

John Glenn Middle School Bedford, Massachusetts

Safe Routes to School Infrastructure Program



Massachusetts Department of Transportation (MassDOT)
Office of Transportation Planning

Preliminary Assessment

April 3 2015

massDOT
Massachusetts Department of Transportation

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 Glenn Middle School in Bedford. An assessment includes gathering information on the selected school through reviewing the school's assessment request, mapping student residency, conducting a preliminary meeting with school staff, municipal officials, and community members, observing school arrival and dismissal patterns, reviewing collision history, and 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. The purpose of this assessment is to identify potential improvements that would make walking and bicycling safer and more attractive modes for children traveling to and from school. Additionally, the intent is to identify the most applicable improvements that could be implemented as part of the Massachusetts SRTS Infrastructure Program.

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. MassRIDES, the Commonwealth's travel option service, delivers the in-school education and encouragement program for MassDOT. MassRIDES 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 high priority 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 strongly supported by 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.

2.3 The School Assessment Program

Since the program's start in 2006, MassDOT has visited more than 60 schools across the Commonwealth, prepared more than 45 assessments, and initiated designs for more than 20 schools. To date, 15 infrastructure projects have been built.

The minimum requirements for being eligible for an infrastructure assessment at the time that the John Glenn Middle School applied were 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.

Student residency information is collected and mapped relative to the location of the school. Additionally, existing pedestrian and bicycle infrastructure is mapped to help identify critical gaps in infrastructure as well as provide a visual assessment of the number of students that would benefit from implementing improvements. MassDOT also completes observations of school arrival and dismissal patterns, described in Section 3.4, to identify the need for improvements and potential safety benefits. Existing infrastructure is evaluated for 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.

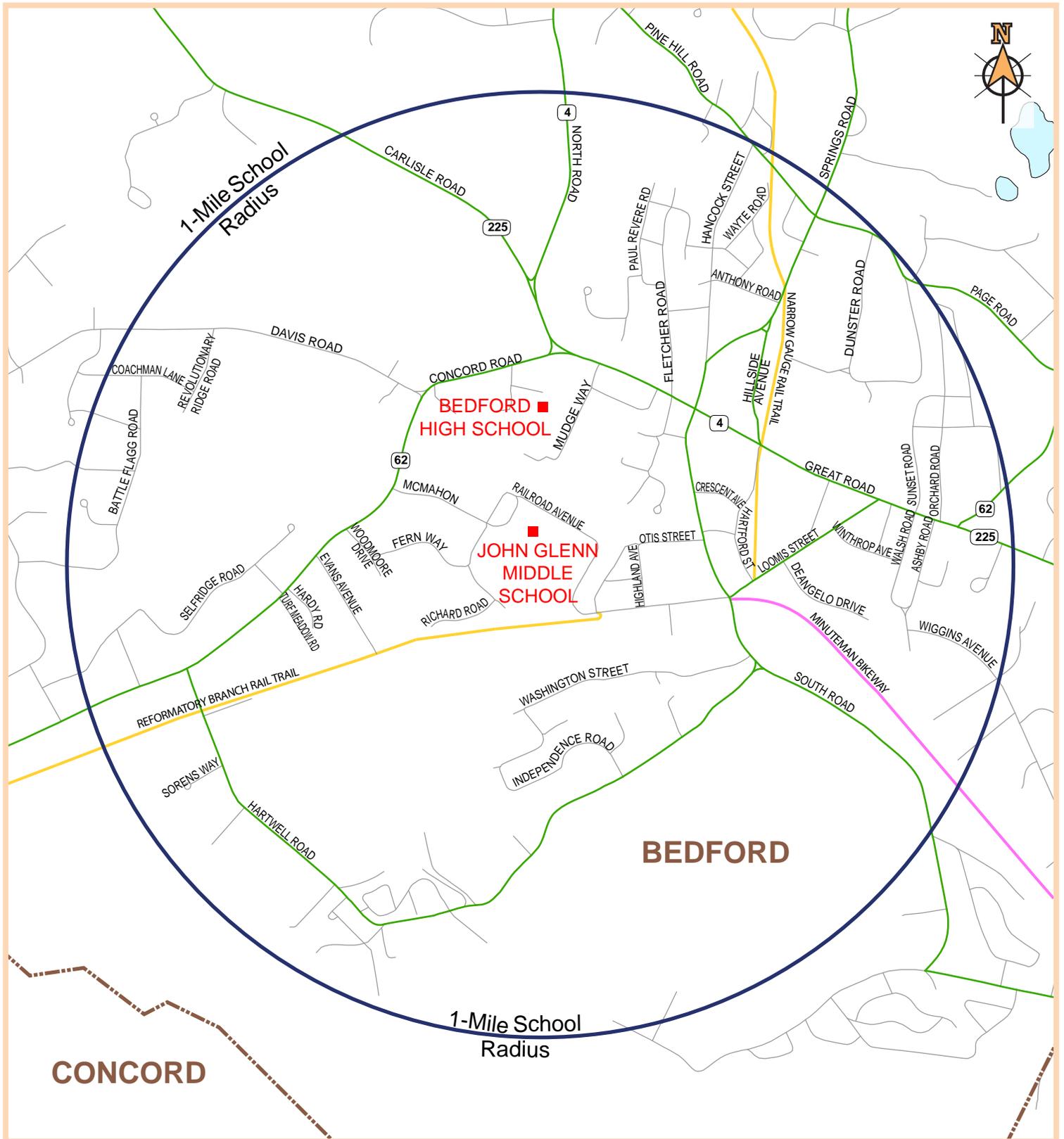
3 John Glenn Middle School

The John Glenn Middle School is a middle school with approximately 1,589 students, approximately 10 percent of whom live within walking distance of the school. The school is located at 99 McMahan Road in the downtown village center of Bedford. The school is bordered by Bedford High School and Bedford Town Center to the north, the Elm Brook Conservation Area to the southwest, and residential neighborhoods to the east and west. The area around the school primarily consists of residential homes located on cul-de-sac streets and undeveloped land. Figure 1 shows the school's relationship to the network of arterial roadways within a 1-mile radius of the school.

The John Glenn Middle School has participated in the education and encouragement program since 2010. The program encourages and educates students and parents through information distribution, teaming with local police, participation in Massachusetts Walk and Bike to School Day, and surveying student travel behavior and monitoring results. The Town of Bedford begins educating and encouraging students at an early age. Children enrolled in Bedford Elementary Schools are provided with a pedestrian safety course in the second grade and a bicycle safety course in the fourth grade. The SRTS Team also coordinates with the Bedford Police Department on Bike Day and has partnered with the Town's Board of Health for the Family in Motion program that teaches about fitness, healthy eating and exercise.

An assessment request was submitted to MassDOT by the John Glenn Middle School in May 2012 and subsequently was selected as part of the seventh round of assessments to receive an infrastructure evaluation. The school's assessment request presented potential need for improvements at multiple locations residing within close proximity to the school, as well as indicated a strong potential for increasing walking and biking due to the number of students residing within walking distance to the school. See Section 3.1 below for Assessment Request and overview of preliminary safety concerns.

This assessment specifically focuses on the streets within close proximity to the school grounds, such as Great Road and Mudge Way, because these streets had been identified to have the greatest concentration of school-related walking and bicycling trips.



Scale: 1" = 1500'

- | | | | |
|--------------------------------------|--------------------|--|------------------|
| — | Principal Arterial | — | Local Street |
| — | Minor Arterial | - - - | Municipal Border |
| — | Collector | — | Path (unpaved) |
| | | — | Path (paved) |

Figure 1: 1-Mile Street Network & Surrounding Schools

3.1 John Glenn Middle School Assessment Request

The assessment request received in 2012, focused on the issues of dangerous crossings of busy roadways and missing connections to existing bicycle and pedestrian infrastructure such as the Narrow Gauge Rail Trail and Reformatory Branch Rail Trail. Additional concerns include heavy traffic volumes of over 25,000 vehicles per day on Great Road and truck traffic on Railroad Avenue. These traffic volumes can be a barrier to walking and bicycling. Approximately 10 percent of the school’s student population resides within a 1-mile radius of the school with approximately 40 percent of those students currently walking or biking to school. Additional concerns include the number of parents dropping off and picking up at the school causing congestion and operational problems that were described in the assessment request.

Completed SRTS School Assessment Request Form Submitted by the John Glenn Middle School, Bedford

School Information		Municipality Information								
School Name	John Glenn Middle School	Municipality Name	Town of Bedford							
Street Address	99 McMahan Road Bedford, MA 01730	Mailing Address	99 McMahan Road Bedford, MA 01730							
Contact Name	Kevin Tracey	Contact Name	Richard Warrington							
Tel. No.	781-275-3201	Tel. No.	781-275-7605							
Email	Kevin.Tracey@bedford.k12.ma.us	Email	rwarrington@bedfordma.gov							
Start Time	7:45am									
Dismissal Time	2:18pm									
School Population Information										
Grade	K	1	2	3	4	5	6	7	8	Sum
Number of Students	157	166	190	147	174	180	199	190	186	1589
Actual number residing within 1 mile of school	12	26	21	12	12	13	17	17	19	149
Estimated number who currently walk/bicycle	3	5	4	4	5	5	7	6	9	48

SRTS Program Activities (please check all that apply)			
X	International Walk to School Day or Massachusetts Walk to School Day		Parent Survey
X	Team with local Police		Pedestrian or Bike Safety Education
	Weekly or Monthly Walk to School Day		Other Walk to School or In-School Activities (explain)
X	Classroom tallies of Walkers/Bikers		
X	Walking School Bus or Bike Train		

Are students bused within 1 mile of the school? Explain if yes.
 Yes. There is a lack of infrastructure and neighborhood schools.

