



Traffic Solutions
William J. Bray, P.E.
235 Bancroft Street
Portland, ME 04102
(207) 774-3603
(207) 400-6890 mobile
trafficsolutions@maine.rr.com

March 4, 2017

Traffic Assessment

For Proposed
Baxter Academy for Technology and Science
Public Charter High School
Portland, Maine

INTRODUCTION

Baxter Academies of Maine are proposing to relocate and consolidate its public charter high school, known as Baxter Academy for Technology and Science, from its current facilities at 54 York Street and 561 Congress Street in Portland to an expanded facility at 185 Lancaster Street. The proposed site is an existing two-story building with a total floor area of approximately 92,561 square feet; Baxter Academies will lease and remodel 31,571 square feet of the building for the expanded charter high school project. Baxter Academies of Maine anticipates starting construction early spring with completion of the second floor expected in early fall prior to the commencement of the 2017-18 academic year and completion of the first floor expected around Thanksgiving.

This report provides an estimate of site trip generation for the proposed Baxter Academy public charter high school project generated during the critical AM peak hour; an assignment of the site trips to the adjacent street system; a review of existing roadway safety trends; a forecast of both 2017 pre- and post-development traffic conditions and, a technical evaluation of multi-way “Stop” control at the Lancaster Street/Chestnut Street intersection.

EXISTING CONDITIONS

Existing Design Hour Traffic: Manual turning movement counts were conducted at both the Chestnut Street/Lancaster Street and Elm Street/Lancaster Street intersections during the morning “*peak*” commuter hours of 7:00 to 9:00AM. Traffic data was collected at the former location on Tuesday, September 13, 2016 and traffic data at the Elm Street/Lancaster Street intersection was collected on Wednesday, February 15, 2017. All traffic entering and exiting both intersections was recorded in 15-minute intervals between the identified study times (A copy of the traffic data is attached as an appendix to the report). From a summary of the data, a peak hour of traffic (7:30 to 8:30AM) was determined for both intersections.

Traffic data collected during time periods other than the summer months of July and August require adjustment to reflect “*peak*” travel conditions. MaineDOT provides factors for adjusting traffic data collected during other periods of time. MaineDOT utilizes highway classifications of I, II, or III for all State and Local roadways. Group I roadways are defined as urban roadways or those roads that typically see commuter traffic and experience little fluctuation from week to week throughout the year. Group II roadways or arterial roads are those that see a

combination of commuter and recreational traffic and, therefore, experience moderate fluctuations during the year. Group III roads or recreational roadways are typically used for recreational purposes and experience significant seasonal fluctuations. MaineDOT has designated the intersecting roadways at both intersections Group I roadways, which require an adjustment of 1.03 for the September 2016 data and a factor of 1.15 for adjusting the February 2017 data. The Chestnut Street/Lancaster Street “base” intersection volumes were increased by an additional 1% to approximate 2017 travel conditions at the intersection. Figure 1 illustratively presents the estimated 2017 Design Hour Traffic forecasts for both study intersections.

Roadway Safety Trends: The Maine Department of Transportation’s (MaineDOT) Accident Records Section provided three-year (2013 through 2015) safety records for the sections of the streets highlighted on the attached map, a combined distance of 0.86 miles. MaineDOT’s report is presented as follows:

**2013 - 2015 Accident Summary
Portions of Kennebec Street, Lancaster Street, Oxford Street,
Preble Street, Elm Street and Chestnut Street**

<u>Location</u>	<u>Number of Accidents</u>	<u>Critical Rate Factor</u>
1. Elm Street @ Kennebec Street	7	2.55
2. Elm Street @ Lancaster Street	9	3.79
3. Preble Street @ Kennebec Street	12	4.22
4. Lancaster Street @ Preble Street	3	1.28
5. Oxford Street @ Preble Street	4	1.65
6. Elm Street @ Somerset Street	2	0.52
7. Chestnut Street @ Oxford Street	1	1.44
8. Chestnut Street @ Lancaster Street	3	4.69
9. Chestnut Street @ Kennebec Street	1	1.03
10. Somerset Street @ Chestnut Street	4	1.25
11. Kennebec Street btw. Elm Street and Chestnut Street	1	0.98
12. Lancaster Street btw. Chestnut Street and Cedar Street	1	5.38
13. Lancaster Street btw. Cedar Street and Elm Street	3	6.87
14. Lancaster Street btw. Elm Street and Preble Street	2	33.90
15. Oxford Street btw. Preble Street and Elm Street	3	10.01
16. Oxford Street btw. Cedar Street and Chestnut Street	2	4.26
17. Preble Street btw. Kennebec Street and Lancaster Street	1	0.53
18. Preble Street btw. Lancaster Street and Oxford Street	3	1.56
19. Elm Street btw. Somerset Street and Kennebec Street	1	0.76
20. Chestnut Street btw. Lancaster Street and Oxford Street	1	1.41
21. Chestnut Street btw. Kennebec Street and Lancaster Street	1	2.34
22. Chestnut Street btw. Somerset Street and Kennebec Street	1	2.71

The MaineDOT considers any roadway segment or intersection 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 (locations highlighted in red), two locations meet MaineDOT’s criteria for a high crash location. A total of 9 crashes and a Critical Rate Factor (CRF) of 3.79 were reported for the Elm Street/Lancaster Street intersection. A total of 12 vehicle crashes with a Critical Rate Factor of 4.22 were reported for the second location at Preble Street and Kennebec Street. A more in-depth review (preparation of detailed vehicle collision diagrams) was prepared for both locations to determine if a clear pattern of accident is occurring (Copies of the Collision Diagrams are attached as an appendix to the report). The following two paragraphs summarize the detailed safety analysis conducted for both locations:

Location #2 – Elm Street at Lancaster Street: Six of the total crashes reported were “*angle*” collisions involving traffic (auto and/or bicycle) on either approach of Lancaster Street being struck by a thru vehicle traveling northerly on Elm Street. The remaining three crashes occurred more randomly in the intersection.

The City recently completed a very significant roadway/sidewalk reconstruction project along Elm Street, a one-way collector street that connects Portland’s Downtown to Interstate 295 and western sections of the City. The improvement project narrowed pavement widths on Elm Street and widened sidewalks in an effort to reduce travel speeds in the corridor and improve overall pedestrian safety. The safety improvement project should help reduce the frequency of traffic accidents at the noted intersection.

Location #3 – Preble Street at Kennebec Street: The MaineDOT data for this location incorrectly included a vehicle crash occurring at an adjacent intersection; therefore, the total number of reported crashes is reduced to 11 crashes at the intersection. Eight of the 11 vehicle crashes involved motorists entering the intersection from both Kennebec Street approaches colliding with thru vehicles traveling southerly on Preble Street. Existing buildings in both northerly quadrants of the intersection limit vehicle sightlines of approaching vehicles. The City is currently developing preliminary design plans for extending Somerset Street to Hanover Street; the proposed project design also includes discontinuance of the west leg of Kennebec Street between Hanover and Preble Streets. This design feature should greatly reduce the frequency of vehicle crashes occurring within the Kennebec Street/Preble Street intersection.

SITE TRAFFIC

Site Trip Generation: The Institute of Transportation Engineers (ITE) 7th edition of the **TRIP GENERATION** manual provides an equation under Land-Use Code #530 - High School for estimating the volume of peak hour trips generated by a public high school during the morning commuter hour. The analysis was completed based upon a projected school enrollment of 400 students.

$$Ln(T) = 0.77Ln(X) + 0.69 [X = 400 \text{ students}]$$

Accordingly, the 400-student Baxter Academy public charter high school can be expected to generate a total of **200** vehicle trips during the weekday AM peak hour.

Site Trip Assignment: Baxter Academy for Technology and Science recently conducted a survey of their existing student population to determine transportation modal choice of students traveling to/from the 54 York Street site. The results of the survey (copy of survey results attached) are presented as follows:

- 38% Charters School Bus Service
 - 25% Commute with an Adult ⁽¹⁾
 - 18% Public Transportation (METRO, Zoom Bus, Casco Bay Transit, Other)
 - 9% Drive personal vehicle
 - 6% Carpool with another student
 - 3% Walk
 - 1% Bike
- Total = 100%

(1) NOTE: Multiple students are being driven by one adult and/or travel to the work site of the adult and walk to the school.

