NH Route 28 Corridor Safety Study

Prepared by:

Lakes Region Planning Commission
Central New Hampshire Regional Planning Commission
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Funding for this project was provided in part by Lakes and Central Region Planning Commissions and the New Hampshire Department of Transportation.

August 31, 2009

NH Route 28 Corridor Safety Study

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SECTION 1. INTRODUCTION

In 2006, the Lakes Region Planning Commission (LRPC) identified the NH Route 28 corridor as a regional priority for study based on existing traffic volume, development potential, and regional importance. In consultation with the towns of Alton and Barnstead, the LRPC applied for funding from the New Hampshire Department of Transportation (NHDOT) to conduct a safety audit. While the need was acknowleged, it was recommended by the grant evaluation committee that the inclusion of additional communities in the corridor would enhance the proposal. In 2008, the LRPC and Central New Hampshire Regional Planning Commission (CNHRPC) re-applied as joint applicants and were awarded funding to conduct this NH Route 28 Corridor Safety Study. This study examines the 24-mile stretch of NH Route 28 from the Alton traffic circle south to the Epsom/Pembroke town line.

Supporting the need for this study are the following facts:

- The corridor has experienced a 30 percent traffic volume increase from 1997 to 2006 (at the Barnstead/Pittsfield town line).

- Traffic generators include a high level of urban commercial, residential, and employment center activity from the city of Concord, local employers, area second homes, summer tourism, and winter sports in the North Conway and Mount Washington Valley.

- According to the NHDOT Transportation Improvement Plan 2007-2016: Moderate to high congestion is experienced throughout the corridor, with Level of Service (LOS) diminished to ratings of E (unstable traffic flow) & F (forced or a breakdown in traffic flow) in the southern stretch near the Epsom traffic circle.

- The Lakes Region Transportation Plan 2008 identifies east-west corridors as leading transportation planning priorities, and NH Route 28 as a "Lifeline Corridor" having critical importance for the state and the region.

NHDOT encourages the use of corridor studies to generate more involvement and greater insight of community values and views relating to the maintenance and improvement of state transportation routes. This cooperative approach requires consideration for the multitude of users; local residents, business owners, seasonal visitors to the area, and through traffic. The intent of the NH Route 28 Corridor Safety Study is to assess current conditions, identify potential safety improvements, assess potential future safety and land use issues, and outline practical land use strategies that can be implemented at the local level.

The services of Vanasse Hangen Brustlin, Inc. (VHB) were used in the development of conceptual and pre-engineering safety improvments. VHB staff provided assistance in the prioritization of safety concerns, identification of near-term and long-term improvements, the production of project specific graphics, and the development of preliminary safety improvement cost estimates. While the graphics are

suitable for planning purposes and not intended to represent final solutions, the potential projects could be considered for future implementation, and the cost estimates will be useful in budgeting discussions.

In addition to safety improvements, this study explores the link between land use and transportation. While the NHDOT approves driveway permits for access on state transportation routes based on safety, transportation design and connectivity have an impact on community character. This study acknowledges the importance of future development on NH Route 28 as it relates to the maintenance of community character. Existing land use regulations and zoning ordinances from corridor communities were reviewed for key transportation principles, strategies, and policy statements designed to influence future development within the corridor. The result of this review is a series of corridor-wide recommendations as well as specific town recommendations for each community in the study area.

The Boards of Selectmen in each community were asked by LRPC and CNHRPC to appoint representatives to a Project Advisory Committee (PAC). The PAC consisted of a broad base of local representatives with planning experience or a working knowledge of the NH Route 28 corridor. Press releases were used to notify the public about all PAC meetings. A NH Route 28 Corridor Safety Study web page was created to facilitate the exchange of information including, meeting notes, study drafts and maps, data collection results, and general information regarding the purpose of the study.[1]

A subcommittee was formed to conduct a safety field assessment. This Safety Audit Team (SAT) was comprised of 14 people including representatives from each community and planning commission, NHDOT, and Federal Highway Administation (FHWA) staff. The SAT participated in a two-day training session in Manchester, NH on the FHWA method of conducting Road Safety Audits (RSAs). The LRPC organized assistance from the RSA Peer to Peer program (RSA P2P) where a verteran of the RSA process participated in field review with the SAT for three days.

Committee meetings and VHB involvement in the study are outlined below:

Fall 2008

- Data collected by planning commission staff include vehicle speed, volume, and classification counts. Historic accident data is requested for each corridor community and provided to NHDOT for crash analysis.

February 10, 2009 – Study Kick-off Meeting – Barnstead Town Hall

- The first meeting of the PAC includes a project overview and timeline, an overview of existing conditions, and a presentation of historic crash analysis.

- The PAC develops a list of priority safety concerns that includes 17 locations within the study area.

March 3-4, 2009 – Road Safety Audit Training, Manchester, NH

[1] http://www.lakesrpc.org/services_transportation_route28.asp

- Training provided by Craig Allred, FHWA Transportation Specialist.

  Attendees:
  Vanessa Bitterman, CNHRPC
  Rodrigo Marion, CNHRPC
  Michael Izard, LRPC
  Adam Hlasny, LRPC
  David Kerr, Barnstead Board of Selectmen
  Bill Evans, Barnstead Health Officer
  Ken Roberts, Alton Road Agent
  Gordon Ellis, Epsom Road Agent
  Dave Furintino, Epsom Resident
  Peter Holmes, Chichester Business Owner
  Robert Wharem, Pittsfield Police Chief
  Gary Johnson, Pittsfield Fire Chief

April 20, 2009 – Consultant Interviews

- Consultant Selection Team consisting of Michael Tardiff - LRPC, Rodrigo Marion - CNHRPC, and Michael Izard - LRPC evaluate eleven perspective consulting firms and narrow the field to three firms for telephone interviews. Each firm is provided a list of interview questions in advance of the phone conference. After careful consideration, Vanasse Hangen Brustlin, Inc. was considered best qualified to assist with this project.

April 26-28, 2009 – Safety Audit Team Conducts Safety Field Assessment

- Field review of concerns identified by the Project Advisory Committee on February 10. Epsom Fire Department serves as team headquarters.

  Participants:
  Kenneth Roberts, Alton Highway Department
  Bill Evans, Barnstead Health Officer
  David Kerr, Barnstead Board of Selectmen
  James Plunkett, Chichester
  Peter Holmes, Chichester
  Betsy Bosiak, Epsom
  Gary Johnson, Pittsfield Fire Department
  Robert Wharem, Pittsfield Police Department
  Martin Calawa, FHWA (NH)
  Rosemarie Anderson, FHWA (NJ) Peer to Peer Program participant
  Stuart Thompson, NHDOT
  Rodrigo Marion, CNHRPC
  Craig Tufts, CNHRPC
  Adam Hlasny, LRPC
  Michael Izard, LRPC

May 12, 2009

- Consultant Selection Team meets with VHB to develop consultant scope of services.

June 25, 2009 – Preliminary Safety Audit Team Road Safety Audit Findings – Prospect Mountain High School, Alton, NH

- SAT results are summarized and presented at a PAC meeting. The committee identifies a "top ten list" of concerns for concept planning.
- VHB is introduced as the consulting engineer and discusses project involvement.

July 30, 2009 - Project Advisory Committee Meeting – Pittsfield Town Hall

- Existing land use reviewed and potential recommendations discussed.
- Preliminary results from VHB.

August 27, 2009 - Final Project Advisory Committee Meeting – Chichester Town Hall

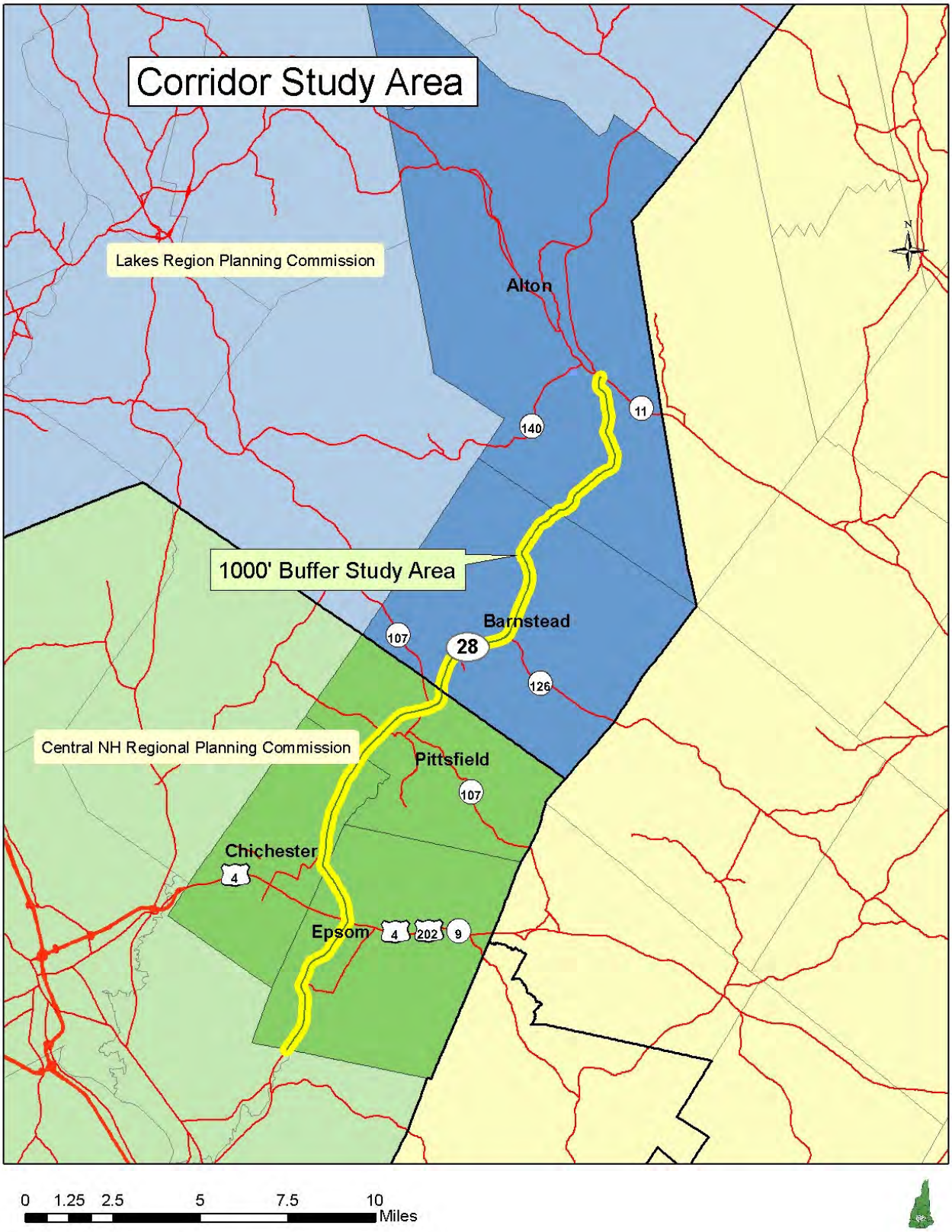
- Project Advisory Committee and public input on draft study report is requested.

September 2009 - Report Presented to Boards of Selectmen

- Board of Selectmen from each corridor community is asked to formally accept study recommendations.

Details for all meetings (minutes, adgendas, press releases, news articles, etc.) are included in Appendix A of this document. Map 1.1 shows the extent of the corridor study area.

Map 1.1 Corridor Study Area



SECTION 2. EXISTING CONDITIONS

The study kick-off meeting held on February 10, 2009 was attended by nearly 30 people, including both the committee members and the public. Each person in attendance was provided an opportunity to express their near-term concerns about road safety within the corridor study area. The results of this discussion are displayed below.

Alton

- Stockbridge Corner Road
- Prospect Mountain/Dudley Road
- Lot Line Road, Abednego Road
- No sidewalks near school
- Fragmented sidewalk network

Barnstead

- North Barnstead Road
- Peacham Road/White Oak Road/Lakeshore Drive
- Colony Drive

Chichester

- Kelly Corner Road (80-unit development proposed)
- NH Route 28/Main Street intersection (42-unit development pending)
- Epsom/Chichester town line (poorly banked, dangerous curve)

Epsom

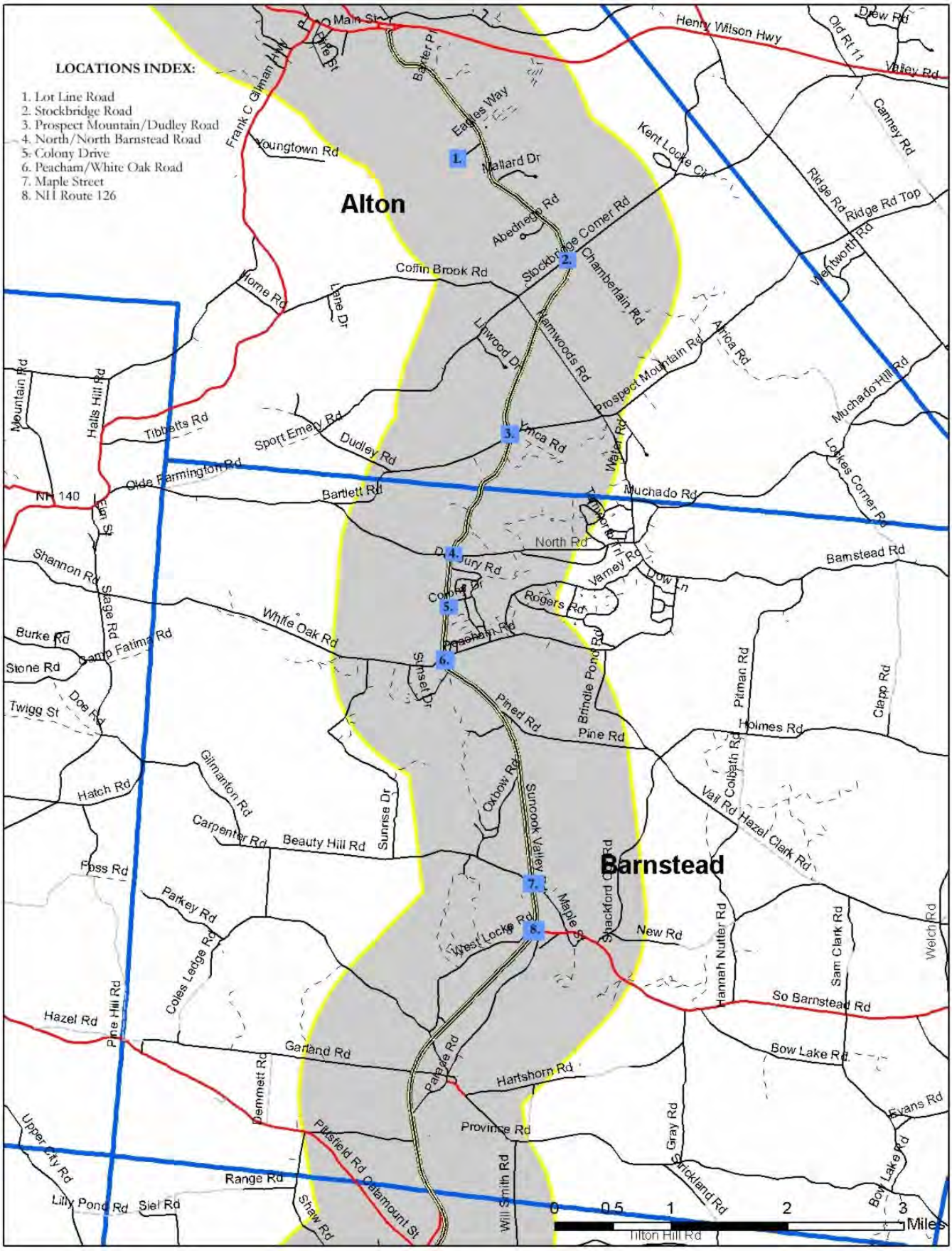
- Entrances to businesses surrounding traffic circle (access management)
- Elkins Road
- Mill House Road
- Shoulders throughout

Pittsfield

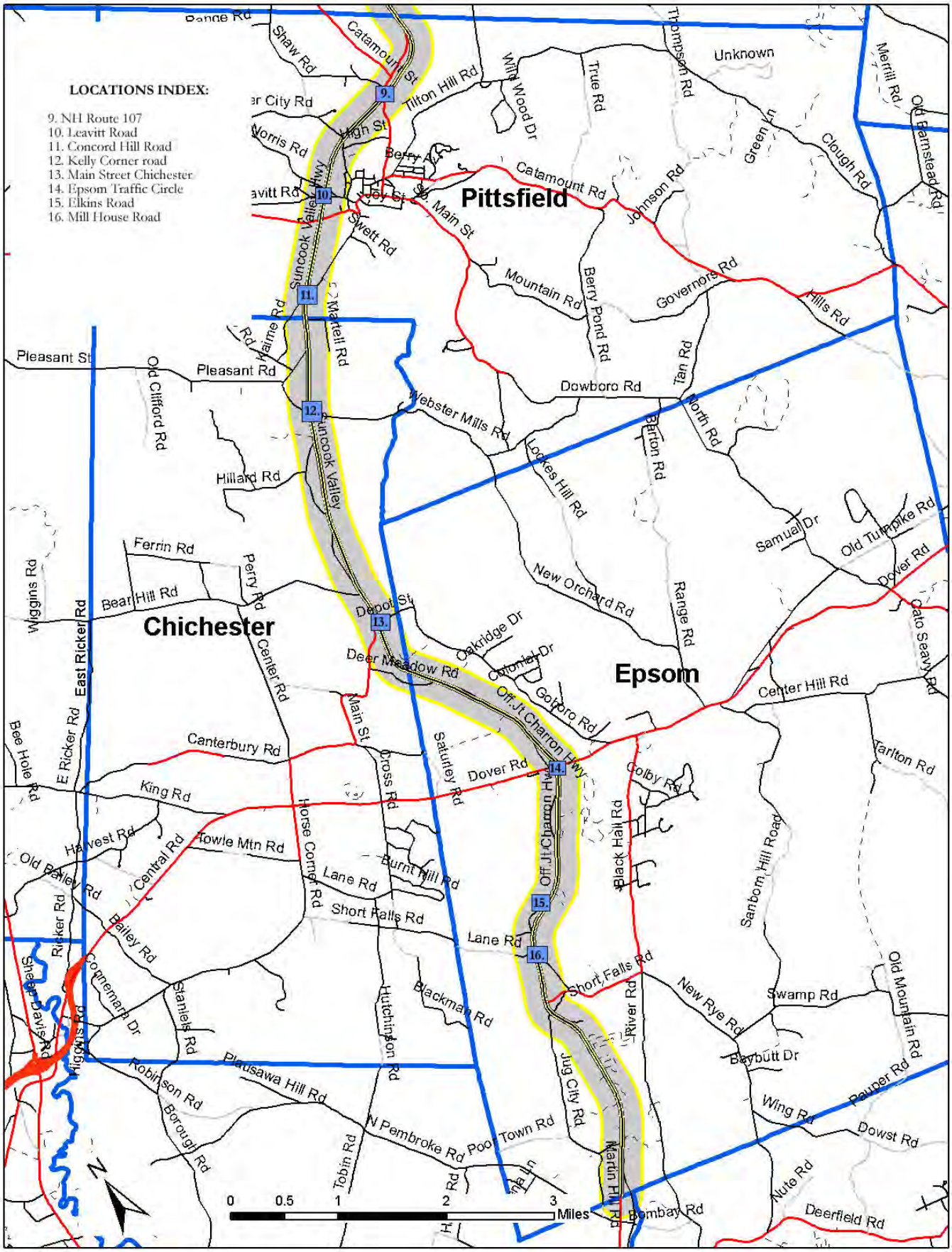
- Leavitt Road (foot traffic problem)
- NH Route 28/107 intersection ("yield on green" sign, sight distance issues)
- Concord Hill Road (sight distance issues)
- Need for sidewalks and crosswalks at intersection of Route 28 & 107 (foot traffic)

The list of concerns served as guidance for the Safety Audit Team assessment when conducting the road safety audits. Each of the location specific concerns assessed through the audit process are presented on Maps 2.1 and 2.2 in order from north to south. In addition, the general theme of bicycle access is addressed in a level of service analysis presented later in this section, and the topic of access management is discussed in the land use section of this document. Through public input an additional location, NH Route 28 at the entrance to King's Grant, a modular home park in Epsom, was added to the road safety audits.

Map 2.1 Northern Corridor Road Safety Audit Locations



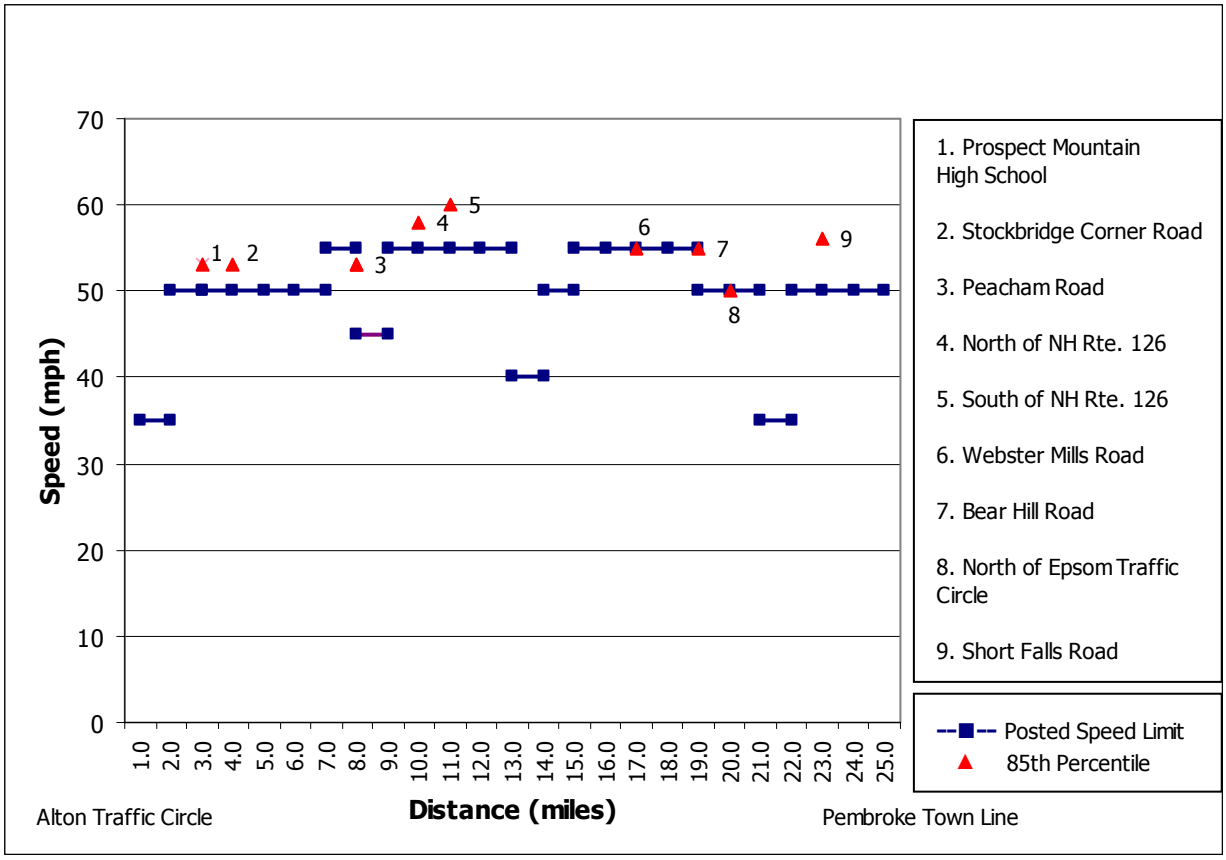
Map 2.2 Southern Corridor Road Safety Audit Locations



Traffic Data

Speed data were collected at nine locations to assess safe travel patterns at posted speed limits. Automatic traffic counters were used to collect the speed data over the course of one week in the fall of 2008. As dipicted in Graph 2.1, the posted speed limit (blue) was compared to travel speeds of 85 percent of the vehicles passing the recorder at a given location (red). Generally, recorded speeds were within 5 miles per hour of the posted speed limit. Excessive speed, more than 15 miles per hour over the posted speed limit, was generally one percent of the traffic or less.

Graph 2.1 Comparisons of Southbound Posted Speeds with Traveled Speeds



Graphs of the speeds recorded at each location are included in Appendix B. The perception of vehicles traveling too fast for condtions was a recurring theme raised at public meetings during the study and also by many members of the Safety Audit Team who were in close proximity to traffic while conducting field assessments. A second speed study was conducted for comparative purposes. Supplemental weekday commuter peak hour travel speed data was collected by providing local residents that drive the corridor for their daily commute to/from work with a GPS unit. The GPS unit continuously recorded travel speeds along the corridor. The resulting data provides a snapshot of average northbound and southbound travel speeds along each segment of the corridor during weekday commuting hours. Table 2.1 summarizes the commuter speeds recorded in July 2009.

Table 2.1 NH Route 28 Travel Speeds During Weekday Commuter Hours

Weekday Morning Travel Speeds Southbound Segment from NH Route 11 to:	Posted Speed	Avg. Speed	Max. Speed
Lot Line Road	50	40.6	46.9
Stockbridge Corner Road	50	46.5	52.0
Prospect Mountain Road	50	44.4	49.6
North Barnstead Road	55	42.2	48.7
Colony Drive	55	45.2	49.7
Peacham Road	55	44.0	48.4
Maple Street	55	50.5	60.1
NH Route 126	55	49.5	55.0
NH Route 107	55	53.7	61.3
Leavitt Road	55	50.4	56.5
Concord Hill Road	55	53.1	57.7
Kelly Corner Road	55	53.7	58.2
Main Street	50	53.7	59.9

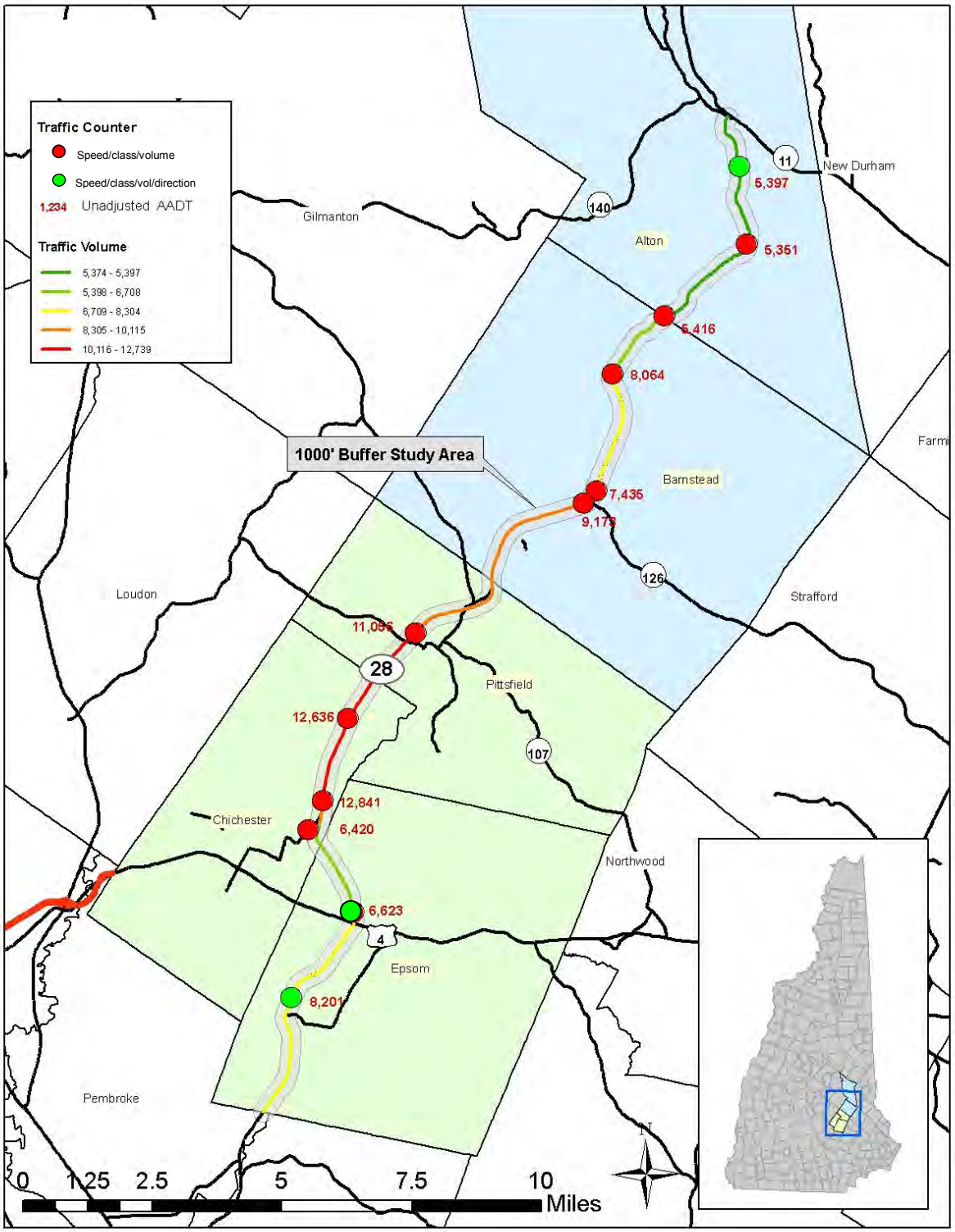
Weekday Evening Travel Speeds Northbound Segment from Epsom Circle to:	Posted Speed	Avg. Speed	Max. Speed
Main Street	50	47.5	55.1
Kelly Corner Road	55	52.0	56.3
Concord Hill Road	55	53.6	57.8
Leavitt Road	55	54.8	57.4
NH Route 107	55	51.2	55.3
NH Route 126	55	45.1	56.0
Maple Street	55	49.2	56.1
Peacham Road	55	52.1	61.0
Colony Drive	55	41.0	49.0
North Barnstead Road	55	46.7	50.0
Prospect Mountain Road	50	44.0	48.6
Stockbridge Corner Road	50	42.6	44.8
Lot Line Road	50	45.8	50.0

Speeds represented in miles per hour.

In general, the data show that average travel speeds during the weekday commuter peak hours (AM southbound and PM northbound) tend to be lower than the posted speed limit, as would be expected when the corridor is carrying its heaviest volumes of traffic. The highest travel speeds recorded during the morning southbound commute occurred in the vicinity of Maple Street and NH Route 107 where maximum speeds exceeded 60 MPH. During the weekday evening northbound commute the highest recorded speeds occurred in the vicinity of Peacham Road where speeds also exceeded 60 MPH.

Map 2.3 indicates the annual average daily traffic (AADT) within the corridor based on automatic recorders deployed in the fall of 2008. It should be noted that the data is not seasonally adjusted and therefore is not comparable to historic NHDOT traffic counts at the same loctions.

Map 2.3 2008 Annual Average Daily Traffic Counts



Noteworthy from the traffic volume data is the significant decrease in traffic on NH Route 28 south of Main Street in Chichester. This change is due largely to the alternative route that Main Street provides from NH Route 28 to US Route 4 for vehicles traveling to Concord and points west. Also noteworthy is the declining traffic north of Pittsfield and NH Route 126 where commercial development is less prominent. Detailed traffic volume and vehicle classification graphs are provided in Appendix B of this document.

Accident Data

Each corridor community was asked to provide local historic accident data for analysis and support of conclusions drawn about safety issues raised during the road safety audit process. Local accident data is preferable to accident data compiled by NHDOT. This is because the NHDOT data is not as comprehensive due to a reporting threshold that excludes damage below $1,500 from being reported, and the level of detail required to diagram accident locations is lacking in the NHDOT data. Where detailed historic accident data were availble for Alton and Barnstead, NHDOT prepared crash summaries for the intersections of Peacham Road, North Barnstead Road, Stockbridge Corner Road, Prospect Mountain Road, and Colony Drive. This information is included in Appendix B of this document. These crash summaries are also referenced where applicable when discussing location specific recommendations in the next section.

Interviews were conducted with local police, fire, and town personnel to supplement the crash data for the study area. These testimonies provided valuable insights into driver behavior, safety related conditions along the corridor, and ultimately about the likely causes of the crashes that have occurred. A common opinion heard throughout the interviews was that the crash data does not reflect the high frequency of near misses at several of the corridor intersections.

Some of the specific insights and their sources are as follows:

Alton Police Captain Heath

- Considers Hamwoods Drive to be more hazardous than Lot Line Road since it is more populated, has a narrow entrance, has a 6-foot drop off culvert nearby, and has limited sight lines.
- Some northbound drivers go off the road into the triangular island at the Stockbridge Corner Road split due to driver confusion on which way NH Route 28 goes.
- Prospect Mountain Road needs street lighting and access management.
- A lot of vehicles slide through the Dudley Road stop sign due to the approach grade.
- A lot of single vehicle, run off the road crashes occur due to the lack of shoulders and the adjacent drainage ditches. He feels the shoulders and the roadway profile should be fixed before the intersections.

Chichester Fire Lieutenant Cole

- There are frequent rear-end crashes on Main Street due to inattention.
- There are serious side impacts and rear end crashes as vehicles enter NH Route 28 from Main Street to fill gaps that are too short.
- The weekday evening delays on Main Street can reach the elementary school, nearly ½ mile away. This causes driver frustration and risk taking, and it forces fire engines to use the wrong side of the street to get to NH Route 28, including going around the small turning ramp the wrong way at NH Route 28.
- There are all varieties of crashes at Kelly Corner Road, mostly due to poor judgment of distances and speeds from the side road.

Epsom Police Captain Moulton

- Very few crashes at Elkins Road and these are frequently in winter due to sharp curve and grade.
- Millhouse Road is a low priority.
- Epsom Circle experiences a high number of crashes, but the severity is generally low. The yield conditions at the entry points are the sources of frequent rear-end crashes when the lead vehicle stops and the motorist in the moving second vehicle is looking to the left to merge.

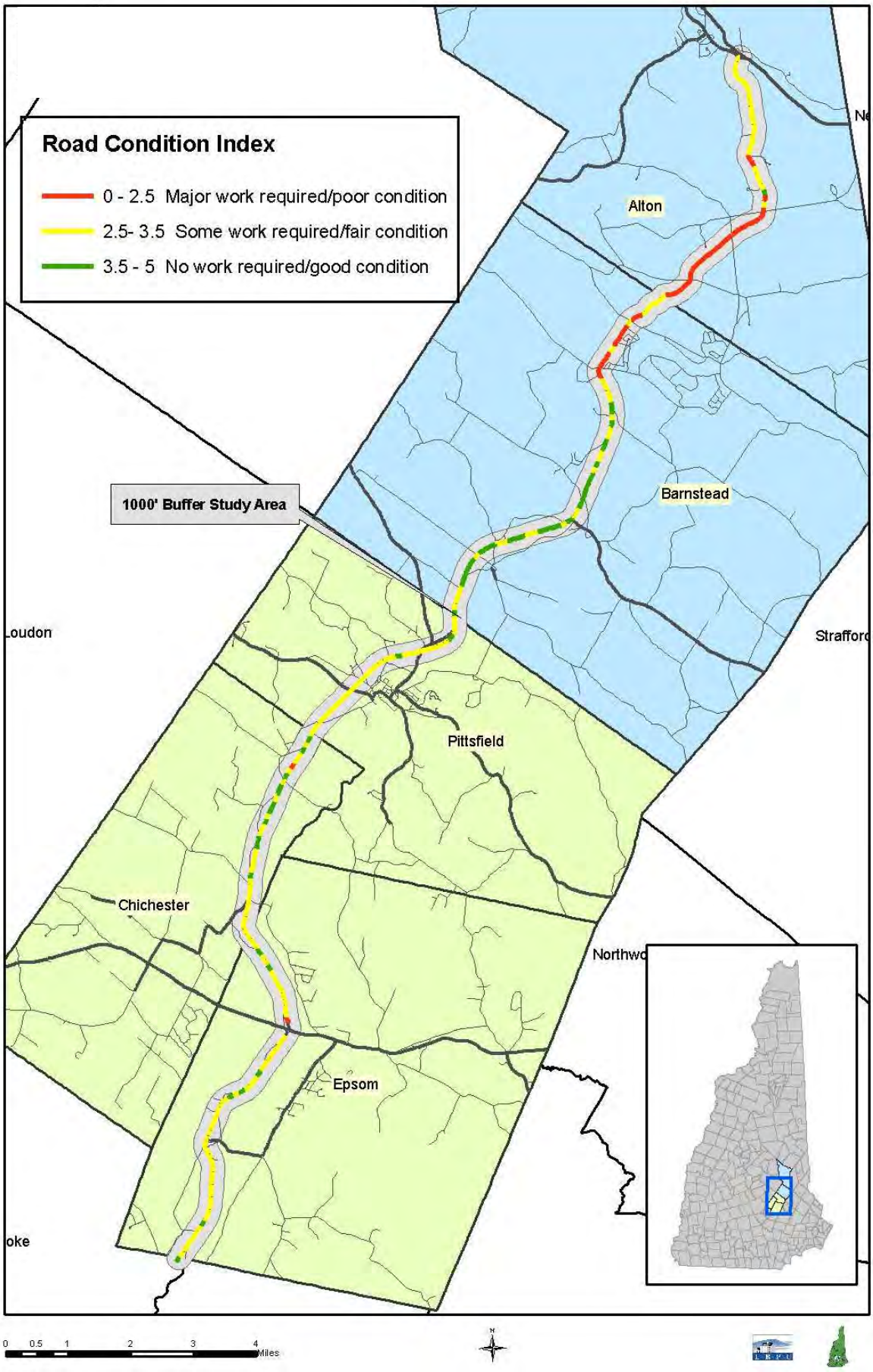
Pittsfield Police Chief Wharem

- The negative offset left turns at NH Route 107 are a significant cause of serious crashes because some motorists are misled to think they are in exclusive left turn lanes and the opposing left turning vehicles obstruct their view of the oncoming through traffic.

Pavement Condition

The NHDOT conducts assessments of road pavement conditions statewide and maintains a database of this information. This assessment is based on what is referred to as a Ride Comfort Index (RCI), which measures the amount of work needed to improve a roadway based on the roughness of the surface. The planning commissions aquired this data for the NH Route 28 corridor in 2008. Map 2.4 displays the level of work to improve the ride on NH Route 28 in the study area based on the most recent assessment conducted by NHDOT.

Map 2.4 Existing Pavement Conditions

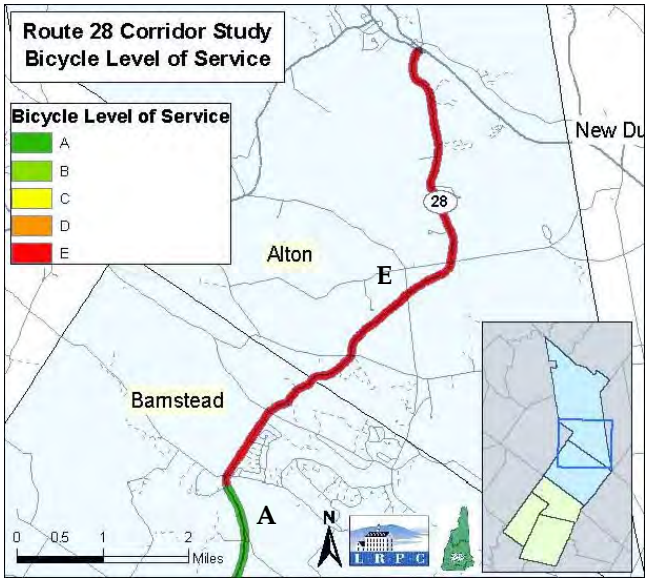


Bicycle Level of Service Assessment

A bikability assessment was conducted by LRPC and CNHRPC in the NH Route 28 corridor as a measure of the quality of service for this mode of travel. The Bicycle Level of Service (BLOS) assessment tool measures bicycle conditions of shared roadway environments and is based on industry research published by the Transportation Research Board[2].

Criteria such as volume and composition of traffic (percent heavy vehicles), pavement condition, curb side lane width, presence of parking, presence of bike lanes, presence of drainage structures, and roadway speed were documented and evaluated according to the bicycle model procedures.
The northern section of the study area, displayed in Map 2.5 is the most critical section of the corridor according to the results of the bikability assessment. As the map below shows, the level of service for bicyclists in this section is graded "E". This low grade is attributable to poor road conditions and limited shoulder width.

Map 2.5 Alton – Barnstead Bicycle Level of Service

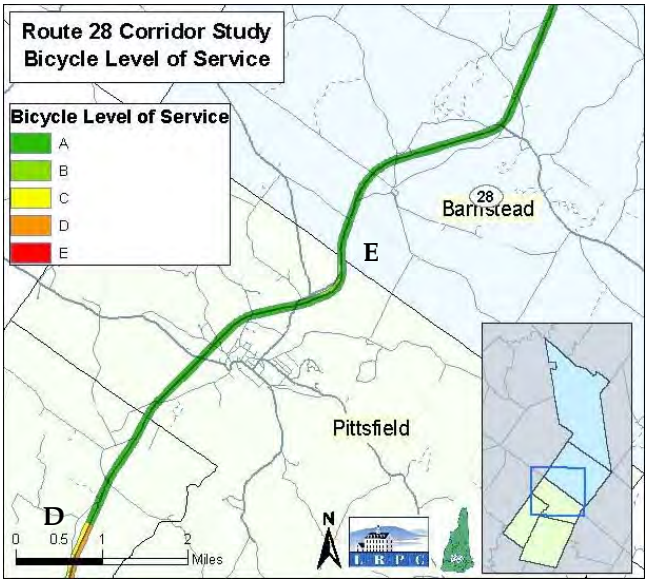


The southern Barnstead and Pittsfield section of the study area (see map below) has different characteristics. This section received the best bicycle rating along the corridor due to its wide shoulders and good pavement condition. Although speed data are not formally considered in the Bicycle Level of Service (BLOS) model, the speed data collected for this study were explored. Even though the BLOS rating for this section was high, this section may not be recommended for inexperienced bicyclists due to high-speed traffic.

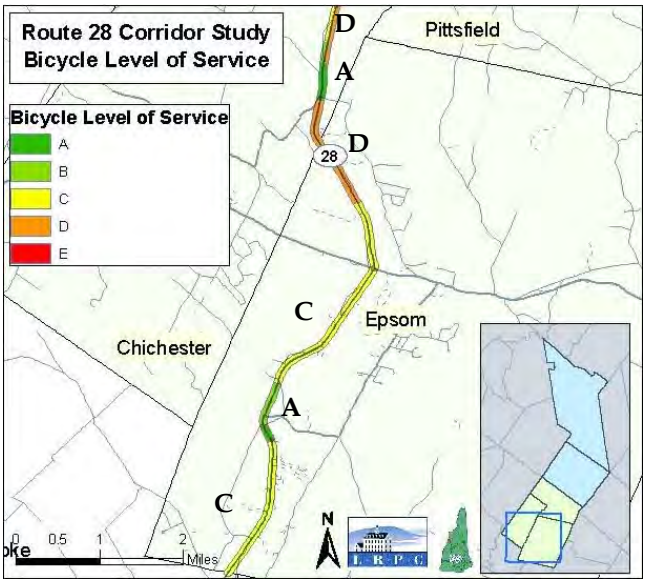
[2] Landis, Bruce W. "Real-Time Human Perceptions: Toward a Bicycle Level of Service" Transportation research Record 1578, Transportation Research Board, Washington DC 1997

The central section from Barnstead to Pittsfield, displayed in Map 2.6, reflects the overall average grade of the corridor. The roadway characteristics in this section vary from one point to the other. Traffic volume and shoulder width are key components that vary considerably.

Map 2.6 Barnstead - Pittsfield Bicycle Level of Service



Map 2.7 Chichester – Epsom Bicycle Level of Service



The BLOS displayed in Map 2.7 shows that the bicycle level of service along the southern corridor is marginal. The presence of heavy vehicles, mediocre conditions of the road, and the lack of a dedicated bicycle lane contribute to the overall LOS "C" rating along this section of the study area.

