TOWN OF STOW
TRAFFIC SAFETY ADVISORY COMMITTEE

Minutes of December 22, 2021 Traffic Safety Advisory Committee Meeting

Committee Members Present: Chief Michael Sallese; Fire Chief John Paul Benoit; Steven Nadeau; Jesse Steadman

Chief Sallese called the meeting to order at 1 pm.

Steve Nadeau not yet present.

Review of Meeting Minutes
Members reviewed the minutes of December 13, 2021.

John Paul Benoit moved to approve the minutes of November 16 , 2021.
Jesse Steadman seconded.
VOTED: 3-0 Unanimously in favor (Chief Sallese – Yea; Chief Benoit – Yea; Jesse Steadman - Yea)

Member Updates
Chief Sallese updated Committee members on a site visit he and the Superintendent of Streets made to the intersection of Harvard and Finn Roads. It was discussed that 200 feet of visual clearance is required to make a stop in a 25MPH zone, similar to the southbound approach to the intersection. However, the sight lines cannot be met in this location and Steve Nadeau believed that a stop sign and stop bar would be warranted.

Jesse Steadman noted that it appears the same firm may be performing the traffic study for the Athens Lane, Stow Acres and Masters Academy projects, which would provide continuity in the data that would help Committee members understand traffic patterns in a large part of Stow. Jesse Steadman noted that in the event that the Masters Academy wants to utilize the former entrance to the Bose campus on Old Bolton Road, he will be looking for information on the current and estimated usage of the Route 117/Hiley Brook Road intersection. Others agreed.

Steve Nadeau Arrived.

Steve Nadeau added to the Police Chief's updates regarding Harvard Road, noting that he has a template for making a stop sign recommendation to the Select Board, which requires a Public Hearing of the Select Board, as well as a two week notice requirement for the Hearing. Chief Sallese noted he will have the topic on the next agenda.

Budget Items
Jesse Steadman noted that he had a discussion with the Town Administrator regarding the Committee's agreement on pursuing engineering funds for the Hudson Road/Route 117 intersection. Jesse Steadman explained that the Town Administrator believed that the request would be an article that could be

submitted after the Select Board calls for articles in January. The Town Administrator noted that the delay in submitting the request may also provide time for the Town to determine whether any private investment in the effort will be possible.

Town Wide 25MPH Recommendation
Members discussed the updated draft letter prepared by the Town Planner. Chief Benoit provided feedback regarding the wording of the Traffic Rules and Orders language. It was agreed that the Committee would hold off on a final vote to submit until such time as the Assistant Planner was able to analyze the specific sections of applicable roadways that would qualify as "thickly settled."

Project Tracking Process
Chief Benoit recommended that all specific locations and issues noted in the tracking spreadsheet should reference the posted minutes for the topic rather than trying to paraphrase the outcome in the tracking sheet. Committee members agreed.

Crescent Street Speed Zones
The Committee discussed a map and email sent by the Town Planner, showing the current locations of speed limit signs along Crescent Street. It was noted that there is a five MPH difference in the westbound and eastbound lanes in the vicinity of Pilot Grove Farm due to a slightly lower speed zone (30 MPH) as drivers approach the Crescent Street/West Acton Road intersection.

Approval of Letters to Residents
The Committee discussed the draft response to a resident on 34 Meeting House Lane.

Chief Sallese moved to approve the letter as amended.
Steve Nadeau seconded.
VOTED: 4-0 Unanimously in favor (Chief Sallese – Yea; Chief Benoit – Yea; Jesse Steadman – Yea; Steve Nadeau)

The next meeting is scheduled for January 12, 2021 at 1pm.

Chief Sallese motioned to adjourn
Steve Nadeau seconded.
VOTED: 4-0 Unanimously in favor (Chief Sallese – Yea; Chief Benoit – Yea; Jesse Steadman – Yea; Steve Nadeau)

Respectfully Submitted,

Jesse Steadman

Draft

Planning Board
380 Great Road
Stow, MA 01775
Tel: 978-897-5098
Fax: 978-897-2321

Town of Stow
Traffic Safety
Advisory Committee

Memo

To: Stow Select Board
CC: Denise Dembkoski – Town Administrator; Complete Streets Committee; Planning Board
From: Traffic Safety Advisory Committee
Police Chief, Michael Sallese
Fire Chief, John Paul Benoit
Superintendent of Streets, Steve Nadeau
Town Planner, Jesse Steadman
Date: 12/17/2021
Re: Recommendation on Amending Traffic Rules and Orders

Summary
The purpose of this memo is to recommend the Stow Select Board authorize specific changes to the Traffic Rules and Orders for the improvement of public safety on Stow roads. Specifically, this memo recommends the following actions:

1. Amendment to the Traffic Rules and Orders to reduce speed limits on applicable public and private ways that currently do not have posted speed limits AND meet the definition of Thickly Settled, in accordance with Article 6, Section 6 of the Town's General Bylaw;
2. To support funding for signage to implement speed reduction measures;
3. To support funding for the study of a "Safety Zone" along Crescent Street, in the vicinity of Town Center.

Traffic Safety Advisory Committee Charge
The Traffic Safety Advisory Committee was established in 2021 by the Stow Select Board to act as an *"advisory group that can receive all requests and suggestions for traffic safety improvement in the Town of Stow, and evaluate and recommend to the Town Administrator and Select Board various approaches that could be used to create safer and more livable neighborhoods through efforts to reduce speeding and unnecessary traffic on neighborhood roads."*

Town Wide 25 MPH Regulation on Qualifying Roadways

Since its first meeting of August 17th, the Traffic Safety Advisory Committee (TSAC) has accepted well over fifty pieces of correspondence regarding traffic safety issues from a variety of neighborhoods and streets in Stow. Many of those letters regard the high speed of vehicles and the attending safety hazards that they impart. While there are a number of design and signage interventions the Committee is also considering, the TSAC believes that speed regulation can play an important role.

The TSAC has reviewed the process for amending speed limits through the MassDOT required process. Given that MassDOT requires traffic studies for amending speed limits, undertaking individual, street-by-

Fig. 1

street studies on many of the relatively short, low trafficked roads in Stow, would not be as efficient or cost effective as implementing a blanket speed regulation on qualifying roadways. The Committee has further found that regulating speeds on many of Stow's non-speed regulated roadways would not only provide the Police Department with the legal mechanism to enforce speeds in those areas, but provide opportunities to further educate drivers regarding speed expectations in Stow.

Enabling Legislation

At the July 2017 Special Town Meeting, voters approved a measure allowing the Town to opt-in to MGL c90 s.17C, which enables municipalities to lower the speed limit for Town owned roads that meet the definition of *Thickly Settled* or *Business District*, provided there is no speed regulation in place for that road. MassDOT has provided guidance indicating that the best method for enabling this allowance is to place signage at entrances to Town stating a speed limit of 25 mph, unless otherwise posted (see Fig. 1 and Exhibit C).

MGL c90 §17C defines *Thickly Settled* districts as:

> *"the territory contiguous to any way which is built up with structures devoted to business, or the territory contiguous to any way where dwelling houses are situated at such distances as will average less than two hundred feet between them for a distance of a quarter of a mile or over."*

Effect of the Regulation on Stow Roads

Given that the language of c.90 s.17C specifies that roads receiving a *Thickly Settled* speed reduction must be *Town owned*, the Traffic Safety Advisory Committee is also recommending that the Select Board act through its Traffic Rules and Orders to implement a similar speed limit on *Town Maintained Private Ways* that meet the same *Thickly Settled* definition.

The Planning Department has separated the two distinct categories of roads subject to the recommended changes to the Traffic Rules and Orders. The below table breaks down the specific recommended action of the Select Board, as well as the type and number of roads affected through implementation:

Table 1: Recommended Actions

Recommended Action	Proposed Traffic Rules and Order Change	Type of Road affected	# of Affected Roadways
Reduce speed limit on all "thickly settled," Town-owned roadways in Stow to 25MPH.	Amend Article VI Section 7-2 to refer to (25) MPH on all "Town-owned public ways" defined as thickly settled in accordance with an appendix of applicable street listings and c.90 s.17C.	Town-owned public ways within a thickly settled district.	XX (see Exhibit A)

Reduce speed limit on all "thickly settled" *Town-maintained private ways* in Stow to 25 MPH	Amend Article VI Section 7-2 to refer to "Town Maintained Private Ways," meeting "Thickly Settled" definition.	Private way, maintained and plowed for public safety.	XX (See Exhibit A for list)
	Add definition of "Town Maintained Private Way" to Article I – Definitions.		
	Amend Article VI to create a new Section 12 listing all un-regulated Town-owned ways, and all Town Maintained Private Ways in Stow		

Required Signage
In addition to amending the Traffic Rules and Orders, the Town would need to post signage at the prominent entrances to Stow, as recommended in attached Exhibit B. The installation of the signage would not only notify drivers of the new regulation, but also set expectations among drivers that the Town is serious about vehicle speeds throughout Stow. Although no bid has yet been placed or official estimate received, the TSAC estimates that the cost of the necessary signage, including the required steel posts, could be between $4-5 thousand dollars.

What About Business Districts?
Although the statute specifically refers to the ability to lower speed limits in established "Business Districts," the Business Districts in the Town of Stow, primarily Lower Village and portions of Hudson Road at Route 117, are unaffected by this proposed Traffic Order due to already having an established speed regulation in place (see Exhibit B for statutory language). Therefore, all existing speed regulations in place within those districts would remain.

Traffic Safety Advisory Committee Recommendation
On December 21st, 2021, the Traffic Safety Advisory Committee voted unanimously to recommend that the Stow Select Board amend the Traffic Rules and Orders to create a new Section 12 of Article VI, titled "Thickly Settled Districts," which states that all roadways listed in Section 12 shall be subject to a speed limit of 25mph, unless otherwise posted, in accordance with MGL chapter 90 s.17C or to use any other language as recommended by the Select Board or Town Counsel to achieve the same.

Creation of Safety Zone on Crescent Street

At the July, 2017 Special Town Meeting, the Town of Stow accepted rights associated with *Section 194 of Chapter 218 of the Acts of 2016* to establish regulatory 20 mph "Safety Zones" in qualifying areas of Town. Safety Zones are intended to be used in areas where vulnerable road users are more likely to be present, such as in the vicinity of parks, certain municipal uses, areas in around school and daycare centers, etc. The establishment of Safety Zones must be predicated upon a study in conformance with the Manual on Uniform Traffic Control Devices (MUTCD).

The TSAC is considering such a Safety Zone along Crescent Street, in the vicinity of Hartley Road, Library Hill Road and Town Center Park. Crescent Street includes three of the top 10

Complete Streets Prioritization Plan projects and is a heavily used pedestrian corridor, particularly school aged children. The TSAC is requesting the Select Board's support for an Article at the May Annual Town Meeting to study the implementation of a Safety Zone at Crescent Street. In the intervening time, the TSAC will begin to solicit estimates for the required study, although it is expected to be below $10,000.00.

Speed Zone Extension on Sudbury Road

The Traffic Safety Advisory Committee has voted to authorize the Superintendent of Streets to move the north-bound Speed Limit sign of 25 MPH approximately 300 feet south of the Pine Bluff Recreation Area entrance (in the vicinity of 322 Sudbury Road). The purpose of this change is to provide notice of the north bound speed zone prior to reaching Pine Bluff, rather than after passing through what can be a busy entrance to a public facility. Several comments regarding Sudbury Road have been provided by residents to the Traffic Safety Advisory Committee and the Committee believes this can be an effective mitigation measure to reduce speeds in the area. No change to the Traffic Rules and Orders is proposed. Please see the attached map for reference.

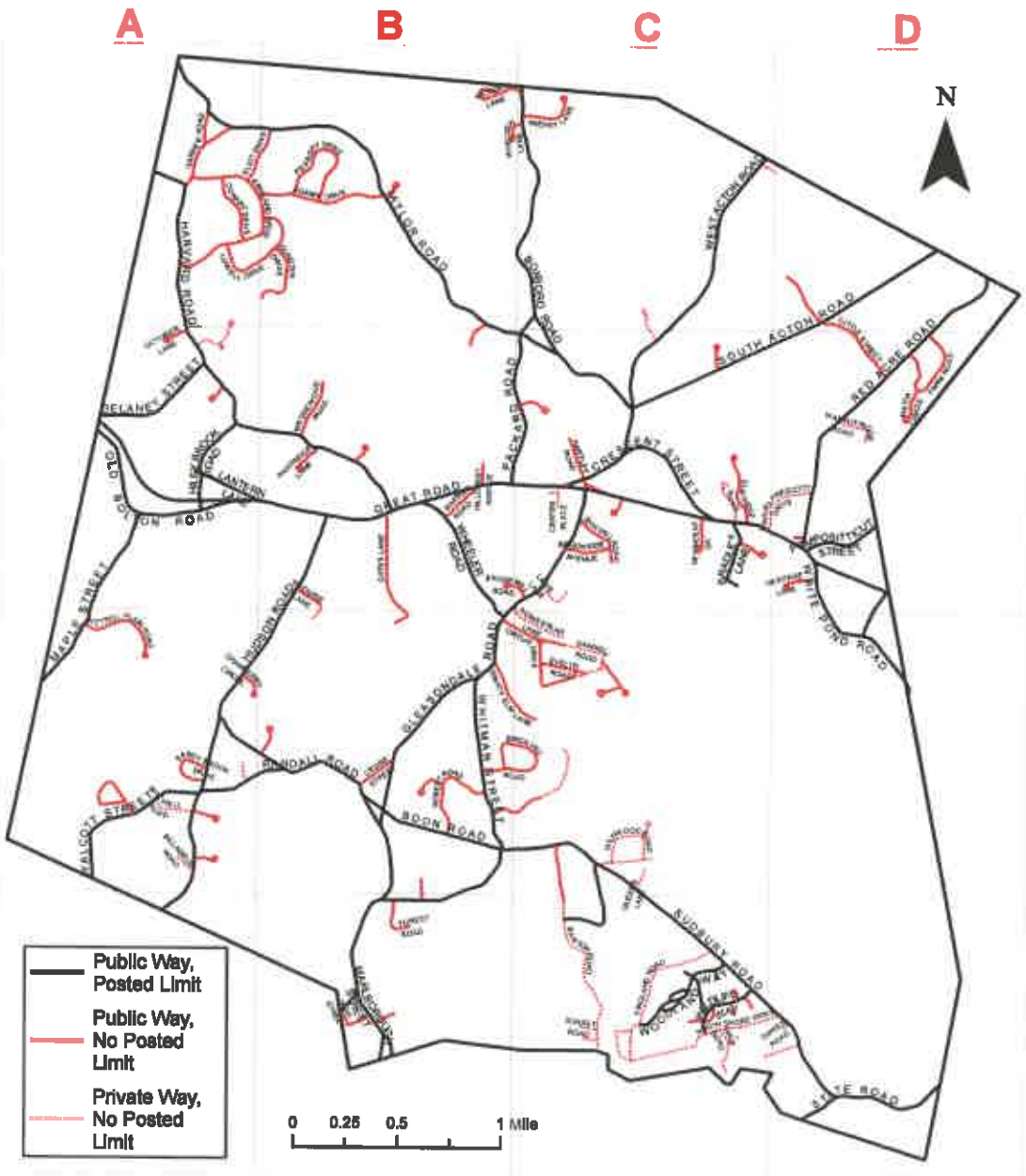
Public Ways

Street	Grid	Street	Grid
Acorn Dr	A1, B1	Hickory Ln	B1
Apple Blossom Ln	B1, C1	High St	B4
Asa Whitcomb Wy	B1, B2	Hillcrest Ave	B2
Barton Rd	C1, C2	Indian Ridge Rd	A3
Birch Hill Rd	B3, C3	Kensington Wy	B2
Box Mill Rd	C2	Kimball Main Rd	A3
Bristol Mill Rd	B2, C2	Kirkland Dr	A1, B1
Brookside Ave	C2	Lane's End	C2
Candlewood Dr	C4	Library Hill Rd	C2
Carriage Ln	C2	Locust Dr	A1, B1
Catherine Cir	B3	Magazine Ln	B2
Cider Mill Rd	A2	Marlborough St	B4
Circuit Dr	B3, C3	Mayan Dr	B1
Common Rd	C2	Middlemead Wy	C2
Consent Dr	A1	Millbrook Cir	D1
Cranberry Dr	A3	Minesters Way	C2
Cranberry Dr	A3	Mt. Vernon Rd	A3
Crossman Dr	C2	Nara Rd	B3
Cricket Ct	D4	October Ln	A2
Cross St	B3	Partridge Ln	B2
Deercrest Dr	C2	Peabody Dr	B1
Dunster Dr	B1	Pine Ridge Rd	C2
Eggarch Rd	A3	Railroad Ave	B4
Elliot Dr	A1, B1	Robert Rd	B3
Elm Ridge Rd	C2	Robin Wood Ln	B3, B4
Evelyn Rd	C2	Salamander Ln	C4
Fairway Dr	B3	Sandy Brook Dr	A3
Farm Rd	C3	Sawmill Rd	C2
Forest Rd	B4	Timberridge Rd	C2
Fox Ct	C4	Treaty Elm Ln	B3, C3
Frances Dr	A3	Trotty Ln	C2
Gardner St	D2	Tuttle Ln	D1, D2
Garner Rd	A3	Wedgewood Rd	B3
Green Ln	B1, B2	Wethersbee Ln	C2
Hartley Rd	C2	Whalden Ln	B3, C3
Heritage Ln	D1	Whitney Rd	B3
Hickory Ln	B3, C3	Woodbourne Ct	C4