A trip assignment model, prepared for all site trips impacting the street system immediately adjacent to the proposed project site, was developed based upon the following assumptions and considerations:

400 students and 60 staff	
40% of students (152) ride 3 chartered buses	= 3 trips
25% of students (100) commute with an adult:	
o 40 students travel as a single occupant in vehicle with adult	= 80 trips
o 20 students travel with a second student and adult	= 20 trips
o 15 students travel with two other students and adult	= 10 trips
o 25 students travel with adult to work site and walk to school	= 0 trips
18% of students (72) use public transportation	= 0 trips
9% of students (36) drive personal auto and park off-site	= 0 trips ⁽¹⁾
6% of students (24) car pool with fellow student and park off-site	= 0 trips ⁽¹⁾
3% of students (12) walk	= 0 trips
1% of students (4) bike	= 0 trips
85% of staff (51) will drive to site and park in Lancaster Street parking lot	= 51 trips ⁽¹⁾
15% of staff (9) will use other modes of transportation	= 0 trips
Total Trips Impacting Street System	= 164 trips

(1) NOTE: A total of 50 on-site parking spaces are provided in an adjacent off-street parking lot for employees only. No student parking is provided.

Approximately, 109 of the 164 peak hour trips are expected to arrive at the 185 Lancaster Street site and the remaining 55 trips are parents leaving after dropping-off student(s).

Figure 2 illustratively presents the assignment of the site trips to the street system immediately adjacent to the proposed 185 Lancaster Street site.

2017 POST-DEVELOPMENT TRAFFIC FORECAST

Other Development Traffic: Traffic generated by projects that have been approved by the local Planning Board and/or the Maine Department of Transportation, yet are not open, must be included in the estimate of post-development traffic. Peak hour trips generated by the following projects were appropriately assigned to the study intersections:

- o 191 Marginal Way Re-Development Project
- o Mid-Town Development
- o Bayside Bowl
- o 89 Anderson Street
- o Schlotterback & Foss Building
- o #443 Congress Street
- o Westerlea View Lofts

Figure 3 is a “line-diagram” plan that depicts the Other Development trip assignment to both study intersections.

2017 Post-Development Traffic – AM Peak Hour: 2017 Post-Development traffic forecasts were prepared for both study intersections combining peak hour trips generated by the Baxter Academy project (Refer to Figure 2) with Other Development trips highlighted on Figure 3 with 2017 Design Hour Traffic as illustrated on Figure 1. Figure 4 graphically presents the 2017 Post-Development Traffic Conditions for both study intersections during the AM peak hour.

LANCASTER STREET/CHESTNUT STREET – MULTI-WAY “STOP” CONTROL EVALUATION

The Chestnut Street/Lancaster Street intersection presently operates as a two-way STOP controlled intersection with both Lancaster Street approaches under STOP control. A detailed evaluation was completed in 2016 to determine if projected traffic conditions at that time warranted a modification of the traffic control at the

intersection. The earlier study, which was based upon existing 2016 travel conditions measured at the intersection, concluded that traffic conditions at the intersection failed to satisfy the minimum warrants for “*multi-way*” STOP control.

The proposed Baxter Academy for Technology and Science project is forecast to moderately increase peak hour traffic volumes traveling through the subject intersection, especially during the “*morning*” peak hour. The traffic projections estimate an increased volume of 73 trips will travel through the subject intersection in the AM peak hour. It is anticipated that lower residual volumes of traffic generated by the school project will travel through the intersection throughout a typical weekday. A decision to modify traffic control at the intersection should be based upon actual travel conditions measured at the intersection versus estimated travel patterns of multiple development projects impacting the intersection. It is the recommendation of this report that further study of the intersection should be deferred until the Baxter Academy site is fully functional.

STUDENT “DROP-OFF” PARKING SPACE DEMAND

Approximately twenty-five percent (25%) of the existing student enrollment commute with an adult to and from the existing Baxter Academy site at 54 York Street. Short-term on-street parking spaces located on the south side of Maple Street is the primary “drop-off/pick-up” area for students traveling via this mode. Other curbside parking areas used include the west side of York Street opposite the school entrance and the 1-hour parking spaces located on the north side of Maple Street (York Street to Commercial Street). Existing student “drop-off/pick-up” practices were observed on Monday, February 27, 2017 during both the morning arrival and afternoon departure time periods. Vehicle trips were recorded in 5-minute increments between 7:40 and 8:25AM and, again, between 2:30 and 3:00PM. The following tables summarize that effort:

Parent “Drop-Off” Trips

<u>Survey Start Time</u>	<u>Total Vehicle Trips</u>
7:40 to 7:45 AM	5
7:45 to 7:50 AM	5
7:50 to 7:55 AM	4
7:55 to 8:00 AM	6
8:00 to 8:05 AM	8
8:05 to 8:10 AM	7
8:10 to 8:15 AM	9
8:15 to 8:20 AM	6
8:20 to 8:25 AM	9

Parent “Pick-Ups” Parking Space Trends

<u>Survey Start Time</u>	<u>Number of Vehicles “Waiting”</u>
2:30 to 2:35 PM	7
2:35 to 2:40 PM	8
2:40 to 2:45 PM	8
2:45 to 2:50 PM	10
2:50 to 2:55 PM	13
2:55 to 3:00 PM	15

A total of fifty-nine (59) “*drop-off*” trips were recorded during the morning arrival period; with a peak value of 9 trips occurring during two separate time periods. A separate tally of vehicle duration was not maintained, although, the length of stay very seldom exceeded 30 to 60 seconds in length. The afternoon survey process focused on the “*length of stay*” for each motorist versus “*total trips*” as was the case used in the morning survey. Motorists in the afternoon were observed arriving early on-site, well in advance of the school dismissal time,

parking in the available on-street parking spaces located near the 54 York Street site. As shown in the chart, the “peak” number of vehicles parked curbside was 15, which occurred just prior to the school dismissal time of 3:00PM. The survey stopped at 3:00 PM concurrent with the end of the school day. It is reasonable to assume that the actual “peak” number of vehicles queued waiting for a student may have exceeded 15 vehicles, just after dismissal time but the duration was very short.

The student capacity of the proposed 185 Lancaster Street site is 400 students, representing an increase of 57 students when compared to the existing York Street site. Accordingly, it is reasonable to assume that the drop-off parking needs of the new school site will increase proportionally resulting in a student “drop-off” parking demand of 18 vehicle spaces. A parking space demand of 11 spaces is determined for the morning peak hour.

SUMMARY

1. The proposed Baxter Academy for Technology and Science public charter high school can be expected to generate approximately 200 vehicle trips during the “busiest” single hourly time period of the day; the AM peak hour. Roughly 80% percent of the trips (164 trips) impact the street system immediately adjacent to the proposed site at 185 Lancaster Street. The remaining site trips (36-trips) are generated by students traveling to school in a private vehicle parking off-site in public parking lots or curbside on nearby streets.
2. MaineDOT’s Traffic Safety Bureau’s latest three-year safety report (2013 through 2015) for the segments of streets and intersections highlighted on the attached City map identified two locations as High Crash Locations (HCL). Detailed vehicle collision diagrams were prepared for both locations to better determine if a clear pattern of accident is occurring at either location.

Location #2: Elm Street at Lancaster Street, had a reported total of 9 vehicle crashes and a Critical Rate Factor of 3.79. The predominate crash pattern were “angle” crashes, which accounted for six of the 9 reported vehicle crashes. A detailed review of each traffic crash report suggests travel speed and roadway conditions were likely contributing factors causing the crash. The City’s most recent street re-construction project on Elm Street, which narrowed travel lanes on Elm Street, should help immensely in reducing vehicle speeds on the Elm Street approach to the intersection.

