RSG INC.
TRANSPORTATION

Jonathan Daniels Elementary School Pedestrian/Bicycle Travel Plan

Keene, NH

July 2010

PLANNING ■ DESIGN ■ OPERATIONS

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Report Prepared for:
The City of Keene Safe Routes to School Committee

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1.0 INTRODUCTION

Resource Systems Group (RSG) has been retained by the City of Keene to develop this Bicycle and Pedestrian Travel Plan for Jonathan Daniels Elementary School. Table 1 shows the steps to creating a Safe Routes to School (SRTS) program as defined by the *SRTS Guide*[1]. The purpose of this project is to fulfill steps 3, 4 and 5.

Table 1: Steps to Creating a SRTS Program

Step 1: Identify people who want to make walking and bicycling to school safe and appealing for children
Step 2: Hold a kick-off meeting to create a vision
Step 3: Gather information and identify issues
Step 4: Identify solutions
Step 5: Make a plan
Step 6: Fund the plan
Step 7: Act on the plan
Step 8: Evaluate, make improvements and keep moving

Specifically, the City of Keene SRTS Committee is initiating this plan in order to:

- Reach out and educate school stakeholders and the public about SRTS
- Identify barriers to walking/biking to school
- Prioritize infrastructure improvements for walking and biking to and from the Jonathan Daniels Elementary School
- Enable the City to pursue SRTS infrastructure grants for identified improvements

The plan follows the NHDOT template for SRTS Travel Plans and addresses the following areas:

- Community Organizing Efforts
- Evaluation
- Encouragement
- Education
- Enforcement
- Engineering

[1] Available at www.saferoutesinfo.org.

2.0 COMMUNITY ORGANIZING EFFORTS

81% of JDES students are dropped off at and picked up from school in a family vehicle, resulting in traffic congestion at the school.[1] Many students miss out on the health benefits of walking and biking and the high volume of traffic generated by the parent drop-offs creates intermodal conflicts and safety issues. Given that the majority of students live within walking distance of the school, a Safe Routes to School Ad-Hoc Committee was convened to determine why students were not walking/biking to school and what could be done to shift travel behavior from family vehicles to walking and biking.

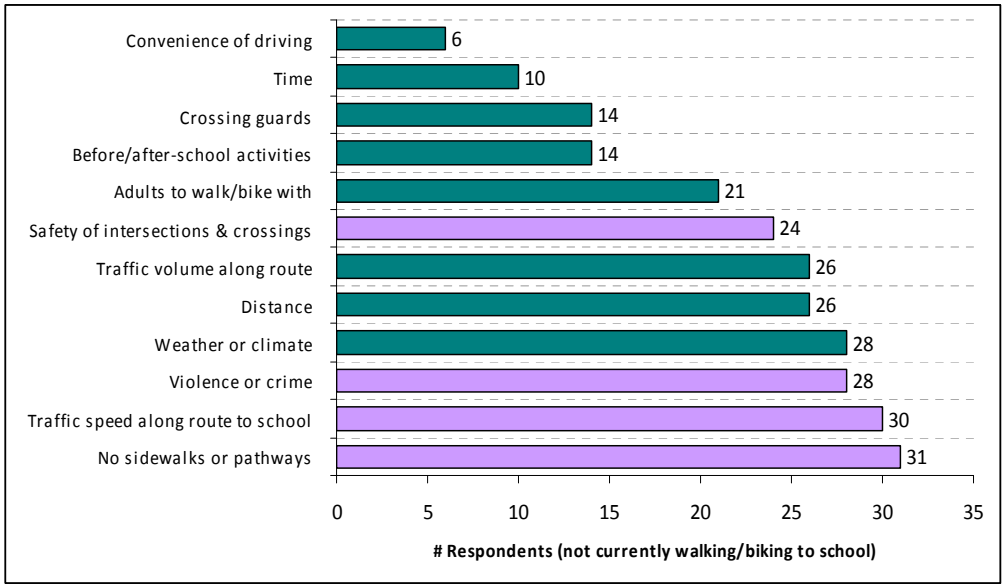
In 2009, the City of Keene worked with students at Keene State University to collect start-up data for a SRTS program. Parent and student classroom surveys were conducted and preliminary mapping tasks were completed. The results of this work are provided in Appendix A.

During the development of this Travel Plan, the planning team met with the SRTS Committee to present existing conditions and prioritize recommended improvements. A public meeting was also held to review the results of the committee's prioritization and to gather feedback and input from parents and neighbors. The materials from this meeting were also posted on the JDES website to solicit additional input from parents.

2.1 2009 Parent Start-Up Survey

The Committee gathered a significant amount of input from the Jonathan Daniels School community on a wide range of issues related to bicycle and pedestrian access to the school. Figure 1 below shows the listing of reasons parents provided for not allowing their child to walk or bicycle to school. While some of these are not controllable (e.g. weather, distance from school), a number of the most important reasons cited (highlighted in purple) can be addressed through a successful Safe Routes to School educational and infrastructure improvement effort.

Figure 1: Reasons for Not Allowing Child to Walk/Bike to School[2]



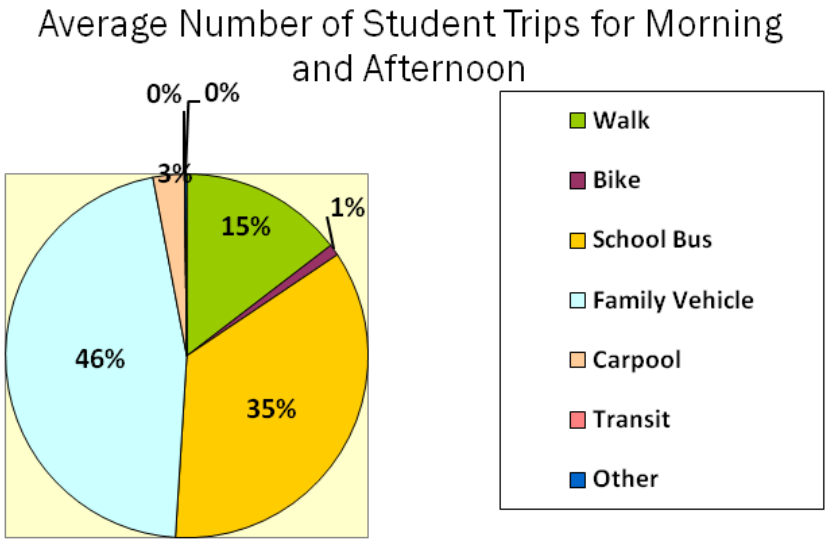
[1] As shown in the 2009 Safe Routes To School Classroom Surveys conducted by Keene State University students. (Provided by the City of Keene.)

[2] Source: Parent Survey Summary Report for Jonathan Daniels Elementary, National Center for Safe Routes to School

3.0 EVALUATION

For SRTS programs, the Evaluation step is critical not just to identify barriers to safe walking and bicycling, but also to monitor progress and plan effectiveness. This section provides an evaluation of existing conditions, including relevant planning documents and studies and crash history. The 2009 SRTS study conducted by the Keene State students (Appendix A) indicates the existing participation of students walking and bicycling to school (Figure 2). This figure may serve as a baseline for the success of this plan in increasing the number of students who walk and bike to school instead of take a family vehicle.

Figure 2: Results of 2009 SRTS Classroom Surveys (source: City of Keene)



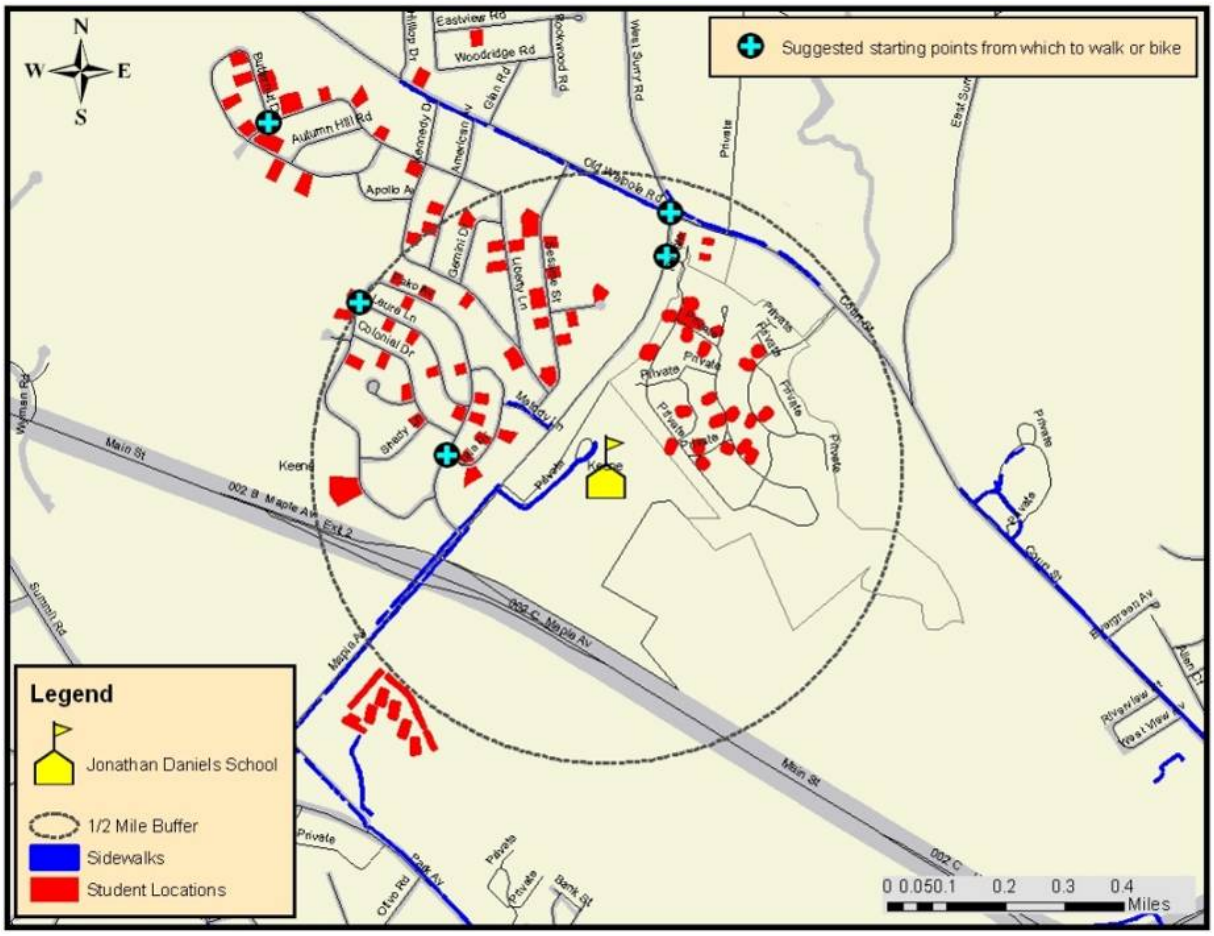
3.1 Overview of Schools

3.1.1 Jonathan Daniels Elementary School

Jonathan Daniels Elementary School (JDES) has 178 students from kindergarten through fifth grade. JDES is located in a suburban area on Maple Avenue between Route 12 and Court Street/Old Walpole Road in Keene, NH as shown in Figure 3 and Figure 4 below. Maple Avenue is a two-lane urban minor arterial roadway with an average daily traffic volume of approximately 5,000 vehicles per day. Maple Avenue is posted with at 30 miles per hour in this area with a 20 mile per hour school zone flasher adjacent to the school driveway. The JDES driveway is stop-controlled on the minor approach, with a single lane for left- and right-turns.

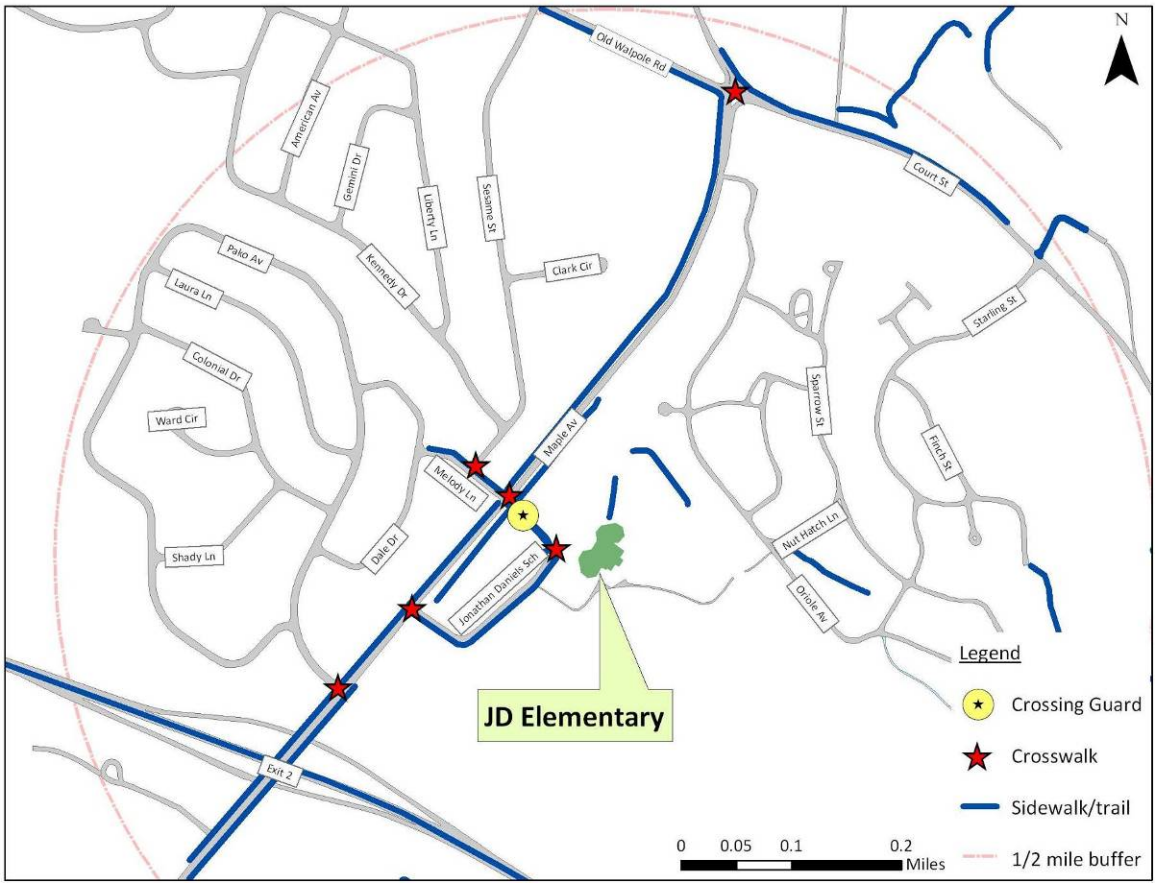
In 2009, the City of Keene worked with Keene State University students to map the JDES student catchment area and suggested starting points for walking school buses or bike trains. The full results of the Keene State students' work are included in Appendix A. Figure 3 shows suggested starting points for walking and biking for the neighborhoods within ½ mile of JDES, where the majority of students live.

Figure 3: Student Locations within ½ mile of JDES and Suggested Starting Points from which to Walk or Bike (source: City of Keene)



Route conditions within this area were assessed in the field to determine the current level of walkability and bikeability to the school. Figure 4 shows the locations of sidewalks and trails, crosswalks, and crossing guards within ½ mile of JDES.

Figure 4: JDES Walking Route Assessment



As suggested above, JDES has several transportation modes to organize during the short school arrival/dismissal periods. Figure 5 shows the existing JDES site and arrival/dismissal areas for pedestrians/bicyclists, school buses, and family vehicles. Parents picking up students in private vehicles are asked to queue along the driveway and refrain from entering the parking lot; this is intended to minimize vehicle/pedestrian conflicts. A crosswalk extends across the parking lot entrance (Figure 6) for pedestrians to access Maple Avenue and the crosswalk (staffed by a crossing guard) at Melody Lane. School buses enter the parking lot to pick up and drop off students at the front door of the school.

Figure 5: Overview of Student Access at Jonathan Daniels Elementary School

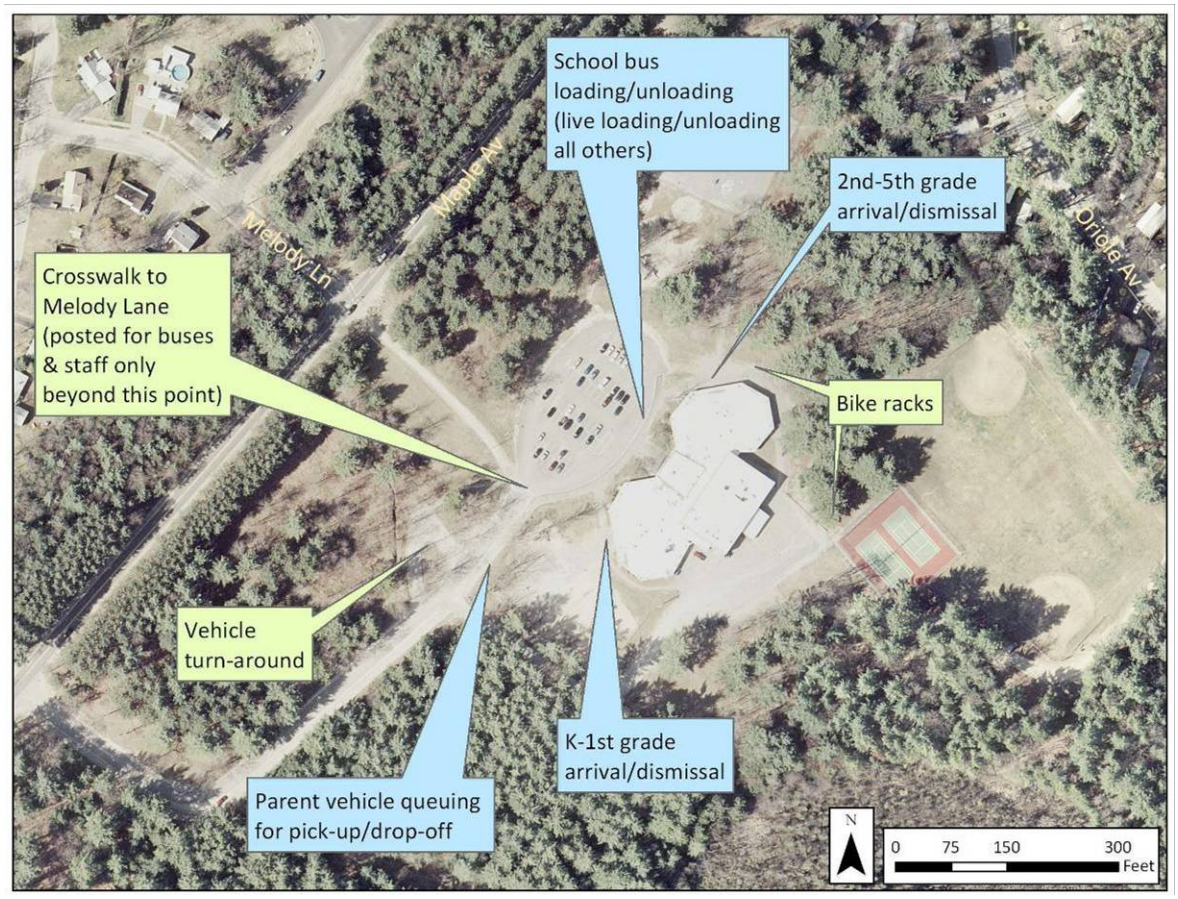


Figure 6: School Parking Lot Entrance/Crosswalk to Melody Lane

3.1.2 Keene Middle School

Figure 7 shows the draft plans for Keene Middle School (KMS), which is currently under construction to the southwest of JDES. KMS is expected to have 700 to 1,000 students in grades 6-8. There will be two accesses to KMS from Maple Avenue. The first aligns with Pako Aveune and the second utilizes the existing access for JD Elementary. As shown in Figure 7, there is a one-way (clockwise) access road that loops around KMS and provides access to parking and the athletic facilities south of the site. The school's construction program includes:

- Left- and right-turn lanes into and out of both school driveways. (Figure 8 and Figure 9)
- Northbound/eastbound left-turn lane to Pako Avenue. (Figure 8)
- Crosswalks across Maple Avenue on the southern/western side of each school driveway.

- A median on the south/west side of the JDES driveway.
- Sidewalks into the KMS site along the south/west side of each driveway, crosswalks across the driveways, and a sidewalk around the school building. However, there is no sidewalk on the south side of Maple Avenue between the two school driveways.
- Improvements to the sidewalk on the south side of Maple Avenue west of NH 12.
- Additional crossing guards at both school driveways.

Figure 7: Construction Plans for Keene Middle School (source: Meridian Land Services, Inc.)

