Eliot Elementary School
Needham, Massachusetts

Safe Routes to School Infrastructure Program

Massachusetts Department of Transportation (MassDOT)
Office of Transportation Planning

Final Assessment

December 18, 2015

1 Introduction

Massachusetts Safe Routes to School (SRTS) is a federally funded initiative of the Massachusetts Department of Transportation (MassDOT). SRTS encourages public elementary and middle school students to walk and bicycle to school safely through education and outreach as well as infrastructure improvements such as sidewalks, pedestrian crossings, traffic calming, signals, signage, and bike lanes.

A Safe Routes to School (SRTS) Infrastructure Assessment was conducted for the John Eliot Elementary School (Eliot School) in Needham. An assessment includes gathering information on the selected school through reviewing the school's assessment request, mapping student residency (when available), conducting a preliminary meeting with school staff, municipal officials, and community members, observing school arrival and dismissal patterns, reviewing collision history, and possibly collecting additional traffic counts or other information necessary to assess the needs of the school. This information is compiled to draw conclusions about the existing barriers to walking / biking to school, identify missing or deficient infrastructure, and develop recommendations for infrastructure improvements in the vicinity of the school.

While the report contains a number of recommendations for improvement, MassDOT has determined that none of these improvements is a prominent candidate for implementation as an SRTS project. This is due to the presence of existing walking and bicycling infrastructure near the school, the potential challenges associated with implementing traffic calming features on Central Avenue (an minor arterial roadway), limited scale of potential improvements that may utilize federal funds, and the low potential for measurably increasing the safety and accessibility of walking or bicycling to and from the school.

Because of the constraints of program budget and schedule, MassDOT cannot build all of the projects identified by infrastructure assessments through its SRTS Infrastructure program. Recommendations made for a given school must be weighed against each other, and against the recommendations made for other schools in the context of program funding and expected benefits from each recommendation. The criteria used to determine whether a project is appropriate for SRTS Infrastructure funding is discussed in Attachment A.

Although an SRTS-funded project is not recommended for the Eliot School, this report includes several recommendations for improvement based on the submitted assessment request form, the field visit, and discussions with school and municipal staff. These recommendations can be pursued by the Town of Needham as part of future initiatives to improve walking and bicycling. In addition, because no SRTS Infrastructure project is recommended for the Eliot School, the Town of Needham remains eligible to request an assessment at another school in Needham in the future.

2 The SRTS Program Overview

The SRTS Program is a Federal-aided program implemented in Massachusetts in 2006. It was created by Section 1404 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), signed into Public Law (P.L. 109-59) on August 10, 2005.

According to the federal legislation that created SRTS, the program's purpose is:

(1) To enable and encourage children, including those with disabilities, to walk and bicycle to school;

(2) To make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age; and

(3) To facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.

The Moving Ahead for Progress in the 21st Century Act (MAP-21), which was signed into law on July 6, 2012, consolidated a number of previous Federal funding programs. As a result of the new law, the SRTS program and the Transportation Enhancements (TE) program were incorporated into the Transportation Alternatives (TA) program. The TA program provides Federal-Aid Highway funds to state Departments of Transportation (DOTs) for projects that were previously eligible under either SRTS or TE. These funds are available for a range of different uses, which include the former SRTS categories of infrastructure projects, as well as education and encouragement programs that benefit elementary and middle school children in grades K-8.

The Massachusetts SRTS program is administered through the Massachusetts Department of Transportation (MassDOT), and is composed of two parts: an education / encouragement component and an infrastructure improvement component. The Massachusetts Safe Routes to School program (MA SRTS) delivers the in-school education and encouragement program for MassDOT. MA SRTS also works with communities and schools to leverage support in identifying needs for improved walking and biking infrastructure.

Where applicable, MassDOT then evaluates walking and bicycling access conditions at the school; identifies potential infrastructure projects that would improve pedestrian and bicycle access; and develops designs for a selected set of potential pedestrian and bicycle access improvements.

2.1 Policy Support for SRTS

The goal of the SRTS program is to increase children's physical activity, improve air quality, ease traffic congestion, and foster the continued growth of safe and sustainable communities. The program is an important strategy to advance key MassDOT policies, including:

- *The GreenDOT Policy*, MassDOT's comprehensive sustainability initiative that is designed to integrate environmental responsibility into all MassDOT functions. GreenDOT is driven by three primary goals: reduce greenhouse gas emissions; promote the healthy transportation options of walking, bicycling, and public transit; and support smart growth development.
    - *The Mode Shift Goal within GreenDOT* was announced by MassDOT in October 2012. The Mode Shift Goal is an initiative to triple the share of travel by bicycling, transit and walking in Massachusetts by 2030. In collaboration with regional transportation partners, community leaders, advocates and customers, MassDOT will reconsider what is possible for the Commonwealth's transportation system and imagine healthier, greener and cleaner mobility.
    - *Healthy Transportation Policy Directive within GreenDOT* was issued by MassDOT in September 2013. The Healthy Transportation Policy formalizes MassDOT's commitment to the implementation and maintenance of transportation networks that serve all mode choices.
- *Complete Streets*, the comprehensive multi-modal design philosophy in MassDOT's *Project Development and Design Guide*. Complete Streets calls for safe and appropriate accommodation of all roadway users, and an approach to roadway design giving critical early consideration not only to motor vehicles, but also pedestrians, bicyclists, and public transit riders.

2.2 Project Selection Criteria

Federal funding legislation provides funding for SRTS projects and programs through its Transportation Alternatives (TA) funding program, which requires that TA funding is used most efficiently. Therefore, MassDOT carefully reviews the merits and potential of each infrastructure investment project to ensure that TA funding supports the most deserving projects. Potential projects are evaluated based on an analysis of feasibility, safety and mobility benefits, number of students expected to benefit, property and other impacts, and overall project costs.

If MassDOT is able to identify measures that could improve bicycling and walking conditions at the school, an assessment report is produced. The assessment report includes a review of the assessment request and the obstacles to walking and bicycling identified by the school; an evaluation of existing conditions and observations of current behavior; an identification of potential infrastructure improvements; and a preliminary evaluation of these improvements with respect to feasibility, safety benefits, likelihood of increasing walking and bicycling, and cost.

As discussed above and in further detail in Chapter 3, the area surrounding the Eliot Elementary School has existing sidewalks on the majority of the main roadways within a 1-mile radius of the school. In addition, there are limited opportunities to install raised crosswalks or other vertical traffic calming devices along Central Avenue. As a result, this preliminary evaluation does not identify any potential SRTS Infrastructure projects that could measurably improve the safety or access of walking and bicycling to the Eliot Elementary School. Although no SRTS Infrastructure projects were identified for the

Eliot School, this report identifies pedestrian safety improvements that could be pursued by the Town of Needham through other funding sources.

2.3 The School Assessment Program

Since the program's start in 2006, MassDOT has visited more than 70 schools across the Commonwealth, prepared more than 45 assessments, and initiated designs for nearly 30 schools. To date, 21 infrastructure projects have been built.