Sign Inventory

A sign inventory was conducted in the corridor study area in the fall of 2008. The inventory consists of GPS locations for all information, direction, and advisory signs within the study area. Commercial signs were not included in this inventory, but are discussed in this report where they present a safety concern. Each sign identified in the inventory is referenced by the Manual of Uniform Traffic Control Devices (MUTCD) reference number. The inventory, which is too detailed to present in map form in this document, can be accessed by contacting the Lakes or Central Planning Commissions.

Concurrent Studies

The NHDOT is currently investigating a reconstruction project that would upgrade portions of the section of NH Route 28 from the Alton traffic circle south approximately 7.0 miles to address safety and pavement conditions. This section is referenced in this document as the northern segment, and is significantly different than the southern section (Barnstead to Epsom) in that is tends to be narrower with more rolling terrain and horizontal shifts in the alignment.

The state project calls for major modifications to the NH Route 28 horizontal and vertical alignment. A cursory review of the NHDOT's preliminary design plans indicate that the reconstruction will substantially improve the existing deficient sight lines and other safety concerns that were identified by the Safety Audit Team. More than $4.75 million have been allocated for improvements to this segment of NH Route 28, which according to the current NHDOT schedule, become available in two installments ($1.25 million in 2010 and $3.5 million in 2015).

NHDOT engineers recently presented two horizontal and vertical alignment alternatives to the towns of Alton and Barnstead at a public officials meetings to obtain preliminary input on what the design speed should be in each community. Based on the preliminary feedback at these meetings, it appears that Alton may select a 50 MPH design speed and Barnstead may select a 40 MPH design speed. The 50 MPH design is generally straighter and requires more cuts, fills and right-of-way impacts. The 50 MPH design also tends to cost more than the 40 MPH design. The NHDOT proposed typical section would include 12 foot lanes and 4 foot shoulders.

To remain consistent with this on-going state project, any long range or high cost solutions that are discussed in this NH Route 28 study that fall within the northern section of the corridor will be compatible with both the 40 MPH (Barnstead) and 50 MPH (Alton) potential design parameters and alignments.

SECTION 3. ROAD SAFETY AUDIT PROCESS AND RESULTS SUMMARY

A project Safety Audit Team (SAT) was established in the spring of 2009. By design, a Road Safety Audit Team is designed to be an independent, multidiciplinary group. The SAT was comprised of local officials, members of police and fire departments, concerned citizens, and planning commission, NHDOT, and Federal Highway Admisistration (FHWA) staff. The SAT received FHWA Road Safety Audit (RSA) training in March prior to conducting a field assessment of the 17 areas of safety concern identified by the Project Advisory Committee in February 2009.

The SAT conducted a corridor-wide assessment during April 26-28 and the preliminary results were shared with Project Advisory Committee (PAC) and consulting engineer, Vanasse Hangen Brustlin (VHB) at a June 25, 2009 public meeting held in Alton. At that meeting, a SAT rating of the leading ten safety concerns along the corridor was presented and discussed. The purpose of this exercise was not to conclude which safety concerns presented the most pressing need in priority order, but to establish a "top ten list" for VHB to examine in greater detail when developing conceptual plans for safety improvments. The initial list of ten priority locations was:

1) Peacham/White Oak Road
2) North Barnstead/North Road
3) Stockbridge Corner Road
4) Main Street Chichester
5) Epsom Traffic Circle
6) Prospect Mountain/Dudley Road
7) Leavitt Road
8) NH Route 107
9) NH Route 126
10) Maple Street Barnstead

After committee discussion and public comment, it was decided and agreed upon by the PAC that Kelly Corner and Concord Hill Roads should replace Leavitt Road and Maple Street, since Leavitt Road has other funding for improvements through the Safe Routes to Schools Program and Maple Street pedestrian concerns may be more appropriately addressed off NH Route 28. Further, it was decided that the section of NH Route 28 between Kelly Corner and Concord Hill Roads should serve as a study section suitable for consideration by VHB. Table 3.1 summarizes the SAT findings for each location, and outlines a priority list of locations for which conceptual improvements would be developed by VHB. A detailed summary of results of the SAT field assessment, the *NH Route 28 Road Safety Audit - Preliminary Assessment Results: Assessment Conducted - April 26-28, 2009* is located in Appendix C.

At the June 25 meeting, the intersection of King's Grant and NH Route 28 in Epsom was raised as a location of significant safety concern by the public. It was determined that planning commission staff would assess this location and include an assessment summary in the project study report. Also discussed was the dangerous curve at the Epsom/Chichester town line which was described as poorly banked when identified as a safety concern at the PAC meeting in February 2009. NHDOT survey staff recently (summer 2009) conducted a review of the cross-level at this location which revealed no engineering concerns.

Table 3.1 Safety Audit Team Findings and Priority Locations

	NH Route 28 Corridor Safety Study *Community Concerns identified by Rt 28 Corridor Advisory Committee February 10, 2009* *Solutions from Rt 28 Safety Audit Team RSA Conducted April 27-28, 2009*	Road Safety Audit Solutions	Signage missing / needed	Updated signage needed	Sign location improvement needed	Painted lane adjustment	Improve line of sight (vegetation)	Improve pavement markings	Address through traffic	Guardrail improvement needed	Dangerous pavement drop-offs	Add shoulders	Signal adjustment	Access management needed	Speed enforcement needed	Congestion mitigation	Add turning lane	Redesign - Roadway alignment	Redesign - Vertical alignment	Redesign - Intersection alignment	Improve approach to intersection	Pavement improvements	Unpermitted use in right of way	Hazard in the right of way	Crosswalk	Sidewalks	Pedestrian signals	Add signalization	Improve signalization	Change passing zone through intersection	Add street lights	Develop local ped/bike travel plan
	Community Concerns																														
	Lot Line Road / Route 28		✓	✓							✓			✓																	✓
☒	Stockbridge Corner Road / Route 28		✓	✓	✓		✓	✓			✓	✓	✓				✓	✓			✓	✓		✓					✓			
	No sidewalk near high school Alton (pedestrian)				✓		✓					✓																				✓
☒	Prospect Mountain - Dudley Road / Route 28		✓	✓	✓			✓				✓		✓					✓		✓											
☒	North Barnstead - North Road / Route 28			✓			✓	✓											✓		✓				✓							
	Colony Drive						✓	✓							✓		✓														✓	✓	
☒	Peacham - White Oak Road / Route 28																✓		✓		✓				✓							
	Maple Street, Barnstead			✓				✓		✓	✓											✓					✓				✓	
☒	Route 126 / 28 intersection														✓		✓				✓											
☒	NH Route 28/107 (intersection and ped)					✓							✓												✓	✓	✓	✓	✓			
	Leavitt Road pedestrian access		✓		✓						✓						✓								✓	✓					✓	
☒	Concord Hill Road / Route 28						✓						✓								✓											
☒	Kelly Corner Road			✓											✓							✓	✓									
☒	Main Street Chichester			✓	✓						✓										✓				✓	✓						
☒	Epsom Traffic Circle													✓	✓	✓				✓												
	Elkins Road		✓				✓																									
	Mill House Road		✓						✓										✓	✓	✓											
	TOTALS		6	7	5	1	6	5	1	1	4	4	3	2	5	1	5	1	4	2	8	3	1	3	3	4	1	1	2	1	3	2
☒	Priority locations for further study as determined by the Project Advisory Committee 6-25-09 based on RSA Team recommendations.																															

Consulting Engineer

After a thorough selection process, Vanasse Hangen Brustlin, Inc. (VHB) was selected by planning commission staff from among eleven New England fims that responded to a request for qualifications (RFQ) to assist in the development of: conceptual safety designs, associated planning level cost estimates, general corridor-wide recommendations, and short, medium, and long-term recommendations for safety improvements at priority locations. To accomplish this, VHB reviewed data collected by the regional planning commissions and the results of the SAT findings; conducted supplemental research; and performed field observations to gain an understanding of the existing deficiencies and safety concerns. Assistance was provided by the SAT, PAC, and regional planning commissions.

In July 2009, VHB engineers conducted a field review observing the physical characteristics of the corridor and more specifically the safety concerns identified by the PAC. This task was performed to confirm the findings of the SAT, as well as to provide an independent review that might generate additional or unique findings. The results of this field work, combined with the other data collection efforts, form the basis for the findings and recommendations outlined in the next two sections of this report. The results are intended to assist the communities and the New Hampshire Department of Transportation (NHDOT) in making informed decisions about where to apply resources to address safety concerns within the corridor.

Additional Study

With limited funding, it is important to identify strategies that will provide the greatest return on investment. The cost of a strategy is relatively straight forward, but the benefits are often less well understood. Crash reduction factors (CRF) are a tool to help identify the expected benefits of a particular strategy. A CRF is the percentage crash reduction that might be expected to occur at a specific location after implementing a given countermeasure or group of countermeasures. The *Desktop Reference for Crash Reduction Factors* published by the Federal Highway Administration in September 2007 provides estimates of CRF's associated with intersection, roadway departure, and pedestrian crashes. However, in order for CRF's to be estimated for the NH Route 28 corridor, the crash history and detailed crash diagrams must be completed for the "Top 10 Priority Locations" (at a minimum). It is recommended that the crash research and associated analysis for the corridor be completed as the next step, such that the CRF's can then be estimated and used in selecting the most beneficial countermeasures for implementation.

It is important to note that additional detailed data collection, analysis, and engineering design may be necessary to further refine and/or justify the recommendations presented herein.

SECTION 4. CORRIDOR-WIDE FINDINGS

Issue: Pavement Edge Drop-offs

As noted by the Safety Audit Team (SAT) and Vanasse Hangen Brustlin (VHB), pavement edge drop-offs exist throughout the study area. Although there does not appear to be any formal research available that quantifies the crash reduction for installing a safety edge, one study prepared by the AAA Foundation for Highway Safety in September 2006 indicates that pavement edges may be a contributing factor in as many as 18 percent of rural run-off-road crashes on paved roadways with unpaved shoulders. Photo 4.1 shows a standard pavement edge without material backing the pavement.

Photo 4.1 Edge Drop-off

Potential Solutions: Apply Safety Edge[3]
Repair and maintain gravel shoulders

The safety edge (see Photo 4.2) consists of a formed sloped pavement edge that is more forgiving than the normal vertical pavement edge when it is exposed to traffic. The primary benefit that the safety edge provides is that vehicles that leave the pavement can recover back onto the pavement easier with the sloped edge than with the vertical edge. The safety edge can be created when paving roads by attaching a metal form to the paver. As a result this is considered a very low cost solution when done in conjunction with a construction project. Crushed gravel shoulder material would still be brought up flush with the pavement surface along the safety edge as would be done when paving without a safety edge. The benefit of the safety edge is realized wherever the crushed gravel shoulder washes away from

[3] You Can Reduce Pavement Edge Drop-offs with the Safety Edge Pavement Edge Treatment, US Department of Transportation Federal Highway Administration, Publication Number FHWA-SA-09-023

the paved shoulder. It is not recommended to attempt to simply add a safety edge to existing paved shoulders unless the intent is to also widen the paved shoulder or add a substantial overlay. It is expected that cracking and loss of the safety edge would occur unless it is formed as part of new shoulder pavement.

Photo 4.2 Safety Edge Treatment

In the absence of the recommended paved shoulder work it is suggested that the crushed gravel shoulder material be brought up flush with the edges of the paved shoulders. This resolves the drop-off condition. The solution is simple and considered a maintenance operation. It is not unexpected that safety edge problems were mostly observed where vehicles frequently run along or off the edge of the shoulder, such as where vehicles frequently stop in the through lanes to turn left and other vehicles pass them on the right.

In addition, there are also drainage induced drop-offs in low spots along the corridor. It may be possible that the NHDOT maintenance crews could add gravel shoulder repair to their spring maintenance routines if it is not already part of it, or raise their awareness of where the recurring problem areas are located. The expected costs of maintaining these washed out areas, as part of the state's spring maintenance routine, are expected to be relatively low.

Issue: Objects in the Clear Zone

The clear zone is defined as the area adjacent to the roadway that should remain clear of hazards to vehicles that might leave the pavement and clear of obstructions to sight lines. The recommended clear zone width is a function of the roadway's design speed. The clear zone for this corridor was found to be generally free of hazards. However, there are a

Photo 4.3 Stockbridge Corner Road Culvert Headwall in Clear Zone

few locations, as represented in Photo 4.3, where fixed objects such as culvert headwalls are located in or very near the NH Route 28 clear zone.

Potential Solution:

The preferred solution would be to verify where the hazards are and schedule their removal. The boulder at Peacham Road is one candidate. The others include drainage headwalls at a few locations that are in the clear zone such as the one at Stockbridge Corner Road and the one at North Barnstead Road. The desired clear zone in the 40 MPH (and under) zone is 14 to 18 feet measured from the traveled way (white line). In the 50 MPH zones it increases to 18 to 28 feet, depending on side slope conditions.

The cost of these improvements will depend on the solutions. Moving headwalls can also require reconfiguring the ditches and that could involve impacts to private property. The costs should be $10,000 or less at most locations, barring complications.

Issue: Street Name/ Intersection Ahead Signs

Some of the side street advance warning signs are either missing or they do not include side street road names (Photo 4.4). This lack of advanced signage causes unnecessary friction in the traffic flow by forcing drivers to slow down at side streets and read the green street name signs that are typically located right at the intersection. This is a safety concern because of the resulting change in speed and the motorists becoming distracted from normal driving.

Photo 4.4 Side Street Advanced Warning Sign with Street Name

Potential Solution:

The ideal configuration is to consistently include road names with advance warning graphic signs as shown below. The cost to do a onetime update of the missing or severely damaged signs would likely be in the range of $2,000 to $3,000, based on the observation that roughly half of the signs are either missing or deficient. This would be considered a maintenance issue from that point forward.

Issue: Lack of Roadway Lighting

The following intersections currently do not have street lights:

Road Name	Priority
Peacham Road	1
North Barnstead Road	2
Stockbridge Corner Road	3
Main Street	4
Prospect Mountain Road	6
Kelly Corner	10
Millhouse Road	14
Lot Line Road	15
Elkins Road	16

It is noted that five out of the top 6 highest ranking priority intersections do not have street lighting.

Potential Solution:

It is desirable to add street lighting to at least the intersections that fall within the top 10 highest priority intersections. Street lighting is recommended at unsignalized intersections such as Peacham Road and North Barnstead Road where the side streets are not clearly visible to the approaching motorists on the mainline. Street lighting historically has reduced night-time crash patterns associated with rear-end, right angle, and other types of crashes associated with the lack of driver awareness on the presence of the intersection. In addition, the provision of street lights and enhanced driver awareness improves the driver's perception-reaction time, as well as the visibility of pedestrian or other objects in the intersection area. Research conducted by the National Cooperative Highway Research Program (NCHRP) and published in Report 617 indicates a 21 percent reduction in nighttime crashes after installing lights.

There appears to be overhead power lines in the vicinity of all of the above intersections, which helps minimize the initial installation costs.

Issue: Overgrown Vegetation

In general, the vegetation within the corridor appears relatively well maintained. However, there are locations where vegetation reduces sight distances to and from the intersecting roadways.

Potential Solution:

This is generally a maintenance issue. It requires town, NHDOT and property owner awareness and diligence, especially at the intersections such as Peacham Road and Prospect Mountain Road where the roadway curvature and profile already restrict sight lines.

Issue: Side Street Pavement Markings

Many of the town roads that intersect NH Route 28 lack stop bars and centerlines, as shown in Photo 4.5. The stop bars help alert motorists that there is a stop condition, and they also define where to stop. The centerlines define the lanes for motorists approaching NH Route 28, as well as for motorists turning from NH Route 28.

Photo 4.5 Side Street without Centerlines and Stop Bars

Potential Solution:

Stop bars should be installed where they are missing and centerlines added for at least 100 feet on the side roads. This is a low cost enhancement that should cost less than $200 per side road if done as part of a paving program. It should be recognized that it is an annual cost since the markings do wear off. The NHDOT policy is that they install and maintain the stop signs, but the stop bars and centerline striping is technically not required at stop conditions so they are left to the towns to install and maintain.

Issue: Guardrail End Treatments

There are locations where the guardrail end treatments have been upgraded to the type shown in Photo 4.6. These end treatments have been shown to perform well in end-on motor vehicle crashes. These should be installed over time wherever they are missing facing the oncoming traffic. This is an NHDOT implementation issue, and may be a matter of replacing old style end sections as they become damaged or worn.

Photo 4.6 Guardrail End Treatment

Issue: Single Vehicle Run Off Road Crashes

Single vehicle run off the road crashes can result from a number of causes ranging from inattention to driver impairment. In many instances the cause is related to excessive speed for the existing condition, which may include weather related conditions, as well as roadway geometrics.

Potential Solution: Rumble Strips
Approximate Cost: $10,000 - $15,000 per mile

Rumble strips along the edge of the road have been shown to reduce run off the road crashes since they alert drivers that they have strayed out of the travel lanes. They are relatively inexpensive and easy to install. Research conducted by the Federal Highway Administration (FHWA) indicates that the installation of rumble strips could reduce run off road crashes by 13 percent on 2-lane rural roadways. One downfall to rumble strips is that they do produce noise when crossed, so care should be taken when installed to avoid placement where homes are in close proximity to the roadway. Another concern is that they should be carefully considered where bicycle use is expected since they can be a hazard to bikes. This is generally not a problem if the paved shoulder is wide, but on the northern section of NH Route 28 through Barnstead and Alton the rumble strips would make cycling difficult because the shoulders are only 1 to 2 feet wide.

Photo 4.7 Typical Centerline Rumble Strip

Centerline rumble strips, as shown in Photo 4.7, can also be used in areas where excessive crossing of the centerline occurs. They are frequently installed on curves where crashes have resulted from cars encroaching on the oncoming lane or in areas where illegal passing is a problem. The northern section of NH Route 28 through Barnstead and Alton may be a good place to install centerline rumble strips since the road is more curvy and hilly than the southern section. FHWA research indicates that center rumble strips could reduce the overall crash rate on a 2-lane rural road by 14 percent and the head-on crash rate by more than 50 percent.

Issue: Passing Zones

There are two passing zones that are of concern within the study area. In each case the passing zone goes past side roads, thus introducing a higher potential that passing vehicles will conflict with turning vehicles. The first intersection is King's Grant in Epsom. Based on testimony provided at the PAC meetings, that intersection has recently experienced serious crashes involving passing vehicles. The concern is heightened because the roadway serves a senior housing development. The second intersection is illustrated in Photo 4.8 at Colony Drive. The concern is heightened at this intersection because there are no paved shoulders that would aid in avoidance and recovery maneuvers.

Photo 4.8 NH Route 28 Passing Zoning Through Colony Drive Intersection

Potential Solution: Review and Reconfigure Passing Zones

Both passing zones should be considered for reconfiguration (shortening or shifting) or elimination. This requires a request from the community to NHDOT.

SECTION 5. INTERSECTION SPECIFIC FINDINGS

Peacham Road Intersection: Barnstead, NH Priority Ranking: 1

Description of Safety Concerns

The safety concerns at this intersection are primarily due to the extreme horizontal and vertical alignments on NH Route 28 and the side road approaches. The combination of horizontal and vertical curvature on NH Route 28 introduces shortened sight lines to and from the intersecting roads, well below state and industry standard recommended minimum sight distances.

Photo 5.1.1 Yield Road Intersection

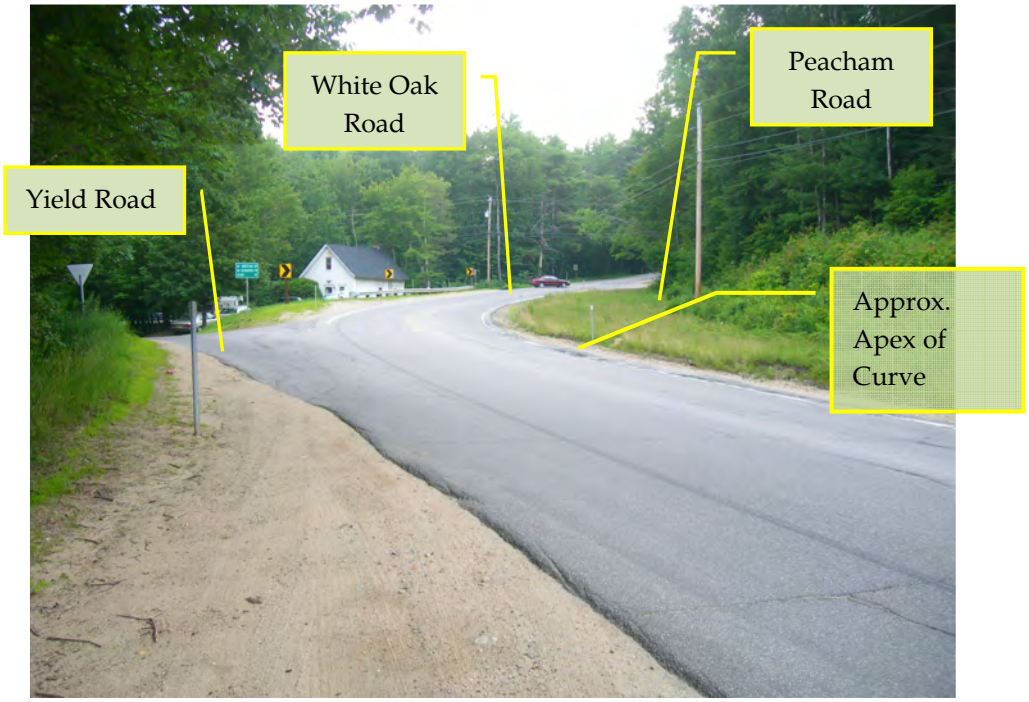
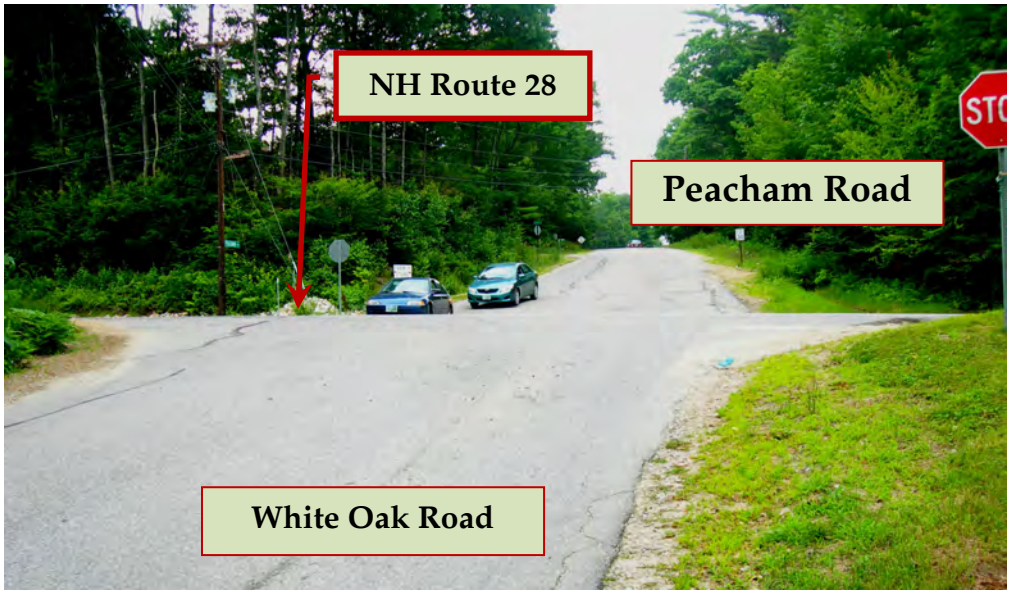


Photo 5.1.1 shows Yield Road dropping away to the left. It also illustrates how the NH Route 28 curvature limits visibility even with cleared vegetation at the apex of the curve. Peacham Road is behind the trees on the right and White Oak Road falls away to the left behind the white house.

Peacham Road and White Oak Road have steep and abrupt approaches to the edge of Route 28, as seen in Photo 5.1.2 that was taken from the White Oak Road approach.

Photo 5.1.2 Peacham White Oak Road Intersection



The steep Peacham Road approach makes it more difficult to stop on snow and ice, and the White Oak Road approach restricts the driver's view of NH Route 28 while also impeding acceleration onto NH Route 28. The Yield Road approach drops away sharply from the edge of NH Route 28. This is a concern since the horizontal geometry supports a higher speed entry from NH Route 28 than the vertical alignment supports.

In addition to the above, the cross section of NH Route 28 consistently lacks paved shoulders through the intersection area and this impairs the ability of motorists to take evasive actions if necessary.

The following minor conditions also introduce safety concerns:

- A boulder within the clear zone just south of Peacham Road;
- Lack of striping and stop bars on the side roads;
- Poor pavement condition on the east side of Route 28;
- Lack of street lighting; and

- Drainage issues at the base of the Peacham Road hill that likely spill onto the roadway at certain times of year.

The NHDOT crash diagram for this intersection includes accidents from the period of February 12, 2006 through May 10, 2008. During this period 13 crashes occurred within 250 feet of the intersection. There were no fatalities reported, only one personal injury, and the remaining 12 accidents involved property damage only. The most prevalent trends noted include angle type and rear end accidents, which primarily occurred at the intersection or in close proximity to the side street approaches.

Additional Observations:

- Crashes are reportedly due to several of the above concerns, possibly in combination.
- There are records of rear end crashes on Peacham Road and this is likely attributed to the steepness of the hill, particularly in winter.
- Northbound right turning vehicles slow down to a near stop to turn right onto Peacham Road due to the abrupt change of grade.
- The surrounding land use is currently mostly forest, however Peacham Road leads to significant residential areas and is steadily used.
- There appears to be very little pedestrian activity or bicycle use at this location.

Potential Solutions

Short Term / Low Cost Improvements
Approx. Cost: under $10,000

- Remove boulder from clear zone.
- Add roadway lighting at the primary intersection.
- Add stop bars and centerline striping on the side streets.
- Expand vegetation control on the inside of the NH Route 28 curve.

Mid-term / Medium Cost Improvements
Approx. Cost: $200,000

- Improve drainage on east side of NH Route 28 including sub-drain along edge of road.
- Rehabilitate northbound NH Route 28 pavement.

- Add northbound right turn lane on NH Route 28 to Peacham Road.

Long Range / High Cost Improvements
Approx. Cost: $1,800,000

This intersection falls within the northern segment of NH Route 28. According to the initial Town of Barnstead position the design speed would be 40 MPH. This initial position was based on a public presentation of 40 MPH and 50 MPH design alternatives and further decisions are pending evaluation of cost estimates that will be provided by NHDOT. Design speed is defined as the maximum safe operating speed for a roadway where the design features of the roadway govern the speed under favorable conditions. The design speed is used to set a variety of design parameters, such as horizontal curvature, superelevation, minimum sight distance, maximum grade, etc. when designing a roadway. Design speeds are normally selected based on the classification of the roadway, the traffic volumes, the terrain, and the observed speeds. The conceptual alignment and profile that the NHDOT developed for the ultimate long term solution requires full depth reconstruction, realignment and re-profiling of NH Route 28 through the intersection. Four foot paved shoulders will also be added, and it was proposed that Yield Road and Shore Drive would be connected and direct access to NH Route 28 would be cut off from each of these, thereby eliminating two sets of conflict points on NH Route 28.

- Improve NH Route 28 alignment and profile to minimum 40 MPH as per NHDOT alignment study design plans.
- Improve White Oak Road profile.
- Connect Shore Drive and Yield Road and disconnect Yield Road from NH Route 28.
- Reconstruct approximately 2,600 feet of NH Route 28 and widen to include 4 foot shoulders.
- Investigate feasibility of Peacham Road profile improvements once NH Route 28 alignment and profile are established.

Illustration 5.1.1 depicts the approximate 40 MPH NHDOT design configuration.

Illustration 5.1.1 Approximate 40 MPH Design at Peacham, White Oak, and Yield Roads

North Barnstead Road Intersection: Barnstead, NH Priority Ranking: 2

Description of Safety Concerns

The safety concerns at this intersection are primarily due to the horizontal and vertical alignments of NH Route 28 and the side road approaches. The combination of horizontal and vertical curvature on Route 28 introduces shortened sight distances to and from the intersecting roads. At this intersection the crest vertical curve is the primary cause for concern. Photo 5.2.1 shows a vehicle turning onto North Barnstead Road on the right just north of the actual crest on NH Route 28.

Photo 5.2.1 NH Route 28 Looking North at North Barnstead Road

Photo 5.2.2 was taken from roughly where a driver on North Barnstead Road would stop to enter NH Route 28. Vehicles on NH Route 28 appear very quickly from over the crest and from around the horizontal curve. Entering NH Route 28 requires alertness, good timing and good acceleration.

Photo 5.2.2 North Barnstead Road Driver's View at NH Route 28

In addition to the concerns on NH Route 28, the North Road approach is steep and curved with high ground and vegetation on its southern side. These factors make visibility of the stop sign difficult. Photo 5.2.3 illustrates how the stop sign is positioned on the left side of the road so it will be visible (proper placement is on the right, clearly visable). Note that there is a flashing beacon at this location, which is very justified.

Photo 5.2.3 North Road View to NH Route 28

In addition to the above, the cross section of NH Route 28 lacks paved shoulders through the intersection area and this impairs the ability of motorists to take evasive actions if necessary.

The following minor conditions also introduce safety concerns:

- A drainage headwall possibly within the clear zone just south of North Barnstead Road.
- Lack of pavement striping and stop bars on the side roads.
- Lack of street lighting.
- Stop ahead sign on North Road needs replacing.

The NHDOT crash diagram prepared for this location shows three accidents occurring at this location - one rear end collision, one angle type collision, and one single vehicle accident that included an animal.

Additional Observations:

- Crashes are likely due to several of the above concerns, possibly in combination.
- NH Route 28 southbound motorists turn into the North Road entrance in order to achieve a better vantage point of northbound traffic so they can then cross NH Route 28 to North Barnstead Road.
- The surrounding land use is currently mostly forest and farm, and North Road currently appears to be very low volume.
- There appears to be very little pedestrian activity or bicycle use at this location.

Potential Solutions

Short Term / Low Cost Improvements
Approximate Cost: under $10,000

- Remove drainage headwall from clear zone.
- Add roadway lighting.
- Add stop bars and centerline striping on the side streets.
- Expand vegetation control on the inside of the NH Route 28 curve and on North Road.
- Upgrade old signs.

Mid-term / Medium Cost Improvements

The primary concern at this location is the NH Route 28 profile. The ultimate solution is considered by VHB to be the full reconstruction, realignment and profile improvement solution envisioned by NHDOT. It would be possible to add shoulders as a midterm / mid cost solution, but the cost of doing that work could be wasted since the shoulders would be reconstructed with the roadway when the profile and alignment issues are addressed under the high cost solution. If the ultimate NHDOT solution is projected to be many years away then the addition of NH Route 28 shoulders within the area of the intersection may prove to be prudent.

Long Range / High Cost Improvements
Approximate Cost: $750,000

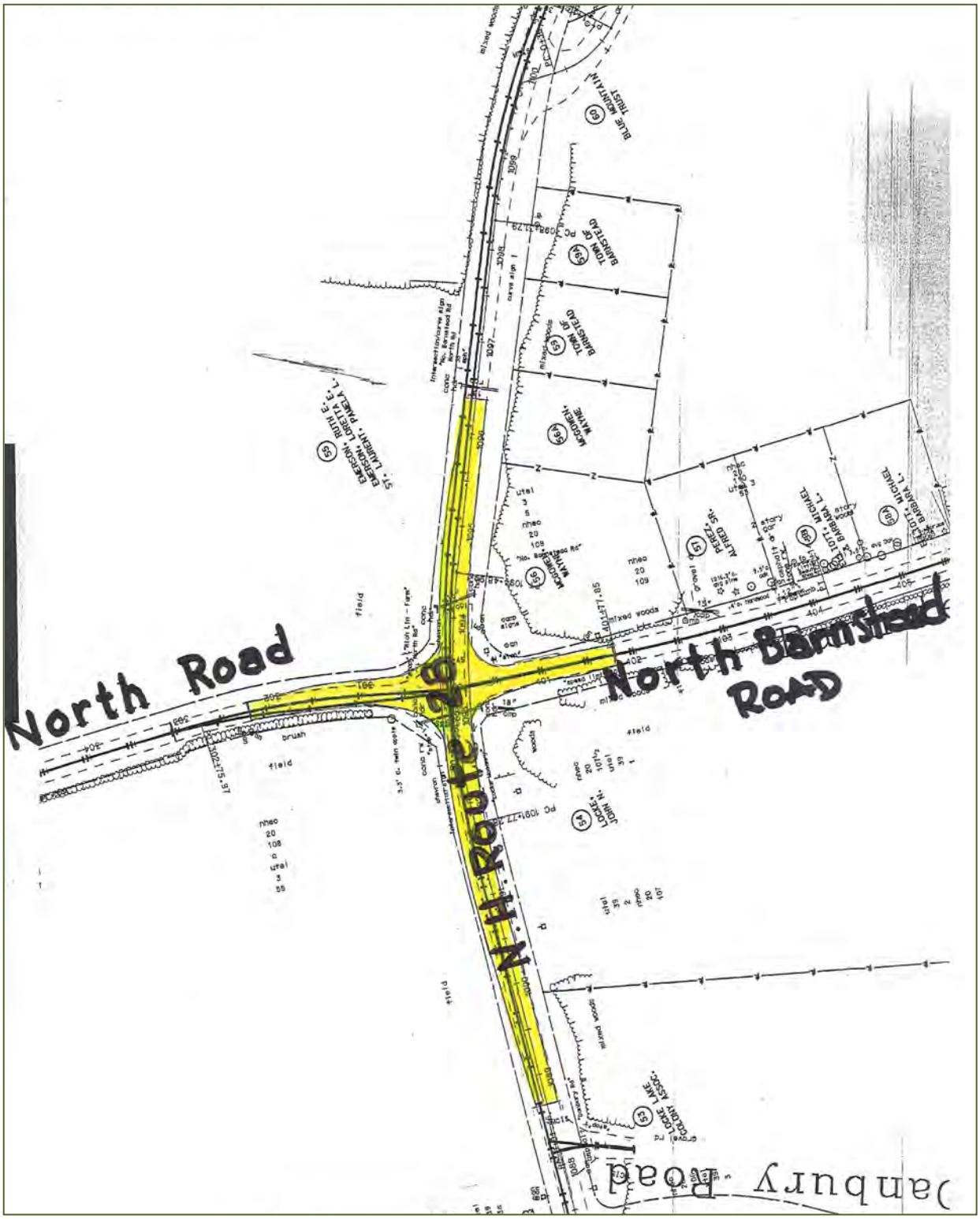
This intersection falls within the northern segment of NH Route 28. Preliminary feedback provided by the Town of Barnstead's suggests that the design speed may be 40 MPH. The conceptual alignment and profile that the NHDOT developed for the ultimate long term solution requires full depth reconstruction, realignment and re-profiling of NH Route 28 through the intersection. Four-foot paved shoulders would be added along NH Route 28, but VHB recommends that 8 or 10 foot shoulders be considered through the intersection to provide improved space for collision avoidance, as well as informal acceleration and deceleration areas for turning vehicles.

- Improve NH Route 28 alignment and profile to 40 MPH as per NHDOT design.

- Reconstruct approximately 800 feet of Route 28 and widen to include 4 foot to 10 foot shoulders.

Illustration 5.2.1 depicts the approximate 40 MPH NHDOT design configuration.

Illustration 5.2.1 Approximate 40 MPH Design at North and North Barnstead Roads



Stockbridge Corner Road Intersection: Alton, NH Priority Ranking: 3

Description of Safety Concerns

The safety concerns at this intersection are primarily due to the horizontal and vertical alignments of NH Route 28 and the side roads. At this intersection the two-way cut through from NH Route 28 to Stockbridge Road in close proximity to the four-way intersection is a primary safety concern. Photo 5.3.1 shows a vehicle turning from NH Route 28 to Stockbridge Road.

Photo 5.3.1 Stockbridge Corner Road Cut Through

Photo 5.3.2 shows the driver's view to the north from the western approach to NH Route 28. Note that the approach is sloped up to NH Route 28 so the driver's eye is low, and also note how the vegetation restricts sight distance.

Photo 5.3.2 Stockbridge Corner Road Driver's View at NH 28

There are also concerns at this intersection that include the drainage headwall and shoulder drop-offs shown in Photos 5.3.3 and 5.3.4.

Photo 5.3.3 Hazard in Clear Zone

Photo 5.3.4 Pavement Edge Drop-off

In addition to the above, the cross section of NH Route 28 lacks adequate paved shoulders through the intersection area and this impairs the ability of motorists to take evasive actions if necessary. Shoulders would also improve sight lines by restricting encroaching vegetation and other obstructions.

The following minor conditions also introduce safety concerns:

- Drainage headwall possibly within the clear zone south of Stockbridge Corner Road.
- Lack of pavement striping on the side roads.
- Lack of street lighting.

- Encroaching vegetation restricts sight lines.

The intersection of Stockbridge Corner Road and NH Route 28 observed 9 crashes during the period of April 12, 2006 to November 15, 2008. These accidents occurred within 300 feet of the intersection with one personal injury crash and 8 property damage only crashes. Most notably, there were four single vehicle off road crashes that occurred along NH Route 28 just north of the intersection.

Additional Observations:

- The surrounding land use is currently mostly forest and residential with some minor commercial. Stockbridge Corner Road appears to be a fairly busy roadway.
- There appears to be very little pedestrian activity or bicycle use at this location.
- The northbound downgrade likely contributes to the speeds on NH Route 28 northbound being excessive for the conditions.

Potential Solutions

Short Term / Low Cost Improvements
Approximate Cost: under $30,000

- Remove drainage headwall from clear zone.
- Add roadway lighting.
- Add stop bars and centerline striping on the side streets.
- Expand vegetation control on NH Route 28.
- Close the cut-through at the southern end with simple barrier and signs.
- Repair edge drop-offs.
- Upgrade and reposition flashing beacon as per Safety Audit Team.
- Update old and install missing signs.

Mid-term / Medium Cost Improvements
Approximate Cost: $50,000

The cut through road should be modified to be one-way northbound and the road narrowed to reduce confusion for northbound NH Route 28 drivers as to which road is the main road and which is the

minor road. It may also be possible to add curvature to the cut through as an additional visual cue that it is not NH Route 28. Photo 5.3.5 depicts a proposed modification.

Photo 5.3.5 Stockbridge Corner Road Cut Through Potential One-way Direction

It may also be possible to add additional signing to reduce northbound motorist confusion. Installing chevron signs on the outside of the NH Route 28 curve would help indicate that the main road is curving to the left. Some type of guide sign at the entrance to the cut through indicating that Stockbridge Corner Road is ahead and NH Route 28 stays left would also help reduce confusion. Note that keeping this road open one-way northbound is preferred to closing it since it provides the indirect benefit of reducing the number of right turning vehicles at the Stockbridge/Route 28 intersection. That 90 degree right turn forces vehicles to come to a near stop in the northbound NH Route 28 travel lane, which was noted by the Alton police as a safety concern.

Long Range / High Cost Improvements
Approximate Cost: $600,000

This intersection falls within the northern segment of NH Route 28. Preliminary feedback from the town of Alton suggests that they may desire a design speed of 50 MPH. The conceptual alignment and profile that the NHDOT developed for the ultimate long term solution requires full depth reconstruction, realignment and re-profiling of NH Route 28 through the intersection. Four foot paved shoulders would be added along NH Route 28; however, VHB recommends that 8 or 10 foot shoulders be considered through the intersection to provide improved space for collision avoidance, as well as informal acceleration and deceleration areas for turning vehicles.

- Improve NH Route 28 alignment and profile to 50 MPH as per NHDOT design.
- Reconstruct approximately 800 feet of NH Route 28 and widen to include 4 foot to 10 foot shoulders.
- Raise the profile of the eastbound Stockbridge Corner Road approach at the intersection to improve sight lines for motorists entering Route 28.
- Consider left turn lanes if turning warrants are met.

Illustration 5.3.1 Potential Improvements at Stockbridge Corner Road

Main Street Intersection: Chichester, NH Priority Ranking: 4

Description of Safety Concerns

The safety concerns at this intersection are primarily due to the horizontal layout of the side road approaches. Main Street has three one-way connections to NH Route 28, and this is complicated further by the fact that Depot Street intersects NH Route 28 nearly opposite one of those connections. Photo 5.4.1 shows vehicles queued on the northbound Main Street approach. This is a common occurrence and is in itself a safety concern because the delays lead to motorist frustration and aggressive driver behavior. When motorists experience long delays while waiting to exit from a side street, they often become frustrated and take a smaller than acceptable gap to turn on the mainline, resulting in the mainline drivers having to break unexpectedly.

Photo 5.4.1 Vehicles Queued at Main Street Approach to NH Route 28

Photo 5.4.2 shows the commercial driveway and parking area for the country store adjacent to Main Street. The wide open space creates the potential for confusion and multiple points of conflict.

Photo 5.4.2 Country Store Main Street Access in Chichester

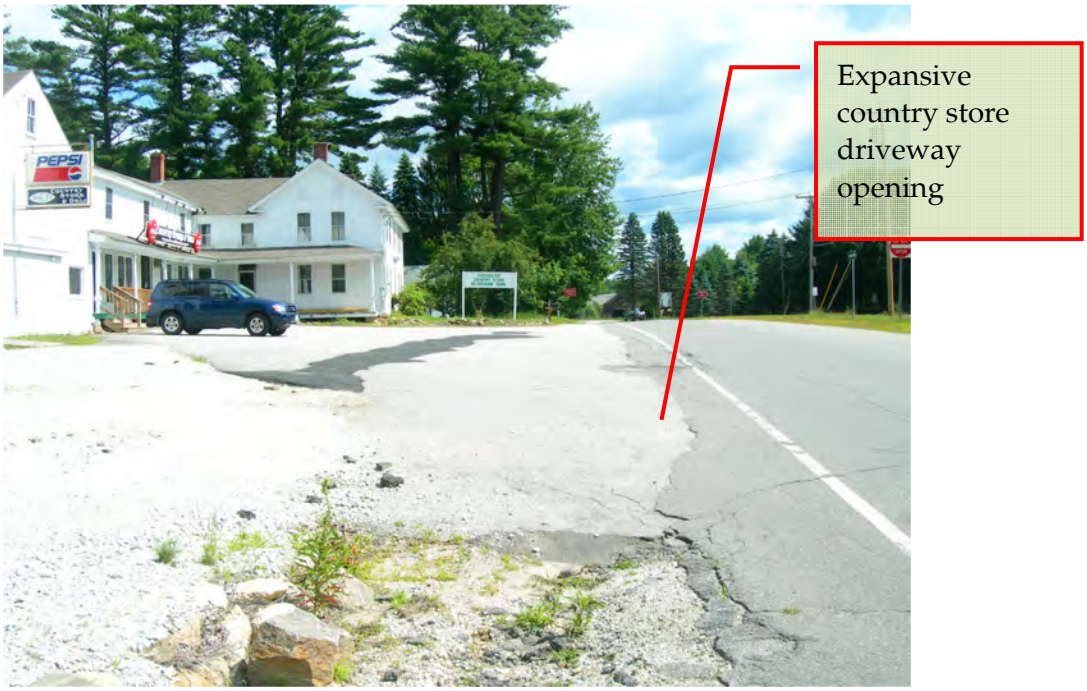


Photo 5.4.3 shows the view on the one-way Main Street southbound connector leg. The tree is obscuring the country store driveway. The concern is that some vehicles have not completely slowed down to the posted 35 MPH speed at this point after leaving the higher speed NH Route 28 travel way.

Photo 5.4.3 Obscured Country Store Driveway

There are also minor concerns at this intersection that include overgrown vegetation pavement edge drop-offs along the edge of NH Route 28 as seen in Photos 5.4.4 and 5.4.5.

Photo 5.4.4 Obscured Signage

Photo 5.4.5 Pavement Edge Drop-off

In addition to the above, the following minor conditions also introduce safety concerns:

- Lack of street lighting.
- Main Street entrance not lined up well with Depot Street.
- Improper pedestrian crossing sign. The sign shown in Photo 5.4.6 should only be placed where crosswalks are present.

