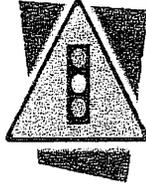


Attachment 4

Traffic Assessment and Turning Diagram



Traffic Solutions
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Portland, ME 04102
(207) 774-3603
(207) 400-6890 mobile
trafficsolutions@maine.rr.com

September 1, 2014

Traffic Assessment
Proposed
Waterboro DMEP X, LLC
9,100 sf. Variety Store

INTRODUCTION

Waterboro DMEP X, LLC is proposing a 9,100 square foot variety store on Chadbourne Ridge Road on a 2.06 acre parcel of property located in the Town of Waterboro, Maine. The proposed variety store will be accessed through a single driveway entrance on Chadbourne Ridge Road located approximately 110 feet north of the State Route 5 (Sokokis Trail)/Clark's Bridge Road/Chadbourne Ridge Road intersection. Chadbourne Ridge Road is a twenty-two foot wide road with 2'+ wide gravel shoulders along both edges of pavement.

This document provides a summary of existing traffic conditions for the section of Chadbourne Ridge Road adjacent to the project site including an estimate of 2014 peak traffic volumes and a review of current roadway safety conditions; an estimate of peak hour trip generation for the proposed variety store project; evaluates the need for a separate left-turn entry lane on Chadbourne Ridge Road for left-turning traffic into the proposed site driveway and, lastly, conducts a review of vehicle sight distance at the proposed driveway entrance.

EXISTING CONDITIONS

Existing Traffic: A manual turning movement count was conducted at the intersection of State Route 5/Chadbourne Ridge Road/Clark's Bridge Road on Wednesday, August 27, 2014 to determine existing PM "peak" roadway traffic volumes. All vehicular traffic entering the intersection was recorded in 15-minute intervals between the hours of 3:00 to 6:00 PM (A copy of the field data summary sheet is attached). From a summary of the data, it was determined that the peak hour occurs between 4:45 and 5:45 PM.

Traffic data collected during the months of July and August are generally considered representative of "peak" travel conditions and further adjustment is not required. Figure 1 is a "line-diagram" presenting the "peak" hour traffic volumes for the study intersection. As depicted on the drawing, approximately 55 vehicles travel northbound and 38 vehicles travel southbound along the Chadbourne Ridge Road frontage of the proposed variety store site during the noted peak hour time period.

Existing Safety Trends: The Maine Department of Transportation's (MaineDOT) Accident Records Section provided the latest three-year (2011 through 2013) crash data for the section of State Route 5 (Sokokis Trail) between Silas Brown Road and Evergreen Drive, a distance of approximately 2.14 miles and the 0.69 mile section of Chadbourne Ridge Road between SR Route 5 and Silas Brown Road. Their report is summarized as follows and attached as an appendix to the report:

2011 -2013 Traffic Accident Summary

<u>Location</u>	<u>Total Crashes</u>	<u>Critical Rate Factor</u>
1. State Route 5/Chadbourne Ridge Rd./Clark's Bridge Rd.	1	0.41
2. State Route 5 btw. Silas Brown Rd. and Chadbourne Ridge Rd.	5	0.45
3. State Route 5 btw. Chadbourne Ridge Rd. and Evergreen Dr.	5	0.22
4. Chadbourne Ridge Road between SR Route 5 and Silas Brown Rd.	0	0.00

The MaineDOT considers any roadway intersection or segment a high crash location if both of the following criteria are met:

- *8 or more accidents*
- *A Critical Rate Factor greater than 1.00*

As the data presented in the table shows, the incidence of traffic crashes occurring on the noted section of State Route 5 are below MaineDOT's threshold criteria for identification of a high crash location.

SITE TRAFFIC

Site Trip Generation: An estimate of trip generation for the proposed 9,100 square foot variety store was developed based upon recent data collected at three similar stores in New Hampshire and Maine, a methodology approved by MaineDOT when applicable ITE data isn't available.