Is there currently a fee for bus transportation? Explain if yes.
 No.

Is your school district considering budget cuts with respect to school transportation? Explain if yes.
 No.

Submitted by (if different from above)			
Name	Carla Baer Olson	Position/Organization	Coordinator, Healthy Bedford
Email	healthybedfrod@bedfordma.gov	Telephone	781-275-7727

Describe any potential changes to the school’s status in terms of future closure or relocation that are currently known (leave blank if there are no changes planned).
 None.

If there are walking school buses or bike trains, describe the frequency, meeting location, typical route, and approximate number of participating students walking or bicycling to school.

Many students walk and bike to the middle school (JGMS) daily. Our SRTS program has gained momentum as students become familiar with the program in the elementary grades and then move up to JGMS when they are developmentally able to walk and bike independently to school. Many students access JGMS, via biking and walking, converging from several areas of town onto Railroad Avenue. In addition, JGMS students use Railroad Avenue to access the town center and town campus for after school activities.

Based on input from school staff, parents, and students, please describe any physical obstacles students face regarding routes to your school such as dangerous crossings, sidewalks along busy roads without adequate separation between traffic and pedestrians, missing or deteriorated sidewalks, or inadequate bicycle parking. If available, please show this information on a map and include your school's location, any zone boundaries, and the quadrant (east, north, west, south) where families residing within 1 mile are located (refer to the enclosed sample).

Many families are reluctant to let their students cross Great Road (Bedford's main thoroughfare) at Hillside Avenue/Bacon Road, due to high traffic volume, poor sight lines, unclear right of way, and general congestion and an experience of lack of safety. This is unfortunate as it is an integral connector to JGMS, as well as the High School where students could bike and walk on the Narrow Gauge Railway crossing Great Road, and connect to the Depot Area. The Depot Area, in addition to being the terminus for the Minuteman Bikeway, is adjacent to Railroad Avenue and the Reformatory Branch Bikeway extension area.

The Great Road / Hillside Avenue area has the desirable asset of being proximal to the Narrow Gauge Rail Trail, a maintained stone dust path used by walkers and bikers as a travel corridor as well as for recreation. Further, the Great Road crossing is also crucial for Lane [Elementary School] students coming from the south side of town via the Narrow Gauge Trail which leads directly to Lane School, our most popular biking route to Lane.

The Railroad Avenue area provides connection to many parts of Bedford not only with JGMS, but the High School as well, and for the entire Town Campus, including churches, the library, town offices, park and recreational activities as well as the Minuteman Bikeway. Railroad Avenue is without sidewalks on the first section of the road, towards JGMS, and is a congested commercial area with no separation between traffic and pedestrians and cyclists. Traffic of all types in this area will increase as plans are underway for a multi-use building at 53 Loomis Street in the Depot/Railroad area and which will include businesses, as well as approximately 25 residential apartment units.

Describe other impediments to walking or bicycling such as policies, other safety concerns, social issues, etc.

Since Bedford no longer has neighborhood schools, and sidewalk connectivity in some areas is nonexistent, many families have become dependent on vehicular travel. The Great Road / Hillside Avenue area is widely regarded as a very challenging intersection for pedestrians, bicyclists and drivers alike by residents, commuters, and town officials. This is a distinct disadvantage in attempts to enable students and families to walk and bike to school safely.

Please estimate the number of additional students you would expect to see walking or bicycling to school if infrastructure improvements were implemented to address existing obstacles. If more than one obstacle is identified, please estimate the number of students for each remedy.

Looking at the maps and our enrollment 6-8, it is our estimation that for JGMS alone, we would see an increase of approximately 25 students walking and biking to school on a daily basis if The Great Road Hillside improvements were made. Railroad Avenue improvements would increase walking and biking by approximately 8-10 students daily. Lane students would see an increase of 10 students biking regularly with the Great Road / Hillside Avenue improvements. High School walking and biking regularly would also increase by approximately 20-25 students daily with Great Road / Hillside improvements. It is our anticipation that these numbers will grow over time as more and more students are exposed to the bicycle and pedestrian safety training, and the culture begins to shift. In addition, with safety access increasing crossing the Great Road, more and more residents will utilize these access points for recreation and travel corridors, numbers will increase as parents will feel more comfortable walking and biking, and allowing their children to do the same to and from school.

Based on the Assessment Request Form submitted by the school, Great Road was identified by both school administrative staff and parents as a safety concern for students walking to school due to heavy commuter traffic along the corridor. Additionally, Great Road provides connections for bicycles and pedestrians to the Narrow Gauge Rail Trail, which was identified as the Town's most popular biking route, and provides connections to multiple residential neighborhoods to the east of the school. This assessment specifically focuses on the streets close to the school grounds, including Great Road, Mudge Way, and Railroad Avenue, because these streets have been identified to have the greatest concentration of school-related walking and bicycling trips.

3.2 Student Residency Mapping

The Assessment Request submitted by the John Glenn Middle School included a map depicting the location where each of its students live within a 1-mile radius of the school. A similar map was also included for the Bedford High School, which shares a campus with the Middle School, and is included in Attachment A. The density of the student population within a 1-mile radius of the John Glenn Middle School is shown in Figure 2.

The map demonstrates that approximately 30 percent (40 students) of the Middle School's population that lives within 1 mile of the school resides in neighborhoods northeast of the school and are required to cross Great Road (Route 4) to travel to the Middle School. An additional 78 high school students also live in neighborhoods to the northeast and must cross Great Road to travel to school. Great Road contains a mix of commercial and residential properties, and serves as an arterial roadway connection between Interstate 95 to the east and Carlisle Road to the west. Due to the heavy traffic volumes on this arterial roadway and a lack of pedestrian crossings, this roadway forms a barrier for students walking to school.

Approximately 50 of the students living east of Great Road reside in neighborhoods along Hillside Avenue and would cross Great Road at the intersection with Hillside Avenue to walk to school. This intersection has been identified within the Assessment Request as a difficult crossing due to heavy traffic volumes on Great Road and poor sight lines to the crossing due to the vertical curvature of the roadway. The Narrow Gauge Trail runs perpendicular to Great Road and crosses Great Road just east of the intersection with Hillside Avenue; however the existing crossing is unsignalized and does not provide direct access to the John Glenn Middle School.

An additional 21 students live in neighborhoods northeast of Great Road / Loomis Street intersection and cross Great Road at this intersection to walk to/from school. This is a signalized intersection equipped with pedestrian signals and push-buttons. However, the existing pedestrian signals are in poor condition and the push-buttons do not comply with Americans with Disabilities Act (ADA) standards, making the signals difficult to actuate by pedestrians with physical disabilities. In addition, poor grading at this intersection causes water to pond at the base of the accessible ramps and creates a dangerous walking environment in the winter when ponding water freezes. As a result, pedestrians walk in the vehicular travelway, increasing the potential for a collision between a motorist and pedestrians.

The remaining 47 students living east of Great Road cross the roadway in the vicinity of the intersection with Mudge Way, which essentially serves as the driveway to the Bedford High School and municipal center. This intersection was also identified as a difficult crossing as it is unsignalized and traffic volumes on Great Road are heavy during school arrival and dismissal periods. Although crosswalks are striped at this intersection, the pavement markings are faded and there is no pedestrian crossing signage, reducing the visibility of the crosswalk for motorists. Similar to Loomis Street, poor grading causes water to pond within the curb ramps and results in pedestrians walking within the vehicular travelway, creating the potential for a collision.

Approximately 30 middle school students and 50 high school students live within neighborhoods to the southeast of the school and travel along Railroad Avenue to walk to/from school. A mixed-use development is currently proposed on Railroad Avenue that will add an additional 25 residential homes on this street, with potential students for these two schools. There are a number of commercial and industrial buildings on Railroad Avenue between South Road and Highland Avenue that generate heavy truck traffic. This section of Railroad Avenue contains wide curb cuts and no sidewalks or shoulders, causing pedestrians to have to walk within the travelway where large trucks and parent pick-up/drop-off traffic is traveling.

Based on the safety concerns raised in the assessment request, and the high potential for increasing walking and biking to school as a result of an SRTS-funded infrastructure improvement, the John Glenn Middle School was selected to receive an SRTS infrastructure assessment.

