	1	\$ 20,000.00
659.01	MOBILIZATION	LS	\$ 60,000.00	1	\$ 60,000.00
SUBTOTAL					\$ 870,770.00
CONTINGENCY (20%)					\$ 174,154.00
CONSTRUCTION COST					\$ 1,044,924.00

Gorrill Palmer
Conceptual Opinion of Probable Cost

11/23/2016

Job: **Waterville Feasibility Study**
Project Location: **Waterville, Maine**
Comments: **Conceptual Cost for Sheet 5**
Date: 11/21/2016
References:

Calculated By: TL
Checked By: JW, DE

- Notes:
1. Conceptual Opinion of Probable Cost, based on concept plans dated 11/09/2016.
 2. Costs defined below include construction only and do not include engineering, inspection and conceptual right of way costs.
 3. Construction costs based on aerial images and not based on topographic survey. Revised costs to be developed during the preliminary design using survey information.
 4. Utility, Environmental, Landscaping, and Lighting costs are not included.
 5. Potential outdoor gathering area, raised crosswalk, and raised intersection not included in cost estimate.
 6. Work assumes no right of way impacts.
 7. Work assumes milling and 1.5" pavement overlay of existing roadway surface.

SHEET 5					
Item	Item Description	Unit	Unit Price	Quantity	Amount
202.202	REMOVING PAVEMENT SURFACE	SY	\$ 7.00	2400	\$ 16,800.00
203.20	COMMON EXCAVATION	CY	\$ 20.00	260	\$ 5,200.00
304.10	AGGREGATE SUBBASE COURSE - GRAVEL	CY	\$ 30.00	160	\$ 4,800.00
403.1021	TEXTURED ASPHALT PAVEMENT	SY	\$ 50.00	110	\$ 5,500.00
403.208	HOT MIX ASPHALT 12.5 MM	TON	\$ 125.00	865	\$ 108,125.00
403.209	HOT MIX ASPHALT 9.5 MM (INCID.)	TON	\$ 175.00	50	\$ 8,750.00
604.252	CATCH BASIN TYPE A5-C	EA	\$ 3,400.00	14	\$ 47,600.00
609.11	VERTICAL CURB TYPE 1	LF	\$ 35.00	1050	\$ 36,750.00
627.733	4" WHITE OR YELLOW PAVEMENT MARKING LINE	LF	\$ 0.70	4000	\$ 2,800.00
627.75	WHITE OR YELLOW PAVEMENT OR CURB MARKING	SF	\$ 3.00	3000	\$ 9,000.00
652.00	MAINTENANCE OF TRAFFIC	LS	\$ 30,000.00	1	\$ 30,000.00
659.01	MOBILIZATION	LS	\$ 25,000.00	1	\$ 25,000.00
SUBTOTAL					\$ 300,325.00
CONTINGENCY (20%)					\$ 60,065.00
CONSTRUCTION COST					\$ 360,390.00

Appendix N

Meeting Minutes

MEETING NOTES

Project: Waterville Downtown Transportation Study - Kickoff Meeting
Client: City of Waterville / Colby College / MaineDOT
Location of Meeting: REM room, The Center, 93 Main Street, Waterville
Date of Meeting: February 1, 2016
Date of Minutes: February 18, 2016
Meeting Purpose: Kickoff Meeting with City and Stakeholders
Attendees: See Attached attendance list

Summary of Discussion:

City Manager Mike Roy, and Don Ettinger, Principal in Charge of Gorrill Palmer each gave opening remarks welcoming everyone to the meeting. Randy Dunton, Project Manager, gave a presentation using Powerpoint (copy of slides attached to these meeting minutes). A general summary of the questions and comments following the presentation of the information on each slide is presented below for each topic presented:

Purpose and Need: The following comments/ additions were suggested for the purpose and need statement:

1. Brian of Colby College suggested adding “an interconnected, integrated approach to land use and transportation”.
2. Emphasize pedestrian safety.
3. Think beyond what the Downtown is today.
4. Greg Brown, Public Works Director- increase residential density in the downtown.
5. Linkages and safety for bicycles and pedestrians.
6. Need to add transit in a justifiable way.
7. Ed Hanscom, MaineDOT-Perhaps there could be a more general purpose and need statement followed by bullets for the more specific elements.
8. Improve accessibility for all modes.
9. Need to add that the solutions need to be within realistically available funding limits.