Photo 5.4.6 Improper Use of Crosswalk Sign on NH Route 28

Additional Observations:

The operational characteristics of the intersection play an important role in generating the safety concerns. The traffic volume data collected by the Planning Commissions indicate that Main Street has become a significant commuter cut through between NH Route 28 and Route 4 and so this intersection becomes stressed to the point that drivers take risks and make mistakes. A reportedly common occurrence is that during the PM peak hour motorists have difficulty entering NH Route 28 from Main Street. Frustration ultimately leads to motorists attempting to fill gaps on NH Route 28 that are too short. This can cause the northbound vehicles to brake hard, take evasive actions, or even crash.

It was also noted during the public informational meetings that a large residential development is planned off of Depot Street. This will likely increase the vehicular and pedestrian concerns at this intersection. Pedestrian crossing was noted as a concern by the Project Advisory Committee (PAC).

Potential Solutions

Short Term / Low Cost Improvements
Approximate Cost: under $10,000

- Add roadway lighting.
- Add stop bars and centerline striping on Depot Street.
- Clear overhanging vegetation on NH Route 28, especially on the inside of the southbound curve onto Main Street.
- Replace the pedestrian crossing sign with the proper sign (W11-2, which does not include a cross walk).
- Dress up the pavement edge drop-off areas with crushed gravel for shoulders.
- Re-orient the "wrong way" sign so it faces the correct oncoming northbound Main Street traffic.

Mid-term / Medium Cost Improvements
Approximate Cost: $75,000+

- Construct curbing and medians across the country store frontage to define two drive openings on Main Street as an access management enhancement.
- Narrow the pavement on the southbound Main Street connection and add rumble strip to the delta island nose to help calm traffic coming off NH Route 28.
- Add a sidewalk on Main Street toward the school.

These improvements are depicted in Illustration 5.4.1.

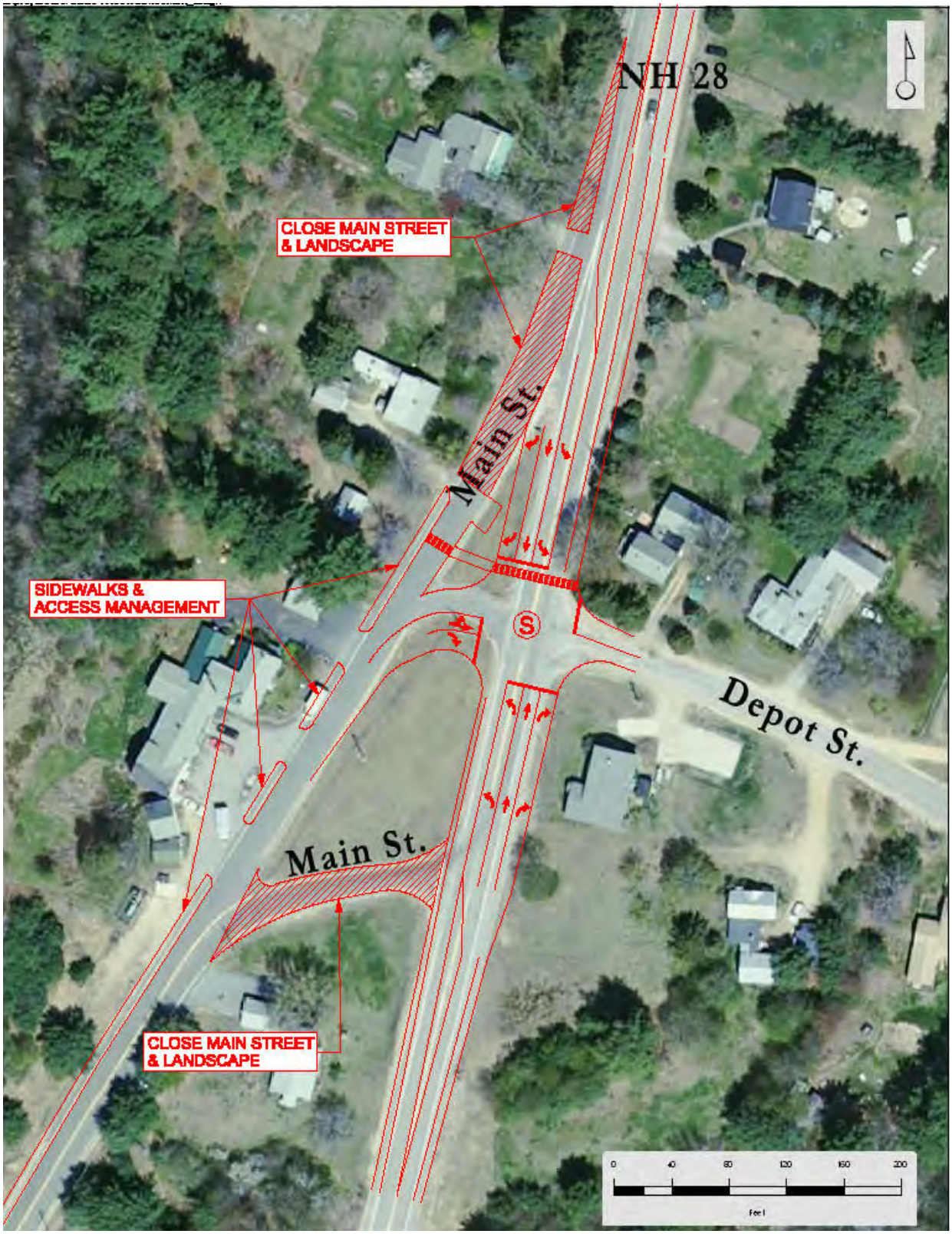
Long Range / High Cost Improvements
Approximate Cost: $500,000+

The ultimate long term solution at this intersection would likely involve adding a traffic signal and consolidating all of the Main Street legs so they intersect at one location opposite Depot Street. This solution would incorporate pedestrian signals as well as turn lanes on both NH Route 28 approaches. Detailed turn movements data is required to determine if traffic volume demands at this location currently warrant the installation of a traffic signal or if a signal would be warranted in the near future (with the completion of the development off of Depot Street). These long range conceptual improvements are depicted in Illustration 5.4.2.

It should be noted that this ultimate solution could be arrived at in stages. The first stage could include adding a right turn lane to Depot Street, followed by a phase that adds left turns. Signals could then be installed when warranted.

Illustration 5.4.1 Medium Cost Improvements at Main and Depot Streets, Chichester

Illustration 5.4.2 NH Route 28 Long Range Conceptual Improvements at Main and Depot Streets



Epsom Circle Intersection: Epsom, NH Priority Ranking: 5

Description of Safety Concerns

The safety concerns at this intersection are primarily due to the relatively high circulating volumes and speeds in the circle. This is partly due to the nature of traffic circles, especially when compared to roundabouts which are intentionally designed for lower speeds.

In addition, there are other safety concerns specific to this traffic circle. These concerns are directly related to the commercial driveways that exist in three of the four quadrants of the circle as shown in Photo 5.5.1. The drives are wide and create confusion and multiple potential conflict points in the circle.

Photo 5.5.1 Aerial View of Epsom Circle

There is also a concern that the dual use center turn lane on the eastern approach extends right up to the delta island and allows vehicles to cross traffic in either direction at a high volume/high conflict location.

Additional Observations:

Weekday peak hour delays on some approaches to the circle are known to be lengthy, and weekend delays are also common. This is relevant because delays can lead to motorist frustration which can also affect driver behavior entering the circle, traveling through the circle and even trying to make up time after the circle. Motorists in the approaches are required to yield so they are forced to wait for and fill gaps in the circulating traffic stream. All of these conditions can lead to aggressive behavior.

It was also noted that there are no bike or pedestrian accommodations through the intersection, however bikes can use the circle as vehicles do.

Potential Solutions

Mid-term / Medium Cost Improvements
Approximate Cost: $75,000+

- Construct curbing and medians to reduce the opening widths of the commercial drive openings as an access management enhancement. Complete closure of those drives is preferred from a safety perspective, but would likely involve right-of-way costs.

- Extend the delta island on the eastern approach to discourage crossing US Route 4 near the circle.

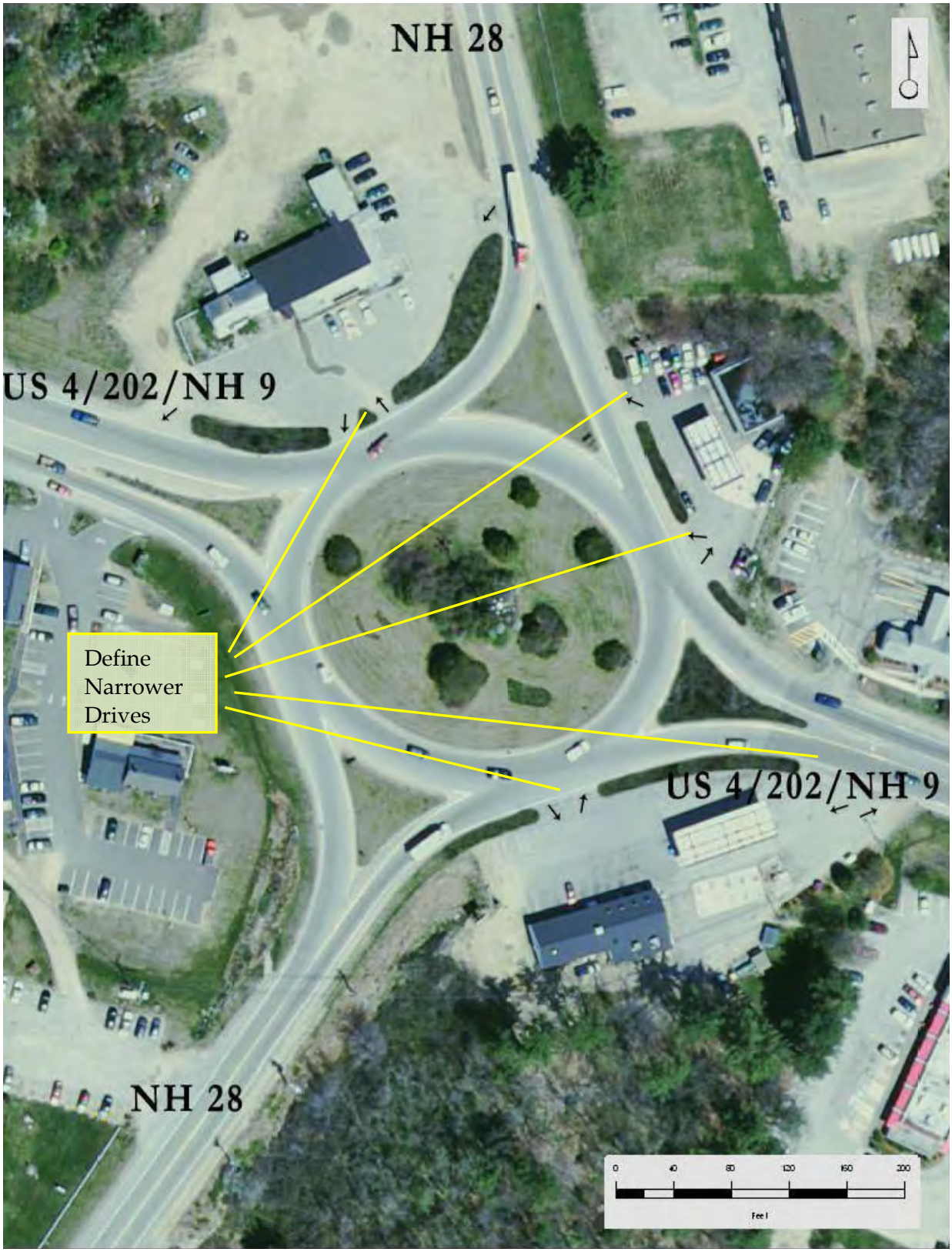
These improvements are depicted in Illustration 5.5.1.

- Possibly construct minor geometric modifications in the approaches to encourage reduced speeds during non-peak periods when it is currently possible to travel through the circle with little deceleration if there are no oncoming vehicles.

Long Range / High Cost Improvements
Approximate Cost: Unknown

The traffic circle has reportedly been studied by others in the past, more from an operational perspective than a safety perspective. A two lane roundabout has been discussed and could provide safety and operational benefits because it could handle higher traffic volumes at lower speeds. This would be a high cost project and would likely involve right-of-way compensation costs to close the commercial drive access to the roundabout.

Illustration 5.5.1 Medium Cost Conceptual Improvements



Prospect Mountain Road Intersection: Alton, NH Priority Ranking: 6

Description of Safety Concerns

The safety concerns at this intersection are primarily due to the combined horizontal and vertical geometry of NH Route 28 limiting sight distances from the side streets. A secondary concern is the expansive commercial driveway in the northeast quadrant of the intersection. Photo 5.6.1 captures the horizontal and vertical curvature of NH Route 28 south of the intersection from the Prospect Mountain Road approach. Also note the private sign, utility pole and roadway signs that influence sight lines to and from the intersection.

Photo 5.6.1 NH Route 28 Horizontal and Vertical Curvature

Photo 5.6.2 shows the commercial driveway and parking area adjacent to the intersection. The wide open space creates the potential for confusion and multiple points of conflict. Also note the lack of stop bar and centerline striping on Prospect Mountain Road in this picture.

Photo 5.6.2 Open Access to Commercial Driveway and Parking

Photo 5.6.3 shows the view north on NH Route 28 from Dudley Road at approximately the point where motorists would stop. Note that the sight distance on NH Route 28 is limited even with good vegetation control.

Photo 5.6.3 Dudley Road Sight Distance North on NH Route 28

There are also concerns at this intersection that include overgrown vegetation on the inside of the curve and a drainage culvert near the edge of NH Route 28, as well as the lack of street lighting.

Photo 5.6.4 Overgrown Vegetation

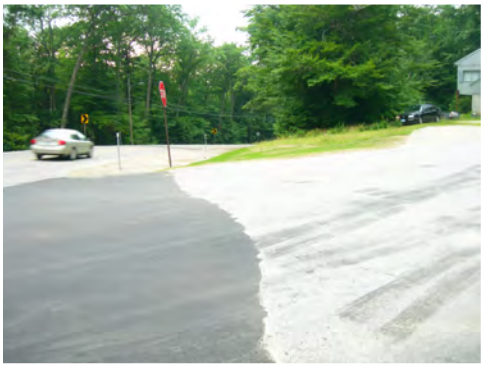


Photo 5.6.5 Drainage Culvert

The crash diagram prepared by the NHDOT suggests that five accidents have occurred at this location. Three of the crashes are angle type and occurred at the intersection itself. Two of the crashes appear to be single vehicle off road crashes that occurred on the east side of NH Route 28, north of Prospect Mountain Road.

Additional Observations:

The primary concern at this intersection is related to limited sight distance vs. high speeds on NH Route 28. Bike and pedestrian traffic appear to be minimal.

Potential Solutions

Short Term / Low Cost Improvements
Approximate Cost: under $10,000

- Add roadway lighting.
- Add stop bars and centerline striping on both side roads.
- Clear overhanging vegetation on NH Route 28, especially on the inside of the southbound curve.
- Consider moving the private sign since it can be a distraction at the intersection.
- Add missing intersection warning signs on NH Route 28 including road names.

Mid-term / Medium Cost Improvements
Approximate Cost: $75,000+

- Construct curbing and medians across adjacent commercial frontage to define two drive openings on NH Route 28 and possibly one on Prospect Mountain Road as an access management enhancement.

These improvements are depicted in Illustration 5.6.1.

Long Range / High Cost Improvements
Approximate Cost: Unknown

This intersection falls within the northern segment of NH Route 28. Preliminary feedback from the town of Alton suggests that they may desire a design speed of 50 MPH when the State rebuilds this segment of the corridor. The conceptual alignment and profile that the NHDOT developed for the ultimate long term solution requires full depth reconstruction and minor realignment and re-profiling of NH Route 28 through the intersection. Four foot paved shoulders would be added along NH Route 28; however, VHB recommends that 8 or 10 foot shoulders be considered through the intersection to provide improved space for collision avoidance, as well as informal acceleration and deceleration areas for turning vehicles.

Illustration 5.6.1 Conceptual Medium Cost Improvements – Dudley and Prospect Mountain Roads

NH Route 107 Intersection: Pittsfield, NH Priority Ranking: 7

Description of Safety Concerns

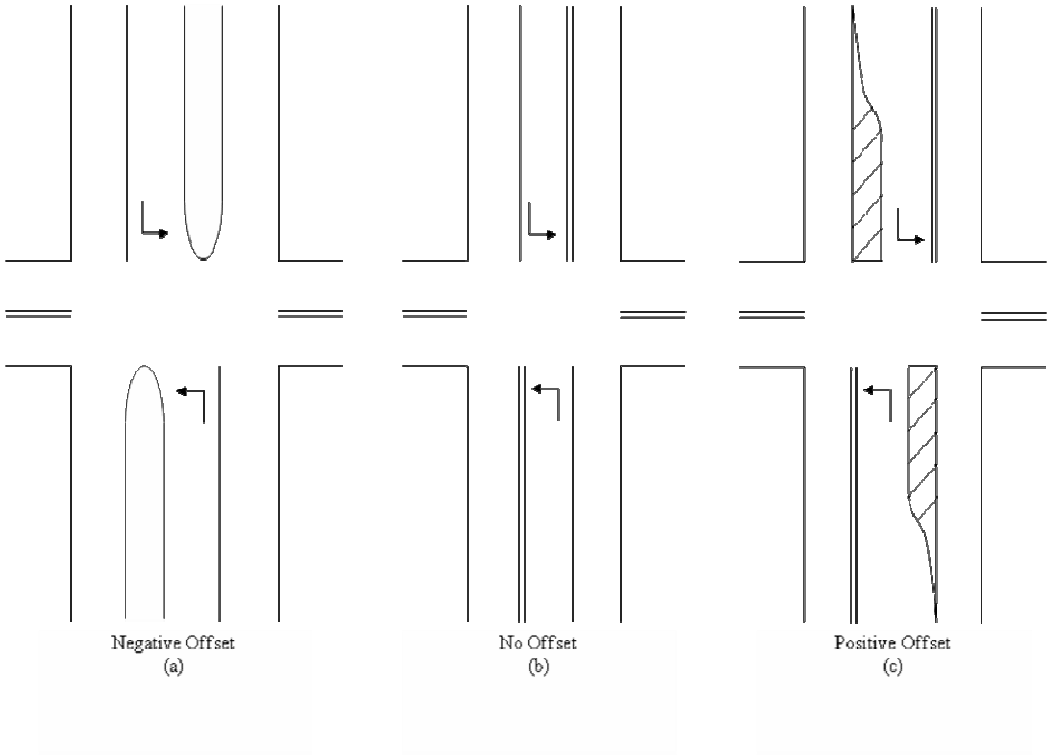
The safety concerns at this intersection are primarily related to the NH Route 28 left turns in the intersection.

Photo 5.7.1 shows that the opposing left turn lanes are not oriented directly across from one another. In fact, they have what is called a "negative offset". The issue is that turning vehicles have their sight lines blocked by vehicles in the opposing left turn lane, and the view of oncoming high speed through traffic can be obstructed until it is too late to react. This is significant because the left turns are not currently controlled by left turn arrows and a protected phase of the signal, so when turning vehicles get the green light the through traffic is also free to proceed.

Photo 5.7.1 NH Route 28 Opposing Left Turn Lanes at NH Route 107

Studies have found that the crash rate can be lowered by 30 to 40 percent when the left turn lanes are changed from negative to positive offset. Illustration 5.7.1 depicts left turn offset conditions.

Illustration 5.7.1 Left Turn Offset Conditions



Additional Observations:

The intersection does not currently include pedestrian accommodations. It was reported during a public informational meeting that the NHDOT is considering a request to add crosswalks across NH Route 28 at this intersection. It should be noted that connecting sidewalks do not currently exist on either side of the intersection.

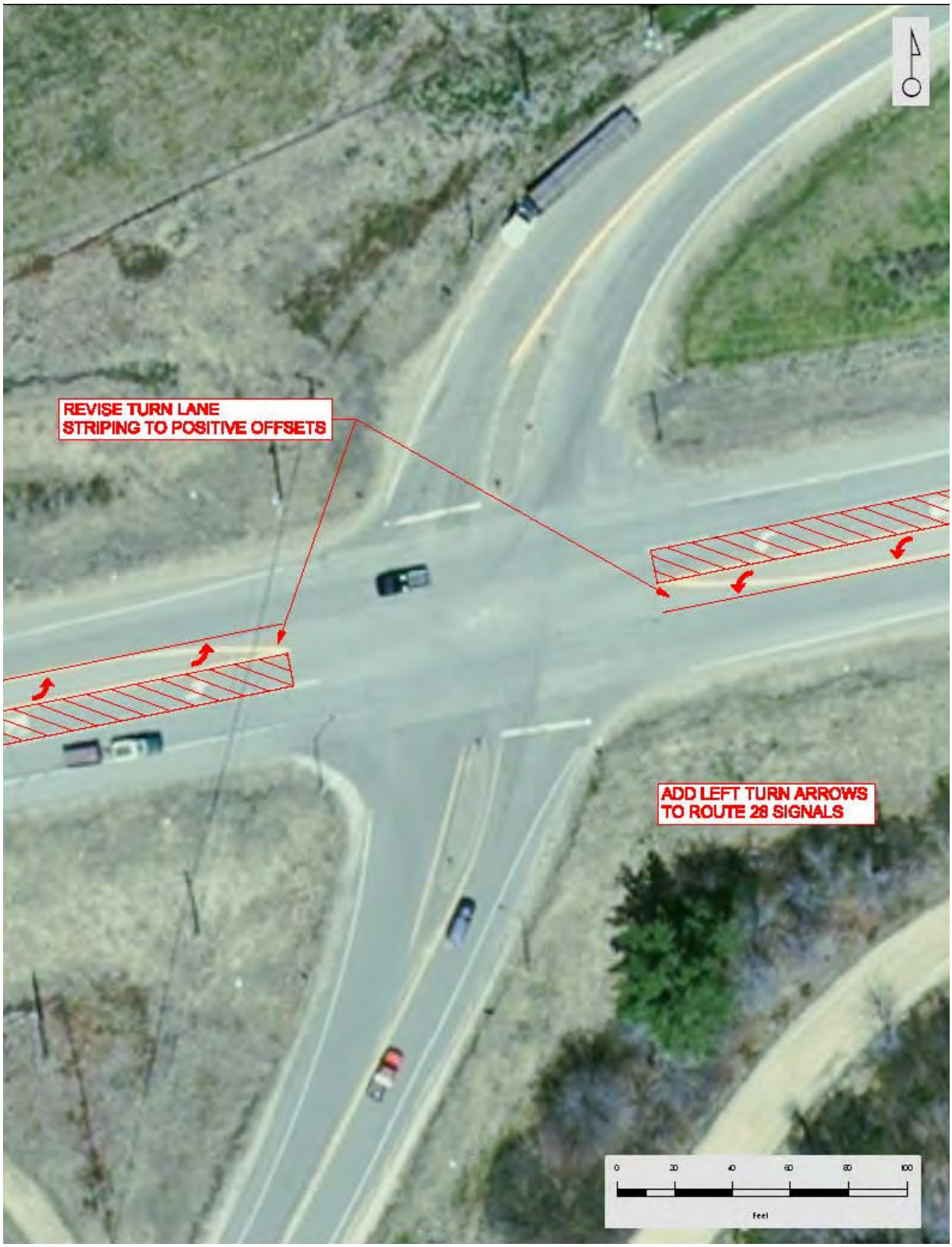
Potential Solutions

Short Term / Low Cost Improvements
Approximate Cost: $10,000

- Re-stripe the Route 28 approaches to go from negative offset left turns to positive offset.
- Add left turn arrows to control the left turn lanes. (The NHDOT is reportedly planning to make this enhancement near term so a cost is not included for the signal modifications.)

These proposed left turn lane improvements are depicted in Illustration 5.7.2.

Illustration 5.7.2 Positive Offset Left Turn Lane Improvement



NH Route 126 Intersection: Barnstead, NH Priority Ranking: 8

Description of Safety Concerns

The safety concerns at this intersection are primarily related to high speeds on NH Route 28 in combination with the long sweeping curvature that slightly inhibits sight distances along the corridor.

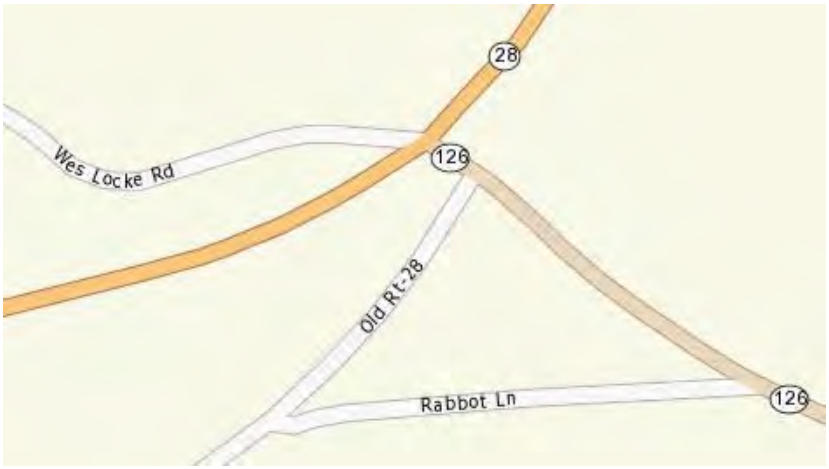


Photo 5.8.1 captures the horizontal and vertical curvature of NH Route 28 south of the intersection from the NH Route 126 approach. (Also note the vehicles parked in the right-of-way across NH Route 28.)

Photo 5.8.1 NH Route 28 Horizontal and Vertical Curvature South of NH Route 126

Photo 5.8.2 shows the curvature north of the intersection.

Photo 5.8.2 Curvature of NH Route 28 North of NH Route 126

The NH Route 126 approach is the primary side road approach and Wes Locke Road is a minor roadway that enters NH Route 28 at a skewed angle. Photo 5.8.3 shows the Wes Locke Road approach. There is currently a flashing beacon suspended over the intersection.

Photo 5.8.3 Wes Locke Approach from NH Route 28

Additional Observations:

One of the observed issues at this intersection is that northbound vehicles turning right onto NH Route 126 tend to obscure northbound through vehicles from the view of vehicles hoping to enter NH Route 28 from NH Route 126. This is because they frequently use the wide shoulder as a right turn lane. One

possible solution would be to actually widen the shoulder and make it a formal right turn lane. That would help reduce confusion on whether vehicles are turning or not, and moving them further to the outside of the curve would help separate them from the through vehicles. Otherwise the solution would be to narrow the shoulder; however, this alternative is not recommended at this location because it would introduce a new set of concerns due to turning vehicles slowing down in the through lane.

It was also observed that southbound vehicles that turn left into NH Route 126 may be well served by a left turn lane. Detailed intersection turning movement counts should be conducted so left turn warrants can be reviewed to determine whether a formal southbound left turn lane onto NH Route 126 would be permitted.

It was also noted that at the Old Route 28 intersection there is a noticeable hump in NH Route 126. This hump tends to dramatically shorten the sight distance to the stop line when approaching NH Route 28 from the east. Skid marks were observed on the pavement west of Parade Road which may have been related to the short sight distance. Photo 5.8.4 illustrates the crest of the rise in NH Route 126 just east of NH Route 28.

Photo 5.8.4 Crest of Rise on NH Route 126 East of NH Route 28

Potential Solutions

Short Term / Low Cost Improvements
Approximate Cost: under $10,000

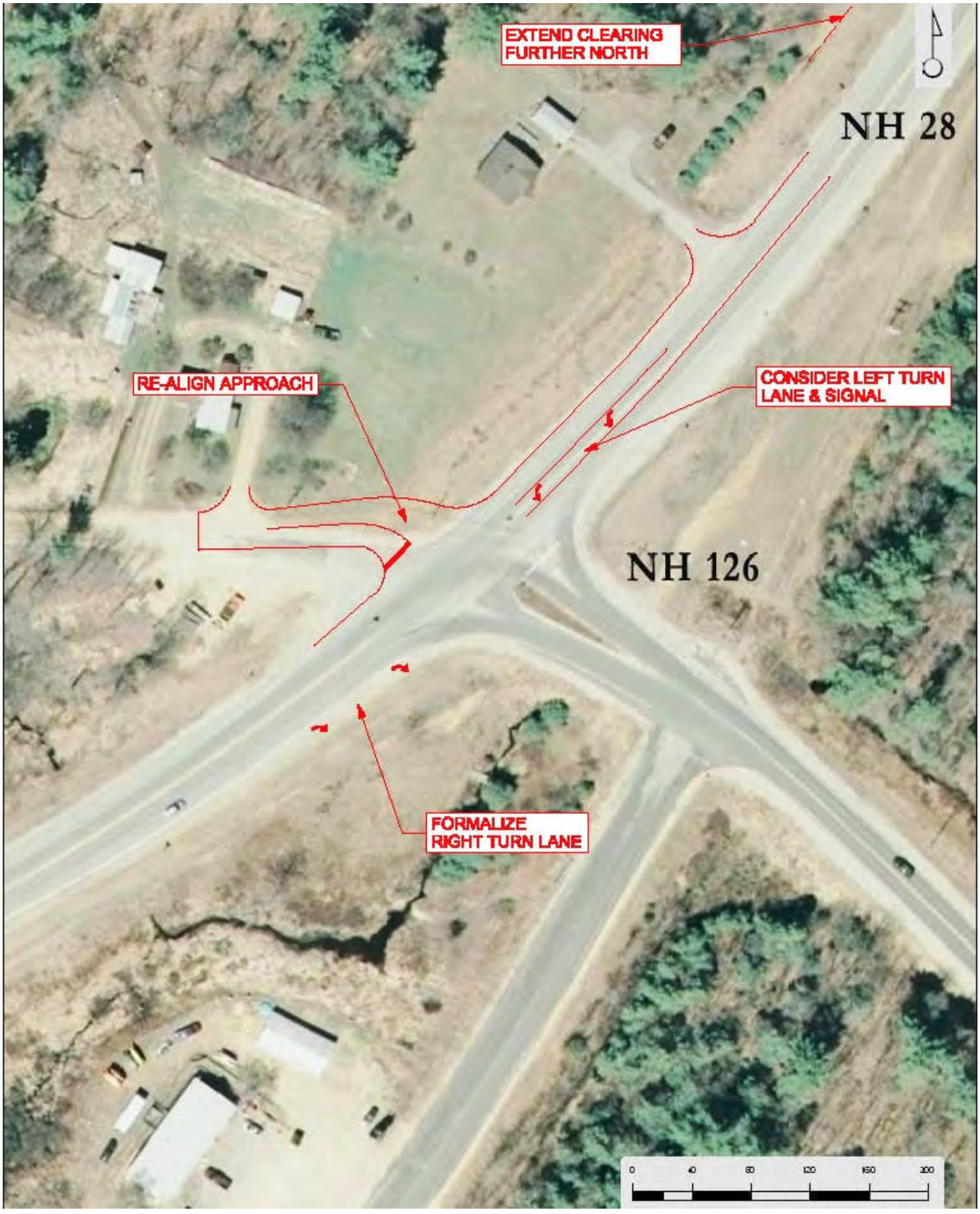
- Clear overhanging vegetation on NH Route 28, especially on the inside of the southbound curve.
- Add missing intersection warning signs on NH Route 28 including road names.

Mid-term / Medium Cost Improvements
Approximate Cost: up to $500,000

- Construct southbound left turn (if warrants are met).
- Re-align Wes Locke Road to reduce the skew.
- Widen northbound shoulder and formalize a right turn lane.

These improvements are depicted in Illustration 5.8.1.

Illustration 5.8.1 Medium Cost Improvements NH Route 28 at NH Route 126



Concord Hill Road Intersection: Pittsfield, NH Priority Ranking: 9

Description of Safety Concerns

The safety concerns at this intersection are primarily related to high speeds on NH Route 28 in combination with the long sweeping curvature that slightly inhibits sight distances on the corridor.

Photo 5.9.1 captures NH Route 28 north of the intersection from the Concord Hill Road approach. It should be noted that a left turn lane has recently been added into the Dunkin Donuts establishment in the photo and a left turn was also added into Concord Hill Road. The addition of the left turn lane helps address many of the concerns in the intersection since it separates high speed and low speed southbound vehicles.

Photo 5.9.1 NH Route 28 North of Concord Hill Road

Photo 5.9.2 shows how NH Route 28 curves south of the intersection. Vegetation in the clear zone is relatively well maintained, however the curvature creates the desire to manage trees that are seemingly far in the distance.

Photo 5.9.2 Curvature of NH Route 28 South of Concord Hill Road

Potential Solutions

Short Term / Low Cost Improvements
Approximate Cost: under $10,000

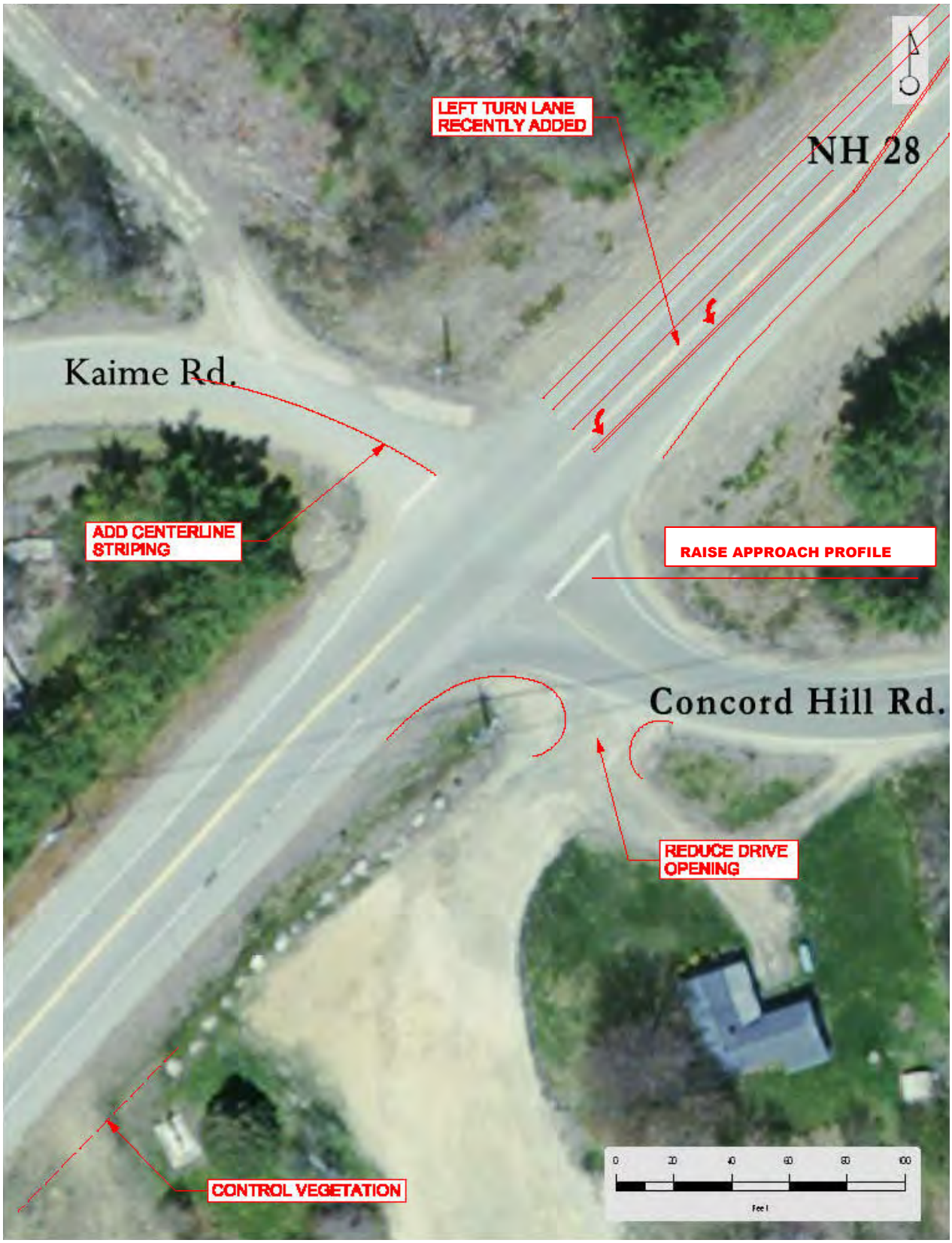
- Manage NH Route 28 vegetation, especially on the inside of the curves.
- Maintain edges of pavement drop-offs by applying crushed gravel shoulder material at problem areas.
- Add centerline stripe to Kaime Road.

Mid-term / Medium Cost Improvements
Approximate Cost: $100,000+

- Raise the Concord Hill Road approach profile to improve sight distance and ability to start from a stop.
- Add curbing on the southeast corner to define the drive entrances.

These improvements are depicted in Illustration 5.9.1.

Illustration 5.9.1 Kaime and Concord Hill Roads Medium Cost Improvements

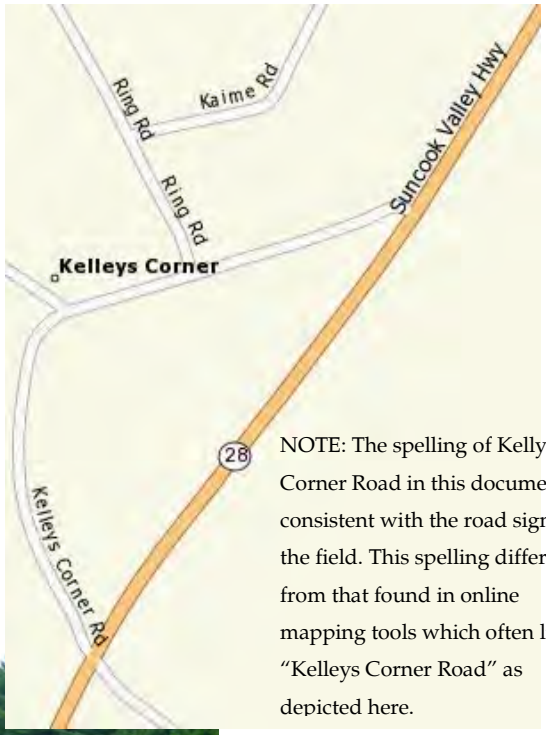


Kelly Corner Road Intersection: Chichester, NH Priority Ranking: 10

Description of Safety Concerns

The safety concerns at this intersection are primarily related to the combination of horizontal and vertical curvature on NH Route 28. Photo 5.10.1 captures NH Route 28 north of the intersection from the Kelly Corner Road approach. It is important to note the way the approaching vehicles rise up from a blind sag in the profile.

Vegetation in the clear zone is relatively well maintained, however the curvature creates the desire to manage trees that are seemingly far in the distance.



NOTE: The spelling of Kelly Corner Road in this document is consistent with the road signs in the field. This spelling differs from that found in online mapping tools which often list "Kelleys Corner Road" as depicted here.

Photo 5.10.1 NH Route 28 North of Kelly Corner Road

Additional Observations:

The Kelly Corner Road approach slopes down to NH Route 28 and there are potholes and a dip in the pavement at the bottom. Residents reportedly have to slow down when entering the side street to avoid bottoming out. This is a concern due to the high speeds on NH Route 28. There is also reportedly new development planned off of Kelly Corner Road, so side road traffic at this intersection is expected to increase.

Potential Solutions

Short Term / Low Cost Improvements
Approximate Cost: under $20,000

- Manage NH Route 28 vegetation, especially on the inside of the curves.
- Maintain edges of pavement drop-offs by applying crushed gravel shoulder material at problem areas.
- Add stop line and centerline stripes to Kelly Corner and Webster Mills Roads.
- Repair potholes on Kelly Corner Road apron.
- Add street lights on both approaches.
- Consider reconstructing the Kelly Corner Road approach apron if cars are continuing to bottom out.

These improvements are depicted in Illustration 5.10.1.

Mid and Long Term Improvements were not identified for this location. If development off of Kelly Road continues to the point of generating significant traffic, and if an increase in crashes coincides with that development, it may be advisable to study the addition of turn lanes on NH Route 28 as mitigation.

Illustration 5.10.1 Low Cost Improvements Kelly Corner and Webster Mill Roads

Buck Street Extension Intersection (King's Grant), Epsom, NH

Description of Safety Concerns

King's Grant is a senior modular home park serving a population of nearly 100 residents. King's Grant is accessed by Buck Street Extension from NH Route 28 in Epsom. Buck Street is a town maintained road which turns right (south) immediately after intersection with NH Route 28. The roadway to King's Grant (Maple Street) continues straight.

Buck Street Extension cannot easily be seen from NH Route 28, especially from the north, due to the topography. From the north, drivers can't see the intersection until they are upon it. At 50 mph this leaves little time to react. At the intersection with NH Route 28 the shoulders on the northbound lane are very narrow (2-3 feet) and not wide enough to be used as turn lanes. The southbound lane has wider shoulders allowing vehicles a paved surface for avoidance and recovery maneuvers.

There is a passing zone on NH Route 28 through the intersection with Buck Street Extension, thus introducing a higher potential that passing vehicles will conflict with turning vehicles.

There is a temporary sign (dance studio) to the south on NH Route 28 that completely blocks visibility for approaching drivers from the south and people turning out onto NH 28 Route. There is a hillcrest to the south and a saddle to the north of the Buck Street Extension intersection. Drivers turning right out of Kings Grant may look south and see nobody coming, and pull out into somebody who is passing another southbound vehicle. The sign obstruction to the south makes you want to look longer as you pull in to the lane.

There are other private developments with private entrances accessing NH Route 28 in this area (Kings Towne, Meadow Brook). These entrances may have similar problems conditions.

Additional Observations:

- There is a passing zone on NH Route 28 through the intersection at Buck Street Extension.
- The posted speed limit on NH Route 28 is 55 miles per hour.
- No signage intersection warning signage exists leading to intersection.

- The stop bar on Buck Street Extension has completely worn off.
- Vegetation looking northbound may obstruct views of traffic on NH Route 28.
- The Photo 5.11.1 shows that there may be expansion to the development.

Photo 5.11.1 Aerial View of King's Grant and Potential Expansion Area

Potential Solutions:

- Work with local business owner towards relocating business signage.
- Vegetation north of the intersection could be trimmed and needs to be maintained.
- The passing zone should be considered for reconfiguration (shortening or shifting) or elimination. This should be done in conjunction with NHDOT.
- Evaluate the need for additional advanced intersection warning signage on NH Route 28.

SECTION 6. LAND USE AND AESTHETICS

Land use and aesthetics play an important role in defining the character of a community. They can also directly impact how well a transportation corridor functions. These are two areas where a community has a significant amount of influence, both through local regulations and the development review process. For these reasons, a land use assessment was conducted by planning commission staff. The results of this assessment serve as a starting point for future discussion between planning commission staff, transportation officials, and local land use boards about safety related land use within the corridor. While considerable effort by planning commission staff was put forth in the evaluation of local land use documents, field review, and development of potential recommendations, additional coordination and discussion are warranted prior to implementation. This may include, but is not limited to, a presentation of potential recommendations at future corridor community planning board meetings.

The assessment consisted of a review of each of the five corridor communities' Master Plans, Zoning Ordinances, Zoning Maps, and Subdivision and Site Plan Review Regulations. Field observation was also employed to assist with the analysis. Many individual factors were considered in assessing current local land use planning; these included the following categories:

Master Plan Recommendations
Information obtained through a public process or recommendations from the land use chapters of recent Master Plans were reviewed.

Land Use Regulations and Patterns
Since digital land use mapping was not available for each of the corridor communities, field observations were used to provide the basis for discussions and analysis for each of the towns.

Zoning Districts
Each community's zoning has its own purpose, which is clearly stated in the beginning of the document. These statements were reviewed for transportation and safety related references.

Future Development
The location and type of future development along NH Route 28 will influence future in-corridor traffic patterns and contribute to future safety needs. Trip generation will increase as development occurs. The potential location of future development was researched by field observation of properties for sale. Research was conducted to identify parcels with controlled access. Parcel maps for the two communities with digital parcel maps (Chichester and Pittsfield) were updated with this information as a starting point for understanding future corridor land use development potential and limitations.

Access Management
There is considerable growth potential in the corridor for multiple types of land use. Regulating the access points must occur to ensure that the desired level of development is maximized and is safely sited. Access management is a tool that balances access and travel

mobility, which positively impacts safe and efficient movement of vehicles. According to NHDOT:

> "Each driveway that intersects a roadway provides a point of potential conflict as cars turn off of the roadway, or turn onto the roadway. As a result, traffic slows down, the efficiency of the roadway is reduced and the potential for accidents increases."