Town Maintained Private Ways

Street	Grid	Street	Grid
Apple Blossom Ln	C2	Longwood Rd	C3
Barton Rd	C4	Lone Ln	C2
Bluebird Rd	A2	Middlemead Wy	C3
Brandywoods Cir	C1, C2	Mitchell Rd	A3
Canterbury Rd	C3, D3	North Shore Dr	C4, D4
Center Place	C2	Orchard Wy	C4
Dixon Rd	C4	Oriente Ln	C2
Dorees Rd	D4	Samuel Prescott Dr	D3, C2
Deer Field Ln	C2	Sawmill Rd	C2
Elizabeth Dr	B3, B2	Snows Star Ln	A3
Hess Rd	C4	Sunset Rd	C4
Hollocks Point Rd	C4, D4	Sylvan Dr	A1, A2
Homestead Ln	C1, C2	Thicket Cir	C3
Kingfield Rd	C4	Walnut Ridge Rd	D2
Lakewood Rd	C3	Wildwood Rd	C3

***Private ways not maintained by the Town are not represented on the map



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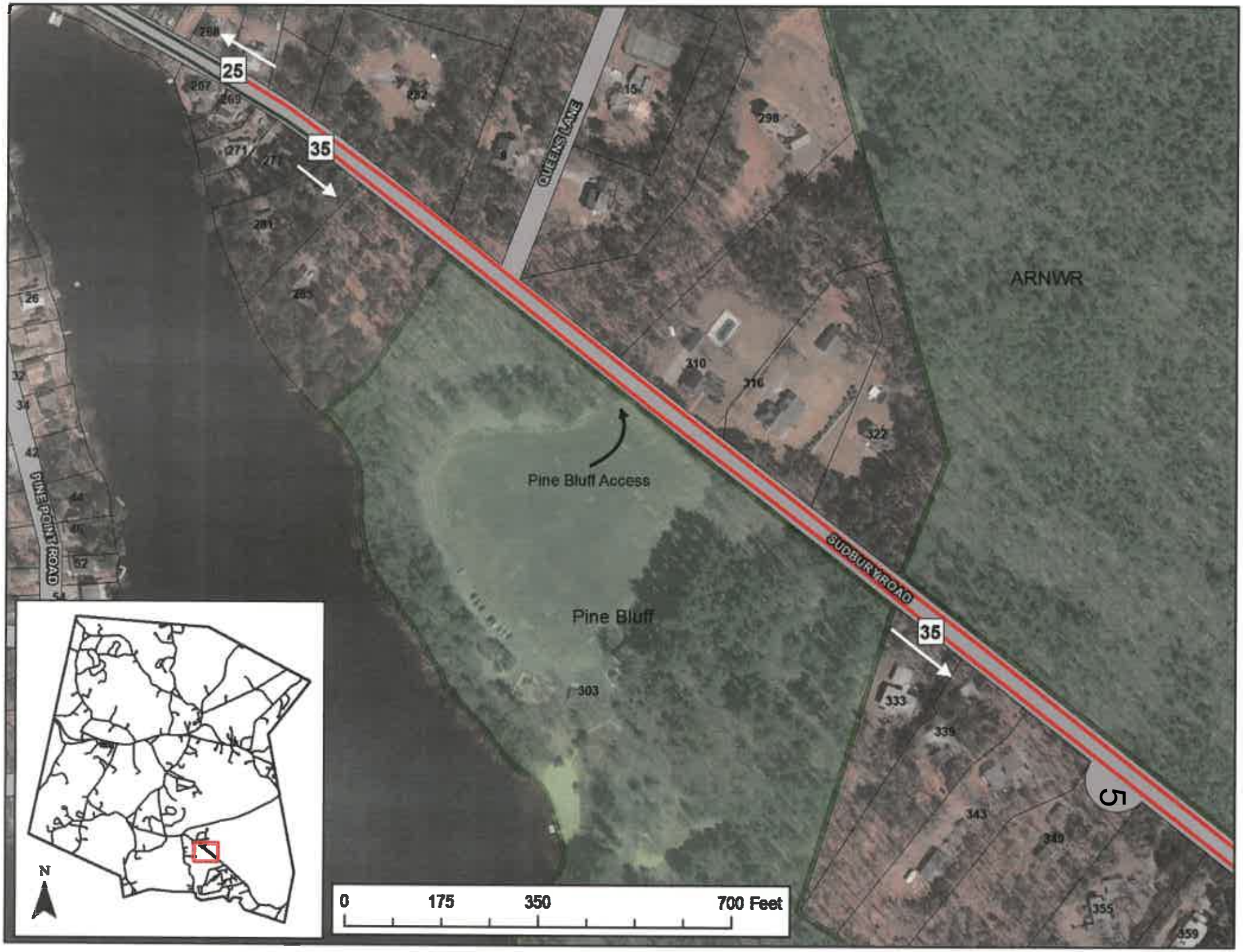
25
35
QUEENS LANE
ARNWR
Pine Bluff Access
SUDBURY ROAD
PINE POINT ROAD
Pine Bluff
35
5
N
0
175
350
700 Feet

11/16/21-1/3/22 (1700)

Radar Location	Hours	MV Stops	Citation	Verbal
60 Great Road	3.5	9	3	6
118 Great Road	4.3	0	0	0
403 Great Road	3.75	4	2	2
875 Great Road	45min	0	0	0
Boxboro Road	30min	1	1	0
Center Intersection	6.6	0	0	0
Crescent Street	3.75	9	2	7
Crescent St @ Library Hill	1.25	1	1	0
Delaney Street	1.4	0	0	0
Gleasondale Road	8.9	26	12	14
Great Road	1	0	0	0
Great Rd @ Hudson Rd	10.2	6	4	2
Great Rd @ Pompo St	11.8	1	1	0
Harvard Road	10.8	1	0	1
Hasting Street	4.7	0	0	0
Marlboro Road	1.4	3	2	1
Packard Road	14.8	10	2	8
Peabody @ Adams	2.7	0	0	0
Pompo Street	3.7	4	3	1
S. Acton Road	16.3	2	2	0
State Road	4.4	8	7	1
Sudbury Road	5.8	3	0	3
Taylor Road	5.5	6	4	2
Walcott @ Pennie	1.75	0	0	0
W. Acton Road	12.25	2	1	1
Wheeler Road	32	12	7	5
Other MV Stops				
Hudson Road		2	2	0
Great Road		18	10	8
Gleasondale Road		2	0	2
	172.55	130	66	64

Massachusetts Procedures for Speed Zoning on State and Municipal Roadways
Submitted Safety Concern Status
Traffic Safety Advisory Committee Request Submittal Form
Traffic Safety Policy

Contact Info

Address:
380 Great Road
Stow, MA 01775
United States
See map: Google Maps

Submitted Safety Concern Status

Traffic Safety Advisory Committee

Traffic Concern/Complaint	Meeting Discussed
Wheeler Road	August 31, 2021, September 13, 2021, September 28, 2021
Gleasondale Road	August 31, 2021, September 13, 2021
Sudbury Road	August 31, 2021, September 13, 2021, September 28, 2021
Barton Road	August 31, 2021, September 13, 2021
Red Acre Road	September 28, 2021
Crescent Street	September 28, 2021, October 25, 2021, November 16, 2021, December 13, 2021
South Acton Road	September 28, 2021
Taylor Road	September 28, 2021
Great Road	September 28, 2021
Old Bolton Road	September 28, 2021
Hudson Road	September 28, 2021, October 25, 2021, December 13, 2021
Harvard Road	October 25, 2021, November 16, 2021
Hasting Street	October 25, 2021
Walcott Street	October 25, 2021, November 16, 2021
Pompositticut Street	October 25, 2021
Eliot Drive	October 25, 2021
Chestnut Street	October 25, 2021
Packard Road	October 25, 2021
Common Road	November 16, 2021
Meetinghouse	November 16, 2021

MEMORANDUM

TO: Mr. Bruce Wheeler
Athens Street LLC
148 Park Street
North Reading, MA 01864

FROM: Mr. Jeffrey S. Dirk, P.E., PTOE, FITE JSD
Managing Partner
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
(978) 269-6830
jdirk@rdva.com
Professional Engineer in CT, MA, ME, NH, RI and VA

DATE: December 21, 2021

RE: 9026

SUBJECT: Transportation Impact Assessment
Proposed Active Adult Residential Community – Athens Street
Stow, Massachusetts

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a residential community to be located off of Athens Street in Stow, Massachusetts, that will be designed and marketed toward active adults (hereafter referred to as the "Project"). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project along Hudson Road and at the intersections of Great Road (Route 117) at Hudson Road, Hudson Road at Athens Street, and Hudson Road at Edson Street. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)[1] for a senior housing community, the Project is expected to generate approximately 794 vehicle trips on an average weekday (two-way, 24-hour volume), with 50 vehicle trips expected during the weekday morning peak-hour and 58 vehicle trips expected during the weekday evening peak-hour;

2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition); however, it was noted that the Hudson Road northbound approach to Route 117 is predicted to operate at or over capacity (defined as level-of-service (LOS) "E" or "F", respectively) during both the weekday morning and evening peak hours independent of the Project, with Project-related impacts on this approach defined as a general increase in average motorist delay that resulted in an increase in vehicle queuing of up to four (4) vehicles;

3. All movements at the Hudson Road/Athens Street intersection (the access to the Project site) are predicted to operate at LOS B or better with the addition of Project-related traffic where an LOS of "D" or better is defined as "acceptable" traffic operations;

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[1] *Trip Generation*, 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.

4. Independent of the Project, the Route 117/Hudson Road intersection was found to have a motor vehicle crash rate that is above the Massachusetts Department of Transportation (MassDOT) statewide and District 3 average crash rates for an unsignalized intersection, and the intersection is included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash location for the years 2015 through 2017. As such, specific recommendations have been provided to advance safety related improvements at this intersection; and

5. Lines of sight at the Hudson Road/Athens Street intersection were found to exceed the recommended minimum distance for the intersection to operate in a safe and efficient manner based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the recommendations defined herein.

The following details our assessment of the Project.

PROJECT DESCRIPTION

The Project will entail the construction of a 141±-unit residential community to be located off Athens Street in Stow, Massachusetts. The residential community will include both single-family homes and cottage style units that will be designed and marketed toward active adults and will be advanced on several parcels of land. The north portion will contain 50 single-family homes and the south portion will contain 70 single-family homes and 21 single-floor cottage-style units. The Project site encompasses approximately 120± acres of land bound by the Bose Corporation Stow Campus, residential properties, and areas of open and wooded space to the north; a commercial property and areas of open and wooded space to the south; and residential properties and areas of open and wooded space to the east and west. The Project site currently contains several vacant buildings and associated appurtenances that will be removed to accommodate the Project. Access to the Project site will be provided by way of Athens Street, which will be improved (widened) and paved.

Imagery ©2021 Google

On-site parking will be provided for approximately 310 vehicles, or a parking ratio of 2.2 parking spaces per unit, which is consistent with the parking requirements for residential dwellings with consideration of visitor parking as specified by Section 7.3.3.3, *Schedule of Minimum Parking: Residential*, of the Town of Stow Zoning Bylaws.[2]

STUDY METHODOLOGY

This study was prepared in consultation with the MassDOT and the Town of Stow; was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; on-street parking; public transportation services; observations of traffic flow; and collection of pedestrian, bicycle, and vehicle counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for analyses consistent with MassDOT guidelines. The analysis conducted in stage two identifies existing or projected future capacity, safety, and access issues, as these areas relate to the transportation infrastructure.

The third stage of the study presents and evaluates measures to address deficiencies in the transportation infrastructure, if any, identified in stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in June and July 2021. This inventory included the collection of traffic-volume data and vehicle travel speed measurements, as well as a review of existing pedestrian and bicycle accommodations, public transportation services, and motor vehicle crash data. The following summarizes existing conditions within the study area.

Roadways

Hudson Road

Hudson Road is a two-lane, urban collector roadway that is under town jurisdiction and traverses the study area in a north-south direction. In the vicinity of the Project site, Hudson Road provides two 11-foot-wide lanes that are separated by a double-yellow centerline with 2 to 3-foot wide marked shoulders. The posted speed limit in the vicinity of the Project site is 40 miles per hour (mph), with prevailing travel speeds measured in July 2021 found to be 44 mph in both directions[3]. Sidewalks and illumination is not provided in the vicinity of the Project site. Land use along Hudson Road within the study area consists of the Project site and residential and commercial properties.

[2]Two spaces per dwelling unit is required for residential dwellings containing less than five bedrooms plus one parking space for each additional bedroom and sufficient off-street parking for visitors.

[3]The prevailing travel speed is also known as the 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below during the observation period.

Athens Street

Athens Street is a 10± foot wide, unimproved gravel roadway that traverses a general east-west direction for a distance of approximately 2,265 linear feet (lf) west of Hudson Road and provides access to several vacant buildings that are situated within the Project site. Athens Street will be widened and paved to accommodate access to the Project.

Intersections

Table 1 and Figure 1 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in July 2021.

Table 1
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
Rte. 117/ Hudson Rd.	S	1 general-purpose travel lane on all approaches	Yes; 1 to 2-feet on Rte. 117; 2 to 5-feet on Hudson Rd.	Yes; sidewalks along the south side of Rte. 117 and for approximately 165 feet along the east side of Hudson Rd.; crosswalk provided across Hudson Rd.	No
Hudson Rd./ Athens St.	S	1 general-purpose travel lane on all approaches; Athens St. is an unimproved gravel roadway	Yes; 2 to 3-feet Hudson Rd	No	No
Hudson Rd./ Edson St.	S	1 general-purpose travel lane on all approaches	Yes; 2 to 4-feet on Hudson Rd.	No	No

[a]S = STOP-sign control.

Existing Traffic Volumes

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, manual turning movement counts (TMCs), and vehicle classification counts were completed in June 2021. The ATR counts were conducted on Hudson Road, north of Athens Street, on June 23rd and 24th, 2021 (Wednesday through Thursday, inclusive) in order to record weekday traffic conditions over an extended period, with weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak-period manual TMCs performed at the intersections of Route 117 at Hudson Road and Hudson Road at Edson Street on June 23rd, 2021 (Wednesday). These time periods were selected for analysis purposes as they are representative of the peak-traffic-volume hours for both the Project and the adjacent roadway network.

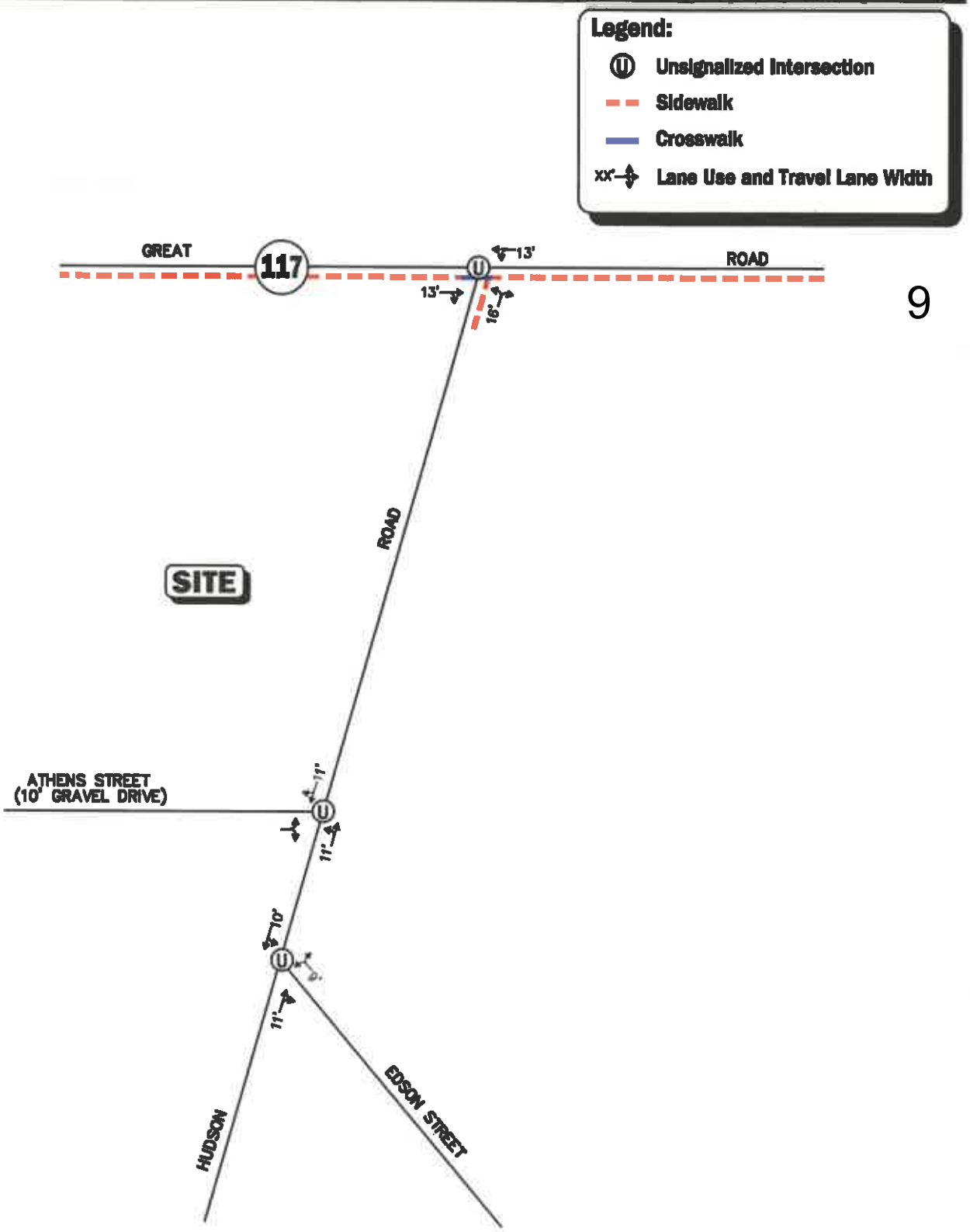


Figure 1

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Accommodations

Vanasse & Associates inc

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic-volume data from MassDOT Continuous Count Station No. 4172 located on Route 2 in Acton was reviewed. Based on a review of this data, it was determined that traffic volumes for the month of June are approximately 4.8 percent *above* average-month conditions. As such, no adjustments to the raw traffic count data were made as the data is representative of traffic-volume conditions that are higher than those under the average-month conditions.