Manual traffic counts were conducted at: (1) Dollar General Store, Nashua, New Hampshire; (2) Family Dollar Store, Waterboro, Maine and; (3) Family Dollar Store, Portland, Maine. All vehicle trips entering and exiting each of the three stores were recorded in 15-minute intervals between the hours of 3:00 to 6:00 PM. The following tables summarize the collected data for each location:

Existing Dollar General Store
Vehicle Trip Generation
Nashua, New Hampshire
(7,560 sf store)

Time Period	Entering Trips	Existing Trips	Total Trips
3:00pm to 3:15pm	3	10	13
3:15pm to 3:30pm	7	7	14
3:30pm to 3:45pm	8	6	14
3:45pm to 4:00pm	10	11	21
4:00pm to 4:15pm	8	9	17
4:15pm to 4:30pm	7	10	17
4:30pm to 4:45pm	6	6	12
4:45pm to 5:00pm	8	7	15
5:00pm to 5:15pm	4	6	10
5:15pm to 5:30pm	6	8	14
5:30pm to 5:45pm	5	7	12
5:45pm to 6:00pm	5	6	11
Peak Hour: 3:30pm to 4:30pm	33	36	69

Trip Rate Nashua, NH Store = 69 trips ÷ 7,560/1,000 = 9.13 trips/1,000 sf

Existing Family Dollar Store
Vehicle Trip Generation
Waterboro, Maine
(8,750 sf store)

Time Period	Entering Trips	Existing Trips	Total Trips
3.00pm to 3:15pm	3	1	4
3:15pm to 3:30pm	0	2	2
3:30pm to 3:45pm	1	3	4
3:45pm to 4:00pm	5	3	8
4:00pm to 4:15pm	2	1	3
4:15pm to 4:30pm	2	0	2
4:30pm to 4:45pm	6	0	6
4:45pm to 5:00pm	4	1	5
5:00pm to 5:15pm	7	5	12
5:15pm to 5:30pm	7	5	12
5:30pm to 5:45pm	9	3	12
5:45pm to 6:00pm	7	2	9
Peak Hour: 5:00pm to 6:00pm	30	15	45

Trip Rate Waterboro Store = 45 trips ÷ 8,750/1,000 = 5.14 trips/1,000 sf

Existing Family Dollar Store
Vehicle Trip Generation
Portland, Maine
(8,000 sf)

Time Period	Entering Trips	Existing Trips	Total Trips
3.00pm to 3:15pm	5	1	6
3:15pm to 3:30pm	4	0	4
3:30pm to 3:45pm	0	7	7
3:45pm to 4:00pm	9	2	11
4:00pm to 4:15pm	2	5	7
4:15pm to 4:30pm	11	3	14
4:30pm to 4:45pm	7	0	7
4:45pm to 5:00pm	2	12	14
5:00pm to 5:15pm	0	3	3
5:15pm to 5:30pm	13	4	17
5:30pm to 5:45pm	15	7	22
5:45pm to 6:00pm	10	0	10
Peak Hour: 4:45pm to 5:45pm	30	26	56

Trip Rate Portland Store = 56 trips ÷ 8,000/1,000 = 7.00 trips/1,000 sf

Based upon a summary of the data collected at the three variety store sites, an average of 7.09 trips per 1,000 square feet of floor area are generated during the PM peak hour time period. Accordingly, the proposed 9,100 square foot variety store can be expected to generate a total of 65 vehicle trips in the evening peak hour.

Vehicle Trip Distribution: This report utilizes a site trip distribution pattern of 55% entering trips and 45% exiting trips, which replicates the average distribution patterns found at the three variety store sites. Based upon these projected trip distribution patterns, **36** of the **65** total trips generated in the evening peak hour will enter and **29** trips will exit the proposed variety store during the same time period.

Vehicle Trip Composition: Based upon national survey data, retail stores generate a high percentage of trips already on the roadway system generally referred to as “pass-by” trips. This report has assumed a modest estimate of 30% of the trips generated by the proposed store are, in fact, “pass-by” trips, with the remaining trips classified as “new” or primary trips. Accordingly, the proposed project can be expected to generate a total of **20** “pass-by” trips and **45** primary trips.