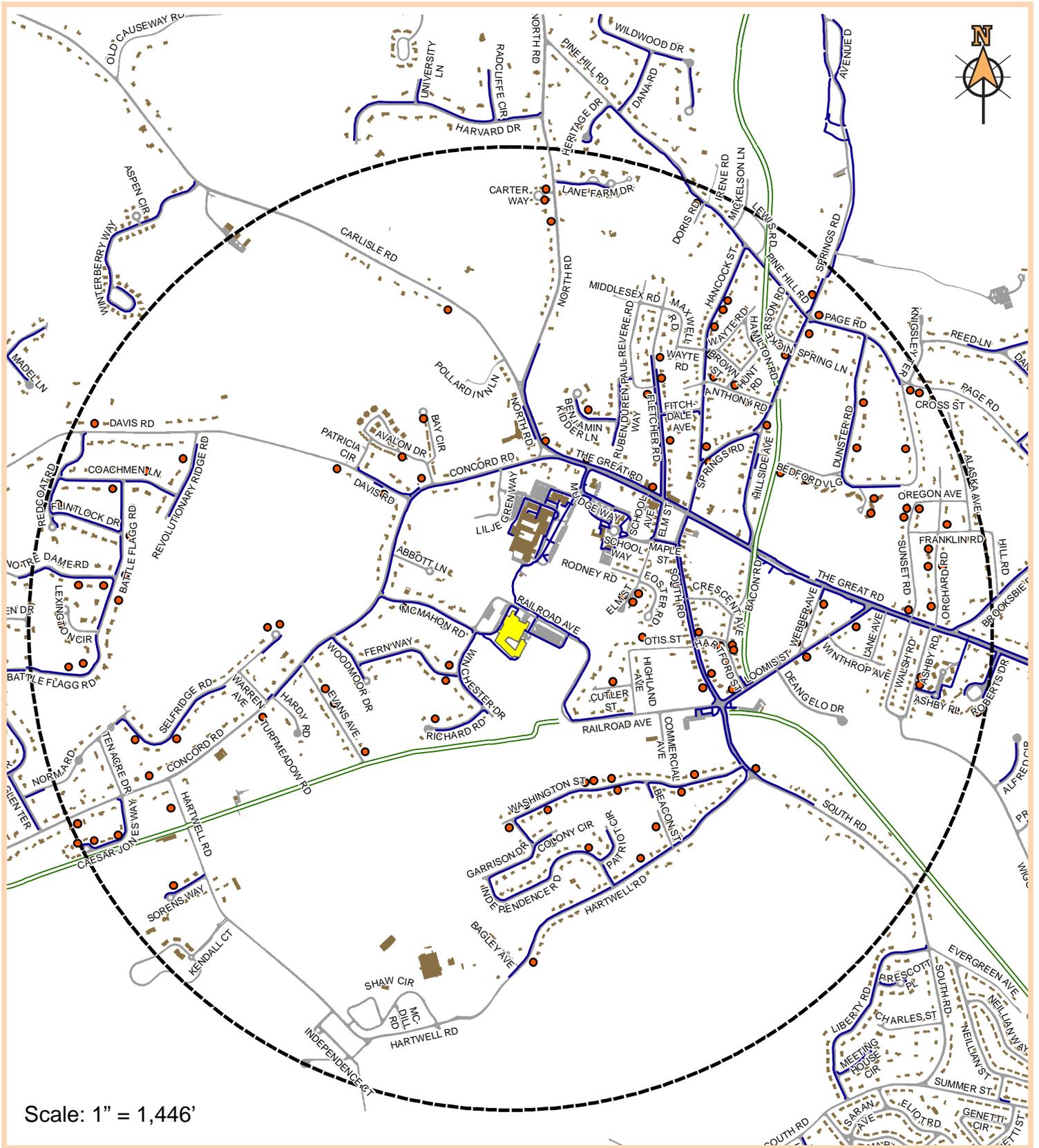


Figure 2: Student Residency Map

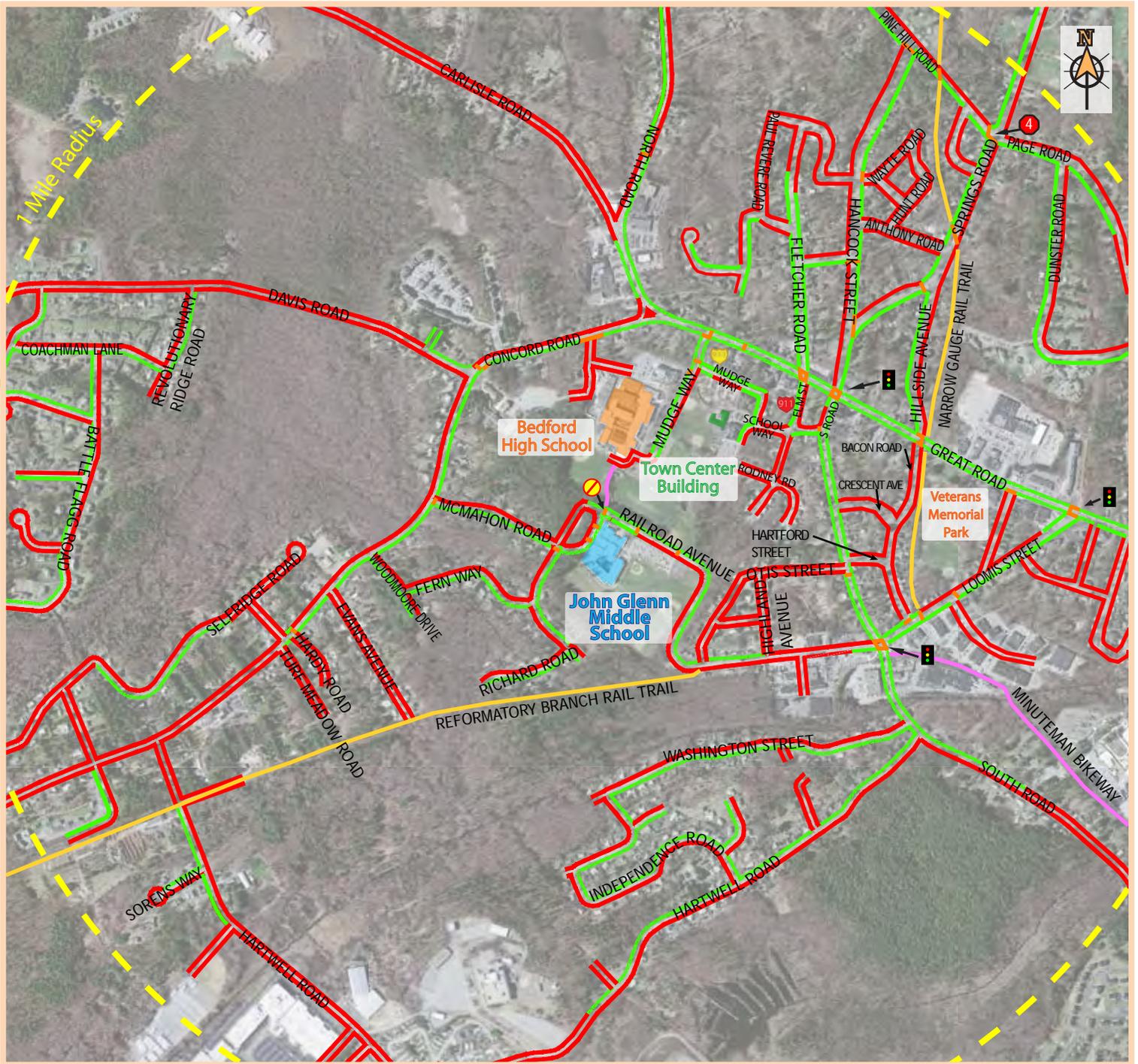
3.3 Infrastructure Assessment and Field Visit

The MassDOT Team attended a preliminary assessment meeting and performed a field visit and inventory of sidewalks at John Glenn Middle School on October 5, 2012. The following people attended the meeting.

<u>Attendee:</u>	<u>Representing:</u>
Carla Baer Olson	Healthy Bedford
Kevin Tracey	John Glenn Middle School, Principal
Richard Warrington	Town of Bedford, Department of Public Works
Steve Waite	Bedford Police Department, School Resource Officer
Margot Fleischman	Town of Bedford, Board of Selectmen
Samantha Fonseca-Moreira	MassRIDES
Heather Ross	MassRIDES
Keith Arnold	MassDOT District 4
Laurie Pessah	Toole Design Group
Chris Bosley	Toole Design Group
Kerry Racki	TEC, Inc.

At the preliminary assessment meeting, school and Town staff identified factors impacting walking and biking to the John Glenn Middle 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 bicycle 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 John Glenn Middle School are delineated in Section 3.4.

MassDOT performed additional field visits following the preliminary assessment meeting to confirm the proposed limits of work as part of the review process with Town staff.



1" = 1200'

KEY

- Sidewalk
- No Sidewalk
- Existing Crosswalk
- Path (unpaved)
- Path (paved)
- 911 Fire Department
- 911 Police Station
- ● ● Fully Signalized Intersection
- 4 4-Way Stop
- X Crossing Guard

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

Figure 3: Existing Conditions Around John Glenn Middle School

3.4 General Observations

The following observations are based on field observations and the preliminary meeting unless otherwise noted.

School Arrival and Dismissal

- Bedford High School is approximately 1,000 feet from the John Glenn Middle School. These two schools share bus routes. In the morning, all students are dropped off on Railroad Avenue at the John Glenn Middle School and high school students walk to the school along the paved path across the ball fields. In the afternoon, John Glenn Middle School students riding the bus walk along this path to the Bedford High School for bus pick-up. Approximately 40 percent of the students riding the buses are Bedford High School students and 60 percent are John Glenn Middle School students.
- There is a small staff parking lot located off of Railroad Avenue across from the John Glenn Middle School, which some parents use as a drop-off area during the school arrival period.
 - Students dropped off in this area must walk across the school driveway where bus drop-off occurs, resulting in significant conflict between pedestrians and buses.
- Although the John Glenn Middle School does not have any formal walking school buses, due to heavy concentrations of students living along Hillside Avenue, Loomis Street, and Railroad Avenue, the majority of students walking from these neighborhoods naturally form biking and walking groups to travel to/from school.
- Parent pick-up and drop-off for the John Glenn Middle School is supposed to occur in the teacher's parking lot with parents entering the second entrance off Railroad Avenue, looping through the parking lot and exiting via the same driveway. The school places traffic cones at the first entrance to the parking lot during pick-up and drop-off to reinforce the policy; however, some parents drive through the cones or pull in next to the cones to drop off their children and back out onto Railroad Avenue.
 - The disregard of the pick-up and drop-off policy causes back-ups for bus drop-off and pick-up. This pick-up and drop-off area does not appear to impact the primary pedestrian crossing points and therefore is not part of the focus of the SRTS improvements.
- Every student has the option of riding the bus to school. Many parents have stated that they do not want their middle school students riding the bus with high school students.
- Bicycle racks are provided at the front and back of the John Glenn Middle School. School staff estimate that approximately 15 students currently bike to school on a regular basis, which is consistent with the number of bicycles observed in the bicycle racks on the day of the preliminary meeting.

