

Waldoboro Intersection of Rte 220 with Main St and Jefferson St

Safety Analysis

Intersection Location



Intersection Location



Main Street Westbound Approach



Main Street Eastbound Approach



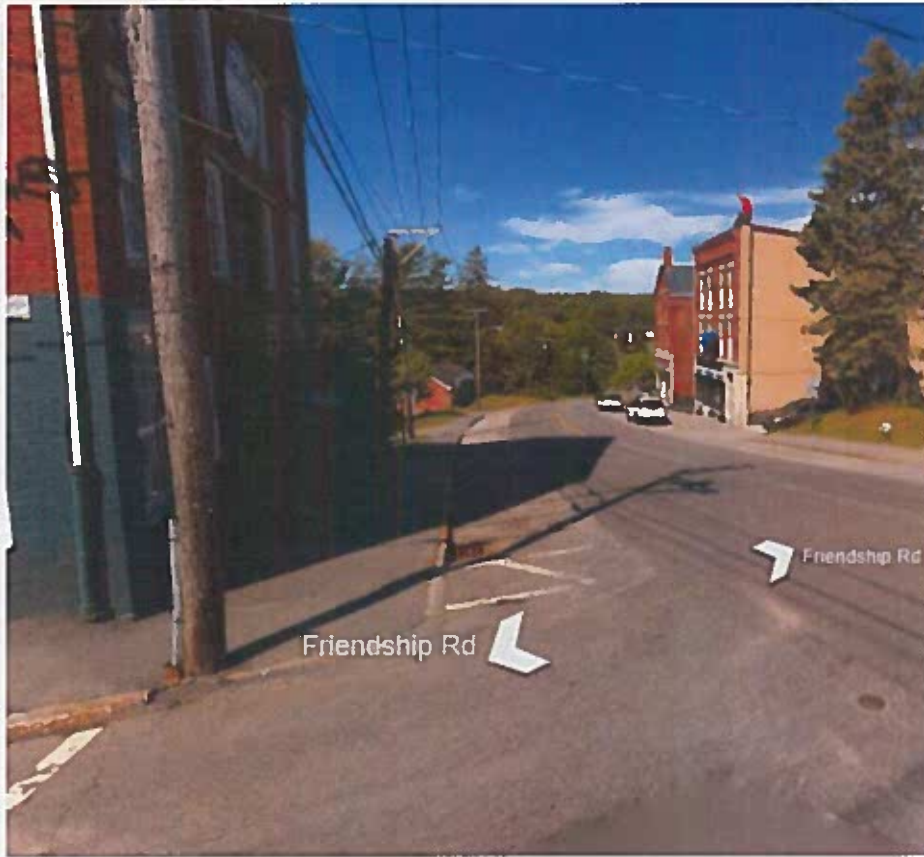