The starting point for good access management is the development of a solid foundation in the local master plan. The master plan should include goals, objectives, strategies, and policies that support good access management. The plan should establish how the community will balance mobility with access, identify the desired access management approach, and designate corridors that require special consideration.[4] For additional information on effective access management strategies contact your planning commission.

Aesthetics relate to the "look" and character of an area and are often subjective in nature. Agreeable aesthetics have the ability to enhance quality of life for residents and visitor perceptions, both of which can lead to a stronger local economy. This section considers multiple aspects of aesthetics and has a high reliance on the support of the Zoning Ordinances, Subdivision Regulations, and Site Plan Regulations. The examination of existing conditions and resulting recommendations were based on the following four components which are each related to safety:

Signage

When signage is done well, it can contribute to a safer highway for motorists trying to find a destination and can enhance the character of the neighborhood in which the signs are located. Poor signage, however, can be distracting to motorists, block important sightlines at intersections and driveways, and contribute to the visual blight within an area. Signage in this section of the report will focus primarily on signs related to advertising, as opposed to those serving traffic control and safety functions.

Lighting

Lighting can have a tremendous impact on the visual characteristics and traffic safety of the corridor. Light needs to be controlled to prevent glare to motorists, a nuisance to residents, and to curb light pollution. Appropriate lighting is beneficial for safety and can help create a more appealing environment after dark. The focus in this section is onsite lighting as opposed to roadway lighting.

Buffers

Buffering involves separating land uses and highway facilities with landscaping, grassed areas, earthen berms, fences, and other similar features to reduce impacts on each other. On NH Route 28, natural tree buffers are predominant both to the sides and fronts of the developed properties. The placement and maintenance of landscapes can impact roadway safety as well. Vegetation and other buffers that are not properly maintained or located can obscure important road features and distract motorists.

[4] NH Route 25 Corridor Study, Lakes Region Planning Commission, Page 31, April 2008.

Landscaping

Landscaping is an integral part of any building site and of key importance when considering the character of a roadway. Landscaping can help shield less attractive features of physical development from the roadway, such as parking lots and the buildings themselves. This creates a more attractive setting for travelers, and can also assist in calming the speed of traffic through built-up neighborhoods. Landscaping also provides retention for drainage and may promote wildlife which adds to character of the corridor when visited.

Summary of Land Use and Aesthetics Findings

The NH Route 28 corridor within the study area is a mix of single family and multi-family residential, open agricultural land, local businesses, a few franchise businesses, and two traffic circles. While the five communities have different characteristics, a common thread is natural tree stands lining much of the corridor within the Safety Audit study area.

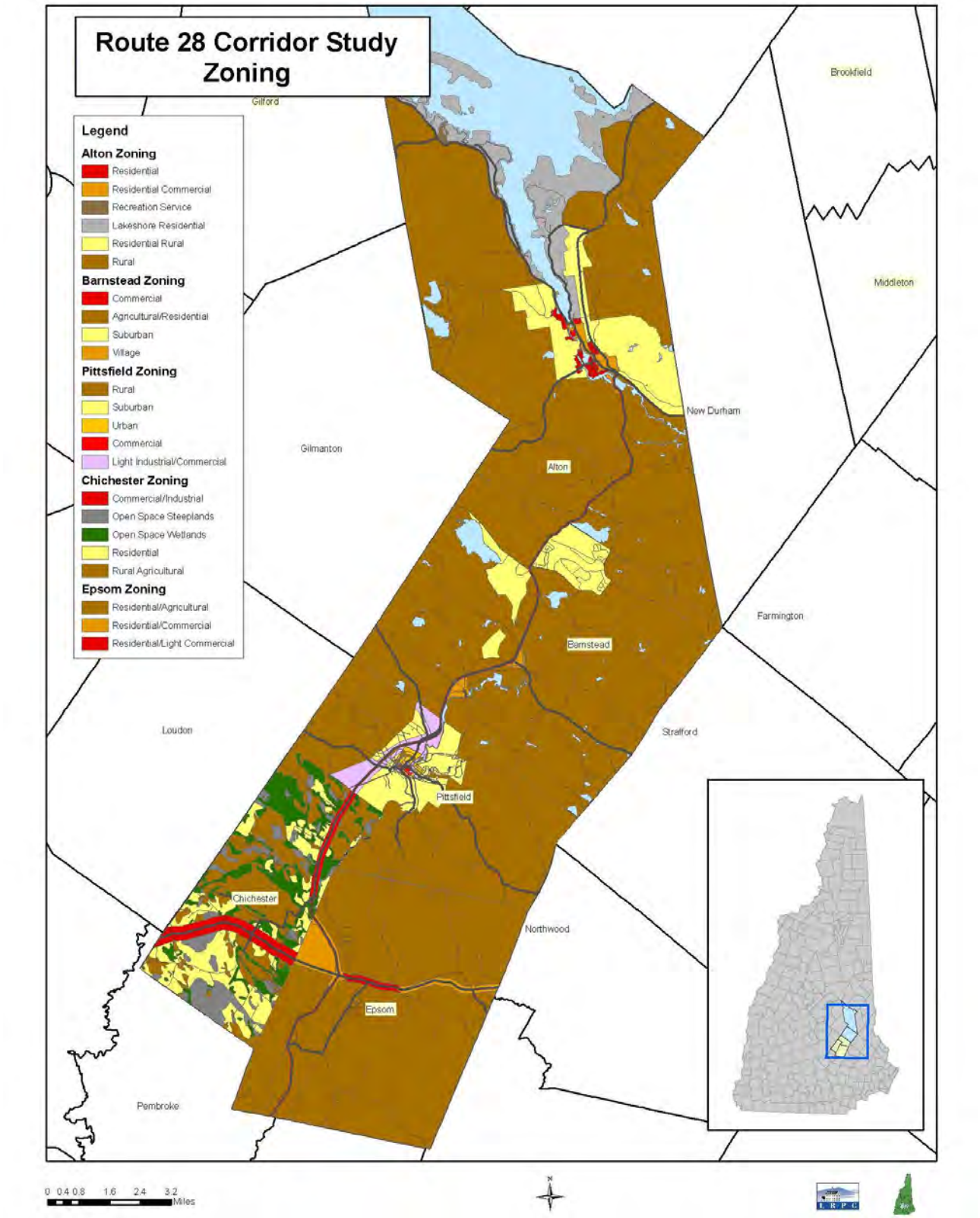
Signage is much different in Pittsfield (higher contrast, larger) than it is in Alton (wooden painted, smaller) but portable reader board signs are common in four of the five towns. Landscaping is found in a few areas, and most lighting in the corridor is exterior lit signage with some examples present in parking lots. Scenic agricultural land is abundant, as are forested tree stands.

A tremendous opportunity exists for the corridor as a gateway to the Lakes Region. The further north one travels, the more evident it becomes that the architectural and aesthetic atmosphere is changing. Promotion of tourism and businesses that encourage motorists to stop at a business, visit a while, and eat at a restaurant could be obtained through revising the ordinances and regulations for new businesses. Marketing existing businesses can persuade them to enhance the aesthetics of their properties. The development of a NH Route 28 Marketing Committee can further these goals.

Nodal development would be one way of encouraging development along NH 28. The focus is to create "nodes" where commercial and mixed-use development can be concentrated. Nodes, or the potential for nodes, are found in each of the five communities. This dense type of development allows driveways and access roads to be shared more easily than under a "strip" type of development. The density of development also provides additional opportunities for walking between commercial establishments. Commercial nodes exist along the corridor. Examples are found in Pittsfield, at the Epsom and Alton traffic circles, and in Barnstead. Opportunities for growth at these areas could be enhanced by zoning with higher density and a set of supporting regulations which guide the logistic and aesthetic components of development.

Zoning along the NH Route 28 corridor is fairly consistent with a rural or residential zone for the majority of the travel-way through Epsom, Barnstead, and Alton as depicted in Map 6.1. Chichester and Pittsfield have primarily commercial zones along NH Route 28. The five communities have identical opportunities for strengthening their Zoning Ordinance and regulations for signage, buffering, and lighting. Where regulations do not currently exist, planning boards have the ability to negotiate with developers to obtain these aesthetic characteristics.

Map 6.1 Corridor Zoning



Land Use

The NH Route 28 corridor is characterized by a variety of land uses that are similar among the towns. Active agriculture, forests, single family residences, multi-family developments, cottage industries, franchise businesses, local enterprises, and others are found along NH Route 28. The placement of these land uses is fragmented, so communities should work to ensure that like uses are placed next to one another. Advantages to this type of separated development include the economic value of the patronizing of adjacent businesses (a "destination" for shoppers), the formation of residential neighborhoods, and the natural beauty of the corridor's rural assets is preserved.

A goal of attracting tourism and businesses that cater to visitors should be developed that is embraced by each of the communities. By pooling resources and working together to develop new ordinances and marketing strategies, through the formation of a new NH Route 28 Betterment Committee or collaboration with their respective economic development councils, Alton, Barnstead, Chichester, Epsom, and Pittsfield should be able to see improvements in the number of people patronizing the businesses. This in turn will encourage more development to occur, and will encourage the type of development desired by the communities.

Much of NH Route 28 through the five communities is controlled access. Land use is affected by a land owner's ability to obtain access to a highway through the issuance of a driveway permit or curb cut. Research was conducted to assess existing "controlled access" in the study area. The NHDOT Right of Way Bureau provided a listing on plans and associated references. From these plans, associated files containing specifics on parcels affected by controlled access were reviewed. The result of this research was an update to parcel maps in Chichester and Pittsfield, where parcel based mapping was available (see Map 6.2). This information serves as a starting point for communities interested in understanding future land use development potential.

Noteworthy is that no "limited access" exists within the study area. Limited access is a condition where the NHDOT purchase of property rights precludes any future driveway permits from being issued. Controlled access in comparison is a condition where NHDOT has purchased some of a land owner's ability to obtain multiple driveway permits. Many of the plans for the study area are characterized by controlled access. A third designation is "uncontrolled access." This is a condition where the minimum standards used by NHDOT when a driveway permit is applied for, determine where and how many access points are approved. Some of the minimum standards are: drive width, amount of frontage, and line of sight (RSA 236:13). Access management is a tool planning boards can use to influence curb cuts.

It was noted that plans were on file for most of the 24 mile stretch of NH Route 28 in the study area. The exception was from Station 270 of Plan Number 2091 north to the Barnstead / Alton town line. The plans reviewed from south to north in the corridor are identified as follows:

- Plan Name: Pembroke – Epsom, 1952
  Project Name: TLR 14176
  Project Number: P1998
  Reference Number: 965

- Plan Name: Epsom – Chichester, 1952
  Project Name: PN 14190
  Project Number: P2277
  Reference Number: 957

- Plan Name: Chichester, 1960
  Project Name: F023-1(5)
  Project Number: 3895
  Reference Number: 8-D

- Plan Name: Pittsfield, 1964
  Project Name: F023-1(6)
  Project Number: 4506
  Reference Number: 2-C

- Plan Name: Pittsfield - Barnstead
  Project Name: F023-1(8)
  Project Number: P-7440-B
  Reference Number: 3080

- Plan Name: Barnstead, 1968
  Project Name: F023-1(9)
  Project Number: 7440- A and B
  Reference Number: 70

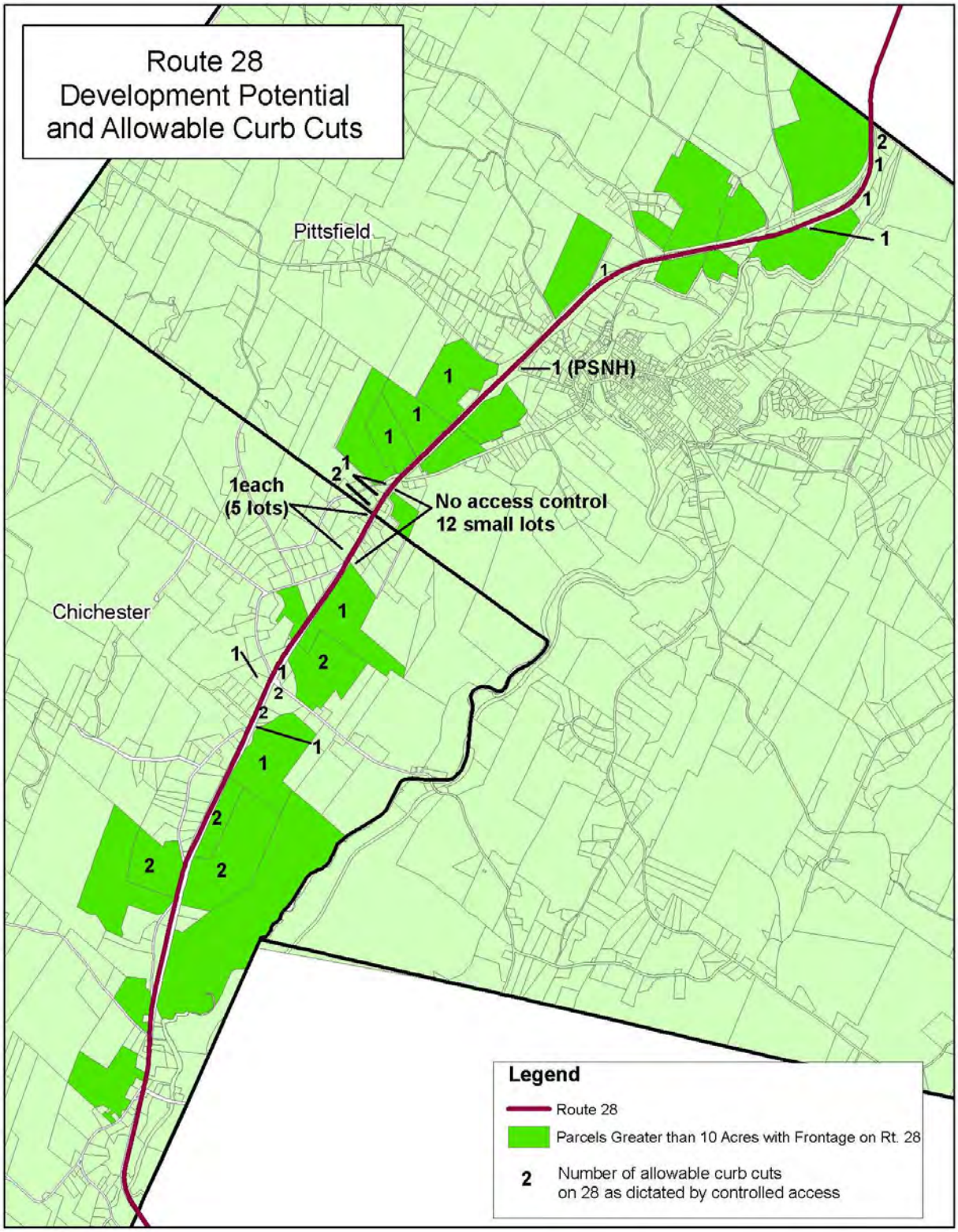
- Plan Name: Barnstead, 1956
  Project Name: F23-1(3)
  Project Number: 2970
  Reference Number: 2091

- Plan Name: Alton – Barnstead, 1933
  Project Name: Proctor's Curve
  Project Number: None
  Reference Number: 3215

- Plan Name: Alton, 1930
  Project Name: 225F
  Project Number: None
  Reference Number: 3077

- Plan Name: Alton, 2008
  Project Name: X-A000 (480)
  Project Number: 13802
  Reference Number: HH5

Map 6.2 NH Route 28 Controlled Access – Chichester and Pittsfield



Aesthetics

All five communities have opportunities to enhance the beauty of the corridor for both new and existing development. Signage, lighting, landscaping, and buffers can be addressed individually by Alton, Barnstead, Chichester, Epsom, and Pittsfield to ensure that NH Route 28 is an attractive and inviting highway. Adopting sections of highway or landscaping islands for beautification will add to the enjoyment of travelers. By installing consistent "Welcome" signs, the communities will take ownership of their towns and will establish a sense of place.

Where lighting is concerned:

> "RSA 236:55 prohibits any person from positioning any light, either on or off the highway, in such a way "as to blind or dazzle the vision of travelers" on the highway…The lighting of private property, particularly business property, should be addressed either in a zoning ordinance or as an element in site plan review. In that way, standards can be tailored to the municipality's needs and can be made more measurable and definite than the vague standard of this statute. Local lighting regulations that are more stringent than this statute have been upheld, even when their sole purpose was aesthetics."[5]

Revisions to Zoning Ordinances, Subdivision Regulations, and Site Plan Review Regulations will enable a more consistent look to the corridor. New developments will be designed in accordance with new landscaping, signage, buffering, and lighting standards. Existing developments can be improved through an amended site plan review process to incorporate the same positive transformations.

Conclusion

Alton, Barnstead, Chichester, Epsom, and Pittsfield are different communities along NH Route 28 with individual goals and inherent development and growth concerns. However, they share similar opportunities and areas for improvement along NH Routes 28, including the retention of rural character, improving inconsistent lighting and signage, enacting access management regulations, and improving business opportunity. Improvements can be made to ensure that development is appropriately placed and is aesthetically pleasing. Local regulation and ordinance revision is a tool that Alton, Barnstead, Chichester, Epsom, and Pittsfield can undertake to obtain "ownership" of their portion of state-owned NH 28 and will invite more visitors to stay for a visit and patronize their businesses. The communities should continue to work together to uniformly enhance the corridor to meet their respective goals.

While new "Welcome" signs will add character and establish a sense of place in the individual corridor communities, it would be helpful to have a corridor oversight committee to ensure that all signage and other enhancements are complementary and upgrade the aesthetics of the entire corridor, rather than one or two towns along the way. It would seem beneficial to include on the welcome signs some indication of the cooperation between communities. Independence and

[5] A Hard Road to Travel: New Hampshire Law of Local Highways, Streets and Trails, Local Government Center, 2004.

character of towns could be preserved while cooperation takes place in regards to signage and economic promotion.

For example, a town welcome sign could include a town seal and/or motto, and the year the town was founded for individuality. The five signs, however, might all be in the same font or same color to distinguish them as a cooperative group along the corridor. It is possible to avoid the extremes of town isolationism on the one hand, and loss of individual character due to shared signage on the other, by establishing a coalition between the towns that delineates how best to move forward with both economic promotion and aesthetic enhancements. This coalition could ensure shared goals, while also being receptive to the long-term goals of the individual communities.

Field observations that support the following potential recommendations are located in Appendix D.

Potential Recommendations for NH Route 28 Corridor Communities

Future Development

- Continue to apply the Zoning Ordinance and Site Plan Review provisions to ensure that future development remains compatible in the area. Where specific landscaping, signage, streetscaping, and architectural provisions do not yet exist in local land use regulations, negotiate with developers to ensure that these components are incorporated into the final design.

Access Management

- Improve dialogue between local communities and the NH Department of Transportation during the permitting process for curb cuts along NH Route 28.

- Undertake an access management audit, such as outlined in the Innovative Land Use Guide[6], to determine if access management strategies are adequately addressed.

- Research and map the status of controlled access along NH Route 28 and incorporate this in local land use planning.

- Amend the Site Plan Review and Subdivision Regulations by utilizing the model for access management in the Innovative Land Use Guide to ensure that future development along NH Route 28 is organized.

Signage

- Amend the Zoning Ordinance to specifically address "portable reader board" signs to stipulate the timeframe in which they can be erected, their size and style, and grant the Code Enforcement Officer the ability to take enforcement action as needed.

[6] Innovative Land Use Techniques – A Handbook for Sustainable Development, NH Department of Environmental Services, October 2008.

Lighting

- Amend the Zoning Ordinance to include an article on outdoor lighting. This would take into consideration shielding and height, which help ensure that unnecessary light does not leave the site thus protecting the dark skies rural environment. Guidance for outdoor lighting ordinances is found in the Innovative Land Use Guide.

- Develop lighting standards for the Site Plan Review Regulations, which include the style of lighting fixtures, the color of poles, etc. subject to the review and approval of the Planning Board.

Landscaping and Buffers

- Adopt a landscaping ordinance to ensure the continued and enhanced aesthetic beauty of the Town utilizing the Innovative Land Use Guide model.

- Amend the Subdivision Regulations to include landscaping standards utilizing the Innovative Land Use Guide model for the consistent rural appearance of new developments.

- Amend the Site Plan Review Regulations to include landscaping standards utilizing the Innovative Land Use Guide model to ensure that new businesses provide a landscaping plan that enhance the beauty of the community.

- Amend the Zoning Ordinance to include specific requirements for buffering in each of the zoning districts to ensure that any development's visual impact is kept at a minimum at the side, rear, and front of the property.

- Form a NH 28 Betterment Committee, comprised of representatives from each community and the NH Department of Transportation, to ensure that the future of the NH 28 corridor will be rural yet prosperous, and to monitor the progress of the recommendations from the NH 28 Safety Audit.

- Develop an "Adopt a Spot" program for local businesses to gain recognition and produce a visually appealing landscaped area at key locations such as traffic islands or road intersections.

- Develop a program for Epsom, Chichester, Pittsfield, Barnstead, and Alton that encourages the erection of a "Welcome to [Town]" sign, which would be of consistent sizes and materials, at each of the Town lines.

- Form a NH 28 Marketing Committee of businesses on NH 28, based on some of the principles of the Main Street Program, to encourage existing businesses to perform landscaping, revise signage for more consistency, and to develop a cohesive plan for drawing customers to the area.

Appendix A

Meeting Documentation

Committee Formation Letter
February 10, 2009
Other Meetings
June 25, 2009
July 30, 2009
August 27, 2009

November 5, 2008

Town of Epsom
Board of Selectmen
Robert Blodgett, Chairman
PO Box 10
Epsom, NH 03234

Re: NH Route 28 Corridor Safety Audit
Project Advisory Committee (PAC) Representation

Dear Mr. Blodgett,

In partnership with Central NH Regional Planning Commission (CNHRPC) the Lakes Region Planning Commission (LRPC) is pleased to announce that the New Hampshire Department of Transportation (NH DOT) has approved Statewide Planning and Research (SPR) funding to conduct a safety study along NH Route 28 between Alton and Epsom. This letter serves as a formal request to the Board of Selectmen to appoint representation to a Project Advisory Committee (PAC) to aid regional planning commission staff in the development of this study.

As you are aware, the study area for this project, from the Alton traffic circle south to the Epsom-Pembroke town line, represents a locally and regionally significant transportation corridor. Ideally, PAC members are those with an understanding of the fine details that make this state route a significant resource for your community. Suggested committee representation includes a member from each of the following:

- Town Administrator or Board of Selectmen Representative
- Town Planner or Transportation Technical Advisory Committee (TAC) member
- Police
- Road Agent / Director of Public Works

The anticipated time commitment for committee members is approximately four (2-3 hour) meetings, attendance at a day long Federal Highway Administration safety audit training session, and time spent reviewing study report drafts.

Dependent on committee formation, regional planning commission staff are prepared to facilitate a PAC kick-off meeting the second week in February 2009. We look forward to working with the town of Epsom on this project. Please contact me if you have any questions regarding this request.

Sincerely,

Michael Izard, Principal Planner

Cc: LRPC Commissioners - Alton, Barnstead
CNHRPC Commissioners – Chichester, Epsom, Pittsfield
Rodrigo Marion, CNHRPC Principal Transportation Planner
William Watson, NHDOT Administrator, Planning and Community Assistance
Sharon Wason, CNHRPC Executive Director
Kimon Koulet, LRPC Executive Director
09-712

November 5, 2008

Town of Chichester
Board of Selectmen
Richard DeBold, Chairman
54 Main Street
Chichester, NH 03258

Re: NH Route 28 Corridor Safety Audit
Project Advisory Committee (PAC) Representation

Dear Mr. DeBold,

In partnership with Central NH Regional Planning Commission (CNHRPC) the Lakes Region Planning Commission (LRPC) is pleased to announce that the New Hampshire Department of Transportation (NH DOT) has approved Statewide Planning and Research (SPR) funding to conduct a safety study along NH Route 28 between Alton and Epsom. This letter serves as a formal request to the Board of Selectmen to appoint representation to a Project Advisory Committee (PAC) to aid regional planning commission staff in the development of this study.

As you are aware, the study area for this project, from the Alton traffic circle south to the Epsom-Pembroke town line, represents a locally and regionally significant transportation corridor. Ideally, PAC members are those with an understanding of the fine details that make this state route a significant resource for your community. Suggested committee representation includes a member from each of the following:

- Town Administrator or Board of Selectmen Representative
- Town Planner or Transportation Technical Advisory Committee (TAC) member
- Police
- Road Agent / Director of Public Works

The anticipated time commitment for committee members is approximately four (2-3 hour) meetings, attendance at a day long Federal Highway Administration safety audit training session, and time spent reviewing study report drafts.

Dependent on committee formation, regional planning commission staff are prepared to facilitate a PAC kick-off meeting the second week in February 2009. We look forward to working with the town of Chichester on this project. Please contact me if you have any questions regarding this request.

Sincerely,

Michael Izard, Principal Planner

Cc: LRPC Commissioners - Alton, Barnstead
CNHRPC Commissioners – Chichester, Epsom, Pittsfield
Rodrigo Marion, CNHRPC Principal Transportation Planner
William Watson, NHDOT Administrator, Planning and Community Assistance
Sharon Wason, CNHRPC Executive Director
Kimon Koulet, LRPC Executive Director
09-712

November 5, 2008

Town of Pittsfield
Board of Selectmen
Lawrence Konopka, Chairman
PO Box 98
Pittsfield, NH 03263

Re: NH Route 28 Corridor Safety Audit
Project Advisory Committee (PAC) Representation

Dear Mr. Konopka,

In partnership with Central NH Regional Planning Commission (CNHRPC) the Lakes Region Planning Commission (LRPC) is pleased to announce that the New Hampshire Department of Transportation (NH DOT) has approved Statewide Planning and Research (SPR) funding to conduct a safety study along NH Route 28 between Alton and Epsom. This letter serves as a formal request to the Board of Selectmen to appoint representation to a Project Advisory Committee (PAC) to aid regional planning commission staff in the development of this study.

As you are aware, the study area for this project, from the Alton traffic circle south to the Epsom-Pembroke town line, represents a locally and regionally significant transportation corridor. Ideally, PAC members are those with an understanding of the fine details that make this state route a significant resource for your community. Suggested committee representation includes a member from each of the following:

- Town Administrator or Board of Selectmen Representative
- Town Planner or Transportation Technical Advisory Committee (TAC) member
- Police
- Road Agent / Director of Public Works

The anticipated time commitment for committee members is approximately four (2-3 hour) meetings, attendance at a day long Federal Highway Administration safety audit training session, and time spent reviewing study report drafts.

Dependent on committee formation, regional planning commission staff are prepared to facilitate a PAC kick-off meeting the second week in February 2009. We look forward to working with the town of Pittsfield on this project. Please contact me if you have any questions regarding this request.

Sincerely,

Michael Izard, Principal Planner

Cc: LRPC Commissioners - Alton, Barnstead
CNHRPC Commissioners – Chichester, Epsom, Pittsfield
Rodrigo Marion, CNHRPC Principal Transportation Planner
William Watson, NHDOT Administrator, Planning and Community Assistance
Sharon Wason, CNHRPC Executive Director
Kimon Koulet, LRPC Executive Director
09-712

November 5, 2008

Town of Barnstead
Board of Selectmen
Gordon Preston, Chairman
PO Box 11
Center Barnstead, NH 03225

Re: NH Route 28 Corridor Safety Audit
Project Advisory Committee (PAC) Representation

Dear Mr. Preston,

In partnership with Central NH Regional Planning Commission (CNHRPC) the Lakes Region Planning Commission (LRPC) is pleased to announce that the New Hampshire Department of Transportation (NH DOT) has approved Statewide Planning and Research (SPR) funding to conduct a safety study along NH Route 28 between Alton and Epsom. This letter serves as a formal request to the Board of Selectmen to appoint representation to a Project Advisory Committee (PAC) to aid regional planning commission staff in the development of this study.

As you are aware, the study area for this project, from the Alton traffic circle south to the Epsom-Pembroke town line, represents a locally and regionally significant transportation corridor. Ideally, PAC members are those with an understanding of the fine details that make this state route a significant resource for your community. Suggested committee representation includes a member from each of the following:

- Town Administrator or Board of Selectmen Representative
- Town Planner or Transportation Technical Advisory Committee (TAC) member
- Police
- Road Agent / Director of Public Works

The anticipated time commitment for committee members is approximately four (2-3 hour) meetings, attendance at a day long Federal Highway Administration safety audit training session, and time spent reviewing study report drafts.

Dependent on committee formation, regional planning commission staff are prepared to facilitate a PAC kick-off meeting the second week in February 2009. We look forward to working with the town of Barnstead on this project. Please contact me if you have any questions regarding this request.

Sincerely,

Michael Izard, Principal Planner

Cc: LRPC Commissioners - Alton, Barnstead
CNHRPC Commissioners – Chichester, Epsom, Pittsfield
Rodrigo Marion, CNHRPC Principal Transportation Planner
William Watson, NHDOT Administrator, Planning and Community Assistance
Sharon Wason, CNHRPC Executive Director
Kimon Koulet, LRPC Executive Director
09-712

November 5, 2008

Town of Alton
Board of Selectmen
Alan Sherwood, Chairman
PO Box 659
Alton, NH 03809

Re: NH Route 28 Corridor Safety Audit
Project Advisory Committee (PAC) Representation

Dear Mr. Sherwood,

In partnership with Central NH Regional Planning Commission (CNHRPC) the Lakes Region Planning Commission (LRPC) is pleased to announce that the New Hampshire Department of Transportation (NH DOT) has approved Statewide Planning and Research (SPR) funding to conduct a safety study along NH Route 28 between Alton and Epsom. This letter serves as a formal request to the Board of Selectmen to appoint representation to a Project Advisory Committee (PAC) to aid regional planning commission staff in the development of this study.

As you are aware, the study area for this project, from the Alton traffic circle south to the Epsom-Pembroke town line, represents a locally and regionally significant transportation corridor. Ideally, PAC members are those with an understanding of the fine details that make this state route a significant resource for your community. Suggested committee representation includes a member from each of the following:

- Town Administrator or Board of Selectmen Representative
- Town Planner or Transportation Technical Advisory Committee (TAC) member
- Police
- Road Agent / Director of Public Works

The anticipated time commitment for committee members is approximately four (2-3 hour) meetings, attendance at a day long Federal Highway Administration safety audit training session, and time spent reviewing study report drafts.

Dependent on committee formation, regional planning commission staff are prepared to facilitate a PAC kick-off meeting the second week in February 2009. We look forward to working with the town of Alton on this project. Please contact me if you have any questions regarding this request.

Sincerely,

Michael Izard, Principal Planner

Cc: LRPC Commissioners - Alton, Barnstead
CNHRPC Commissioners – Chichester, Epsom, Pittsfield
Rodrigo Marion, CNHRPC Principal Transportation Planner
William Watson, NHDOT Administrator, Planning and Community Assistance
Sharon Wason, CNHRPC Executive Director
Kimon Koulet, LRPC Executive Director
09-712

Date: February 2, 2009

Press Release

For Immediate Release

For More Information, Call:

Lakes Region Planning Commission
Michael Izard, Planning Manager / Principal Planner
279-8171

Central NH Region Planning Commission
Rodrigo Marion, Principal Transportation Planner
226-6020

NH Route 28 Corridor Safety Study
Kick-off Meeting

There will be a meeting of the NH Route 28 Project Advisory Committee (Route 28 PAC) at 2:00 PM on Tuesday, February 10, 2009. The meeting will be held at the Barnstead Town Hall in Barnstead, NH. At this meeting the Route 28 PAC, comprised of municipal officials from Alton, Barnstead, Chichester, Epsom, and Pittsfield, NHDOT and regional planning commission staff, will discuss transportation safety improvement needs, and review existing conditions and automobile crash analysis results. Members of the public who are concerned about transportation safety within the NH Route 28 corridor study area, from the Allentown/Epsom town line north to the Alton traffic circle, are encouraged to attend and provide their input. For additional information about this meeting please contact Michael Izard, Principal Planner at the Lakes Region Planning Commission at 279-8171 or Rodrigo Marion, Principal Transportation Planner at the Central NH Regional Planning Commission at 226-6020.

LAKES REGION PLANNING COMMISSION

103 Main Street, Suite #3
Meredith, NH 03253
tel (603) 279-8171
fax (603) 279-0200
www.lakesrpc.org

NH Route 28 Corridor Safety Audit

Tuesday, February 10, 2009
Barnstead Town Hall
2:00 – 4:00 PM

AGENDA

2:00 **INTRODUCTIONS**

2:10 **PROJECT OVERVIEW:** Michael Izard, Principal Planner, LRPC

2:25 **DISCUSSION:** Local Views of Near and Long-Term Corridor Transportation Needs

3:10 **CRASH ANALYSIS:** Stuart Thompson, Highway Safety Engineer, NHDOT

3:25 **EXISTING CONDITIONS:** Rodrigo Marion, Principal Transportation Planner, CNHRPC

3:40 **PROJECT NEXT STEPS**

4:00 **ADJOURN**

LAKES REGION PLANNING COMMISSION

103 Main Street, Suite #3
Meredith, NH 03253
tel (603) 279-8171
fax (603) 279-0200
www.lakesrpc.org

MINUTES of February 10, 2009
NH 28 Corridor Study Kickoff Meeting
Barnstead Town Hall, Center Barnstead, NH

PRESENT:

Alton
Sharon Penney, Town Planner
Kenneth Roberts, Highway Agent
Phil Smith, Police Chief
Leo Paradis, Resident
Donna Paradis, Resident

Barnstead
Charles Booker, Resident
David Brown, ZBA
Peter Llewellyn, Police Department
David Murley, Planning, Fire & Rescue
Richard Niolet, Highway Department
Gordon Preston, Selectmen
John Wheeler, Resident

Chichester
Peter Holmes, Resident
Richard Moore, Planning Board

Epsom
Gordon Ellis, Road Agent
Joanne Randall, Selectman

Pittsfield
Edward Vien, Selectman
Gary Johnson, Fire Department
Robert Wharem, Police Chief

NHDOT
Tom Jameson, Planning & Community Asst.
Don Lyford, Highway Design
G. Stuart Thompson, Highway Design

Regional Planning Commissions
Rodrigo Marion, Central NHRPC
Vanessa Bittermann, Central NHRPC
Kimon Koulet, Lakes RPC
Adam Hlasny, Lakes RPC

Others
Paul Bartolomucci, Prospect Mountain High School Superintendent
Brendan Berube, Reporter, *The Baysider*

1. Call to Order

Kimon Koulet of Lakes Region Planning Commission called the meeting to order at approximately 2:00 pm. All in attendance were provided the opportunity to introduce themselves.

2. Project Overview

K. Koulet explained that he was "pinch-hitting," for Michael Izard, who was unable to attend the meeting due to a family emergency. K. Koulet continued by explaining the project's scope, the people and agencies involved, what steps have already been taken, and gave a direction for the meeting to proceed.

3. Group Discussion

K. Koulet facilitated a group discussion, during which a representative from each of the five communities was given an opportunity to present short-term (12-18 month range) safety concerns they had for their portion of the corridor. Long-term transportation needs (5 year range) were also discussed resulting in the following list of concerns:

Short Term Safety Concerns (in order of priority by town)

Alton
- Stockbridge Road
- Prospect Mountain/Dudley Road
- Lot Line Rd, Abednego Road
- No sidewalks near school
- Fragmented sidewalk network

Barnstead
- North Barnstead Road
- Peacham Road/White Oak Road/Lakeshore Drive
- Colony Drive

Chichester
- Kelly Corner Rd (80-unit development proposed)
- NH Route 28/Main Street intersection (42-unit development pending)
- Epsom/Chichester Town Line (poorly banked, dangerous curve)

Epsom
- Entrances to business surrounding traffic circle (access management)
- Elkins Road
- Mill House Road
- Shoulders throughout

Pittsfield
- Leavitt Road (foot traffic problem)
- NH Route 28/107 intersection ("yield on green" sign, sight distance issues)
- Concord Hill Road (sight distance issues)
- Need of sidewalks and crosswalks at intersection of Route 28 & 107 (foot traffic)

Long Term Corridor Transportation Needs (in order of priority by town)

ALTON
- Sidewalks throughout corridor

BARNSTEAD
- "Wider and straighter" roadway throughout
- Sidewalks
- Drainage need

CHICHESTER
- Bear Hill Rd intersection
- Athletic fields
- Ice cream shop (parking problems)

EPSOM
- Conduct build out analysis on west side of NH Route 28
- Introduce recreational areas along the corridor

PITTSFIELD
- Parallel road to NH Route 28 for access to downtown
- Turn lanes at key intersections
- Consideration of lower speed limits to prevent accidents

Public comments:

- Traffic circle in Alton needs better signage (yield signs)
- Having center turning lanes in certain locations along the corridor
- Barnstead to Epsom circle is the most dangerous section: Focus in road design aspects
- From Mountain High School to Alton traffic circle: There is a need of sidewalks for students

4. Crash Analysis

Stuart Thompson of NH DOT delivered a PowerPoint presentation regarding crash analysis along the corridor. He also mentioned the upcoming safety audit, and how it will be conducted. He used previous examples from other states to demonstrate how the process works.

5. Existing Conditions

Rodrigo Marion of Central New Hampshire Planning Commission delivered a PowerPoint presentation about the existing conditions in the Route 28 Corridor. This presentation included accident data for intersections, traffic count data on volume, speed, and classification, and an analysis of potential for bicycle paths along the corridor. R. Marion pointed out that any data in the presentation is available from CNHRPC upon request. Handouts were available showing more detailed traffic count data from LRPC.

6. Project Next Steps

K. Koulet wrapped up the meeting by describing what the next steps in the corridor study process would be. He discussed a timeline handout that reviewed the schedule of meetings and other events related to the study. While the next meeting of the full Corridor Advisory Committee (CAC) is not until June, there is a required Federal Highway Administration training on road safety audits scheduled for March 3-4, for which two members from each community agreed to participate as follows:

Philip Smith, Alton Police Chief
Ken Roberts, Alton Road Agent
Barnstead representatives to be determined
Richard Moore, Chichester Planning Board
Peter Holmes, Chichester Resident
Gordon Ellis, Epsom Road Agent
David Fiorentino, Epsom Resident
Gary Johnson, Pittsfield Fire Chief
Robert Wharem, Pittsfield Police Chief

Those trained in road safety audits will represent the Safety Audit Team (SAT), a subcommittee of the CAC, who will participate in field study scheduled in April/May.

The meeting was adjourned at approximately 4:10 pm.

NH Route 28 Corridor Safety Study
Meeting Information

February 10 – Project overview

See website for additional information.

March 3-4 – Road Safety Audit Training in Manchester

Attendees:

- Vanessa Bitterman, CNHRPC
- Rodrigo Marion, CNHRPC
- Michael Izard, LRPC
- Adam Hlasny, LRPC
- David Kerr, Barnstead Board of Selectmen
- Bill Evans, Barnstead Health Officer
- Ken Roberts, Alton Road Agent
- Gordon Ellis, Epsom Road Agent
- Dave Furintino, Epsom Resident
- Peter Holmes, Chichester Business Owner
- Bob Lane, Pittsfield Police Chief
- Gary Johnson, Pittsfield Fire Chief

April 20 – Consultant Interviews

Project Team: Michael Tardiff, Rodrigo Marion, Mike Izard

Candidate Consulting Firms: Vannase Hangen Brustlin, Inc. (VHB) - Bedford, NH
Fay, Spofford, and Thorndike – Bedford, NH
McFarland Johnson – Concord, NH

April 26-28 - Safety Audit Team Field Assessments

Field review of areas of concern identified by the Corridor Advisory Committee on February 10.

Participants:

- Kenneth Roberts, Alton HD
- Bill Evans, Barnstead HO
- David Kerr, Barnstead BOS
- James Plunkett, Chichester
- Peter Holmes, Chichester
- Betsy Bosiak, Epsom
- Gary Johnson, Pittsfield FD
- Robert Wharem, Pittsfield PD
- Martin Calawa, FHWA (NH)
- Rosemarie Anderson, FHWA (NJ) Peer to Peer Program participant
- Stuart Thompson, NHDOT
- Trent Zanes, NHDOT
- Rodrigo Marion, CNHRPC

- Craig Tufts, CNHRPC
- Adam Hlasny, LRPC
- Michael Izard, LRPC

May 12 – Project Team meets with VHB to develop consultant scope of services.

Date: June 12, 2009

Press Release

For Immediate Release

For More Information, Call:

Lakes Region Planning Commission
Michael Izard, Planning Manager / Principal Planner
279-8171

Central NH Region Planning Commission
Rodrigo Marion, Principal Transportation Planner
226-6020

NH Route 28 Corridor Safety Study
Project Advisory Committee Meeting

There will be a meeting of the NH Route 28 Project Advisory Committee (Route 28 PAC) from 2:00 PM to 4:00 PM on Thursday, June 25, 2009. The meeting will be held at the Prospect Mountain High School cafeteria in Alton, NH. At this meeting the Route 28 PAC, comprised of municipal officials from Alton, Barnstead, Chichester, Epsom, and Pittsfield, NHDOT and regional planning commission staff, will review preliminary findings from a Road Safety Audit (RSA) conducted on April 26-28, 2009. The committee will prioritize safety improvement needs within the project study area from the Alton traffic circle south on NH Route 28 to the Epsom/Pembroke town line. Based on the results of the RSA and the committee's priority concerns, consultants from Vanasse Hangen Brustlin (VHB) will develop conceptual plans for safety improvements at ten locations. Members of the public who are concerned about transportation safety within the NH Route 28 corridor study area are encouraged to attend and provide their input. For additional information about this meeting please contact Michael Izard, Principal Planner at the Lakes Region Planning Commission at 279-8171 or Rodrigo Marion, Principal Transportation Planner at the Central NH Regional Planning Commission at 226-6020.

LAKES REGION PLANNING COMMISSION

103 Main Street, Suite #3
Meredith, NH 03253
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NH Route 28 Corridor Safety Audit
Project Advisory Committee (PAC) Meeting

Thursday, June 25, 2009
Prospect Mountain High School Cafeteria, Alton, NH
2:00 – 4:00 PM

AGENDA

2:00 **INTRODUCTIONS**

2:10 **PRELIMINARY ROAD SAFETY AUDIT PROCESS AND RESULTS:**
Michael Izard, Principal Planner, LRPC
Rodrigo Marion, Principal Transportation Planner, CNHRPC
Road Safety Audit Team Members

3:00 **DISCUSSION:** PAC Consensus on Corridor-wide Safety Priorities

3:20 **PROJECT PROGRESS UPDATE:** Land Use, Accident Analysis, etc.

3:30 **VANASSE HANGEN BRUSTLIN (VHB) PROJECT INVOLVEMENT OVERVIEW:**
Robin Bousa, VHB Project Manager
Greg Bakos, Highway Engineer

3:55 **PROJECT NEXT STEPS and COMPLETION TIMELINE**

4:00 **ADJOURN**

LAKES REGION PLANNING COMMISSION

103 Main Street, Suite #3
Meredith, NH 03253
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fax (603) 279-0200
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Minutes of June 25, 2009
NH Route 28 Corridor Safety Audit
Project Advisory Committee (PAC) Meeting

PRESENT:

Alton
Kenneth Roberts, Highway Agent

Barnstead
David Kerr, Selectman
David Murley, Planning Board
Bill Evans, Health Officer

Chichester
No representatives present

Pittsfield
Gary Johnson, Fire Department
Edward Vien, Selectman

Epsom
Betsy Bosiak, Planning Board

NH DOT
G. Stuart Thompson, Highway Safety Engineer
Trent Zanes, Preliminary Design

Regional Planning Commissions
Rodrigo Marion, Principal Transportation Planner, CNHRPC
Craig Tufts, Transportation/GIS Planner, CNHRPC
Evan Aird, Assistant Planner, CNHRPC
Michael Izard, Principal Planner, LRPC
Adam Hlasny, Assistant Planner, LRPC

Vanasse Hangen Brustlin (VHB)
Greg Bakos, Senior Highway Engineer
Robin Bousa, Project Manager

Others
Paul Bartolomucci, PMHS Superintendent
Mark Riedel, Buckeyz Blasting Corp.
Jan & Lorraine Scott, Alton
Bill DeLong, Alton
Jeff St. Cyr, State Representative
Bruce Reynolds, Epsom
Edna & William Quint, Barnstead
Roger Nelson, Barnstead
John Wood, Barnstead
Harold Sebellanza, Epsom
David Fossett, Pittsfield
Ruth A. Messier, Alton
Brendan Berube, Reporter, *The Baysider*

1. Call to Order

Michael Izard of Lakes Region Planning Commission called the meeting to order at approximately 2:05 pm. All in attendance were provided the opportunity to introduce themselves.