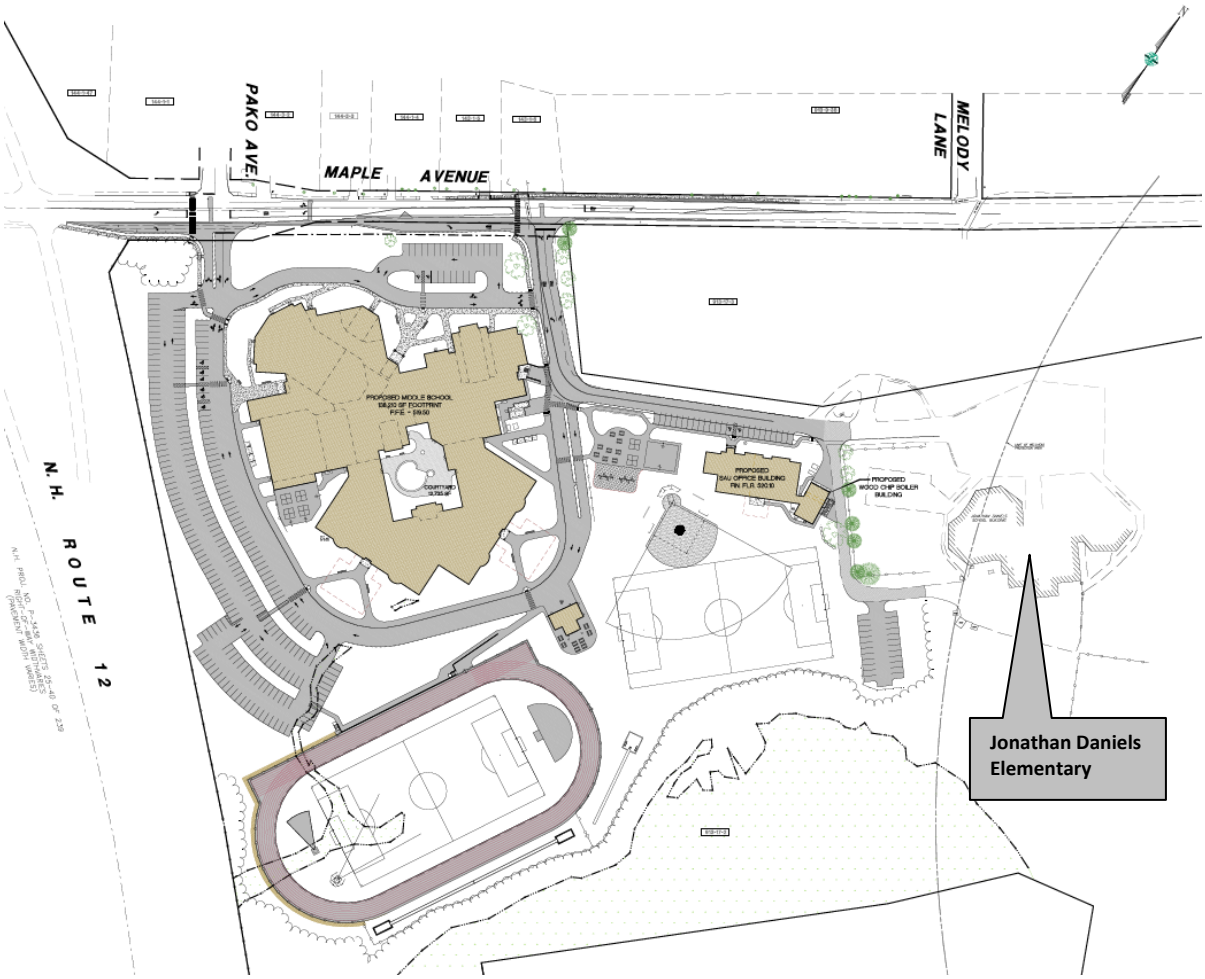


Figure 8: Construction Details for KMS Driveway at Pako Ave (source: Meridian Land Services, Inc.)

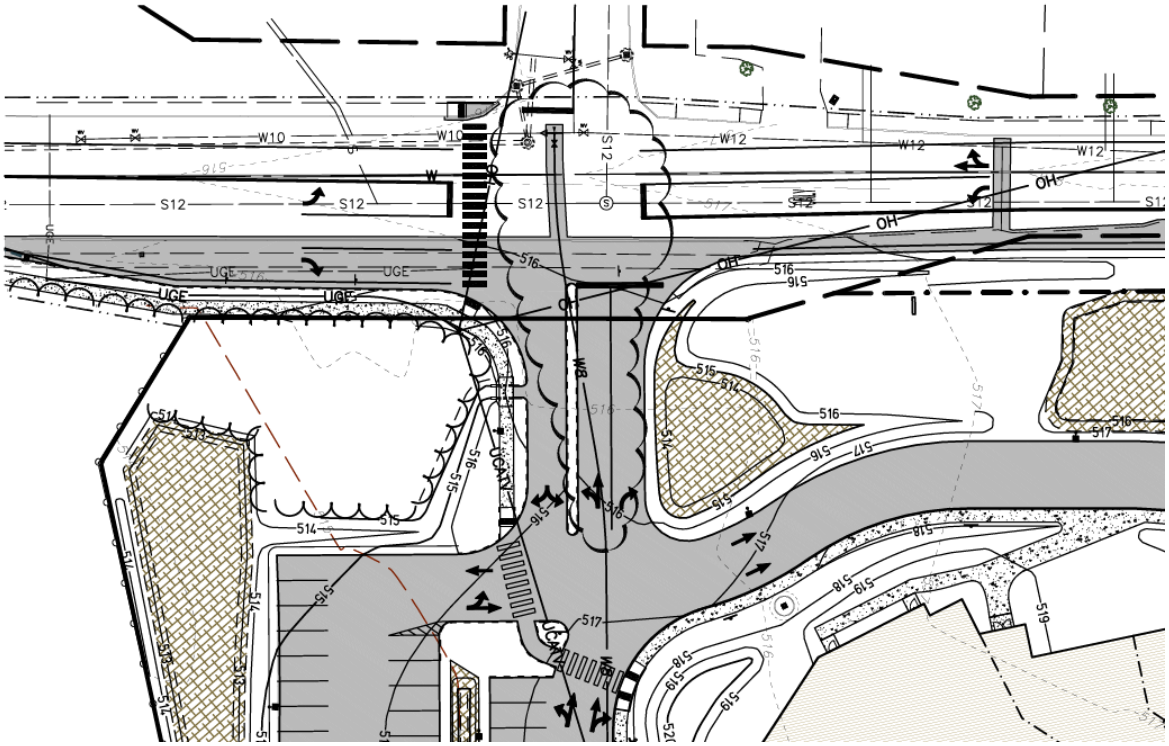
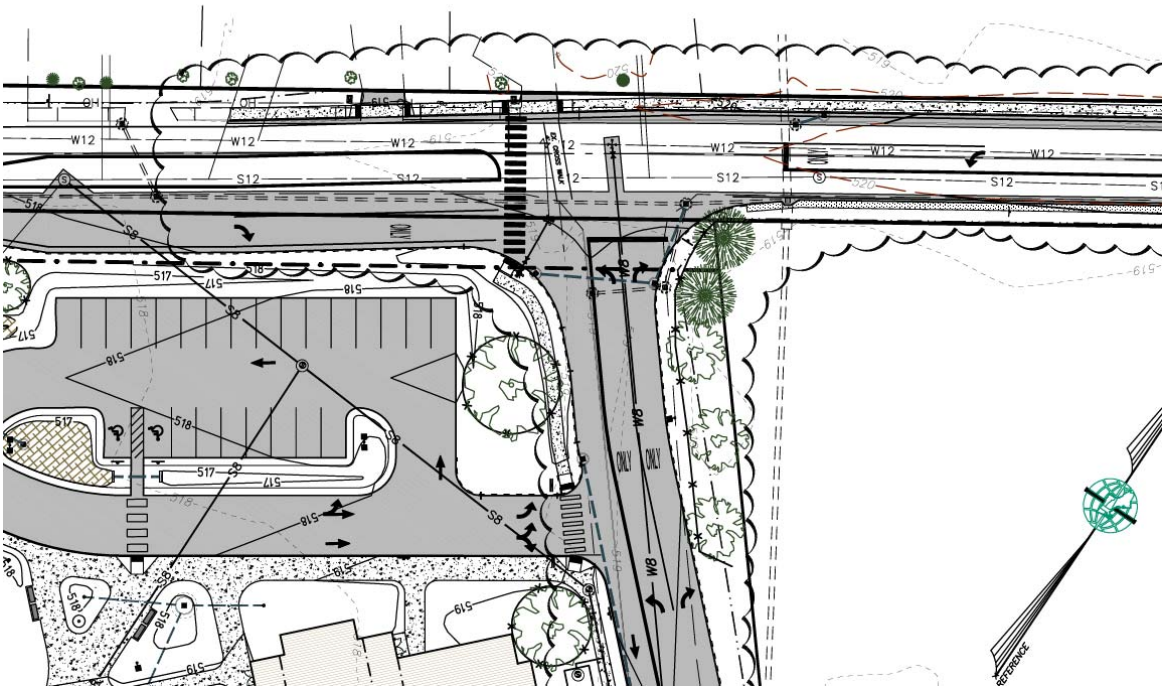


Figure 9: Construction Details for Shared KMS/JDES Driveway (source: Meridian Land Services, Inc.)



3.2 Maple Avenue

Concerns about vehicle speeds on Maple Avenue are a major concern of parents surveyed for the 2009 SRTS study. While pavement markings and signs exist to alert drivers of the school zone, more can be done to enhance these elements and increase the school's presence on Maple Avenue. (See Appendix B for more detail on existing conditions.) The 2008 Traffic Study conducted for Keene Middle School indicated that "compliance with 20 mph during morning and afternoon school periods is limited to 10-20% of drivers."[1]

Maple Avenue has both curbed and uncurbed sections with variable shoulder widths. There is a sidewalk on the northwest side of Maple Avenue (Figure 10). Between Melody Lane and Pako Avenue, the sidewalk and curb abut the roadway, while to the north and south of this section, there is a green strip that provides a buffer between pedestrians and vehicles (Figure 11).

Figure 10: Maple Avenue Sidewalk and Melody Lane Crosswalk

[1] November 2008, *Keene Middle School Traffic Study*, page 22.

Figure 11: Green strip between Sidewalk and Maple Avenue (North of Melody Lane)

There is an informal path through the forested conservation area between Maple Avenue and JDES (see Figure 12). Due to historic covenants that run with the Dinsmoor Woods parcel, no sidewalks or other improvements can be constructed on this parcel. However, the path should be recognized as a significant pedestrian connection, and it is included in the Route Assessment in Figure 4.

Figure 12: Path through Forested Conservation Area between Maple Avenue and JDES

3.2.1 Maple Avenue Crash History

The Keene Police Department provided a summary of crashes on Maple Avenue in the vicinity of Jonathan Daniels Elementary School from 2007 to 2010. As shown in Table 2, there have been 15 crashes

since 2007; of these, six involved injuries and four involved pedestrians or bicyclists. At least five were caused by driver inattention/distraction.

Table 2: Maple Avenue Crash History 2007-2010 (source: Keene Police Department)

Year	Location	Did crash involve ped/bike?	Property Damage Only/Injury/Fatality?	Description/ Contributing Factors
2007	At JD School	N	1 injury (non-incapacitating)	Inattention/distraction
	Maple Ave at Route 12 ramps	Y	2 injuries (non-incapacitating)	Skidding
	Maple Ave	N	Unknown	Single vehicle crash due to inclement weather
	Maple Ave between JD School driveway and Melody Lane	N	PDO	Inattention/distraction
2008	Maple Ave between JD School driveway and Melody Lane	N	1 injury (non-incapacitating)	DUI
	Maple Ave at Melody Lane	N	PDO	Inattention/distraction
	Maple Ave at Melody Lane	Y	PDO	Right turn
	Maple Ave at JD School driveway	Y	1 injury (non-incapacitating)	DUI
	Maple Ave	N	Unknown	Rear end collision
2009	Maple Ave at JD School driveway	N	PDO	Unknown
	Maple Ave between JD School driveway and Pako Ave	N	PDO	Rear end collision caused by Inattention/distraction
	Maple Ave between JD School driveway and Melody Lane	N	PDO	Unknown, DUI
	Maple Ave at Route 12 ramps	N	1 injury (non-incapacitating)	Inattention/distraction
2010	At JD School	N	PDO	School bus hit parked vehicle

3.3 Neighborhoods Northwest of Maple Avenue

As shown in Figure 4 above, there are no sidewalks in the neighborhoods on the northwest side of Maple Avenue (with the exception of a short segment on Melody Lane). However, the roads are very wide (as shown in Figure 13) and feedback from public forums has suggested that, for the most part, pedestrians feel comfortable walking on the side of the road.

Figure 13: Typical Roadway in Neighborhoods Northwest of Maple Avenue

3.4 Relevant Reports

3.4.1 1999 City of Keene Bicycle/Pedestrian Path Master Plan

The Bicycle/Pedestrian Master Plan was prepared by the City of Keene Bicycle/Pedestrian Path Advisory Committee (BPAC) and the City of Keene Planning Department in 1999. The plan is reviewed here to ensure consistency with the JDES Travel Plan. Relevant points include:

- Included as a goal of the Master Plan is: "To prioritize public bicycle/pedestrian pathway projects for development to meet alternative transportation needs." This goal is very much in sync with the mission of SRTS.
- Specific to Maple Avenue, the plan recommends widening the roadway for 4' bike lanes and placing "share the road" signs along Maple Street. Although on-street bike facilities are inappropriate for elementary school students, raising awareness of bicyclists and pedestrians in the area is beneficial.

Beyond the Bicycle/Pedestrian Path Master Plan, it is interesting to note the Keene City Code of Ordinance requires bicycle registration for residents.[1] In addition, NH State Law requires the use of bicycle helmets by children under 16 years old.[2]

3.4.2 Keene Middle School Traffic Study (2008 & 2010 update)

The Traffic Impact Study for KMS identified existing conditions and estimated future conditions for the planned Maple Avenue site. Relevant points include the following:

- Speed studies were conducted as part of the analysis. The results indicated that 85th percentile speeds are 36 mph during the day (the posted speed limit is 30 mph). When the 20 mph school

[1] Part II Chapter 94, Article VI of the Keene City Code of Ordinance.

2 NH State Law: RSA 265:144.

zone speed limit is in effect during the morning and afternoon, "speeds are lower but compliance with 20 mph is limited to 10-20% of drivers."

- The majority of KMS students (340-370) are expected to take the bus, with approximately half as many (170-205) being dropped off/picked up in family vehicles. 65-100 students are expected to walk or bicycle.
- With the additional KMS traffic, left-turns out of both driveways are projected to have high levels of delay (with the planned improvements of separate left- and right-turn lanes). However, the presence of the crossing guard at the intersection's crosswalk may help to "create gaps in the through traffic to allow vehicles to exit with less delay."
- Signal warrant analyses were not conducted at either driveway.
- The study recommends encouraging students to ride the bus over other travel modes.
- The 2010 update recommends finding ways to reduce vehicle speeds on Maple Avenue, such as increased enforcement, larger signs, flashing speed displays, etc..

3.5 Measures of Effectiveness

Measures of effectiveness are suggested here in order to monitor the program and evaluate its progress.

- Number of students walking & biking to school
- Number of SRTS events/initiatives like Walking Wednesdays
- Shifts in mode split from family vehicle to walking or biking
- Number of crashes
- Number of speeding violations

4.0 ENCOURAGEMENT

Encouragement efforts to spur interest and excitement among parents and students include:

- Special events such as International Walk to School Day/Month (October)
- Regular events such as Walk or Bike to School Days or Walking Wednesdays
- Walking School Buses
- Bicycle Trains
- Mileage Clubs (a.k.a. Frequent Walker/Bicyclist Cards)
- Contests
- Incorporation into classroom activities such as tracking the number of miles each student would have to walk to walk the equivalent distance across the US, etc.

In addition, Appendix A of the Keene Bicycle/Pedestrian Path Master Plan describes how to "Create a Bicycle/Pedestrian Friendly Community."

5.0 EDUCATION

STRS focuses on educating students, parents, and neighbors on safety, the health benefits of walking and bicycling, and the environment. For elementary school children, pedestrian safety is considered more of an issue than bicycle safety, which is typically addressed in middle school. SRTS guidelines suggest holding school assemblies, to be reinforced by classroom activities (such as in Physical Education), parental involvement, and skills practice. Parental involvement can include reinforcing safe driving, walking, and bicycling near the school and when picking up/dropping off students. Media stories have been suggested as an effective way to reach parents.

The City of Keene Bicycle/Pedestrian Path Master Plan recommends several methods for improving public awareness of pathway regulations, including signs, printed materials, and safety days/presentations (page 15).

6.0 ENFORCEMENT

Enforcement activities can involve a Student Safety Patrol, Neighborhood Speed Watch Programs, Crossing Guards, and other role models. In addition to the crossing guard at Melody Lane, JDES has a staff person to act as a school driveway monitor during arrival and dismissal.

In addition to providing a police presence, law enforcement officers can participate by leading school assemblies and teaching safety courses. Efforts suggested by SRTS include:

- Speed trailers/feedback signs (discussed in Section 7.0)
- Traffic complaint hotline
- Photo enforcement
- Progressive ticketing:
    1. Educate
    2. Warn
    3. Ticket

7.0 ENGINEERING

The identified deficiencies within the study area were grouped into four categories:

- School pick-up/drop-off area
- Vehicle speeds on Maple Avenue
- Upcoming changes to walkability/bikeability
- Future of informal pedestrian connections

Fourteen potential improvements were identified to address these areas as shown in Table 3.

Table 3: Themes and Potential Solutions

On May 18, 2010, the existing conditions assessment and potential improvements were presented to the SRTS Ad-Hoc Committee. The committee was provided a worksheet and asked to prioritize each improvement. (See Appendix B for the presentation and the prioritization worksheet.) **Error! Reference source not found.**Figure 14 and Figure 15 below present the results of the prioritization process.

Figure 14: SRTS Ad-Hoc Committee Improvement Prioritization

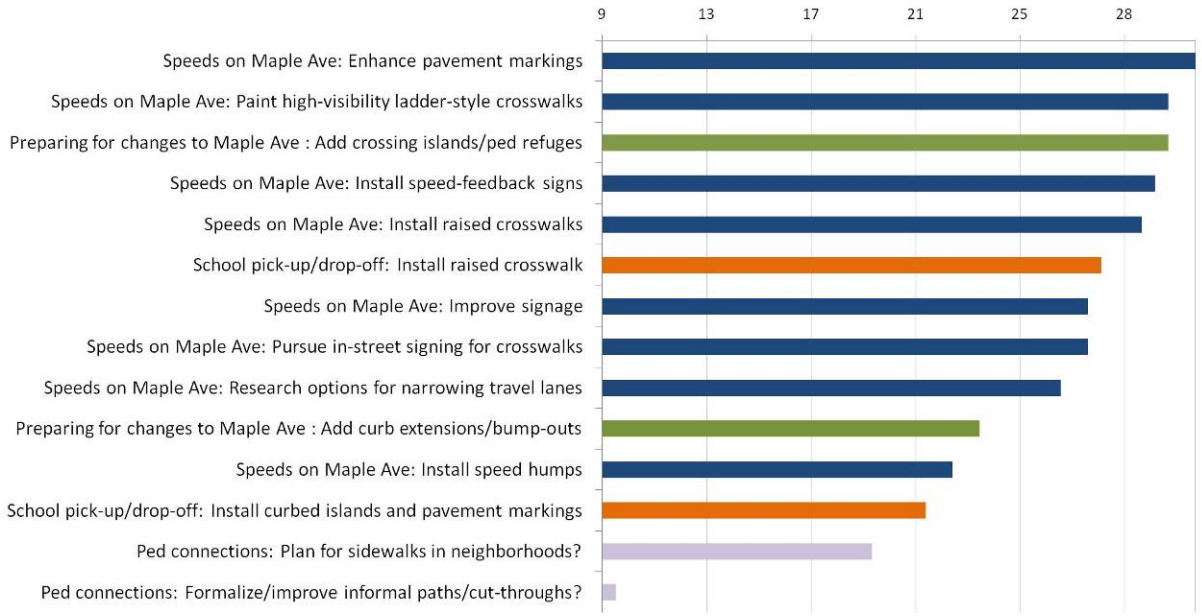
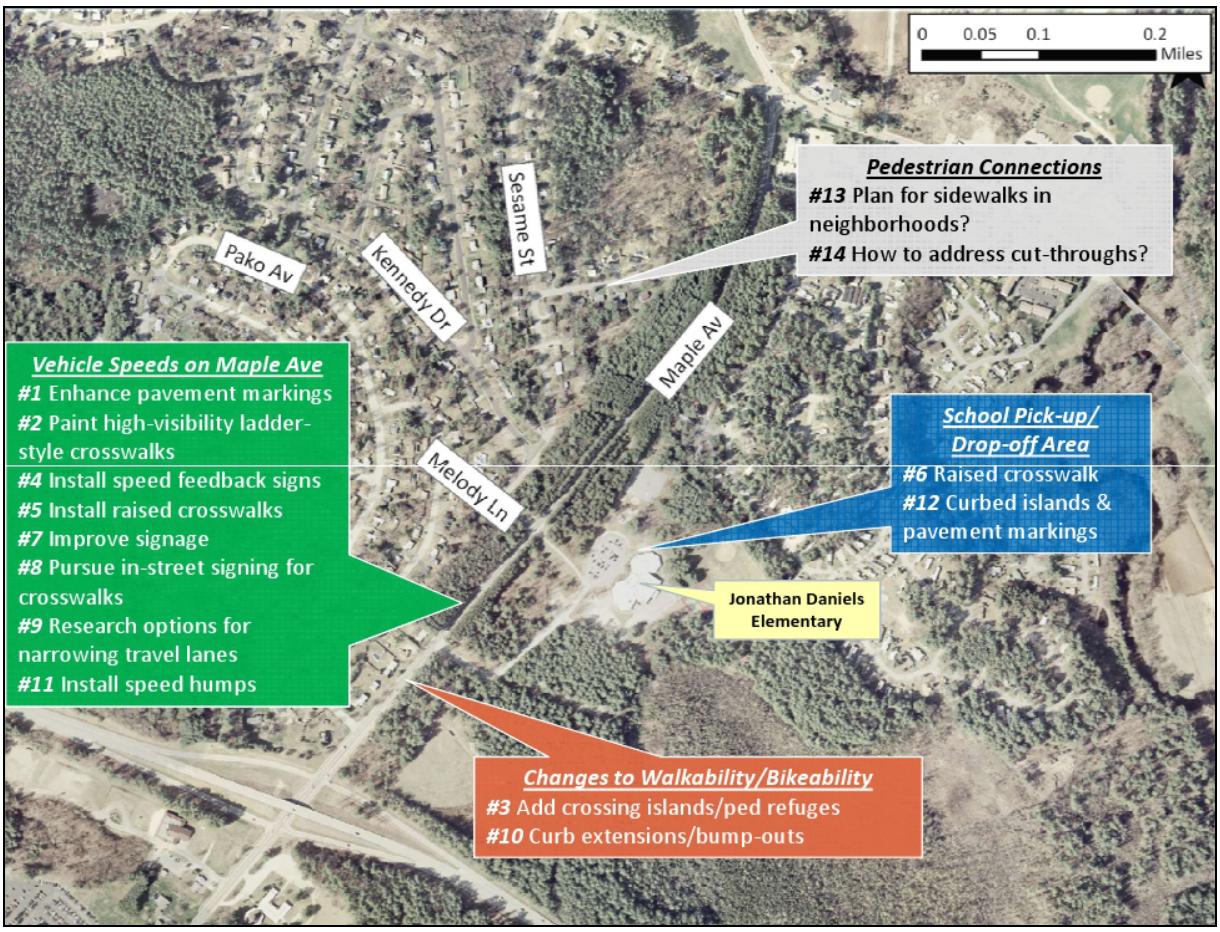
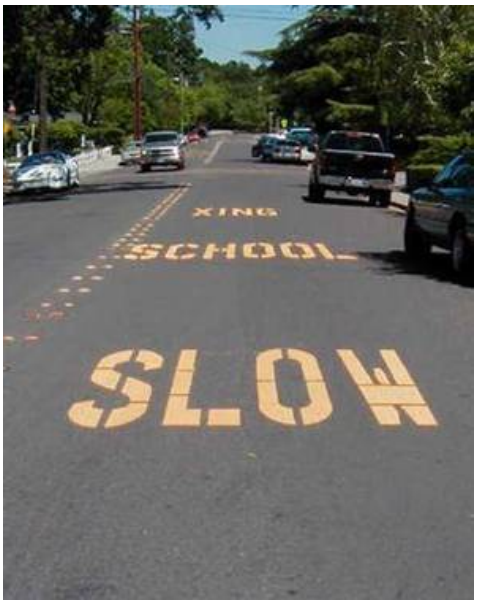


Figure 15: Improvements Prioritized by SRTS Ad-Hoc Committee



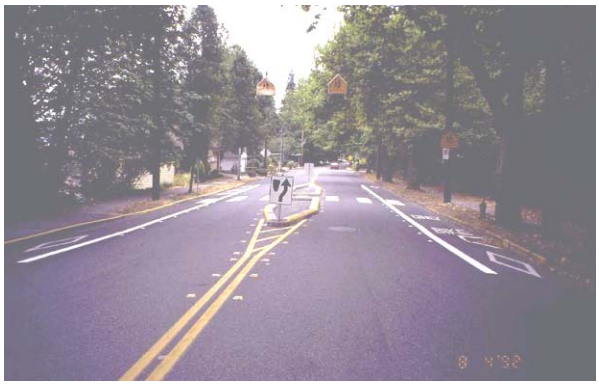
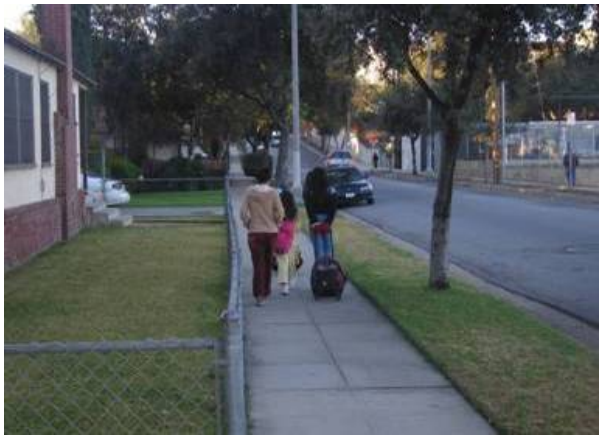
The prioritized improvements are described in more detail in Table 4 below, which includes the priority ranking, and example of the improvement, and preliminary cost estimate. Preliminary cost estimates are based on industry standards and/or the NHDOT Average Price List 2007-2008.

