STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
STATE TRAFFIC COMMISSION
Two Capitol Hill
Providence, R. I. 02903

May 5, 2011

The Honorable John J. Tassoni, Jr.
33B Waterview Drive
Smithfield, RI 02917

Dear Senator Tassoni:

The State Traffic Commission (STC) at its April 13, 2011 meeting considered your request to reconsider lowering the posted 40 MPH speed limit and the 30 MPH school zone speed limits on Providence Pike between the Smithfield Town Line and Greenville Road. As you know, the STC examined this issue in 2009 and voted to leave the speed limits unchanged.

A comprehensive study was undertaken for this stretch of road. A speed study was conducted in 3 locations. The first was in the 30 MPH school zone for the North Smithfield Elementary School. The second was conducted in the 40 MPH area between the elementary and middle school and the third location was in 30 MPH school zone near the athletic field of the Middle/High School. The results of the speed study are shown below:

	LOCATION 1		LOCATION 2		LOCATION 3	
Data Collection Location:	**Approx. 200 FT North of N.S. Elementary School Driveway**		**Near 2110 Providence Pike** (Approx. Midway Between Loc. 1 & 3)		**Approx. 300 FT South of N.S. Middle/High School Athletic Fields Driveway**	
Time:	8:45 am to 9:55 am		11:15 am to 12:00 pm		2:15 pm to 3:00 pm	
Weather:	Sunny, Dry		Partly Cloudy, Dry		Cloudy, Dry	
Direction:	SB	NB	SB	NB	SB	NB
Posted Speed (MPH):	30	30	40	40	30	30
Mean Speed (MPH):	44	42	45	44	43	40
85th Percentile Speed (MPH):	48	45	50	48	49	46

In 2009 we reasoned that *"Motorists tend to drive at a speed that they feel comfortable given the characteristics of the road, such as width, sight distance, riding surface, densely settled, etc. By reducing the speed limit to 30 MPH, motorists would continue to drive at speed that they feel comfortable resulting in very limited speed reduction."* The 2011 data collected for this study exemplifies this reasoning. The motorist speeds in the 40 MPH speed zone and 30 MPH school zones are nearly identical.

Based on this data, we still feel that reducing the speed limits could have negative effects due to the increase in speed distribution. When motorists obey a lower posted speed, motorists who continue to travel at a speed that is comfortable, could get frustrated and lead to unsafe passing or other dangerous decisions. Based on the latest study, the STC did not approve the reduction in the speed limit.

However, as part of the study, some inconsistencies with the existing signing were brought to light. The STC approved relocating the existing school zone signs to create school zones that extend from 300 feet beyond the school property limits.

Also, relative to the intersection of Providence Pike and Douglas Pike in Smithfield, the STC voted to examine if traffic calming measures could be incorporated into the traffic signal design which is scheduled to be awarded to a construction contractor in December of 2011.