Vehicle Trip Assignment: A trip assignment model, that is based upon existing travel patterns, found at the State Route 5/Chadbourne Ridge Road/Clark’s Bridge Road intersection (reference is directed to Figure 1) were utilized in assigning the site trips to the existing roadway system. Those traffic distribution values are presented as follows:

Pass-By Trips

- State Route 5 WB Thru Movement = 10%
- State Route 5 EB Thru Movement = 10%
- Chadbourne Ridge Road NB = 40%
- Chadbourne Ridge Road SB = 40%

Primary Trips

- State Route 5 West approach = 42%
- State Route 5 East approach = 45%
- Chadbourne Ridge Road approach = 08%
- Clark’s Bridge Road approach = 05%

The attached Figure 2 illustratively presents the assignment of the site trips to the existing roadway system.

SIGHT DISTANCE

The Maine Department of Transportation’s Highway Entrance and Driveway Rules require the following sight distances for a non-mobility roadway:

Sight Distance Standards

Speed Limit	Sight Distance
25 mph	200 feet
30	250
35	305
40	360
45	425
50	495
55	570

Chadbourne Ridge Road is currently regulated with a 35mph posted speed limit, which requires an unobstructed sightline of 305 feet. An unobstructed sightline in excess of 1,000 feet was determined "looking" right and a clear line of sight to the State Route 5 intersection was determined "looking" left.

AUXILIARY LANE WARRANT ANALYSIS

The Maine Department of Transportation has published a warrant for auxiliary left-turn lanes in their December 2004 Highway Design Manual. The warrants are predicated upon the volume of two-way traffic traveling on the designated highway and the volume of left-turning vehicles. Figure 8-19 from MaineDOT's referenced design manual was used in conducting the analysis (A copy of the chart with the superimposed traffic values is attached as an appendix to the report). The values used in the analysis are noted as follows:

V_a = 40
V_o = 75
Lt % = 15.0%

The analysis concludes that an exclusive left-turn entry lane on the southbound approach of Chadbourne Ridge Road, at the proposed site entrance, is not warranted based upon the forecast 2014 Post-Development traffic conditions.

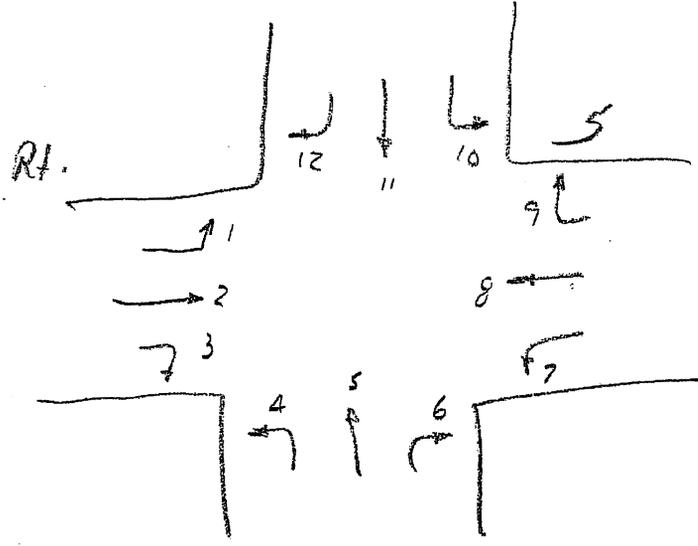
SUMMARY

1. A total of 65 vehicle trips will be generated by the proposed variety store during the PM peak hour, with 36 trips entering and the remaining 29 trips exiting the site.
2. MaineDOT's Traffic Safety Bureau's latest three-year safety report for the section of State Route 5 between Silas Brown Road and Evergreen Drive and the section of Chadbourne Ridge Road between State Route 5 and Silas Brown Road shows that all roadway segments and intersections within the noted sections of highway experience fewer traffic crashes than the threshold criteria for identification of a high crash location.
3. Sightline measurements recorded at the centerline of the proposed driveway entrance on Hallowell Road exceed MaineDOT's standard (305 feet) for a posted speed limit of 35mph, which reflects the current posted speed limit on Chadbourne Ridge Road along the frontage of the proposed project site.
4. Based upon a projected maximum left-turn volume to the site of 6 vehicles per hour and an opposing through volume of 75 vehicles per hour traveling north on Chadbourne Ridge Road, a left-turn storage lane is not warranted for left-turn entry trips to the proposed project site.
5. A Town of Waterboro driveway entrance permit will be required for the proposed commercial driveway onto Chadbourne Ridge Road.