Adjustments to the traffic-volume data in order to account for the impacts associated with restrictions imposed as a result of the COVID-19 pandemic were not required as the mandatory restrictions were lifted and replaced with voluntary measures on May 28th, 2021, prior to the date of the collection of the traffic-volume data that forms the basis of this assessment.

Hudson Road in the vicinity of the Project site was found to accommodate approximately 4,800 vehicles per day (vpd) on an average weekday (two-way, 24-hour volume), with approximately 335 vehicles per hour (vph) during the weekday morning peak hour (7:00 to 8:00 AM) and approximately 470 vph during the weekday evening peak hour (4:30 to 5:30 PM).[4] The 2021 Existing weekday morning and evening peak-hour traffic volumes are graphically depicted on Figures 2 and 3.

Pedestrian and Bicycle Facilities

As shown on Figure 1, a sidewalk is provided along the south side of Route 117 within the study area and along the east side of Hudson Road for a distance of approximately 165 feet south of Route 117, with a marked crosswalk provided for the crossing Hudson Road. Formal bicycle facilities were not identified within the immediate study area, and Route 117 and Hudson Road do not provide sufficient width on a continuous basis to accommodate bicycle travel in a shared traveled-way configuration (i.e., bicyclists and motor vehicles sharing the traveled way).[5]

Public Transportation

Regularly scheduled public transportation services are not currently provided in the immediate vicinity of the Project site. To the northeast of the Project site, the Massachusetts Bay Transit Authority (MBTA) provides commuter rail service to South Station in Boston on the Fitchburg Line by way of South Acton Station which is, located at 4 Central Street in Acton (approximately 5 miles from the Project site).

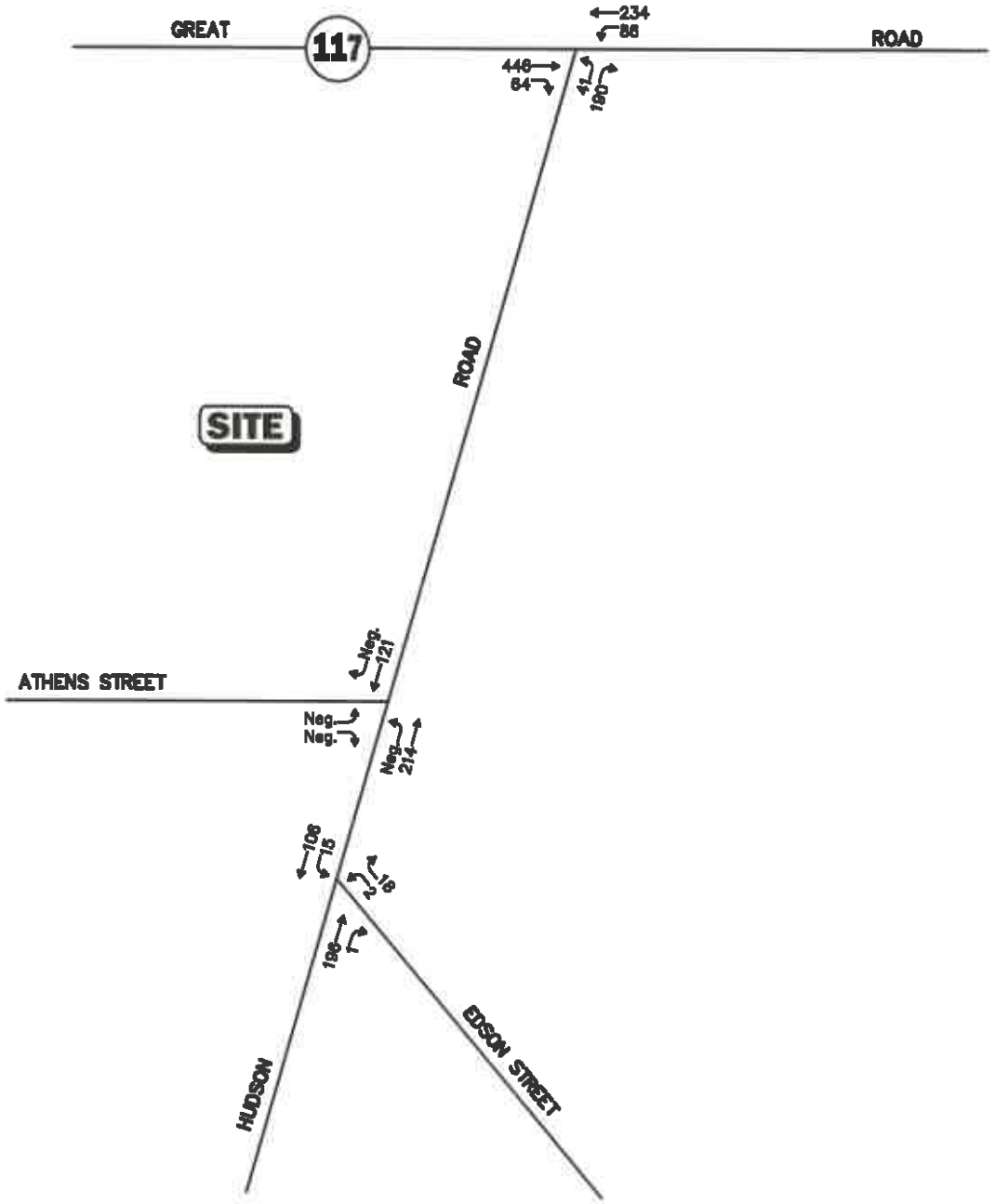
The Stow Council on Aging (COA) provides on-demand rides for resident senior citizens for weekly shopping trips and rides to and from medical appointments in Stow and the surrounding area.

Motor Vehicle Crash Data

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2014 through 2018, inclusive) to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and is presented in Table 2.

[4] The peak-hour traffic volumes were obtained from Figures 2 and 3.

[5] A minimum combined travel lane and paved shoulder width of 14 feet is required to support bicycle travel in a shared traveled-way condition.



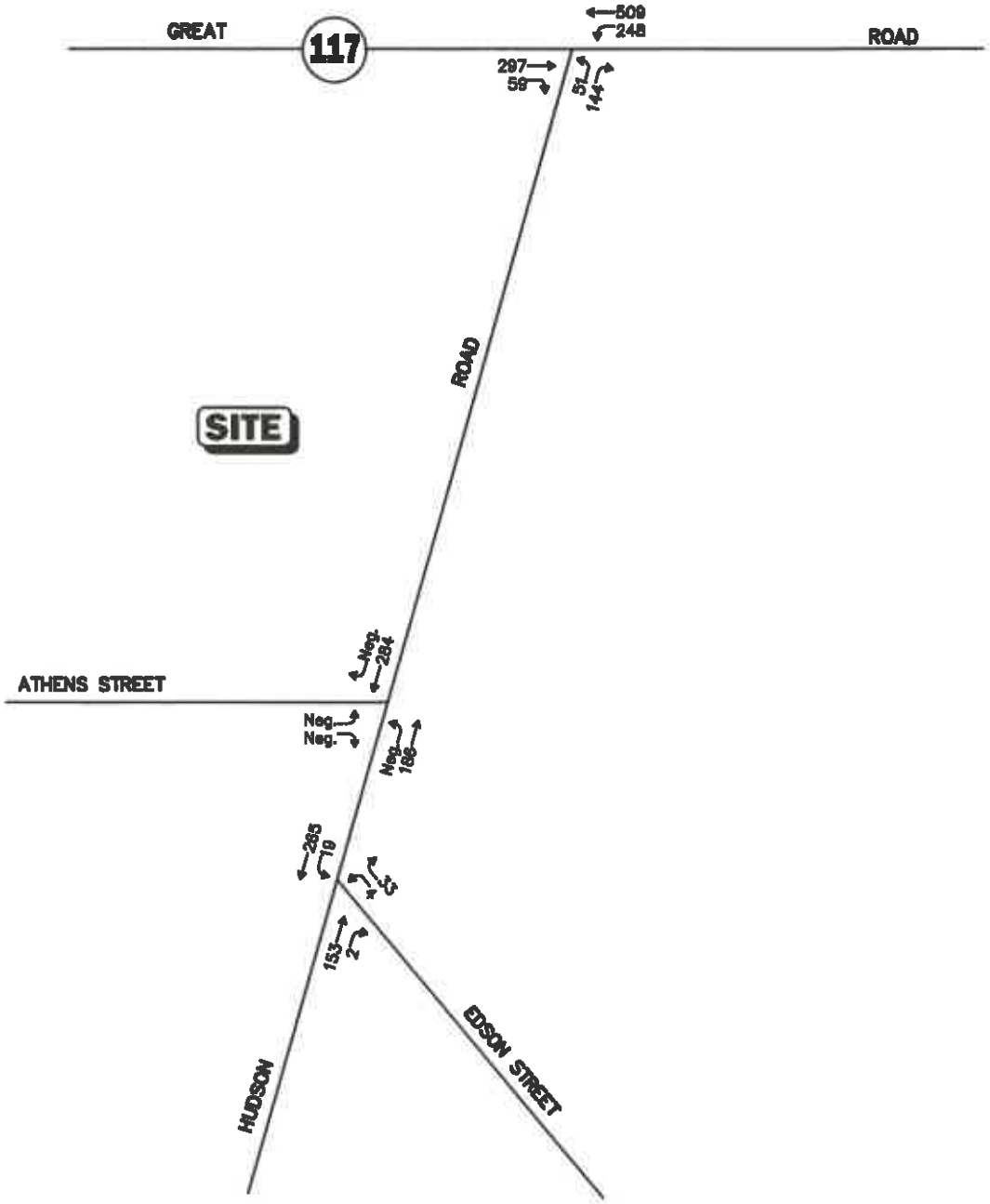
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 2

Vanasse & Associates inc

2021 Existing Weekday Morning Peak-Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3

2021 Existing Weekday Evening Peak-Hour Traffic Volumes

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Table 2
MOTOR VEHICLE CRASH DATA SUMMARY[a]

	Route 117/ Hudson Road	Hudson Road/ Athens Street	Hudson Road/ Edson Road
Traffic Control Type[b]	U	U	U
Year:			
2014	5	0	0
2015	6	0	0
2016	12	0	0
2017	5	0	0
2018	6	0	0
Total	34	0	0
Average	6.8	0	0
Crash Rate[c]	1.28	0	0
MassDOT Crash Rate:[d]	0.57/0.61	0.57/0.61	0.57/0.61
Significant?[e]	Yes	No	No
Type:			
Angle	12	0	0
Head-On	2	0	0
Rear-End	15	0	0
Rear-to-Rear	1	0	0
Sideswipe	3	0	0
Fixed Object	1	0	0
Pedestrian/Bicycle	0	0	0
Unknown/Other	0	0	0
Total	34	0	0
Conditions:			
Clear	23	0	0
Cloudy	2	0	0
Rain	7	0	0
Snow/Ice	2	0	0
Not Reported/Other	0	0	0
Total	34	0	0
Lighting:			
Daylight	31	0	0
Dawn/Dusk	0	0	0
Dark (Road Lit)	2	0	0
Dark (Road Unlit)	1	0	0
Total	34	0	0
Day of Week:			
Monday-Friday	27	0	0
Saturday	4	0	0
Sunday	3	0	0
Total	34	0	0
Severity:			
Property Damage Only	27	0	0
Non-fatal Injury	7	0	0
Not Reported	0	0	0
Total	34	0	0

[a]Source: MassDOT Safety Management/Traffic Operations Unit records, 2014 through 2018.
[b]Traffic Control Type: U = unsignalized.
[c]Crash rate per million vehicles entering the intersection.
[d]Statewide/District crash rate.
[e]The intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 3).

Based on a review of this data, no (0) motor vehicle crashes were reported to have occurred at the Hudson Road/Athens Street or Hudson Road/Edson Road intersections over the five-year review period. The Route 117/Hudson Road intersection experienced 34 total crashes over the five-year period, or an average of 6.8 crashes per year. The majority of the reported crashes occurred on a weekday; during daylight; under clear weather conditions; and involved rear-end or angle-type collisions that resulted in property damage only. The intersection was found to have a motor vehicle crash rate that is *above* both the MassDOT statewide and District average crash rates for an unsignalized intersection for the MassDOT Highway Division District in which the intersection is located in (District 3).

A review of the MassDOT statewide high crash location list indicated that the Route 117/Hudson Road intersection is included on MassDOT's HSIP listing as a high crash cluster location for 2015 through 2017. MassDOT defines a HSIP eligible cluster as: *" ...a cluster in which the total number of 'equivalent property damage only' crashes is within the top 5 percent of all clusters in that region. 'Equivalent property damage only' is a method of combining the number of crashes with the severity of crashes based on a weighted scale where a fatal crash is worth 10, an injury crash is worth 5 and a property damage only crash is worth 1."* Designation as a HSIP location allows for MassDOT to prioritize funding for safety-related improvements in a specific region of the state. A review of MassDOT's Road Safety Audit (RSA) listing indicates that an RSA has not been conducted for the intersection. As such, recommendations have been provided to advance safety-related improvements at this intersection that are detailed in the *Recommendations* section of this assessment.

The detailed MassDOT Crash Rate Worksheets and High Crash Location mapping are attached.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2028, which reflects a seven-year planning horizon consistent with MassDOT guidelines. Independent of the Project, traffic volumes on the roadway network in the year 2028 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2028 No-Build traffic volumes reflect 2028 Build traffic-volume conditions with the Project.

Future Traffic Growth

Future traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic; however, potential population growth and development external to the study area would not be accounted for in the resulting traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

Specific Development by Others

The Town of Stow Planning Department was consulted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this consultation, the following projects were identified for inclusion in this assessment:

- ***Pennie Lane Residential Development, Walcott Street, Stow, Massachusetts.*** This project entails the construction of five (5) single-family homes to be located off of Walcott Street and south of the Project site. Traffic volumes associated with this project within study area of this assessment are expected to be relatively minor and would be reflected in the general background growth rate.

- ***Joanne Drive Residential Development, Sudbury Road, Stow, Massachusetts.*** This project entails the construction of seven (7) single-family homes to be located off of Sudbury Road and east of the Project site. Traffic volumes associated with this project within the study area of this assessment are expected to be relatively minor and would be reflected in the general background growth rate.

- ***Stow Acres Redevelopment, Randall Road, Stow, Massachusetts.*** This project entails the redevelopment of a portion of the Stow Acres Country Club that is located off Randall Road and south of the Project site into approximately 25 age-restricted apartments, approximately 40 two or three-bedroom rentable cottages and approximately 124 detached single-family homes. Traffic volumes associated with this project were added to the 2028 No-Build and 2028 Build condition traffic volumes.

