

NH Route 140 Corridor Study



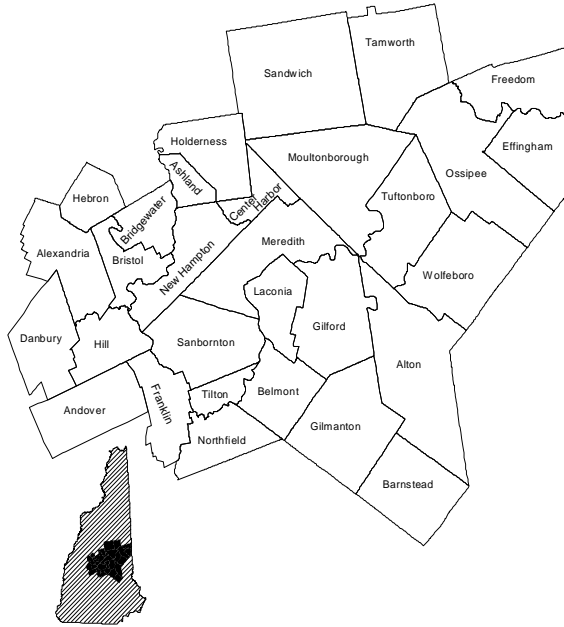
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THE LAKES REGION PLANNING COMMISSION



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1. INTRODUCTION

Identified as a primary corridor of critical importance to the region or “lifeline corridor” in the *Lakes Region Transportation Plan 2008*, NH Route 140 (NH140) is one of nine roadways that handle the majority of the traffic flow through and within the region and provide direct connection to other lifeline corridors. The lifeline corridors that intersect NH140 include: US Route 3/NH Route 11, NH Route 106, and NH Route 11. Additionally, Interstate 93 near the NH140 western terminus in Tilton and NH Route 28 near its eastern terminus in Alton are immediately adjacent lifeline corridors.

Spanning 21.1 miles, NH140 serves a progressively lesser volume of daily traffic from west to east. The average daily traffic carried in 2010 was approximately 8,100 vehicles on NH140 in Tilton compared to 2,100 vehicles in Alton. The traffic volume on NH140 decreases significantly east of NH106 in Belmont and decreases moderately again east of NH107 in Gilmanton. The most rural section of NH140 between NH107 in Gilmanton and NH11 in Alton provides access to several popular recreational areas including: Crystal, Manning, Suncook, and Sunset Lakes, Hills Pond, and the 3,270 acre Hidden Valley Wildlife Conservation Easement which is home to the Hidden Valley Boy Scout Reservation, Camp Bell Reservation, and Easter Seals Camp. Many of the lakefronts in this area are dotted with a mix of year-round and seasonal homes which attract visitors to the NH140 corridor.

Also known as the Frank C. Gilman Highway in Alton, NH140 provides the most direct access to the interstate from the east as far north as Lewiston, Maine and south to the Dover area in New Hampshire. The movement of goods by truck in the NH140 corridor is influenced by Tilton which serves as a regional commerce center, a large asphalt paving and aggregates industry in Northfield, and the Northfield Commercial and Industrial Zone with access located directly on NH140. Other contributing factor to traffic on NH140 are several annual NASCAR and other smaller events hosted by the New Hampshire Motor Speedway located 6.8 miles to the south on NH106 which can attract more than 100,000 spectators. Further traffic diversity is provided by an active farm in Belmont adjacent to the village center that sells locally grown vegetables on a seasonal basis and an inter-regional bicycle and pedestrian trail in the development stages. A built portion of the trail currently ends in the commercial district in Tilton on NH140 near US3. The trail will eventually cross NH140 making connection with another phase of trail to the northeast in Belmont and Laconia. The town of Belmont envisions a bicycle and pedestrian trail parallel to NH140 from Belmont Village to the Coca Cola plant.



Safety improvements to NH140 from the Northfield/Belmont town line, east 3.4 miles to NH106 was once programmed in the New Hampshire Ten Year Plan for transportation improvements. The project was removed in 2009 due to budget constraints, changed regional priorities, and local community acceptance to making incremental improvements on NH140 in favor of a major reconstruction/realignment project that was slated to address steep grades, sharp curves, restricted sight distances, insufficient guardrails, and traffic management.

While moderate traffic volumes exist today, future development potential within the NH Route 140 corridor is great. The corridor is currently experiencing increased traffic pressure as alternative

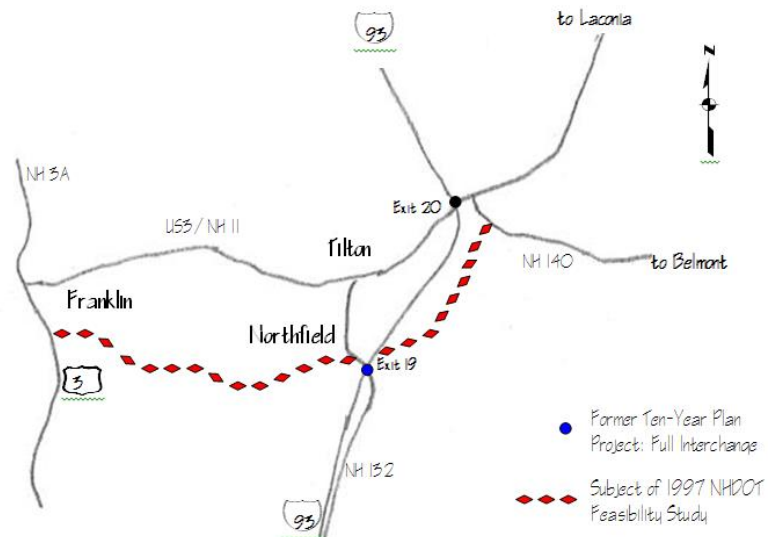
routes are explored by motorists seeking to avoid seasonal traffic congestion on US3/NH11 - the most heavily traveled state route in the Lakes Region. Residents describe one such alternative route, which adds nearly six miles to a five mile trip to downtown Laconia, as taking less time during seasonal congestion periods (Silver Lake Road, Tilton to Jamestown Road, Belmont to NH140 to NH106 to Laconia). Other alternative routes that utilize NH140 and roadway improvements have been explored in past studies as well including:

1994 - Route 3/11 Corridor Study

Senate Bill 60-A (February 18, 1992) established a Policy Committee/Task Force to work with NHDOT, affected municipalities, and LRPC to study and make recommendations concerning upgrading, construction, repair, and realignment within existing highway corridors. This study acknowledged that improved connections east of Exit 19 to NH Route 140 might help address regional transportation concerns. The committee concluded that continuing development at Exit 20 justified exploring alternative eastbound connections from Interstate 93.

1997 - Feasibility Study of an Alternate Highway for US Route 3 in Franklin

The Legislature passed HB-1339-FN-A in 1996 which established... "A committee to conduct feasibility study relative to the constructions of an alternate highway for Route 3 South in Franklin to Exit 19, making Exit 19 a 4-way interchange, and continuing East to Route 140." An alternate highway was proposed including two concepts in Northfield to connect Exit 19 to NH140: A) Hidden Lane, Bay Hill Road, Shaker Road, South Road, and B) Caveny Drive, Shedd Road to NH140 via one of two short new roads.



2000 – Representative Thomas presented a draft proposal for upgrades to NH Routes 11 and 140. The proposal included re-designating all of NH Route 140 as NH Route 11.

2000 - NH 140 Bypass Study

NHDOT proposed six alternative routes to bypass the Belmont village area. In response, the town selectmen formed a Route 140 Advisory Task Force consisting of town officials, regional planning groups and citizens of the town. The Bypass Study presents several alternatives to improve traffic operations and safety on NH140 through Belmont. Based on the study findings, feedback from the community, and the endorsement from the Belmont Board of Selectmen, the Advisory Task Force recommended that the "B2 Upgrade" alternative be carried forward for further study and design. The B2 upgrade would: 1) provide a consistent roadway cross-section and improved alignment to the north of the existing roadway; and 2) improve geometry of intersections including complete reconstruction

of the intersections at Main Street and at North Main Street/Church Street, in each case providing a through movement for NH140 traffic.

2000 – Routes 11 and 140 Upgrade Study

NHDOT proposed six alternate routes to bypass the Belmont village area. All routes rejected. Town proposal (B2) accepted and submitted to NHDOT. Route 140 options (construction of bypass from Tilton to NH106) recommended to be retained on the Ten Year Plan.

Currently, there are no projects in the state Ten Year Plan for the improvements noted above including:

- modifications to US3/NH11 to improve traffic congestion;
- a full interchange at Exit 19;
- formalization of alternative routes connecting to NH140 or any type of bypass; or
- NH140 reconstruction/realignment.

Proposed NH Route 140 in-corridor improvements in the state Ten Year Plan are limited to opposing left turn lanes on NH140 at the intersection of Jamestown/South Roads in Belmont. This project is slated for construction in 2015 to be funded through the Highway Safety Improvement Program (HSIP).

In the absence of plans to advance recommendations from past studies, the intent of this *NH Route 140 Corridor Study* is to explore and prioritize strategies designed to enhance the traveler experience which are: 1) endorsed by the participating corridor communities; 2) considered by NHDOT in the allocation of scarce resources; and 3) consistent with regional goals and priorities. 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. While the study area is the full extent of NH140, detailed analysis is focused west of NH107 where traffic volumes and development pressures are most significant.

2. STUDY TEAM

The Board of Selectmen in each NH140 community was asked by LRPC to appoint representatives to a Local Advisory Work Group (LAWG). LRPC suggested representation from up to four candidates from the following groups: municipal staff, Planning Board, Board of Selectmen, LRPC Transportation Advisory Committee, business owner, and/or interested resident. The LAWG consisted of a broad base of local representatives with planning experience or a working knowledge of the NH Route 140 corridor. Resource Systems Group, Inc. was hired by the LRPC through a qualifications-based selection process to assist in the preparation of preliminary conceptual designs for priority concerns identified by the LAWG.

LRPC staff facilitated LAWG meetings, prepared agendas, and draft meeting notes. A NH Route 140 Corridor Study web page was created to facilitate the exchange of information including meeting notes, drafts of the plan and maps, data collection results, and general information

regarding the purpose of the study.¹ Notes from each of the LAWG meetings are located in Appendix A. The LAWG meeting dates and agenda items for discussion are listed below:

March 28, 2012

- Kick-off Meeting:
Project purpose, goals, timeline, and supporting documents;
Current improvement projects;
Determine extent of build-out analysis;
Identification of areas of concern.

July 25, 2012

- Meeting 2:
Review build-out and trip generation methodologies
Discuss accident history
Review traffic count locations

October 31, 2012

- Meeting 3:
Refine build-out methodology
Discuss future development potential
Review traffic count results
Consultant selection process update

November 21, 2012

- Field assessment conducted by LRPC and consulting staff

December 12, 2012

- Meeting 4:
Summary of field assessment
RSG presentation of preliminary recommendations
Finalize build-out methodology
Review draft trip generation map

January 31, 2013

- Meeting 5:
Review and prioritize revised recommendations
Establish report presentations to Boards of Selectmen

3. EXISTING CONDITIONS

Population Trends

The combined US Census population for the five NH140 corridor communities (Alton, Belmont, Gilmanon, Northfield and Tilton) was reviewed. Historic trends indicate a 216 percent population

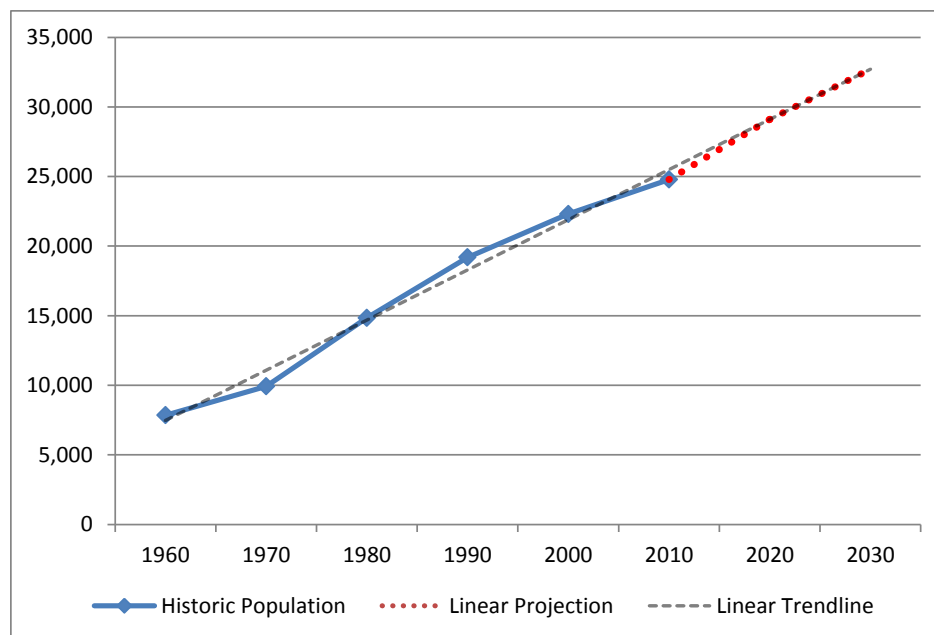
¹ http://lakesrpc.org/services_transportation_route140.asp

increase from 7,851 (1960) to 24,779 (2010) or a 4.3 percent annual average rate of growth. The population projection in Figure 3.1 indicates a below average rate of growth of 1.6 percent annually beginning in 2010 will produce a combined population of 32,700 in 2030. While the impacts of community-wide population growth do not necessarily equate to increased traffic impacts within the NH140 corridor, population data and other factors such as the availability of developable land, attractiveness of the area, existing settlement patterns, and direct access to the interstate and commuter corridors, clearly indicate the potential is great for growth to be accommodated within proximity to the 140 corridor. The commercial and residential development potential within the corridor will be explored in greater detail.

Review of subdivision and residential permitting data from 2005-2010 indicates three of the five corridor communities (Alton, Belmont, and Northfield) have experienced greater development activity in comparison to other Lakes Region communities. This timeframe is generally characterized by a significant economic and housing market decline and slump, but produced the following noteworthy observations that support development pressure and population growth in proximity to the NH140 corridor:

- ❑ The town of Alton was one of five Lakes Region communities issuing the greatest number of residential building permits from 2006 to 2010.
- ❑ The towns of Belmont and Northfield accounted for approximately 17 percent of the reported land acres subdivided in the Lakes Region in 2010.
- ❑ The towns of Alton and Belmont represented 31 percent of the reported lots created in the Lakes Region in 2006.²

Figure 3.1: NH Route 140 Corridor Communities Population Trends 1960-2030



² *Development Activity in the Lakes Region*, Lakes Region Planning Commission, 2006-2012

Recurring Accident Analysis

LAWG members requested a five to ten year historic motor vehicle accident summary from their local police department. The historic accident data was reviewed by LRPC staff to: 1) assist in determining areas of greatest safety concern throughout the corridor; and 2) provide guidance on where additional information, such as traffic turning movement counts and state reported accident reports, may be warranted to assess potential solutions at priority locations. Figure 3.3 displays the approximate location of the recurring crash sites using the alpha-numeric reference for each site from Figure 3.2 (A1 = Alton site with most recurring crashes).

Figure 3.2: NH140 Historic Accident Summary by Corridor Community

Alton: June 2004 - June 2012

Total Accidents: 45
 Annual Average: 5.6
 Accidents at recurring locations: 7

Recurring Locations and Number of Recurring Accidents (highest to lowest)

A1.	Main Street (Route 11) at NH 140: 3
A2.	NH 140 1,000' west of Elliot Street: 2
A3.	725 Frank C. Gilman Highway (NH140): 2

Belmont: 2000 - 2011

Total Accidents: 169
 Annual Average: 15.4
 Accidents at recurring locations: 164

Recurring Locations and Number of Recurring Accidents (highest to lowest)

B1.	NH 106 at NH 140: 53
B2.	Main Street at Gilmanton Road: 46
B3.	Main Street at Depot Street: 24
B4.	NH 140 at Jamestown Road: 20
B5.	NH 140 at Dearborn Street: 10
B6.	NH 140 at Scenic Drive: 6
B7.	NH 140 at Best Street: 5

Gilmanton: 2002 - 2012

Total Accidents: 46
 Annual Average: 4.6
 Accidents at recurring locations: 45

Recurring Locations and Number of Recurring Accidents (highest to lowest)

G1.	NH 140 at NH 107: 37
G2.	NH 140 at Sawtooth Road: 4
G3.	NH 140 at Shannon Road: 2
G4.	NH 140 at Crystal Lake Road: 2

Northfield: 2007 - 2011

Total Accidents: 26
 Annual Average: 5.5
 Accidents at recurring locations: 19

Recurring Locations and Number of Recurring Accidents (highest to lowest)

N1.	NH 140 (within 500') Riverside Park Drive: 5
N2.	NH 140 (1,500' - 2,300' east) Riverside Park Drive: 5
N3.	NH 140 at Shaker Road: 4
N4.	NH 140 (within 200' west) Belmont/Northfield town line: 3
N5.	NH 140 (500' east) Shaker Road: 2

Tilton: January 2007 – July 2012

Total Accidents: 68
 Annual Average: 12.2

Recurring Locations and Number of Recurring Accidents (highest to lowest)

Location information not provided.	
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Figure 3.3: NH140 Recurring Accident Sites



The initial accident review focused on the identification of areas with recurring crashes. Additional information or assessment may be required to best assess safety improvement strategies at these recurring accident locations. For each corridor community, the locations with the greatest number of recurring vehicle accidents were noted and reviewed by the LAWG. Figure 3.2 summarizes the results of the historic accident data review. For example, from June 2004 to June 2012 there were a total of 45 vehicle accidents on NH140 or at the intersection of NH140 with side streets in Alton. Of the 45 total accidents, seven occurred at three locations: Main Street/NH140, Elliot Street /NH140, and near 725 Frank C. Gilman Highway. Main Street/NH140 was the location with the most recurring accidents (three) during this time period. LRPC staff followed up with the Alton Police Department to better understand specific sites and the potential to include or dismiss individual sites for further study. For example, the Alton Police Department verified the nature of the two accidents that occurred in proximity to 725 Frank C. Gilman Highway were not related to a need to improve roadway conditions and the Main Street intersection at NH140 is a priority area of concern.

When the recurring accident locations were discussed by the LAWG and based on consultation between local police departments and LRPC staff, the following observations and recommendations were made:

- Alton** Main Street presents a functional challenge: tractor trailers turning onto NH140 are forced to occupy a portion of the NH140 eastbound lane due to limited turning radius. Currently the town of Alton is working on planned improvements at the adjacent Monument Square. The plans are available for review and may be beneficial when considering the configuration of Main Street at NH140.
- Belmont** While the accident history indicates NH106 at NH140 had the highest recurring accident location; intersection improvements have significantly reduced the frequency of accidents at this location in recent years. The leading concerns are the intersections of Gilmanton Road, Depot Street and Jamestown Road at NH140. Improvements at Jamestown Road are currently being addressed through the Highway Safety Improvement Program (HSIP). The LAWG determined turning movement counts would be beneficial at Depot Street and Church Street during high school arrival and departure times (LRPC conducted these counts as part of this study). Limited line of sight and grade challenges at the intersection of Best Street at NH140 make this a good candidate for further review.
- Gilmanton** All LAWG members generally agreed NH107 at NH140 warrants safety review and improvements based on limited westbound and northbound site distance, lack of sidewalks and crosswalks, and the number of recurring accidents which does not account for a multitude of observed near misses. The site may be challenging to improve due to the historic district and structures, and because of the steeply sloped approaches to the intersection.

It should be noted funding for this study and the size of the study area allowed only a portion of the sites with recurring accidents to benefit from further detailed review. The remaining sites may have compelling need for safety improvement and further safety analysis.

Right-of-Way Controls and Access

The three types of right-of-way access to NH140 were determined by LRPC staff with the assistance of NHDOT Right-of-Way Bureau and the NHDOT District 3 office. The three types of access are generally described as follows:

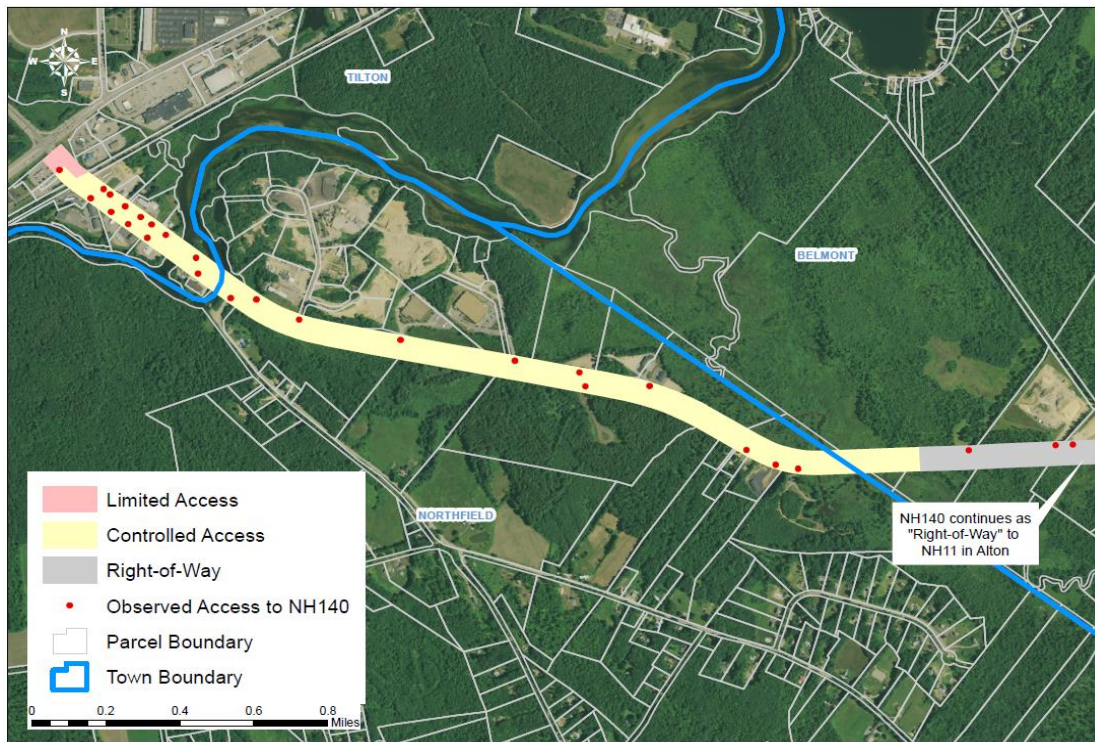
Limited Access (LAROW) - the most restrictive; typically allowing no access.

Controlled Access (CAROW) - granted as part of the public hearing process required during the development of a highway project. While access points are previously identified anyone seeking access must follow the NHDOT driveway permitting process. Although the number and location of the access points are identified at the time the roadway was constructed, the access points may be moved during the permitting process if the number of access points remains the same.

Right-of-Way – least restrictive right-of-way requires an NHDOT driveway permit.

The vast majority (19.8 miles) of NH140 is classified as Right-of-Way, where access locations can exist on either side of the road once every 250 feet on average. Figure 3.4 indicates the types and location of access restrictions in the NH140 corridor. The likely locations of 23 of the 29 access points established when NH140 was built in the 1940s are highlighted within the controlled access portion of the corridor. Access point locations were initially identified using GIS software together with aerial photography and later verified with assistance from NHDOT District 3 through the review of access permit files and project plans.

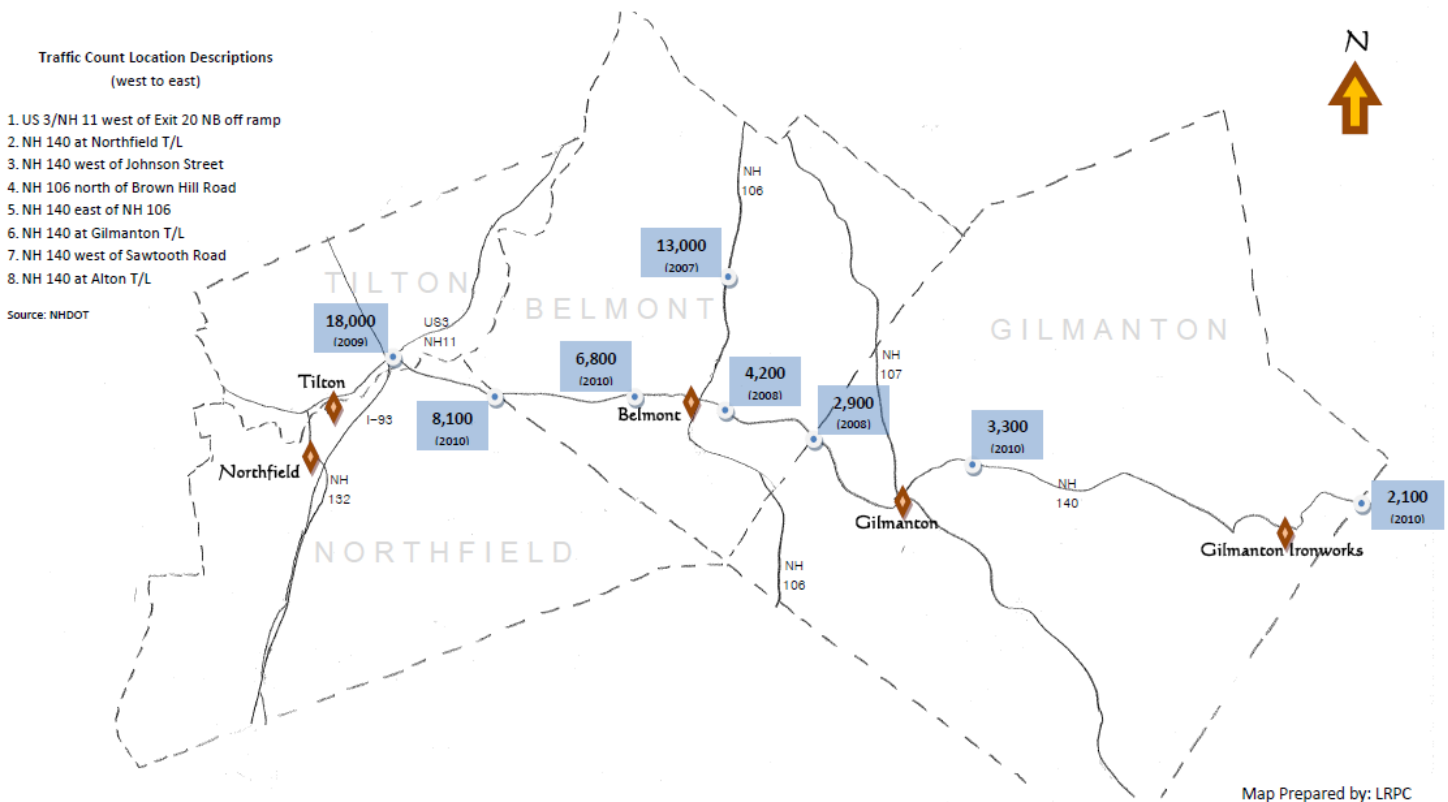
Figure 3.4: NH140 Right-of-Way Controls



Vehicle Traffic

The NH Department of Transportation maintains traffic statistics for predetermined locations statewide. The traffic volumes reported by DOT are seasonally adjusted to reflect annual average daily traffic (AADT). Data is generally collected at each location on a three year rotation. Figure 3.5 indicates historic AADT volumes in and adjacent to the NH140 corridor.

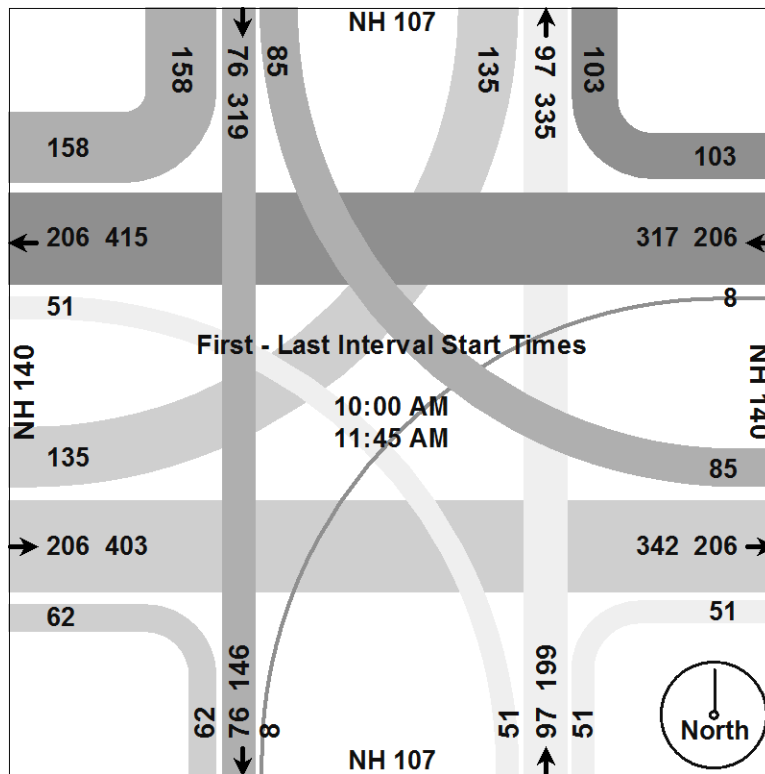
Figure 3.5: Annual Average Daily Traffic at Select Locations



The LRPC collected additional traffic data in 2012 based on specific areas of concern identified by the LAWG. These special traffic counts included the following:

- Turning movement counts were conducted at five key locations in the corridor study area during peak AM and PM traffic periods during the day. The turning counts detail vehicle movements through intersections and the volume of traffic in all directions during one-hour intervals. Figure 3.6 shows the results of the Saturday morning turning movements of vehicles traveling through the intersection of NH140 and NH107 in Gilmanton between the hours of 10:00AM and noon. During this time, a total of 1,238 vehicles moved through the intersection. Turning movements can show potential conflicts and provide clues for potential safety improvements and intersection enhancements. The turning movement data collected by LRPC was summarized and provided to the consulting engineers from Resource Systems Group, Inc. (RSG) for their use in the assessment of potential safety improvement recommendations. Diagrams for all five turning movement locations are located in Appendix B.