JOB NO. _____

INTERSECTION PLAN *Chadburn Ridge Road*
WITH NUMBERED MOVEMENTS:



INTERSECTION *Rt. 5/Chadburn Ridge Rd./Clark's Bridge Rd.*
 DATE *8-27-2014*
 DAY OF WEEK *wednesday*
 WEATHER *Sunny*
 REMARKS:

C = Bicycle
T = Trucks

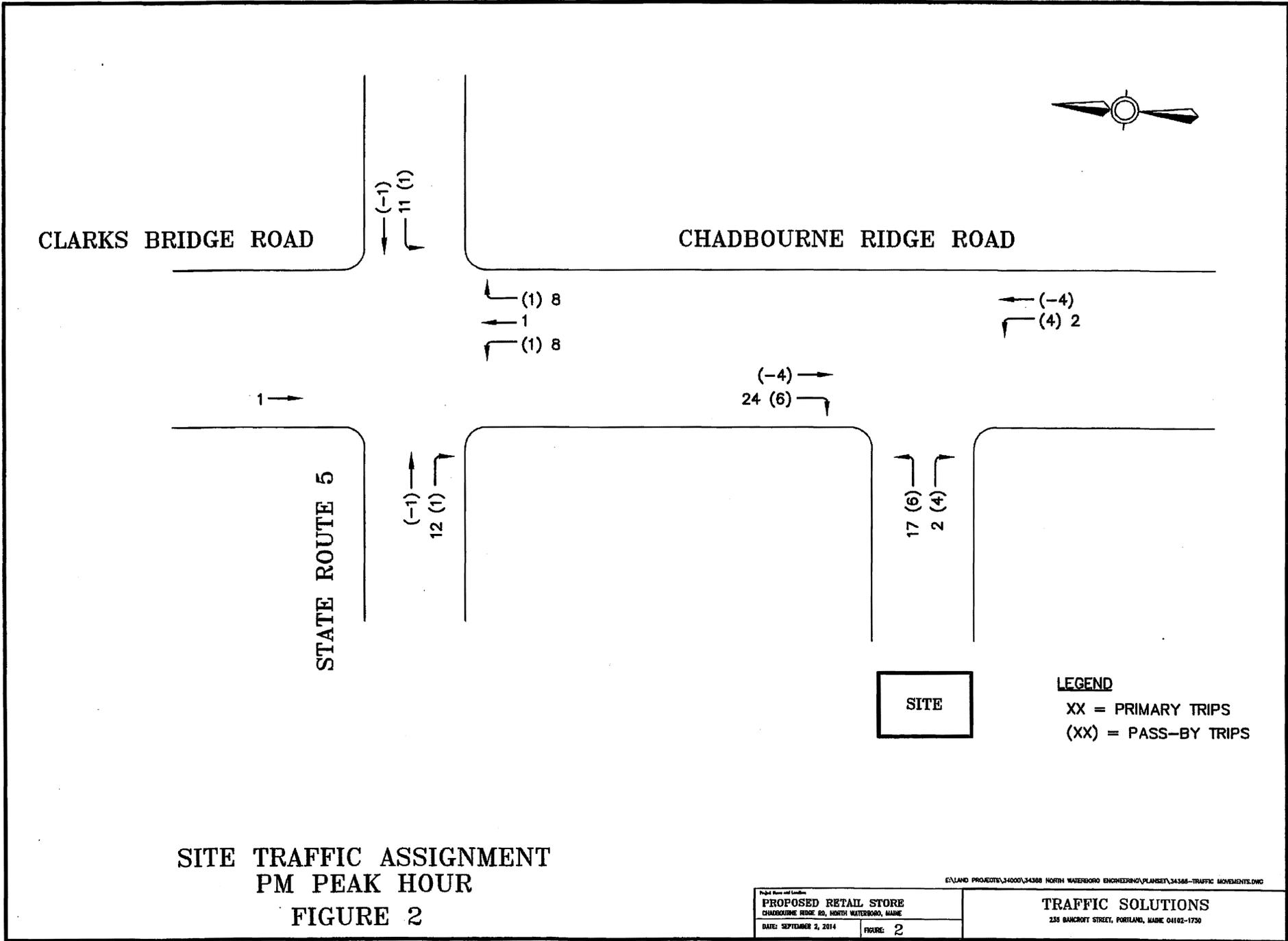
Clark's Bridge Road **COUNT SUMMARY**
 MOVEMENT