Friendship Street Northbound Approach



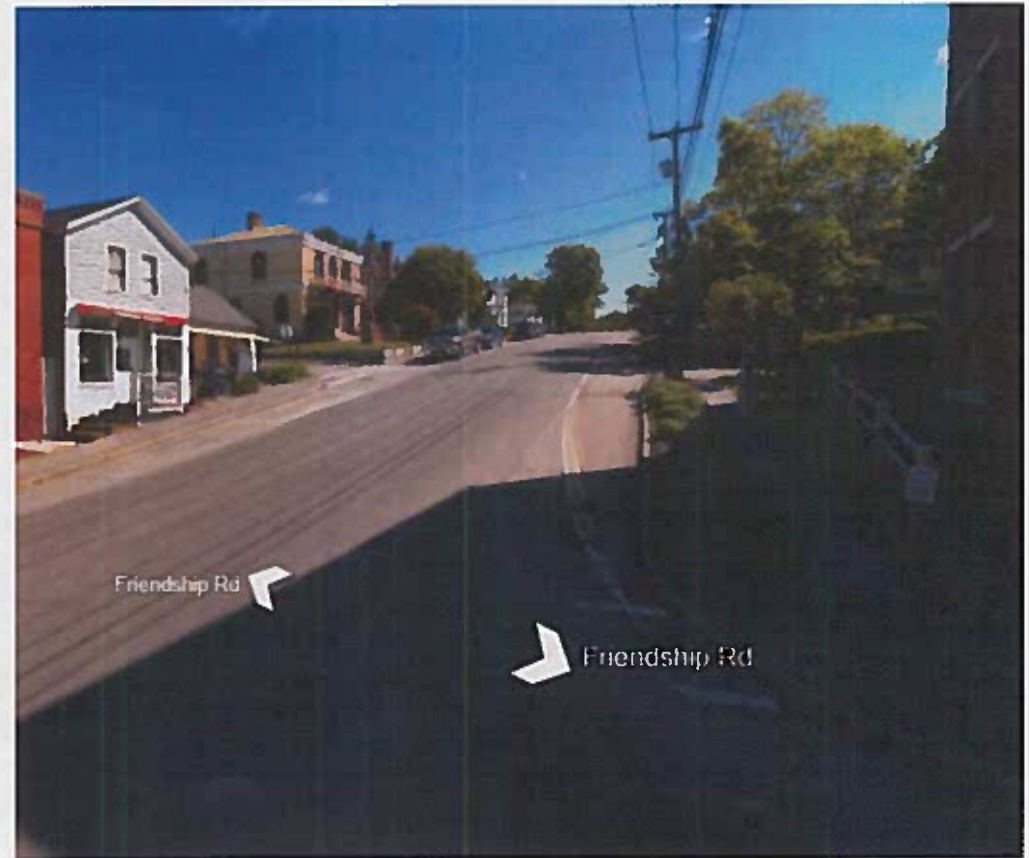
Friendship Street Northbound Approach



Friendship Street Northbound Approach



Looking Left



Looking Right

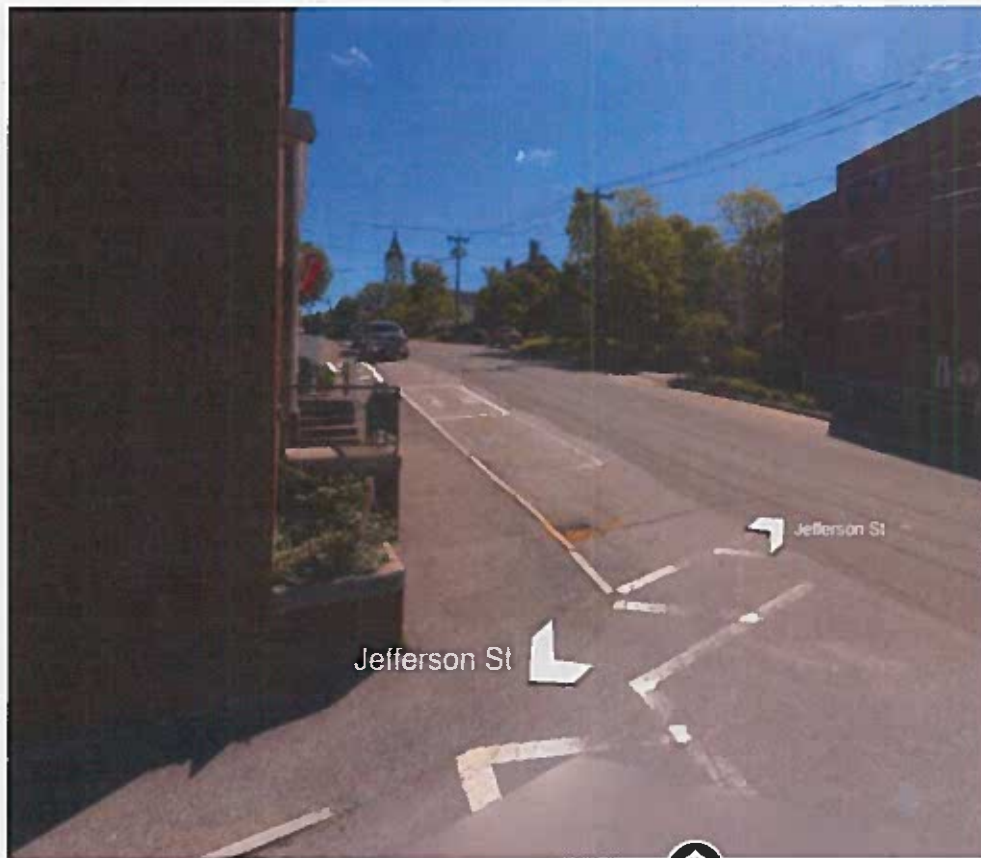