Figure 3.6: NH140 at NH107 Turning Movement Count – August 25, 2012



- Automatic traffic recorders were used to clock vehicle speeds at five locations to further assess safe travel patterns at posted speed limits. Figure 3.7 shows the results of a speed count conducted from July 24 through July 31, 2012 for vehicles southbound on NH107 north of NH140 in Gilmanton. During this period, speed was recorded for a total of 9,620 vehicles: approximately 2 percent traveling at excessive speed (more than 15 miles per hour over the speed limit); approximately 43 percent traveled five or more mile per hour over the posted speed limit of 30 miles per hour, and approximately 19 percent were traveling at or below the posted speed limit. These results contrast with northbound traffic during the same timeframe, where 82 percent of the northbound vehicles traveled within +/- five miles per hour of the posted 30 mile per hour speed limit. Diagrams for all five speed counts are located in Appendix B.
- Several traffic volume counts were conducted for the NHDOT annual traffic data collection program in proximity to NH140 and are included in Appendix B. These temporary, week-long counts are typically conducted on a three-year rotation. Figure 3.8 shows results of the data collected from June 25 to July 2, 2012 on NH106 at the Belmont/Laconia municipal line. Noteworthy is the average daily traffic (ADT) versus annual average daily traffic (AADT). The ADT represents the average vehicles recorded per day, during the week the data was collected. The AADT reflects the average amount of traffic at a location on any given day of the year once adjusted for seasonal factors. In this case, the season adjustment

factor (.81) was derived from the average seasonal variation from permanent traffic counters on recreational highways.

It is common practice to base road improvements on AADT thus accounting for average traffic conditions and not over building to seasonal conditions. While AADT is a fundamental measure for management of transportation systems, studies have shown AADT values can vary by at least 11 percent in 95 percent of cases with regional routes serving commuter and business trips. Regional routes with these characteristics represent the smallest AADT estimation errors in the referenced studies; heavy traffic rural routes serving recreation areas have shown the highest estimation errors. Despite their importance, AADT values are simply rough estimates of traffic counts along the vast majority of roadway sections.³ Unadjusted traffic volumes are often used in the calculation of crash rates (crashes/ADT) providing more accurate results.

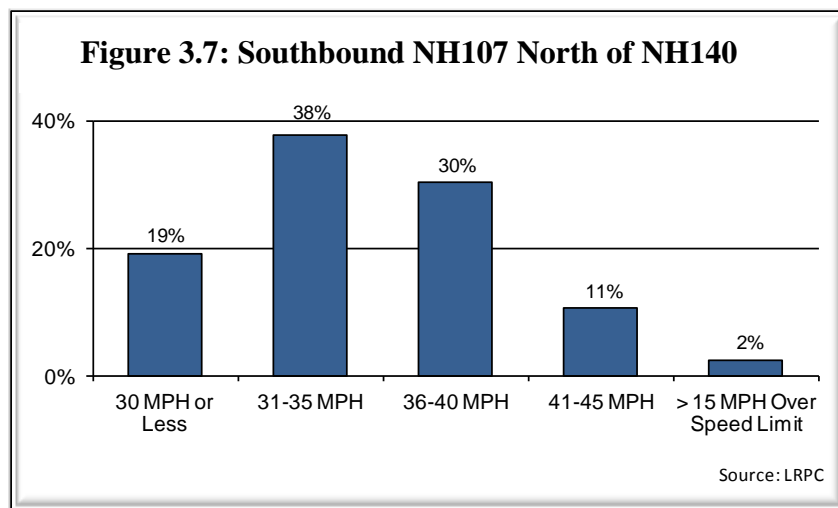
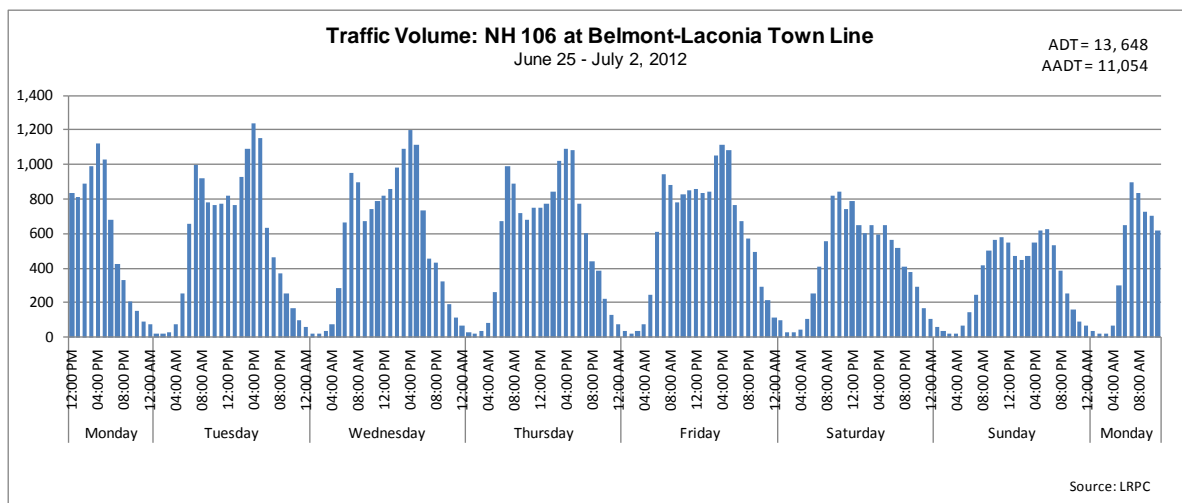


Figure 3.8: NH106 at Belmont/Laconia Town Line



³ *Estimates of AADT: Quantifying the Uncertainty*, Presented at the World Conference on Transportation Research, The University of Texas at Austin, 2007.

Noting the challenges associated with AADT accuracy, the decreased traffic on NH106 at the Belmont/Laconia municipal line is consistent with a general decrease in traffic volume region-wide. This downward trend is likely the result of lingering impacts from the Great Recession, which has affected Lakes Region tourism, construction, and attendance at large events such as Motorcycle Week in Laconia.

4. BUILD-OUT ANALYSIS

A useful tool in assessing future growth potential within a community or transportation corridor is build-out analysis. This planning tool is used to calculate the total development that *could* occur given existing zoning and other land use regulations. The analysis provides valuable information to support planning board decisions by detailing potential future land use, development capabilities, and the amount of additional traffic that could be generated if the corridor was developed to its full potential.

The following is a description of the data used in developing the build-out and the analysis process. The outcome is an estimate of future development expressed in terms of the number of potential housing units and the square feet of commercial and industrial building space that could be built if full development capacity were reached. Based on these results, a final estimate was produced on the assumption that future development will generate a specified amount of traffic.

Data Development

The mapping component of the build-out analysis required parcel information in Geographic Information Systems (GIS) format. This data was acquired from the New Hampshire Department of Revenue Administration (NHDRA) for the towns of Tilton, Northfield, Belmont, and Gilmanton. Computer Assisted Mass Appraisal (CAMA) data, which included detailed tax assessor information, was used to improve the accuracy of the parcel acreage information and provide additional parcel level detail. Attributes not contained in the CAMA data were added through the use of GIS overlays and aerial photograph interpretation. This information included zoning districts, minimum lot size requirements, water and sewer service availability, maximum residential density, and minimum lot frontage requirements. Various sources were used to assess environmental constraints including: New Hampshire Hydrography Dataset, National Wetlands Inventory, Society for the Protection of New Hampshire Forests steep slopes and conservation lands, Natural Resources Conservation Service soils, and 2003 USDA National Agriculture Imagery Program.

Land Use Updates

In order to more accurately analyze the potential for development along the corridor, it was necessary to update existing land uses. This was accomplished using assessor databases, 2008 digital orthoquad color photographs, and 2011 Google satellite imagery. Members of the LAWG verified the GIS-based land use assessment and provided further details where necessary. Additional feedback was provided by LAWG representatives about the number of existing units and uses. For example, the number and use of units in multi-unit structures were verified based on local knowledge.

Limits of Build-Out Analysis

For the purpose of this study the corridor was defined as all parcels within 1,000 feet of NH Route 140. This boundary was extended slightly in Northfield to include parcels within Northfield's Tax Increment Finance District. Funding constraints, the scale of the study (21.1 mile corridor), and lack of detailed information needed for each of the five corridor communities precluded a corridor-wide build-out assessment. As a result, the LAWG identified three corridor segments for build-out analysis based on the greatest likelihood of near-term development and consideration of the greatest potential for impacts on travel within the corridor if development should occur. Because the three sections differ in available land for development and permitted land uses, they provide a good cross section of the corridor as a whole.

The limits of the build-out analysis are displayed in Figure 4.1. A description of each of these sections follows:

Section 1: Extending east 1.77 miles from the western terminus of NH140 at US3/NH11 in Tilton to the Northfield/Belmont town line. This section consists of 458 acres in Northfield, 231 acres in Tilton, and includes dense commercial and industrial uses with relatively heavy vehicle traffic.

Section 2: Extending east 1.4 miles from approximately 0.55 miles east of NH 106 in Belmont to the Belmont/Gilmanton town line. This section lies east of Belmont Village Center and is zoned "Rural". It consists of 789 acres, mostly comprised of low-density residential development.

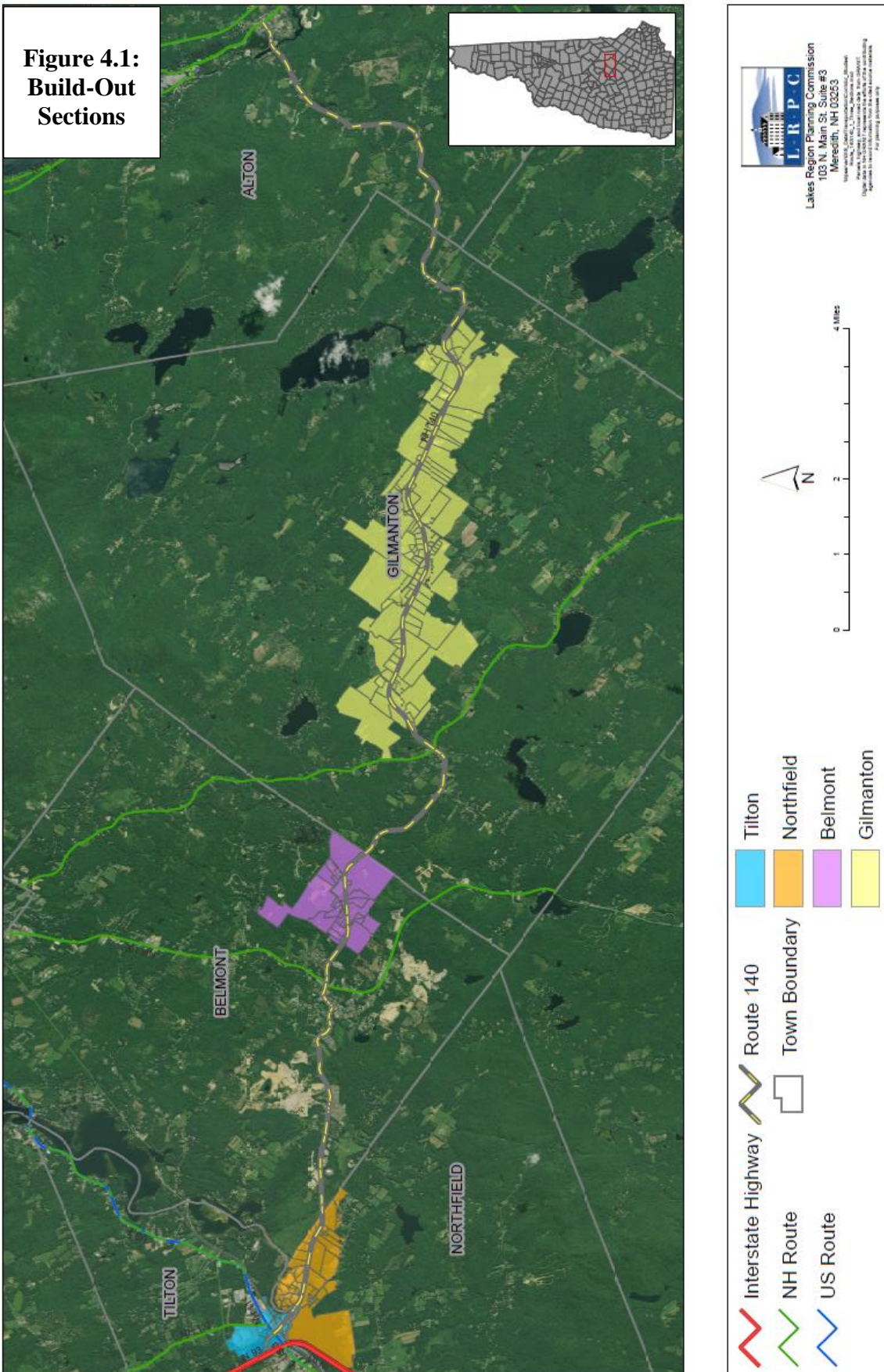
Section 3: Extending 5.6 miles east from approximately 0.5 miles east of NH107 in Gilmanton to the Suncook River in Gilmanton. It consists of 3,426 acres. The entire section is zoned "Rural," however existing land uses include single-family residential, multi-family residential and institutional land uses including a library and school.

Build-Out Methodology

The following descriptions outline the steps and assumptions used to determine land available for future development. Once this calculation was made additional assumptions were applied to draw conclusions about future traffic generation from development within the corridor.

a. Total Acreage: Local zoning was applied to the three build-out sections. The total acreage represents the total land area of all parcels within each zoning district according to tax assessor information.

b. Environmental Constraints: Environmentally constrained areas were determined according to existing land use regulations using GIS software. In all areas it was assumed development is not permitted in wetlands or conservation land. Other community specific constraints included steep slopes, the presence of hydric or poor-draining soils, and water body setbacks. The land area was calculated for specific environmental constraints which were subtracted from the total acreage of each parcel.



c. Zoning Constraints: Several zoning defined restrictions were applied to each parcel as based on corridor community zoning ordinances. Map 1 indicates the existing zoning in each of the build-out sections. Figure 4.2 provides an overview of these dimensional constraints applicable by town and zone. Map 2 indicates the extent of the environmental constraints in each of the build-out sections.

Figure 4.2: Zoning Constraints by Zoning District

Zone	Minimum Lot Size (acres)	Minimum Frontage (feet)	Maximum Lot Coverage (percent)	Maximum Residential Density (units per lot)
Tilton - Regional Business	1	0	75	NP
Northfield - Com/Ind	0.5	150	50	NP
Northfield - Conservation	5	250	50	2
Belmont - Rural	3	180	NA	1
Gilmanton - Rural	2	200	NA	1

NP = not permitted

Additional assumptions were applied for specific circumstances not defined in local ordinances as follows:

- ❑ For commercial and industrial development, after the maximum lot coverage was calculated, the remaining commercial area was reduced by 25 percent to account for parking, driveway, and landscaping.
- ❑ For parcels with insufficient frontage to meet zoning requirements 15 percent of the area was subtracted to account for land that would be consumed by the creation of roadway. The remaining developable area of such parcels was calculated for inclusion in the build-out totals.
- ❑ Parcels that are not likely to be further developed due to their ownership status or use are considered “built-out” for the purposes of this analysis, meaning that they have no further development potential according to the zoning ordinance and land use regulations. These include town or utility company land as well as landlocked parcels (i.e. parcels without existing road frontage). Areas within parcels currently in use for parking and commercial buildings were also considered to be built-out.
- ❑ Several parcels in Northfield lie within two zones. For these parcels, zoning was applied according to the zone with the greatest land area.

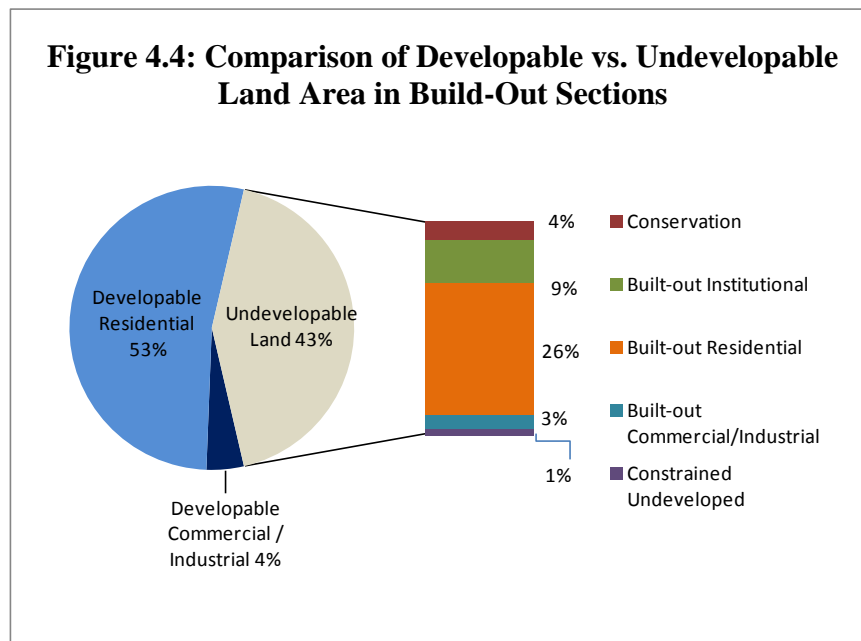
d. Net Developable Land Area: The net developable land area is a measurement of the total amount of land that is unrestricted due to environmental or zoning constraints, is not considered built-out, and may be utilized for either the creation of additional residential lots or for commercial or industrial development.

Build-Out Land Analysis Summary

The net developable land area in the three build-out sections analyzed is approximately 2,808 acres or 57 percent of the total area (4,904 acres) reviewed. Figure 4.3 summarizes the results of the land analysis by community. Figure 4.4 provides the detail about the undevelopable land. Noteworthy is that of the 2,096 unbuildable acres, approximately five percent is either constrained (1 percent) or in conservation (4 percent).

Figure 4.3: Net Developable Land Area in Build-Out Section Communities

	Belmont		Gilmanton		Northfield		Tilton		Total	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Total Acreage in Build-Out Section	789	100%	3,426	100%	458	100%	231	100%	4,904	100%
Built-out, Constrained, Conservation	290	37%	1,401	41%	276	60%	129	56%	2,096	43%
Net Developable Land Area	500	63%	2,025	59%	182	40%	102	44%	2,808	57%



Trip Generation Projections

The verified land use for each build-out section was reviewed to establish an approximation of the amount of vehicle trips generated by existing land use types. The Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition was referenced to determine appropriate trip generation rates. Where needed, LRPC staff and LAWG members confirmed business details, providing a reasonable match to the business descriptions provided in the ITE manual. Confirmed business details included items such as the number of rooms for motels and number of pumps for gasoline stations. In the few instances where trip generation information was not available for a specific business type, best judgment was applied and the business owner was consulted to gain a

better understanding of specifics about their operation. One such example was a multi-family house with commercial dog kennel.

Of the three build-out sections analyzed only the Tilton/Northfield area contained existing commercial and industrial uses. Due to zoning restrictions, the Tilton/Northfield area is also the only build-out area with future commercial and industrial development potential. Since the entire build-out portion in Tilton is zoned Regional Commercial and no new industrial uses are allowed within this zone, all potential non-residential development in Tilton is projected to be commercial. Figure 4.5 indicates the existing week-day vehicles trips generated by land use for each town portion of the build-out sections. Maps 3 and 4 indicate the existing land use and associated trips generated by the existing land uses in each of the build-out sections.

Figure 4.5: Existing Week-day Trips by Land Use

Northfield

Building (Sq. Ft.)	Commercial	Trips
3,408	General Office Building	38
4,824	2-Family Residential / Dog Kennel	57
11,688	General Office Building	129
11,688	General Office Building	129
31,608		352
Building (Sq. Ft.)	Industrial	Trips
9,275	Manufacturing	35
11,850	Warehousing	42
53,045	Manufacturing	203
120,000	General Light Industrial	836
194,170		1,117
Building (Sq. Ft.)	Government / Institutional / Utility	Trips
1,040	Utilities	4
1,040		4
Dwelling Units	Residential	Trips
17	Single-Family Detached Housing	162
4	Residential Condominium/Townhouse	23
21		185

Gilmanton

Building (Sq. Ft.)	Government / Institutional / Utility	Trips
54,301	Elementary School	838
10,773	Library	606
65,074		1,444
Dwelling Units	Residential	Trips
72	Single-Family Detached Housing	685
6	Residential Condominium/Townhouse	35
4	Apartment	27
82		747

Belmont

Dwelling Units	Residential	Trips
22	Single-Family Detached Housing	209
1	Mobile Home	5
23		214

Tilton

Building (Sq. Ft.)	Commercial	Trips
1,556	Automobile Care Center	26
4,784	Fast-Food Restaurant with Drive Thru	2,373
4,917	Fast-Food Restaurant with Drive Thru	2,439
5,282	Convenience Market with Gasoline Pumps	4,466
5,712	Convenience Market with Gasoline Pumps	4,830
9,158	High-Turnover (Sit-Down) Restaurant	1,164
9,238	Fast-Food Restaurant with Drive Thru	4,582
9,606	Drive-in Bank	1,423
9,741	Fast-Food Restaurant with Drive Thru	4,833
9,760	Specialty Retail Center	433
12,200	Wholesale Market	82
16,200	Automobile Sales	523
29,322	Pharmacy/Drugstore with Drive Thru	2,842
33,664	Motel (Rooms)	355
51,784	Hotel (Rooms)	556
178,268	Shopping Center	7,612
391,192		38,539

Building (Sq. Ft.)	Industrial	Trips
25,220	Manufacturing	96
6,521	Warehousing	23
294,528	Warehousing	1,049
326,269		1,168

Building (Sq. Ft.)	Government / Institutional / Utility	Trips
3,948	Utilities	16
3,948		16

Dwelling Units	Residential	Trips
1	Single-Family Detached Housing	10
1	Mobile Home	5
2		15

The number of potential additional future residential units was determined by excluding the parcels and portions of parcels with no potential for development, as described earlier in this chapter. Where zoning allows for residential development, residentially developable land was divided in a way that maximized density and number of units allowable under current municipal regulation. In cases where existing road frontage would have prevented further development of a parcel, the creation of new frontage was assumed at a reduction of 15 percent of each additional lot's developable area.

CAMA data provided commercial and industrial building area in units of thousand square feet, which were readily summed. The Belmont and Gilmanton build-out sections included no commercial or industrial uses, and current zoning does not allow for future commercial or industrial

uses in these areas. Existing commercial and industrial building area is shown for the build-out area in Northfield and Tilton. The amount of additional future commercial and industrial building area was determined by subtracting existing building area from parcels with commercial or industrial development potential, then removing 50 percent of the land area in Northfield and 25 percent in Tilton to comply with maximum lot coverage regulations. Figure 4.6 details existing and potential development by land use type in each build-out section. Map 5 details the development potential for each build-out section.

Figure 4.6: Existing and Potential Development by Land Use Type

	Existing Residential Units	Potential Residential Units	Existing Commercial (thousand sq. ft.)	Existing Industrial (thousand sq. ft.)	Potential Commercial/Industrial (thousand sq. ft.)
Belmont	23	217	-	-	-
Gilmanton	82	868	-	-	-
Northfield	21	13	32	194	1,649
Tilton	2	-	391	326	785*
	128	1,098	423	520	2,434

*Future development of residential or Industrial uses is not allowed within Tilton's build-out area.

While it is not possible to predict the type of non-residential development that will occur in the future, two methods were used for estimating the amount of additional week-day vehicle trips that may be generated by commercial and industrial land uses at build-out. Projection 1 assumes a proportional distribution of existing commercial and industrial buildings and trips for the net developable non-residential areas in Tilton and Northfield. This projection averages the trips generated by similarly sized existing business and industry. Projection 2 provides a refinement to Projection 1 based on planning judgment, local knowledge, and careful consideration of the each town's existing zoning. Also, consideration was given to the potential for further residential subdivision of parcels that do not meet frontage requirements on existing roads. The two projections provide a combined (existing and potential) range of total week-day vehicle trips between 111,774 to 136,160 at build-out for the three build-out sections. Figure 4.7 displays the results of both projections by community. Based on the assumptions used the amount of week-day trips could increase by 2.5 to 3 times what exists today. Considering increased week-end and seasonal traffic in the area, the week-day figures represent conservative estimates of potential trips generated.

Figure 4.7: Projected Week-day Vehicle Trips at Build-Out

	Existing	Projection 1	Total	Projection 2	Total
Belmont	214	724	938	2,119	2,333
Gilmanton	2,191	3,484	5,675	8,048	10,239
Northfield	1,658	10,838	12,496	10,105	11,763
Tilton	39,737	77,314	117,051	47,702	87,439
Total	43,800	92,360	136,160	67,974	111,774

As a whole, the build-out scenarios project an overall increase in trip generation at a factor of 2.53 (i.e. each trip generated today becomes 2.53 trips generated at build-out.) Thus, a basic projection of trip generation for the entire corridor at build-out would be to estimate existing trip generation corridor-wide and multiply by 2.53. It is also possible to use the build-out results by identifying the specific growth projections that most closely fit with the characteristics of a given area within or adjacent to the NH140 corridor. For example, under build-out conditions, several areas could substantially impact vehicle traffic along the NH140 corridor including:

- Belmont’s commercial district adjacent to NH106 north of NH140
- The industrial districts in Belmont along NH140 and NH106 south of NH140
- Gilmanton Ironworks to Alton’s rural residential district along NH140

Major Trip Generators Map

While the build-out analysis and associated trip generation projections provide a useful reflection of possible future traffic in the NH140 corridor, other influences exist today that are equally important to take into consideration in planning for a safe and efficient corridor travel experience. The purpose of the Major Trip Generators Map (Map 6) is to illustrate leading employers, destinations, population densities, commuter patterns, and alternative routes in proximity to the NH140 corridor that influence existing traffic. Growing concerns about traffic that have been articulated in local planning documents in recent years include:

“...traffic flow on Route 3/11 east of Exit 20 has increased about 20 percent” (in the past 10 years).
–*Tilton Master Plan Update (2009)*

“...the majority of traffic going through downtown Tilton is through traffic.” –*Tilton Master Plan Update (2009)*

Results of a community survey indicated an increase in people using roads in Northfield as alternate routes to and from areas outside of Northfield. –*Northfield Master Plan*

“Increased congestion on US Route 3 from Franklin to Tilton and Exit 20 may be pushing commuters and other travelers to seek other routes to I-93. One of the points of access for many of these commuters may be Exit 19, resulting in travel through Northfield.” – *Northfield Master Plan*
“Traffic volumes measured on NH Route 140 represent primarily regional traffic, traveling through the Town of Northfield.” Traffic volumes indicate that around 1,000 vehicles per day use NH Route 140 in Northfield for local purposes such as access to Shaker Road as well as existing business located on NH140 in Northfield. – *Northfield Master Plan*

The Town of Alton expects that sections of Old Wolfeboro Road, Alton Mountain / Avery Hill Road, Stockbridge Corner Road, Chestnut Cove Road, and Prospect Mountain Road will experience the greatest increase in volume in the future. –*Alton Master Plan*

Map 6 elements that support these concerns and the LAWG recommendations for priority NH140 improvements include:

- US3/NH11 Level of Service F (LOS F) creates incentive for travelers to use alternate routes. The alternate routes illustrated on Map 6 were identified through committee discussions, data analysis, and a review of corridor community master plans, NHDOT reports and other documents. The alternative routes include:
 - Jamestown and Silver Lake Roads between NH140 in Belmont and 3/11 in Tilton;
 - Dearborn Street between Church Street to NH140 in Belmont;
 - Allens Mill Road between NH140 and NH106 in Gilmanton;
 - Stage Road between NH140 and NH107 in Gilmanton;
 - Cross Mill Road connecting Franklin to NH132 and Exit 19 in Northfield.
- 2010 US Census population density by census block. Notable is the highest densities in the travel triangle formed by NH106, NH140 and US3/NH11. Where available, the location of existing residences is also shown.
- Various destinations are shown on the map including major employer data from the NH Economic and Labor Market Information Bureau. These include businesses that employ more than 94 employees. Other destinations include: municipal services, retail/shopping destinations, and places of worship. In most cases the destinations are located in relative proximity to dense population centers and within the nodal centers along NH140 as depicted in Map 7 - Corridor-wide Zoning.
- Census “On the Map” distance and direction commuter data is provided in tabular and “radar chart” formats. Notable is the percentage of Belmont (48 percent), Northfield (40 percent), and Tilton (42 percent) residents that travel less than ten miles to work in the more than 4,000 jobs in and around the NH140 corridor. The radar charts show the magnitude and general direction of commuters from home to work and from work to home.
- Traffic counts are presented at additional locations than previously discussed. These include NASCAR event traffic counts and Annual Average Daily Traffic (AADT). Noteworthy is that traffic volumes can increase by as much as 40 percent above the AADT during peak summer holiday weeks like Labor Day week-end.

Build-Out Summary

The build out analysis indicates the potential is great for additional development within the NH Route 140 corridor study. The associated traffic generated by additional development could have significant impact on safe travel within the NH140 corridor and on connecting lifeline corridors where travel demand on US3 exceeds capacity and NH11 presents challenges to large trucks turning onto NH140. Not captured in the build-out based trip generation projections is the increased traffic NH140 will serve due to its role providing alternative routes as illustrated in Map 6. This traffic is difficult to quantify, but should be considered in addition to the build-out generated trips.

The build-out is supportive of the need for good access management and land use practices. The LAWG reviewed existing corridor-wide zoning and the potential for changes within the context of the build-out results. While this produced limited recommendations for near-term land use regulation and zoning changes, the pace of development and incremental traffic changes over time may dictate how frequently the results of this study are revisited.

5. SITE ASSESSMENTS AND EVALUATIONS

Site evaluations were made based on the supporting traffic, safety, and GIS documentation of need described earlier in this report, field assessment conducted by Lakes Region Planning Commission and consulting staff on November 21, 2012, and Local Area Working Group (LAWG) input regarding the results of the site assessments at the December 12, 2013 LAWG meeting. Figure 5.1 provides a summary of the specific topics evaluated at each of the seven sites reviewed during the site visits. The sites are listed as reviewed, from west to east along NH140.

Figure 5.1: Site Evaluation Locations and Content

Site	Town	Location	Sight Distance	Signal Warrant	Congestion Analysis	Concept Sketch	Safety Analysis
1	Northfield	NH140 at Shaker Road	✓	✓	✓		
2	Belmont	NH140 at Main Street		✓			✓
3	Belmont	NH140 / Main Street / Church Street		✓	✓	✓	
4	Belmont	NH140 at Best Street	✓			✓	
5	Gilmanton	NH140 at NH107	✓	✓	✓	✓	
6	Gilmanton	NH140 at Stage Road				✓	
7	Alton	NH140 at NH11				✓	

The following descriptions detail a) key findings and b) recommendations for each site.

Site 1: Northfield - NH140 at Shaker Road

a) Key Findings:

Stopping sight distances: Current conditions are sight distances of over 500 feet along NH140 in both directions which exceeds minimum requirement of 425 feet.