Sidewalk and Pathway Infrastructure

- The crosswalks and pavement markings within the vicinity of the school are in good condition and appropriate school crossing and advance warning signs are provided at most crossings.
- The intersection of Great Road and Mudge Way is unsignalized and difficult for pedestrians to cross due to heavy traffic volumes of over 25,000 vehicles per day passing through the intersection, and its proximity west of a commercialized stretch on Great Road. The existing accessible ramps are not ADA-compliant and poor drainage near the ramps causes water to pond at the ramp termini. There are no pedestrian crossing warning signs at the crosswalk on Great Road and crosswalk markings are faded, reducing visibility of the crosswalk. Great Road through this intersection contains one wide travel lane in each direction, resulting in high travel speeds. This intersection is one of the focal points for the Town's recent Great Road Master Plan and was identified within the Master Plan as warranting installation of a traffic signal. This issue is addressed in the proposed SRTS project described in Chapter 4.
 - Due to the lack of pedestrian warning signs and faded crosswalk markings, motorists do not anticipate pedestrians crossing the roadway and may be unprepared to stop for a pedestrian in the crosswalk.
 - Ponding water in the curb ramps forces pedestrians to walk in the travelway where there is a greater potential for a collision with a motorist.
 - The heavy traffic volumes on Great Road limit the number of gaps in traffic of an adequate length to allow a pedestrian to cross the roadway. As a result, pedestrians must wait a long time to cross and may choose to take gaps that are too short
- Parents of students living north of Great Road do not feel it is safe to allow students to walk unaccompanied by an adult to school due to the heavy traffic volume from commuting traffic on Great Road in the morning.
 - As a result, many students living in this area are driven to school, which increases the congestion on Great Road, making it more difficult for pedestrians to cross the roadway. This issue is addressed in the proposed SRTS project described in Chapter 4.
- There is an existing asphalt path located between John Glenn Middle School and Bedford High School that is used by many children during and after school hours to travel between the schools. As the asphalt path merges with the High School driveway and parking lot, there are no sidewalks provided along the driveway, forcing students to walk in the busy roadway. In addition, there are no crosswalks connecting the path to the sidewalks that run along the front of the High School or along Mudge Way. This issue is addressed in the proposed SRTS project described in Chapter 4.

- The lack of sidewalks along a portion of the High School driveway forces students to walk in the roadway, resulting in significant conflict between pedestrian and vehicular traffic and increasing the potential for a collision.
- Well marked crosswalks are critical to alerting drivers to the presence of pedestrians crossing the roadway and to encourage drivers to yield to pedestrians in the crosswalk. Marked crosswalks also encourage pedestrians to cross in dedicated locations where drivers expect pedestrians crossing. Railroad Avenue provides direct access to the John Glenn Middle School from the east; however, there is no existing sidewalk on Railroad Avenue between South Road and Highland Avenue and from Highland Avenue to the school the sidewalk is in poor condition. Although a grass strip separates this section of sidewalk on the northern side of the road from the roadway, there is no curb reveal or other vertical separation provided. The width of the sidewalk along this section of roadway is inconsistent and accessible ramps are not ADA-compliant. This roadway has been identified as a major safety concern for parents allowing students to walk to school. This issue is addressed in Recommendation 1 in Chapter 4.
 - Students walking to school along Railroad Avenue typically form groups to ease concerns about safety and security walking through the industrial portion of Railroad Avenue and to increase visibility of the group. The existing sidewalk ranges from 3 to 5 feet in width and is located adjacent to overgrown vegetation that hinders access to the sidewalk. As a result, students walk along the grass strip or within the roadway to remain in groups, increasing the potential for conflicts or collisions with vehicular traffic.
 - The narrow lane widths, lack of shoulders along the roadway, and lack of curb reveal creates the potential for a motorist to easily drive onto the sidewalk if distracted or traveling too fast for the roadway conditions.
- The section of sidewalk along Railroad Avenue near the ball fields has drainage routed over it and is often submerged in water. Even when the sidewalk is not submerged, it often contains debris from recent rain events.
 - The presence of water and debris within the sidewalk limits access for pedestrians and becomes a hazard, particularly for those with vision or mobility impairments.
 - As a result, pedestrians walking in this area walk within the roadway, increasing the potential for conflicts with vehicular traffic.
 - Some students who could otherwise walk to school along Railroad Avenue are driven to school following rain events to avoid needing to walk in this area.

These issues are addressed in Recommendation 1 in Chapter 4.

- The School and Town staff noted that the Narrow Gauge Rail Trail crosses Great Road too close to the intersection of Bacon Road / Hillside Avenue, which causes driver confusion.

- Driver confusion may result in drivers failing to yield the right-of-way to pedestrians and bicyclists crossing the roadway, increasing the potential for a collision. In addition, driver confusion may limit the ability of a driver to make an appropriate decision within a safe and sufficient distance to act accordingly at the intersection.
- Town staff reported that there have been two or three pedestrian crashes at the crosswalk at Bacon Road / Hillside Avenue in 2011-2012.
- The intersection is currently identified as Highway Safety Improvement Program (HSIP) eligible for 2010-2012 based on the occurrence of collisions at this intersection.

This issue is addressed in Recommendation 2 in Chapter 4.

- Hillside Avenue and Bacon Road are used as a cut-through route for traffic wishing to avoid Great Road (Route 4 / 225) and South Road. . There are currently no sidewalks provided along Bacon Road and a sidewalk is provided only along the western side of Hillside Avenue. Approximately 50 students live in neighborhoods along Hillside Avenue and 8 students live along Bacon Road and utilize these roadways to walk to/from school.
 - The lack of sidewalks along the easterly side of Hillside Avenue forces students to walk in the roadway or cross heavy cut-through traffic to the sidewalk on the westerly side.
 - The lack of sidewalks along Bacon Road forces students to walk in the roadway, increasing conflicts between pedestrian and vehicular traffic.
 - Town staff reported that three pedestrian collisions have occurred along these roadways as a result of conflicts between pedestrians and vehicular traffic

These issues are addressed in Recommendations 2 and 3 in Chapter 4.

- School Way is a small stretch of road located between Mudge Way and Elm Street that provides access to the Center Elementary School, Bedford Town Hall and the Town Campus from the east. There are currently no sidewalks and there is no street lighting provided along School Way between Mudge Way and Elm Street.
 - The lack of sidewalks forces students to walk in the roadway, increasing conflict with vehicular traffic.
 - The lack of sufficient lighting reduces safety and security for pedestrians walking along School Way when it is dark and may limit driver visibility of pedestrians walking in the roadway.

These issues are addressed in Recommendation 4 in Chapter 4.

- Poor grading at the intersection of Great Road / Loomis Street causes ponding of water at the openings of the accessible ramps. This causes a limited number of pedestrians and bicyclists to walk in the roadway around the puddles and over the

curb to access the sidewalk, and limits the accessibility of this intersection. This issue is addressed in Recommendation 5 in Chapter 4.

- Pedestrians walking in the roadway create conflicts and the potential for collisions with motorists traveling along Great Road.
- Pedestrian push-buttons at the Great Road / Loomis Street intersection are confusing as there are two push-buttons on each corner and it is unclear which one to push. In addition, the existing push-buttons are not ADA compliant and the signal indications are not Manual on Uniform Traffic Control Devices (MUTCD) compliant. Pedestrians and bicyclists often become impatient waiting for the WALK indication and cross during the DON'T WALK indication. Drivers often ignore pedestrians crossing the roadway and make right-turns during the WALK interval.
 - It is important for signals to comply with MUTCD standards to provide uniformity in traffic control and allow these devices to be easily recognized and understood. When signals are not compliant, the signal indications may not be understood, causing drivers and pedestrians to ignore the indications or act in a manner inconsistent with the intent of the signal indication. In the case of the pedestrian signals at this intersection, if pedestrians are unable to see and understand the signal indications, they may enter the roadway when it is unsafe to cross.
 - Because the existing push-buttons are not ADA-compliant, elderly or disabled pedestrians may have difficulty pressing the buttons and actuating the pedestrian phases, making it increasingly difficult and dangerous for these pedestrians to cross the roadway.
 - Pedestrians crossing during the DON'T WALK indication is a serious concern as drivers will not be anticipating pedestrians crossing during this signal phase, creating the potential for a collision.
 - Pedestrians crossing the roadway during the WALK interval expect to have the right-of-way and may not be looking for turning traffic. Therefore, there is a high potential for a collision if drivers ignore the WALK signal indication and turn right without yielding to pedestrians.

Davis Road currently has no sidewalks and narrow shoulders with wetlands containing endangered species on both sides. However, this road is not a significant pedestrian / bicycle route as less than 15% of the John Glenn Middle School's student population is estimated to live in neighborhoods off Davis Road based on Figure 2, and only 6 of these students live within one mile from the school, typically considered an acceptable walking distance. *Traffic Speeds and Volumes*

- Great Road at the intersection with Bacon Road / Hillside Avenue carries approximately 1,300 to 1,400 vehicles per hour (vph) during the weekday morning and evening peak hours based on counts collected by Vanasse Hangen Brustlin, Inc. (VHB) as part of The Great Road Master Plan prepared for the Town of Bedford in August 2012.

Crossing Guards

- There are three crosswalks along Railroad Avenue to travel to/from the school. However, a crossing guard is positioned at only one of these three crosswalks to assist students in crossing the roadway. The crossing guard is stationed at the western-most driveway due to the difficulty of buses exiting the drop-off area.
- A crossing guard is stationed on Great Road near Bacon Road / Hillside Avenue, and was reportedly almost struck by a vehicle the afternoon before the preliminary meeting (October 4, 2012).