	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
3:00		43		1	111	11	4	50	1	11	11	11	127
3:15	3	S T	0	1	4	2	4	50	1	11	11	11	127
3:30	2	S T	0	0	1	3	T 5	44	2	11	1	0	106
3:45	2	S T	0	0	0	1	7	61	2	11	11	11	136
4:00	3	33	3	1	0	0	7	58	3	11	1	11	119
4:15	6	40	2	1	T	3	2	57	8	11	1	11	134
4:30	4	40	1	1	0	1	4	70	4	11	11	11	143
4:45	5	33	2	1	1	4	4	73	7	11	11	1	142
5:00	5	39	0	0	111	11	7	73	8	11	0	11	151
5:15	4	S T	1	1	11	11	4	70	7	11	11	11	145
5:30	5	T S	0	11	111	11	7	69	4	1	0	11	137
5:45	6	48	2	0	1	11	4	76	6	11	11	11	157
6:00	2	T 52	1	111	0	111	2	72	7	111	0	0	149

PEAK HOUR COUNT

TIME: *4:45* TO: *5:45*

20	161	3	3	10	15	22	293	25	14	7	17	
----	-----	---	---	----	----	----	-----	----	----	---	----	--



**SITE TRAFFIC ASSIGNMENT
PM PEAK HOUR
FIGURE 2**

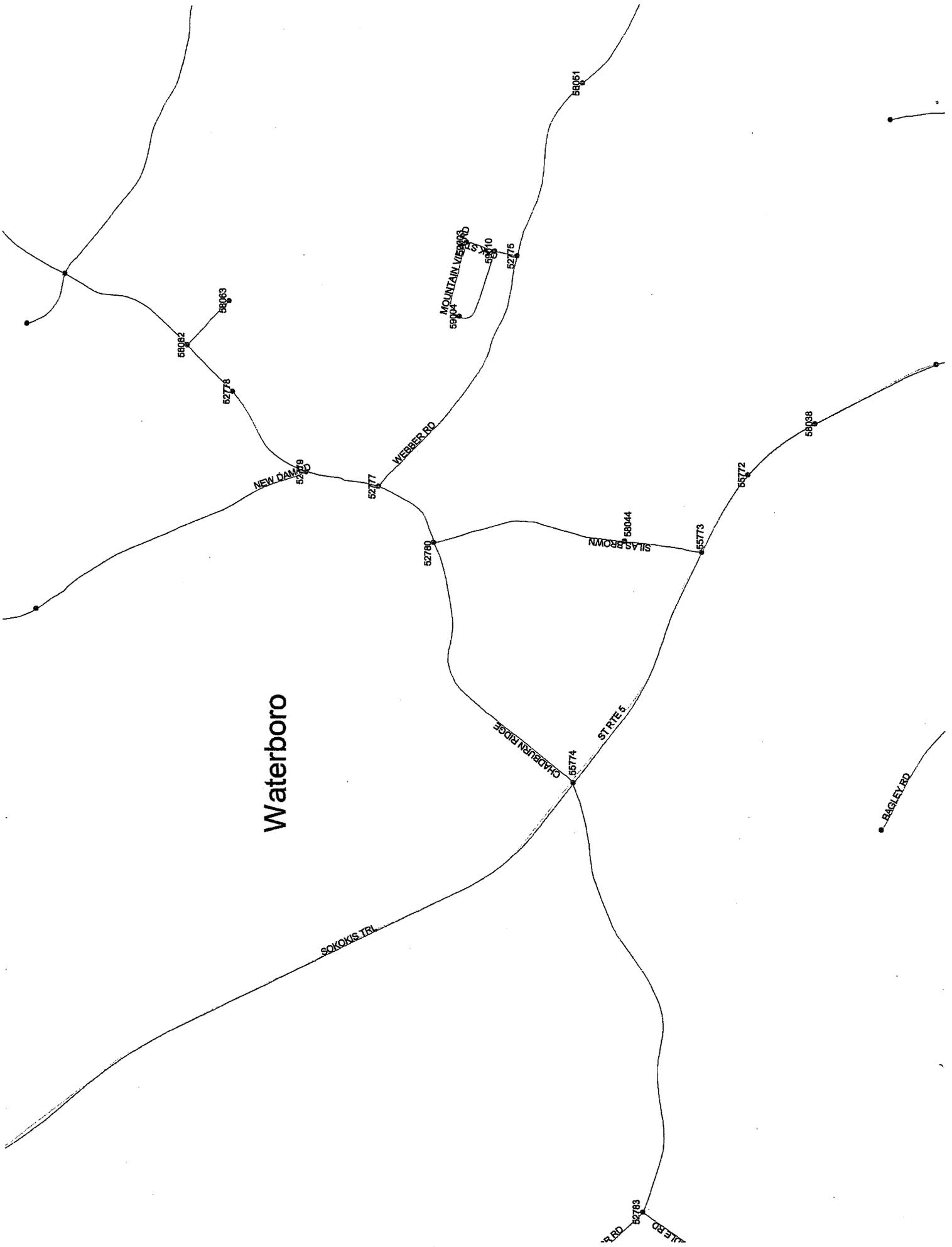
Project Name and Location:
PROPOSED RETAIL STORE
 CHADBOURNE RIDGE RD, NORTH WATERBORO, MAINE
 DATE: SEPTEMBER 2, 2014

E:\LAND PROJECTS\34000\34308 NORTH WATERBORO ENGINEERING\PLANSET\34308-TRAFFIC MOVEMENTS.DWG

TRAFFIC SOLUTIONS
 235 BANCROFT STREET, PORTLAND, MAINE 04102-1750

FIGURE: 2

Waterboro



Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