Jefferson Street Southbound Approach



Jefferson Street Southbound Approach



Jefferson Street Southbound Approach



Looking Left



Looking Right

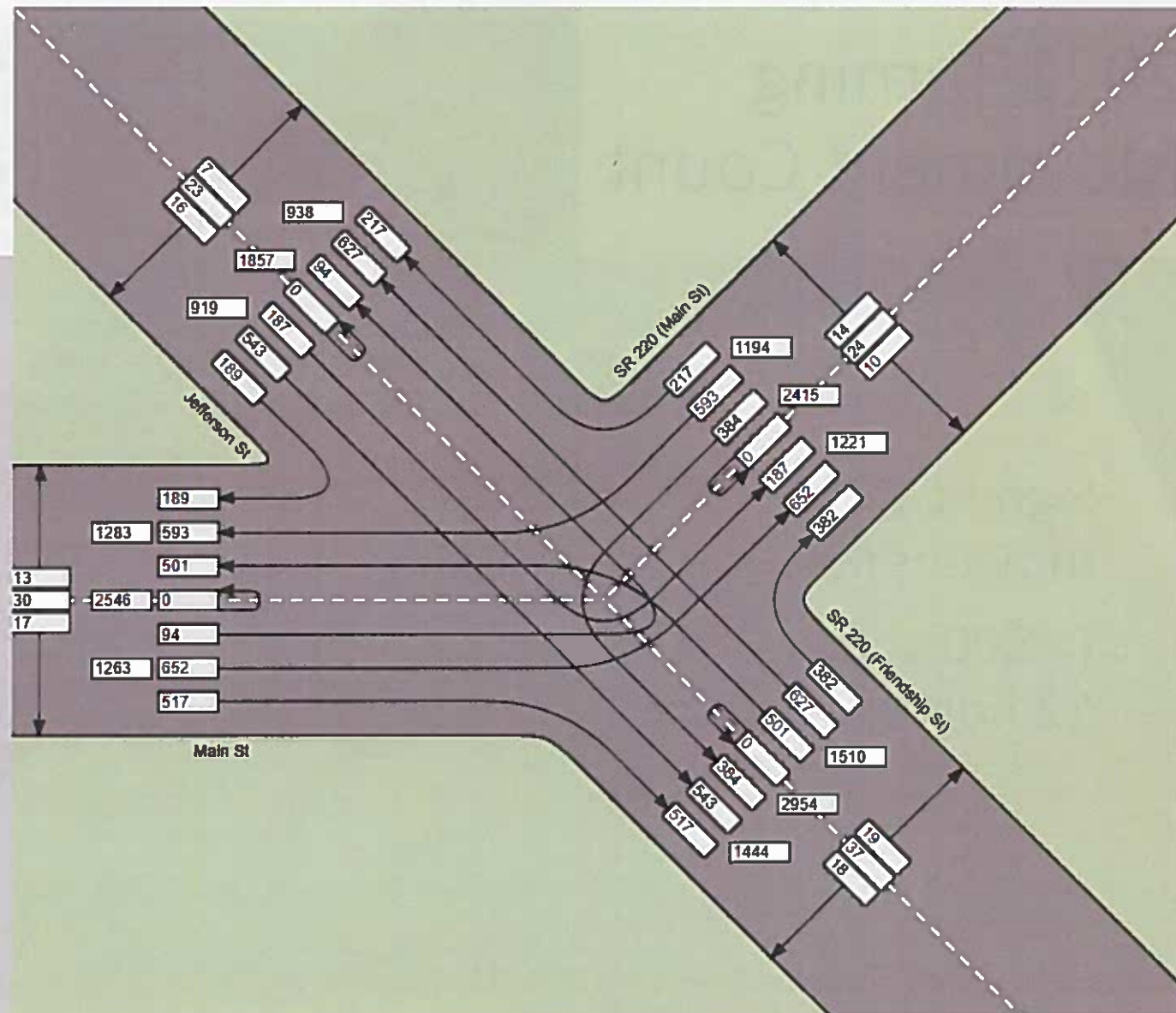
Annual Average Daily Traffic Volumes



