



To: Ron Rodjenski, Town Administrator  
From: Joe Segale P.E., Jon Slason E.I.T., RSG  
Subject: Camel's Hump Middle School Short-Term Design Recommendations  
Date: 17 January 2007  
Copy To: David Roberts, CCMPO

## **1.0 INTRODUCTION**

This memorandum presents the concept design for the short-term Safe Routes to School (SR2S) recommendations at the Camel's Hump Middle School in Richmond, Vermont

Resource Systems Group (RSG) was retained by the Chittenden County Metropolitan Planning Organization (CCMPO) and the Town of Richmond to develop designs for short-term improvements in the vicinity of the Camel's Hump Middle School. The design recommendations are part of a larger, wide-ranging Safe Routes to School plan that has been developed for the school.

## **2.0 BACKGROUND**

The Camel's Hump Middle School participated in the CCMPO's Safe Routes to School pilot program in 2005. A significant amount of planning was done during the pilot program that outlined several goals and concepts for infrastructure improvements adjacent to the school's access along Jericho Road. The pilot program developed a plan dated November 2005 that outlined several potential projects that would improve the visibility and 'significance' of the area. The projects include:

- **Jericho Road:**
  - Edgeline striping and vertical delineators to create a buffer between the roadway and the sidewalk;
  - Improved signage, striping, and school zone designation to improve legibility;
  - Sustained speed enforcement effort;
  - Sidewalk extension from School Street to Southview entrance; and
  - Major roadway upgrade, including wider sidewalks with buffer.
- **School Street**
  - Improvement of school entrance, wider sidewalks, and more separation between sidewalk and road; and

- Scoping/preliminary engineering for a School Street extension to Route 2, pedestrian, bike, emergency access, and new drop off area.
- **Four Corners (US 2-Jericho Road) Intersection**
  - Traffic signal retiming;
  - Cumberland Farms surface treatment; and
  - Permanent crossing guard funding.
- **East Main Street**
  - Reconstruct sidewalks

In the time since the November 2005 plan has been completed the Town of Richmond has been working to implement the recommendations. The Town has received funds to study the feasibility of improving Jericho Road and the Town has initiated a downtown parking study.

The recommended designs in this memorandum focus on the Jericho Road–School Street intersection and are the latest in the Town’s effort to implement the Safe Routes to School plan. All improvements recommended in this phase are along Jericho Road in the vicinity of the School’s entrance and along School Street.

### 3.0 DESIGN

The concept design focuses on improving the distinction and legitimacy of the school zone by upgrading signage and striping along Jericho Road and at the intersection of School Street and Jericho Road.

Highlights of the recommended design shown in Figure 1 include:

- 1) *Striping and in-pavement markers to narrow and define the school’s driveway.* The striping combined with the in-pavement markers will provide a year-round solution to narrow the approach to Jericho Road from the school. The striping and markers do not affect drainage and plowing like a more permanent curbing solution. Narrowing the approach will encourage slower speeds for vehicles entering and exiting the school and improve sight lines, creating a safer intersection. The markers will be placed along the outer white line along the travel way and along the transverse lines between the curb and the traveled way.

In-pavement markers are reflectors in a steel housing that are installed primarily below the grade of the road. The reflectors are snow-plowable and provide a ‘rumble’ like feel if a vehicle drives over them. While the striping will visually narrow the driveway, the paint can



be obscured during inclement weather. These reflectors combined with the striping will provide additional, year-round, reinforcement that the area is not meant for vehicles. Cut-sheets for the in-pavement markers are provided in the appendix.

- 2) *Curb/Shoulder lane marking to narrow the travel lanes to 11' along Jericho Road.* Defining the 11-foot travel lanes which are narrower than the current 12-foot lanes, will reinforce the "School Zone" along Jericho Road.
- 3) *Striping along the asphalt sidewalk to improve definition and create a visible buffer between the road and the sidewalk.* The striping along the asphalt sidewalk will provide the driver a visual cue that the asphalt sidewalk is a separate facility off the road. The striping will provide a visual barrier between pedestrians and vehicles.