The minimum requirements for being eligible for an infrastructure assessment at the time that the Eliot School applied were are as follows:

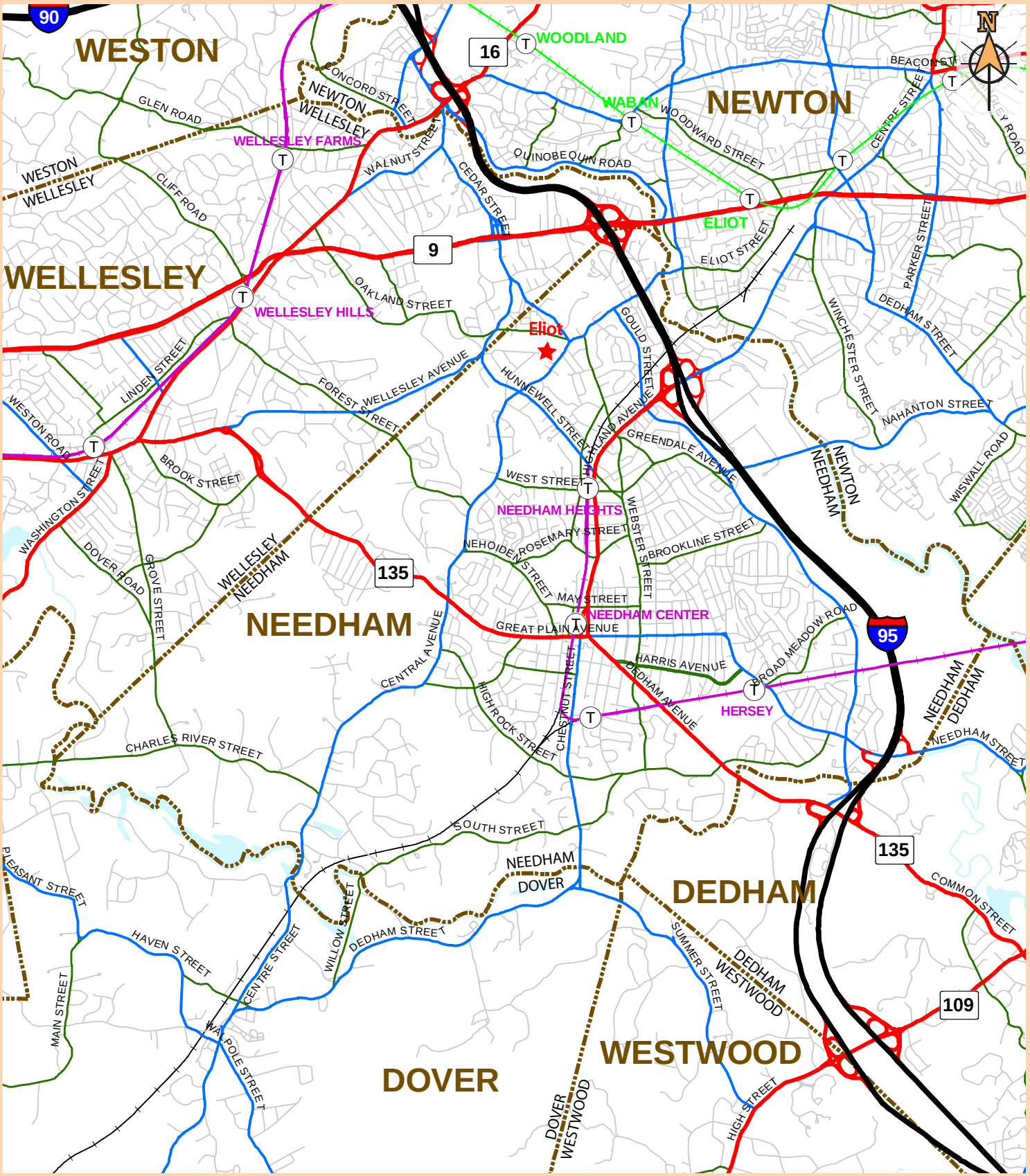
- A school must have participated for at least one year in the SRTS education and encouragement program, and
- The school must complete an assessment request that includes:
    - A letter of support from the municipality's chief executive that names a municipal liaison for project coordination,
    - Commitment of the municipality to fulfill their responsibilities under a SRTS infrastructure project.

An infrastructure assessment aims to provide a description of the travel characteristics of a school's student population, issues related to pedestrian and bicycle access to the school, and results of field observations. It identifies factors limiting walking and biking to school, and makes recommendations for measures to increase the number of students walking and biking or improve safety for those students already walking and biking.

Existing infrastructure is evaluated for general compliance with Americans with Disabilities Act (ADA), Architectural Access Board (AAB), and Manual on Uniform Traffic Control Devices (MUTCD) standards to inform the range of mobility improvements. Impacts on right-of-way, grading, drainage, wetlands, and other environmental resources are also evaluated to assess the feasibility of constructing potential Safe Routes to School funded projects in an expedited manner.

3 John Eliot Elementary School

The John Eliot Elementary School is an elementary school with a total of approximately 387 students, approximately 89 percent of whom live within walking distance of the school. The school is located at 135 Wellesley Avenue in Needham, off of Oakland Street. Figure 1 shows the school's relationship to the network of arterial roadways, which carry heavy traffic volumes that can be a barrier to walking and bicycling. The school is bordered by single family housing on all sides. The school is located in close proximity to Central Avenue to the south, which is a minor arterial roadway carrying approximately 14,000 vehicles per day. The heavy traffic volumes and wide crossings at intersections cause a barrier to walking and biking to school. Figure 2 shows the school's relationship to the network of arterial roadways within a 1-mile radius of the school.



N.T.S.

- Principal Arterial
- Minor Arterial
- Collector
- Local Street
- Municipal Border
- MBTA Commuter Rail
- MBTA Green Line
- Out of Service Rail Line