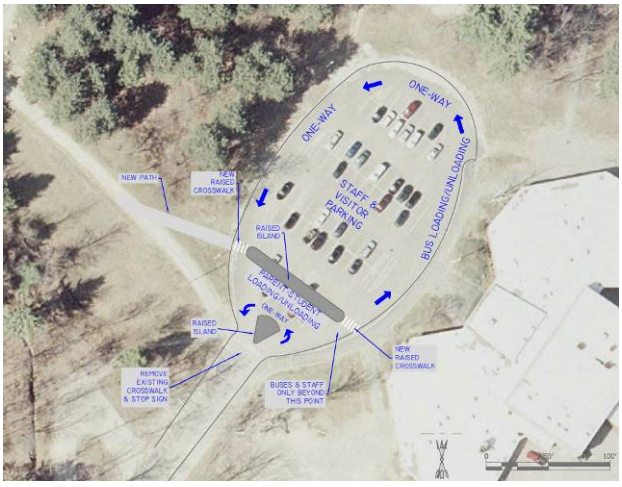
Table 4: Overview of Prioritized Improvements (photo sources: SRTS National Course)

Priority	Improvement	Example	Estimated Unit Cost
1	Enhance pavement markings		$30 / square foot *(includes removal of old markings)*
2	Paint high-visibility ladder-style crosswalks		$2,000 each *(includes removal of old markings)*
3	Add crossing islands/pedestrian refuges (see plans below)		To be included in KMS construction

4	Install radar speed feedback signs		$5,000 each
5	Install raised crosswalk on Maple Avenue		$6,000 each
6	Install raised crosswalk at entrance to school parking lot		$8,000 each *(assuming stamped asphalt as shown)*

7	Improve signage			$300 each
8	Pursue in-street signing for crosswalks			$300 each

9	Research options for narrowing travel lanes (e.g. splitter islands, green strips to buffer sidewalk from roadway, striping narrower travel lane widths)	 	Feasibility to be determined
10	Add curb extensions/bump-outs (see plans below)		To be included in KMS construction
11	Install speed humps		$5,000 each

12	Install curbed islands and pavement markings in school parking lot to separate modes (see plans below)		$80,000
13	Plan for sidewalks in neighborhoods?	As noted above in Section 3.3, feedback has suggested that pedestrians feel comfortable walking on the side of the road.	
14	Formalize short-cuts through woods?	The SRTS Committee discussed this issue and decided that the short-cuts should not be endorsed or formalized due to safety reasons and because the Melody Lane sidewalk and crosswalk are closely aligned with the shortcuts.	

7.1 Preparing for Changes to Walkability/Bikeability on Maple Avenue

The construction of KMS during the development of this Travel Plan presented an opportunity to immediately implement some of the improvements noted above. The KMS project includes turning lanes onto and from Maple Avenue, which increase crossing distances for pedestrians. The existing crossing distance on Maple Avenue at the JDES driveway and at Pako Avenue is 44', as shown in Figure 16. The addition of turning lanes shown in the draft plans for the Maple Avenue-JDES intersection (Figure 17) would extend the Maple Avenue crossing distance to 53'.

Figure 16: Existing Cross-Section of Maple Avenue

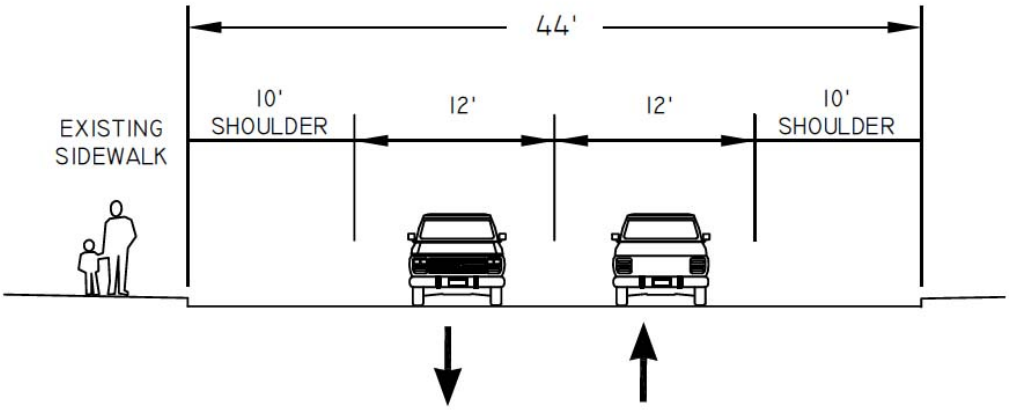
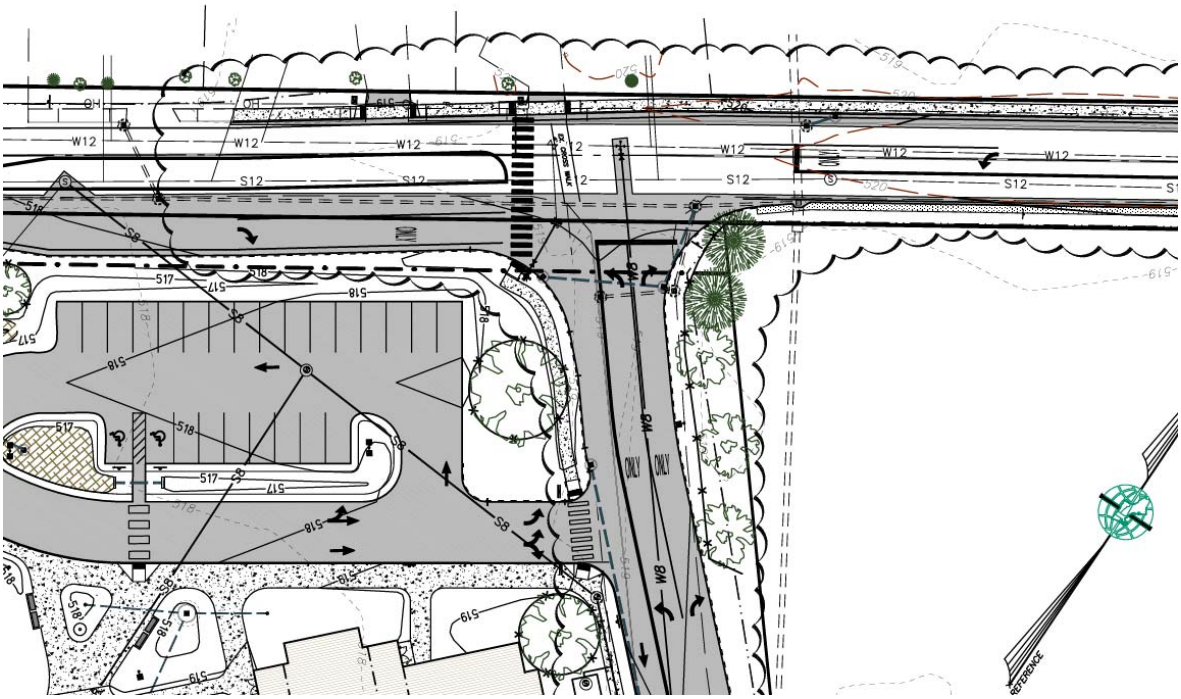


Figure 17: Construction Plans for Maple Ave-JDES Intersection (source: Meridian Land Services, Inc.)



The median to the west of the intersection presents an opportunity to create a pedestrian refuge to address this increase in crossing distance, as shown in Figure 18.

The additional turning lanes on Maple Avenue at Pako Avenue increase the crossing distance to 60' (Figure 19). A narrow splitter island and curb extensions can help to address the crossing distance at this location, as shown in Figure 20.

Figure 18: Proposed Improvements to Maple Avenue at JDES Intersection

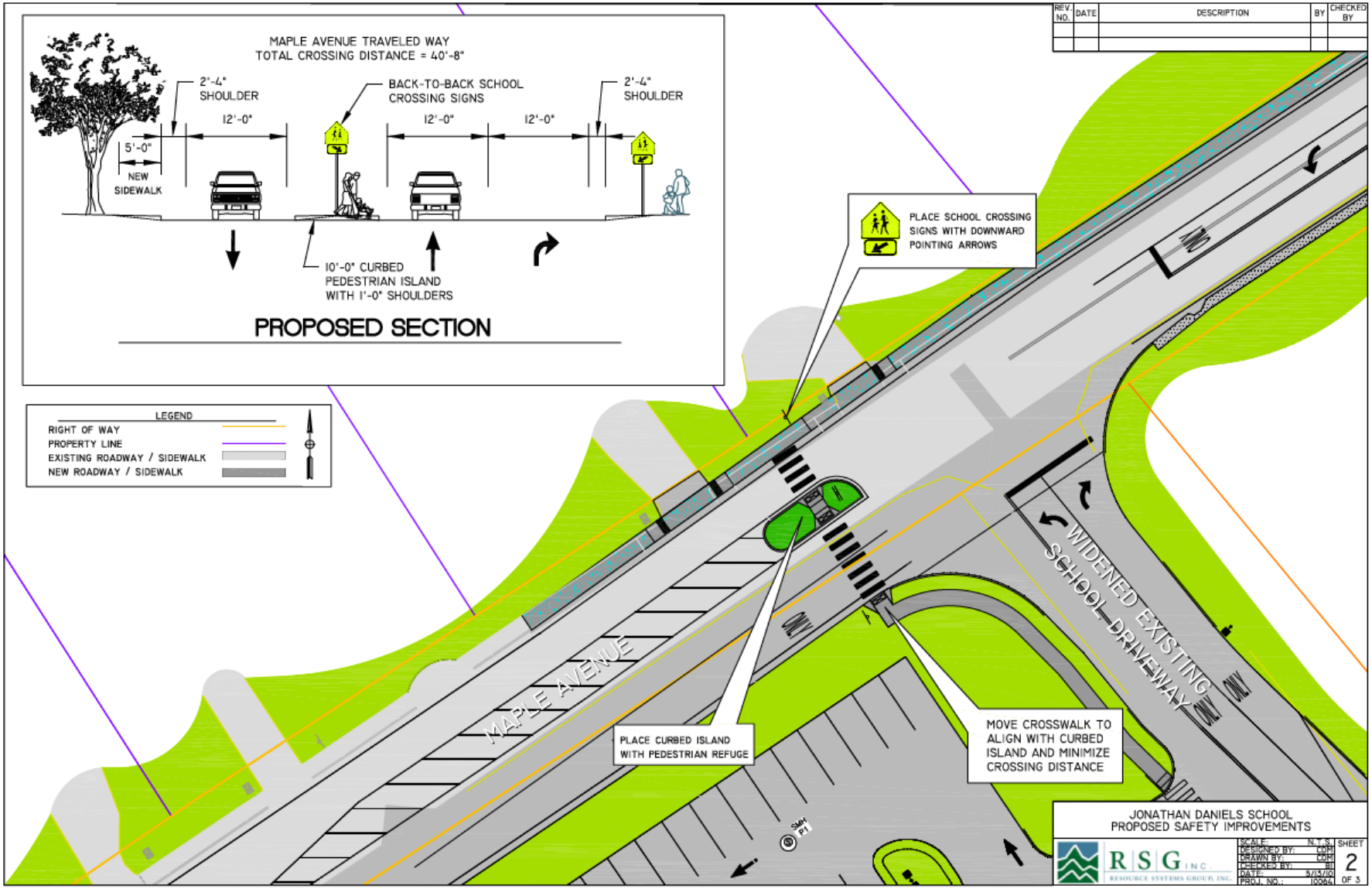


Figure 19:Construction Plans for Maple Ave-Pako Ave-KMS intersection (source: Meridian Land Services, Inc.)

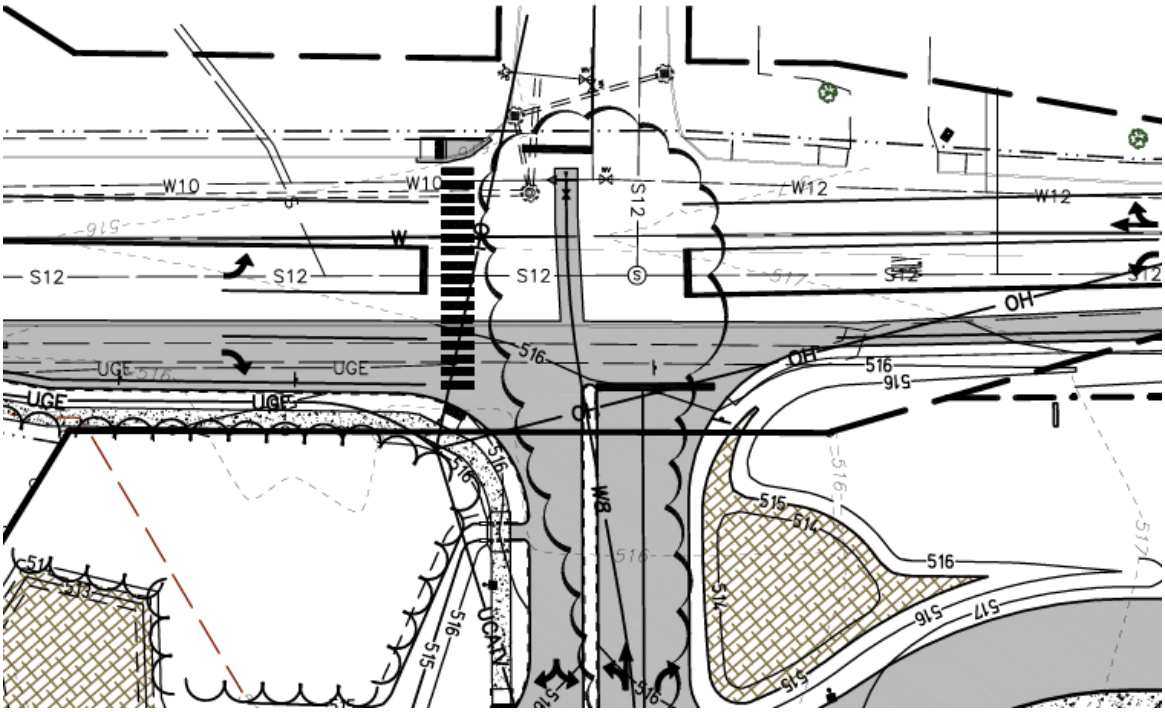
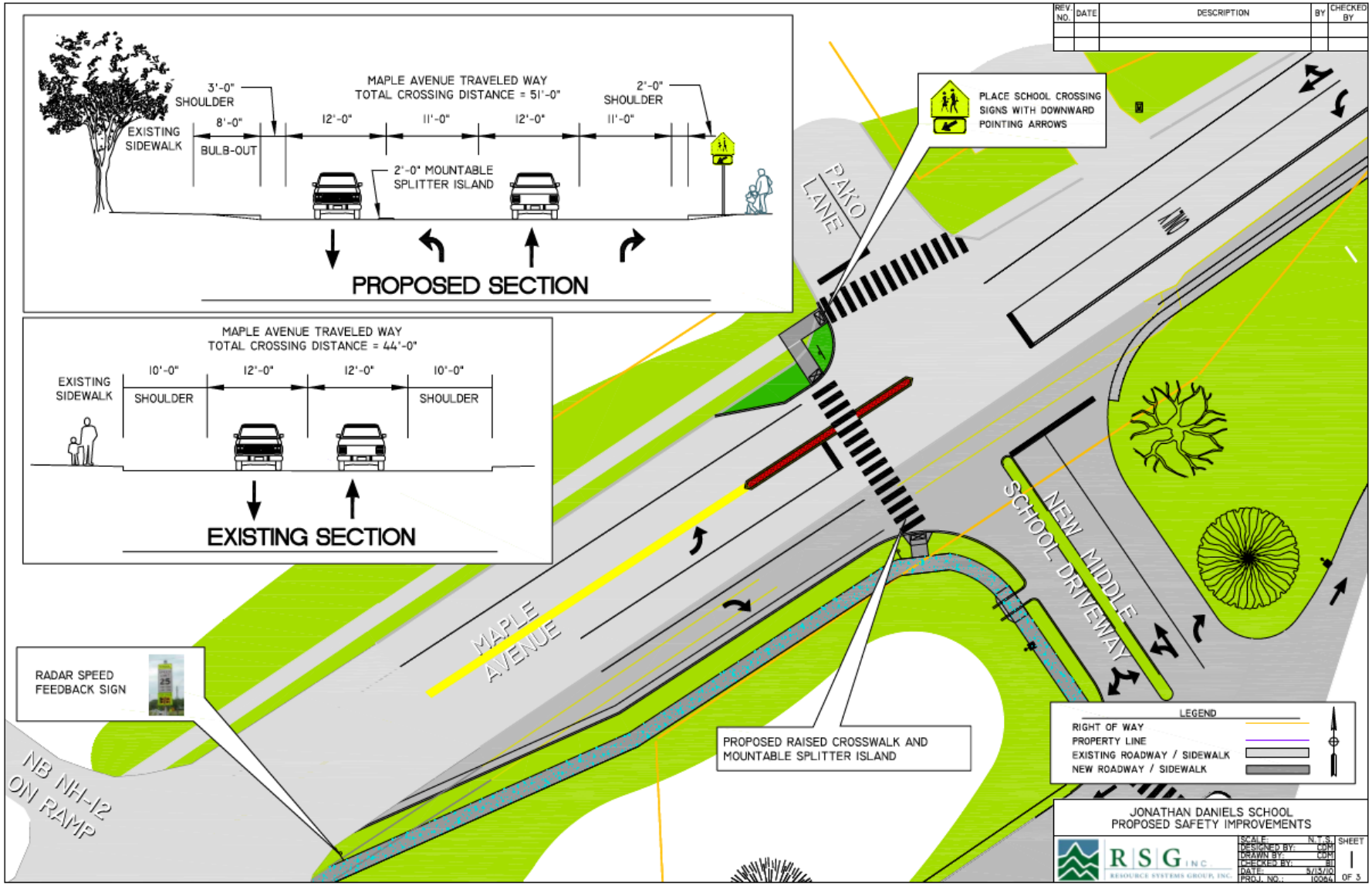


Figure 20: Proposed Improvements to Maple Avenue at Pako/KMS Intersection

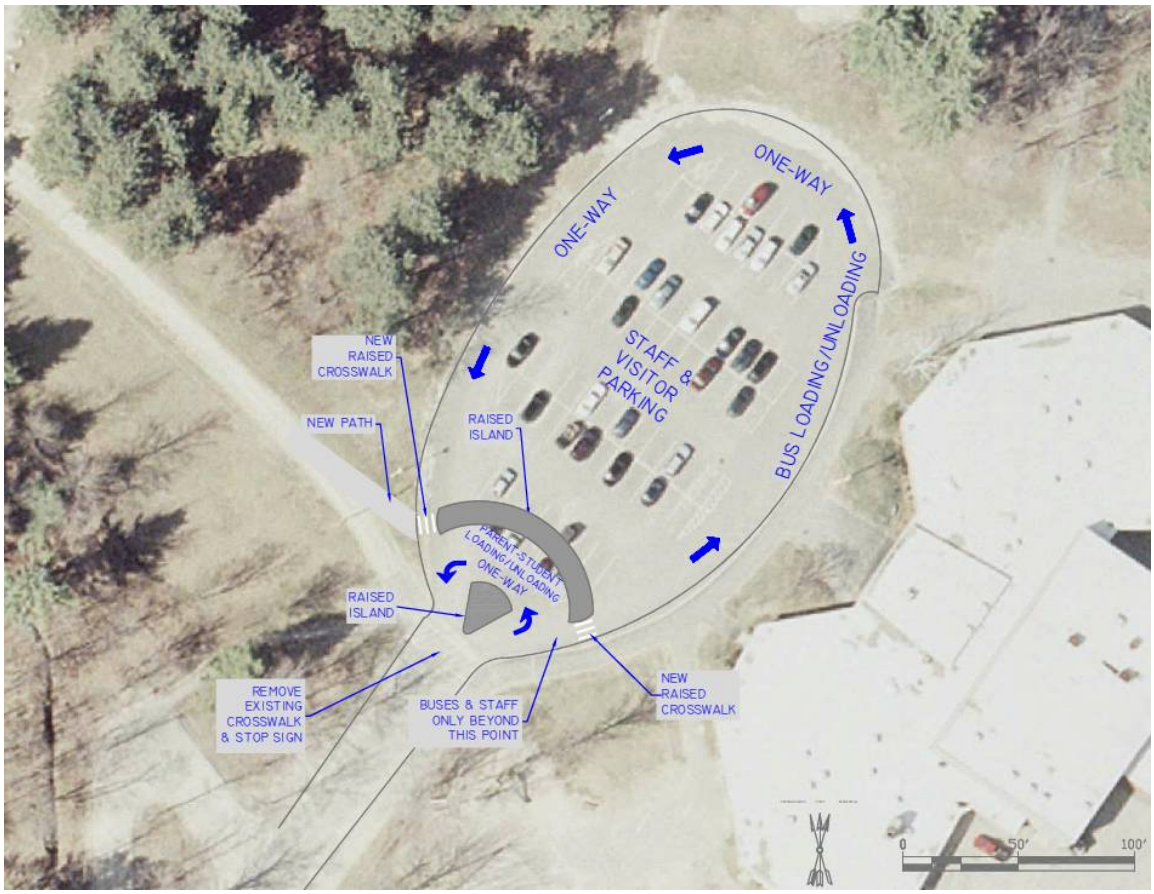


7.2 School Pick-Up/Drop-Off

The nature of school arrival and dismissal periods involves several transportation modes convening in a short window of time and presents several safety issues. At JDES, arrival and dismissal is organized at the front of the school in the parking lot. Modes are separated as much as possible to minimize conflicts and safety problems. To reinforce this separation, curbed islands, raised crosswalks, and pavement markings are recommended. Figure 21 and Figure 22 present two options for the student pick up and drop off area with minimum parking impacts. Alternative 1 involves a straight crossing with an island where students can get into the vehicle. Alternative 2 involves a curved island to reinforce that family vehicles are not to enter the parking lot during arrival/dismissal; however, this option does not align as closely with the desired path of pedestrians. Public feedback showed greater support for Alternative 1. Questions were raised regarding whether buses would be able to pass through the vehicle queue to enter the parking lot. The potential for widening the driveway to create space for buses will need to be investigated.