2021 Turning Movement Count

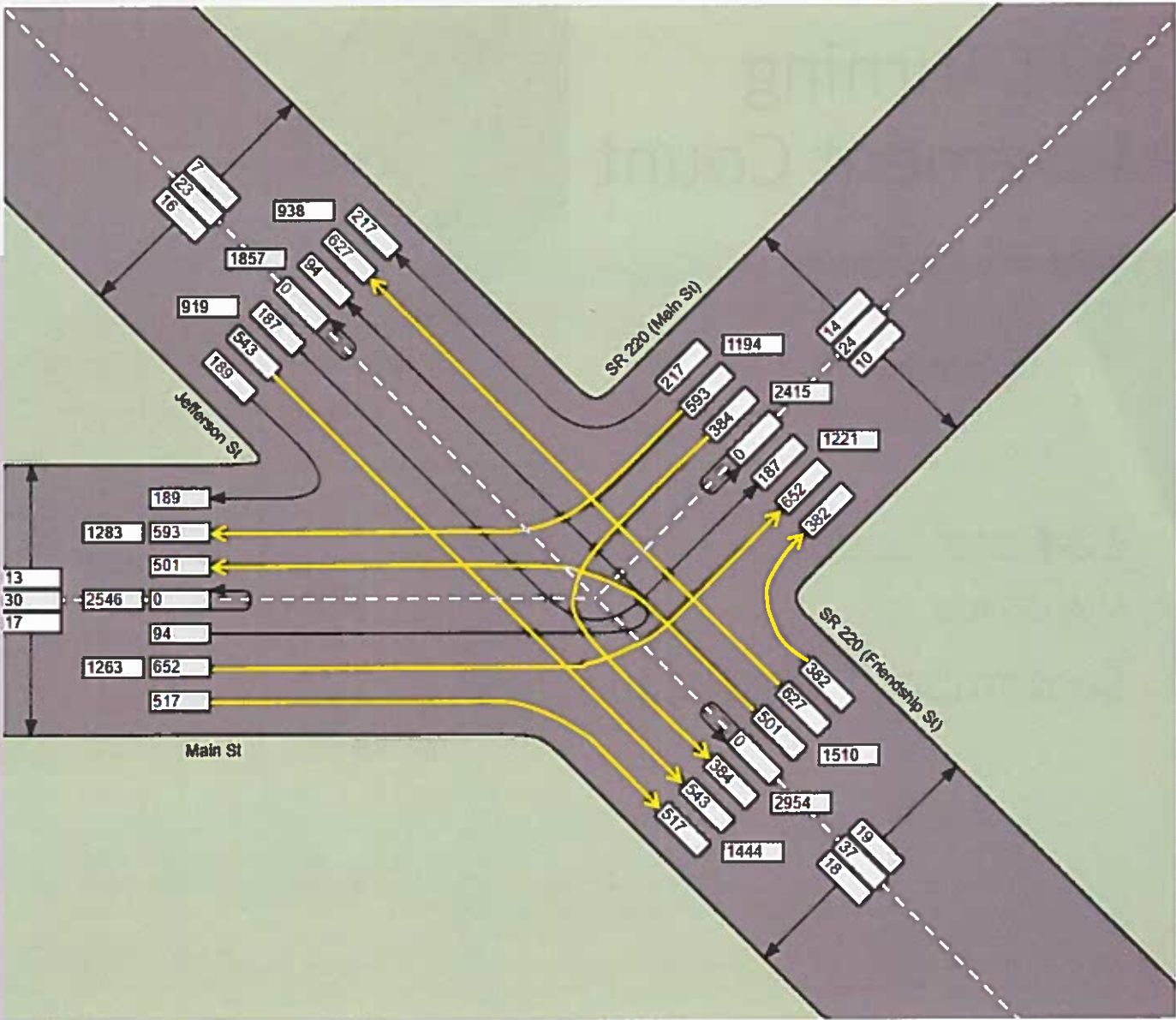
12-Hour Count
Volumes

September 15th, 2021



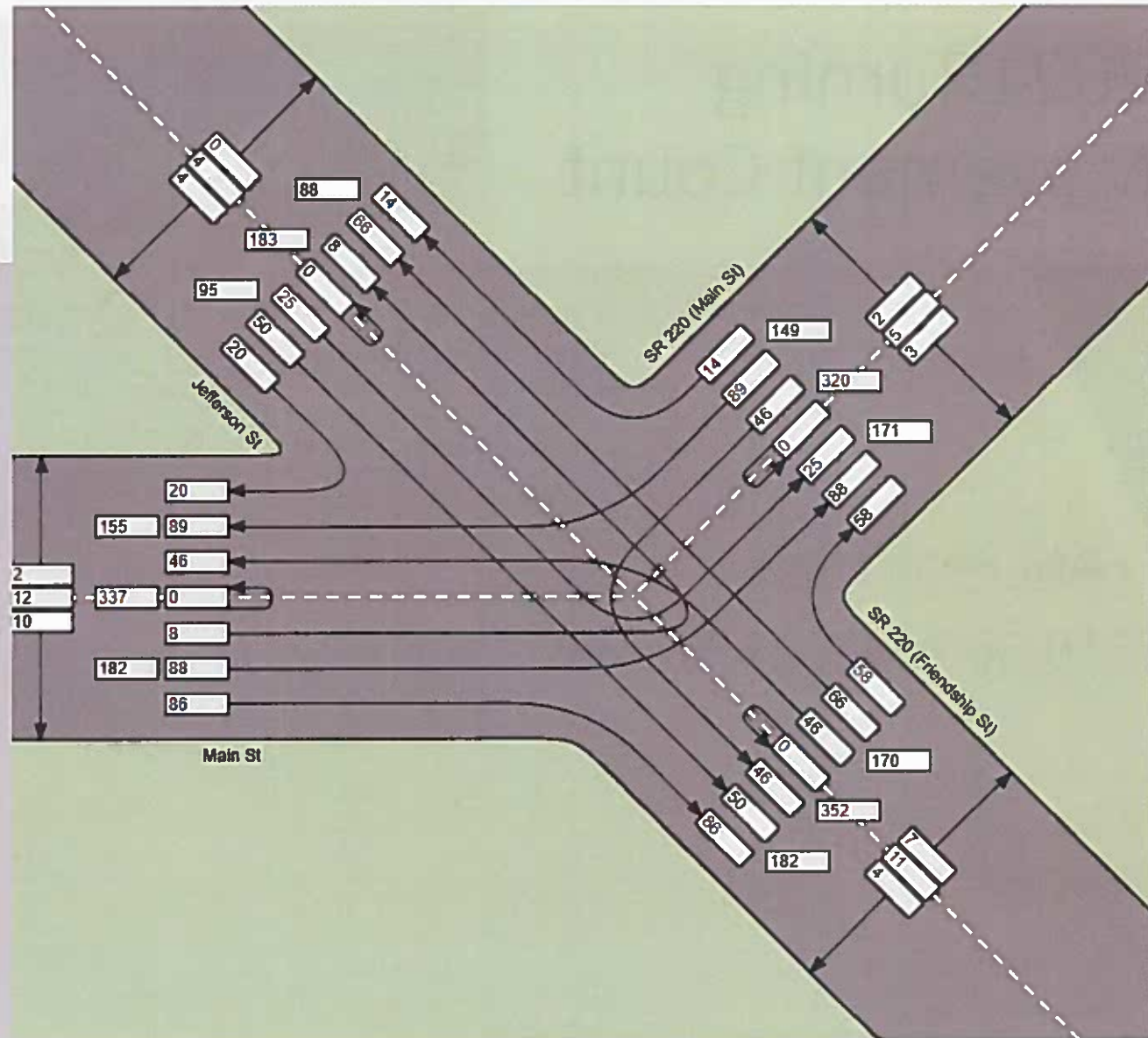
2021 Turning Movement Count

Significant
movements
(> 300 vehicles in
12 hours)