Figure 1: Map of Needham, MA

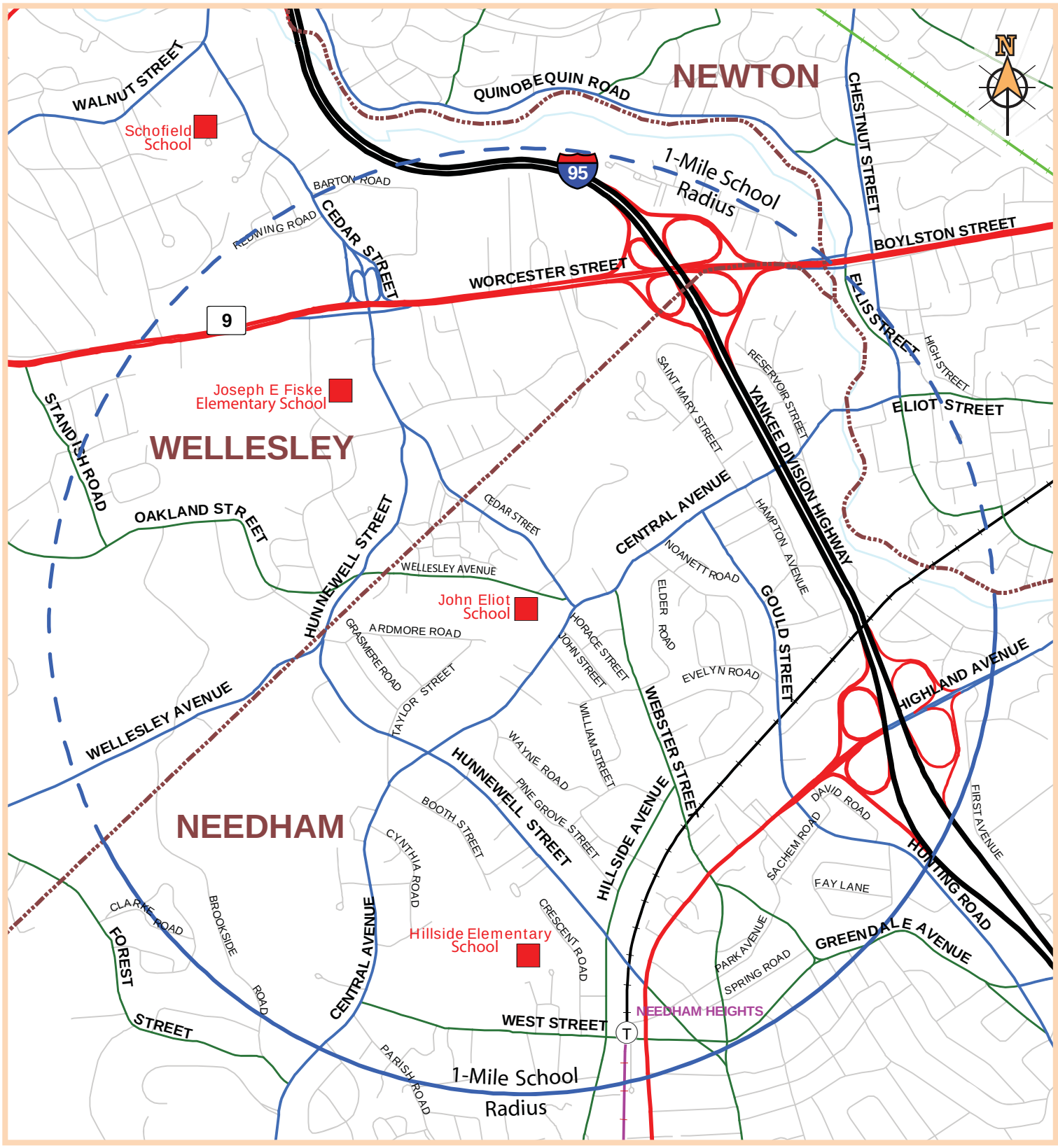


Figure 2: 1-Mile Street Network & Surrounding Schools

3.1 Eliot Elementary School Assessment Request

The assessment request received in 2009 focused on the issues of busy roadways with intersections controlled by traffic signals and pedestrians crossing Highland Avenue and (high volumes). Additional concerns include heavy traffic volumes of approximately 14,000 vehicles per day on Central Avenue, with significant commuter volumes during the morning peak hour. These traffic volumes can be a barrier to walking and bicycling. Additional concerns include missing sidewalk connections and street lighting for afterschool students that were described in the assessment request.

Completed SRTS School Assessment Request Form Submitted by the Eliot Elementary School, Needham

School Information		**Municipality Information**	
School Name	John Eliot School	Municipality Name	Town of Needham
Street Address	135 Wellesley Ave Needham, MA 02494	Mailing Address	1471 Highland Ave Needham, MA 02492
Principal Name	Suzanne Wilcox, (Former/Applicant) Roderick MacNeal, Jr., (Current)	Contact Name	Anthony Del Gaizo, PE
Tel. No.	781-455-0452	Tel. No.	781-455-7550
Email	roderick_macneal@needham.k12.ma.us	Email	adelgaizo@ needhamma.gov
Start Time	8:20 AM		
Dismissal Time	2:45 PM		

School Population Information (2009 Enrollment)

Grade	K	1	2	3	4	5	6	7	8	Sum
Number of Students	59	69	78	56	63	62	-	-	-	387
Actual number residing within 1 mile of school	56	65	68	55	51	50	-	-	-	345
Estimated number who currently walk/bicycle	10	11	11	10	9	9	-	-	-	60

Are students buses within 1 mile of the school? Explain if yes.

No.

Describe the potential for increasing walking and bicycling to the school

Nearly all Eliot students could walk or bike to school, if routes were safer. All Eliot students live within 1.5 miles of the school, and most of them live within 1 mile of the school.

A small number of students – 22 this year- will not be able to walk, either because they are METCO students living in Boston or because they have chosen to travel out of their school district to attend

Eliot. Another small group will not be able to walk because they attend before- and after- school programs every day; their days are long, their extended-day programs may take place across town, and, for much of the year, it's dark during their commute. The exact size of this group is difficult to determine, but the number of students attending Eliot's before- and after-school program this year is fewer than 20.

The remaining 340 or so Eliot students could walk or bike if some sidewalks were improved and some street crossings made less hazardous.

The enthusiasm is there. Eliot's walk-to-school program began in 2006, after a parent survey revealed that 72% of respondents want their children to walk but less than 30% of those children do walk. The program has grown each year, and this year several neighborhoods have formed regular walking or biking groups, including one of the neighborhoods furthest from the school. The culture at Eliot may be changing: walking and biking is more visible and seems to be more acceptable. Our monthly walk-to-school days bring out about 100 students each month, and the fun they have on those walks has encouraged some families to make walking to school a more regular event.

Even the regular walkers, however, describe some traffic dangers in Eliot's neighborhoods. We might be able to convince even more families to walk if those dangers were eliminated.

Describe the problems your school faces regarding safe routes to your school

Eliot has three problem spots:

1. The Highland Avenue / Webster Street intersection - Traffic is fast and dense along Highland Avenue, as cars travel towards the Route 128 on-ramp. Cars and trucks squeeze so close to the sidewalk that truck mirrors overhang the sidewalk. The Highland / Webster intersection is five lanes wide and busy. Cars sometimes go through the red light or turn right on red when pedestrians are in the crosswalk. There is a fire station at this intersection. There is no audible signal for the pedestrian walk signal.
2. The sidewalk on the south side of Central Avenue, particularly between Webster Street and Noanett. Cars drive very quickly on Central Avenue in the morning. Central Avenue curves to the east at Webster Street. The sidewalk at that point has no curb, and cars heading east to Newton, and driving too fast, drive up on the sidewalk.
3. Hunnewell Street, west of Central Avenue – Hunnewell Street is heavily traveled in the morning. Students who have to cross Hunnewell have a hard time getting across safely.

The issues identified in the assessment request regarding poor sidewalk conditions, dangerous intersection crossings, heavy traffic volumes and high speeds on area roadways are described further in the next chapter as well as with the recommendations in Chapter 4.

3.2 Participation in SRTS Education and Encouragement

The Eliot School has been actively involved in education and encouragement activities through the SRTS program for over a year, making it eligible for an SRTS Infrastructure Assessment. The program successfully encourages and educates students and parents through: information distribution, special events, weekly walking days, neighborhood walking groups, and surveying and monitoring results.

As discussed in Chapters 1 and 3, the majority of the roadways within a 1-mile radius of the Eliot School have existing sidewalks on one or both sides of the street. The main barrier to walking and biking to school as identified within the Assessment Request is the heavy volume of vehicular traffic on Central Avenue, which presents a safety concern for students crossing the roadway. The Town has expressed an aversion to installing raised crosswalks or pedestrian refuge islands along Central Avenue. Therefore, limited options

exist for managing vehicle speeds and improving the safety of the pedestrian crossings.

Although 89 percent of the Eliot School's population lives within a 1-mile radius of the school and the existing infrastructure is strong surrounding the school, only 18 percent of the students within a 1-mile radius were walking or biking to school in 2009. This suggests that policy changes or additional education and encouragement activities are necessary to improve the number of students walking and biking to school. Infrastructure improvements are not likely to increase the walking population without these programs.