Figure 21: Alternative 1 for Parking Lot Improvements

Figure 22: Alternative 2 for Parking Lot Improvements



8.0 SUMMARY AND NEXT STEPS

This travel plan identifies existing conditions and potential improvements to walkability and bikeability to Jonathan Daniels Elementary School. The Keene SRTS Committee prioritized the improvements so that they can be pursued in order of importance to the school community. The next step is to pursue infrastructure funding, both locally and through the Safe Routes to School program, to implement the identified improvements.

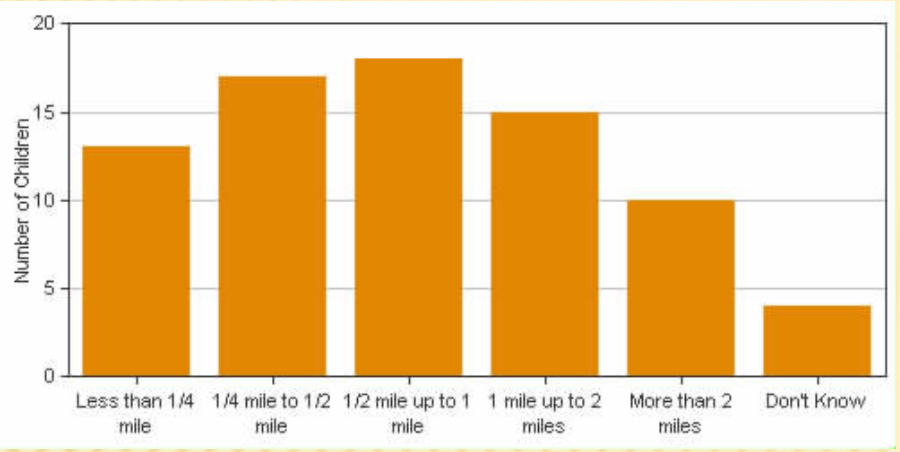
In addition, an important and ongoing part of the SRTS Evaluation process is monitoring the effectiveness of projects and programs over time. Therefore, performance measures, such as the ones suggested in Section 3.5, would be useful for evaluation purposes and to reflect how the walkability and bikeability of JDES changes.

APPENDIX A

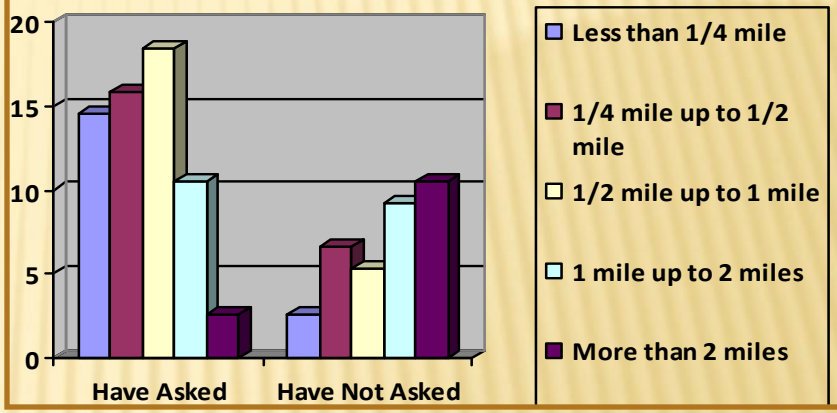
2009 SRTS Survey Results

SAFE ROUTES TO SCHOOL RESULTS

Number of Students by Distance They Live from School:



Number of Students Who Have Asked Their Parent for Permission to Walk/Bike to School in the Last Year:

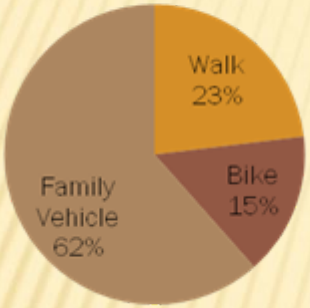


Number of Parents Who Feel Their Child's School Encourages or Discourages Walking and Biking to/from School:

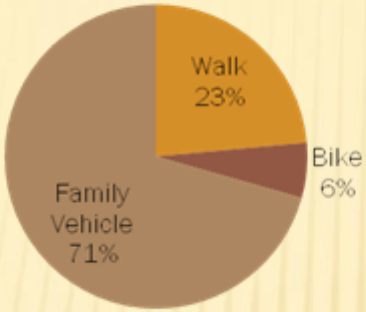
Strongly Encourage	Encourage	Neutral	Discourage	Strongly Discourage
9.7%	38.9%	36%	0%	1.4%

Transportation Trends Separated By Distance

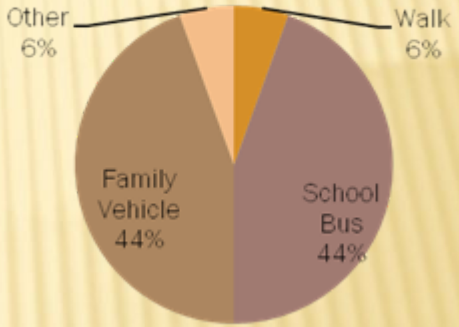
less than 1/4 mile



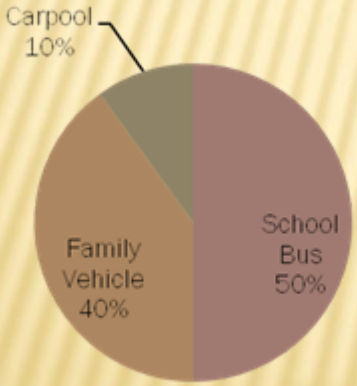
1/4 to 1/2 mile



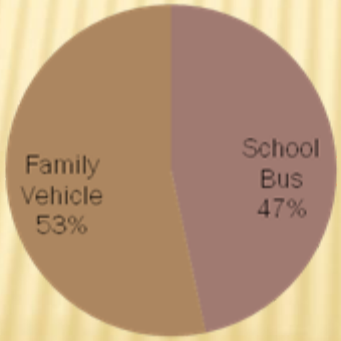
1/2 to 1 mile



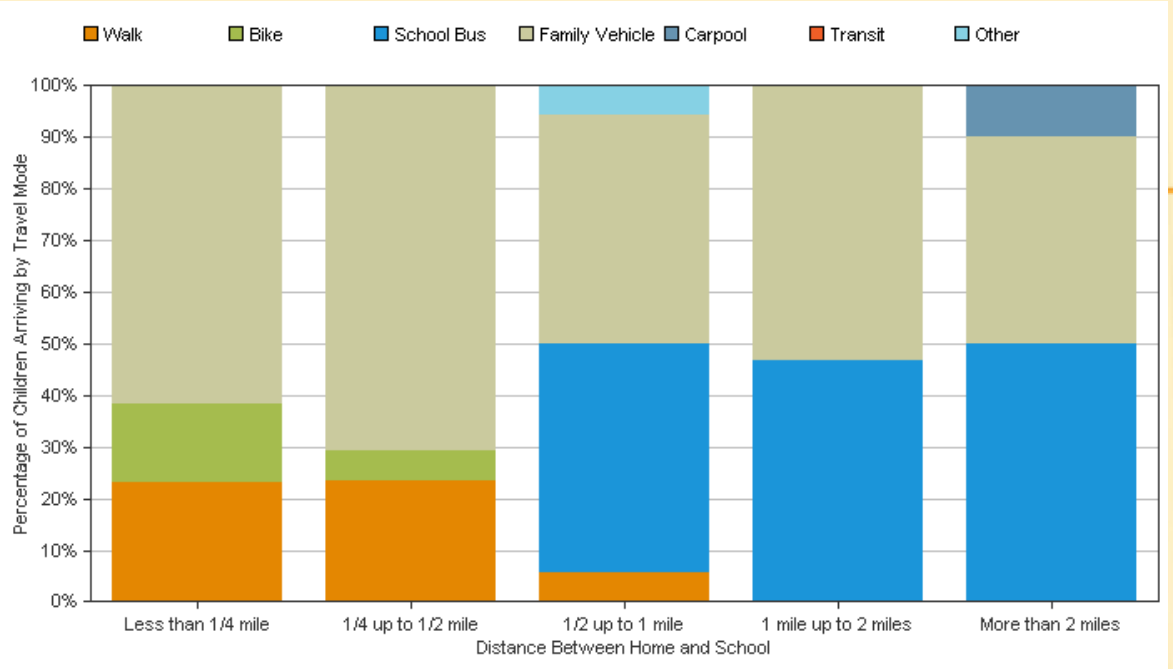
2+ miles



1 to 2 miles

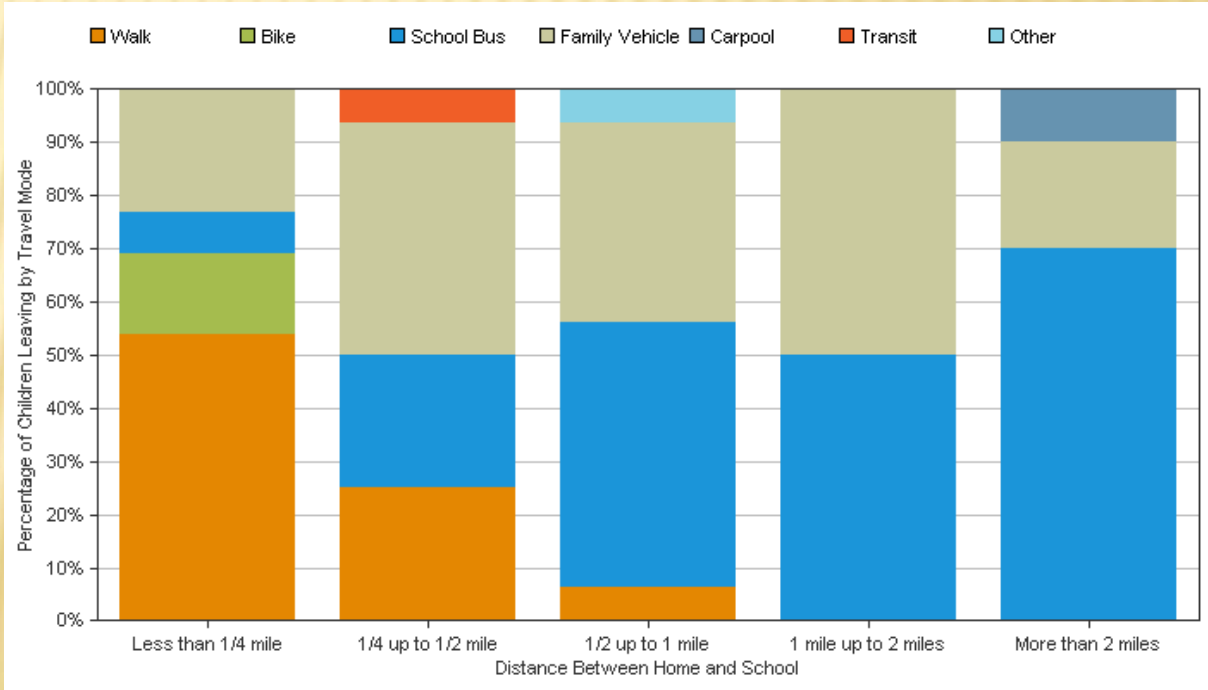


Other modes of transportation including transit are omitted from charts due to the percentage being 0.

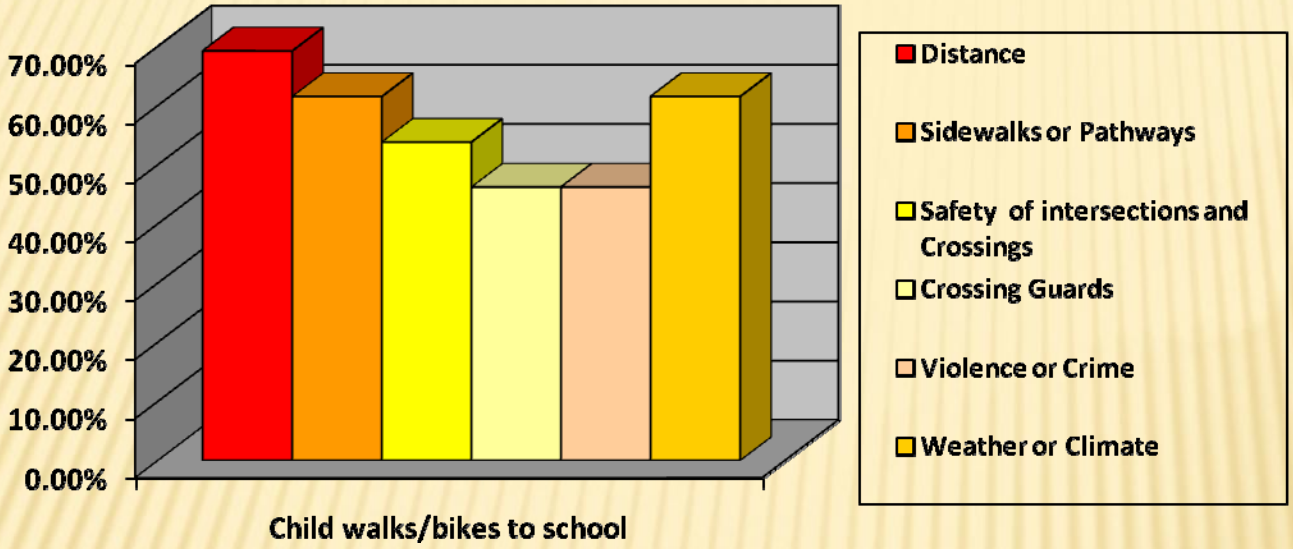


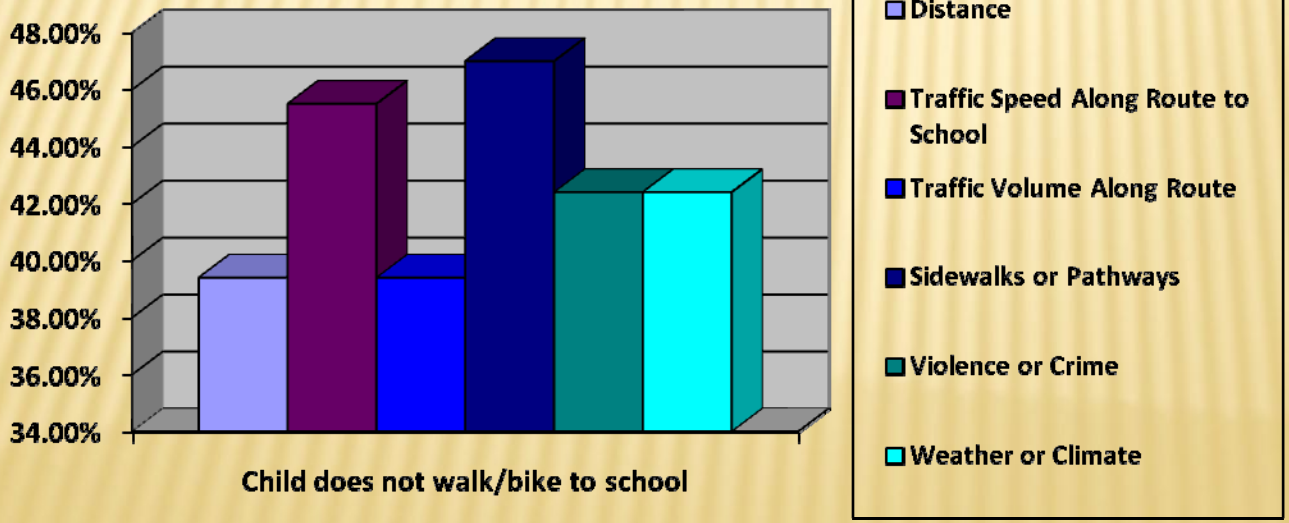
From Home to School

From School to Home

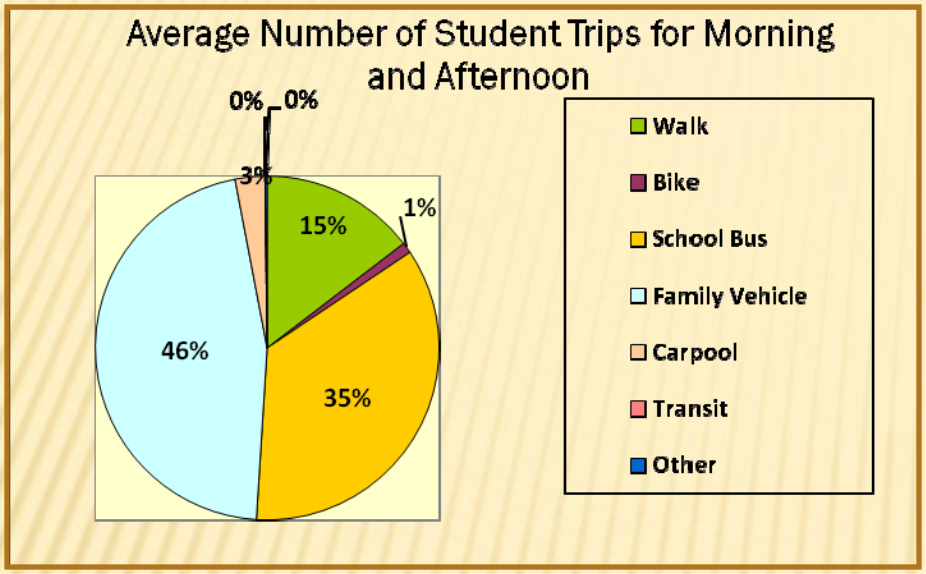


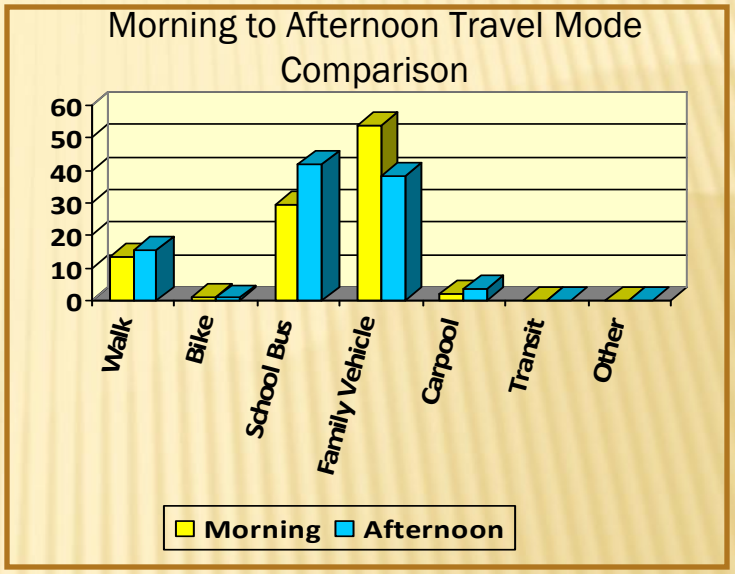
Perceived Barriers to Having Children Walk/Bike to School





