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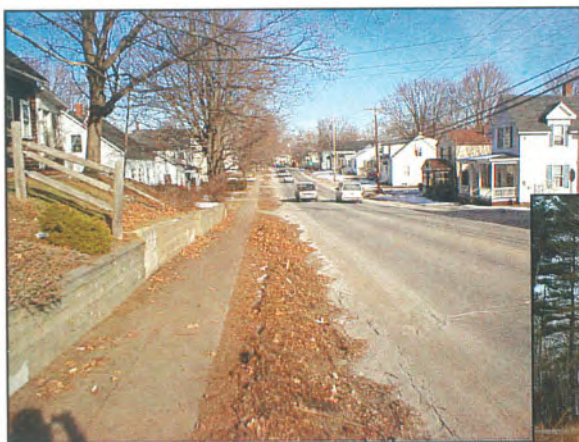
Corridor Evaluation

Washington Street/US Route 202 Rochester, New Hampshire

Submitted to:



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EXECUTIVE SUMMARY

The purpose of this traffic evaluation is to determine the magnitude and estimated cost of the roadway improvements necessary to accommodate existing and projected traffic along US Route 202/Washington Street from the Rochester/Barrington Town Line northeasterly to the Strafford Square intersection over a 10-year design life. Note that the analyses in this report are planning level analyses, and more detailed analyses will be required for design purposes.

This study has evaluated the existing traffic operations of the US Route 202/Washington Street corridor from the Rochester/Barrington town line, northeasterly to the Strafford Square intersection and the potential traffic impacts resulting from future development. The study recommends corridor improvements that should accommodate anticipated growth both inside and outside the corridor over a 10-year design horizon.

Traffic projections for the corridor to the 2013 design year were based on a future land use scenario developed in cooperation with City officials and appropriate developers for known planned developments along the Washington Street (US Route 202) corridor. These volumes were added to existing traffic volumes in addition to background traffic growth expected to be generated outside the corridor study area. An analysis of intersection capacity, with and without the five proposed developments, was conducted for each major corridor intersection. These analyses suggest implementation of the following measures to provide improved traffic operations along the corridor, while providing sufficient mitigation of existing conditions and the potential site-related impacts. Conceptual corridor improvement plans are depicted in Figures 18 through 29.

A conceptual construction cost estimate for each roadway improvement not already under final design has been developed. It should be noted that these costs do not include fees associated with items such as engineering design, utility coordination/relocation/contract administration, and acquisition of right-of-way costs. It should also be noted that the feasibility of constructing the left- and right-turn treatments at the locations will need to be examined in greater detail in the final design process due to existing physical constraints.

Washington Street Corridor Improvements, including Brock Street Intersection

- Within the 50-foot right-of-way along its length (3,500± linear feet from Brock Street to Strafford Square) the following should be provided (see Option 2 in Appendix H and Figures 18 through 21):
 - Two eleven-foot travel lanes, one in each direction.
 - A ten-foot lane for parallel parking on the east (commercial) side of the roadway.
 - A two-foot shoulder on the west (residential) side of the roadway.
 - Two-foot utility strips and five-foot sidewalks with vertical curbing on both sides of the roadway.
 - Closed drainage system.
- Installation of traffic signals at the Washington Street/Brock Street/Woodlawn Avenue intersection.
- Provide an exclusive northbound right-turn lane from Washington Street onto Brock Street.
- Provide an exclusive southbound left-turn lane from Washington Street onto Brock Street.
- Provide lane separation (an exclusive left-turn lane and a shared through right-turn lane) on the Brock Street westbound approach.
- Note that the design of the Brock Street intersection as shown in Figure 18 has recently been modified to eliminate the northbound left turn on Washington Street to avoid a sensitive archeological site on the southwest corner of the intersection.
- Construction Cost Estimate: \$3,960,000 (2007 dollars), based on ongoing final design.

North Main Street (NH Route 11)/Walnut Street (US Route 202A) Intersection (Strafford Square)

- Reconstruct Strafford Square to a two-lane roundabout (see Figure 22).

- Construction Cost Estimate: \$1,405,000 (2007 dollars), based on ongoing final design.

Dry Hill Road Intersection

- Upgrade the intersection (see Figure 23) to provide an exclusive northbound right-turn lane on US Route 202 into Dry Hill Road.
- Construction Cost Estimate: \$380,000 (2007 dollars).

Estes Road Intersection

- Upgrade the intersection (see Figure 24) to provide exclusive southbound left- and right- turn lanes on US Route 202 into Estes Road.
- Clear vegetation within the right-of-way along the east side of US Route 202 and south of Estes Road to enhance any available sight distance.
- Because this intersection is on a sharp curve on NH Route 202, it should be re-aligned to provide appropriate sight distance. However, this would likely involve ROW purchase and the removal of at least one residence. This major upgrade should be considered, but is not included in this estimate.
- Construction Cost Estimate: \$690,000 (2007 dollars).

Chesley Hill Road/ Hussey Hill Road Intersection

- Upgrade the intersection (see Figures 25 and 26) to provide a bypass shoulder to allow southbound through traffic on US Route 202 to bypass left turns onto Chesley Hill Road.
- Clear vegetation within the right-of-way along the west side of US Route 202 and north of Hussey Hill Road to enhance any available sight distance.
- Construction Cost Estimate: \$545,000 (2007 dollars).

Highfield Commons Site Driveway Intersection

- Provide a new intersection at the site drive (see Figure 27).
- A stop sign should be installed on the Highfield Commons approach to US Route 202.

- Provide lane separation on the Highfield Commons approach.
- Provide an exclusive southbound right-turn lane on US Route 202 into the site.
- Construction Cost Estimate: To be constructed by the Developer – no City cost.

Flatley Company Site Driveway Intersection

- Provide a new intersection at the site drive (see [Figure 28](#)).
- Installation of traffic signals at the US Route 202/Flatley Company Site Driveway intersection.
- Northbound Approach (US Route 202): Provide one through lane, an exclusive right-turn lane into the site, and an exclusive left-turn lane to Pine Lane Extension.
- Southbound Approach (US Route 202): Provide two exclusive left-turn lanes and one through-right lane.
- Westbound Approach (Flatley Company Site Driveway): Provide two exiting lanes, one through-left lane and one right-turn lane.
- Eastbound Approach (Pine Lane Extension): Provide one lane in each direction.
- Construction Cost Estimate: To be constructed by the Developer – no City cost.

Spaulding Turnpike (NH Route 16) Northbound Ramps Intersection

- No changes from NHDOT proposed improvements. Some of these improvements are being made as part of the construction of the Flatley project (see [Figure 29](#)).
- Construction Cost Estimate: To be constructed by the Developer and the NHDOT – no City cost.

Spaulding Turnpike (NH Route 16) Southbound Ramps Intersection

- No changes from NHDOT proposed improvements. Some of these improvements are being made as part of the construction of the Flatley project (see [Figure 29](#)).

- Construction Cost Estimate: To be constructed by the Developer – no City cost.

Secretariat Estates Site Driveway Intersection

- A stop sign should be installed on the Secretariat Estates approach to US Route 202.
- Provide lane separation on the Secretariat Estates approach.
- Provide an exclusive southbound right-turn lane on US Route 202 into the site.
- Construction Cost Estimate: This intersection has already been constructed by the Developer with these design features.

A summary of the projected cost for each proposed improvement is presented below.

Location	Estimated Construction Cost (2007 \$)	Notes
Washington St. Corridor, with Brock St. Intersection	\$3,960,000	Under Design for City
Strafford Square Roundabout	\$1,405,000	Under Design for City
Dry Hill Road Intersection	\$380,000	
Estes Road Intersection	\$690,000	
Hussey Hill Road/Chesley Hill Road Intersection	\$545,000	
Highfield Commons Site Drive Intersection	-	To be Built By Developer
Flatley Company Site Drive Intersection	-	Under Construction by Developer
Spaulding Turnpike Northbound Ramps Intersection	-	Under Construction by Developer
Spaulding Turnpike Southbound Ramps Intersection	-	Under Construction by Developer
Secretariat Estates Site Drive Intersection	-	In Place
Total	\$6,980,000	

I. INTRODUCTION

Presented herein is the Final Report of the Washington Street Corridor Study. This report updates the draft report dated January 28, 2004. Traffic estimates have not been updated from those used in the draft report (2003 and 2013), but estimated costs for the recommended projects use the most recent data available.

The purpose of this traffic evaluation is to determine the magnitude and estimated cost of the roadway improvements necessary to accommodate existing and projected traffic along US Route 202/Washington Street from the Rochester/Barrington town line northeasterly to the Strafford Square intersection over a 10-year design life. Note that the analyses in this report are planning level analyses, and more detailed analyses will be required for design purposes.

Traffic projections for the corridor to the 2013 design year were based on a future land use scenario developed in cooperation with City officials and appropriate developers for known planned developments along the US Route 202 corridor. These projects are generally located on [Figure 1](#) and are described in detail later in this report. Background traffic growth was also determined based on historical data and growth expectations. The traffic data was analyzed and recommendations made to improve traffic flow through the corridor.

II. METHODOLOGY

Determining the traffic impacts of both the proposed developments and background growth affecting the US Route 202/Washington Street corridor consists of evaluating both existing and future traffic conditions. Typically, level of service analyses are performed in order to determine whether or not the adjacent streets and/or intersections can accommodate any anticipated increase in traffic generated by a new development. Thus, this evaluation will address both pre-development and post-development conditions, identify any incremental impact, and recommend appropriate roadway improvements to ensure the safe and efficient operation of the adjacent streets and intersections within the study area through a 10-year design period.

The methodology used in this study to develop traffic volumes for analysis purposes includes the following steps:

- Traffic data collection, performed in December 2002.
- Establish and analyze Existing Year (2002), Opening Year (2003) and Future Year (2013) peak month No-Build conditions (without the proposed developments) during both the weekday AM and PM peak hours. This analysis considers seasonal and annual traffic growth.
- Estimate traffic to be generated by the proposed residential developments and distribute this traffic to the adjacent road network to establish and analyze Opening Year (2003) and Future Year (2013) Build conditions (with the residential developments in place).

- Estimate traffic to be generated by the future retail development and distribute this traffic to the adjacent road network to establish and analyze Future Year (2013) Build conditions (with all potential developments in place).

After developing the traffic volumes, the evaluation consists of performing capacity and level of service analyses, examining geometric and safety aspects, drawing conclusions, and making recommendations for the appropriate level of roadway improvements necessary to provide and/or maintain acceptable traffic operations in the study area.

III. STUDY AREA DESCRIPTION

A. Roadway Network

The Corridor Study area consists of the section of US Route 202/Washington Street beginning at the unsignalized intersection of Strafford Square in the northeast and terminating at the Rochester/Barrington town line in the southwest. For purposes of this report, the US Route 202/Washington Street corridor is referred to as a north/south corridor. This evaluation includes the currently unsignalized intersections of US Route 202/Washington Street with Roy Street, Brock Street/Woodlawn Avenue, NH Route 16 Northbound Ramps, NH Route 16 Southbound Ramps, Hussey Hill Road/Chesley Hill Road, Estes Road and Dry Hill Road (see [Figure 1](#)).

The US Route 202/Washington Street corridor is comprised of two segments with very different characteristics. The section south of the Spaulding Turnpike, US Route 202, operates as a rural highway, typified by two 11- to 12-foot travel lanes, one in each direction, with gravel shoulders. It has a posted speed limit of 45 miles per hour and rolling curvilinear terrain. It is bordered by forests, wetlands, and well-spaced residences and housing developments. The section north of the Spaulding Turnpike, Washington Street, transitions to an urban setting. It is typified by two 11- to 12-foot lanes, one in each direction, and narrow, paved shoulders. It has a posted speed limit of 30 miles per hour, informal on-street parking, sidewalks without a barrier, and poor drainage infrastructure. There are many intersecting side streets and a high number of driveways, providing access to several closely spaced single and multifamily housing units and a variety of commercial land uses.

Roy Street is a City-maintained local road posted for 30 miles per hour that stretches between Walnut Street (US Route 202A) and Washington Street. It functions as the primary access road for the residential developments along its length, as well as a cut-through route for those travelling between Walnut Street and Washington Street who wish to bypass the Strafford Square intersection.

Brock Street is a City-maintained road posted for 30 miles per hour that runs east/west, connecting NH Route 125 to the east and Washington Street to the west. It functions as the primary access road for the many residential and institutional developments along its length. The McClelland Elementary and Rochester Middle Schools are located on Brock Street approximately 0.4 miles to the east of Washington Street. The eastbound approach to the Brock Street/Washington Street intersection is named Woodlawn Avenue; a local street that extends westerly and

dead ends at the Spaulding Turnpike. The Woodlawn Avenue eastbound approach has an overall pavement width of 25 feet, with no paved shoulder and no striped centerline, and serves as the sole access to a small number of residences. The cross section of the Brock Street westbound approach consists of two 12 to 14-foot lanes, one in each direction, striped with a double-yellow centerline, with an 8-foot paved shoulder and a 5-foot sidewalk on the south side of the roadway.

Spaulding Turnpike (NH Route 16) is a two- to four-lane, limited access highway with six exits to the City of Rochester. This expressway provides access to Interstate 95 to the south and terminates at NH Route 16/NH Route 25, Old White Mountain Highway, to the north. In the vicinity of Washington Street (Exit 13) the road is currently two lanes, but the NHDOT is preparing to expand it to four lanes, with construction expected in 2010.

Chesley Hill Road is a City-maintained road posted for 30 miles per hour that also runs east/west, connecting NH Route 125 to the east and Washington Street to the west. It too functions as the primary access road for the residential developments along its length. The eastbound approach to the Chesley Hill Road/US Route 202 intersection is named Hussey Hill Road, a local road that extends westerly and dead ends approximately ½ mile west of US Route 202. Near its intersection with US Route 202, the Hussey Hill Road eastbound approach has an overall pavement width of 30 feet, with no paved shoulder and no striped centerline. The cross section of the Chesley Hill Road westbound approach consists of two 12-foot travel lanes, with no shoulders, and is striped with a double-yellow centerline. At the time of this writing, Chesley Hill Road is closed just east of US Route 202 due to a bridge washout. The road is currently being repaired.

Estes Road is a City-maintained road posted for 35 miles per hour. It too functions as an east/west route, from NH Route 202A to the west to its intersection with Gear Street and Oak Street to the east, which both eventually lead to NH Route 125. It functions as the primary access road for the residential developments along its length. In the vicinity of its intersection with US Route 202, the cross section of the roadway is 24-foot overall pavement width consisting of two 12-foot lanes, striped with a double-yellow centerline, with no paved shoulders.

Dry Hill Road is a City-maintained road posted for 35 miles per hour. About one mile to the west, it becomes a Class VI road. To the east it goes to NH Route 125 and continues to Main Street. It functions as the primary access road for the residential developments along its length. Near its intersection with US Route 202, the Dry Hill Road eastbound approach has an overall pavement width of 25 feet, with no paved shoulder and no striped centerline. The cross section of the Dry Hill Road westbound approach consists of two 13-foot lanes, one in each direction, striped with a double-yellow centerline, with no shoulders.

B. Intersections

The existing lane geometry and traffic control at the eight study area unsignalized intersections, from north to south, is as follows:



Washington Street/North Main Street/Walnut Street (Strafford Square)

Single approach lanes are present on all four legs of this typical unsignalized intersection. This intersection is a highly skewed intersection with an obscure definition of the motorist's right-of-way. This intersection allows for multiple turning movements with various stop and yield requirements. The predominant traffic movement appears to be along the Main Street (NH Route 11) corridor, in an east-west direction, serving as a link between Downtown Rochester and the Spaulding Turnpike (NH Route 16). The intersection is bounded by several potentially historic properties.

Washington Street/Roy Street

Single approach lanes are present on all three legs of this unsignalized intersection, with the Roy Street eastbound approach operating under Stop sign control.

Washington Street/Brock Street/Woodlawn Avenue

Single approach lanes are present on all four legs of this unsignalized intersection, with the Woodlawn Avenue eastbound approach and the Brock Street westbound approach operating under Stop sign control.

US Route 202/NH Route 16 Northbound Ramps

Single approach lanes are present on all three legs of this unsignalized intersection, with the NH Route 16 Northbound Off-Ramp westbound approach operating under Stop sign control. At the time of this writing, the intersection is being reconstructed as part of the development of the Flatley project just to the south. The intersection will be signalized, with northbound through and right-turn lanes, southbound through and left-turn lanes, and left- and right-turn lanes from the off-ramp.

US Route 202/NH Route 16 Southbound Ramps

Single approach lanes are also present on all three legs of this unsignalized intersection, with the NH Route 16 Southbound Off-Ramp eastbound approach operating under Stop sign control. At the time of this writing, the intersection is being reconstructed as part of the development of the Flatley project just to the south. The intersection will be signalized, and converted into a half diamond, with the southbound off-ramp entering from the north and a new southbound on-ramp to the south.

US Route 202/Hussey Hill Road/Chesley Hill Road

Single approach lanes are present on all four legs of this unsignalized intersection, with the Hussey Hill Road eastbound approach and the Chesley Hill Road westbound approach operating under Stop sign control.

US Route 202/Estes Road

Single approach lanes are present on all four legs of this unsignalized intersection, with the Estes Road eastbound and westbound approaches operating under Stop sign control. Because of sight distance restrictions, this intersection has flashing lights and “Dangerous Intersection” warning signs on US Route 202 southbound.

US Route 202/Dry Hill Road

Single approach lanes are present on all four legs of this unsignalized intersection, with the Dry Hill Road eastbound and westbound approaches operating under Stop sign control.

C. Traffic Volumes

Intersection turning-movement counts were conducted during weekday AM (7:00 to 9:00 AM) and PM (4:00 to 6:00 PM) peak periods during the second week of December 2002 at the following locations:

- Washington Street at North Main Street (NH Route 11)/Walnut Street (US Route 202-A)
- Washington Street at Roy Street
- Washington Street at Brock Street/Woodlawn Avenue
- Washington Street (US Route 202) at Spaulding Turnpike (NH Route 16) Northbound Ramps
- Washington Street (US Route 202) at Spaulding Turnpike (NH Route 16) Southbound Ramps
- US Route 202 at Hussey Hill Road/Chesley Hill Road
- US Route 202 at Estes Road
- US Route 202 at Dry Hill Road

Also, intersection turning-movement counts were conducted at the first three intersections listed above during school release times (2:45 to 4:00 PM) to evaluate this special condition as part of the signal warrants analyses.

Based on these counts, the morning peak hour during this period occurred between 7:00 and 8:00 AM, while the afternoon peak hour occurred between 4:15 and 5:15 PM. Copies of the traffic count summary sheets are provided in Appendix A.

CLD also conducted Automatic Traffic Recorder (ATR) counts at the following locations:

- Washington Street, south of Cleveland Street
- US Route 202, south of Spaulding Turnpike (NH Route 16) Southbound Ramps



- Brock Street, west of Janet Street

These counts are also provided in Appendix A. During this period, Average Weekday Traffic volumes (AWDT) on Washington Street were 7,949 vehicles per day (vpd), south of Cleveland Street and 7,120 vpd south of the Spaulding Turnpike Southbound Ramps. AWDT on Brock Street was 5,762 vpd.

D. Crash Data

The compilation of City of Rochester Police Department Crash Data for calendar years 1999 through 2002 was evaluated to determine if there were high crash locations that may require additional traffic control measures, such as signals. Appendix B contains a summary of this data. According to the *Manual on Uniform Traffic Control Devices (MUTCD), Millennium Edition*, five or more reported crashes, of types susceptible to correction by traffic signal control, must have occurred within a 12-month period, along with meeting minimum thresholds for traffic volumes, before a signal is warranted.

Upon review of the crash data, the largest number of crashes occurred at the Strafford Square intersection in 2001, when there were seven reported crashes. Available crash information for this location during the other calendar years indicates that there were two or fewer reported crashes per year. It should be noted that there were 6 to 11 poorly documented crashes per calendar year along the Washington Street corridor; however, the likelihood that these all occurred at the same location is relatively low. Therefore, there appears to be no warrant for traffic signals or other safety controlling measures at the study area intersections along the Washington Street (US Route 202) corridor based on crash history. Additionally, major improvements are anticipated at Strafford Square, which are expected to alleviate some of the geometric deficiencies which may contribute to crash occurrences.

IV. CONDITIONS WITHOUT THE PROPOSED DEVELOPMENTS

A. Development of No-Build Traffic Networks

In accordance with NHDOT guidelines for traffic studies, seasonal adjustments are made to the raw traffic data to represent average month traffic conditions, in this case by using historical turning-movement counts at four intersections within the study area. This included counts conducted by Laurie M. Rauseo, P.E., PTOE, during June 2002 at the intersections of US Route 202 at the NH Route 16 Northbound Ramps, NH Route 16 Southbound Ramps and at Chesley Hill/Hussey Hill Roads, as part of the Highfield Commons project. It also included counts at the US Route 202/Dry Hill Road intersection conducted in October 2002 by Stephen G. Pernaw & Company as part of the Secretariat Estates - Phase I project. Based on this information, weekday AM peak hour counts were determined to be 4.5% lower than historical average month counts. Therefore, the December 2002 AM peak hour counts were increased by 4.5% to derive the 2002 average month AM peak hour volumes. It should be noted that no adjustments were made to the weekday PM peak hour counts since

December volumes are historically similar in terms of seasonal volumes in this area. [Appendix C](#) contains these adjustment calculations.

Traffic volume networks were constructed using these volumes after balancing between applicable intersections. The Existing Year (2002) weekday AM and PM peak hours are shown in [Figure 2](#).

In order to determine the Opening and Future Year volumes, an annual adjustment factor needs to be applied to the existing traffic volumes. The historical traffic data for US Route 202, NH Route 4 and NH Route 16 was used to evaluate growth trends. The average growth rate along these roadways in the general study area over the last 10 years has been approximately 2 to 6% per year (see [Appendix C](#)). However, since the anticipated development in the immediate study area is itemized as part of this corridor study, a 3% growth rate per year will likely be reasonable, if not conservative. Therefore, the 3% growth rate per year was applied to the 2002 average month volumes in order to derive 2003 and 2013 average month AM and PM peak hour volumes, the assumed Opening and Future Years.

Analysis of State population and employment projections for the area show that the Rochester area is expected to grow by about 1.5% per year for the next several years. Therefore, the growth of 3% per year is likely conservative, and the traffic estimates for 2013 are probably closer to 2020 estimates. See [Appendix C](#) for details.

The Opening Year 2003 weekday AM and PM peak hour No-Build volumes are shown in [Figure 3](#), while the Future Year 2013 weekday AM and PM peak hour No-Build volumes are shown in [Figure 4](#).

B. Analysis of 2002, 2003, and 2013 No-Build Conditions

Intersection capacity analyses were then performed to determine the current (2002) and projected (2003 and 2013) operating efficiency of the eight study area intersections, using the methodology published in the *2000 Highway Capacity Manual* (HCM). The Level of Service (LOS) for an intersection is computed and assigned a value of "A" through "E," on a scale of increasing delay and congestion. LOS "A" represents the ideal free-flow condition with vehicles experiencing minimal levels of delay, while LOS "E" represents conditions where vehicles experience very long delays, and is usually considered to be the capacity of the intersection.

For unsignalized intersections, the LOS at two-way, stop-controlled intersections represents a level of average control delay for vehicles turning to and from the minor side streets from the major (uncontrolled) traffic flow. The "gap acceptance methodology" assumes that major street traffic is generally unaffected by minor street flow, and that minor street traffic must wait for an "acceptable gap" in the main traffic flow in order to complete their maneuver.

The length and availability of these gaps decreases as the volume on the main street increases. LOS "A" for unsignalized intersections indicates an average delay of 10 seconds or less per vehicle on the minor street. LOS "F" conditions exist when the

calculated delay is greater than 50 seconds per vehicle. This condition is typified by insufficient gaps of suitable size to allow traffic demand from the side street to cross safely through a major street traffic stream. Consequently, either long queues will occur on the side streets; or side street drivers will begin selecting smaller-than-usual gaps to complete their turn, which can present a safety problem and disruption to the main street traffic flow, even if this minor street- turning demand is small. Engineering judgment is applied in these cases to consider the necessity of additional traffic control measures, such as signalization, turning restrictions, or other physical improvements.

For signalized intersections, the LOS is related to the ratio of traffic volumes passing through the intersection to the ability of the intersection to process the traffic demand, expressed as a level of average delay experienced by the average driver. When average delays across the intersection exceed 80 seconds, the intersection is said to be operating at a failure condition. LOS “D,” defined as average delays between 35 and 55 seconds, is generally considered to be an acceptable operating condition in developed areas.

It should be noted that the 2013 No-Build Scenario also accounts for the Spaulding Turnpike Exit 13 Reconstruction by the NHDOT. This project involves US Route 202/Washington Street to be reconstructed as a five-lane section between the Northbound and Southbound Ramps intersections, both of which will be signalized.

The actual calculations of the capacity analyses for the eight study area intersections under No-Build conditions are provided in Appendix D, while the results for the No-Build (as well as the Build conditions) are tabulated for each intersection in Table 3, shown later in the report. The Build conditions are discussed in later sections.

1. Strafford Square: Northbound left turns from Walnut Street/Washington Street operate at LOS F during the AM and PM peak hours in 2002, 2003, and 2013. Northbound right turns from Walnut Street and Washington Street operate at LOS D during the AM and PM peak hours in 2002 and during the PM peak hour in 2003. This northbound right-turn movement would deteriorate to LOS E during the AM peak hour in 2003 and to LOS F during both the AM and PM peak hours in 2013.
2. Washington Street at Roy Street: Conditions at this unsignalized intersection show all turning movements would operate at LOS C or better in 2002, 2003, and 2013 during both AM and PM peak hours.
3. Washington Street at Brock Street/Woodlawn Avenue: Existing (2002) conditions yield a LOS E and LOS F for the westbound Brock Street approach during the AM and PM peak hours, respectively, and a LOS D for the eastbound Woodlawn Avenue approach during the PM peak hour. In 2003 and 2013, both the AM and PM peak hours would function at LOS F on the westbound approach, along with the westbound approach in 2013 during the PM peak hour.

4. Washington Street at NH 16 Northbound Ramps:
 - *Unsignalized:* Conditions at this unsignalized intersection show all turning movements would operate at LOS B or better in 2002 and 2003 during both AM and PM peak hours.
 - *Signalized:* In 2013, this signalized intersection is expected to operate at an overall LOS B during both the AM and PM peak hours.
5. Washington Street at NH 16 Southbound Ramps:
 - *Unsignalized:* Conditions at this unsignalized intersection show all turning movements would operate at LOS B or better in 2002 and 2003 during both AM and PM peak hours.
 - *Signalized:* In 2013, this signalized intersection is expected to operate at an overall LOS A and LOS B during the AM and PM peak hours, respectively.
6. US Route 202 at Hussey Hill Road/Chesley Hill Road: Conditions at this unsignalized intersection show all turning movements would operate at LOS C or better in 2002, 2003, and 2013 during both AM and PM peak hours.
7. US Route 202 at Estes Road: Eastbound turning movements from Estes Road operate at LOS E during the AM and PM peak hours in 2013. All other movements operate at LOS C or better.
8. US Route 202 at Dry Hill Road: Conditions at this unsignalized intersection show all turning movements would operate at LOS C or better in 2002, 2003, and 2013 during both AM and PM peak hours.

V. ESTIMATES OF SITE-GENERATED TRAFFIC FROM PROPOSED DEVELOPMENTS

A. Trip Generation

Estimates of site-generated traffic from the five specific known developments, as described below, should generally follow specific patterns in terms of peaking characteristics. Empirical field observations of these land uses have been made across the country, and average rates and equations have been derived from this data. This information is provided in the Institute of Transportation Engineers' (ITE) publication entitled *Trip Generation, 6th Edition*, which was the latest edition at the time this study was conducted. However, the retirement communities that are age restricted for owners/tenants 55 and older tend to see a slightly higher rate of trip generation during the typical peak hours since some of that age group are still part of the active commuter workforce. Therefore, trip generation calculations for this type of land use were estimated using the findings from the empirical research of Stephen G. Pernaw & Co. (SGP) on Age Restricted Residential Trip Generation. The results for all uses are summarized in Table 1, while Appendix E contains the actual calculations.

1. **Highfield Commons:** This project is a 219-acre Planned Unit Development. It is expected to have 390 proposed residential units (168 apartments, 73 rowhouses, 127 single-family houses, and 22 elderly housing units) plus various nonresidential uses, including a health club, day care facility, bed and breakfast, and general store. This development will have its own access onto US Route 202, approximately 1,800 feet to the north of the Hussey Hill Road intersection. It was assumed that all of the apartments (168 residential units) would be built by Opening Year (2003) with the remainder of the development completed by Future Year (2013). It should be noted that trip generation calculations for this development were taken directly from the Laurie M. Rauseo, P.E., PTOE, Traffic Memorandum, dated January 13, 2003. A copy of this memorandum is also provided in Appendix E. As of early 2007, this development has not been started.

Table 1 Projected Trip Generation						
DEVELOPMENT	Weekday AM Peak			Weekday PM Peak		
	Enter	Exit	Total	Enter	Exit	Total
2003 (Opening Year)						
<i>Highfield Commons</i>						
168 Residential Units	14	73	87	74	36	110
<i>Secretariat Estates</i>						
50 Residential Units	6	13	19	16	6	22
<i>Chesley Hill Road</i>						
33 Residential Units	8	25	33	26	14	40
<i>Ledgeview Drive</i>						
190 Residential Units	20	92	112	90	45	135
Subtotal All Developments (2003):	48	203	251	206	101	307
2013 (Design Year)						
<i>Highfield Commons</i>						
390 Residential Units and Supporting Land Uses	50	200	250	210	110	320
<i>Secretariat Estates</i>						
275 Residential Units and Supporting Land Uses	73	154	227	169	105	274
<i>Chesley Hill Road</i>						
33 Residential Units	8	25	33	26	14	40
<i>Ledgeview Drive</i>						
256 Residential Units	24	116	140	114	58	172
<i>Flatley Company</i>						
300,000-SF Retail and one out-parcel for a Restaurant	221	151	372	669	704	1373
Subtotal All Developments (2013):	376	646	1022	1188	991	2179

2. Secretariat Estates: This project is a 210-acre Planned Unit Development. Preliminary plans include 275 dwelling units (32 condominiums, 28 townhouses, 90 cottage units, and 125 elderly housing units,) plus various nonresidential uses also, including an equestrian club house, community center, fitness center, offices, general store, barn, horse paddock, outdoor recreational facilities, pastures, trails, and open space. This project will also have its own connection on US Route 202, south of Dry Hill Road, along with an emergency, gated entrance on Dry Hill Road. It was assumed that 50 elderly housing units will be built by Opening Year (2003) with the remainder of the development completed by Future Year (2013). As of early 2007, this development is being built and assumed to be completed by 2013.
3. Chesley Hill Road: Access to this project will be onto Chesley Hill Road; no direct connection to US Route 202 is proposed. It is expected to have 33 single-family residential lots. It was assumed that the full development (33 units) would be built in both Opening Year (2003) and Future Year (2013).
4. Ledgeview Drive: This project will directly access Ledgeview Drive, located to the east of US Route 202. It is expected to have 256 proposed residential units (140 condominiums, 104 apartments, and 12 single-family houses). It should be noted that although this project is a fair distance from US Route 202, it is anticipated that some traffic will utilize the US Route 202/Washington Street corridor and is, therefore, included in this assessment.

In the Opening Year (2003), 80 condominiums and all apartments (104), along with half of the single-family houses (6), were included. The remaining development was included in the Future Year (2013) scenario.

5. Flatley Company: This future “regional” development will have its own driveway on US Route 202, south of NH Route 16 (Exit 13). At this time, it is expected to include 300,000 square feet of retail space and an out-parcel for a restaurant. This development was considered only in the Future Year (2013) scenario, since there was no formal proposal for the development of this parcel in 2003. As of 2007, this project is under construction. The estimated number of trips, based on the traffic study for the project, is 1375 in the PM peak, which is similar to the number of trips (1373) estimated for this report. Therefore, no changes in traffic numbers were made for purposes of this report.

Trips to and from the proposed residential developments would all be considered as “new” trips added to the adjacent street network. However, in regards to the other proposed development uses (300,000 SF retail space, high-turnover sit-down restaurant and general store), all of the above trips should not be considered “new” trips added to adjacent street network. Some of these trips are already on the adjacent street network and are simply “passing-by” the site. Others, considered “non-pass-by,” are those that are both new to the adjacent street network as well as those diverted to the site from their regular route, such as the Spaulding Turnpike, and returning to their usual route afterwards. The ITE *Trip*

Generation Handbook, March 2001, contains information on typical splits of new, pass-by and diverted trips for these proposed uses. The total trip generation for these uses is then adjusted to reflect these trip characteristics, along with consideration given to the adjacent land uses/roadway network. The results of these adjustments are shown in Table 2, while the calculations are also provided in Appendix E.

Table 2 Pass-By Versus Non-Pass-By Trips, 2013 (Design Year)						
DEVELOPMENT	Weekday AM Peak			Weekday PM Peak		
	Enter	Exit	Total	Enter	Exit	Total
<i>Commercial</i>						
General Store: (Secretariat Estates)						
Total Site Trips	8	8	16	9	9	18
100% "Pass-By" Trips	8	8	16	9	9	18
300,000 SF Retail (Flatley Company)						
Total Site Trips	187	120	307	623	674	1297
10% "Pass-By" Trips	19	12	31	62	67	129
90% "Non-Pass-By" Trips	168	108	276	561	607	1168
Restaurant Out-Parcel (Flatley Company)						
Total Site Trips	34	31	65	46	30	76
10% "Pass-By" Trips	3	3	6	5	3	8
90% "Non-Pass-By" Trips	31	28	59	41	27	68
Total Commercial "New (Non-Pass-By)" Trips	199	136	335	602	634	1236
<i>Residential (100% "New" Trips)</i>						
Highfield Commons, 390 Residential Units	50	200	250	210	110	320
Secretariat Estates, 275 Residential Units	65	146	211	160	96	256
Chesley Hill Road, 33 Residential Units	8	25	33	26	14	40
Ledgeview Drive, 256 Residential Units	24	116	140	114	58	172
Total Residential (954 Units) "New" Trips	147	487	634	510	278	788
Grand Total "New" Trips	346	623	969	1112	912	2024

Therefore, the net increase in "new" traffic added to the local roadway network (US Route 202 and adjacent streets) during the 2013 Design Year would be on the order of 969 trips in the AM peak hour and 2024 trips in the PM peak hour.

B. Trip Distribution/Assignment

The route that site-generated traffic chooses to travel will depend on the proposed land use and the relative location of origins and destinations for the trip in question. In this case, the distribution of traffic to and from the proposed residential developments were assumed to follow the same general direction orientation as the existing traffic patterns on US Route 202 and adjacent local street network in the vicinity of each site. Since trip generation during the AM and PM peak hours generally reflect trips between home and work, the 1990 US Census Data on Journey to Work was also evaluated to develop reasonable assumptions about where current Rochester residents work. Traffic was then assigned to the local road network based on their most likely route between the study area and their work destination. In regards to the retail development (Flatley Company), traffic was distributed based on NH Route 16, as well as US Route 202, directional orientation. The individual traffic assignments for each development are shown separately in Figures 5 to 14, while Appendix E contains the actual calculations.

This assignment of site-generated residential traffic was then added to the Opening Year (2003) and Future Year (2013) weekday AM and PM peak hour No-Build 7networks to derive traffic volume networks with the proposed residential developments in place. These Build Residential (Build-R) networks are shown in Figures 15 and 16 for the Opening Year and Future Years, respectively. Subsequently, the assignment of the Flatley Company site-generated traffic was then added to the 2013 weekday AM and PM Build Residential networks to derive traffic volumes with full implementation of the five known planned developments along the US Route 202 corridor. Figure 17 depicts the 2013 weekday AM and PM peak hour full-build, Build Residential/Mall (Build-RM), networks.

VI. CONDITIONS WITH THE PROPOSED DEVELOPMENTS

Capacity analyses were performed, again using *HCM* procedures, for the 2003 Build, 2013 Build-R, and 2013 Build-RM AM and PM peak hour scenarios under existing geometric conditions. A narrative intersection summary is provided below, while the capacity results are tabulated in Table 3 for each intersection. The actual calculations are provided in Appendices D (No-Build), F (Build-R) and G (Build-RM). In addition, locations that are expected to operate under unacceptable levels of service, LOS E and F are summarized in Table 4. Note that the analyses for the existing intersections were performed with the intersections in their current geometric configuration.

1. Strafford Square: Northbound left turns from Walnut Street/Washington Street would continue to operate at LOS F during both the AM and PM peak hours under the 2003 Build and 2013 Build-R and Build-RM conditions. Northbound right turns from Walnut Street/Washington Street would deteriorate from LOS E and D to LOS F and LOS E under the 2003 Build AM and PM peak hours, respectively. This movement would also continue to operate at LOS F during both the AM and PM peak hours under the 2013 Build-R and Build-RM conditions. Westbound lefts from North Main Street would deteriorate from LOS D to LOS F under both 2013 Build-R and Build-RM conditions during the weekday PM peak hour.

Table 3 – Intersection Capacity Analyses

Strafford Square (North Main/Washington/Walnut)

	Weekday AM Peak LOS (sec./veh. Delay)			Weekday PM Peak LOS (sec./veh. Delay)		
2002	Existing Peak Month			Existing Peak Month		
WB LT from North Main Street	B(10.2)			B(12.4)		
NB LT from Walnut/Washington	F(104.5)			F(NC*)		
NB RT from Walnut/Washington	D(30.0)			D(29.6)		
2003	No-Build	Build (Res)		No-Build	Build (Res)	
WB LT from North Main Street	B(10.7)	B(10.9)		B(12.9)	B(13.8)	
NB LT from Walnut/Washington	F(784.1)	F(246.3)		F(NC*)	F(NC*)	
NB RT from Walnut/Washington	E(42.7)	F(50.5)		D(33.4)	E(37.8)	
2013	No-Build	Build (Res)	Build (Res/Mall)	No-Build	Build (Res)	Build (Res/Mall)
WB LT from North Main Street	B(14.9)	C(16.8)	C(17.2)	D(28.8)	F(66.0)	F(80.1)
NB LT from Walnut/Washington	F(NC*)	F(NC*)	F(NC*)	F(NC*)	F(NC*)	F(NC*)
NB RT from Walnut/Washington	F(270.6)	F(357.2)	F(365.9)	F(215.4)	F(315.3)	F(349.2)

*NC – calculated value >999.9

Roy Street at Washington Street

	Weekday AM Peak LOS (sec./veh. Delay)			Weekday PM Peak LOS (sec./veh. Delay)		
2002	Existing Peak Month			Existing Peak Month		
NB LT from Washington	A(8.3)			A(8.3)		
EB LT/RT from Roy Street	B(12.1)			B(11.4)		
2003	No-Build	Build (Res)		No-Build	Build (Res)	
NB LT from Washington	A(8.4)	A(8.4)		A(8.3)	A(8.5)	
EB LT/RT from Roy Street	B(12.5)	B(12.8)		B(11.5)	B(12.1)	
2013	No-Build	Build (Res)	Build (Res/Mall)	No-Build	Build (Res)	Build (Res/Mall)
NB LT from Washington	A(8.9)	A(9.3)	A(9.3)	A(8.9)	A(9.6)	A(9.8)
EB LT/RT from Roy Street	C(16.1)	C(18.2)	C(18.7)	B(13.8)	C(17.0)	C(18.2)

Table 3 (Cont.) – Intersection Capacity Analyses

Brock Street/Woodlawn Avenue at Washington Street

	Weekday AM Peak LOS (sec./veh. Delay)			Weekday PM Peak LOS (sec./veh. Delay)		
2002	Existing Peak Month			Existing Peak Month		
NB LTR from Washington	A(7.7)			A(7.7)		
SB LTR from Washington	A(8.7)			A(8.9)		
WB LTR from Brock Street	E(48.7)			F(90.2)		
EB LTR from Woodlawn	A(9.4)			D(28.1)		
2003	No-Build		Build (Res)	No-Build		Build (Res)
NB LTR from Washington	A(7.7)		A(7.7)	A(7.7)		A(7.9)
SB LTR from Washington	A(8.9)		A(9.1)	A(9.0)		A(9.1)
WB LTR from Brock Street	F(84.3)		F(133.8)	F(116.0)		F(246.1)
EB LTR from Woodlawn	A(9.5)		A(9.6)	D(30.2)		E(35.5)
2013	No-Build	Build (Res)	Build (Res/Mall)	No-Build	Build (Res)	Build (Res/Mall)
NB LTR from Washington	A(7.9)	A(8.1)	A(8.1)	A(7.9)	A(8.4)	A(8.5)
SB LTR from Washington	B(10.1)	B(11.3)	B(11.4)	B(10.1)	B(11.1)	B(11.7)
WB LTR from Brock Street	F(762.1)	F(NC*)	F(NC*)	F(764.0)	F(NC*)	F(NC*)
EB LTR from Woodlawn	B(10.0)	B(10.5)	B(10.6)	F(116.8)	F(442.6)	F(852.3)

*NC – calculated value >999.9

NH Route 16 NB Ramps at US Route 202

	Weekday AM Peak LOS (sec./veh. Delay)			Weekday PM Peak LOS (sec./veh. Delay)		
2002	Existing Peak Month			Existing Peak Month		
SB LT from US Route 202	A(8.2)			A(8.1)		
WB LT/RT from Route 16 NB Off-Ramp	B(13.4)			B(12.3)		
2003	No-Build	Build (Res)		No-Build	Build (Res)	
SB LT from US Route 202	A(8.2)	A(8.6)		A(8.1)	A(8.3)	
WB LT/RT from Route 16 NB Off-Ramp	B(14.2)	C(16.2)		B(12.5)	B(14.1)	
2013	No-Build	Build (Res)	Build (Res/Mall)	No-Build	Build (Res)	Build (Res/Mall)
Intersection (Signalized w/NHDOT improvements)	B(11.0)	B(13.9)	B(16.5)	B(11.3)	B(16.4)	C(25.0)

Table 3 (Cont.) – Intersection Capacity Analyses

NH Route 16 SB Ramps at US Route 202

	Weekday AM Peak LOS (sec./veh. Delay)			Weekday PM Peak LOS (sec./veh. Delay)		
2002	Existing Peak Month			Existing Peak Month		
NB LT from US Route 202	A(8.2)			A(8.0)		
EB LT/RT from Route 16 SB Off-Ramp	B(12.2)			B(12.9)		
2003	No-Build	Build (Res)		No-Build	Build (Res)	
NB LT from US Route 202	A(8.3)	A(8.5)		A(8.0)	A(8.3)	
EB LT/RT from Route 16 SB Off-Ramp	B(12.7)	B(14.0)		B(13.2)	B(14.9)	
2013	No-Build	Build (Res)	Build (Res/Mall)	No-Build	Build (Res)	Build (Res/Mall)
Intersection (Signalized w/NHDOT improvements)	A(6.0)	B(11.9)	B(15.1)	B(10.8)	B(11.7)	B(16.1)

Hussey Hill Road/Chesley Hill Road at US Route 202

	Weekday AM Peak LOS (sec./veh. Delay)			Weekday PM Peak LOS (sec./veh. Delay)		
2002	Existing Peak Month			Existing Peak Month		
NB LTR from US Route 202	A(7.7)			A(8.0)		
SB LTR from US Route 202	A(8.3)			A(8.0)		
WB LTR from Chesley Hill	B(12.3)			B(11.8)		
EB LTR from Hussey Hill	B(12.8)			C(16.0)		
2003	No-Build		Build (Res)	No-Build		Build (Res)
NB LTR from US Route 202	A(7.7)		A(7.7)	A(8.1)		A(8.2)
SB LTR from US Route 202	A(8.4)		A(8.5)	A(8.0)		A(8.2)
WB LTR from Chesley Hill	B(12.7)		B(13.2)	B(11.9)		B(12.2)
EB LTR from Hussey Hill	B(13.3)		B(14.5)	C(16.4)		C(19.3)
2013	No-Build	Build (Res)	Build (Res/Mall)	No-Build	Build (Res)	Build (Res/Mall)
NB LTR from US Route 202	A(7.9)	A(8.1)	A(8.1)	A(8.4)	A(9.0)	A(9.3)
SB LTR from US Route 202	A(8.9)	A(9.6)	A(9.7)	A(8.4)	A(8.9)	A(9.2)
WB LTR from Chesley Hill	C(15.7)	C(21.2)	C(22.3)	B(14.9)	C(20.0)	C(23.4)
EB LTR from Hussey Hill	C(16.5)	C(23.9)	C(25.0)	C(22.8)	E(42.5)	F(57.8)

Table 3 (Cont.) – Intersection Capacity Analyses

Estes Road at US Route 202

	Weekday AM Peak LOS (sec./veh. Delay)		Weekday PM Peak LOS (sec./veh. Delay)	
2002	Existing Peak Month		Existing Peak Month	
NB LTR from US Route 202	A(7.7)		A(7.9)	
SB LTR from US Route 202	A(7.9)		A(7.9)	
WB LTR from Estes Road	B(11.5)		B(14.1)	
EB LTR from Estes Road	C(16.7)		C(19.9)	
2003	No-Build	Build (Res)	No-Build	Build (Res)
NB LTR from US Route 202	A(7.7)	A(7.8)	A(7.9)	A(8.0)
SB LTR from US Route 202	A(8.0)	A(8.1)	A(7.9)	A(8.0)
WB LTR from Estes Road	B(11.9)	B(12.2)	B(14.4)	C(15.1)
EB LTR from Estes Road	C(18.3)	C(19.8)	C(20.8)	C(23.1)
2013	No-Build	Build (Res)	No-Build	Build (Res)
NB LTR from US Route 202	A(7.9)	A(8.1)	A(8.2)	A(8.7)
SB LTR from US Route 202	A(8.3)	A(8.9)	A(8.2)	A(8.7)
WB LTR from Estes Road	B(14.4)	C(19.5)	C(21.2)	E(40.1)
EB LTR from Estes Road	E(37.2)	F(131.7)	E(48.6)	F(223.4)

Dry Hill Road at US Route 202

	Weekday AM Peak LOS (sec./veh. Delay)		Weekday PM Peak LOS (sec./veh. Delay)	
2002	Existing Peak Month		Existing Peak Month	
NB LTR from US Route 202	A(7.6)		A(7.8)	
SB LTR from US Route 202	A(8.0)		A(7.8)	
WB LTR from Dry Hill Road	B(12.8)		B(12.9)	
EB LTR from Dry Hill Road	B(12.6)		B(12.7)	
2003	No-Build	Build (Res)	No-Build	Build (Res)
NB LTR from US Route 202	A(7.6)	A(7.6)	A(7.8)	A(7.8)
SB LTR from US Route 202	A(8.0)	A(8.1)	A(7.8)	A(7.9)
WB LTR from Dry Hill Road	B(13.4)	B(14.1)	B(13.1)	B(13.8)
EB LTR from Dry Hill Road	B(13.1)	B(13.6)	B(12.8)	B(13.4)
2013	No-Build	Build (Res)	No-Build	Build (Res)
NB LTR from US Route 202	A(7.8)	A(8.0)	A(8.0)	A(8.5)
SB LTR from US Route 202	A(8.4)	A(8.9)	A(8.0)	A(8.4)
WB LTR from Dry Hill Road	C(16.8)	D(25.5)	C(16.5)	D(26.4)
EB LTR from Dry Hill Road	C(16.1)	C(22.3)	C(15.4)	C(21.8)

Table 3 (Cont.) – Intersection Capacity Analyses

Flatley Company Drive at US Route 202

	Weekday AM Peak LOS (sec./veh. Delay)	Weekday PM Peak LOS (sec./veh. Delay)
2013 Build (Residential/Mall)		
Signalized Intersection	B(12.9)	C(21.7)

Highfield Commons at US Route 202

	Weekday AM Peak		Weekday PM Peak	
	Average Delay (sec.)	LOS	Average Delay (sec.)	LOS
2003 Build (Residential)				
NB LT from US Route 202	7.7	A	8.4	A
EB LT from Highfield Commons	16.0	C	16.9	C
EB RT from Highfield Commons	9.5	A	11.0	B
2013 Build (Residential)				
NB LT from US Route 202	8.2	A	9.9	A
EB LT from Highfield Commons	84.1	F	81.1	F
EB RT from Highfield Commons	10.7	B	14.7	B
2013 Build (Residential/Mall)				
NB LT from US Route 202	8.2	A	10.3	B
EB LT from Highfield Commons	96.4	F	126.5	F
EB RT from Highfield Commons	10.8	B	15.7	C

Secretariat Estates at US Route 202

	Weekday AM Peak		Weekday PM Peak	
	Average Delay (sec.)	LOS	Average Delay (sec.)	LOS
2003 Build (Residential)				
NB LT from US Route 202	7.7	A	7.8	A
EB LT from Secretariat Estates	12.3	B	12.6	B
EB RT from Secretariat Estates	9.4	A	9.8	A
2013 Build (Residential)				
NB LT from US Route 202	8.0	A	8.6	A
EB LT from Secretariat Estates	21.9	C	22.8	C
EB RT from Secretariat Estates	10.2	B	11.1	B
2013 Build (Residential/Mall)				
NB LT from US Route 202	8.1	A	8.7	A
EB LT from Secretariat Estates	22.7	C	26.3	D
EB RT from Secretariat Estates	10.2	B	11.5	B

TABLE 4 Intersection Capacity Analysis: Summary of 'Unacceptable' LOS						
INTERSECTION	Weekday AM Peak LOS (sec./veh. Delay)			Weekday PM Peak LOS (sec./veh. Delay)		
	No-Build	Build (Res)	Build (Res/Mall)	No-Build	Build (Res)	Build (Res/Mall)
Strafford Square						
2002						
NB LT from Walnut/Washington	F(104.5)			F(NC*)		
2003						
NB LT from Walnut/Washington	F(184.1)	F(246.3)		F(NC*)	F(NC*)	
NB RT from Walnut/Washington	E(42.7)	F(50.5)			E(37.8)	
2013						
WB LT from North Main Street					F(66.0)	F(80.1)
NB LT from Walnut/Washington	F(NC*)	F(NC*)	F(NC*)	F(NC*)	F(NC*)	F(NC*)
NB RT from Walnut/Washington	F(270.6)	F(357.2)	F(365.9)	F(215.4)	F(315.3)	F(349.2)
Brock Street/Woodlawn Avenue at Washington Street						
2002						
WB LTR from Brock Street	E(48.7)			F(90.2)		
2003						
WB LTR from Brock Street	F(84.3)	F(133.8)		F(116.0)	F(246.1)	
EB LTR from Woodlawn					E(35.5)	
2013						
WB LTR from Brock Street	F(762.1)	F(NC*)	F(NC*)	F(764.0)	F(NC*)	F(NC*)
EB LTR from Woodlawn				F(116.8)	F(442.6)	F(852.3)
Hussey Hill Road/Chesley Hill Road at US Route 202						
2013						
EB LTR from Hussey Hill					E(42.5)	F(57.8)
Estes Road at US Route 202						
2013						
WB LTR from Estes Road					E(40.1)	F(60.5)
EB LTR from Estes Road	E(37.2)	F(131.7)	F(160.5)	E(48.6)	F(223.4)	F(546.5)
Highfield Commons at US Route 202						
2013						
EB LT from Highfield Commons		F(84.1)	F(96.4)		F(81.1)	F(126.5)

*NC – calculated value >999.9

2. Washington Street at Roy Street: All turning movements would operate at LOS C or better under 2003 Build and 2013 Build-R and Build-RM during both AM and PM

peak hours. There would be little change, if any, in LOS and delay from No-Build to both Build conditions.