Location #3: Preble Street at Kennebec Street, had a reported total of 12 vehicle crashes and a Critical Rate Factor of 4.22. A review of the vehicle crash reports provided by MaineDOT shows that one vehicle accident report was incorrectly coded occurring at an adjacent intersection. Eight of the 11 vehicle accidents were “angle” crashes involving motorists on both Kennebec Street approaches striking thru vehicles traveling southerly on Preble Street. The west approach of Kennebec Street is proposed to be closed with the extension of Somerset Street to Hanover Street. Six of the 8 “angle” crashes involved motorists from this approach colliding with thru Preble Street traffic. Completion of the proposed, federally funded project should greatly reduce the frequency of traffic crashes reported at the intersection.

3. The proposed Baxter Academy school project is expected to increase, somewhat moderately, the volume of traffic traveling through the Chestnut Street/Lancaster Street intersection during two time periods of the day; the morning and afternoon peak hours. Measured traffic impacts during the remaining hours will be very minor. A detailed traffic safety evaluation report was completed in 2016 of the intersection to determine if the current traffic control measures were both appropriate and safe. The report specifically evaluated whether prevailing traffic volumes warranted multi-way STOP control at the intersection. The traffic safety report concluded that existing traffic conditions found at the intersection do not meet the minimum requirements for “multi-way” STOP control. It would be the recommendation of this report that the City may want to re-assess traffic conditions at the intersection in the near future to determine if prevailing conditions have changed.

4. Baxter Academy has determined that approximately 25% of their students travel to/from school with another adult and are dropped-off and/or picked-up curb side in the immediate area of the school site. The number of parking spaces required, albeit for short periods of time, to accommodate the drop-off/pick-up needs of the new school site is critical. To most accurately assess the parking space needs, existing field measurements were conducted at the existing 54 York Street school site. All student drop-off and pick-up occurrences were recorded in 5-minute increments between 7:40 and 8:25 AM and, again, between 2:30 and 3:00 PM. The peak number of occupied parking spaces in the morning peak hour was 11 and the peak parking space utilization value in the afternoon was 15. The student capacity of the proposed 185 Lancaster Street site is 400 students, representing an increase of 57 students when compared to the existing York Street site. Accordingly, it is reasonable to assume that the drop-off parking needs of the new school site will increase proportionally resulting in a student "drop-off" parking demand of 18 vehicle spaces for the afternoon dismissal time and a much lower parking space requirement of 11 spaces in the morning arrival period.



Portland: Lancaster & Chestnut
 Tuesday September 13, 2016
 Sunny
 Count By: Dawn-Marie Fahey

File Name : Portland Lancaster & Chestnut 091316
 Site Code : 00091316
 Start Date : 9/13/2016
 Page No : 5

Start Time	Chestnut From North				Lancaster From East				Chestnut From South				Lancaster From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	15	36	7	58	2	10	2	14	3	9	1	13	5	8	1	14	99
07:45 AM	11	58	10	79	2	12	3	17	0	5	2	7	9	8	3	20	123
08:00 AM	9	37	5	51	7	7	3	17	3	9	1	13	4	7	5	16	97
08:15 AM	10	33	4	47	4	5	3	12	1	3	2	6	5	4	1	10	75
Total Volume	45	164	26	235	15	34	11	60	7	26	6	39	23	27	10	60	394
% App. Total	19.1	69.8	11.1		25	56.7	18.3		17.9	66.7	15.4		38.3	45	16.7		
PHF	.750	.707	.650	.744	.536	.708	.917	.882	.583	.722	.750	.750	.639	.844	.500	.750	.801

Portland: Elm & Lancaster
 Wednesday February 15, 2017
 Clear
 Count By: Dawn-Marie Fahey

File Name : Portland Elm & Lancaster AM 021517
 Site Code : 00021517
 Start Date : 2/15/2017
 Page No : 5

Start Time	Elm St From North				Lancaster From East				Elm St From South				Lancaster From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	14	18	0	32	3	24	2	29	0	11	3	14	75
07:45 AM	0	0	0	0	18	16	0	34	6	54	2	62	0	22	5	27	123
08:00 AM	0	0	0	0	7	17	0	24	8	37	3	48	0	21	7	28	100
08:15 AM	0	0	0	0	13	12	0	25	6	36	2	44	0	11	11	22	91
Total Volume	0	0	0	0	52	63	0	115	23	151	9	183	0	65	26	91	389
% App. Total	0	0	0	0	45.2	54.8	0		12.6	82.5	4.9		0	71.4	28.6		
PHF	.000	.000	.000	.000	.722	.875	.000	.846	.719	.699	.750	.738	.000	.739	.591	.813	.791

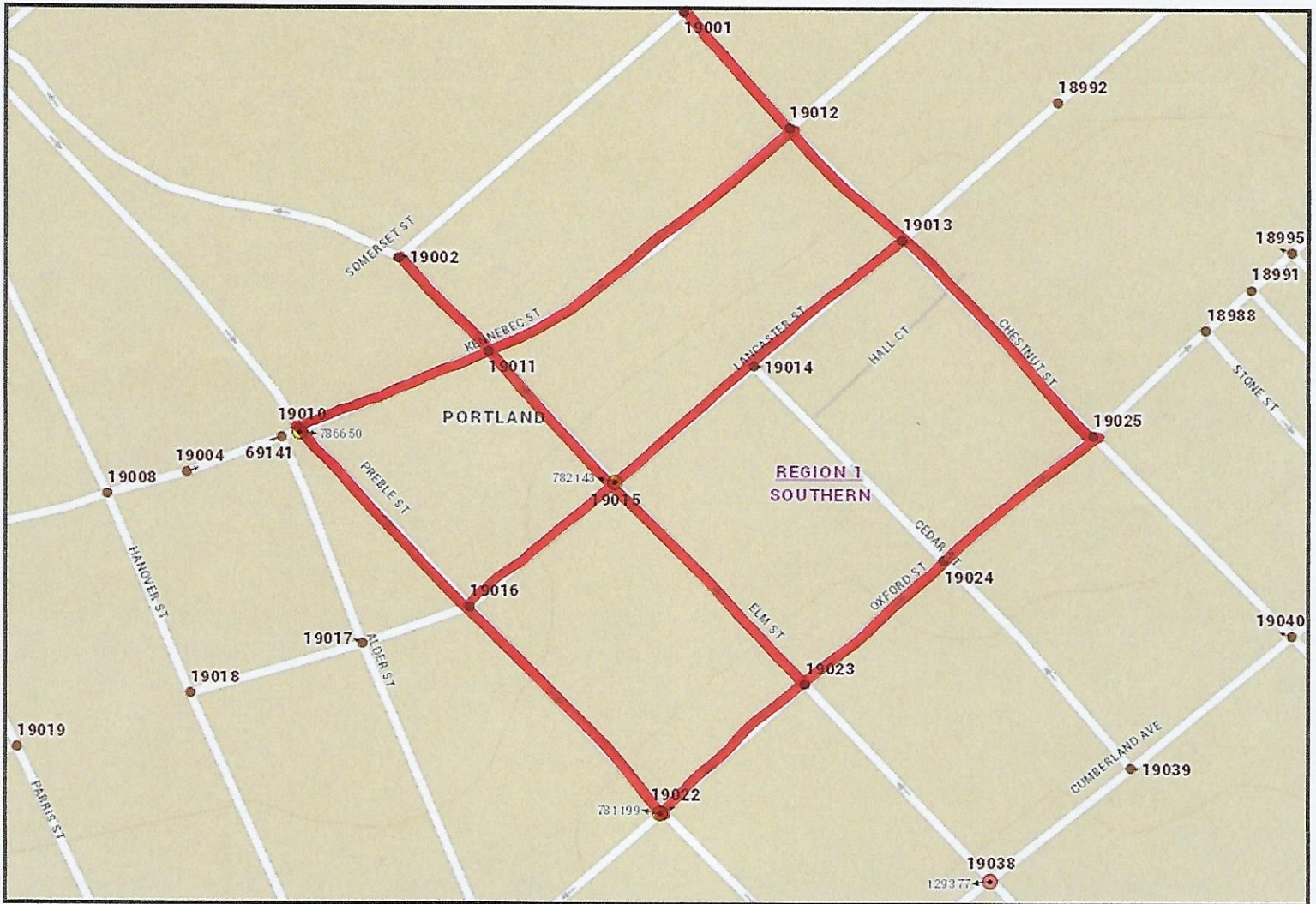
60 72

26 174 10

75 30

seasonal traffic adjustment $1.01 \div 0.88 = 1.15$

DEFAULT TITLE FROM MAP DOCUMENT



The Maine Department of Transportation provides this publication for information only. Reliance upon this information is at user risk. It is subject to revision and may be incomplete depending upon changing conditions. The Department assumes no liability if injuries or damages result from this information. This map is not intended to support emergency dispatch.