No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

General Background Traffic Growth

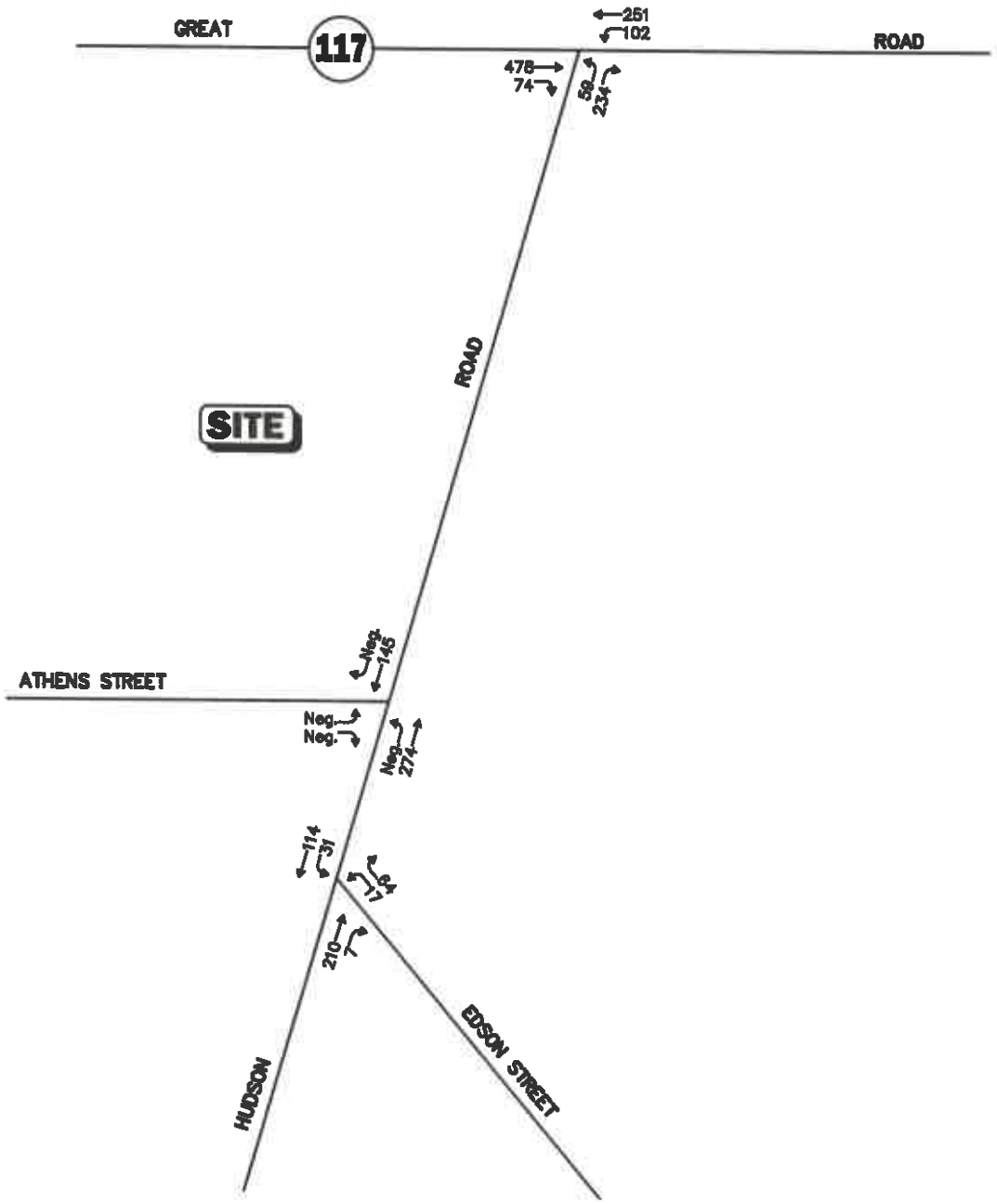
Traffic-volume data compiled by MassDOT from permanent count stations located in the area were reviewed in order to determine general traffic growth trends in the area. This data indicates that annual traffic volumes have fluctuated between decreases of 1.0 percent and increases of 0.67 percent, with the average growth rate found to be approximately 0.35 percent per year. In order to provide a prudent planning condition for the Project, a higher 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

The Town of Stow and MassDOT were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2028 within the study area. Based on these discussions, no roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

No-Build Traffic Volumes

The 2028 No-Build condition peak-hour traffic volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2021 Existing peak-hour traffic volumes and then adding the peak-hour traffic volumes associated with the identified specific development project by others. The resulting 2028 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figures 4 and 5.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 4

2028 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

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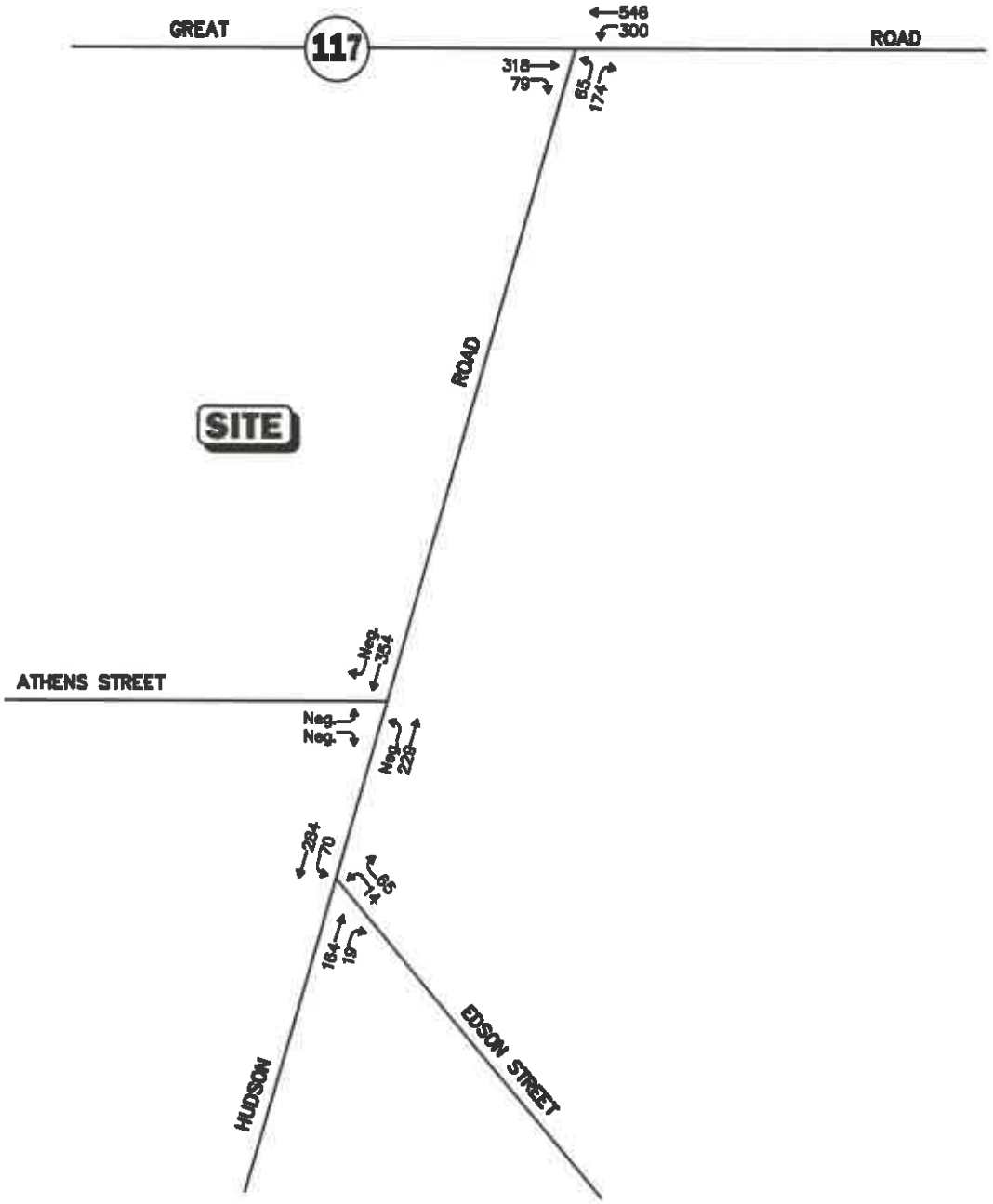

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 5

2028 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

Project-Generated Traffic

Design year (2028 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

As proposed, the Project will entail the construction of a residential community that will include approximately 141± detached single-family homes and cottages that will be marketed towards active adults. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the ITE[6] for a similar land use as that proposed were used. ITE Land Use Code (LUC) 251, *Senior Adult Housing - Single-Family*, was used to establish the traffic characteristics of the Project, the results of which are summarized in Table 3.

Table 3
TRIP-GENERATION SUMMARY

Time Period/Direction	Proposed Senior Housing Community (141 Dwellings)[a]
Average Weekday Daily:	
Entering	397
Exiting	397
Total	794
Weekday Morning Peak Hour:	
Entering	17
Exiting	33
Total	50
Weekday Evening Peak Hour:	
Entering	35
Exiting	23
Total	58

[a]Based on ITE LUC 251, *Senior Adult Housing – Single-Family.*

Project-Generated Traffic-Volume Summary

As can be seen in Table 3, the Project is expected to generate approximately 794 vehicle trips on an average weekday (two-way, 24-hour volume, or 397 vehicles entering and 397 exiting), with 50 vehicle trips (17 vehicles entering and 33 exiting) expected during the weekday morning peak-hour and 58 vehicle trips (35 vehicles entering and 23 exiting) expected during the weekday evening peak-hour.

[6]Ibid 1.

Trip Distribution and Assignment

The directional distribution of generated trips to and from the Project site was determined based on a review of U.S. Census Journey-to-Work data for the Town of Stow and then refined based on a review of existing traffic patterns within the study area. The general trip distribution for the Project is graphically depicted on Figure 6, with the additional traffic that is expected to be generated by the Project assigned on the study area roadway network as shown on Figures 7 and 8.

Build Traffic Volumes

The 2028 Build condition traffic volumes consist of the 2028 No-Build traffic volumes with the addition of the traffic expected to be generated by the Project. The 2028 Build weekday morning and evening peak-hour traffic volumes are graphically depicted on Figures 9 and 10.

TRAFFIC OPERATIONS ANALYSIS

In order to assess the potential impact of the Project on the roadway network, a detailed traffic operations analysis (motorist delays, vehicle queuing, and level-of-service) was performed for the study intersections. Capacity analyses provide an indication of how well transportation facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

In brief, six levels of service are defined for each type of facility. They are given letter designations ranging from A to F, with LOS "A" representing the best operating conditions and LOS "F" representing congested or constrained operations. An LOS of "E" is representative of a transportation facility that is operating at its design capacity with an LOS of "D" generally defined as the limit of "acceptable" traffic operations. Since the level-of-service of a traffic facility is a function of the flows placed upon it, such a facility may operate at a wide range of levels of service depending on the time of day, day of week, or period of the year. The Synchro® intersection capacity analysis software, which is based on the analysis methodologies and procedures presented in the 2010 *Highway Capacity Manual* (HCM)[7] for unsignalized intersections, was used to complete the level-of-service and vehicle queue analyses.

Analysis Results

Level-of-service and vehicle queue analysis were conducted for 2021 Existing, 2028 No-Build and 2028 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Table 4, with the detailed analysis results attached.

The following is a summary of the level-of-service and vehicle queue analyses for intersection within the study area. For context, we note that an LOS of "D" or better is generally defined as "acceptable" operating conditions.

Route 117 at Hudson Road

The addition of Project-related traffic was shown to result in a general increase in average motorist delay during both the weekday morning and evening peak hours that resulted in a degradation in level-of-service from LOS E to LOS F on the Hudson Road approach during the weekday morning peak-hour and continued LOS F operating conditions (no change over No-Build conditions) during the weekday evening peak-hour,

[7] *Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2010.

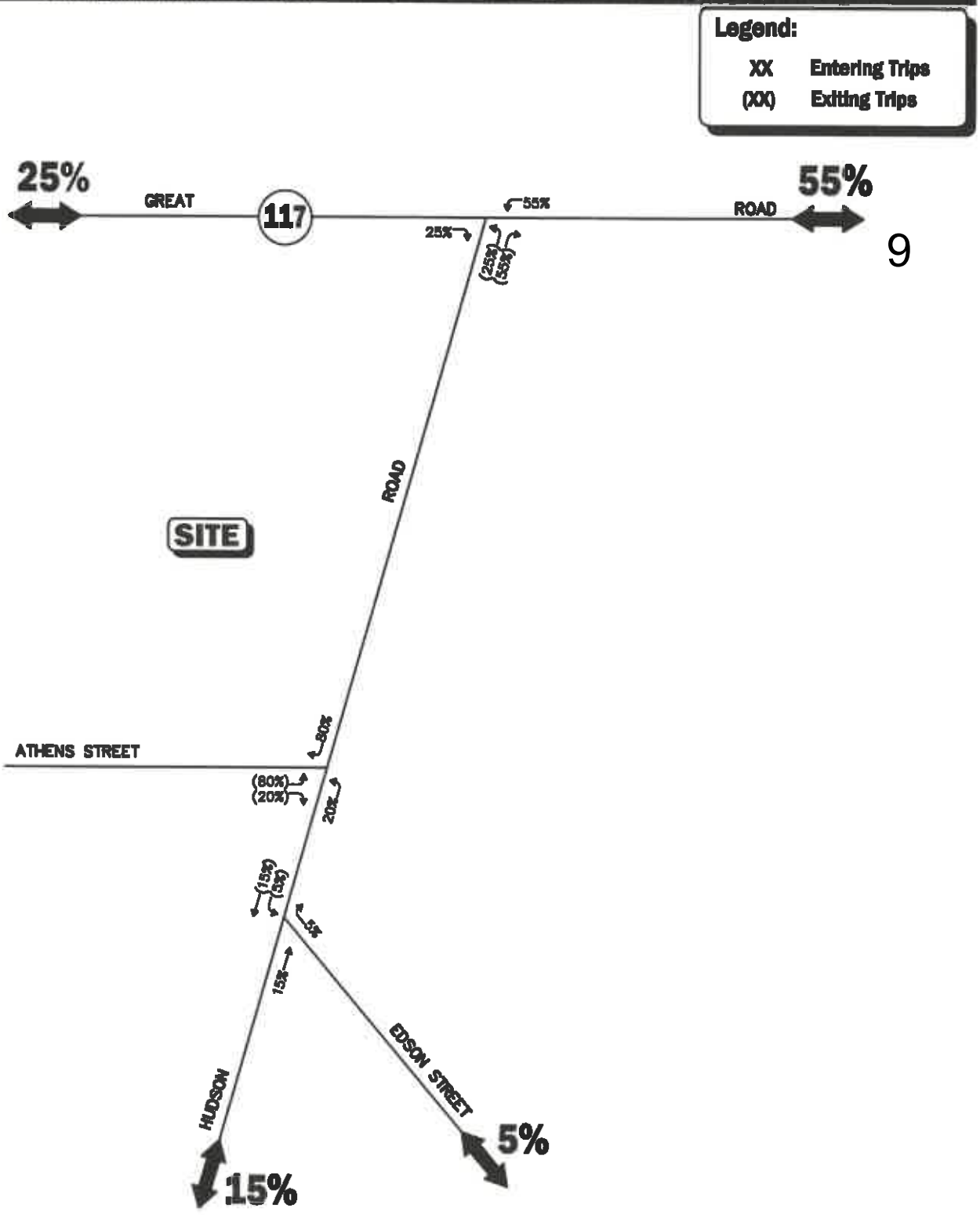

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Figure 6

Trip Distribution Map

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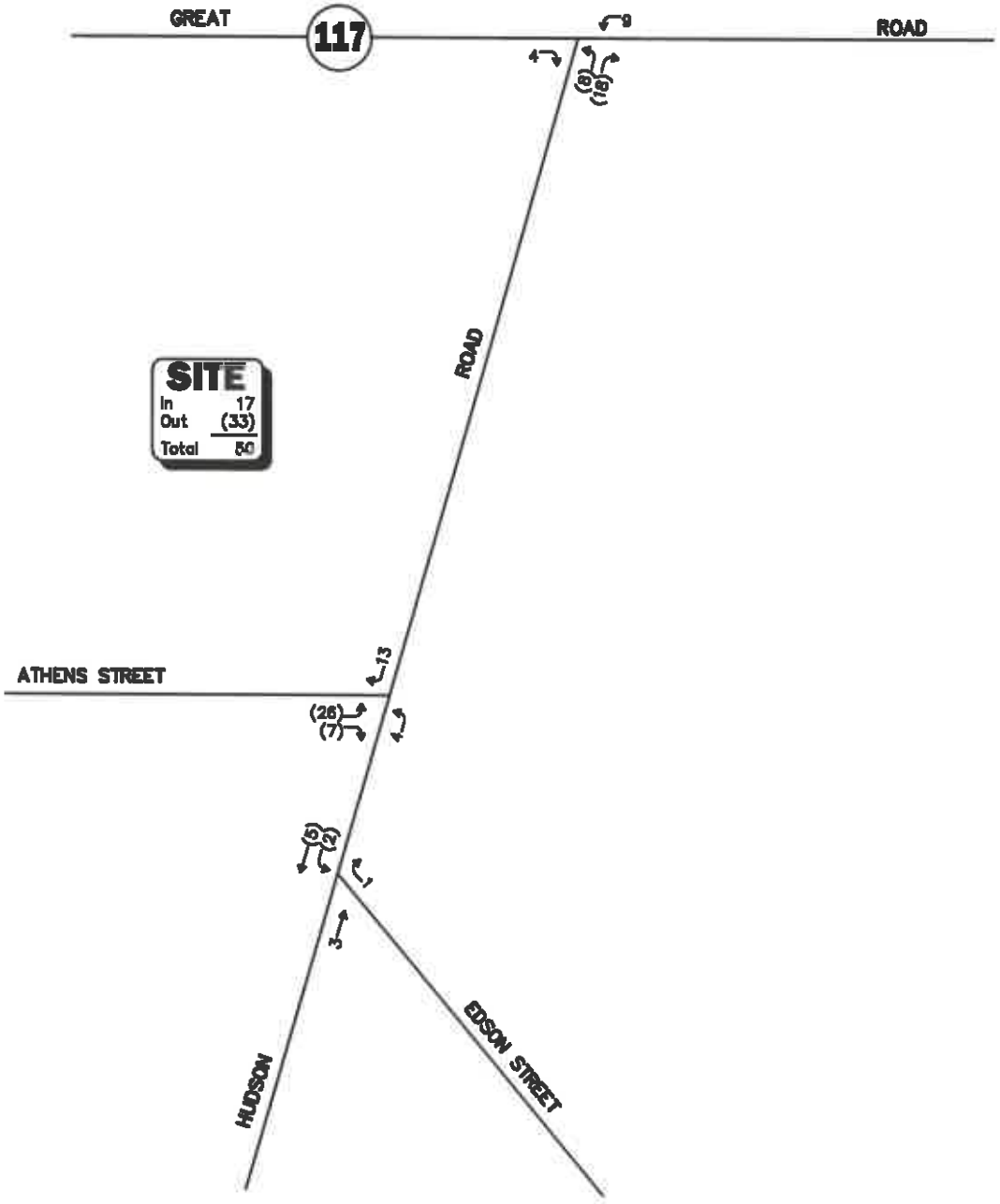