3. Washington Street at Brock Street/Woodlawn Avenue: All westbound exiting traffic from Brock Street would continue to operate at LOS F during both the AM and PM peak hours under the 2003 Build and 2013 Build-R and Build-RM conditions, in its existing unsignalized configuration. There would be little change in LOS and delay from No-Build to both Build conditions. The left-turn movement out of Brock Street would still be a problem as it is today.
4. Washington Street at NH Route 16 Northbound Ramps:
 - *Unsignalized:* All turning movements would operate at LOS C or better in under 2003 Build conditions during both AM and PM peak hours. There would be little change, if any, in LOS and delay from No-Build to Build conditions.
 - *Signalized:* This signalized intersection will operate at acceptable LOS C, or better during, both peak hours under 2013 Build-R and Build-RM conditions. There would be little change, if any, in LOS and in average delay from the No-Build to both Build conditions.
5. Washington Street at NH Route 16 Southbound Ramps:
 - *Unsignalized:* All turning movements would operate at LOS B or better under 2003 Build conditions during both AM and PM peak hours. There would be little change, if any, in LOS and delay from No-Build to Build conditions.
 - *Signalized:* This signalized intersection will operate at acceptable LOS B or better during both peak hours under 2013 Build-R and Build-RM conditions. There would be little change, if any, in LOS and in average delay from the No-Build to both Build conditions.
6. US Route 202 at Hussey Hill Road/Chesley Hill Road: All turning movements would operate at LOS C or better under 2003 Build and 2013 Build-R and Build-RM during both AM and PM peak hours, with the exception of eastbound exiting traffic from Hussey Hill Road. Under 2013 Build-R and Build-RM during the PM peak hour, the westbound exiting traffic from Hussey Hill Road operates at LOS E and LOS F, respectively.
7. US Route 202 at Estes Road: Conditions at this unsignalized intersection show that under the 2013 Build-R and 2013 Build-RM conditions, the westbound exiting movements from Estes Road operate at LOS E and LOS F, respectively, in the PM peak hour. All eastbound exiting traffic from Estes Road would continue to operate at poor levels of service, deteriorating to LOS F under 2013 Build-R and Build-RM during both AM and PM peak hours.
8. US Route 202 at Dry Hill Road: All turning movements would operate at LOS C or better under 2003 Build and 2013 Build-R and Build-RM during both AM and PM peak hours, with the exception of westbound exiting traffic from Dry Hill Road. Under 2013 Build-R and Build-RM during both AM and PM peak hours, the westbound

exiting traffic from Dry Hill Road operate at LOS D, which is still considered acceptable for design parameters.

9. US Route 202 at Flatley Company Drive: This new intersection would be signalized. As an isolated intersection, is expected to operate at an overall LOS B and LOS C under the 2013 Build-RM weekday AM and PM peak hours, respectively. This intersection was analyzed with the following geometry:

- Northbound Approach (US Route 202): The roadway was assumed to have one through lane and an exclusive right-turn lane.
- Southbound Approach (US Route 202): The roadway was assumed to have two exclusive left-turn lanes and one through lane.
- Westbound Approach (Flatley Company Site Driveway): The roadway was assumed to have two exiting lanes, exclusive left- and right-turn lanes.

This is the configuration that will be constructed for the intersection, with the exception that Pine Lane will be extended to enter the intersection from the west. The previous analyses were used in the evaluation of the intersection.

10. US Route 202 at Highfield Commons: At this new unsignalized intersection, all turning movements would operate at LOS C or better under 2003 Build and 2013 Build-R and Build-RM during both AM and PM peak hours, with the exception of eastbound lefts from Highfield Commons Driveway. Under 2013 Build-R and Build-RM during both AM and PM peak hours, the westbound exiting traffic from Highfield Commons operates at LOS F.
11. US Route 202 at Secretariat Estates: Conditions at this new unsignalized intersection show that under the 2013 Build-RM conditions, the left-turn movement from the Secretariat Estates Driveway onto US Route 202 is expected to operate at LOS D in the PM peak hour, which is still considered acceptable for design parameters. All other movements operate at LOS C or better.

Many of the stopped approaches at unsignalized intersections will operate at a poor LOS because of the heavy north-south through traffic on US Route 202/Washington Street. Locations that are expected to operate under unacceptable levels of service, LOS E and F, are summarized in Table 4.

VII. OTHER DESIGN CONSIDERATIONS

A. Washington Street Corridor

The Washington Street corridor from Strafford Square southerly to Brock Street is approximately 3,500 linear feet. There is a 50-foot right-of-way within this section of the corridor. As previously described, the roadway is typified by two 11- to 12-foot lanes, one in each direction, and narrow, paved shoulders. It has a posted speed limit of 30 miles per hour, informal on-street parking, sidewalks without a barrier, and poor drainage infrastructure. There are many intersecting side streets and a high number of driveways, providing access to several closely spaced single and multifamily housing units and a variety of commercial land uses.



Three alternative cross sections for this urban section of the corridor, north of the Turnpike, were prepared and are described below (see [Appendix H](#) for the cross-sectional alternative plans). Each of the three alternatives consists of a 36-foot cross section, curb-to-curb, as well as a 7-foot panel on each side of the roadway, which would accommodate both a sidewalk with vertical curb and a utility strip.

Alternative 1:

- Layout: A two-lane roadway with 12-foot lanes, one in each direction, and a 6-foot shoulder on each side of the roadway.
- Advantages: The main advantage to this alternative would be a narrower travel way with the shoulders potentially serving as a bike lane. This could result in slower traffic speeds though this corridor and the preservation of the “neighborhood.”
- Disadvantages: The primary disadvantages to this alternative would be no additional lanes to accommodate left-turning traffic as well as no on-street parking. Not providing any left-turn treatment would disrupt the through traffic flow.

Alternative 2:

- Layout: A two-lane roadway with 11-foot travel lanes, one in each direction, with a 10-foot lane on the east (commercial) side of the roadway for parallel parking, and a 2-foot shoulder on the west (residential) side of the roadway.
- Advantages: Again, this alternative would provide a narrower travel way, potentially resulting in lower travel speeds, and would also provide on-street parking.
- Disadvantages: Similar to Alternative 1, not providing any left-turn treatment would disrupt the through traffic flow. Shoulder widths, however, are too narrow for a designated bike lane.

Alternative 3:

- Layout: A two-lane roadway also with 11-foot travel lanes, one in each direction, along with a 10-foot two-way left-turn lane (TWLTL).
- Advantages: This TWLTL would allow for the left-turning traffic to use the center lane.
- Disadvantages: The main disadvantages to this alternative would be, similar to Alternative 1, no on-street parking, along with the potential safety issue due to left-turn movements competing with the traffic from the various driveways along the corridor. Prevailing speeds would likely be higher than the posted speed limit given the storage provided for left-turning movements.

The aforementioned three alternatives were publicly presented at the Rochester City Council Meeting on both March 18 and November 18, 2003. The Council made a recommendation to move forward with Alternative 2: two travel lanes, a defined

parking aisle on the east (commercial) side, and sidewalks and a utility strip on both sides of the roadway.

B. Strafford Square Intersection

Due to the failing levels of service for the critical movements at this intersection under current, unsignalized conditions, alternatives such as a traditional signalized intersection, along with modern roundabout analyses, were evaluated. Narrative descriptions are provided below. Appendix H contains a concept plan for each alternative while capacity analyses are provided in Appendix I.

Signalized Intersection

- Alternative 1: The first option maintains this intersection as a four-way intersection; however, a slip lane between Washington Street and Walnut Street would be provided. This option would require a unique phasing plan. It should be noted, however, operations would still fail, LOS F, at this intersection under 2013 Build-RM PM peak hour conditions, the assumed worse case scenario for this intersection.
- Alternative 2: This option closed the Walnut Street approach to this intersection, creating a three-way signalized intersection at North Main and Washington Streets, with a second signalized intersection just south of North Main Street to accommodate movements between Walnut Street and Washington Street. The resulting implications of closing this leg would result in traffic potentially diverted to Roy Street and creating two separate, closely spaced signalized intersections likely requiring coordination. The overall operation of the Strafford Square intersection would be at an acceptable LOS D; however, some movements would still operate at unacceptable/failing LOS E and LOS F.

Roundabout

- Alternative 1, One-Lane: A one-lane roundabout has a capacity range of accommodating 2,500 to 2,800 entering vehicles in any given hour, with the critical assumption that entering volumes are equally distributed on each leg of the roundabout. Under projected 2003 No-Build conditions, the Stafford Square intersection is expected to see nearly 2,200 vehicles in the PM peak hour. However, the distribution of traffic volumes on each approach is very uneven, with heavy movements along North Main Street. As a result, the analyses portray failure conditions, even under the 2003 No-Build PM peak hour scenario for the North Main Street westbound approach. These movements would continue to operate under failing conditions in the 2003 Build and 2013 Build-R and Build-RM PM peak hour scenarios.
- Alternative 2, Two-Lane: A two-lane roundabout has a capacity range of accommodating 3,500 to 4,000 entering vehicles in any given hour, with the same assumptions as the one-lane roundabout. Under projected 2013 Build-RM, this intersection is estimated to see nearly 3,200 entering vehicles during the PM peak

hour; therefore, the two-lane roundabout would be the only option that would operate acceptably under this worse case scenario. However, it should be noted that this alternative has the potential to impact two properties: one located at the Washington Street/Walnut Street intersection and one at the North Main Street/Walnut Street intersection.

Capacity analyses were performed using *Roundabouts: An Informational Guide, Exhibit 4-3*, procedures for the two roundabout alternatives and are provided in Appendix I.

Both of the signalized and roundabout alternatives were publicly presented at the Rochester City Council Meeting on both March 18 and November 18, 2003. The Council recommended moving ahead with the conceptual design plans for the two-lane roundabout alternative. Issues such as access management of driveways on or near the roundabout are being addressed in the design phases of the project.

The Strafford Square intersection is slated for construction funding in the fiscal year 2013 of the NHDOT's ten-year highway plan. As currently envisioned, improvements would include reconstruction of the intersection to a modern two-lane roundabout. It may be beneficial to the City to reconstruct this intersection earlier than 2013 to coincide with the needed improvements to the Washington Street corridor and submit for reimbursement under the State's Municipally Managed Project program at a later date.

C. Sight Distance

The American Association of State Highway and Transportation Officials (AASHTO) standard criteria for Stopping Sight Distance (SSD) requires a minimum of 250 feet for a design speed of 35 miles per hour (mph). The required SSD for an assumed 50-mph design speed is 425 feet. The AASHTO guidelines also desire 390 feet of Intersection Sight Distance (ISD) for any left turn out of a minor street for an assumed design speed of 35 mph. Similarly, the desired ISD for a design speed of 50 mph is 555 feet.

NHDOT driveway permit criteria requires 400 feet of "all season safe sight distance" (ASSSD), defined as a line of sight with no visual obstructions measured at a height of 3'9" (from driver's eye to driver's eye). This criterion applies to the State-maintained section of the US Route 202 corridor, south of the Spaulding Turnpike.

Table 5 summarizes the findings of the sight distance evaluation. The following discussion, however, describes the locations that do not meet the criteria for either AASHTO Stopping and/or Intersection Sight Distance, along with NHDOT criteria, where applicable:

- Washington Street/Woodlawn Avenue/Brock Street: The sight distance to the south was measured at only 335 feet, while the sight distance looking to the north was measured at 390 feet, where 390 feet of ISD is desired. This intersection has vertical alignment issues that hinder sight distance. It should be noted that no mitigation for this deficiency is planned, since this intersection is anticipated to be signalized.

TABLE 5 SIGHT DISTANCE									
INTERSECTION	Speed Limit (posted/ design)	Required Sight Distance		Actual Sight Distance			Satisfied		Comments
		Intersection (ISD)	Stopping (SSD)	Left (ISD/SSD)	Right (ISD/SSD)	Intersection (ISD)	Stopping (SSD)		
Washington/Roy Street	30/35	390	250	390	390	Yes	Yes		
Washington/Brock Street	30/35	390	250	390	390	Yes	Yes		
Washington/Woodlawn Avenue	30/35	390	250	390	335	No (R)	Yes		Curving vertical alignment, south of Woodlawn Avenue, hinders the available sight distance. Will be signalized.
US Route 202/NH Route 16 NB Ramps	30/35	390	250	390	390	Yes	Yes		
US Route 202/NH Route 16 SB Ramps	30/35	390	250	390	390	Yes	Yes		
US Route 202/Chesley Hill Road	45/50	555	350	555	555	Yes	Yes		
US Route 202/Hussey Hill Road	45/50	555	350	327	555	No (L)	No (L)		Vegetation removal on west side of US Route 202, north of Hussey Hill Road is recommended to enhance available sight distance.
US Route 202/Estes Road (WB)	45/50	555	350	429	555	No (L)	Yes		Vegetation removal on east side of US Route 202, south of Estes Road is recommended to enhance available sight distance. In addition, the removal of a retaining wall on the east side of US Route 202, north of Estes Road could potentially increase the available sight distance.
US Route 202/Estes Road (EB)	45/50	555	350	375	275	No (L,R)	No (R)		Curving horizontal alignment, north of Estes Road, hinders the available sight distance.
US Route 202/Dry Hill Road (WB)	45/50	555	350	375	555	No (L)	Yes		Curving vertical alignment, south of Dry Hill Road, hinders the available sight distance.
US Route 202/Dry Hill Road (EB)	45/50	555	350	555	400	No (R)	Yes		Curving vertical alignment, south of Dry Hill Road, hinders the available sight distance.

Note: Sight distances measured in December 2002

- US Route 202/Hussey Hill Road: The sight distance to the north was measured at only 327 feet, while the sight distance looking to the south was measured at 555 feet, where 555 feet of ISD and 400 feet of ASSSD is required. The removal of vegetation within the right-of-way along the west side of US Route 202 and north of Hussey Hill Road could potentially increase the available sight distance.
- US Route 202/Estes Road (WB): The sight distance looking to the north was measured at 275 feet, while the sight distance looking to the south was measured at 375 feet, where 555 feet of ISD is desired and 400 feet of ASSSD is required. The removal of vegetation within the right-of-way along the east side of US Route 202 and south of Estes Road could potentially increase the available sight distance. In addition, the removal of a retaining wall on the east side of US Route 202 and north of Estes Road could potentially increase the available sight distance; however, this may be located on private property.
- US Route 202/Estes Road (EB): The sight distance to the south was measured at only 429 feet, while the sight distance looking to the north was measured at 555 feet, where 555 feet of ISD is desired. This intersection has horizontal alignment issues that hinder sight distance, which could only be mitigated by providing physical improvements or other safety measures, i.e. down-posting the speed limit within this section of the corridor.
- US Route 202/Dry Hill Road (WB): The sight distance to the south was measured at only 375 feet, while the sight distance looking to the north was measured at 555, where 555 feet of ISD is desired and 400 feet of ASSSD is required. This intersection has vertical alignment issues that hinder sight distance, which could only be mitigated by providing physical improvements or other safety measures.
- US Route 202/Dry Hill Road (EB): The sight distance to the south was measured at only 400 feet, while the sight distance looking to the north was measured at 555, where 555 feet of ISD is desired. This intersection has vertical alignment issues that hinder sight distance, which could only be mitigated by providing physical improvements or other safety measures.

It should be noted that some recommended improvements at the aforementioned intersections, which are described later in this report, may address these deficiencies.

D. Left-Turn Warrants

Under NHDOT and AASHTO guidelines, the combination of approaching, turning, and opposing traffic volumes yields a maximum number of left turns that can be accommodated without treatment. If the value meets the warrant, a bypass shoulder is generally considered the first level of appropriate left-turn treatment. If the value is twice the warrant, a full left-turn lane is usually required.

Traffic operations at the study area intersections under all No-Build, Build-R, and Build-RM AM and PM peak hour conditions were evaluated for left-turn treatment warrants. Based on the projections of advancing and opposing volumes, it appears that left-turn

treatment warrants would be met at the above locations under certain scenarios as described below. The calculations are provided in Appendix J.

1. Washington Street (Northbound)/Roy Street:
 - Bypass Shoulder: 2013 AM peak hour scenarios.
 - Full Left-Turn Lane: PM peak hour all scenarios.
2. Washington Street (Southbound)/Brock Street/Woodlawn Avenue:
 - Full Left-Turn Lane: AM and PM peak hours all scenarios.
3. US Route 202/NH Route 16 Northbound Ramps (Existing):
 - Bypass Shoulder: 2002 Existing AM Peak Hour, 2003 No-Build AM Peak Hour, and 2003 Build PM Peak Hour.
 - Full Left-Turn Lane: 2003 Build AM Peak Hour.
4. US Route 202/NH Route 16 Northbound Ramps (NHDOT: Diamond Interchange):
 - Bypass Shoulder: 2013 No-Build AM Peak Hour.
 - Full Left-Turn Lane: AM and PM peak hours both 2013 Build scenarios.
5. US Route 202/NH Route 16 Southbound Ramps (Existing):
 - Bypass Shoulder: 2003 No-Build PM Peak Hour.
 - Full Left-Turn Lane: 2003 Build-R AM Peak Hour.
6. US Route 202/NH Route 16 Southbound Ramps (NHDOT: Diamond Interchange):
 - Bypass Shoulder: PM peak hour all 2013 scenarios.
 - Full Left-Turn Lane: AM peak hour all 2013 scenarios.
7. US Route 202 (Southbound)/Chesley Hill Road:
 - Bypass Shoulder: AM and PM peak hours both 2013 Build scenarios.
8. US Route 202 (Southbound)/Estes Road:
 - Bypass Shoulder: 2002 Existing PM Peak Hour, 2003 No-Build PM Peak Hour, 2003 Build-R PM Peak Hour, and 2013 Build-RM AM Peak Hour.
 - Full Left-Turn Lane: PM Peak Hour all 2013 scenarios.

It should be noted that the feasibility of constructing the left-turn treatments at the above locations will need to be examined in greater detail due to physical constraints, such as right-of-way limitations, during the design of the project.

Under the Council's recommended improvement plan for the Washington Street section of the corridor, Alternative 2, described in Section VII.B and providing the

warranted left-turn lane treatment at the Roy Street intersection, is not compatible with the overall corridor design. The design elements of Alternative 2, especially with parallel parking, make it more difficult to provide a left-turn lane at this location. Additionally, the improvements slated for Washington Street and Strafford Square may encourage traffic to use Strafford Square, rather than using Roy Street as a cut-through route.

E. Right-Turn Warrants

Traffic operations at the study area intersections under all scenarios were also evaluated for right-turn treatment warrants, using criteria in the publication “Guidelines for Treatment of Right-Turn Movements on Rural Roads” (Transportation Research Record 855) for evaluating warrants for right-turn treatments. These calculations are provided in Appendix K.

Based on this evaluation, it appears that right-turn treatment warrants would be met at the study area intersections under certain scenarios as described below:

1. US Route 202 (Northbound)/Brock/Woodlawn: AM and PM peak hours all scenarios.
2. US Route 202/NH Route 16 Northbound Ramps (Existing): AM and PM peak hours all 2002 and 2003 scenarios.
3. US Route 202/NH Route 16 Northbound Ramps (NHDOT: Diamond Interchange): AM and PM peak hours all 2013 scenarios.
4. US Route 202/NH Route 16 Southbound Ramps (Existing): AM peak hour both 2003 scenarios.
5. US Route 202/NH Route 16 Southbound Ramps (NHDOT: Diamond Interchange): AM and PM peak hours all 2013 scenarios.
6. US Route 202 (Southbound)/Highfield Commons Driveway: PM Peak Hour all Build scenarios.
7. US Route 202 (Southbound)/Estes Road: PM peak hour all 2013 scenarios.
8. US Route 202 (Northbound)/Dry Hill Road: AM peak hour both 2013 Build scenarios.
9. US Route 202 (Southbound)/Secretariat Estates Driveway: PM peak hour both 2013 Build scenarios.

It should be noted that the feasibility of constructing the right-turn treatments at the above locations will also need to be examined in greater detail due to physical constraints, such as right-of-way limitations.

F. Signal Warrant Analyses – Brock Street

The volume of traffic, combined with the poor levels of service for turning movements exiting Brock Street onto Washington Street, led to the evaluation of

standard traffic signal warrants. A traffic signal warrant analysis was conducted using the criteria established in the MUTCD, see [Appendix L](#). The MUTCD contains the methodology for evaluating warrants for traffic signal installation and states that "Traffic control signals should not be installed unless one or more of the signal warrants in this Manual are met."¹

Based on these analyses, all three major traffic-related warrants (Warrants 1, 2, and 3) were satisfied under 2013 No-Build conditions, only Warrant 2 (four-hour volumes) was met under 2002 Existing and 2003 No-Build conditions.

Capacity analyses were performed, again using *HCM* procedures, for the Brock Street intersection with the required modifications to the existing intersection geometry to accommodate both existing and projected traffic under signalized conditions. The analyses are also provided in [Appendix L](#). This intersection geometry should include the following modifications:

- Provide an exclusive northbound right-turn lane from Washington Street onto Brock Street.
- Provide an exclusive southbound left-turn lane from Washington Street onto Brock Street.
- Provide lane separation (an exclusive left-turn lane and a shared through right-turn lane) on the Brock Street westbound approach.

A conceptual layout of this intersection is included with the other concepts in [Appendix H](#). Note that the layout presented there has been recently modified as described above with no northbound left-turn lane on Washington Street to avoid a sensitive archeological site on the southwest corner of the intersection.

G. Warrant Threshold Analyses

Signal Warrants

Incremental No-Build year analyses were performed to determine the threshold for meeting all three major signal warrants at the Brock Street/Woodlawn Avenue intersection. Based on these analyses, Warrants 1, 2, and 3 would be satisfied under 2010 No-Build conditions, with Warrant 3 met under 2004 No-Build conditions (see [Appendix M](#)).

Left-Turn Warrants

Subsequent to the above analyses, incremental year analyses were performed to determine the No-Build and/or Build thresholds when the above left-turn treatments would be warranted. It should be noted that the locations, which presently satisfied the left-turn treatment warrants under 2002 Existing conditions (Section VII.D, items 1, 2 and 8A), were not considered in these analyses. In addition, the US Route

¹ U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices Millennium Edition, December 2000 and Updated June 2001, p. 4C-1.

202/NH Route 16 Northbound/Southbound Ramps intersections (Section VII.D, items 3 to 6) were also not considered, given the NHDOT improvements that will occur independent of the proposed developments along the corridor. Therefore, interim year analyses were performed for the remaining two locations: Chesley Hill Road and Estes Road.

Based on the projections of advancing and opposing volumes, the following conclusions were made:

- US Route 202 (Southbound)/Chesley Hill Road: A bypass shoulder would be required under 2004 Build (approximately 325 residential units) and/or 2012 No-Build conditions.
- US Route 202 (Southbound)/Estes Road: A full left-turn lane would be required under 2005 Build (approximately 370 residential units) and/or 2010 No-Build conditions.

It should be noted that interim year volumes, along with the associated number of residential developments, were calculated using straight-line interpolation between Opening Year (2003) and Design Year (2013) projected volumes, for both No-Build and Build-R conditions (see Appendix M).

In addition, as requested at the February 13, 2003 project status meeting held at the City of Rochester, left-turn warrant analyses were evaluated at the intersection of US Route 202 and Chesley Hill Road under 2013 Build with Chesley Hill Road, 33-lot subdivision, only.

Based on the projections of advancing and opposing volumes, it was determined that the bypass shoulder (warranted under 2013 Build-R AM and PM peak hour conditions) would also be warranted under 2013 Build (Chesley Hill Road Subdivision only) PM peak hour conditions (see Appendix M). This indicates that left-turn treatment can be attributed directly to the Chesley Hill Road development, specifically.

Right-Turn Warrants

Similarly, incremental year analyses were performed to determine the No-Build and/or Build thresholds when the aforementioned right-turn treatments would be warranted. It should be noted that the locations, which presently satisfied the right-turn treatment warrants under 2002 Existing conditions (Section VII.E, item 1) or 2003 Build conditions (item 6), were not considered in these analyses. In addition, the US Route 202/NH Route 16 Northbound/Southbound Ramps intersections (Section VII.E, items 2 to 5) were also not considered, given the NHDOT improvements that will occur independent of the proposed developments along the corridor. Therefore, interim year analyses would be performed for the remaining three locations: Estes Road, Dry Hill Road, and Secretariat Estates Driveway.

Based on the projections of advancing and opposing volumes, the following conclusions were made:

- US Route 202 (Southbound)/Estes Road: Right-turn treatments would be warranted under 2006 Build (approximately 416 residential units) and/or 2008 No-Build conditions.
- US Route 202 (Northbound)/Dry Hill Road: Right-turn treatments would be required under 2012 Build (approximately 609 residential units).
- US Route 202/Secretariat Estates Driveway: Right-turn treatments would be required under 2008 Build (approximately 508 residential units).

It should be noted, here again, that interim year volumes, along with the associated number of residential developments, were calculated using straight-line interpolation between Opening Year (2003) and Design Year (2013) projected volumes, for both No-Build and Build-R conditions (see Appendix M).

H. Queue Length Calculations

Queue length calculations were conducted for the Future Year (2013) Build (Residential/Mall) AM and PM peak hour cases at the future signalized intersections of US Route 202 at Brock Street/Woodlawn Avenue and at the Flatley Company driveway. To be conservative, the following assumptions were made regarding the queue length calculations:

- No 'credit' for right turns on red (RTOR) was accounted for in queue length calculations.
- An average vehicle length of 25 feet was used to determine the actual queue length. It is generally found that the average length that a vehicle occupies in a queued situation, including the comfort space between vehicles, is between 20 and 25 feet.

The 99% queue length calculations for the Future Year (2013) Build (Residential/Mall) AM and PM peak hours are included in Appendix N, the longer of which would obviously control the required storage length that should be provided for each movement. Engineering judgement must be used in cases where the 99% queue cannot be provided due to physical constraints, such as right-of-way limitations.

VIII. RECOMMENDED CORRIDOR IMPROVEMENTS

This study has evaluated the existing traffic operations of the US Route 202/Washington Street corridor from the Rochester/Barrington town line, northeasterly to the Strafford Square intersection and the potential traffic impacts resulting from future development. The study recommends corridor improvements that should accommodate anticipated growth both inside and outside the corridor over a 10-year design horizon.

Traffic projections for the corridor to the 2013 design year were based on a future land use scenario developed in cooperation with City officials and appropriate developers for known planned developments along the Washington Street (US Route 202) corridor. These volumes were added to existing traffic volumes in addition to background traffic growth expected to be generated outside the corridor study area. An analysis of intersection capacity, with and without the five proposed developments, was conducted for each major corridor intersection. These analyses suggest implementation of the following measures to provide improved traffic operations along the corridor, while providing sufficient mitigation of existing conditions and the potential site-related impacts. Conceptual corridor improvement plans are depicted in Figures 18 through 29.

A conceptual construction cost estimate for each roadway improvement not already under final design is also summarized below, while actual calculations are provided in Appendix O. It should be noted that these costs do not include fees associated with items such as engineering design, utility coordination/relocation/contract administration, and acquisition of right-of-way costs. It should also be noted that the feasibility of constructing the left- and right-turn treatments at the locations will need to be examined in greater detail in the final design process due to existing physical constraints.

Washington Street Corridor Improvements, including Brock Street Intersection

- Within the 50-foot right-of-way along its length (3,500± linear feet from Brock Street to Strafford Square) the following should be provided (see Option 2 in Appendix H and Figures 18 through 21):
 - Two eleven-foot travel lanes, one in each direction.
 - A ten-foot lane for parallel parking on the east (commercial) side of the roadway.
 - A two-foot shoulder on the west (residential) side of the roadway.
 - Two-foot utility strips and five-foot sidewalks with vertical curbing on both sides of the roadway.
 - Closed drainage system.
- Installation of traffic signals at the Washington Street/Brock Street/Woodlawn Avenue intersection.
- Provide an exclusive northbound right-turn lane from Washington Street onto Brock Street.
- Provide an exclusive southbound left-turn lane from Washington Street onto Brock Street.
- Provide lane separation (an exclusive left-turn lane and a shared through right-turn lane) on the Brock Street westbound approach.
- Note that the design of the Brock Street intersection as shown in Figure 18 has recently been modified to eliminate the northbound left turn on Washington Street to avoid a sensitive archeological site on the southwest corner of the intersection.

- Construction Cost Estimate: \$3,960,000 (2007 dollars), based on ongoing final design.

North Main Street (NH Route 11)/Walnut Street (US Route 202A) Intersection (Strafford Square)

- Reconstruct Strafford Square to a two-lane roundabout (see [Figure 22](#)).
- Construction Cost Estimate: \$1,405,000 (2007 dollars), based on ongoing final design.

Dry Hill Road Intersection

- Upgrade the intersection (see [Figure 23](#)) to provide an exclusive northbound right-turn lane on US Route 202 into Dry Hill Road.
- Construction Cost Estimate: \$380,000 (2007 dollars).

Estes Road Intersection

- Upgrade the intersection (see [Figure 24](#)) to provide exclusive southbound left- and right- turn lanes on US Route 202 into Estes Road.
- Clear vegetation within the right-of-way along the east side of US Route 202 and south of Estes Road to enhance any available sight distance.
- Because this intersection is on a sharp curve on NH Route 202, it should be re-aligned to provide appropriate sight distance. However, this would likely involve ROW purchase and the removal of at least one residence. This major upgrade should be considered, but is not included in this estimate.
- Construction Cost Estimate: \$690,000 (2007 dollars).

Chesley Hill Road/ Hussey Hill Road Intersection

- Upgrade the intersection (see [Figures 25 and 26](#)) to provide a bypass shoulder to allow southbound through traffic on US Route 202 to bypass left turns onto Chesley Hill Road.
- Clear vegetation within the right-of-way along the west side of US Route 202 and north of Hussey Hill Road to enhance any available sight distance.
- Construction Cost Estimate: \$545,000 (2007 dollars).

Highfield Commons Site Driveway Intersection

- Provide a new intersection at the site drive (see [Figure 27](#)).
- A stop sign should be installed on the Highfield Commons approach to US Route 202.
- Provide lane separation on the Highfield Commons approach.
- Provide an exclusive southbound right-turn lane on US Route 202 into the site.
- Construction Cost Estimate: To be constructed by the Developer – no City cost.

Flatley Company Site Driveway Intersection

- Provide a new intersection at the site drive (see [Figure 28](#)).
- Installation of traffic signals at the US Route 202/Flatley Company Site Driveway intersection.
- Northbound Approach (US Route 202): Provide one through lane, an exclusive right-turn lane into the site, and an exclusive left-turn lane to Pine Lane Extension.
- Southbound Approach (US Route 202): Provide two exclusive left-turn lanes and one through-right lane.
- Westbound Approach (Flatley Company Site Driveway): Provide two exiting lanes, one through-left lane and one right-turn lane.
- Eastbound Approach (Pine Lane Extension): Provide one lane in each direction.
- Construction Cost Estimate: To be constructed by the Developer – no City cost.

Spaulding Turnpike (NH Route 16) Northbound Ramps Intersection

- No changes from NHDOT proposed improvements. Some of these improvements are being made as part of the construction of the Flatley project (see [Figure 29](#)).
- Construction Cost Estimate: To be constructed by the Developer and the NHDOT – no City cost.

Spaulding Turnpike (NH Route 16) Southbound Ramps Intersection

- No changes from NHDOT proposed improvements. Some of these improvements are being made as part of the construction of the Flatley project (see [Figure 29](#)).
- Construction Cost Estimate: To be constructed by the Developer – no City cost.

Secretariat Estates Site Driveway Intersection

- A stop sign should be installed on the Secretariat Estates approach to US Route 202.
- Provide lane separation on the Secretariat Estates approach.
- Provide an exclusive southbound right-turn lane on US Route 202 into the site.
- Construction Cost Estimate: This intersection has already been constructed by the Developer with these design features.

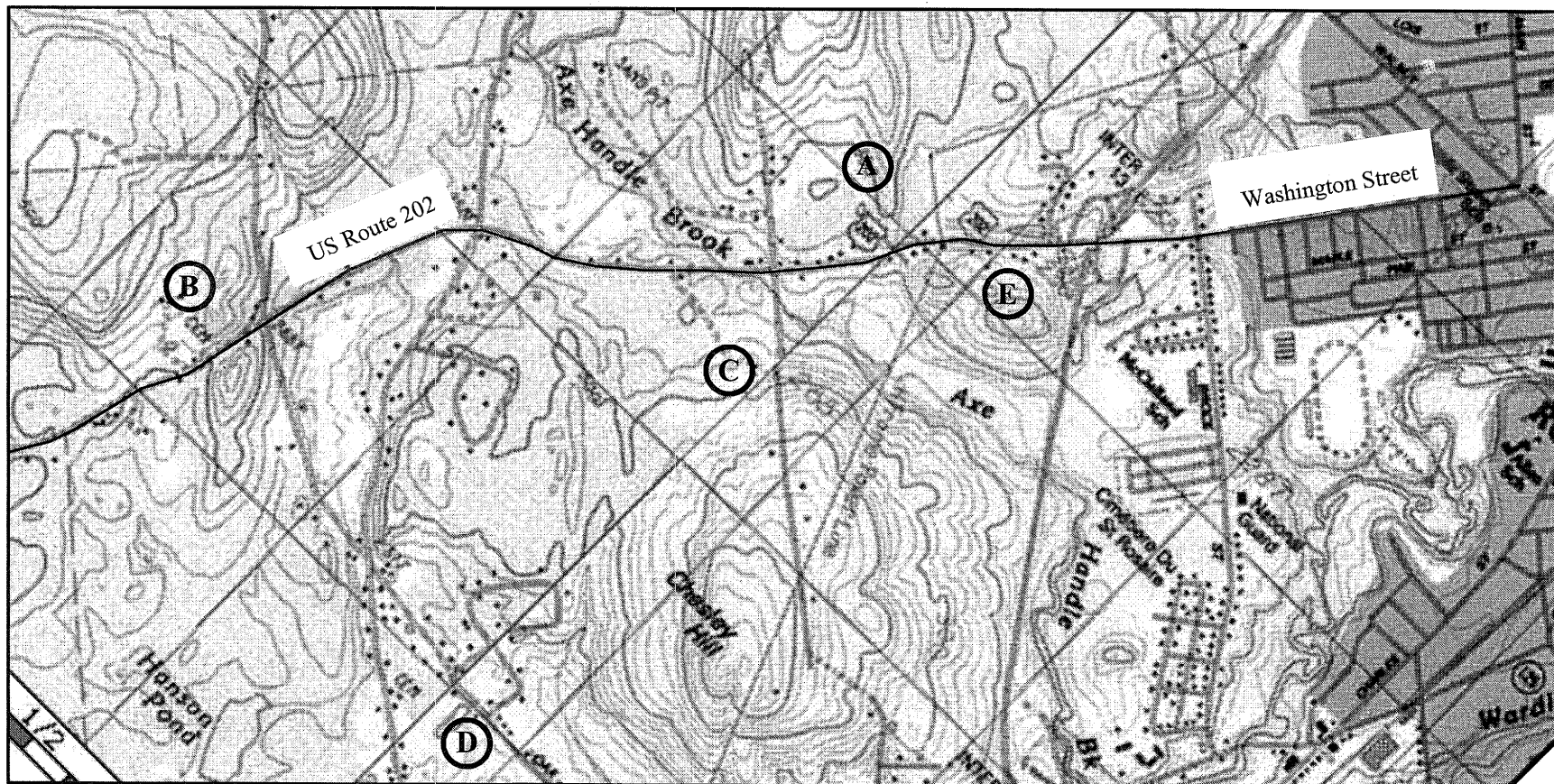
A summary of the projected cost for each proposed improvement is presented below.

Location	Estimated Construction Cost (2007 \$)	Notes
Washington St. Corridor, with Brock St. Intersection	\$3,960,000	Under Design for City
Strafford Square Roundabout	\$1,405,000	Under Design for City
Dry Hill Road Intersection	\$380,000	
Estes Road Intersection	\$690,000	
Hussey Hill Road/Chesley Hill Road Intersection	\$545,000	
Highfield Commons Site Drive Intersection	-	To be Built By Developer
Flatley Company Site Drive Intersection	-	Under Construction by Developer
Spaulding Turnpike Northbound Ramps Intersection	-	Under Construction by Developer
Spaulding Turnpike Southbound Ramps Intersection	-	Under Construction by Developer
Secretariat Estates Site Drive Intersection	-	In Place
Total	\$6,980,000	

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KEY

- (A) HIGHFIELD COMMONS
- (B) SECRETARIAT ESTATES
- (C) CHESLEY HILL ROAD
- (D) LEDGEVIEW DRIVE
- (E) FLATLEY COMPANY

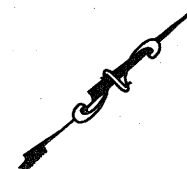
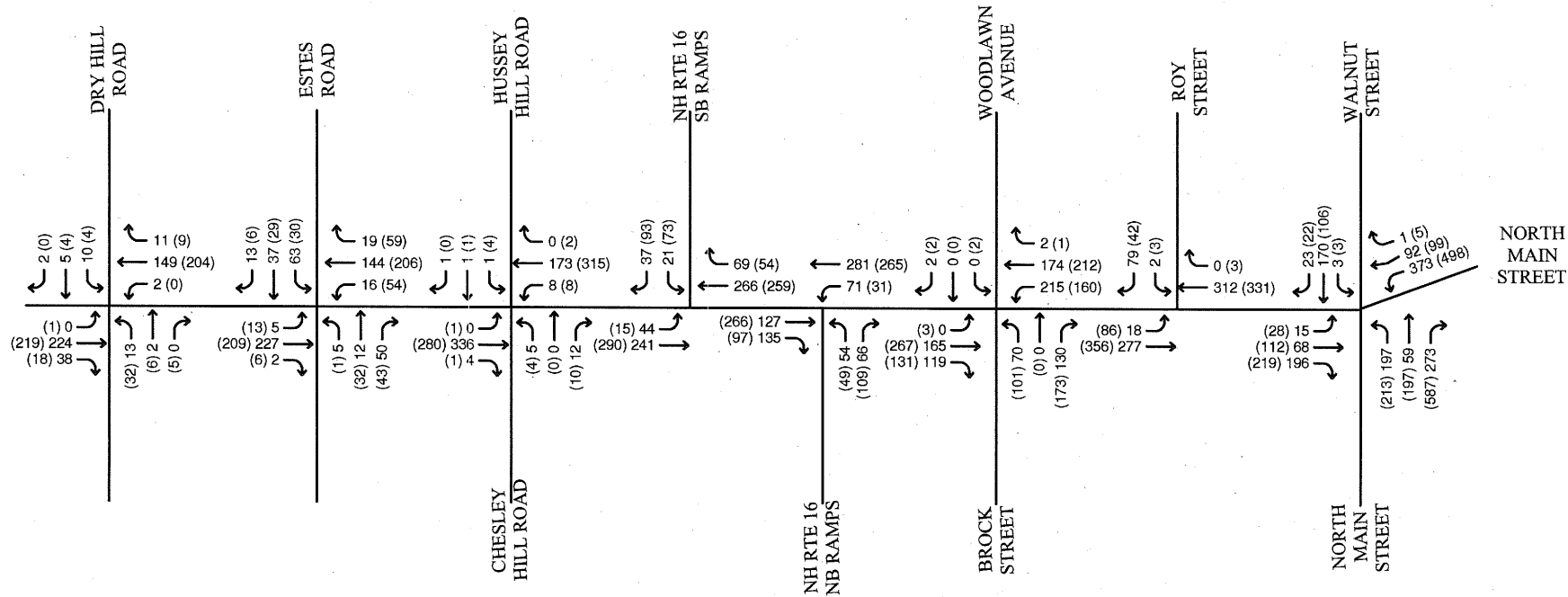


FIGURE 1
PROJECT LOCATION MAP
NOT TO SCALE

US Route 202 Corridor Study
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540 Commercial Street - Manchester, NH 03101
(603) 668-8223 - Fax: (603) 668-9802
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Maine - New Hampshire - Vermont



KEY
 XXX = Weekday AM Peak Hour
 (7:00 to 8:00 AM)
 (XXX) = Weekday PM Peak Hour
 (4:15 to 5:15 PM)