The striping should continue west along School Street to provide a visual delineation between the school entrance and the narrow asphalt sidewalk on the south side. In-pavement markers should be installed in addition to the striping at a 20 foot interval. The striping and in-pavement markers provide a short-term improvement until the sub-station is removed which will allow enough width to replace the existing inadequate sidewalk with a new sidewalk complete with green space and pedestrian lighting.

- 4) *Solar-powered flashers and new school signs to define the "School Zone".* The standard school warning sign designating a "School Zone" will be combined with a single yellow programmable beacon that will be active during the AM and PM school traffic peaks. The beacon will be solar-powered and mounted on a standard 2' square traffic sign pole.

The design recommendations are shown in the schematic in Figure 1. The schematic shows the location of the major infrastructure and the location of the school zone along Jericho Road.

Detailed concept plans, specifications, and installation instructions are attached in Appendix A.

In addition to the recommended design in this study, other potential improvements have been evaluated as to their applicability and value to the study area. The improvements are secondary and can be installed once the initial design recommendations have been implemented.

- **Widening the sidewalk along the south side of School Street**—The narrow 3-4 foot wide sidewalk is inadequate and does not meet current design standards. Though the sidewalk should be replaced, it should wait until the sub-station is removed. Once the sub-station is removed (scheduled to be removed by late 2007) a wider sidewalk can be installed with pedestrian scale lighting and a green belt to further separate the pedestrians from the vehicle travel. This improvement could be tied into the larger Jericho Road reconstruction or be a separate stand alone project.



- **Driver Feedback Sign (Speed Radar)**—A driver feedback sign, similar to the one shown below, could be placed facing the southbound traffic heading downhill along Jericho Road. The feedback sign is not part of the short-term design because the recommended design will slow traffic at the School Street intersection, alert oncoming motorists of a school zone, and provide a visual buffer between the vehicles and the sidewalk. The feedback sign would be redundant. Therefore, the estimated \$7-\$8,000 sign is not vital to meet the goals of the Safe Routes to School Plan.

If vehicle speeds along Jericho Road continue to be a concern in the study area the feedback sign should be part of an overall traffic calming strategy along Jericho Road.

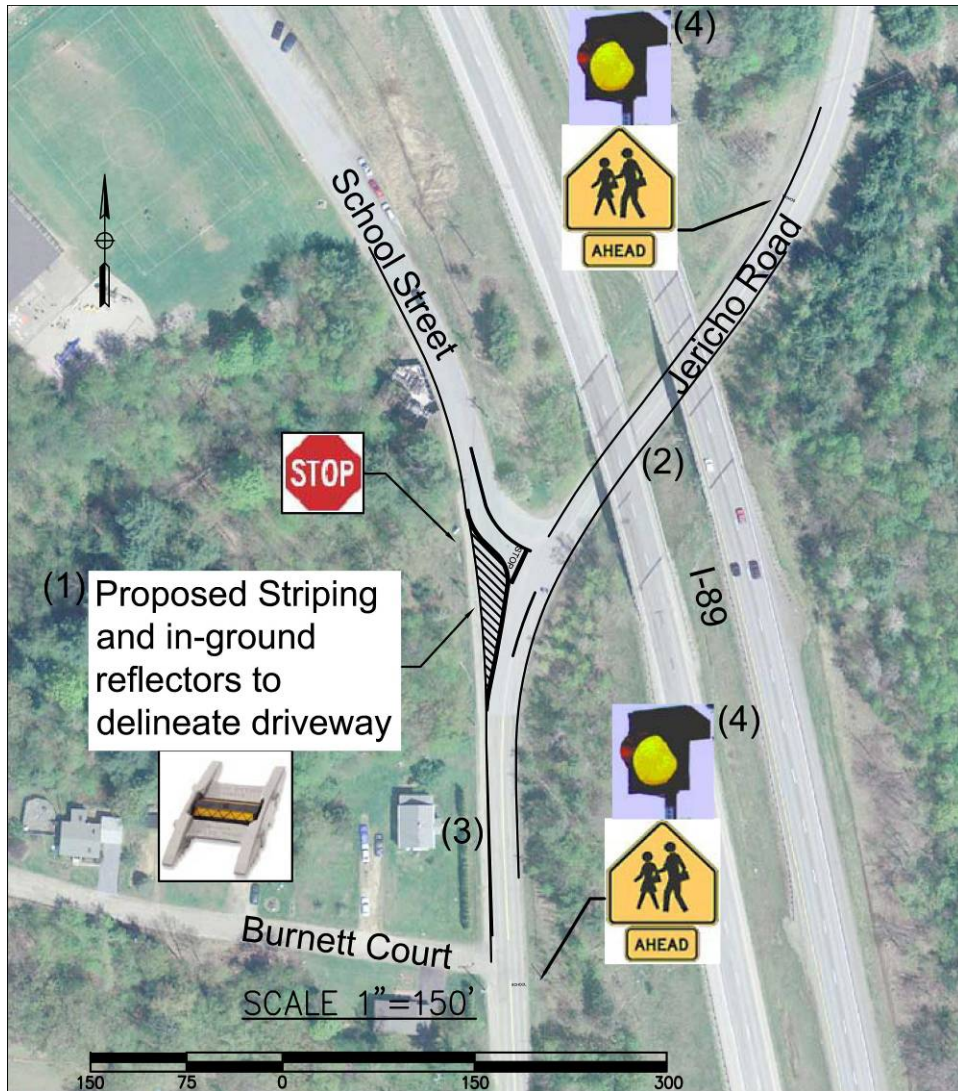
- **School Street Lighting**—Street lights or pedestrian scale lighting infrastructure are not included in the recommended designs because of the uncertainty of the sub-station removal. Once the sub-station is removed the area can be evaluated to determine the best option to improve lighting along School Street and Jericho Road.