Very truly yours,
STATE TRAFFIC COMMISSION

Robert Rocchio

Robert Rocchio, P.E.
Secretary

RR/swp

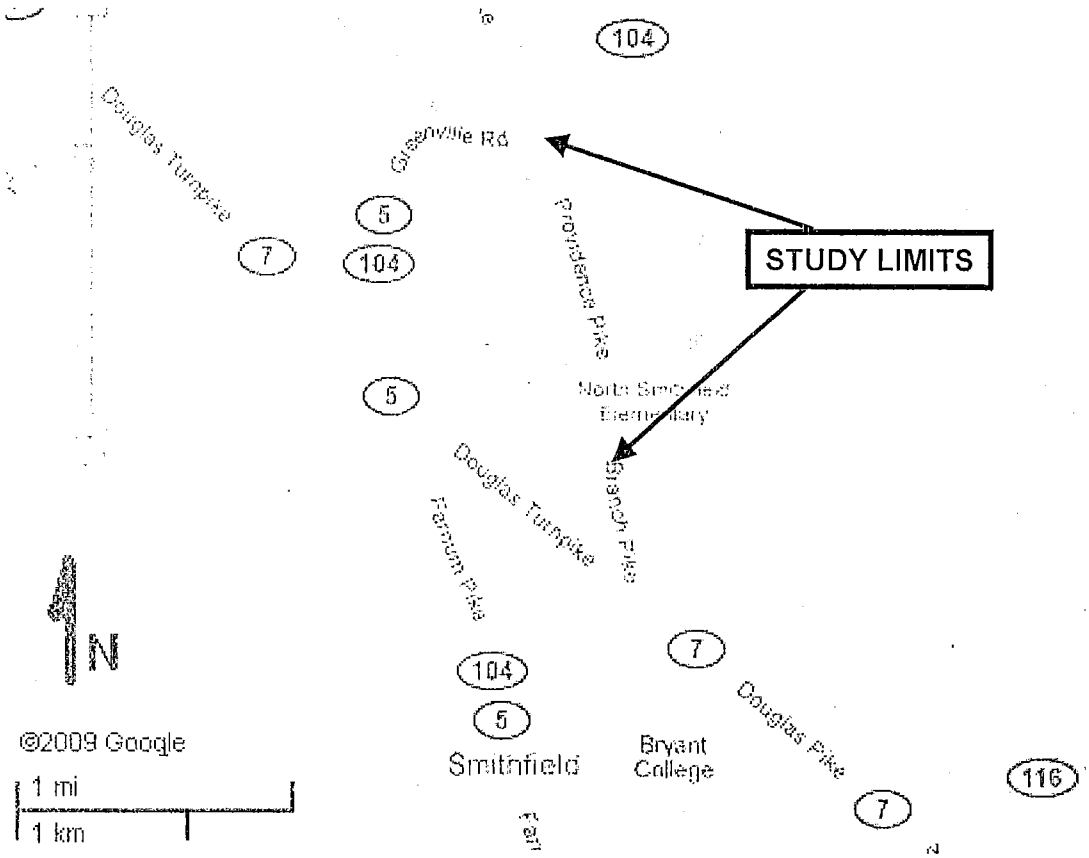
cc: Paulette D. Hamilton, Town Administrator
Steven E. Reynolds, Chief (North Smithfield Police Department)
Director Lewis, Cassin, Farhoumand, Frezza, Jill Silva, Smith, file

Study Prepared for the

Rhode Island State Traffic Commission

SPEED STUDY

PROVIDENCE PIKE
NORTH SMITHFIELD, RHODE ISLAND



Study Conducted by: The Rhode Island Department of Transportation
Traffic Engineering Unit

APRIL 2011

Introduction

This study was conducted in response to a March 2011 request from State Senator John J. Tassoni, Jr. to investigate whether the posted speed limits on the section of Providence Pike in North Smithfield between the Smithfield Town Line and Greenville Road should be changed.

In November 2009 the Rhode Island Department of Transportation (RIDOT) conducted a similar study in the same area of Providence Pike, also at Senator Tassoni's request.

Study Area Description

The study area is the approximately 1.2-mile segment of the Providence Pike, a minor arterial roadway, between the Smithfield Town Line and the signalized intersection at Greenville Road (RI Routes 5/104). Within this area, the Providence Pike roadway cross-section includes one travel lane in each direction with paved shoulders on both sides of the roadway. The width of the travel lanes and shoulders varies throughout the area, with typical 11- to 12-foot travel lanes and 3- to 5-foot paved shoulders provided.

While the roadway is listed as lying within the urbanized area boundary identified by the RI Statewide Planning Program, the general character of the roadway may be described as suburban/rural in nature, as this portion of Providence Pike runs through predominately forested and farm areas, with abutting land uses primarily residential. Two schools, the North Smithfield Middle School at 1850 Providence Pike and the North Smithfield Elementary School at 2214 Providence Pike are located near the northern and southern ends of the study area, respectively.

The horizontal geometric alignment of this segment of Providence Pike can be characterized as generally straight, with a gradual sweeping curve adjacent to the athletic facilities at North Smithfield Middle/High Schools, and another gradual but reverse curve approximately 700 feet north of the North Smithfield Elementary School that is intersected by Grange Road. Vertical geometric alignment varies throughout the study area but can be characterized as generally level terrain, with a gradual crest vertical curve near the center of the area (between approximately 500 feet and 1,450 north of Grange Road) and a more significantly inclined crest vertical curve between

approximately 500 and 1,200 feet south of Greenville Road (this vertical curve coexists with the horizontal curve adjacent to the athletic facilities at North Smithfield Middle/High Schools). Although the design speed of this segment of Providence Pike is unknown, for the purposes of this study a vehicle was driven in dry, daylight conditions at forty (40) miles per hour (MPH) while traversing each of the noted horizontal and vertical geometric curves, and the vehicle did so with ease and without loss of traction.