3.5 Currently Planned Municipal and State Construction Projects

There are a few transportation improvement projects proposed in Bedford within a 1-mile radius of the John Glenn Middle 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.

- *The Great Road Master Plan* – Concepts are currently being developed by VHB for improvements along Great Road and North Road from Veterans Memorial Park to the intersection with Carlisle Road. As part of these improvements, Hillside Avenue is being considered a “gateway” to the community. The project proposes new 5-foot wide sidewalks with grass buffers, 4-foot bike lanes, new striping for travel and parking lanes, signal upgrades/coordination, new signals and period streetscape elements. The project will be constructed in segments.
- *Minuteman Bikeway Extension* – A project is proposed to extend the Minuteman Bikeway, which includes providing two 11-foot travel lanes, 4-foot shoulders / bike lanes, and a 6-foot concrete sidewalk on both sides of Railroad Avenue from the intersection of South Road to the Minuteman Bikeway. The existing gravel path known as the Reformatory Branch Rail Trail will be paved. A HAWK signal may be provided on Railroad Avenue between the Reformatory Branch Rail Trail and the proposed extension of the Minuteman Bikeway. Funding for this project has not yet been identified.
- *Railroad Avenue Reconstruction* – A project to reconstruct a section of Railroad Avenue is currently in the design process with the Town of Bedford. The project includes restricting driveway approach access, relocating utility poles, and constructing two 6-foot sidewalks and shoulders. Bicycle lanes are not currently proposed as part of this project. The Town recently met with MassDOT staff to discuss the potential for future TIP funding.

A coordination meeting between VHB, Town staff and TEC was held on December 13, 2012 to discuss whether any portion of these larger projects would be beneficial to children at the John Glenn Middle School and if so what the scope of the SRTS portion of the project would entail.

4 Recommendations for Improvement

In the school's assessment request and during the field visit, John Glenn Middle School and Town of Bedford staff identified a number of existing safety concerns and infrastructure deficiencies related to walking and bicycling access to the school (See Sections 3.1 through 3.4). During the field visit, additional deficiencies and needs were identified (See Section 3.4).

MassDOT has made a number of recommendations described below for infrastructure improvements that address these issues and deficiencies described in Chapter 3 and shown graphically in Figure 4. The recommendations are focused principally on unsafe crossings along Great Road and missing sidewalk sections for major walking and bicycling routes. Preliminary conceptual improvement graphics (See Figures 5 and 6) and narrative descriptions of potential improvements (see Sections 4.1 and 4.2) were prepared and shared with Town of Bedford Planning and Engineering staff to gain concurrence on the need, scope, and priority of the recommendations. Multiple follow-up meetings and field visits were conducted to verify the recommendations. The recommendations and potential project described are derived from the culmination of these discussions, the assessment request, the field observations, and additional analyses described in prior sections of this assessment.

The John Glenn Middle School's assessment has identified a substantial benefit associated with an improvement project and a high potential for increasing walking / biking, in addition to a significant safety enhancement for students already walking and biking to this school, as well as the adjacent high school. Furthermore, the recommended project for the John Glenn Middle School will also provide a benefit to the surrounding community by providing additional options for alternative mode travel and recreation.

Not all of the recommendations identified by this assessment will be funded by MassDOT with Federal Transportation Alternatives (TA) funds. The project that is likely to have the greatest benefit to walking and biking to school has been proposed as a SRTS project. Additional recommended infrastructure recommendations serve to improve safety and mobility for the John Glenn Middle School's walking and biking population. These recommendations are described to help assist the Town of Bedford to consider further improvement projects to help support SRTS within their community.

4.1 Proposed MassDOT SRTS Infrastructure Project

MassDOT recommends the following project under the SRTS infrastructure program: reconstruct existing sidewalk along the Bedford High School driveway and along Great Road at the intersection of Mudge Way, install fully actuated traffic signal at the Great Road/Mudge Way intersection with dedicated left-turn lane, and construct a sidewalk connection from the Bedford High School driveway to an existing pedestrian path between the High School and John Glenn Middle School. The installation of the traffic signal at Great Road and Mudge Way will improve pedestrian safety and accessibility for the 47 students who live in neighborhoods on the northeasterly side of Great Road and must cross this intersection to walk to school. The installation of a left-turn lane at this intersection will ensure that excessive queuing will not occur on Great Road as a result of

the signal installation. The upgraded sidewalk connection between the middle and high schools will improve pedestrian accessibility for John Glenn Middle School students walking to buses at the High School or continuing up Mudge Way to walk to/from school. There is an added benefit to children at the High School and the nearby Center Elementary School who also walk to school. Additionally, as mentioned during the preliminary meeting, the Town Campus, as it is known, also has much activity during non-school hours. Therefore, a project in this area would be of great benefit for anyone accessing the Town Campus at this time. The proposed SRTS infrastructure project is comprised of two improvements, described below. The first improvement consists of installing a traffic signal and improving pedestrian accommodations at the Great Road / Mudge Way intersection. The second improvement consists of improving the pedestrian connection between the John Glenn Middle School and the Bedford High School.

Reconstruct Sidewalks and Install Traffic Signal with Pedestrian Countdown Indications at Great Road and Mudge Way

As discussed in Section 3.5, the intersection of Great Road and Mudge Way provides access to the Bedford Town Campus from the North. This intersection is unsignalized and difficult for pedestrians to cross due to heavy traffic volumes along Great Road and its proximity west of a commercialized stretch on Great Road. The existing accessible ramps are not ADA-compliant and poor drainage near the ramps causes water to pond at the ramp termini. There are no pedestrian crossing warning signs at the crosswalk on Great Road and crosswalk markings are faded, reducing visibility of the crosswalk. Travel lanes along this section of Great Road are extremely wide, resulting in high travel speeds of over 35 mph.

Improvements to the Great Road and Mudge Way intersection have previously been identified by the Town through their consultant, VHB, as part of the Great Road Master Plan (See Attachment B for an excerpt from the Master Plan). The improvements identified in the master plan were discussed and refined as part of a series of public meetings held between December 2010 and October 2011. MassDOT found that improvements to this intersection, including signalization of the intersection, restriping lane lines, and reconstruction of pedestrian crossings and access ramps, would significantly improve safety for students walking and bicycling to the Town Campus.

To improve pedestrian safety and encourage traffic control consistent with the Master Plan, MassDOT recommends installation of a traffic signal at the Great Road / Mudge Way intersection and traffic control improvements along Great Road. The major elements of the project include:

- Installation of a traffic signal with countdown pedestrian indicators at the intersection of Great Road and Mudge Way.
- Construction of new ADA-compliant ramps and crosswalks at the Great Road / Mudge Way intersection.
- Installation of a new crosswalk on the western approach to the Great Road / Mudge Way intersection.

- Construction of a left-turn lane on the Great Road westbound approach to Mudge Way.
- Reconstruction of cement concrete sidewalks with vertical granite curbing on both the north and south side of Great Road for approximately 100' in each direction.
- Installation of cement concrete median on Great Road to west of Mudge Way to reduce the travel lane width and provide better lane definition.
- Relocation of the mid-block crosswalk on Mudge Way south of Great Road to the intersection of Mudge Way / Liljegren Way and construction of new ADA-compliant ramps and crosswalks at the intersection.
- New pavement markings and signs to provide 4' minimum wide bike shoulders on Great Road consistent with the Great Road Master Plan.
- Application of new crosswalk and stop line pavement markings.
- Installation of MUTCD-compliant warning and regulatory signs.
- Relocation of two utility poles on the southerly side of Great Road.

This improvement can be considered as an early action item of the master plan that can be expanded upon in the future. See Figure 5 for additional detail and a graphical depiction of the improvements described above.

Construct Sidewalk Connection between High School and Middle School

The existing asphalt path located between John Glenn Middle School and Bedford High School is used by many children during and after school hours to travel between the schools. All John Glenn Middle School students utilizing bus service must walk to the High School along this path to board their buses in the afternoon. All High School students utilizing bus services are dropped off at the Middle School in the morning and must walk along this path to the High School. In addition, the 50 high school students living in neighborhoods along Railroad Avenue may utilize this pathway to walk to Railroad Avenue. The 45 Middle School students living in neighborhoods northeast of Great Road may utilize this path to walk to Mudge Way to access Great Road. Currently the 15'± path between the schools is restricted to emergency vehicles and pedestrians only. As the asphalt path merges with the High School driveway and parking lot, there are no sidewalks provided along the driveway, forcing students to walk in the busy roadway. In addition, there are no crosswalks connecting the path to the sidewalks that run along the front of the High School or along Mudge Way. The path is very steep as it approaches Railroad Avenue and does not meet ADA guidelines.