FIGURE 2
DECEMBER 2002 BASE TRAFFIC
VOLUMES
 NOT TO SCALE

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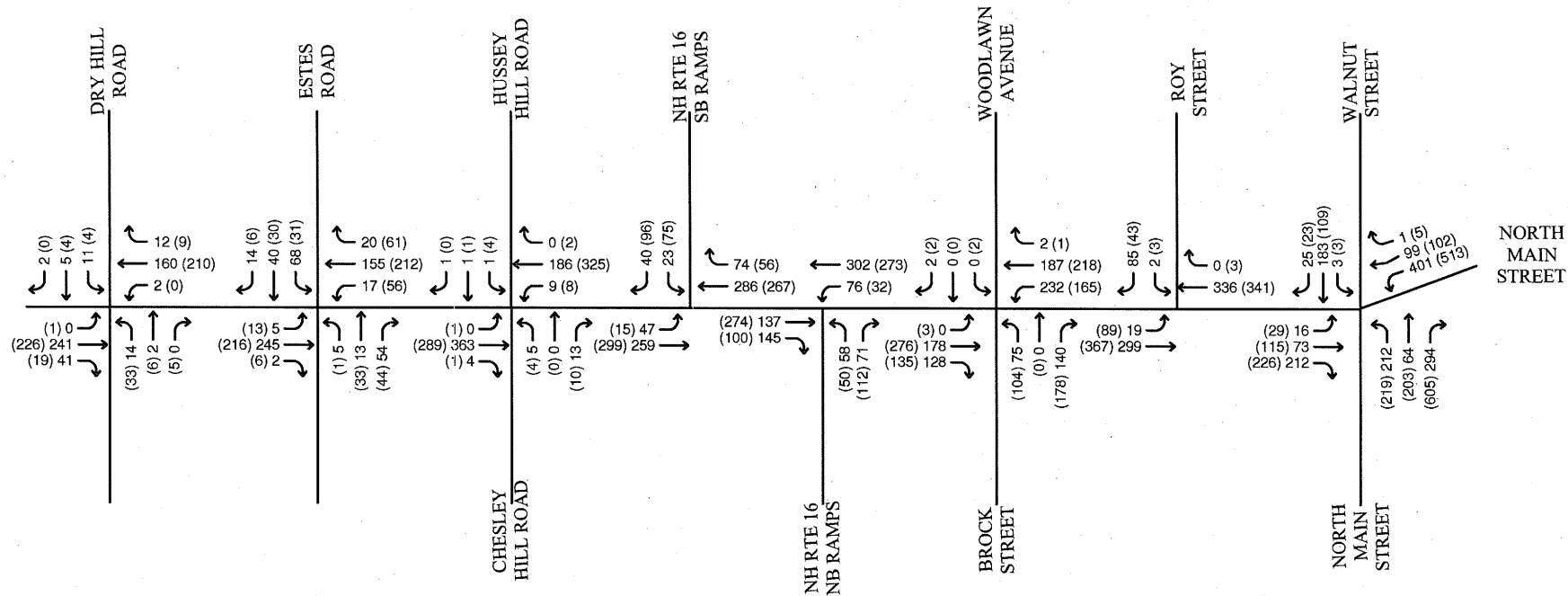
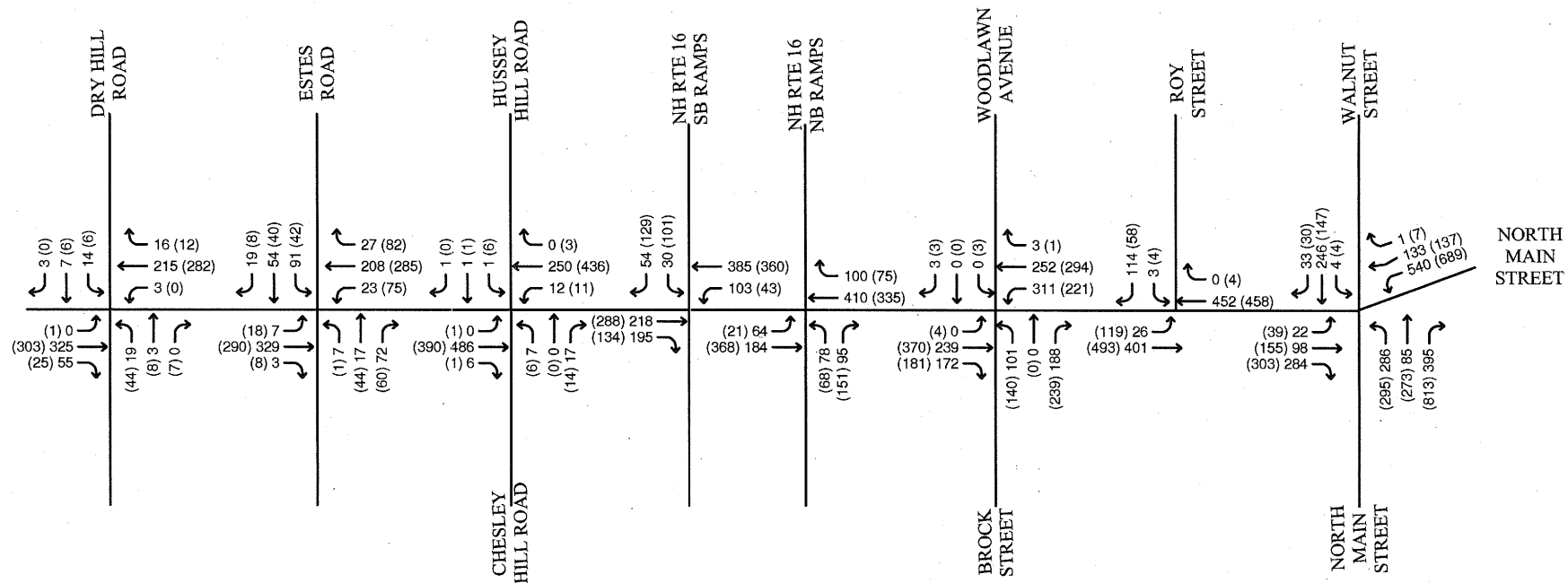


FIGURE 3
 OPENING YEAR (2003)
 NO-BUILD CASE
 NOT TO SCALE

US Route 202 Corridor Study
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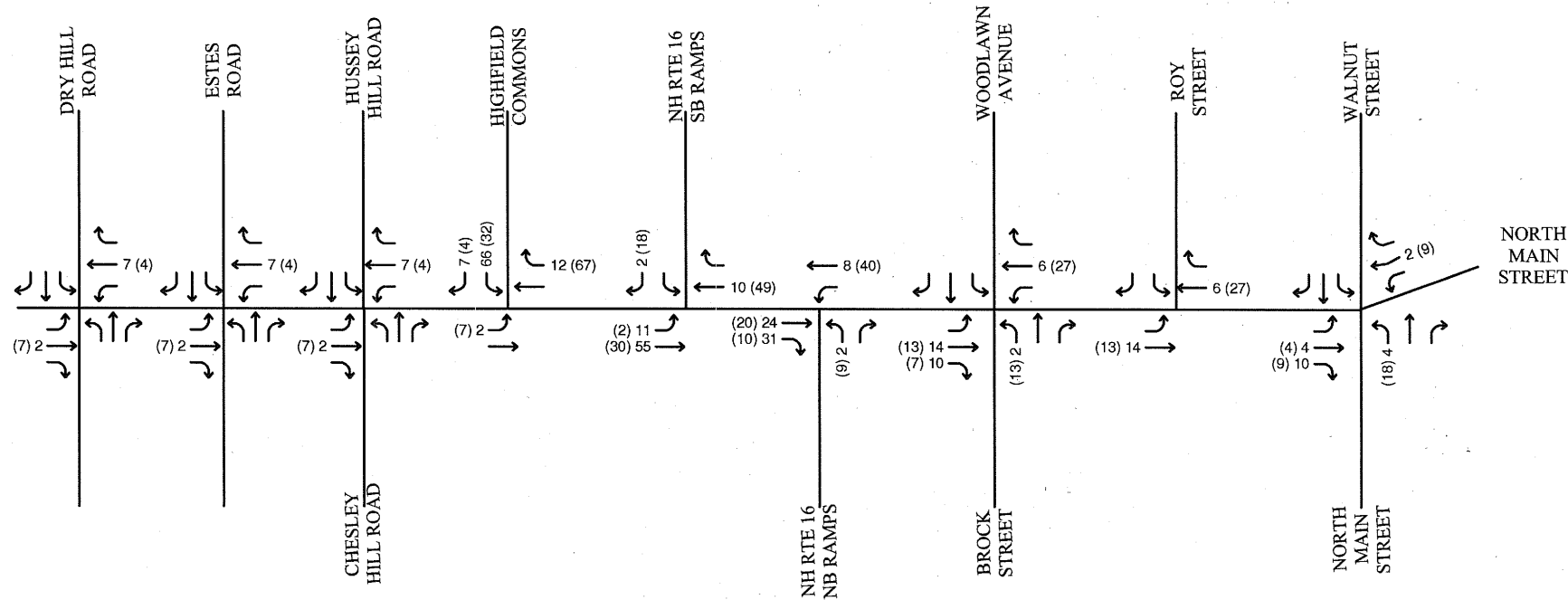


KEY
 XXX = Weekday AM Peak Hour
 (XXX) = Weekday PM Peak Hour



FIGURE 4
 FUTURE YEAR (2013)
 NO-BUILD CASE
 NOT TO SCALE
 US Route 202 Corridor Study
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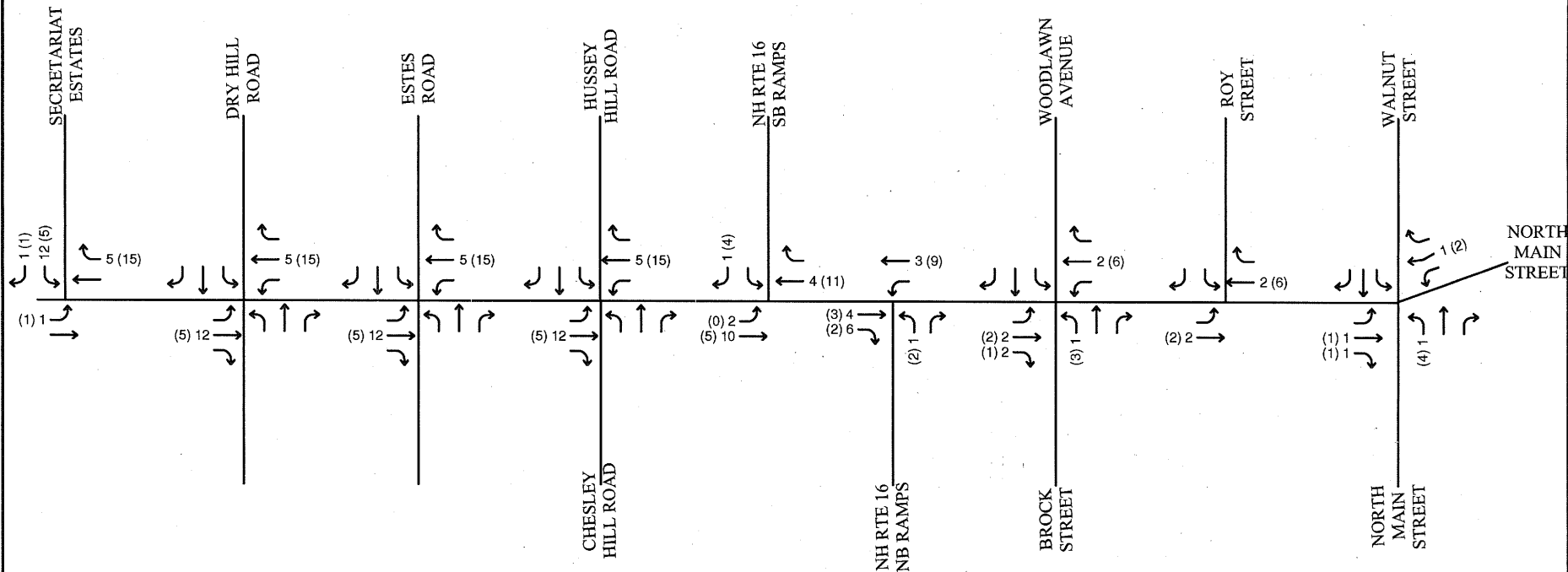


KEY
 XXX = Weekday AM Peak Hour
 (XXX) = Weekday PM Peak Hour

FIGURE 5
 DISTRIBUTION OF
 SITE-GENERATED TRAFFIC -
 HIGHFIELD COMMONS -
 OPENING YEAR (2003)
 NOT TO SCALE

US Route 202 Corridor Study
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 clde@clde-engineers.com www.clde-engineers.com
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KEY
 XXX = Weekday AM Peak Hour
 (XXX) = Weekday PM Peak Hour



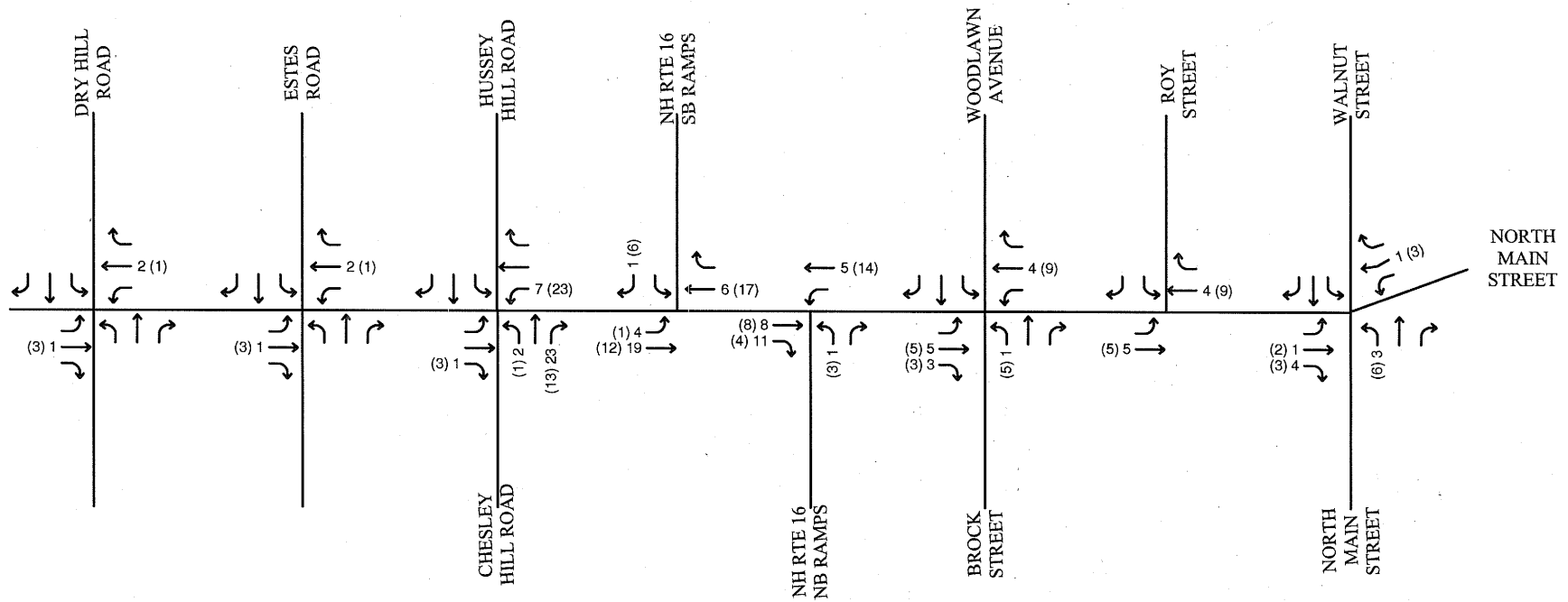
FIGURE 6
 DISTRIBUTION OF
 SITE-GENERATED TRAFFIC -
 SECRETARIAT ESTATES -
 OPENING YEAR (2003)

NOT TO SCALE

US Route 202 Corridor Study
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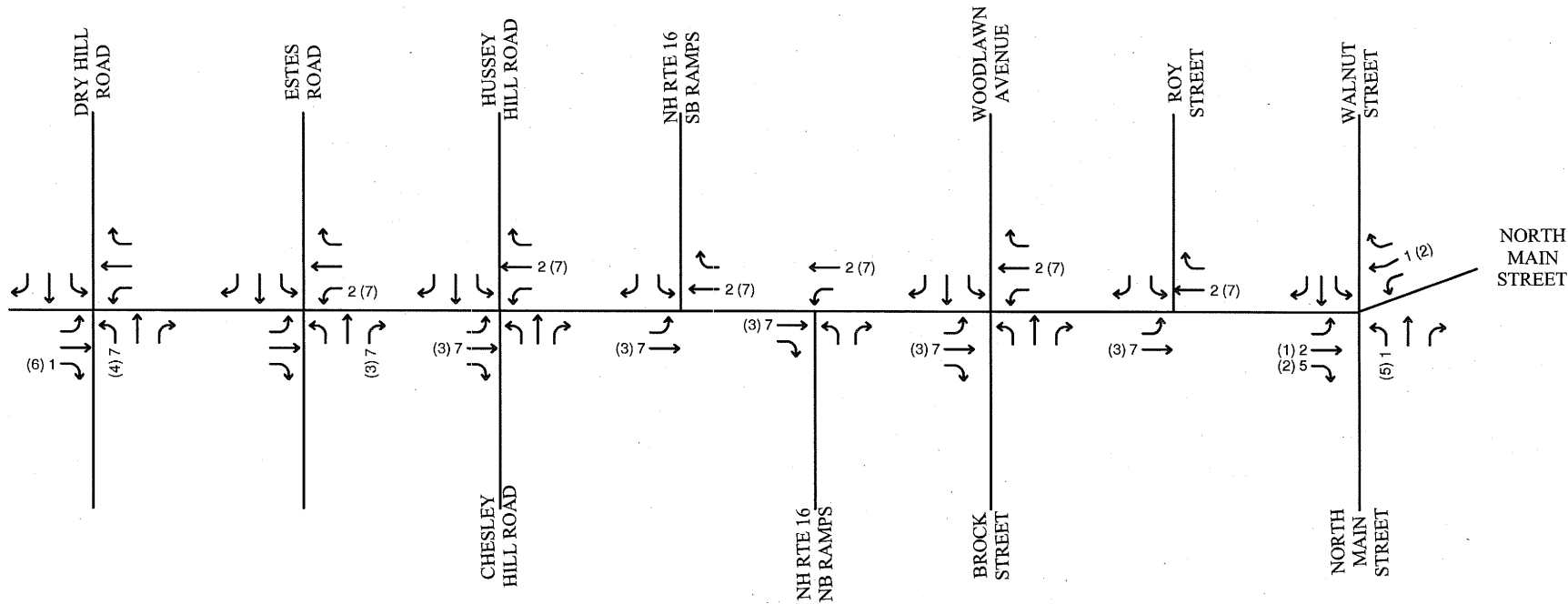
KEY
 XXX = Weekday AM Peak Hour
 (XXX) = Weekday PM Peak Hour



FIGURE 7
 DISTRIBUTION OF
 SITE-GENERATED TRAFFIC -
 CHESLEY HILL ROAD -
 OPENING YEAR (2003)
 NOT TO SCALE

US Route 202 Corridor Study
 CLD REFERENCE # 02-0402





KEY
 XXX = Weekday AM Peak Hour
 (XXX) = Weekday PM Peak Hour

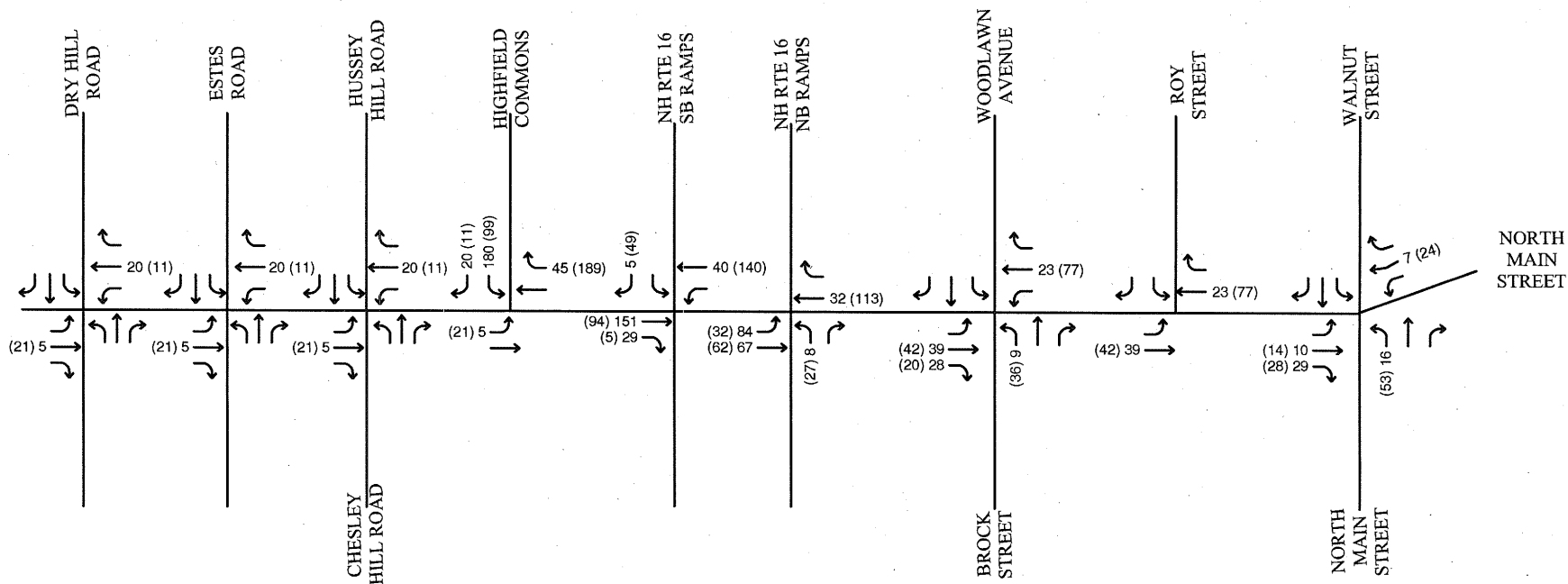


FIGURE 8
 DISTRIBUTION OF
 SITE-GENERATED TRAFFIC -
 LEDGEVIEW DRIVE -
 OPENING YEAR (2003)

NOT TO SCALE

US Route 202 Corridor Study
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KEY
 XXX = Weekday AM Peak Hour
 (XXX) = Weekday PM Peak Hour

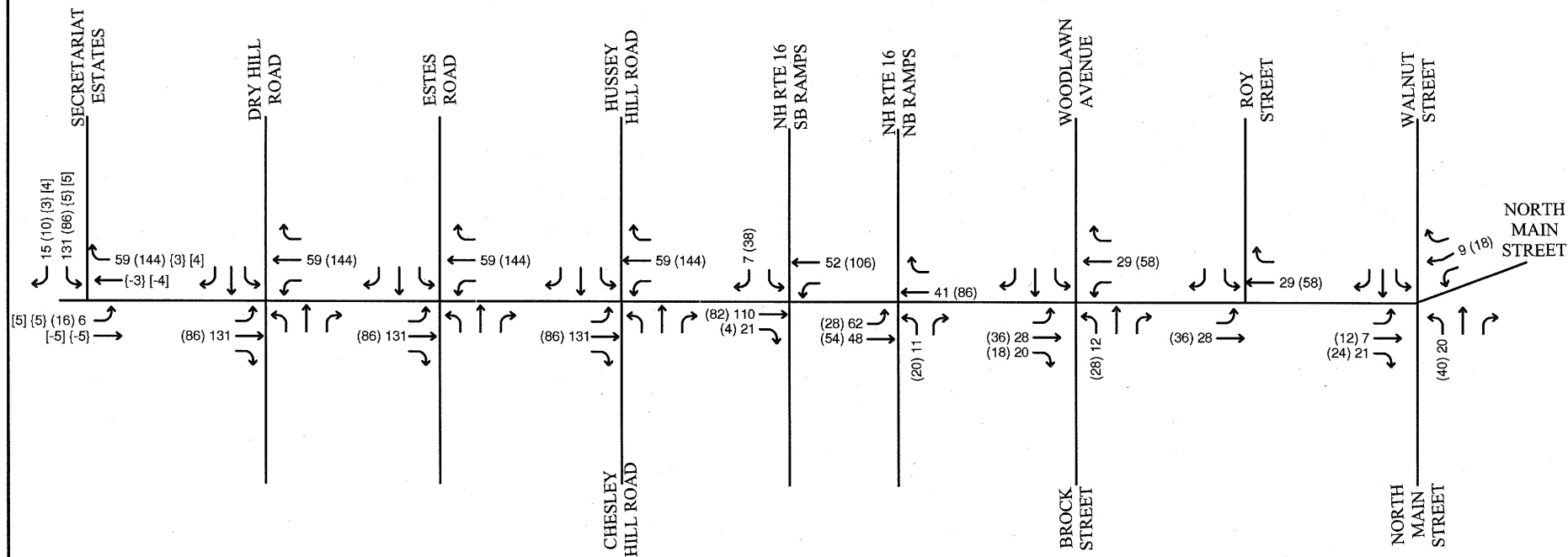


FIGURE 9
DISTRIBUTION OF
SITE-GENERATED TRAFFIC -
HIGHFIELD COMMONS -
FUTURE YEAR (2013)

NOT TO SCALE

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KEY

XXXX = Weekday AM Peak Hour, "New" Trips
 (XXX) = Weekday PM Peak Hour, "New" Trips
 {XXX} = Weekday AM Peak Hour, "Pass-By" Trips
 [XXXX] = Weekday PM Peak Hour, "Pass-By" Trips

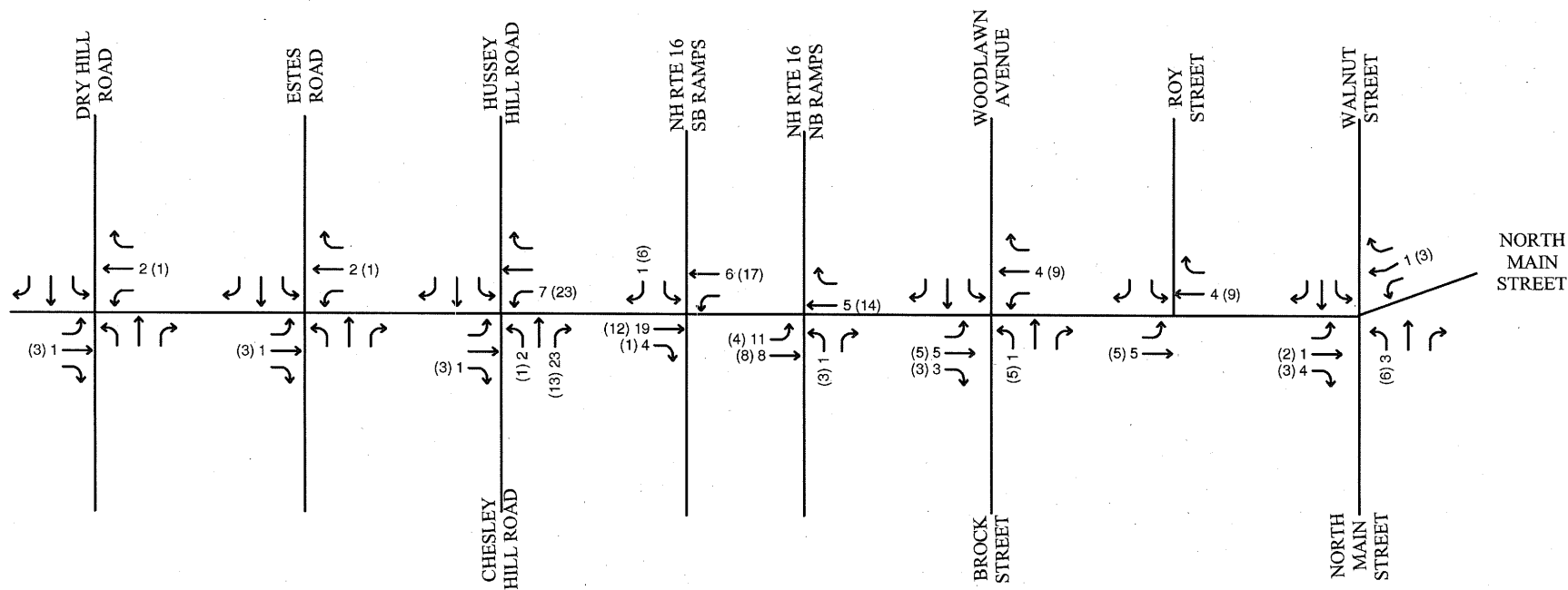


FIGURE 10
 DISTRIBUTION OF
 SITE-GENERATED TRAFFIC -
 SECRETARIAT ESTATES -
 FUTURE YEAR (2013)
 NOT TO SCALE

US Route 202 Corridor Study
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 clde@cldegroup.com www.cldegroup.com
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KEY
 XXX = Weekday AM Peak Hour
 (XXX) = Weekday PM Peak Hour

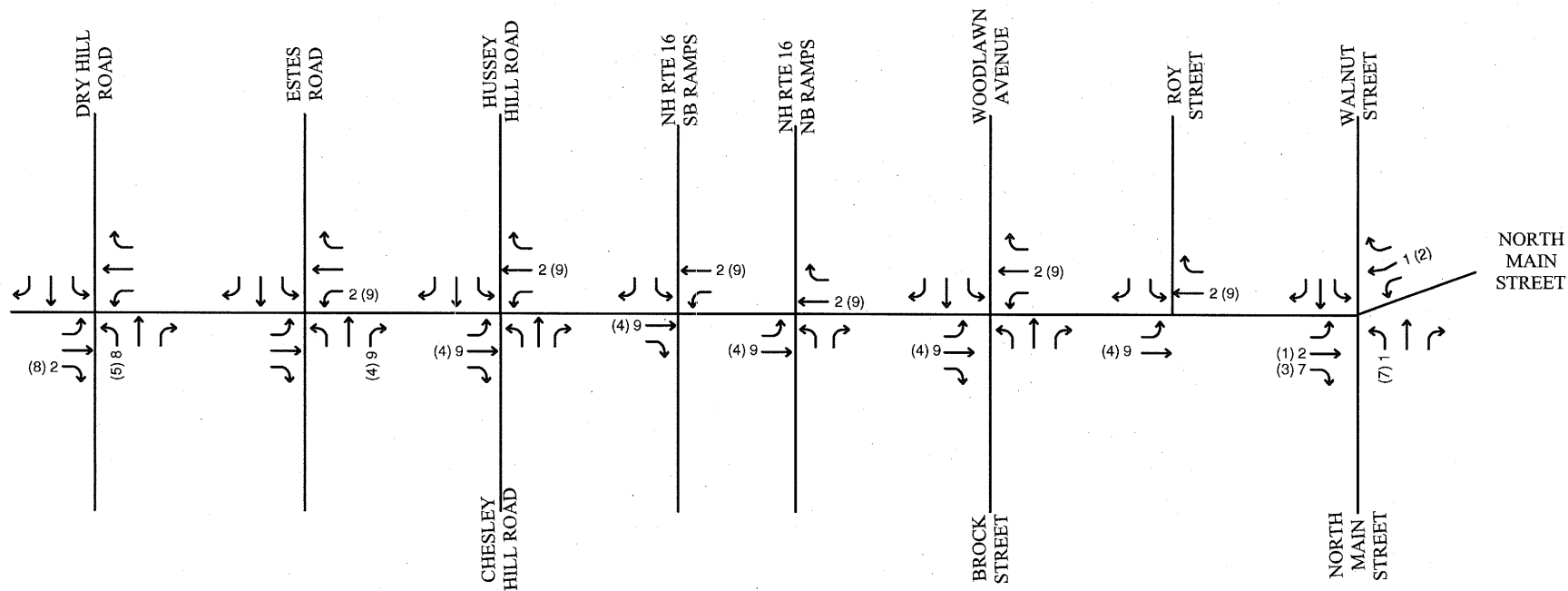


FIGURE 11
DISTRIBUTION OF
SITE-GENERATED TRAFFIC -
CHESLEY HILL ROAD -
FUTURE YEAR (2013)

NOT TO SCALE

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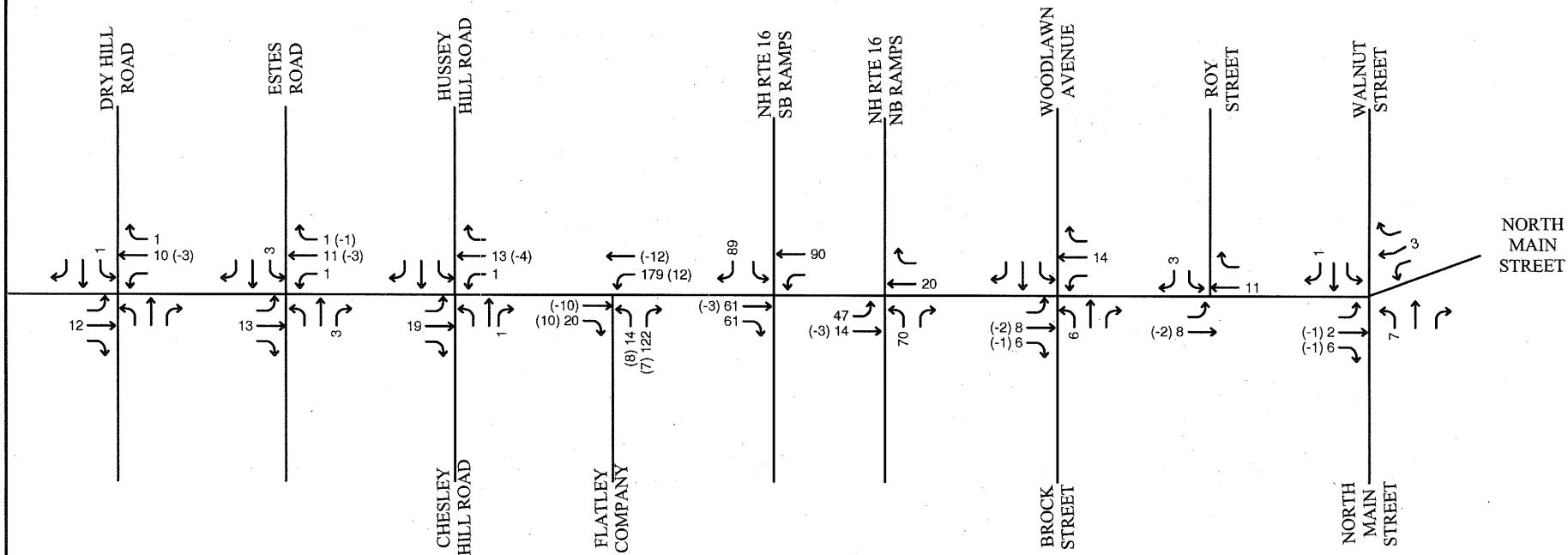


KEY
 XXX = Weekday AM Peak Hour
 (XXX) = Weekday PM Peak Hour

FIGURE 12
 DISTRIBUTION OF
 SITE-GENERATED TRAFFIC -
 LEDGEVIEW DRIVE -
 FUTURE YEAR (2013)
 NOT TO SCALE

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 (603) 666-8723 • Fax (603) 666-8807
 clde@cldeengineers.com www.cldeengineers.com
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KEY

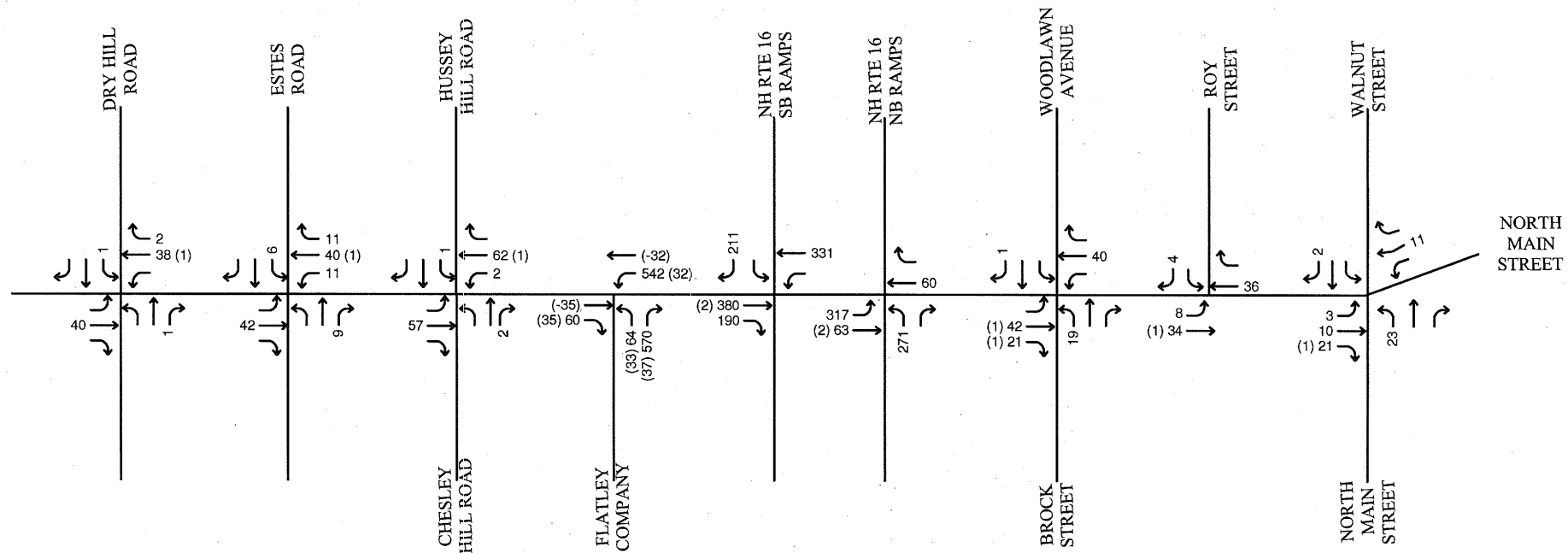
XXX = Weekday AM Peak Hour, "New" Trips
 (XXX) = Weekday AM Peak Hour, "Pass-By" Trips



FIGURE 13
DISTRIBUTION OF
SITE-GENERATED TRAFFIC -
FLATLEY COMPANY -
FUTURE YEAR (2013)
WEEKDAY AM PEAK HOUR
 NOT TO SCALE

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KEY

XXX = Weekday PM Peak Hour, "New" Trips
 (XXX) = Weekday PM Peak Hour, "Pass-By" Trips



FIGURE 14
 DISTRIBUTION OF
 SITE-GENERATED TRAFFIC -
 FLATLEY COMPANY -
 FUTURE YEAR (2013)
 WEEKDAY PM PEAK HOUR
 NOT TO SCALE

US Route 202 Corridor Study
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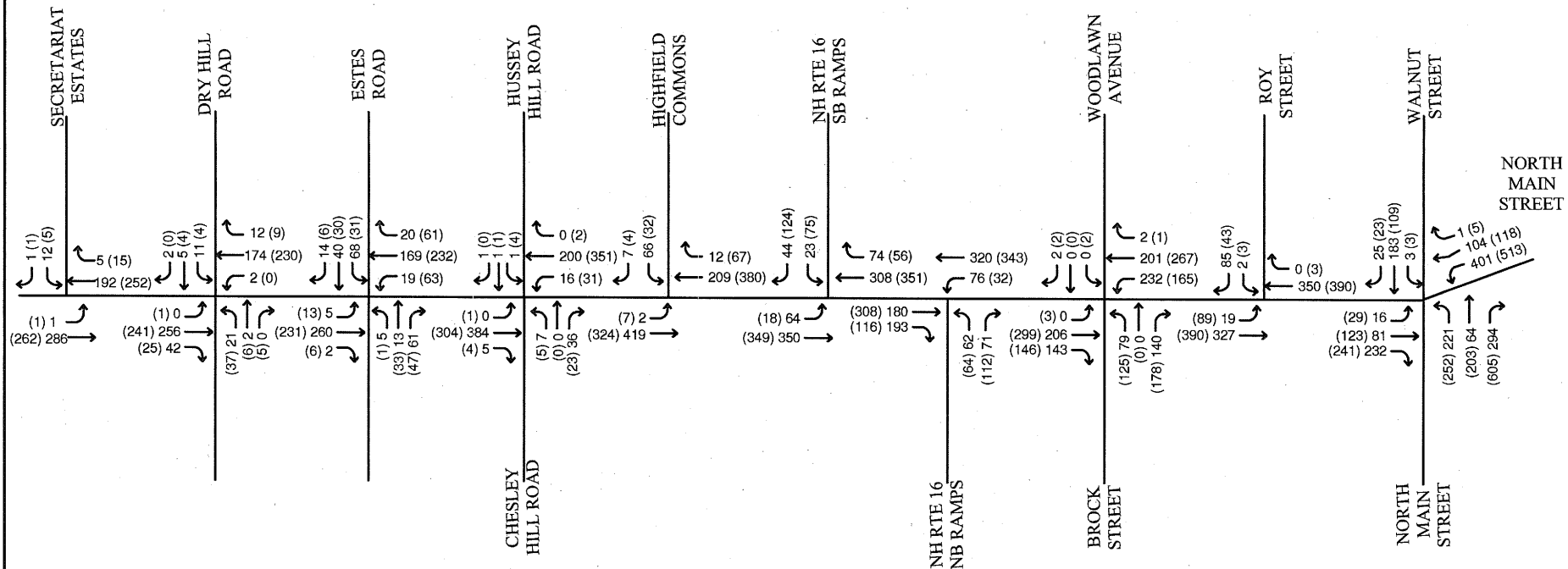


FIGURE 15
OPENING YEAR (2003)
BUILD CASE
 NOT TO SCALE

US Route 202 Corridor Study
 CLD REFERENCE # 02-0402

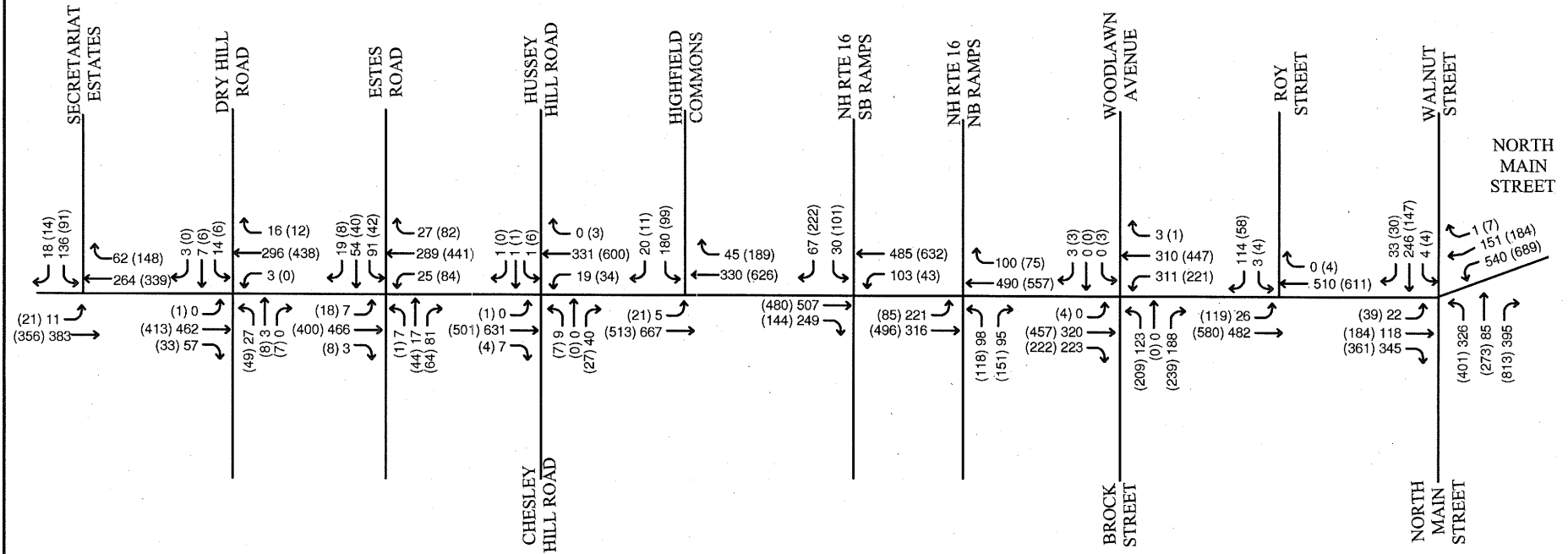
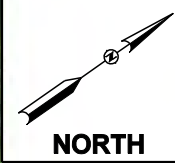


FIGURE 16
FUTURE YEAR (2013)
BUILD (RESIDENTIAL) CASE

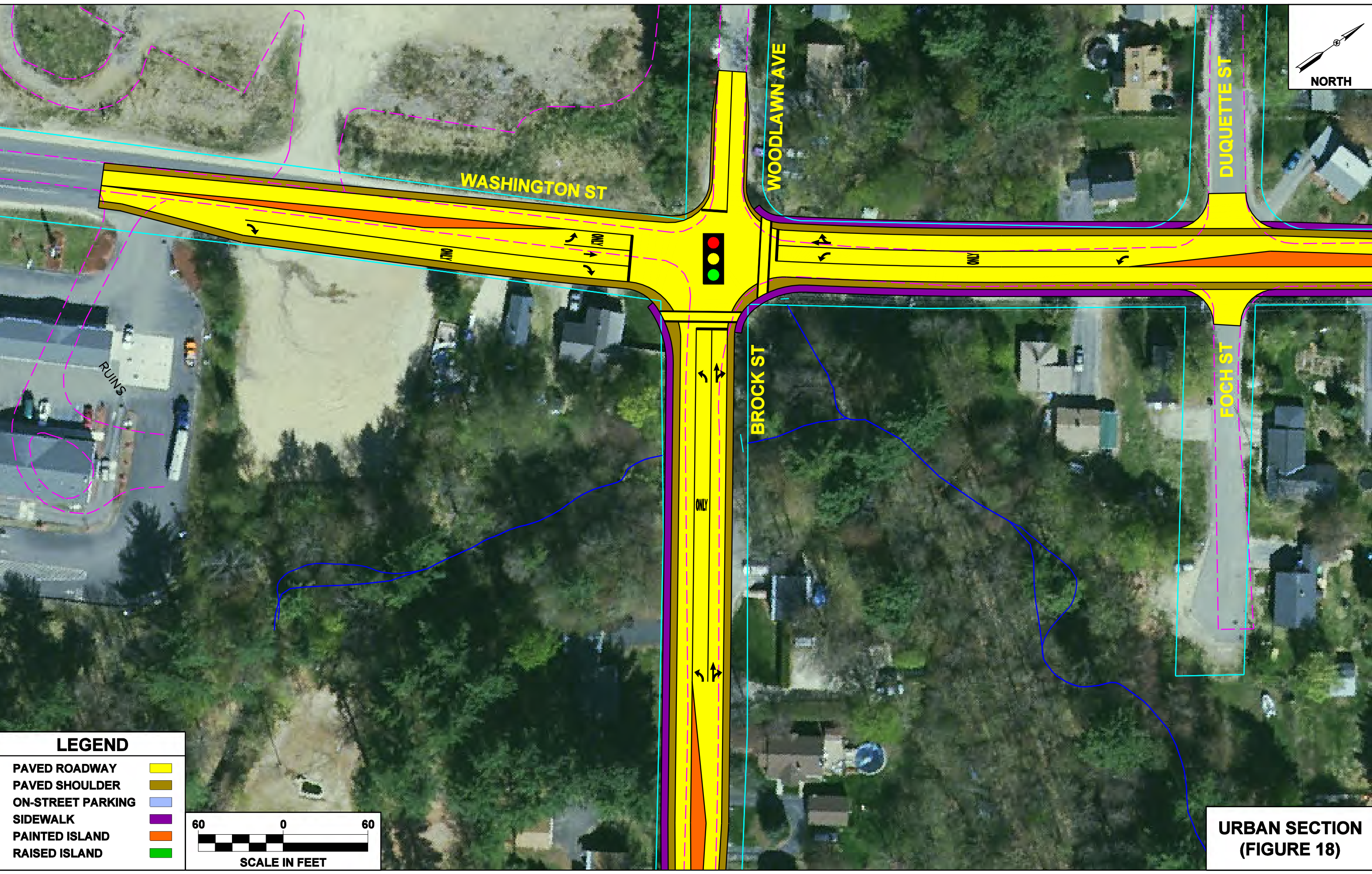
NOT TO SCALE

US Route 202 Corridor Study
 CLD REFERENCE # 02-0402

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NORTH

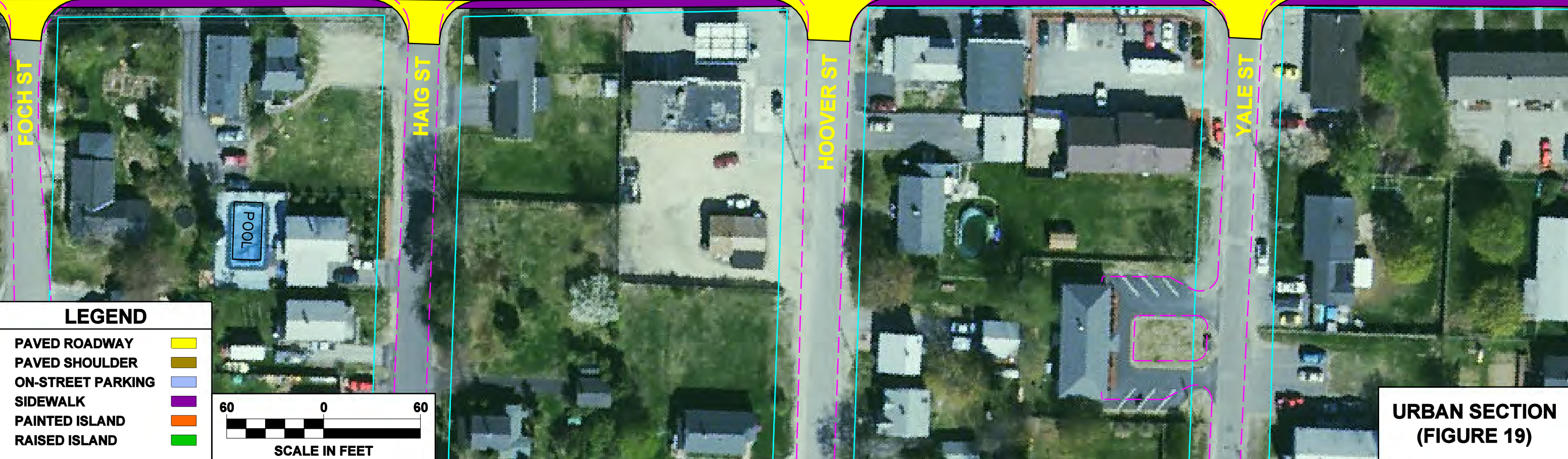
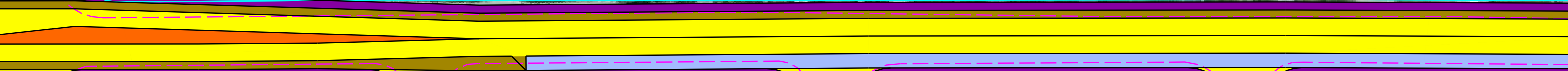
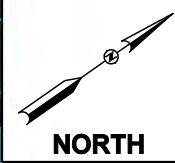