Crash Summary I Section Detail Crash Summary II 1320 Public 1320 Private 1320 Summary

REPORT DESCRIPTION

Rte 5 section 3 in Waterboro

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: 0005X

Start Node: 55773

Start Offset: 0

Exclude First Node

End Node: 55775

End Offset: 0

Exclude Last Node

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

Crash Summary I

Sections																		
Start Node	End Node	Element	Offset Begin - End	Route - MP	Section U/R Length	Total Crashes	K	Injury Crashes				Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF		
55773	55774	3113992	0 - 0.60	0005X - 22.82 ST RTE 5	0.60	1	5	0	0	1	1	3	40.0	0.01188	140.28	311.90	0.00	
Int of SILAS BROWN SOKOKIS TRL				Statewide Crash Rate: 155.68														
55774	55775	3113993	0 - 1.54	0005X - 23.42 ST RTE 5	1.54	1	5	0	0	0	1	4	20.0	0.02839	58.71	259.95	0.00	
Int of CHADBURN RIDGE CLARKS BR RD SOKOKIS TRL				Statewide Crash Rate: 155.68														
Study Years: 3.00					Section Totals:		2.14	10	0	0	1	2	7	30.0	0.04027	82.78	244.02	0.34
					Grand Totals:		2.14	11	0	0	1	2	8	27.3	0.04027	91.06	281.85	0.32