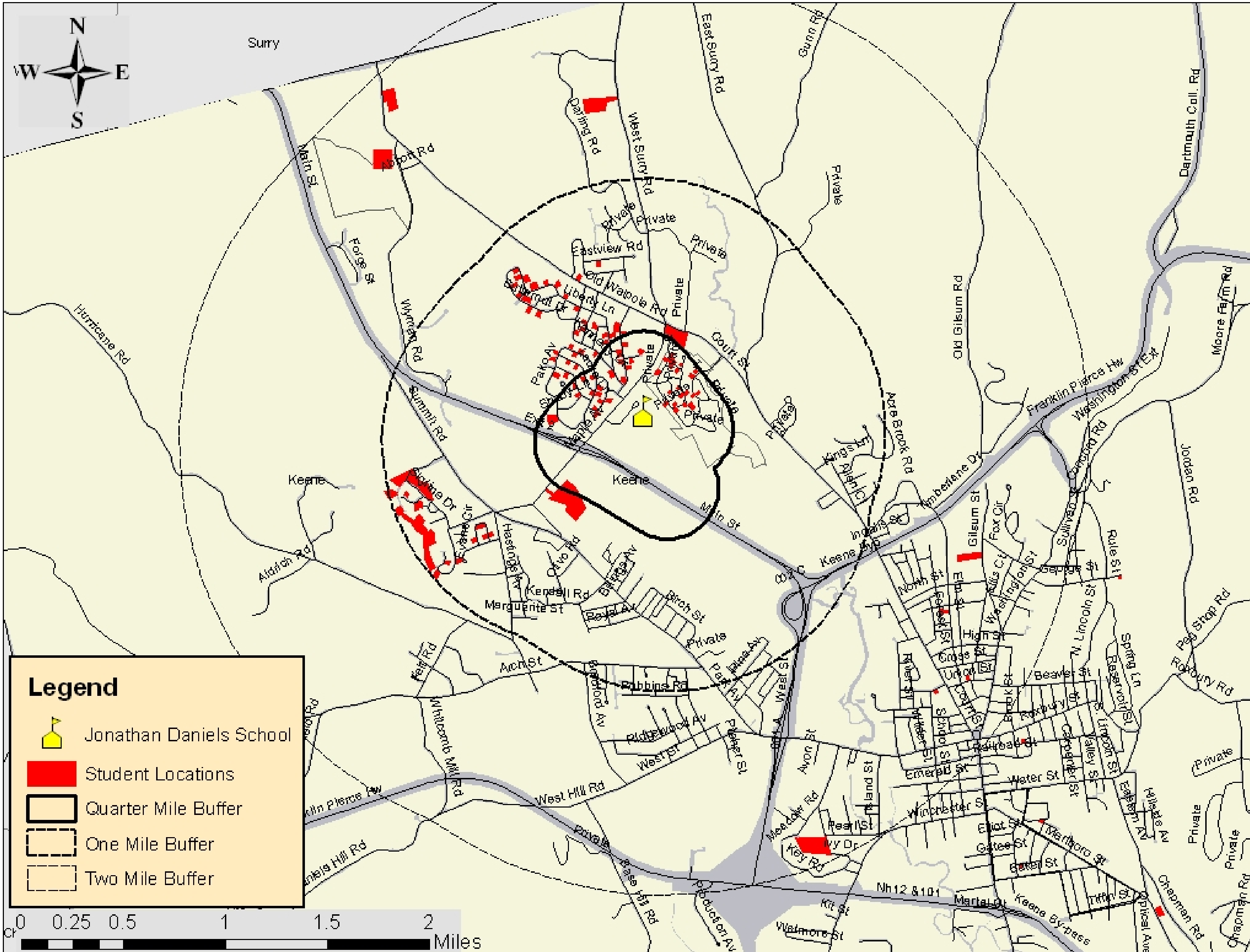
Results from Classroom Surveys

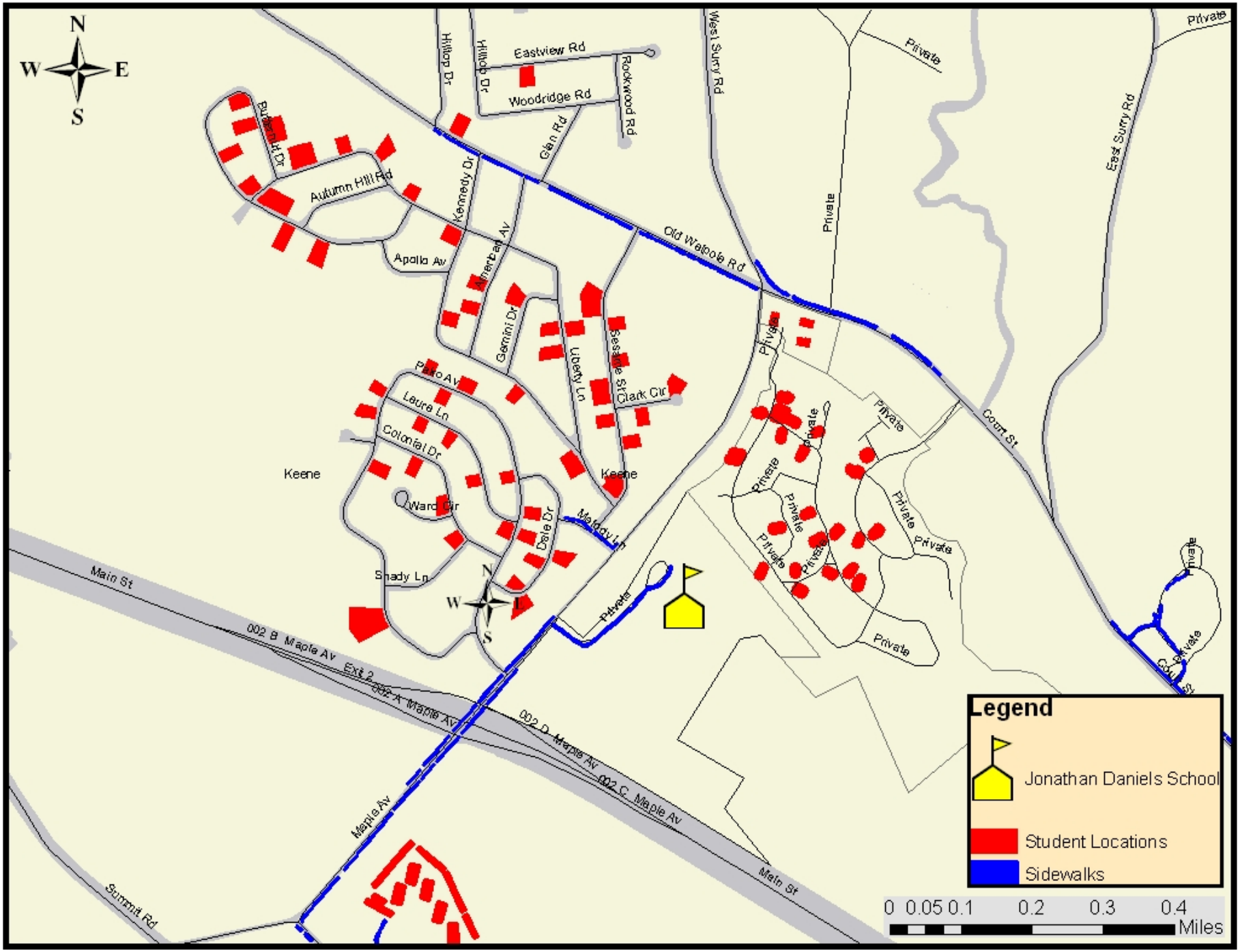


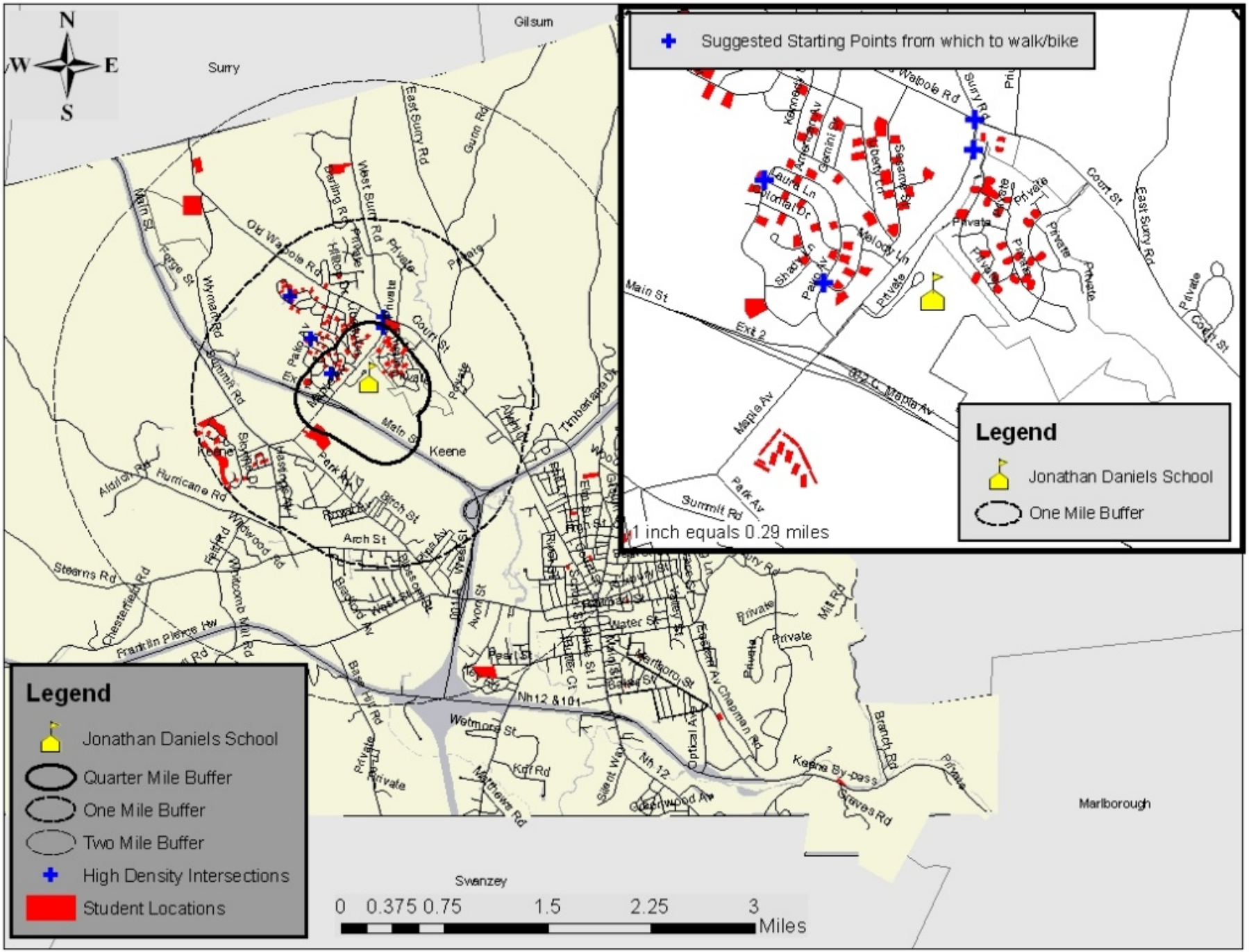


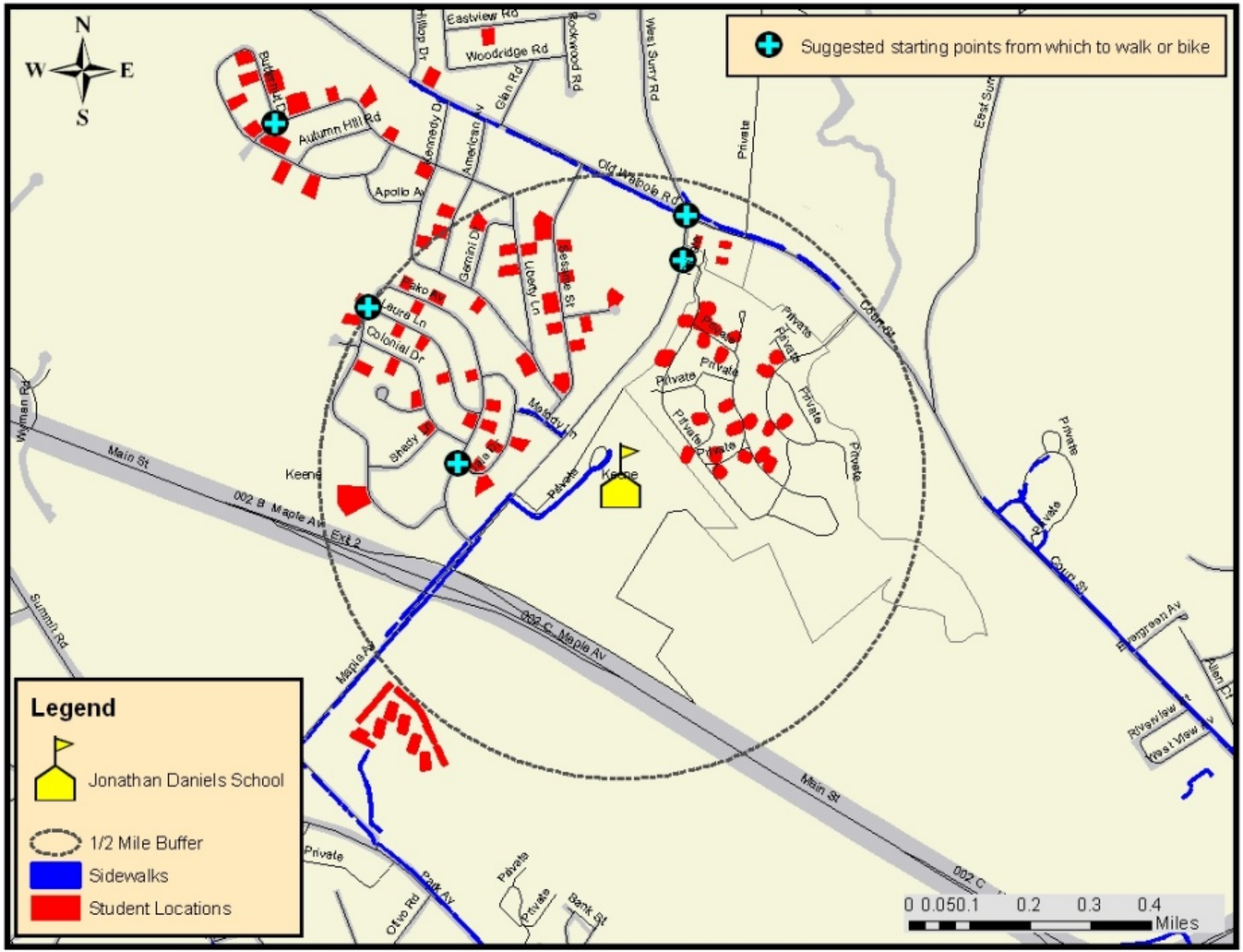
Percentages of Students by Travel Mode to and from School

	Number of Students	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Tues AM	181	13.3%	0.0%	32.0%	53.6%	1.1%	0.0%	0.0%
Tues PM	181	15.5%	0.0%	41.4%	38.7%	4.4%	0.0%	0.0%
Wed AM	178	14.0%	2.2%	27.5%	53.9%	2.2%	0.0%	0.0%
Wed PM	172	15.1%	1.2%	43.6%	38.4%	1.7%	0.0%	0.0%
Thur AM	164	13.4%	1.2%	28.0%	53.7%	3.0%	0.0%	0.6%
Thur PM	158	16.5%	1.3%	39.9%	37.3%	4.4%	0.0%	0.6%


Legend
Jonathan Daniels School
Student Locations
Quarter Mile Buffer
One Mile Buffer
Two Mile Buffer
0 0.25 0.5 1 1.5 2
Miles
N
S
E
W
Surry
Keene
Main St
West Surry Rd
East Surry Rd
Gunn Rd
Dartmouth Coll. Rd
Old Walpole Rd
Court St
Eastview Rd
Darling Rd
Abbott Rd
Forge St
Hurricane Rd
Wyman Rd
Summit Rd
Old Gilsum Rd
Franklin Pierce Hw
Washington St Ext
Moore Farm Rd
Jordan Rd
Concord Rd
Acre Brook Rd
Timberlane Dr
Kings Ln
Liberty Ln
Pako Av
Skyline Dr
Aldrich Rd
Marguerite St
Kendall Rd
Royal Av
Birch St
Ash St
Robbins Rd
Ridgewood Av
West St
Park Av
Baker St
West Hill Rd
Whitcomb Mill Rd
Base Hill Rd
Production Av
Meadow Rd
Key Rd
Ivy Dr
Pearl St
Island St
Avon St
Winchester St
Emerald St
Railroad St
Water St
Marlboro St
Elliot St
Gates St
Baker St
Martell Ct
Keene By-pass
Nh12 & 101
Kit St
Wetmore St
Chapman Rd
Optical Ave
Tiffin St
High St
Cross St
Union St
Beaver St
Roxbury St
Roxbury Rd
Pot Shop Rd
Spring Ln
Reservoir St
N. Lincoln St
Rule St
George St
Gilsum St
Fox Cir
Washington St
Elm St
North St
Sullivan St
Keene By-p
Private


N
W
E
S
Eastview Rd
Woodridge Rd
Rockwood Rd
Hilltop Dr
Hilltop Ct
Glen Rd
West Surry Rd
East Surry Rd
Private
Old Walpole Rd
Court St
Autumn Hill Rd
Kennedy Dr
Apollo Av
Alvertad Av
Gemini Dr
Liberty Ln
Bessette St
Clark Cir
Patio Av
Laura Ln
Colonial Dr
Keene
Ward Cir
Dale Dr
Melody Ln
Shady Ln
Main St
002 B Maple Av Ext 2
002 A Maple Av
002 D Maple Av
002 C Maple Av
Maple Av
Summit Rd
Legend
Jonathan Daniels School
Student Locations
Sidewalks
0 0.05 0.1 0.2 0.3 0.4
Miles


N
W
E
S
Gilsum
Surry
Swanzey
Marlborough
Keene
Suggested Starting Points from which to walk/bike
1 inch equals 0.29 miles
Legend
Jonathan Daniels School
One Mile Buffer
Legend
Jonathan Daniels School
Quarter Mile Buffer
One Mile Buffer
Two Mile Buffer
High Density Intersections
Student Locations
0 0.375 0.75 1.5 2.25 3
Miles


N
W
E
S
Suggested starting points from which to walk or bike
Eastview Rd
Woodridge Rd
Glen Rd
Brookwood Rd
West Surry Rd
Autumn Hill Rd
Apollo Av
Kennedy Dr
American Av
Old Walpole Rd
Private
East Surry Rd
Gemini Dr
Liberty Ln
Sessile St
Laura Ln
Colonial Dr
Shady
Melody Ln
Keene
Main St
002 B Maple Av
Ext 2
002 C Maple Av
Maple Av
Summit Rd
Wyman Rd
Court St
Evergreen Av
Riverview
West View Av
Allen Ct
Park Av
Otto Rd
Bank St
Legend
Jonathan Daniels School
1/2 Mile Buffer
Sidewalks
Student Locations
0 0.050.1 0.2 0.3 0.4
Miles

APPENDIX B

Meeting Materials

SRTS Committee, 18 May 2010: presentation slides and prioritization worksheet
Public Meeting, 9 June 2010: presentation slides

RSG INC.
RESOURCE SYSTEMS GROUP, INC.

Jonathan Daniels Elementary School

Safe Routes to School Project

Prepared for:
City of Keene, NH

5/18/2010

Outline

Meeting Goal: Select and Prioritize Improvements

- Project overview
- Observations from site visit/interviews
- Discuss potential improvements
- Next steps

Project Overview

Jonathan Daniels Elementary School

Phase 1: Evaluation

- ✓ Review relevant plans/studies
- ✓ Identify student catchment area
- ✓ Assess area walkability/bikeability
- ✓ Base mapping
- ✓ Obtain crash data
- ▪ *Identify & prioritize potential improvements*

Phase 2: Education & Outreach

- ▪ Facilitate public outreach session

Phase 3: Prepare Travel Plan

- ▪ Follow standard NHDOT SRTS Travel Plan template

Phase 4: Integrate Travel Plan into Comprehensive Master Plan

The "5 Es" of Safe Routes to School

- Evaluation
- Education
- Encouragement
- Enforcement
- ***Engineering***

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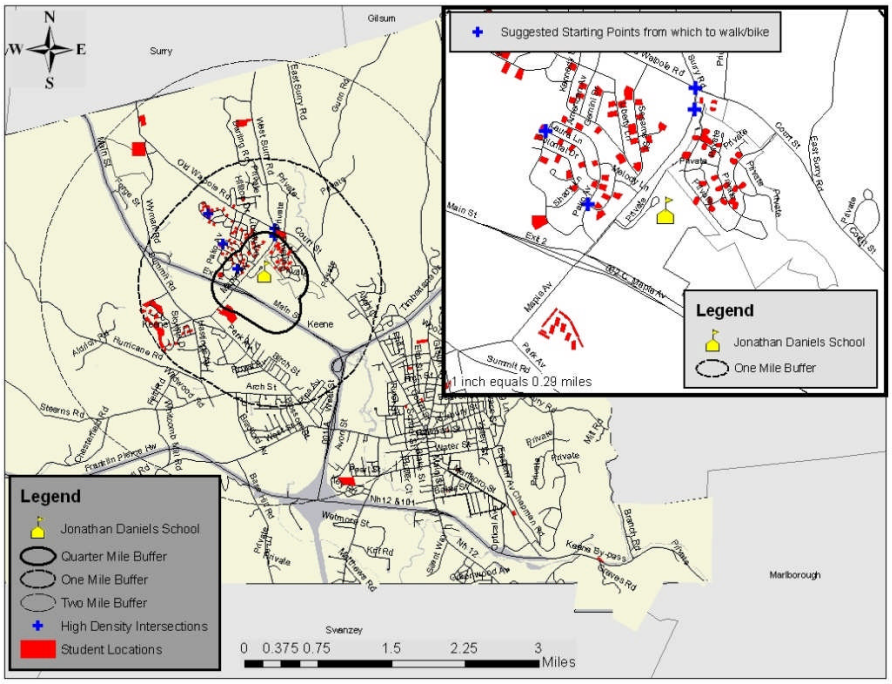
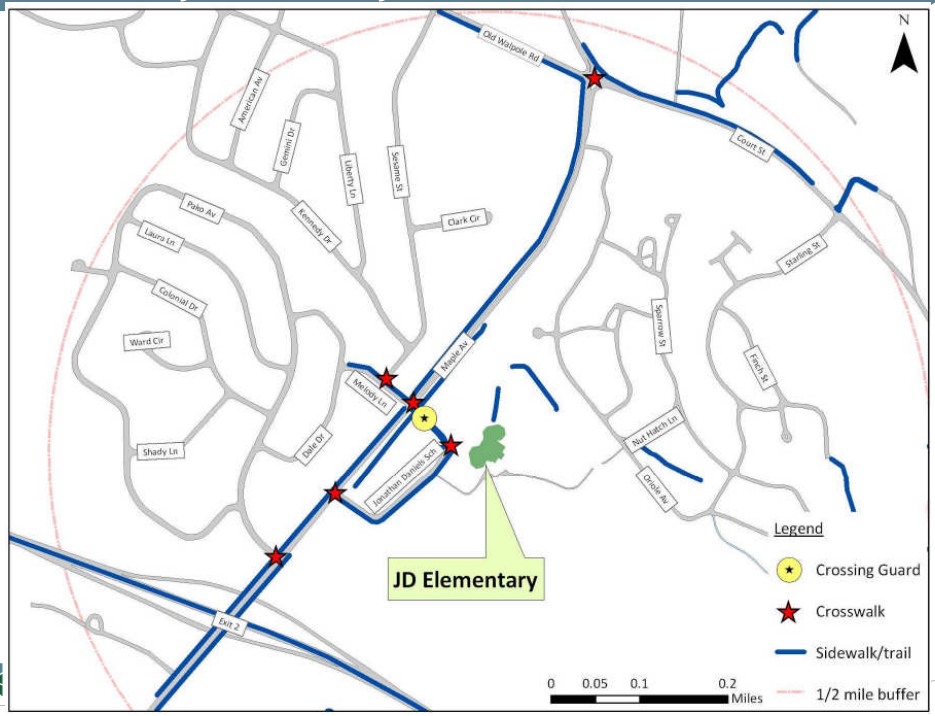
3