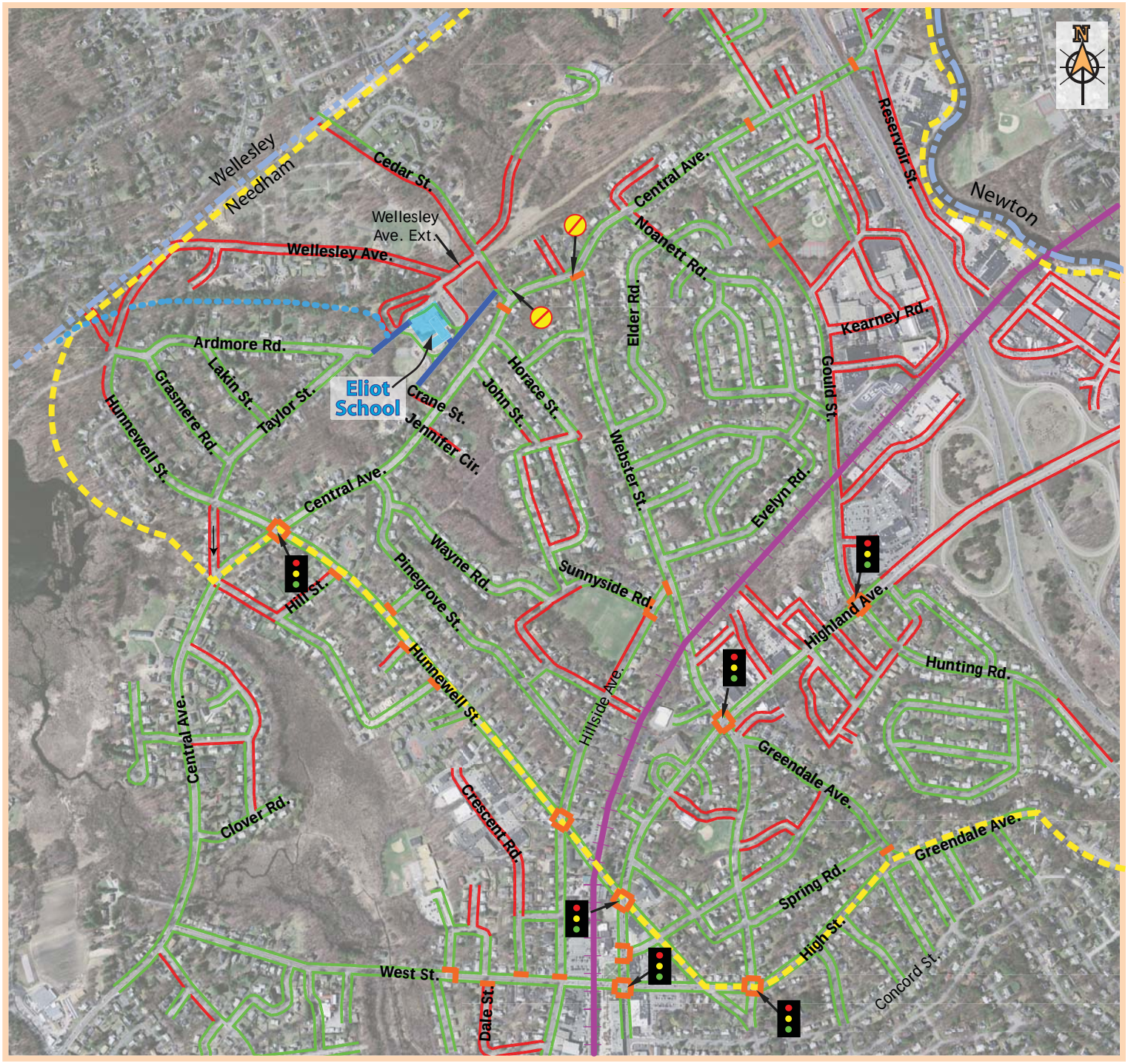
3.3 Field Visit

MassDOT attended a preliminary assessment meeting and performed a field visit and inventory of sidewalks at Eliot School on June 11, 2009. The following people attended the meeting.

Attendee:	Representing:
Susanne Wilcox	Eliot School, former Principal
Anthony Del Gaizo, PE	Needham Town Engineer
Caroline Sabin	Eliot School, Parent
Rebecca Turner	Eliot School, Parent
Christine Morrow	Formerly with MA SRTS
Jennifer Williams	Formerly with TEC, Inc.
Bill Schwartz	Planners Collaborative, Inc.

At the preliminary assessment meeting, school and Town staff identified factors impacting walking and biking to the Eliot School, including the issues that were identified in the assessment request. As part of the field visit and inventory, MassDOT observed school arrival and dismissal procedures and activities; catalogued the locations of key walking and bicycling infrastructure, including sidewalks, pathways, and traffic control features; and identified other factors impacting travel to and from the school. The detailed walking and bicycling infrastructure inventory is shown in Figure 3. MassDOT's observations and assessments on walking and bicycling operations at the Eliot School are delineated in Section 3.4.

Additional field visits were performed by TEC following the preliminary assessment meeting to confirm the proposed limits of work as part of the review process with MassDOT.



1″ = 1000′

KEY

Sidewalk	Town Line
No Sidewalk	MBTA Commuter Rail
Existing Crosswalk	Fully Signalized Intersection
One-Way Street	Path (unpaved)
Crossing Guard	Path (paved)
	School District Boundary

Note: Streets not marked were not observed during the site visit.

Figure 3: Existing Conditions Around Eliot School

3.4 General Observations

School Arrival and Dismissal

- The traffic circulation system for the Eliot School permits an efficient and orderly parent drop off and pickup. Parking for teachers and circulation for the school buses is separated from the driveway used by parents.
- Students from the upper grades of the school assist with drop off operations by opening car doors.
- During arrival and dismissal periods, traffic occasionally backs up onto Wellesley Avenue after overflowing the circular driveway northwest of the school building.
- School staff understandably reported a significant increase in the number of students who walk and bicycle to school when the weather is nice.

Sidewalk and Pathway Infrastructure

- The intersection of Cedar Street and Central Avenue has large curb radii, resulting in high travel and turning speeds through the intersection. Sight distances are limited by the curvature of Central Avenue at the intersection, which presents a safety concern for pedestrians crossing Central Avenue and Cedar Street at this location. Many Eliot School students walk through this intersection due to its proximity to the school. The existing wheelchair ramps do not meet current ADA standards. Although there are pedestrian crossing warning signs on all approaches to the crosswalks, the signs are improperly located and do not meet current MUTCD guidelines. These issues are addressed in Recommendation 1 in Chapter 4.
- The intersection of Webster Street and Central Avenue experiences heavy traffic volumes during school arrival and dismissal periods, which makes it difficult for pedestrians to cross Webster Street in this area. There are a number of residential neighborhoods along the westerly side of Webster Street, but the only designated pedestrian crossing of Webster Street is located at Central Avenue. Therefore, pedestrians are forced to cross Webster Street at a congested intersection or at an unmarked location. This issue is addressed in Recommendation 2 in Chapter 4.
- There are currently no sidewalks along Wellesley Avenue Extension, although many students living to the north of Eliot School along Cedar Street utilize this roadway to walk to/from the Eliot School. This issue is addressed in Recommendation 3 in Chapter 4.
- The assessment request identified the intersection of Highland Avenue and Webster Street as a dangerous pedestrian crossing. Travel speeds and traffic volumes on Highland Avenue are high. The limited roadway width results in vehicles traveling extremely close to the sidewalk and truck mirrors overhanging the sidewalk. Vehicles often turn right on red while pedestrians are in the crosswalks, which is a safety concern for students crossing the roadway. These issues are addressed in Recommendation 4 in Chapter 4 as well as in the

MassDOT roadway improvement project proposed at this location and discussed in Section 4.1.