The regulatory speed limit on Providence Pike within the study area was approved as 40 MPH per STC approval January 19, 1972. More recently, two separate 30 MPH school zone speed limits were approved by the STC in locations in front of the two schools. Copies of STC records showing the recent approvals are included in the Appendix, and details regarding the roadside traffic signs that are installed to accommodate these approvals are presented in the next section.

School- and Speed-Related Traffic Control Signs in Study Area

On March 22, 2011, a drive-by field review was completed to inventory the school- and speed-related traffic control signs that are currently installed within the study area. The sequences of such signs that are installed in both the northbound and southbound directions of Providence Pike are summarized in Table 1.

In the northbound direction, based on currently installed signs the first reduced school speed limit zone (30 MPH) begins approximately 350 feet south of the North Smithfield Elementary School (NSES) driveway and ends at approximately 750 feet north of the NSES driveway, while the second reduced school speed limit zone (30 MPH) begins approximately 1,900 feet south of Greenville Road and ends approximately 300 feet before Greenville Road, at the location marked by an END SCHOOL ZONE sign. Interestingly there are two separate School Speed Limit Assemblies installed in the northbound direction approaching the North Smithfield Middle/High Schools. Also present within the second reduced school speed limit zone (adjacent to the North Smithfield Middle School) is a School Crosswalk Warning Assembly, which is installed at the marked crosswalk across Providence Pike near the school driveway on the east side of the road.

Table 1. School- and Speed-Related Traffic Control Signs in Study Area

SOUTHBOUND			NORTHBOUND	
Approximate Sign Location	Sign Description		Approximate Sign Location	Sign Description
150 feet south of Greenville Rd.	School Speed Limit Assembly (30 MPH, w/ plaque [7:00am-8:00am, 1:30pm-3:30pm])			
			300 feet south of Greenville Rd.	END SCHOOL ZONE
650 feet south of Greenville Rd. (at N.S. MS crosswalk)	School Crosswalk Warning Assembly		650 feet south of Greenville Rd. (at N.S. MS crosswalk)	School Crosswalk Warning Assembly
			1,200 feet south of Greenville Rd.	School Speed Limit Assembly (30 MPH, w/ plaque [7:00am-8:00am, 1:30pm-3:30pm])
1,900 feet south of Greenville Rd. (near N.S. MS/HS property line)	Speed Limit (40 MPH)		1,900 feet south of Greenville Rd. (near N.S. MS/HS property line)	School Speed Limit Assembly (30 MPH, no plaque)
750 feet north of N.S. Elementary School Driveway	School Speed Limit Assembly (30 MPH, no plaque)		750 feet north of N.S. Elementary School Driveway	Speed Limit (40 MPH)
350 feet south of N.S. Elementary School Driveway	Speed Limit (40 MPH)		350 feet south of N.S. Elementary School Driveway	School Speed Limit Assembly (30 MPH, no plaque)
[illegible]	Speed Limit (40 MPH)			
			Upstream of Town Line in Smithfield	Speed Limit (40 MPH)

NORTHBOUND DIRECTION

In the southbound direction, based on currently installed signs the first reduced school speed limit zone (30 MPH, between 7:00am-8:00am and 1:30pm-3:30pm) begins approximately 150 feet south of Greenville Road and ends at approximately 1,900 feet south of Greenville Road, while the second reduced school speed limit zone (30 MPH, no times/days noted) begins approximately 750 feet north of the NSES driveway and ends at approximately 350 feet south of the NSES driveway. Also present within the first reduced school speed limit zone (adjacent to the North Smithfield Middle School) is a School Crosswalk Warning Assembly, which is installed at the marked crosswalk across Providence Pike near the school driveway on the east side of the road.

Vehicle Speed Observations in Study Area

To determine the typical speeds of vehicles traveling in the study area, spot speed data was collected at three separate locations on Providence Pike. Care was exercised in selecting each location and in collecting the data to ensure that the data collection operation was inconspicuous to motorists and that data was only collected for vehicles traveling at free-flow (unobstructed) speeds.

The first data collection location was approximately 200 feet north of the main driveway for the North Smithfield Elementary School (within the currently posted 30 MPH school speed limit zone). The second data collection location was at the approximate midpoint of the study area (near 2110 Providence Pike, which is approximately midway between the two 30 MPH school speed limit zones). The third data collection location was approximately 300 feet south of the driveway for the athletic facilities at the North Smithfield Middle/High Schools (within the currently posted 30 MPH school speed limit zone). The speed data was collected on Tuesday, March 22, 2011 using a laser gun. All data was collected during conditions of dry pavement. A copy of the raw speed data is included in the Appendix.