0.06 Miles
1 inch = 0.04 miles

Date: 2/8/2017
Time: 9:24:25 AM

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

Preble St Chestnut St area in Portland

REPORT PARAMETERS

Year 2013, Start Month 1 through Year 2015 End Month: 12

Route: 0560414	Start Node: 19012 End Node: 19010	Start Offset: 0 End Offset: 0	<input checked="" type="checkbox"/> Exclude First Node <input checked="" type="checkbox"/> Exclude Last Node
Route: 0560426	Start Node: 19013 End Node: 19016	Start Offset: 0 End Offset: 0	<input checked="" type="checkbox"/> Exclude First Node <input checked="" type="checkbox"/> Exclude Last Node
Route: 0560560	Start Node: 19022 End Node: 19025	Start Offset: 0 End Offset: 0	<input checked="" type="checkbox"/> Exclude First Node <input checked="" type="checkbox"/> Exclude Last Node
Route: 0560597	Start Node: 19010 End Node: 19022	Start Offset: 0 End Offset: 0	<input type="checkbox"/> Exclude First Node <input type="checkbox"/> Exclude Last Node
Route: 0560252	Start Node: 19023 End Node: 19015	Start Offset: 0 End Offset: 0	<input checked="" type="checkbox"/> Exclude First Node <input checked="" type="checkbox"/> Exclude Last Node
Route: 0560252	Start Node: 19015 End Node: 19011	Start Offset: 0 End Offset: 0	<input checked="" type="checkbox"/> Exclude First Node <input checked="" type="checkbox"/> Exclude Last Node
Route: 0560252	Start Node: 19011 End Node: 19002	Start Offset: 0 End Offset: 0	<input checked="" type="checkbox"/> Exclude First Node <input type="checkbox"/> Exclude Last Node
Route: 0560135	Start Node: 19025 End Node: 19001	Start Offset: 0 End Offset: 0	<input type="checkbox"/> Exclude First Node <input type="checkbox"/> Exclude Last Node

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

Crash Summary I

Nodes															
Node	Route - MP	Node Description	U/R	Total Crashes	K	A	B	C	PD	Percent Annual M Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF	
19011	0560414 - 0.21	Int of ELM ST KENNEBEC ST	2	7	0	0	0	0	7	0.0	1.910	1.22	0.48	2.55	
												Statewide Crash Rate:	0.15		
19014	0560426 - 0.15	Int of CEDAR ST LANCASTER ST	2	0	0	0	0	0	0	0.0	0.341	0.00	0.60	0.00	
												Statewide Crash Rate:	0.14		
19015	0560426 - 0.20	Int of ELM ST LANCASTER ST	2	9	0	1	2	1	5	44.4	1.572	1.91	0.50	3.79	
												Statewide Crash Rate:	0.15		
19023	0560560 - 0.12	Int of ELM ST OXFORD ST	2	0	0	0	0	0	0	0.0	1.359	0.00	0.52	0.00	
												Statewide Crash Rate:	0.15		
19024	0560560 - 0.17	0509444 POR,OXFORD,CEDAR ST.	2	0	0	0	0	0	0	0.0	0.347	0.00	0.60	0.00	
												Statewide Crash Rate:	0.14		
19010	0560597 - 0.13	Int of KENNEBEC ST PREBLE ST	2	12	0	1	0	3	8	33.3	2.001	2.00	0.47	4.22	
												Statewide Crash Rate:	0.15		
19016	0560597 - 0.19	Int of LANCASTER ST PREBLE ST	2	3	0	0	0	0	3	0.0	1.544	0.65	0.51	1.28	
												Statewide Crash Rate:	0.15		
19022	0560597 - 0.26	Int of OXFORD ST PREBLE ST	2	4	0	0	0	1	3	25.0	1.618	0.82	0.50	1.65	
												Statewide Crash Rate:	0.15		
19002	0560252 - 0.32	Int of ELM ST SOMERSET ST	2	2	0	0	0	1	1	50.0	3.074	0.22	0.42	0.00	
												Statewide Crash Rate:	0.15		
19025	0560135 - 0.16	0509445 POR,CHESTNUT,OXFORD ST.	2	1	0	1	0	0	0	100.0	0.383	0.87	0.60	1.44	
												Statewide Crash Rate:	0.14		
19013	0560135 - 0.24	Int of CHESTNUT ST LANCASTER ST	2	3	0	0	0	1	2	33.3	0.353	2.84	0.60	4.69	
												Statewide Crash Rate:	0.14		
19012	0560135 - 0.28	0509432 POR,CHESTNUT,KENNEBEC ST.	2	1	0	0	0	0	1	0.0	0.549	0.61	0.59	1.03	
												Statewide Crash Rate:	0.14		
19001	0560135 - 0.31	0509421 POR,SOMERSET,CHESTNUT ST.	2	4	0	0	0	1	3	25.0	2.500	0.53	0.43	1.25	
												Statewide Crash Rate:	0.14		
Study Years: 3.00			NODE TOTALS:		46	0	3	2	8	33	28.3	17.551	0.87	0.27	3.18