Local Issues: The following comments/ additions were suggested to be added:

1. Straighten out geometrics of the study area intersections where appropriate, including Temple, Concourse E & Main Street.
2. Connection to the waterfront is important.
3. Ease of snow removal should be considered.
4. Consider business deliveries and related issues.

Previous Studies: The following additional studies/sources should be reviewed:

1. Waterville comprehensive plan
2. KVCOG did a regional level Rte 201 study which included recommendations for the downtown; also did a bike study. These can be found on the KVCOG website.
3. There is a 2001 waterfront planning document and Appendix.
4. There is an active rural living assessment.
5. Ed Hanscom-MaineDOT updated their long range travel demand forecast which should be considered in the growth forecast.
6. The City has a bike/pedestrian plan.

Additional Data

1. Greg Brown-Paul B. forwarded his plans for the former Mill to the City recently.
2. Ed Hanscom-MaineDOT has past traffic counts at some of the intersections at more appropriate times of year that may be helpful in determining seasonal adjustments. Ed said to contact him.
3. Greg asked if Gorrill Palmer will do the crash history. Randy said GP will evaluate crash history.
4. Could the speed be reduced below 25 mph? Randy explained 25 mph is the lowest speed allowed by DOT.
5. Will you be counting pedestrian movements? Randy replied that GP will be considering pedestrians.
6. Will study identify transit improvements that can be made to encourage bicycle traffic? Randy said it will.
7. Ed Hanscom-MaineDOT does have some pedestrian counts that can be considered in the study. Ed also requested that the traffic volumes to be used in the study be based on past counts during peak times of the year and that MaineDOT weekly group mean factors not be utilized in the study.
8. Mike Roy- What additional data will be collected for parking? Mike said he expected another parking survey would be done to follow up upon what Greg did. Mike feels this will be important information if the City is to consider charging for parking in the future which would be a major public policy change.
9. Will you consider a parking garage? Randy said a garage is expensive but will depend on the outcome of the study.
10. Brian (Colby)- Should you do a case study of Portland, Lewiston and other communities who have undertaken similar efforts?

Quality Assurance and Control

1. Greg Brown-AM, noon and PM peaks are the keys to the study especially for Elm Street.
2. Ed Hanscom- MaineDOT has 12 hour counts at some locations.
3. Study should consider Zip Car and smart cars
4. Study should consider shifting commuter routes to relieve Main Street congestion. Could the routes be re-numbered since travelers tend to follow route numbers?
5. Understanding that you can't respond to each comment, can you consider a cut-off date for comments? Similar comments could then be grouped together and a response made to each category.

Scope of Work

1. How will people be made aware of the in-house meetings? Greg responded that the City will review this, but that they are not intended to be public meetings.
2. There is a bicycle/pedestrian coalition that should be consulted during the study.

Schedule

1. When can the public make comments? Greg responded as soon as the website is up and running.

Wrap Up Comments

1. How will the public be notified of meetings? Randy responded that notices of public meetings would be published in the paper and on the Town website. Notices to in-house meetings will not be published.
2. Greg asked how the GP team will reach out to the business community. Randy responded that he will work with the City to determine the best means to reach out to them.
3. Will passenger rail be considered? Randy said this was not identified by the City as an issue for the study.
4. Mike said he would like to discuss whether another parking study is needed with George before the next meeting.
5. Randy said he expected the next public meeting to occur in June.