2. Preliminary Road Safety Audit Process and Results

M. Izard re-introduced the concept of a road safety audit/assessment to all in attendance. He explained that the Corridor Advisory Committee (CAC) had identified 17 priority sites for study along the corridor at the February 10, 2009 meeting. Of these locations, 16 were appropriate for Road Safety Audit study, while the 17th (town line curve) was targeted for NH DOT staff review. He explained that, with the input of the Road Safety Audit Team, a draft "Top 10" list had been established to better guide the efforts of the study, and specifically the efforts of VHB, the contracted engineering firm. He said that the final report is due by the end of August, at which time it will be presented to the Boards of Selectmen in each of the five towns in the study area.

M. Izard and R. Marion then summarized the 16 RSA locations, and gave a brief overview of recurring themes and issues throughout the corridor. These recurring issues were pavement edge drop-offs, structures in the clear zone, street name/intersection warning signs, run off road crashes, lack of illumination, passing zones through intersections, overgrown vegetation, end treatment on guardrails, pavement markings on side streets, and signal adjustments/updates.

In addition to the 16 locations, "Town Line Curve" was mentioned for its slope issues and road alignment. Also, the "King's Grant" Retirement Community and a development north of King's Grant were discussed as dangerous locations with several accidents and many near-misses. Based on extensive public comment, it was recommended by M. Izard that this location be the focus of further review.

3. PAC Consensus on Corridor-wide Safety Priorities

M. Izard presented the "Top 10" list of safety priorities as follows, and explained that these projects are not necessarily in order of importance, but rather they were rated as the 10 locations which VHB will provide additional detail:

1) Peacham/White Oak Rd
2) North Barnstead/North Rd
3) Stockbridge Rd
4) Main Street Chichester
5) Epsom Traffic Circle
6) Prospect Mountain/Dudley Rd
7) Leavitt Rd
8) NH 107
9) NH 126
10) Maple Street Barnstead

After committee discussion, it was decided and agreed upon that Kelly Corner or Concord Hill Road should replace Leavitt Road, since Leavitt has other funding sources (DOT, SRtS). Further, it was decided that the section of NH 28 between Kelly Corner and Concord Hill Roads should serve as a study section included in the top 10, suitable for study by VHB.

4. Project Progress Update

M. Izard reported that Stephanie Alexander, Principal Planner from CNHRPC has been working on an overview of future land use corridor-wide. Her work will be presented at the

July meeting. An essential part of this analysis is an examination of land use regulations throughout the corridor to help determine towns' attitudes and approach to future development. This examination will also allow an opportunity to reflect on future appearance and functionality of the corridor. In general, it is known, the increased curb cuts create additional conflict points, increasing the potential for accidents. As such this component of the study is important for a rounded view of potential future safety concerns.

5. Vanasse Hangen Brustlin (VHB) Project Involvement Overview

Robin Bousa, VHB Project Manager, introduced herself and VHB's involvement with the NH 28 Corridor Study. She described the history of the company, and her expertise in the areas of mobility and functionality. Greg Bakos, Senior Highway Engineer, then introduced himself and his background and involvement. Bousa and Bakos also described the involvement of a third VHB staff member, Frank Rose, of the Virginia office, who is involved in Highway Safety Improvement Program (HSIP) and Crash Reduction Factors. Their six-step scope of work includes reviewing crash data, interviewing safety personnel and residents in the towns along the corridor, conducting a field review, making design and cost recommendations, providing a technical memo (by the end of July), and presenting these findings at a public meeting in August. The work by this engineering firm complements and builds on the Road Safety Audit work done by the Road Safety Audit Team with the assistance of CNHRPC, LRPC and NH DOT.

6. Next Meeting

The next meeting was tentatively scheduled for Thursday, July 30 from 2:00-4:00 pm at a location to be determined somewhere within the NH 28 Corridor study area.

7. Adjourn

The meeting adjourned at approximately 3:50 pm.

Date: July 22, 2009

Press Release

For Immediate Release

For More Information, Call:

Lakes Region Planning Commission
Michael Izard, Planning Manager / Principal Planner
279-8171

Central NH Region Planning Commission
Rodrigo Marion, Principal Transportation Planner
226-6020

NH Route 28 Corridor Safety Study
Project Advisory Committee Meeting

There will be a meeting of the NH Route 28 Project Advisory Committee (Route 28 PAC) from 2:00 PM to 4:00 PM on Thursday, July 30, 2009. The meeting will be held at the Pittsfield Town Hall, located at 85 Main Street, Pittsfield NH. Planning staff from Central NH Regional Planning Commission will present information on existing land use and potential future land use recommendations within the corridor study area that includes the towns of Alton, Barnstead, Chichester, Epsom, and Pittsfield. The study consulting engineers will present preliminary findings of the corridor safety analysis being conducted by Vanasse Hangen Brustlin (VHB). The work of VHB builds on the initial road safety audit conducted by community representatives appointed to Route 28 PAC by the Board of Selectmen from each corridor municipality. Ultimately, the group's efforts will lead to general corridor-wide safety improvement recommendations, improvement cost estimates, and preliminary conceptual designs at the ten leading intersections of concern established by the Route 28 PAC. Members of the public who are concerned about transportation safety within the NH Route 28 corridor study area are encouraged to attend and provide their input. For additional information about this meeting please contact Michael Izard, Principal Planner at the Lakes Region Planning Commission at 279-8171 or Rodrigo Marion, Principal Transportation Planner at the Central NH Regional Planning Commission at 226-6020.

LAKES REGION PLANNING COMMISSION

103 Main Street, Suite #3
Meredith, NH 03253
tel (603) 279-8171
fax (603) 279-0200
www.lakesrpc.org

NH Route 28 Corridor Safety Audit

Project Advisory Committee (PAC) Meeting

Thursday, July 30, 2009
Pittsfield Town Hall, 85 Main Street, Pittsfield, NH
2:00 – 4:00 PM

AGENDA

2:00 **INTRODUCTIONS**

2:10 **EXISTING LAND USE AND POTENTIAL FUTURE LAND USE RECOMMENDATIONS**
Regional Planning Commission Staff

2:30 **LAND USE DISCUSSION**

2:45 **VANASSE HANGEN BRUSTLIN (VHB) SAFETY ASSESSMENT PRELIMINARY FINDINGS**
Greg Bakos, Highway Engineer

3:50 **PROJECT NEXT STEPS**

4:00 **ADJOURN**

LAKES REGION PLANNING COMMISSION

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www.lakesrpc.org

Minutes of July 30, 2009
NH Route 28 Corridor Safety Audit
Project Advisory Committee (PAC) Meeting
Chichester Town Hall, Chichester, NH

PRESENT:

Alton
Kenneth Roberts, Highway Agent

Barnstead
David Kerr, Selectman
David Murley, Planning Board
Bill Evans, Health Officer

Chichester
No representatives present

Pittsfield
Gary Johnson, Fire Department
Robert Wharem, Police Department

Epsom
Betsy Bosiak, Planning Board

NH DOT
Donald Lyford, Project Manager
Bill O'Donnell, District V Maintenance
Trent Zanes, Preliminary Design

Regional Planning Commissions
Rodrigo Marion, Principal Transportation Planner, CNHRPC
Craig Tufts, Transportation/GIS Planner, CNHRPC
Michael Izard, Principal Planner, LRPC
Adam Hlasny, Assistant Planner, LRPC

Vanasse Hangen Brustlin (VHB)
Greg Bakos, Senior Highway Engineer
Robin Bousa, Project Manager

Others
Sharon Patterson, Prospect Mtn High School
Fred Hast, Pittsfield Selectman
Beth Odell, Pittsfield resident
Allen Mayville, Chichester Planning Board
Gwen & Paul Adams, Chichester residents
Brendan Berube, Reporter, *The Baysider*

1 Call to Order

Michael Izard of Lakes Region Planning Commission called the meeting to order at approximately 2:00 pm. All in attendance were provided the opportunity to introduce themselves.

2 Existing Land Use and Potential Future Land Use Recommendations

Craig Tufts of Central NH Regional Planning Commission gave a brief presentation regarding land use in the corridor. He explained that the importance of conducting a land

use study is to anticipate and plan for what development might come, and take advantage of the opportunity to shape what's coming. Management of curb cuts, he said, is of paramount importance to controlling access, and therefore safety, on a state highway such as 28. He discussed several potential recommendations for land use and aesthetics, including access management, lighting, landscaping, signage, cluster development, application of existing regulations, and other ways to maximize the efficiency and appearance of the roadway.

K. Roberts asked on which sections of state highway is access management controlled by the state, and on which by municipality. It was determined that the key to successful access management is the coordination and cooperation between municipalities and DOT. Questions for DOT arose about maintenance and who pays the cost of updating signs, electricity for lighting, pavement markings, and other items. It was stated that Bill Lambert would be contacted for additional information. M. Izard added that now, in a time of economic uncertainty, is also an opportune time to conduct proactive planning, so that when the economy recovers and development begins to increase, there are plans in place to prepare for this development.

3 Vanasse Hangen Brustlin (VHB) Safety Assessment Preliminary Findings

Greg Bakos explained to those present the purpose of VHB's study- to give a "second look" at the findings of the Corridor Advisory Committee, and to add value to the solutions found. He also stated that VHB's purpose is not to dictate the necessary improvements, but rather to guide and make recommendations. Bakos began the presentation by referencing VHB's corridor-wide observations. These included pavement edge drop-offs, hazards in clear zone, street name signs, sporadic lighting, encroaching roadside vegetation, guardrail end treatments, side street pavement markings, etc. Low-cost solutions include widening shoulders, maintaining the clear zone, adding rumble strips, delineation on curves, and roadway lighting.

K. Roberts expressed enthusiasm for rumble strips and their effects on roadway safety. D. Kerr added that a centerline rumble strip might be the way to go in the narrower Alton/Barnstead section of Route 28. G. Bakos pointed out that the downside of rumble strips is the noise created in residential areas.

G. Bakos then summarized VHB's findings on the "lower priority intersections," which include Kelly Corner Road, Concord Hill Road, Leavitt Road, NH Route 126, Colony Drive, Prospect Mountain Road, and Lot Line Road.

VHB continued by giving detailed results from their studies of the "higher priority intersections," in order from south to north. Many locations sparked discussion among those in attendance. VHB recommended closing up some of the access points on the Epsom Traffic Circle, which was met with general agreement.

For Main Street in Chichester, several possible remedies were discussed for the current poorly functioning intersection. These included a roundabout, right-hand turn lane on northbound NH Route 28, and decreasing speed limits on NH Route 28 and Main Street.

For the NH Route 107/NH Route 28 intersection in Pittsfield, fixing the negatively offset turn lanes on NH 28 could reduce crashes by 30-40%, according to VHB. Police Chief

Robert Wharem mentioned that there are, on average, 5-6 near misses per day at this intersection.

For the Maple Street intersection in Barnstead, the need for a crosswalk was discussed due to the high volume of pedestrians coming and going from the elementary school. A crosswalk across NH 28 would, however, pose a safety hazard, as traffic often travels 45-50 mph along this stretch. It was generally agreed upon to leave NH 28 as it is in this section due to the dynamics of the road and the potential for unsafe pedestrian activity.

For Peacham Road, G. Bakos said that most deficiencies at this intersection were due to geometry and narrow shoulders. An improvement of horizontal and vertical alignment would undoubtedly improve safety. Roadway lighting was also mentioned as a short-term, cost-effective improvement. T. Zanes of DOT said that $1.25 million is set aside for 7-mile stretch of NH Route 28 between the Alton traffic circle and Barnstead project in 2010, and $3.5 million in 2015.

At North Barnstead/North Roads, the addition of street lighting and movement of the drainage headwall would be two significant improvements, before the ultimate fix of redoing the intersection's profile. Locals have observed drivers "jug-handling," or using North Road as a turnaround to make the left turn (heading southbound on NH 28) onto North Barnstead Road.

For Stockbridge Road in Alton, VHB suggested either narrowing down or closing off the cutoff road from NH 28 northbound to reduce driver confusion and incidents.

A resident mentioned the dangers of living on Kelly Corner Road, and the potential hazards of the 90-unit development being built on Pleasant Street, which intersects Kelly Corner.

VHB said they are currently working on interviews with police and fire departments in towns where crash data are unavailable. Sometimes local information can be even more valuable than state accident information.

4 Project Next Steps

M. Izard explained to those present that VHB will write a memorandum detailing their findings by August 7. This memo will be consolidated with other meeting information to produce a final study report. The last committee meeting was scheduled for Thursday, August 20, from 2:00-4:00 pm at a location to be determined in Chichester or Barnstead. At this meeting there will be a draft report to be presented to the public, with revisions to the report due by August 31, and a final version presented to town select boards in early September. The meeting was adjourned at approximately 4:18 pm.

Date: August 14, 2009

Press Release

For Immediate Release

For More Information, Call:

Lakes Region Planning Commission
Michael Izard, Planning Manager / Principal Planner
279-8171

Central NH Region Planning Commission
Rodrigo Marion, Principal Transportation Planner
226-6020

NH Route 28 Corridor Safety Study
Project Advisory Committee Meeting

The NH Route 28 Project Advisory Committee (Route 28 PAC) will be meeting from 2:00 PM to 4:00 PM on Thursday, August 27, 2009. The meeting will be held at the Chichester Town Hall, located at 54 Main Street, Chichester, NH. The meeting will focus on the draft NH Route 28 Corridor Safety Study report and NHDOT policies related to the implementation of specific study recommendations. The meeting will also include findings from a field assessment in the area of Kings Grant in Epsom, which is a location of public safety concern. The study consulting engineers, Vanasse Hangen Brustlin (VHB), will be present to answer questions about conceptual design recommendations. Members of the public who are concerned about transportation safety within the NH Route 28 corridor study area from the Alton traffic circle south to the Epsom / Pembroke town line are encouraged to attend and provide their input. For additional information about this meeting please contact Michael Izard, Principal Planner at the Lakes Region Planning Commission at 279-8171 or Rodrigo Marion, Principal Transportation Planner at the Central NH Regional Planning Commission at 226-6020.

Appendix B

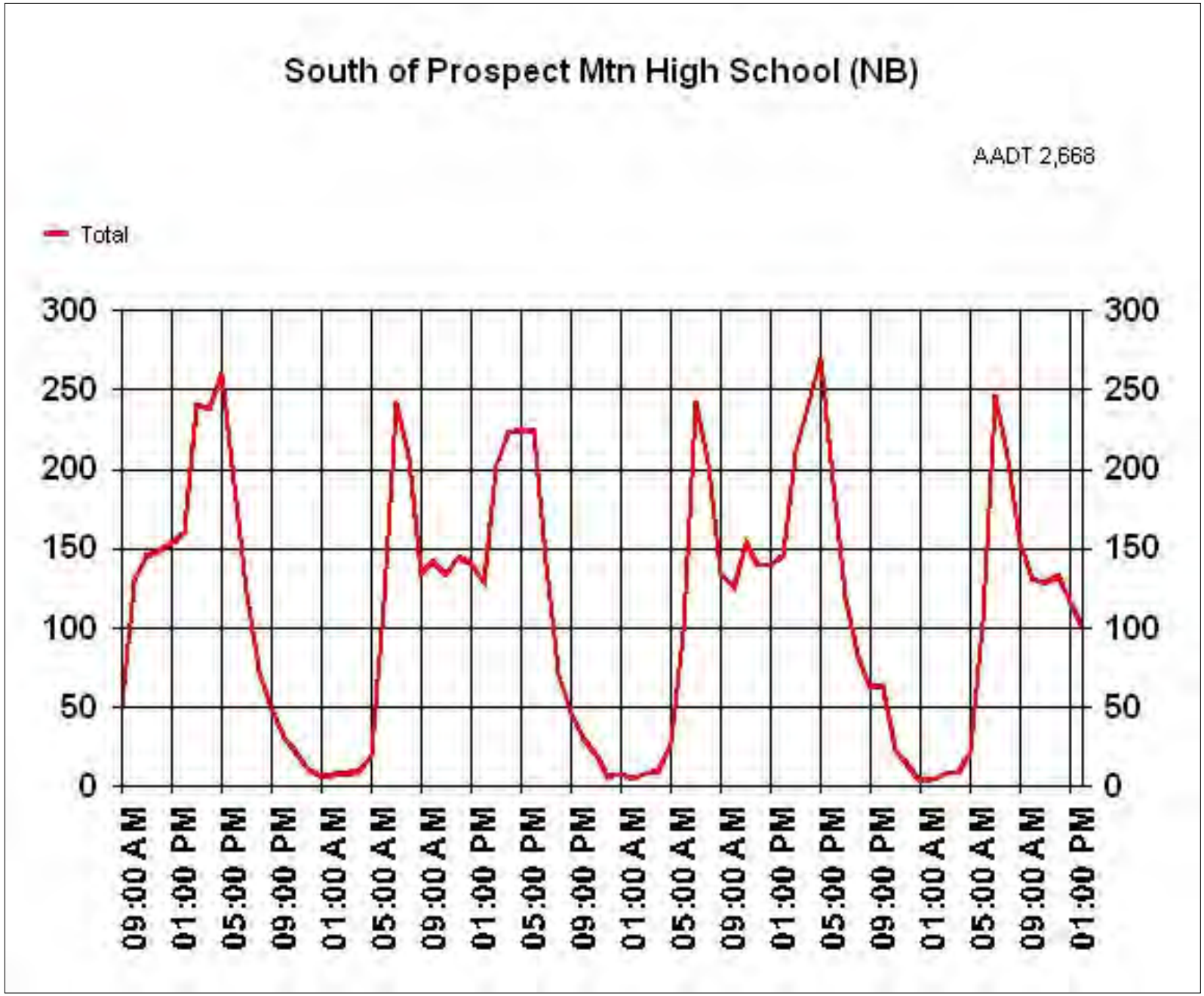
Vehicle Speed, Volume, and Classification Graphics

(Presented from North to South)

Locations:

South of Prospect Mountain High School
South of Stockbridge Road
South of Peacham Road
North of NH Route 126
South of NH Route 126
South of Webster Mills Road
South of Bear Hill Road
Main Street Chichester
North of Epsom Traffic Circle
South of Short Falls Road

Historic Accidents Diagrams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100
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01:00 PM
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01:00 AM
05:00 AM
09:00 AM
01:00 PM
05:00 PM
09:00 PM
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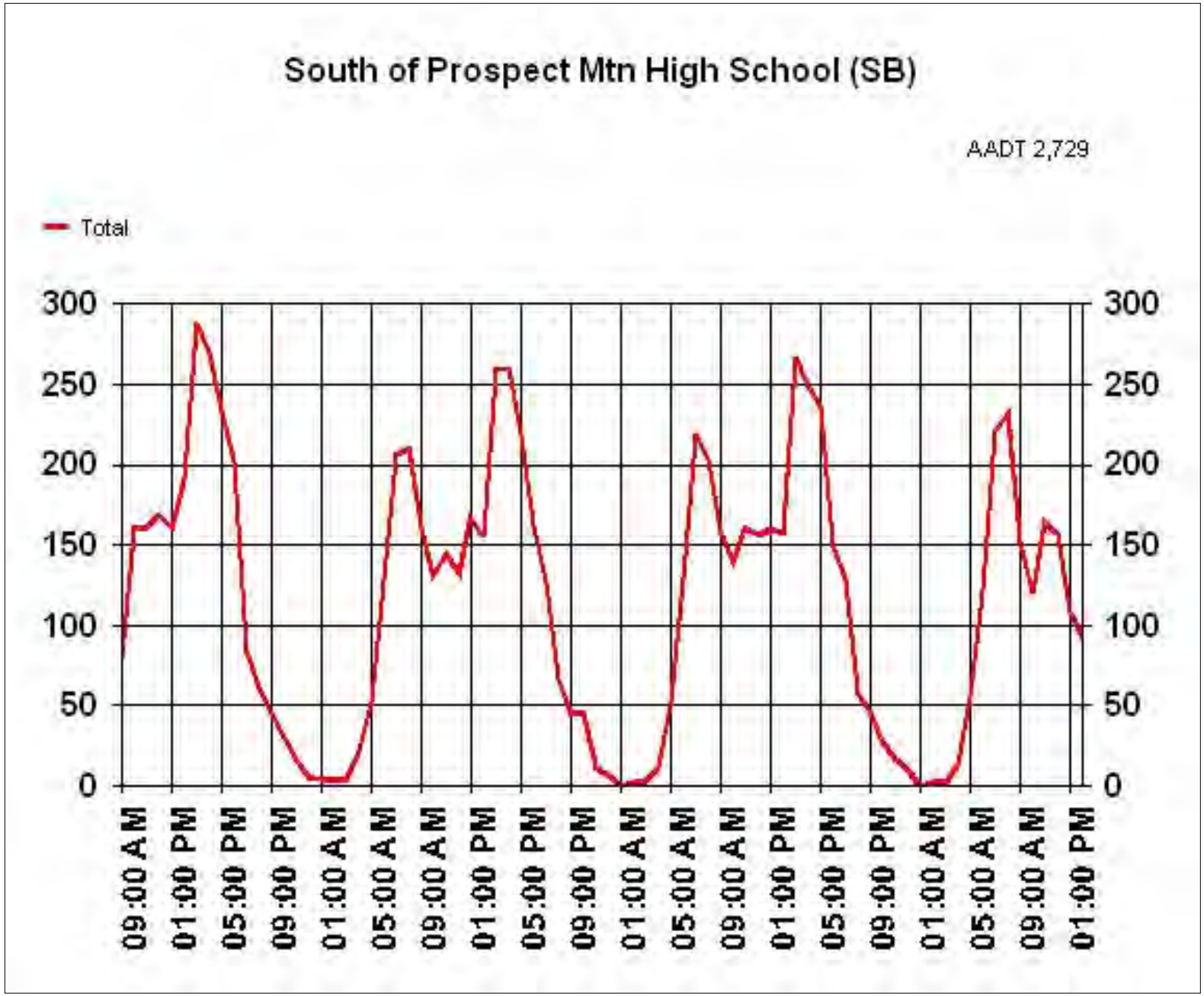
South of Prospect Mtn High School (SB)
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09:00 PM
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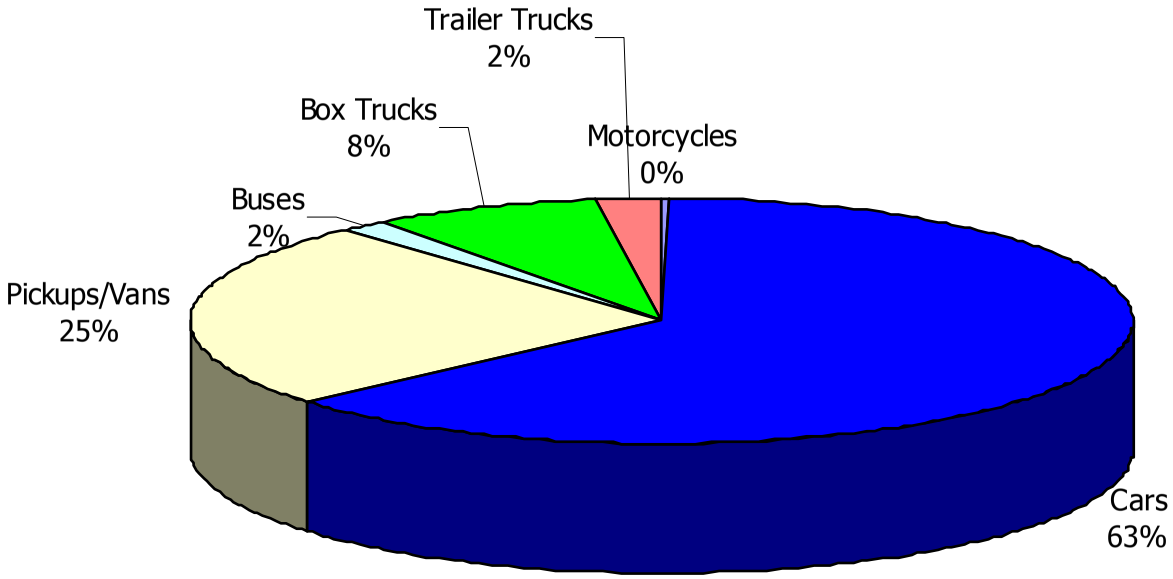
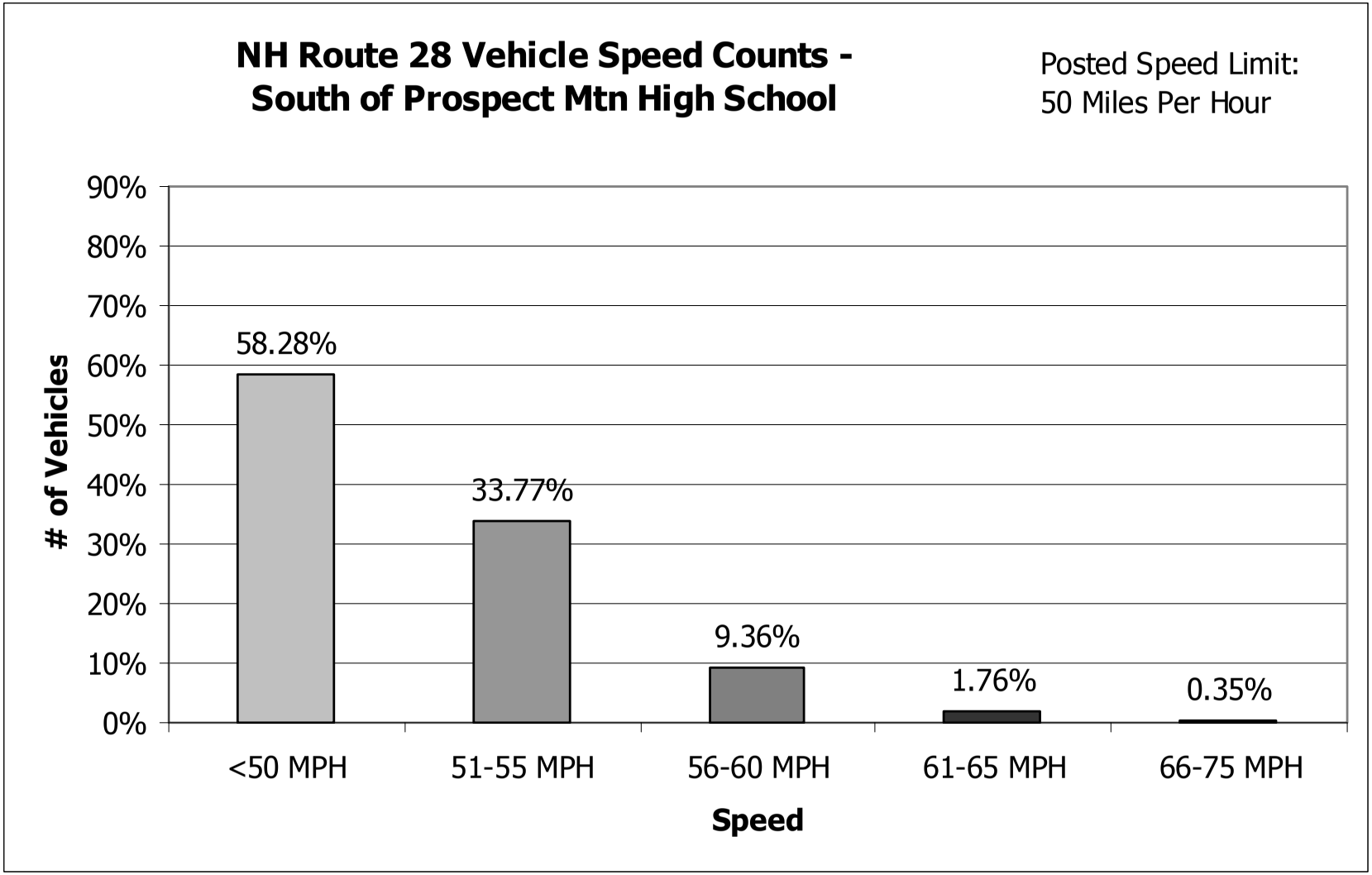
Vehicle Classifications- NH 28 South of Prospect Mtn High School




NH Route 28 Vehicle Speed Counts -
South of Prospect Mtn High School
Posted Speed Limit:
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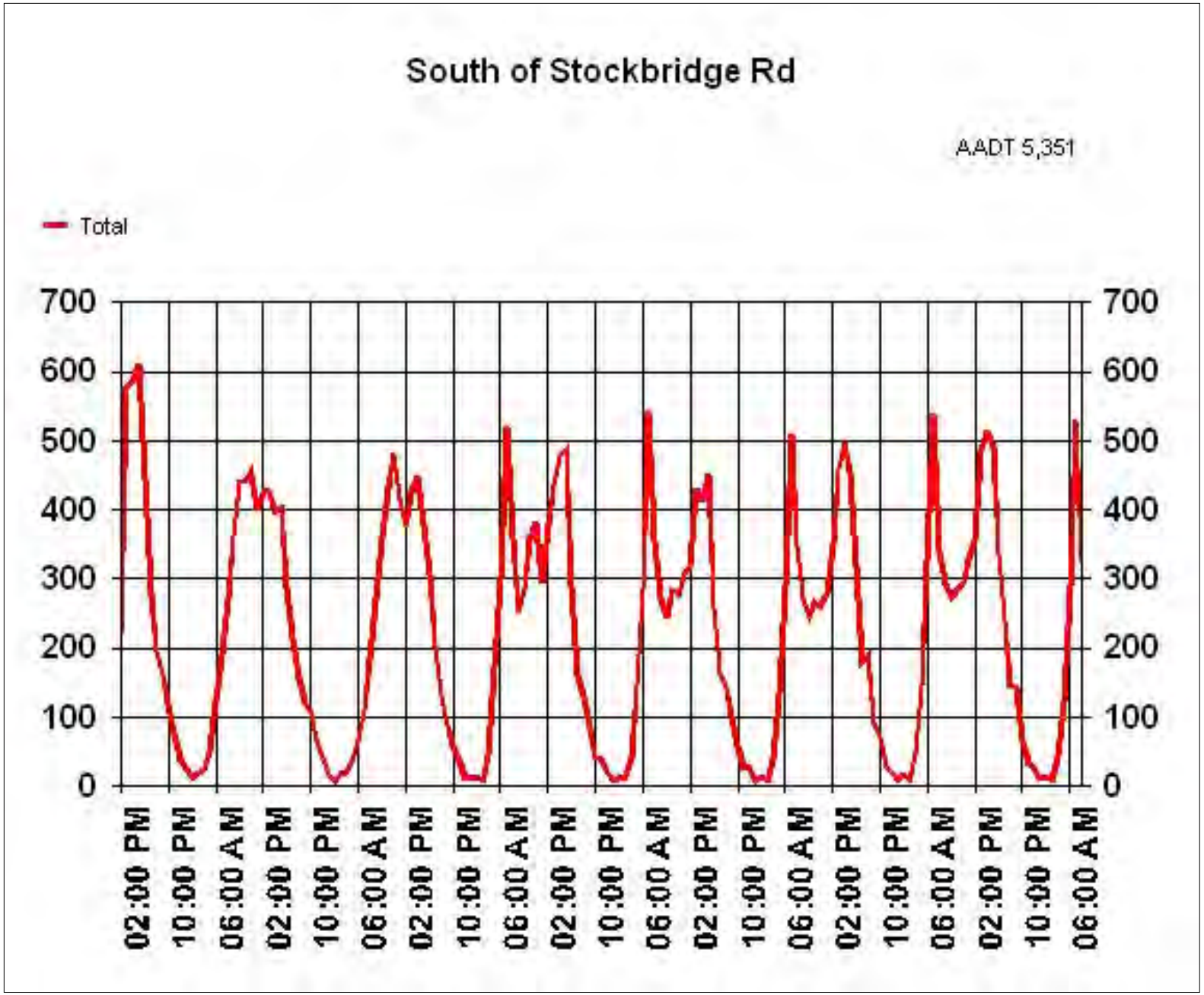
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
# of Vehicles
58.28%
33.77%
9.36%
1.76%
0.35%
<50 MPH
51-55 MPH
56-60 MPH
61-65 MPH
66-75 MPH
Speed


South of Stockbridge Rd
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500
400
300
200
100
0
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10:00 PM
06:00 AM
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02:00 PM
10:00 PM
06:00 AM
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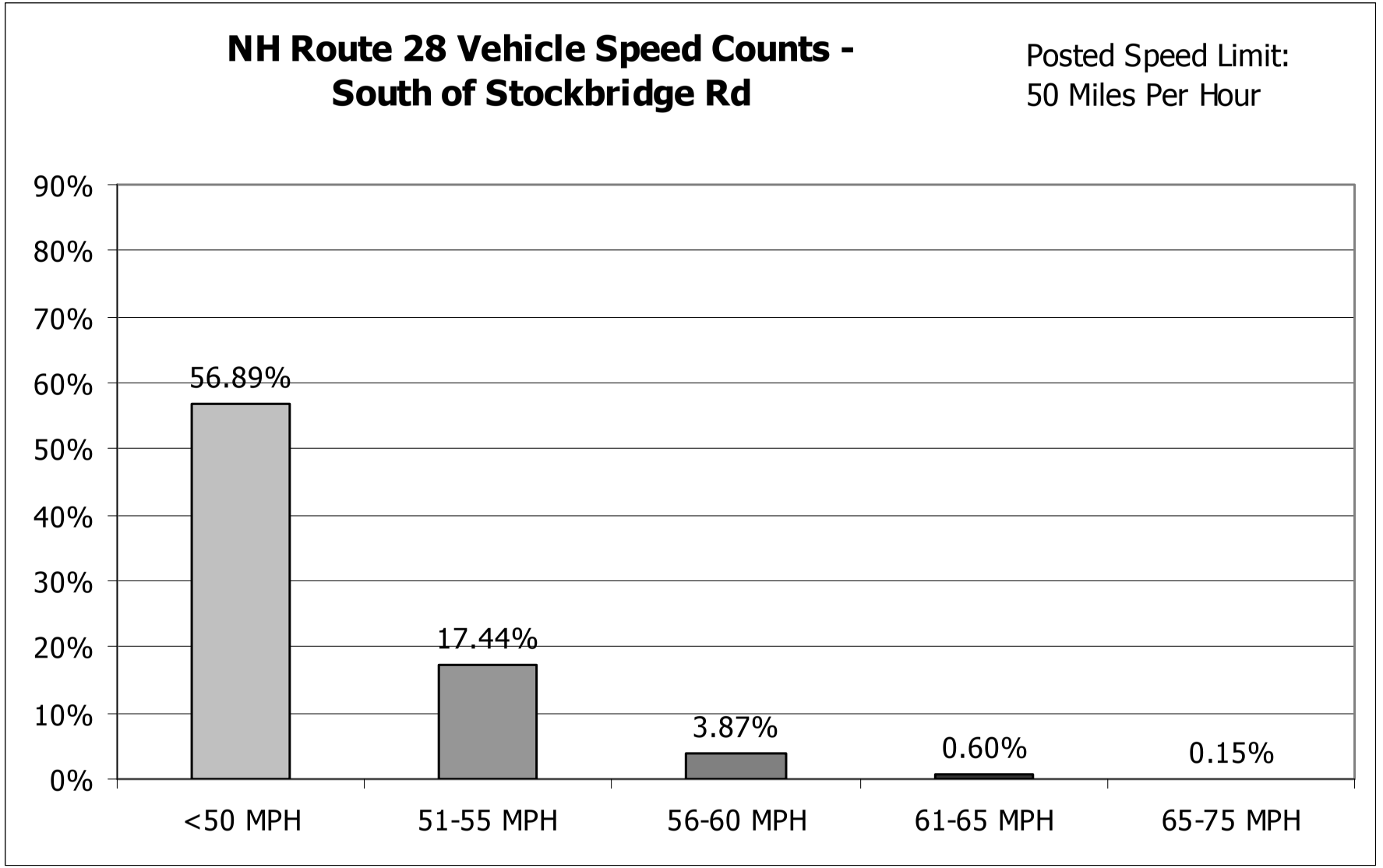
06:00 AM


NH Route 28 Vehicle Speed Counts -
South of Stockbridge Rd
Posted Speed Limit:
50 Miles Per Hour
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
56.89%
17.44%
3.87%
0.60%
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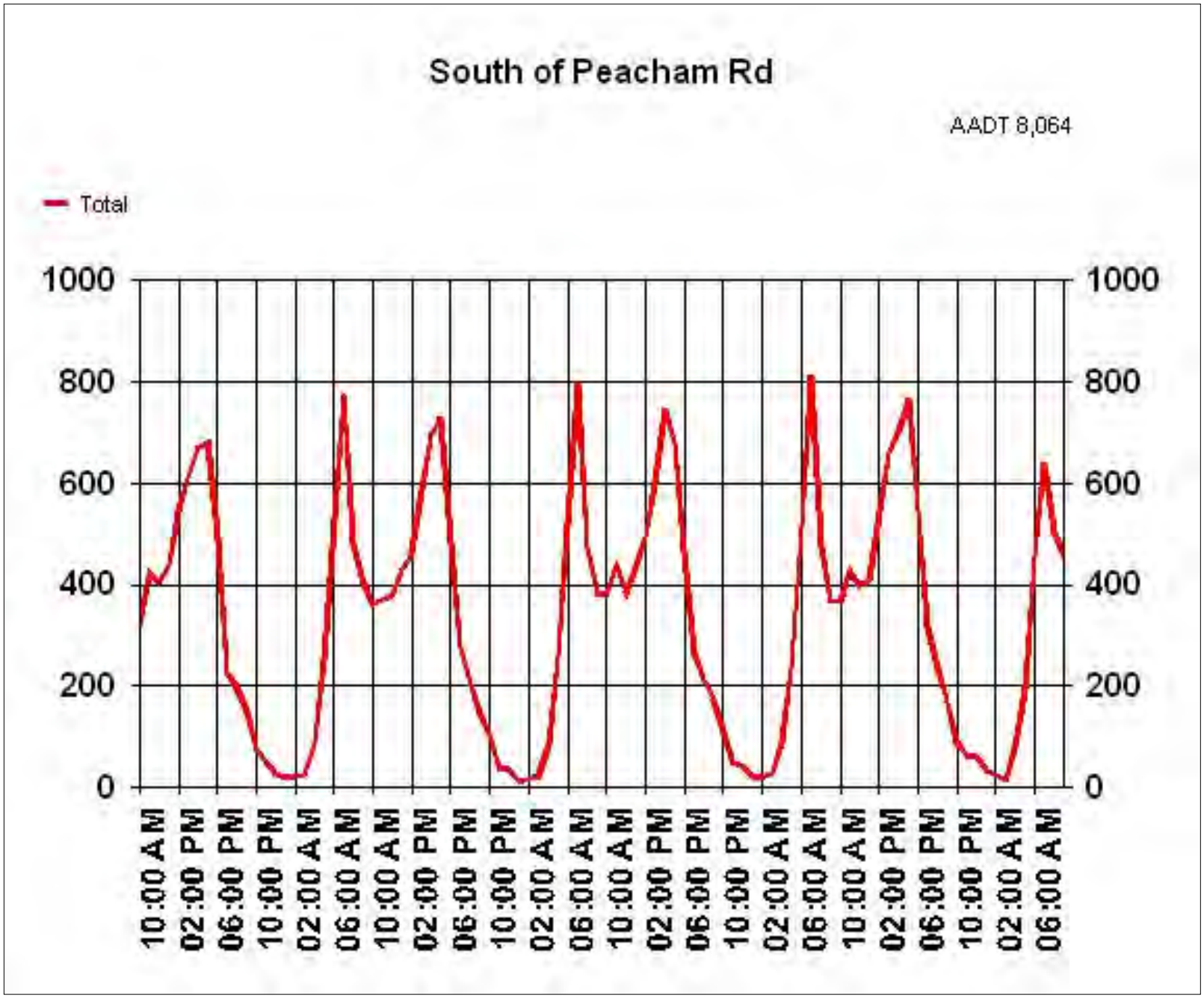
51-55 MPH
56-60 MPH
61-65 MPH
65-75 MPH


South of Peacham Rd
AADT 8,064
Total
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800
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400
200
0
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02:00 PM
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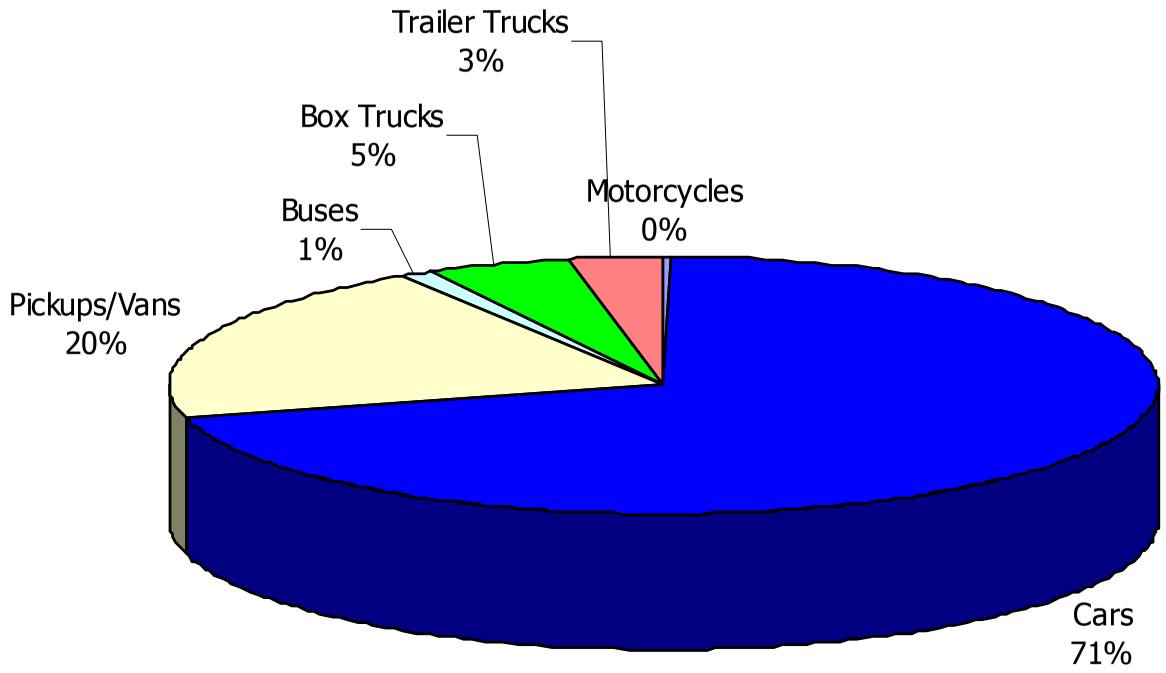
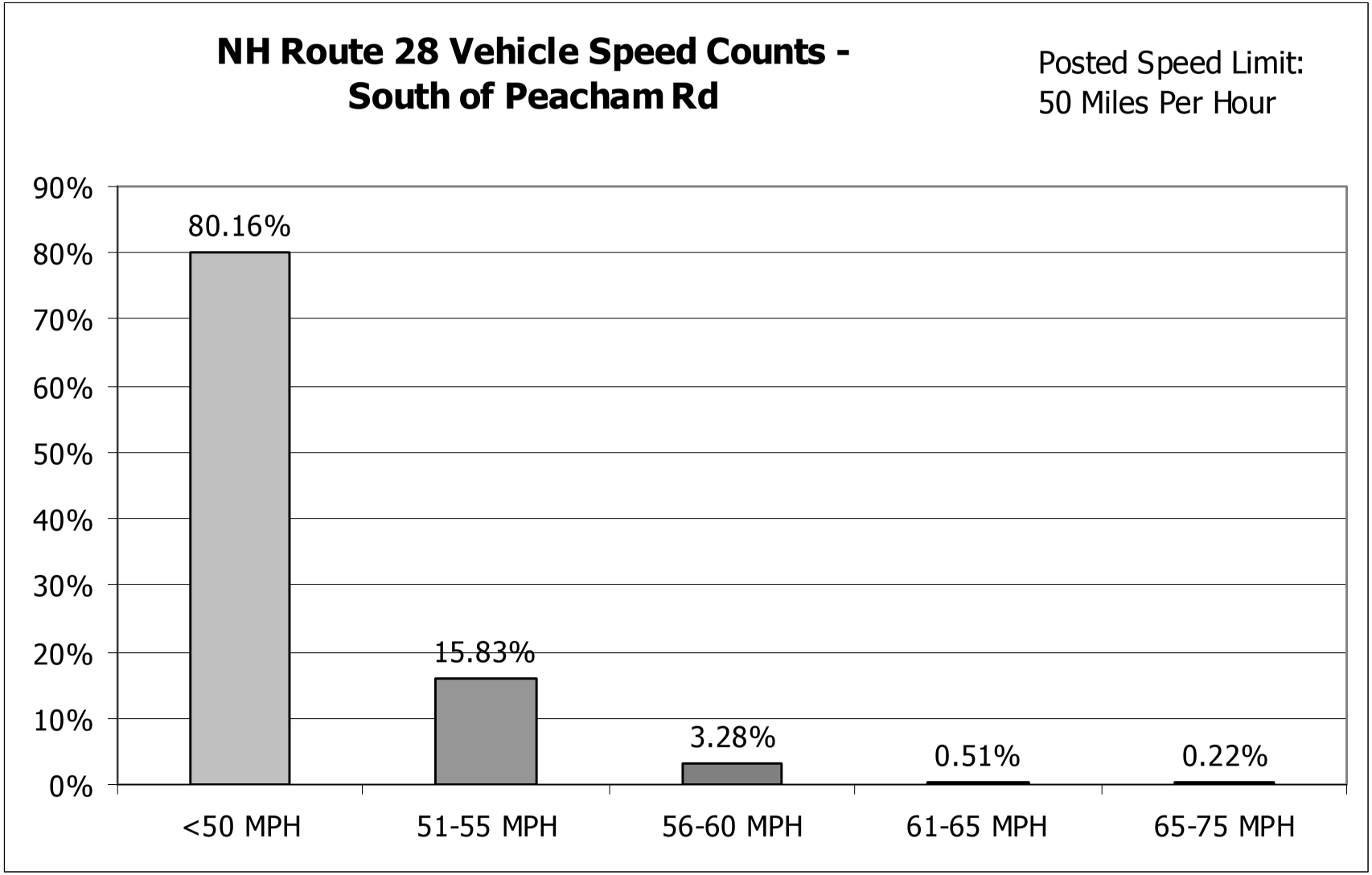
Vehicle Classifications- NH 28 South of Peacham Rd