Student catchment mapping



4

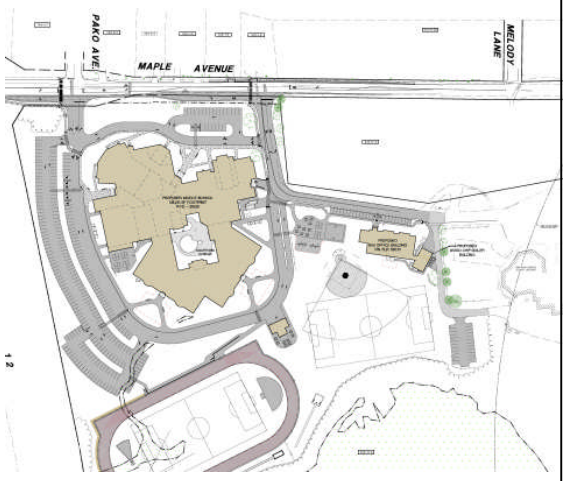
Walkability/Bikeability



5

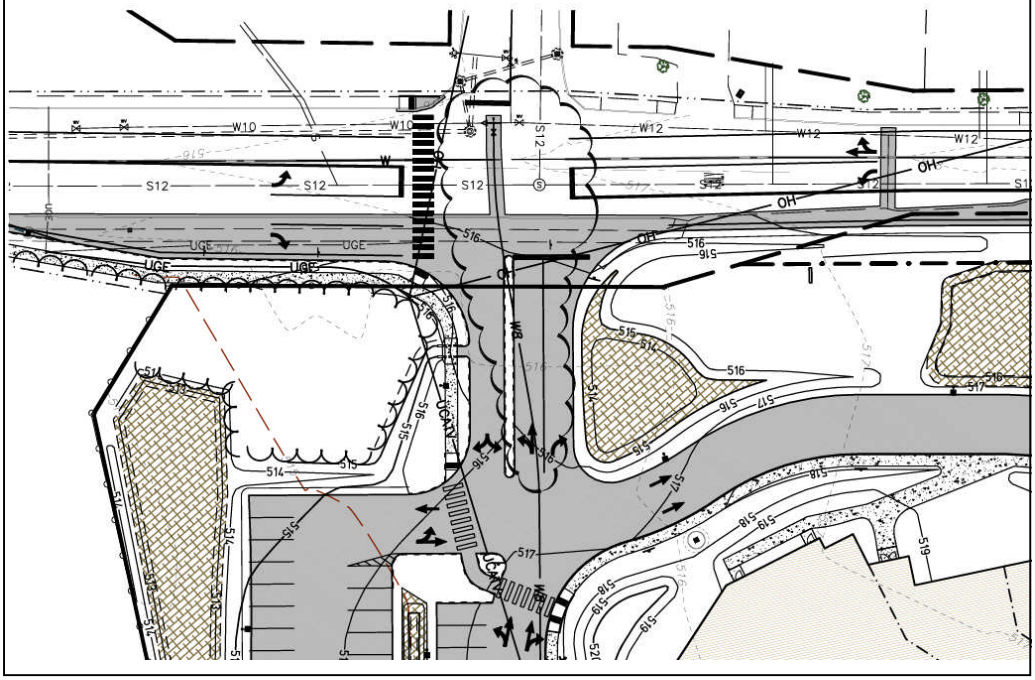
Keene Middle School

- New crosswalk at Pako Ave
- Additional crossing guards at JDE driveway and Pako Ave/KMS driveway
- Traffic study recommends reducing vehicle speeds on Maple Ave
  - through increased enforcement and improvements to signage
- New turn lanes on and to Maple Avenue

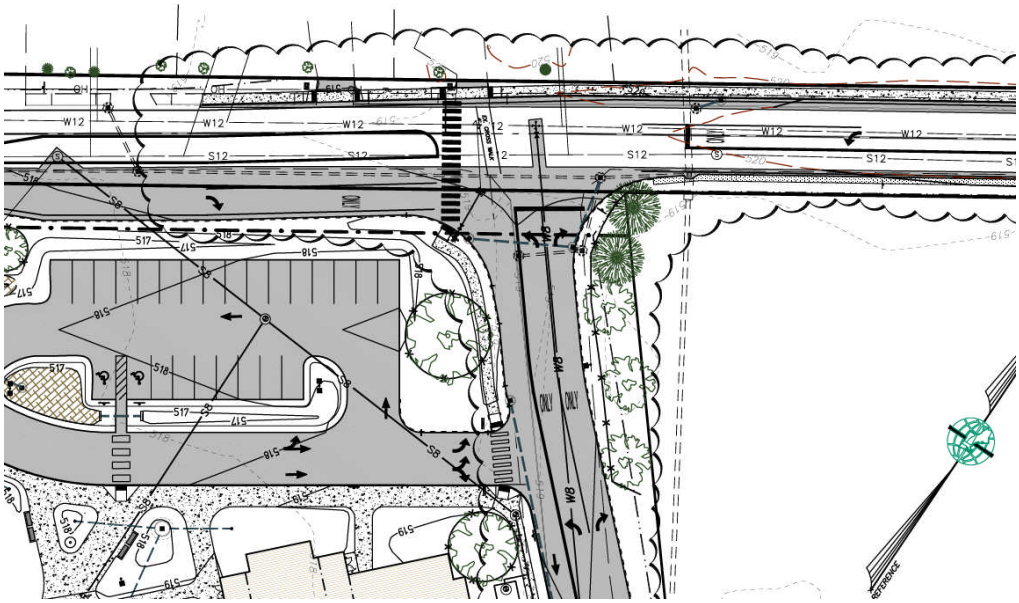


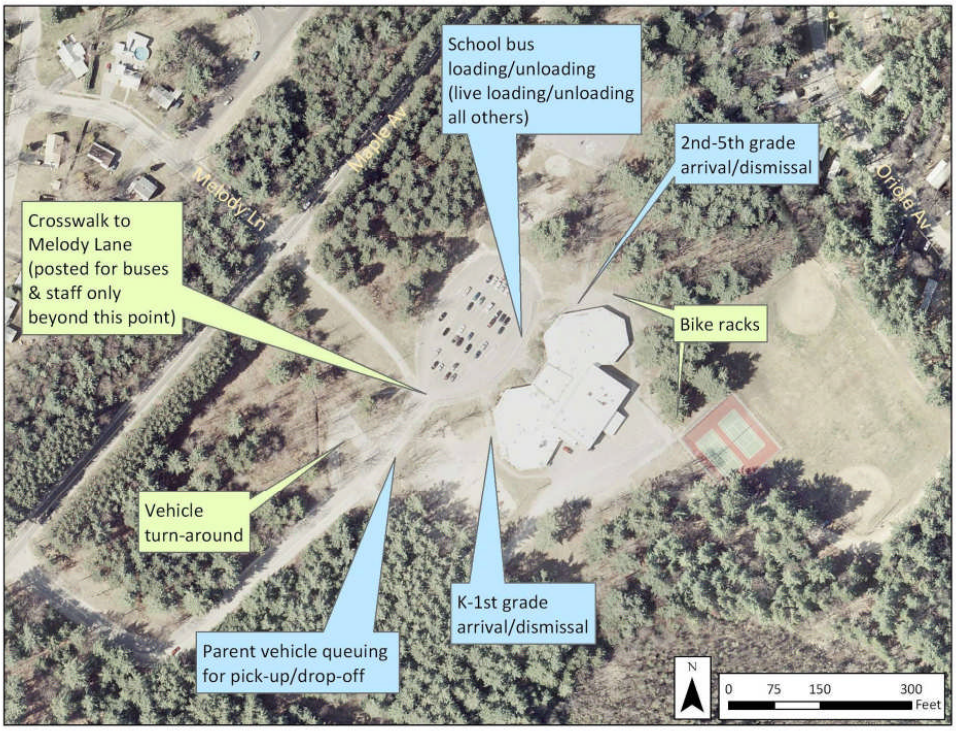
6

Keene Middle School at Pako Avenue



Keene Middle School: shared driveway with JD Elementary





Observations/ Potential Improvements

Identified themes from site visit

- **Potential for improvements to school pick-up/drop-off area**
  - Modal conflicts
- **Need to address vehicle speeds on Maple Avenue**
  - Opportunities to increase school presence on Maple Avenue
  - Traffic calming
- **Prepare for changes to walkability/bikeability**
  - Minimize pedestrian exposure and crossing distances
- **Is there a desire to formalize pedestrian connections?**
  - Informal paths/cut-throughs
  - Pako Ave & Kennedy/Sesame neighborhoods

School pick-up/drop-off area

Pick-up/drop-off area

13

Example of raised pedestrian crossing

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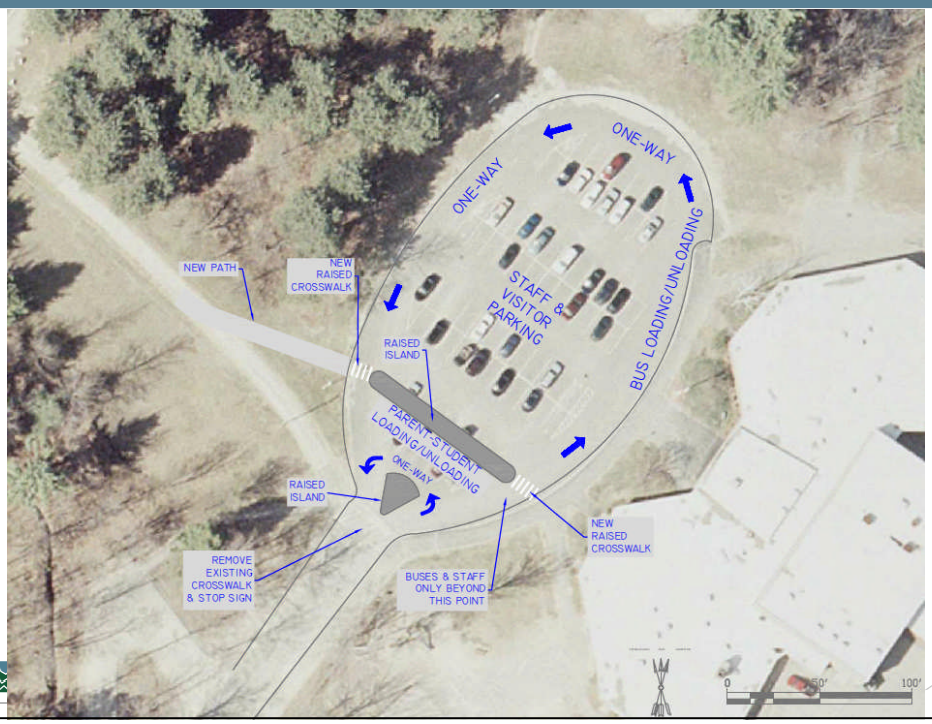
Pick-up/drop-off area

15

Reorganize parking/pick-up/drop-off



16

Reorganize parking/pick-up/drop-off

17

Addressing vehicle speeds:

"compliance with 20 mph during morning and afternoon school periods is limited to 10-20% of drivers"
-2008 Keene Middle School Traffic Study

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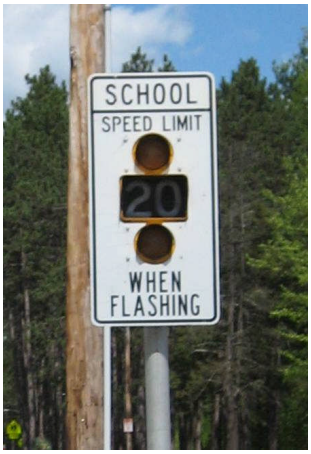
Addressing vehicle speeds

1. Increasing school presence on Maple Avenue

Maple Avenue

Replace existing school speed limit signs to improve visibility



Existing

Examples

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Enhancements to existing overhead beacon at Melody Lane

Existing

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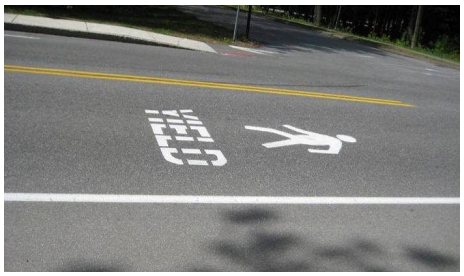
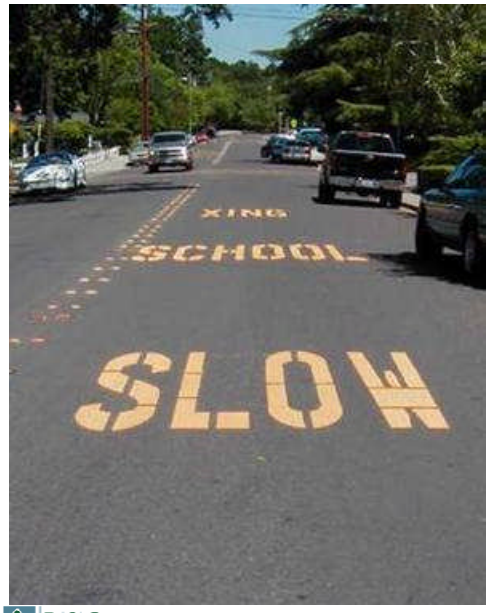
Street crossings: existing



Example pavement marking options



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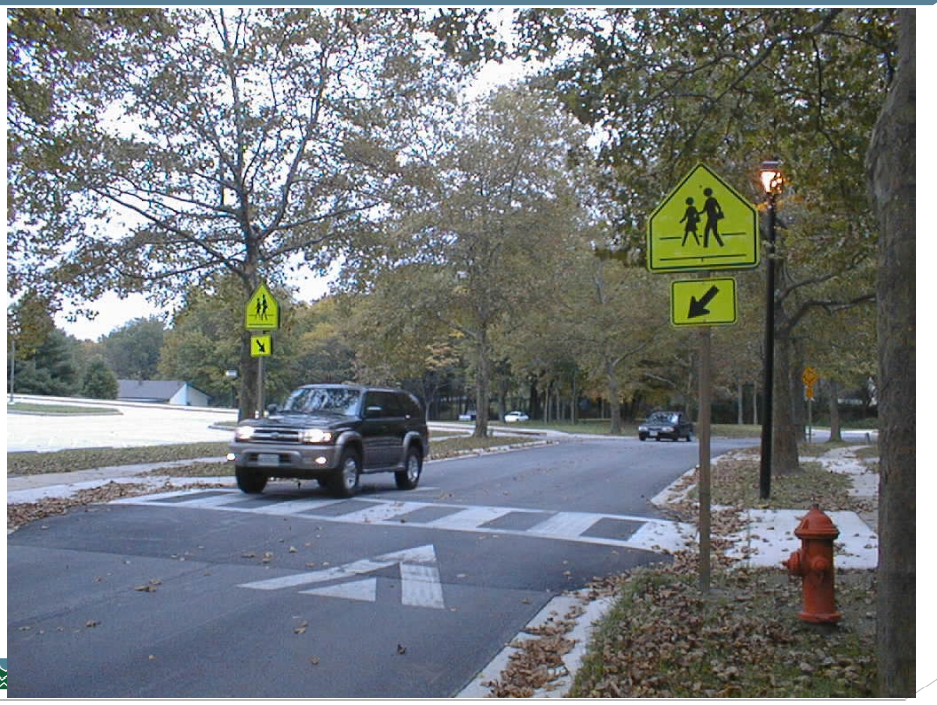
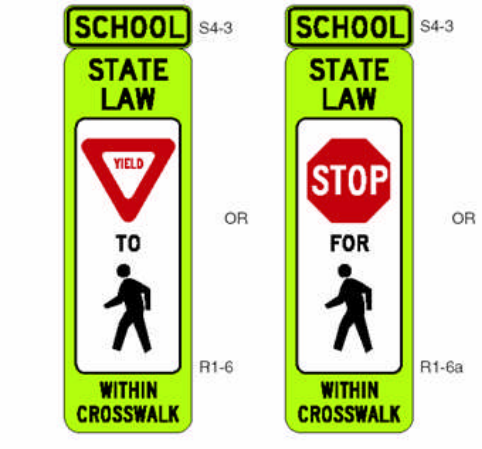
Example high-visibility crosswalk markings

Example of raised pedestrian crosswalk



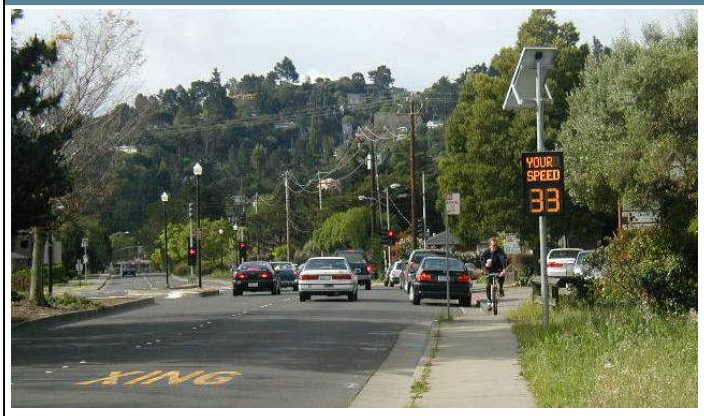
Example of in-street signing



Addressing vehicle speeds

2. Traffic calming

Example speed feedback signs



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Example speed humps

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Example of using striping to reduce lane width & reduce speeds

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Example splitter islands

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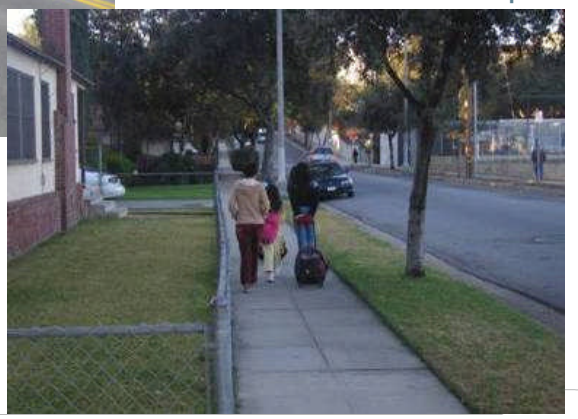
Walkability/bikeability: Maple Street sidewalk

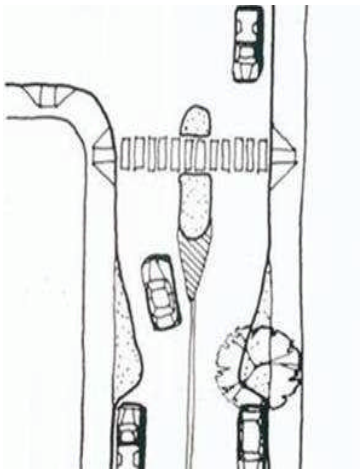
Existing

Example



Prepare for changes in walkability/bikeability

Example crossing islands/ped refuge



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Example crossing islands/ped refuges

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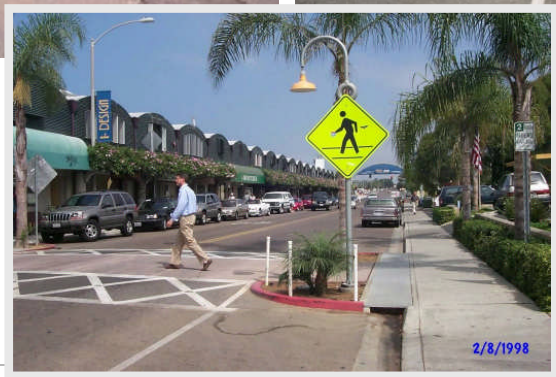
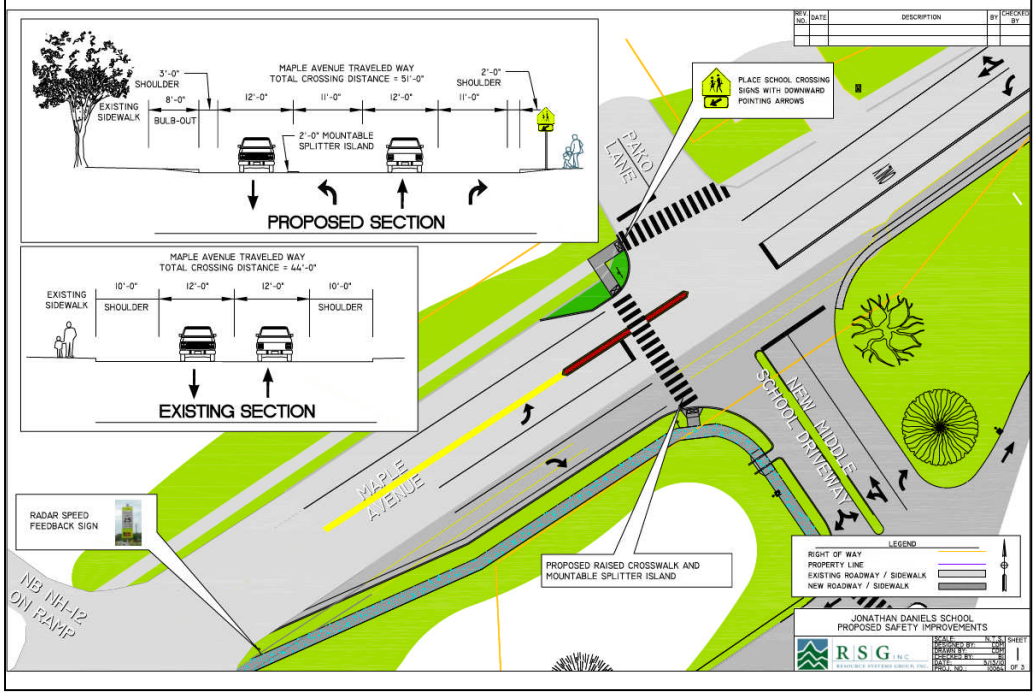
Example two-stage crossing island