LEGEND

PAVED ROADWAY	
PAVED SHOULDER	
ON-STREET PARKING	
SIDEWALK	
PAINTED ISLAND	
RAISED ISLAND	



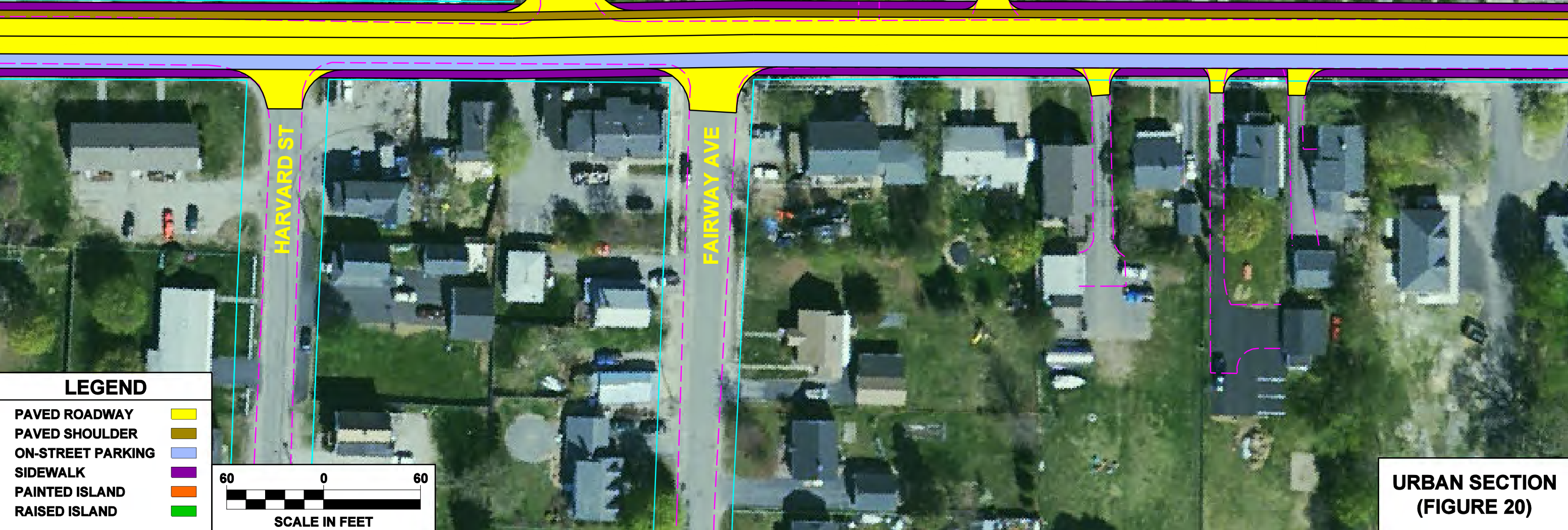
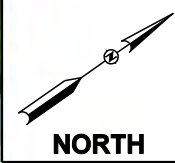
**URBAN SECTION
(FIGURE 18)**



LEGEND	
PAVED ROADWAY	
PAVED SHOULDER	
ON-STREET PARKING	
SIDEWALK	
PAINTED ISLAND	
RAISED ISLAND	

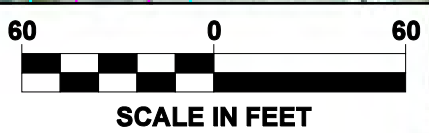


**URBAN SECTION
(FIGURE 19)**

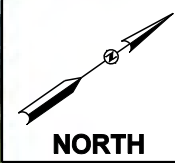


LEGEND

- PAVED ROADWAY
- PAVED SHOULDER
- ON-STREET PARKING
- SIDEWALK
- PAINTED ISLAND
- RAISED ISLAND



**URBAN SECTION
(FIGURE 20)**



NORTH

POOL

ROY ST

MADISON AVE

WASHINGTON ST

CLEVELAND ST

SLYVAIN ST

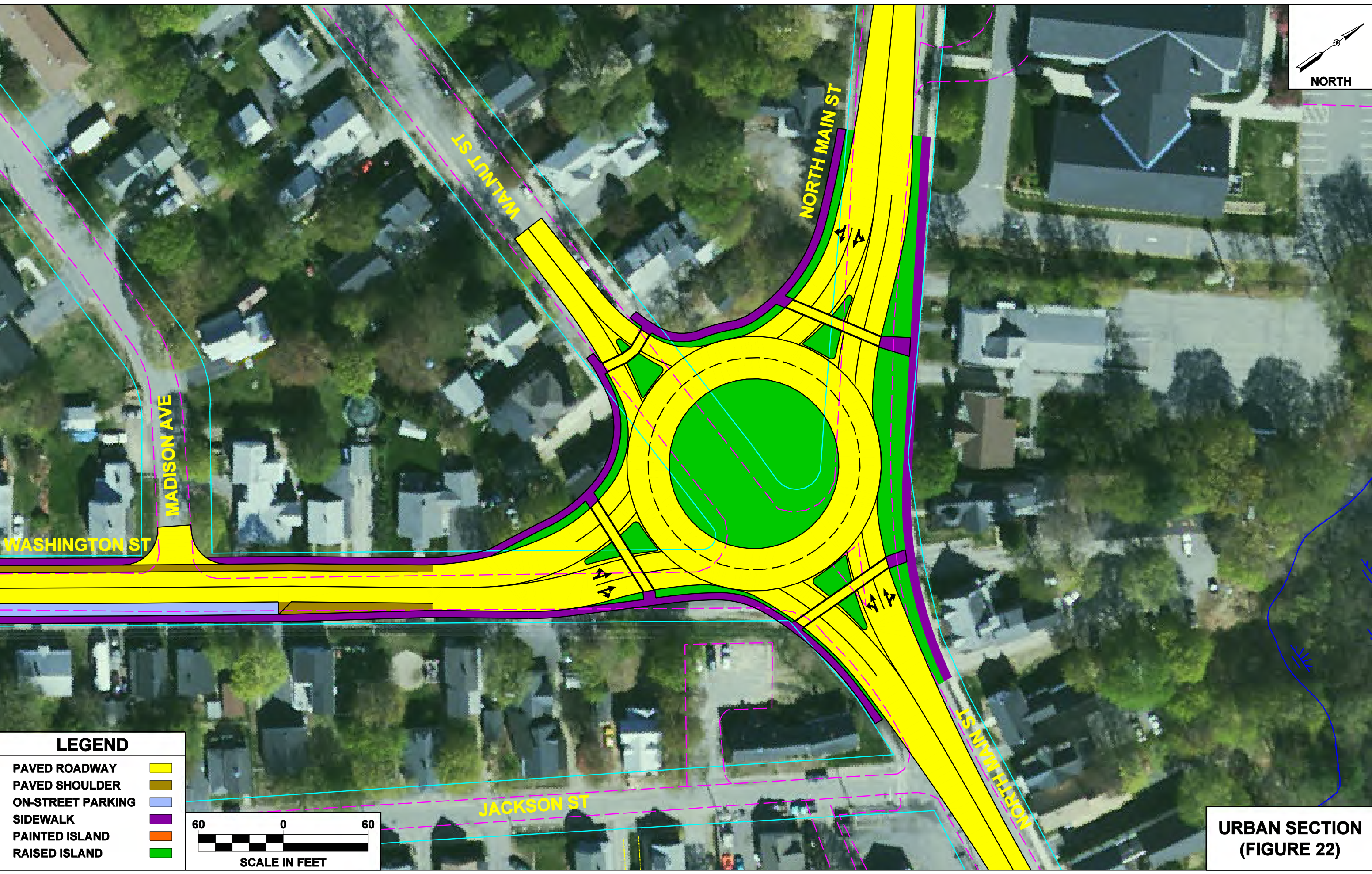
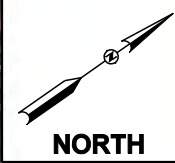
JACKSON ST

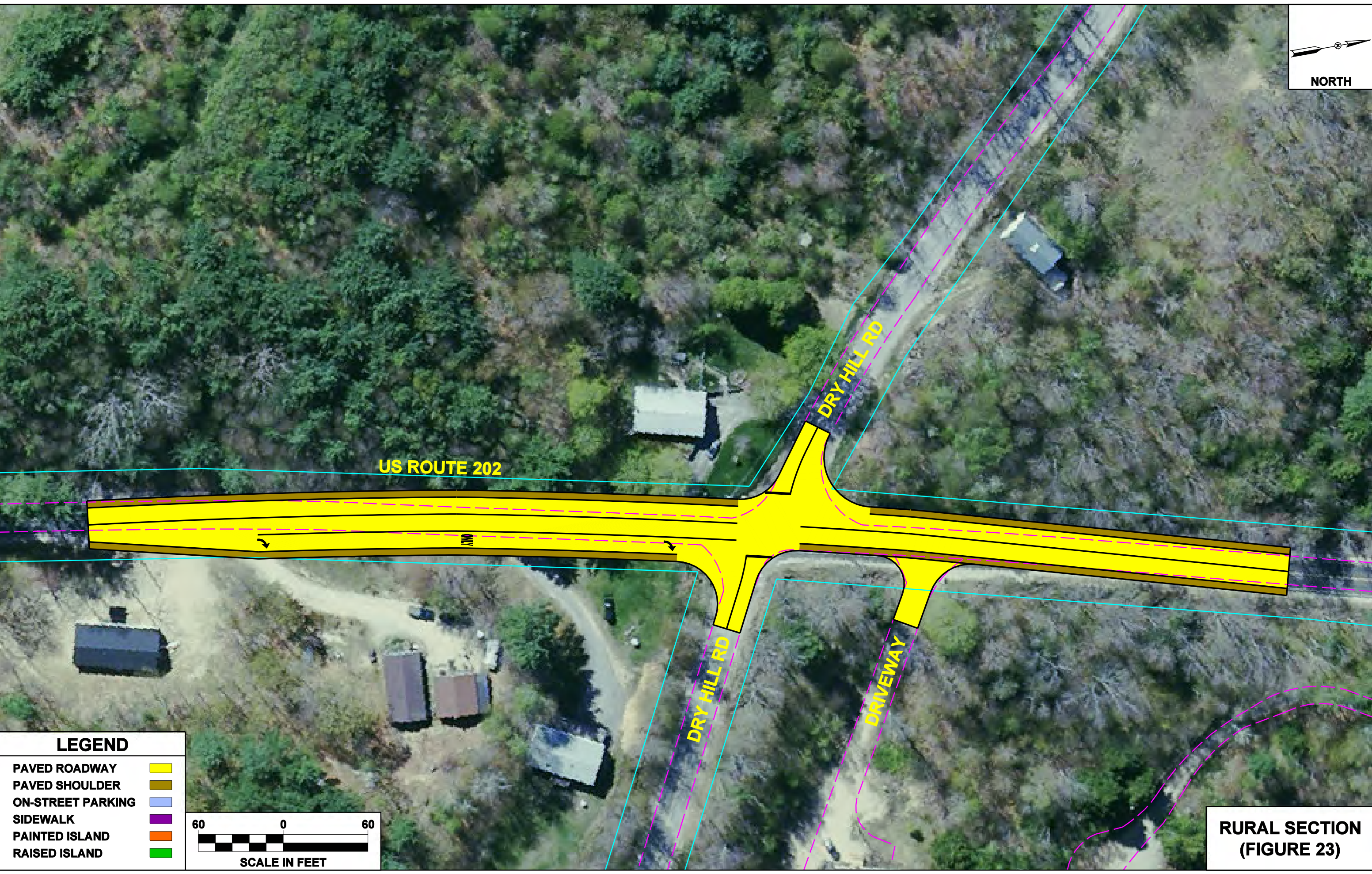
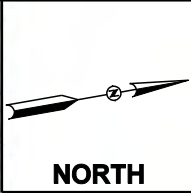
LEGEND

- PAVED ROADWAY
- PAVED SHOULDER
- ON-STREET PARKING
- SIDEWALK
- PAINTED ISLAND
- RAISED ISLAND



URBAN SECTION
(FIGURE 21)





US ROUTE 202

DRY HILL RD

DRY HILL RD

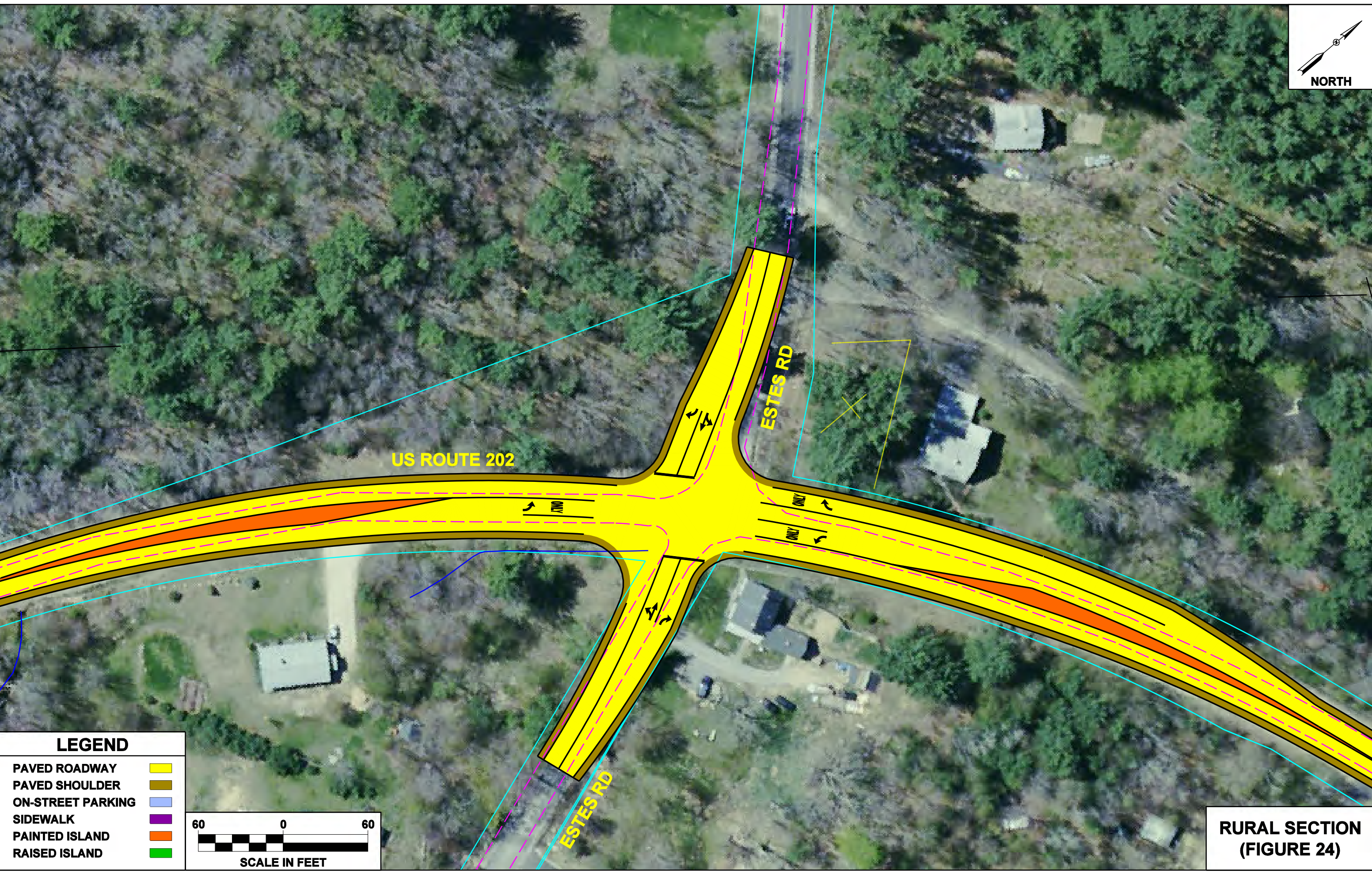
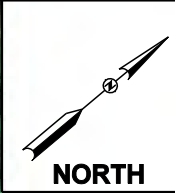
DRIVEWAY

LEGEND

- PAVED ROADWAY
- PAVED SHOULDER
- ON-STREET PARKING
- SIDEWALK
- PAINTED ISLAND
- RAISED ISLAND

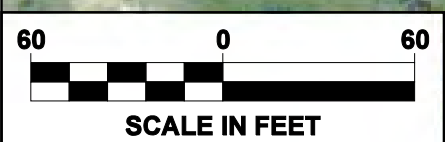


**RURAL SECTION
(FIGURE 23)**

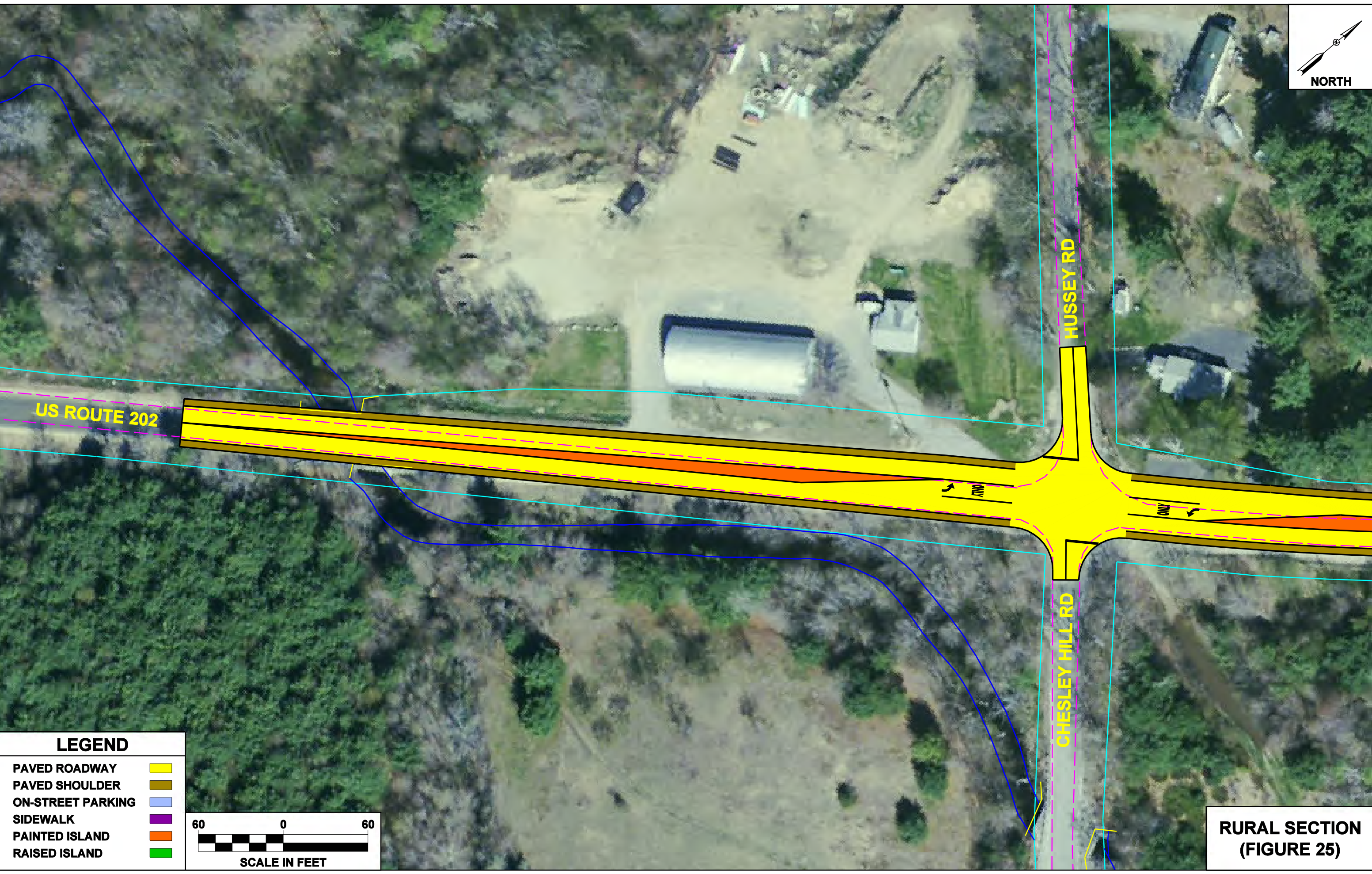
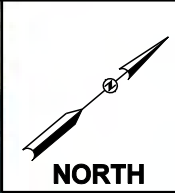


LEGEND

PAVED ROADWAY	
PAVED SHOULDER	
ON-STREET PARKING	
SIDEWALK	
PAINTED ISLAND	
RAISED ISLAND	



**RURAL SECTION
(FIGURE 24)**

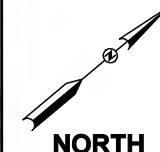


LEGEND

PAVED ROADWAY	
PAVED SHOULDER	
ON-STREET PARKING	
SIDEWALK	
PAINTED ISLAND	
RAISED ISLAND	



**RURAL SECTION
(FIGURE 25)**



HUSSEY HILL RD

US ROUTE 202

CHESLEY HILL RD

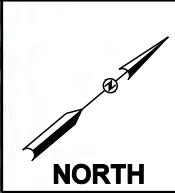
RUIN

LEGEND

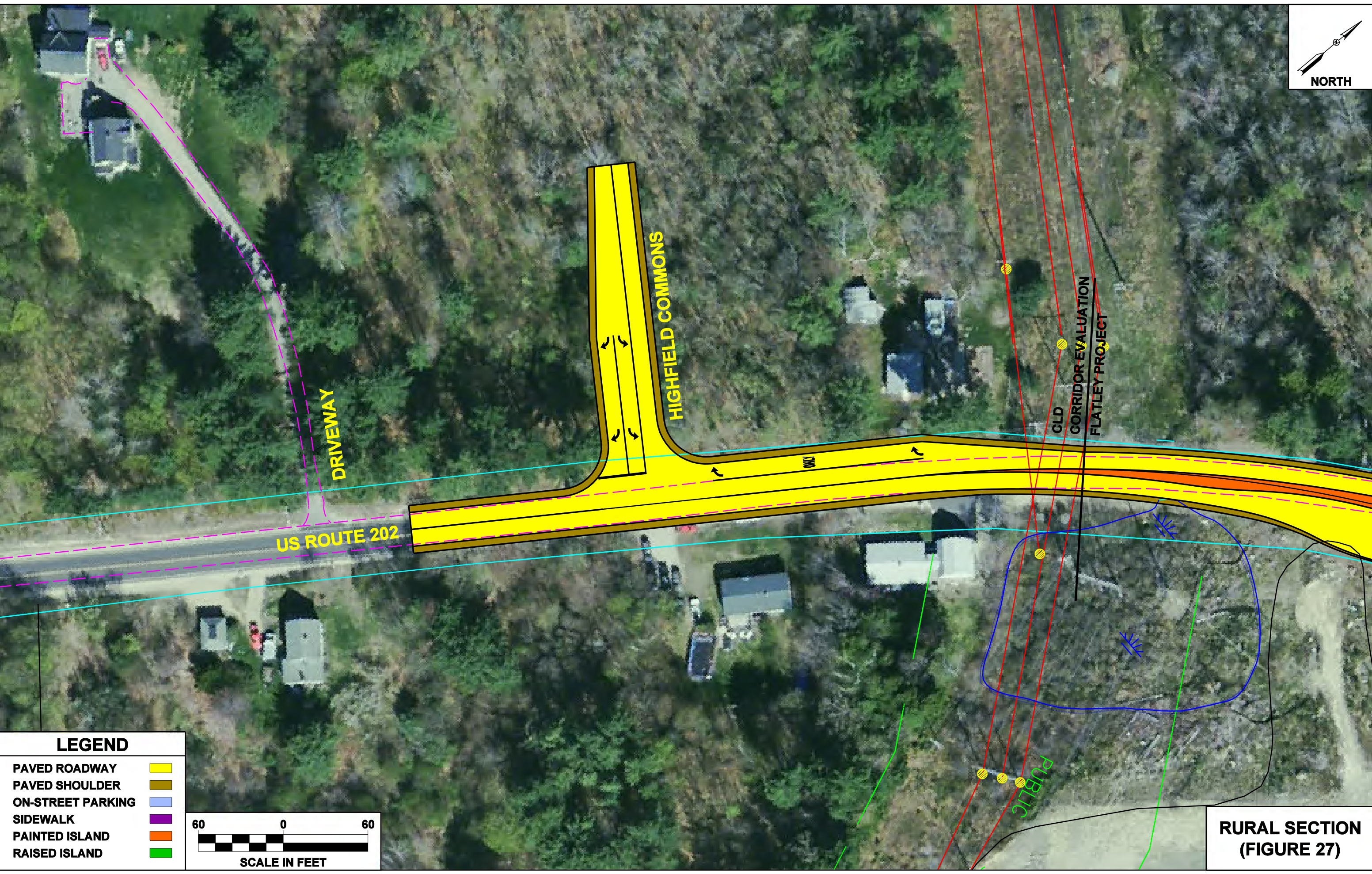
- PAVED ROADWAY
- PAVED SHOULDER
- ON-STREET PARKING
- SIDEWALK
- PAINTED ISLAND
- RAISED ISLAND



**RURAL SECTION
(FIGURE 26)**



NORTH

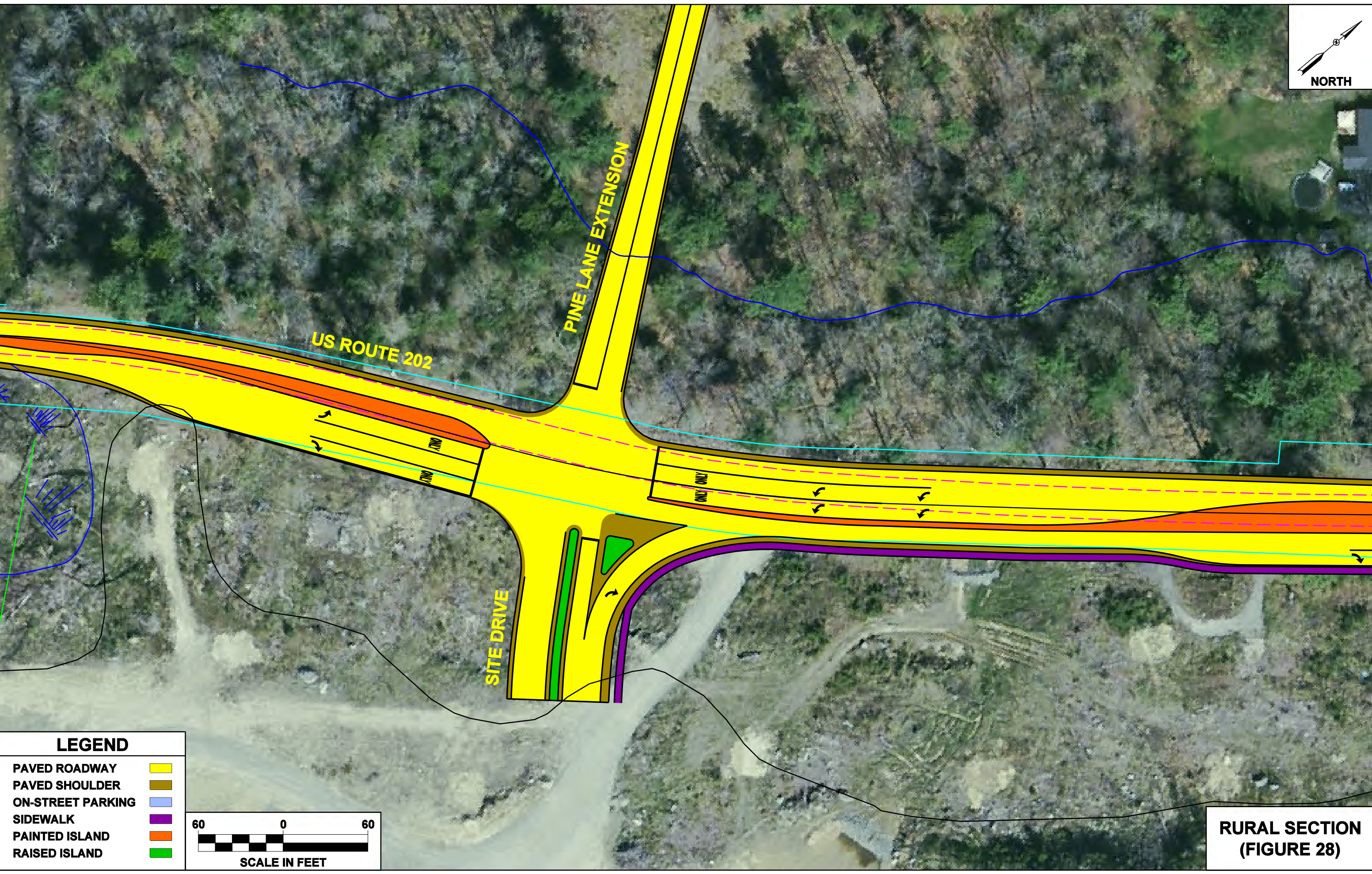


LEGEND

- PAVED ROADWAY
- PAVED SHOULDER
- ON-STREET PARKING
- SIDEWALK
- PAINTED ISLAND
- RAISED ISLAND

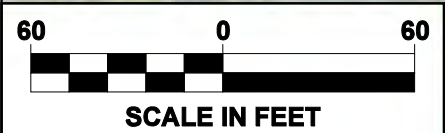


**RURAL SECTION
(FIGURE 27)**

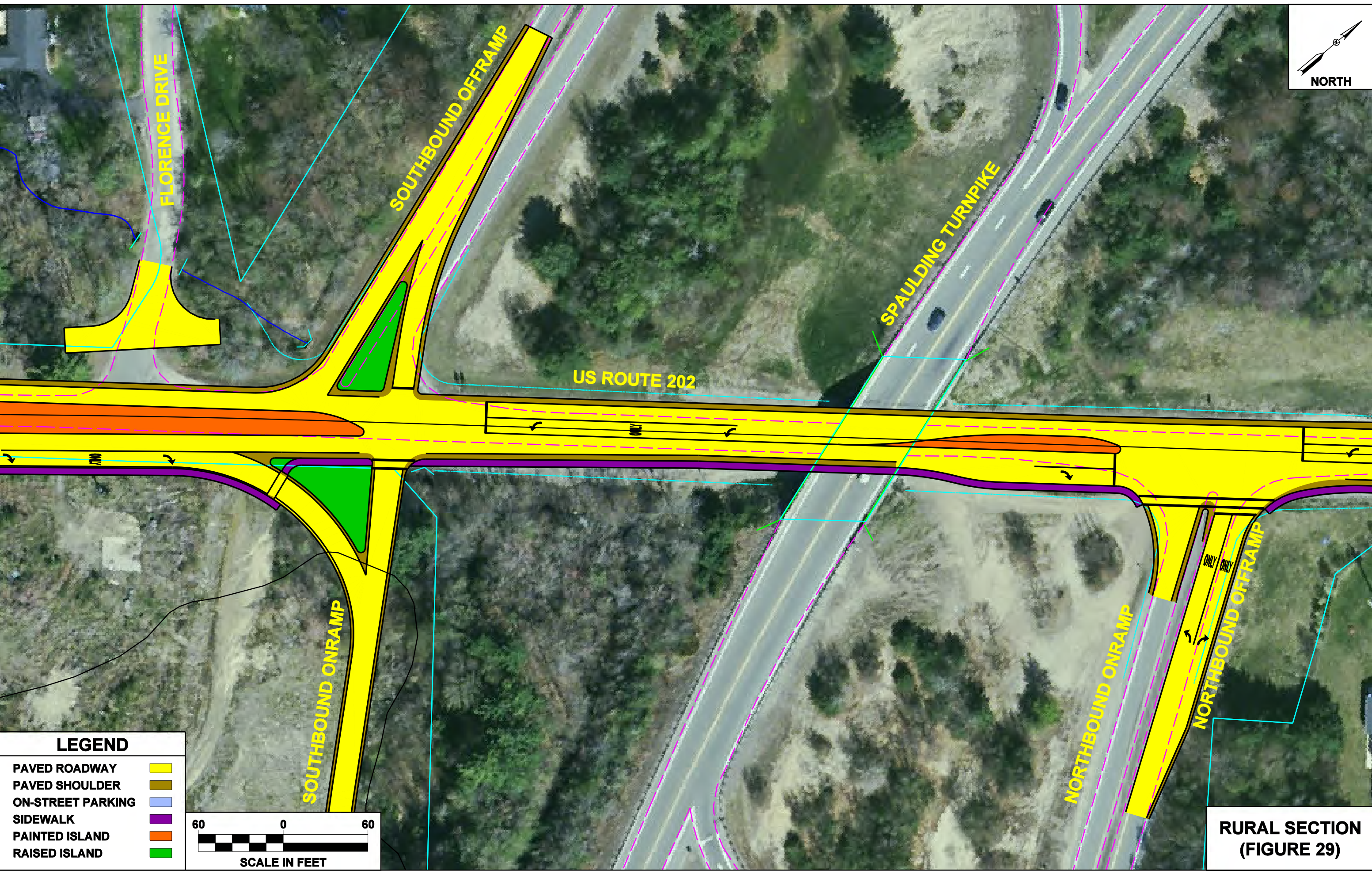
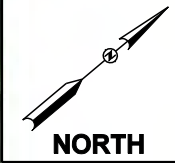


LEGEND

PAVED ROADWAY	
PAVED SHOULDER	
ON-STREET PARKING	
SIDEWALK	
PAINTED ISLAND	
RAISED ISLAND	

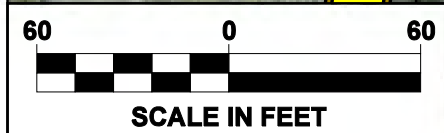


**RURAL SECTION
(FIGURE 28)**



LEGEND

- PAVED ROADWAY
- PAVED SHOULDER
- ON-STREET PARKING
- SIDEWALK
- PAINTED ISLAND
- RAISED ISLAND



**RURAL SECTION
(FIGURE 29)**

Technical Appendices

Corridor Evaluation

Washington Street/US Route 202 Rochester, New Hampshire

Submitted to:



**City of Rochester
Public Works Department
45 Old Dover Road
Rochester, NH 03867**



Prepared by:



**CORRIDOR EVALUATION
WASHINGTON STREET/US ROUTE 202
ROCHESTER, NEW HAMPSHIRE**

TECHNICAL APPENDICES

- A. TRAFFIC COUNT DATA
 - ATR COUNT
 - MANUAL INTERSECTION COUNTS
- B. ACCIDENT DATA – 1999 to 2002- STUDY AREA INTERSECTIONS
- C. TRAFFIC GROWTH TRENDS AND PROJECTIONS
- D. INTERSECTION CAPACITY ANALYSES
2002, 2003 AND 2013 NO-BUILD CASES
- E. TRIP GENERATION / DISTRIBUTION CALCULATIONS
- F. INTERSECTION CAPACITY ANALYSES
2003 BUILD AND 2013 BUILD (RESIDENTIAL)
- G. INTERSECTION CAPACITY ANALYSES
2013 BUILD (RESIDENTIAL/MALL) CASES
- H. CONCEPTUAL ALTERNATIVE PLANS
- I. STRAFFORD SQUARE INTERSECTION CAPACITY ANALYSES
 - SIGNALIZED
 - ROUNDABOUT
- J. LEFT-TURN WARRANTS ANALYSES
- K. RIGHT-TURN WARRANTS ANALYSES
- L. TRAFFIC SIGNAL WARRANTS ANALYSIS
- M. WARRANT THRESHOLD ANALYSES
- N. QUEUE LENGTH CALCULATIONS
- O. CONCEPTUAL COST ESTIMATES OF CORRIDOR IMPROVEMENTS

APPENDIX A

TRAFFIC COUNT DATA

- **ATR Counts**
- **Manual Intersection Counts**

CLD Consulting Engineers, Inc.
540 Commercial Street
Manchester, NH 03101
(603) 668-8223

Page 1
Site Code: 0204021020
Date Printed: 16-Dec-02

Town/State: Rochester, NH

Location: Washington St S of Cleeland
Counter/Counted By: 5229 (B.French)

Weather: Clear, 30's

washington st s of cleeland

Start Time	09-Dec-02		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	4	17	11	20	*	*	*	*	*	*	*	*	8	18
01:00	*	*	0	10	1	12	*	*	*	*	*	*	*	*	0	11
02:00	*	*	3	6	2	10	*	*	*	*	*	*	*	*	2	8
03:00	*	*	5	16	11	11	*	*	*	*	*	*	*	*	8	14
04:00	*	*	14	26	15	9	*	*	*	*	*	*	*	*	14	18
05:00	*	*	41	99	59	70	*	*	*	*	*	*	*	*	50	84
06:00	*	*	106	259	164	174	*	*	*	*	*	*	*	*	135	216
07:00	*	*	221	416	306	342	*	*	*	*	*	*	*	*	264	379
08:00	*	*	216	292	267	267	*	*	*	*	*	*	*	*	242	280
09:00	*	*	177	195	183	180	*	*	*	*	*	*	*	*	180	188
10:00	*	*	189	202	182	193	*	*	*	*	*	*	*	*	186	198
11:00	*	*	204	220	211	230	*	*	*	*	*	*	*	*	208	225
12:00 PM	*	*	232	243	272	285	*	*	*	*	*	*	*	*	252	264
01:00	264	264	223	248	223	249	*	*	*	*	*	*	*	*	237	254
02:00	343	281	290	292	252	224	*	*	*	*	*	*	*	*	295	266
03:00	326	374	299	418	*	*	*	*	*	*	*	*	*	*	312	396
04:00	329	401	316	405	*	*	*	*	*	*	*	*	*	*	322	403
05:00	235	368	266	393	*	*	*	*	*	*	*	*	*	*	250	380
06:00	146	288	206	283	*	*	*	*	*	*	*	*	*	*	176	286
07:00	98	207	160	183	*	*	*	*	*	*	*	*	*	*	129	195
08:00	102	156	144	134	*	*	*	*	*	*	*	*	*	*	123	145
09:00	72	120	116	76	*	*	*	*	*	*	*	*	*	*	94	98
10:00	23	58	28	49	*	*	*	*	*	*	*	*	*	*	26	54
11:00	18	39	22	32	*	*	*	*	*	*	*	*	*	*	20	36
Lane	1956	2556	3482	4514	2159	2276	0	0	0	0	0	0	0	0	3533	4416
Day	4512		7996		4435		0		0		0		0		7949	
AM			07:00	07:00	07:00	07:00									07:00	07:00
Peak Volume			221	416	306	342									264	379
PM			16:00	15:00	12:00	12:00									16:00	16:00
Peak Volume	343	401	316	418	272	285									322	403

Comb. Total 4512 7996 4435 0 0 0 7949

ADT Not Calculated

Town/State: Rochester, NH

Location: Route 202, S of Rte 16 SB ramp

Counter/Counted By: 6558 (B.French)

Weather: Clear, 30's

route 202 s of rte 16 sb ramp

Start Time	09-Dec-02		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	18	18	13	23	*	*	*	*	*	*	*	*	16	20
01:00	*	*	5	6	7	8	*	*	*	*	*	*	*	*	6	7
02:00	*	*	9	4	4	13	*	*	*	*	*	*	*	*	6	8
03:00	*	*	24	12	16	15	*	*	*	*	*	*	*	*	20	14
04:00	*	*	23	33	22	25	*	*	*	*	*	*	*	*	22	29
05:00	*	*	80	66	78	69	*	*	*	*	*	*	*	*	79	68
06:00	*	*	212	171	210	152	*	*	*	*	*	*	*	*	211	162
07:00	*	*	365	191	349	208	*	*	*	*	*	*	*	*	357	200
08:00	*	*	280	200	275	195	*	*	*	*	*	*	*	*	278	198
09:00	*	*	182	158	201	160	*	*	*	*	*	*	*	*	192	159
10:00	*	*	198	165	156	193	*	*	*	*	*	*	*	*	177	179
11:00	*	*	188	197	180	178	*	*	*	*	*	*	*	*	184	188
12:00 PM	*	*	193	207	203	204	*	*	*	*	*	*	*	*	198	206
01:00	*	*	186	181	215	208	*	*	*	*	*	*	*	*	200	194
02:00	216	242	238	254	170	213	*	*	*	*	*	*	*	*	208	236
03:00	281	283	280	303	*	*	*	*	*	*	*	*	*	*	280	293
04:00	308	320	326	362	*	*	*	*	*	*	*	*	*	*	317	341
05:00	259	367	237	406	*	*	*	*	*	*	*	*	*	*	248	386
06:00	188	209	209	227	*	*	*	*	*	*	*	*	*	*	198	218
07:00	113	148	137	157	*	*	*	*	*	*	*	*	*	*	125	152
08:00	75	148	107	152	*	*	*	*	*	*	*	*	*	*	91	150
09:00	40	105	54	120	*	*	*	*	*	*	*	*	*	*	47	112
10:00	45	45	46	36	*	*	*	*	*	*	*	*	*	*	46	40
11:00	18	34	19	37	*	*	*	*	*	*	*	*	*	*	18	36
Lane	1543	1901	3616	3663	2099	1864	0	0	0	0	0	0	0	0	3524	3596
Day	3444		7279		3963		0		0		0		0		7120	
AM			07:00		07:00										07:00	
Peak Volume			365		349										357	
PM			16:00		13:00										16:00	
Peak Volume			367		215										317	
			308		213										386	

Comb. Total 3444 7279 3963 0 0 7120

ADT Not Calculated

CLD Consulting Engineers, Inc.
540 Commercial Street
Manchester, NH 03101
(603) 668-8223

Page 1
Site Code: 0204021020
Date Printed: 16-Dec-02

Town/State: Rochester, NH

Location: Brock St W of Janet St

Counter/Counted By: 5228 (B.French)

Weather: Clear, 30's

brock st w of janet

Start Time	09-Dec-02		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	6	6	6	5	*	*	*	*	*	*	*	*	6	6
01:00	*	*	4	1	7	3	*	*	*	*	*	*	*	*	6	2
02:00	*	*	6	4	4	3	*	*	*	*	*	*	*	*	5	4
03:00	*	*	5	5	1	3	*	*	*	*	*	*	*	*	3	4
04:00	*	*	6	13	8	14	*	*	*	*	*	*	*	*	7	14
05:00	*	*	30	49	24	35	*	*	*	*	*	*	*	*	27	42
06:00	*	*	78	161	86	164	*	*	*	*	*	*	*	*	82	162
07:00	*	*	200	360	229	364	*	*	*	*	*	*	*	*	214	362
08:00	*	*	174	261	173	257	*	*	*	*	*	*	*	*	174	259
09:00	*	*	110	139	110	157	*	*	*	*	*	*	*	*	110	148
10:00	*	*	111	153	120	143	*	*	*	*	*	*	*	*	116	148
11:00	*	*	152	151	151	147	*	*	*	*	*	*	*	*	152	149
12:00 PM	*	*	180	176	192	198	*	*	*	*	*	*	*	*	186	187
01:00	167	185	125	153	165	177	*	*	*	*	*	*	*	*	152	172
02:00	253	282	248	258	*	*	*	*	*	*	*	*	*	*	250	270
03:00	340	234	363	285	*	*	*	*	*	*	*	*	*	*	352	260
04:00	282	258	283	254	*	*	*	*	*	*	*	*	*	*	282	256
05:00	239	192	312	179	*	*	*	*	*	*	*	*	*	*	276	186
06:00	136	106	130	132	*	*	*	*	*	*	*	*	*	*	133	119
07:00	101	62	102	94	*	*	*	*	*	*	*	*	*	*	102	78
08:00	72	52	76	63	*	*	*	*	*	*	*	*	*	*	74	58
09:00	56	52	49	40	*	*	*	*	*	*	*	*	*	*	52	46
10:00	21	21	25	23	*	*	*	*	*	*	*	*	*	*	23	22
11:00	16	10	13	10	*	*	*	*	*	*	*	*	*	*	14	10
Lane	1683	1454	2788	2970	1276	1670	0	0	0	0	0	0	0	0	2798	2964
Day	3137		5758		2946		0	0	0	0	0	0	0	0	5762	
AM			07:00	07:00	07:00	07:00									07:00	07:00
Peak Volume			200	360	229	364									214	362
PM			15:00	15:00	12:00	12:00									15:00	14:00
Peak Volume	340	282	363	285	192	198									352	270