Signal warrant assessment: Based on current 2012 traffic volumes and projected 2022 volumes at the NH 140/Shaker Road intersection, we found that the 8-hour warrant is met in 2012 and both the 8-hour and 4-hour warrants are met in 2022. We further found that a relatively minor increase in traffic on Shaker Road (approximately 10-20 additional vehicles/hour) would trigger the 4-hour warrant. Typically, meeting two or more signal warrants indicates the need for further investigation.

	8-Hour Warrant	4-Hour Warrant	Peak-Hour Warrant
2012	☑ 10 hours met	3 hours met	0 hours met
2022	☑ 11 hours met	☑ 11 hours met	0 hours met

Congestion analysis summary: The estimated delay for the Shaker Road approach is anticipated to increase over the next ten years, dropping the Level of Service from B to C

during the morning peak hour and from C to D during the evening peak hour. Volume-to-capacity ratios remain relatively low in all scenarios.

	AM Peak Hour						PM Peak Hour					
	2012 No Build			2022 No Build			2012 No Build			2022 No Build		
	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
STOP NH 140/Shaker Rd												
EB Thru/RT, NH 140	A	<1	0.16	A	<1	0.17	A	<1	0.34	A	<1	0.37
WB LT/Thru, NH 140	A	<1	0.00	A	<1	0.01	A	<1	0.02	A	<1	0.02
NB LT/RT, Shaker Rd	B	14	0.19	C	16	0.23	C	22	0.27	D	27	0.34

Safety assessment: During the five year period from 2007-2011, there have only been two reported crashes at this intersection (both occurring in 2008). Neither crash resulted in injury or fatality and both occurred on dry pavement. Despite the low crash rate, the Local Area Working Group noted that this intersection is perceived as unsafe and suggested moving the eastbound NH140 35 to 55 mph speed transition from its current location west of the intersection to a position east of the intersection to encourage slower eastbound vehicle speeds through the intersection.

b) Recommendations:

- Request the Northfield Highway Safety Committee review posted speeds and consider relocating the 55 mile per hour speed limit sign on eastbound NH140 from west of the intersection to a position east of the intersection.
- Continue monitoring traffic volumes, delays, and crash reports; consider traffic signal as traffic volumes and/or crash rates increase.

Site 2: Belmont - NH140 at Main Street

a) Key Findings:

Signal warrant assessment: Based on current 2012 traffic volumes and projected 2022 volumes, we found that both the 4-hour and peak-hour signal warrants are met at this intersection. A relatively significant increase in background traffic would be needed to also satisfy the 8-hour warrant. Typically, meeting two or more signal warrants indicates the need for further investigation.

	8-Hour Warrant	4-Hour Warrant	Peak-Hour Warrant
2012	2 hours met	☑ 9 hours met	☑ 2 hours met
2022	3 hours met	☑ 11 hours met	☑ 7 hours met

Congestion analysis summary: The following scenarios were evaluated during the morning and evening peak hours: 1) existing control, 2) all-way stop (AWST), 3) traffic signal, and 4) stop

control on northbound approach with separate right-turn lane for southbound approach (switch stop signs). The congestion results summarized below show that the existing intersection configuration results in long delays and nearly over-capacity conditions on the eastbound approach during the evening peak hour. The “switch stop signs” scenario did not provide favorable congestion results. The all-way stop and signal alternatives were shown to function effectively over the next ten years.

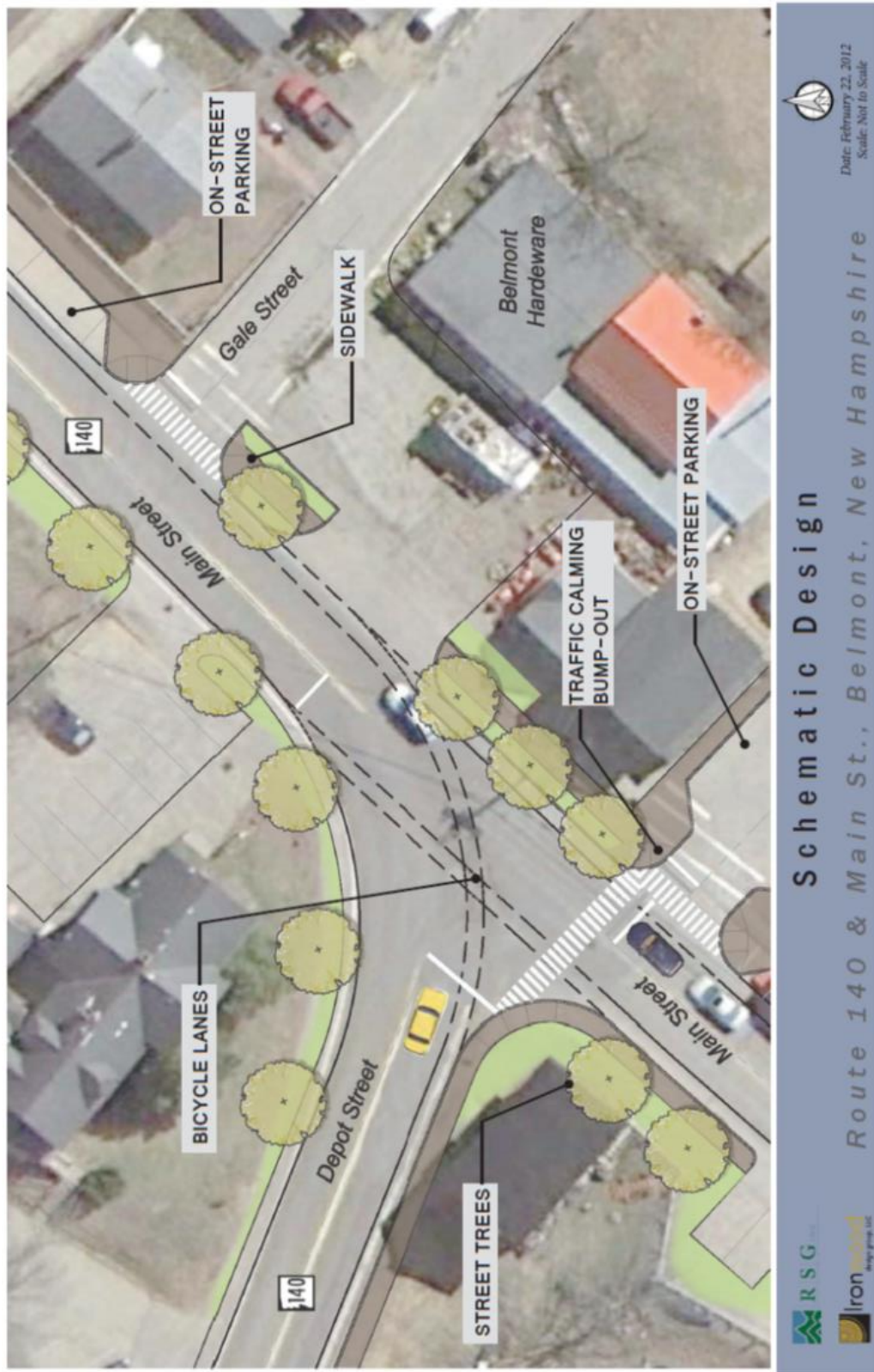
	AM Peak Hour														
	2012 No Build			2022 No Build			2022 AWST			2022 Signal			2022 Switch Stop Signs		
	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
STOP NH 140/Main St															
Overall	-	-	-	-	-	-	B	11	-	A	8	0.42	A	<1	0.00
EB LT/Thru/RT, NH 140	C	17	0.46	C	20	0.55	B	12	-	B	11	0.61	A	6	0.13
WB LT/Thru/RT, Nelson Court	B	11	0.01	B	12	0.01	A	9	-	A	7	0.01	A	1	0.00
NB LT/Thru/RT, Main St	A	4	0.05	A	4	0.06	B	10	-	A	6	0.29	E	38	0.64
SB LT/Thru/RT, Main St	A	<1	0.00	A	<1	0.00	B	11	-	A	6	0.27	B	11	0.23
PM Peak Hour															
Unsignalized Intersections															
STOP NH 140/Main St															
Overall	-	-	-	-	-	-	C	19	-	B	10	0.62	A	<1	0.00
EB LT/Thru/RT, NH 140	F	53	0.91	F	>100	1.10	C	23	-	B	13	0.72	A	6	0.21
WB LT/Thru/RT, Nelson Court	B	15	0.05	C	16	0.06	B	10	-	A	6	0.03	A	2	0.00
NB LT/Thru/RT, Main St	A	4	0.08	A	4	0.09	B	13	-	A	10	0.50	F	>100	1.98
SB LT/Thru/RT, Main St	A	<1	0.01	A	<1	0.01	C	20	-	A	9	0.44	C	20	0.61

Safety assessment: During the five year period from 2007-2011, there were 13 reported crashes at this intersection, three of which involved injuries. The highest percentages of crashes occurred in October (22 percent) which is significantly higher than the statewide average for that month (8 percent). 72 percent of the crashes involved multiple vehicles. No pedestrians were involved in the crashes. Further detail on the cause of the accidents was not provided in state data.

b) Recommendations:

- Consider modifying to all-way stop control as a short and mid-term solution (see Figure 5.2 for details).
- Consider signaling intersection as a longer term solution.

Figure 5.2: Belmont - NH140 at Main Street Conceptual Design



Site 3: Belmont - NH140 / Main Street / Church Street

a) Key Findings:

Signal warrant assessment: Based on current 2012 traffic volumes and projected 2022 volumes, we found that none of the signal warrants are met at this intersection in 2012. However, both the 4-hour and peak-hour warrants are anticipated to be met in 2022. Typically, meeting two or more signal warrants indicates the need for further investigation.

	8-Hour Warrant	4-Hour Warrant	Peak-Hour Warrant
2012	1 hour met	2 hours met	0 hours met
2022	3 hours met	<input checked="" type="checkbox"/> 6 hours met	<input checked="" type="checkbox"/> 5 hours met

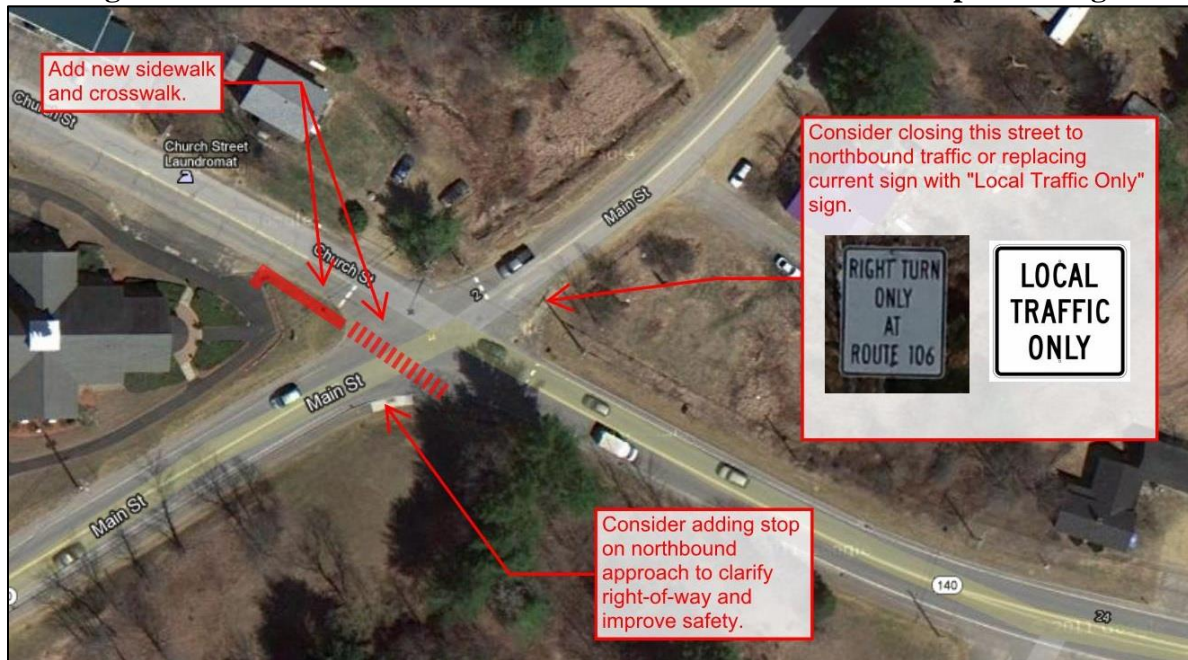
Congestion analysis summary: The current intersection configuration (i.e. stop on three of the four approaches) cannot be analyzed using standard Highway Capacity Manual procedures. RSG evaluated operations in 2022 under all-way stop control and traffic signal control and found that the intersection operates at LOS A or B under both scenarios during both the morning and afternoon peak hours.

Safety assessment: During the five year period from 2007-2011, there were 6 reported crashes at this intersection, none involving injuries. Half of the crashes involved multiple vehicles colliding at an angle. No pedestrians were involved in the crashes. During our site assessment, we identified confusing signage on the northbound Main Street exit directing right turning vehicles to follow Route 106, which could potentially contribute to unsafe conditions. The Local Area Working Group also indicated that the cross-slope through the intersection causes potentially unsafe conditions during snowy and icy weather. If an all-way stop control is implemented, consider a high friction pavement overlay on the northbound approach to address potentially slippery conditions.

b) Recommendations:

- Consider new sidewalk and crosswalk.
- Close Main Street north of intersection to northbound traffic.
- Consider modifying to all-way stop control as a short-term solution (see Figure 5.3).
- Consider signaling intersection as longer term solution.

Figure 5.3: Belmont NH140 / Main Street / Church Street Conceptual Design



Site 4: Belmont - NH140 at Best Street

a) Key Findings:

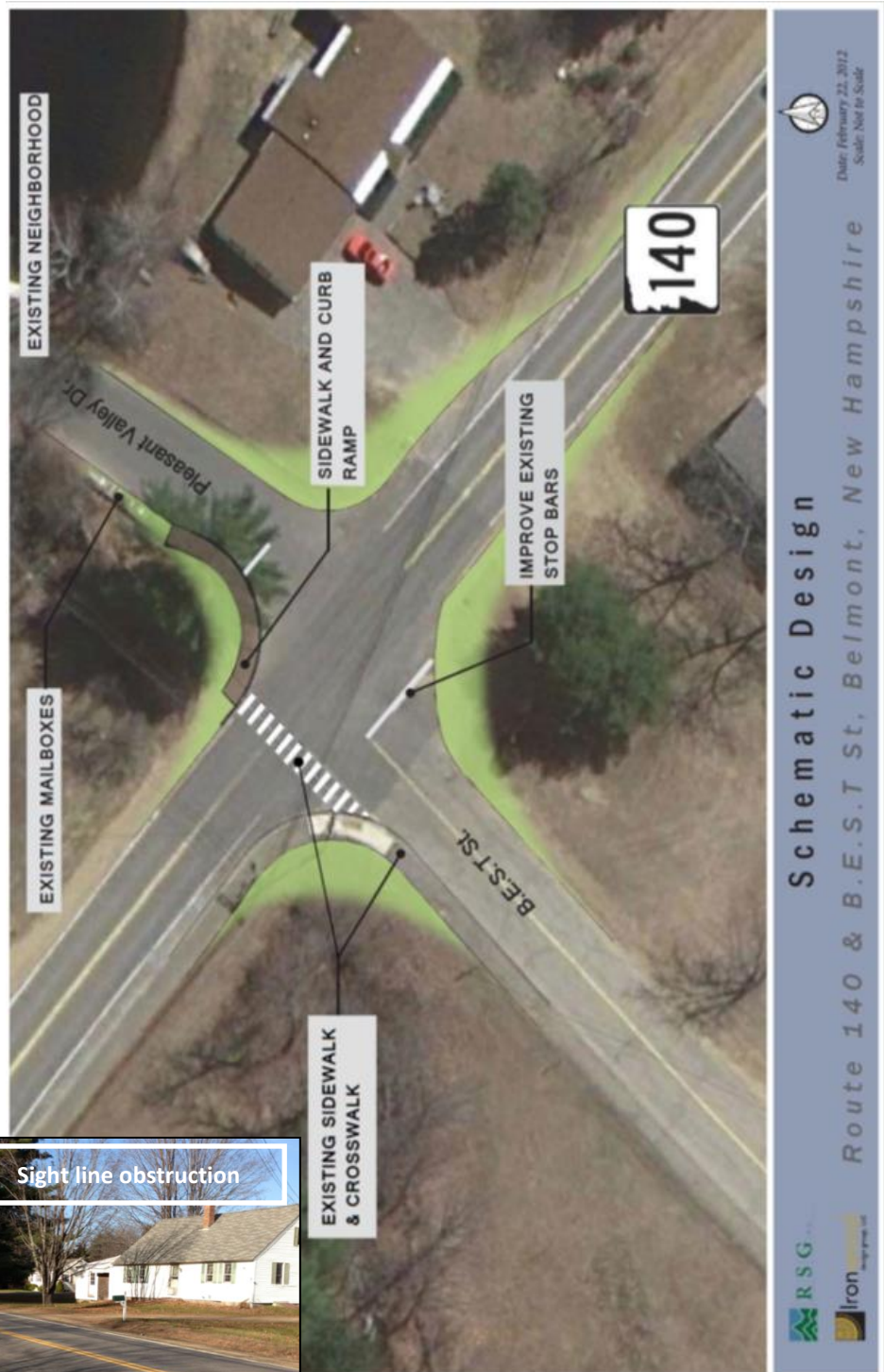
Stopping sight distances: Looking west from Best Street the stopping sight distance is approximately 380 feet, which exceeds the minimum required distance of 155 feet for 25 mile per hour posted speed (during school hours) and 250 feet for 35 mile per hour posted speed (during non-school hours). However, based on our field assessment, we anticipate that there may be substandard *intersection* sight distance – which is the distance measured from the eye of the driver approaching NH140 on Best Avenue looking to the left. The minimum intersection sight distance at this location should exceed 390 feet (for 35 mile per hour posted speed). The sight distance is primarily limited by a horizontal and vertical curve and a utility pole as shown in Figure 5.4.

b) Recommendations:

- If available intersection sight distance is less than 390 feet, consider posting advance horizontal alignment (W1-10) warning sign and supplemental advisory speed sign (W13-1) on NH140 to the west of Best Street to indicate the presence of upcoming intersection.
- Construct a new receiving sidewalk on the north side of the intersection to connect Pleasant Valley Drive with the existing crosswalk across NH140) and sidewalk to the school (see Figure 5.4).



Figure 5.4:
Belmont at Best
Street



Site 5: Gilmanton – NH140 at NH107

a) Key Findings:

Sight distance assessment: The stopping sight distance looking north along NH107 from the westbound NH140 approach is limited to approximately 190 feet, which is under the minimum required distance of 200 feet for a 30 mph posted speed. Sight distance is limited by a horizontal curve and steep side slope on the northeast corner of the intersection. Stopping sight distance looking south along NH107 from the westbound NH140 approach is limited to approximately 275 feet, which exceeds the minimum required distance of 200 feet for 30 mile per hour posted speed. Recent speed counts appear to indicate that up to 70 percent of the vehicles traversing the intersection along NH107 exceed 30 miles per hour, potentially worsening the effects of limited sight distances.

Signal warrant assessment: Based on current 2012 traffic volumes and projected 2022 volumes, we found that none of the signal warrants are met at this intersection in either 2012 or 2022. Typically, meeting two or more signal warrants indicates the need for further investigation.

	8-Hour Warrant	4-Hour Warrant	Peak-Hour Warrant
2012	0 hours met	0 hours met	0 hours met
2022	3 hours met	1 hour met	0 hours met

Congestion analysis summary: The following scenarios were evaluated during the morning and evening peak hours: 1) existing control, 2) all-way stop (AWST), 3) traffic signal, and 4) single lane roundabout. The congestion results summarized below show that the existing intersection operates acceptably from a capacity and delay standpoint under all scenarios.

Unsignalized Intersections	2012 No Build		2022 No Build		PM Peak Hour			2022 Signal			2022 Roundabout		
	LOS	Delay	v/c	LOS	Delay	v/c	2022 AWST	LOS	Delay	v/c	LOS	Delay	v/c
STOP NH 140/NH 107													
Overall	-	-	-	-	-	-	B 11 -	A 7 0.39	A 6 -				
EB LT/Thru/RT, NH 140	C	18	0.52	C	22	0.61	B 12 -	A 5 0.39	A 7 0.34				
WB LT/Thru/RT, NH 140	B	13	0.21	B	13	0.24	A 9 -	A 4 0.13	A 5 0.15				
NB LT/Thru/RT, NH 107	A	3	0.02	A	3	0.02	A 9 -	A 10 0.24	A 6 0.12				
SB LT/Thru/RT, NH 107	A	3	0.04	A	3	0.04	B 10 -	B 10 0.41	A 6 0.20				
	2012 No Build		2022 No Build		AM Peak Hour			2022 Signal			2022 Roundabout		
	LOS	Delay	v/c	LOS	Delay	v/c	2022 AWST	LOS	Delay	v/c	LOS	Delay	v/c
STOP NH 140/NH 107													
Overall	-	-	-	-	-	-	A 9 -	A 6 0.26	A 5 -				
EB LT/Thru/RT, NH 140	B	12	0.17	B	13	0.20	A 9 -	A 3 0.12	A 4 0.11				
WB LT/Thru/RT, NH 140	B	12	0.31	B	13	0.35	A 9 -	A 4 0.22	A 6 0.25				
NB LT/Thru/RT, NH 107	A	3	0.02	A	3	0.03	A 9 -	B 10 0.36	A 5 0.10				
SB LT/Thru/RT, NH 107	A	1	0.01	A	1	0.01	A 9 -	A 10 0.27	A 5 0.16				

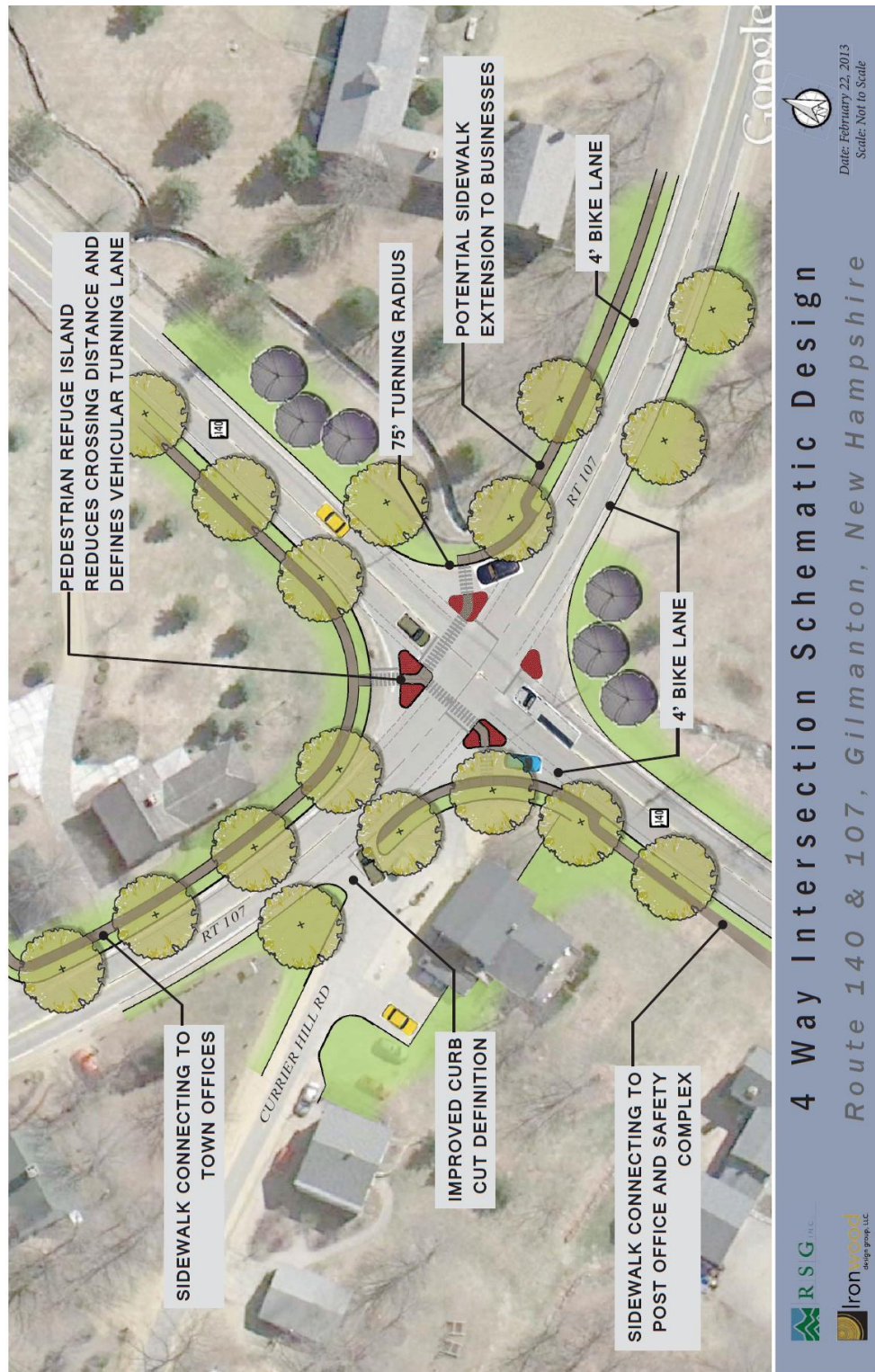
Traffic flow and intersection control: Currently, the east-west NH140 traffic has a stop control and the north-south NH107 traffic is free-flowing. However, the actual traffic distribution at the intersection shows over 60 percent of the traffic is travelling east-west and less than 40 percent is heading north-south. This traffic distribution, along with the presence of sight distance limitations on the westbound NH140 approach indicates that safety improvements could be achieved by switching the stop signs from the NH140 approaches to the NH107 approaches.

Safety assessment: During the five year period from 2007-2011, there were 12 reported crashes at this intersection, giving it one of the highest intersection crash rates (crashes/ADT) in the corridor. Despite the relatively high number of reported crashes, only two involved injuries. Nearly half of the crashes identified the failure to yield right-of-way as the main contributing factor, which is significantly higher than the statewide average of 23 percent and is typically indicative of an intersection where drivers either do not recognize the need to stop or cannot respond in time to oncoming vehicles due to visual obstructions. No pedestrians were involved in the crashes. During the field visit, local residents indicated many near misses occurring at the intersection and noted that the intersection has a reputation for being unsafe.

b) Recommendations:

- In the short-term, construct sidewalks and install landscaping (sensitive to sight distance concerns) along the various intersection approaches to improve pedestrian mobility and calm traffic speeds.
 - While traffic calming is a preferred solution, advance intersection warning signs may encourage slower speeds especially southbound.
 - Speed enforcement is recommended based on speed study conducted by LRPC.
 - NHDOT District 3 has recently conducted a drainage assessment at and adjacent to this intersection. This information should be considered in the further development of improvements at this intersection.
 - NHDOT District 3 advises that additional study would be required to consider a changed stop control from NH140 to NH107 given existing geometry, potential winter operational challenges, and potential difficulties in stopping on NH107. Given approach volume distribution, crash records, and sight distance limitations, the site should be further evaluated by NHDOT District 3 to determine practical safety improvements.
 - Consider single lane roundabout as long-term solution.
-

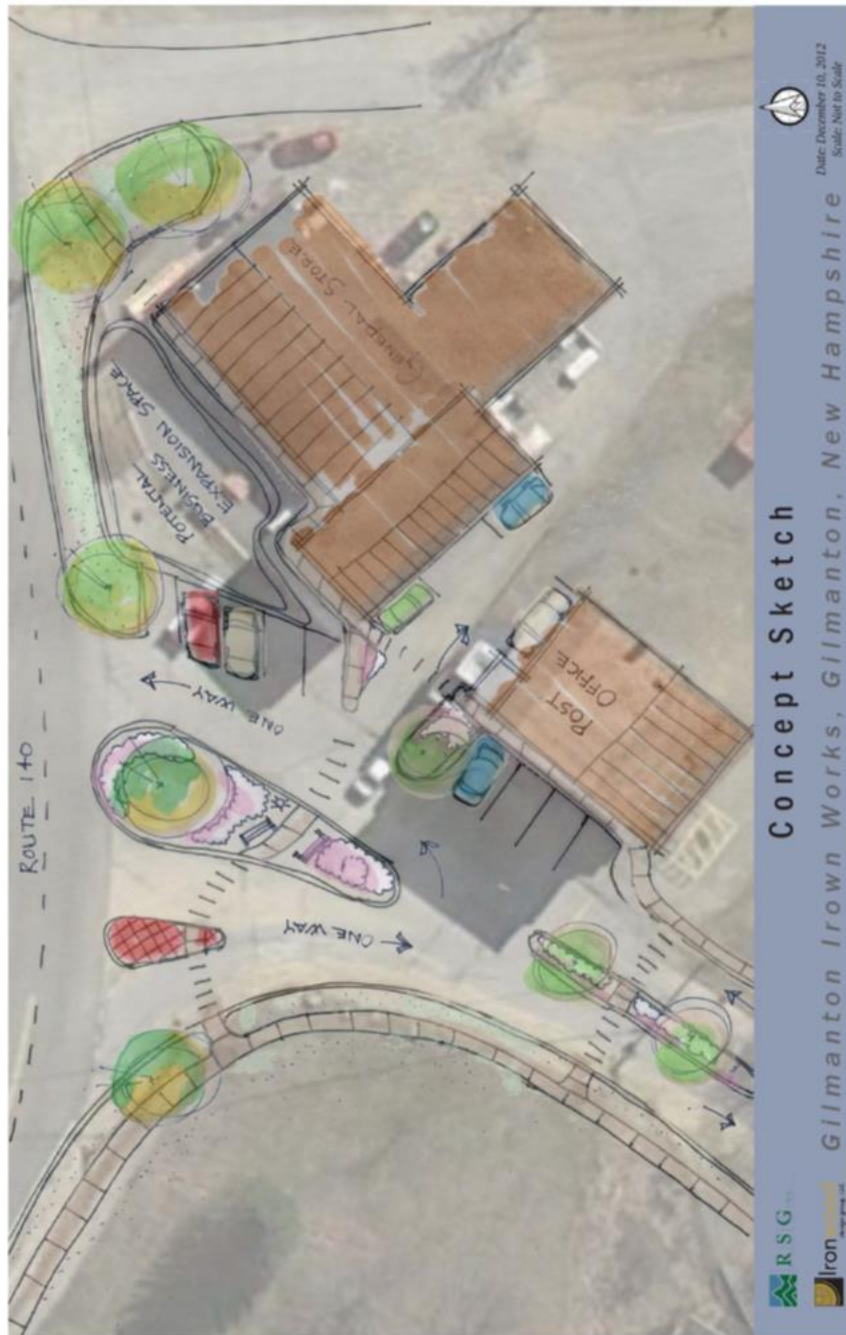
Figure 5.5: Gilmanton – NH140 at NH107 Conceptual Design



Site 6: Gilmanton Iron Works – NH140 at Stage Road

A concept plan was developed for the NH140/Stage Road intersection to identify opportunities to improve the configuration of the intersection and surrounding area to reduce the amount of open paved area, better channelize and direct traffic, narrow and slow traffic flows, and significantly increase landscaping opportunities within and adjacent to the intersection. No further traffic evaluations were conducted for this intersection.