The SPEEDCHECK-1520F pole-mounted radar speed sign.



Figure 1: Design Schematic



#### 4.0 COST ESTIMATE

The total cost of all the design recommendations for the Camel's Hump Middle School is estimated to cost approximately \$16,000. This includes all installation of the in-pavement markers and school zone flashers. The line-item cost breakdown is shown in Table 1.



Each of the design components can be implemented independent of each other and in phases. It is logical that the signage and striping should be implemented first because of cost and ease of installation. Additional components can be installed to further enhance and improve the safety of the area.

**Table 1: Cost Estimate**

<b>Cost Estimate</b>	<b>Quantity</b>	<b>Unit</b>	<b>Cost/Unit</b>	<b>Total Cost</b>
<b>Signs</b>				
<i>Salvage and erect existing school signs</i>	2	EACH	\$ 35.00	\$ 70.00
<b>Striping</b>				
<i>4" White Line</i>	2000	LF	\$ 0.19	\$ 380.00
<i>4" Double Yellow Center Line</i>	200	LF	\$ 0.19	\$ 38.00
<i>Stop Bar</i>	16	LF	\$ 4.20	\$ 67.20
<i>Durable Stencil Street Words</i>	3	EACH	\$ 61.00	\$ 183.00
<b>Beacons</b>				
<i>School Zone Flashing Beacons</i>	2	EACH	\$ 3,300.00	\$ 6,600.00
<b>Markers</b>				
<i>Installed In-Pavement Markers</i>	100	EACH	\$ 35.00	\$ 3,500.00
<b>Subtotal:</b>				<b>\$ 10,838</b>
Miscellaneous Items			5%	541.91
Contingency			10%	1,083.82
Traffic Control			15%	1,625.73
Mobilization			7.50%	812.87
Construction Engineering			12.50%	1,354.78
<b>Subtotal Ancillary Fees:</b>				<b>\$ 5,419</b>
<b>Grand Total:</b>				<b>\$ 16,257</b>

## 5.0 CONTINUING EFFORTS

The Town of Richmond and the Camel's Hump Middle School should continue to move the project recommendations in the November 2005 Safe Routes to School Improvement Plan forward. The Town should investigate funding sources for the reconstruction of Jericho Road and the construction of the School Street extension to US 2. The Town should evaluate the pedestrian accessibility of the US 2-Jericho Road (Four Corners) intersection and recommend any design changes to the Vermont Agency of Transportation.