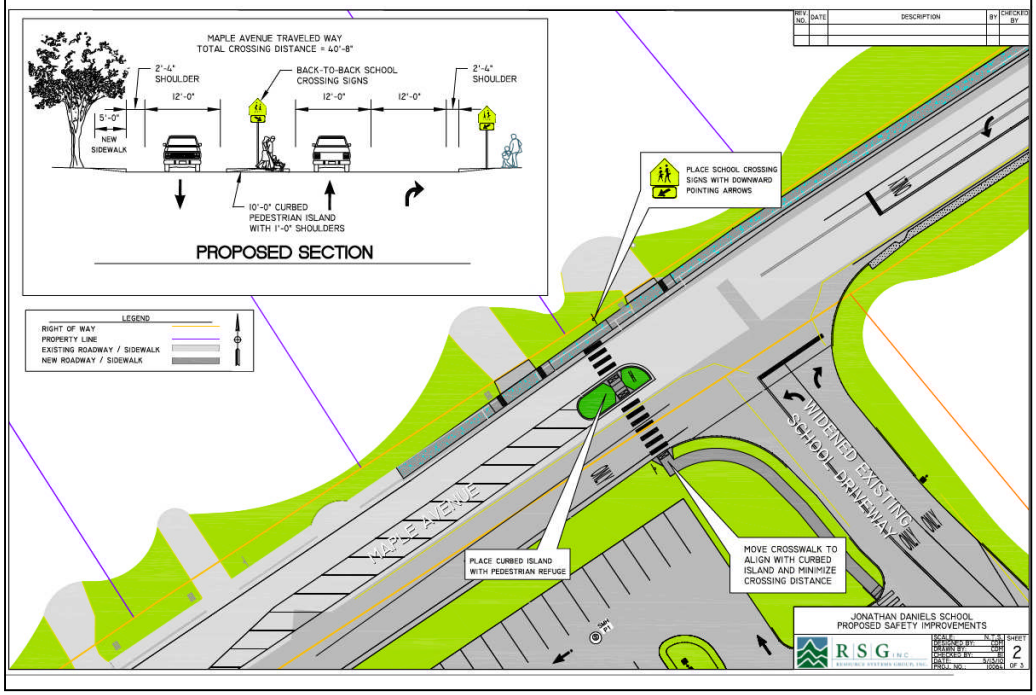
Curb extensions reduce crossing distance and improve visibility of peds



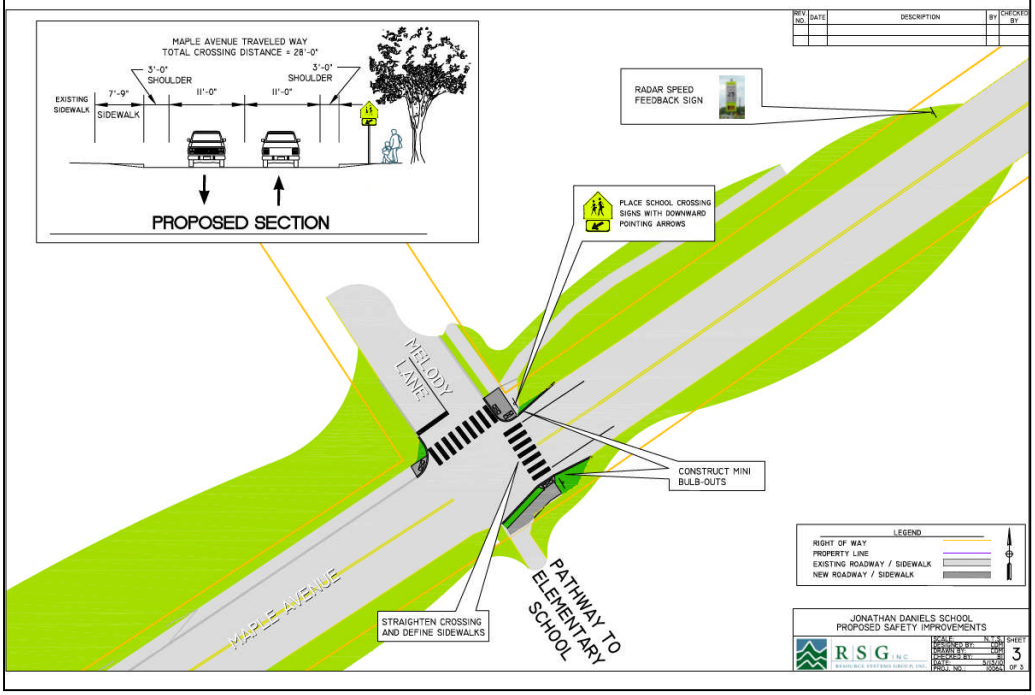
Potential Improvements to Maple Avenue



Potential Improvements to Maple Avenue



Potential Improvements to Maple Avenue



Formalize pedestrian connections?

Formalize ped connections?

1. Paths and cut-throughs

Cut-throughs/informal paths

Cut-throughs/informal paths

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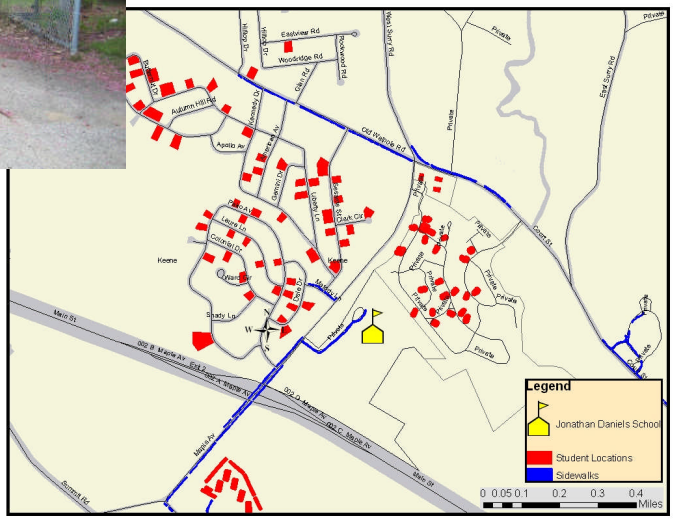
Cut-throughs/informal paths



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Formalize ped connections?

2. Pako Ave and Kennedy/Sesame neighborhoods

Pako Ave & Kennedy/Sesame neighborhoods

Pako Ave & Kennedy/Sesame neighborhoods

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Summary/Prioritization

Themes and Potential Solutions

School pick-up/drop-off area	Address vehicle speeds	Prepare for changes in walkability/ bikeability	Formalizing ped connections?
•Raised crosswalk •Re-organize and separate modes (bus, parent vehicle, staff parking, etc.)	<u>Increase school presence on Maple Ave through:</u> •Signage •Pavement markings <u>Calm traffic using:</u> •Speed feedback signs •Speed humps •Narrow lanes: splitter islands, sidewalk buffers •Raised crosswalks	<u>Minimize pedestrian exposure/crossing distances</u> •Crossing islands/ pedestrian refuges •Curb extensions	<u>Informal paths/cut-throughs</u> •What short cuts could be made safer? •Maximize directness to minimize obstacles to walking <u>Pako & Kennedy/Sesame neighborhoods?</u> •Walking on street vs constructing sidewalks? •Pursue more direct routes (easements between houses)?

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Jonathan Daniels Elementary School: Safe Routes to School

Improvement Prioritization Scoring Sheet

Please assign a priority to each project.

1. School pick-up/drop-off area

1. Replace existing crosswalk at stop sign with a raised crosswalk

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

2. Formalize circulation plan with curbed islands and pavement markings

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

2. Address vehicle speeds on Maple Avenue

1. Improve signage/replace school speed limit signs/add signage to Melody Lane beacon

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

2. Improve/enhance pavement markings

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

3. Replace existing crosswalks with high-visibility ladder-style crosswalks

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

4. Replace existing crosswalks with raised crosswalks

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

5. Pursue in-street signing for crosswalks

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

6. Install speed-feedback signs

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

7. Install speed humps

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

8. Research feasible options for narrowing travel lanes to slow traffic (e.g. striping, sidewalk buffers, splitter islands, etc.)

O	O	O	O	O
1 Not a priority	2 Low priority	3 Medium priority	4 High priority	5 Top priority

3. Prepare for changes in walkability/bikeability

1. Add crossing islands/ped refuges on Maple Ave at KMS and JDE driveway crosswalks

1	2	3	4	5
O	O	O	O	O
Not a priority	Low priority	Medium priority	High priority	Top priority

2. Add curb extensions/bump-outs where feasible

1	2	3	4	5
O	O	O	O	O
Not a priority	Low priority	Medium priority	High priority	Top priority

4. Formalize ped connections?

1. Formalize/improve informal paths/cut-throughs?

No	Yes
O	O

If yes, please assign a priority:

1	2	3	4	5
O	O	O	O	O
Not a priority	Low priority	Medium priority	High priority	Top priority

2. Plan for sidewalks in Pako Ave and Kennedy/Sesame neighborhoods?

No	Yes
O	O

If yes, please assign a priority:

1	2	3	4	5
O	O	O	O	O
Not a priority	Low priority	Medium priority	High priority	Top priority

RSG INC
RESOURCE SYSTEMS GROUP, INC.

Jonathan Daniels Elementary School

Safe Routes to School Project
PUBLIC MEETING

Prepared for:
City of Keene, NH

6/9/2010

Outline

Meeting Goal: Review prioritized improvements and gather feedback/input

- Project overview
- Discuss proposed improvements & priorities
- Next steps

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Project Overview

Jonathan Daniels Elementary School

Phase 1: Evaluation
- ✓ Assess area walkability/bikeability
- ✓ Obtain crash data
- ✓ Identify & prioritize potential improvements

Phase 2: Education & Outreach
- *Hold public forum*

Phase 3: Prepare Travel Plan

Phase 4: Integrate Travel Plan into Comprehensive Master Plan

The "5 Es" of Safe Routes to School

- Evaluation
- Education
- Encouragement
- Enforcement
- ***Engineering***

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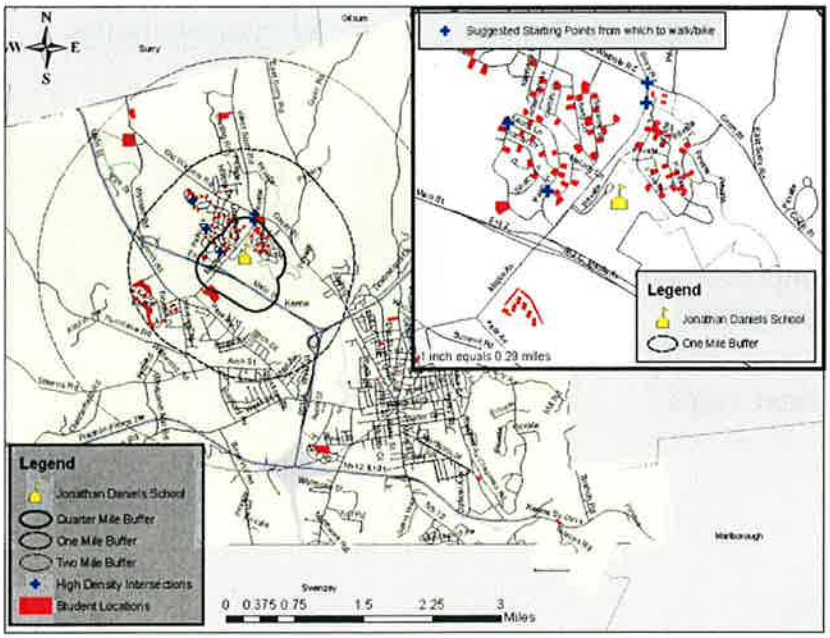
Student catchment mapping



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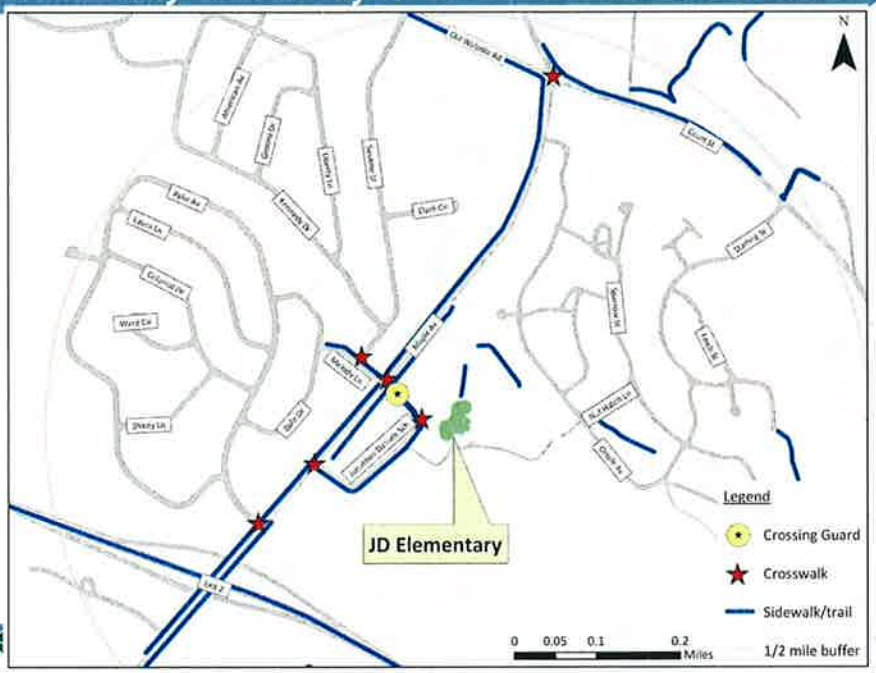
Walkability/Bikeability



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Prioritized Improvements

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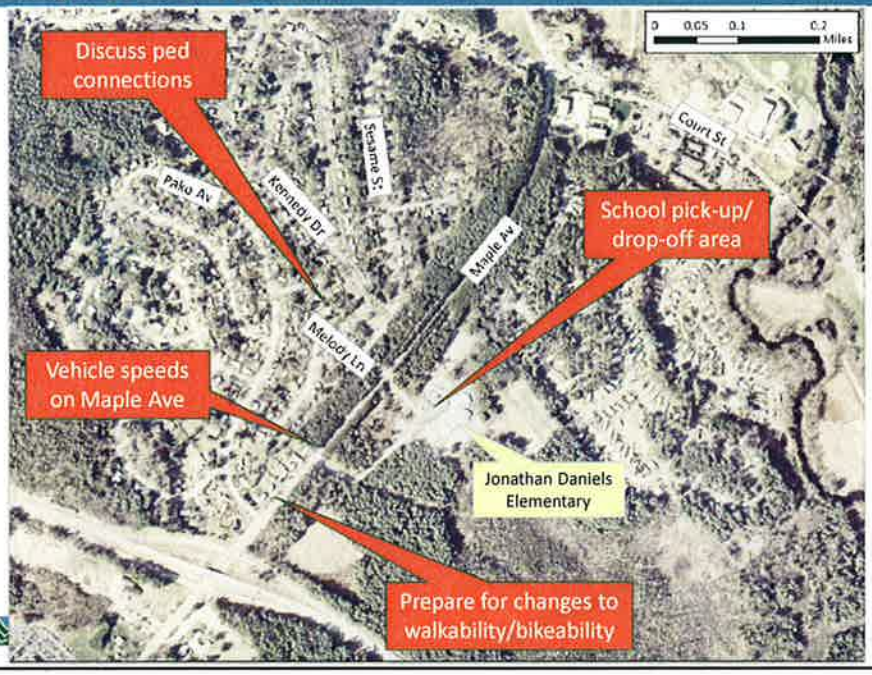
Improvement areas



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Prioritization process

Improvement Prioritization Scoring Sheet

Please assign a priority to each project.

1. School pick-up/drop-off area

1. Replace existing crosswalk at stop sign with a raised crosswalk

1	2	3	4	5
O	O	O	O	O
Not a priority	Low priority	Medium priority	High priority	Top priority

2. Address vehicle speeds on Maple Avenue

1. Improve signage/replace school speed limit signs/add signage to Melody Lane beacon

1	2	3	4	5
O	O	O	O	O
Not a priority	Low priority	Medium priority	High priority	Top priority

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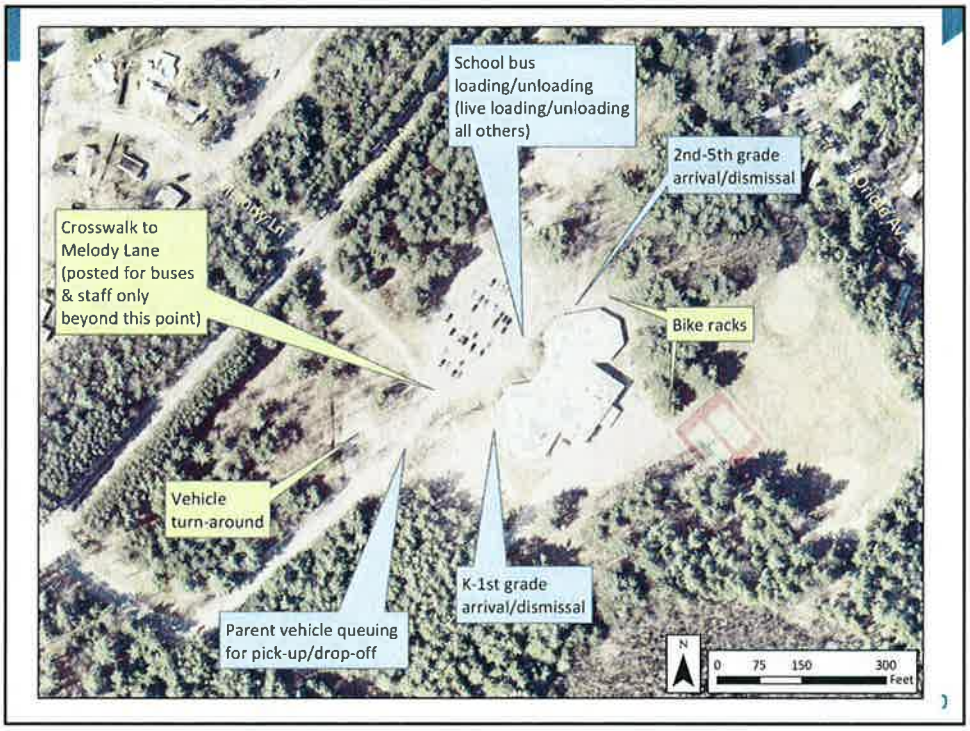
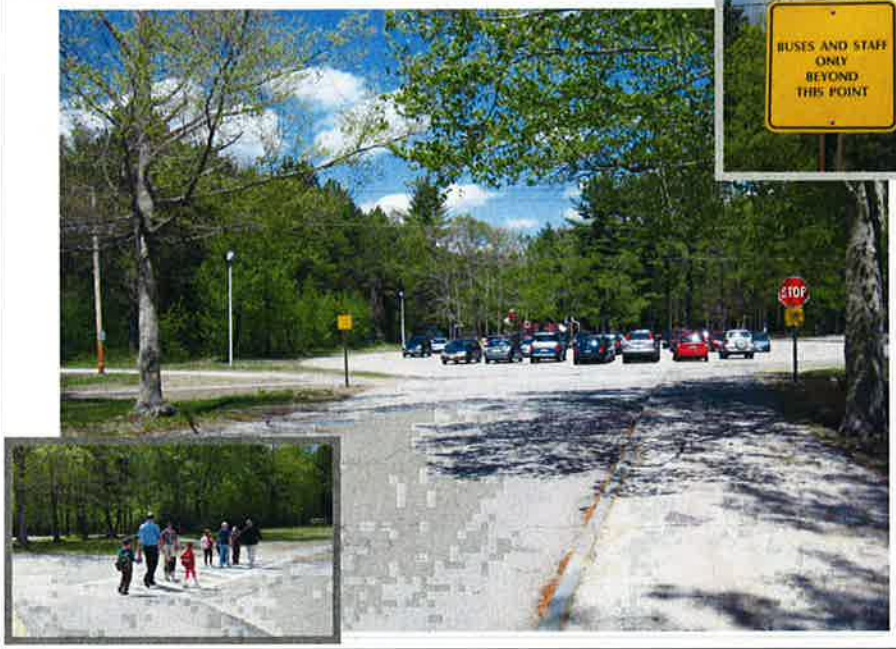
Improvement areas
0 0.05 0.1 0.2
Miles
Court St
Sesame St
Pako Av
Kennedy Dr
Maple Av
School pick-up/
drop-off area
Melody Ln
Jonathan Daniels
Elementary
9


School bus
loading/unloading
(live loading/unloading
all others)
2nd-5th grade
arrival/dismissal
Crosswalk to
Melody Lane
(posted for buses
& staff only
beyond this point)
Bike racks
Vehicle
turn-around
K-1st grade
arrival/dismissal
Parent vehicle queuing
for pick-up/drop-off
N
0 75 150 300
Feet

Pick-up/drop-off area



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Pick-up/drop-off area

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Example of raised pedestrian crossing

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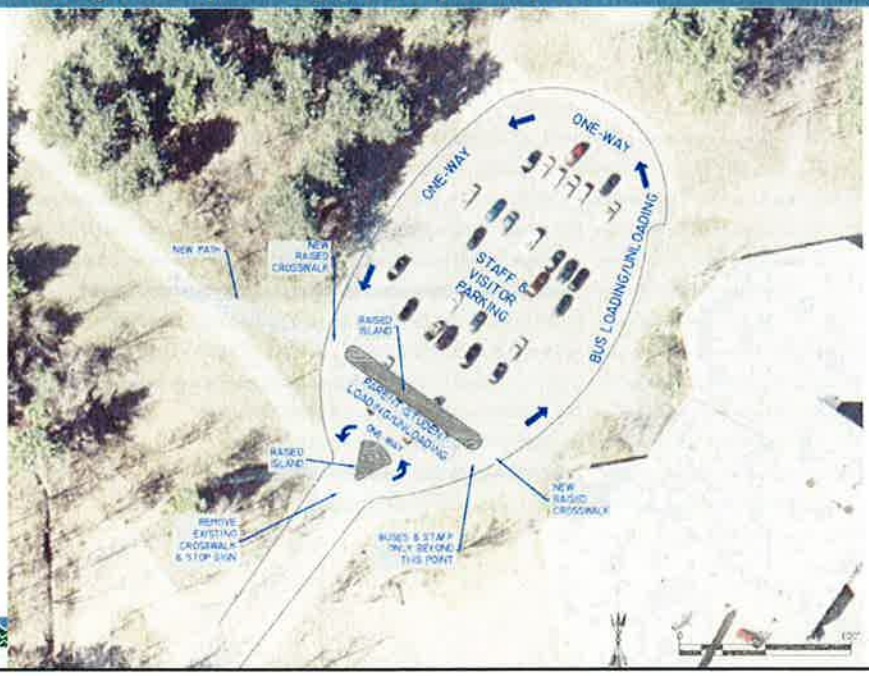
Reorganize parking/pick-up/drop-off