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

Crash Summary I

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section U/R Length	Total Crashes	Sections				Injury Crashes	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF	
							K	A	B	C							PD
19011	19012	194707	0 - 0.10	0560414 - 0.11 RD INV 05 60414	0.10	2	1	0	0	0	0	0	0.0	0.00021	1574.56	1598.97	0.00
Int of ELM ST KENNEBEC ST Statewide Crash Rate: 383.78																	
19010	19011	194704	0 - 0.05	0560414 - 0.21 RD INV 05 60414	0.05	2	0	0	0	0	0	0	0.0	0.00016	0.00	1644.70	0.00
Int of KENNEBEC ST PREBLE ST Statewide Crash Rate: 383.78																	
19013	19014	194710	0 - 0.04	0560426 - 0.11 RD INV 05 60426	0.04	2	1	0	0	0	0	1	0.0	0.00005	6486.09	1204.97	5.38
Int of CHESTNUT ST LANCASTER ST Statewide Crash Rate: 383.78																	
19014	19015	194712	0 - 0.05	0560426 - 0.15 RD INV 05 60426	0.05	2	3	0	0	0	0	3	0.0	0.00009	11025.05	1605.53	6.87
Int of CEDAR ST LANCASTER ST Statewide Crash Rate: 383.78																	
19015	19016	194714	0 - 0.04	0560426 - 0.20 RD INV 05 60426	0.04	2	2	0	0	0	0	2	0.0	0.00004	18946.93	558.86	33.90
Int of ELM ST LANCASTER ST Statewide Crash Rate: 383.78																	
19022	19023	3122298	0 - 0.05	0560560 - 0.07 RD INV 05 60560	0.05	2	3	0	0	1	0	1	50.0	0.00016	6101.84	609.36	10.01
Int of OXFORD ST PREBLE ST Statewide Crash Rate: 159.43																	
19023	19024	194730	0 - 0.05	0560560 - 0.12 RD INV 05 60560	0.05	2	0	0	0	0	0	0	0.0	0.00011	0.00	1642.73	0.00
Int of ELM ST OXFORD ST Statewide Crash Rate: 383.78																	
19024	19025	194732	0 - 0.05	0560560 - 0.17 RD INV 05 60560	0.05	2	2	0	0	0	0	2	0.0	0.00010	6918.50	1622.25	4.26
0509444 POR,OXFORD,CEDAR ST Statewide Crash Rate: 383.78																	
19010	19016	3106835	0 - 0.06	0560597 - 0.13 RD INV 05 60597	0.06	2	1	0	0	0	0	1	0.0	0.00088	379.95	715.35	0.00
Int of KENNEBEC ST PREBLE ST Statewide Crash Rate: 198.28																	
19016	19022	3106836	0 - 0.07	0560597 - 0.19 RD INV 05 60597	0.07	2	3	0	0	0	1	2	33.3	0.00090	1107.50	710.64	1.56
Int of LANCASTER ST PREBLE ST Statewide Crash Rate: 198.28																	
19015	19023	3123553	0 - 0.07	0560252 - 0.17 RD INV 05 60252	0.07	2	0	0	0	0	0	0	0.0	0.00101	0.00	692.86	0.00
Int of ELM ST LANCASTER ST Statewide Crash Rate: 198.28																	
19011	19015	3119283	0 - 0.05	0560252 - 0.24 RD INV 05 60252	0.05	2	0	0	0	0	0	0	0.0	0.00087	0.00	715.87	0.00
Int of ELM ST KENNEBEC ST Statewide Crash Rate: 198.28																	
19002	19011	3129301	0 - 0.03	0560252 - 0.29 RD INV 05 60252	0.03	2	1	0	0	0	0	1	0.0	0.00056	593.28	785.16	0.00
Int of ELM ST SOMERSET ST Statewide Crash Rate: 198.28																	
19013	19025	194711	0 - 0.08	0560135 - 0.16 RD INV 05 60135	0.08	2	1	0	0	0	0	1	0.0	0.00014	2324.95	1654.59	1.41
Int of CHESTNUT ST LANCASTER ST Statewide Crash Rate: 383.78																	
19012	19013	194709	0 - 0.04	0560135 - 0.24 RD INV 05 60135	0.04	2	1	0	0	0	0	1	0.0	0.00009	3742.80	1599.73	2.34
0509432 POR,CHESTNUT,KENNEBEC ST Statewide Crash Rate: 383.78																	
19001	19012	194692	0 - 0.03	0560135 - 0.28 RD INV 05 60135	0.03	2	1	0	0	0	0	1	0.0	0.00008	4204.61	1553.75	2.71
0509421 POR,SOMERSET,CHESTNUT ST Statewide Crash Rate: 383.78																	
Study Years: 3.00					Section Totals:	0.86	20	0	0	1	1	16	10.0	0.00545	1222.83	510.47	2.40
					Grand Totals:	0.86	66	0	3	3	9	49	22.7	0.00545	4035.35	669.73	6.03

COLLISION DIAGRAM

SHEET 1 OF 2

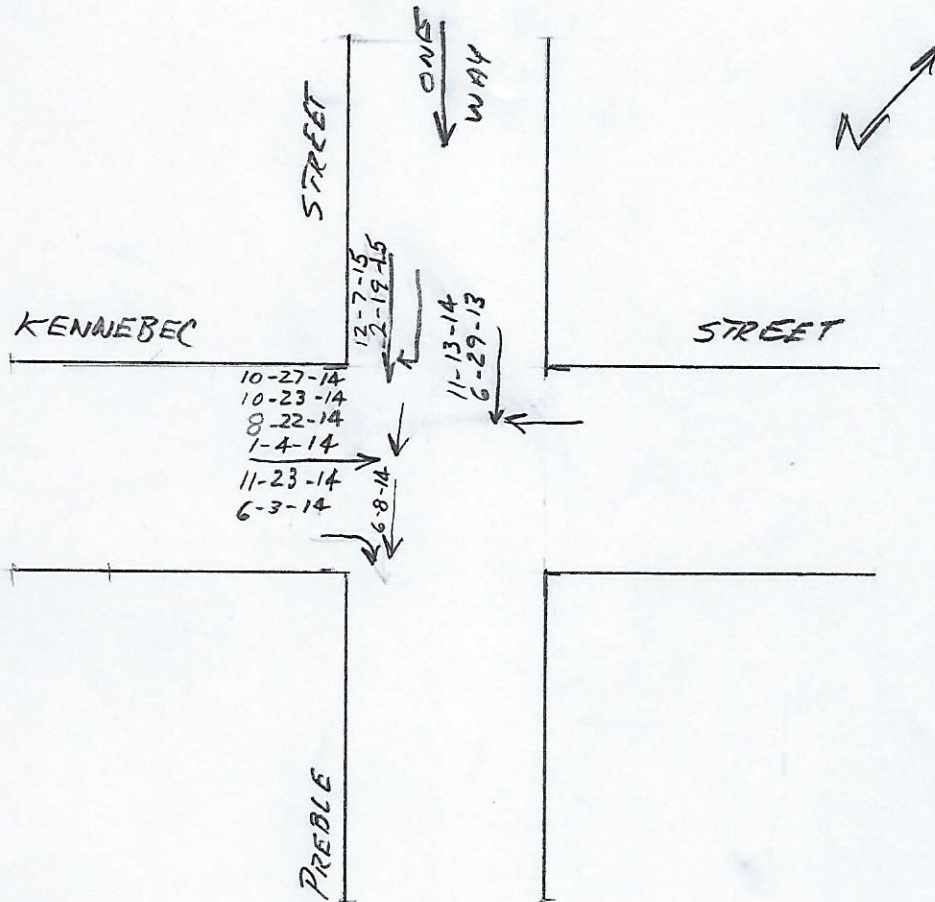
LOCATION PREBLE ST. @ KENNEBEC STS.

TOWN PORTLAND

NODE NO(S) 19010

YEARS REVIEWED 2013 - 2015

DATE PREPARED 2-17-2017



CRITICAL RATE FACTOR _____ EQUIV. PROP. DAMAGE ACC/YEAR _____ ACC/MEV _____

LIGHT

- | | | |
|-------------------------|-------------------------|--------------------------|
| 1. DAWN (MORNING) | 2. DAYLIGHT | 3. DUSK (EVENING) |
| 4. DARK (ST. LIGHTS ON) | 5. DARK (NO ST. LIGHTS) | 6. DARK (ST. LIGHTS OFF) |
| 7. OTHER | | |

ROAD SURFACE

- | | | |
|---------------------------|--------------------------|-----------------------------|
| 1. DRY | 2. WET | 3. SNOW/SLUSH-SANDED |
| 4. ICE/PACKED SNOW-SANDED | 5. MUDDY | 6. DEBRIS |
| 7. OILY | 8. SNOW/SLUSH-NOT SANDED | 9. ICE-PKD. SNOW-NOT SANDED |
| 10. OTHER | | |

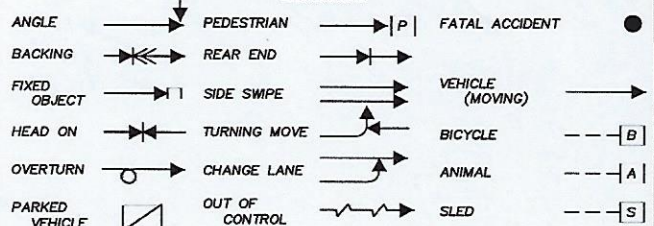
APPARENT CONTRIBUTING FACTORS - HUMAN

- | | | |
|--------------------------------------|-------------------------------------|-------------------------|
| 1. NO IMPROPER ACTION | 2. FAIL TO YLD. RIGHT OF WAY | 3. ILLEGAL UNSAFE SPEED |
| 4. FOLLOW TOO CLOSE | 5. DISREGARD TRAFFIC CONTROL DEVICE | |
| 6. DRIVING LEFT OF CENTER-NO PASSING | 7. IMPROPER PASS-OVERTAKING | |
| 8. IMP. UNSAFE LANE CHANGE | 9. IMP. PARKING START/STOP | 10. IMPROPER TURN |
| 11. UNSAFE BACKING | 12. NO SIGNAL OR IMP. SIGNAL | 13. IMPEDING TRAFFIC |
| 14. DRIVER INATTENTION-DISTRACTION | 15. DRIVER INEXPERIENCE | 18. VISION OBSCURED- |
| 16. PEDEST. VIOLATION ERROR | 17. PHYSICAL IMPAIRMENT | 18. VISION OBSCURED- |
| 16. PEDEST. VIOLATION ERROR | 17. PHYSICAL IMPAIRMENT | 18. VISION OBSCURED- |
| 19. VISION OBSCURED-SUN/HEADLIGHTS | | |
| 20. OTHER VISION OBSCUREMENT | 30. OTHER HUMAN VIOLATION FACTOR | |
| 31. HIT AND RUN | 51. UNKNOWN | |