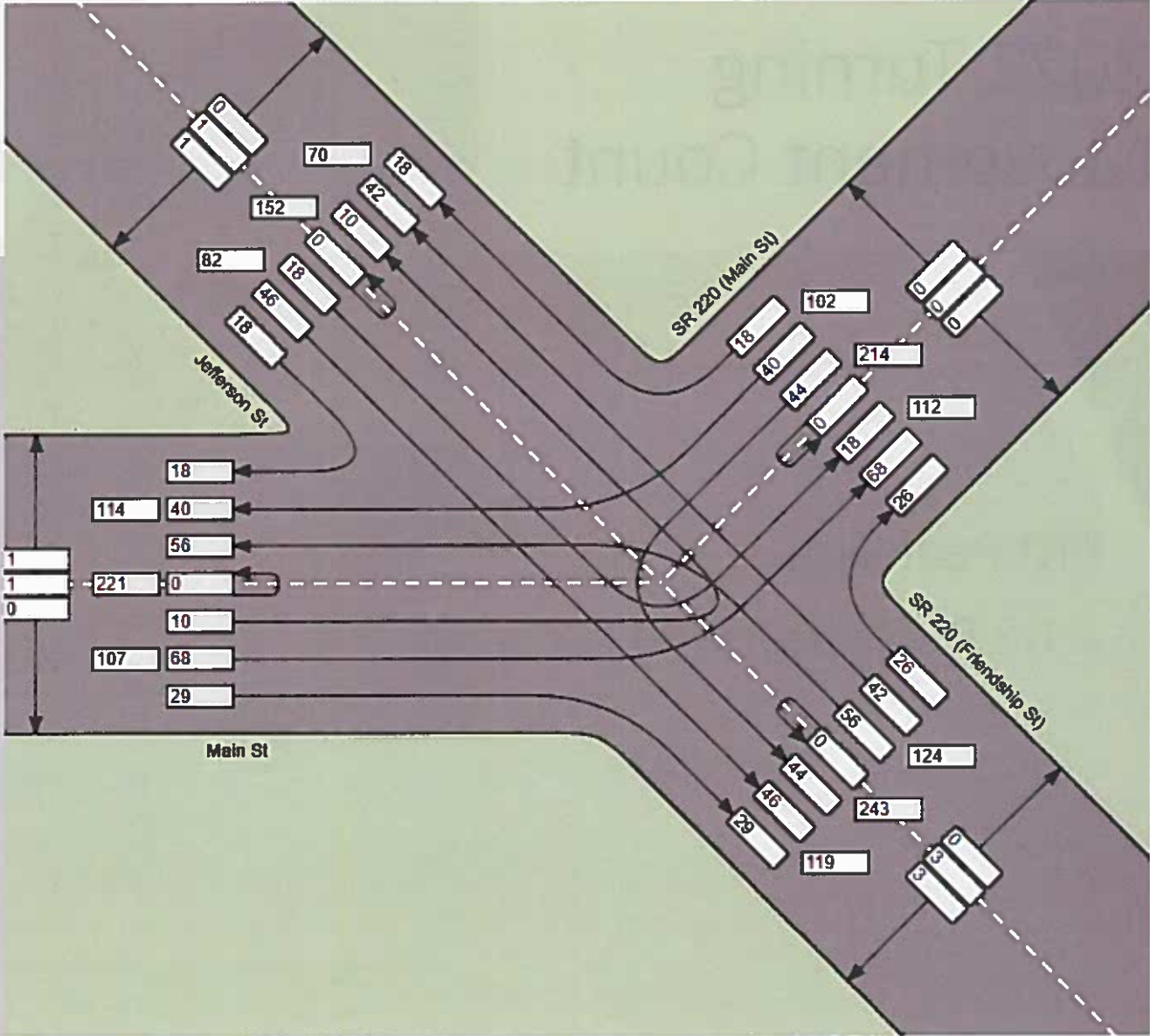
2021 Turning Movement Count

PM Peak Hour
4:00 PM – 5:00 PM



2021 Turning Movement Count

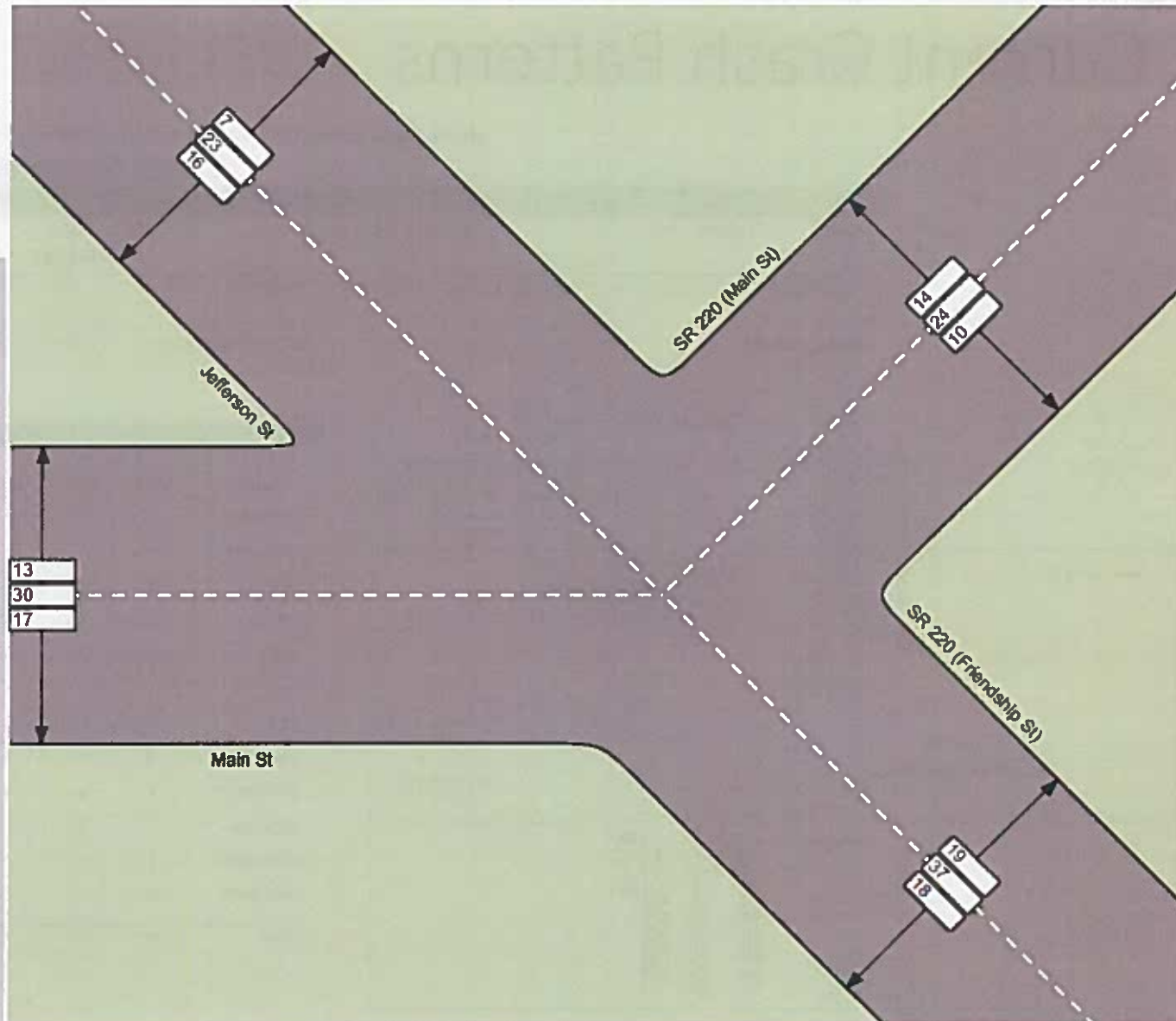
AM Peak Hour
10:30 AM – 11:30 AM



2021 Turning Movement Count

Crossing Pedestrians (12-Hours)

- 54 pedestrians crossing Main Street from 6:00 AM to 6:00 PM
- Likely more pedestrians crossing after 6:00 PM