To improve safety for students walking between the Middle and High Schools, MassDOT recommends construction of a sidewalk and pedestrian crossing improvements along the High School driveway. The project would include the following major elements:

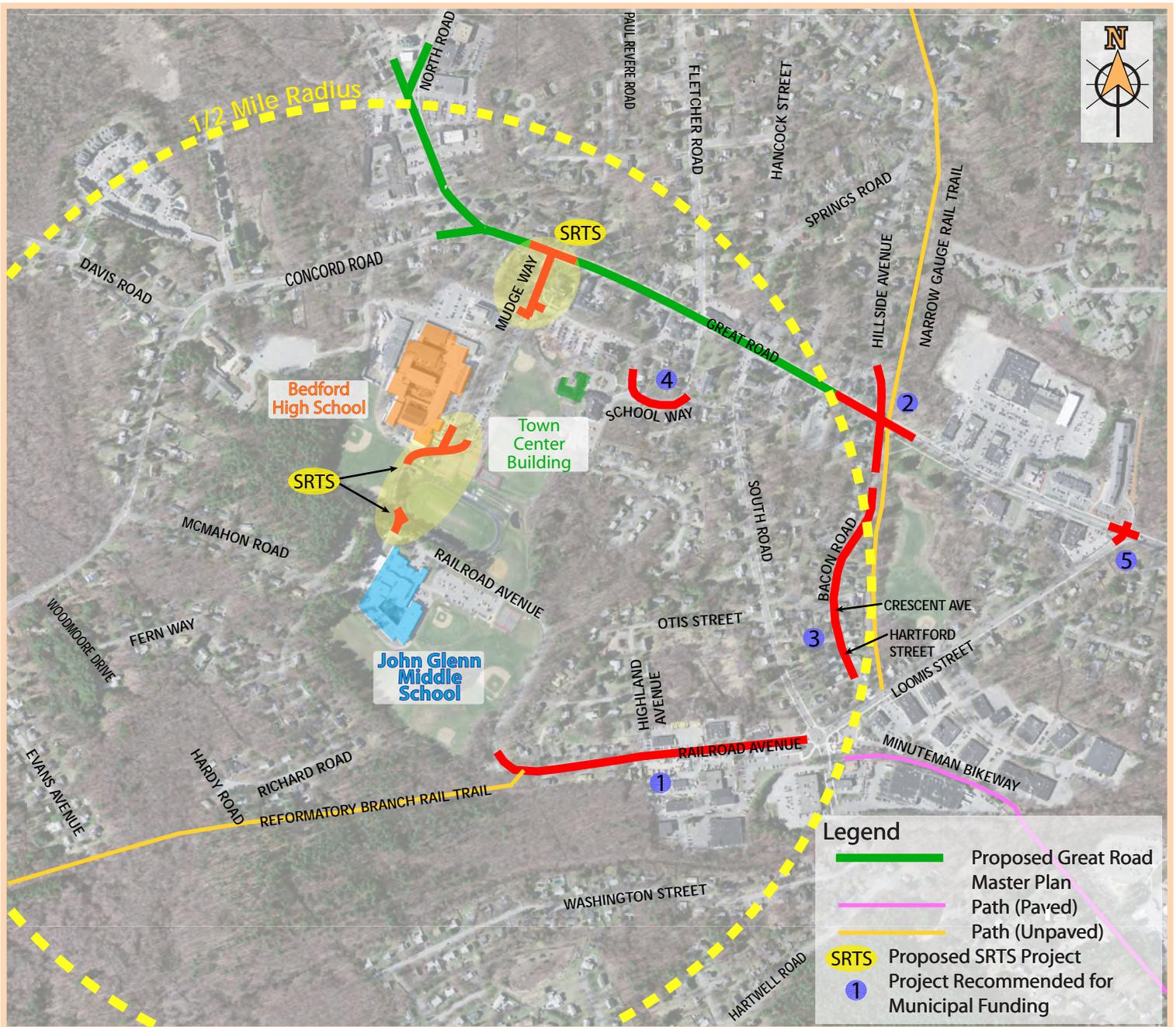
- Construction of a 5' wide asphalt sidewalk with vertical granite curb on the east side of the High School Driveway from the track field gate to just north of the tennis courts.

- Installation of a crosswalk with ADA-compliant accessible ramps along the High School driveway at the southern end to connect the path between the schools to the front entrance of the High School.
- Reconstruction and regrading of the path for ADA-compliance as it approaches Railroad Avenue in front of the Middle School. Construct new accessible ramps and removable bollards at the Railroad Avenue crossing.
- Installation of bollards separating the sidewalk along the front of the High School from the perpendicular parking spaces. Other removable bollards will be introduced at the multi-use path openings on either side.
- Reconstruction of curblines adjacent to truck bays/dumpster pad at the southern end of the High School.
- Installation of a crosswalk with ADA-compliant accessible ramps and pedestrian crossing warning signs along the school driveway and Mudge Way and connection to the existing sidewalk network.

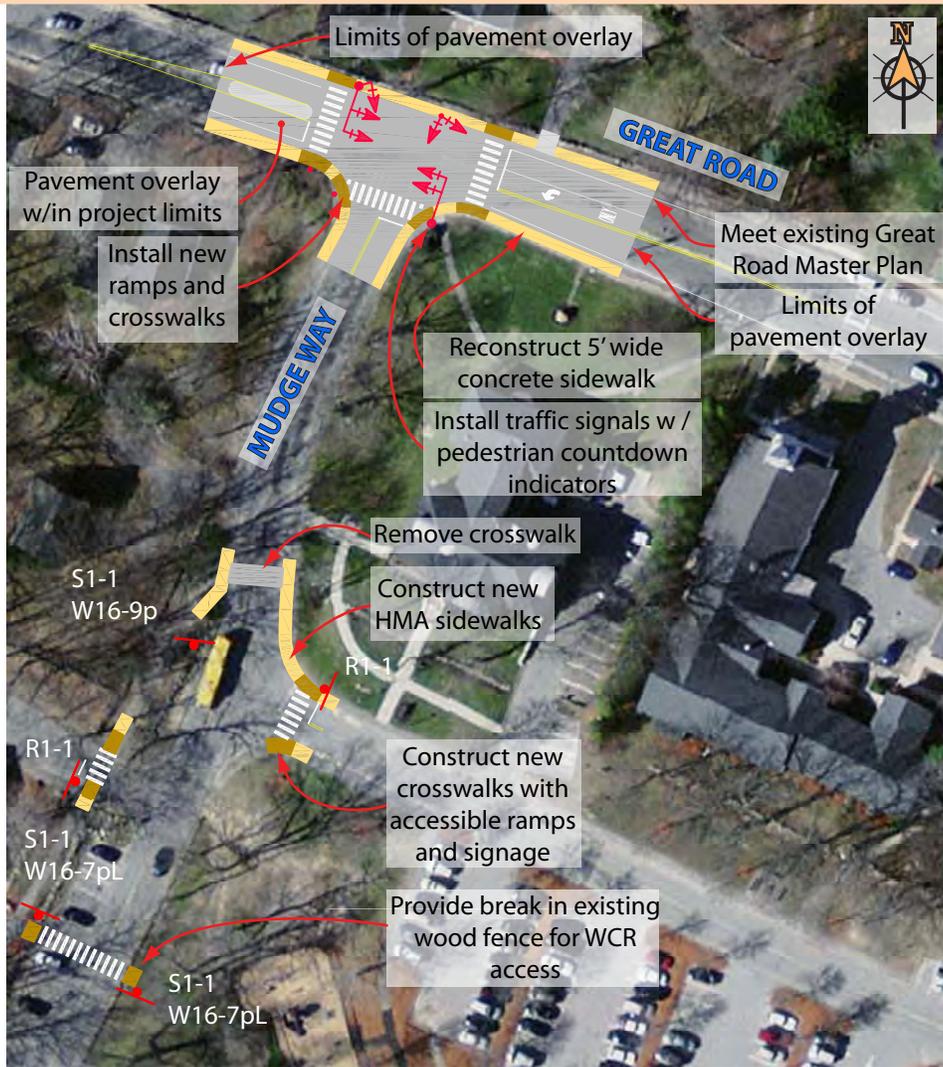
See Figure 6 for additional detail and a graphical depiction of the improvements described above.

The proposed improvements at the Great Road / Mudge Way 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. The proposed sidewalk along the High School driveway would provide a continuous sidewalk connection, separated from vehicular traffic, for pedestrians to travel between the High School and Middle School, significantly improving safety and accessibility of this connection. New crosswalks with pedestrian crossing warning signs will improve visibility and alert drivers to the potential for pedestrians crossing the driveway. The proposed bollards where the existing path meets the High School driveway will ensure that vehicles do not drive onto the pathway while pedestrians may be utilizing the path. These bollards will be removable to allow for emergency access, maintenance, and snow removal.

The conceptual cost estimate for the potential SRTS-funded infrastructure project is \$728,500. The construction of these improvements will likely require many temporary and permanent easements. As described in Chapter 5, the Town will be required to provide a commitment to acquiring these easements prior to advancing this project into design.



1"=800'	KEY PROPOSED IMPROVEMENT	FEASIBILITY	SAFETY/ MOBILITY BENEFIT	COST
Proposed SRTS Infrastructure Project				
SRTS	Reconstruct Sidewalks and Install Traffic Signal with Pedestrian Countdown Indicators at Great Road and Mudge Way Construct Sidewalk Connection Between High School and Middle School	High	High	Moderate
Recommendations to be Pursued by the City or through Other Funding Sources				
1	Construct Sidewalk on Railroad Avenue from the Reformatory Branch Rail to South Road (Currently in Design)	High	High	High
2	Improvements to Great Road Crossing at Bacon Road and Hillside Avenue	High	High	Low
3	Construct Sidewalk on Bacon Road / Crescent Avenue / Hartford Street	Moderate	Moderate	High
4	Construct Sidewalk and Install Lighting on School Way	Moderate	Moderate	High
5	Implement Drainage and Grading Improvements at Great Road and Loomis Street	Moderate	Moderate	Moderate



RECOMMENDED SCOPE OF WORK AND CONCEPTUAL COST ESTIMATE:

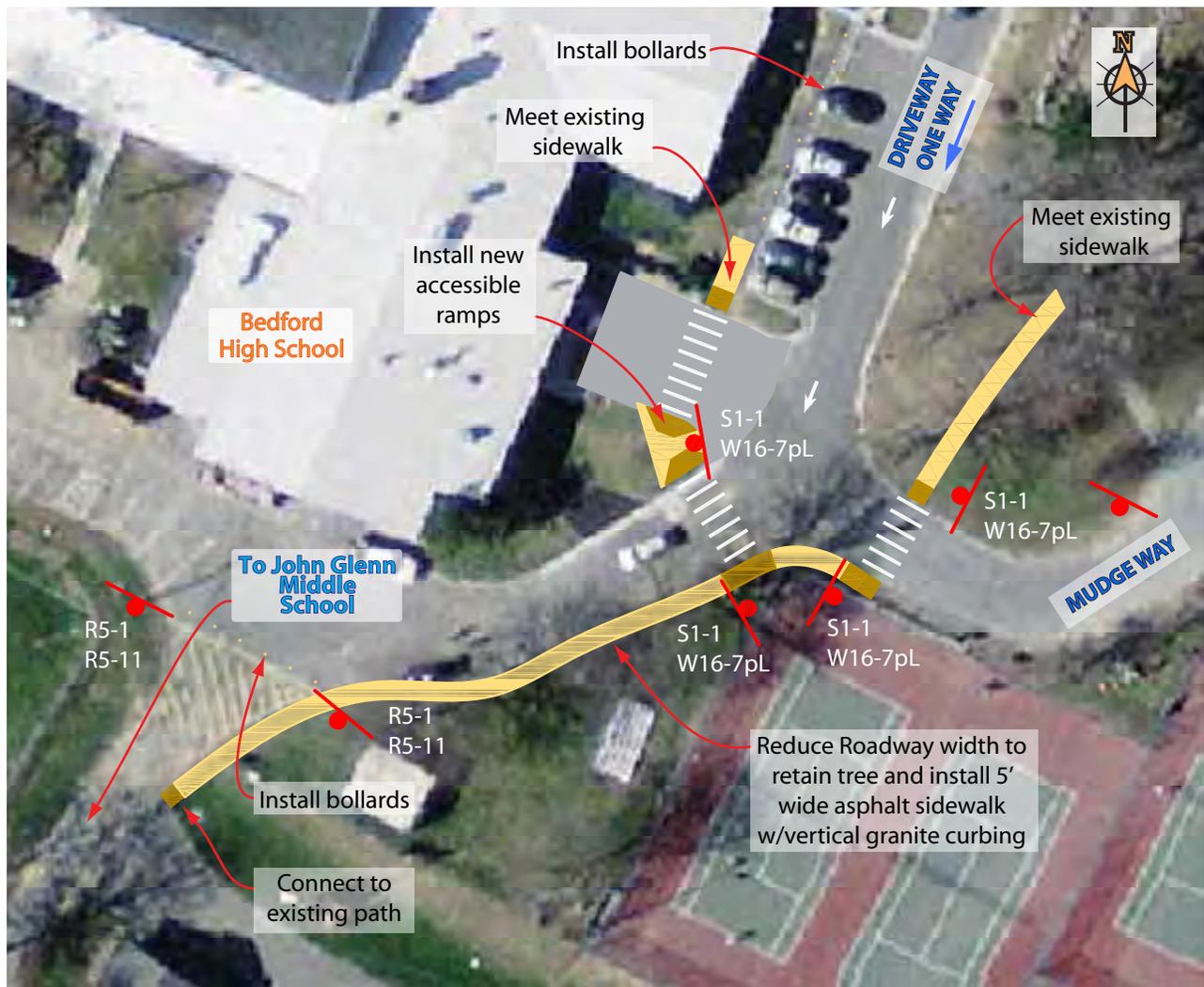
5' WIDE CONCRETE & ASPHALT SIDEWALK & GRANITE CURB (INCLUDING RAMPS)	=	\$ 111,000
PAVEMENT MILL AND OVERLAY	=	\$ 32,500
SIGNS & STRIPING	=	\$ 8,000
LANDSCAPING	=	\$ 6,500
TRAFFIC CONTROL/FIELD OFFICE	=	\$ 77,500
DRAINAGE MODIFICATIONS	=	\$ 27,000
UTILITY POLE RELOCATION	=	\$ 30,000
TRAFFIC SIGNAL	=	\$ 150,000
+/- 25% CONTINGENCY & CONSTRUCTION ENGINEERING	=	\$ 110,500
TOTAL	=	\$ 553,000



Intersection of Great Road and Mudge Way



Figure 5 : Reconstruct Sidewalks and Install Traffic Signal with Pedestrian CountDown Indicators at Great Road and Mudge Way



RECOMMENDED SCOPE OF WORK AND CONCEPTUAL COST ESTIMATE:

5' WIDE ASPHALT SIDEWALK & GRANITE CURB (INCLUDING RAMPS)	= \$ 101,000
SIGNS & STRIPING	= \$ 8,500
LANDSCAPING	= \$ 4,500
DRAINAGE IMPROVEMENTS	= \$ 12,000
TREE REMOVAL	= \$ 3,000
BOLLARDS	= \$ 11,500
+/- 25% CONTINGENCY & CONSTRUCTION ENGINEERING	= \$ 35,000
TOTAL	= \$ 175,500

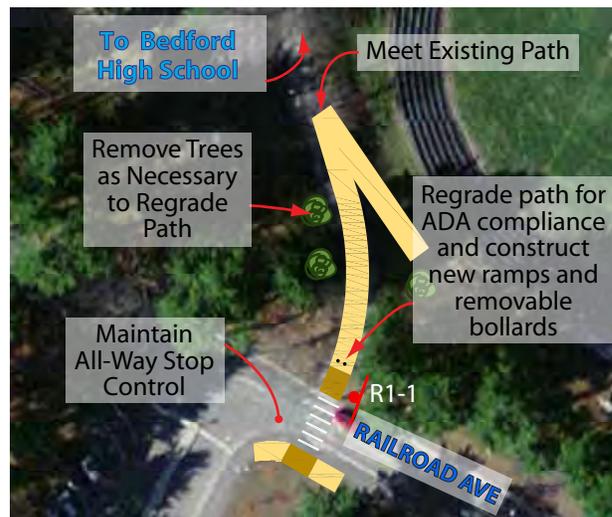


Figure 6 : Construct Sidewalk Connection Between High School and Middle School

4.1 Other Recommendations for Implementation by the Town of Bedford

The MassDOT Team has identified additional infrastructure projects that address less-pressing concerns, but that are nevertheless expected to improve pedestrian and bicycle access to the school property from adjacent neighborhoods. The list of potential projects for the Town of Bedford to consider includes the following:

- Construct Sidewalk on Railroad Avenue from the Reformatory Branch Rail Trail to South Road
- Improvements to Great Road Crossing at Bacon Road / Hillside Avenue
- Construct Sidewalk on Bacon Road / Crescent Avenue / Hartford Street
- Construct Sidewalk and Install Lighting on School Way
- Construct Grading and Drainage Improvements at Great Road / Loomis Street

While these projects will improve safety for students walking to school, they are not anticipated to see the same level of use as the improvements included in the proposed SRTS infrastructure project. All students bused from the John Glenn Middle School and Bedford High School, as well as the 47 students living in neighborhoods north of the Great Road / Mudge Way intersection, and the 50 High School students living in neighborhoods accessed via Railroad Avenue and South Road will benefit from the improvements included in the proposed SRTS infrastructure project. In comparison, approximately 50 students would walk along Bacon Road and cross at the Great Road / Bacon Road / Hillside Avenue intersection, 21 students would cross at the Great Road / Loomis Street intersection, and up to 18 students may travel along School Way from the Middle and High Schools combined.

Recommendation 1 – Construct Sidewalk on Railroad Avenue from the Reformatory Branch Rail Trail to South Road

As observed during field visits and discussed in Section 3.4, the existing sidewalk on Railroad Avenue from the Reformatory Branch Rail Trail to Highland Avenue is in poor condition and is not ADA-compliant. Between Highland Avenue and South Road there are wide curb cuts and no sidewalk is provided. MassDOT recommends constructing 5' wide asphalt sidewalk with vertical granite curbing along the north side of Railroad Avenue between the Reformatory Branch Rail Trail and South Road. A crosswalk will be provided at the Reformatory Branch Rail Trail to allow bicyclists to access the trail. Construction of the sidewalk will allow pedestrians and bicyclists traveling from neighborhoods south and east of the John Glenn Middle School to access the school and Town Campus. This project is currently being advanced by the Town of Bedford.

Recommendation 2 – Improvements to Great Road Crossing at Bacon Road and Hillside Avenue

The Narrow Gauge Rail Trail crosses Great Road adjacent to the intersection of Great Road / Bacon Road / Hillside Avenue. This intersection is unsignalized and causes driver confusion due to its proximity to the rail trail and high speeds that motorists are traveling

along Great Road. Three pedestrian crashes have occurred over the last year from motorists attempting to make left-turn movements onto Great Road from Hillside Avenue and Bacon Road. MassDOT recommends installation of a pedestrian flasher assembly with advance warning signs on Great Road at the Narrow Gauge Rail Trail crossing to alert drivers to pedestrians and bicyclists crossing the roadway.

The installation of a pedestrian flasher assembly will improve bicycle and pedestrian safety and alert drivers to the presence of pedestrian and bicyclists crossing Great Road. New pavement markings and MUTCD-compliant signage will further enhance driver awareness and pedestrian safety. New ADA-compliant accessible ramps should be installed at either end of this crosswalk to improve accessibility for all users. This project is currently being advanced by the Town as part of the Great Road Master Plan.

Recommendation 3 – Construct Sidewalk on Bacon Road/Crescent Avenue/Hartford Street

The Bacon Road / Crescent Avenue / Hartford Street neighborhood is very dense and used by motorists as a cut-through to avoid South Road and Great Road. There are currently no sidewalks provided along Bacon Road, forcing pedestrians to walk in the roadway. MassDOT recommends constructing a 5' wide asphalt sidewalk with vertical granite curbing along the east side of Bacon Road between Loomis Street and Great Road. Construction of the proposed sidewalk will provide vertical separation between motorists and pedestrians and will complete the missing sidewalk connection in this neighborhood.