Comb. Total 3137 5758 2946 0 0 0 5762

ADT Not Calculated

CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State: Rochester, NH

Location: N. Main Street @ Washington St

Counter#/Counted By: B. FRENCH

Weather: Clear, 30's

File Name : AM-N.Main&Washington

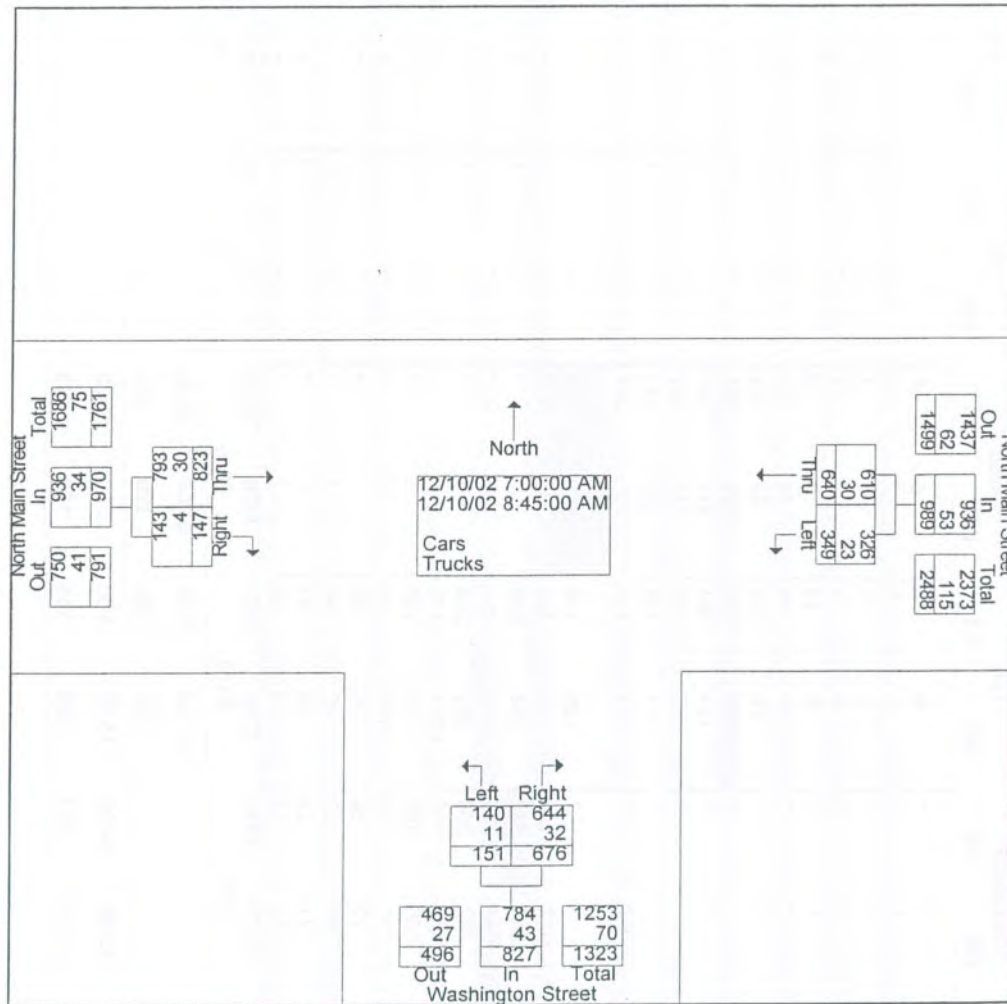
Site Code : 00020402

Start Date : 12/10/2002

Page No : 1

Groups Printed- Cars - Trucks

Start Time	North Main Street Westbound		Washington Street Northbound		North Main Street Eastbound		Int. Total
	Left	Thru	Left	Right	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
07:00	61	56	12	88	65	24	306
07:15	62	133 71	22	101	85	15	356
07:30	39	66	18	84	98	16	321
07:45	41	80	20	90	125	556 14	370
Total	203	476 273	72	435 363	373	442 69	1353
08:00	37	82	15	99	105	25	363
08:15	33	84	25	91	111	23	367
08:30	47	102	22	62	111	15	359
08:45	29	99	17	61	123	15	344
Total	146	367	79	313	450	78	1433
Grand Total	349	640	151	676	823	147	2786
Apprch %	35.3	64.7	18.3	81.7	84.8	15.2	
Total %	12.5	23.0	5.4	24.3	29.5	5.3	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH

Location:Washington St & Walnut

Counter#/Counted By:2536 (R.Ricard)

Weather:Clear, 30's

File Name : AM-Washington St&Walnut

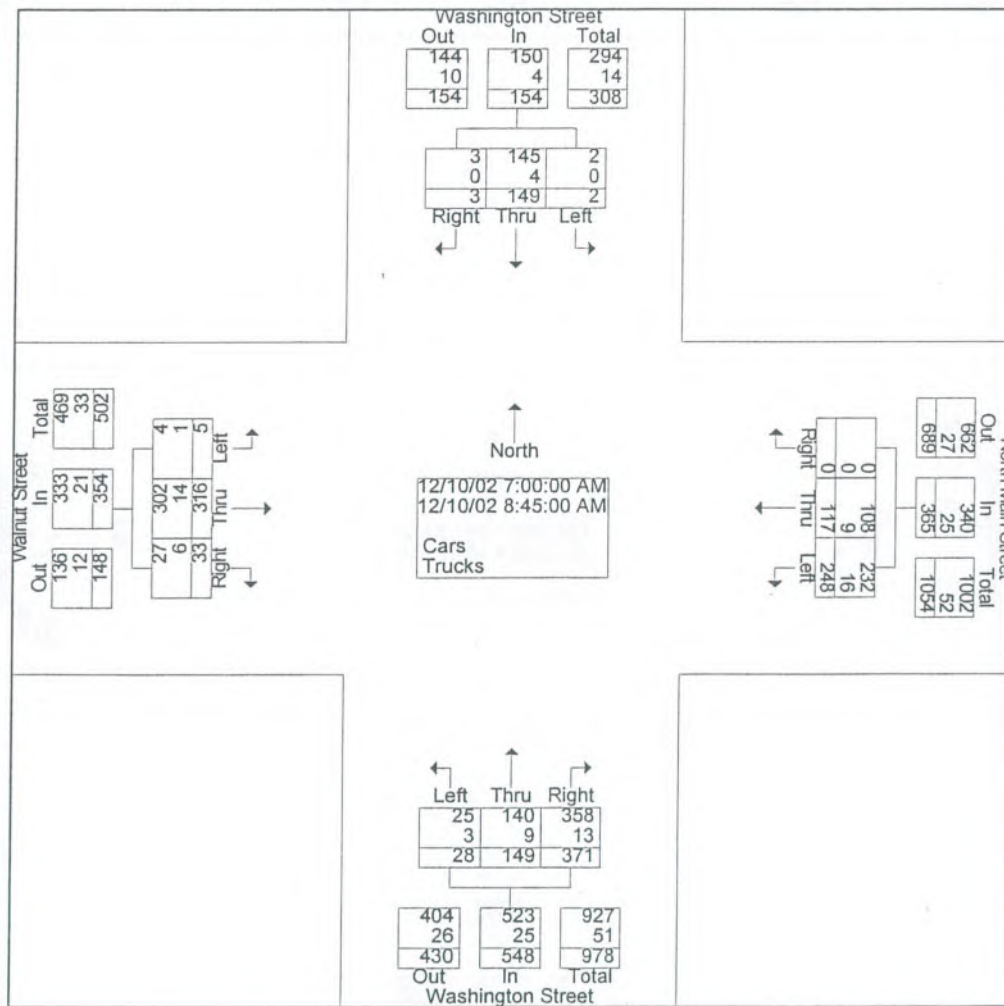
Site Code : 00020402

Start Date : 12/10/2002

Page No : 1

Groups Printed- Cars - Trucks

	Washington Street Southbound			North Main Street Westbound			Washington Street Northbound			Walnut Street Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00	0	27	1	61	11	0	5	15	60	1	47	4	232
07:15	1	15	0	44	17	0	5	21	55	1	44	5	208
07:30	0	15	0	24	16	0	2	19	44	1	39	4	164
07:45	0	15	0	27	15	0	4	18	51	0	40	5	175
Total	1	72	1	156	59	0	16	73	210	3	170	18	779
08:00	0	24	0	18	18	0	1	16	52	0	45	4	178
08:15	0	23	0	18	15	0	3	23	45	1	42	3	173
08:30	1	15	1	37	11	0	6	20	35	0	25	5	156
08:45	0	15	1	19	14	0	2	17	29	1	34	3	135
Total	1	77	2	92	58	0	12	76	161	2	146	15	642
Grand Total	2	149	3	248	117	0	28	149	371	5	316	33	1421
Apprch %	1.3	96.8	1.9	67.9	32.1	0.0	5.1	27.2	67.7	1.4	89.3	9.3	
Total %	0.1	10.5	0.2	17.5	8.2	0.0	2.0	10.5	26.1	0.4	22.2	2.3	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH

Location:N.Main Street @ Jackson St

Counter#/Counted By: B.FRENCH

Weather:Clear, 30's

File Name : AM-N.Main&Jackson

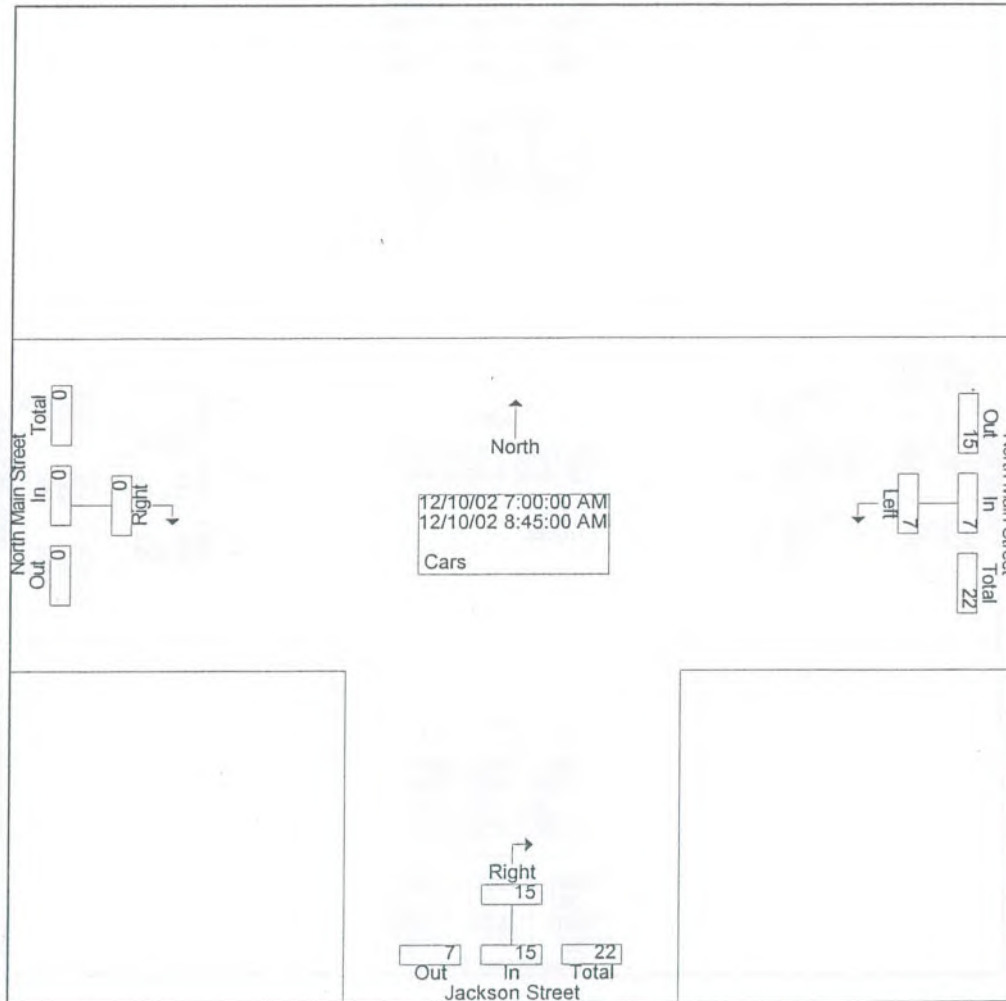
Site Code : 00020402

Start Date : 12/10/2002

Page No : 1

Groups Printed- Cars

	North Main Street Westbound	Jackson Street Northbound	North Main Street Eastbound			
Start Time	Left	Left	Right	Right	Exclu. Total	Inclu. Total
Factor	1.0	1.0	1.0	1.0		
07:00	0	0	3	0	0	3
07:15	1	0	1	0	0	2
*** BREAK ***						
07:45	1	0	0	0	0	1
Total	2	0	4	0	0	6
08:00	1	0	1	0	0	2
08:15	2	0	8	0	0	10
08:30	2	2	2	0	2	4
*** BREAK ***						
Total	5	2	11	0	2	16
Grand Total	7	2	15	0	2	22
Apprch %	100.0		100.0	0.0		
Total %	31.8		68.2	0.0	8.3	91.7



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH
Location:Washington St&Roy
Counter#/Counted By:1932 (J.Marchese)
Weather:Clear, 30's

File Name : AM-Washington&Roy

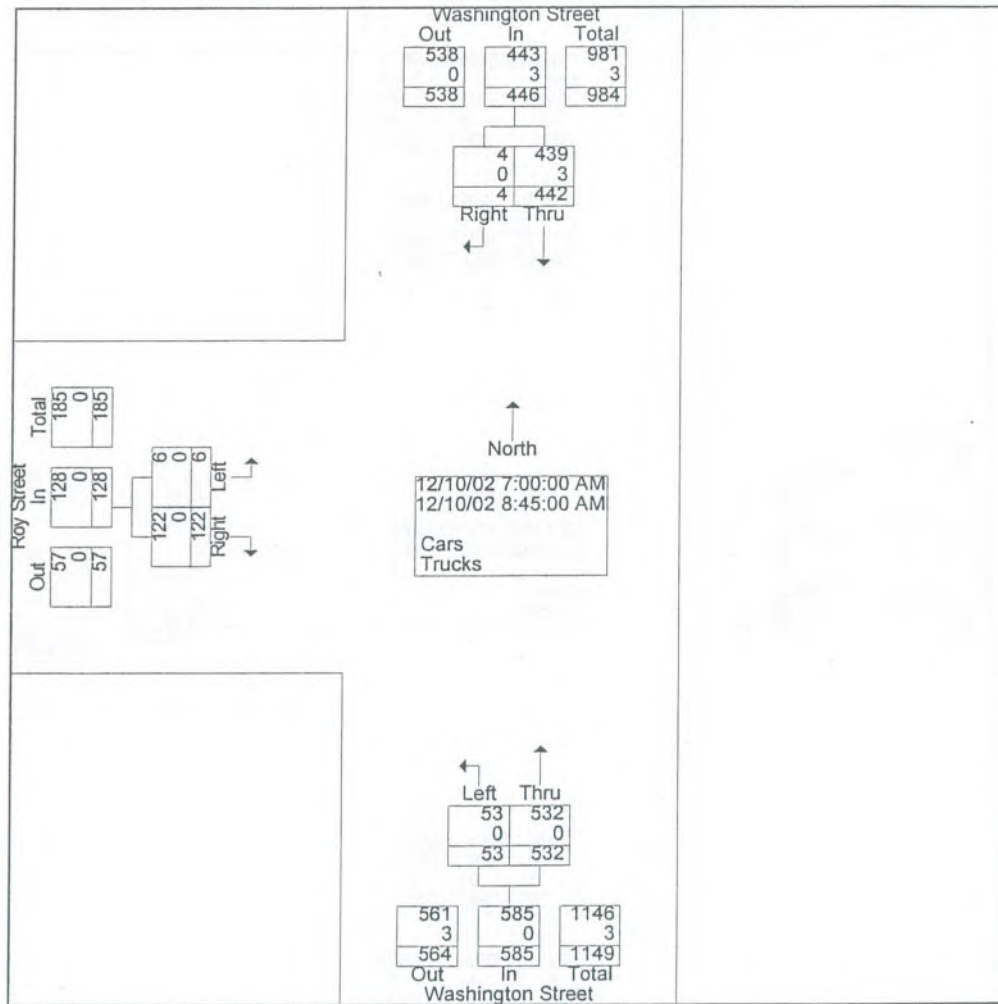
Site Code : 00020402

Start Date : 12/10/2002

Page No : 1

Groups Printed- Cars - Trucks

	Washington Street Southbound		Washington Street Northbound		Roy Street Eastbound		Int. Total
Start Time	Thru	Right	Left	Thru	Left	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
07:00	91	0	4	75	0	17	187
07:15	68	0	7	83	0	11	169
07:30	40	0	4	62	0	19	125
07:45	53	0	4	72	2	17	148
Total	252	0	19	292	2	66	629
08:00	50	1	10	63	1	18	143
08:15	50	0	12	66	0	20	148
08:30	53	3	7	64	2	10	139
08:45	37	0	5	47	1	10	100
Total	190	4	34	240	4	58	530
Grand Total	442	4	53	532	6	122	1159
Apprch %	99.1	0.9	9.1	90.9	4.7	95.3	
Total %	38.1	0.3	4.6	45.9	0.5	10.5	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State: Rochester, NH
Location: Washington St & Brock Street
Counter#/Counted By: 1930 (H. Carlson)
Weather: Clear, 30's

File Name : AM-Washington St&Brock

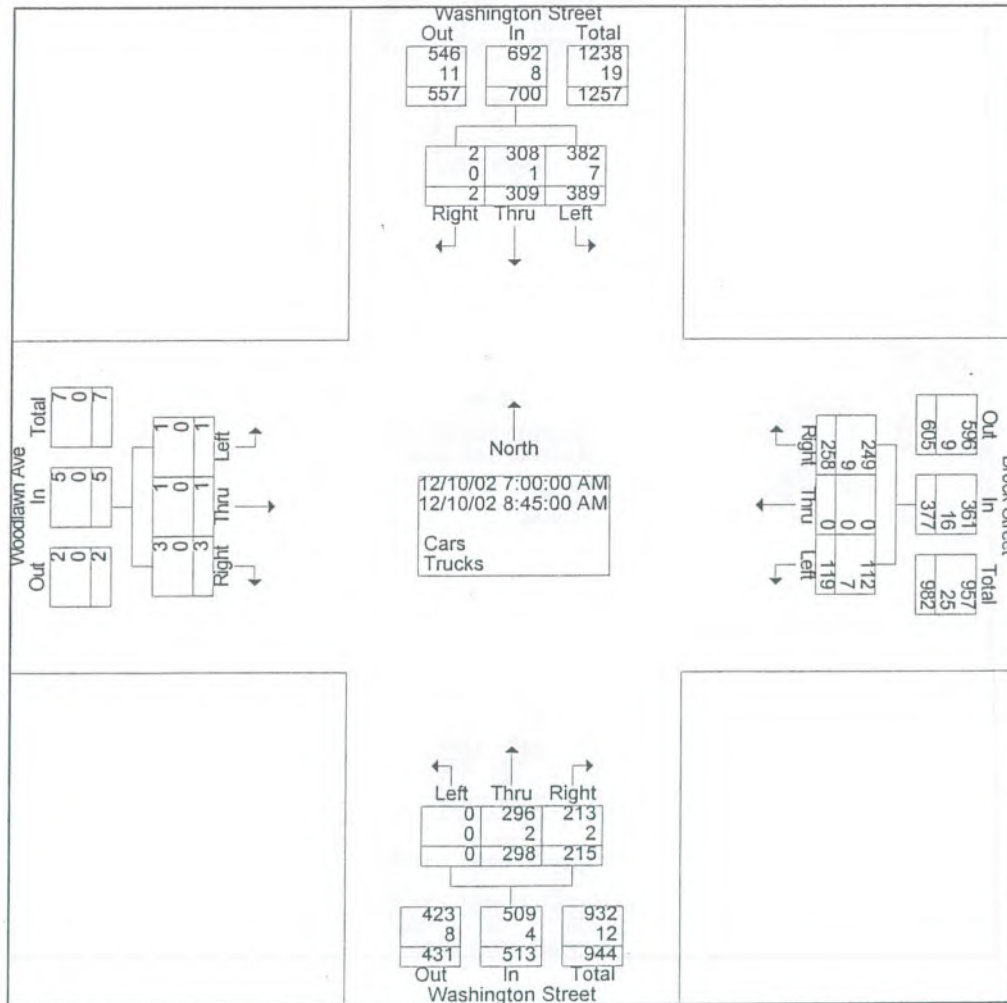
Site Code : 00020402

Start Date : 12/10/2002

Page No : 1

Groups Printed- Cars - Trucks

	Washington Street Southbound				Brock Street Westbound				Washington Street Northbound				Woodlawn Ave Eastbound				Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00	91	32	0	4	26	0	39	0	0	37	42	0	0	0	1	0	4	268	272
07:15	58	45	1	1	21	0	49	0	0	30	28	0	0	0	0	0	1	232	233
07:30	27	54	0	0	15	0	22	0	0	44	22	0	0	0	0	0	0	184	184
07:45	39	43	1	1	8	0	20	0	0	54	27	1	0	0	1	0	2	193	195
Total	215	174	2	6	70	0	130	0	0	165	119	1	0	0	2	0	7	877	884
	389	0.79			200	0.71				285	0.83								
08:00	52	37	0	2	15	0	45	0	0	43	32	0	0	0	1	0	2	225	227
08:15	66	34	0	1	13	0	41	0	0	40	28	0	1	1	0	0	1	224	225
08:30	33	32	0	0	9	0	30	0	0	26	19	0	0	0	0	0	0	149	149
08:45	23	32	0	0	12	0	12	0	0	24	17	0	0	0	0	0	0	120	120
Total	174	135	0	3	49	0	128	0	0	133	96	0	1	1	1	0	3	718	721
Grand Total	389	309	2	9	119	0	258	0	0	298	215	1	1	1	3	0	10	1595	1605
Apprch %	55.6	44.1	0.3		31.6	0.0	68.4		0.0	58.1	41.9		20.0	20.0	60.0				
Total %	24.4	19.4	0.1		7.5	0.0	16.2		0.0	18.7	13.5		0.1	0.1	0.2		0.6	99.4	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH

Location:Washington & Rte 16 NB

Counter#/Counted By:1930 (D.Morrill)

Weather:Cloudy, 30's

File Name : AM-Washington St&Rte 16 NB

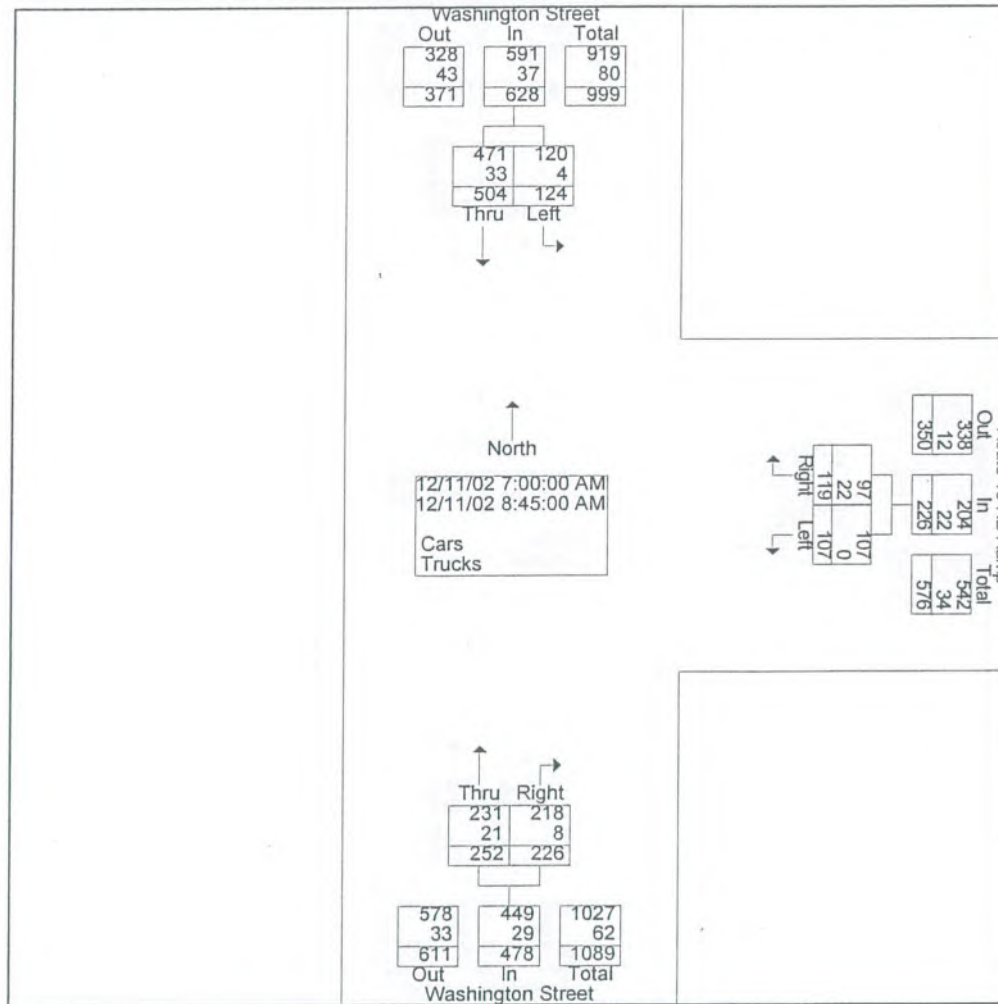
Site Code : 00020402

Start Date : 12/11/2002

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Groups Printed- Cars - Trucks

	Washington Street Southbound		Route 16 NB Ramp Westbound			Washington Street Northbound				
Start Time	Left	Thru	Left	Right		Thru	Right		Int. Total	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00	21	101	80	17	8	25	33		184	
07:15	21		69	14	34	20	44	78	34	202
07:30	16	0.87	58	10	0.81	17	31	0.83	41	173
07:45	13		75	13		21	26		25	173
Total	71	353	282	54	110	66	126	259	133	732
08:00	8		66	23		11	27		33	168
08:15	20		54	7		13	38		31	163
08:30	14		49	15		17	32		16	143
08:45	11		53	8		12	29		13	126
Total	53		222	53		53	126		93	600
Grand Total	124		504	107		119	252		226	1332
Apprch %	19.7		80.3	47.3		52.7	52.7		47.3	
Total %	9.3		37.8	8.0		8.9	18.9		17.0	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH
Location:Washington St @ Rte 16 SB
Counter#/Counted By:2537 (S.Mauzy)
Weather:Cloudy, 30's

File Name : AM-Washington St&Rt 16 SB

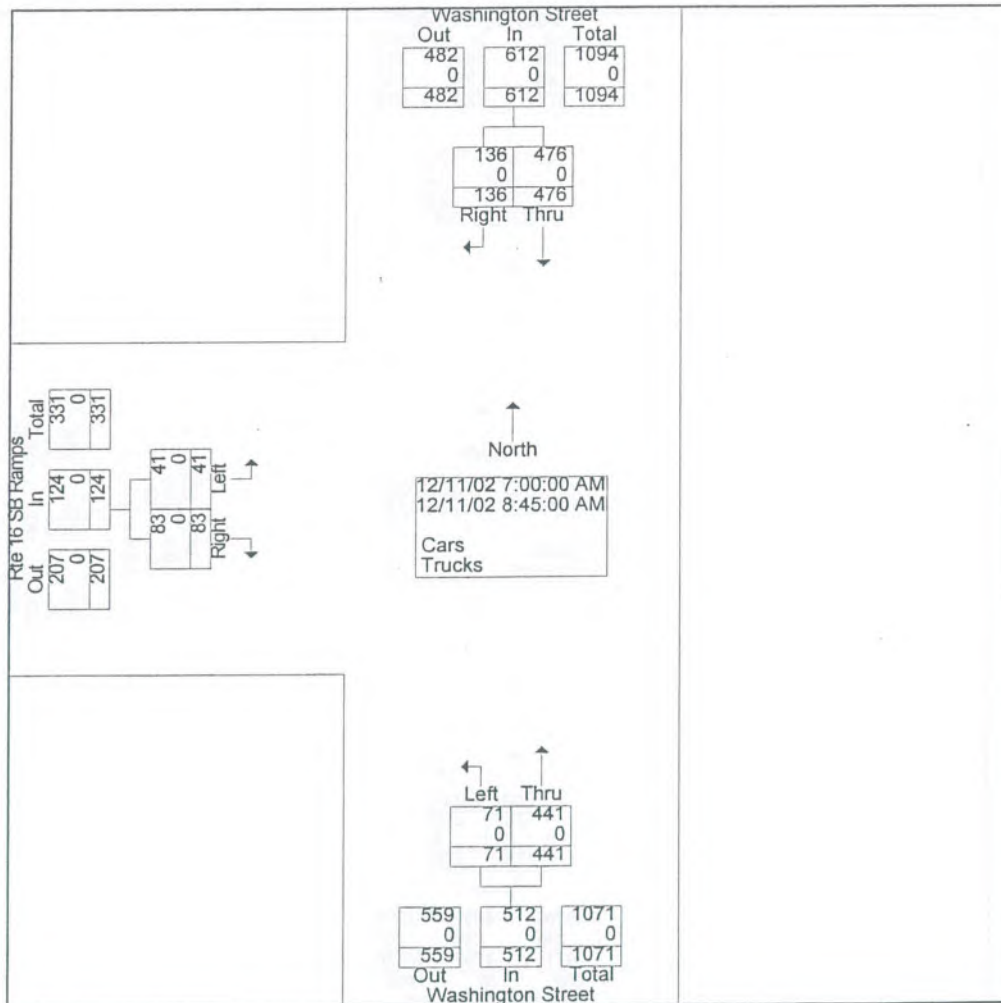
Site Code : 00020402

Start Date : 12/11/2002

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Groups Printed- Cars - Trucks

Start Time	Washington Street Southbound		Washington Street Northbound		Rte 16 SB Ramps Eastbound		Int. Total
	Thru	Right	Left	Thru	Left	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
07:00	79	94	15	12	57	2	173
07:15	73		14	14	33	8	188
07:30	51	0.89	18	7	0.86	4	153
07:45	63		22	11		15	164
Total	266	335	69	44	205	241	678
08:00	73		17	10		55	173
08:15	53		8	3		63	145
08:30	41		22	9		45	129
08:45	43		20	5		37	123
Total	210	67	27	200	20	46	570
Grand Total	476	136	71	441	41	83	1248
Apprch %	77.8	22.2	13.9	86.1	33.1	66.9	
Total %	38.1	10.9	5.7	35.3	3.3	6.7	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH

Location:Washington St&Hussey Hill

Counter#/Counted By:2537 (B.French)

Weather:Clear, 30's, possible icy spots

File Name : AM-Route 202& Hussey Hill

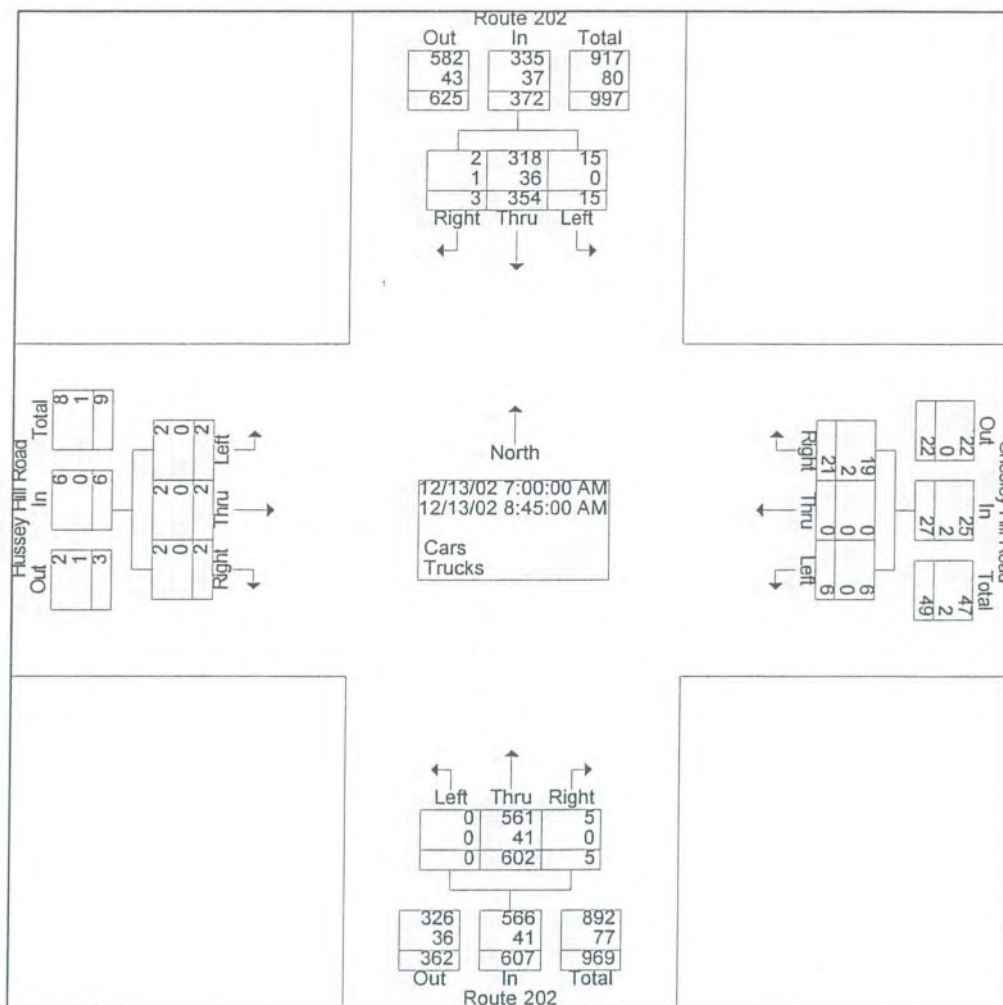
Site Code : 00020402

Start Date : 12/13/2002

Page No : 1

Groups Printed- Cars - Trucks

Start Time	Route 202 Southbound			Chesley Hill Road Westbound			Route 202 Northbound			Hussey Hill Road Eastbound			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00	0	47	0	1	0	6	0	86	1	0	1	1	143
07:15	5	52	47	0	0	3	0	78	2	0	0	0	135
07:30	2	40	0	2	0	2	0	67	0	0	0	0	113
07:45	1	39	0	2	0	1	0	105	1	1	0	0	150
Total	8	181	0.87	5	0.6	12	0	336	4	1	0.75	1	541
08:00	1	36	1	0	0	1	0	71	1	0	0	0	111
08:15	3	53	1	0	0	7	0	96	0	1	0	0	161
08:30	1	46	1	0	0	1	0	56	0	0	1	0	106
08:45	2	46	0	1	0	0	0	43	0	0	0	1	93
Total	7	181	3	1	0	9	0	266	1	1	1	1	471
Grand Total	15	354	3	6	0	21	0	602	5	2	2	2	1012
Apprch %	4.0	95.2	0.8	22.2	0.0	77.8	0.0	99.2	0.8	33.3	33.3	33.3	
Total %	1.5	35.0	0.3	0.6	0.0	2.1	0.0	59.5	0.5	0.2	0.2	0.2	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State: Rochester, NH

Location: Route 202&Estes

Counter#/Counted By: 1932 (J.Stone)

Weather: Clear, 30's, patchy ice

File Name : AM-Route 202&Estes

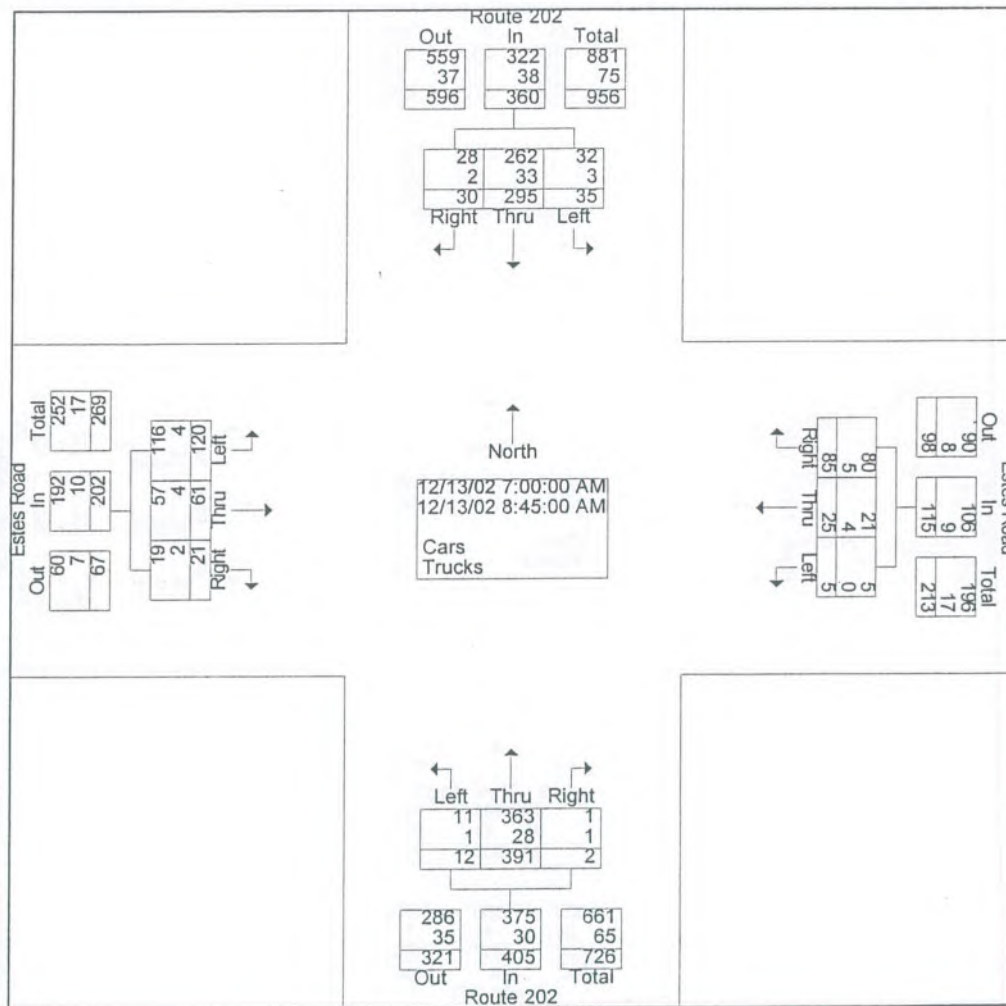
Site Code : 00020402

Start Date : 12/13/2002

Page No : 1

Groups Printed- Cars - Trucks

	Route 202 Southbound			Estes Road Westbound			Route 202 Northbound			Estes Road Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00	6	53	44	3	2	21	2	56	0	16	32	10	163
07:15	5	32	5	0	3	11	2	55	0.91	17	6	0.88	138
07:30	4	35	5	1	4	6.80	0	44	2	12	12	5	130
07:45	1	30	0.83	6	2	3	16	2	70	12	0	17	156
Total	16	176	141	19	5	67	12	225	232	2	62	37	587
08:00	4	36	2	0	4	14	3	46	0	12	6	4	131
08:15	5	40	4	0	3	11	1	52	0	28	5	1	150
08:30	3	43	2	0	2	3	3	41	0	11	7	2	117
08:45	7	35	3	0	4	7	0	27	0	7	6	1	97
Total	19	154	11	0	13	35	7	166	0	58	24	8	495
Grand Total	35	295	30	5	25	85	12	391	2	120	61	21	1082
Apprch %	9.7	81.9	8.3	4.3	21.7	73.9	3.0	96.5	0.5	59.4	30.2	10.4	
Total %	3.2	27.3	2.8	0.5	2.3	7.9	1.1	36.1	0.2	11.1	5.6	1.9	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH

Location:Route 202&Dry Hill/Oak

Counter#/Counted By:1930 (H.Carlson)

Weather:Clear, 30's, icy patches

File Name : AM-Route 202&Dry Hill

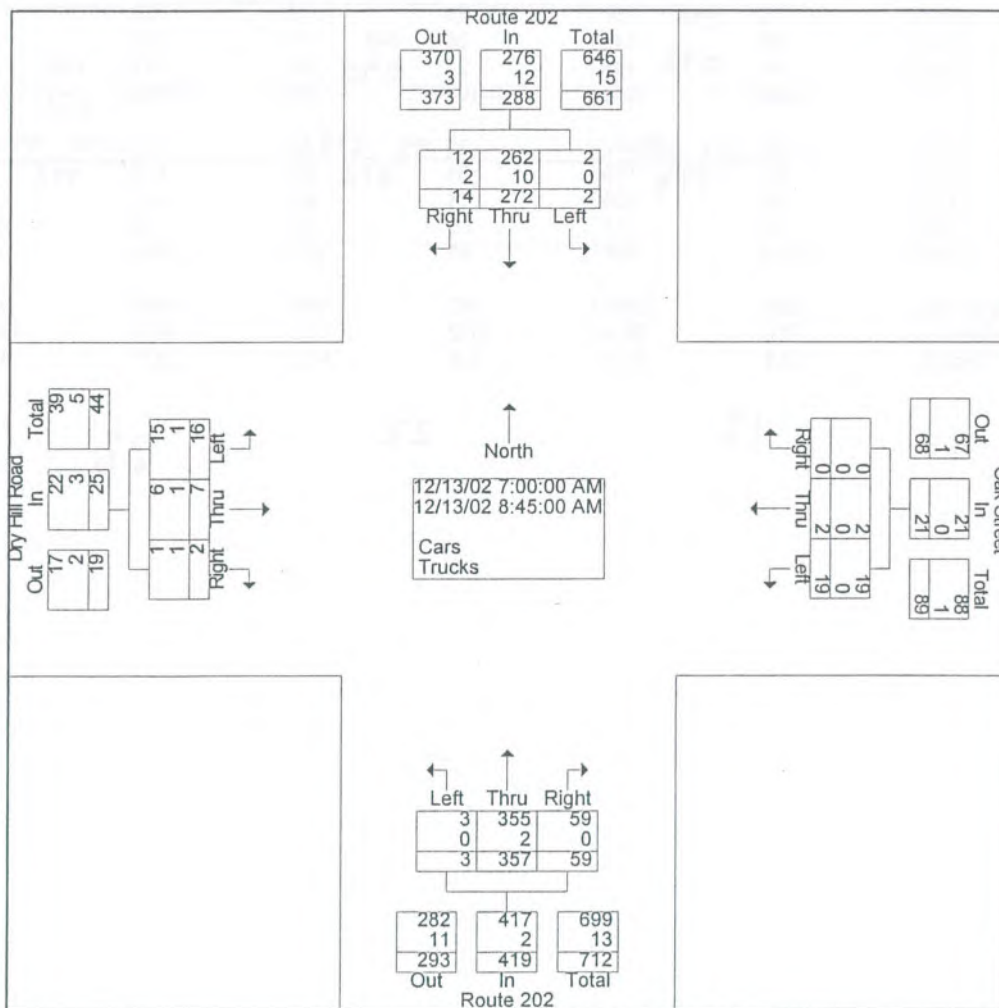
Site Code : 00020402

Start Date : 12/13/2002

Page No : 1

Groups Printed- Cars - Trucks

	Route 202 Southbound			Oak Street Westbound			Route 202 Northbound			Dry Hill Road Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00	1	39	2	2	0	0	0	46	5	4	2	0	101
07:15	0	25	3	4	2	0	0	51	10	2	0	1	98
07:30	1	36	3	5	0	0	0	45	10	3	3	1	107
07:45	0	36	2	2	0	0	0	65	13	0	0	0	118
Total	2	136	10	13	2	0	0	207	38	9	5	2	424
08:00	0	31	0	2	0	0	0	42	11	1	0	0	87
08:15	0	38	3	1	0	0	2	52	3	2	1	0	102
08:30	0	39	0	2	0	0	0	29	1	1	1	0	73
08:45	0	28	1	1	0	0	1	27	6	3	0	0	67
Total	0	136	4	6	0	0	3	150	21	7	2	0	329
Grand Total	2	272	14	19	2	0	3	357	59	16	7	2	753
Apprch %	0.7	94.4	4.9	90.5	9.5	0.0	0.7	85.2	14.1	64.0	28.0	8.0	
Total %	0.3	36.1	1.9	2.5	0.3	0.0	0.4	47.4	7.8	2.1	0.9	0.3	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH
 Location:Washington St&N.Main St
 Counter#/Counted By:2537
 Weather:Clear, 30's

File Name : PM-N.Main&Washington

Site Code : 00020308

Start Date : 12/09/2002

Page No : 1

Groups Printed- Cars - Trucks

Start Time	North Main Street Westbound		Washington Street Northbound		North Main Street Eastbound		Int. Total
	Left	Thru	Left	Right	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
13:45	41	74	11	52	95	21	294
Total	41	74	11	52	95	21	294
14:00	84	104	18	44	104	17	371
14:15	79	115	27	73	115	25	434
14:30	90	140	24	64	118	8	444
14:45	85	144	20	71	108	13	441
Total	338	503	89	252	445	63	1690
15:00	71	124	23	47	129	14	408
15:15	78	146	32	66	107	12	441
*** BREAK ***							
Total	149	270	55	113	236	26	849
16:00	77	174	34	72	102	12	471
16:15	113	270	23	70	106	18	487
16:30	98	142	26	103	129	27	499
16:45	97	0.92 146	21	0.90 67	143	165 22	496
Total	385	619	104	286	480	79 0.90	1953
17:00	102	410 587 142	29	99 273 59	120	490 94 27	479
17:15	83	997 149	31	372 59	118	572 13	453
17:30	53	126	14	63	87	14	357
17:45	56	117	19	56	69	26	343
Total	294	534	93	237	394	80	1632
Grand Total	1207	2000	352	940	1650	269	6418
Apprch %	37.6	62.4	27.2	72.8	86.0	14.0	
Total %	18.8	31.2	5.5	14.6	25.7	4.2	

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CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH

Location:Washington&Walnut

Counter#/Counted By:1888 (A.Sanders)

Weather:Clear, 30's

File Name : PM-Washington&Walnut

Site Code : 00020402

Start Date : 12/09/2002

Page No : 1

Groups Printed- Cars - Trucks

	Washington Street Southbound			North Main Street Westbound			Washington Street Northbound			Walnut Street Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
13:45	0	19	0	24	13	0	2	14	48	0	29	7	156
Total	0	19	0	24	13	0	2	14	48	0	29	7	156
14:00	0	18	1	56	25	0	3	17	29	2	18	2	171
14:15	0	25	0	51	22	0	2	28	46	0	30	1	205
14:30	0	13	0	47	36	0	2	23	43	0	29	6	199
14:45	0	18	0	44	35	0	4	22	52	0	23	2	200
Total	0	74	1	198	118	0	11	90	170	2	100	11	775
15:00	0	15	0	34	34	0	10	23	33	1	20	6	176
15:15	0	12	0	41	37	0	4	35	38	1	31	3	202
*** BREAK ***													
Total	0	27	0	75	71	0	14	58	71	2	51	9	378
16:00	1	10	1	36	41	0	6	33	41	0	34	0	203
16:15	0	20	0	53	59	112	3	22	50	2	21	8	238
16:30	0	25	2	55	34	0	8	25	44	1	36	43	236
16:45	0	18	0.81	41	55	0.88	4	20	0.92	0	27	4	215
Total	1	73	30	185	189	0	21	100	179	3	118	0.76	892
17:00	0	29	92	49	178	48	9	24	82	0	3	22	235
17:15	0	14	97	42	44	395	7	32	302	3	23	130	205
17:30	0	16	0	27	29	0	6	15	47	0	26	1	167
17:45	1	13	1	24	27	1	3	18	32	0	24	2	146
Total	1	72	2	142	148	2	25	92	164	3	95	7	753
Grand Total	2	265	8	624	539	2	73	354	632	10	393	52	2954
Apprch %	0.7	96.4	2.9	53.6	46.3	0.2	6.9	33.4	59.7	2.2	86.4	11.4	
Total %	0.1	9.0	0.3	21.1	18.2	0.1	2.5	12.0	21.4	0.3	13.3	1.8	

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CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH
Location:Jackson St @ N.Main St
Counter#/Counted By:2537
Weather:Clear, 30's