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

Crash Summary I

Nodes															
Node	Route - MP	Node Description	U/R	Total Crashes	Injury Crashes				Percent Annual M	Crash Rate	Critical Rate	CRF			
					K	A	B	C	PD	Injury	Ent-Veh				
55773	0005X - 22.82	Int of SILAS BROWN SOKOKIS TRL	1	0	0	0	0	0	0	0.0	2.845	0.00	0.37	0.00	
												Statewide Crash Rate:	0.12		
55774	0005X - 23.42	Int of CHADBURN RIDGE CLARKS BR RD SOKOKIS TRL	1	1	0	0	0	0	1	0.0	2.135	0.16	0.39	0.00	
												Statewide Crash Rate:	0.12		
55775	0005X - 24.96	Int of EVERGREEN DR SOKOKIS TRL	1	0	0	0	0	0	0	0.0	1.764	0.00	0.41	0.00	
												Statewide Crash Rate:	0.12		
Study Years: 3.00			NODE TOTALS:		1	0	0	0	1	0.0	6.744	0.05	0.29	0.17	

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

Crash Summary I Section Detail Crash Summary II 1320 Public 1320 Private 1320 Summary

REPORT DESCRIPTION

Chadburn Ridge

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: **3100465**

Start Node: **52780**

Start Offset: **0**

Exclude First Node

End Node: **55774**

End Offset: **0**

Exclude Last Node

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

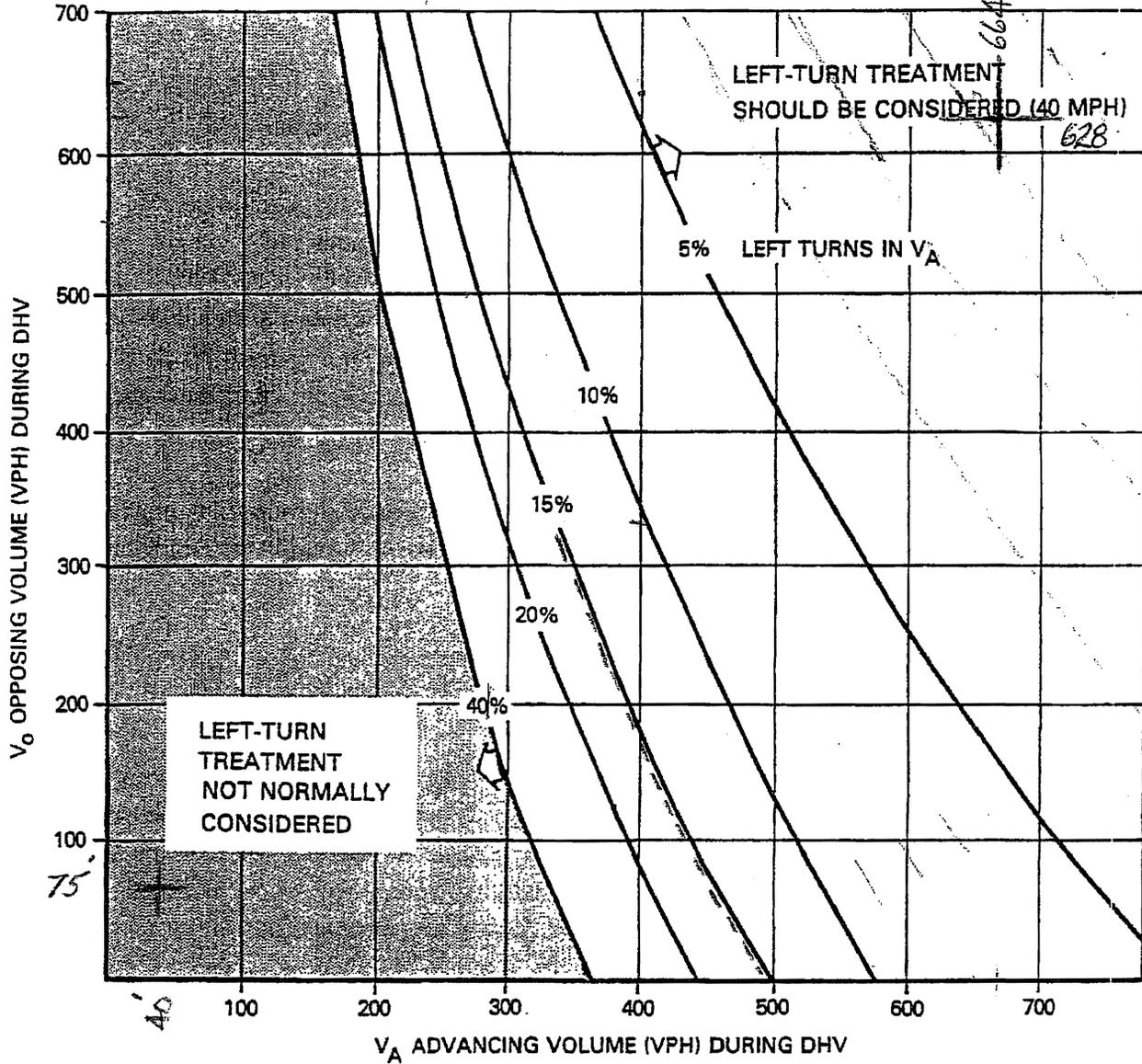
Crash Summary I

Node	Route - MP	Node Description	U/R	Nodes							Percent Annual M Injury Ent-Veh	Crash Rate	Critical Rate	CRF
				Total Crashes	K	A	B	C	PD					
52780	3100465 - 3.92	3102364 WTBO,SILAS BROWN,CHADBURN RD	1	1	0	0	0	0	1	0.0	1.178	0.28	0.48	0.00
												Statewide Crash Rate:	0.13	
55774	3100465 - 4.61	Int of CHADBURN RIDGE CLARKS BR RD SOKOKIS TRL	1	1	0	0	0	0	1	0.0	2.135	0.16	0.37	0.00
												Statewide Crash Rate:	0.11	
Study Years: 3.00			NODE TOTALS:		2	0	0	0	2	0.0	3.313	0.20	0.35	0.58

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

Crash Summary I