- VEHICULAR

- | | | |
|------------------------------------|----------------------------|--------------------------|
| 41. DEFECTIVE BRAKES | 42. DEFECTIVE TIRE/FAILURE | 43. DEFECTIVE LIGHTS |
| 44. DEFECTIVE SUSPENSION OR FACTOR | 45. DEFECTIVE STEERING | 50. OTHER VEHICLE DEFECT |
| | 51. UNKNOWN | |

SYMBOLS



WEATHER

- | | | |
|------------|----------|------------------|
| C = CLEAR | F = FOG | R = RAIN |
| SL = SLEET | S = SNOW | CL = CLOUDY |
| | | XW = CROSS WINDS |

INJURIES

- | | |
|--------------------|------------------------|
| K = FATAL | B = NON-INCAPACITATING |
| A = INCAPACITATING | C = POSSIBLE INJURY |

S:\SHEETS\COLLISION DIAGRAM.DWG

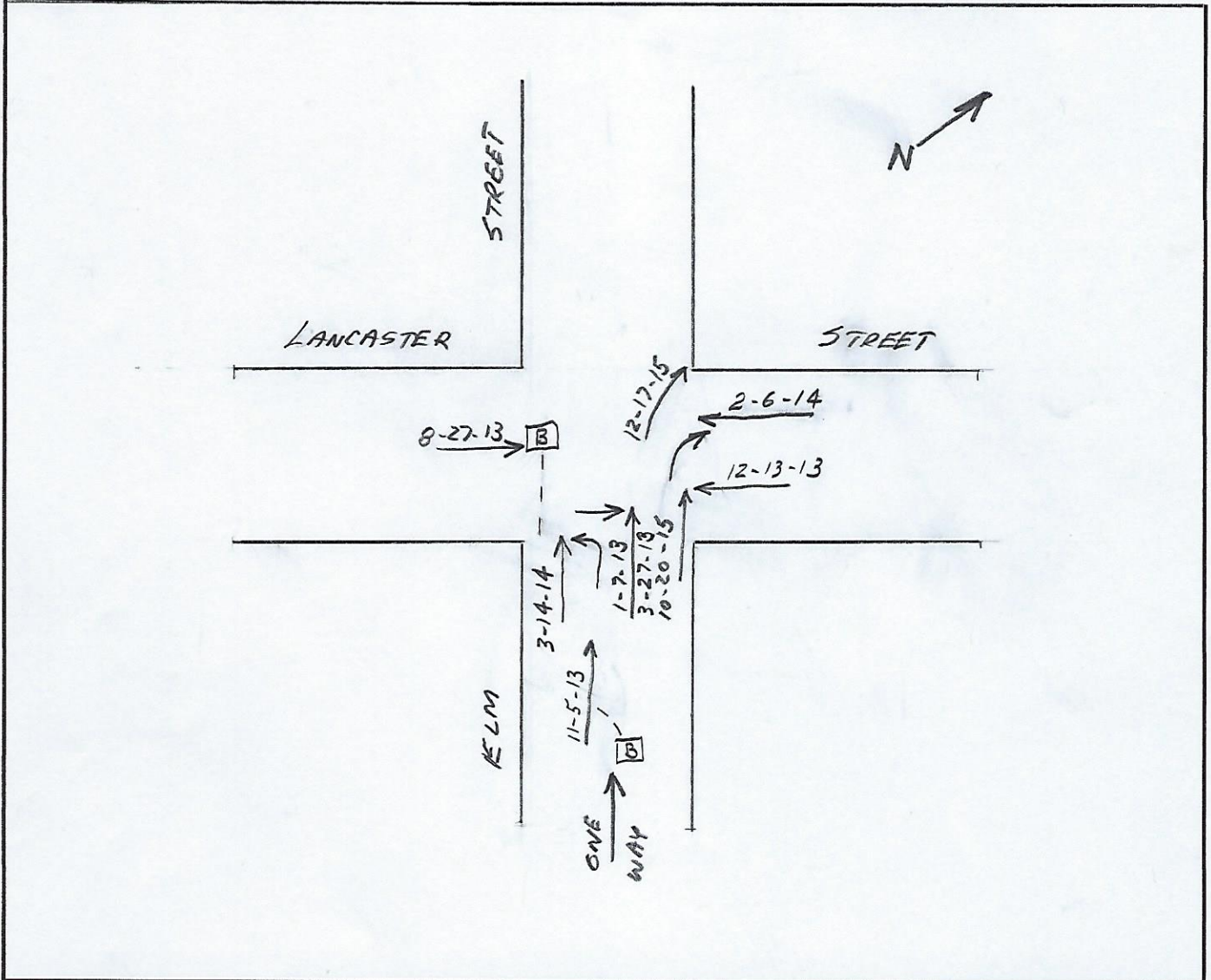
COLLISION DIAGRAM

SHEET 1 OF 2

LOCATION ELM ST. @ LANCASTER ST.

TOWN PORTLAND NODE NO(S) 19015

YEARS REVIEWED 2013-2015 DATE PREPARED 2-17-2017



CRITICAL RATE FACTOR _____ EQUIV. PROP. DAMAGE ACC/YEAR _____ ACC/MEV _____

- LIGHT**
- | | | |
|-------------------------|-------------------------|--------------------------|
| 1. DAWN (MORNING) | 2. DAYLIGHT | 3. DUSK (EVENING) |
| 4. DARK (ST. LIGHTS ON) | 5. DARK (NO ST. LIGHTS) | 6. DARK (ST. LIGHTS OFF) |
| 7. OTHER | | |
- ROAD SURFACE**
- | | | |
|---------------------------|--------------------------|-----------------------------|
| 1. DRY | 2. WET | 3. SNOW/SLUSH-SANDED |
| 4. ICE/PACKED SNOW-SANDED | 5. MUDDY | 6. DEBRIS |
| 7. OILY | 8. SNOW/SLUSH-NOT SANDED | 9. ICE-PKD. SNOW-NOT SANDED |
| 10. OTHER | | |
- APPARENT CONTRIBUTING FACTORS - HUMAN**
- | | | |
|--------------------------------------|-------------------------------------|--------------------------------------|
| 1. NO IMPROPER ACTION | 2. FAIL TO YLD. RIGHT OF WAY | 3. ILLEGAL UNSAFE SPEED |
| 4. FOLLOW TOO CLOSE | 5. DISREGARD TRAFFIC CONTROL DEVICE | 6. IMPROPER PASS-OVERTAKING |
| 7. DRIVING LEFT OF CENTER-NO PASSING | 8. IMP. UNSAFE LANE CHANGE | 9. IMP. PARKING START/STOP |
| 10. IMPROPER TURN | 11. UNSAFE BACKING | 12. NO SIGNAL OR IMP. SIGNAL |
| 13. IMPEDING TRAFFIC | 14. DRIVER INATTENTION-DISTRACTION | 15. DRIVER INEXPERIENCE |
| 16. PEDEST. VIOLATION ERROR | 17. PHYSICAL IMPAIRMENT | 18. VISION OBSCURED-WINDSHIELD GLASS |
| 19. VISION OBSCURED-SUN/HEADLIGHTS | 20. OTHER VISION OBSCUREMENT | 30. OTHER HUMAN VIOLATION FACTOR |
| 31. HIT AND RUN | 51. UNKNOWN | |
- VEHICULAR**
- | | | |
|------------------------------------|----------------------------|--------------------------|
| 41. DEFECTIVE BRAKES | 42. DEFECTIVE TIRE/FAILURE | 43. DEFECTIVE LIGHTS |
| 44. DEFECTIVE SUSPENSION OR FACTOR | 45. DEFECTIVE STEERING | 50. OTHER VEHICLE DEFECT |
| 51. UNKNOWN | | |