Figure 5.6: Gilmanton Iron Works - NH140 at Stage Road Conceptual Design



Site 7: Alton – NH140 at NH11

A concept plan was developed for the NH140/NH11 intersection to address a number of existing deficiencies including insufficient accommodations for trucks turning from NH140 onto NH11, missing sidewalk links, and disconnected parking areas. Enlarged turn radius may impact town museum property. No further traffic evaluations were conducted for this intersection.

Figure 5.7: Alton – NH140 at NH11



Additional Considerations

Northfield Economic Development Zone

Northfield's Strategic Plan for Economic Development (March 2012) outlines several initiatives to encourage additional economic development in town. Given the town's current zoning and accessibility to the interstate, the area along NH140 between the Tilton and Belmont town lines is likely to play an important role in this economic development program. The Town should be proactive in planning for necessary transportation infrastructure in advance of the development to specify elements such as preferred road cross-sections, sidewalk network, access locations, access management provisions, etc. These items should be articulated sufficiently to incorporate into the town's Zoning Ordinance (e.g. setback requirements, presence of sidewalks, etc.) and Subdivision and Site Plan regulations (access management, road cross-sections, etc.) as appropriate.

Corridor-Wide Access Management

As an important east-west connector in the broader regional and statewide context, maintaining some minimum level of service for through traffic is essential along the NH140 corridor. One important tool that planners can use to help maintain capacity for through traffic is through the proper design and management of access points onto NH140. The various towns along the corridor are encouraged to work with the Lakes Region Planning Commission and NHDOT District 3 officials and consider adopting the NHDOT Memorandum of Agreement for Coordinating Highway Access.

Corridor-Wide Stop Control on Minor Legs

During our corridor investigation, it was observed that many (see Figure 5.8) of the minor road approaches to NH140 along the corridor had neither stop signs nor stop bars. For drivers unfamiliar to the area, this can cause confusion and potentially unsafe conditions. It is recommended that the towns work collaboratively with NHDOT District 3 officials to identify and address the specific approaches in need of stop signs and/or painted stop bars.

Figure 5.8: Missing Stop Signs and Stop Bars

Town	Road intersecting NH 140	Stop Sign	Stop Bar
Alton	Star Lane	x	x
Belmont	Scenic Drive	x	x
Belmont	Bell Drive	x	x
Belmont	Hackett Road (west end only)	x	x
Gilmanton	Canaan Road	x	x
Gilmanton	Olde Route 140	x	x
Gilmanton	Seibel Road	x	x
Gilmanton	Moore Road (posted as private)	x	x
Gilmanton	Page Road	x	x
Gilmanton	Patty Smith Road	x	x
Gilmanton	Evergreen Lane	x	x
Gilmanton	Cogswell Road (at both ends)	x	x
Gilmanton	Elm Street	x	x
Gilmanton	Church Street	x	x
Gilmanton	Old Town Road	x	x

Coffin Brook Road

The Coffin Brook Road intersection at NH140 should be further reviewed for potential safety improvements related to the acute angle of approach to NH140 (see Figure 5.8). Opportunities for realignment bringing Coffin Brook Road closer to 90 degree approach should be further explored.

Figure 5.9: Coffin Brook Road Vicinity Map



6. RECOMMENDATIONS

The NH140 Local Advisory Working Group reviewed recommendations and conceptual designs for safety improvements developed by the consulting engineers. The recommended improvements at specific locations were prioritized based on all supporting documentation and the perceived benefit to the traveling public. The results are summarized in Figure 6.1.

Figure 6.1: NH140 Priority Improvements to Enhance Travel

Priority	Corridor Location	Recommendation	Timeframe	Cost Estimate	Potential Funding Source(s)
1	Belmont - NH140 at Main Street	All-way stop control	Short-term	Negligible	Municipal budget
		Install traffic signal	Mid- to Long-term	\$350,000	NHDOT, Municipal budget, Developer contribution or exaction
2	Belmont - NH140 / Main Street / Church Street	New sidewalk and crosswalk	Short-term	\$50,000	Municipal budget, NHDOT (Transportation Alternatives Program)
		Close Main Street north of intersection to northbound traffic	Short-term	\$1,000 - 10,000	Municipal budget
		All-way stop control	Mid-term	Negligible	Municipal budget
		Install traffic signal	Long-term	\$300,000	NHDOT, Municipal budget, Developer contribution or exaction
3	Belmont - NH 140 at Best Street	Advance warning signs	Short-term	Negligible	NHDOT District 3 - Betterment Funds
		Small sidewalk section along Pleasant Valley Drive	Short-term	\$5,000 - 10,000	Municipal budget
4	Gilmanton - NH140 at NH107	NHDOT District 3 intersection evaluation or formal Road Safety Audit	Short-term	Negligible	NHDOT District 3 or Highway Safety Improvement Program - Road Safety Audit Betterment Funds
		Incorporate NHDOT District 3 drainage assessment results in discussion of potential solutions	Short-term	Negligible	NHDOT District 3
		Intersection approach improvements, landscaping, sidewalks	Mid-term	\$150,000 - \$300,000	Municipal budget, NHDOT (Transportation Alternatives Program, Highway Safety Improvement Program)
		Single lane roundabout	Long-term	\$500,000 - \$1,000,000+	Municipal budget, NHDOT
5	Alton - NH140 at NH11	Acquire right of way as needed from municipal site	Short-term	TBD	Municipal budget
		Intersection reconfiguration, curbing, sidewalks, landscaping, parking definition, drainage	Mid- to Long-term	\$200,000 - \$400,000	Municipal budget, Developer contribution or exaction, NHDOT (Transportation Alternatives Program)
6	Northfield - NH140 at Shaker Road	Review speed postings	Short-term	Negligible	Municipal budget
		Install traffic signal	Mid- to Long-term	\$200,000	TIF, DOT, Municipal budget
7	Gilmanton Iron Works - NH140 at Stage Road	Intersection definition, curbing, landscaping, sidewalks.	Mid-term	\$150,000 - \$250,000	NHDOT, Municipal budget, Developer contribution or exaction

7. IMPLEMENTATION PLAN

Figure 7.1: Near-term Recommendations Strategies

	Next Step	Responsible Party(s)	Supporting Party(s)
Town of Alton	Investigate right of way ownership on south side of NH140 at NH11 and acquire as needed.	Board of Selectmen - research town records	Town records and NHDOT Right of Way Bureau
	Determine level of desired improvements beyond improved turning radius based on RSG concept (i.e. traffic calming, bicycle and pedestrian connectivity) and consider funding source(s).	Board of Selectmen	NHDOT Planning and Community Assistance for Federal Funding options, LRPC TAC for Transportation Alternatives funding.
	Install stop sign - NH140 at Star Lane.	Board of Selectmen	Public Works Department
	Assess opportunities for alignment change - intersection of NH140 at Coffin Brook Road	Board of Selectmen - written request for intersection evaluation to NHDOT District 3	Public Works Department, NHDOT District 3 Engineer
Town of Belmont	Install stop signs - NH140 at Scenic Drive, Bell Drive and Hackett Road (west).	Board of Selectmen	Public Works Department
	Written request for stop control change - NH140 at Main Street	Board of Selectmen - cite NH140 Corridor Study recommendation and consultant analysis.	NHDOT Bureau of Traffic, Principal Engineer
	NH140 at Main Street - determine level of desired improvements beyond changed stop control based on RSG concept (i.e. landscaping, traffic calming, on-street parking, sidewalk) and consider funding source(s).	Board of Selectmen	NHDOT Planning and Community Assistance for Federal Funding options, LRPC TAC for Transportation Alternatives funding.
	Assess intersection site distance - NH140 at Best Street	LRPC - completed 6-21-13.	Intersection site distance measured by NHDOT District 3 (338 feet) supports advance signage recommended by RSG.
	Based on intersection site assessment above, submit written request for advance warning signage west of Best Street intersection	Board of Selectmen	NHDOT Bureau of Traffic, Principal Engineer
	Consider developing a Safe Routes to School Travel Plan	Board of Selectmen	LRPC
	Assess budget for recommended sidewalk at Pleasant Valley Drive	Board of Selectmen	Road Agent
	NH140/ Main Street/ Church Street - determine funding source for sidewalk and crosswalk improvements	Board of Selectmen	Road Agent, LRPC TAC for Transportation Alternatives funding
	Assess and replace/add missing signage as outlined in Figure 5.8	Board of Selectmen	Road Agent
Town of Gilmanton	NH140 at NH107 submit Road Safety Audit application to NHDOT.	Board of Selectmen	LRPC
	Consider developing a Safe Routes to School Travel Plan	Board of Selectmen	LRPC
	Request meeting with NHDOT District 3 staff to discuss potential solutions based on drainage study and site assessment.	Board of Selectmen	NHDOT District 3, LRPC, Gilmanton TAC member, Road Agent, business owners.
	Review NH140 posted speed limits in area of Shaker Road	Northfield Highway Safety Committee	NHDOT District 3, NHDOT Bureau of Traffic
Town of Northfield	Monitor traffic volumes and crash reports for Shaker Road intersection at NH140.	Northfield Highway Safety Committee	LRPC
	Review and refine land use regulation and zoning to incorporate access management and transportation infrastructure in NH140 commercial zone.	Planning Board, Board of Selectmen	Northfield Strategic Plan for Economic Development, LRPC, LRPC Circuit Rider
	Participate in Transportation Demand Management committee to be established by LRPC summer 2013	Board of Selectmen or appointee	LRPC
Town of Tilton	Monitor progress of Winnepesaukee River Trail and assess opportunities for connectivity providing US3 accessibility.	Board of Selectmen	LRPC
	Complete Ten Year Plan project proposal for mid-term and long-term recommended projects in this plan.	Board of Selectmen	LRPC, TAC member, Road Agent
All Corridor Communities	Review NH16 access management video.	Planning Board, Board of Selectmen, Road Agent	LRPC
	Consider including access management strategies in local master planning efforts, land use regulations, and zoning ordinances.	Planning Board	LRPC

The implementation plan serves as a starting point to address near-term recommendations identified in this study. The purpose of the plan is to identify a path and responsible parties required to move recommendations forward to implementation. A common goal and need for corridor communities to realize the full potential of the results of this study is a commitment to revisiting and reprioritizing recommendations within a three year timeframe. The implementation plan is divided into six sections, one specific to each of the five corridor communities and a final section with common implementation strategies.

8. COMMUNITY ACCEPTANCE

In July 2013 Lake Region Planning Commission staff and LAWG community representative(s) presented the final draft corridor study to each corridor community Board of Selectmen. The Boards were encouraged to acknowledge the study contents and prioritized corridor-wide recommendations as mutually beneficial to each community and the traveling public.

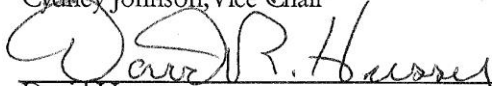
As stated below:

The Alton Board of Selectmen has reviewed and endorses the recommendations in the NH Route 140 Corridor Study: July 2013.

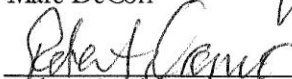
August 15, 2013
Date


R Loring Carr, Chairman of Board


Cydney Johnson, Vice Chair


David Hussey

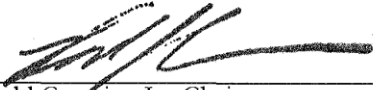

Marc DeCoff


Robert Daniels

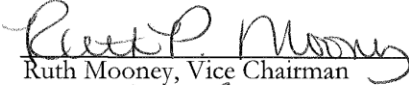
The Belmont Board of Selectmen has reviewed and endorses the recommendations in the NH Route 140 Corridor Study: July 2013.

August 5, 2013

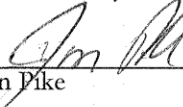
Date



Ronald Cormier, Jr., Chairman



Ruth Mooney, Vice Chairman



Jon Pike

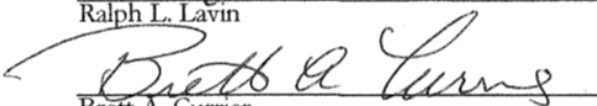
The Gilmanton Board of Selectmen has reviewed and endorses the recommendations in the NH Route 140 Corridor Study: July 2013.

Date

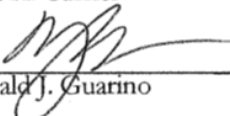
July 29, 2013



Ralph L. Lavin



Brett A. Carrier

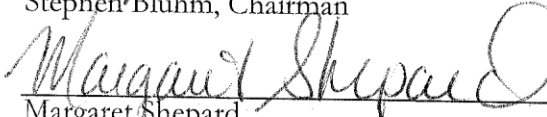


Donald J. Guarino

The Northfield Board of Selectmen has reviewed and endorses the recommendations for improvements to NH Rt. 140 within the town of Northfield as presented in the NH Route 140 Corridor Study: July 2013.

July 23 2013
Date

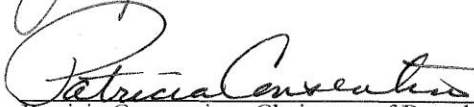

Stephen Bluhm, Chairman


Margaret Shepard


Kevin Waldron

The Tilton Board of Selectmen has reviewed and endorses the recommendations in the NH Route 140 Corridor Study: July 2013.


July 18th, 2013
Date


Patricia Consentino, Chairman of Board


Sandra Plessner, Vice Chair


Katherine D. Dawson


Joseph Jesseman


Albert LaPlante

APPENDIX A:

Local Advisory Working Group Meeting Notes

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Meeting 5 - Page A-13

LAWG Meeting 1**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 140 Corridor Study
 Meeting Notes of March 28, 2012
 Belmont Town Hall, Belmont, NH**

PRESENT:

Rick Ball, Belmont Planning Technician
 Jean Beaudin, Belmont Town Administrator
 Candace Daigle, Belmont Town Planner
 Peter Harris, Belmont Planning Board
 Ralph Lavin, Gilmanton Selectman
 Katherine Dawson, Tilton Selectman
 Dean Eastman, NHDOT Planning and Community Assistance
 Michael Izard, Lakes Region Planning Commission
 Marie Gelinas, Lakes Region Planning Commission

1. Call to Order

Michael Izard called the meeting to order at approximately 1:00 p.m. All in attendance introduced themselves.

2. Project Overview

M. Izard provided two handouts: 1) a project overview with proposed timeline, and 2) a map with historic traffic counts along the NH Route 140 corridor. He discussed the purpose of the study and the role of the Local Advisory Working Group. He indicated the NH Department of Transportation (NHDOT) is interested in corridor studies on state routes to get input from communities and better understand their long term needs and impacts of state highways through their community. He provided a copy of the Route 25 Corridor Study (2008) as an example of the type of report to be generated as a result of this study and described a few of the outcomes in Center Harbor and Moultonborough.

Mike briefly described the rationale for Route 140 being considered as a priority east-west corridor in the region. He cited historic considerations that would have an impact on the corridor including a traffic feasibility study to help mitigate traffic congestion on US Route 3 and NH Route 11 where an alternative considered an off-corridor connection from Franklin to Exit 20 use of existing roadways including a portion of Route 140. C.

Daigle indicated there have been discussions about directing Route 11 traffic to Route 140 using signs.

The focus of this project is to look at the historic traffic counts, land use and zoning, and

making recommendations for potential improvements. Mike shared the results of reviewing the

Belmont, Gilmanton, Northfield, and Tilton master plans for transportation elements related to Route 140. These included: several references to access management, desirability of gateways acknowledging entrance to the town of Belmont, public transportation needs generally, the TIF District on Route 140 in Northfield, and consideration for an alternative to an existing park and ride east of Exit 20 with the possibility of a site on Route 140. K. Dawson suggested this may be around the Bay Road or Shaker Road to connect into Route 140 which many people take to avoid traffic at Exit 20 to get into Northfield. While Tilton's latest master plan was not available, their 1994 plan references declining level of service on US3/NH11 and declining accidents at the US3/NH11 - NH 140 intersection (1970-1990). All in attendance agreed this is an area of concern today.

Mike stated he does not currently have historic accident data, but has spoken with Stuart Thompson from the NHDOT who will assist in getting this information for mapping. The state information may provide some clues for areas of safety concerns, but community level reports may be needed to supplement the state data at specific locations. C. Daigle suggested it may be beneficial to ask local police chiefs to provide accident summary reports.

Several scheduled projects that will impact the corridor were discussed including:

- Belmont - NH140 at South Road - Highway Safety Improvement Program
- Belmont - Downtown Revitalization Project/ Factory Village Designation
- Tilton - NH140 Bridge Rehabilitation over Winnepesaukee River

The group discussed zoning and land use/land cover maps provided by LRPC. M. Izard noted that the land use/land cover dates back to 2006. When appropriate areas have been identified for build-out analysis there will be a need for land use / land cover verification by the town representative.

Mike described build-out analysis for this project as a process in determining what would the traffic would be if all available parcels were to be built according to what existing zoning allows for. It is too time consuming and the funding is not built into the project to do a build-out analysis for the entire corridor. The group suggested three areas for build out analysis to be conducted:

Build-out Analysis

- NH Route 140 Gilmanton Corners to Gilmanton Iron Works
- Gilmanton line to the Belmont elementary school
- Exit 20 area to include J Jill and TIF District in Northfield

Mike indicated he would check into the availability of parcel and tax assessor data and evaluate the feasibility of conducting build-out for these areas.

3. Areas of Concern

General discuss ensued. The question was raised if Alton should be included in the study. All agreed this would be beneficial. The following represents areas for consideration corridor-wide:

- Intersection of Main Street and NH140 (Belmont) – critical times mornings and 4:00PM
- Stop sign on Main Street in Belmont to give NH140 through movement or four-way control.
- Intersection of NH140 and NH107 (Gilmanton) – historic district, accidents
- NH Motor Speedway event traffic
- Should Alton be included in the study area
- Stage Road is the main road and Route 140 (confuses people who live there because there is no stop sign) Gilmanton
- Stage Road is the main road to Route 107 and Route 129 (Gilmanton)
- Shaker Road and Route 140 (Northfield)
- Intersection with Elementary School and Pleasant Valley (Belmont)
- Farm equipment in roadway (Belmont)
- Downhill to Elementary School in Belmont
- Uphill sight distance west of Elementary School in Belmont

Crosswalks:

- Belmont Elementary School
- Belmont Hardware and the apartments across the street (Depot and Main Street)
- Gilmanton has no crosswalks or sidewalks
- Gilmanton Community Church has no crosswalk
- Gilmanton Elementary School to the library has no crosswalk

Recreation:

- NH140 is on State Bike Map – little recreational use

- Potential for future trail crossing at Coca Cola (Belmont)
- Winnipiesaukee Trail crossing
- Shaker Road boat launch – parking adequate for organized paddles?
- High Street to Gilmanton Corners

Traffic Counts:

- Northfield-Tilton town line (speed)
- Belmont – Main Street at NH140 (turning movements)
- Thru-traffic going to the school
- Factory Hill?
- NH 107/NH 140

4. Project Next Steps:

M. Izard outlined several actions needed in preparation for the next meeting:

- LRPC to compile meeting notes. LAWG members should review draft notes for completeness regarding areas of concern.
- Local police departments should prepare a summary report of accidents along the corridor (five-year period). Accident reports may be requested for specific locations in the future.
- M. Izard will get state historic accident information from NHDOT and check on town of Alton representation.
- LRPC will begin consultant selection process and data collection.
- M. Izard will check on feasibility of conducting build-out in areas identified. Local review will be required to verify land-use/land-cover and zoning for build-out areas when established.
- LAWG to meet again in June/July – email correspondence until then.

5. Adjourn:

There being no other business, the meeting adjourn at 2:53 PM.

LAWG Meeting 2**LAKES REGION PLANNING COMMISSION**

103 Main Street, Suite #3
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 www.lakesrpc.org



MEETING NOTES of the July 25, 2012
NH Route 140 Corridor Study – Local Advisory Working Group (LAWG)
Belmont Corner Meeting House, Belmont, NH

PRESENT:

Ken McWilliams, Alton
 Candace Daigle, Belmont
 Glenn Smith, Northfield
 Katherine Dawson, Tilton
 William Rose, NHDOT
 Michael Izard, LRPC
 Daniel Callister, LRPC

1. Call to Order

M. Izard of the Lakes Region Planning Commission (LRPC) called the meeting to order at approximately 1:00 p.m. All in attendance introduced themselves.

2. Build-out Analysis

D. Callister of the Lakes Region Planning Commission displayed a series of maps depicting various stages of the build-out analysis for three areas within the NH Route 140 corridor and provided explanation of his methodology to the group. D. Callister explained the purpose of the build-out analysis is to provide an idea of the development potential (both commercial and residential) within the corridor. D. Callister explained how zoning ordinances and subdivision regulations were used to determine how much of each parcel could be developed and for what uses. These three sections provide a diverse sample of the corridor as a whole.

3. Major Employers and Trip Generation Methodology

D. Callister provided details regarding the current state of the trip generation portion of the NH Route 140 Corridor Study. The amount of vehicle traffic resulting from how properties are used (residence, store, library, etc.) are provided in a trip generation manual prepared by the Institute of Traffic Engineers. K. McWilliams pointed out that under the current methodology, institutional uses were not being distinguished from commercial uses and he recommended providing a separately calculated rate for them. A list of major employers within and surrounding the corridor was compiled, mapped, and discussed with the group.

LRPC has made some updates to existing land-uses using 2009 aerial photography and 2011 satellite imagery; however, due to limitations associated with this update method,

there is a need for representatives from the towns to provide further land use detail. Since the trip generation rates for commercial, industrial, institutional and residential uses vary so greatly, it is important that accurate land use information is used. G. Smith recommended that as the towns are contacted for this land use information, it would be important to determine if the town is planning any changes to their existing zoning since such changes could greatly alter both the trip generation as well as the build-out analysis.

4. Accident History and Traffic Counts Summary

M. Izard provided details regarding traffic accident data obtained from the respective Police Departments of Alton, Belmont, and Tilton. The data shows the number of accidents and identifies specific recurring locations. Problematic intersections include NH 106 at NH 140, Main Street at Depot Street in Belmont and Main Street at Gilmanton Road in Belmont. Data was not available for Gilmanton or Northfield as of July 25, and the data from Tilton is lacking in detail.

Counts have been collected at the intersections of Shaker Road and NH 140 in Northfield and at Main Street and Depot Street in Belmont. These counts are turning movement counts which will be able to provide detailed information regarding the direction and flow of vehicles at these intersections. A total of four such counts have been planned for the corridor study and M. Izard asked for recommendations for to the two remaining count locations. NH 140 at NH 107 in Gilmanton was suggested by C. Daigle due to concern that the intersection is in need of improved signalization. K. Dawson suggested looking more closely at Jamestown Road, which has experienced an increasing volume of traffic as a way to avoid the congestion around Exit 20 in Tilton. The intersection at Gilmanton Road and Main Street in Belmont was suggested along with a recommendation from C. Daigle that the count be conducted after the school year has begun to account for the increased volume caused by the high school.

M. Izard explained that in addition to the turning movement counts, eight traffic counts were conducted at various locations through out the corridor to measure speeds, vehicle classification, and traffic volumes. This information will be useful for purposes of trip generation as well as for making specific recommendations for improvements along the NH Route 140 corridor.

Discussion took place regarding how the New Hampshire Department of Transportation (NHDOT) will factor into the corridor study. W. Rose on behalf of NHDOT explained that along with the corridor study, NHDOT is going to be expecting a detailed implementation plan.

5. Next Steps

The next LAWG meeting will likely take place in September, but the date is to be determined.

Meeting adjourned at 3:00pm.

LAWG Meeting 3**LAKES REGION PLANNING COMMISSION**

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 Meredith, NH 03253
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 Fax (603) 279-0200
 www.lakesrpc.org



**NH Route 140 Corridor Study – Local Advisory Working Group
 October 31, 2012 Meeting Notes
 Belmont Corner Meeting House, Belmont, NH**

PRESENT:

Ken McWilliams, Alton
 Rick Ball, Belmont
 K. Jeanne Beaudin, Belmont
 Candace Daigle, Belmont

Glenn Smith, Northfield
 Katherine Dawson, Tilton
 Daniel Callister, LRPC
 Michael Izard, LRPC

1. Call to Order

M. Izard of the Lakes Region Planning Commission (LRPC) called the meeting to order at approximately 1:00 p.m.

2. Future Development Potential

Since last meeting, LRPC has been in contact with corridor communities requesting verification of land use information and asking regarding future developments or zoning changes that may merit consideration in the Corridor Study. Responses were received from each of the five communities and updates to the land use database have been made accordingly. M. Izard referenced the town of Alton's response to the question about potential future land use and confirmed each corridor community has the opportunity to provide input. D. Callister prepared a list of all the unique land uses found within the three zones and has classified them into land use categories consistent with the latest edition of the Trip Generation Manual for calculating trip generation estimates. It was explained that most commercial/industrial trip generation rates are based on the square feet of buildings, and that the manual provides for some categories of land use other rates based on number of employees, number of pumps at a gas station, etc. An effort was made to select the rates that most closely reflect realistic trip generation for the corridor. C. Daigle questioned if alternative rates could be reviewed for the schools. There was general consensus that the land uses and rates displayed at the meeting would work well for the study.

M. Izard explained that these figures will be used to help determine potential future trips as well. D. Callister has developed a methodology for projecting future trips based on grouping together similar trip generation rates from existing commercial and industrial uses and applying those averages proportionally to future commercial and industrial

square footage. G. Smith and K. McWilliams recognized that land uses may not grow proportional to what exists today. For example, Tilton may currently be “built out for fast food”. Based on discussion about the methodology, M. Iazard suggested that a range of future trips based on more than one methodology may be best. LRPC will project trip generation using alternative methods for committee review.

3. Build Out Methodology

M. Iazard provided a handout showing an overview of the build out methodology. D. Callister explained the step-by-step process of taking total acreage from the corridor area and removing constrained acreage. The final result is the net developable area within the corridor. G. Smith suggested that frontage, setbacks and maximum lot coverage should be removed from the list since they are not technically “constraints”. C. Daigle and K. McWilliams were concerned that the methodology currently does not consider the possibility of new roads for residential development. This may significantly understate the development potential of large residential parcels like those that exist in the Belmont and Gilmanton build-out areas. LRPC will update build-out analysis to include assumptions about subdivision roads for committee review.

4. Review of Traffic Count Data

M. Iazard distributed a summary report for all of the traffic counts conducted in the corridor. Discussion followed regarding certain intersections that provided interesting results. The counts suggest that a large percentage of traffic on NH 140 at the Northfield/Tilton town line was travelling well over the posted speed limit. There was also interest in the intersection at NH107 and NH140 in Gilmanton where very few drivers were speeding, likely due to enforcement. These results will be passed on to the consultant. The bridge closure on Church Street has prevented LRPC from conducting turning movement counts at high school arrival and departure times. The town will inform LRPC when the bridge re-opens.

5. Consultant Selection Status

New Hampshire Department of Transportation (NHDOT) requires that hired consultants have an approved indirect rate. This requires firms to go through a process with an auditor, and needs to be updated periodically. Currently no agreement has been signed with a consultant, but there may be some developments soon. Discussion followed about Belmont revitalization plans including gateways to the village. Belmont representatives agreed to provide links to revitalization plans.

M. Iazard proposed November 28 as a tentative date for the next meeting and will be in touch with LAWG members with news regarding the consultant selection process.

Meeting adjourned at 2:25 p.m.

LAWG Meeting 4**LAKES REGION PLANNING COMMISSION**

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**Meeting Notes of December 12, 2012
NH Route 140 Corridor Study - Local Advisory Work Group
Belmont Corner Meeting House, Belmont, NH**

PRESENT:

Ken McWilliams, Alton
Rick Ball, Belmont
Candace Daigle, Belmont
Glenn Smith, Northfield
Katherine Dawson, Tilton
Daniel Callister, LRPC
Michael Izard, LRPC
William Rose, NHDOT
David Saladino, Resource Systems Group, Inc. (RSG)

1. Call to Order

M. Izard called the meeting to order at approximately 12:30 p.m.

2. Overview of the Field Assessment Process

M. Izard explained that specific priority locations were identified along the corridor by using the best available data. While the entire corridor was reviewed, these priority locations were the focus of the site visit conducted November 21 by LRPC, RSG, and Ironwood staff. The corridor is a mix of segments with varying land use characteristics that change as you travel from west to east. The priority locations lie mostly within the western half of the corridor, but a sketch will be made for the intersection of NH 140 and NH 11 in Alton as well as at Gilmanton Ironworks.

3. Presentation and Discussion of Preliminary Recommendations

D. Saladino provided handouts showing the preliminary transportation evaluation findings along with accompanying concept plan recommendations for improvements in a site-by-site format.

NH 140 at Shaker Road

RSG found that the stopping sight distance along NH 140 of over 500 feet in both directions exceeds minimum requirement of 425 feet. RSG was able to extrapolate the 3-hour turning movement count data to reflect a 12-hour period based on separate traffic volume counts. Using this information as well as the number of cars delayed at the

intersection, RSG was able to determine that current conditions meet the 8-hour signal warrant and that conditions in 2022 (based on an annual traffic increase of one percent) meet both 8- and 4-hour signal warrants. Congestion analysis results revealed that delays approaching the intersection from Shaker Road were expected to worsen by 2022. C. Daigle expressed concern about the 55 mph speed limit on NH 140 through the intersection and inquired if this could be changed so that the posted speed limit for eastbound traffic would increase to 55 mph east of the Shaker Road intersection. D. Saladino indicated that the accident data provided by the town will be reviewed in more detail and the state data has been requested as well. G. Smith of Northfield added that the town has received complaints about unsafe conditions at the intersection, but these were not specific to speed, and are not supported by the accident data. G. Smith recommended that the Highway Safety Committees from both Tilton and Northfield could review the current posted speeds and suggest changes.