File Name : PM-N.Main&Jackson

Site Code : 00020308

Start Date : 12/09/2002

Page No : 1

Groups Printed- Cars

	North Main Street Westbound	Jackson Street Northbound		North Main Street Eastbound		Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Left	Right	Right				
Factor	1.0	1.0	1.0	1.0				
13:45	0	0	1	0		0	1	1
Total	0	0	1	0		0	1	1
14:00	1	0	0	0		0	1	1
14:15	1	0	0	0		0	1	1
14:30	2	0	0	0		0	2	2
14:45	0	1	1	1		1	2	3
Total	4	1	1	1		1	6	7
15:00	1	0	2	0		0	3	3
15:15	3	0	1	0		0	4	4
*** BREAK ***								
Total	4	0	3	0		0	7	7
16:00	4	1	2	0		1	6	7
16:15	1	0	0	0		0	1	1
16:30	2	1	2	0		1	4	5
16:45	0	0	1	0		0	1	1
Total	7	2	5	0		2	12	14
17:00	2	0	1	1		0	4	4
17:15	3	0	2	0		0	5	5
17:30	0	0	1	0		0	1	1
17:45	2	1	2	1		1	5	6
Total	7	1	6	2		1	15	16
Grand Total	22	4	16	3		4	41	45
Apprch %	100.0		100.0	100.0				
Total %	53.7		39.0	7.3		8.9	91.1	

CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH
 Location:Washington St&Roy
 Counter#/Counted By:2324 (J.Danis)
 Weather:Clear, 30's

File Name : PM-Washington St&Roy

Site Code : 00020402

Start Date : 12/09/2002

Page No : 1

Groups Printed- Cars - Trucks

Start Time	Washington Street Southbound		Washington Street Northbound		Roy Street Eastbound		Int. Total
	Thru	Right	Left	Thru	Left	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
13:45	54	2	6	72	1	1	136
Total	54	2	6	72	1	1	136
14:00	77	3	9	47	1	4	141
14:15	77	2	12	77	0	11	179
14:30	61	2	10	69	0	4	146
14:45	62	1	10	67	2	12	154
Total	277	8	41	260	3	31	620
15:00	57	0	18	67	2	9	153
15:15	52	0	21	72	1	5	151
15:30	0	0	0	6	0	0	6
15:45	62	0	32	103	0	9	206
Total	171	0	71	248	3	23	516
16:00	45	6	28	82	0	9	170
16:15	81	0	20	82	0	15	198
16:30	83	86 3	24	72	1	6	189
16:45	64	0.91 0	16	0.93 71	2	0.70 9	162
Total	273	9	88	307	3	39	719
17:00	83	311 3 0	16	76 314 89	0	3 39 9	197
17:15	59	314 2	20	390 74	1	42 8	164
17:30	46	1	16	65	1	9	138
17:45	43	0	10	55	0	7	115
Total	231	3	62	283	2	33	614
Grand Total	1006	22	268	1170	12	127	2605
Apprch %	97.9	2.1	18.6	81.4	8.6	91.4	
Total %	38.6	0.8	10.3	44.9	0.5	4.9	

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CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State: Rochester, NH

Location: Washington Street & Brock St

Counter#/Counted By: 1932 (S.Bourcier)

Weather: Clear, 30's

File Name : PM-Washington&Brock

Site Code : 00020402

Start Date : 12/09/2002

Page No : 1

Groups Printed- Cars - Trucks

Start Time	Washington Street Southbound				Brock Street Westbound				Washington Street Northbound				Woodlawn Ave Eastbound				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
13:45	30	30	0	2	12	0	29	0	0	36	19	0	0	0	0	0	158
Total	30	30	0	2	12	0	29	0	0	36	19	0	0	0	0	0	158
14:00	46	40	1	1	12	1	29	0	1	31	17	0	0	0	0	0	179
14:15	54	41	0	0	19	0	73	0	0	37	19	22	0	0	0	0	265
14:30	38	38	0	1	18	0	51	0	1	34	32	23	0	1	0	0	237
14:45	57	28	1	0	25	0	29	0	0	44	25	4	1	0	0	0	214
Total	195	147	2	2	74	1	182	0	2	146	93	49	1	1	0	0	895
15:00	37	60	0	0	34	1	76	0	0	41	23	4	0	0	0	0	276
15:15	27	28	0	0	17	1	50	0	0	44	21	6	0	0	0	0	194
*** BREAK ***																	
15:45	45	28	0	0	20	0	72	0	3	87	32	0	0	0	0	0	287
Total	109	116	0	0	71	2	198	0	3	172	76	10	0	0	0	0	757
16:00	29	38	0	0	27	0	70	0	1	54	16	0	0	0	0	0	235
16:15	46	55	0	0	17	0	43	0	2	77	37	116	2	0	2	0	281
16:30	39	48	0.90	0	21	0.60	42	0	1	61	32	1	0	0	0	0	245
16:45	32	48	0	0	24	0	37	0	0	62	34	0.86	0	0	0	0	239
Total	146	189	0	0	89	0	192	0	4	254	149	3	2	0	2	0	1000
17:00	43	61	2	1	39	0	51	1	3	67	28	1	0	0	0	0	292
17:15	25	42	0	0	19	0	55	0	3	61	19	0	0	0	0	0	224
17:30	25	39	0	0	25	1	27	0	0	53	12	0	0	0	0	0	182
Grand Total	573	624	3	6	329	4	734	0	12	789	366	62	3	1	2	0	3508
Apprch %	47.5	51.7	0.2	0.5	30.8	0.4	68.8	0.0	1.0	64.2	29.8	5.0	50.0	16.7	33.3	0.0	
Total %	16.3	17.8	0.1	0.2	9.4	0.1	20.9	0.0	0.3	22.5	10.4	1.8	0.1	0.0	0.1	0.0	

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CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH
Location:Washington St & Route 16 NB
Counter#/Counted By:1932 (L.Perry)
Weather:Cloudy, 30's

File Name : PM-Washington&Rte 16 NB

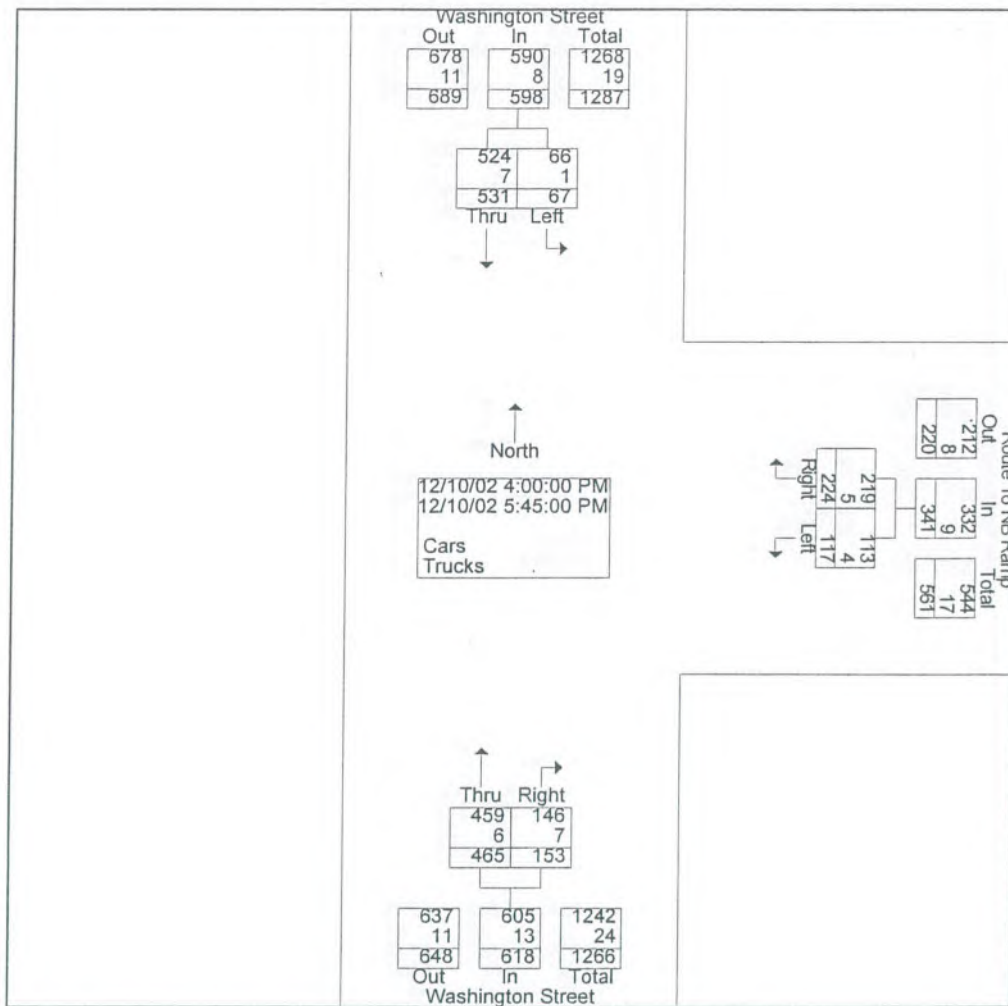
Site Code : 00020402

Start Date : 12/10/2002

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Groups Printed- Cars - Trucks

	Washington Street Southbound		Route 16 NB Ramp Westbound		Washington Street Northbound		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
16:00	6	67	16	30	57	12	188
16:15	4	67	11	27	63	24	196
16:30	6	62	18	47	63	90	205
16:45	6	76	8	30	61	0.98	199
Total	22	0.97 266	53	0.84 116	244	87	788
17:00	15	31 265 66	12	49 109 23	71	253 94 19	206
17:15	17	296 80	14	158 25	48	352 15	199
17:30	6	56	20	38	67	17	204
17:45	7	63	18	22	35	15	160
Total	45	176 265	64	4% 108	221	0% 66	769
Grand Total	67	531	117	224	465	153	1557
Apprch %	11.2	88.8	34.3	65.7	75.2	24.8	
Total %	4.3	34.1	7.5	14.4	29.9	9.8	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State:Rochester, NH
Location:Washington St & Rte 16 SB
Counter#/Counted By:2536(R.Ricard)
Weather:Cloudy, 30's

File Name : PM-Washington St&Rte 16 SB

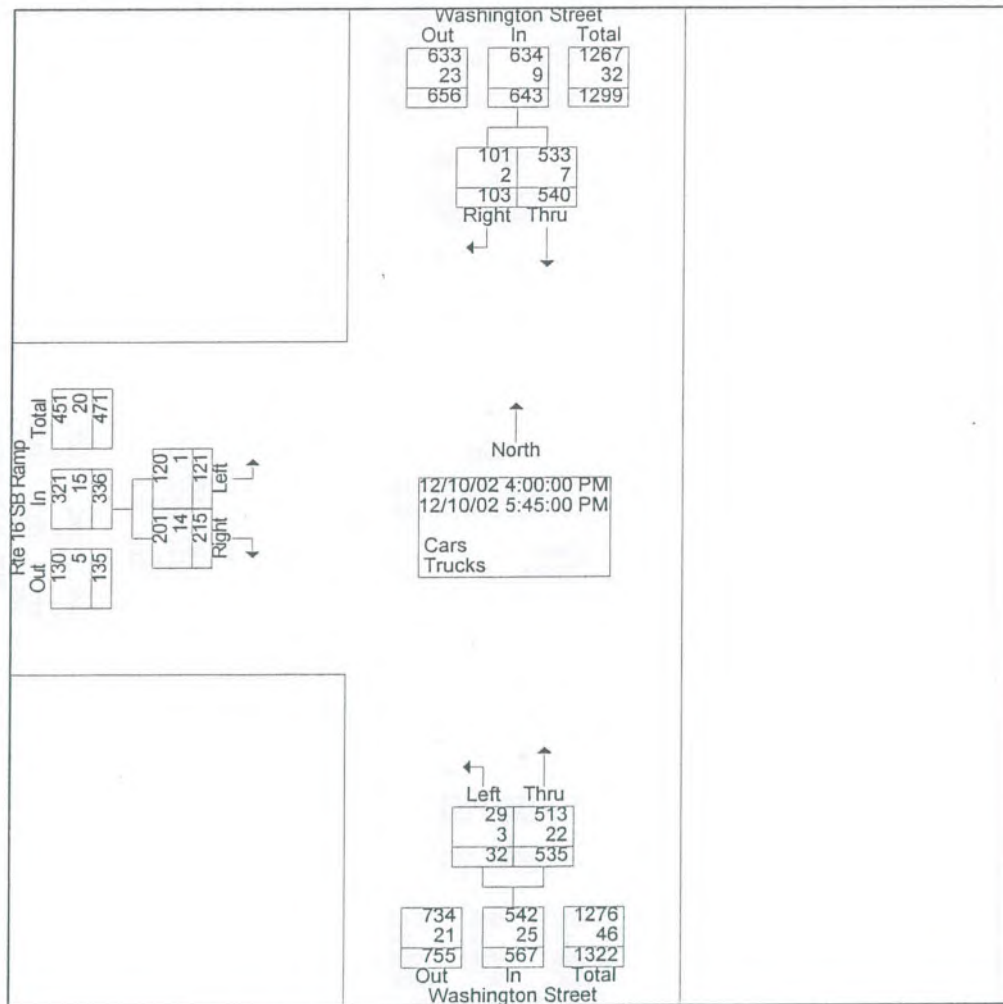
Site Code : 00020402

Start Date : 12/10/2002

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Groups Printed- Cars - Trucks

Start Time	Washington Street Southbound		Washington Street Northbound		Rte 16 SB Ramp Eastbound		Int. Total
	Thru	Right	Left	Thru	Left	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
16:00	65	17	2	80	15	33	212
16:15	57	20	6	82 76	18	17	194
16:30	70	82 12	4	73	16	26	201
16:45	65	12	3	77	15	0.93 24	196
Total	257	0.95 61	15	0.93 306	54	50 100	803
17:00	67	259 54 10	2	15 290 64	24	73 93 26	193
17:15	80	313 13	7	305 52	12	166 33	197
17:30	71	9	5	66	15	29	195
17:45	65	10	3	47	6	27	158
Total	283	1% 42	17	5% 229	57	5% 115	743
Grand Total	540	103	32	535	121	215	1546
Apprch %	84.0	16.0	5.6	94.4	36.0	64.0	
Total %	34.9	6.7	2.1	34.6	7.8	13.9	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State: Rochester, NH

Location: Rte 202 & Hussey/Chesley

Counter#/Counted By: 2537 (L. Means)

Weather: Cloudy, 30's

File Name : PM-Route 202 & Hussey Hill

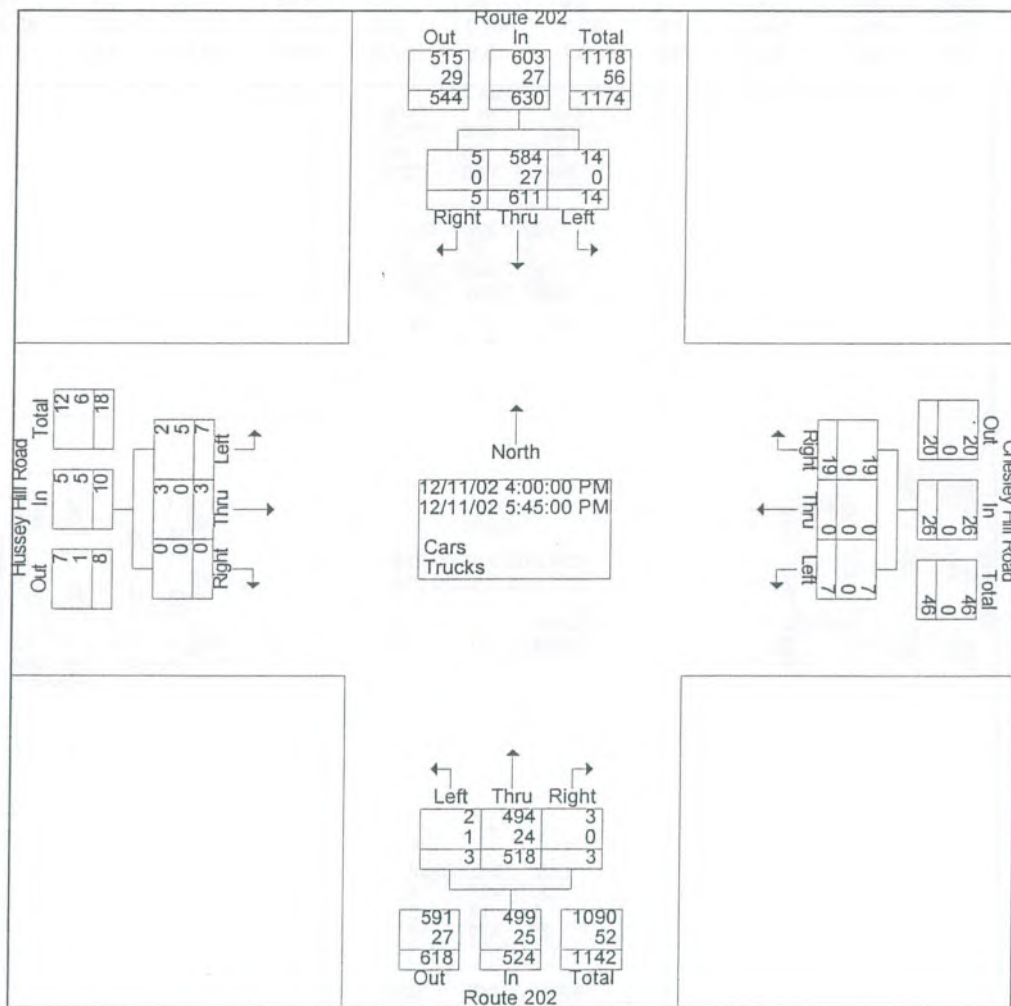
Site Code : 00020402

Start Date : 12/11/2002

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Groups Printed- Cars - Trucks

Start Time	Route 202 Southbound			Chesley Hill Road Westbound			Route 202 Northbound			Hussey Hill Road Eastbound			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
16:00	2	83	1	1	0	4	0	57	0	0	1	0	149
16:15	3	79	1	0	0	2	0	85	0	0	0	0	170
16:30	1	83	0	2	0	4	1	69	0	1	0	0	161
16:45	0	64	1	1	0	2	0	72	0	1	0	0	141
Total	6	309	3	4	0	12	1	283	0	2	1	0	621
		93			6						3		
17:00	4	89	2	14	0	10	0	54	1	2	1	0	154
17:15	0	77	1	0	0	2	0	56	0	2	5	1	139
17:30	2	66	1	2	0	1	2	66	1	1	0	0	142
17:45	2	70	0	0	0	2	0	59	1	0	0	0	134
Total	8	302	2	3	0	7	2	235	3	5	2	0	569
		56			0								
Grand Total	14	611	5	7	0	19	3	518	3	7	3	0	1190
Apprch %	2.2	97.0	0.8	26.9	0.0	73.1	0.6	98.9	0.6	70.0	30.0	0.0	
Total %	1.2	51.3	0.4	0.6	0.0	1.6	0.3	43.5	0.3	0.6	0.3	0.0	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State: Rochester, NH
Location: Route 202 & Estes
Counter#/Counted By: 2324 (J.Danis)
Weather: Cloudy, 30's

File Name : PM-Route 202 & Estes

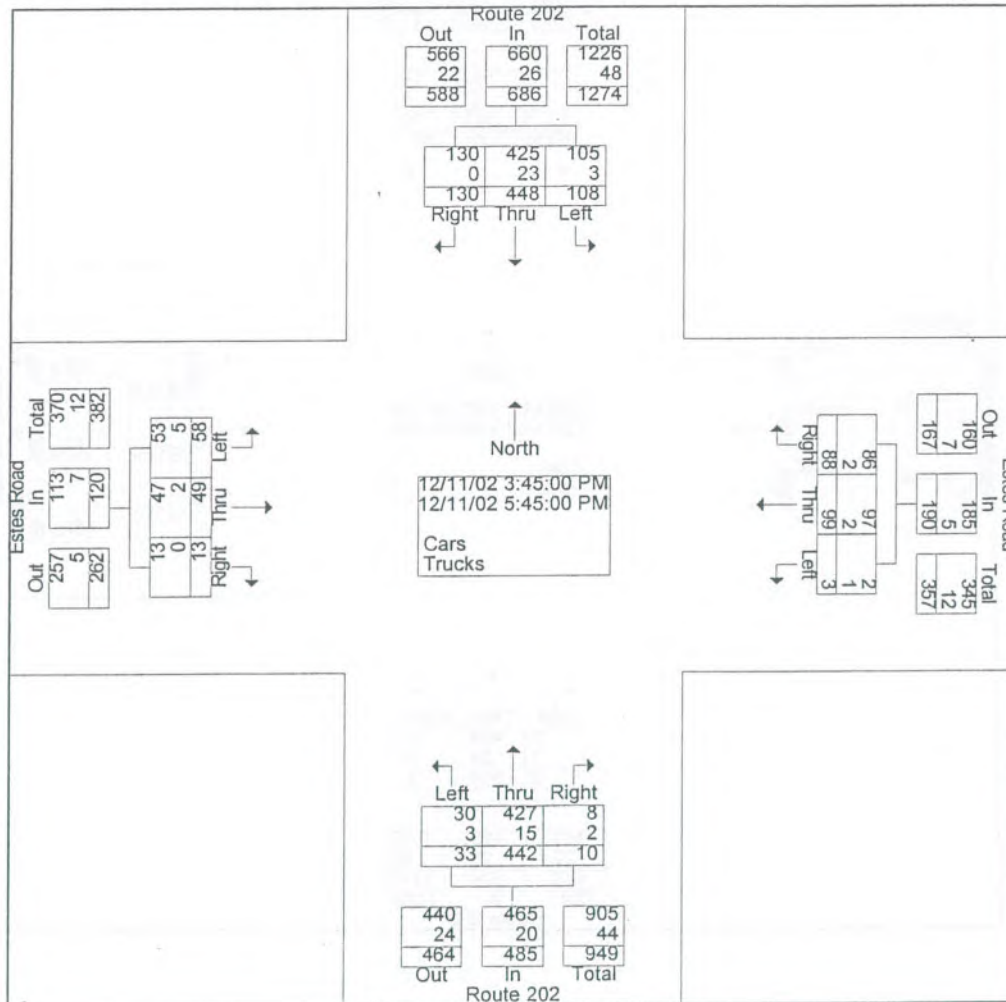
Site Code : 00020402

Start Date : 12/11/2002

Page No : 1

Groups Printed- Cars - Trucks

Start Time	Route 202 Southbound			Estes Road Westbound			Route 202 Northbound			Estes Road Eastbound			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
15:45	14	47	10	1	13	10	4	48	1	8	2	1	159
Total	14	47	10	1	13	10	4	48	1	8	2	1	159
16:00	9	57	16	0	13	9	9	46	1	5	6	4	175
16:15	14	53	12	1	1	13	4	60	1	12	7	20	179
16:30	12	53	18	0	14	26	5	53	3	3	9	0	182
16:45	10	41	12	0	8	0.72	1	51	0.85	7	7	0.30	150
Total	45	204	58	1	36	45	19	210	5	27	29	7	686
17:00	17	53	55	0	1	32	3	13	39	7	27	6	163
17:15	11	49	313	0	19	75	3	58	222	4	64	5	181
17:30	13	42	13	0	15	7	3	49	0	7	4	0	153
17:45	8	51	14	1	7	11	1	38	0	5	3	0	139
Total	49	197	62	1	50	33	10	184	4	23	18	5	636
Grand Total	108	448	130	3	99	88	33	442	10	58	49	13	1481
Apprch %	15.7	65.3	19.0	1.6	52.1	46.3	6.8	91.1	2.1	48.3	40.8	10.8	
Total %	7.3	30.2	8.8	0.2	6.7	5.9	2.2	29.8	0.7	3.9	3.3	0.9	



CLD Consulting Engineers, Inc.

540 Commercial Street

Manchester, NH 03101

(603) 668-8223

Town/State: Rochester, NH

Location: Route 202 & Dry Hill

Counter#/Counted By: 2536 (S. Bourcier)

Weather: Cloudy, 30's

File Name : PM-Route 202&Dry Hill

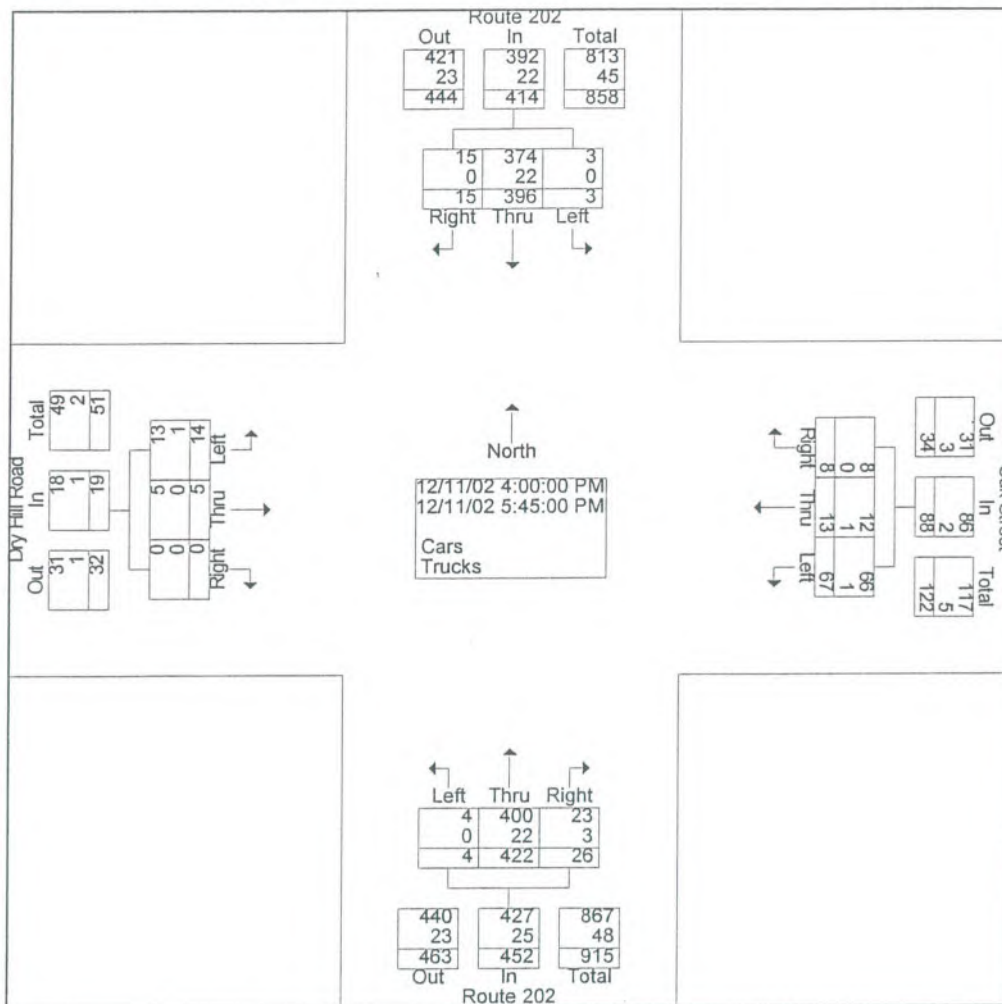
Site Code : 00020402

Start Date : 12/11/2002

Page No : 1

Groups Printed- Cars - Trucks

	Route 202 Southbound			Oak Street Westbound			Route 202 Northbound			Dry Hill Road Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
16:00	1	49	3	9	2	1	0	52	2	3	0	0	122
16:15	0	54	3	7	0	1	0	56	3	0	2	0	126
16:30	0	55	2	8	2	0	1	63	67 3	1	1	0	136
16:45	0	55	58 3	9	13 3	1	0	55	0.91 5	3	1	0	135
Total	1	213	0.91 44	33	0.83 3	3	1	226	0.91 43	7	0.5 4	0	519
17:00	0	38	202 91	8	32 16	5 3	0	1	50	224 18 7	0	4 0	108
17:15	2	58	211 2	4	1	43 0	0	42	243 1	0	8 1	0	111
17:30	0	40	211 0	13	2	2	2	51	2	6	0	0	118
17:45	0	47	1	9	2	0	1	53	3	1	0	0	117
Total	2	183	51 4	34	2	46 5	3	196	79 13	7	0.5 0	0	454
Grand Total	3	396	15	67	13	8	4	422	26	14	5	0	973
Apprch %	0.7	95.7	3.6	76.1	14.8	9.1	0.9	93.4	5.8	73.7	26.3	0.0	
Total %	0.3	40.7	1.5	6.9	1.3	0.8	0.4	43.4	2.7	1.4	0.5	0.0	



APPENDIX B

ACCIDENT DATA 1999 to 2002 – STUDY AREA INTERSECTIONS



Accident Status Report

From: 01/01/1999 Thru: 12/31/2002

Page: 1
01/09/2003Location: (ALL)
Street: ROUTE 202
Intersecting Street: (ALL)
Zones: (ALL)

<u>Officer</u>	<u>State</u>	<u>Rpt/Acc. Date & Time</u>	<u>Location / Street Names</u>
99-39-AC 85	No	01/09/1999 2001	ROUTE 202A
99-46-AC 61	No	01/11/1999 0335	ROUTE 202 ER
99-141-AC 61	No	02/03/1999 0838	ROUTE 202 @ DRY HILL RD ✓
99-324-AC 55	No	04/18/1999 1120	ROUTE 202 ER @ SALMON FALLS RD
99-326-AC 48	No	04/18/1999 0815	202 HIGHLAND / ROUTE 202 BYD @ MILTON RD
99-365-AC 60	No	05/07/1999 1358	ROUTE 202 BYD
99-441-AC 87	Yes	05/28/1999 1708	ROUTE 202 / ROUTE 202 @ ESTES RD ✓
99-513-AC 94	Yes	06/17/1999 2139	ROUTE 202A
99-551-AC 43	No	06/30/1999 0411	ROUTE 202 ER
99-555-AC 34	Yes	07/02/1999 0554	ROUTE 202 202 by pass
99-652-AC 49	No	08/04/1999 0810	ROUTE 202 ER
99-738-AC 43	Yes	08/26/1999 0605	ROUTE 202 ER
99-810-AC 95	Yes	09/18/1999 1240	ROUTE 202A @ SAMPSON RD
99-817-AC 88	Yes	09/19/1999 1849	ROUTE 202 @ SFR ?
99-884-AC 100	No	10/13/1999 1547	ROUTE 202 @ C&E 7 ✓
99-958-AC 88	No	11/07/1999 1853	ROUTE 202A
99-985-AC 87	No	11/14/1999 1945	ROUTE 202 @ ESTES / ROUTE 202 @ ESTES RD ✓

Location: (ALL)
Street: ROUTE 202
Intersecting Street: (ALL)
Zones: (ALL)

99-993-AC	<u>Officer</u> 35	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 11/19/1999 0348	<u>Location / Street Names</u> ROUTE 202 <i>ER</i>
99-1099-AC	<u>Officer</u> 109	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 12/20/1999 1633	<u>Location / Street Names</u> NEAR EASTERN AVE / ROUTE 202 BYP
00-88-AC	<u>Officer</u> 94	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 01/26/2000 1610	<u>Location / Street Names</u> ROUTE 202 @ ESTES RD
00-133-AC	<u>Officer</u> 60	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 02/05/2000 1646	<u>Location / Street Names</u> ROUTE 202A
00-171-AC	<u>Officer</u> 100	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 02/18/2000 2046	<u>Location / Street Names</u> ROUTE 202 <i>Washington St Jct Rd ?</i>
00-272-AC	<u>Officer</u> 106	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 03/26/2000 1328	<u>Location / Street Names</u> ROUTE 202A @ ROY ST
00-343-AC	<u>Officer</u> 61	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 04/22/2000 1646	<u>Location / Street Names</u> AT EXIT 13 / ROUTE 202 <i>(NB/SB)</i>
00-382-AC	<u>Officer</u> 109	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 05/05/2000 2026	<u>Location / Street Names</u> BY BLUE HILLS SUBDIVISION / ROUTE 202 <i>?</i>
00-385-AC	<u>Officer</u> 94	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 05/06/2000 1843	<u>Location / Street Names</u> ROUTE 202 BYPASS AT EXIT 16 NORTH / ROUTE 2
00-457-AC	<u>Officer</u> 34	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 05/30/2000 1551	<u>Location / Street Names</u> ROUTE 202 <i>ER</i>
00-506-AC	<u>Officer</u> 103	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 06/17/2000 2139	<u>Location / Street Names</u> ROUTE 202 <i>West SFR ?</i>
00-528-AC	<u>Officer</u> 87	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 06/26/2000 1341	<u>Location / Street Names</u> ROUTE 202 <i>300 ft E. Estes v (included in Estes)</i>
00-543-AC	<u>Officer</u> 87	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 07/01/2000 1115	<u>Location / Street Names</u> 202 / ROUTE 202 @ SALMON FALLS RD
00-591-AC	<u>Officer</u> 46	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 07/17/2000 0335	<u>Location / Street Names</u> 202 BY PASS / ROUTE 202
00-608-AC	<u>Officer</u> 91	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 07/21/2000 1602	<u>Location / Street Names</u> ROUTE 202 @ SPAULDING TPKE <i>(NB or SB) ?</i>
00-675-AC	<u>Officer</u> 48	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 08/10/2000 1059	<u>Location / Street Names</u> ROADWAY / ROUTE 202 BYP
00-686-AC	<u>Officer</u> 102	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 08/12/2000 1907	<u>Location / Street Names</u> ROUTE 202 <i>ER</i>

Accident Status Report

From: 01/01/1999 Thru: 12/31/2002

Page: 3
01/09/2003

Location: (ALL)
Street: ROUTE 202
Intersecting Street: (ALL)
Zones: (ALL)

<u>Officer</u>	<u>State</u>	<u>Rpt/Acc. Date & Time</u>	<u>Location / Street Names</u>
00-749-AC	85	No 09/04/2000 2348	ROUTE 202A
00-771-AC	60	No 09/13/2000 1709	ROUTE 202 BYP @ MILTON RD
00-781-AC	87	No 09/17/2000 1526	202 / ROUTE 202 @ CHESLEY HILL RD ✓
00-794-AC	68	No 09/21/2000 2203	ROUTE 202 ER
00-861-AC	87	No 10/09/2000 1318	202A / ROUTE 202A @ HIGH ST
00-865-AC	50	No 10/11/2000 1555	ROUTE 202A @ ESTES RD
00-869-AC	94	Yes 10/13/2000 0639	ROUTE 202 / ROUTE 202 ER
00-947-AC	91	No 11/03/2000 1727	SHOREVILLE PLAZA / ROUTE 202 @ HIGHLAND ST
00-1006-AC	68	No 11/26/2000 1009	ROUTE 202A
00-1009-AC	46	No 11/26/2000 1137	ROUTE 202 ER

Location: (ALL)
Street: ROUTE 202
Intersecting Street: (ALL)
Zones: (ALL)

<u>Officer</u>	<u>State</u>	<u>Rpt/Acc. Date & Time</u>	<u>Location / Street Names</u>
00-1011-AC 87	No	11/26/2000 1000	ROUTE 202A / ROUTE 202A
00-1066-AC 109	No	12/12/2000 0658	Location / Street Names NEXT TO THE QAUNSI HUT / ROUTE 202 ?
01-116-AC 64	No	01/30/2001 1742	Location / Street Names ROUTE 202 BYP
01-119-AC 53	No	01/31/2001 0818	Location / Street Names ROUTE 202 BYP
01-199-AC 48	Yes	02/25/2001 1043	Location / Street Names ROADWAY / ROUTE 202 <i>im. n. Dry Hill</i> ✓ (Dry Hill)
01-200-AC 87	No	02/25/2001 1140	Location / Street Names ROUTE 202 BYPASS / ROUTE 202 BYP
01-257-AC 95	No	03/10/2001 1121	Location / Street Names ROUTE 202 ER @ ROUTE 202 BYP
01-288-AC 48	No	03/22/2001 0725	Location / Street Names ROADWAY / ROUTE 202A
01-322-AC Officer	No	03/30/2001 1506	Location / Street Names ROUTE 202 BYP
01-340-AC 48	Yes	04/04/2001 0756	Location / Street Names ROADWAY / ROUTE 202 <i>im. s Dry Hill</i> ✓ (Dry Hill)
01-348-AC 48	Yes	04/05/2001 1456	Location / Street Names ROADWAY / ROUTE 202 ER @ MAIN ST
01-360-AC 102	Yes	04/07/2001 1631	Location / Street Names ROUTE 202 @ ESTES RD
01-413-AC 102	Yes	04/30/2001 0545	Location / Street Names ROUTE 202A @ FRENCH HUSSEY RD
01-576-AC 34	Yes	06/28/2001 1627	Location / Street Names ROUTE 202 BYP
01-629-AC 48	Yes	07/12/2001 1430	Location / Street Names ROUTE 202 @ DRY HILL RD
01-633-AC 35	Yes	07/13/2001 1731	Location / Street Names ROUTE 202 ER @ SALMON FALLS RD
01-645-AC 109	No	07/17/2001 1816	Location / Street Names IN FRONT OF 415 / ROUTE 202 ER @ SALMON FAL

Accident Status Report

From: 01/01/1999 Thru: 12/31/2002

Page: 5
01/09/2003

Location: (ALL)
Street: ROUTE 202
Intersecting Street: (ALL)
Zones: (ALL)

01-663-AC	<u>Officer</u> 53	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 07/24/2001 1211	<u>Location / Street Names</u> ROUTE 202 <u>ER</u>
01-717-AC	<u>Officer</u> 107	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 08/11/2001 1521	<u>Location / Street Names</u> 110 STRATFORD ROAD / ROUTE 202A
01-768-AC	<u>Officer</u> 91	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 08/29/2001 1616	<u>Location / Street Names</u> ROUTE 202 ER
01-930-AC	<u>Officer</u> 122	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 10/30/2001 0734	<u>Location / Street Names</u> ROUTE 202 <u>Washington St. (other) ✓</u>
01-954-AC	<u>Officer</u> 34	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 11/07/2001 2027	<u>Location / Street Names</u> ROUTE 202 <u>300 F.E. Dry Hill Dry Hill ✓</u>
01-958-AC	<u>Officer</u> 102	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 11/09/2001 1703	<u>Location / Street Names</u> ROUTE 202A @ NORTH MAIN ST <u>Stratford SE ✓</u>
01-1032-AC	<u>Officer</u> 48	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 12/05/2001 1000	<u>Location / Street Names</u> ROADWAY / ROUTE 202 <u>10 ft W. N. Main St Stratford ✓</u>
01-1054-AC	<u>Officer</u> 83	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 12/09/2001 1356	<u>Location / Street Names</u> ROUTE 202 ER
01-1089-AC	<u>Officer</u> 121	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 12/18/2001 1027	<u>Location / Street Names</u> ROUTE 202 BYP @ MILTON RD
02-11-AC	<u>Officer</u> 84	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 01/07/2002 0036	<u>Location / Street Names</u> ROUTE 202 <u>ER</u>
02-46-AC	<u>Officer</u> 35	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 01/17/2002 0957	<u>Location / Street Names</u> ROUTE 202 <u>1000 ft E. Estes Rd ✓</u>
02-68-AC	<u>Officer</u> 83	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 01/21/2002 1738	<u>Location / Street Names</u> ROUTE 202 BYP @ HIGHLAND ST
02-123-AC	<u>Officer</u> 87	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 02/05/2002 1205	<u>Location / Street Names</u> ROUTE 202 / ROUTE 202 <u>ER</u>
02-129-AC	<u>Officer</u> 50	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 02/07/2002 0638	<u>Location / Street Names</u> ROUTE 202 ER @ SALMON FALLS RD
02-180-AC	<u>Officer</u> 68	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 03/04/2002 0842	<u>Location / Street Names</u> ROUTE 202 @ ESTES RD ✓
02-217-AC	<u>Officer</u> 94	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 03/18/2002 1627	<u>Location / Street Names</u> ROUTE 202 <u>ER by Pass</u>
02-288-AC	<u>Officer</u> 123	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 04/05/2002 2212	<u>Location / Street Names</u> ROUTE 202 ER @ SALMON FALLS RD

Accident Status Report

From: 01/01/1999 Thru: 12/31/2002

Page: 6
01/09/2003

Location: (ALL)
Street: ROUTE 202
Intersecting Street: (ALL)
Zones: (ALL)

<u>02-322-AC</u>	<u>Officer</u> 112	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 04/21/2002 2001	<u>Location / Street Names</u> ROUTE 202 ER
02-331-AC	<u>Officer</u> 53	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 04/23/2002 1350	<u>Location / Street Names</u> ROUTE 202 BYP
02-518-AC	<u>Officer</u> 37	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 06/23/2002 1020	<u>Location / Street Names</u> ROUTE 202 ER
02-563-AC	<u>Officer</u> 112	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 07/13/2002 1807	<u>Location / Street Names</u> ROUTE 202 BYP
02-663-AC	<u>Officer</u> 87	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 08/19/2002 1012	<u>Location / Street Names</u> 202 BY PASS / ROUTE 202 BYP
02-664-AC	<u>Officer</u> 87	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 08/19/2002 1731	<u>Location / Street Names</u> A-1 AUTO SALES / ROUTE 202
02-679-AC	<u>Officer</u> 130	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 08/27/2002 0636	<u>Location / Street Names</u> ROUTE 202 @ ESTES RD ✓
02-928-AC	<u>Officer</u> 83	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 11/20/2002 0400	<u>Location / Street Names</u> ROUTE 202 BYP
02-966-AC	<u>Officer</u> 122	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 12/05/2002 0736	<u>Location / Street Names</u> ROUTE 202 ER @ SALMON FALLS RD
02-1002-AC	<u>Officer</u> 107	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 12/15/2002 0628	<u>Location / Street Names</u> 202 BYPASS RAMP / ROUTE 202 BYP

Accident Status Report

From: 01/01/1999 Thru: 12/31/2002

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01/09/2003

Location: (ALL)
Street: ROUTE 202
Intersecting Street: (ALL)
Zones: (ALL)

~~92-1043-AC~~

Officer
126

State Rpt/Acc. Date & Time
No 12/25/2002 1711

Location / Street Names
~~ROUTE 202 BYP~~

State Reports Required: 35
State Reports Not Required: 54



Accident Status Report

From: 01/01/1999 Thru: 12/31/2002

Page: 1
01/09/2003

Location: (ALL)

Street: WASHINGTON ST

Intersecting Street: (ALL)

Zones: (ALL)

	<u>Officer</u>	<u>State</u>	<u>Rpt/Acc.</u>	<u>Date & Time</u>	<u>Location / Street Names</u>	
99-133-AC	94	No		01/31/1999 1818	WASHINGTON ST	other
99-155-AC	20	No		02/06/1999 1130	WASHINGTON ST @ YALE ST	✓
99-291-AC	91	No		04/02/1999 1526	WASHINGTON ST	other
99-336-AC	91	No		04/23/1999 1753	WASHINGTON ST	other
99-481-AC	85	No		06/09/1999 0714	IN FRONT OF IRVING / WASHINGTON ST	✓
99-531-AC	85	No		06/24/1999 0627	WASHINGTON ST @ ESTES RD	✓
99-577-AC	49	Yes		07/09/1999 1315	WASHINGTON ST @ ROY ST	✓
99-598-AC	94	Yes		07/15/1999 2112	WASHINGTON ST @ HOOVER ST	✓
99-647-AC	48	No		08/03/1999 1438	ROADWAY / WASHINGTON ST	other
99-707-AC	53	Yes		08/18/1999 0747	WASHINGTON ST	other
99-708-AC	88	No		08/18/1999 1634	WASHINGTON ST @ ROY ST	✓
99-793-AC	50	Yes		09/13/1999 0646	IRVING MAINWAY / WASHINGTON ST @ HOOVER ST	✓
99-798-AC	35	Yes		09/15/1999 0745	WASHINGTON ST	other ✓
99-812-AC	97	No		09/19/1999 1039	WASHINGTON ST @ HOOVER ST	✓
99-824-AC	57	No		09/21/1999 1640	WASHINGTON ST @ HARVARD ST	✓
99-902-AC	87	No		10/19/1999 1551	WASHINGTON STREET / WASHINGTON ST @ BROCK S	✓
99-908-AC	48	Yes		10/21/1999 1004	ROADWAY / WASHINGTON ST	other ✓

Accident Status Report

From: 01/01/1999 Thru: 12/31/2002

Page: 2
01/09/2003

Location: (ALL)
Street: WASHINGTON ST
Intersecting Street: (ALL)
Zones: (ALL)

Case Number	Officer	State	Rpt/Acc.	Date & Time	Location / Street Names	Notes
99-911-AC	91	No		10/21/1999 1540	WASHINGTON ST @ HOOVER ST	✓
99-918-AC	95	Yes		10/23/1999 0936	WASHINGTON ST	other ✓
99-936-AC	87	No		11/02/1999 1522	IRVING GAS STATION PARKING LOT / WASHINGTON	✓
99-1062-AC	34	No		12/10/1999 1552	WASHINGTON ST @ ESTES RD	✓
99-1127-AC	35	Yes		12/30/1999 1542	WASHINGTON ST @ ROY ST	✓
00-13-AC	94	Yes		01/08/2000 1748	WASHINGTON ST @ OAK ST	✓
00-66-AC	68	No		01/20/2000 1822	WASHINGTON ST @ HOOVER ST	✓
00-80-AC	87	No		01/25/2000 1253	WASHINGTON STREET / WASHINGTON ST	other ✓
00-87-AC	43	No		01/26/2000 1213	IRVING MAINWAY / WASHINGTON ST	✓
00-89-AC	107	Yes		01/26/2000 1707	WASHINGTON ST	other ✓
00-146-AC	34	Yes		02/11/2000 1102	WASHINGTON ST @ ESTES RD	✓
00-170-AC ST @ BROCK ST	96	Yes		02/18/2000 1724	INTERSECTION BROCK & 202 WASHINGTON / WASHI	✓
00-201-AC	94	Yes		02/26/2000 1858	WASHINGTON ST	other ✓
00-202-AC	101	No		02/26/2000 1906	WASHINGTON ST	other ✓
00-399-AC	95	No		05/10/2000 1717	WASHINGTON ST @ ESTES RD	✓
00-415-AC	88	No		05/13/2000 2032	WASHINGTON ST	other ✓
00-586-AC	87	No		07/16/2000 0957	ROUTE 202 / WASHINGTON ST @ ESTES RD	✓

Location: (ALL)
Street: WASHINGTON ST
Intersecting Street: (ALL)
Zones: (ALL)

	<u>Officer</u>	<u>State</u>	<u>Rpt/Acc.</u>	<u>Date & Time</u>	<u>Location / Street Names</u>
00-595-AC	48	No	07/17/2000	1348	ROADWAY / WASHINGTON ST ✓ other
00-638-AC	103	Yes	07/28/2000	1721	IRVING MAINWAY / WASHINGTON ST ✓
00-674-AC	101	No	08/09/2000	1644	WASHINGTON ST ✓ other
00-733-AC	87	No	09/01/2000	1111	WASHINGTON ST / WASHINGTON ST @ NORTH MAIN ✓
00-738-AC	101	No	09/01/2000	1702	WASHINGTON ST @ HIGHLAND AVE ✓
00-763-AC	94	Yes	09/09/2000	1951	WASHINGTON ST ✓ other
00-956-AC	87	No	11/07/2000	1030	WASHINGTON STREET / WASHINGTON ST @ BROCK S ✓
00-963-AC	35	Yes	11/09/2000	1841	WASHINGTON ST ✓ other
00-1033-AC	88	No	11/30/2000	2105	WASHINGTON ST ✓ other
00-1037-AC	95	Yes	12/01/2000	1455	WASHINGTON ST @ WALNUT ST ✓