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Figure 7

Project-Generated Weekday Morning Peak-Hour Traffic Volumes

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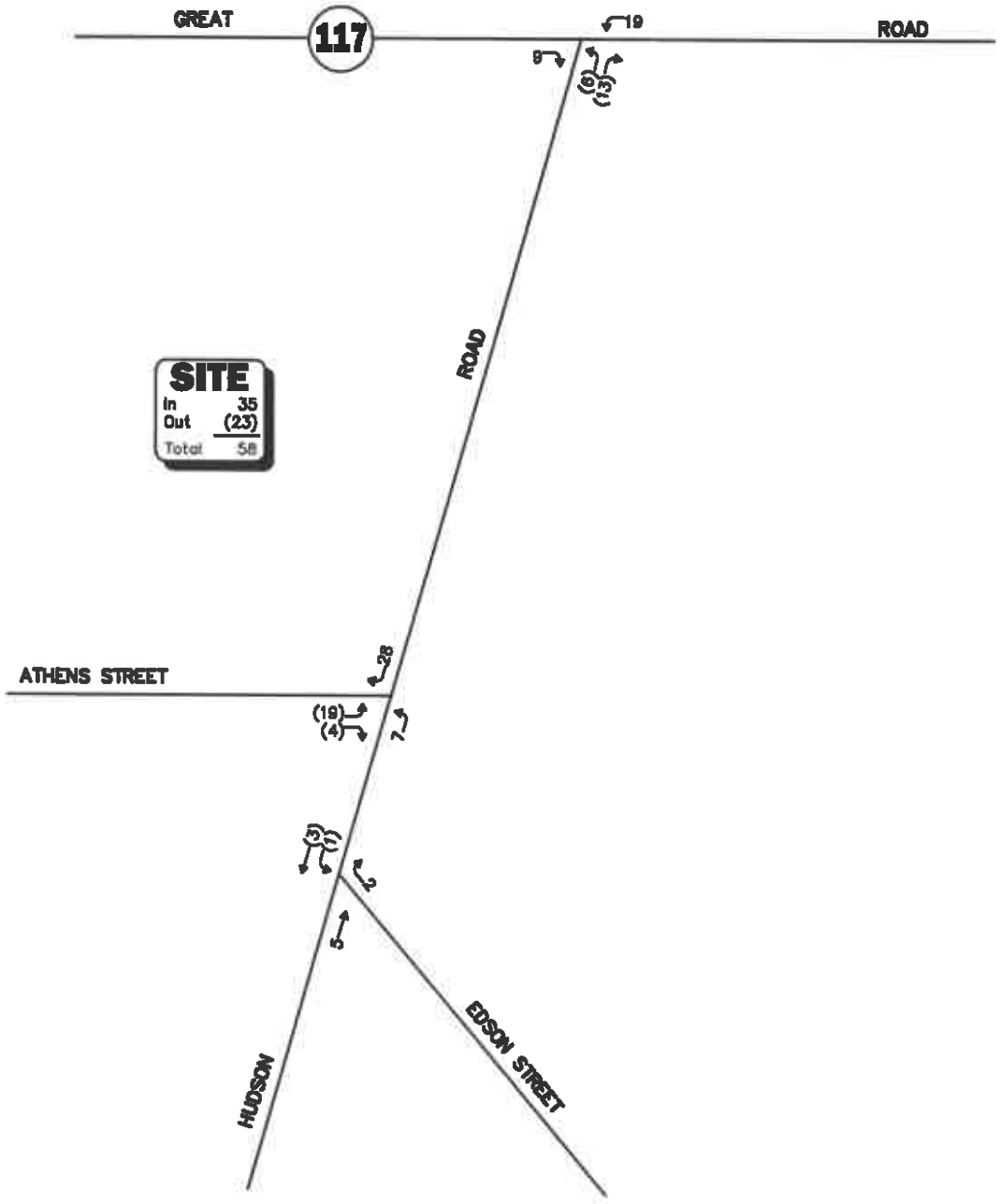
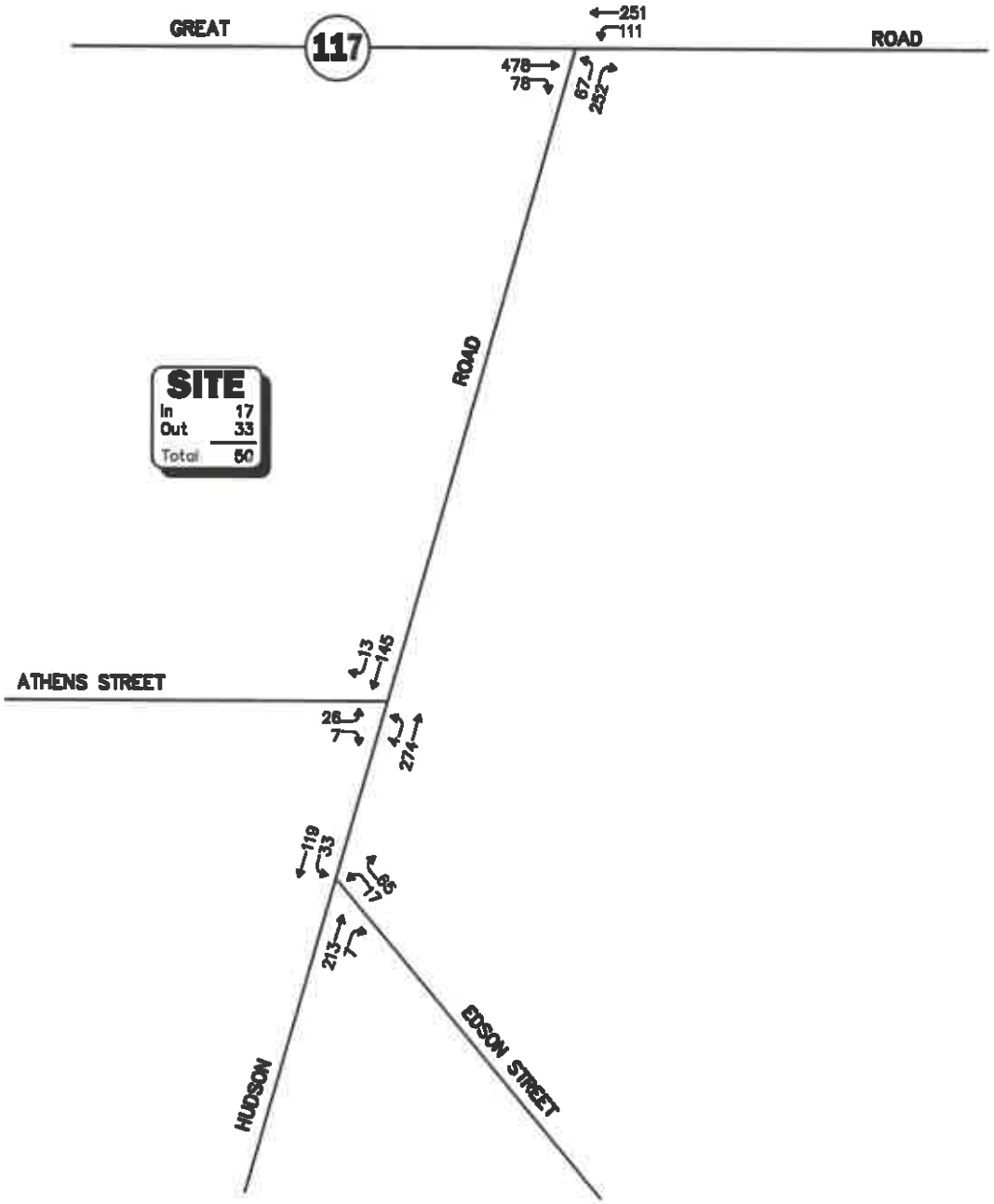


Not To Scale

Figure 8

Project-Generated Weekday Evening Peak-Hour Traffic Volumes

Vanasse & Associates inc



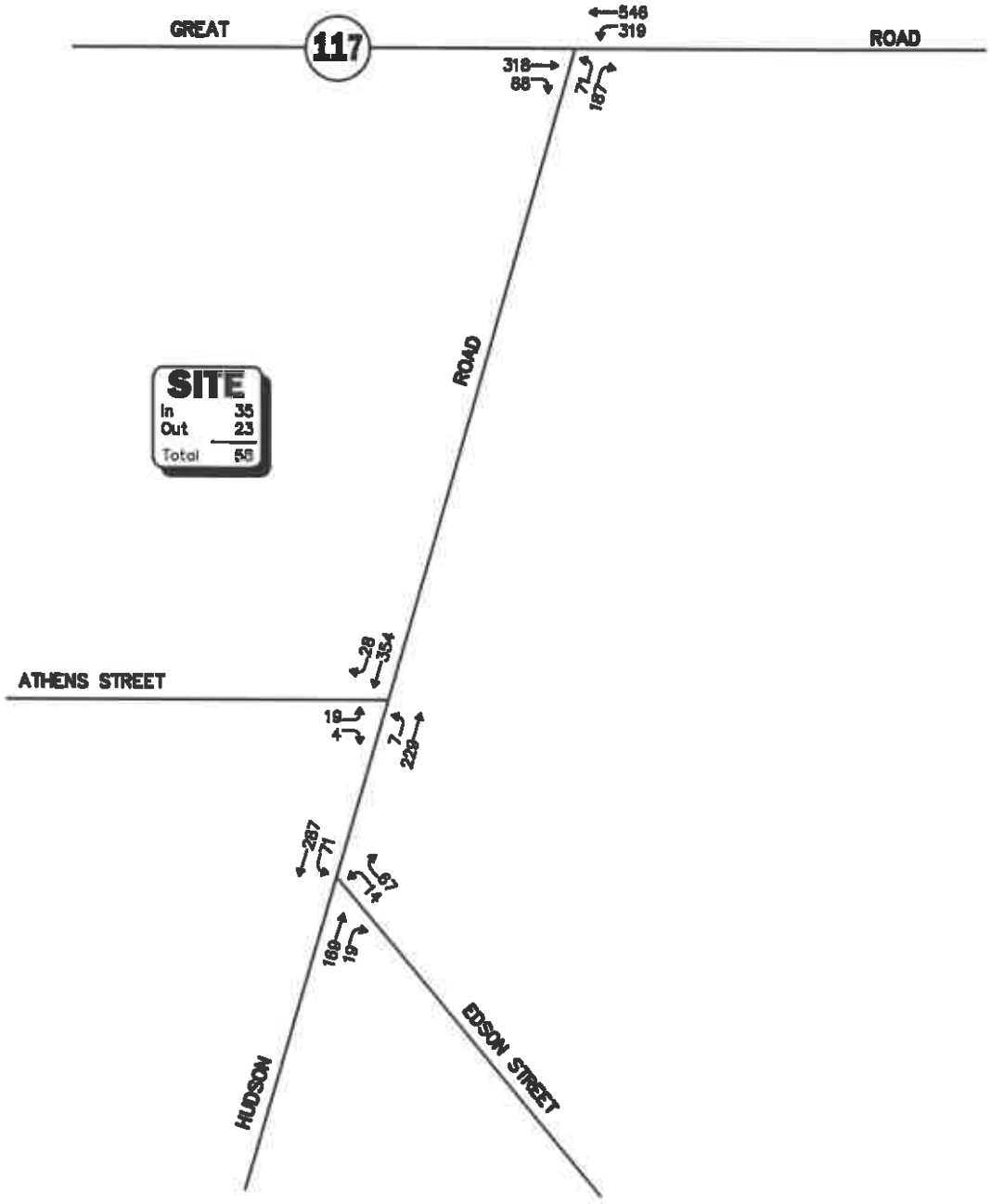
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 9

2028 Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 10

2028 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

with vehicle queues shown to increase by up to four (4) vehicles. Independent of the Project, it was noted that the Hudson Road approach is currently operating at its design capacity (i.e., LOS E) during both the weekday morning and evening peak hours, with conditions expected to further degrade in the future under No-Build conditions such that the Hudson Road approach is predicted to operate over capacity (i.e., LOS F) during the weekday evening peak-hour, again, independent of the Project. All movements along Route 117 were shown to operate at LOS A during the peak hours with vehicle queues of up to one (1) vehicle.

Hudson Road at Athens Street

All movements at the Athens Street/Hudson Road intersection were shown to operate at LOS B or better during the peak hours with negligible vehicle queuing.

Hudson Road at Edson Street

No change in level-of-service or vehicle queuing is predicted to occur for any movement over No-Build conditions, with all movements continuing to operate at LOS B or better and Project-related impacts defined as an increase in average motorist delay of less than 1.0 seconds.

Table 4
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

	2021 Existing				2028 No-Build				2028 Build			
Unsignalized Intersection/Peak Hour/Movement	Demand[a]	Delay[b]	LOS[c]	Queue[d] 95th	Demand	Delay	LOS	Queue 95th	Demand	Delay	LOS	Queue 95th
Route 117 at Hudson Road												
Weekday Morning:												
Route 117 EB: TH/RT	510	0.0	A	0	552	0.0	A	0	556	0.0	A	0
Route 117 WB: LT/TH	320	2.4	A	1	353	2.7	A	1	362	2.9	A	1
Hudson Road NB: LT/RT	231	35.1	E	6	293	45.4	E	8	319	>50.0	F	10
Weekday Evening:												
Route 117 EB: TH/RT	356	0.0	A	0	397	0.0	A	0	406	0.0	A	0
Route 117 WB: LT/TH	757	2.9	A	1	846	3.3	A	1	865	3.5	A	1
Hudson Road NB: LT/RT	195	45.4	E	6	239	>50.0	F	14	258	>50.0	F	18
Hudson Road at Athens Street												
Weekday Morning:												
Hudson Road NB: LT/TH	214	0.0	A	0	274	0.0	A	0	278	0.1	A	0
Hudson Road SB: TH/RT	121	0.0	A	0	145	0.0	A	0	158	0.0	A	0
Athens Street EB: LT/RT	0	0.0	A	0	0	0.0	A	0	33	11.4	B	0
Weekday Evening:												
Hudson Road NB: LT/TH	186	0.0	A	0	229	0.0	A	0	236	0.2	A	0
Hudson Road SB: TH/RT	284	0.0	A	0	354	0.0	A	0	382	0.0	A	0
Athens Street EB: LT/RT	0	0.0	A	0	0	0.0	A	0	23	14.6	B	0
Hudson Road at Edson Street												
Weekday Morning:												
Hudson Road NB: TH/RT	197	0.0	A	0	217	0.0	A	0	220	0.0	A	0
Hudson Road SB: LT/TH	121	1.0	A	0	145	1.7	A	0	152	1.7	A	0
Edson Street WB: LT/RT	20	9.6	A	0	81	10.7	B	1	82	10.8	B	1
Weekday Evening:												
Hudson Road NB: TH/RT	155	0.0	A	0	183	0.0	A	0	188	0.0	A	0
Hudson Road SB: LT/TH	284	0.5	A	0	354	1.6	A	0	358	1.6	A	0
Edson Street WB: LT/RT	37	10.0	B	0	79	11.5	B	1	81	11.6	B	1

[a]Demand in vehicles per hour.
[b]Average control delay per vehicle (in seconds).
[c]Level of service.
[d]Queue length in vehicles.
NB = northbound, EB = eastbound; SB = southbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

SIGHT DISTANCE ASSESSMENT

Sight distance measurements were performed at the Hudson Road/Athens Street intersection in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[8] requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an oncoming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 5 presents the measured SSD and ISD at the subject intersection.

Table 5
SIGHT DISTANCE MEASUREMENTS[a]

	Feet		
Intersection/Sight Distance Measurement	Required Minimum (SSD)	Desirable (ISD)[b]	Measured
Hudson Road at Athens Street			
Stopping Sight Distance:			
Hudson Road approaching from the north	360	--	500+
Hudson Road approaching from the south	360	--	500+
Intersection Sight Distance:			
Looking to the north from Athens Street	360	430	500+
Looking to the south from Athens Street	360	500	500+

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on a 45 mph approach speed on Hudson Road.