- The assessment request identified Hunnewell Street west of Central Avenue as a safety concern for pedestrians crossing the roadway. Students walking to the Eliot School from neighborhoods south of the school along Central Avenue utilize a discontinued portion of Taylor Street and cross Hunnewell Street to continue down the remainder of Taylor Street to the school. There are no marked crosswalks or pedestrian crossing warning signs at this crossing location. Traffic volumes on Hunnewell Street are heavy during the school arrival period, which increases the danger to pedestrians. This issue is addressed in Recommendation 5 in Chapter 4.
- The assessment request identified the sidewalk along the southerly side of Central Avenue between Webster Street and Noanett Road as a safety concern due to the lack of curb reveal, speed of vehicles on this curve, and vehicles riding up on the sidewalk. Since the assessment request was completed, the sidewalk along this section of Central Avenue has been reconstructed to provide vertical granite curb.
- There are multiple paved paths that lead to the Eliot School. Path connections exist between Ardmore Road and the northwest corner of the school and between the end of Crane Street and Cedar Street, passing by the south side of the school.
- Students are required to pass a bicycle safety training course before they are allowed to bicycle to school.
- The school recently installed a bicycle rack behind the school, near the connection to Ardmore Road, to promote safe bicycle storage. Students formerly rested or chained their bikes to the chain link fence in this same area. There is a separate bicycle rack for teachers' bikes near the main entrance to the school.

Traffic Volumes and Speeds

- Based on traffic volume counts collected by MassDOT in 2008, Highland Avenue near the intersection with Webster Street carries approximately 19,200 vehicles per day.
- Based on traffic volume counts collected by MassDOT in 2005, Wellesley Avenue near Eliot School carries approximately 5,900 vehicles per day.
- The posted speed limit on Central Avenue, near Cedar Street and Webster Street, is 25 mph. Based on field observations, the motor vehicle traffic appears to operate at a higher speed.
- The following traffic data for Central Avenue was provided by the Town of Needham. Values shown represent average daily traffic for data collected over the time period:

Section of Central Avenue	1999	2000
Southwest of Webster Street	14,397	13,728
Southwest of John Street	10,516	N/A
East of Webster Street	N/A	14,608

Crossing Guards

- Crossing guards are stationed at the intersections of Central Avenue and Cedar Street, and Central Avenue and Webster Street. Due to the configuration of the intersection of Cedar Street and Central Avenue, the crossing guard must control a large paved area. Westbound traffic on Central Avenue forms two lanes with the right lane tuning onto Cedar Street in order to connect to Route 9 to the north. Further, because this road is a key commuter route throughout the Town of Needham, volumes are high and speeds are reportedly in excess of the 25 MPH posted limit in the vicinity of this intersection. Finally, the curvature of the intersection limits sight distances.

3.5 Currently Planned Municipal and State Construction Projects

There are two transportation improvement projects proposed in Needham within a 1-mile radius of the Eliot School. These projects are taken into account in developing the recommendations for the SRTS infrastructure assessment in order to ensure that the SRTS recommendations are not conflicting with or redundant to other planned projects. A brief summary of these projects is provided below.

- *Highland Avenue Reconstruction*: MassDOT plans to reconstruct Highland Avenue from Webster Street to the Needham/Newton line (Project #606635). The project involves widening Highland Avenue to provide two lanes in each direction and exclusive left-turn lanes at the intersection with Second Avenue, which lies on the opposite side of I-95. A sidewalk is proposed for the entire length of the project along both sides of Highland Avenue and bicycles will be accommodated with a minimum width shoulder on both sides of Highland Avenue. The project is scheduled to begin construction in the spring of 2018.

- *I-95/Route 128 Bridge Replacement:* MassDOT is currently reconstructing five bridges along I-95 between Kendrick Street in Needham and Route 9 in Wellesley (Project #603711). The bridges that lie within a 1-mile radius of the Eliot School include the Highland Avenue bridge over I-95, the I-95 bridge over Central Street, and the I-95 bridge over Route 9. In addition to replacement of these bridges, the project includes installation of an additional travel lane and wider shoulders in each direction toward the median. The project is scheduled to complete construction in the spring of 2019.
- *School Zone Signs & Markings*: The Town of Needham recently approved funds to introduce additional school zone and reduce speed limit signs and markings on Central Avenue in the vicinity of Cedar Street and Webster Street.
- *Accessible Pedestrian Signals*: The Town of Needham is in the process of procuring a contractor to install accessible pedestrian signal devices at the existing signalized intersection of Highland Avenue / Webster Street.

4 Recommendations for Improvement

In the school's assessment request and during the field visit, Eliot School and Town of Needham staff identified existing safety concerns and infrastructure deficiencies related to walking and bicycling access to the school (See Sections 3.1, and 3.4). During the field visit, MassDOT identified additional deficiencies and needs (See Section 3.4).

School and Town staff identified Central Avenue as a major barrier to walking and biking to school due to heavy traffic volumes and limited sight distances of crosswalks on Central Avenue that create dangerous crossings. The crosswalk at the intersection of Central Avenue and Cedar Street was identified as a high priority location as the majority of students cross Central Avenue at this location. However, most school-age pedestrian movements are assisted by a crossing guard at this location. Because Central Avenue is classified as a minor arterial roadway, the opportunities for managing vehicle speeds and improving the safety of this crossing through the use of raised crosswalks or other vertical traffic calming devices are limited.

Highland Avenue, particularly at the intersection with Webster Street and Greendale Avenue, was also identified as a major safety concern. Improvements to this intersection are partially included as part of MassDOT's Highland Avenue reconstruction project or have been partially alleviated through the Town's recent actions to enhance the visibility of crosswalks, introduce additional no-turn-on-red restrictions, and complete the installation of accessible pedestrian signal (APS) devices.

MassDOT has identified recommendations for infrastructure improvements aimed at addressing the other identified issues and deficiencies, focused principally on dangerous pedestrian crossings and missing sidewalk sections. While none of these recommendations result in a candidate SRTS Infrastructure project based on the criteria included as an attachment to this document, there are a number of improvement options available to the Town of Needham, which could be pursued using local funding sources or through the Boston Metropolitan Planning Organization (MPO) federal project funding process.

4.1 Other Recommendations for Implementation by the Town of Needham

The MassDOT Team has identified additional infrastructure improvements anticipated to improve pedestrian and bicycle access to the school property from adjacent neighborhoods. These improvements are meant as recommendations the Town could consider for future projects. The five potential improvements areas identified are described in this section:

- Reconfiguration of the Cedar Street / Central Avenue intersection
- Pedestrian crossing improvements at Webster Street / Elder Road
- Construction of a sidewalk along Wellesley Avenue Extension
- Pedestrian crossing improvements at Highland Avenue / Webster Street / Greendale Avenue intersection
- Pedestrian crossing improvements at Hunnewell Street / Taylor Street

Recommendation 1 – Reconfigure Intersection of Cedar Street and Central Avenue and Enhance Signs

The curb radii at the intersection of Cedar Street and Central Avenue are large, allowing for high travel and turning speeds through the intersection. The curvature of Central Avenue at the intersection limits sight distances, which results in safety concerns for pedestrians crossing Central Avenue and Cedar Street at this location. With its proximity to the Eliot School, a large volume of students walk through this intersection to reach the school. The existing wheelchair ramps at this intersection do not meet current ADA standards. There are no advance pedestrian crossing warning signs along Central Avenue, and the existing pedestrian crossing signs at the crosswalk do not meet current MUTCD guidelines.