Current Crash Patterns

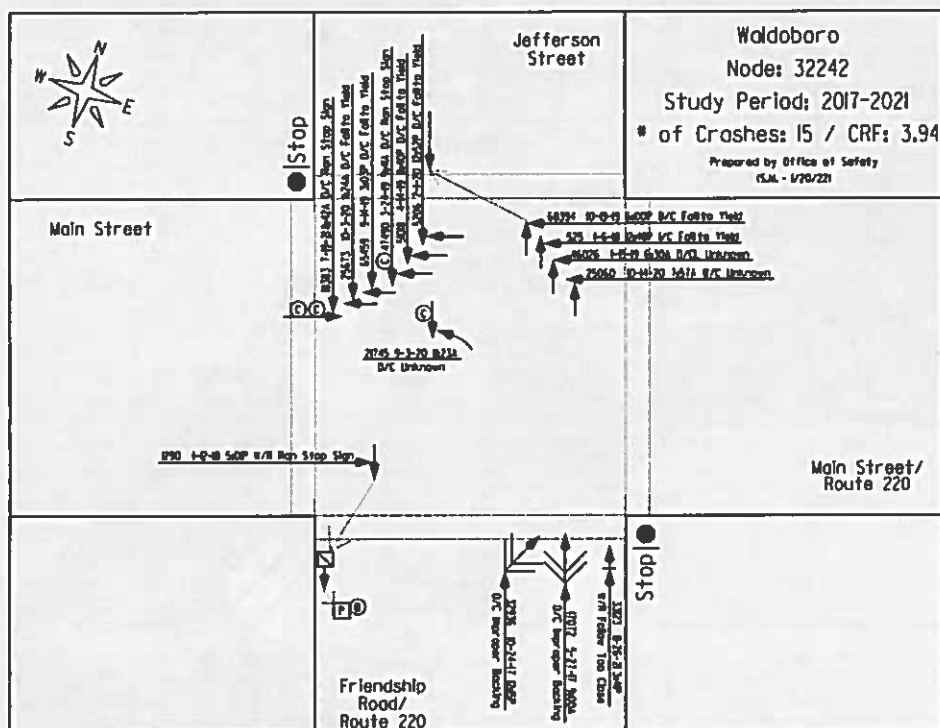
Maine Department Of Transportation - Office of Safety, Crash Records Section

Crash Summary I

Nodes													
Node	Route - MP	Node Description				U/R	Total Crashes	K	Injury Crashes			Percent Injury	
									A	B	C	PD	
32242	0220X - 9.32	Int of	FRIENDSHIP RD	JEFFERSON ST	MAIN ST	1	15	0	0	1	3	11	26.7

Study Years: 5.00

NODE TOTALS:	15	0	0	1	3	11	26.7
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Crashes by Year and Month											
Month	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
JANUARY	2	0	2	0	0	0	2	1	0	0	7
FEBRUARY	0	1	2	0	0	0	0	0	1	0	4
MARCH	0	0	0	0	0	0	0	1	0	0	1
APRIL	0	0	0	0	0	0	0	1	0	0	1
MAY	0	0	0	1	0	1	0	0	0	0	2
JUNE	1	1	0	0	0	0	0	0	0	0	2
JULY	0	0	0	0	2	0	0	0	0	1	3
AUGUST	0	0	0	0	0	0	0	0	0	0	0
SEPTEMBER	0	0	0	0	0	0	0	1	1	0	2
OCTOBER	1	0	0	0	0	1	0	1	2	0	5
NOVEMBER	0	0	0	0	0	0	0	0	0	1	1
DECEMBER	0	0	0	0	0	0	0	0	0	0	0
Total	4	2	4	1	2	2	2	5	4	2	28

HCL History

- High Crash Location (HCL)
 - Requires minimum of 8 crashes in 3 years and a Critical Rate Factor ≥ 1
 - Current HCL – 11 crashes and CRF of 4.22 (2018-2020)
 - HCL for 3 three-year periods since 2006

Years	Number of Crashes	Critical Rate Factor (Approximate)	HCL?
2019-2021	11	4.22	Yes
2018-2020	11	4.22	Yes
2017-2019	9	3.25	Yes
2016-2018	6	2.30	No
2015-2017	5	1.92	No
2014-2016	7	2.68	No
2013-2015	7	2.68	No
2012-2014	10	4.05	Yes
2011-2013	6	2.58	No
2010-2012	5	2.15	No



Network Screening Rankings

High rate of crashes and angle crashes:

- 418th highest on excess crash rankings
- T-95th most angle crashes among stop-controlled intersections
 - T-12th most in Mid-Coast Region
- 47th highest critical rate factor of any 2020 HCL intersection
 - 9th highest in the Mid-Coast Region

Low Average Crash Severity

- Injury percentage since 2017 is 31.3% (below average)
- No fatal or serious injury crashes at this intersection in our electronic records (since 2003)
- 41 of 42 crashes (97.6%) since 2003 are property damage or possible injury



Identified Issues with Intersection

- Steep grade approaching and through the intersection
 - Main Street grade is 12.6% 40 feet east of intersection and 9.2% 25 feet west of intersection
- Confusion of all-way stop
 - Some drivers may pull out in front of Main Street because they think this intersection is an all-way stop
- Limited vehicular sight distance
 - Limited by on-street parking, historic buildings, and horizontal curve.
- Crosswalk sight distance
 - Limited by on-street parking
- No standard crosswalk signs for Main Street free flowing approaches
 - Difficult to find space to install signs
- Difficult to place signs
 - Supplemental signing could be beneficial
 - Dense buildings and driveways, on-street parking, and narrow sidewalks
 - No Crosswalk signs at this intersection on Main Street

Recent Improvements

- Stop signs were updated, a supplemental stop sign was installed on Friendship Road, and “CROSS TRAFFIC DOES NOT STOP” plaques were installed under each stop sign. This work order was submitted following a field review in July 2020
- The intersection was also paved in 2020. Crosswalks have been repainted as they were before. Currently (Jan 2022) on-street parking spaces have either not been re-painted or have seasonally worn off.