Recommendation 4 – Construct Sidewalk and Install Lighting on School Way

School Way is a small stretch of road located between Mudge Way and Elm Street, and provides access to the Center Elementary School, Bedford Town Hall and the Town Campus from the east. Currently there are no sidewalks along School Way between Elm Street and Mudge Way and there is no street lighting in this area. MassDOT recommends construction of 5' wide asphalt sidewalk with vertical granite curbing on the north side of School Way from Elm Street to Mudge Way. ADA-compliant accessible ramps and a crosswalk would be installed at the intersection of Mudge Way and School Street. The sidewalk would continue adjacent to the on-street parking on Mudge Way and terminate just north of the parking where sidewalk exists today. New lighting consistent with the Great Road Master Plan would be installed to make the Town Campus more attractive for pedestrians. The proposed improvements would provide a continuous sidewalk connection between Mudge Way and South Road, improving pedestrian safety and accessibility. Combined with installation of street lighting to improve visibility in winter months, the proposed sidewalk would allow School Way and South Road to function as a safe alternative to walking along Railroad Avenue to access neighborhoods along South Road, Hartwell Road, and Loomis Street.

Recommendation 5 – Implement Drainage and Grading Improvements at Great Road / Loomis Street

Poor grading at the intersection of Great Road / Loomis Street causes ponding of water at the openings of the accessible ramps. This causes pedestrians and bicyclists to walk in the roadway around the puddles and over the curb to access the sidewalk, and limits the

accessibility of this intersection. MassDOT recommends regrading the intersection and upgrading the existing drainage system to eliminate ponding of water at the accessible ramps. The installation of push-button directional signage (R10-3) to direct pedestrians which button to push to cross each leg may reduce confusion as there are currently two push-buttons on each corner of the intersection. The installation of “Turning Vehicles YIELD to Pedestrians” (R10-15) signs on all approaches for vehicular traffic may help to alert drivers to pedestrians in the crosswalk. The prohibition of right-turn-on-red may also reduce conflicts between vehicles and pedestrians, but may increase vehicular delays through the intersection.

5 Next Steps

MassDOT intends to advance the proposed infrastructure project due to its ability to help increase the number of children walking and bicycling to school and substantially improve safety for pedestrians and bicyclists. The benefit of the proposed SRTS infrastructure project was assessed based on the inventory of existing infrastructure and identification of critical gaps, student residency / density information indicating the number of students that would benefit from infrastructure improvements as well as pedestrian / bicycle collision occurrence.

In order to successfully complete an SRTS infrastructure project, MassDOT and the Town of Bedford must work together to advance it through the SRTS Infrastructure Program process. The next steps include design and permitting, which are described in detail in Section 5.2 below. Schedules related to these activities can vary depending upon the school calendar (especially summer vacation), ability to reach a consensus on recommended actions, timing of Town Meeting, logistics of the Town's right-of-way acquisition process, and other factors.

Although the project development process is comprehensive and can take a significant amount of time, each step is necessary to satisfy requirements for the use of Federal money to build these projects. MassDOT and the Town of Bedford each have important responsibilities, described below. Cooperation and communication between MassDOT and the Town will help to make the process move as smoothly and quickly as possible.

5.1 Project Approval (Step 1)

In order to advance the identified project, the Town of Bedford must formally accept the recommendations in the report. This formal acceptance will entail the following steps:

Collaborative Review and Final Concept Development

The SRTS infrastructure project proposed for funding by MassDOT will be reviewed by the Engineering Division of the Department of Public Works and other relevant Town staff, and refined in collaboration with MassDOT.

Formal Review and Approval

Assuming endorsement by the Engineering Division, the proposed SRTS project must then be submitted to the Board of Selectmen for approval. The Town's legal counsel should review the assessment and provide guidance to the Town regarding the right-of-way process, including the need for a permanent easement(s) on school property for any areas where Federal funds will be used for new or upgraded pedestrian or bicycle facilities.

To ensure community support for a proposed project, MassDOT strongly encourages the Town to invite public comment from both the project abutters and the school community. Should the Town's staff require assistance in presenting the recommendations, a representative of MassDOT would be available to participate in such a meeting.

Formal approval requires a vote of the Board of Selectmen and a letter from the board or Town Administrator stating the Town’s support of the proposed SRTS infrastructure project in its conceptual form.

Assumption of Town Responsibilities

The Town of Bedford must also formally accept its responsibilities for implementing the project. This requires a vote of endorsement from the Board of Selectmen and submission of a letter from the Town Administrator that acknowledges municipal responsibility for the right-of-way acquisition process and the municipality’s assumption of costs associated with legal counsel review and fee takings, if required. Right-of-way needs are generally limited to narrow strip easements adjacent to the public right-of-way to provide space for a sidewalk; as a result, costs are usually not high.

The Town of Bedford must also identify a municipal liaison who will be responsible for leading future design reviews with municipal staff, organizing public meetings, and coordinating the right-of-way acquisition process described below.

5.2 Design, Evaluation, and Construction (Steps 2 & 3)

Once the SRTS infrastructure project is proposed and approved by MassDOT, a project design will be advanced in coordination with MassDOT and the Town’s municipal liaison. This project design will require conformance with MassDOT’s *Project Development and Design Guide* and HTC Directive as applicable.

Ground Survey

The design work will require detailed topographic ground survey and right-of-way layout research to properly locate the proposed infrastructure. The detailed ground survey is needed for any required utility design, including drainage, and to identify and minimize any impacts to the abutting parcels. Ground survey costs are covered by the SRTS program.

Right-of-Way Certification (Municipal Responsibility)

The survey and design process would identify any fee takings and any easements (both temporary and permanent) on private property that are needed for construction. The Town would be required to secure all fee takings and easements necessary to complete the project. The identification and legal clearance of the public right-of-way must be completed prior to MassDOT’s issuance of a Right-of-Way Certificate, which is necessary to enable the use of Federal funds for construction activities as part of the SRTS program.

Under a Town form of government, adoption of a warrant article is required at Town Meeting to receive donated property or acquire easements and land in fee by purchase or eminent domain. As Town Meetings are typically conducted once or twice per year, the timing of the submission of the warrant article for the Town’s legal counsel review is critical to the overall schedule of the project. MassDOT will fund the preparation of roadway layout and easement plans that may be required for the project. Although the school is publicly-owned property, the Town of Bedford would still be required to perform an Order of Taking for any easements on the school property; this plan needs to

be recorded at the Registry of Deeds and is a requirement to secure the Federal funds for this project.

Permitting

MassDOT would coordinate any necessary Categorical Exclusion (CE) requests as part of National Environmental Policy Act (NEPA) permitting. These permitting elements require coordination with the MassDOT Highway Division’s Environmental Section, Right-of-Way Bureau, and relevant District office.

Final Design and Programming

As part of the SRTS program, the MassDOT Highway Division may accept a combined submission at the 25 percent/75 percent design stage in order to expedite the design review process for projects that are primarily associated with new sidewalk construction or reconstruction. Figure 7, presents a *generalized* summary of the steps required as part of the design and permitting process with associated time frames. All design costs are managed and funded as part of the MassDOT SRTS program.

Construction

After final plans, specifications, and cost estimates (PS & E) are completed and approved, the MassDOT Highway Division would publicly advertise the project for construction bids. Upon selection of a construction firm, a contract would be prepared and signed. The Highway Division would oversee the project through the appropriate District office. All eligible construction costs would be covered by MassDOT’s SRTS program.

Pre- and Post-Construction Evaluation

To quantify the benefits of the project, pre-construction and post-construction evaluations would be undertaken by MassDOT.

For additional information about the SRTS Infrastructure Program or to provide written comments on this Preliminary Assessment, please contact:

Melissa Kalicin
MassDOT Office of Transportation Planning
Ten Park Plaza, Room 4150
Boston, MA 02116-3973
melissa.kalicin@state.ma.us

Typical Design and Permitting Timeframe		
	Steps	Months
1. Project Endorsement	1 Municipality invites public comment and project receives positive vote from Board of Selectmen or City Council.	1
	2 Municipality accepts recommendations and sends letter of support and commitment to fulfill responsibilities from chief executive.	1
2. Design, Permitting, and ROW Process	3 Obtain approval from the MassDOT project review committee (PRC) to initiate a design/construction project with a specific funding program (e.g., Safe Routes to School FY 2017) and project schedule.	1-3
	4 Complete field survey	1
	5 Prepare 25/75% design package & preliminary Right-of-Way plan. Send early environmental coordination letters. Conduct an early coordination meeting with the municipality to review the current design and address any comments.	2
	6 Obtain MassDOT/municipal review of 25/75% design. Conduct a ROW coordination meeting with the municipality to review the ROW acquisition process.	2
	7 Schedule, advertise, and conduct design public hearing.	< 2
	8 Respond to comments, prepare 100% design and final Right-of-Way plans. Obtain environmental permits (if required).	1-2
	9 Obtain MassDOT/municipal review of 100% design. Municipality acquires takings and easements.	1-2
	10 Prepare PS&E plan package for final review and advertisement; Project programmed (Federal funds obligated).	1-2
3. Advertising, & Construction	11 MassDOT advertises project to solicit construction bids.	1-2
	12 MassDOT prepares construction contract and issues contractor's Notice to Proceed.	2-3
Total Approximate Design & Permitting Schedule		15-23

Figure 7: Safe Routes to School Infrastructure Program Typical Design and Permitting Timeframe

This report was prepared by the TEC Team:



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with

the COLLABORATIVE

Planners Collaborative
Design Collaborative
Communications Collaborative

and