[b]Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

As can be seen in Table 5 the available lines of sight at the Hudson Road/Athens Street intersection were found exceed the recommended minimum sight distance to function in a safe (SSD) and efficient (ISD) manner based on a 45 mph approach speed along Hudson Road, which is 5 mph above the posted speed limit in the vicinity of the Project site (40 mph) and is slightly above the measured 85th percentile vehicle travel speed (44 mph).

[8] *A Policy on Geometric Design of Highway and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

SUMMARY

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a residential community to be located of off Athens Street in Stow, Massachusetts, that will be designed and marketed toward active adults. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE[9] for a senior housing community, the Project is expected to generate approximately 794 vehicle trips on an average weekday (two-way, 24-hour volume), with 50 vehicle trips expected during the weekday morning peak-hour and 58 vehicle trips expected during the weekday evening peak-hour;

2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition); however, it was noted that the Hudson Road northbound approach to Route 117 is predicted to operate at or over capacity (defined as LOS "E" or "F", respectively) during both the weekday morning and evening peak hours independent of the Project, with Project-related impacts on this approach defined as a general increase in average motorist delay that resulted in an increase in vehicle queuing of up to four (4) vehicles;

3. All movements at the Hudson Road/Athens Street intersection (the access to the Project site) are predicted to operate at LOS B or better with the addition of Project-related traffic where an LOS of "D" or better is defined as "acceptable" traffic operations;

4. Independent of the Project, the Route 117/Hudson Road intersection was found to have a motor vehicle crash rate that is above the MassDOT statewide and District 3 average crash rates for an unsignalized intersection, and the intersection is included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash location for the years 2015 through 2017. As such, specific recommendations have been provided to advance safety related improvements at this intersection (discussion follows); and

5. Lines of sight at the Hudson Road/Athens Street intersection were found to exceed the recommended minimum distance for the intersection to operate in a safe and efficient manner based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified as a part of this assessment. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

[9]Ibid 1.

Project Access

Access to the Project site will be provided by way of Athens Street, which will be improved (widened) and paved, and thereafter by an interconnected network of roadways to be constructed within the Project site. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the Site Plans:

- The Project site roadway (Athens Street) and internal circulating roads should be a minimum of 22 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle. To the extent that a reduced roadway is used (i.e., less than 22 feet), on street parking should be prohibited along at least one side of the roadway.
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided. STOP-signs and marked STOP-lines should also be provided at major intersections located within the Project site.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).[10]
- A sidewalk should be provided along at least one side of Athens Street and the internal roadway network that should extend to Hudson Road.
- Driveways to the residential units should be a minimum of 21 feet long measured between the garage door and the far edge of the sidewalk (edge closest to the residence) where a sidewalk is provided, and 23 feet measured between the garage door and the edge of the traveled-way in locations without a sidewalk.
- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of Athens Street and at intersections internal to the Project site should be designed and maintained so as not to restrict lines of sight.
- Snow accumulations (windrows) within sight triangle areas should be promptly removed where such accumulations would impede sight lines.

Off-Site

Route 117 at Hudson Road

Independent of the Project, all movements from Hudson Road at the Route 117/Hudson Road intersection are currently or are predicted to operate at or over capacity (i.e., LOS "E" or "F", respectively) during both the weekday morning and evening peak hours. Absent improvement, motorist delays are expected to further increase in the future, again, independent of the Project. In addition and also independent of the Project, the Route 117/Hudson Road intersection was identified to have a motor vehicle crash history that warrants further review and advancement of specific improvements to enhance safety. In an effort to identify both safety and capacity improvements at this intersection, the Project proponent will facilitate the completion of a Road Safety Audit (RSA) at the intersection. The RSA will be performed prior to the issuance of the first Certificate of Occupancy for the Project. In addition, the Project proponent will design and construct the short-term improvements that are suggested as an outcome of the RSA subject to receipt of all necessary right, permit, and approvals.

[10] *Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

Transportation Demand Management

Regularly scheduled public transportation services are not currently provided in the immediate vicinity of the Project site. To the northeast of the Project site, the Massachusetts Bay Transit Authority (MBTA) provides commuter rail service to South Station in Boston on the Fitchburg Line by way of South Acton Station which is, located at 4 Central Street in Acton (approximately 5 miles from the Project site). The Stow Council on Aging (COA) provides on-demand rides for resident senior citizens for weekly shopping trips and rides to and from medical appointments in Stow and the surrounding area.

In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules, and fare information will be posted in a central location and/or otherwise made available to residents;
- A "welcome packet" will be provided to residents detailing available public transportation services, bicycle and walking alternatives, and commuter options available;
- Pedestrian accommodations will be incorporated into the Project site; and
- Secure bicycle parking will be provided proximate to the clubhouse and/or recreational areas.

With the implementation of the above recommendations, safe and efficient access can be provided to the Project site and the Project can be accommodated within the confines of the existing transportation infrastructure.

cc: File

APPENDIX

PROJECT SITE PLAN
AUTOMATIC TRAFFIC RECORDER COUNT DATA
MANUAL TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
COVID-19 ADJUSTMENT DATA
VEHICLE TRAVEL SPEED DATA
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAPPING
GENERAL BACKGROUND TRAFFIC GROWTH
BACKGROUND DEVELOPMENT TRAFFIC-VOLUMES NETWORKS
TRIP-GENERATION CALCULATIONS
JOURNEY TO WORK TRIP DISTRIBUTION
CAPACITY ANALYSIS WORKSHEETS

PROJECT SITE PLAN

TOWN OF STOW, MASSACHUSETTS

PROPOSED PEDESTRIAN IMPROVEMENTS

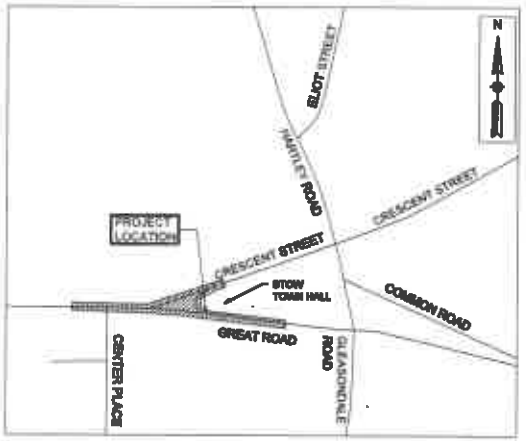
AT

GREAT ROAD AND CRESCENT STREET

DECEMBER 13, 2021

INDEX

SHEET NO.	DESCRIPTION
1	TITLE & INDEX
2	LEGEND
3	TRAFFIC PLAN
4	RAMP AND PAVEMENT MARKING PLAN
5	TRAFFIC DETAILS
6	RAMP DETAIL
7 - 8	TRAFFIC MANAGEMENT PLANS



LOCATION PLAN

SCALE IN FEET

THESE PLANS ARE IMPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2016 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 2009 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1999 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

10

PROPOSED PEDESTRIAN IMPROVEMENTS
GREAT ROAD AND CRESCENT STREET

CONCEPT DESIGN

TITLE

PREPARED FOR:
TOWN OF STOW
PLANNING DEPARTMENT

PREPARED BY:
GREEN INTERNATIONAL AFFILIATES, INC.

SCALE: AS NOTED
DESIGNED BY: MB
DRAWN BY: MB
CHECKED BY: CF
SHEET NO. 1 OF 8

ABBREVIATIONS

GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOARD
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
FAC	FRAME AND COVER
FAG	FRAME AND GRATE
FDN.	FOUNDATION
FLGSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GR/GV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LTP	LIGHT POLE
LP	LIGHTING LOAD CENTER
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHS	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY
PBR	PROTECT AND RETAIN

ABBREVIATIONS (cont.)

GENERAL

R	RADIUS OF CURVATURE
RAD	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET TREE	RETAIN TREE WITH TREE PROTECTION - ARMORING & PRUNING
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
RSR	REMOVE AND RESET
RAS	REMOVE AND STACK
RT	RIGHT
SB	GRANITE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL

CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR AMBER
FYL	FLASHING AMBER LEFT ARROW
FYR	FLASHING AMBER RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILE, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TS 650	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
Y	STEADY CIRCULAR AMBER
YL	STEADY AMBER LEFT ARROW

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB		JERSEY BARRIER OR BRIDGE OR JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST BOLLARD
		POST CIRCULAR
	WELL	WELL
	MH	ELECTRIC HANDHOLE
		FENCE GATE POST
	GG	GAS GATE
BHL		BORING HOLE
MW		MONITORING WELL
TP		TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
MHS	MHS	MASSACHUSETTS HIGHWAY BOUND
MON		MON UNSET
SB		STONE BOUND
TB		TOWN OR CITY BOARD
		TRAVERSE OR TRIANGULATION STATION
	TPL or GUY	TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
	UPR	UTILITY POLE W/ RISEBOX
	UPDL	UTILITY POLE WITH DOUBLE LIGHT
	ULT	UTILITY POLE W/ 1 LIGHT
	UPL	UTILITY POLE
		BUSH
SIZE TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		OVERHEAD CABLE/WIRE
		CURBING
		CONTOURS
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCE STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALE/SILT FENCE
		TREE LINE OR LIMIT OF CLEARING AND GRUBBING
		BANCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT
		EASEMENT CONTROL BARRIER

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		STOP LINE
		CROSSWALK
		SOLID WHITE LINE
		SOLID YELLOW LINE
		BROKEN WHITE LINE
		BROKEN YELLOW LINE
		DOTTED WHITE LINE
		DOTTED YELLOW LINE
		DOTTED WHITE LINE EXTENSION
		DOTTED YELLOW LINE EXTENSION
		DOUBLE WHITE LINE
		DOUBLE YELLOW LINE

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTIONALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
		RAILROAD SIGNAL
		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
		MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 13"x13" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

10

PROJECT: PROPOSED PEDESTRIAN IMPROVEMENTS
GREAT ROAD AND CRESCENT STREET

DESIGN SUBMISSION: CONCEPT DESIGN

DRAWING TITLE: LEGEND

PREPARED FOR:
TOWN OF STOW
PLANNING DEPARTMENT
380 GREAT ROAD
STOW, MASSACHUSETTS

PREPARED BY:
GREEN INTERNATIONAL AFFILIATES, INC.
TRANSPORTATION | STRUCTURAL | WATER RESOURCES | ONLINE
[illegible] | 978.923.0420 | [illegible]

SCALE: AS NOTED | DESIGNED BY: MB
DATE: 12/12/2017 | DRAWN BY: MB
PROJECT NO. 2393.2 | CHECKED BY: GT

SHEET NO. 2 OF 8

SSD ADJUSTED ON SLOPES=(1.47 * V * T) + (V2 / (2a * ((A / 32.2) + G)))						
	SPEED	t	a	G	SSD adj	ROUNDUP
GREAT RD EB	40*	2.5	11.2	-0.25%	391.449	395
GREAT RD WB	40**	2.5	11.2	0.09%	391.662	395

NOTES:
* THE DAILY AVERAGE 85TH SPEED OF GREAT ROAD EASTBOUND IS 32 MPH BASED ON 2021 ATR DATA. USE 40 MPH TO BE CONSERVATIVE.
** THE DAILY AVERAGE 85TH SPEED OF GREAT ROAD WESTBOUND IS 39 MPH BASED ON 2021 ATR DATA. USE 40 MPH TO BE CONSERVATIVE.

10

PROJECT: PROPOSED PEDESTRIAN IMPROVEMENTS GREAT ROAD AND CRESCENT STREET

DESIGN SUBMISSION: CONCEPT DESIGN

DRAWING TITLE: DESIGN PLAN

PREPARED FOR: TOWN OF STOW PLANNING DEPARTMENT 380 GREAT ROAD STOW, MASSACHUSETTS

PREPARED BY: GREEN INTERNATIONAL AFFILIATES, INC.

SCALE: AS NOTED | DESIGNED BY: NB | DRAWN BY: NB | CHECKED BY: GT | SHEET NO. 3 OF 8

10

PROJECT:
PROPOSED PEDESTRIAN IMPROVEMENTS
GREAT ROAD AND CRESCENT STREET

DESIGN SUBMISSION:
CONCEPT DESIGN

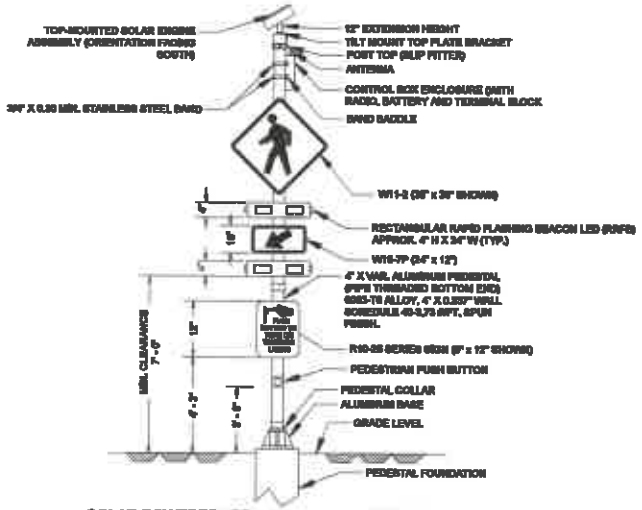
DRAWING TITLE:
DESIGN PLAN

PREPARED FOR:
TOWN OF STOW
PLANNING DEPARTMENT
380 GREAT ROAD
STOW, MASSACHUSETTS

PREPARED BY:
GREEN INTERNATIONAL AFFILIATES, INC.
TRANSPORTATION | ENGINEERING | ENERGY RESOURCE CONSULTING
230 LOTTI LEPOW ROAD, SUITE 3 HAMPTON, NH 03842
978.926.4100 | www.greenintl.com

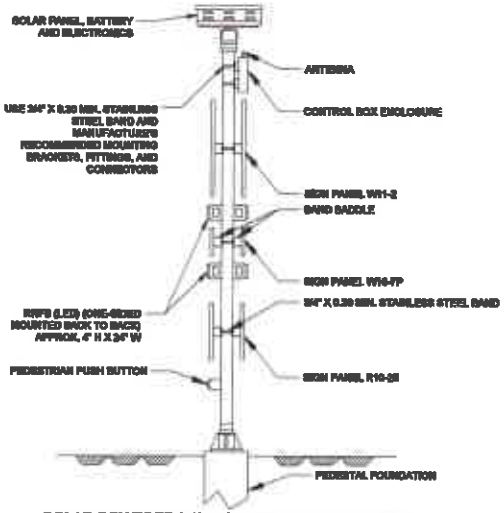
SCALE: AS NOTED	DESIGNED BY: MB	SHEET NO.
DATE: 12/23/2021	DRAWN BY: MB	4 OF 8
PROJECT NO. 21002	CHECKED BY: GT	

NO.	DATE	REVISION



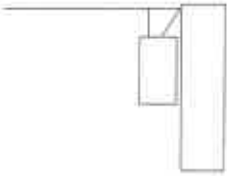
SOLAR POWERED LED BORDER SIGN - FRONT VIEW

NOT TO SCALE



SOLAR POWERED LED BORDER SIGN - SIDE VIEW

NOT TO SCALE



PEDESTAL FOUNDATION DETAILS

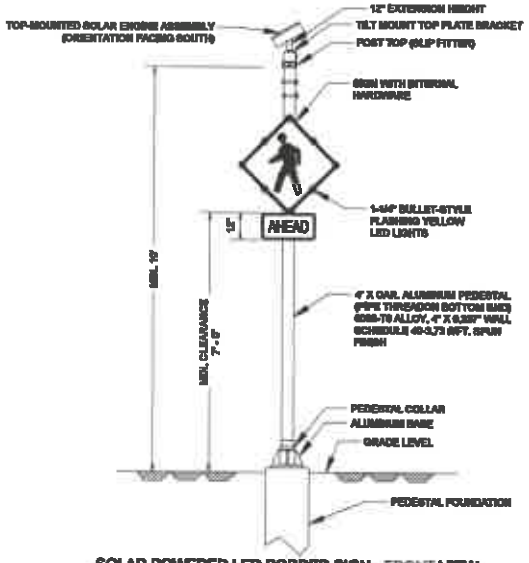
NOT TO SCALE

NOTES:

1. DETAIL ALSO APPLICABLE FOR THE PEDESTAL FOUNDATIONS FOR THE SOLAR POWERED LED BORDER SIGN ASSEMBLY, FLASHING BEACON SCHOOL ZONE SIGN ASSEMBLY, AND RADAR SPEED FEEDBACK ASSEMBLY

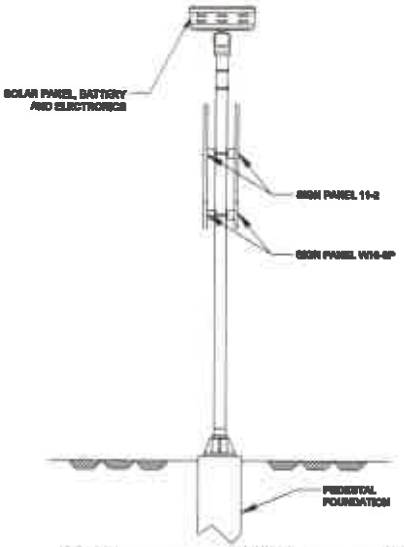
NOTES:

1. MATERIAL TO BE ALUMINUM
2. ALL SURFACES TO BE PAINTED WITH AT LEAST TWO COATS OF EXTERIOR GRADE POWDER COAT PAINT SUITABLE FOR A LOW SPEED TRAFFIC ENVIRONMENT SUBJECT TO HIGH LEVELS OF SALT
3. DETAIL ALSO APPLICABLE FOR THE ALUMINUM BASES FOR THE SOLAR POWERED LED BORDER SIGN ASSEMBLY, FLASHING BEACON SCHOOL ZONE SIGN ASSEMBLY, AND RADAR SPEED FEEDBACK ASSEMBLY



SOLAR POWERED LED BORDER SIGN - FRONT VIEW

NOT TO SCALE



SOLAR POWERED LED BORDER SIGN - SIDE VIEW

NOT TO SCALE

NOTES:

1. LEDS TO HAVE FLASH RATE BETWEEN 50-60 TIMES PER MINUTE
2. LEDS SHALL BE FIELD ADJUSTABLE
3. MATERIAL TO BE ALUMINUM
4. ALL SURFACES TO BE PAINTED WITH AT LEAST TWO COATS OF EXTERIOR GRADE POWDER COAT PAINT SUITABLE FOR A LOW SPEED TRAFFIC ENVIRONMENT SUBJECT TO HIGH LEVELS OF SALT

10

PROJECT: PROPOSED PEDESTRIAN IMPROVEMENTS GREAT ROAD AND CRESCENT STREET

DESIGN SUBMISSION: CONCEPT DESIGN

DRAWING TITLE: TRAFFIC DETAILS

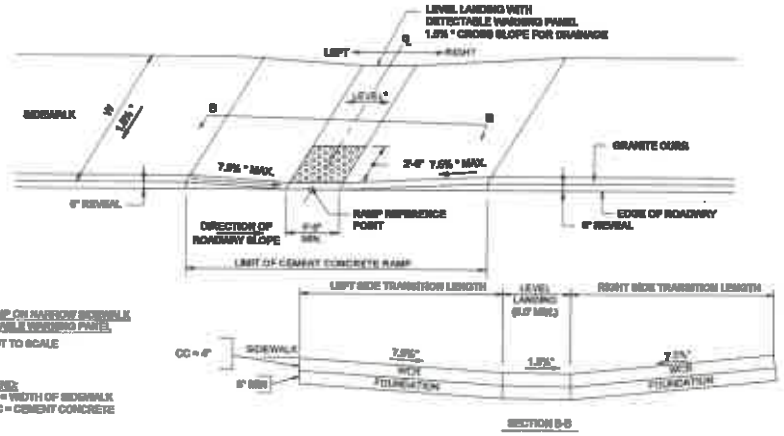
PREPARED FOR: TOWN OF STOW PLANNING DEPARTMENT

PREPARED BY: GREEN INTERNATIONAL AFFILIATES, INC.

SCALE: AS NOTED | DRAWN BY: HB | CHECKED BY: GF

DATE: 12/15/2021

SHEET NO. 5 OF 8



SECTION B-B

WHEELCHAIR RAMP ON NARROW SIDEWALK WITH DETECTABLE WARNING PANEL

NOT TO SCALE

LEGEND:
W = WIDTH OF SIDEWALK
CC = CEMENT CONCRETE

WHEELCHAIR RAMPS LESS THAN 12'-0" SIDEWALK

NOT TO SCALE

NOTES:

1. CONSTRUCTION TOLERANCE ± 0.2%
   SEE CONSTRUCTION STANDARD E 107.2.1
2. SEE CONSTRUCTION STANDARD E 107.3.0 - DETECTABLE WARNING PANELS SHALL BE INSTALLED IN ACCORDANCE WITH CONSTRUCTION STD E 107.3.0
   CONTRACTOR IS ULTIMATELY RESPONSIBLE FOR CONSTRUCTING RAMPS COMPLIANT WITH ADAAAB RULES, REGULATIONS AND STANDARDS.
   CONTRACTOR SHALL VERIFY RAMPS ARE ADAAAB COMPLIANT BEFORE POURING CEMENT CONCRETE.

NOTES:

PAVEMENT MARKINGS:

- THE WORK FOR INSTALLING PAVEMENT MARKINGS AND PERFORMING PAVEMENT MARKING REMOVAL SHALL CONFORM TO THE RELEVANT PROVISIONS OF SECTION 850 AND 860 OF THE MASSDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
- ALL PAVEMENT MARKING SHALL BE THERMOPLASTIC AND CONFORM TO THE MASSDOT MATERIAL SPECIFICATION M7.01.00 AND M7.01.04.
- CROSSWALKS WILL BE SHOWN ON CURB CUT WHEEL CHAIR RAMP SKETCHES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REFERENCE AND RECORD ALL EXISTING CROSSWALK PAVEMENT MARKINGS, THEIR LOCATIONS AND DIMENSIONS FOR REPRODUCTION AFTER REMOVAL, IF REQUIRED BY THE ENGINEER. THE RECORDING SHALL BE DONE PRIOR TO ANY OTHER WORK ON THE PROJECT AND COPIES SHALL BE GIVEN TO THE ENGINEER.
- ALL PERMANENT CROSSWALK PAVEMENT MARKINGS MUST BE APPLIED WITHIN ONE (1) WEEK OF COMPLETION OF THE WHEELCHAIR RAMP. ALL CROSSWALKS SHALL BE TEN FEET WIDE, BE PERPENDICULAR TO THE ROADWAY, AND CONSIST OF TWO PARALLEL "RAIL" MARKINGS WITH "LADDER" STRIPING BETWEEN THE "RAIL" MARKINGS. THE ENGINEER MAY DIRECT THE CONTRACTOR TO APPLY ADDITIONAL PAVEMENT MARKINGS.
- PAVEMENT MARKING REMOVAL SHALL BE PERFORMED BY GRINDING THE PAVEMENT MARKING FROM THE PAVEMENT OR OTHER METHOD OF PHYSICAL REMOVAL APPROVED BY THE ENGINEER. PAINTING OVER EXISTING MARKINGS WILL NOT BE ALLOWED.

RAMPS:

- THE WORK FOR REMOVING AND DISCARDING THE EXISTING CURB ALONG THE LIMITS OF THE PROPOSED WHEELCHAIR RAMP AND INSTALLING GRANITE TRANSITION CURB FOR THE WHEELCHAIR RAMP TRANSITIONS SHALL CONFORM TO THE RELEVANT PROVISIONS OF SECTION 930 OF THE MASSDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
- WHERE THERE IS AN EXISTING GRASS SURFACE ADJACENT TO THE BACK OF THE PROPOSED CEMENT CONCRETE SIDEWALK SURFACE, BACK OF THE PROPOSED CEMENT CONCRETE WHEELCHAIR RAMP, AND/OR WHERE DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PLACE LOAM AND SEED AT THE BACK OF THE CEMENT CONCRETE SIDEWALK SURFACE.
- ALL WHEELCHAIR RAMP JOINTS AND TRANSITION SECTIONS WHICH DEFINE GRADE CHANGES SHALL BE FORMED, SCRIBED AND CHECKED PRIOR TO PLACING CEMENT CONCRETE. ALL GRADE CHANGES ARE TO BE MADE AT JOINTS WHICH ARE TO BE TRANSVERSE TO THE PEDESTRIAN PATH OF TRAVEL, EXCLUDING THE JOINTS FORMING THE WHEELCHAIR RAMP FLARE SECTIONS.
- THE PEDESTRIAN RAMP, INCLUDING THE DETECTABLE WARNING PANEL SHALL BE PROTECTED FROM ALL TRAFFIC, VEHICULAR OR PEDESTRIAN, DURING THE CURING PROCESS. PRIOR TO COMPLETION ALL DEBRIS MUST BE CLEANED FROM THE DETECTABLE WARNING PANEL.

10

PROJECT: PROPOSED PEDESTRIAN IMPROVEMENTS
GREAT ROAD AND CRESCENT STREET

DESIGN SUBMISSION: CONCEPT DESIGN

DRAWING TITLE: TRAFFIC DETAILS

PREPARED FOR:
TOWN OF STOW
PLANNING DEPARTMENT
380 GREAT ROAD
STOW, MASSACHUSETTS

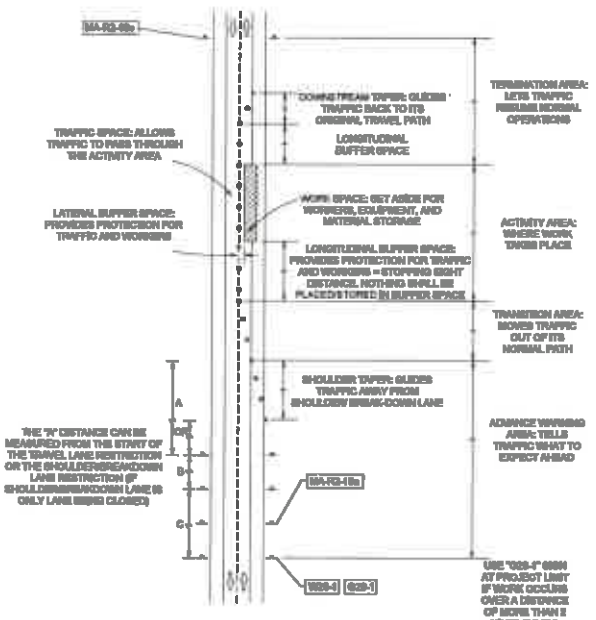
PREPARED BY:
GREEN INTERNATIONAL AFFILIATES, INC.
TRANSPORTATION | ENGINEERING | WATER RESOURCES | CONSULTING
270 LEGION ROAD, SUITE 3 WESTFORD, MA 01886
978.692.8181 | www.greenintl.com

SCALE: AS NOTED	DESIGNED BY: HB	SHEET NO.
DATE: 12/2/2021	DRAWN BY: NB	6 OF 8
PROJECT NO. 2021.0	CHECKED BY: CT	

NO.	DATE	REVISIONS
1	2/2/22	

TEMPORARY TRAFFIC CONTROL NOTES:

1. MINIMUM LANE WIDTH OF 11 FEET SHALL BE MAINTAINED UNLESS OTHERWISE NOTED. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF THE DRUMS OR CONES (IF USED).
2. THE CONTRACTOR MAY ELECT TO PROVIDE ALTERNATE METHODS TO MAINTAIN TRAFFIC. ALTERNATE METHODS PROPOSED BY THE CONTRACTOR SHALL BE SUBMITTED TO TOWN OF STOW FOR REVIEW AND APPROVAL.
3. THE CONTRACTOR SHALL COORDINATE APPROVAL OF ANY CHANGES TO THE TEMPORARY TRAFFIC CONTROL PLAN WITH TOWN OF STOW PRIOR TO CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL ALSO NOTIFY TOWN OF STOW TWO (2) WEEKS IN ADVANCE OF PLACING TEMPORARY TRAFFIC CONTROL SIGNS.
4. THESE PLANS ARE NOT INTENDED TO LIMIT THE CONTRACTOR'S APPROACH TO SCHEDULE THE WORK BUT TO OUTLINE ONE WAY OF PROGRESSING. THE CONTRACTOR IS EXPECTED TO USE KNOWLEDGE AND EXPERIENCE TO PERFORM THE WORK IN THE MOST EFFICIENT AND SAFE MANNER IN COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS.
5. PLACE ALL SAFETY DEVICES AND CONSTRUCTION SIGNING BEFORE ACTUAL CONSTRUCTION WORK BEGINS.
6. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED BASED ON FIELD CONDITIONS WITH THE APPROVAL OF THE ENGINEER.
7. WHEN EXISTING SIGNS ARE NO LONGER APPLICABLE THEY SHALL BE TEMPORARILY COVERED DURING CONSTRUCTION OR REMOVED AND RESET UPON COMPLETION OF CONSTRUCTION. THE COST SHALL BE INCIDENTAL TO THE CONTRACT.
8. ALL SIGNS SHALL BE REFLECTORIZED, WITH REFLECTIVE SHEETING CONFORMING TO M9.20.0. ALL SIGN COLORS SHALL BE PER THE CONSTRUCTION SIGN SUMMARY TABLE AND CURRENT MUTCD.
9. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
10. CONTRACTOR SHALL RECORD EXISTING PAVEMENT MARKINGS AND RESTORE ALL MARKINGS TO EXISTING CONDITIONS AT THE CONCLUSION OF CONSTRUCTION AT EACH LOCATION.
11. CONTRACTOR SHALL REMOVE ALL TRAFFIC CONTROL DEVICES IMMEDIATELY WHEN NO LONGER NEEDED.
12. UNLESS OTHERWISE NOTED, ALL PAVEMENT MARKINGS, SIGNS AND OTHER TRAFFIC EQUIPMENT REMOVED OR DAMAGED AS A RESULT OF THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED IN CONFORMANCE WITH THE CONTRACT DOCUMENTS.
13. CONTRACTOR SHALL INSTALL, REMOVE, AND MAINTAIN ALL TRAFFIC CONTROL DEVICES AS SHOWN ON THE DRAWINGS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
14. ACCESS/EGRESS TO ALL ABUTTERS SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
15. CONTRACTOR SHALL MAINTAIN EMERGENCY PASSAGE AT ALL TIMES TO BUILDINGS WITHIN AND ADJACENT TO THE PROJECT LIMITS AS WELL AS A LARGER AREA IF AFFECTED BY CONSTRUCTION CONDITIONS. CONTRACTOR SHALL MAINTAIN 24 HOUR EMERGENCY VEHICLE ACCESS TO CONSTRUCTION AREAS.
16. CONTRACTOR SHALL COORDINATE WITH ABUTTERS FOR THE PROPOSED WORK AND SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF THE WORK THAT WILL REQUIRE TEMPORARY CLOSURE OF ACCESS TO THEIR PROPERTY.
17. THE CONTRACTOR SHALL COORDINATE THE WORK WITH ALL ABUTTING PROJECTS.
18. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
19. CONSTRUCTION WORK WITHIN SCHOOL ZONE WILL OCCUR OUTSIDE OF SCHOOL SEASON, UNLESS OTHERWISE NOTED. CONTRACTOR SHALL COORDINATE WITH TOWN OF SHERBORN AND ENGINEER IF THE CONSTRUCTION OCCUR IN SCHOOL SEASON. PEDESTRIAN DETOUR AND DETAILS OF ADA COMPLIANT RAMPS SHALL BE PROVIDED BY ENGINEER AS NEEDED.
20. ALL DETOURS AND LANE CLOSURES SHALL BE COORDINATED WITH TOWN OF STOW AT LEAST TWO WEEKS IN ADVANCE.
21. THE FIRST FIRST (5) PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH TYPE A LIGHTS.
22. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
23. MINIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.



ADVANCE SIGNAGE AND COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL (TTC) ZONE
NOT TO SCALE

FORMULAS FOR DETERMINING TAPER LENGTH

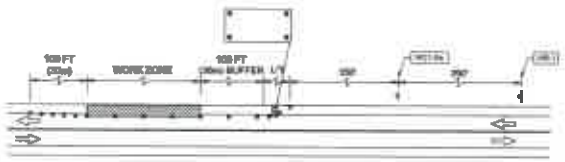
SPEED (S)	TAPER LENGTH (L) IN FEET
40 MPH OR LESS	$L=WS^2/60$
45 MPH OR MORE	$L=WS$

WHERE:
- L = TAPER LENGTH IN FEET
- W = WIDTH OF OFFSET IN FEET
- S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH PERCENTILE SPEED PRIOR TO WORK (START/END), OR THE ANTICIPATED OPERATING SPEED IN MPH.

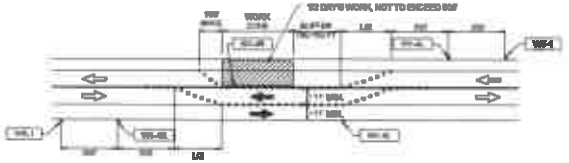
TRAFFIC DEVICE LEGEND

- WORK ZONE
- DIRECTION OF VEHICULAR TRAFFIC
- DIRECTION OF PROPOSED VEHICULAR TRAFFIC
- SIGN
- TYPE III BARRICADE
- REFLECTORIZED PLASTIC DRUM OR 36" CONE
- POLICE OFFICER
- ARROW/CAUTION BOARD

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED	
SPEED (MPH)	DISTANCE (FEET)
25	155
30	200
35	250
50	425



TYPICAL APPLICATION - TWO LANE ROAD SHOULDER CLOSURE
NOT TO SCALE



TYPICAL APPLICATION - TWO LANE ROAD SHOULDER AND TRAVEL LANE CLOSURE
NOT TO SCALE

10

PROJECT: PROPOSED PEDESTRIAN IMPROVEMENTS GREAT ROAD AND CRESCENT STREET

DESIGN SUBMISSION: CONCEPT DESIGN

DRAWING TITLE: TTCP PLAN

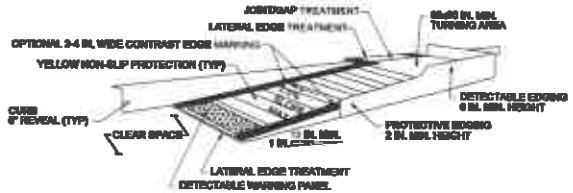
PREPARED FOR: TOWN OF STOW PLANNING DEPARTMENT

PREPARED BY: GREEN INTERNATIONAL AFFILIATES, INC.