Alternatives Considered

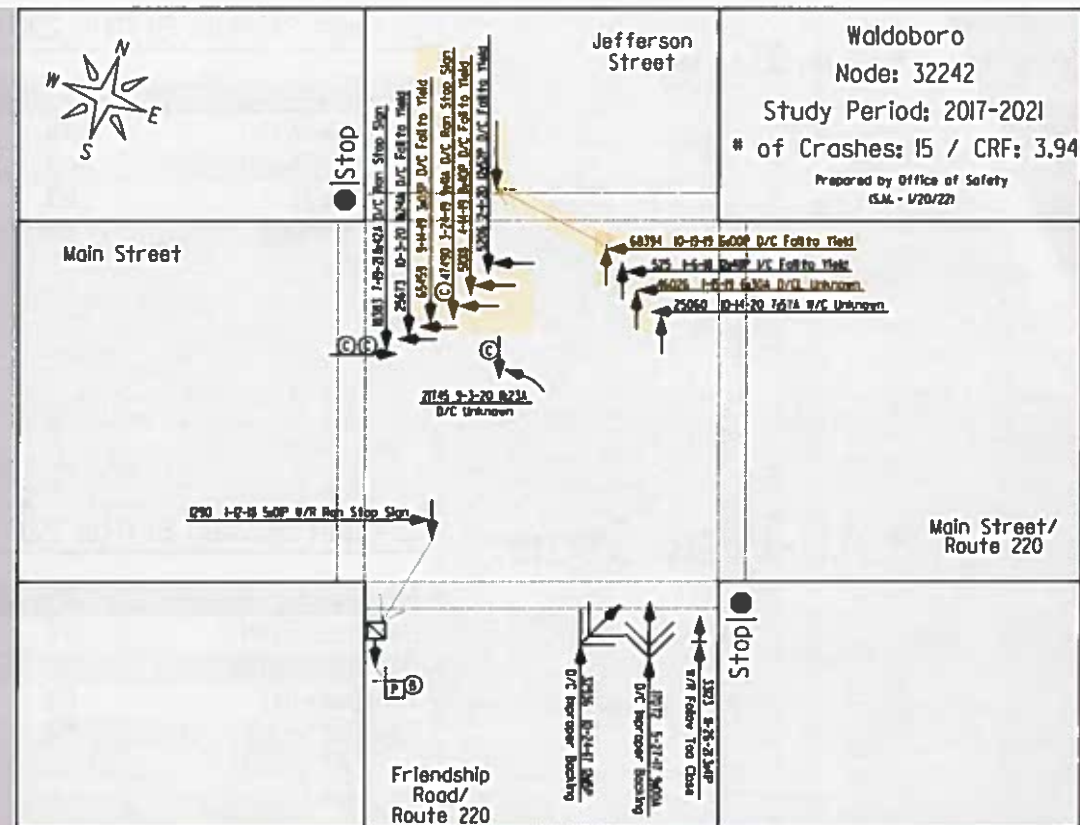
- Traffic Signal
- All-Way Stop
- Alternatives that keeps Main Street as free flowing
 - Reduced parking, increased signage and markings, remove crosswalk, crosswalk bumpout, RRFB
 - Raised crossings or speed tables to slow traffic on Main Street
 - Brings speed closer to intersection sight distance and improves pedestrian safety

- Signal warrant is not met
- Minor Street is high enough, but major road fails for 11 of the 12 hours

Warrant 7		Crash Experience - Correctable by Signalization		Other alternatives failed?		Crosswalks		route signs directing to other streets		supplemental stop sign		cross traffic		does not stop			
This warrant deals with an intersection that is experiencing an abnormal crash pattern. For the warrant to be met, 5 or more crashes that can be corrected by traffic signal control have occurred in a 12 month period; and other less restrictive measures to correct the problem have been tried and have failed to reduce accidents; and there exist a volume of vehicular and pedestrian traffic not less than 80 percent of the requirements specified either in the Minimum Vehicular Volume warrant (1A), the Interruption of Continuous Traffic warrant (1B), or the Pedestrian Volume warrant (4); and the signal installation will not seriously disrupt progressive traffic flow.																	
Crashes correctable by Signal Installation		correctable 2019 5		total 5		Five or more correctable crashes in one year? yes											
Required Volumes Page 4c-3,4 of MUTCD based on # of Lanes				Warrant 1A/Warrant 1B		Adjusted Warrant 1A		Adjusted Warrant 1B									
				350		525		280		420							
				185		53		84		42							
Is Warrant 1 met with volume requirements adjusted to 80%?				No													
HOUR		Route 220 Friendship Pk		Warrant 1A Met?		Warrant 1B Met?		No Rts		Warrant 1A Met?		Warrant 1B Met?		Warrant 1A		Warrant 1B	
6		69		91 Major Fail		70 Major Fail		78 Major Fail		Major Fail		Major Fail		0		0	
7		106		106 Major Fail		78 Major Fail		78 Major Fail		Major Fail		Major Fail		0		0	
8		139		104 Major Fail		78 Major Fail		78 Major Fail		Major Fail		Major Fail		0		0	
9		131		122 Major Fail		90 Major Fail		90 Major Fail		Major Fail		Major Fail		0		0	
10		166		115 Major Fail		92 Major Fail		92 Major Fail		Major Fail		Major Fail		0		0	
11		178		104 Major Fail		62 Major Fail		62 Major Fail		Major Fail		Major Fail		0		0	
12		218		106 Major Fail		79 Major Fail		79 Major Fail		Major Fail		Major Fail		0		0	
13		184		130 Major Fail		96 Major Fail		96 Major Fail		Major Fail		Major Fail		0		0	
14		251		115 Major Fail		88 Major Fail		88 Major Fail		Major Fail		Major Fail		0		0	
15		244		126 Major Fail		87 Major Fail		87 Major Fail		Major Fail		Major Fail		0		0	
16		298		153 Met		101 Met		101 Met		Major Fail		Major Fail		1		1	
17		230		87 Major Fail		72 Major Fail		72 Major Fail		Major Fail		Major Fail		0		0	
Warrant 7		N/A		With Right Turns Included on Minor													
Warrant 7		Not Met		With Right Turns Excluded on Minor													