To better identify the pedestrian crossing locations and calm traffic near the Eliot School, MassDOT recommends the following measures:

- Reduce the curb radius on the northeast corner of the intersection of Cedar Street and Central Avenue.
- Construct bump-outs on both sides of Central Avenue at the crosswalk just west of Cedar Street to improve driver visibility of pedestrians in the crosswalk and reduce the length of the pedestrian crossing. This improvement may require modifications to drainage structures. A raised median island could be provided on Central Avenue in place of the bump-outs to provide a pedestrian refuge while maintaining the shoulder width for bicycle access.
- Upgrade accessible ramps and sidewalks approaching the crossing.
- Install updated pedestrian warning signs and markings to meet MUTCD guidelines.
- Install dynamic radar speed identification signs, which inform motorists of their actual travel speed in relation to the posted speed limit, on each Central Avenue approach approximately 1,000 feet in advance of the intersection.

This proposed work would provide better definition for pedestrians and bicyclists in the area. However, MassDOT assumed that the alignment and cross-section of Central Avenue would be maintained to reduce impacts to private property and existing utilities. This may require MassDOT's approval of a Design Exception Request for shoulders less than four feet wide prior to endorsement as a formal design project. The conceptual cost estimate for this improvement is approximately $287,000. See Figure 5 for additional detail and a graphical depiction of the improvements.

Recommendation 2 – Improve Crosswalks and Ramps at Webster Street and Elder Road

Traffic volumes are heavy at the intersection of Webster Street and Central Avenue, which makes it difficult for pedestrians to cross Webster Street in this area. However, there are a number of residential neighborhoods along the westerly side of Webster Street. Although there are sidewalks on both sides of Webster Street, the only designated pedestrian crossing of Webster Street is located at Central Avenue.

In order to provide a stronger connection from the neighborhoods east of Webster Street to the school, MassDOT recommends installing crosswalks and upgrading the ramps at the intersection of Webster Street and Elder Road. This new crossing would provide an option for students who do not feel comfortable crossing at the intersection of Central Avenue / Webster Street, where there are additional traffic conflicts. MassDOT recommends the following items as part of this recommendation:

- Reconstruct approximately 275 feet of asphalt sidewalk and new cement concrete ADA-compliant ramps.
- Apply new crosswalk pavement markings across Elder Road and Webster Street.
- Perform minor grading and lawn restoration at the back of the ramps and sidewalk where the work meets private property.

The proposed improvements along Webster Street and Elder Street will significantly improve safety and accessibility for pedestrians crossing the intersection, as well as for bicyclists traveling through the intersection. The reconstructed curb ramps will improve accessibility for all pedestrians. Installation of MUTCD compliant signage pavement markings will help convey message to drivers.

The conceptual cost estimate for this improvement is approximately $139,000. See Figure 6 for a graphical representative of the proposed improvements.

Recommendation 3 – Construct Sidewalk on Wellesley Avenue Extension (School Driveway)

Students living to the north of Eliot School along Cedar Street utilize Wellesley Avenue Extension to walk to/from the Eliot School. However, there are currently no sidewalks along this roadway.

MassDOT recommends constructing a sidewalk on the south side of the Wellesley Avenue Extension, commonly referred to as the school driveway. This sidewalk should be constructed with a minimum width of 5 feet between the existing sidewalk on Cedar Street to the main entrance of the Eliot School. This connection would require new crosswalks and warning signs on Cedar Street and near the driveway “loop” on the east side of the school. This work was identified as a secondary recommendation because it would be used by a low number of students residing to the north along Cedar Street. The proposed reconstruction of sidewalk would improve pedestrian safety by providing vertical separation from vehicles.

Recommendation 4 – Improve Pedestrian Crossings at Highland Avenue/Webster Street/Greendale Avenue

The existing pedestrian signals and push buttons at the intersection of Highland Avenue and Webster Street do not meet current MUTCD standards. In addition, the wheelchair ramps are apex style and do not meet ADA compliance. MassDOT recommends improving the intersection of Highland Avenue and Webster Street by retrofitting the existing traffic signal with new pedestrian push buttons and “countdown” pedestrian signal heads. This work may precipitate other general ramp upgrades to be considered ADA-compliant.

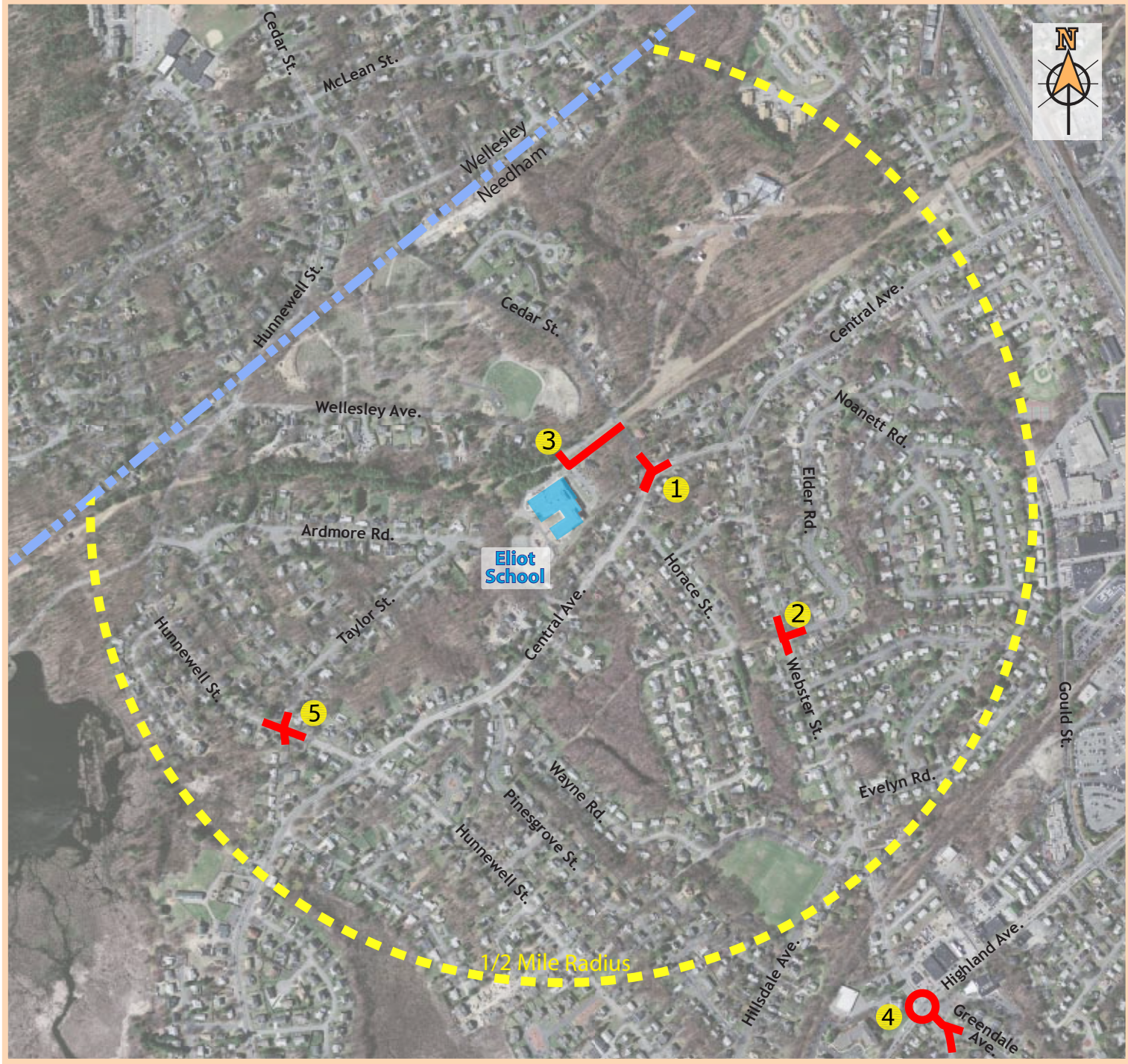
The horizontal geometry at the intersection of Webster Street at Greendale Avenue results in an ill-defined pedestrian crossing area and crossing distances that are unnecessary. MassDOT recommends reconstruction of the intersection to reduce the curb radii, construct new ADA-compliant ramps, apply new (shorter) crosswalks and install appropriate pedestrian warning signs. This work will require extensive drainage modifications to redirect stormwater flow into newly located catch basins. This work was identified as a secondary recommendation due to its distance from the Eliot School.