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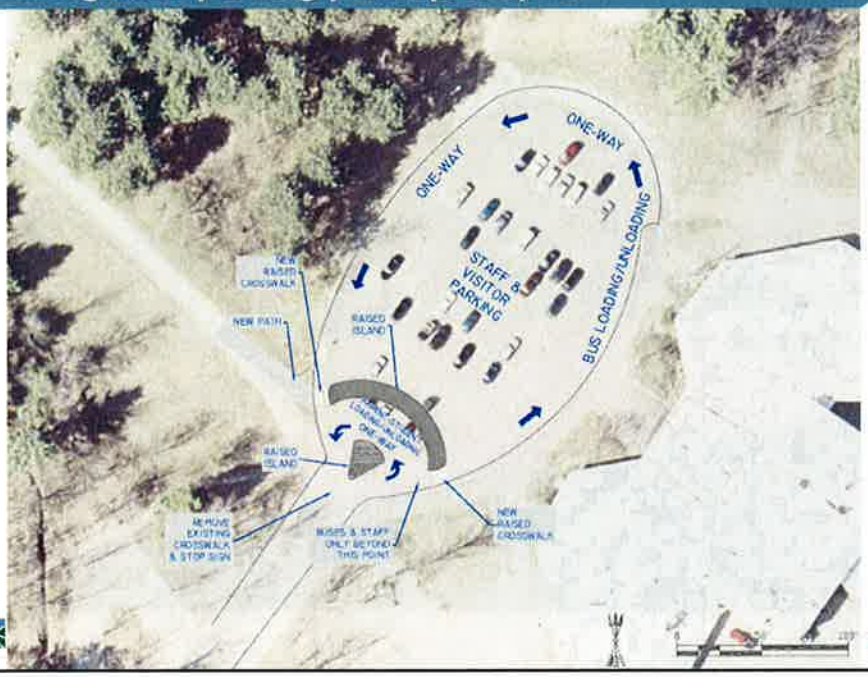
Reorganize parking/pick-up/drop-off



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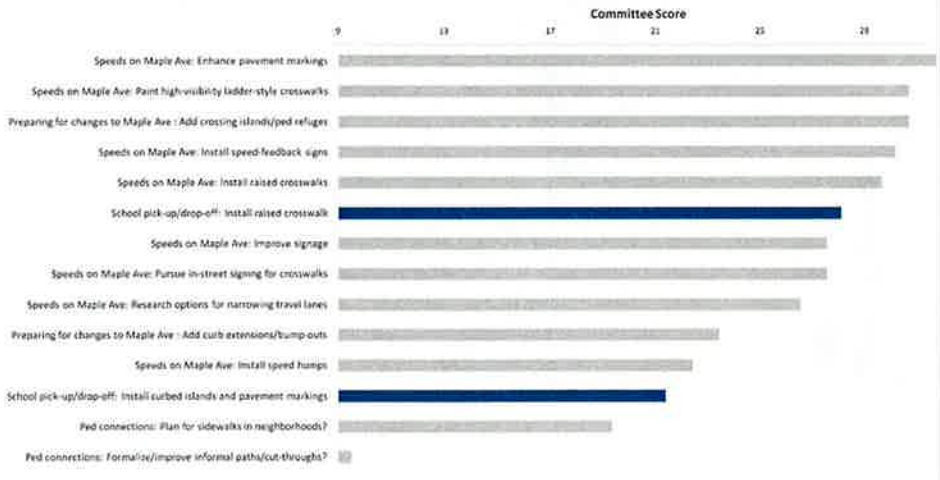
Pick-up/drop-off area



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Improvement areas

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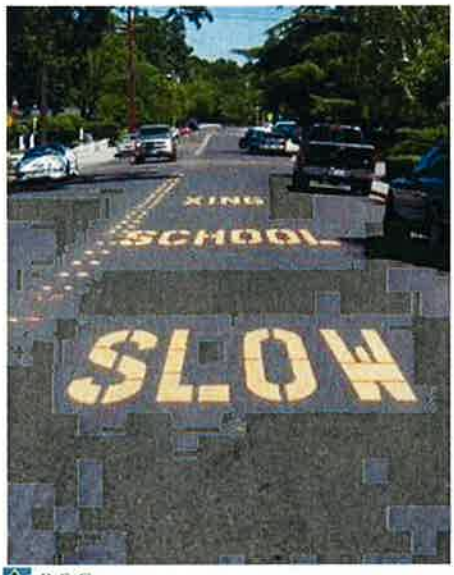
Street crossings: existing

Example pavement marking options



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Example high-visibility crosswalk markings

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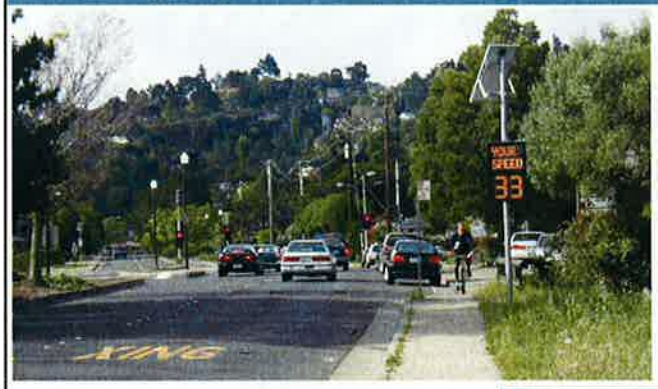
Example speed feedback signs



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Example of raised pedestrian crosswalk

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Maple Avenue

Replace existing school speed limit signs to improve visibility

Existing

Examples

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Enhancements to existing overhead beacon at Melody Lane

Existing

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Example of in-street signing

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Example of using striping to reduce lane width & reduce speeds

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Example splitter islands

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Walkability/bikeability: Maple Street sidewalk

Existing

Example

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Example speed humps

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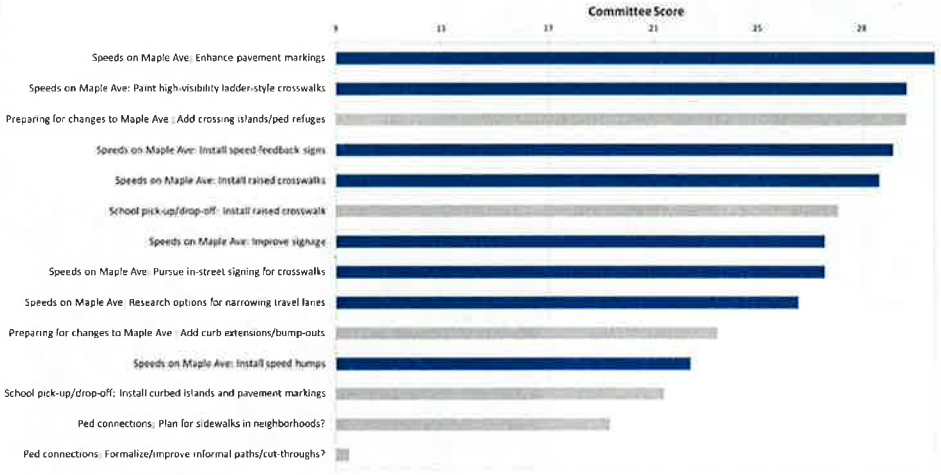
Vehicle speeds on Maple Ave



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Improvement areas

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Keene Middle School

- New crosswalk at Pako Ave
- Additional crossing guards at JDE driveway and Pako Ave/KMS driveway
- Traffic study recommends reducing vehicle speeds on Maple Ave
  - through increased enforcement and improvements to signage
- New turn lanes on and to Maple Avenue

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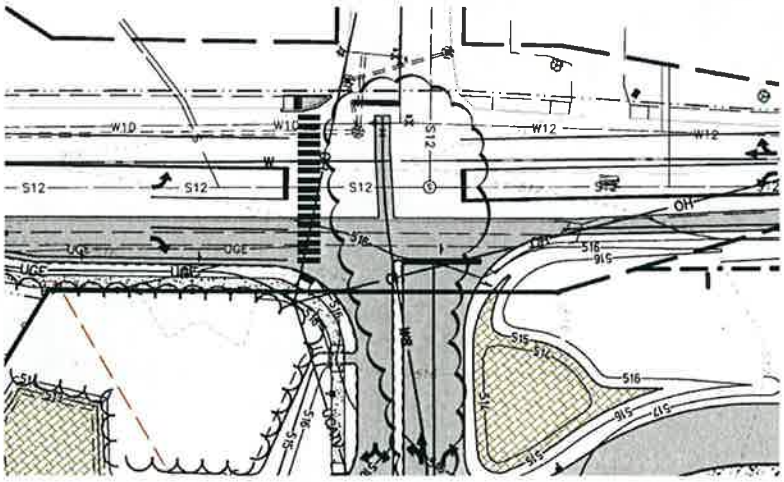
Keene Middle School at Pako Avenue



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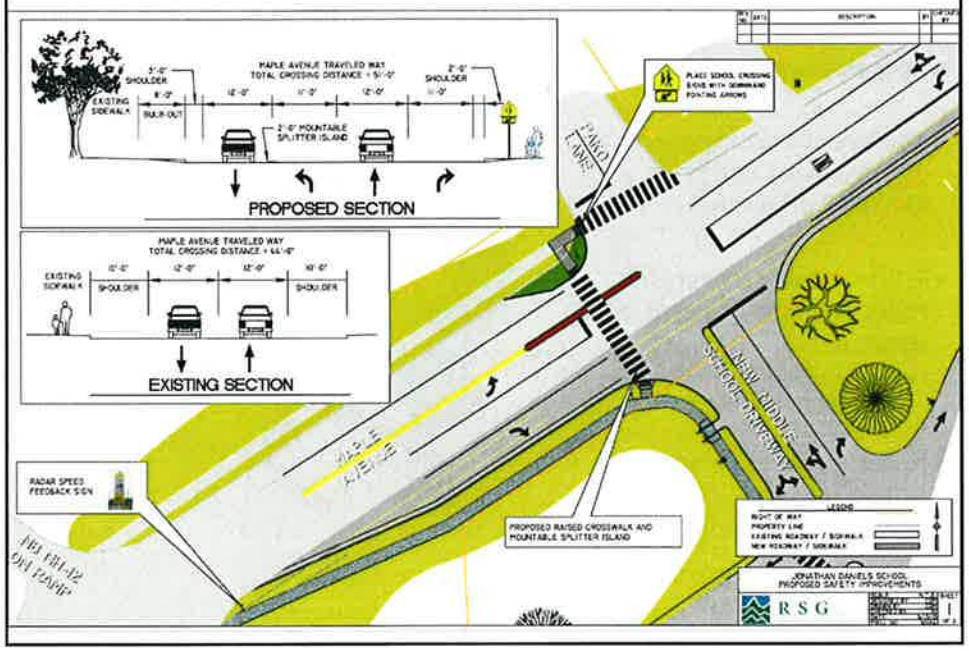
Potential Improvements to Maple Avenue



Example splitter islands

Curb extensions reduce crossing distance and improve visibility of peds

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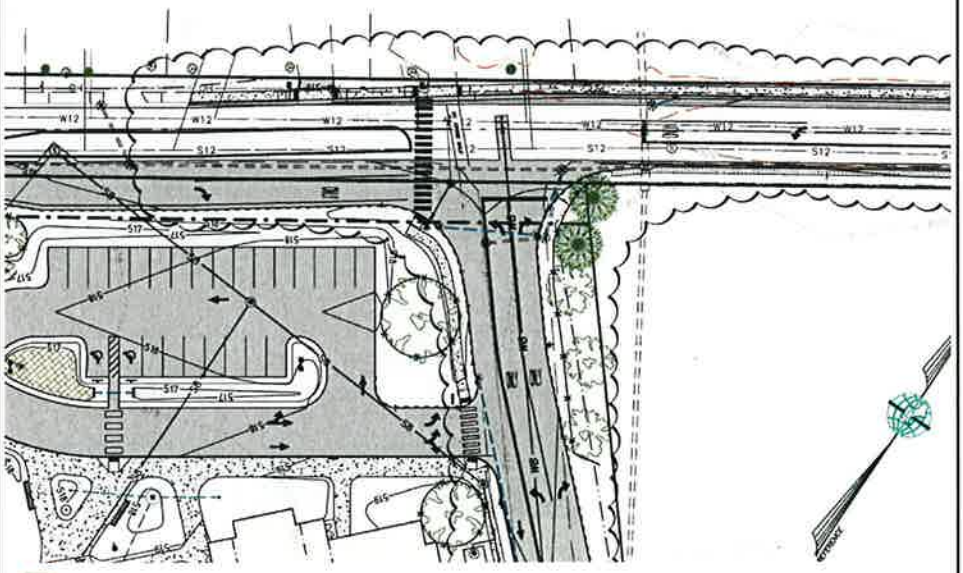
Keene Middle School: shared driveway with JD Elementary



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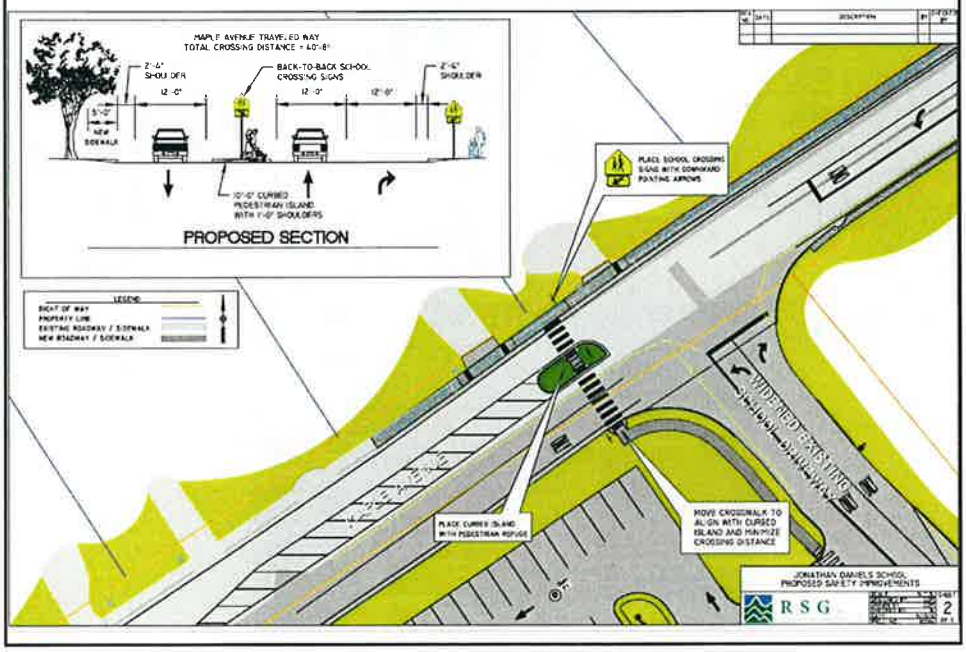
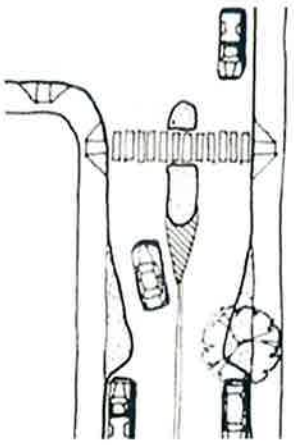
Potential Improvements to Maple Avenue



Example crossing islands/ped refuge



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Example crossing islands/ped refuges

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Example two-stage crossing island

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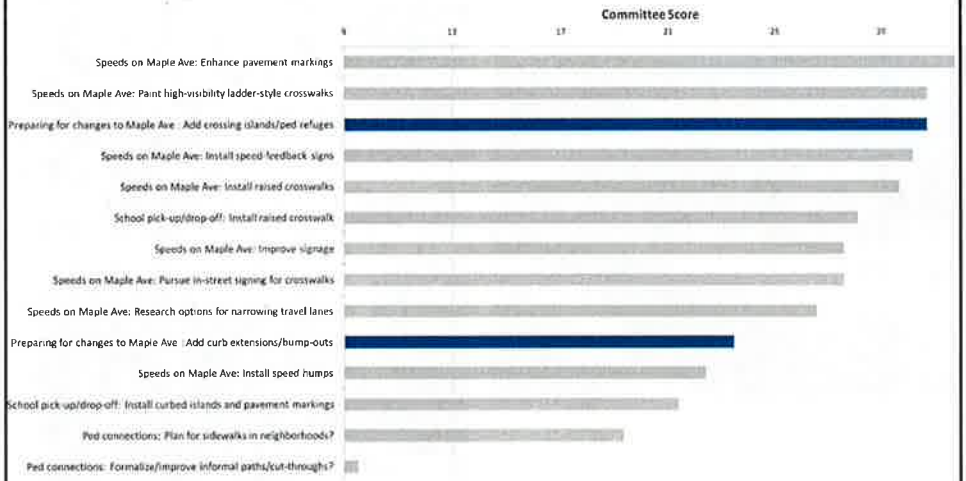
Changes to Maple Avenue



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Improvement areas

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Pako Ave & Kennedy/Sesame neighborhoods

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Cut-throughs/informal paths

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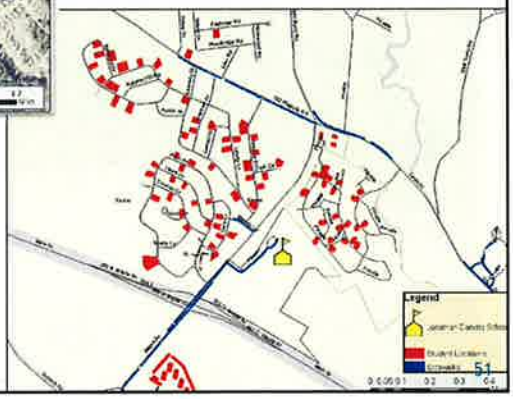
Cut-throughs/informal paths



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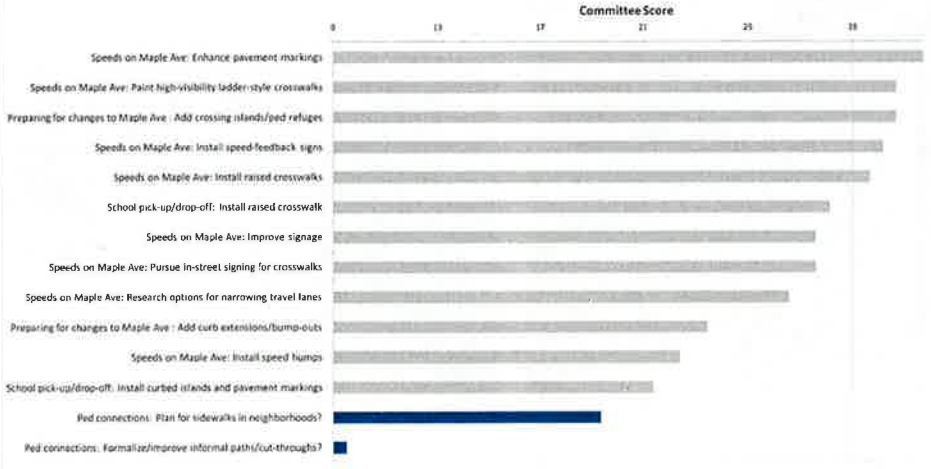
Pedestrian connections



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Summary

Themes and Potential Solutions

School pick-up/drop-off area	Address vehicle speeds	Prepare for changes in walkability/ bikeability	Formalizing ped connections?
•Raised crosswalk •Re-organize and separate modes (bus, parent vehicle, staff parking, etc.)	Increase school presence on Maple Ave through: •Signage •Pavement markings Calm traffic using: •Speed feedback signs •Speed humps •Narrow lanes: splitter islands, sidewalk buffers •Raised crosswalks	Minimize pedestrian exposure/crossing distances •Crossing islands/ pedestrian refuges •Curb extensions	Informal paths/cut-throughs •Security issues? Pako & Kennedy/Sesame neighborhoods? •Walking on street vs constructing sidewalks?

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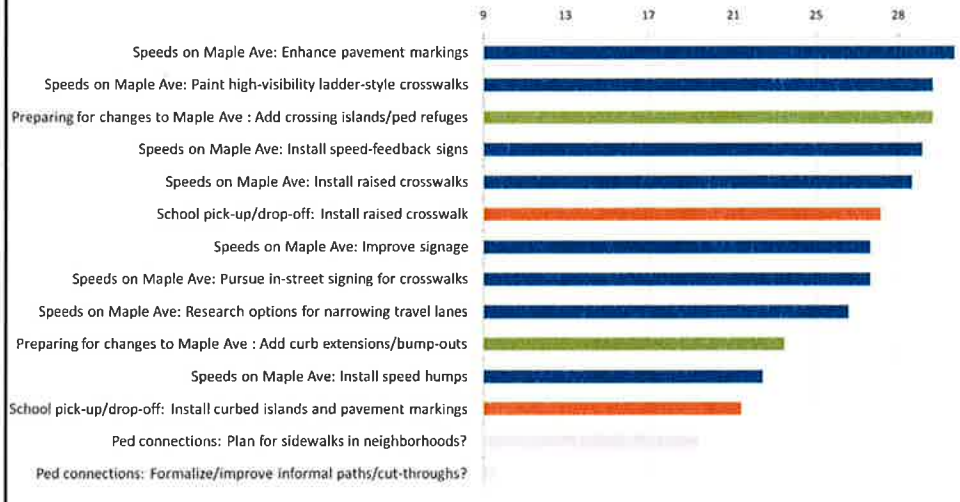
Summary/Prioritization



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Next Steps

- Prepare travel plan
- Integrate travel plan into City of Keene Master Plan

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