SYMBOLS

ANGLE	↓	PEDESTRIAN	→ P	FATAL ACCIDENT	●
BACKING	← ← ←	REAR END	→ →	VEHICLE (MOVING)	→
FIXED OBJECT	→ T	SIDE SWIPE	→ →	BICYCLE	---[B]
HEAD ON	→ ←	TURNING MOVE	→ ↻	ANIMAL	---[A]
OVERTURN	○→	CHANGE LANE	→ ↗	SLED	---[S]
PARKED VEHICLE	□	OUT OF CONTROL	→ ~		

WEATHER

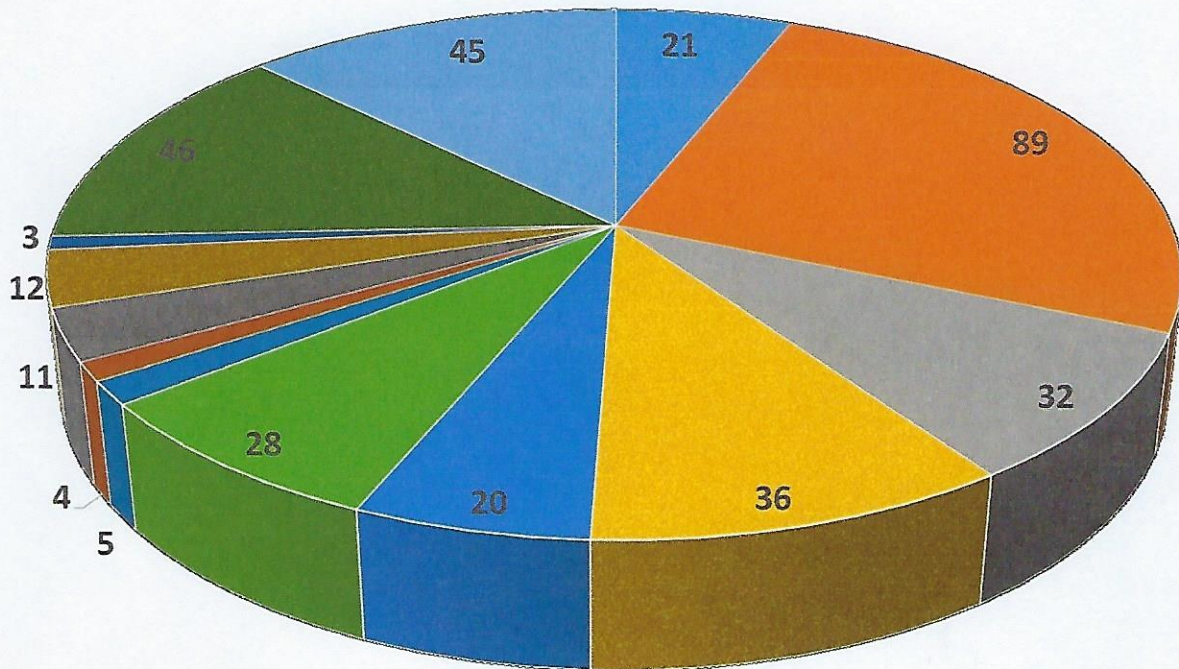
C = CLEAR	F = FOG	R = RAIN
SL = SLEET	S = SNOW	CL = CLOUDY
		XW = CROSS WINDS

INJURIES

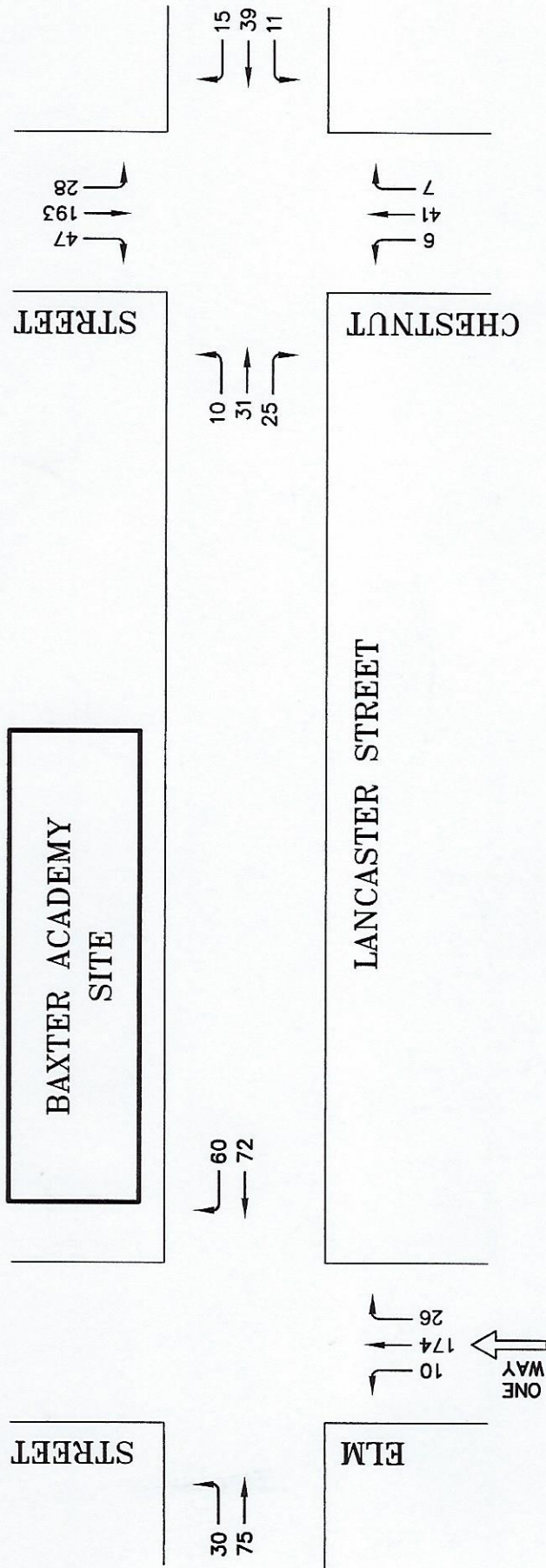
K = FATAL	B = NON-INCAPACITATING
A = INCAPACITATING	C = POSSIBLE INJURY

S:\SHEETS\COLLISION DIAGRAM.DWG

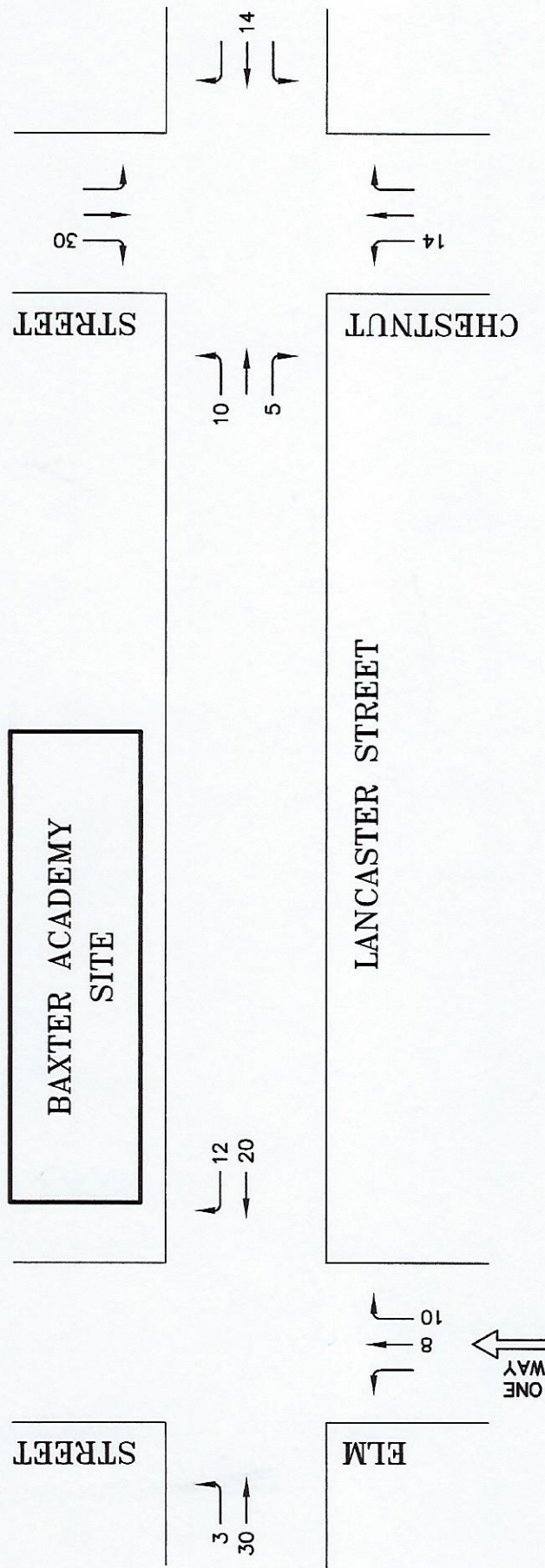
How our students get to school 2016-2017