The proposed improvements at the Highland Avenue / Webster Street / Greendale Avenue intersection will significantly improve safety and accessibility for pedestrians crossing the intersection, as well as for bicyclists traveling through the intersection. The pedestrian signals will provide dedicated phases for pedestrians to cross the roadway without conflict with vehicular traffic. The reconstructed curb ramps will improve accessibility for all pedestrians. Installation of MUTCD compliant signals and signage will ensure driver compliance with the intended messages.

Recommendation 5 – Improve Pedestrian Crossing at Hunnewell Street and Taylor Street

Hunnewell Street carries a high volume of traffic during the morning and evening peak periods. In addition, a large number of students utilize Hunnewell Street and Taylor Street to walk to/from the Eliot School. There are currently no crosswalks provided on Hunnewell Street at Taylor Street. MassDOT recommends that the Town consider installing a crosswalk on Hunnewell Street at Taylor Street with appropriate pedestrian crossing warning signage. This work may precipitate other general ramp upgrades to be considered ADA-compliant.

The proposed improvements along Hunnewell Street and Taylor Street will improve safety and accessibility for pedestrians crossing the intersection, as well as for bicyclists traveling through the intersection. Installation of MUTCD compliant signage and pavement markings will help convey the intended messages to drivers.



1"=800'

KEY	PROPOSED IMPROVEMENT	FEASIBILITY	SAFETY/ MOBILITY BENEFIT	COST
Potential SRTS Infrastructure Project Recommendations				
	No Projects Identified			
Recommendations to be Pursued by Town or Through Other Funding Sources				
1	Reconfigure Intersection of Cedar Street and Central Avenue and Enhance Signs	High	Moderate	Moderate
2	Improve Crosswalks and Ramps at Webster Street and Elder Road	High	Moderate	Low
3	Construct Sidewalk on Wellesley Avenue Extension (School Driveway)	High	Moderate	Moderate
4	Improve Pedestrian Crossings at Highland Avenue/Webster Street/Greendale Avenue	High	Moderate	High
5	Improve Pedestrian Crossing at Hunnewell Street/Taylor Street	High	Low	Low

MassDOT

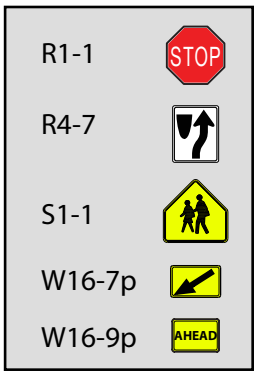
Figure 4: Location of Recommended Improvements

Massachusetts Safe Routes to School Infrastructure Team

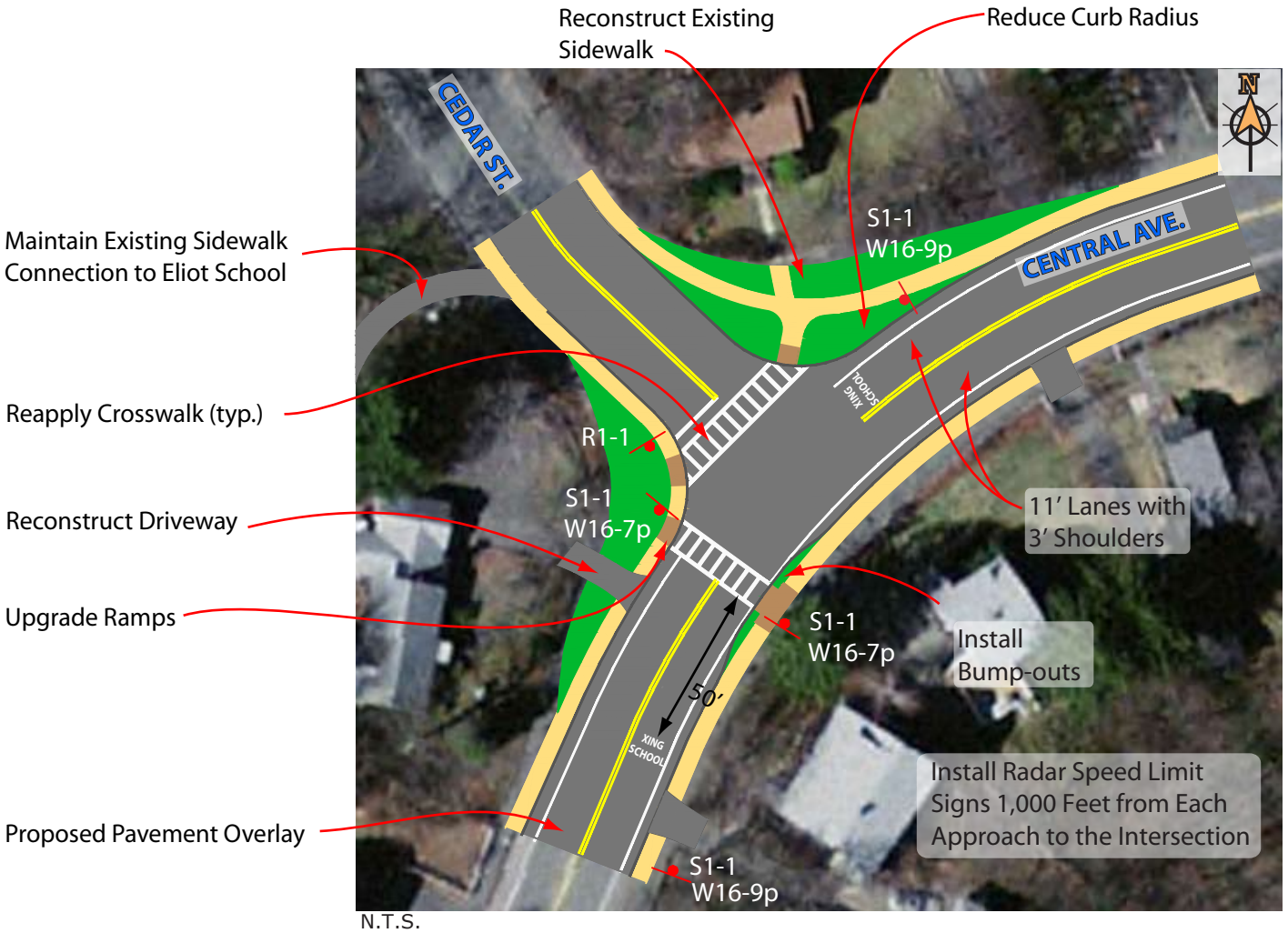
MASSACHUSETTS Safe Routes to School
Mass.gov/MassDOT/SafeRoutes