SCALE: AS NOTED | DESIGNED BY: MB | DRAWN BY: (M) | CHECKED BY: CF

DATE: [illegible] | PROJECT NO. 21002.

SHEET NO. 7 OF 8



TEMPORARY CURB RAMP - PARALLEL TO CURB

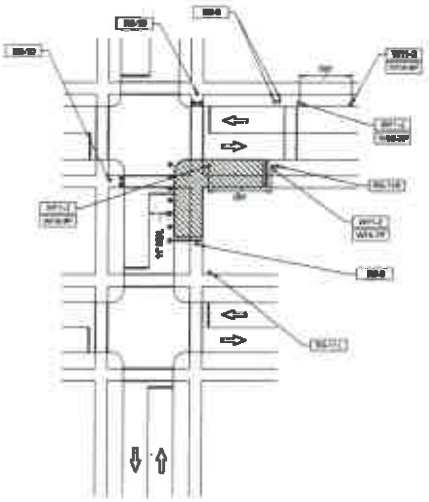
NOT TO SCALE

TEMPORARY CURB RAMP - PERPENDICULAR TO CURB

NOT TO SCALE

NOTES:

1. CURB RAMPS SHALL BE 60 IN. MINIMUM WIDTH WITH A FIRM, STABLE AND NON-SLIP SURFACE.
2. PROTECTIVE EDGING WITH A 2 IN. MINIMUM HEIGHT SHALL BE INSTALLED WHEN THE CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6 IN. OR GREATER OR HAS A SIDE APRON SLOPE STEEPER THAN 1:3 (33%). PROTECTIVE EDGING SHOULD BE CONSIDERED WHEN THE CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3 IN. OR MORE.
3. PROTECTABLE EDGING WITH 6 IN. MINIMUM HEIGHT AND CONTRASTING COLOR SHALL BE INSTALLED ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION (TURNS).
4. CURB RAMPS AND LANDINGS SHOULD HAVE A 1:50 (2%) MAX CROSS-SLOPE.
5. CLEAR SPACE OF 48x48 IN. MINIMUM SHALL BE PROVIDED ABOVE AND BELOW THE CURB RAMP.
6. THE CURB RAMP WALKWAY EDGE SHALL BE MARKED WITH A CONTRASTING COLOR ABUTTING UP TO THE EXISTING SIDEWALK.
7. WATER FLOW IN THE GUTTER SYSTEM SHALL HAVE MINIMAL RESTRICTION.
8. LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL BE LESS THAN 0.5 IN. WIDTH.
9. CHANGES BETWEEN SURFACE HEIGHTS SHOULD NOT EXCEED 0.5 IN. LATERAL EDGES SHOULD BE VERTICAL UP TO 0.25 IN. HIGH, AND BEVELED AT 1:2 BETWEEN 0.25 IN. AND 0.5 IN. HEIGHT.
10. TYPICAL DETAILS ON THIS SHEET MAY NOT BE NEEDED AND ARE PROVIDED FOR REFERENCE PURPOSES.
11. IF A TEMPORARY PEDESTRIAN RAMP LEADS TO A CROSSWALK, THEN A DETECTABLE WARNING PAD MUST BE ADHERED TO THE BASE OF THE RAMP. IF IT LEADS TO A PROTECTED PEDESTRIAN BYPASS THAT DOES NOT CONFLICT WITH VEHICULAR TRAFFIC, THEN A PAD SHALL NOT BE INSTALLED ON THE RAMP.



NOTE:

ADA COMPLIANT ACCESS TO BE MAINTAINED AT ALL TIMES, INCLUDING PEDESTRIAN GUIDANCE SYSTEMS AT WORK ZONES. ANY PEDESTRIAN DETOURS OR BYPASSES SHALL INCLUDE AN ADA COMPLIANT ROUTE WITH PROPER BARRICADES, RAILING, RAMPS, AND SIGNAGE, ETC.

TYPICAL APPLICATION - SIDEWALK WORK
MIDBLOCK WITH TEMPORARY PEDESTRIAN PATH

NOT TO SCALE

TYPICAL APPLICATION - SIDEWALK WORK
QUADRANT CLOSURE

NOT TO SCALE

10

PROJECT: **PROPOSED PEDESTRIAN IMPROVEMENTS GREAT ROAD AND CRESCENT STREET**

DRAWING SUBMISSION: **CONCEPT DESIGN**

DRAWING TITLE: **TTCP PLAN**

PREPARED FOR:
TOWN OF STOW
PLANNING DEPARTMENT
[illegible]
STOW, MASSACHUSETTS

PREPARED BY:
GREEN INTERNATIONAL AFFILIATES, INC.
TRANSPORTATION STRUCTURAL WATER RESOURCES WALKS
[illegible]

NO.	DATE	REMARKS

SCALE: AS NOTED
DESIGNED BY: MB
DRAWN BY: MB
CHECKED BY: KT
SHEET NO. 8 OF 8

Planning Board
380 Great Road
Stow, MA 01775
Tel: 978-897-5098
Fax: 978-897-2321

Town of Stow
Planning Board

Memo

To: Traffic Safety Advisory Committee
From: Malcolm Ragan – Assistant Town Planner
Date: 01.03.2022
Re: Crescent Street Speed Limits

The Special Speed Limits list for Stow includes two regulations governing speeds on Crescent Street. Regulation No. 550 is dated 8/04/70, and regulation 550-A is dated 12/08/95. Speed limit signs are still located according to the old regulation from 1970 and were not moved in response to the updated speed regulations adopted in 1995. The locations of the updated speed zones are shown in purple on the final map in this memo.

Regulation No. 550, Dated August 4, 1970

Crescent Street - NORTHBOUND

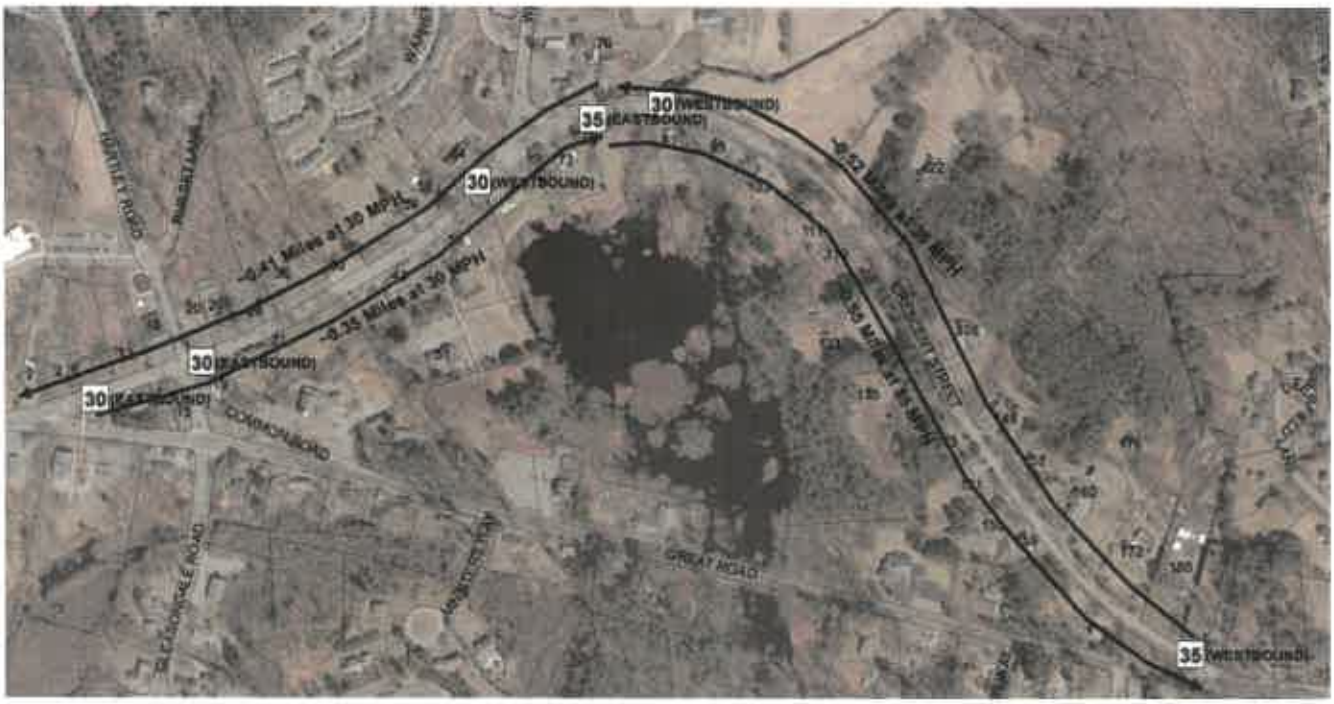
Beginning at Routes 117 & 62,
thence northerly on Crescent Street
0.52 miles at 35 miles per hour
0.41 " " 30 " " " ending at Route 117;
the total distance being 0.93 miles.

No. 550 -3-

Crescent Street - SOUTHBOUND

Beginning at a point 160 feet south of Route 117,
thence southerly on Crescent Street
0.35 miles at 30 miles per hour
0.55 " " 35 " " " ending at Routes 117 & 62;
the total distance being 0.90 miles.

The location of current speed limit signs is roughly in line with the above regulation, map on following page showing current conditions.



Regulation No. 550-A, Dated December 8, 1995

The following regulation No. 550-A amended the speed zones. Compliant locations for revised zones are shown in purple on the following map.

Special Speed Regulation number 550, dated August 4, 1970, is hereby amended on Crescent Street as follows:

That the following speed limits are established at which motor vehicles may be operated in the areas described:

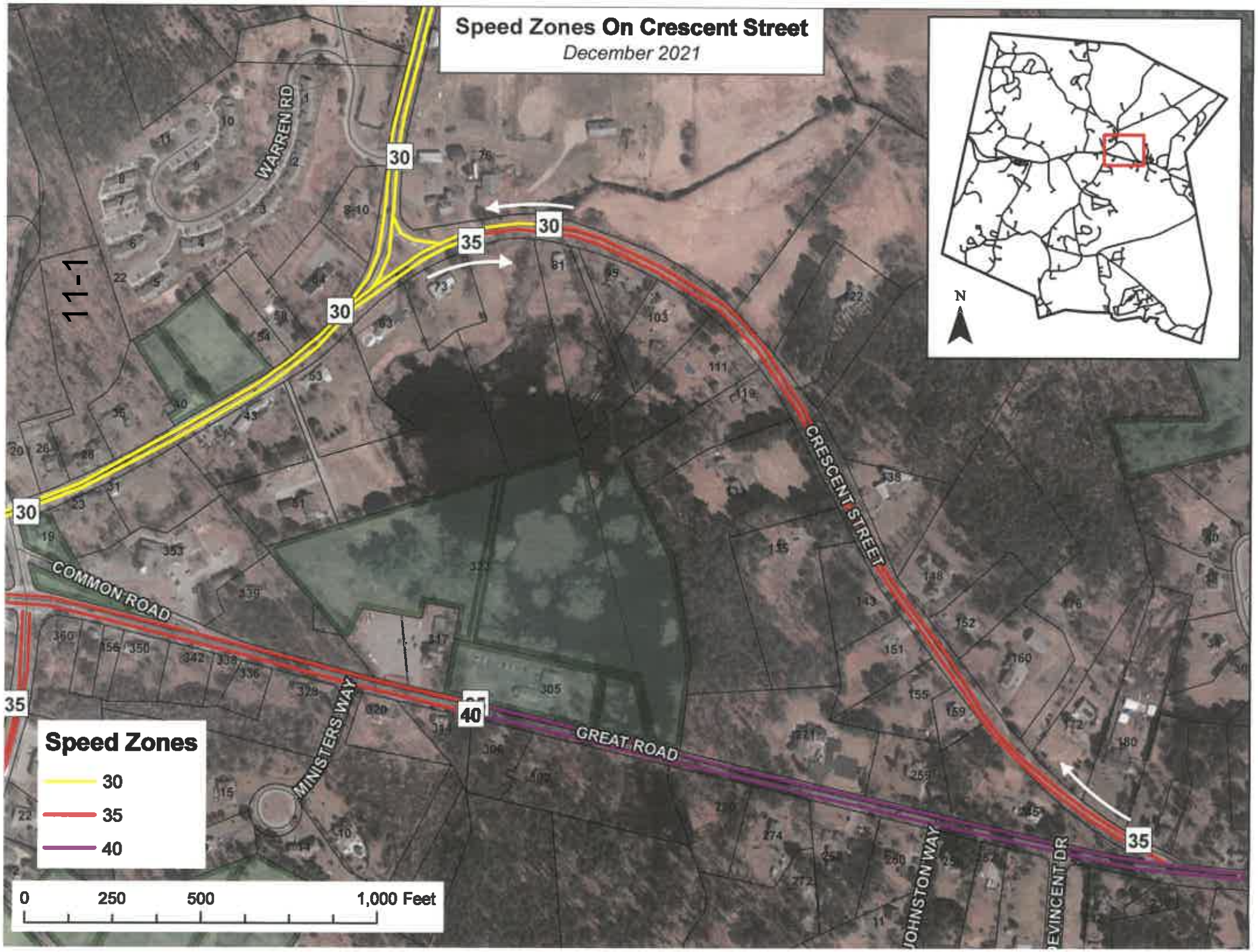
CRESCENT STREET - WESTBOUND

By striking out the clauses reading
0.52 miles at 35 miles per hour
0.41 miles at 30 miles per hour
And inserting in place thereof
0.33 miles at 35 miles per hour
0.60 miles at 30 miles per hour

CRESCENT STREET - EASTBOUND

By striking out the clauses reading
0.35 miles at 30 miles per hour
0.55 miles at 35 miles per hour
And inserting in place thereof
0.57 miles at 30 miles per hour
0.33 miles at 35 miles per hour


30 (WESTBOUND)
30 (EASTBOUND)
30 (WESTBOUND)
35
30
(EASTBOUND)
30
(EASTBOUND)
30
(EASTBOUND)
COMMON ROAD
GREAT ROAD
35
(WESTBOUND)


Speed Zones On Crescent Street
December 2021
11-1
WARREN RD
CRESCENT STREET
COMMON ROAD
MINISTERS WAY
GREAT ROAD
JOHNSTON WAY
30
35
40
N
Speed Zones
30
35
40
0
250
500
1,000 Feet

stowpolice

From: Stow MA via Stow MA <cmsmailer@civicplus.com>
Sent: Monday, December 27, 2021 10:21 AM
To: stowpolice
Subject: Form submission from: Traffic Safety Advisory Committee Request Submittal Form

Follow Up Flag: Follow up
Flag Status: Completed

Submitted on Monday, December 27, 2021 - 10:20am
Submitted by anonymous user: 71.184.91.251
Submitted values are:

First Name: ALAN
Last Name: DONKIN Jr
Street Address: 36 Lowell Dr
Address Line 2:
City, State, Zip (if other than Stow): Stow
E-Mail Address: adonkin@verizon.net
Please describe the location of the traffic concern: Lowell Drive
Please describe the nature of the neighborhood traffic problem you are concerned with : FedEx delivery van traveling at a very high rate of speed down our street this morning at 10:16 Monday Dec. 27, 2021. This has also been observed by a number of our neighbors with regards to FedEx deliveries recently.
Please list possible solutions to the problem that you would like the Town of Stow to consider: Contact FedEx and register a complaint about this driver. I haven't figured out how to do that without spending hours on hold with their customer service.
Please attach any documents you would like the Committee to review here:

The results of this submission may be viewed at:
https://www.stow-ma.gov/node/143221/submission/2526

Chief Michael Sallese

From: Chief Michael Sallese
Sent: Tuesday, December 28, 2021 8:22 AM
To: adonkin@verizon.net
Subject: RE: Form submission from: Traffic Safety Advisory Committee Request Submittal Form

Hi Alan,

I have forwarded your complaint to a FedEx Security member who will be reaching out to you. His name is Mark Sokol.

If you do not hear from him, please let me know.

Thank you,

Michael Sallese, Chief of Police
Stow Police Department
305 Great Road
Stow, MA 01775
978-897-4545

From: Stow MA via Stow MA <cmsmailer@civicplus.com>
Sent: Monday, December 27, 2021 10:21 AM
To: stowpolice <stowpolice@stow-ma.gov>
Subject: Form submission from: Traffic Safety Advisory Committee Request Submittal Form

Submitted on Monday, December 27, 2021 - 10:20am
Submitted by anonymous user: 71.184.91.251
Submitted values are:

First Name: ALAN
Last Name: DONKIN Jr
Street Address: 36 Lowell Dr
Address Line 2:
City, State, Zip (If other than Stow): Stow
E-Mail Address: adonkin@verizon.net
Please describe the location of the traffic concern: Lowell Drive
Please describe the nature of the neighborhood traffic problem you are concerned with : FedEx delivery van traveling at a very high rate of speed down our street this morning at 10:16 Monday Dec. 27, 2021. This has also been observed by a number of our neighbors with regards to FedEx deliveries recently.
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