MEETING NOTES

Project: Downtown Transportation Study, Waterville, Maine
Date/Location of Meeting: 04-22-16; MaineDOT Headquarters, Augusta, Maine
Prepared By: Emily Tynes / Thomas Gorrill
Purpose of Meeting: Hear feedback from project stakeholders on work completed and potential concepts for the Downtown
GP Attendees: Randy Dunton, Tom Gorrill, Emily Tynes
Distribution: Randy Dunton, Tom Gorrill, Georges Jacquemart, Bob Metcalf
Other Attendees: Georges Jacquemart (GJ) BFJ, Greg Brown (GB) City of Waterville, Bob Metcalf (BM) Mitchell & Associates, John Lombardi (JL) City of Waterville, Nate Howard (NH) MaineDOT Planning, Brad Foley (BF) MaineDOT Highway, Ed Hanscom (EH) MaineDOT Planning, Martin Rooney (MR1) MaineDOT Planning, Stephen Landry (SL) MaineDOT Traffic, Mike Roy (MR2) City of Waterville, Douglas Terp (DT) Colby, Nick Isgro (NI) City of Waterville, Brian Clark (BC) Colby, Paul Ureneck (PU) Colby

Purpose of Meeting

- GP Team presentation of existing conditions in Downtown Waterville and preliminary concepts for future designs
- Hear feedback on the concepts from Colby, the City of Waterville, and MaineDOT

Summary of Notes:

- NI welcomed everyone to the meeting. Reminded the attendees that the project should consider the Downtown area as a whole instead of as smaller individual projects. Also emphasized that this project will not only impact the Downtown, but also the surrounding areas.
- RD introduced the GP Team and gave a presentation on existing traffic conditions using Powerpoint (slides attached to these meeting minutes). The following comments were made on the existing traffic conditions:
 - MR2 stated that Temple street lot across from Blueshield be shown as available private parking.
 - BC stated that parking area D on the Public Parking figure is actually private parking. He also suggested adding the parking area on Temple Street across from the blue parking area on the Private Parking figure and a private parking area between public parking areas D and E to the Private Parking Figure.
 - BC clarified that the Pedestrian and Bicycle Accommodations figure is quantitative, not qualitative. RD confirmed that it only shows the location of the sidewalks and crosswalks, not the condition that they are in or if they meet ADA requirements.
- GJ presented existing and proposed parking conditions using Powerpoint (slides attached)



- Suggested paid parking or more parking enforcement
- His parking analysis includes the public use of parking area D
- Assumed the students living in the residence hall would use public parking
- The parking is one large system based on the idea of “Park and Walk”
- Assumed long term parking in the Head of Falls parking area (and that the Head of Falls lot will be expanded and improved)
- His capacity does not include the on-street parking on Front Street
- Utilized a 3/1000sf parking ratio in the Downtown, not a 5/1000sf parking ratio as stated in the ordinance because he feels it is more accurate for retail uses in a downtown area
- Overall feedback on existing conditions:
 - NI stated that he has never had trouble with parking in the Downtown, even during peak demand
 - NI feels that the crash problem on Main Street is due to speed
 - DT stated that based on the existing capacity of the Head of Falls parking lot, there would still be a surplus of parking, even if the parking lot was not expanded.
 - NI stated that at this time there is very little enforcement of parking regulations. Employees of businesses on Main Street often park in the two hour spaces right in front of their shops
 - GB asked if future parking demand included the Mardens and CMP Buildings. GJ said those were not included because they have their own parking areas and are not expected to park in the Downtown. GB feels that those buildings already have a parking problem during the day and in the public meeting the presentation should include a slide showing their parking capacity and demand
 - GB feels that the Head of Falls parking area can be expanded to more than 200 spaces
 - NI thinks the parking for the Mardens and CMP buildings is ok. They are responsible for their own parking
- RD and GJ gave presentation on Future Conditions using Powerpoint (slides attached). Stated that all the concepts are preliminary and have not been checked for capacity, truck turning movements, etc.
 - GJ discussed the first concept.
 - Intersection where some vehicles move to Front Street.
 - Asked the attendees if they want all the through traffic from Main Street to shift to Front Street
 - This concept assumes not all through traffic has shifted to Front Street
 - RD explained the next concept (labeled concept 4).
 - Moves all the southbound through traffic from Main Street to Front Street
 - Makes Main Street the destination