RECOMMENDED SCOPE OF WORK AND CONCEPTUAL COST ESTIMATE:

ADA RAMPS, BUMP-OUTS, & SIDEWALK RECONSTRUCTION	=	$81,000
ASPHALT PAVEMENT OVERLAY	=	$35,000
SIGNS & STRIPING	=	$4,000
LANDSCAPING	=	$4,500
DRAINAGE MODIFICATIONS	=	$17,000
TRAFFIC CONTROL/ MOBILIZATION/FIELD OFFICE	=	$78,000
RADAR SPEED LIMIT SIGNS	=	$10,000
25% CONTINGENCY & CONSTRUCTION ENGINEERING	=	$57,500
TOTAL	**=**	**$287,000**



Radar Speed Limit Sign

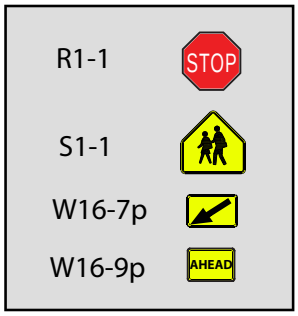


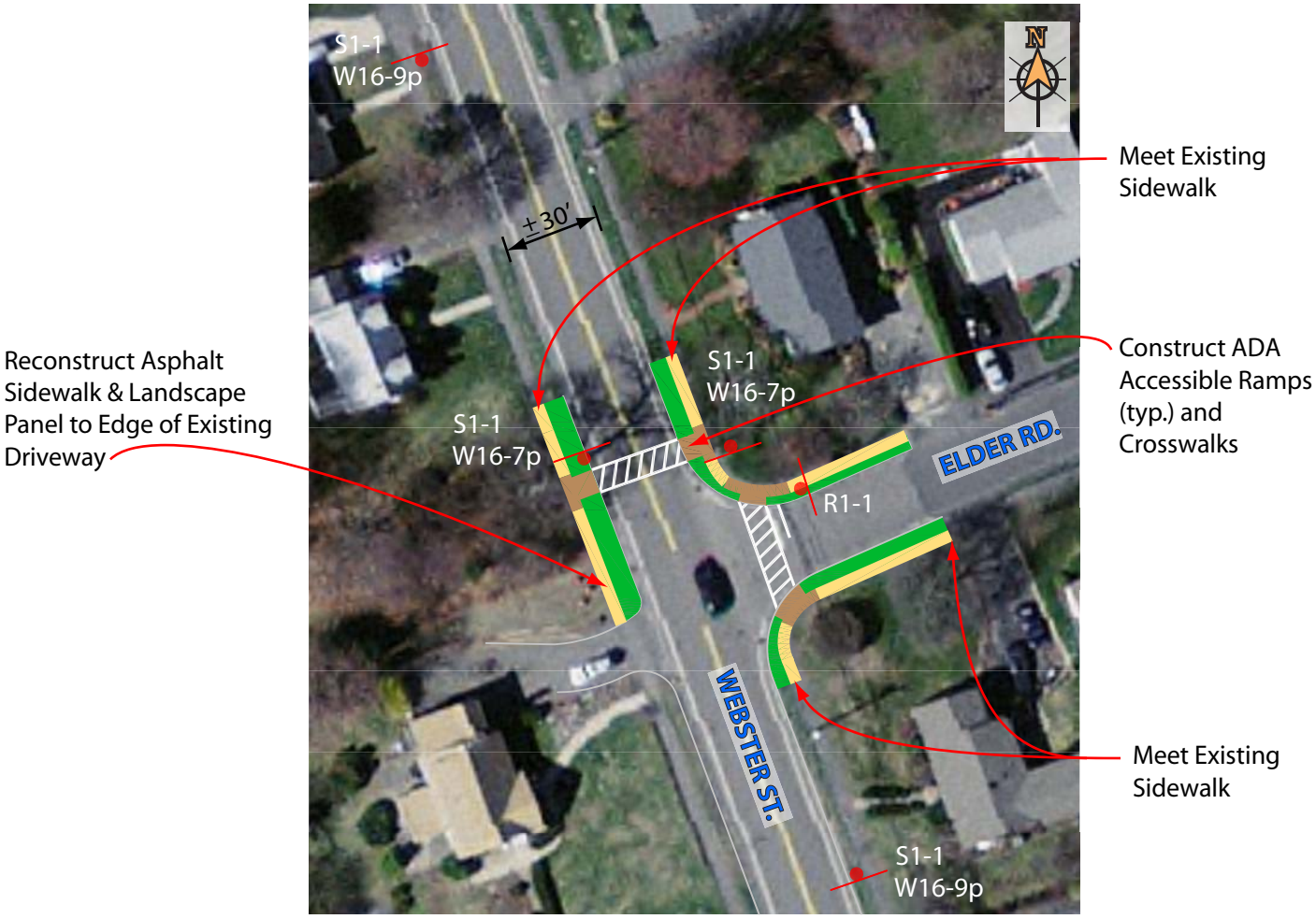
N.T.S.

Figure 5: Recommendation 1 - Reconfigure Intersection of Cedar Street and Central Avenue & Enhance Signs

RECOMMENDED SCOPE OF WORK AND CONCEPTUAL COST ESTIMATE:

ADA RAMPS, GRANITE CURB, & ASPHALT SIDEWALK	=	$40,000
SIGNS & STRIPING	=	$3,500
LANDSCAPING/GRASS RESTORATION	=	$3,000
DRAINAGE	=	$9,500
TRAFFIC CONTROL/ MOBILIZATION/FIELD OFFICE	=	$55,000
25% CONTINGENCY & CONSTRUCTION ENGINEERING	=	$28,000
TOTAL	**=**	**$139,000**





N.T.S.

Figure 6: Recommendation 2 - Add Crosswalk and Construct Ramps on Webster Street and Elder Road

This report was prepared by the TEC Team:

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with

the COLLABORATIVE
Planners Collaborative
Design Collaborative
Communications Collaborative

Attachment A

Safe Routes to Schools (SRTS) Infrastructure Project Selection Criteria

When determining whether to recommend implementation of a potential project, MassDOT considers its feasibility, safety and mobility benefits, number of students expected to benefit, property and other impacts, and construction cost.

The next issue is identifying which of the recommended projects, if any, should be implemented by MassDOT using federal SRTS funding. In general, MassDOT selects the highest priority project or projects for SRTS program construction: those with the greatest safety and mobility benefits for the most students, assuming the impacts are manageable and the budget is proportional to the expected benefit.

The overall construction budget for a SRTS project needs to be within an appropriate range: it must be a large enough project to justify the high design and review standards required for the use of federal SRTS funding, but low enough to enable MassDOT to provide improvements for as many communities as possible. Projects with construction costs that are too low or too high, irrespective of their feasibility and benefits, are typically recommended for construction by the municipality or through other funding sources.

The most desirable SRTS infrastructure projects are those that provide a significant benefit (such as a considerable length of sidewalk, coupled with moderate intersection improvements), but that have minimal impacts to right-of-way, wetlands, and grading. Conversely, less feasible projects are typically those that either require minimal construction (such as signage or pavement markings), or those that require significant land acquisition, permitting, clearing, re-grading, or construction of large retaining walls.