NH Route 28 Vehicle Speed Counts -
South of Peacham Rd
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80%
70%
60%
50%
40%
30%
20%
10%
0%
80.16%
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3.28%
0.51%
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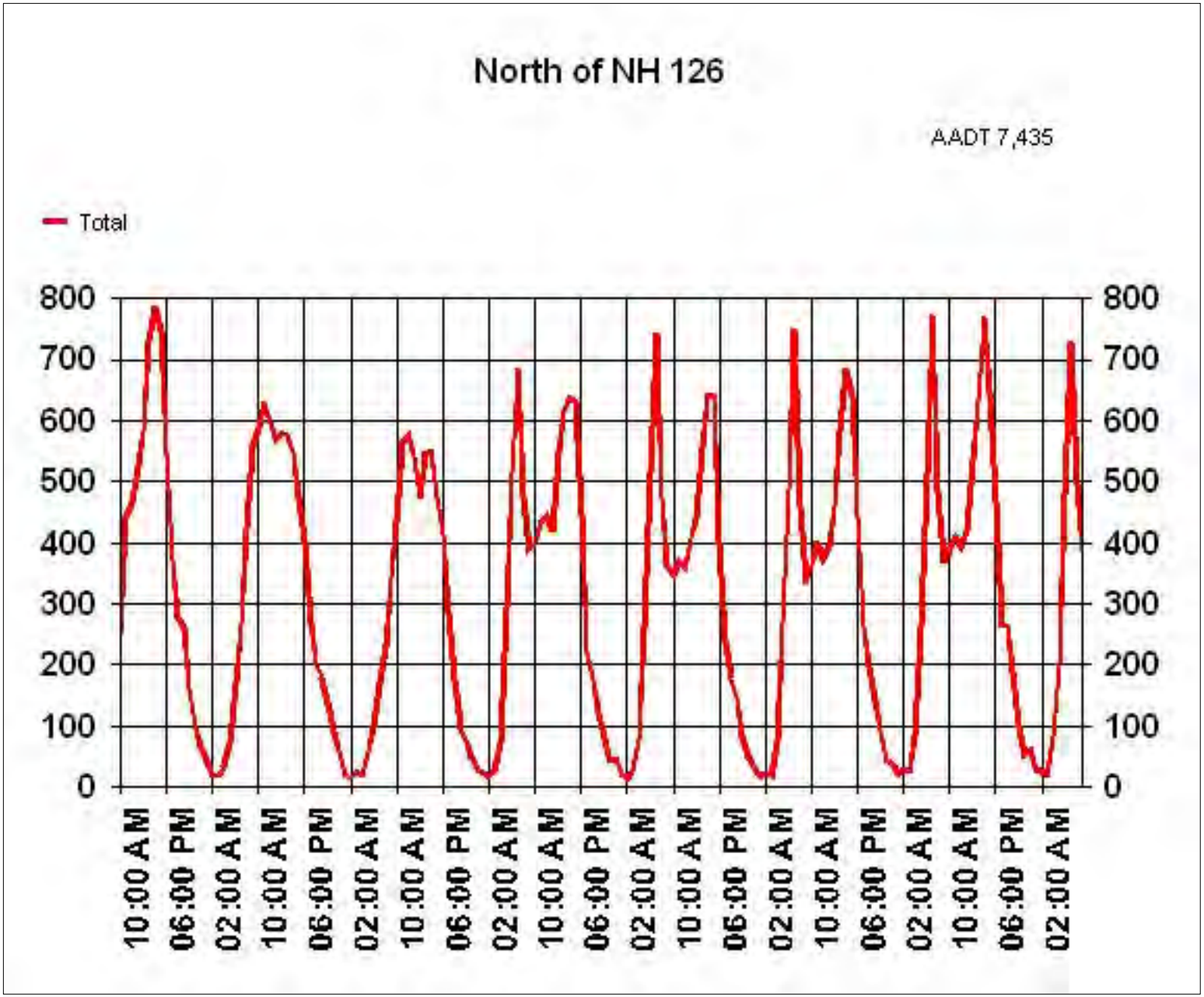
51-55 MPH
56-60 MPH
61-65 MPH
65-75 MPH


North of NH 126
AADT 7,435
Total
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600
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200
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06:00 PM
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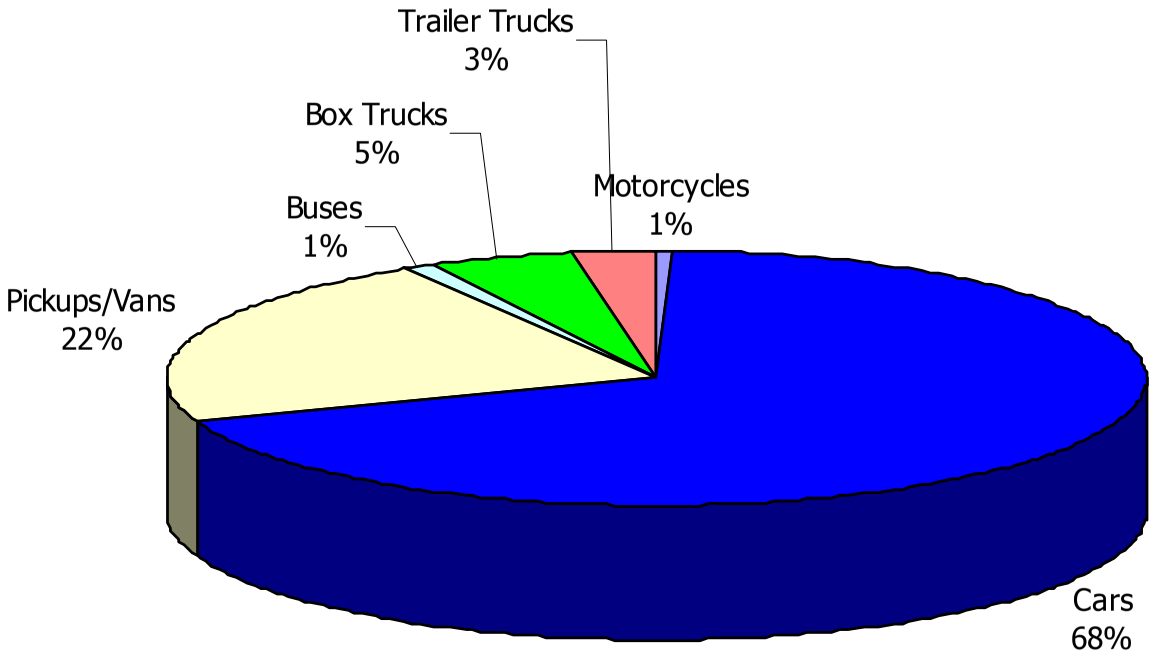
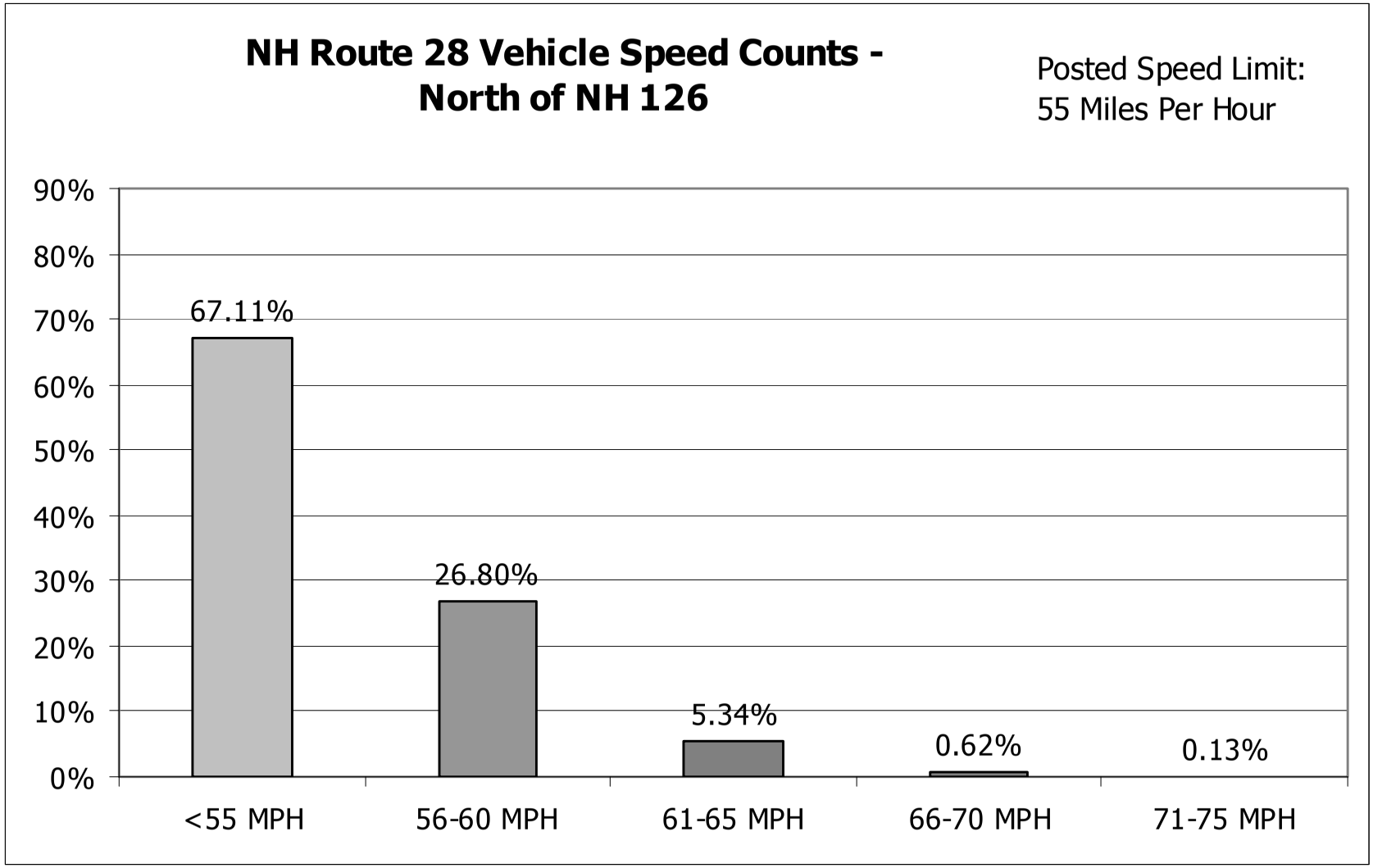
Vehicle Classifications - NH 28 North of NH 126




NH Route 28 Vehicle Speed Counts -
North of NH 126
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80%
70%
60%
50%
40%
30%
20%
10%
0%
67.11%
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0.62%
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56-60 MPH
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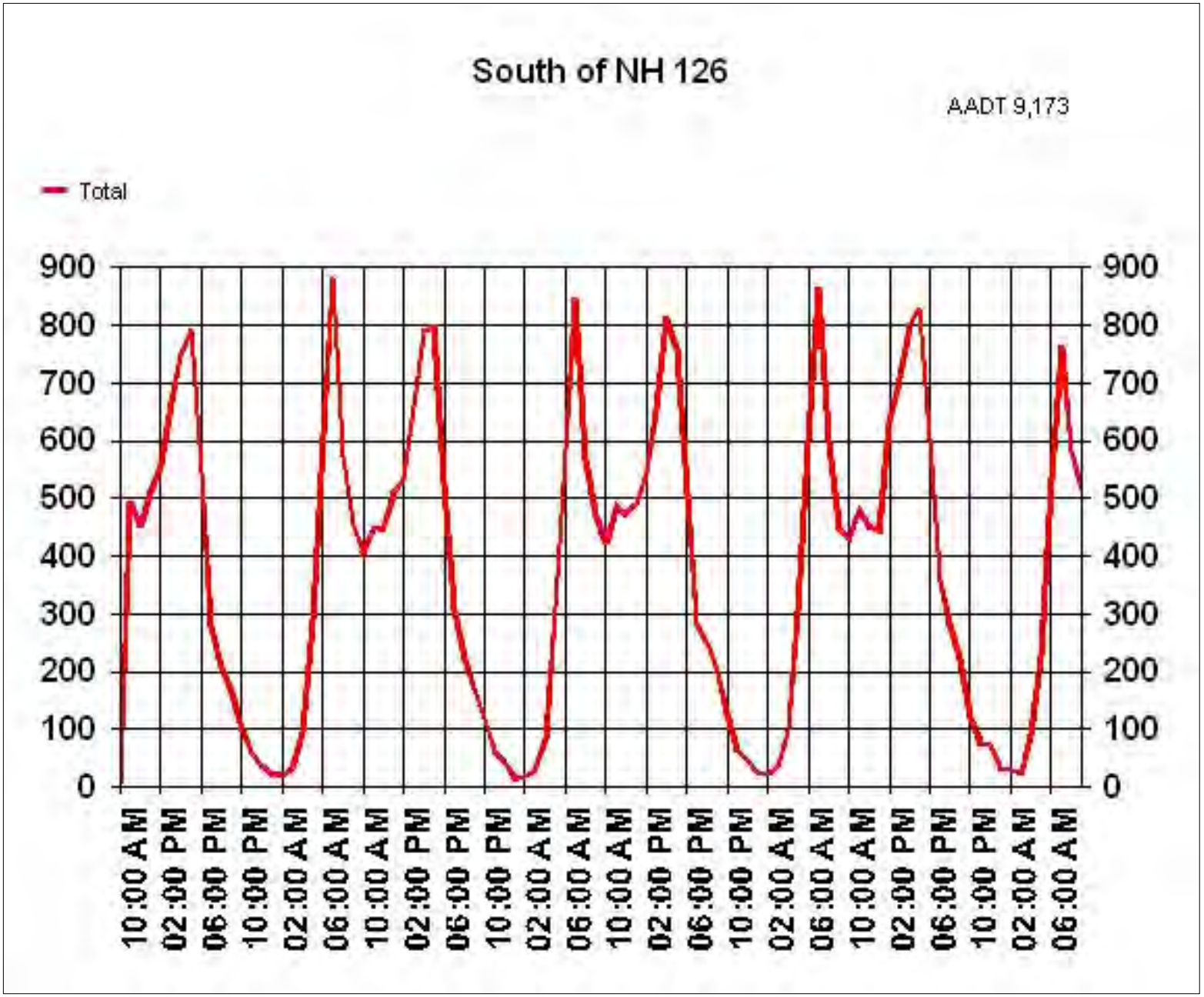
66-70 MPH
71-75 MPH


South of NH 126
AADT 9,173
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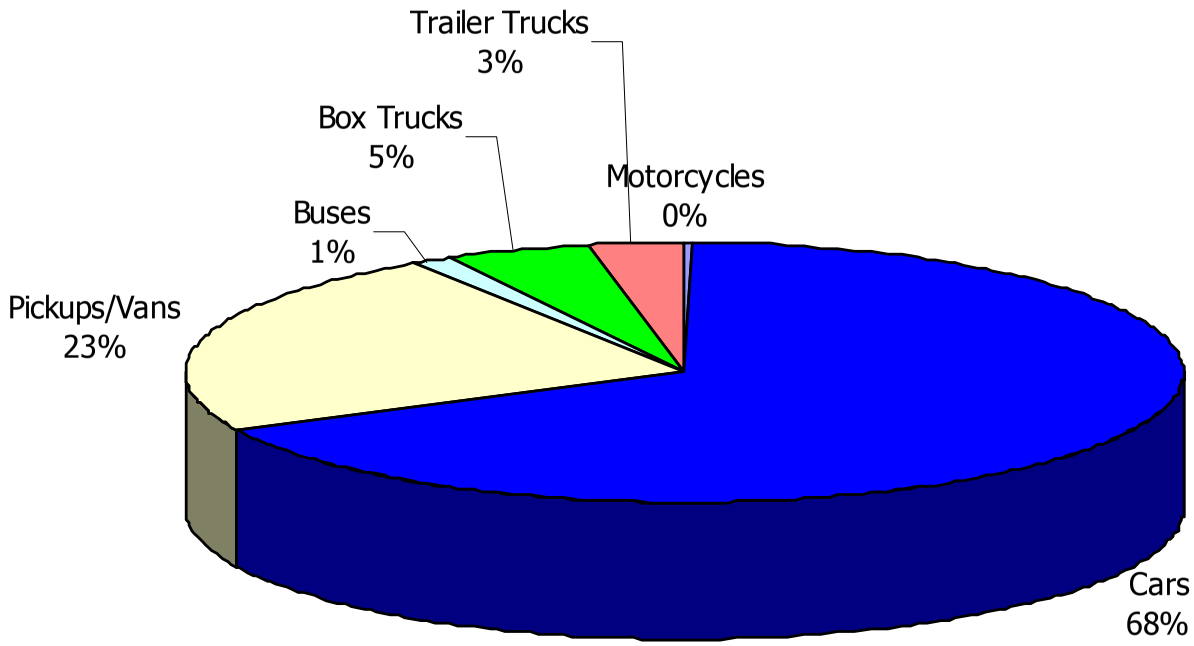
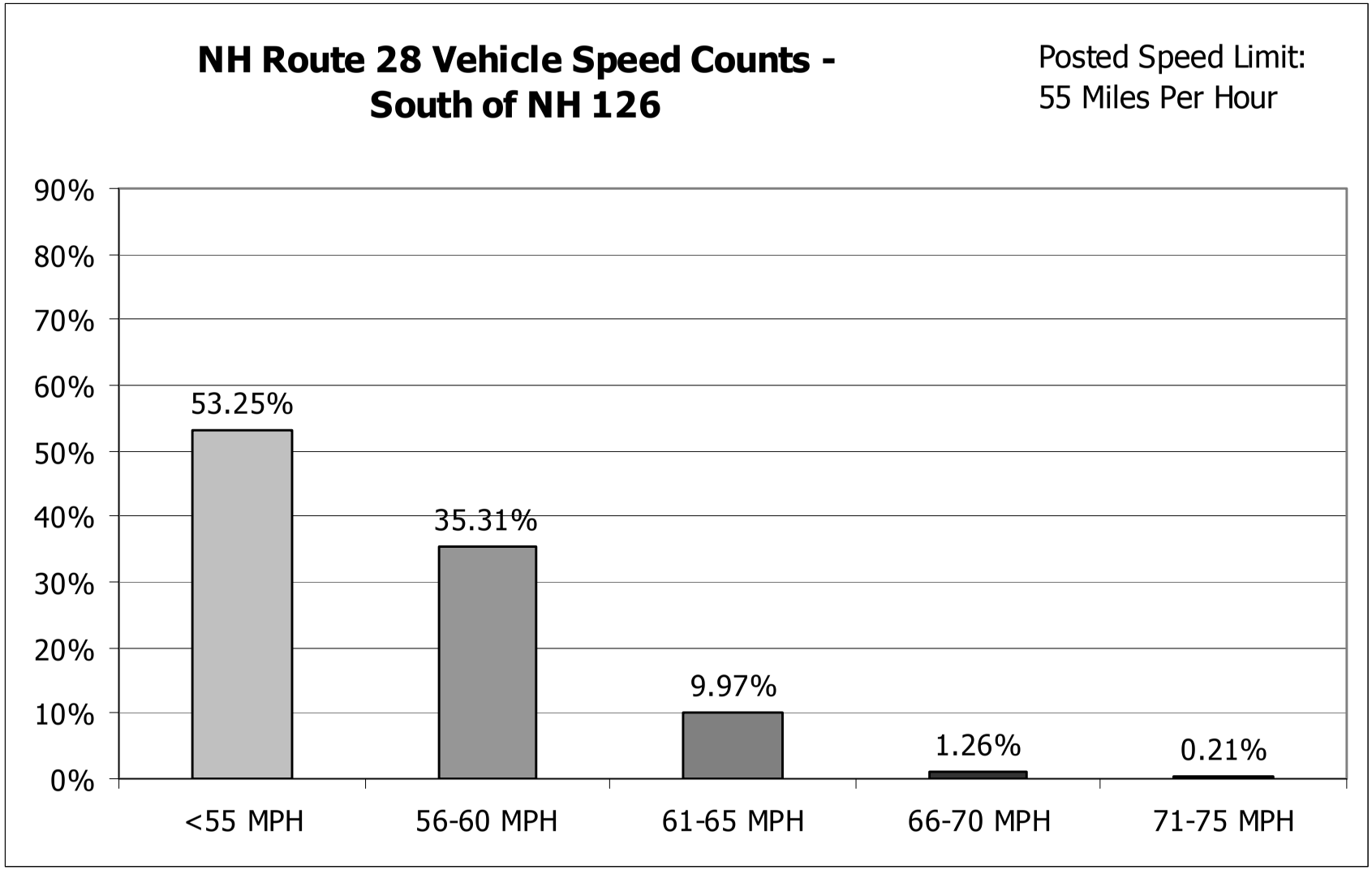
NH 28 Vehicle Classifications - South of NH 126




NH Route 28 Vehicle Speed Counts -
South of NH 126
Posted Speed Limit:
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70%
60%
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40%
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10%
0%
53.25%
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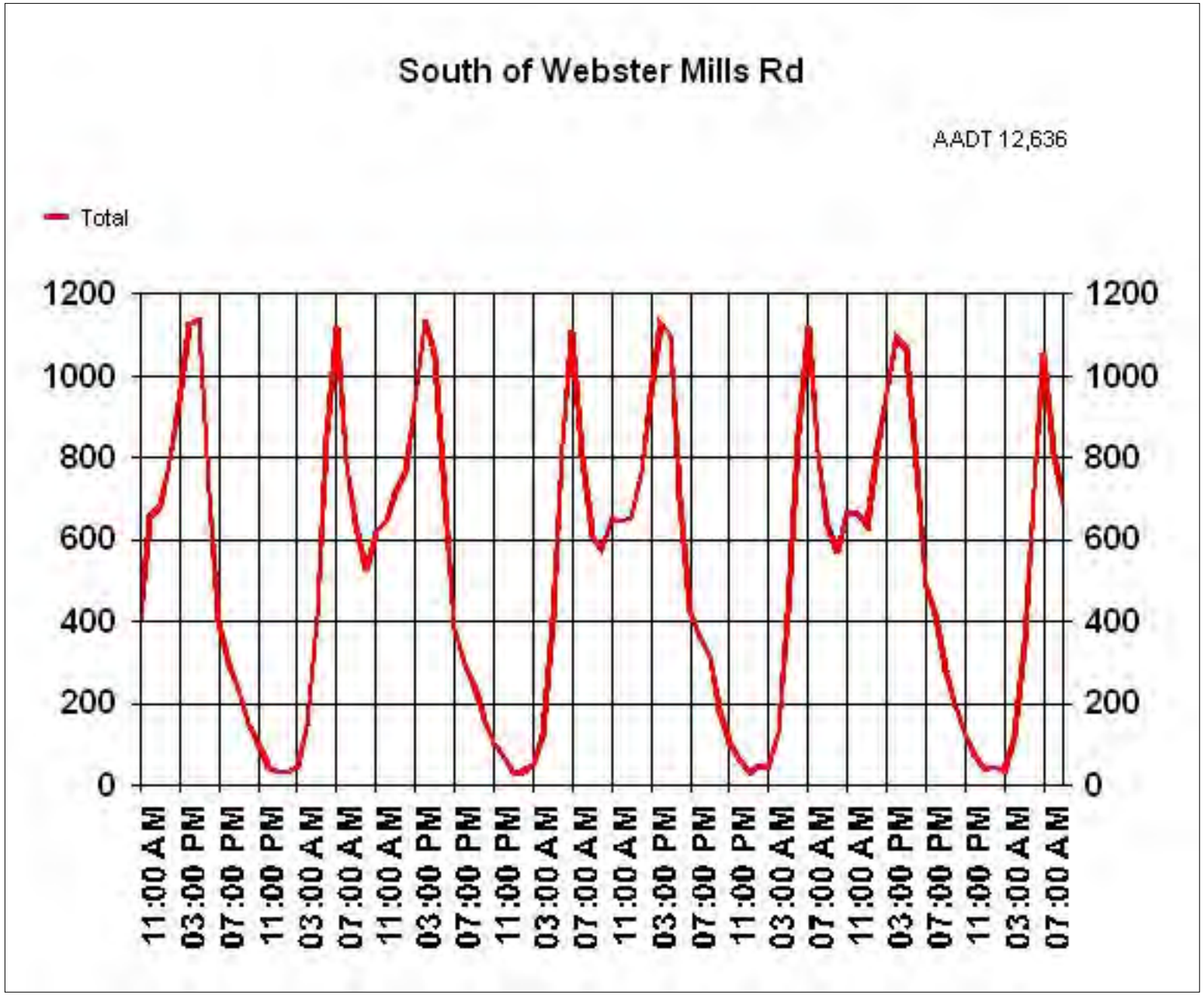
<55 MPH
56-60 MPH
61-65 MPH
66-70 MPH
71-75 MPH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Total
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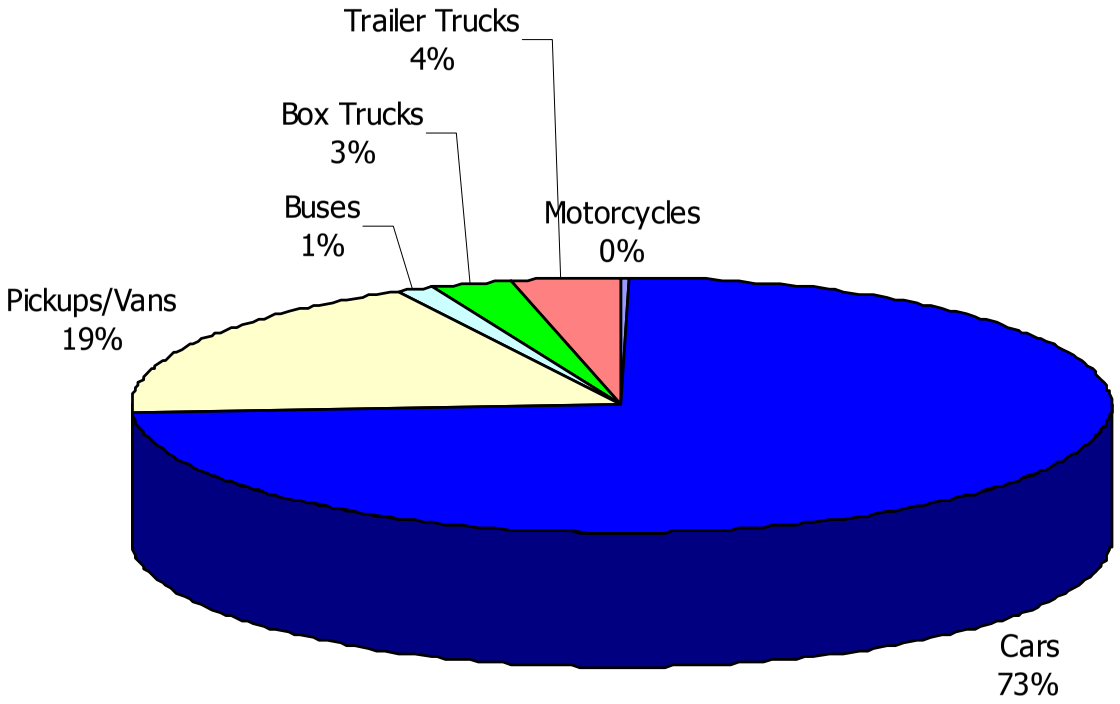
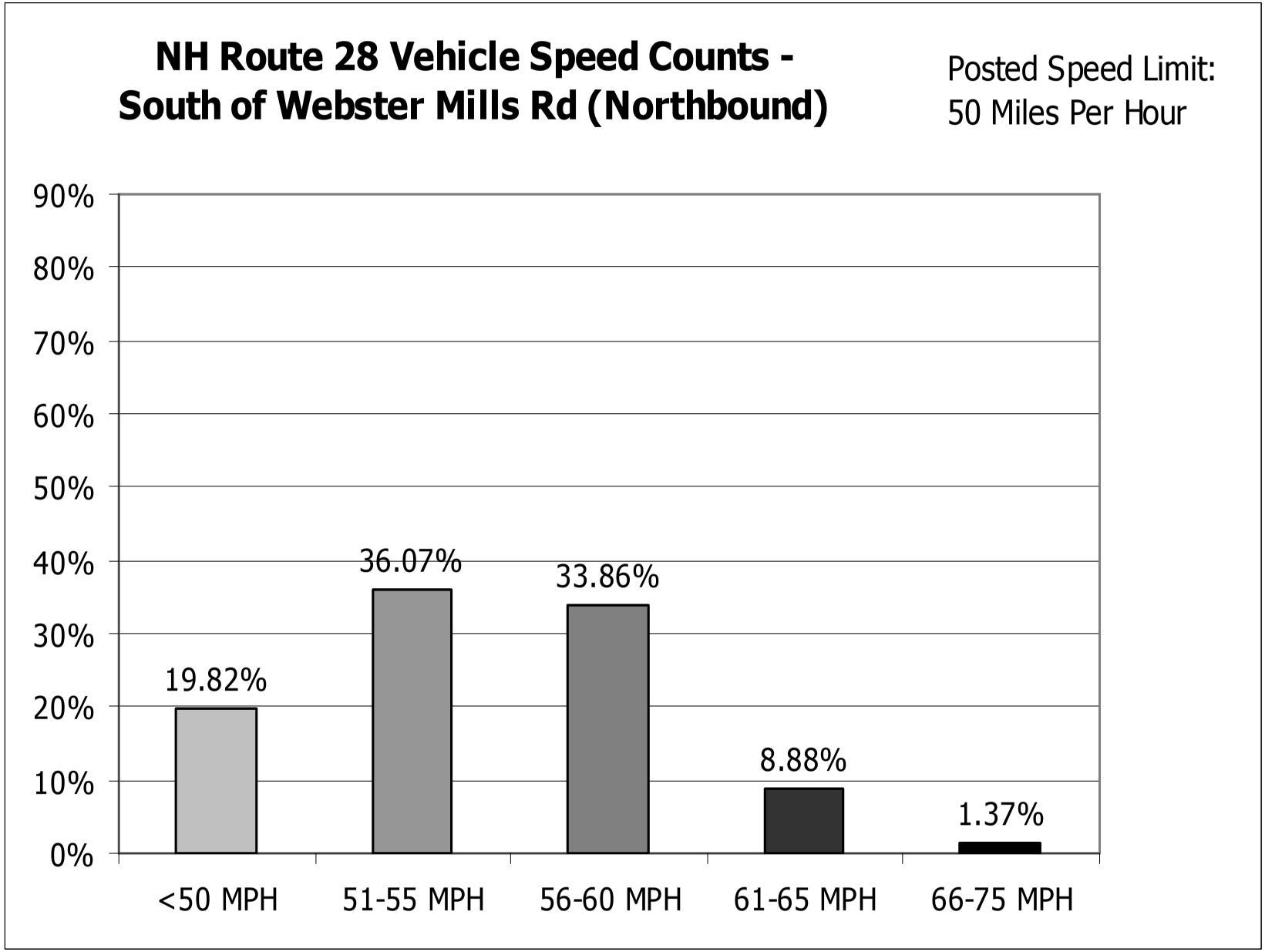
NH 28 Vehicle Classifications - South of Webster Mills Rd




NH Route 28 Vehicle Speed Counts -
South of Webster Mills Rd (Northbound)
Posted Speed Limit:
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80%
70%
60%
50%
40%
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10%
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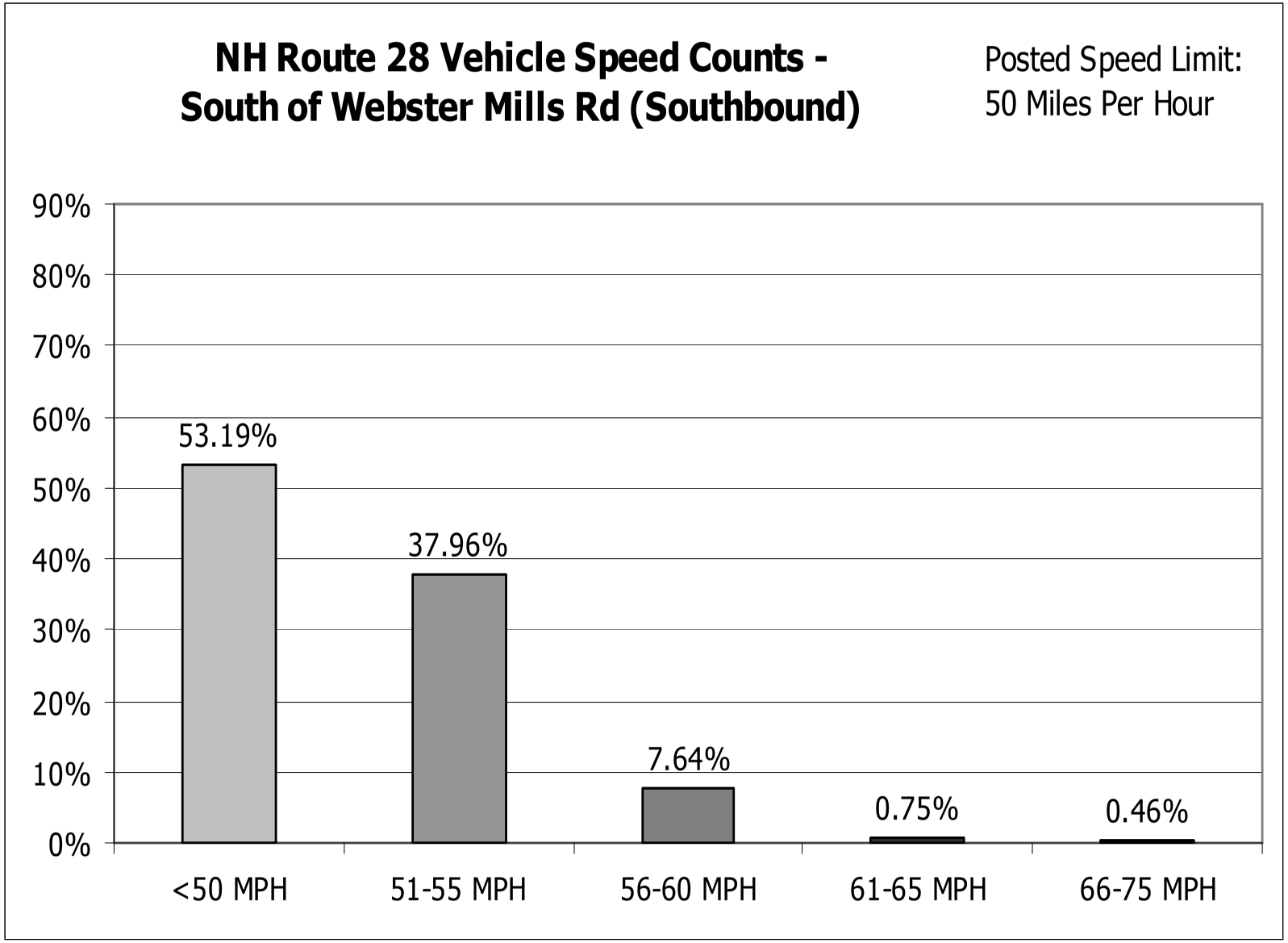
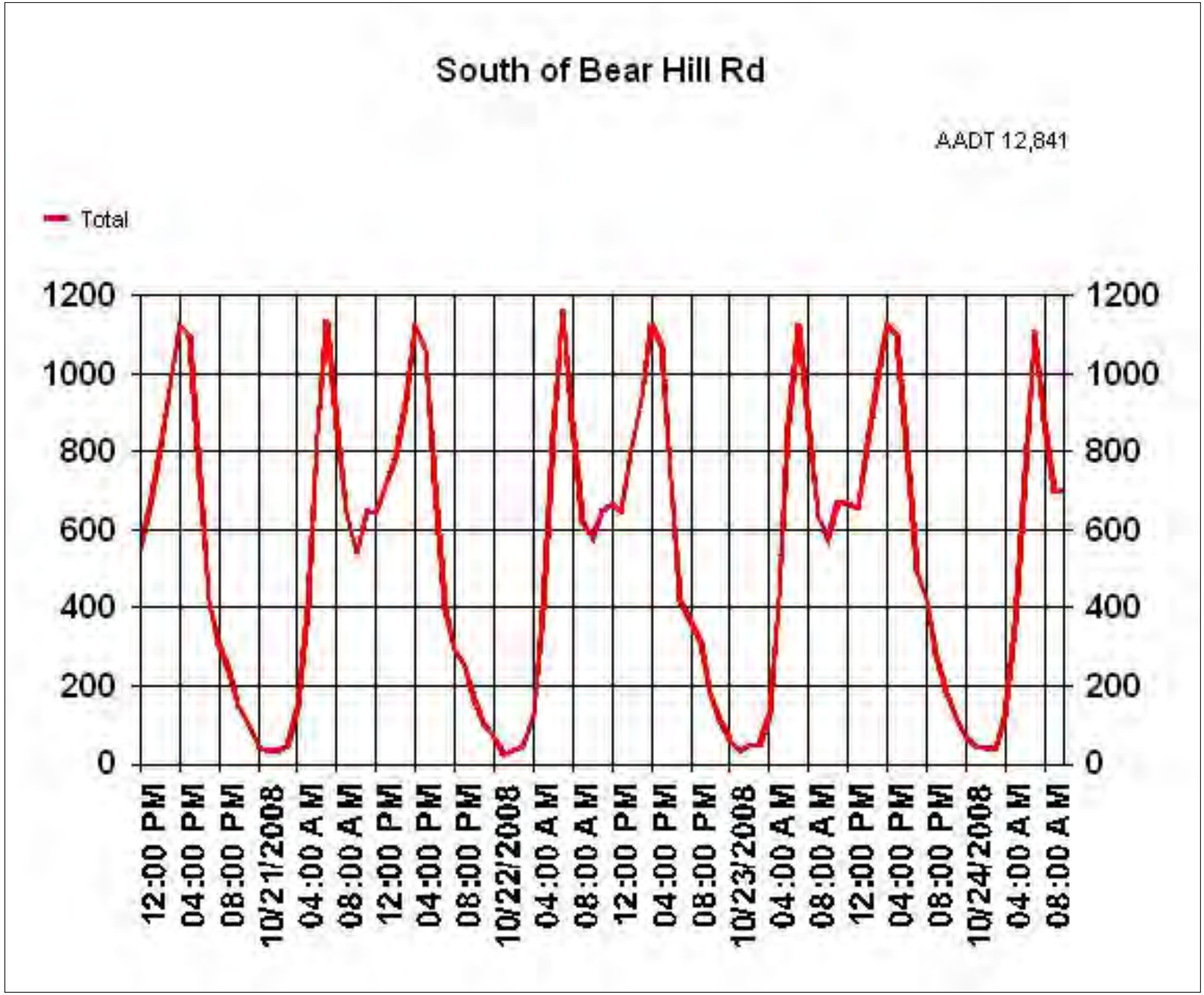
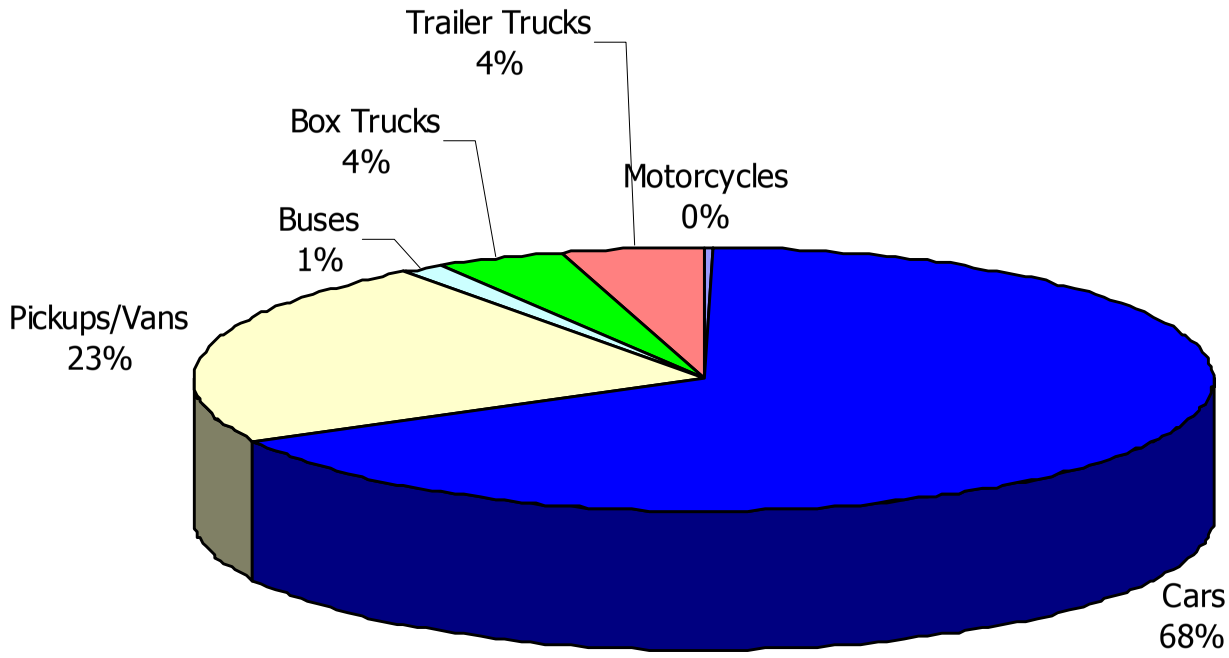
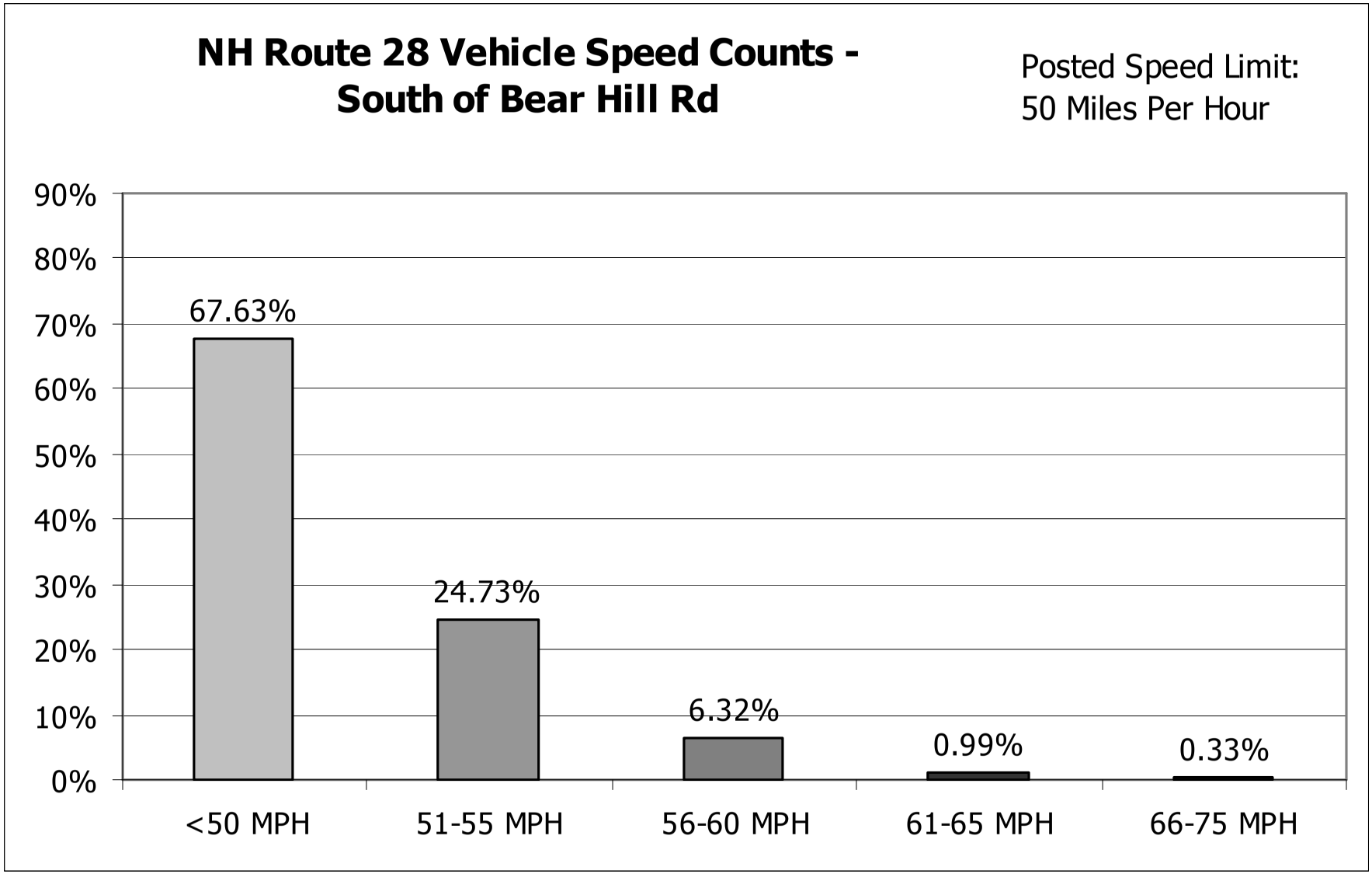
19.82%
36.07%
33.86%
8.88%
1.37%
<50 MPH
51-55 MPH
56-60 MPH
61-65 MPH
66-75 MPH