- Carpool -21
- Commute with Adult - 89
- Drive own car- 32
- Luce Transportation - Lewiston -36
- METRO - Breeze - 20
- METRO - Local - 28
- Ride Bike - 5
- Lakes Region Bus - 4
- Walk - 11
- Zoom Bus - 12
- Boat - 3
- Luce Transportation - Topsham - 46
- Luce Transportation - Windham - 45



2017 DESIGN HOUR TRAFFIC
 AM PEAK HOUR
 FIGURE 1



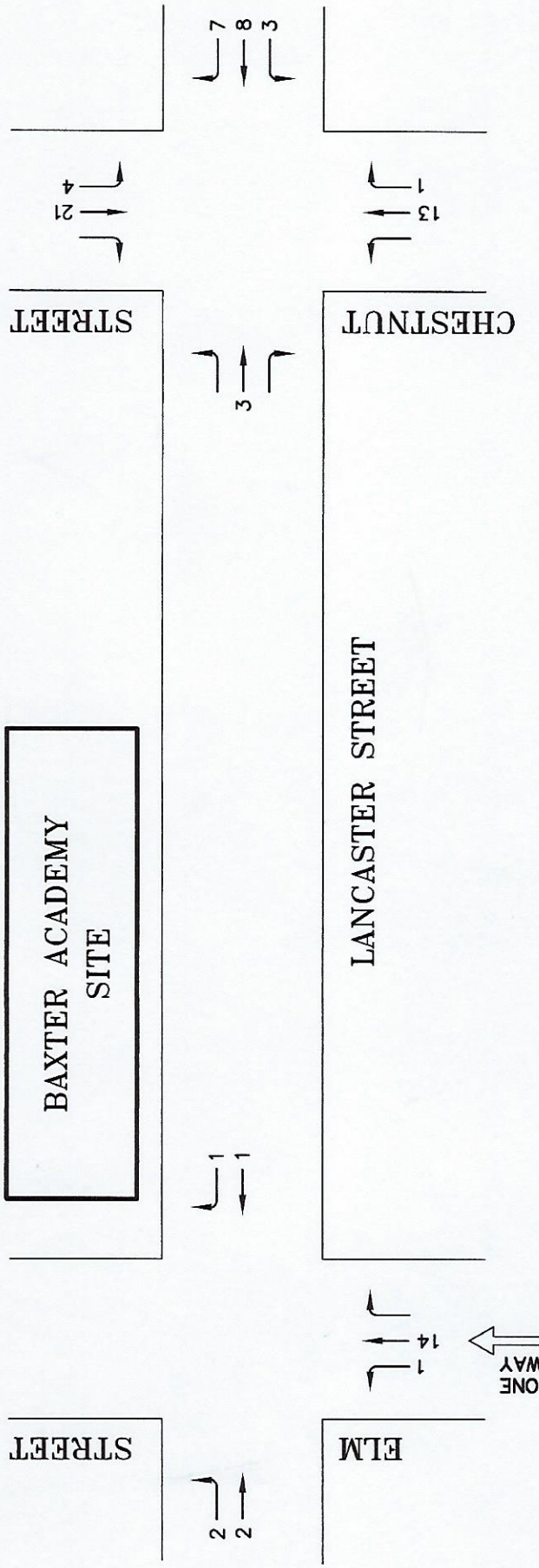
**SITE TRAFFIC ASSIGNMENT
AM PEAK HOUR
FIGURE 2**

ES:\LAND PROJECTS\31400\3144391 TRAFFIC SOLUTIONS\BAXTER ACADEMY\TRAFFIC\BAXTER ACADEMY 3-2-17.DWG

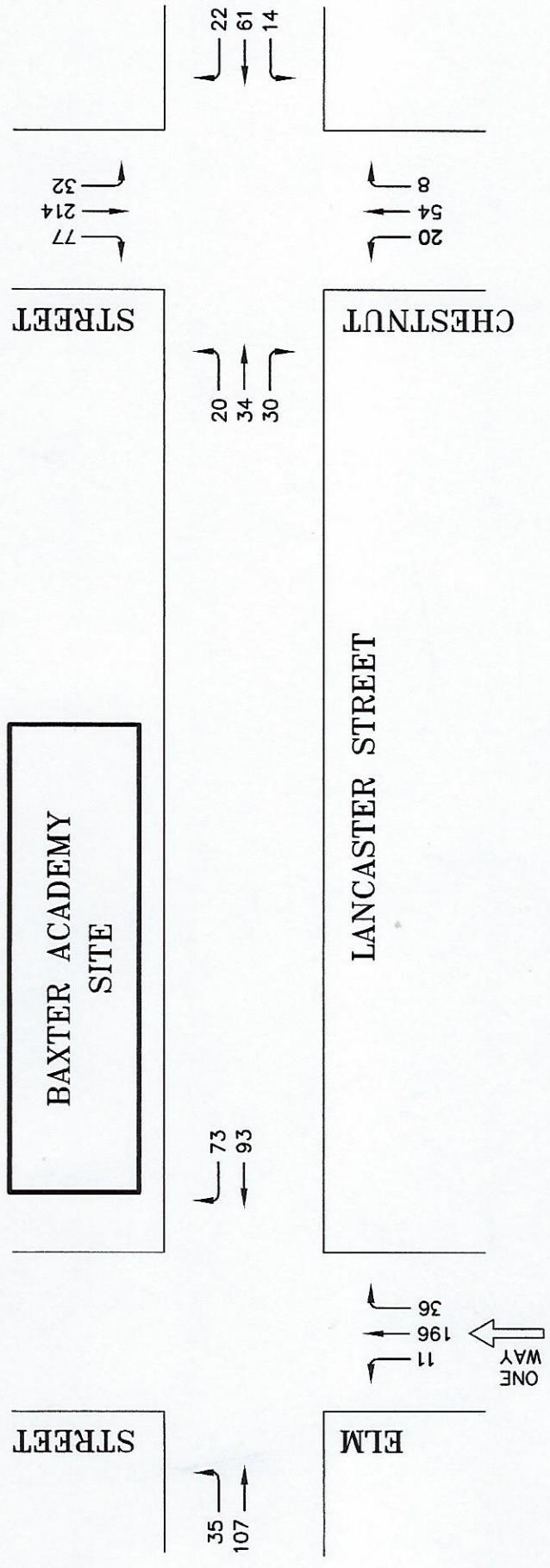
Project Name and Location:
BAXTER ACADEMY
185 LANCASTER STREET, PORTLAND, MAINE
DATE: FEBRUARY, 2017

TRAFFIC SOLUTIONS
233 BURNSIDE STREET, PORTLAND, MAINE 04102-1730

FIGURE: 2



OTHER DEVELOPMENT TRAFFIC
 AM PEAK HOUR
 FIGURE 3



2017 POST-DEVELOPMENT TRAFFIC
 AM PEAK HOUR
 FIGURE 4