NH 140 and Main Street in Belmont (South Intersection)

Eastbound traffic on NH 140 currently experiences delays associated with a Level of Service F (LOS-F) during the evening peak hour. Four scenarios were assessed at this location: 1) no change; 2) an all-way stop; 3) a traffic signal; and 4) changing the stop control signs so that only the northbound Main Street approach has to stop.

RSG recommends, based on their modeling, to install an all-way stop at this intersection which would be easy to install and remove if needed. M. Izard asked if signs could be put into place for a trial period to see how things go. W. Rose commented that this would require coordination with Bill Lambert in the NHDOT Traffic Bureau. A sketch was produced for improving the intersection and adjacent sections of Main Street. Discussion followed with concern expressed that the sketch restricted access to the hardware store from Main Street. D. Saladino agreed to provide a revised sketch.

NH 140 and Church Street in Belmont

This intersection is currently designed to allow northbound Main Street traffic to pass through the intersection without stopping which causes confusion for unfamiliar drivers and potentially unsafe conditions. There is a lack of a crosswalk and sidewalk across the northbound Main Street approach and there is confusing signage for vehicles continuing northbound on Main Street indicating “right turn only at NH 106”. RSG suggested an all-way stop could improve conditions at this intersection, but did not have traffic counts to confirm this recommendation. C. Daigle added that in bad weather it would be difficult for vehicles to make it up the hill on eastbound NH 140 if they had to stop at the northbound approach. M. Izard asked about the acceptability of closing Main Street to northbound traffic between Church Street and NH 106. C. Daigle explained that this concept has been discussed, but was met with resistance by the State because of racetrack event traffic.

NH 140 and B.E.S.T. Street at Elementary School in Belmont

Although the stopping sight distance at this intersection exceeds the minimum required distance, RSG anticipates that there may be substandard intersection sight distance, which is the distance measured from the eye of the driver approaching NH 140 from the school looking to the left. The sight distance is limited by a horizontal and vertical curve and a utility pole on NH 140 east of the intersection. Increasing sight distance may be costly as it might involve relocating a utility pole and reconstructing NH 140. RSG recommends the addition of a receiving sidewalk on the north side of the crosswalk on NH 140 as well as advance warning signage on NH 140 approaching Best Street from the west. The question was raised if a crossing guard is present at this intersection.

NH 140 at NH 107 in Gilmanton

Sight distance is limited from the westbound NH 140 approach. The sight distance looking north along NH 107 is under the minimum required for a 30 mph zone. Sight distance is limited by a horizontal curve and a steep side slope on the northeast corner of intersection. RSG found that the current intersection configuration stops the lower volume (39% of approaching traffic) movements at the intersection and suggests that the stop signs be changed to stop traffic on NH 107 rather than NH 140 or that an all-way stop is installed. A sketch was produced for a roundabout at the intersection. This may be challenging due to grades and right-of-way availability at the intersection which may make this alternative costly. M. Iazard noted that during the site visit they met with a number of people who were anxious to see changes made to this intersection. This intersection had the highest number of accidents of the intersections reviewed in Gilmanton. C. Daigle suggested that large scale engineered solutions may be difficult because of the historic district. It was agreed that something should be done to define the store entrance.

NH 140 at Stage Road in Gilmanton Ironworks

RSG presented a sketch of possible improvements at this intersection that would help to define the traffic flow and improve the aesthetics of the area. Currently there is no signage for traffic approaching the intersection from Stage Road and there is no clear definition between on-street parking and through traffic lanes.

General Corridor

D. Saladino asked about plans for infrastructure improvements in the Tax Increment Finance (TIF) district on NH 140 in Northfield and explained that in Enfield they were able to make infrastructure improvements through TIF district funds. G. Smith said that he would have to revisit the plan. Regarding a Memorandum of Understanding (MOU) for access management between local communities and the NHDOT District office, M. Iazard explained that currently there are no MOUs in the Lakes Region, but they have been recommended in corridor studies and recently discussed in Center Harbor and Moultonborough. W. Rose suggested that the situations are different from district to district and that it may be beneficial to explore what has been done in District 2.

D. Saladino described that during the site visit they noticed that many minor approaches on NH 140 do not have stop signs, which could present safety and liability issues. Most of these roads experience low traffic volumes, but should be addressed.

RSG agreed to revise their sketches using the input from this meeting by the end of December. M. Izard will provide RSG's updated report to committee members for review and discussion prior to presentations to Boards of Selectmen.

4. Confirm Build-out Analysis

M. Izard explained that he hopes to be able to finalize the build-out results at today's meeting. Two build-out scenarios were prepared that provide a range of trip generation possibilities. Neither method is perfect, but each tries to show existing potential for development along the NH Route 140 corridor. K. McWilliams suggested perhaps using an average of the two, but concern was expressed that the range is very wide in some places and that the second scenario is probably much more realistic than the first. The hope is to be able to apply build-out results as a factor for the upcoming Major Trip Generators map. From the results it appears as though the one percent growth rate used by RSG in their projections will not sufficiently reflect build-out conditions.

5. Review Draft Major Trip Generators Map

D. Callister passed out copies of the Major Trip Generators map for committee review and comment. The purpose of the map is to try to visually capture movements along the NH 140 corridor, to help understand the potential for development without having to conduct a full-scale build-out for the corridor, and to illustrate how increased traffic is likely to affect the corridor. The map shows major employers, municipal services, retail/shopping destinations as well as population density, traffic volume counts, and commuter information. The map also highlights routes that have been identified as alternate routes or shortcuts that are being utilized by non-local traffic. Comments from the committee included removing alternate route in Franklin and on Currier Hill Rd. in Gilmanton. The map was seen as being cluttered and busy, and it would be beneficial to simplify it if at all possible. M. Izard stressed that this map reflects not conclusions, but data only. Conclusions associated with the map will be provided in written form by LRPC. D. Callister agreed to email this map in large-scale PDF format to committee members.

M. Izard proposed the first or second week in January for next meeting to discuss presentations to Boards of Selectmen. It was agreed that individual presentations would be more appropriate than trying to do joint presentations. The group should identify possible dates for these presentations.

Meeting adjourned at 2:40 p.m.

LAWG Meeting 5**LAKES REGION PLANNING COMMISSION**

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**Meeting Notes of the January 31, 2013
 NH Route 140 Corridor Study – Local Advisory Work Group
 Corner Meeting House, Belmont, NH**

PRESENT:

Ken McWilliams, Alton
 Candace Daigle, Belmont
 Rick Ball, Belmont
 Katherine Dawson, Tilton
 Bill Rollins, NHDOT District 3
 Michael Izard, LRPC
 Daniel Callister, LRPC

1. Call to Order

M. Izard called the meeting to order at approximately 1:00 p.m.

2. Plan Acceptance

The goal is to prioritize the study recommendations and to set a schedule for presenting the draft report to the boards of selectmen to sign off on. The LAWG reviewed the report acceptance language from the NH Route 25 Corridor Study that states the board was “encouraged to acknowledge the study contents and recommendations.” After discussion, it was agreed to use the wording from the Route 25 Corridor Study adding a sentence explaining that the reason for endorsing recommendations in other communities is because all corridor communities will benefit from those recommendations.

3. Review and Prioritize Recommended Improvements

The approach to establishing priority recommendations was discussed. LAWG members present agreed to establishing priorities through group discussion based on the data and documentation. Revised recommendations, based on LAWG comments when the draft recommendations were presented at the LAWG meeting on December 12, 2012, were reviewed and discussed. There was concern that the recommendations for the intersection at Route 11 in Alton are in conflict with an existing town plan for Monument Square. It may be possible to retain the improvement recommendations as they pertain specifically to Route 140 at that intersection, and the graphic should be updated accordingly. There may be a need to acquire right of way at that location and one of the parcels affected is a town museum. Right-of-way should be a short-term recommendation. Coffin Brook intersection is not addressed in the recommendations however it will be mentioned in the text as a location that is in need of improvement due to the acute angle of the intersection.

B. Rollins of NHDOT District 3 explained that the relocation of the posted speed limits during the bridge construction near the Shaker Road intersection this summer was intended to be permanent, but they were replaced due to a miscommunication. The District is working on placing those signs back to the recommended configuration. M. Izard questioned if changing a posted speed limit without traffic calming measures will be effective in slowing vehicles down. B. Rollins provided the committee with the input of Mark Morrill, District Engineer on several recommendations. Specifically, Morrill did not support switching the stop control at the intersection of NH140 and NH107 in Gilmanton since it would be difficult for NH107 traffic to stop under winter conditions. The trees in the sketch may hinder site distance also. The district is looking at drainage there and it may be possible to incorporate some of the recommendation ideas with that work. It may also be possible to do some of the curbing work with Betterment funds. A short term recommendation should be for a District 3 field review of the intersection. In light of the comments from the District Engineer, the committee agreed to remove the recommendation to switch the stop control at that location. Possible near-term recommendations at Depot and Main Streets in Belmont would be to paint stop bars and add stop signs. LRPC will confirm with the consultant that crosswalk recommendations conform to the Manual of Uniform Traffic Control Devices, which is highly regarded by DOT.

Discussion of factors to consider while prioritizing recommendations included number of accidents, traffic volume, and project costs. A priority list was suggested based on a traveler's perspective which was unanimously accepted as an appropriate prioritization of the seven recommendations. They are:

- 1) Main Street/Depot Street in Belmont
- 2) Main Street/Church Street in Belmont
- 3) B.E.S.T. Street in Belmont
- 4) NH107/NH140 in Gilmanton
- 5) NH11/NH140 in Alton
- 6) Shaker Road/NH140 in Northfield
- 7) Stage Road/NH140 in Gilmanton Iron Works

4. Meeting with Boards of Selectmen

M. Izard indicated the study needs to conclude by April 2013. The goal is provide a draft report for LAWG review and comment in the next two weeks. Once available, LAWG members agreed to one week for review. The committee members agreed to be present at their board of selectmen meetings and assist in getting the draft report on the agenda. Previous meeting minute drafts have been updated based on comments received to date. These will be finalized for inclusion in the report.

Meeting adjourned at 2:35 p.m.

APPENDIX B:

NH Route 140 Corridor Study Traffic Count Summaries

Turning Movement Counts

- Belmont: Church Street @ NH Route 140 – Page B-1
- Belmont: Jamestown Road @ NH Route 140 – Page B-3
- Belmont: Main Street @ NH Route 140 – Page B-6
- Gilmanton: NH Route 107 @ NH Route 140 – Page B-8
- Northfield: Shaker Road @ NH Route 140 – Page B-11

Vehicle Classification, Speed, and Volume Counts

- Belmont near Belmont Elementary School – Page B-13
- Belmont: South Road over Belmont River – Page B-17
- Gilmanton: NH Route 107 South of NH Route 140 – Page B-21
- Gilmanton: NH Route 107 North of NH Route 140 – Page B-25
- Northfield-Tilton Town Line – Page B-29

Vehicle Volume Counts

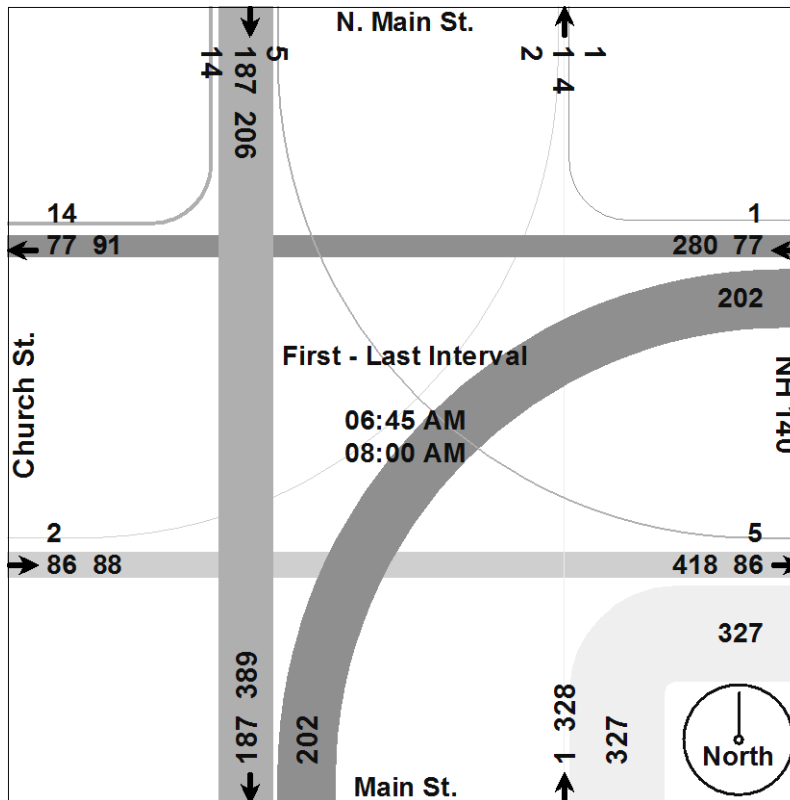
- Shaker Road South of NH 140, Northfield - Page B-33
- NH Route 140 Over Suncook River, Gilmanton- Page B-33
- NH 106 at Belmont-Laconia Town Line- Page B-35

Location: Church Street @ NH Route 140 - Belmont

Date: Tuesday, December 18, 2012

Time: 6:45AM – 8:15AM

Peak Hour: 7:15AM to 8:15 AM



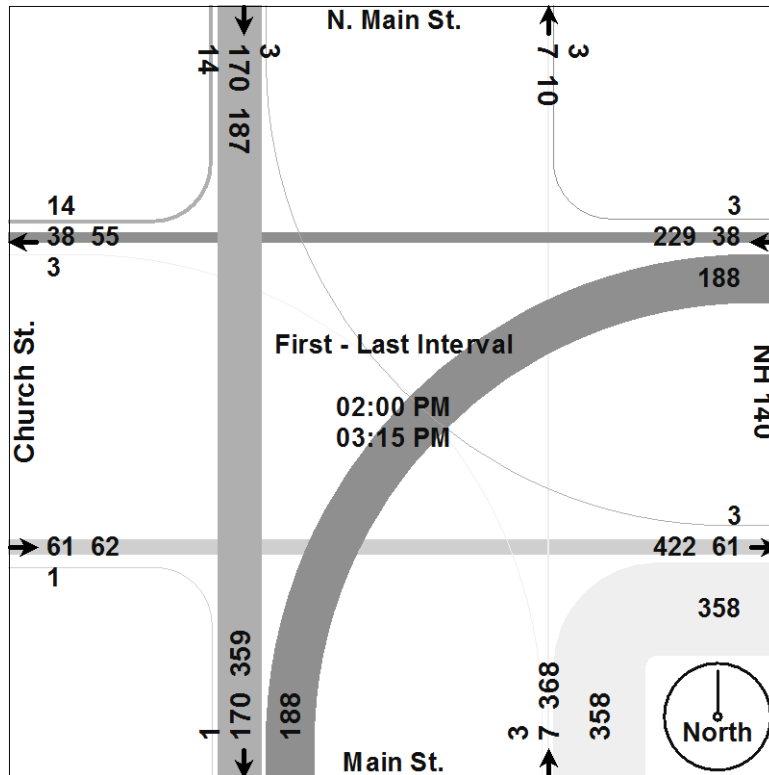
Start Time	N. Main Street From North			NH 140 From East			Main Street From South			Church Street From West		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
6:45 AM	2	24	2	0	9	31	42	0	0	0	8	1
7:00 AM	4	29	0	0	8	27	40	0	0	0	14	0
7:15 AM	1	42	2	1	25	42	52	1	0	0	22	0
7:30 AM	1	42	0	0	13	38	74	0	0	0	15	0
7:45 AM	6	30	0	0	12	32	66	0	0	0	15	1
8:00 AM	0	20	1	0	10	32	53	0	0	0	12	0

Location: Church Street @ NH Route 140 - Belmont

Date: Tuesday, December 18, 2012

Time: 2:00PM – 3:30PM

Peak Hour: 2:30PM to 3:30PM



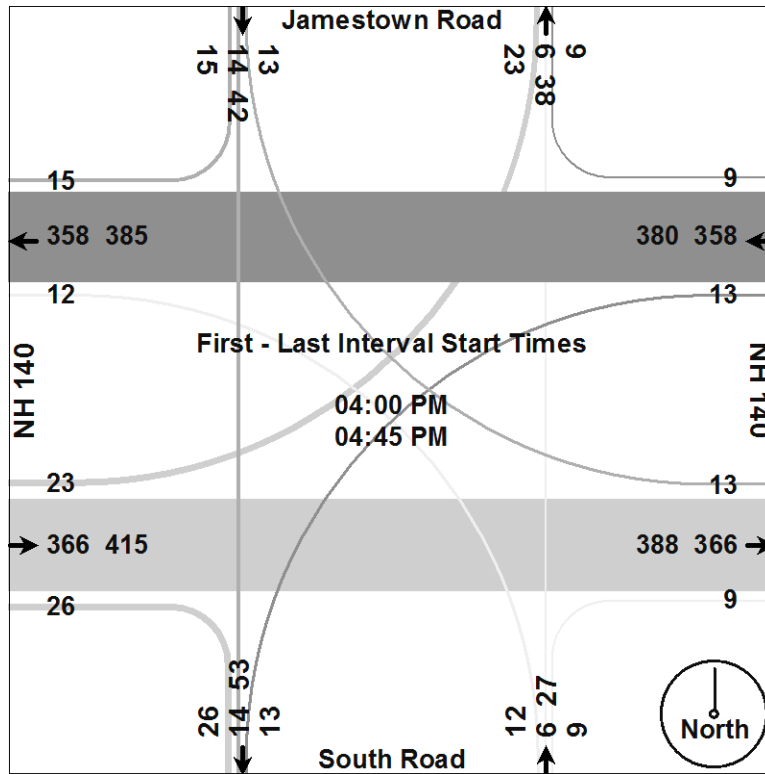
Start Time	N. Main Street From North			NH 140 From East			Main Street From South			Church Street From West		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2:00 PM	3	18	0	1	5	28	53	0	0	0	9	0
2:15 PM	1	26	1	1	7	26	54	1	0	1	19	0
2:30 PM	4	29	0	0	3	21	41	2	1	0	6	0
2:45 PM	3	36	1	0	7	38	77	1	1	0	12	0
3:00 PM	1	34	1	0	10	37	70	2	1	0	11	0
3:15 PM	2	27	0	1	6	38	63	1	0	0	4	0

Location: Jamestown Road @ NH Route 140 - Belmont

Date: Tuesday, August 21, 2012

Time: 4:00PM – 5:00PM

Peak Hour only as determined by previously conducted traffic volume count.



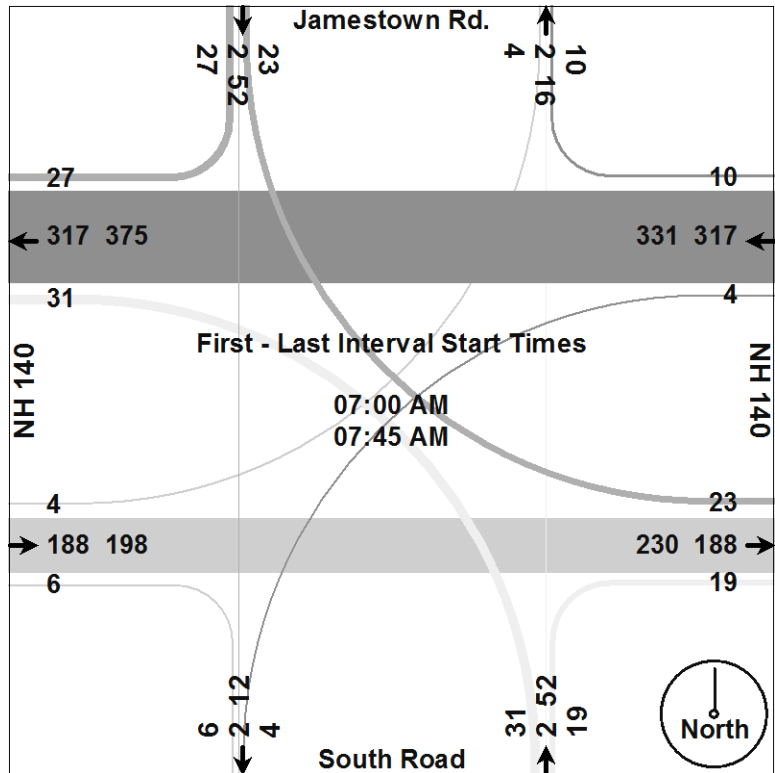
Start Time	Jamestown Rd. From North			NH 140 From East			South Road From South			NH 140 From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
04:00 PM	1	8	3	2	70	3	2	1	1	9	95	7
04:15 PM	3	3	6	2	97	5	3	1	3	5	80	8
04:30 PM	5	0	5	2	93	0	3	3	2	1	81	5
04:45 PM	4	3	1	7	98	1	4	1	3	8	110	6

Location: Jamestown Road @ NH Route 140 - Belmont

Date: Wednesday, August 22, 2012

Time: 7:00AM – 8:00AM

Peak Hour only as determined by previously conducted traffic volume count.



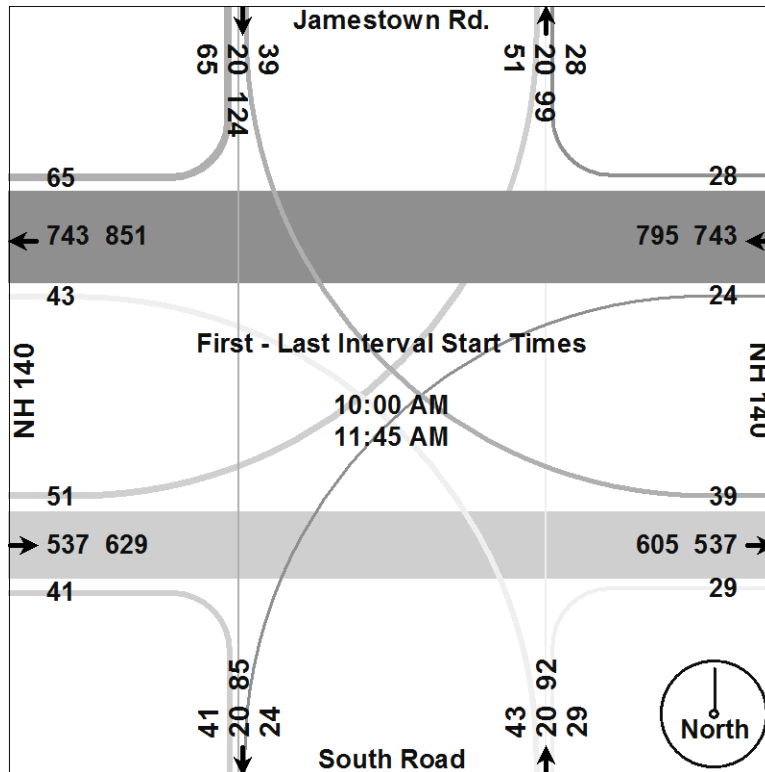
Start Time	Jamestown Rd. From North			NH 140 From East			South Road From South			NH 140 From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:00 AM	7	0	5	0	72	1	7	0	4	0	37	0
07:15 AM	1	1	6	1	73	3	9	1	3	1	40	0
07:30 AM	10	1	8	1	95	3	12	0	6	2	60	3
07:45 AM	5	0	8	2	77	3	3	1	6	1	51	3

Location: Jamestown Road @ NH Route 140 - Belmont

Date: Saturday, August 25, 2012

Time: 10:00AM – 12:00PM

Peak Hour: 11:00AM to 12:00PM



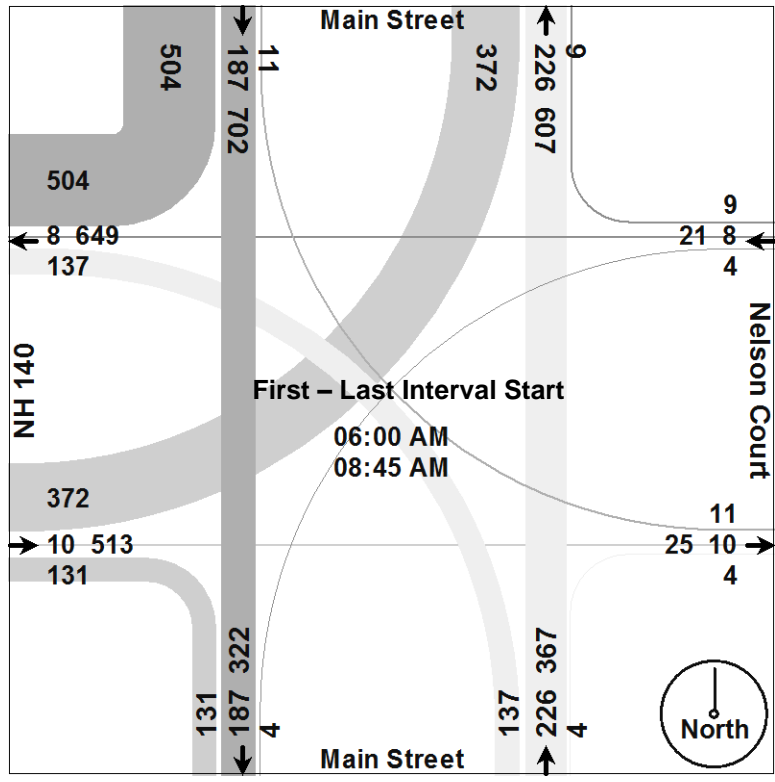
Start Time	Jamestown Rd. From North			NH 140 From East			South Road From South			NH 140 From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
10:00 AM	6	1	14	3	71	3	5	3	2	6	48	3
10:15 AM	7	2	10	4	99	3	6	1	6	5	56	4
10:30 AM	2	3	6	2	92	4	4	5	5	11	76	3
10:45 AM	6	2	8	4	82	2	4	2	3	7	80	6
11:00 AM	6	4	13	5	89	4	10	3	2	5	63	6
11:15 AM	6	1	4	2	76	6	3	3	5	6	57	5
11:30 AM	3	5	4	3	111	2	4	1	2	6	74	8
11:45 AM	3	2	6	1	123	4	7	2	4	5	83	6

Location: Main Street @ NH Route 140 - Belmont

Date: Thursday, August 9, 2012

Time: 6:00AM – 9:00AM

Peak Hour: 7:00AM to 8:00AM



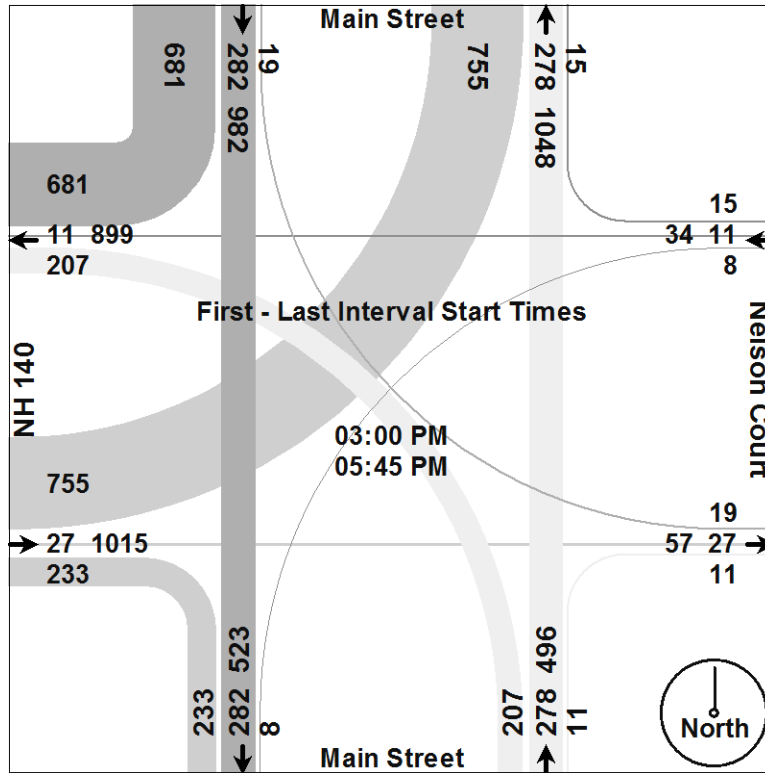
Start Time	Main Street From North			Nelson Court From East			Main Street From South			NH 140 From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
06:00AM	0	6	24	0	0	0	10	11	1	14	0	6
06:15AM	2	7	39	0	1	1	8	13	2	27	0	8
06:30AM	2	14	55	1	2	2	8	16	0	39	1	9
06:45AM	2	15	44	0	2	1	11	15	0	21	3	9
07:00AM	0	12	47	0	0	2	12	12	0	38	1	14
07:15AM	0	21	43	0	0	1	19	25	0	31	2	11
07:30AM	1	19	55	1	0	0	13	19	0	44	0	19
07:45AM	0	19	41	0	2	0	14	29	0	46	1	20
08:00AM	0	25	37	0	0	2	7	23	0	26	1	11
08:15AM	1	17	36	0	1	0	12	24	0	23	0	8
08:30AM	2	14	39	1	0	0	10	18	1	33	1	7
08:45AM	1	18	44	1	0	0	13	21	0	30	0	9

Location: Main Street @ NH Route 140 - Belmont

Date: Thursday, August 9, 2012

Time: 3:00PM – 6:00PM

Peak Hour: 5:00PM to 6:00PM



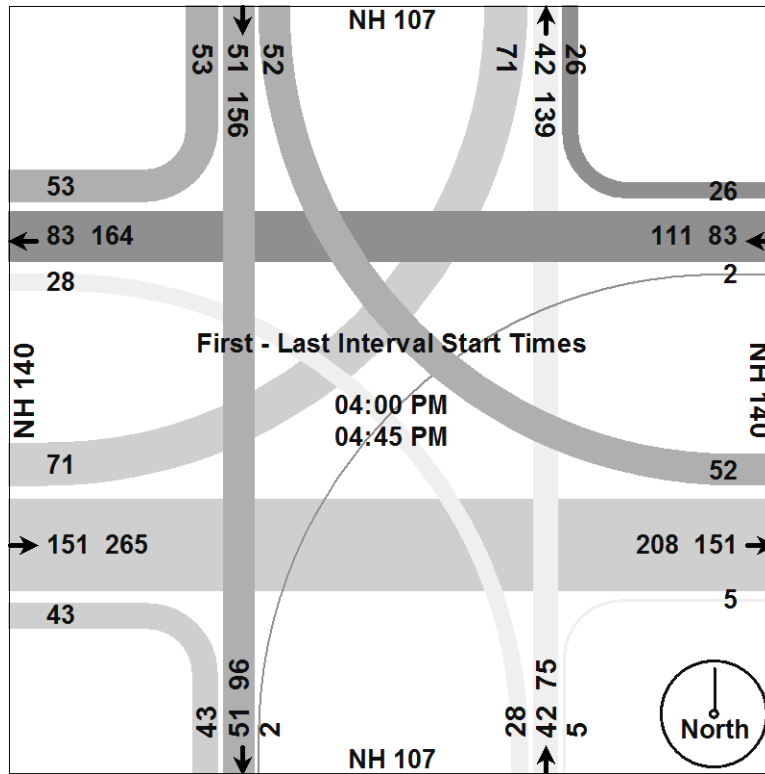
Start Time	Main Street From North			Nelson Court From East			Main Street From South			NH 140 From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
03:00PM	0	22	64	0	0	1	5	25	0	61	0	16
03:15PM	0	17	45	1	0	1	22	26	0	57	2	16
03:30PM	2	22	50	1	0	0	16	20	2	59	2	22
03:45PM	3	18	54	0	1	1	14	15	1	61	2	29
04:00PM	1	29	57	0	2	0	25	31	3	68	0	19
04:15PM	0	20	57	0	1	1	12	24	1	68	4	23
04:30PM	4	19	55	1	0	2	20	23	1	57	2	15
04:45PM	1	26	55	2	1	2	19	24	0	62	5	28
05:00PM	3	28	65	0	3	2	22	28	2	71	2	16
05:15PM	2	29	72	1	2	1	23	24	0	60	4	12
05:30PM	1	30	56	2	1	0	13	23	0	74	0	22
05:45PM	2	22	51	0	0	4	16	15	1	57	4	15

Location: NH Route 107 @ NH Route 140 - Gilmanton

Date: Tuesday, August 21, 2012

Time: 4:00PM – 5:00PM

Peak Hour only as determined by previously conducted traffic volume count.