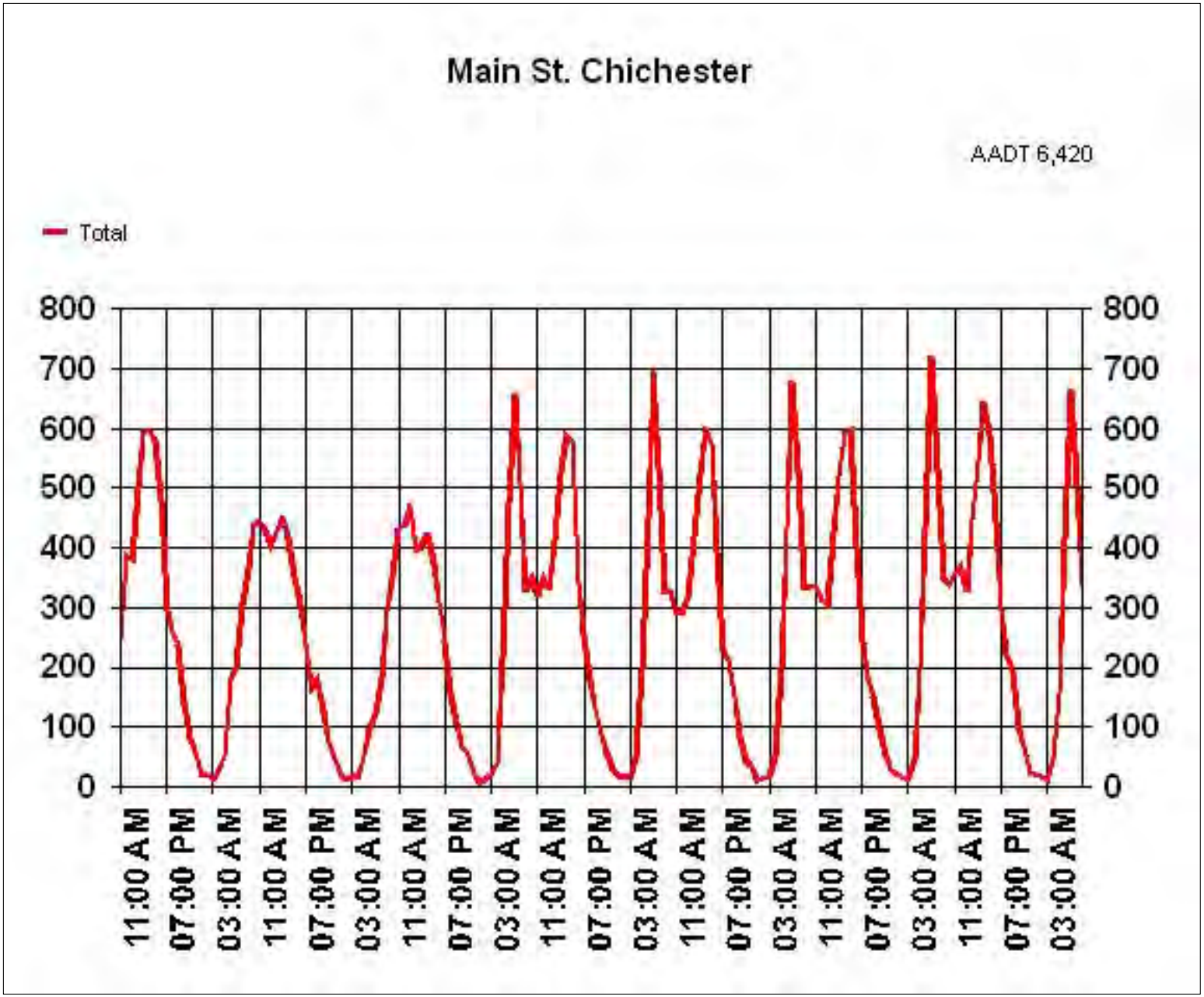

NH Route 28 Vehicle Speed Counts -
South of Webster Mills Rd (Southbound)
Posted Speed Limit:
50 Miles Per Hour
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
53.19%
37.96%
7.64%
0.75%
0.46%
<50 MPH
51-55 MPH
56-60 MPH
61-65 MPH
66-75 MPH

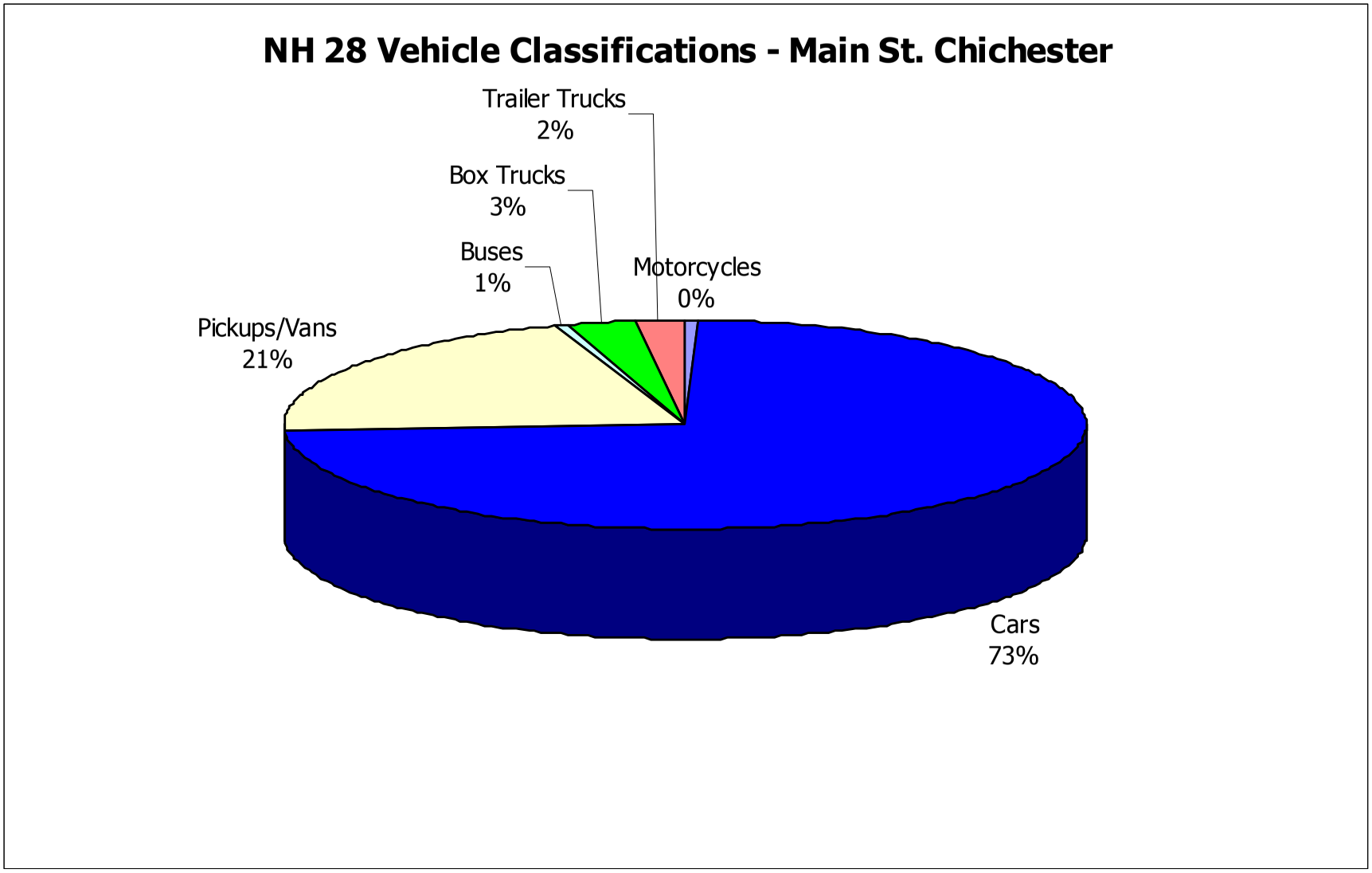

South of Bear Hill Rd
AADT 12,841
Total
1200
1000
800
600
400
200
0
12:00 PM
04:00 PM
08:00 PM
10/21/2008
04:00 AM
08:00 AM
12:00 PM
04:00 PM
08:00 PM
10/22/2008
04:00 AM
08:00 AM
12:00 PM
04:00 PM
08:00 PM
10/23/2008
04:00 AM
08:00 AM
12:00 PM
04:00 PM
08:00 PM
10/24/2008
04:00 AM
08:00 AM

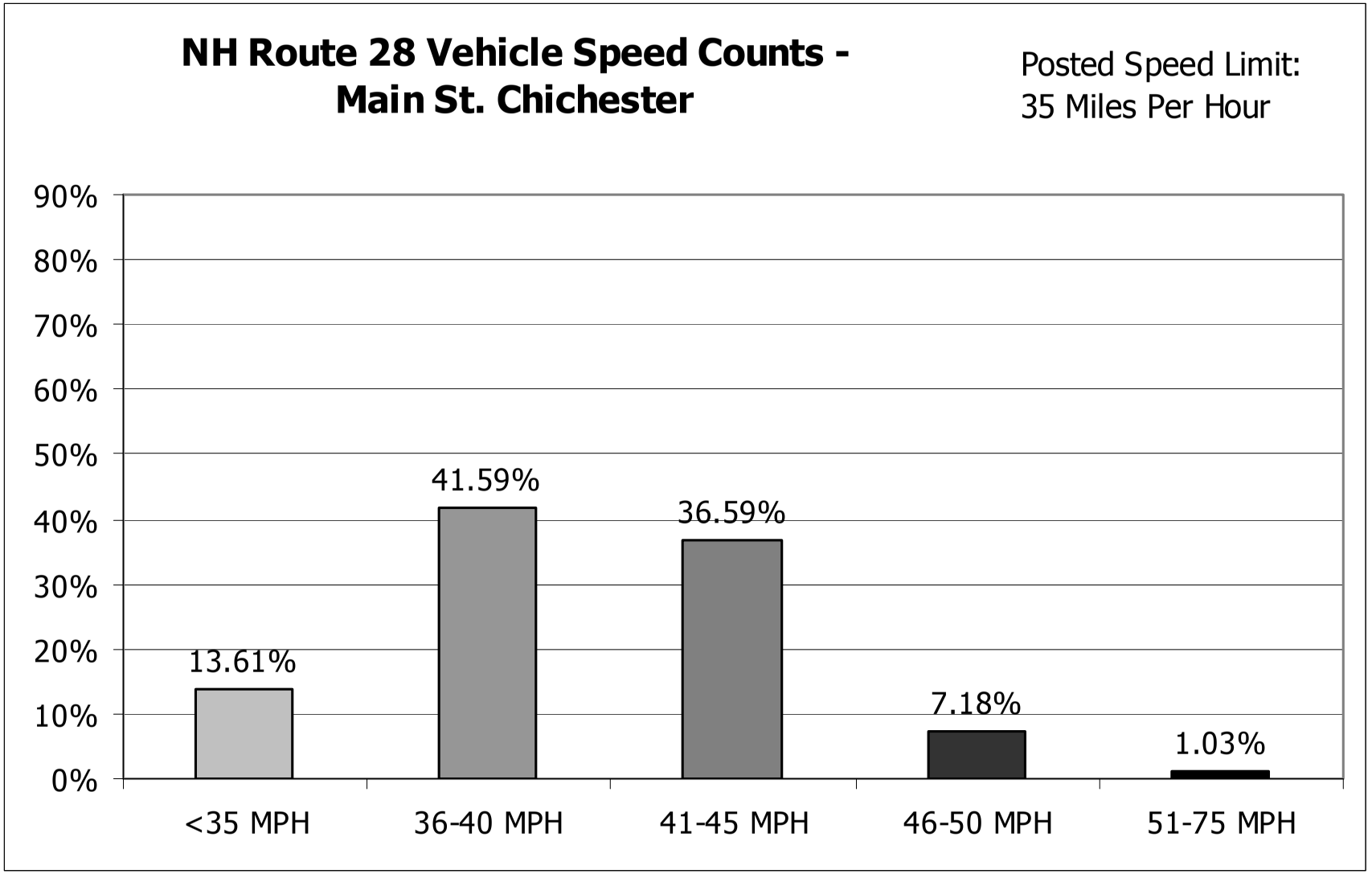
NH 28 Vehicle Classifications - South of Bear Hill Rd

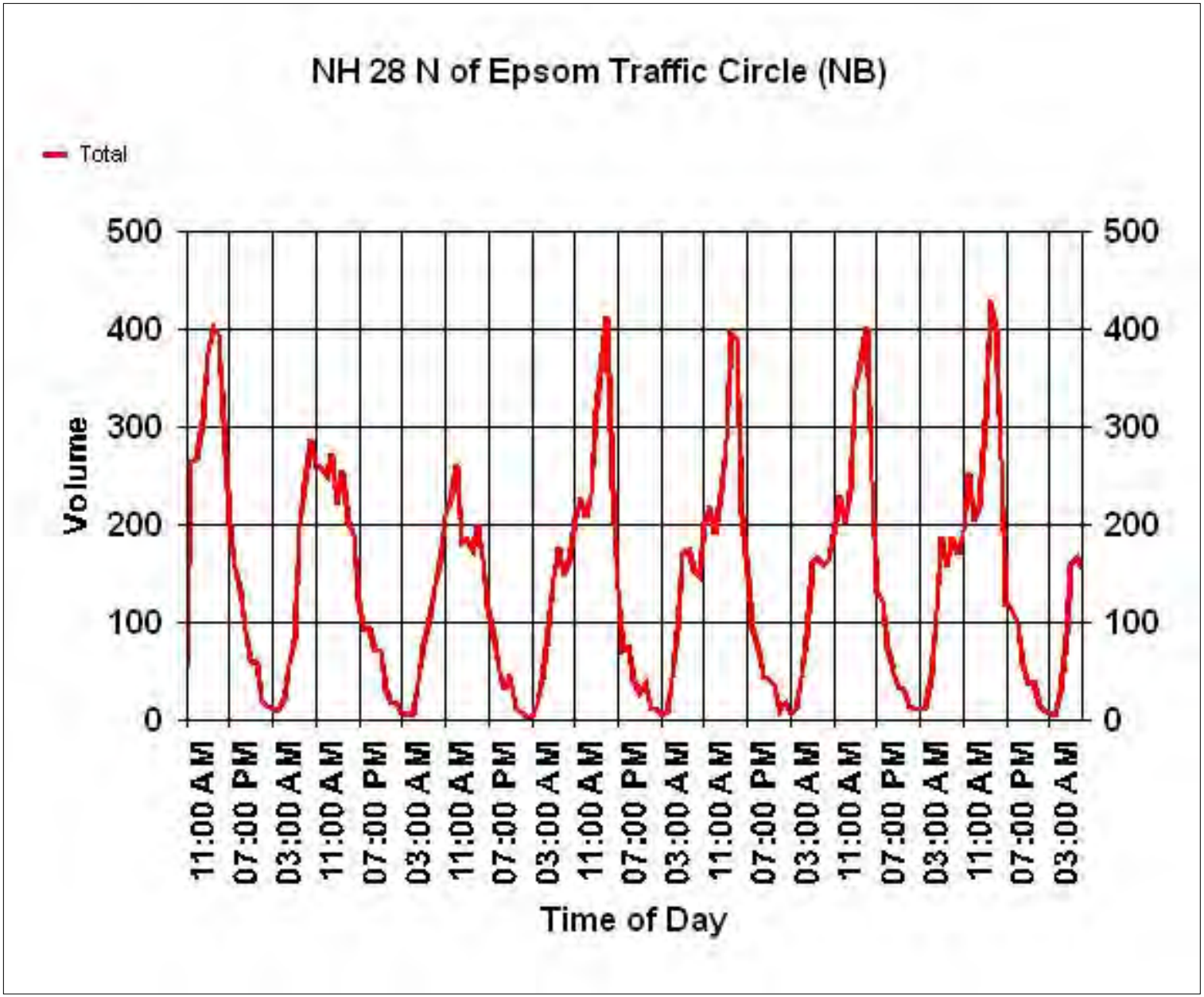


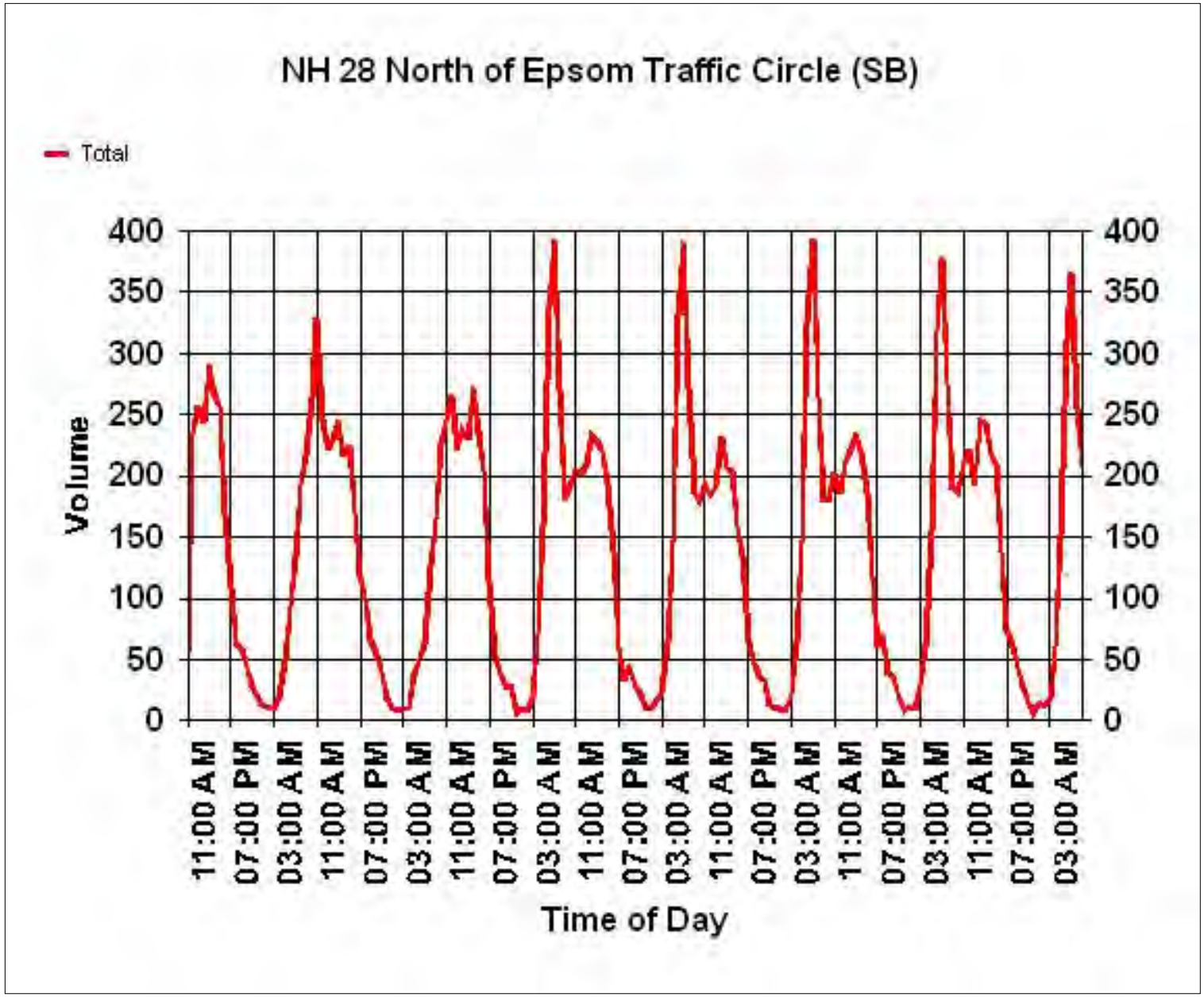

NH Route 28 Vehicle Speed Counts -
South of Bear Hill Rd
Posted Speed Limit:
50 Miles Per Hour
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
67.63%
24.73%
6.32%
0.99%
0.33%
<50 MPH
51-55 MPH
56-60 MPH
61-65 MPH
66-75 MPH


Main St. Chichester
AADT 6,420
Total
800
700
600
500
400
300
200
100
0
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM

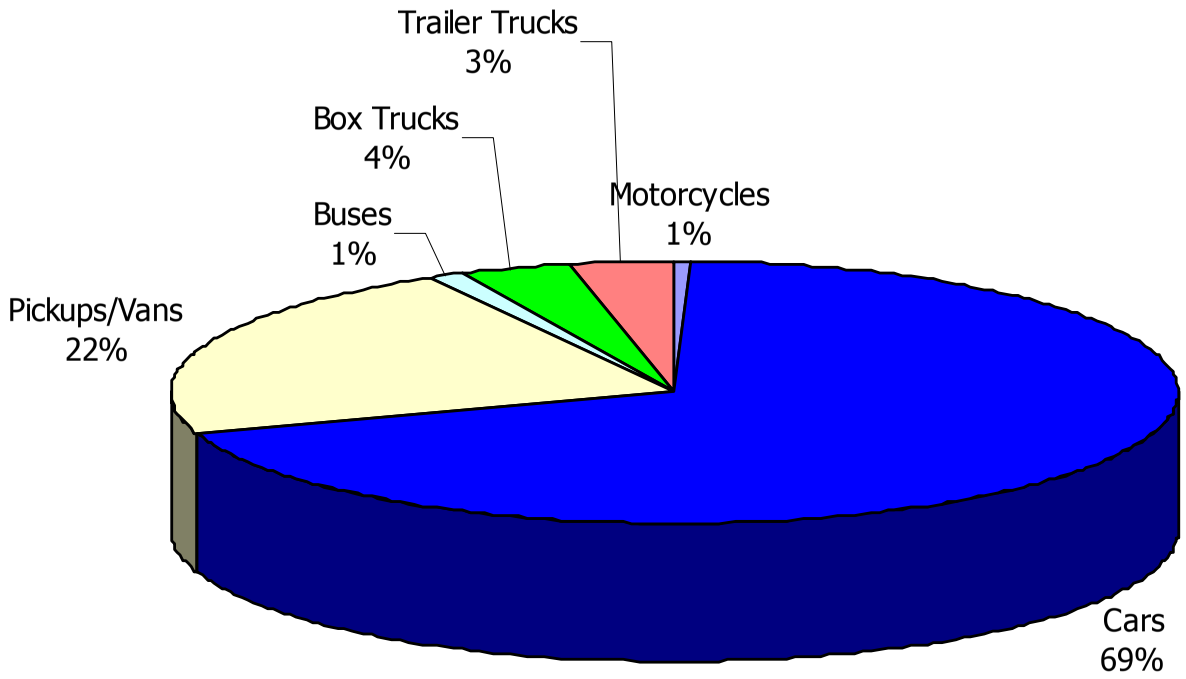

NH 28 Vehicle Classifications - Main St. Chichester
Trailer Trucks
2%
Box Trucks
3%
Buses
1%
Motorcycles
0%
Pickups/Vans
21%
Cars
73%

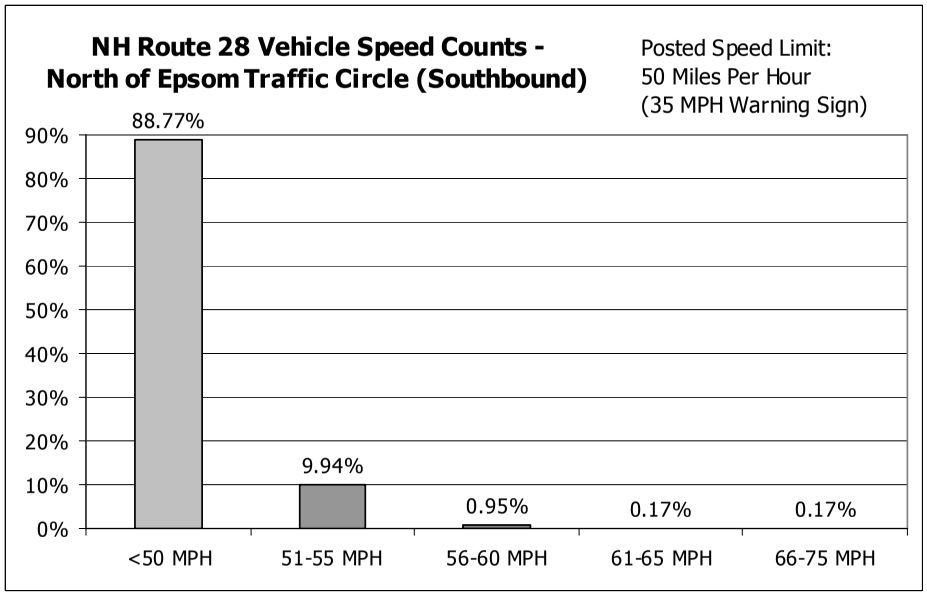

NH Route 28 Vehicle Speed Counts -
Main St. Chichester
Posted Speed Limit:
35 Miles Per Hour
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
13.61%
41.59%
36.59%
7.18%
1.03%
<35 MPH
36-40 MPH
41-45 MPH
46-50 MPH
51-75 MPH

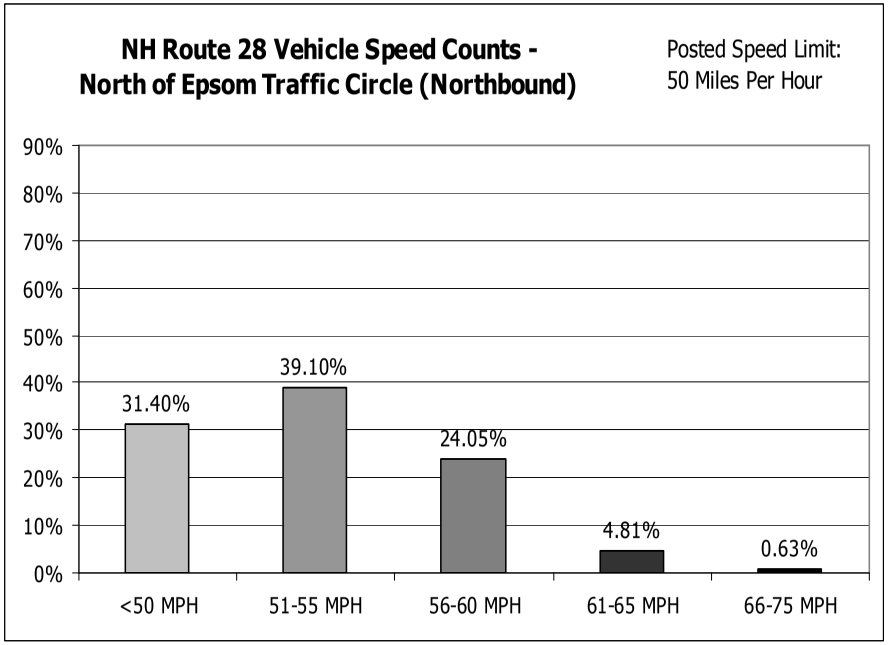

NH 28 N of Epsom Traffic Circle (NB)
Total
Volume
500
400
300
200
100
0
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
Time of Day

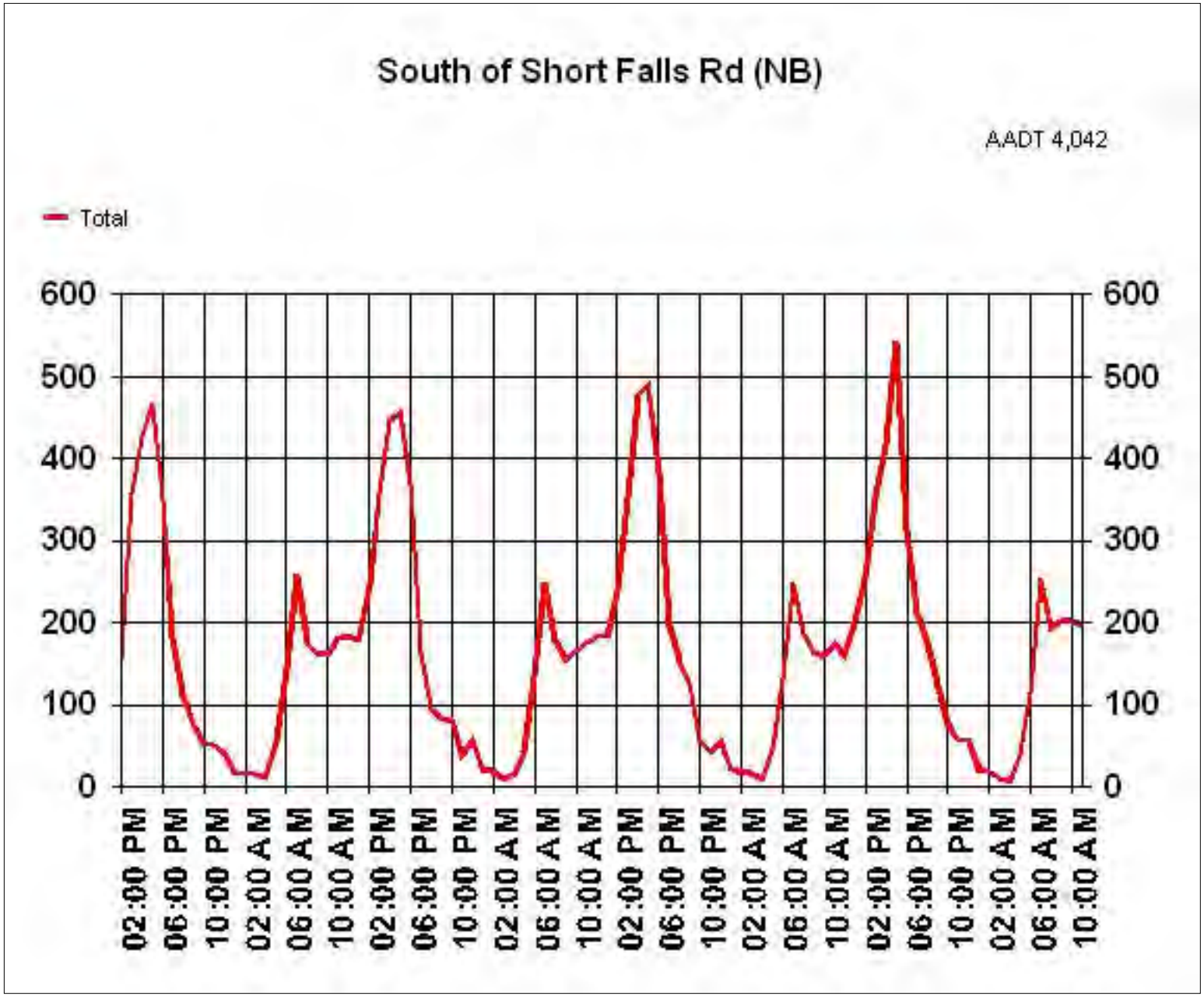

NH 28 North of Epsom Traffic Circle (SB)
Total
Volume
400
350
300
250
200
150
100
50
0
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
11:00 AM
07:00 PM
03:00 AM
Time of Day

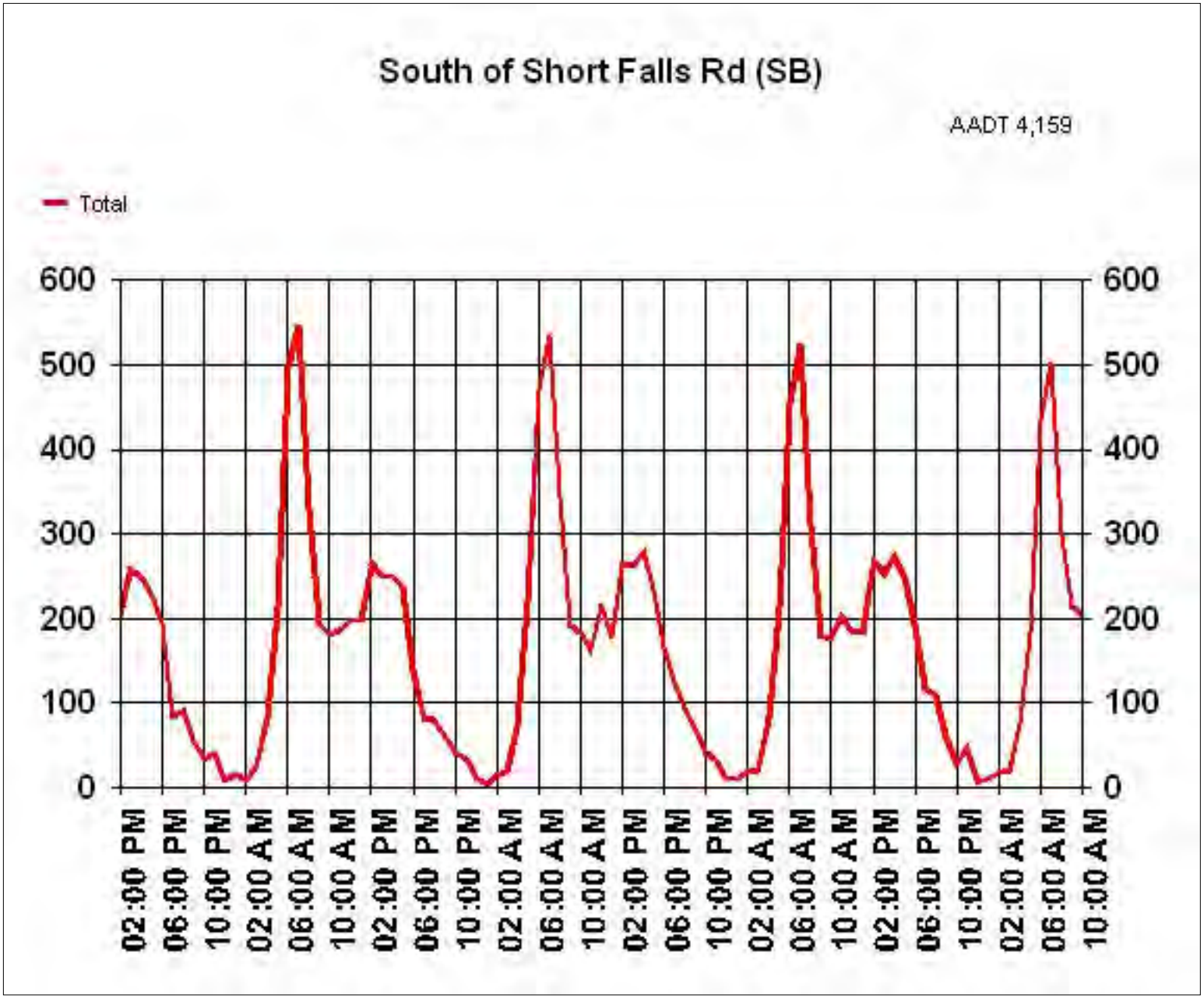
NH 28 Vehicle Classifications - North of Epsom Traffic Circle



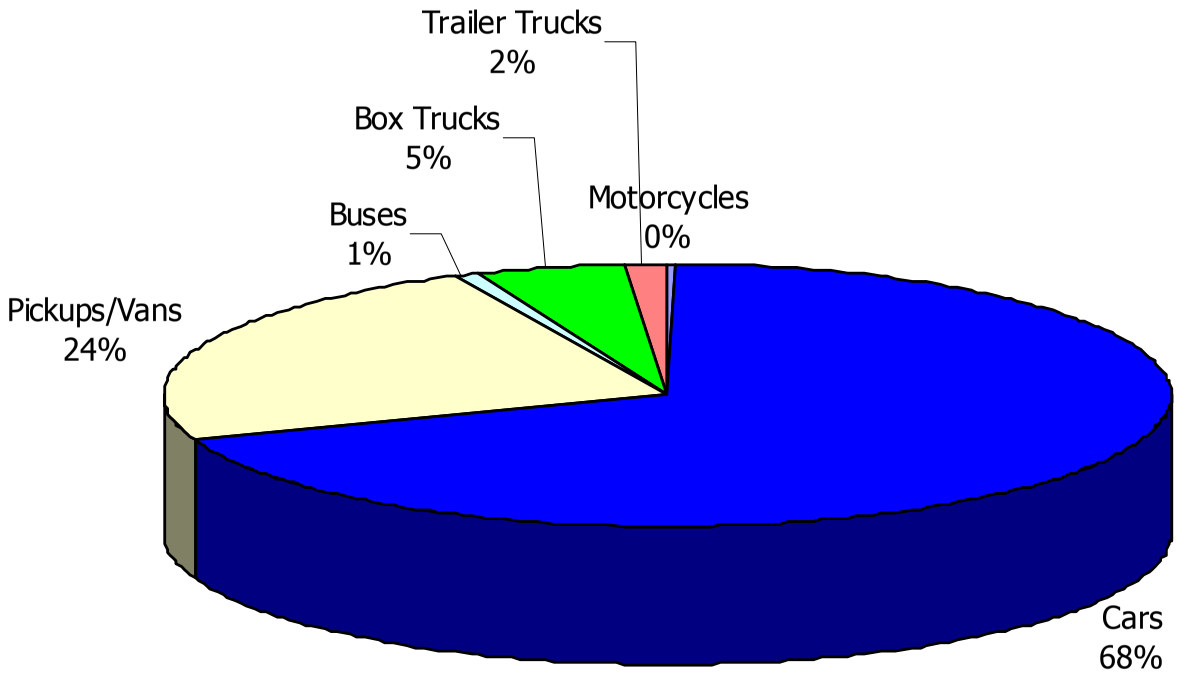

NH Route 28 Vehicle Speed Counts -
North of Epsom Traffic Circle (Southbound)
Posted Speed Limit:
50 Miles Per Hour
(35 MPH Warning Sign)
88.77%
9.94%
0.95%
0.17%
0.17%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
<50 MPH
51-55 MPH
56-60 MPH
61-65 MPH
66-75 MPH

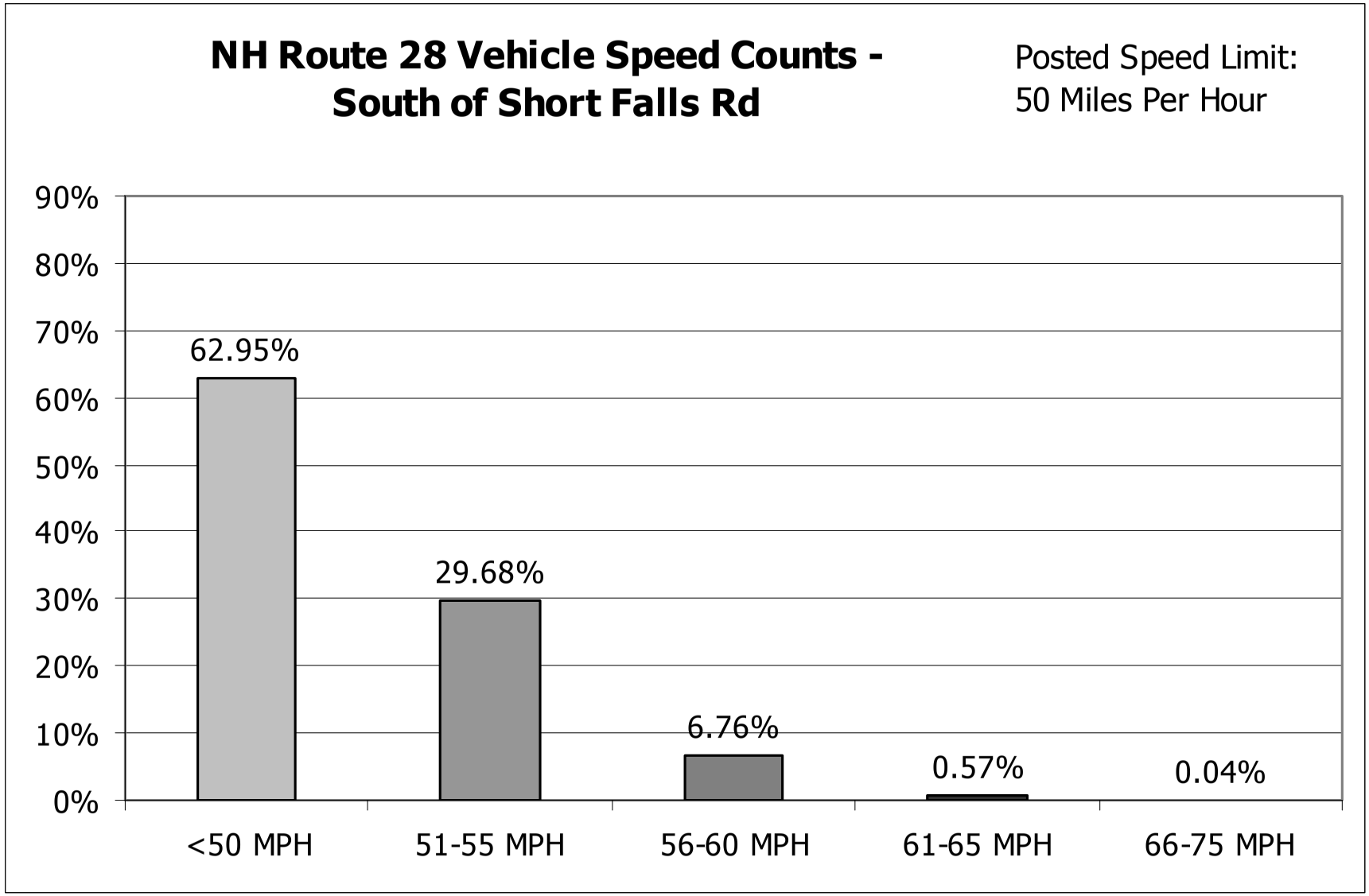

NH Route 28 Vehicle Speed Counts -
North of Epsom Traffic Circle (Northbound)
Posted Speed Limit:
50 Miles Per Hour
31.40%
39.10%
24.05%
4.81%
0.63%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
<50 MPH
51-55 MPH
56-60 MPH
61-65 MPH
66-75 MPH