- GJ added that there are alternatives to the concept, e.g. moving the roundabout
- Concept does not show access to Burger King or Dunkin Donuts
- GB stated that if the overpass is removed, access to the Police Department would need to be reconfigured
- DT commented that by not providing access to Burger King or Dunkin Donuts it makes the City look unfriendly to businesses. GJ explained that accesses are possible, but the concept is preliminary and does not show them yet
- GJ discussed the third concept at the intersection of Main Street / Elm Street / College Avenue
 - Stated that this would be the easiest intersection to update if Main Street was two way by prohibiting left turns and making the Main Street northbound a concurrent phase. This would keep the Level of Service about equal to the existing
 - This intersection could also be updated with a double roundabout, which is a more expensive option
- RD discussed the fourth concept (labeled concept 3).
 - Connects the existing two-way section of Main Street to Union Street at a signalized intersection
 - The existing one-way Main Street approach could remain one-way or change to two-way
 - This would make the Main / Elm / College intersection more conventional in size and operation
 - BC said that if Main Street is not changing to two-way, there would be no reason to change the intersection
- GJ explained the fifth concept at the intersection of Water / Main / Front / Spring
 - This accommodates the City's desire for a rectangular park and accommodates two-way traffic on Front Street
 - Connecting the Front Street northbound traffic is easy, but the southbound traffic is more challenging. This concept assumes Front Street southbound traffic will switch to Main Street before reaching the intersection
 - GJ does not expect commuters to switch from Main Street southbound to Front Street
 - The main purpose of the short road connecting Front Street to Main Street just north of the intersection is for traffic access to the proposed hotel
 - This concept assumes Front Street is a secondary road to Main Street and southbound traffic will move to Front Street and Elm Street
 - MRI stated that removing traffic on Main Street will help with crash problem and the signalized intersections on Main Street will be critical
 - GJ stated that signage would be utilized to direct traffic



- NI said that the City will need to decide whether or not they support two-way traffic
- MRI said that the City will need to decide if they want through traffic on Main Street or Front Street. GB said once they see modeling on the alternatives, they will know which to choose
- RD said that once the City decides which street they want the through traffic to use, the more detailed designs can be created
- GJ stated that there are approximately 800 southbound vehicles on Main Street during the PM peak hour. He feels that if both Main Street and Front Street are two-way, then if 100 shift to Front Street and 200 shift to Elm, then the network will function well
- RD discussed the next concept (labeled concept 1) at Water / Main / Front
 - A roundabout would not work if Main Street is two-way because there would be too many entrances too close together
 - This concept assumes Front Street is the commuter route
 - Roundabouts are perceived as less pedestrian friendly than traffic signals
 - GJ said that to design this with two-way Main Street the roundabout would need to be moved north and made larger (less pedestrian friendly)
 - SL stated that signing the roundabout would be the most difficult part because there is not a lot of room to put signs
 - GJ said that in other countries dual lane roundabouts are not striped, but they are in the US
- RD discussed the next concept (labeled concept 2) at Water / Main / Front
 - Shown as Main Street one-way, but could be two-way (two-way would add a phase to the intersection and lower the Level of Service)
 - This concept has overall acceptable levels of service, but they do decrease from the existing geometry
 - If moving forward with this concept, the Team would look at reducing the width to make the intersection more pedestrian friendly
- BM gave presentation on street design using Powerpoint (slides attached)
 - Goal is to make Main Street pedestrian and bicycle friendly
 - Wants to take advantage of the Commons
 - Mitchell & Associates is also doing the Riverwalk project
 - Wants to create a way for pedestrians to cross Front Street to the Head of Falls parking area and connect everything to the Riverwalk
 - Include outdoor seating on the sidewalks by new businesses
 - Transit stop by the residence hall
 - Make the area near the old post office a gateway to the downtown
 - Briefly discussed the cross sections included in the slideshow
 - GB asked if the bicycle lanes needed to be on Main Street or if bicyclists could be sent on a different street. RD replied that if Front is a the secondary street it could