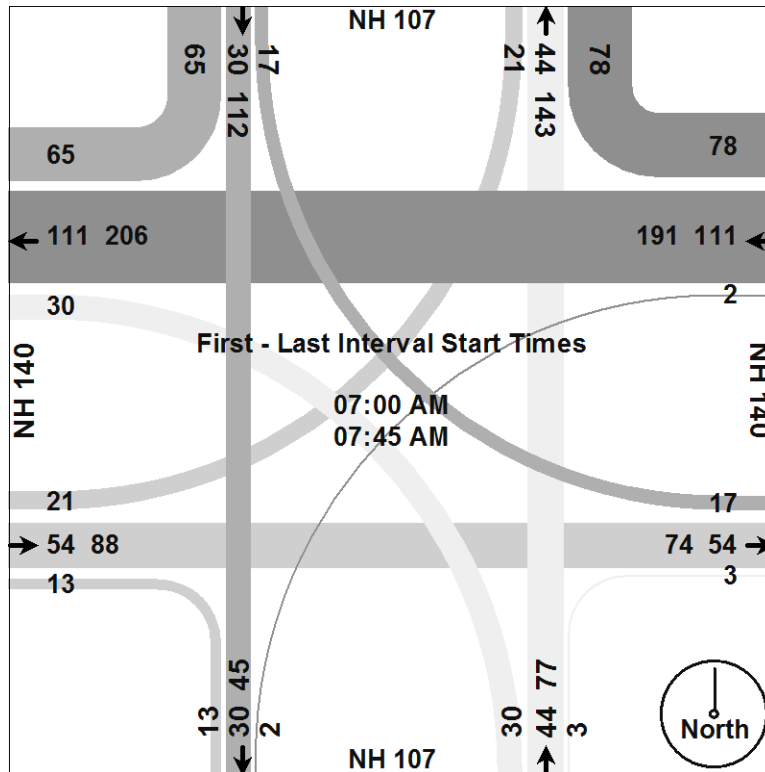
Start Time	NH 107 From North			NH 140 From East			NH 107 From South			NH 140 From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
04:00 PM	10	11	13	0	24	5	7	6	0	18	35	7
04:15 PM	11	10	17	0	20	5	6	13	3	14	35	16
04:30 PM	13	17	11	0	17	10	10	9	0	22	43	10
04:45 PM	18	13	12	2	22	6	5	14	2	17	38	10

Location: NH Route 107 @ NH Route 140 - Gilmanton

Date: Wednesday, August 22, 2012

Time: 7:00AM – 8:00AM

Peak Hour only as determined by previously conducted traffic volume count.



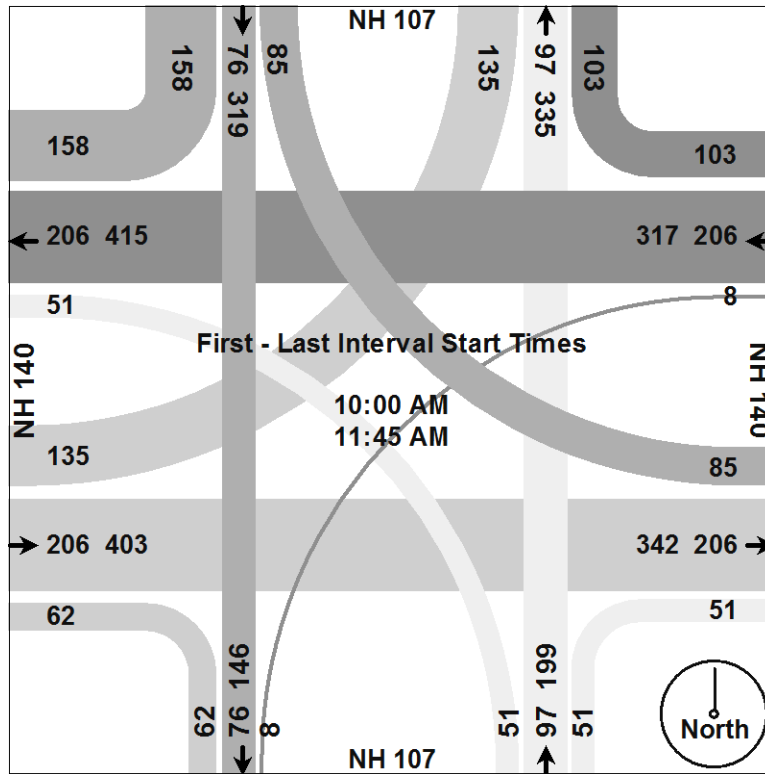
Start Time	NH 107 From North			NH 140 From East			NH 107 From South			NH 140 From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:00 AM	2	6	17	0	16	13	8	8	1	2	5	3
07:15 AM	1	7	20	1	27	21	7	13	1	5	17	3
07:30 AM	5	8	13	1	30	26	6	13	0	8	15	3
07:45 AM	9	9	15	0	38	18	9	10	1	6	17	4

Location: NH Route 107 @ NH Route 140 – Gilmanton

Date: Saturday, August 25, 2012

Time: 10:00AM – 12:00PM

Peak Hour: 11:00AM to 12:00PM



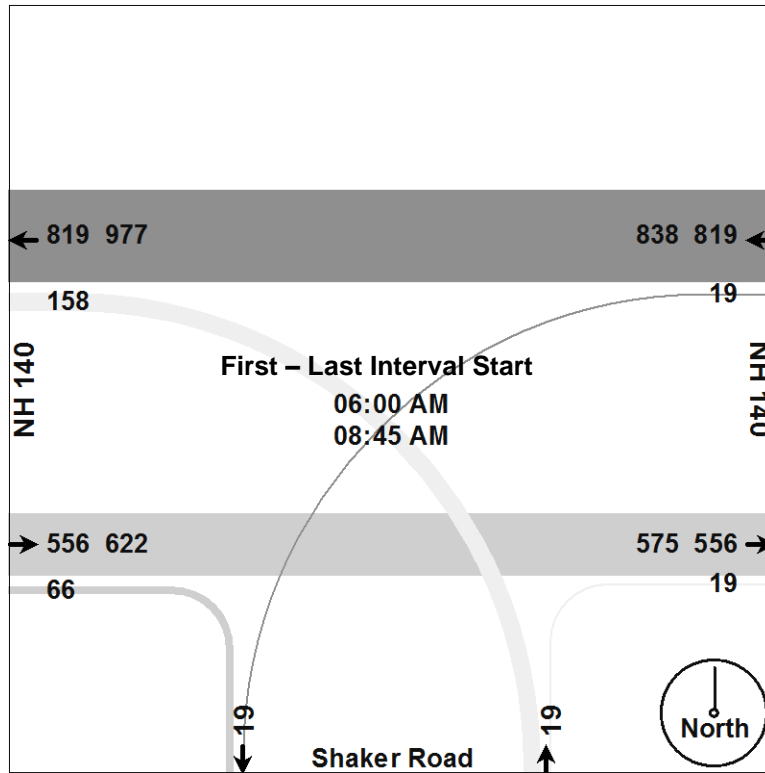
Start Time	NH 107 From North			NH 140 From East			NH 107 From South			NH 140 From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
10:00 AM	10	11	23	1	31	8	10	15	1	14	36	6
10:15 AM	12	8	20	0	26	13	7	5	1	22	14	4
10:30 AM	5	3	21	0	24	13	6	10	0	12	29	10
10:45 AM	14	11	21	2	21	18	10	17	1	14	27	7
11:00 AM	13	11	16	1	29	9	6	10	2	16	20	11
11:15 AM	9	12	18	2	23	14	3	10	1	18	25	10
11:30 AM	15	9	22	2	27	11	5	13	41	23	23	7
11:45 AM	7	11	17	0	25	17	4	17	4	16	32	7

Location: Shaker Road @ NH Route 140 - Northfield

Date: Thursday, August 9, 2012

Time: 6:00AM – 9:00AM

Peak Hour: 7:00AM to 8:00AM



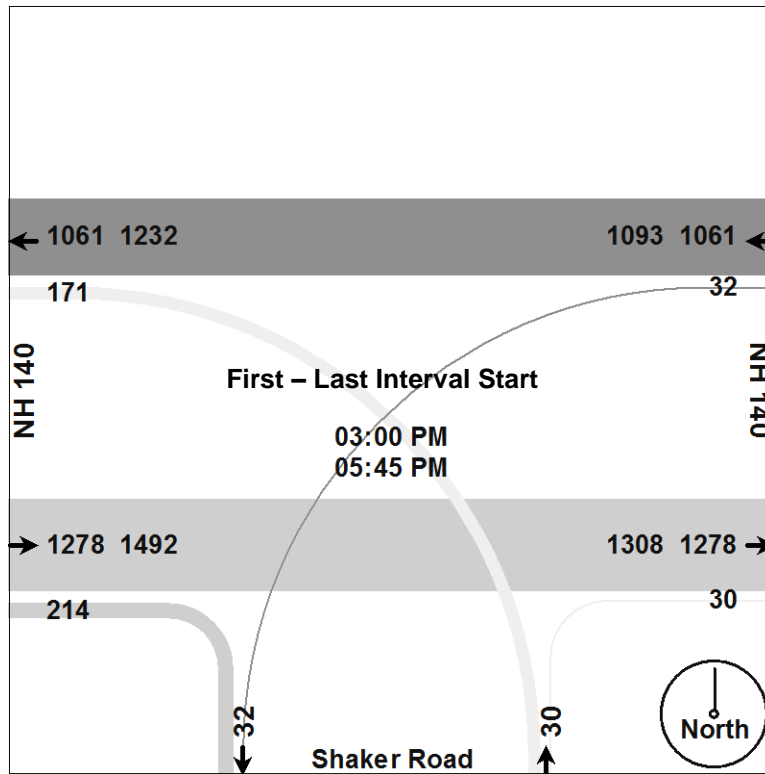
Start Time	NH 140 From West			Shaker Road From South			NH 140 From East		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
06:00 AM	1	27	1	4	0	1	1	38	0
06:15 AM	0	23	1	8	0	0	0	42	0
06:30 AM	0	48	4	15	0	1	2	58	0
06:45 AM	0	50	2	18	0	1	5	87	0
07:00 AM	0	57	9	15	0	0	2	59	0
07:15 AM	0	44	6	15	0	0	2	66	0
07:30 AM	0	47	5	19	0	2	0	90	0
07:45 AM	0	62	5	15	0	10	1	82	0
08:00 AM	0	54	7	16	0	2	2	81	0
08:15 AM	0	42	11	8	0	1	1	67	0
08:30 AM	0	51	2	13	0	0	3	76	0
08:45 AM	0	51	13	12	0	1	0	73	0

Location: Shaker Road @ NH Route 140 - Northfield

Date: Thursday, August 9, 2012

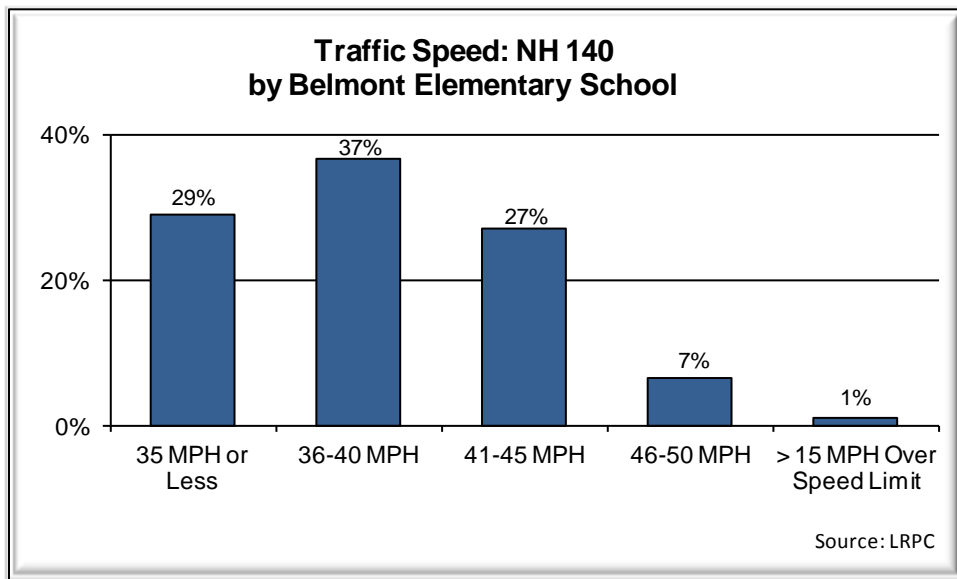
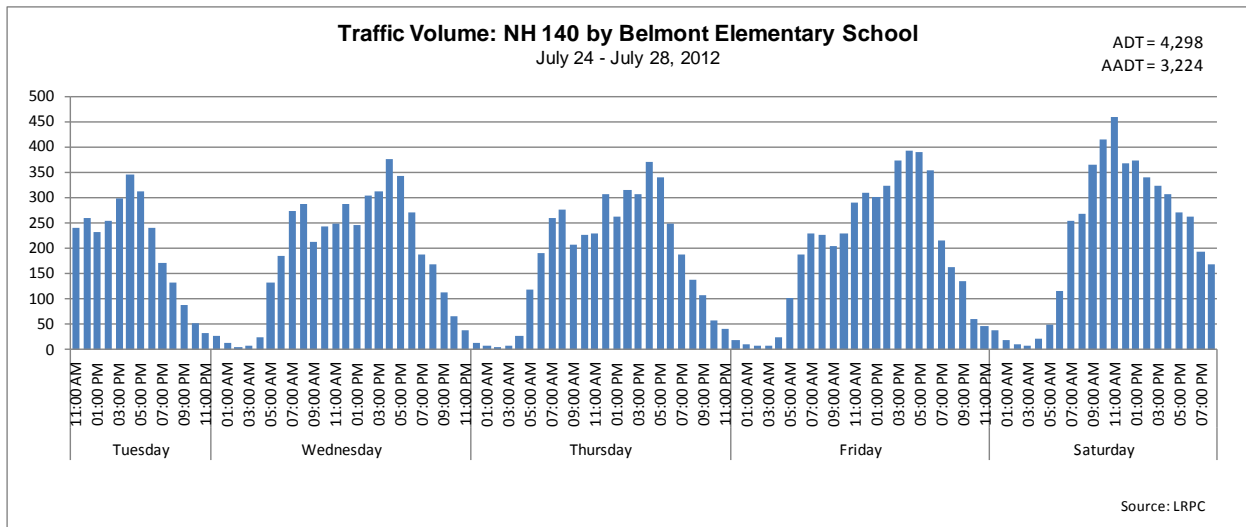
Time: 3:00PM – 6:00PM

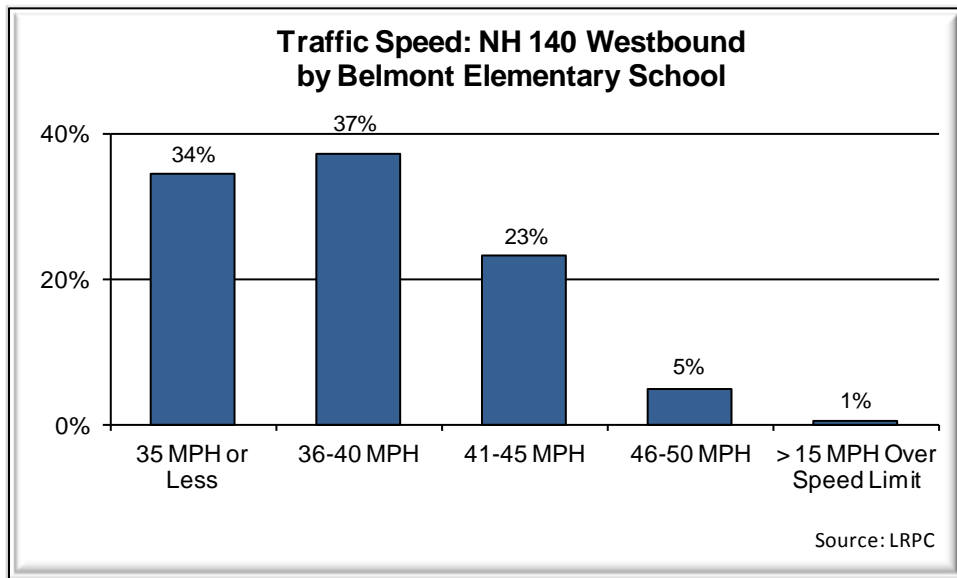
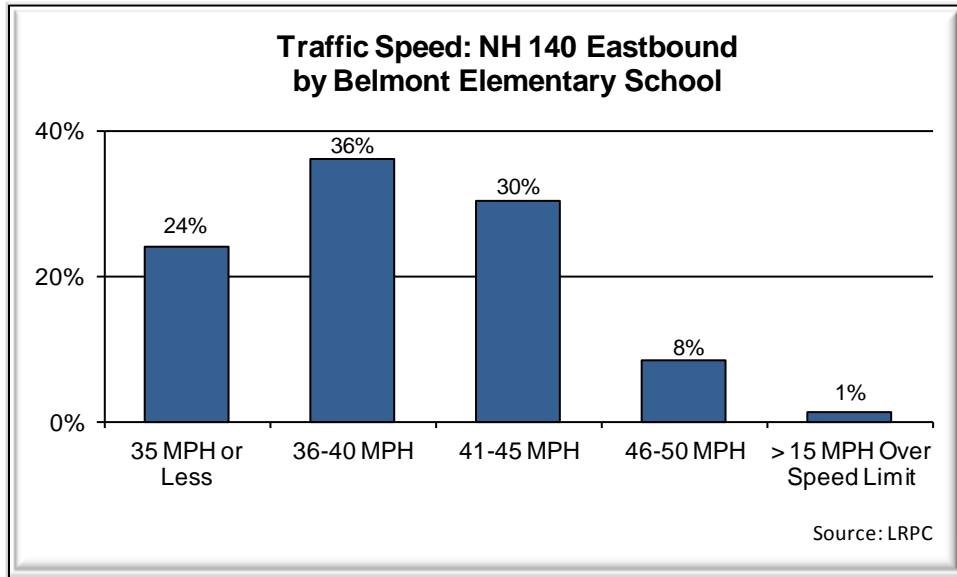
Peak Hour: 5:00PM to 6:00PM

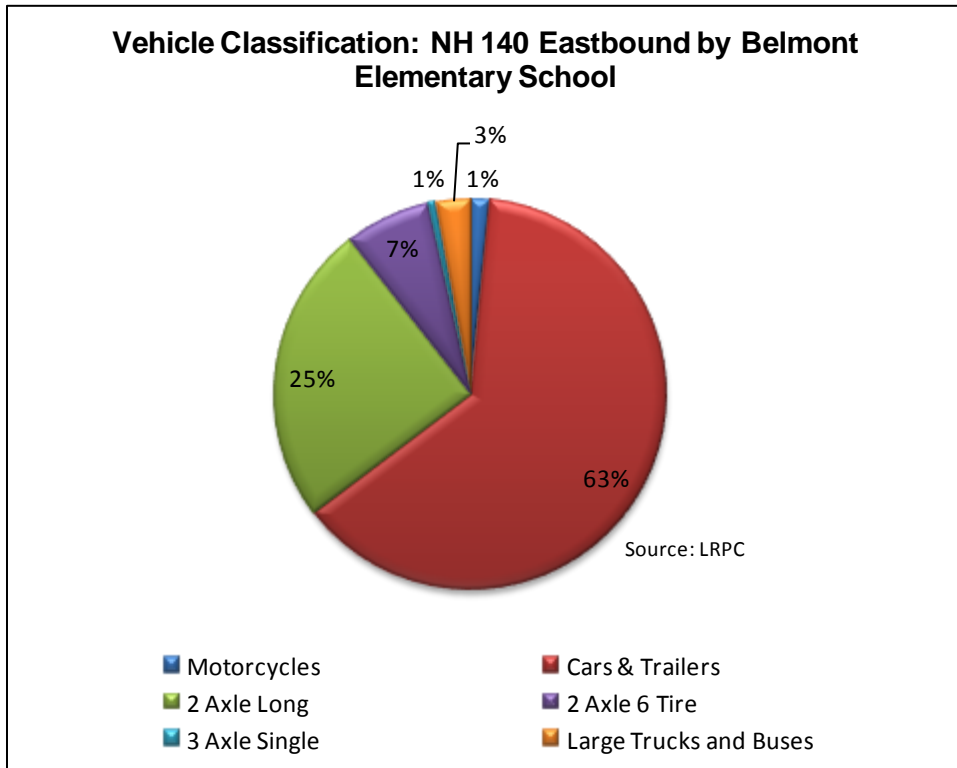
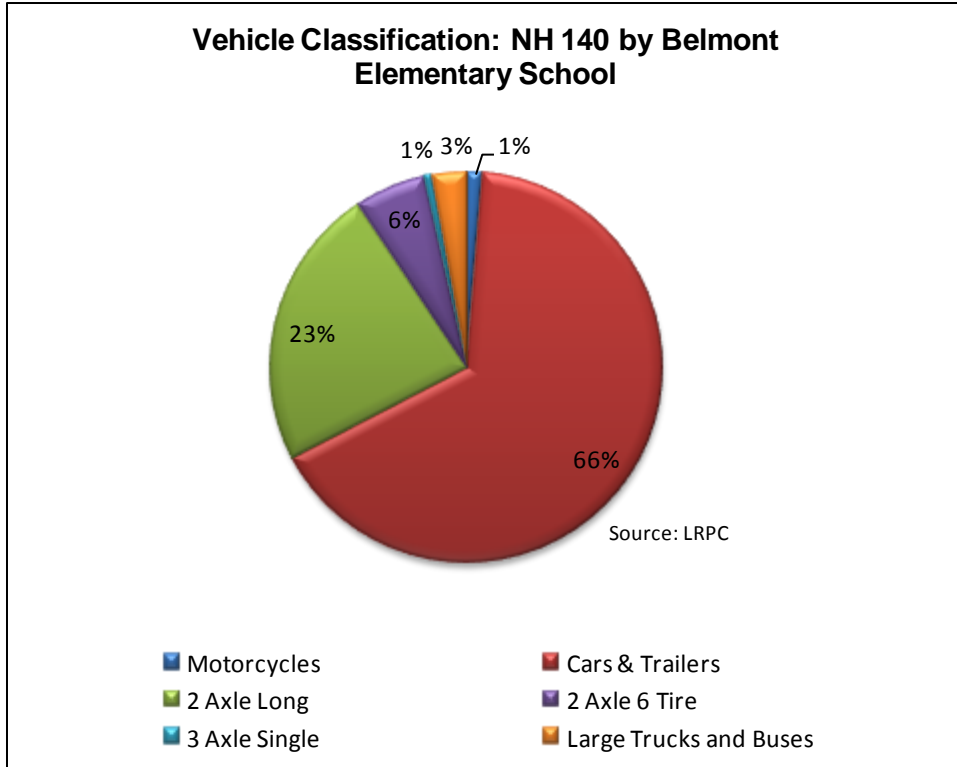


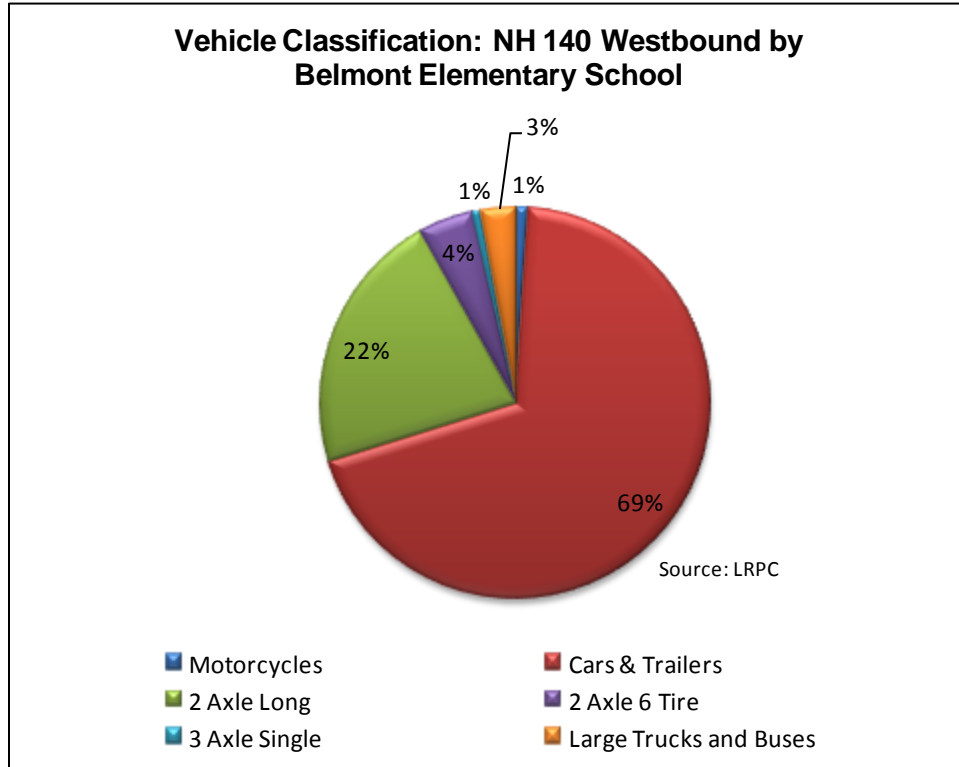
Start Time	NH 140 From West			Shaker Road From South			NH 140 From East		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
3:00 PM	0	103	14	11	0	1	0	77	0
3:15 PM	0	91	12	9	0	1	3	81	0
3:30 PM	0	100	10	15	0	4	2	87	0
3:45 PM	0	116	21	19	0	5	5	118	0
4:00 PM	0	110	22	13	0	0	6	80	0
4:15 PM	0	116	15	12	0	2	1	96	0
4:30 PM	0	90	21	14	0	2	0	87	0
4:45 PM	0	103	18	16	0	2	3	95	0
5:00 PM	0	105	18	17	0	3	6	76	0
5:15 PM	0	121	21	18	0	2	0	92	0
5:30 PM	0	112	20	8	0	4	3	99	0
5:45 PM	0	111	22	19	0	4	3	73	0

Location: NH Route 140 by Belmont Elementary School
Date: Tuesday, July 24 – Tuesday, July 31, 2012
Posted Speed Limit: 35 Miles per Hour

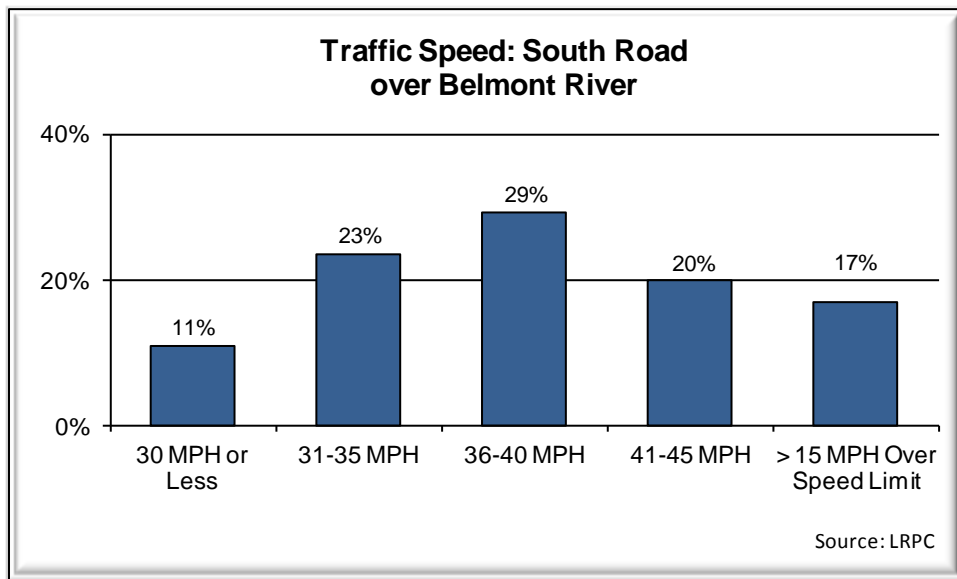
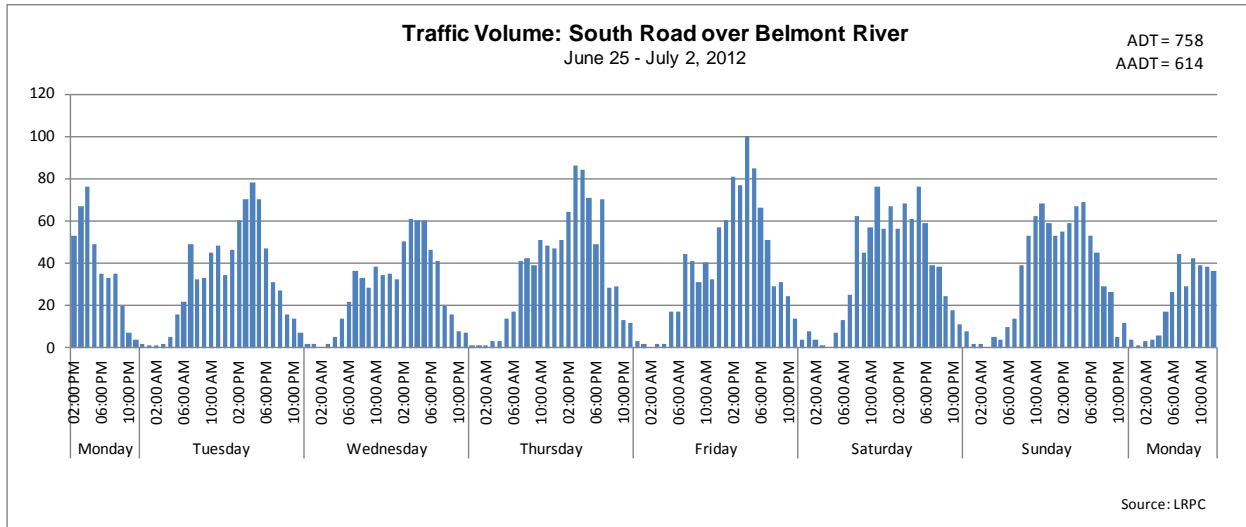