The results of the speed data collection are summarized in Table 2 below. The data indicates that at all three locations, the mean (average) and 85th percentile speed in both directions on Providence Pike were higher than the posted speed limits. The 85th percentile speed in each direction in both of the reduced school speed limit zones was at least fifteen (15) MPH greater than the posted limits in those areas. Average speeds were lowest at the data collection site closest to the Middle/High School; this may be

explained by the fact that speed data was collected at this site shortly after school dismissal (at a time when school buses are expected to be on the road), while data were collected at both other sites during times when school was in session (at times when school buses are not expected to be on the road). Speed differentials between the posted (limit) and actual observed operating speeds in each of the two reduced school speed limit zones were greater than they were in the 40 MPH section.

Table 2. Spot Speed Data Summary

	LOCATION 1		LOCATION 2		LOCATION 3	
Data Collection Location:	**Approx. 200 FT North of N.S. Elementary School Driveway**		**Near 2110 Providence Pike** (Approx. Midway Between Loc. 1 & 3)		**Approx. 300 FT South of N.S. Middle/High School Athletic Fields Driveway**	
Time:	8:45 am to 9:55 am		11:15 am to 12:00 pm		2:15 pm to 3:00 pm	
Weather:	Sunny, Dry		Partly Cloudy, Dry		Cloudy, Dry	
Direction:	SB	NB	SB	NB	SB	NB
Posted Speed (MPH):	30	30	40	40	30	30
Mean Speed (MPH):	44	42	45	44	43	40
85th Percentile Speed (MPH):	48	45	50	48	49	46

Given the collected speed data, it appears motorists typically drive their vehicles within the study section of Providence Pike at speeds that are consistently higher than the posted speed limits, both in the 40 MPH signed area and the 30 MPH school zones.

Crash Analysis

In a further effort to determine whether the posted speed limits on Providence Pike should be changed, crash records from January 1, 2008 to April 4, 2011 were obtained and reviewed for the study area. A copy of the full crash records with narratives that were reviewed is included in the Appendix. After a cursory review of the obtained records, several crash records were eliminated from further consideration because the crash location fell outside of the study area limits. The remaining crashes are summarized in Table 3.

Table 3. Summary of Crashes Occurring within Study Area

Year	No. of Crashes	Crash Type Breakdown	No. of Injuries
2008	3	Angle @ Private Driveway --- 1 Pedestrian @ High School Athletic Field Driveway --- 1** Angle @ Greenville Road Traffic Signal --- 1**	2
2009	4	Angle @ Elementary School Driveway --- 1 Head On – Animal --- 1 Rear End @ Greenville Road Traffic Signal --- 1 Angle @ Greenville Road Traffic Signal --- 1	0
2010	4	Broadside @ Greenville Road Traffic Signal --- 1** Head On – Animal --- 1 Run Off Road – Medical (Seizure) --- 1** Rear End @ Private Driveway --- 1	2
2011*	2	Head On – Animal --- 1 Hazard in Roadway (Pothole) --- 1	0
Total	13		4

* January 1 to April 4
** Injuries Sustained

In the three-year, three-month period from January 2008 to April 2011 there were thirteen (13) crashes, four (4) of which resulted in injuries. Vehicular collisions at the signalized intersection of Providence Pike and Greenville Road accounted for four (4) crashes, nearly one-third of the total crashes observed in the study area. A review of the narratives for each of these crashes does not suggest that excessive vehicular speed on Providence Pike was a contributory factor in the crash.

Of the remaining nine (9) crashes, five (5) involved either a collision with an animal, a pothole in the roadway, or driver medical condition (seizure). For each of these 5 crashes, the narratives do not provide evidence or suggest that excessive speeds played a role in causing the collisions.

Three (3) multi-vehicle crashes occurred at driveways within the study area; one each in 2008, 2009, and 2010. The 2008 crash occurred as a vehicle attempted to exit a private driveway at 1943 Providence Pike and collided with an approaching vehicle that the exiting driver failed to see. The 2009 crash involved a motorist turning out of the driveway from the North Smithfield Elementary School who collided with another vehicle

headed straight on Providence Pike. The 2010 crash occurred as a vehicle making a left hand turn into a private driveway at 2358 Providence Pike was rear-ended by a trailing vehicle traveling in the same direction. Injuries were not sustained in any of these crashes. While excessive speeds may have played a role in these crashes, it appears that driver error (e.g., failure to yield right of way) was the leading contributing factor to all three of these crashes.