Accident Status Report

From: 01/01/1999 Thru: 12/31/2002

Page: 4
01/09/2003

Location: (ALL)
Street: WASHINGTON ST
Intersecting Street: (ALL)
Zones: (ALL)

Case Number	Officer	State	Rpt/Acc.	Date	Time	Location / Street Names
00-1060-AC	100	No		12/08/2000	1846	ROADWAY / WASHINGTON ST ✓ other
00-1106-AC	107	Yes		12/18/2000	1700	IRVING OIL CORPORATION / WASHINGTON ST @ HO ✓
01-11-AC	48	Yes		01/04/2001	1322	ROADWAY / WASHINGTON ST @ BROCK ST ✓
01-232-AC	37	No		03/06/2001	1400	WASHINGTON ST @ BROCK ST ✓
01-239-AC	34	Yes		03/07/2001	1556	WASHINGTON ST @ ESTES RD ✓
01-245-AC	112	No		03/08/2001	2127	WASHINGTON ST @ WALNUT ST ✓
01-289-AC	60	No		03/22/2001	0711	WASHINGTON ST ○
01-315-AC	53	Yes		03/30/2001	0904	WASHINGTON ST ○
01-317-AC	100	No		03/30/2001	0930	ROADWAY / WASHINGTON ST ○
01-411-AC	108	No		04/30/2001	0642	IRVING MAINWAY / WASHINGTON ST
01-460-AC	34	Yes		05/17/2001	2206	WASHINGTON ST @ WALNUT ST ✓
01-532-AC	37	No		06/14/2001	1429	WASHINGTON ST @ ESTES RD ✓
01-600-AC	112	No		07/05/2001	1008	WASHINGTON ST @ BROCK ST ✓
01-727-AC	83	Yes		08/15/2001	1854	WASHINGTON ST ○
01-730-AC	37	No		08/16/2001	1035	WASHINGTON ST ○
01-777-AC	126	Yes		08/30/2001	1755	WASHINGTON ST @ NORTH MAIN ST ✓
01-899-AC	37	No		10/17/2001	1448	WASHINGTON ST @ NORTH MAIN ST ✓

Location: (ALL)
Street: WASHINGTON ST
Intersecting Street: (ALL)
Zones: (ALL)

	<u>Officer</u>	<u>State</u>	<u>Rpt/Acc.</u>	<u>Date & Time</u>	<u>Location / Street Names</u>
01-903-AC	37	No	10/18/2001	1435	WASHINGTON ST @ WALNUT ST ✓
01-1073-AC	102	No	12/15/2001	2310	SHELL STATION / WASHINGTON ST
02-44-AC	11	No	01/17/2002	0919	330 WASHINGTON ST / WASHINGTON ST
02-71-AC	10	Yes	01/22/2002	1240	WASHINGTON ST 0
02-158-AC	53	Yes	02/23/2002	1021	WASHINGTON ST 0
02-209-AC	108	No	03/15/2002	1813	WASHINGTON ST @ ESTES RD ✓
02-227-AC	107	Yes	03/20/2002	1659	SHELL STATION / WASHINGTON ST ✓
02-246-AC	43	Yes	03/25/2002	0714	WASHINGTON ST @ BROCK ST ✓
02-336-AC	94	Yes	04/25/2002	2257	WASHINGTON ST 0
02-338-AC	126	No	04/26/2002	2245	WASHINGTON ST 0
02-410-AC	50	Yes	05/21/2002	0836	SHELL STATION / WASHINGTON ST ✓
02-420-AC	126	No	05/23/2002	1530	WASHINGTON ST 0
02-472-AC	35	No	06/08/2002	2100	WASHINGTON ST 0
02-532-AC	108	No	06/27/2002	1646	EXIT 13 OFF RAMP WEST / WASHINGTON ST ✓
02-585-AC	87	No	07/22/2002	1118	SHELL STATION / WASHINGTON ST ✓
2-666-AC	61	No	08/20/2002	1635	WASHINGTON ST 0
2-723-AC	121	No	09/11/2002	1649	WASHINGTON ST @ WALNUT ST ✓

Location: (ALL)
Street: WASHINGTON ST
Intersecting Street: (ALL)
Zones: (ALL)

02-757-AC	<u>Officer</u> 43	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 09/25/2002 0721	<u>Location / Street Names</u> WASHINGTON ST @ HOOVER ST ✓
02-770-AC	<u>Officer</u> 91	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 09/28/2002 0820	<u>Location / Street Names</u> WASHINGTON ST @ DRY HILL RD ✓
02-905-AC	<u>Officer</u> 94	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 11/14/2002 1350	<u>Location / Street Names</u> WASHINGTON ST @ NORTH MAIN ST ✓
02-956-AC	<u>Officer</u> 21	<u>State</u> No	<u>Rpt/Acc. Date & Time</u> 11/29/2002 2030	<u>Location / Street Names</u> WASHINGTON ST ○
02-980-AC	<u>Officer</u> 49	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 12/09/2002 0949	<u>Location / Street Names</u> WASHINGTON ST @ ROY ST ✓
02-1009-AC	<u>Officer</u> 125	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 12/16/2002 1649	<u>Location / Street Names</u> WASHINGTON ST @ BROCK ST ✓
02-1027-AC	<u>Officer</u> 50	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 12/22/2002 1323	<u>Location / Street Names</u> WASHINGTON ST ○
02-1053-AC	<u>Officer</u> 53	<u>State</u> Yes	<u>Rpt/Acc. Date & Time</u> 12/27/2002 1038	<u>Location / Street Names</u> WASHINGTON ST ○

State Reports Required: 36
State Reports Not Required: 50

APPENDIX C

TRAFFIC GROWTH TRENDS AND PREDICTIONS

AM PEAK HOUR (7:00-8:00 AM)				
INTERSECTION		JUN 2002	DEC 2002	(JUN/DEC)
US 202/Chesley/Hussey				
Hussey Hill Rd				
	EBL	3	1	3.00
	EBT	1	1	1.00
	EBR	0	1	0.00
Chesley Hill Rd				
	WBL	1	5	0.20
	WBT	0	0	#DIV/0!
	WBR	9	12	0.75
US 202				
	NBL	0	0	#DIV/0!
	NBT	324	336	0.96
	NBR	3	4	0.75
US 202				
	SBL	5	8	0.63
	SBT	200	173	1.16
	SBR	3	0	#DIV/0!
Total Intx. Vol.		549	541	1.01
Washington St/Rte 16 NB Ramps				
Washington St				
	NBT	291	126	2.31
	NBR	72	133	0.54
Washington St				
	SBL	43	71	0.61
	SBT	248	282	0.88
Rte 16 NB Ramp				
	WBL	24	54	0.44
	WBR	47	66	0.71
Total Intx. Vol.		725	732	0.99
Washington St/Rte 16 SB Ramps				
Washington St				
	NBT	296	241	1.23
	NBL	59	44	1.34
Washington St				
	SBT	139	266	0.52
	SBR	130	69	1.88
Rte 16 SB Ramp				
	EBL	61	21	2.90
	EBR	71	37	1.92
Total Intx. Vol.		756	678	1.12
TOTAL VOL (ABOVE 3 INTX)		2030	1951	1.04

Note: JUN 2002 counts conducted by
Laurie M. Rausedo, P.E., PTOE

DEC 2002 counts conducted by
CLD Consulting Engineers, Inc.

AM PEAK HOUR (7:00-8:00 AM)				
INTERSECTION	OCT 2002	DEC 2002	(OCT/DEC)	
US 202/Dry Hill Rd/Oak St				
Dry Hill Road				
EBL	10	9	1.11	
EBT	5	5	1.00	
EBR	3	2	1.50	
Oak Street				
WBL	17	13	1.31	
WBT	1	2	0.50	
WBR	1	0	#DIV/0!	
US 202				
NBL	1	0	#DIV/0!	
NBT	219	207	1.06	
NBR	32	38	0.84	
US 202				
SBL	1	2	0.50	
SBT	156	136	1.15	
SBR	7	10	0.70	
Total Intx. Vol.	453	424	1.07	

Note: OCT 2002 counts conducted by
Stephen G. Pernaw & Company

DEC 2002 counts conducted by
CLD Consulting Engineers, Inc.

TOTAL VOL (ABOVE 4 INTX)	2483	2375	1.045
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PM PEAK HOUR (4:15-5:15 PM)				
INTERSECTION		JUN 2002	DEC 2002	(JUN/DEC)
US 202/Chesley/Hussey				
Hussey Hill Rd				
	EBL	3	4	0.75
	EBT	0	1	0.00
	EBR	1	0	#DIV/0!
Chesley Hill Rd				
	WBL	6	4	1.50
	WBT	0	0	#DIV/0!
	WBR	8	10	0.80
US 202				
	NBL	5	1	5.00
	NBT	320	280	1.14
	NBR	3	1	3.00
US 202				
	SBL	1	8	0.13
	SBT	300	315	0.95
	SBR	1	2	0.50
Total Intx. Vol.		648	626	1.04
Washington St/Rte 16 NB Ramps				
Washington St				
	NBT	244	258	0.95
	NBR	96	94	1.02
Washington St				
	SBL	33	31	1.06
	SBT	239	265	0.90
Rte 16 NB Ramp				
	WBL	56	49	1.14
	WBR	122	109	1.12
Total Intx. Vol.		790	806	0.98
Washington St/Rte 16 SB Ramps				
Washington St				
	NBT	275	290	0.95
	NBL	30	15	2.00
Washington St				
	SBT	220	259	0.85
	SBR	64	54	1.19
Rte 16 SB Ramp				
	EBL	54	73	0.74
	EBR	98	93	1.05
Total Intx. Vol.		741	784	0.95
TOTAL VOL (ABOVE 3 INTX)		2179	2216	0.98

Note: JUN 2002 counts conducted by
Laurie M. Rauseo, P.E., PTOE

DEC 2002 counts conducted by
CLD Consulting Engineers, Inc.

PM PEAK HOUR (4:15-5:15 PM)				
INTERSECTION		OCT 2002	DEC 2002	(OCT/DEC)
US 202/Dry Hill Rd/Oak St				
Dry Hill Road				
EBL		10	4	2.50
EBT		1	4	0.25
EBR		0	0	#DIV/0!
Oak Street				
WBL		24	32	0.75
WBT		5	6	0.83
WBR		1	5	0.20
US 202				
NBL		2	1	2.00
NBT		236	224	1.05
NBR		10	18	0.56
US 202				
SBL		1	0	#DIV/0!
SBT		241	202	1.19
SBR		11	9	1.22
Total Intx. Vol.		542	505	1.07

Note: OCT 2002 counts conducted by
Stephen G. Pernaw & Company

DEC 2002 counts conducted by
CLD Consulting Engineers, Inc.

TOTAL VOL (ABOVE 4 INTX)	2721	2721	1.00
---------------------------------	------	------	-------------



CLD Consulting Engineers, Inc.
540 Commercial Street
Manchester, NH 03101
(603) 668-8223 FAX(603) 668-8802

JOB	02-0402
SHEET NO.	
CALCULATED BY	KRD
CHECKED BY	

OF	
DATE	12/26/02
DATE	

SUBJECT BACKGROUND GROWTH RATE - US202/Washington Street

from data for US Route 4 at Northwood/Nottingham TL

<u>YEAR</u>	<u>AADT</u>	
2001	9466	
		-0.95%
2000	9557	
		-1.87%
1999	9739	
		2.17%
1998	9532	
		3.99%
1997	9166	
		0.89%
1996	9085	
		3.11%
1995	8811	
		3.16%
1994	8541	
		5.74%
1993	8077	
		5.43%
1992	7661	
		-0.33%
1991	7686	

10 YEAR AVERAGE GROWTH
1991 - 2001

2.3%

THIS DATA IS FROM THE NHDOT PERMANENT RECORDER
STATION ON US ROUTE 4 AT THE Northwood/Nottingham Townline.



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Manchester, NH 03101
(603) 668-8223 FAX(603) 668-8802

JOB	02-0402	
SHEET NO.		OF
CALCULATED BY	KRD	DATE
CHECKED BY		DATE

SUBJECT BACKGROUND GROWTH RATE - US202/Washington Street

<u>YEAR</u>	<u>AADT</u>	
2001	23809	
		5.01%
2000	22674	
		3.54%
1999	21898	
		4.64%
1998	20926	
		10.61%
1997	18919	
		-2.45%
1996	19395	
		5.64%
1995	18359	
		4.56%
1994	17559	
		6.99%
1993	16412	
		4.43%
1992	15716	
		4.75%
1991	15003	

10 YEAR AVERAGE GROWTH 1991 - 2001	5.9%
---	-------------

THIS DATA IS FROM THE NHDOT PERMANENT RECORDER
STATION ON NH ROUTE 16 AT THE TOLL BOOTH IN ROCHESTER.

30-Dec-02

SEASONAL ADJUSTMENTS TO
NHDOT PERMANENT RECORDER DATA

CITY/TOWN: Northwood, NH
 LOCATION: US Route 4 at Nottingham Townline
 TIMEFRAME: January - December, 2001

MONTH	AVERAGE DAILY	AVERAGE WEEKDAY	SEASONAL ADJUSTMENT FACTORS			
			TO AVERAGE ANNUAL		TO PEAK MONTH	
			DAILY	WEEKDAY	DAILY	WEEKDAY
January	7,864	8,201	1.20	1.16	1.44	1.37
February	8,261	8,611	1.14	1.10	1.37	1.30
March	8,200	8,205	1.15	1.16	1.38	1.37
April	9,390	9,537	1.01	1.00	1.21	1.18
May	9,875	9,798	0.96	0.97	1.15	1.14
June	10,510	10,660	0.90	0.89	1.08	1.05
July	11,234	10,968	0.84	0.87	1.01	1.02
August	11,319	11,207	0.84	0.85	1.00	1.00
September	10,016	9,739	0.94	0.98	1.13	1.15
October	9,608	9,607	0.98	0.99	1.18	1.17
November	9,039	9,150	1.05	1.04	1.25	1.22
December	8,155	8,328	1.16	1.14	1.39	1.35
CALC AVG	9,456	9,501				
NHDOT AVG	9,466	9,516				
PEAK MONTH	August 11,319	August 11,207				

30-Dec-02

SEASONAL ADJUSTMENTS TO
NHDOT PERMANENT RECORDER DATA

CITY/TOWN: Northwood, NH
 LOCATION: US Route 4 at Nottingham Townline
 TIMEFRAME: January - December, 2000

MONTH	AVERAGE DAILY	AVERAGE WEEKDAY	SEASONAL ADJUSTMENT FACTORS			
			TO AVERAGE ANNUAL		TO PEAK MONTH	
			DAILY	WEEKDAY	DAILY	WEEKDAY
January	7,750	8,143	1.23	1.18	1.47	1.38
February	8,249	8,531	1.16	1.13	1.38	1.32
March	8,830	8,968	1.08	1.07	1.29	1.25
April	9,129	9,317	1.05	1.03	1.25	1.21
May	9,927	9,829	0.96	0.98	1.15	1.14
June	10,684	10,625	0.89	0.91	1.07	1.06
July	11,414	11,251	0.84	0.86	1.00	1.00
August	11,365	11,139	0.84	0.86	1.00	1.01
September	10,598	10,446	0.90	0.92	1.08	1.08
October	9,831	9,721	0.97	0.99	1.16	1.16
November	8,719	8,942	1.10	1.08	1.31	1.26
December	8,131	8,654	1.17	1.11	1.40	1.30
CALC AVG	9,552	9,631				
NHDOT AVG	9,557	9,641				
PEAK MONTH	July 11,414	July 11,251				



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(603) 668-8223 • Fax: (603) 668-8802
cld@cldengineers.com • www.cldengineers.com
Maine • New Hampshire • Vermont

JOB ROCHESTER - US202

JOB NO. 02-0402

SHEET NO. _____

OF _____

CALCULATED BY KRD

DATE 12-31-02

CHECKED BY _____

DATE _____

SUBJECT ANNUAL GROWTH RATES - US202

SCALE _____

DATA SPECIFIC TO WASHINGTON ST./ US202
FROM SRPC
US202 - S. of Axehamole Brook (SITE# 389059)
OCT-98 6705 vpd

From CLD
US202 - S. of RT. 16 SB Ramps
DEC-02 7279 vpd

BASED ON RAW #S

$$\text{Growth Rate} = \frac{7279}{6705} = 1.086 \text{ for } 4.16 \text{ YEARS}$$

$$= \sim 2.0\% \text{ per year}$$

BASED ON SEASONALLY ADJUSTED ADTS (based on NH Rt. 4 DATA)

$$100^{\text{th}} \text{ SEASONAL ADJ FROM OCT} \rightarrow \text{DEC} = \frac{8328}{9607} = 0.87$$

$$\text{SRPC (ADJ)} = 6705 \times 0.87 = 5833 \text{ vpd}$$

$$\text{ADJ. GROWTH RATE} = \frac{7279}{5833} = 1.248 \text{ FOR } 4.0 \text{ YEARS}$$

$$= \sim 6.2\% \text{ per year}$$

NOTE: AS A MAJOR EAST-WEST HIGHWAY, NH ROUTE 4 MAY HAVE MORE SEASONAL CHARACTERISTICS. SINCE WE ARE ITEMIZING THE ANTICIPATED DEFICITMENTS, A GROWTH RATE OF 3%/YR. WILL LIKELY BE REASONABLE.

Municipality	Total Population			2005	2005
	U.S. Census		OEP	Group	Persons per
	1990	2000	Estimate	Quarters	Square Mile
			2005	Pop	
Barrington	6,164	7,475	8,175	8	175.1
Dover	25,042	26,884	28,728	804	1,076.0
Durham	11,818	12,664	13,443	4,768	600.1
Farmington	5,739	5,774	6,710	27	183.8
Lee	3,729	4,145	4,436	28	221.8
Madbury	1,404	1,509	1,748	0	152.0
Middleton	1,183	1,440	1,710	2	94.5
Milton	3,691	3,910	4,372	0	132.1
New Durham	1,974	2,220	2,488	1	60.1
Rochester	26,630	28,461	30,684	285	684.9
Rollinsford	2,645	2,648	2,662	0	364.7
Somersworth	11,249	11,477	11,880	33	1,212.2
Strafford	2,965	3,626	3,985	9	81.3
Strafford Co.	104,233	112,233	121,021	5,965	329.5

Water area not included in persons per sq. mi calculations

Group Quarters population is included in total population

Population
1.5%/yr Growth
00-05

Municipality	Total Population			2005 Group Quarters Pop	2005 Persons per Square Mile
	U.S. Census		OEP Estimate 2005		
	1990	2000			
Acworth	776	836	882	0	22.7
Charlestown	4,630	4,749	4,941	20	138.0
Claremont	13,902	13,151	13,124	206	304.5
Cornish	1,659	1,661	1,715	1	40.8
Croydon	627	661	750	1	20.4
Goshen	742	741	809	8	36.1
Grantham	1,247	2,167	2,438	0	89.6
Langdon	580	586	616	0	37.8
Lempster	947	971	1,076	0	33.3
Newport	6,110	6,269	6,395	118	147.0
Plainfield	2,056	2,241	2,420	0	46.4
Springfield	788	945	1,057	0	24.2
Sunapee	2,559	3,055	3,229	0	153.0
Unity	1,341	1,530	1,652	236	44.6
Washington	628	895	957	0	21.0
Sullivan Co.	38,592	40,458	42,061	590	78.2
N.H.	1,109,117	1,235,550	1,315,000	38,350	156.5

Population of unincorporated places not included in this report

Water area not included in persons per sq. mi calculations

Group Quarters population is included in total population

NH Office of Energy & Planning

January 2007

Municipality	2005	Projections					Differences				
	Est.	2010	2015	2020	2025	2030	05-10	10-15	15-20	20-25	25-30
Barrington	8,180	8,510	8,990	9,450	9,900	10,270	340	470	470	440	370
Dover	28,730	29,310	29,970	30,450	30,900	31,250	590	660	480	450	350
Durham	13,440	13,840	14,480	15,070	15,630	16,100	400	640	590	560	470
Farmington	6,710	6,930	7,280	7,610	7,930	8,190	220	350	330	310	260
Lee	4,440	4,580	4,830	5,080	5,310	5,510	140	250	250	230	200
Madbury	1,750	1,800	1,880	1,950	2,020	2,080	50	80	80	70	60
Middleton	1,710	1,770	1,880	1,990	2,090	2,170	60	110	110	100	80
Milton	4,370	4,530	4,790	5,040	5,270	5,460	160	260	250	230	200
New Durham	2,490	2,640	2,920	3,180	3,440	3,650	160	270	270	250	210
Rochester	30,680	31,560	32,930	34,290	35,560	36,650	880	1,360	1,360	1,280	1,080
Rollinsford	2,660	2,740	2,870	2,990	3,100	3,190	80	130	120	110	90
Somersworth	11,880	12,080	12,290	12,480	12,950	13,350	200	210	190	470	400
Strafford	3,990	4,180	4,400	4,620	4,830	5,010	190	220	220	210	180
Strafford Co.	121,020	124,490	129,500	134,210	138,930	142,890	3,470	5,020	4,710	4,720	3,960

NH Office of Energy & Planning

January 2007

Municipality	2005	Projections					Differences				
	Est.	2010	2015	2020	2025	2030	05-10	10-15	15-20	20-25	25-30
Acworth	880	980	1,050	1,100	1,150	1,180	100	70	50	40	40
Charlestown	4,940	5,360	5,610	5,810	6,030	6,210	420	250	200	220	180
Claremont	13,120	13,400	13,620	13,880	14,230	14,600	280	220	260	350	370
Cornish	1,720	1,900	2,030	2,120	2,200	2,270	190	130	90	80	70
Croydon	750	830	880	930	960	990	80	60	40	40	30
Goshen	810	890	950	990	1,020	1,050	80	60	40	40	30
Grantham	2,440	2,750	2,970	3,140	3,290	3,410	310	220	170	150	120
Langdon	620	680	730	760	790	810	70	40	30	30	20
Lempster	1,080	1,180	1,260	1,310	1,360	1,400	110	70	50	50	40
Newport	6,400	6,670	6,860	7,040	7,240	7,430	270	190	180	210	190
Plainfield	2,420	2,710	2,800	2,880	2,960	3,030	290	90	80	80	70
Springfield	1,060	1,170	1,260	1,320	1,380	1,430	120	90	70	60	50
Sunapee	3,230	3,590	3,850	4,040	4,210	4,370	360	260	200	170	150
Unity	1,650	1,830	1,960	2,060	2,140	2,210	180	130	100	80	70
Washington	960	1,240	1,340	1,420	1,500	1,570	280	100	80	80	70
Sullivan Co.	42,060	45,180	47,140	48,800	50,460	51,960	3,120	1,960	1,660	1,660	1,490

N.H. 1,315,000 1,365,140 1,420,000 1,470,010 1,520,310 1,565,040 50,160 54,900 49,990 50,310 44,690

All numbers rounded to nearest ten

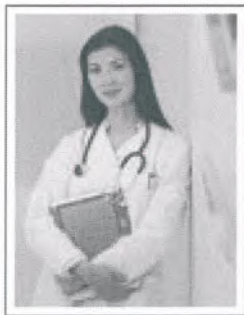
rounding may impact differences

Population
 Rochester 05-15
 0.7%/yr growth
 Strafford County
 0.7%/yr

Strafford County Statistics

(rank statewide by county)

		Rank
Population (2005 Census)	119,015	4th
Area (square miles)	368.8	10th
Population Density (persons per square mile)	322.7	3rd
Per Capita Personal Income (2004 BEA)	\$30,529	9th
Projected employment growth	15.6%	5th
Largest city	Rochester	



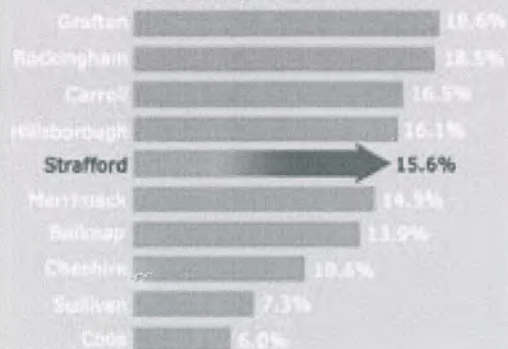
➤ Employment in Strafford County is projected to grow by 15.6 percent, slightly less than the state average. Leading industry sectors include Educational services, primarily at the University of New Hampshire.

➤ Manufacturing employment in Strafford County is projected to be relatively steady, with only a slight decline. In specific industries, significant declines are expected in Textile mills and Plastics and rubber manufacturing. Losses may be offset by gains in Chemical manufacturing and Machinery manufacturing.

Strafford County Employment Projections by Industry

Industry	Base 2004	Projected 2014	Change	Percent Change
Total Employment	47,834	55,313	7,479	15.6%
Agri., Forestry, Fishing & Hunting	184	195	11	6.0%
Mining	23	21	-2	-8.7%
Construction	1,690	2,021	331	19.6%
Manufacturing	5,333	5,263	-70	-1.3%
Utilities	69	68	-1	-1.5%
Wholesale Trade	1,304	1,421	117	9.0%
Retail Trade	6,484	7,613	1,129	17.4%
Transportation & Warehousing	1,004	1,091	87	8.7%
Information	1,024	1,109	85	8.3%
Finance & Insurance	2,142	2,412	270	12.6%
Real Estate & Rental & Leasing	447	495	48	10.7%
Professional, Scientific, & Tech Svcs	1,319	1,604	285	21.6%
Mgmt of Companies & Enterprises	343	383	40	11.7%
Administrative & Waste Mgmt Svcs	1,507	1,834	327	21.7%
Educational Services	7,821	9,439	1,618	20.7%
Health Care & Social Assistance	5,533	7,259	1,726	31.2%
Arts, Entertainment, & Recreation	585	719	134	22.9%
Accommodation & Food Services	3,336	3,886	550	16.5%
Other Services (Ex Government)	1,668	1,905	237	14.2%
Government	2,340	2,655	315	13.5%
Total Employment (Ex Self-employed)	44,156	51,393	7,237	16.4%
Self-employed & Unpaid Family Wrkrs	3,678	3,920	242	6.6%

Projected Employment Growth Rates by County, 2004-2014



Employment
04-14
15.6%
1.5%/yr.

APPENDIX D

INTERSECTION CAPACITY ANALYSES 2002, 2003 AND 2013 NO-BUILD CASES

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/23/03		Analysis Year	2002 Existing Conditions
Analysis Time Period	AM Peak Hour			

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	373	93	256	273	0
Peak-Hour Factor, PHF	1.00	0.79	0.79	0.89	0.89	1.00
Hourly Flow Rate, HFR	0	472	117	287	306	0
Percent Heavy Vehicles	0	—	—	5	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	71	0	366	0	0	0
Peak-Hour Factor, PHF	0.88	1.00	0.88	1.00	1.00	1.00
Hourly Flow Rate, HFR	80	0	415	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		287	80		415			
C (m) (vph)		972	106		543			
v/c		0.30	0.75		0.76			
95% queue length		1.24	4.09		6.82			
Control Delay		10.2	104.5		30.0			
LOS		B	F		D			
Approach Delay	—	—	42.0					
Approach LOS	—	—	E					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/23/03		Analysis Year	2003 No-Build
Analysis Time Period	AM Peak Hour			

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	401	100	276	294	0
Peak-Hour Factor, PHF	1.00	0.79	0.79	0.89	0.89	1.00
Hourly Flow Rate, HFR	0	507	126	310	330	0
Percent Heavy Vehicles	0	—	—	5	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	76	0	395	0	0	0
Peak-Hour Factor, PHF	0.88	1.00	0.88	1.00	1.00	1.00
Hourly Flow Rate, HFR	86	0	448	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		310	86		448			
C (m) (vph)		936	86		515			
v/c		0.33	1.00		0.87			
95% queue length		1.46	5.68		9.43			
Control Delay		10.7	184.1		42.7			
LOS		B	F		E			
Approach Delay	--	--	65.4					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/23/03		Analysis Year	2013 No-Build
Analysis Time Period	AM Peak Hour			

Project Description: Rochester US Rte 202 (CLD No. 02-402)

East/West Street: N. Main Street

North/South Street: Walnut/Washington

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	540	134	371	395	0
Peak-Hour Factor, PHF	1.00	0.79	0.79	0.89	0.89	1.00
Hourly Flow Rate, HFR	0	683	169	416	443	0
Percent Heavy Vehicles	0	—	—	5	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	
Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	102	0	530	0	0	0
Peak-Hour Factor, PHF	0.88	1.00	0.88	1.00	1.00	1.00
Hourly Flow Rate, HFR	115	0	602	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		416	115		602			
C (m) (vph)		774	28		397			
v/c		0.54	4.11		1.52			
95% queue length		3.25	13.96		32.56			
Control Delay		14.9			270.6			
LOS		B	F		F			
Approach Delay	--	--	497.4					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	LMM
Agency/Co.	CLD Consulting Engineers, Inc.
Date Performed	1/23/03
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Strafford Square
Jurisdiction	Rochester, NH
Analysis Year	2002 Existing Conditions

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	498	104	410	587	0
Peak-Hour Factor, PHF	1.00	0.90	0.90	0.92	0.92	1.00
Hourly Flow Rate, HFR	0	553	115	445	638	0
Percent Heavy Vehicles	0	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	115	0	325	0	0	0
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR	127	0	361	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		445	127		361			
C (m) (vph)		927	28		494			
v/c		0.48	4.54		0.73			
95% queue length		2.65	15.46		5.99			
Control Delay		12.4			29.6			
LOS		B	F		D			
Approach Delay	—	—	509.9					
Approach LOS	—	—	F					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/23/03		Analysis Year	2003 No-Build
Analysis Time Period	PM Peak Hour			

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	513	107	422	605	0
Peak-Hour Factor, PHF	1.00	0.90	0.90	0.92	0.92	1.00
Hourly Flow Rate, HFR	0	570	118	458	657	0
Percent Heavy Vehicles	0	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	118	0	335	0	0	0
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR	131	0	372	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		458	131		372			
C (m) (vph)		911	24		482			
v/c		0.50	5.46		0.77			
95% queue length		2.89	16.38		6.79			
Control Delay		12.9			33.4			
LOS		B	F		D			
Approach Delay	—	—	631.7					
Approach LOS	—	—	F					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	<i>Strafford Square</i>
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	<i>Rochester, NH</i>
Date Performed	1/23/03		Analysis Year	<i>2013 No-Build</i>
Analysis Time Period	PM Peak Hour			

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	689	144	568	813	0
Peak-Hour Factor, PHF	1.00	0.90	0.90	0.92	0.92	1.00
Hourly Flow Rate, HFR	0	765	160	617	883	0
Percent Heavy Vehicles	0	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	159	0	450	0	0	0
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR	176	0	500	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		617	176		500			
C (m) (vph)		743	3		363			
v/c		0.83	58.67		1.38			
95% queue length		9.25	24.34		24.71			
Control Delay		28.8			215.4			
LOS		D	F		F			
Approach Delay	--	--						
Approach LOS	--	--		F				

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Washington Street @ Roy Street
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/14/03		Analysis Year	2002 Existing Conditions
Analysis Time Period	AM Peak Hour			
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>				
East/West Street: <i>Roy Street</i>			North/South Street: <i>Washington Street</i>	
Intersection Orientation: <i>North-South</i>			Study Period (hrs): <i>0.25</i>	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	18	277	0	0	312	0
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.69	0.69
Hourly Flow Rate, HFR	20	322	0	0	452	0
Percent Heavy Vehicles	0	—	—	2	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	2	0	79
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.87	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	2	0	90
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	20						92	
C (m) (vph)	1119						602	
v/c	0.02						0.15	
95% queue length	0.05						0.54	
Control Delay	8.3						12.1	
LOS	A						B	
Approach Delay	—	—				12.1		
Approach LOS	—	—				B		

>

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *Washington Street @ Roy Street*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Roy Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	19	299	0	0	336	0
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.69	0.69
Hourly Flow Rate, HFR	22	347	0	0	486	0
Percent Heavy Vehicles	0	--	--	2	--	--

Median Type

Undivided

RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street

	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	2	0	85
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.87	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	2	0	97
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			-3	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	22						99	
C (m) (vph)	1087						576	
v/c	0.02						0.17	
95% queue length	0.06						0.62	
Control Delay	8.4						12.5	
LOS	A						B	
Approach Delay	--	--					12.5	
Approach LOS	--	--					B	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *Washington Street @ Roy Street*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Roy Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	26	401	0	0	452	0
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.69	0.69
Hourly Flow Rate, HFR	30	466	0	0	655	0
Percent Heavy Vehicles	0	--	--	2	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	3	0	114
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.87	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	3	0	131
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	30						134	
C (m) (vph)	942						457	
v/c	0.03						0.29	
95% queue length	0.10						1.21	
Control Delay	8.9						16.1	
LOS	A						C	
Approach Delay	--	--				16.1		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Washington St @ Roy Street
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/14/03		Analysis Year	2002 Existing Conditions
Analysis Time Period	PM Peak Hour			
Project Description Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Roy Street			North/South Street: Washington Street	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	86	356	0	0	331	3
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR	92	382	0	0	363	3
Percent Heavy Vehicles	2	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	3	0	42
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.70	1.00	0.70
Hourly Flow Rate, HFR	0	0	0	4	0	60
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	92						64	
C (m) (vph)	1193						628	
v/c	0.08						0.10	
95% queue length	0.25						0.34	
Control Delay	8.3						11.4	
LOS	A						B	
Approach Delay	—	—				11.4		
Approach LOS	—	—				B		

>

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *Washington St @ Roy Street*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Roy Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	89	367	0	0	341	3
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR	95	394	0	0	374	3
Percent Heavy Vehicles	2	—	—	1	—	—

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	3	0	43
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.70	1.00	0.70
Hourly Flow Rate, HFR	0	0	0	4	0	61
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	95						65	
C (m) (vph)	1181						616	
v/c	0.08						0.11	
95% queue length	0.26						0.35	
Control Delay	8.3						11.5	
LOS	A						B	
Approach Delay	--	--				11.5		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *Washington St @ Roy Street*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Roy Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	119	493	0	0	458	4
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR	127	530	0	0	503	4
Percent Heavy Vehicles	2	--	--	1	--	--

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LT				TR
Upstream Signal		0		0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	4	0	58
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.70	1.00	0.70
Hourly Flow Rate, HFR	0	0	0	5	0	82
Percent Heavy Vehicles	0	0	0	0	0	0

Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	127						87	
C (m) (vph)	1058						498	
v/c	0.12						0.17	
95% queue length	0.41						0.63	
Control Delay	8.9						13.8	
LOS	A						B	
Approach Delay	--	--				13.8		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/14/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *Washington/Woodlawn/Brock*
 Jurisdiction *Rochester, NH*
 Analysis Year *2002 Existing Conditions*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Woodlawn Avenue/Brock Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	165	119	215	174	2
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.79	0.79	0.79
Hourly Flow Rate, HFR	0	187	135	272	220	2
Percent Heavy Vehicles	1	—	—	2	—	—

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	70	0	130	0	0	2
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.50	0.50	0.50
Hourly Flow Rate, HFR	98	0	183	0	0	4
Percent Heavy Vehicles	6	6	6	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	272		281			4	
C (m) (vph)	1353	1238		344			824	
v/c	0.00	0.22		0.82			0.00	
95% queue length	0.00	0.84		7.06			0.01	
Control Delay	7.7	8.7		48.7			9.4	
LOS	A	A		E			A	
Approach Delay	--	--		48.7			9.4	
Approach LOS	--	--		E			A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	Washington/Woodlawn/Brock
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/20/03	Analysis Year	2003 No-Build
Analysis Time Period	AM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Woodlawn Avenue/Brock Street		North/South Street: Washington Street	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	178	128	232	187	2
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.79	0.79	0.79
Hourly Flow Rate, HFR	0	202	145	293	236	2
Percent Heavy Vehicles	1	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	75	0	140	0	0	2
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.50	0.50	0.50
Hourly Flow Rate, HFR	105	0	197	0	0	4
Percent Heavy Vehicles	6	6	6	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	293		302			4	
C (m) (vph)	1335	1212		308			807	
v/c	0.00	0.24		0.98			0.00	
95% queue length	0.00	0.95		10.27			0.01	
Control Delay	7.7	8.9		84.3			9.5	
LOS	A	A		F			A	
Approach Delay	--	--		84.3			9.5	
Approach LOS	--	--		F			A	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM			Intersection	Washington/Woodlawn/Brock			
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH			
Date Performed	1/20/03			Analysis Year	2013 No-Build			
Analysis Time Period	AM Peak Hour							
Project Description: <i>Rochester US Rte 202 (CLD No. 02-402)</i>								
East/West Street: <i>Woodlawn Avenue/Brock Street</i>				North/South Street: <i>Washington Street</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	0	239	172	311	252	3		
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.79	0.79	0.79		
Hourly Flow Rate, HFR	0	271	195	393	318	3		
Percent Heavy Vehicles	1	—	—	2	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	101	0	188	0	0	3		
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.50	0.50	0.50		
Hourly Flow Rate, HFR	142	0	264	0	0	6		
Percent Heavy Vehicles	6	6	6	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	393		406			6	
C (m) (vph)	1245	1095		159			725	
v/c	0.00	0.36		2.55			0.01	
95% queue length	0.00	1.65		35.20			0.03	
Control Delay	7.9	10.1		762.1			10.0+	
LOS	A	B		F			B	
Approach Delay	—	—	762.1			10.0+		
Approach LOS	—	—	F			B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/14/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *Washington/Woodlawn/Brock*
 Jurisdiction *Rochester, NH*
 Analysis Year *2002 Existing Conditions*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Woodlawn Avenue/Brock Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	3	267	131	160	212	1
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.90	0.90	0.90
Hourly Flow Rate, HFR	3	310	152	177	235	1
Percent Heavy Vehicles	2	—	—	1	—	—

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LTR			LTR	
Upstream Signal		0		0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	101	0	173	2	0	2
Peak-Hour Factor, PHF	0.76	0.76	0.76	0.25	0.25	0.25
Hourly Flow Rate, HFR	132	0	227	8	0	8
Percent Heavy Vehicles	1	1	1	25	25	25

Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	3	177		359			16	
C (m) (vph)	1331	1104		350			172	
v/c	0.00	0.16		1.03			0.09	
95% queue length	0.01	0.57		12.18			0.30	
Control Delay	7.7	8.9		90.2			28.1	
LOS	A	A		F			D	
Approach Delay	--	--		90.2			28.1	
Approach LOS	--	--		F			D	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM			Intersection	Washington/Woodlawn/Brock			
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH			
Date Performed	1/20/03			Analysis Year	2003 No-Build			
Analysis Time Period	PM Peak Hour							
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>								
East/West Street: <i>Woodlawn Avenue/Brock Street</i>				North/South Street: <i>Washington Street</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	3	276	135	165	218	1		
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.90	0.90	0.90		
Hourly Flow Rate, HFR	3	320	156	183	242	1		
Percent Heavy Vehicles	2	—	—	1	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	104	0	178	2	0	2		
Peak-Hour Factor, PHF	0.76	0.76	0.76	0.25	0.25	0.25		
Hourly Flow Rate, HFR	136	0	234	8	0	8		
Percent Heavy Vehicles	1	1	1	25	25	25		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	3	183		370			16	
C (m) (vph)	1323	1091		335			159	
v/c	0.00	0.17		1.10			0.10	
95% queue length	0.01	0.60		14.17			0.33	
Control Delay	7.7	9.0		116.0			30.2	
LOS	A	A		F			D	
Approach Delay	--	--	116.0			30.2		
Approach LOS	--	--	F			D		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Washington/Woodlawn/Brock
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/20/03		Analysis Year	2013 No-Build
Analysis Time Period	PM Peak Hour			
Project Description: Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Woodlawn Avenue/Brock Street			North/South Street: Washington Street	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	4	370	181	221	294	1
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.90	0.90	0.90
Hourly Flow Rate, HFR	4	430	210	245	326	1
Percent Heavy Vehicles	2	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	140	0	239	3	0	3
Peak-Hour Factor, PHF	0.76	0.76	0.76	0.25	0.25	0.25
Hourly Flow Rate, HFR	184	0	314	12	0	12
Percent Heavy Vehicles	1	1	1	25	25	25
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	4	245		498			24	
C (m) (vph)	1233	949		193			54	
v/c	0.00	0.26		2.58			0.44	
95% queue length	0.01	1.03		42.52			1.66	
Control Delay	7.9	10.1		764.0			116.8	
LOS	A	B		F			F	
Approach Delay	--	--	764.0			116.8		
Approach LOS	--	--	F			F		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst LMM
 Agency/Co. CLD Consulting Engineers, Inc.
 Date Performed 1/14/03
 Analysis Time Period AM Peak Hour

Site Information

Intersection US202 @ Rt. 16 NB Ramps
 Jurisdiction Rochester, NH
 Analysis Year 2002 Existing Conditions

Project Description Rochester US Rte 202 (CLD No. 02-402)

East/West Street: Rt. 16 NB Ramps

North/South Street: US202

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	127	135	71	281	0
Peak-Hour Factor, PHF	1.00	0.83	0.83	0.87	0.87	1.00
Hourly Flow Rate, HFR	0	153	162	81	322	0
Percent Heavy Vehicles	6	--	--	6	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	54	0	66	0	0	0
Peak-Hour Factor, PHF	0.81	1.00	0.81	1.00	1.00	1.00
Hourly Flow Rate, HFR	66	0	81	0	0	0
Percent Heavy Vehicles	11	0	11	0	0	0
Percent Grade (%)	-2			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		81	66		81			
C (m) (vph)		1223	358		783			
v/c		0.07	0.18		0.10			
95% queue length		0.21	0.67		0.34			
Control Delay		8.2	17.3		10.1			
LOS		A	C		B			
Approach Delay	--	--	13.4					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Rt. 16 NB Ramps
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/20/03		Analysis Year	2003 No-Build
Analysis Time Period	AM Peak Hour			
Project Description: Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Rt. 16 NB Ramps			North/South Street: US202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	137	145	76	302	0
Peak-Hour Factor, PHF	1.00	0.83	0.83	0.87	0.87	1.00
Hourly Flow Rate, HFR	0	165	174	87	347	0
Percent Heavy Vehicles	6	--	--	6	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	58	0	71	0	0	0
Peak-Hour Factor, PHF	0.81	1.00	0.81	1.00	1.00	1.00
Hourly Flow Rate, HFR	71	0	87	0	0	0
Percent Heavy Vehicles	11	0	11	0	0	0
Percent Grade (%)		-2			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		87	71		87			
C (m) (vph)		1198	329		765			
v/c		0.07	0.22		0.11			
95% queue length		0.23	0.81		0.38			
Control Delay		8.2	18.9		10.3			
LOS		A	C		B			
Approach Delay	--	--	14.2					
Approach LOS	--	--	B					

HCS2000- DETAILED REPORT

General Information				Site Information	
Analyst	LMM			Intersection	Rte 16 NB Ramp/US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas
Date Performed	01/23/2003			Jurisdiction	Rochester, NH
Time Period	AM Peak Hour			Analysis Year	2013 No-Build
				Project ID	Rochester US 202 (CLD No. 02-0402)

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N _i	0	0	0	1	0	1	1	1	0	0	1	1
Lane group				L		R	L	T			T	R
Volume, V (vph)				78		95	64	184			410	100
% Heavy vehicles, %HV				2		2	2	2			2	2
Peak-hour factor, PHF				0.90		0.90	0.90	0.90			0.90	0.90
Pretimed (P) or actuated (A)				A		A	A	A			A	A
Start-up lost time, I _s				2.0		2.0	2.0	2.0			2.0	2.0
Extension of effective green, e				4.0		4.0	4.0	4.0			4.0	4.0
Arrival type, AT				3		3	5	5			3	3
Unit extension, UE				3.0		3.0	3.0	3.0			3.0	3.0
Filtering/metering, I				1.000	1.000	1.000	0.992	0.992			1.000	1.000
Initial unmet demand, Q _b				0.0		0.0	0.0	0.0			0.0	0.0
Ped / Bike / RTOR volumes	0			0		0				0		0
Lane width				12.0		12.0	12.0	12.0			12.0	12.0
Parking / Grade / Parking	N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N _m												
Buses stopping, N _B				0		0	0	0			0	0
Min. time for pedestrians, G _p												
Phasing	WB Only	02	03	04	NS Perm	NB Only	07	08				
Timing	G = 16.0	G =	G =	G =	G = 21.0	G = 5.0	G =	G =				
	Y = 6	Y =	Y =	Y =	Y = 6	Y = 6	Y =	Y =				
Duration of Analysis, T = 0.25						Cycle Length, C = 60.0						

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				87		106	71	204			456	111
Lane group capacity, c				531		475	529	1056			714	1187
v/c ratio, X				0.16		0.22	0.13	0.19			0.64	0.09
Total green ratio, g/C				0.30		0.30	0.57	0.57			0.38	0.75
Uniform delay, d ₁				15.5		15.8	11.6	6.3			15.1	2.0
Progression factor, PF				1.000		1.000	0.128	0.128			1.000	1.000
Delay calibration, k				0.11		0.11	0.11	0.11			0.22	0.11
Incremental delay, d ₂				0.1		0.2	0.1	0.1			1.9	0.0
Initial queue delay, d ₃												
Control delay				15.6		16.0	1.6	0.9			17.0	2.1
Lane group LOS				B		B	A	A			B	A
Approach delay				15.8			1.1			14.1		
Approach LOS				B			A			B		
Intersection delay	11.0						Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/14/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *US202 @ Rt. 16 NB Ramps*
 Jurisdiction *Rochester, NH*
 Analysis Year *2002 Existing Conditions*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Rt. 16 NB Ramps*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	266	97	31	265	0
Peak-Hour Factor, PHF	1.00	0.98	0.98	0.97	0.97	1.00
Hourly Flow Rate, HFR	0	271	98	31	273	0
Percent Heavy Vehicles	0	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	49	0	109	0	0	0
Peak-Hour Factor, PHF	0.84	1.00	0.84	1.00	1.00	1.00
Hourly Flow Rate, HFR	58	0	129	0	0	0
Percent Heavy Vehicles	4	0	4	0	0	0
Percent Grade (%)		-2			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		31	58		129			
C (m) (vph)		1195	417		716			
v/c		0.03	0.14		0.18			
95% queue length		0.08	0.48		0.65			
Control Delay		8.1	15.0+		11.1			
LOS		A	C		B			
Approach Delay	--	--	12.3					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Rt. 16 NB Ramps
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/20/03		Analysis Year	2003 No-Build
Analysis Time Period	PM Peak Hour			
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>				
East/West Street: <i>Rt. 16 NB Ramps</i>			North/South Street: <i>US202</i>	
Intersection Orientation: <i>North-South</i>			Study Period (hrs): <i>0.25</i>	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	274	100	32	273	0
Peak-Hour Factor, PHF	1.00	0.98	0.98	0.97	0.97	1.00
Hourly Flow Rate, HFR	0	279	102	32	281	0
Percent Heavy Vehicles	0	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	50	0	112	0	0	0
Peak-Hour Factor, PHF	0.84	1.00	0.84	1.00	1.00	1.00
Hourly Flow Rate, HFR	59	0	133	0	0	0
Percent Heavy Vehicles	4	0	4	0	0	0
Percent Grade (%)		-2			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		32	59		133			
C (m) (vph)		1183	406		707			
v/c		0.03	0.15		0.19			
95% queue length		0.08	0.50		0.69			
Control Delay		8.1	15.4		11.3			
LOS		A	C		B			
Approach Delay	--	--	12.5					
Approach LOS	--	--	B					