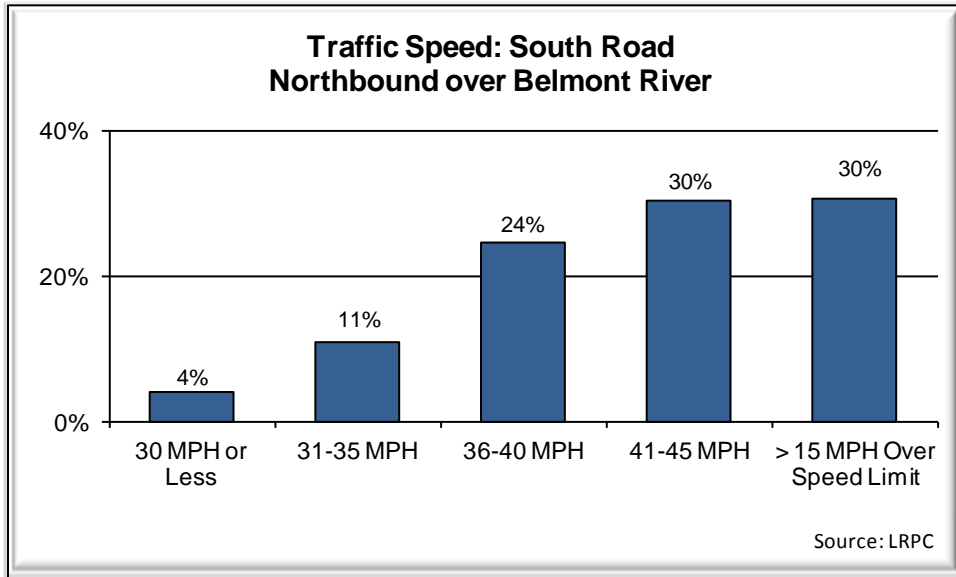
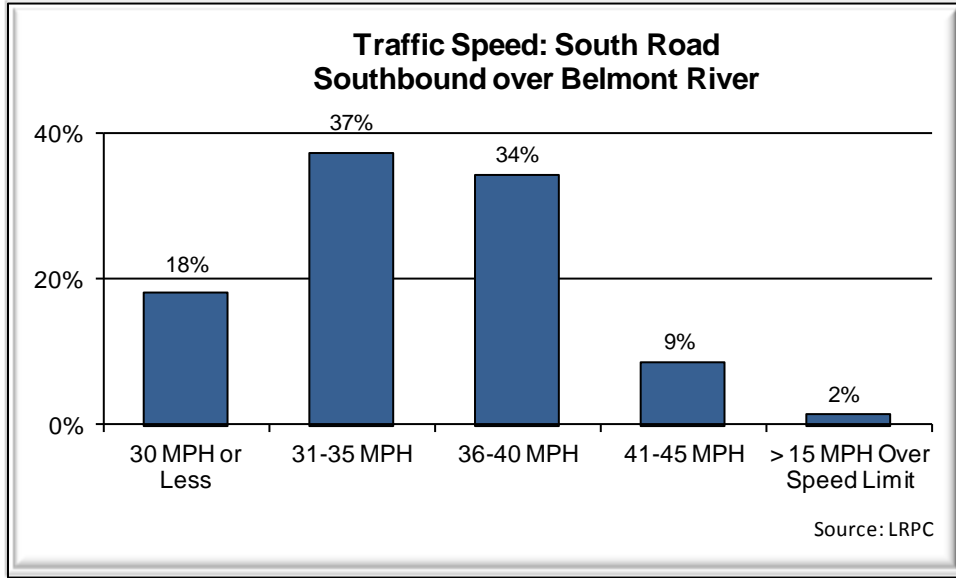


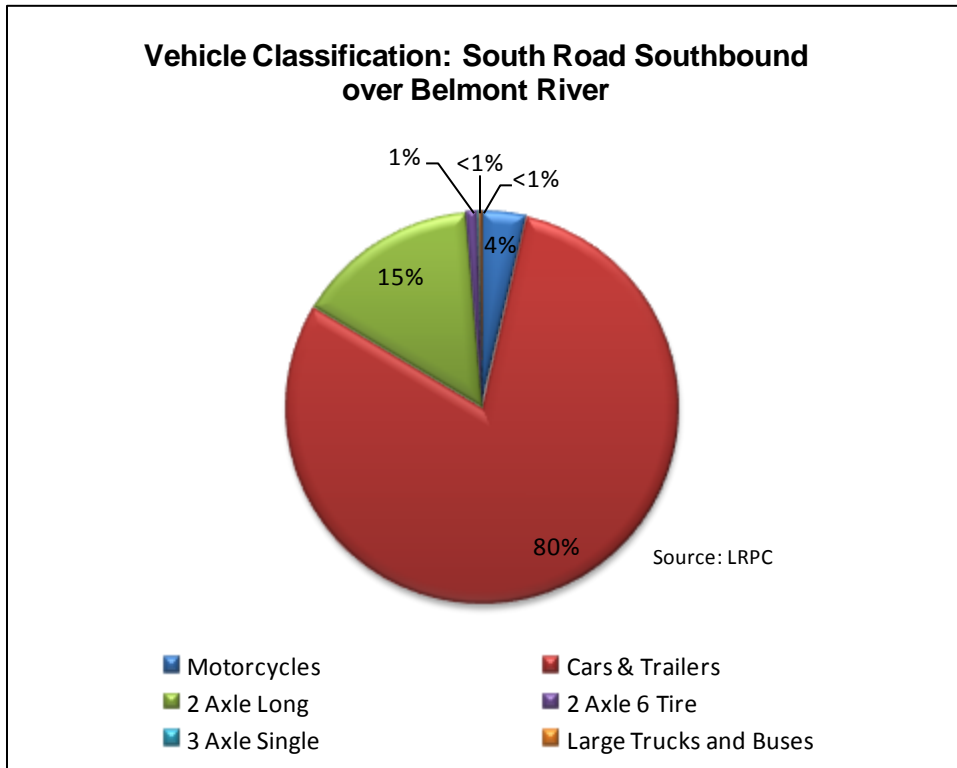
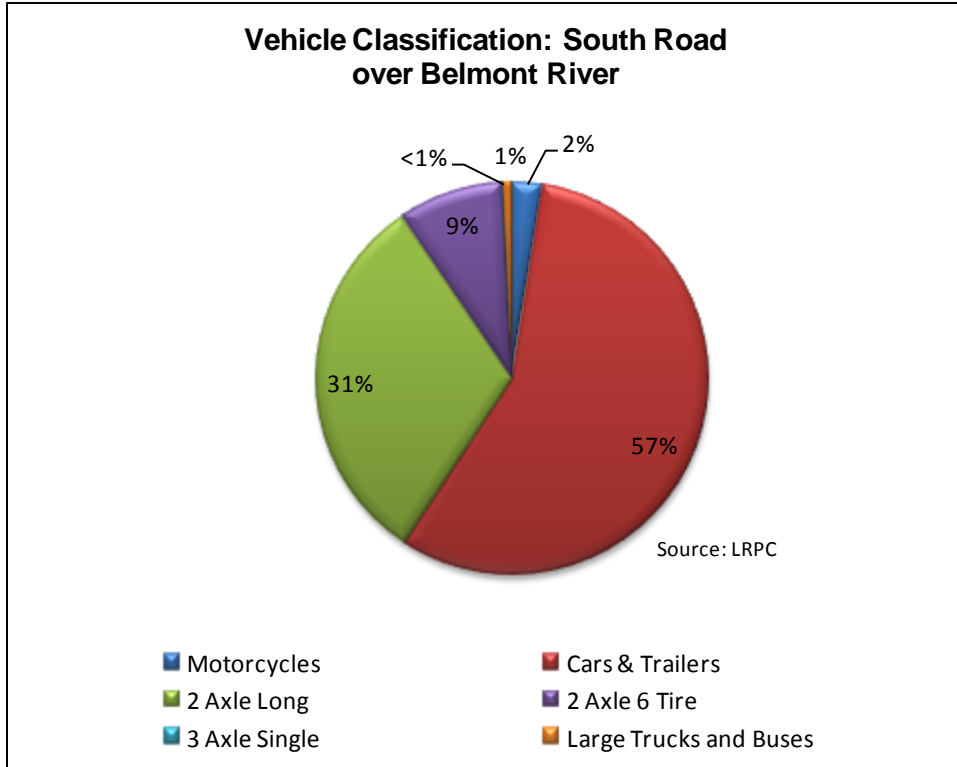


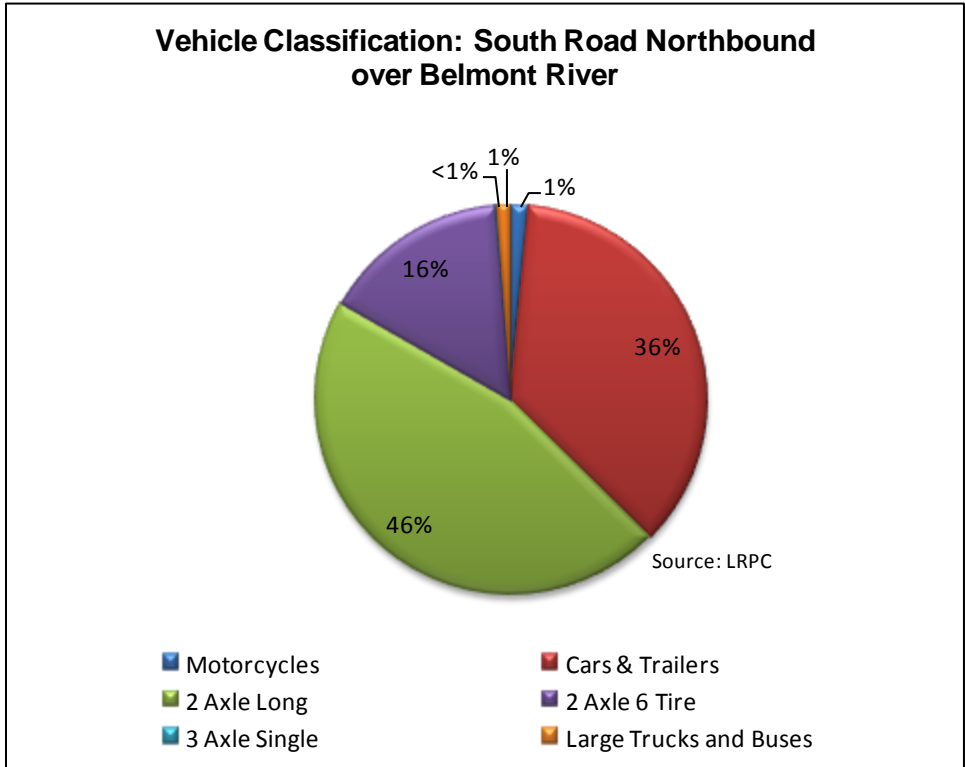


Location: South Road over Belmont River, Belmont
Date: Monday, June 25 – Monday, July 2, 2012
Posted Speed Limit: 30 Miles per Hour

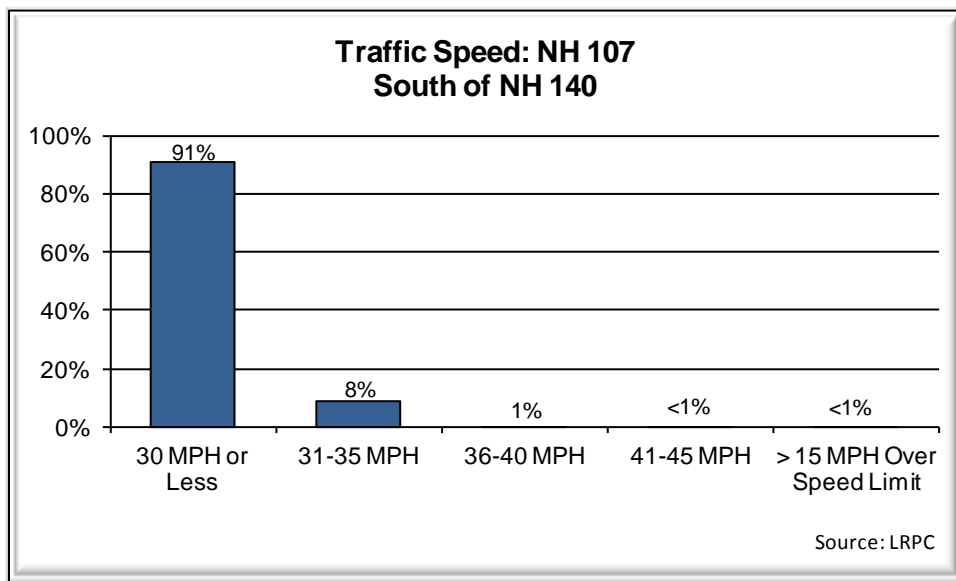
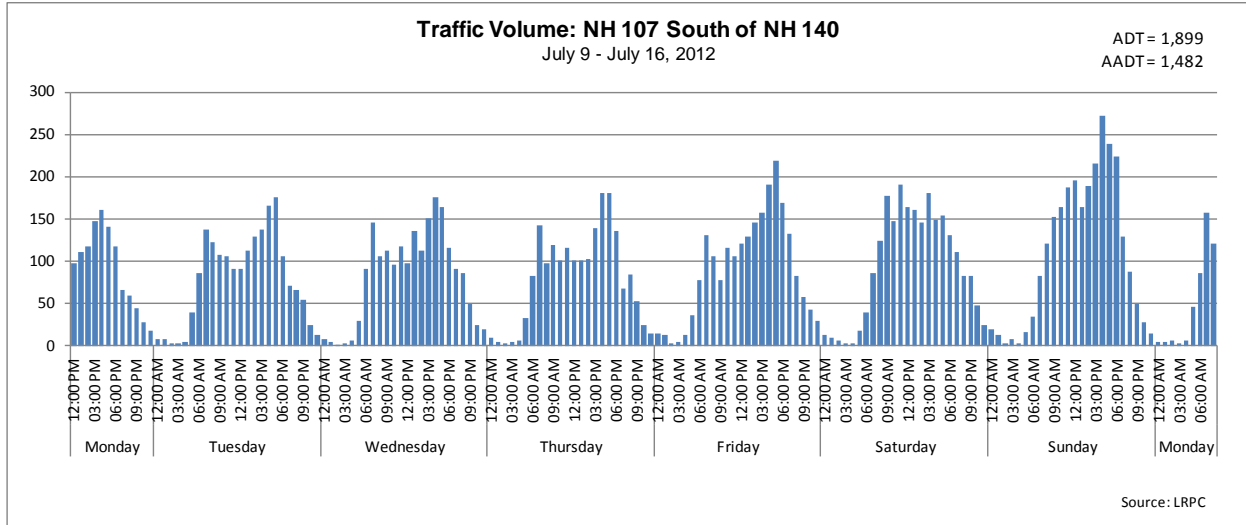


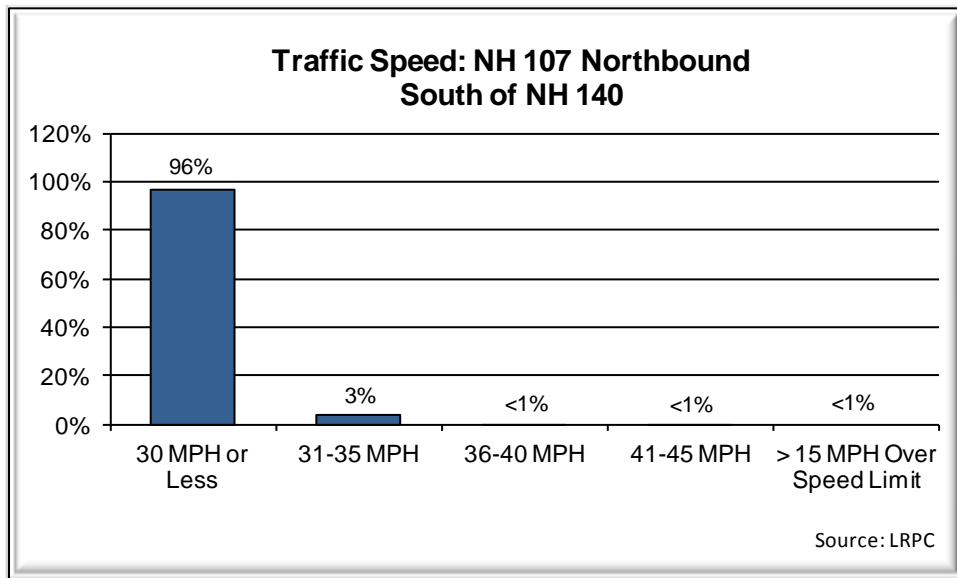
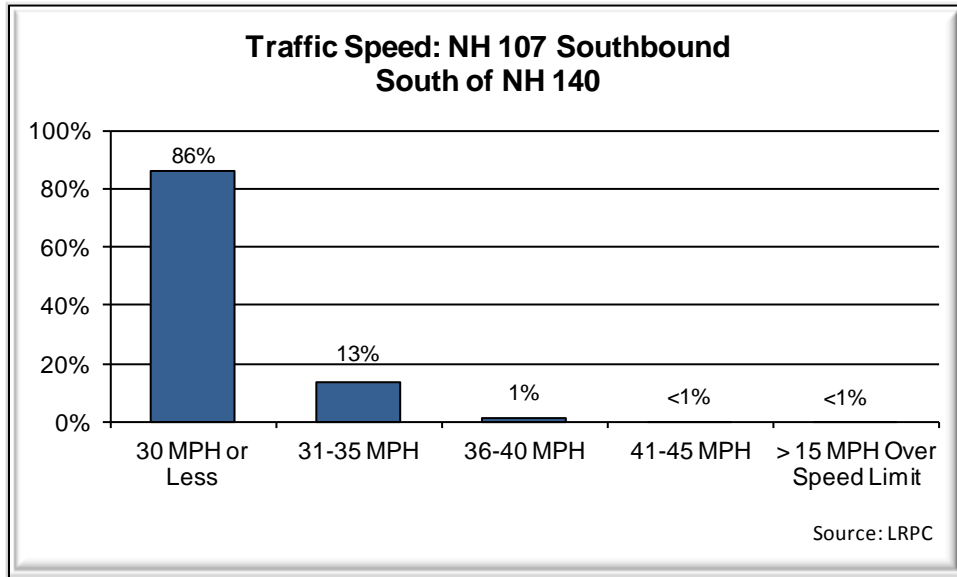


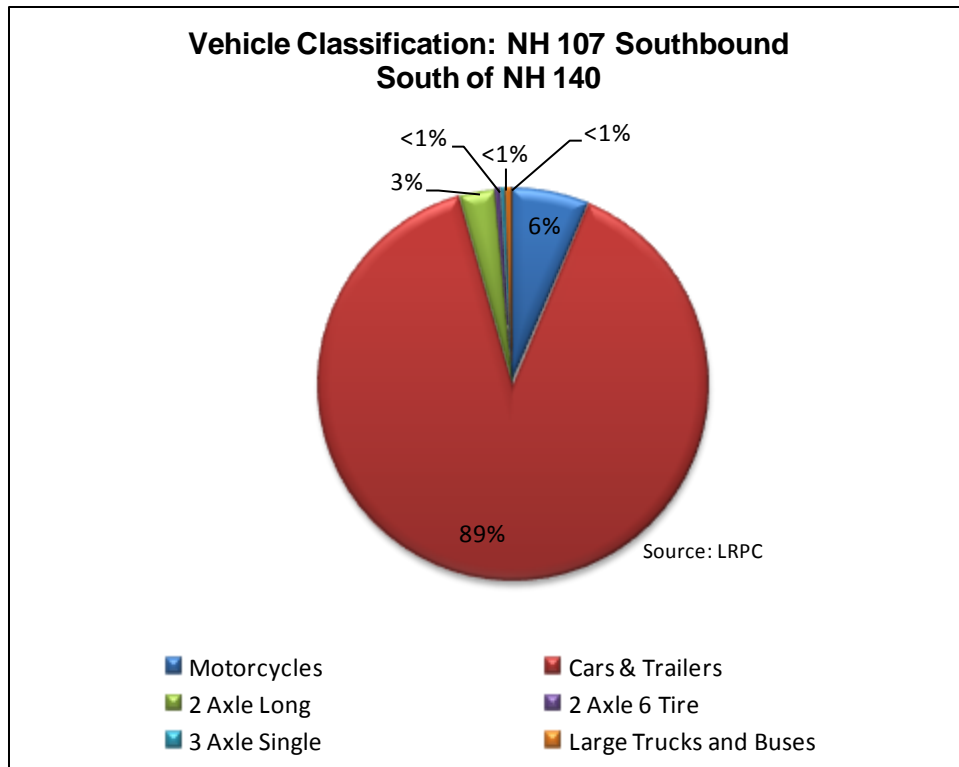
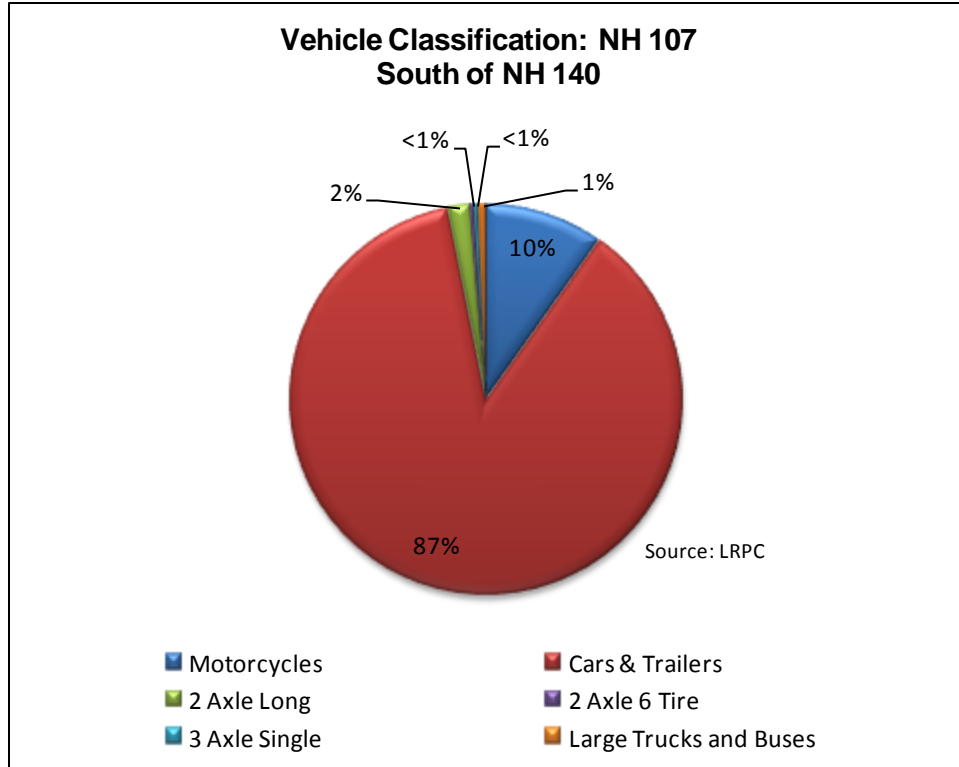


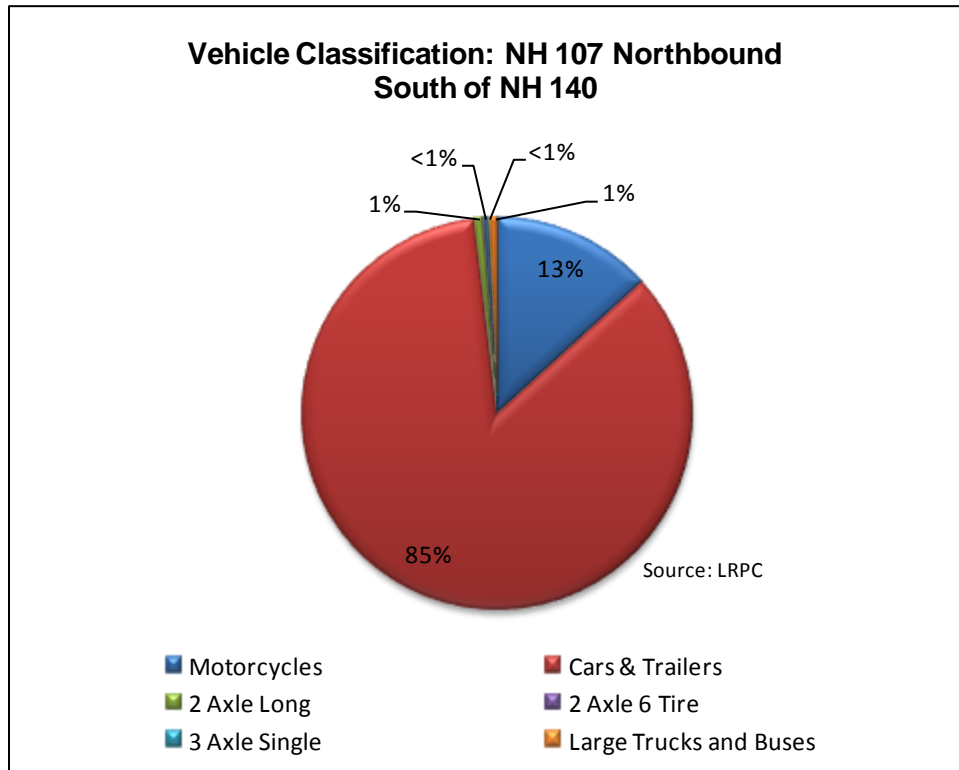


Location: NH Route 107 South of NH Route 140
Date: Monday, July 9 – Monday, July 16, 2012
Posted Speed Limit: 30 Miles per Hour

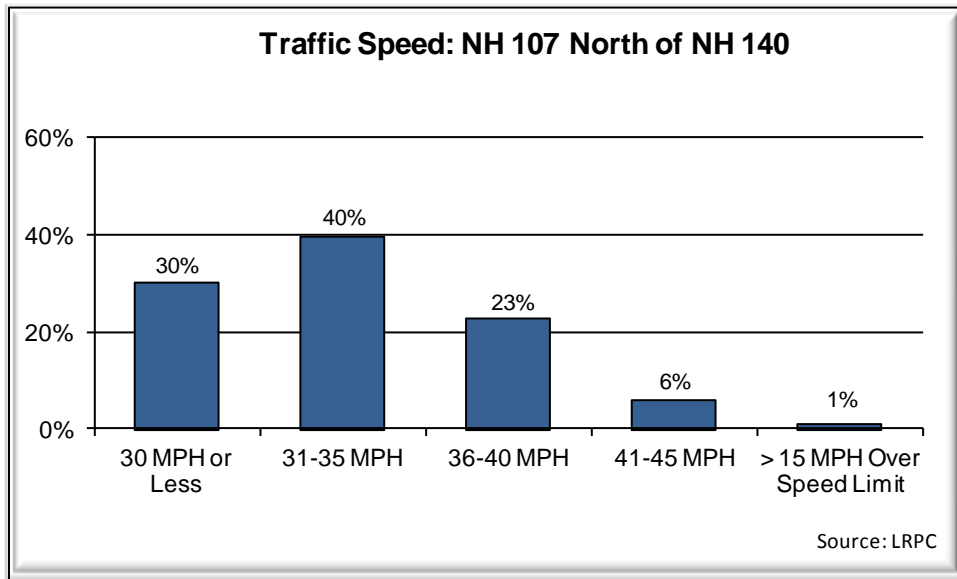
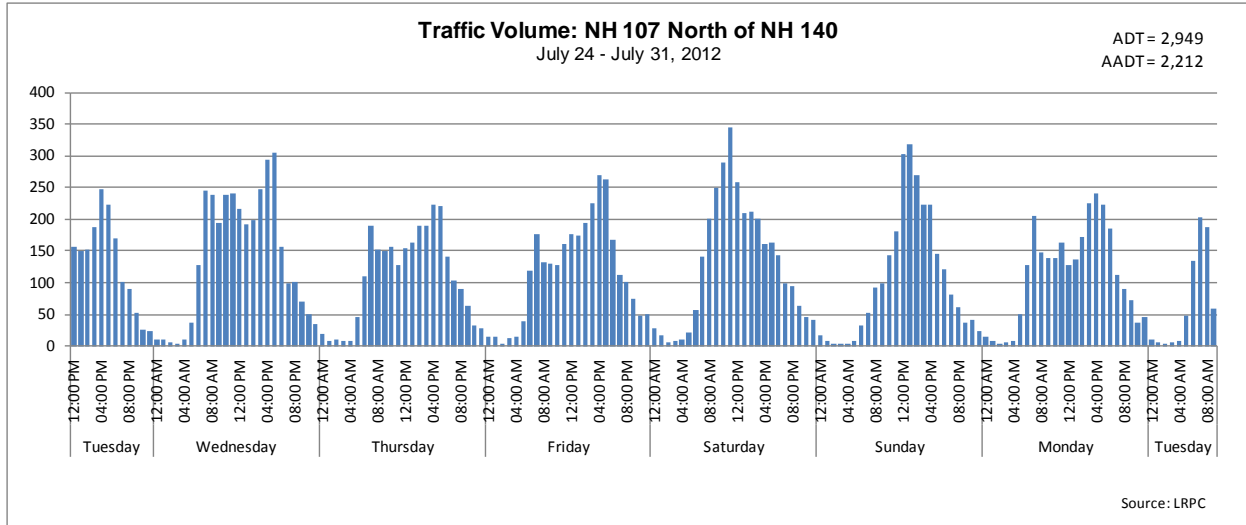