In 2008 a pedestrian was struck and injured near the North Smithfield Middle/High School athletic field driveway. A review of the narrative for this crash indicates that the pedestrian attempted to cross the road behind a bus parked on the side of the road during dark conditions. The operator of the vehicle indicates that the pedestrian darted out in front of her vehicle, and she did not have time to stop. The reporting police officer indicates that the vehicle speed at time of impact was estimated as between 25 MPH and 40 MPH. It appears that pedestrian error (failure to yield right of way) was the leading contributing factor to this crash.

Recommendations

Speed Limits

Research has shown that most motorists traverse roadways at speeds which they feel are reasonable given their expectations of conditions to be encountered, regardless of any posted speed limits. Research has also shown that crash risk tends to be lowest for vehicles traveling at or near the average speed of traffic. Given the above, and considering the general roadway characteristics (including geometric alignment) within the study area, the results of the vehicle speed observations, and the findings from the crash analysis, it is not recommended that any of the currently posted speed limits within the study area be reduced.

The current Manual on Uniform Traffic Control Devices (MUTCD) includes a statement that non-statutory posted speed limits should be within five (5) MPH of the 85th percentile speed of free-flowing traffic. Given that the 85th percentile vehicle speeds observed as part of this study ranged from 45 to 50 MPH at all three observation locations, increasing the 40 MPH (general) speed limit to 45 MPH should be considered. Further, the speed

observations show that the average motorist typically travels through each of the reduced school speed limit zones at a speed of at least ten (10) MPH greater than the posted (30 MPH) limit, suggesting that the existing School Speed Limit (Sign) Assemblies are not effective.

While detailed information regarding North Smithfield Elementary and Middle/High School student pedestrian demands/conflicts on Providence Pike was not collected as part of this study, it is expected that a limited number of students do walk to/from the schools on most school days (current North Smithfield school transportation policy excludes non-special education students from being eligible for school bus ridership when there is a safe walking area to a school and the distance to school is less than or equal to [a] ¾ of a mile for students in Grades 1 thru 5 or [b] 1-½ miles for students in Grades 6 thru 12). A total of three (3) student pedestrians were observed walking along and/or crossing Providence Pike near the Middle/High School athletic field driveway between 2:15 pm and 3:00 pm on March 22. Because of these student pedestrian expectations, the existence of a reduced school speed limit zone adjacent to each school on Providence Pike appears to be warranted in general (see "Other" below for specific recommended changes to school-area traffic control signs). More frequent but targeted speed enforcement in the school zones by police would be expected to help improve the effectiveness of (and motorist compliance with) the School Speed Limit Assemblies. However, given the findings of the crash and speed analyses, and due to the aforementioned concerns about crash risks associated with increased differentials of motorist speeds, it is not recommended that either of the currently posted 30 MPH speed limits be reduced.

Other

Based on the review of school- and speed-related traffic control signs in the study area, the following actions are noted for compliance with the MUTCD:

1. It is recommended that the existing END SCHOOL ZONE sign installed 300 feet south of the Greenville Road signalized intersection facing northbound motorists be removed, and "replaced" by a new Speed Limit sign (MUTCD Code R2-1) installed a short but appropriate distance north of the intersection, facing northbound Providence Pike motorists.

2. For each of the reduced school speed limit zones that is to remain, a new School Advance Warning sign assembly (including an appropriately-sized S1-1 sign and an appropriate W16-series plaque) must be installed at an appropriate distance in advance of each School Speed Limit Assembly, for compliance with MUTCD Section 7B.15.

3. The limits and effective days/times of each of the existing reduced school speed limit zones should be re-evaluated to determine whether they are signed appropriately, given (a) the intent of the original 2008 requests to the STC and (b) current RI Statute Section 31-14-2; Speed Restrictions. If necessary, the School Speed Limit Assemblies, Speed Limit signs (MUTCD Code R2-1), and/or END SCHOOL ZONE signs should be modified and/or relocated for consistency with the appropriate limits and effective days/times. *NOTE 1: The STC Records for the two reduced speed zones (copy included in the Appendix) do not explicitly indicate the appropriate limits. NOTE 2: In the northbound direction near the Middle/High Schools, one of the two 30 MPH signs should be removed.*