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section Length	U/R	Total Crashes	Sections					Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF
								K	A	B	C	PD					
52780	55774	235592	0.- 0.69	3100465 - 3.92	0.69	1	0	0	0	0	0	0	0.0	0.00209	0.00	628.20	0.00
3102364 WTBO,SILAS BROWN,CHADBURN RD				RD INV 31 00465		Statewide Crash Rate: 222.60											
Study Years: 3.00				Section Totals:		0.69	0	0	0	0	0	0	0.0	0.00209	0.00	628.20	0.00
				Grand Totals:		0.69	2	0	0	0	0	2	0.0	0.00209	318.93	677.56	0.47



Instructions:

1. The family of curves represent the percent of left turns in the advancing volume (V_A). The designer should locate the curve for the actual percentage of left turns. When this is not an even increment of 5, the designer should estimate where the curve lies.
4. Read V_A and V_O into the chart and locate the intersection of the two volumes.
5. Note the location of the point in #2 relative to the line in #1. If the point is to the right of the line, then a left-turn lane is warranted. If the point is to the left of the line, then a left-turn lane is not warranted based on traffic volumes.

**VOLUME WARRANTS FOR LEFT-TURN LANES
AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS
(40 mph)**

Figure 8-19

PRELIMINARY SITE PLAN

North Waterboro, ME - Hwy 5 & Chadbourne Ridge Rd

PROTOTYPE:	C	DEVELOPER	DESIGNER	DATE:
BLDG/SALES SF:	9,100/7,310	COMPANY: GBT Realty Corp.	COMPANY: GBT Realty Corp.	7-7-14
ACREAGE:	2.09	NAME: Austin Rogers	NAME: Sarah Holley	
PARKING SPACES:	40	PHONE #: (615) 370-0670	PHONE #: (615) 370-0670	

NOTE: WB-67 TRUCK USED.

NOTE:
DIMENSIONS SHOWN ALONG PROPERTY, RIGHT-OF-WAY AND/OR LEASE LINES ARE PRELIMINARY AND SHOWN FOR INFORMATIONAL PURPOSES ONLY.

NOTE:
PARKING REQUIRED BY CODE:
1 SPACE / 200 S.F. RETAIL +
1 SPACE / 3 EMPLOYEES = 40 SPACES
RE-PLATTING REQUIRED.