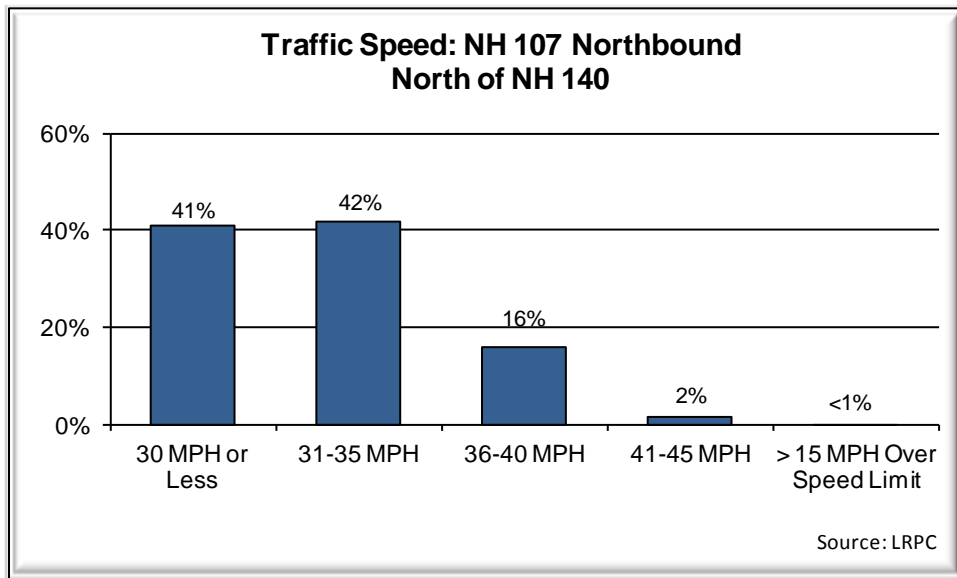
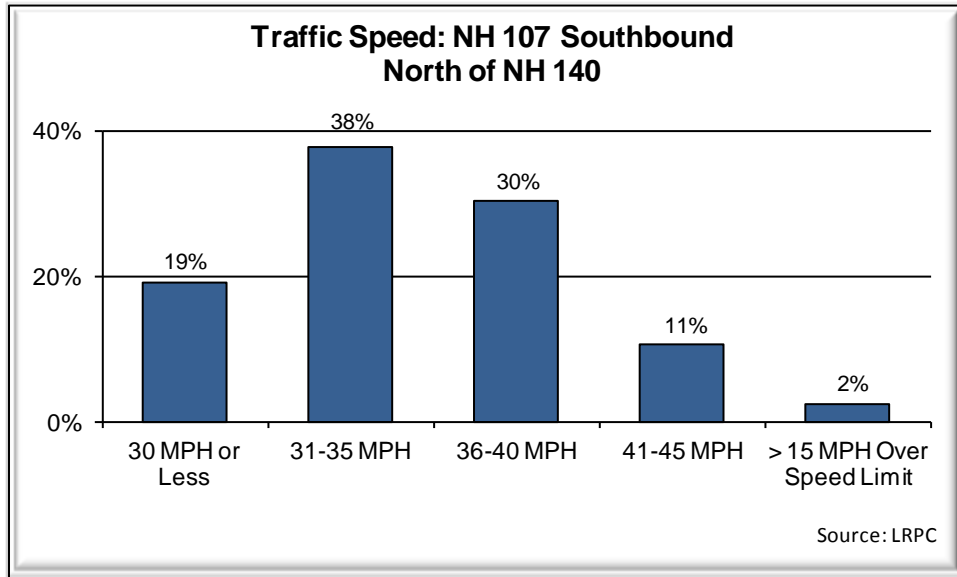


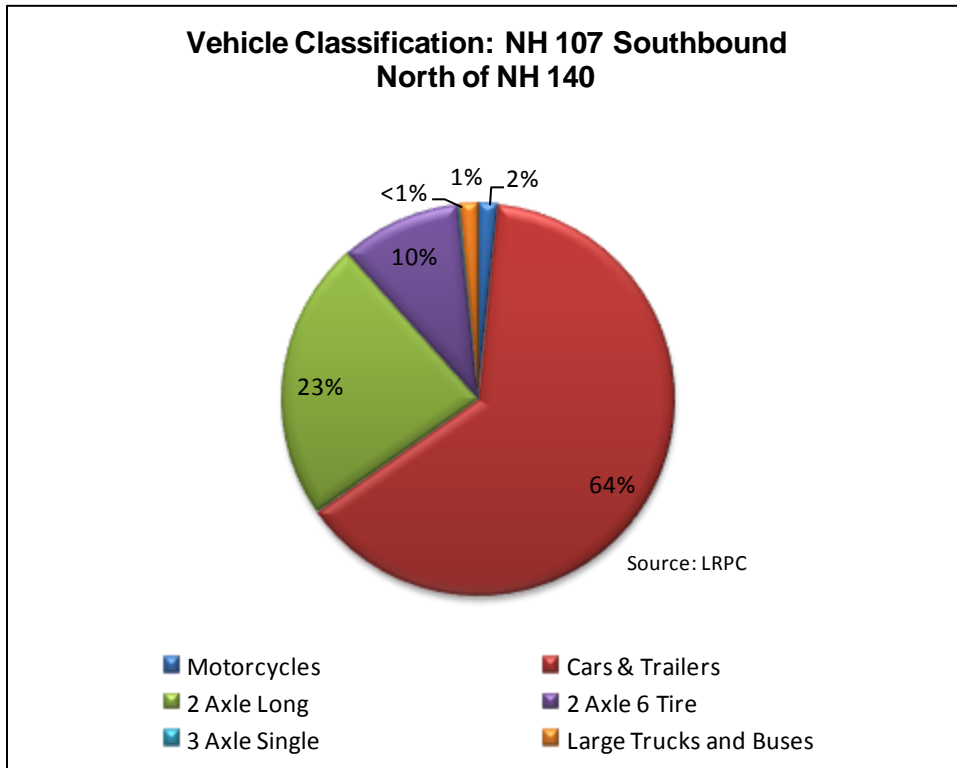
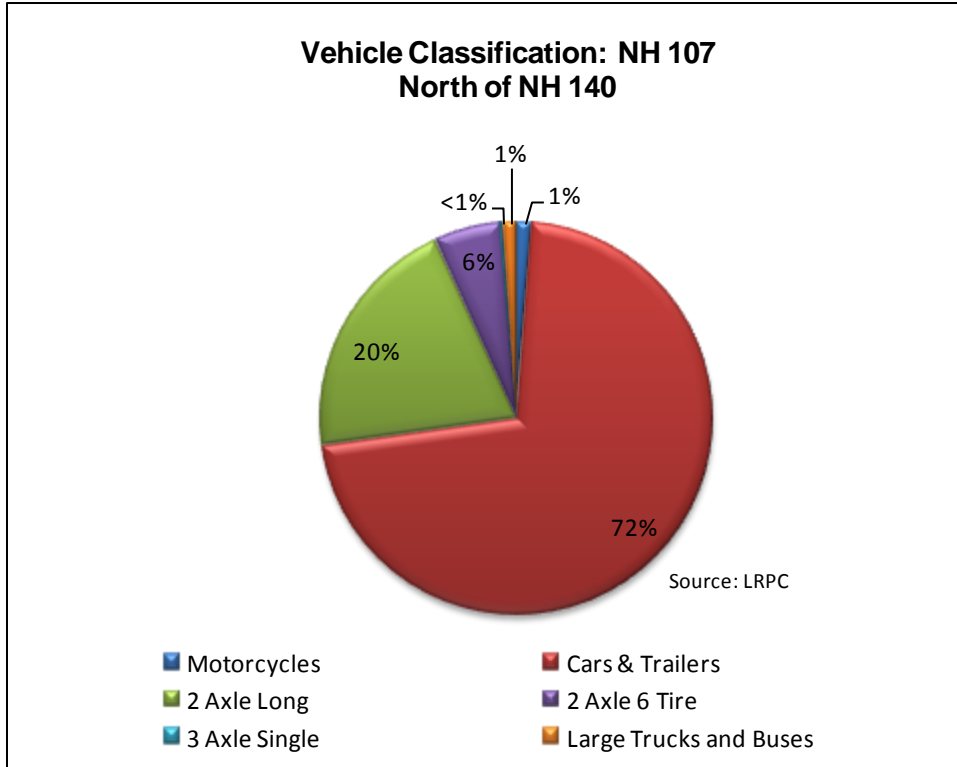


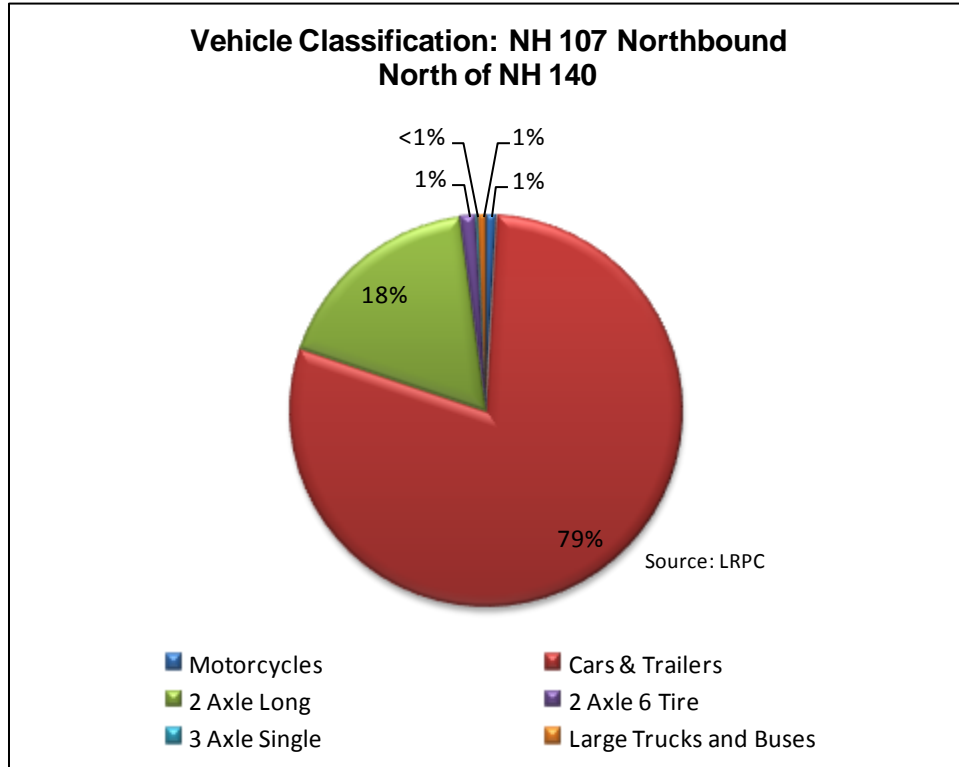


Location: NH Route 107 North of NH Route 140
Date: Tuesday, July 24 – Tuesday, July 31, 2012
Posted Speed Limit: 30 Miles per Hour

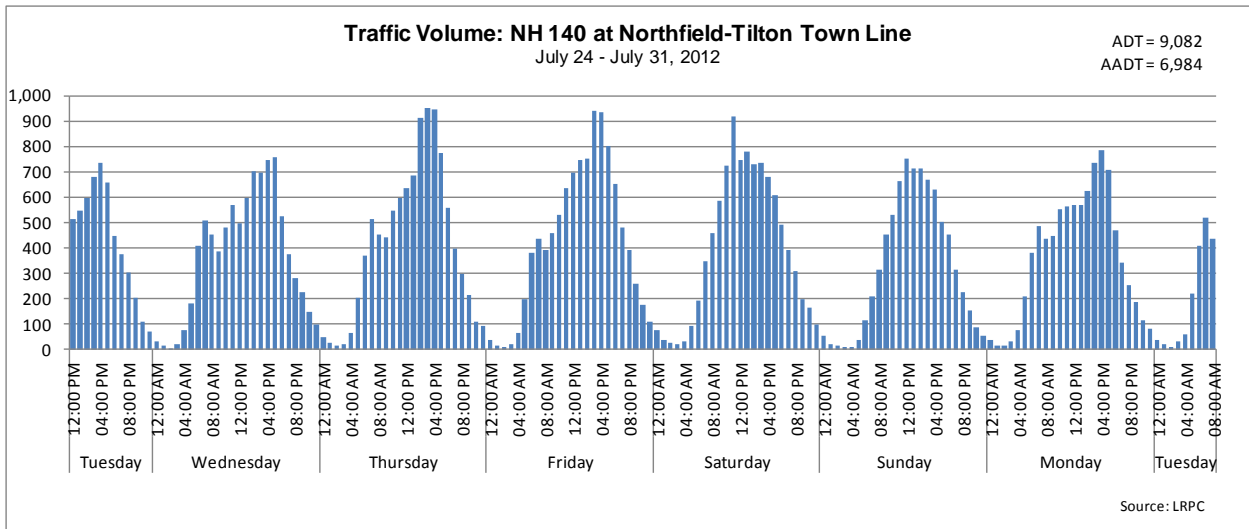




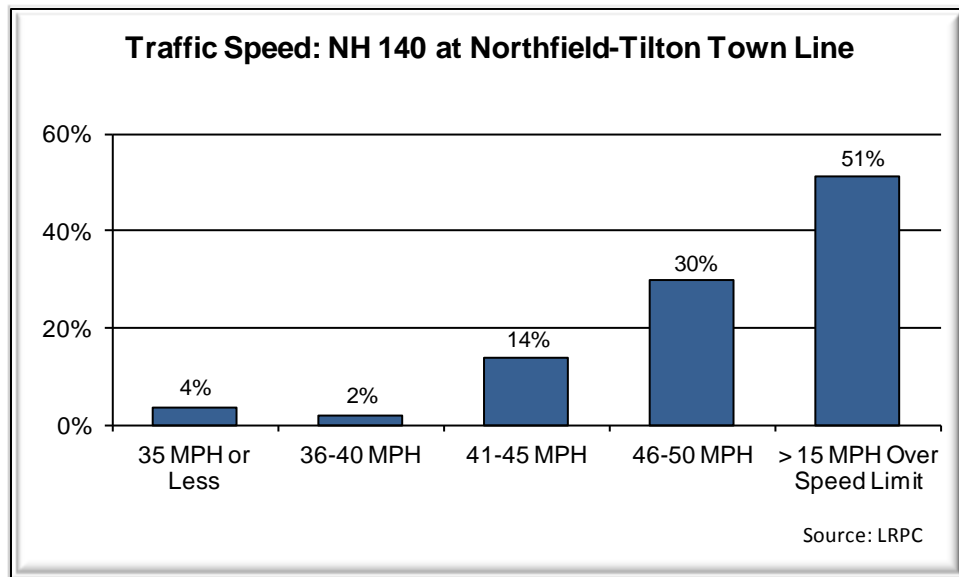


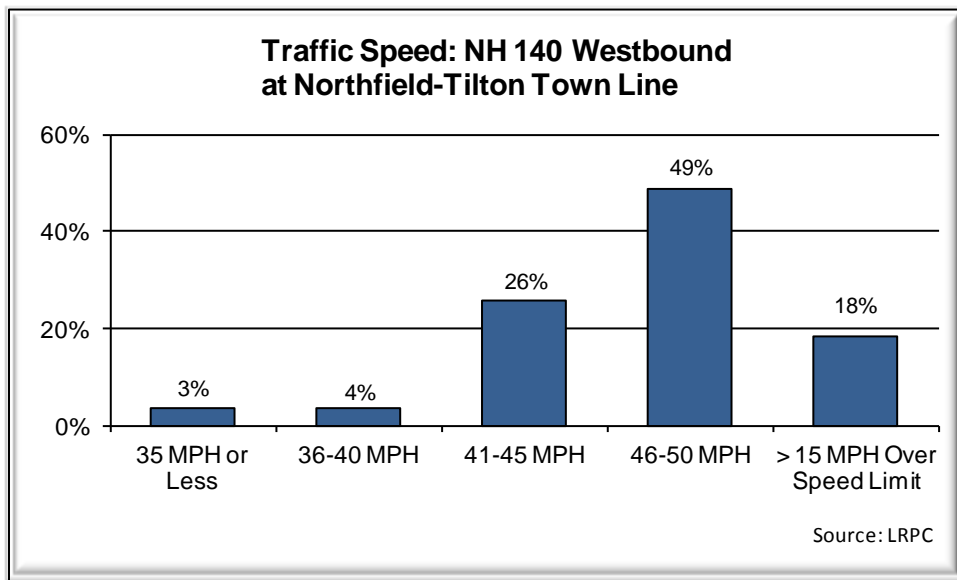
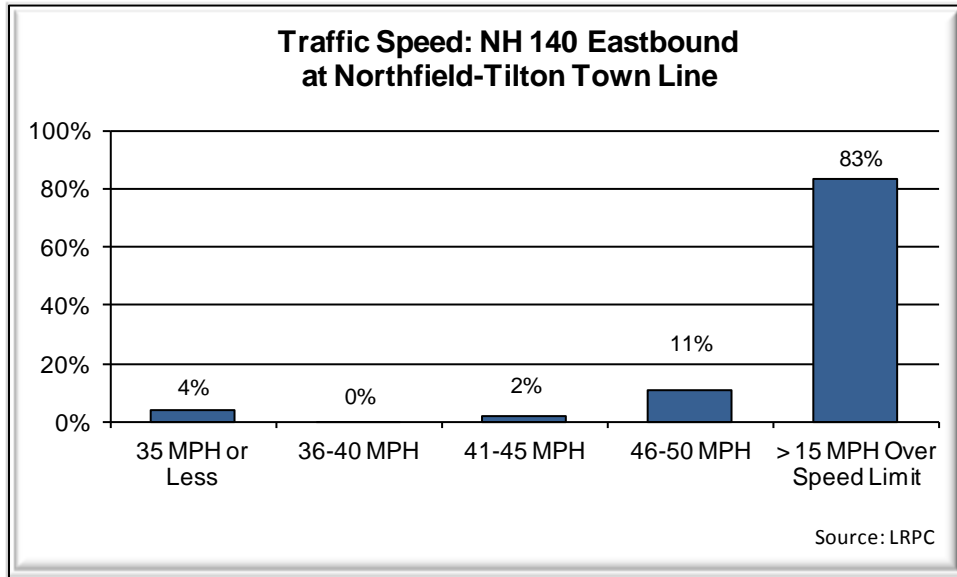


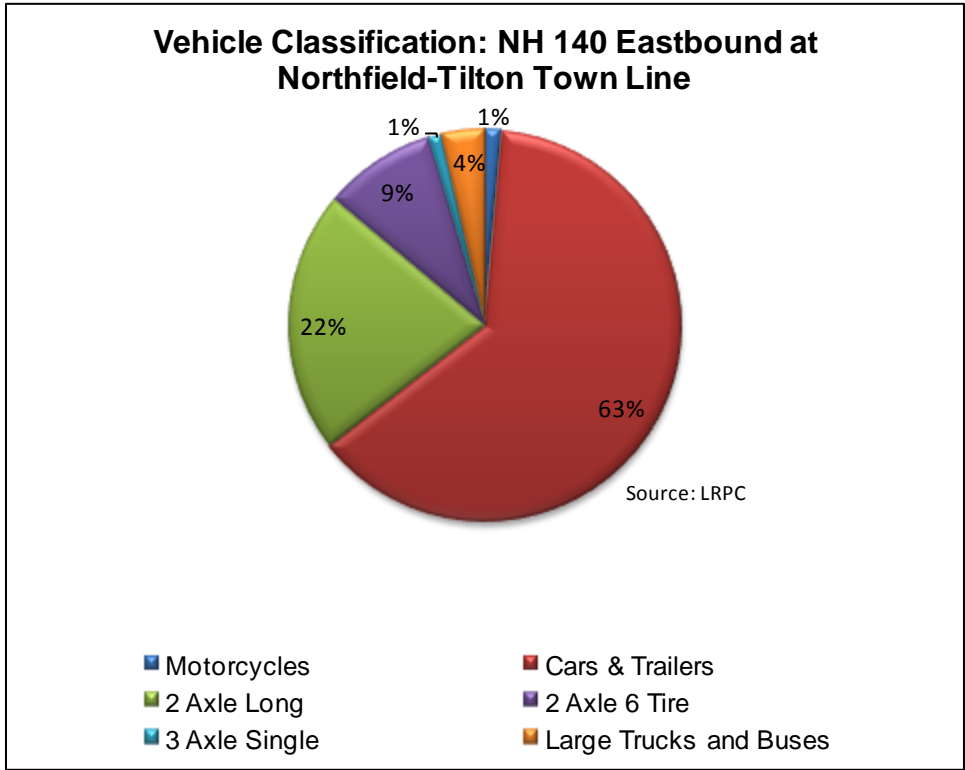
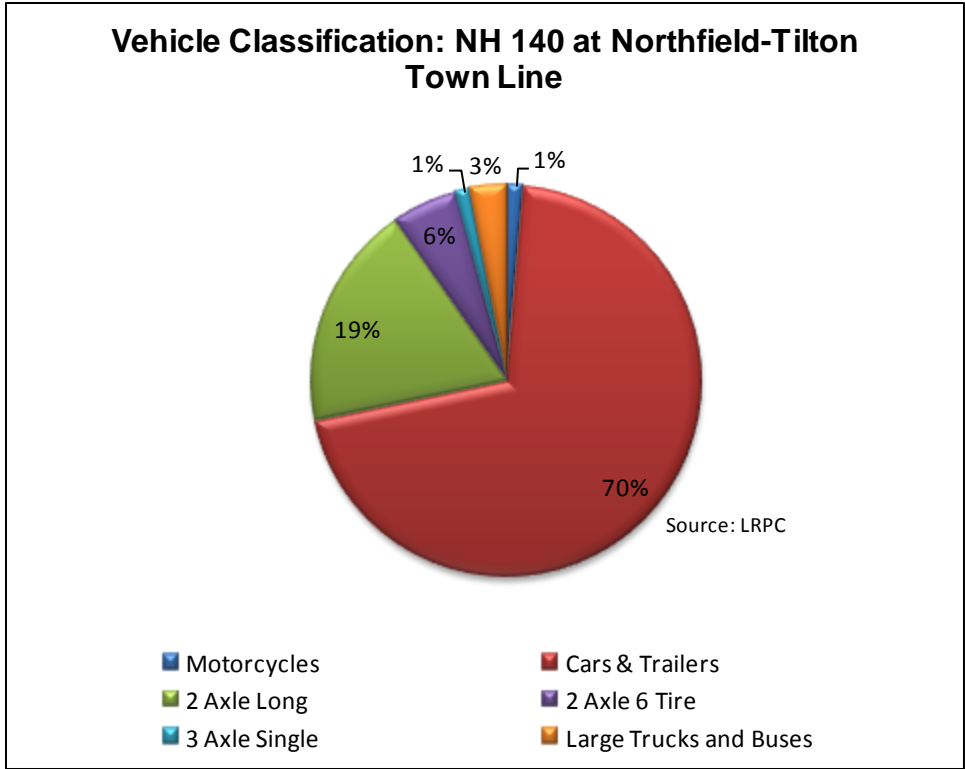
Location: NH Route 140 Northfield-Tilton Town Line
Date: Tuesday, July 24 – Tuesday, July 31, 2012
Posted Speed Limit: 35 Miles per Hour

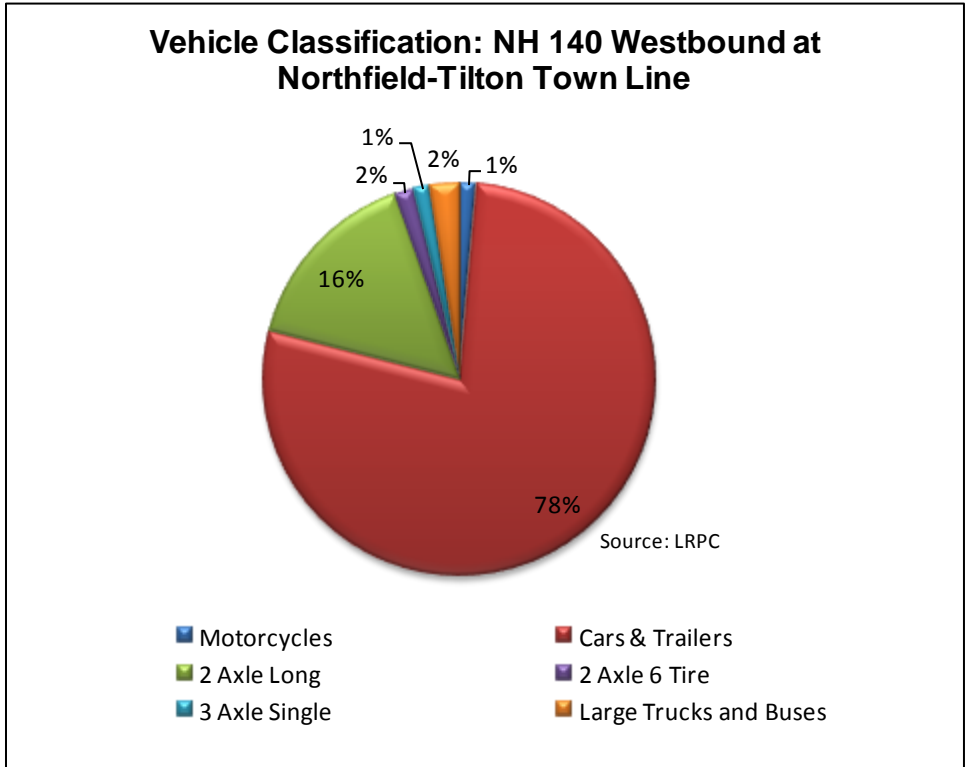


Speed Summary: It appears motorists are comfortable traveling at a rate of speed in excess of the posted speed limit of 35 miles per hour at the Northfield-Tilton Town Line. This segment of roadway is characterized by wide shoulders and fewer driveways in comparison to the more commercialized area west of the town line on NH Route 140 in Tilton. The graphs indicate far fewer westbound motorists traveling 15 mph or more over the posted speed limit (18% versus 83% eastbound). Bridge construction during data collection may have impacted the speed of westbound vehicles.



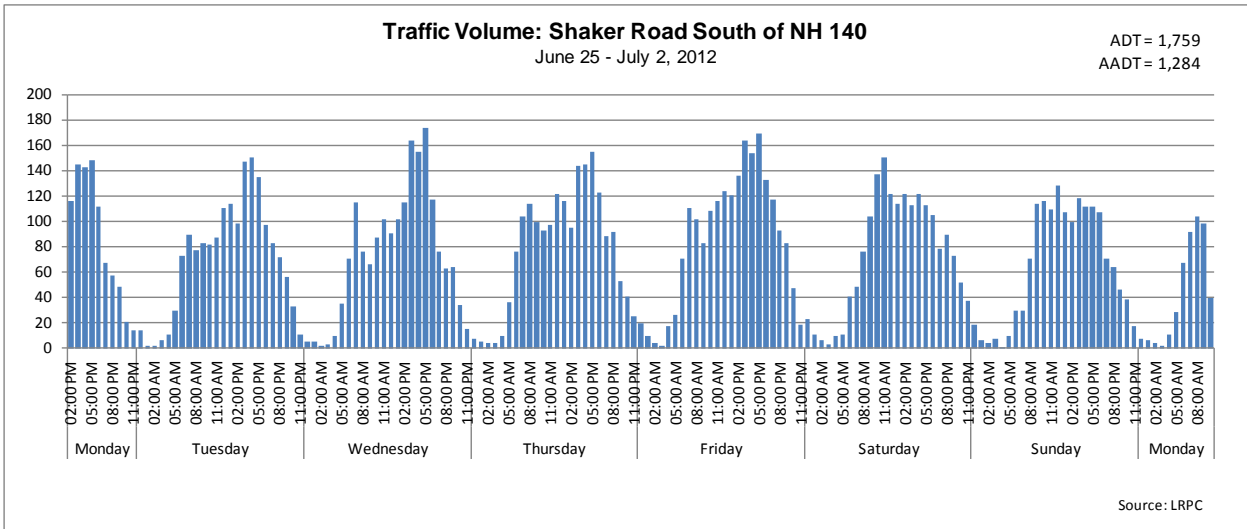






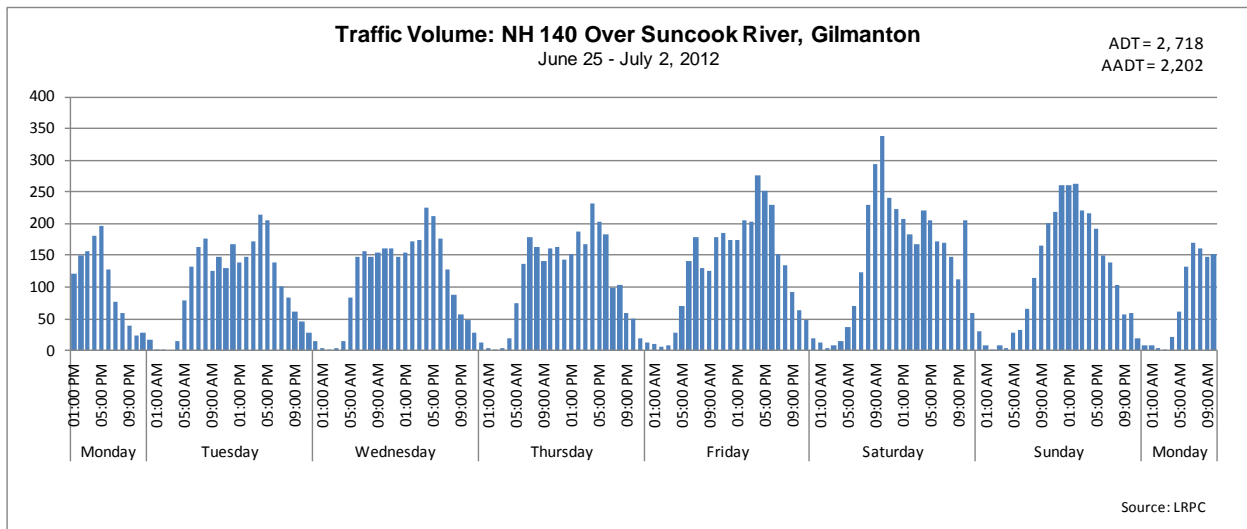
Location: Shaker Road South of NH 140

Date: Monday, June 25 – Monday, July 2, 2012



Location: NH Route 140 Over Suncook River, Gilmanton

Date: Monday, June 25 – Monday, July 2, 2012



Location: NH 106 at Belmont-Laconia Town Line
Date: Monday, June 25 – Monday, July 2, 2012