South of Short Falls Rd (NB)
AADT 4,042
Total
600
500
400
300
200
100
0
02:00 PM
06:00 PM
10:00 PM
02:00 AM
06:00 AM
10:00 AM
02:00 PM
06:00 PM
10:00 PM
02:00 AM
06:00 AM
10:00 AM
02:00 PM
06:00 PM
10:00 PM
02:00 AM
06:00 AM
10:00 AM
02:00 PM
06:00 PM
10:00 PM
02:00 AM
06:00 AM
10:00 AM

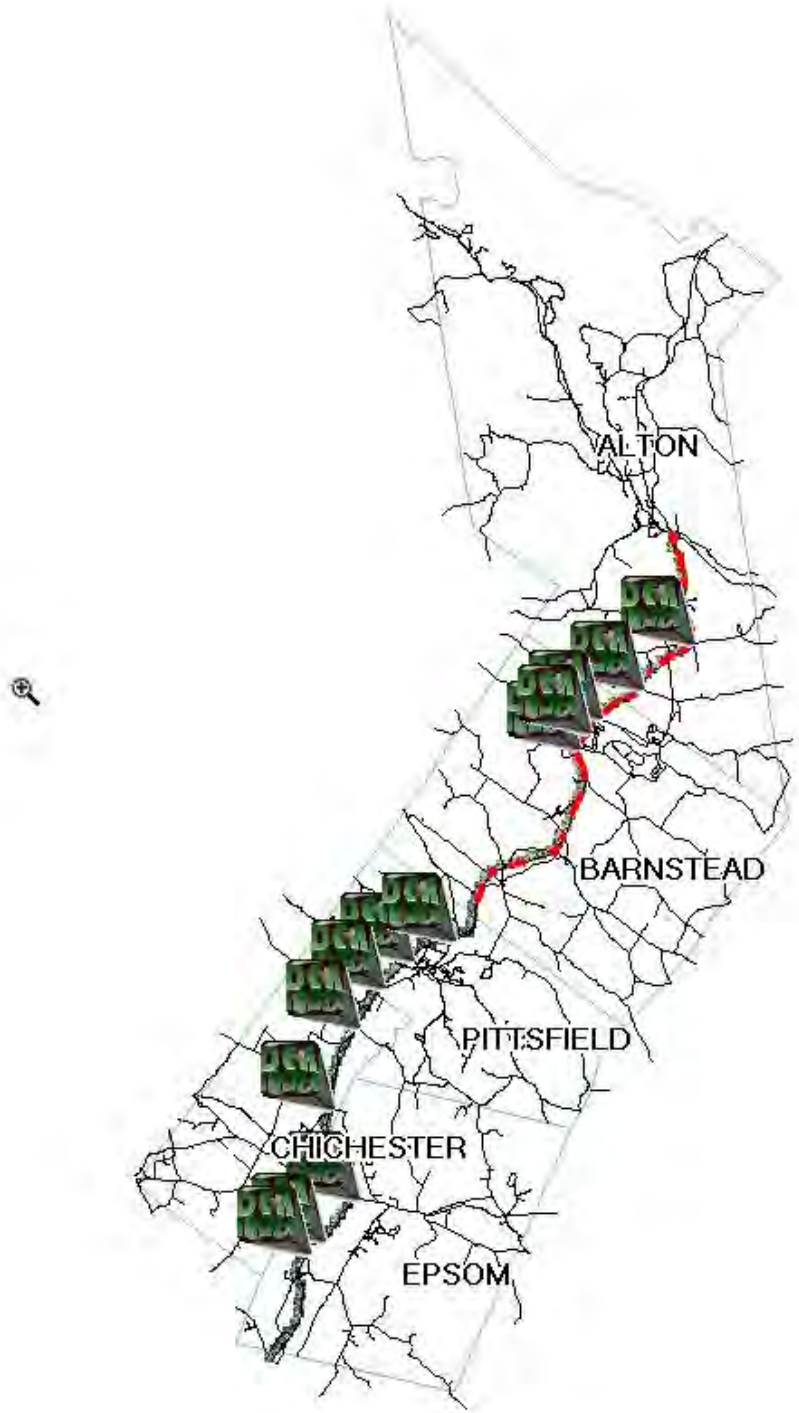

South of Short Falls Rd (SB)
AADT 4,159
Total
600
500
400
300
200
100
0
02:00 PM
06:00 PM
10:00 PM
02:00 AM
06:00 AM
10:00 AM
02:00 PM
06:00 PM
10:00 PM
02:00 AM
06:00 AM
10:00 AM
02:00 PM
06:00 PM
10:00 PM
02:00 AM
06:00 AM
10:00 AM
02:00 PM
06:00 PM
10:00 PM
02:00 AM
06:00 AM
10:00 AM

NH 28 Vehicle Classifications - South of Short Falls Rd




NH Route 28 Vehicle Speed Counts - South of Short Falls Rd
Posted Speed Limit: 50 Miles Per Hour
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
62.95%
29.68%
6.76%
0.57%
0.04%
<50 MPH
51-55 MPH
56-60 MPH
61-65 MPH
66-75 MPH

NH Route 28: Historic Accident Diagrams



0 2.5 5 7.5 10

Scale in Miles

Epsom

- Epsom Traffic Circle
- Elkins Road
- Mill House Road
- Shoulders Throughout

Mill House Road - Epsom

Elkins Road - Epsom

Epsom Circle

Chichester

- Kelly Corner Road
- SR28 and Main Street
- Epsom and Chichester town line

Kellys Corner - Chichester

Main Street - Chichester

Pittsfield

- Leavitt Road
- SR28 and SR107
- Concord Hill

Leavitt Road - Pittsfield

SR107- Pittsfield

Concord Hill - Pittsfield

Barnstead

- North Barnstead Road
- Peacham Road
- Colony Drive

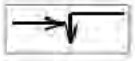

Collision Diagram Legend:
PDO
Injury
Fatal
Single Vehicle
Rear End
Head On
Side Swipe Op Dir
Angle Lft Trn Op Dir
Angle Straight
Angle Lft Trn
Side Swipe Same Dir
Means One of this Crash Type With This Severity
North Barnstead Road: Barnstead
0
25
50
75
100
Scale in Feet


Collision Diagram Legend:
PDO
Injury
Fatal
Single Vehicle
Rear End
Head On
Side Swipe Op Dir
Angle Lft Trn Op Dir
Angle Straight
Angle Lft Trn
Side Swipe Same Dir
Means One of this Crash Type With This Severity
Peacham Road: Barnstea
0
22.5
45
67.5
90
Scale in Feet
4/28/2009
16

Intersection Report

Barnstead, NH: SR28 and Peacham Road
13 crashes are within **250** Feet of the intersection
Crashes occurred between **2/12/2006** and **5/10/2008**
Intersection Equivalent Property Damage Only: **17**
Intersection Crash Rate: **3.3MEV**

Collision Information

Injury Type:	17 Single Vehicle 	03 Rear End - Same Dir, Both Veh, Straight 	01, 06 Head On Side Swipe - Opp Dir, Both Veh, Straight 	02 Lt Turn - Opp Dir, 1 Veh Straight 1 Veh, Lt 	11 Right Angle - App. Angle, Both Veh, Strt 	14 Right Angle Lt - 1 Veh Strt, 1 Veh Lt 	07 Side Swipe - Same Dir, Both Veh, Straight 	All Other Collision types
Fatal	0	0	0	0	0	0	0	0
Incapacitating	0	0	0	0	0	0	0	0
Non Incapacitating	0	0	0	0	0	0	0	0
Injury severity unknown	0	1	0	0	0	0	0	0
Property Damage Only	2	4	0	1	3	0	1	1

Collision Patterns:(>5% in common)	Vehicle Patterns:(>5% in common)	Passenger Patterns:(>5% in common)
FirstHarmfulEvent: "Collision with Motorvehicle in Transport Same Roadway": 85% "Collision with Embankment": 8% "Collision with Animal": 8% MannerOfCollision: "Front-to-Rear (includes Rear-End)": 38% "Not Collision with Motor Vehicle in Transport": 15% "Sideswipe â€“ Same Direction": 8% "Rear-to-Side": 8% "Front-to-Side, Opposite Direction": 8% "Front-to-Side, Right Angle (includes Broadside)": 23% RoadwaySurfaceCondition: "Ice": 31% "Snow or Slush": 31% "Dry": 31% "Wet": 8% LightCondition: "DayLight": 85% "Dark": 15% AtmosphericConditions: "No Adverse Atmospheric Conditions": 38% "Snow": 46% "Rain": 15%	NoOfOccupants: "4": 8% "1": 75% "2": 12% MostHarmfulEvent: "Collision with Motorvehicle in Transport Same Roadway": 92% DriverViolationsCharged: "": 100% RelatedFactorsDriverLevel: "None": 58% "Inattentive": 17% "Driving Too Fast for Conditions or in Excess of Posted Maximum": 17% ChangeInDirectionThatLedToCollision: "Stoppped": 33% "No change, going in the same direction": 54% DirectionOfTravelBeforeCollision: "West": 25% "South": 33% "North": 29% "East": 12%	MyDate: "2/14/2008 10:58:12 AM": 8% "2/22/2008 11:04:15 AM": 8% "2/22/2008 11:10:43 AM": 8% "2/22/2008 11:15:31 AM": 8% "2/28/2008 11:41:31 AM": 8% "3/12/2008 12:21:43 PM": 8% "5/10/2008 2:18:07 PM": 8% "3/15/2007 4:03:59 AM": 8% "2/12/2006 5:27:26 PM": 8% "3/16/2006 6:12:07 PM": 8% "3/22/2006 6:17:55 PM": 8% "11/8/2006 2:23:40 AM": 8% "12/30/2006 3:10:59 AM": 8% MyTime: "4/24/2009 7:43:00 AM": 8% "4/24/2009 3:57:00 PM": 8% "4/24/2009 2:45:00 PM": 8% "4/24/2009 3:35:00 PM": 8% "4/24/2009 7:25:00 AM": 8% "4/24/2009 9:30:00 AM": 8% "4/24/2009 8:12:00 PM": 8% "4/25/2009 7:35:00 AM": 8% "4/25/2009 9:40:00 AM": 8% "4/25/2009 7:08:00 PM": 8% "4/25/2009 6:20:00 AM": 8% "4/26/2009 6:28:00 AM": 8% "4/26/2009 12:00:00 PM": 8%

Colony Drive - Barnstead

Alton

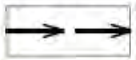
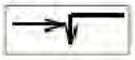
- Stockbridge Road
- Prospect Mountain
- Lot Line Road
- Alton School


Collision Diagram Legend:
PDO
Injury
Fatal
Single Vehicle
Rear End
Head On
Side Swipe Op Dir
Angle Lft Trn Op Dir
Angle Straight
Angle Lft Trn
Side Swipe Same Dir
Means One of this Crash Type With This Severity
Stockbridge Corner Road, Alton
0
25
50
75
100
Scale in Feet

Intersection Report

Alton, NH: Stockbridge Road and SR28
9 crashes are within **300** Feet of the intersection
Crashes occurred between **4/12/2006** and **11/15/2008**
Intersection Equivalent Property Damage Only: **12**
Intersection Crash Rate: **1.93 MEV**

Collision Information

Injury Type:	17 Single Vehicle 	03 Rear End - Same Dir, Both Veh. Straight 	01, 06 Head On/Side Swipe - Opp Dir, Both Veh. Straight 	02 Lt Turn - Opp Dir, 1 Veh Straight 1 Veh. Lt 	11 Right Angle - App. At angle Both Veh. Strt 	14 Right Angle Lt - 1 Veh Strt, 1 Veh Lt 	07 Side Swipe - Same Dir, Both Veh Straight 	All Other Collision types
Fatal	0	0	0	0	0	0	0	0
Incapacitating	0	0	0	0	0	0	0	0
Non Incapacitating	0	0	0	0	0	0	0	0
Injury severity unknown	1	0	0	0	0	0	0	0
Property Damage Only	3	3	0	0	2	0	0	0

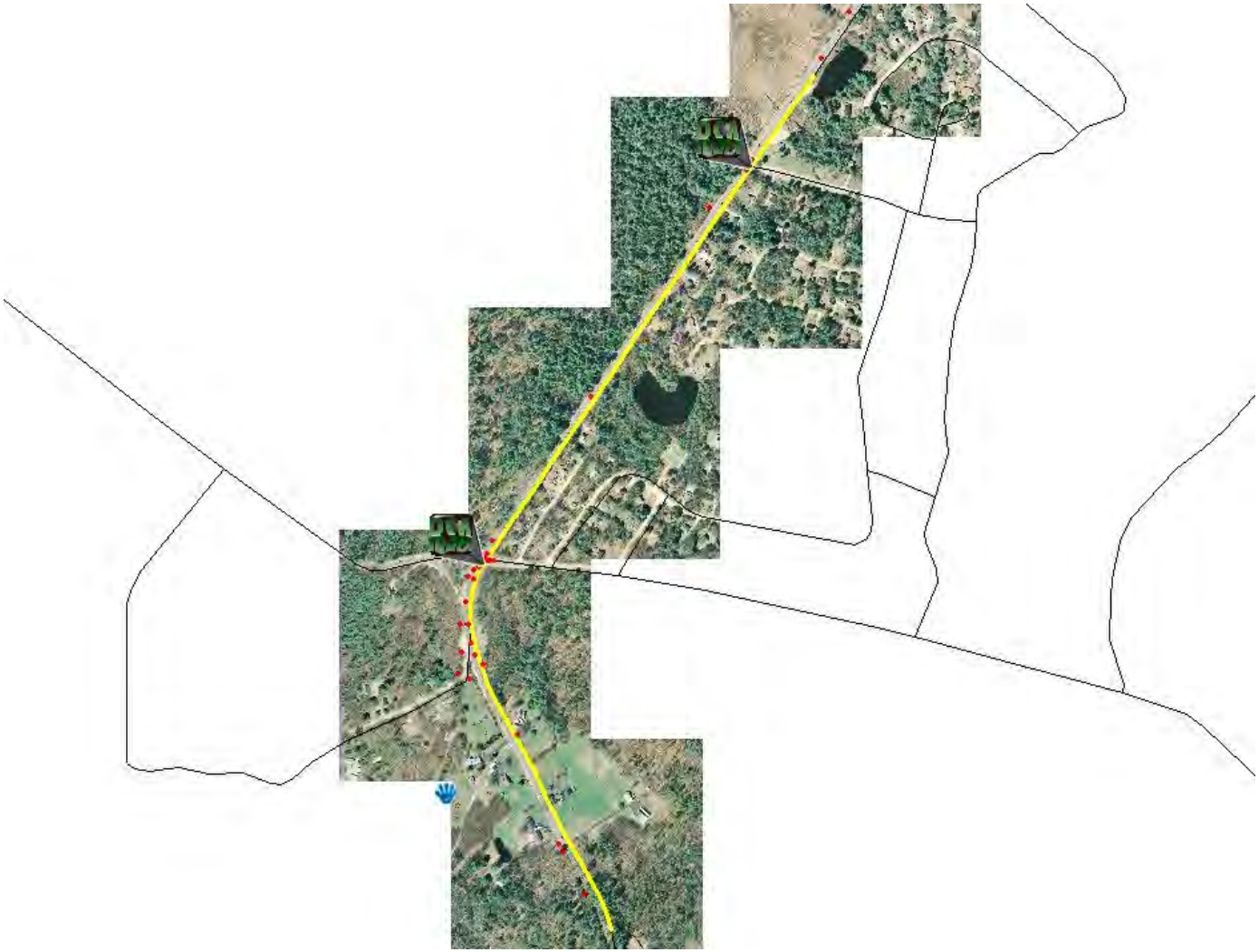
Collision Patterns :(>5% in common)	Vehicle Patterns :(>5% in common)	Passenger Patterns :(>5% in common)
FirstHarmfulEvent: "Collision with Motorvehicle in Transport Same Roadway": 56% "Collision with Person": 11% "Non-Collision: Other Non-fixed": 33% MannerOfCollision: "Front-to-Rear (includes Rear-End)": 33% "Front-to-Side, Right Angle (includes Broadside)": 22% "Not Collision with Motor Vehicle in Transport": 44% RoadwaySurfaceCondition: "Dry": 67% "Snow or Slush": 11% "Wet": 22% LightCondition: "DayLight": 100% AtmosphericConditions: "No Adverse Atmospheric Conditions": 89% "Rain": 11%	NoOfOccupants: "1": 67% "98": 13% "2": 13% "3": 7% MostHarmfulEvent: "Collision with Motorvehicle in Transport Opposite Roadway": 7% "Collision with Motorvehicle in Transport Same Roadway": 67% "Collision with Person": 7% "Collision with Tree": 13% "Collision wth Utility Light Pole.Light Support": 7% RelatedFactorsDriverLevel: "None": 60% "Inattentive": 20% "Failure to Yield Right-of-Way": 13% "Operator Inexperience": 7% ChangeInDirectionThatLedToCollision: "Stoppped": 33% "No change, going in the same direction": 67% DirectionOfTravelBeforeCollision: "North": 33% "East": 13% "South": 47% "West": 7%	MyDate: "4/12/2006 8:48:11 AM": 11% "5/18/2006 10:26:44 AM": 11% "10/22/2006 11:22:25 AM": 11% "1/20/2007 2:28:59 PM": 11% "2/17/2007 2:33:32 PM": 11% "3/31/2008 3:27:21 PM": 11% "6/10/2008 3:54:46 PM": 11% "7/25/2008 10:48:38 AM": 11% "11/15/2008 10:53:24 AM": 11% MyTime: "2/13/2009 4:15:11 PM": 11% "2/18/2009 3:40:00 PM": 11% "2/18/2009 11:56:25 AM": 11% "2/23/2009 7:07:59 AM": 11% "2/23/2009 3:55:32 PM": 11% "2/27/2009 11:59:21 AM": 11% "2/27/2009 8:15:46 AM": 11% "3/9/2009 11:45:38 AM": 11% "3/9/2009 12:15:24 PM": 11%

Prospect Mountain - Alton

Lot Line Road - Alton

Alton School

Run off Road Segment – Peacham, Barnstead



Appendix C

Road Safety Audit Team Results

Preliminary Assessment Results:
Assessment Conducted April 26-28, 2009

NH Route 28

Road Safety Audit - Preliminary Assessment Results

Assessment Conducted - April 26-28, 2009

Road Safety Audit Teams

Team 1

- Betsy Bosiak, Epsom Planning Board
- David Kerr, Barnstead Board of Selectmen
- Craig Tufts, CNHRPC

Team 2

- Stuart Thompson, NHDOT
- Adam Hlasny, LRPC
- Robert Wharem, Pittsfield Police Department
- James Plunkett, Chichester

Team 3

- Peter Holmes, Chichester
- Kenneth Roberts, Alton Highway Department
- Martin Calawa, FHWA (NH)
- Michael Izard, LRPC

Team 4

- Bill Evans, Barnstead Health Officer
- Gary Johnson, Pittsfield Fire Department
- Rosemarie Anderson, FHWA (NJ)
- Rodrigo Marion, CNHRPC

Lot Line Road

RSA Team Findings:

- Request for speed enforcement
- Stop sign improvement needed
- Intersection warning sign with supplemental street names plaque needed
- School safety for pedestrians/bicyclists
- No shoulders

Lot Line Road

Potential Improvements:

- New stop sign needed
- Improved intersection warning sign with supplemental street names plaque needed
- Greater speed enforcement
- Travel Plan- bicycle and pedestrian
- Work with school safety officer
- Addition of shoulders

Stockbridge Corner Road

RSA Team Findings:

- Missing signage
- Pavement edge drop off on NH Route 28 southbound south of intersection
- Right of way drop offs southbound NH Route 28 (north of intersection)
- No shoulders
- Deceptive road alignment/geometrics (NH Route 28 northbound approaching intersection)
- Multiple approaches to NH Route 28 from Stockbridge Road westbound
  - Skewed second approach
  - NH Route 28 access in close proximity
- Stockbridge Road sight distance from western approach looking towards NH Route 28 southbound
- Steep approach on Stockbridge Road eastbound to intersection making it difficult to enter roadway
- Beacon light in need of realignment
- Drainage structure in clear zone.

Stockbridge Corner Road

Potential Improvements:

- Upgrade stop signs/replace missing street signs
- Realign beacon and/or replace with LED
- Add stop bars/stop ahead pavement markings at Stockbridge Road approaches to intersection
- Back up edge of pavement/add shoulders/correct edge drop offs
- Work with existing landowner to increase sight distance southbound on NH Route 28 (possible sound barrier needed)
- Remove open drainage structures from clear zone
- Eliminate the southern most entrance to Stockbridge Road
    - create visual buffer on Rt 28
    - evaluate need for chevrons
    - create right turn lane (28 north)

Prospect Mountain/Dudley Roads

RSA Team Findings:

- Stop Ahead signs need replacement
- Intersection warning signs needed
- Steep approach off of Dudley Road
- Visibility from Dudley Road to the north
- Slightly skewed visibility to the south
- Commercial signage is a distraction at the intersection
- Hidden street signage

Prospect Mountain/Dudley Roads

Potential Improvements:

- Relocate commercial signage in advance of intersection
- Relocate street signs on telephone poles or overhead
- Upgrade Stop Ahead warning signage/add Stop Ahead sign on Dudley Road
- Add stop bars on Dudley/Prospect Roads
- Lower fore slope on NH Route 28 southbound approach to provide better sight distance
- Add shoulders
- Work with local landowner to define residential access
- Possible fill north of intersection on NH Route 28

North Barnstead/North Roads

RSA Team Findings:

- Snow storage capacity/snow drifting issues
- Limited sight distance
- Drainage on southeast corner
- Vegetation obstructs view northbound
- Sign upgrades needed (Stop Ahead & Stop)
- Missing pavement markings (stop bars)

North Barnstead/North Roads

Potential Improvements:

- Lower grade of north bound approach to intersection (3-5 foot cut, minimum 500 feet)
  - –Maintain grade at existing intersection
  - –Lower ditch line in same area (for sight /snow storage)
- Stop bars at intersections
- Replace old Stop & Stop Ahead signs
- Replace structure on southwest corner of intersection
- Narrow throat of North Rd
- Trim foliage where needed

Colony Drive

RSA Team Findings:

- Rear end crashes
- Shoulder drop off
- Shaded
- Speed
- Passing zone through intersection
- No illumination

Colony Drive

Potential Improvements:

- Enforcement
- Illumination
- Open the area up
- Request NHDOT to change passing zone
- Stop bar
- Left turning lane

Peacham/White Oak Roads

RSA Team Findings:

- Drainage issues on southwest quadrant of intersection
- Vertical alignment of White Oak approach (too steep)
- Chevron placement on NH Route 28 northbound
- Dangerous right onto Peacham Road (northbound)
- Improved shoulders needed

Peacham/White Oak Roads

Potential Improvements:

- Explore possibility of friction pavement on Peacham Road
- Install slip lane for right turns onto Peacham Road
- Elevation change on White Oak Road
- Remove obstructions
- Improve drainage in area of intersection

Maple Street

RSA Team Findings:

- Signs are worn and do not meet current standards
- Guardrail is in disrepair
- Intersection skewed
- Pavement in in disrepair
- Lack of sidewalk from school to NH Route 28
- Crosswalk signs at school are oriented in wrong direction

Maple Street

Potential Improvements:

- Replace signs
- Re-stripe crosswalks at school and reorient signs
- Illumination
- Add Sidewalks from intersection to connect existing sidewalks
- Address edge drop off
- Repair pavement and guardrail

NH Route 126

RSA Team Findings:

- Use of shoulders as right turn lane onto NH Route 126
- Use of Shoulders to pass left turning vehicles onto NH Route 126
- Cannot enter straight across NH Route 28 to Wes Locke Road
- Banked corner makes turns for trucks difficult (rollovers)
- Proximity of Parade Road on NH Route 126, close to intersection with NH Route 28
- Maintain vegetation near Parade Road for visibility
- Very high speed portion of NH Route 28
- Commercially zoned property across NH Route 28 (off Wes Locke Road)
- Left turning traffic onto NH Route 126 will block view for right turns onto NH Route 28

NH Route 126

Potential Improvements:

- Speed reduction
- Turn lanes
- Re-alignment of Wes Locke Road

NH Route 107

RSA Team Findings:

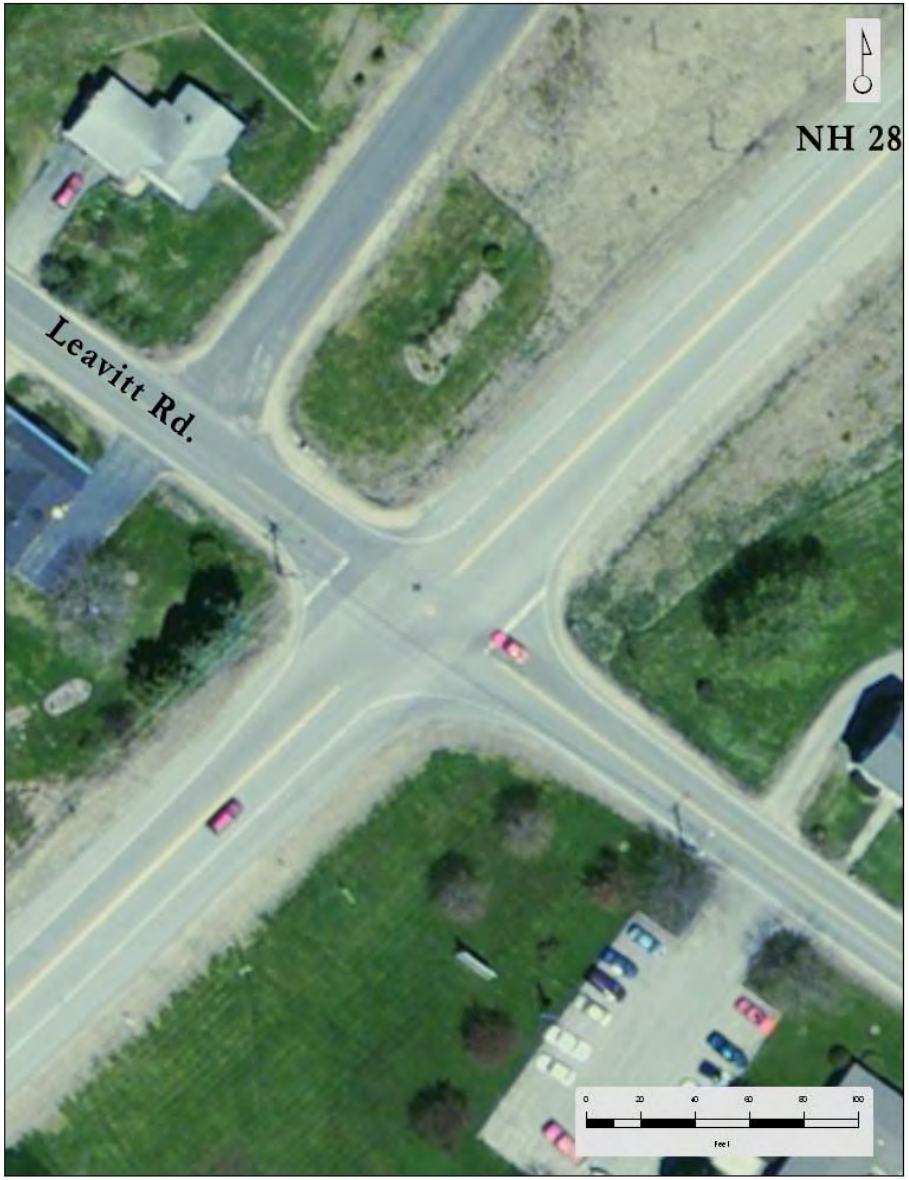
- Sight distance from turn lanes
- Overhead sign upgrade
- ADA complaint
- Signal alignment
- Turning lane alignment

NH Route 107

Potential Improvements:

- Yellow turn arrow and red stop
- Realign turn bays
- Realign signals
- Sidewalks and crosswalks needed
- Pedestrian crossing button

Leavitt Road



RSA Team Findings:

- High traffic volume coming out of Leavitt Road
- 36 crashes resulting personal injuries (Report 2004-2008)
- Difficult grade approach on Leavitt Rd

Leavitt Road

Potential Improvements:

- Relocate signs
- Pedestrian signal head
- Crosswalks at new signalized intersection
- Conduct traffic count to determine the need of turn lanes
- Illumination
- Add Sidewalks from intersection to connect existing sidewalks
- Address edge drop off

Concord Hill Road

RSA Team Findings:

- Sight distance to the south
- Vegetation to the south
- Realign lighting
- Grade approach Concord Hill Road to NH Route 28

Concord Hill Road

Potential Improvements:

- Remove vegetation
- Adjust illumination
- Improve grade approach

Kelly Corner Road

RSA Team Findings:

- Speed
- Sight distance to the south on NH Route 28 is short (hill and curve)
- There is a turn sign but no stop ahead signage on Kelly Corner Road
- Blind corner on Kelly Corner Road leading to the intersection (in both directions)
- Narrow road with soft gravel shoulder- vehicles cut corner (from north) and drive on gravel and crumbling corner
- Signage from neighboring businesses in right of way may block view

Kelly Corner Road

Potential Improvements:

- Signage
- Speed reduction on NH Route 28
- Improve surface of Kelly Corner Road

Main Street Chichester

RSA Team Findings:

- Orientation of wrong way signs
- Turn radius tight
- Edge drop off and sight distance

Main Street Chichester

Potential Improvements:

- Relocate signs
- Crosswalks at Main Street
- Remove wrong way signs and add one way
- Illumination
- Sidewalks along Main Street
- Address edge drop off
- Consider opening the radius for turning movements

Epsom Traffic Circle

RSA Team Findings:

- Access management issues throughout
- Speeding through the circle
- Long queues/congestion

Epsom Traffic Circle

Potential Improvements:

- ACCESS MANAGEMENT
- Address speeding within circle
- ?????

Elkins Road

RSA Team Findings:

- Stop ahead sign on Elkins Road- corner blocks view of intersection
- Signage on NH Route 28
- Low priority intersection

Elkins Road

Potential Improvements:

- Improve signage from all approaches
- Maintain vegetation on corners to keep visibility intact

Mill House Road

RSA Team Findings:

- Skewed four way intersection
- Angled intersection
- Sight issues looking south (hill crest)
- Sight issues looking north (curve)
- No intersection approach warning signs on NH Route 28
- Left turning traffic from the north on NH Route 28 is hidden by curve

Mill House Road

Potential Improvements:

- Realign intersection with Lane Road
- Add signage
- Raise grade of Mill House Road
- Improve approach on Mill House Road
- Address cut-through issues- no through traffic signage?

Appendix D

Detailed Land Use Assessment by Town:

Alton
Barnstead
Chichester
Epsom
Pittsfield

NH Route 28 Corridor – Land Use and Aesthetics
Field Observations: From Epsom north to Alton.

EPSOM

Heading north on NH 28, large residential lots contain modest homes that are set back from the road. Single family homes are interspersed with multiple significant agricultural lands, small businesses, a campground, elderly housing facilities, and manufactured housing parks. Small businesses such as a pet care facility are found alongside homes, separated by a natural tree buffer. Small business parks or buildings shared by more than one business are located along both sides of the road at different locations, but most are not landscaped. Businesses situated along NH 28, include a trading post, an auctioneer vendor, and a home sale group. Webster Park offers a recreational experience. The wide shoulders and openness encourage driving faster than the speed limit.

Through field observation, there is little available land for sale along NH 28 for business or new homes. One potentially good location was an underutilized or commercial property with a red house and plenty of parking which was located south of the Epsom traffic circle.

Business signage along the NH 28 corridor in Epsom is inconsistent, and many have an outdated or "institutional" look. Some signage could use improvement because of the visual impressions given, including one recycling sign with aluminum can accents. A manufactured housing park had an attractive wooden sign, which was exterior lit. Most of the signage was exterior lit. Multiple portable reader board signs were observed. A sign directory at a newly built commercial center is an excellent example of a successful sign arrangement.

Minimal road signage is found along NH 28. Signage leading up to the traffic circle at the junction of US 4/202 is not abundant or far enough off to prepare drivers. Several intersection signs were too close to the actual intersections to prepare drivers to slow. A local traffic sign was missing at the entrance of Old NH 28.

Street lighting is uncommon on NH 28. Some businesses have adapted lighting to the buildings or to illuminate signage. Unshielded lighting is found at a car dealership. A good example of lighting is shielded downward-pointing on low poles at a strip mall. Some businesses have floodlights on the building, such as at a restaurant. Other flood lighting is directed at signage.

One tall light pole was erected at the Epsom traffic circle island. While perhaps less efficient, shorter and more frequent poles with shielded lights placed along the perimeter of the circle would be more aesthetically pleasing and may reduce the amount of light escaping into the night sky.

Along the corridor through Epsom, tree buffers are located throughout which naturally screen many residences from businesses and more intensive residential use. Some screening is found at businesses to visually contain certain elements, such as at a propane seller.

Commercial landscaping is consistently non-existent along the corridor in Epsom. These include some of the business parks or buildings which contain multiple businesses, a funeral home, a home

sales group, and multiple others at which landscaping would ordinarily be expected. Examples of lightly and pleasantly landscaped businesses include a real estate office and the post office. Most private homes have pleasing landscaping with mowed lawns, flowers, and shrubs.

On NH 28 on both the southerly side and northerly side of the Epsom traffic circle, the businesses on both sides of the road are mostly devoid of greenery except for mowed sod. Wide curb cuts do not channelize traffic. A pleasing wetland buffer at the circle offers a model or inspiration for others to follow. Visitors traveling through the corridor at this location are provided with convenience businesses such as gas stations and restaurants but are not invited to spend time in the area because of the lack of landscapes and pedestrian-friendly buffers.

CHICHESTER

NH 28 through town follows along the Suncook River. A campground on the east is attractively landscaped. A classic country store on the west adds ambience and historic flair to a busy intersection with Main Street. Modest homes with charming landscaping are situated close to NH 28 along the corridor. Carpenter Memorial Center on the west provides an easily accessible recreational opportunity. A new professional business on the east is architecturally appealing and blends in with the surroundings. Farmland is located in various places along the strip, some of which are vacant and some actively used. Older businesses dot the study area. Throughout the stretch of NH 28, unbroken tree stands that could yield significant development potential are situated in long segments. Near the Pittsfield town line, an older shopping plaza is on the west. Few commercial properties appear to be for sale.

Two residential lots were observed for sale in the vicinity of Bear Hill Road. It appears that Chichester may have other opportunities based on the significant stands of trees alongside the road, but further analysis would need to be undertaken.

Generally, business signs in town are older, have strong coloration, and lack consistency in materials, size, and appearance. Some, including a sign directory at a shopping plaza, have high contrasting signs that compete with one another and as a result, are difficult to read. A large sign at a mattress business could be smaller, closer to the ground, and have less contrasting colors to be visually appealing. Interchangeable signs, some of which appear to be permanent, announce the presence of businesses.

Street lights are scarce along the Chichester section of NH 28. The occasional street lamppost provides light, but not always at helpful places such as intersections with other roads. Some businesses that stay open at night have lights on the buildings, but few business signs are lighted. Most signs are exterior lit with a floodlight directed onto the sign.

Because of the large tree expanses on NH 28 between residential and non-residential uses, buffers may not be necessary in many cases.

A stone and loam business on the left has trucks and equipment parked at the rear of the property alongside NH 28. There is an opportunity for screening from the road.

A campground is simply landscaped with an expanse of mowed lawn with trees. A landscaping company on the right heading north looks visually appealing with immature landscaping and an attractive wood sign. An agricultural store has no landscaping between the parking lot and NH 28. A carpet business on the right could be made more attractive with more landscaping and less

pavement. A country store could have more greenery, shrubs, and flowers to complete the old-time feel of the site. Traffic islands such as at the intersection of Main Street and NH 28 are plain and could use perennial and annual plantings.

PITTSFIELD

Just after the Chichester town line, a vacant industrial / manufacturing / commercial building appears available for reuse in Pittsfield. Wide travel lanes with wide shoulders are found along much of NH 28 in Pittsfield and most residential homes and commercial facilities are set far back from the road. This setup encourages fast travel and makes it more difficult for drivers to see upcoming businesses; as a result, the signs are larger. There are a few new buildings that were built with architectural character, including a professional building and a gas station. Other businesses populate the corridor, including a construction industry business, storage units, a jewelry business, restaurants, and others. Businesses are generally screened from residences by natural tree buffers.

There were no properties for sale in Pittsfield observed along NH 28. An opportunity for a business relocation is found on the west side of NH 28 where a large vacant commercial/industrial building is for lease.

Business signs are larger and taller in order to be seen from NH 28, as most are set back from the wide road. A billboard for a jewelry business on the side of the road draws the driver's eye but is too large for the feel that Pittsfield is trying to foster. An automatic teller machine sign is exceptionally tall. Two electric moving signs were observed. An attractive sign directory has different fonts and colors, which renders the individual signs difficult to read. Signs are often unclear when several are within sighting distance because of the size and contrast variation. An opportunity for sign regulation exists within Pittsfield for a consistent feel that both limits the distraction of drivers and invites them to stop at businesses.

Exterior lit signs are common, and buildings often have floodlights. Lighting at a gas station was observed as appropriate for the site as well as architecturally interesting with low, black historic poles. Traffic signalization on the Pittsfield section of the NH 28 is abundant. Areas of blinking lights or traffic lights include at intersections with NH 107, River Road, Leavitt Road, and Loudon Road.

As is found along most of the NH 28 corridor, Pittsfield has much of its non-residential uses screened by natural tree buffers. One example of such an arrangement is a commercial/construction/industry business on the east side of NH 28, which is screened by a natural buffer from residences. Some of these businesses appear to be home businesses.

Some new commercial buildings with architectural character are missing the landscaping component. A gas station on the east side of NH 28 is an attractive example of new architecture although little landscaping is present. An asphalt traffic island just south of Barnstead is a lost opportunity for a landscaped gateway into the community. Plain mowed grass landscaping is present in places. A beautiful example of landscaping is found at a business on the east side of NH 28 with retaining walls and a pond with a fountain.

BARNSTEAD

The section of NH 28 through Barnstead heading north begins with wide lanes and shoulders, which encourage faster traffic flows. As with other sections of the corridor, homes are taken care of with pride. A scenic tree farm and horse boarding center is located on a hill on the west side. Tree stands seem to stretch along for miles. Barnstead has a friendly feel through its land use. A few larger businesses such as self-storage units, a Mobil station, and a motor sports store are interspersed with quaint small businesses, a restaurant, a campground and a country store that begin to take on a more tourist-type character. Farm stands and crafters set up a temporary business site along the roadside. Numerous gravel roads are located off of NH 28. A gravel operation is located on the west side. A commercial node is situated at South Barnstead Road. A large wetland is located on the west side near the Alton town line. Open space and views of nearby hills offer a pleasing gateway into the Lakes Region.

Commercial properties are for sale on the east side of NH 28, including 114 acres north of the junction with NH 107. Three residential lots are for sale north of NH 126. Other commercial acreage includes lots near the SAU offices, near Watson Road, and near NH 126.

Signage is often consistent with the rural character of the area: artsy in nature, of wooden materials and generally appropriate. However, multiple temporary and permanent reader board signs were observed which detract from the feel that is conveyed by the wooden signage. An electronic blinking interchangeable sign at a restaurant could be modified into a permanent sign to be consistent with the character of Barnstead.

A pedestrian sign to cross from one side of NH 28 to the other at a country store suggests the opportunity of a node as it has the potential for a commercial center.

When found on signage, lighting was mostly exterior. One gas station had an interior lit sign. Pole lighting was sometimes found to be unshielded, casting more light than was needed for the site. Street lighting was found over NH 28's intersection with Colony Drive.

Buffers between uses were natural tree stands, which are typically seen in the other four communities in the corridor. Side buffer distances seemed appropriate in most instances and the businesses were often partially screened from the road by trees.

The SAU 86, located in a beautiful building appropriate to the rural surroundings on the eastern side of NH 28, is nicely landscaped. A traffic island at South Barnstead road was landscaped with annual plantings and added a vibrant feel to the area.

ALTON

NH 28 narrows through Alton, and has no shoulders. Larger, older, traditional homes are on left. The lots seem small, and the driveways are wide with poor visibility to NH 28. The road needs some reconstruction although the speed limit is fast. There is more of a rural feel with trees within 10 feet of the travel way. A large wetland is located on the west. An eclectic mix of high-density residential uses, agricultural and vacant land, and non-residential uses are scattered along the corridor. Locke Lake is located on the east side of NH 28 with side roads to cabins. Quintessential lakeside cottages dot NH 28. Agriculture is present in areas such as at Crescent Lake Farm. Few businesses, including a garden center, thrift shop, and a motor-sports center are found until just south of the traffic circle. Prospect Mountain High School, accessible by a side road, is located on the west side of NH 28. An elderly housing development on the east, a cemetery, and a Masonic temple round out the varied

development found along this stretch through Alton. Like Barnstead, gravel roads turn onto NH 28. A large naturally landscaped traffic circle is situated at the northern end of the study corridor.

More properties for sale were observed in Alton than for all of the other four communities in the corridor combined. On the west, a multifamily residential lot and a residential lot on the east side just opposite are for sale. Multiple other residential properties were for sale. A gravel operation on the west side of NH was advertised. At the traffic circle, a large commercial site is available. A significant potential for subdivision exists on the west side of NH 28 between Stockbridge Road and Main Street.

Most signage along the corridor is appropriate for the location and land use type. A few are too large and billboard-like, such as some at Halfmoon Lake. Generally, signage appears older and established. A lovely permanent theater sign is appropriate for the site, but a portable reader board sign could be modified to have a similar feel. Most signs are freestanding and few are mounted on the buildings. Reader board signs are common. A few handcrafted signs add to the ambiance of the setting. A garden center has an appropriate sign directory with consistent lettering and colors. A senior housing community has an inviting sign and entryway.

Lighting at the crafting barn on the east side of NH 28 is rustic-looking and appropriate for the setting. Sign lighting is generally exterior, which is appropriate. One example is the school sign lighting.

The intersection lighting with Stockbridge Corner is very clear, with yellow flashing lights at and leading up to the intersection. A few street lights along NH 28 are placed a couple of miles apart.

Like other communities in the corridor, natural tree buffers separate most uses. With the exception of the lake area and the area south of the traffic circle, residences and businesses are spaced far enough part to take advantage of the tree stands. At the lake and traffic circle, tall landscaping may be more suitable for buffering businesses and residences.

Opportunities for landscaping non-residential uses are found along the corridor. One such location is a thrift shop on the east side of NH 28. A lovely triangle island was landscaped as a rock park and offers a rural flavor to the area. Since NH 28 is narrow through Alton, riprap in the ditches is evident and requires some cleaning. At an established thrift shop, the access to NH 28 is as wide as the building and is all asphalt, with drivers backing into the road to leave the business. Here, a landscaped buffer could serve to alleviate a safety hazard if an alternate parking area was available. The traffic circle is naturally landscaped with a tall, pleasing vegetative buffer in the middle.