- be two lanes with bike lanes, but if it is the commuter route it would need to be three lanes (two travel lanes with a center two way left turn lane)
- NI said that Main Street needs to be two-way with less focus on bicycles and more on making it a pedestrian friendly area
 - GB said that parking may need to be removed to accommodate proposed changes
 - GJ said that if the streets are converted to two-way traffic, the speeds will be reduced significantly. Diagonal parking spaces could be kept because of the reduced speeds.
 - DT suggested decreasing the angle of the parking spaces. GJ replied that they would be easier to back out of, but there would be fewer spaces.
 - GB suggested widening parking spaces to increase safety
 - GB said that there will need to be many trade-offs to find the best traffic circulation and parking solutions
- Overall Comments
- SL asked if the speeding problem is documented or perceived. Additionally, in a different study he completed the 85th percentile speeds increased after the traffic was switched from one-way to two-way
 - GJ is confident that in this study the speeds will decrease since they would be going from two lanes one-way to two lane two-way since with one lane in each direction the slowest vehicle dictates the speed and with two lanes per direction, fast moving vehicles can pass slower vehicles
 - NI said that the existing road is so wide that he feels it is easy to speed and traffic tends to move together (if one vehicle is traveling quickly the rest will follow)
 - SL feels that the speeds should be documented
 - DT agrees that people do switch lanes to travel faster
 - GB said that time of day does make a difference with regards to speeds
 - PU asked how else speeds could be reduced without changing the traffic flow. RD said that edge lines or bump outs would be good options. The edge lines would also help keep traffic away from the parked vehicles
 - MRI said that the City should make decisions on parking, whether Front Street is the commuter route or a secondary street, and Main Street traffic flow. He also would not want to present the public with any concepts without engineering them. He also stated need to make sure the impacts to Front Street and Elm are documented for the desired concept.
 - GB said that the original schedule may have to slip to make sure the study is thorough
 - SL will work with GB and the City to do a speed study on existing Main Street and a road that would be similar to Main Street if it is converted to two-way. GB thought Elm may be comparable, but GJ said that since Elm does not have on street parking it would not be an accurate representation.



- GJ said that the HCL on Main could be helped with reduced speeds and his experience shows that people actually like reduced speeds in areas similar to Downtown Waterville
 - GB stated that the public does want slower traffic, but he is concerned about capacity and feels that the signalized intersections will be very important. He also stated that some connecting side streets are underutilized.
 - MRI reiterated that the City will need to decide if Front is the commuter route or a secondary street
 - GB is concerned that people will get stuck on Front Street trying to go to Main Street and would like to see a model showing “hurdles”
 - GJ said that if the southbound traffic can be reduced from 800 to 500 during the PM peak hour, then the network will function more efficiently.
 - GB said the streets connecting Main and Front are critical and currently underutilized
 - DT said that the issues need to be separated into local decisions and other decisions and most of the issues cannot be resolved until the local decisions are made (such as Front Street commuter route or secondary street)
 - MRI said that from a MaineDOT perspective, there is a lot of local flexibility and as long as the intersections operate at a Level of Service D and the designs are reasonable, MaineDOT will approve the project
 - EH requested that the GP Team to use average speed as a performance measure in the study
 - MRI asked if there had been any discussion with utilities yet. RD said not yet, but there would be in the future. MRI suggested that they be asked about upgrading the utilities and their vision. GB said he has asked some utilities. PU stated that at the Colby public meetings the public requested looking at the utilities while construction happens
 - SL asked EH how to determine the traffic distribution for GP concept 3. EH recommended running the model to look at speeds and adjust traffic distribution until average speeds are about equal. GB thought that would be a good method for distribution since he personally would take the route where he can drive faster.
 - For a design, SL suggested using two opportunities to move from Main Street to Front Street, similar to GP concept 4, but with a signalized intersection, not a roundabout
- Public Meeting May 9, 2016 at 7:00PM in the Waterville City Council Chambers (location subject to change based on meeting attendance).
- Discuss existing conditions as a follow up to the meetings that were held by Colby
 - MRI requested a copy of the slideshow and agenda for the public meeting be sent out by 12:00PM on May 5th.
 - GJ suggested discussing the future concepts, but not including pictures of the concepts until they have been engineered more thoroughly