All-Way Stop Warrant Analysis

- All-way stop crash Warrant B **is met** because of 5 correctable angle crashes in 12 months during 2019
- All-way stop volume Warrant C is not met because major road volume is too low. Minor road meets 80% for 9 hours and major meets 80% for 5.
- This intersection also meets other considerations for an all-way stop such as pedestrian conflicts and sight distance limitations



Synchro/SimTraffic Delays

- Existing:

2: Main St/Main St (Rte 220) & Friendship Rd (Rte 220)/Jefferson St Performance by approach

Approach	NB	SB	NE	SW	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.2	0.2	0.2	0.2
Total Delay (hr)	0.3	0.2	0.0	0.1	0.6
Total Del/Veh (s)	7.0	7.4	0.9	1.3	3.8

- All-Way Stop:

2: Main St/Main St (Rte 220) & Friendship Rd (Rte 220)/Jefferson St Performance by approach

Approach	NB	SB	NE	SW	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.2	0.2	0.2	0.2
Total Delay (hr)	0.3	0.2	0.3	0.2	1.0
Total Del/Veh (s)	5.8	5.9	6.1	6.1	6.0

Synchro/SimTraffic Queue Lengths

- Existing:

Intersection: 2: Main St/Main St (Rte 220) & Friendship Rd (Rte 220)/Jefferson St

Movement	NB	SB	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	92	77	35	48
Average Queue (ft)	47	37	2	9
95th Queue (ft)	75	62	14	36

- All-Way Stop:

Intersection: 2: Main St/Main St (Rte 220) & Friendship Rd (Rte 220)/Jefferson St

Movement	NB	SB	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	80	72	93	59
Average Queue (ft)	42	33	48	38
95th Queue (ft)	67	55	77	57



MaineDOT believes grade on Main
Street is too steep to stop traffic.

What are other alternatives?

Preliminary Signing Plan
Route 220 / Main Street /
Jefferson Street
Waldoboro, ME



Augusta – Winthrop
Street

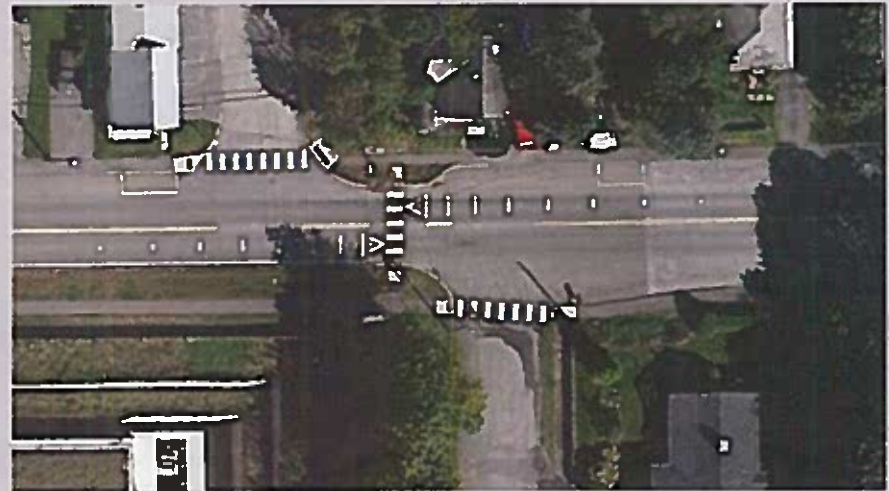
Speed table just
before crosswalk



Augusta – Cony Street

Raised crosswalk

Speed tables and raised crosswalks can be tipped down at the curb line to avoid drainage issues





Village Partnership Initiative

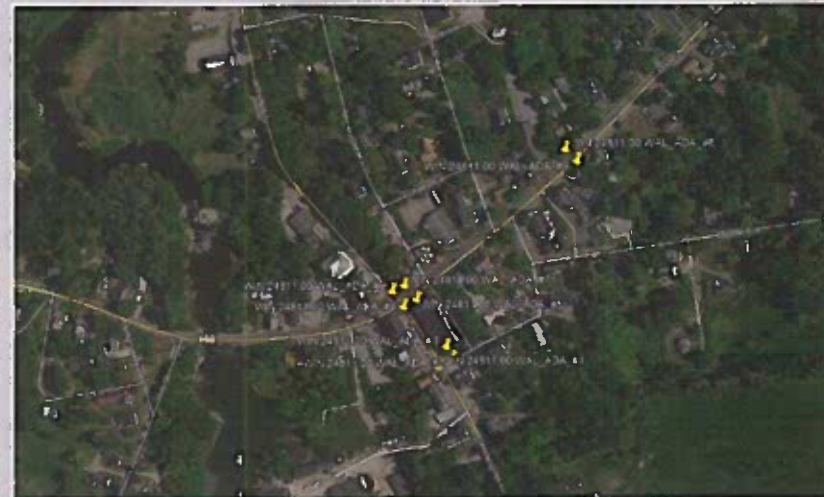
Potentially partner with state for traffic calming, pedestrian safety, etc.
in “downtown” village

Current cost share (may change)

- | | |
|---------------------------------------------------|--------------------------|
| • Municipal Property Valuation <\$150M, | 70% State, 30% Municipal |
| • Municipal Property Valuation a\$150M to \$350M, | 60% State, 40% Municipal |
| • Municipal Property Valuation >\$350M, | 50% State, 50% Municipal |

MaineDOT ADA improvements will be completed this year if a village project is not pursued.

- Need to know decision before the end of March





Thoughts?

Other Ideas?



Other Intersections with Safety Concerns

- Route 235 / Manktown Road
 - Serious injury ran stop sign crashes from Manktown Road
- Route 32 / Main Street
 - Similar angle crashes to this intersection of Main St. / Jefferson St. / Friendship St.
 - Potential sight distance problems related to the vertical curve and grade
- Route 220 / Old Augusta Road
 - Fatal crash in 2017
 - Sight distance issue
- Just over the town line in Warren
 - Route 235 / Old Augusta Road