HCS2000- DETAILED REPORT

General Information

Analyst LMM
 Agency or Co. CLD Consulting Engineers, Inc.
 Date Performed 01/23/2003
 Time Period PM Peak Hour

Site Information

Intersection Rte 16 NB Ramp/US Rte 202
 Area Type All other areas
 Jurisdiction Rochester, NH
 Analysis Year 2013 No-Build
 Project ID Rochester US 202 (CLD No. 02-0402)

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	0	0	0	1	0	1	1	1	0	0	1	1
Lane group				L		R	L	T			T	R
Volume, V (vph)				68		151	21	368			335	75
% Heavy vehicles, %HV				2		2	2	2			2	2
Peak-hour factor, PHF				0.90		0.90	0.90	0.90			0.90	0.90
Pretimed (P) or actuated (A)				A		A	A	A			A	A
Start-up lost time, I_i				2.0		2.0	2.0	2.0			2.0	2.0
Extension of effective green, e				4.0		4.0	4.0	4.0			4.0	4.0
Arrival type, AT				3		3	4	4			3	3
Unit extension, UE				3.0		3.0	3.0	3.0			3.0	3.0
Filtering/metering, I				1.000	1.000	1.000	0.983	0.983			1.000	1.000
Initial unmet demand, Q_b				0.0		0.0	0.0	0.0			0.0	0.0
Ped / Bike / RTOR volumes	0			0		0				0		0
Lane width				12.0		12.0	12.0	12.0			12.0	12.0
Parking / Grade / Parking	N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B				0		0	0	0			0	0
Min. time for pedestrians, G_p												
Phasing	WB Only	02	03	04	NS Perm	NB Only	07	08				
Timing	G = 17.0	G =	G =	G =	G = 19.0	G = 6.0	G =	G =				
	Y = 6	Y =	Y =	Y =	Y = 6	Y = 6	Y =	Y =				
Duration of Analysis, $T = 0.25$						Cycle Length, $C = 60.0$						

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				76		168	23	409			372	83
Lane group capacity, c				560		501	563	1025			652	1161
v/c ratio, X				0.14		0.34	0.04	0.40			0.57	0.07
Total green ratio, g/C				0.32		0.32	0.55	0.55			0.35	0.73
Uniform delay, d_1				14.6		15.7	10.8	7.8			15.8	2.3
Progression factor, PF				1.000		1.000	0.681	0.681			1.000	1.000
Delay calibration, k				0.11		0.11	0.11	0.11			0.17	0.11
Incremental delay, d_2				0.1		0.4	0.0	0.3			1.2	0.0
Initial queue delay, d_3												
Control delay				14.7		16.1	7.4	5.6			17.0	2.3
Lane group LOS				B		B	A	A			B	A
Approach delay				15.7			5.7			14.3		
Approach LOS				B			A			B		
Intersection delay	11.3						Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst LMM
 Agency/Co. CLD Consulting Engineers, Inc.
 Date Performed 1/14/03
 Analysis Time Period AM Peak Hour

Site Information

Intersection US202 @ Rt. 16 SB Ramps
 Jurisdiction Rochester, NH
 Analysis Year 2002 Existing Conditions

Project Description Rochester US Rte 202 (CLD No. 02-402)

East/West Street: Rt. 16 SB Ramps

North/South Street: US202

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	44	241	0	0	266	69
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.89	0.89
Hourly Flow Rate, HFR	51	280	0	0	298	77
Percent Heavy Vehicles	6	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	21	0	37
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.69	1.00	0.69
Hourly Flow Rate, HFR	0	0	0	30	0	53
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-2		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	51					30		53
C (m) (vph)	1162					381		711
v/c	0.04					0.08		0.07
95% queue length	0.14					0.25		0.24
Control Delay	8.2					15.3		10.5
LOS	A					C		B
Approach Delay	--	--				12.2		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Rt. 16 SB Ramps*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Rt. 16 SB Ramps*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	47	259	0	0	286	74
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.89	0.89
Hourly Flow Rate, HFR	54	301	0	0	321	83
Percent Heavy Vehicles	6	--	--	0	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	23	0	40
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.69	1.00	0.69
Hourly Flow Rate, HFR	0	0	0	33	0	57
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-2		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	54					33		57
C (m) (vph)	1133					354		687
v/c	0.05					0.09		0.08
95% queue length	0.15					0.31		0.27
Control Delay	8.3					16.2		10.7
LOS	A					C		B
Approach Delay	--	--				12.7		
Approach LOS	--	--				B		

HCS2000- DETAILED REPORT

General Information

Analyst LMM
Agency or Co. CLD Consulting Engineers, Inc.
Date Performed 01/23/2003
Time Period AM Peak Hour

Site Information

Intersection Rte 16 SB Ramp/US Rte 202
Area Type All other areas
Jurisdiction Rochester, NH
Analysis Year 2013 No-Build
Project ID Rochester US 202 (CLD No. 02-0402)

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	1	0	1	0	0	0	0	1	1	1	1	0
Lane group	L		R					T	R	L	T	
Volume, V (vph)	30		54					218	195	103	385	
% Heavy vehicles, %HV	2		2					2	2	2	2	
Peak-hour factor, PHF	0.90		0.90					0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)	A		A					A	A	A	A	
Start-up lost time, l_i	2.0		2.0					2.0	2.0	2.0	2.0	
Extension of effective green, e	4.0		4.0					4.0	4.0	4.0	4.0	
Arrival type, AT	3		3					3	3	6	6	
Unit extension, UE	3.0		3.0					3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000	1.000					1.000	1.000	0.954	0.954	
Initial unmet demand, Q_b	0.0		0.0					0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0			0		0			
Lane width	12.0		12.0					12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0		0					0	0	0	0	
Min. time for pedestrians, G_p												
Phasing	EB Only	02	03	04	NS Perm	SB Only	07	08				
Timing	G = 18.0	G =	G =	G =	G = 17.0	G = 7.0	G =	G =				
	Y = 6	Y =	Y =	Y =	Y = 6	Y = 6	Y =	Y =				
Duration of Analysis, T = 0.25						Cycle Length, C = 60.0						

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	33		60					242	217	114	428	
Lane group capacity, c	590		528					590	1134	638	994	
v/c ratio, X	0.06		0.11					0.41	0.19	0.18	0.43	
Total green ratio, g/C	0.33		0.33					0.32	0.72	0.53	0.53	
Uniform delay, d_1	13.6		13.9					16.1	2.8	10.4	8.5	
Progression factor, PF	1.000		1.000					1.000	1.000	0.107	0.107	
Delay calibration, k	0.11		0.11					0.11	0.11	0.11	0.11	
Incremental delay, d_2	0.0		0.1					0.5	0.1	0.1	0.3	
Initial queue delay, d_3												
Control delay	13.6		14.0					16.6	2.9	1.2	1.2	
Lane group LOS	B		B					B	A	A	A	
Approach delay	13.8						10.1			1.2		
Approach LOS	B						B			A		
Intersection delay	6.0						Intersection LOS			A		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst LMM
 Agency/Co. CLD Consulting Engineers, Inc.
 Date Performed 1/14/03
 Analysis Time Period PM Peak Hour

Site Information

Intersection US202 @ Rt. 16 SB Ramps
 Jurisdiction Rochester, NH
 Analysis Year 2002 Existing Conditions

Project Description Rochester US Rte 202 (CLD No. 02-402)

East/West Street: Rt. 16 SB Ramps

North/South Street: US202

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	15	290	0	0	259	54
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.95	0.95
Hourly Flow Rate, HFR	16	311	0	0	272	56
Percent Heavy Vehicles	5	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	73	0	93
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.83	1.00	0.83
Hourly Flow Rate, HFR	0	0	0	88	0	112
Percent Heavy Vehicles	0	0	0	5	0	5
Percent Grade (%)	0			-2		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	16					88		112
C (m) (vph)	1215					427		733
v/c	0.01					0.21		0.15
95% queue length	0.04					0.76		0.54
Control Delay	8.0					15.6		10.8
LOS	A					C		B
Approach Delay	--	--				12.9		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM			Intersection	US202 @ Rt. 16 SB Ramps			
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH			
Date Performed	1/20/03			Analysis Year	2003 No-Build			
Analysis Time Period	PM Peak Hour							
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>								
East/West Street: <i>Rt. 16 SB Ramps</i>				North/South Street: <i>US202</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	15	299	0	0	267	56		
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.95	0.95		
Hourly Flow Rate, HFR	16	321	0	0	281	58		
Percent Heavy Vehicles	5	--	--	1	--	--		
Median Type	<i>Undivided</i>							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	0	0	0	75	0	96		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.83	1.00	0.83		
Hourly Flow Rate, HFR	0	0	0	90	0	115		
Percent Heavy Vehicles	0	0	0	5	0	5		
Percent Grade (%)	0			-2				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	16					90		115
C (m) (vph)	1204					416		723
v/c	0.01					0.22		0.16
95% queue length	0.04					0.81		0.56
Control Delay	8.0					16.0		10.9
LOS	A					C		B
Approach Delay	--	--				13.2		
Approach LOS	--	--				B		

HCS2000- DETAILED REPORT

General Information				Site Information	
Analyst	LMM			Intersection	Rte 16 SB Ramp/US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas
Date Performed	01/23/2003			Jurisdiction	Rochester, NH
Time Period	PM Peak Hour			Analysis Year	2013 No-Build
				Project ID	Rochester US 202 (CLD No. 02-0402)

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N _i	1	0	1	0	0	0	0	1	1	1	1	0
Lane group	L		R					T	R	L	T	
Volume, V (vph)	101		129					288	134	43	360	
% Heavy vehicles, %HV	2		2					2	2	2	2	
Peak-hour factor, PHF	0.90		0.90					0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)	A		A					A	A	A	A	
Start-up lost time, l _i	2.0		2.0					2.0	2.0	2.0	2.0	
Extension of effective green, e	4.0		4.0					4.0	4.0	4.0	4.0	
Arrival type, AT	3		3					3	3	4	4	
Unit extension, UE	3.0		3.0					3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000	1.000					1.000	1.000	0.980	0.980	
Initial unmet demand, Q _b	0.0		0.0					0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0			0		0			
Lane width	12.0		12.0					12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N _m												
Buses stopping, N _B	0		0					0	0	0	0	
Min. time for pedestrians, G _p												
Phasing	EB Only	02	03	04	SB Only	NS Perm	07	08				
Timing	G = 18.0	G =	G =	G =	G = 7.0	G = 17.0	G =	G =				
	Y = 6	Y =	Y =	Y =	Y = 6	Y = 6	Y =	Y =				
Duration of Analysis, T = 0.25				Cycle Length, C = 60.0								

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	112		143					320	149	48	400	
Lane group capacity, c	590		528					590	1134	463	994	
v/c ratio, X	0.19		0.27					0.54	0.13	0.10	0.40	
Total green ratio, g/C	0.33		0.33					0.32	0.72	0.53	0.53	
Uniform delay, d ₁	14.2		14.7					16.9	2.7	7.9	8.3	
Progression factor, PF	1.000		1.000					1.000	1.000	0.712	0.712	
Delay calibration, k	0.11		0.11					0.14	0.11	0.11	0.11	
Incremental delay, d ₂	0.2		0.3					1.0	0.1	0.1	0.3	
Initial queue delay, d ₃												
Control delay	14.4		14.9					17.9	2.7	5.7	6.2	
Lane group LOS	B		B					B	A	A	A	
Approach delay	14.7						13.1			6.1		
Approach LOS	B						B			A		
Intersection delay	10.8						Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/14/03	Analysis Year	2002 Existing Conditions
Analysis Time Period	AM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Hussey Hill / Chesley Hill		North/South Street: US202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	336	4	8	173	0
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87
Hourly Flow Rate, HFR	0	419	4	9	198	0
Percent Heavy Vehicles	6	--	--	8	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	5	0	12	1	1	1
Peak-Hour Factor, PHF	0.61	0.61	0.61	0.38	0.38	0.38
Hourly Flow Rate, HFR	8	0	19	2	2	2
Percent Heavy Vehicles	6	6	6	0	0	0
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	9		27			6	
C (m) (vph)	1351	1105		523			469	
v/c	0.00	0.01		0.05			0.01	
95% queue length	0.00	0.02		0.16			0.04	
Control Delay	7.7	8.3		12.3			12.8	
LOS	A	A		B			B	
Approach Delay	--	--	12.3			12.8		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Hussey/Chesley Rd*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Hussey Hill / Chesley Hill*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	363	4	9	186	0
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87
Hourly Flow Rate, HFR	0	453	4	10	213	0
Percent Heavy Vehicles	6	--	--	8	--	--

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LTR			LTR	
Upstream Signal		0		0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	5	0	13	1	1	1
Peak-Hour Factor, PHF	0.61	0.61	0.61	0.38	0.38	0.38
Hourly Flow Rate, HFR	8	0	21	2	2	2
Percent Heavy Vehicles	6	6	6	0	0	0

Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	10		29			6	
C (m) (vph)	1334	1073		499			438	
v/c	0.00	0.01		0.06			0.01	
95% queue length	0.00	0.03		0.18			0.04	
Control Delay	7.7	8.4		12.7			13.3	
LOS	A	A		B			B	
Approach Delay	--	--		12.7			13.3	
Approach LOS	--	--		B			B	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/20/03		Analysis Year	2013 No-Build
Analysis Time Period	AM Peak Hour			
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>				
East/West Street: <i>Hussey Hill / Chesley Hill</i>			North/South Street: <i>US202</i>	
Intersection Orientation: <i>North-South</i>			Study Period (hrs): <i>0.25</i>	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	486	6	12	250	0
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87
Hourly Flow Rate, HFR	0	607	7	13	287	0
Percent Heavy Vehicles	6	--	--	8	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	17	1	1	1
Peak-Hour Factor, PHF	0.61	0.61	0.61	0.38	0.38	0.38
Hourly Flow Rate, HFR	11	0	27	2	2	2
Percent Heavy Vehicles	6	6	6	0	0	0
Percent Grade (%)		4			-4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	13		38			6	
C (m) (vph)	1252	937		375			318	
v/c	0.00	0.01		0.10			0.02	
95% queue length	0.00	0.04		0.34			0.06	
Control Delay	7.9	8.9		15.7			16.5	
LOS	A	A		C			C	
Approach Delay	--	--		15.7			16.5	
Approach LOS	--	--		C			C	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/14/03		Analysis Year	2002 Existing Conditions
Analysis Time Period	PM Peak Hour			
Project Description Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Hussey Hill / Chesley Hill			North/South Street: US202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	280	1	8	315	2
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.87	0.87	0.87
Hourly Flow Rate, HFR	1	337	1	9	362	2
Percent Heavy Vehicles	4	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	4	0	10	4	1	0
Peak-Hour Factor, PHF	0.58	0.58	0.58	0.60	0.60	0.60
Hourly Flow Rate, HFR	6	0	17	6	1	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	9		23			7	
C (m) (vph)	1184	1205		553			333	
v/c	0.00	0.01		0.04			0.02	
95% queue length	0.00	0.02		0.13			0.06	
Control Delay	8.0	8.0		11.8			16.0	
LOS	A	A		B			C	
Approach Delay	--	--		11.8			16.0	
Approach LOS	--	--		B			C	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/20/03	Analysis Year	2003 No-Build
Analysis Time Period	PM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Hussey Hill / Chesley Hill		North/South Street: US202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	289	1	8	325	2
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.87	0.87	0.87
Hourly Flow Rate, HFR	1	348	1	9	373	2
Percent Heavy Vehicles	4	--	--	5	--	--

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LTR			LTR	
Upstream Signal		0			0

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	4	0	10	4	1	0
Peak-Hour Factor, PHF	0.58	0.58	0.58	0.60	0.60	0.60
Hourly Flow Rate, HFR	6	0	17	6	1	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	9		23			7	
C (m) (vph)	1173	1193		542			322	
v/c	0.00	0.01		0.04			0.02	
95% queue length	0.00	0.02		0.13			0.07	
Control Delay	8.1	8.0		11.9			16.4	
LOS	A	A		B			C	
Approach Delay	--	--	11.9			16.4		
Approach LOS	--	--	B			C		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/20/03	Analysis Year	2013 No-Build
Analysis Time Period	PM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Hussey Hill / Chesley Hill		North/South Street: US202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	390	1	11	436	3
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.87	0.87	0.87
Hourly Flow Rate, HFR	1	469	1	12	501	3
Percent Heavy Vehicles	4	—	—	5	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	6	0	14	6	1	0
Peak-Hour Factor, PHF	0.58	0.58	0.58	0.60	0.60	0.60
Hourly Flow Rate, HFR	10	0	24	9	1	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		4			-4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	12		34			10	
C (m) (vph)	1050	1076		397			212	
v/c	0.00	0.01		0.09			0.05	
95% queue length	0.00	0.03		0.28			0.15	
Control Delay	8.4	8.4		14.9			22.8	
LOS	A	A		B			C	
Approach Delay	--	--		14.9			22.8	
Approach LOS	--	--		B			C	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/14/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Estes Road*
 Jurisdiction *Rochester, NH*
 Analysis Year *2002 Existing Conditions*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Estes Road*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	5	227	2	16	144	19
Peak-Hour Factor, PHF	0.81	0.81	0.81	0.83	0.83	0.83
Hourly Flow Rate, HFR	6	280	2	19	173	22
Percent Heavy Vehicles	7	--	--	9	--	--
Median Type	<i>Undivided</i>					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	<i>LTR</i>			<i>LTR</i>		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	5	12	50	63	37	13
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.88	0.88	0.88
Hourly Flow Rate, HFR	6	14	62	71	42	14
Percent Heavy Vehicles	3	3	3	3	3	3
Percent Grade (%)		0			0	
Flared Approach		<i>N</i>			<i>N</i>	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		<i>LTR</i>			<i>LTR</i>	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	<i>LTR</i>	<i>LTR</i>		<i>LTR</i>			<i>LTR</i>	
v (vph)	6	19		82			127	
C (m) (vph)	1349	1241		638			435	
v/c	0.00	0.02		0.13			0.29	
95% queue length	0.01	0.05		0.44			1.20	
Control Delay	7.7	7.9		11.5			16.7	
LOS	<i>A</i>	<i>A</i>		<i>B</i>			<i>C</i>	
Approach Delay	--	--		11.5			16.7	
Approach LOS	--	--		<i>B</i>			<i>C</i>	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Estes Road*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Estes Road*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	5	245	2	17	155	20
Peak-Hour Factor, PHF	0.81	0.81	0.81	0.83	0.83	0.83
Hourly Flow Rate, HFR	6	302	2	20	186	24
Percent Heavy Vehicles	7	--	--	9	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	5	13	54	68	40	14
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.88	0.88	0.88
Hourly Flow Rate, HFR	6	16	67	77	45	15
Percent Heavy Vehicles	3	3	3	3	3	3
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	6	20		89			137	
C (m) (vph)	1331	1218		613			407	
v/c	0.00	0.02		0.15			0.34	
95% queue length	0.01	0.05		0.51			1.46	
Control Delay	7.7	8.0		11.9			18.3	
LOS	A	A		B			C	
Approach Delay	--	--	11.9			18.3		
Approach LOS	--	--	B			C		

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM			Intersection	US202 @ Estes Road			
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH			
Date Performed	1/20/03			Analysis Year	2013 No-Build			
Analysis Time Period	AM Peak Hour							
Project Description: <i>Rochester US Rte 202 (CLD No. 02-402)</i>								
East/West Street: <i>Estes Road</i>				North/South Street: <i>US202</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	7	329	3	23	208	27		
Peak-Hour Factor, PHF	0.81	0.81	0.81	0.83	0.83	0.83		
Hourly Flow Rate, HFR	8	406	3	27	250	32		
Percent Heavy Vehicles	7	--	--	9	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	7	17	72	91	54	19		
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.88	0.88	0.88		
Hourly Flow Rate, HFR	8	21	89	103	61	21		
Percent Heavy Vehicles	3	3	3	3	3	3		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	8	27		118			185	
C (m) (vph)	1252	1113		500			289	
v/c	0.01	0.02		0.24			0.64	
95% queue length	0.02	0.07		0.91			4.07	
Control Delay	7.9	8.3		14.4			37.2	
LOS	A	A		B			E	
Approach Delay	--	--	14.4			37.2		
Approach LOS	--	--	B			E		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Estes Road
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/14/03		Analysis Year	2002 Existing Conditions
Analysis Time Period	PM Peak Hour			
Project Description Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Estes Road			North/South Street: US202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	13	209	6	54	206	59
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89
Hourly Flow Rate, HFR	15	245	7	60	231	66
Percent Heavy Vehicles	3	--	--	4	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	32	43	30	29	6
Peak-Hour Factor, PHF	0.72	0.72	0.72	0.80	0.80	0.80
Hourly Flow Rate, HFR	1	44	59	37	36	7
Percent Heavy Vehicles	3	3	3	5	5	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	15	60		104			80	
C (m) (vph)	1259	1302		501			321	
v/c	0.01	0.05		0.21			0.25	
95% queue length	0.04	0.14		0.77			0.96	
Control Delay	7.9	7.9		14.1			19.9	
LOS	A	A		B			C	
Approach Delay	--	--		14.1			19.9	
Approach LOS	--	--		B			C	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM	Intersection	US202 @ Estes Road				
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH				
Date Performed	1/20/03	Analysis Year	2003 No-Build				
Analysis Time Period	PM Peak Hour						
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>							
East/West Street: <i>Estes Road</i>		North/South Street: <i>US202</i>					
Intersection Orientation: <i>North-South</i>		Study Period (hrs): <i>0.25</i>					

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	13	216	6	56	212	61
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89
Hourly Flow Rate, HFR	15	254	7	62	238	68
Percent Heavy Vehicles	3	--	--	4	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	33	44	31	30	6
Peak-Hour Factor, PHF	0.72	0.72	0.72	0.80	0.80	0.80
Hourly Flow Rate, HFR	1	45	61	38	37	7
Percent Heavy Vehicles	3	3	3	5	5	5
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	15	62		107			82	
C (m) (vph)	1249	1292		490			309	
v/c	0.01	0.05		0.22			0.27	
95% queue length	0.04	0.15		0.82			1.05	
Control Delay	7.9	7.9		14.4			20.8	
LOS	A	A		B			C	
Approach Delay	--	--	14.4			20.8		
Approach LOS	--	--	B			C		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *US202 @ Estes Road*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Estes Road*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	18	290	8	75	285	82
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89
Hourly Flow Rate, HFR	21	341	9	84	320	92
Percent Heavy Vehicles	3	--	--	4	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	44	60	42	40	8
Peak-Hour Factor, PHF	0.72	0.72	0.72	0.80	0.80	0.80
Hourly Flow Rate, HFR	1	61	83	52	49	9
Percent Heavy Vehicles	3	3	3	5	5	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	21	84		145			110	
C (m) (vph)	1142	1198		365			187	
v/c	0.02	0.07		0.40			0.59	
95% queue length	0.06	0.23		1.85			3.21	
Control Delay	8.2	8.2		21.2			48.6	
LOS	A	A		C			E	
Approach Delay	--	--		21.2			48.6	
Approach LOS	--	--		C			E	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/14/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Dry Hill Rd.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2002 Existing Conditions*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Dry Hill Road / Oak Street*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	224	38	2	149	11
Peak-Hour Factor, PHF	0.79	0.79	0.79	0.88	0.88	0.88
Hourly Flow Rate, HFR	0	283	48	2	169	12
Percent Heavy Vehicles	1	--	--	4	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	13	2	0	10	5	2
Peak-Hour Factor, PHF	0.63	0.63	0.63	0.57	0.57	0.57
Hourly Flow Rate, HFR	20	3	0	17	8	3
Percent Heavy Vehicles	0	0	0	6	6	6
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	2		23			28	
C (m) (vph)	1400	1217		482			499	
v/c	0.00	0.00		0.05			0.06	
95% queue length	0.00	0.00		0.15			0.18	
Control Delay	7.6	8.0		12.8			12.6	
LOS	A	A		B			B	
Approach Delay	--	--	12.8			12.6		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Dry Hill Rd.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Dry Hill Road / Oak Street*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	241	41	2	160	12
Peak-Hour Factor, PHF	0.79	0.79	0.79	0.88	0.88	0.88
Hourly Flow Rate, HFR	0	305	51	2	181	13
Percent Heavy Vehicles	1	--	--	4	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	14	2	0	11	5	2
Peak-Hour Factor, PHF	0.63	0.63	0.63	0.57	0.57	0.57
Hourly Flow Rate, HFR	22	3	0	19	8	3
Percent Heavy Vehicles	0	0	0	6	6	6
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	2		25			30	
C (m) (vph)	1385	1192		455			472	
v/c	0.00	0.00		0.05			0.06	
95% queue length	0.00	0.01		0.17			0.20	
Control Delay	7.6	8.0		13.4			13.1	
LOS	A	A		B			B	
Approach Delay	--	--		13.4			13.1	
Approach LOS	--	--		B			B	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM	Intersection	US202 @ Dry Hill Rd.				
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH				
Date Performed	1/20/03	Analysis Year	2013 No-Build				
Analysis Time Period	AM Peak Hour						
Project Description: Rochester US Rte 202 (CLD No. 02-402)							
East/West Street: Dry Hill Road / Oak Street		North/South Street: US202					
Intersection Orientation: North-South		Study Period (hrs): 0.25					

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	325	55	3	216	16
Peak-Hour Factor, PHF	0.79	0.79	0.79	0.88	0.88	0.88
Hourly Flow Rate, HFR	0	411	69	3	245	18
Percent Heavy Vehicles	1	--	--	4	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	19	3	0	14	7	3
Peak-Hour Factor, PHF	0.63	0.63	0.63	0.57	0.57	0.57
Hourly Flow Rate, HFR	30	4	0	24	12	5
Percent Heavy Vehicles	0	0	0	6	6	6
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	3		34			41	
C (m) (vph)	1307	1072		338			365	
v/c	0.00	0.00		0.10			0.11	
95% queue length	0.00	0.01		0.33			0.38	
Control Delay	7.8	8.4		16.8			16.1	
LOS	A	A		C			C	
Approach Delay	--	--	16.8			16.1		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Dry Hill Rd.
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/14/03		Analysis Year	2002 Existing Conditions
Analysis Time Period	PM Peak Hour			
Project Description Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Dry Hill Road / Oak Street			North/South Street: US202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	219	18	0	204	9
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate, HFR	1	240	19	0	224	9
Percent Heavy Vehicles	7	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	32	6	5	4	4	0
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.50	0.50	0.50
Hourly Flow Rate, HFR	38	7	6	8	8	0
Percent Heavy Vehicles	2	2	2	0	0	0
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	0		51			16	
C (m) (vph)	1306	1288		508			484	
v/c	0.00	0.00		0.10			0.03	
95% queue length	0.00	0.00		0.33			0.10	
Control Delay	7.8	7.8		12.9			12.7	
LOS	A	A		B			B	
Approach Delay	--	--		12.9			12.7	
Approach LOS	--	--		B			B	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/20/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *US202 @ Dry Hill Rd.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 No-Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Dry Hill Road / Oak Street*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	226	19	0	210	9
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate, HFR	1	248	20	0	230	9
Percent Heavy Vehicles	7	--	--	5	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	33	6	5	4	4	0
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.50	0.50	0.50
Hourly Flow Rate, HFR	39	7	6	8	8	0
Percent Heavy Vehicles	2	2	2	0	0	0

Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	0		52			16	
C (m) (vph)	1299	1278		497			475	
v/c	0.00	0.00		0.10			0.03	
95% queue length	0.00	0.00		0.35			0.10	
Control Delay	7.8	7.8		13.1			12.8	
LOS	A	A		B			B	
Approach Delay	--	--	13.1			12.8		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US202 @ Dry Hill Rd.
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/20/03	Analysis Year	2013 No-Build
Analysis Time Period	PM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Dry Hill Road / Oak Street		North/South Street: US202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	303	25	0	282	12
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate, HFR	1	332	27	0	309	13
Percent Heavy Vehicles	7	—	—	5	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	44	8	7	6	6	0
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.50	0.50	0.50
Hourly Flow Rate, HFR	53	9	8	12	12	0
Percent Heavy Vehicles	2	2	2	0	0	0
Percent Grade (%)		4			-4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	0		70			24	
C (m) (vph)	1210	1183		384			370	
v/c	0.00	0.00		0.18			0.06	
95% queue length	0.00	0.00		0.66			0.21	
Control Delay	8.0	8.0		16.5			15.4	
LOS	A	A		C			C	
Approach Delay	—	—	16.5			15.4		
Approach LOS	—	—	C			C		

APPENDIX E

TRIP GENERATION / DISTRIBUTION CALCULATIONS

Assumptions for Highfield Commons Trip Generation:

Proposed Ancillary Uses:

General Store: (Assume ITE LUC 852 Convenience Market (open 15-16 hours))

AM Peak Hour: 31.02 trips/ksf @ 2.5 ksf = 78 trips

PM Peak Hour: 34.57 trips/ksf @ 2.5 ksf = 86 trips

[50% in / 50% out]

- most trips will be associated with the proposed development.
- If a sign is placed at the entrance, they will likely get some new/passby traffic. I estimate that only 20% will be external, most of which will be passby.

Day Care Center:

Assume that a great majority of the attendance will be by families within the development

Health Club

Assume that a great majority of the attendance will be from within the development

Church:

Assume that a study of this use is not necessary for the peak hours that are within the proposed scope of work.

Amphitheater:

Assume that a study of this use is not necessary for the peak hours that are within the proposed scope of work.

Bed & Breakfast: (Assume ITE LUC 552 Motel)

This will account for approximately 0.5 trips per room (6-8 rooms total) and will be a negligible volume.

Conclusion:

The conservatism in the traffic generation prepared by Laurie Rauseo will account for most of the trips associated with the proposed ancillary uses listed above.

Laurie M. Rauseo, P.E., PTOE

Traffic Engineering • Transportation Planning

152 Morrill Road
Canterbury, NH 03224

Phone: (603) 783-4802
Fax: (603) 783-4851

TRANSMITTAL MEMORANDUM



DATE: January 13, 2003
TO: Kevin Dandrade
CLD Engineers
FROM: Laurie M. Rauseo, P.E., PTOE
RE: Request for Data from Highfield Commons
Route 202 Corridor Study, Rochester

Per your request, I have enclosed copies of the traffic data I collected for the Highfield Commons project. I have not prepared a Traffic Impact Study for this project as of this date. However, I have prepared preliminary trip generation analysis as follows:

Highfield Commons: Proposed development plans as of 1/3/03:

Apartments	168 units
Rowhouses	73 units
Single Family	127 lots
55 and over	22 lots
Total	390 units

Several supporting land uses such as a health club, day care, church, B&B, and a general store are included in the conceptual plans at this time. Trip generation for the above land use plan, based on ITE Trip Generation, is estimated at approximately 250 AM peak hour trips and 320 PM peak hour trips; 50 enter/200 exit in AM, 210 enter/110 exit in PM. Limited off-site traffic is expected to be generated by the ancillary uses. At this time, it is proposed to provide access to Highfield Commons via one driveway on the north side of Route 202, approximately 1500 feet east of Hussey Hill Road.

If you have any questions, or need further information, please call me at (603) 783-4802 or contact me by e-mail at laurie@rauseo.net.

cc: Jim Mullaney
Bob Rook

HIGHFIELD COMMONS

	Number of Units	AM			PM			Source for Trip Generation
		Trips	Enter	Exit	Trips	Enter	Exit	
Apartments	168	87	14	73	110	74	36	(ITE LUC 220, equations)
Rowhouses	73	40	7	33	47	31	16	(ITE LUC 230, equations)
Single Family Houses	127	98	24	74	133	85	48	(ITE LUC 210, equations)
55 and over	22	8	2	6	10	7	3	(SGP & Compay)
total	390	233	47	186	300	197	103	
health club								
day care								
Bed & Breakfast								
General Store								
Laurie M. Rauseo, PE, PTOE								
(above land use plan: 390		250	50	200	320	210	110	
units +supporting land uses)								
Difference	no. trips	17	3	14	20	13	7	
(LMR vs Calc'd)	%	7.3%	6.4%	7.5%	6.7%	6.6%	6.8%	
	ave. %			6.9%				



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JOB ROCHESTER-US202 Corridor JOB NO. 02-402

SHEET NO. 1 OF 6

CALCULATED BY LMM DATE 1/27/03

CHECKED BY KRD DATE 1/29/03

SUBJECT TRIP GENERATION: SECRETARIAT ESTATES SCALE N/A

PROPOSED DEVELOPMENT:

RESIDENTIAL USES

- 50 UNITS-AGE REST. 55+ (2003/2013)
- 40 UNITS-(APT.) AGE REST 55+ (2013)
- 32 UNITS-GREAT HOUSES (CONDOS) (2013)
- 125 Cottages (35 AGE REST.) (2013)
- 28 units @ town houses (2013)

Auxiliary USES

- 22,800 SF EQUESTRIAN CENTER (2013)
- 5000 SF BARN, TACK SHOP (2013)
- 4,800 SF OFFICE, Commercial (2013)
- 2,200 SF CLUB house (2013)
- 5200 SF BED & BREAKFAST (6-8 rms) (2013)
- 2,000 SF general store (2013)

TRIP GENERATION: RESIDENTIAL

I. 50 UNITS @ INN (AGE RESTRICTED 55+):

SG PER NAW & CO. DATA

A. AM PEAK HOUR

rate = 0.38, 30% enter, 70% exit

$$t = 0.38 * 50 = 19 \quad \text{enter} = 19 * 0.3 = 6 \quad \text{exit} = 19 * 0.70 = 13$$

B. PM PEAK HOUR

rate = 0.44, 72% enter, 28% exit

$$t = 0.44 * 50 = 22 \quad \text{enter} = 22 * 0.72 = 16 \quad \text{exit} = 22 * 0.28 = 6$$

II. 40 Units @ Hilltop Lodge (AGE RESTRICTED 55+)

SG PER NAW & CO. DATA

A. AM PEAK HOUR

rate = 0.38, 30% enter, 70% exit

$$t = 0.38 * 40 = 15 \quad \text{enter} = 15 * 0.3 = 5 \quad \text{exit} = 15 * 0.7 = 10$$

B. PM PEAK HOUR

Rate = 0.44, 72% ENTER, 28% EXIT

$$t = 0.44 * 40 = 18 \quad \text{enter} = 18 * 0.72 = 13 \quad \text{exit} = 18 * 0.28 = 5$$

III. 32 UNITS @ GREAT HOUSES (CONDOMINIUMS)

ITE LUC (230): RESIDENTIAL Condominiums/Townhouses

A. Daily Weekday

$$\text{ARRIVAL RATE} = 5.8\% \text{ FROM LUC} \quad \ln(t) = 0.85 \ln(X) + 2.564 \quad R^2 = 0.83$$

50% entering, 50% exiting



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JOB ROCHESTER-US 202 Corridor JOB NO. 02-402

SHEET NO. 2 OF 6

CALCULATED BY LMM DATE 1/27/03

CHECKED BY KRD DATE 1/29/03

SUBJECT TRIP GENERATION: SECRETARIAT ESTATES SCALE N/A

(Cont.)

1. Average Rate

$$t = 5.860 * 32 = 188 \quad \text{ENTERING} = 188 * 0.5 = 94 \quad \text{EXITING} = 188 * 0.5 = 94$$

2. Equation

$$\ln(t) = 0.850 * \ln(32) + 2.564 = 5.509876$$

$$t = 247 \quad \text{ENTERING} = 247 * 0.5 = 124 \quad \text{EXITING} = 247 * 0.5 = 123$$

B. AM PEAK HOUR

1. average rate = 0.44, equation = $\ln(t) = 0.790 \ln(x) + 0.298$, $R^2 = 0.74$
17% ENTERING, 83% EXITING

1. Average Rate

$$t = 0.44 * 32 = 14 \quad \text{ENTERING} = 14 * 0.17 = 2 \quad \text{EXITING} = 14 * 0.83 = 12$$

2. Equation

$$\ln(t) = 0.790 * \ln(32) + 0.298 = 3.035931$$

$$T = 21 \quad \text{ENTERING} = 21 * 0.17 = 4 \quad \text{EXITING} = 21 * 0.83 = 17$$

C. PM PEAK HOUR

average rate = 0.54, equation = $\ln(t) = 0.827 \ln(x) + 0.309$, $R^2 = 0.79$
entering = 67%, exiting = 33%

1) Average rate

$$t = 0.54 * 32 = 17 \quad \text{ENTERING} = 17 * 0.67 = 11 \quad \text{EXITING} = 17 * 0.33 = 6$$

2) Equation

$$\ln(t) = 0.827 * \ln(32) + 0.309 = 3.175164$$

$$T = 24 \quad \text{ENTERING} = 24 * 0.67 = 16 \quad \text{EXITING} = 24 * 0.33 = 8$$

IV. 125 cottages - single family residences

(ALTHOUGH 35-AGE REST. TO 55+

ITE WUC(210) single-family detached housing

THE HIGHER "NON" AGE-REST. ITE RATE WAS USED FOR ALL 125 COTTAGES 2 BE CONSERVATIVE

A) Daily - Week day

average rate = 9.57, equation = $\ln(t) = 0.920 \ln(x) + 2.707$, $R^2 = 0.96$
50% entering, 50% EXITING

1) Average Rate

$$t = 9.57 * 125 = 1196 \quad \text{entering} = 1196 * 0.5 = 598 \quad \text{EXITING} = 1196 * 0.5 = 598$$

2) Equation

$$\ln(t) = 0.920 \ln(125) + 2.707 = 7.149049$$

$$t = 1273 \quad \text{entering} = 1273 * 0.5 = 637 \quad \text{EXITING} = 1273 * 0.5 = 636$$



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JOB ROCHESTER - US 202 Corridor JOB NO. 02-402
SHEET NO. 3 OF 6
CALCULATED BY Umm DATE 11/27/03
CHECKED BY KRD DATE 1/29/03
SUBJECT TRIP Generation: SECRETARIAT ESTATES SCALE N/A

(cont.)

B) AM PEAK HOUR

Average Rate = 0.75, Equation = $T = 0.700(X) + 9.477$ $R^2 = 0.89$

25% ENTERING, 75% EXITING

1) AVERAGE RATE

$T = 0.75(125) = 94$ ENTERING = $94 * 0.25 = 24$ EXITING = $94 * 0.75 = 70$

2) EQUATION

$T = 0.700(125) + 9.477 = 97$ ENTERING = $97 * 0.25 = 24$ EXITING = $97 * 0.75 = 73$

C) PM PEAK HOUR

Average Rate = 1.01, Equation = $\ln(T) = 0.901 \ln(X) + 0.527$ $R^2 = 0.91$

64% ENTERING, 36% EXITING

1) AVERAGE RATE

$T = 1.01 * 125 = 126$ ENTERING = $126 * 0.64 = 81$ EXITING = $126 * 0.36 = 45$

2) EQUATION

$\ln(T) = 0.901 * \ln(125) + 0.527 = 4.877311$

$T = 131$ ENTERING = $131 * 0.64 = 84$ EXITING = $131 * 0.36 = 47$

V. 23 UNITS - TOWNHOUSES

ITE LUC(230) = RESIDENTIAL CONDOMINIUMS/TOWNHOUSES

A) Daily Weekday

Average Rate = 5.86, Equation = $\ln(T) = 0.850 \ln(X) + 2.564$ $R^2 = 0.83$

50% ENTERING, 50% EXITING

1) AVERAGE RATE

$T = 5.86 * 28 = 164$ ENTERING = $164 * 0.5 = 82$ EXITING = $164 * 0.5 = 82$

2) EQUATION

$\ln(T) = 0.850 \ln(28) + 2.564 = 5.396374$

$T = 221$ ENTERING = $221 * 0.5 = 111$ EXITING = $221 * 0.5 = 110$



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JOB ROCHESTER-US 202 Corridor JOB NO. 02-402

SHEET NO. 4 OF 6

CALCULATED BY Umm DATE 1/27/03

CHECKED BY KRD DATE 1/29/03

SUBJECT TRIP GENERATION-SECRETARIAT ESTATES SCALE N/A

(CONT.)

B) AM PEAK HOUR

average rate = 0.44, EQUATION = $\ln(T) = 0.790 \ln(X) + 0.298$ $R^2 = 0.74$

17% ENTERING, 83% EXITING

1) AVERAGE RATE

$T = 0.44 * 28 = 12$ ENTERING = $12 * 0.17 = 2$ EXITING = $12 * 0.83 = 10$

2) EQUATION

$\ln(T) = 0.790 * \ln(28) + 0.298 = 2.930442$

$T = 19$ ENTERING = $19 * 0.17 = 3$ EXITING = $19 * 0.83 = 16$

C) PM PEAK HOUR

average rate = 0.54, EQUATION = $\ln(T) = 0.827 \ln(X) + 0.309$ $R^2 = 0.79$

ENTERING = 67%, EXITING = 33%

1) AVERAGE RATE

$T = 0.54 * 28 = 15$ ENTERING = $15 * 0.67 = 10$ EXITING = $15 * 0.33 = 5$

2) EQUATION

$\ln(T) = 0.827 \ln(28) + 0.309 = 3.064733$

$T = 21$ ENTERING = $21 * 0.67 = 14$ EXITING = $21 * 0.33 = 7$

• ANCILLARY USES

I. 22,800 SF EQUESTRIAN CENTER

IT WAS ASSUMED THAT THIS DEVELOPMENT WOULD GENERATE 20 TRIPS
[50% ENTERING/50% EXITING] DURING THE AM & PM PEAK HOURS -
SINCE NO ITE TRIP GENERATION INFO FOR THIS TYPE OF USE IS
AVAILABLE.

II. 5,000 SF BARN, TACK SHOP

ASSUME ITE LUC (814) SPECIALTY RETAIL

2.59 TRIPS/KSF = PM PEAK HOUR (ASSUME SAME FOR AM W/REVERSE

43% ENTER/57% EXIT

DIRECTIONAL DIST. - SINCE NO
ITE DATA AVAILABLE).

AM PEAK HOUR

$T = 2.59 * 5 = 13$ enter = $13 * 0.57 = 7$ EXIT = $13 * 0.43 = 6$

PM PEAK HOUR

$T = 2.59 * 5 = 13$ enter = $13 * 0.43 = 6$ EXIT = $13 * 0.57 = 7$



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JOB Rochester US202 Corridor

JOB NO. 02-402

SHEET NO. 5

OF 6

CALCULATED BY LMM

DATE 1/27/03

CHECKED BY KRD

DATE 1/29/03

SUBJECT TRIP GENERATION - SECRETARIAT ESTATES

SCALE N/A

(CONT.)

III. 4,800 SF OFFICE - COMMERCIAL

ITE UC (710) general office building (1000 SF GFA)

A) Weekday - daily

Average rate = 11.01 50% enter, 50% exit

$t = 11.01 * 4.8 = 53$ Entering = $0.5 * 53 = 27$ Exiting = $53 * 0.5 = 26$

B) AM Peak Hour

Average rate = 1.56 88% entering, 12% exiting

$t = 1.56 * 4.8 = 7$ Entering = $0.88 * 7 = 6$ Exiting = $0.12 * 7 = 1$

C) PM Peak Hour

Average rate = 1.49 entering = 17% exiting = 83%

$t = 1.49 * 4.8 = 7$ Entering = $7 * 0.17 = 1$ Exiting = $7 * 0.83 = 6$

IV. 2,200 SF CLUBHOUSE

- ASSUME THAT THE MAJORITY OF ATTENDANCE WILL BE FROM WITHIN THE DEVELOPMENT

V. BED & BREAKFAST (6-8 RMS)

ASSUME ITE UC (312) MOTEL

(11 rms)

- THIS WILL ACCOUNT FOR APPROX. 0.50 TRIPS PER ROOM (6-8 RMS TOTAL) AND WILL BE A NEGLIGIBLE VOLUME.

VI. 2,000 SF GENERAL STORE

ASSUME ITE UC (852) convenience market open 15-16 hrs

A) AM PEAK HOUR

Average rate = 31.02, 50% enter, 50% exit

$t = 31.02 * 2 = 62$ (31 enter, 31 exit)

B) PM PEAK HOUR

Average rate = 34.57 49% enter, 51% exit

$t = 34.57 * 2 = 69$ (34 enter, 35 exit)

- MOST OF THESE TRIPS WILL BE ASSOCIATED WITH THE PROPOSED DEVELOPMENT

- IT WAS ASSUMED THAT APPROXIMATELY 25% WILL BE EXTERNAL & OF THE PASS-BY TYPE, %

AM = $62 * 0.25 = 16$ (8 enter, 8 exit)

PM = $69 * 0.25 = 18$ (9 enter, 9 exit)



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JOB Rochester-US 202

JOB NO. 02-402

SHEET NO. 6

OF 6

CALCULATED BY Lmm

DATE 1/27/03

CHECKED BY KRD

DATE 1/29/03

SUBJECT TRIP Generation: Secretariat Estates SCALE N/A

Summary

2003 RESIDENTIAL

• 50 UNITS-AGE REST. 55+

AM PEAK HOUR

19 (6 enter, 13 exit)

PM PEAK HOUR

22 (16 enter, 6 exit)

2013 RESIDENTIAL

• 50 Units-age Rest. 55+

19 (6 enter, 13 exit)

22 (16 enter, 6 exit)

• 40 UNITS-(APT). AGE REST. 55+

15 (5 enter, 10 exit)

18 (13 enter, 5 exit)

• 32 UNITS-GREAT HOUSES (CARRIAGES)

21 (4 enter, 17 exit)

24 (16 enter, 8 exit)

• 125 cottages

97 (24 enter, 73 exit)

131 (84 enter, 47 exit)

• 28 town houses

19 (3 enter, 16 exit)

21 (14 enter, 7 exit)

TOTAL RESIDENTIAL (275)

171 (42 ENTER, 129 EXIT)

216 (143 enter, 73 exit)

2013 Ancillary USES

• 22,800 SF EQUESTRIAN CENTER

20 (10 enter, 10 exit)

20 (10 enter, 10 exit)

• 5,000 SF BARN, TACK SHOP

13 (7 enter, 6 exit)

13 (6 enter, 7 exit)

• 4,800 SF COMMERCIAL (OFFICE)

7 (6 enter, 1 exit)

7 (1 enter, 6 exit)

• 2,200 SF CLUB HOUSE

(MAJORITY ATTENDANCE W/IN DEVELOPMENT)

• BED & BREAKFAST (6-8 RMS)

(NEGLECTIBLE VOLUME)

• 2,000 SF GENERAL STORE

16 (8 enter, 8 exit)*

18 (9 enter, 9 exit)*

TOTAL "NEW": 40 (23 enter, 17 exit)

40 (17 enter, 23 exit)

* this number represents

"PASS-BY": 16 (8 enter, 8 exit)

18 (9 enter, 9 exit)

25% of total trips generated

56 (31 enter, 25 exit)

58 (25 enter, 32 exit)

by this development &

represents the number of

trips assumed to be external

of the development. It

is also assumed that these

trips are of the PASS-BY type.

GRAND TOTAL :

"NEW" -

211 (65 enter, 146 exit)

256 (160 enter, 96 exit)

PASSBY -

16 (8 enter, 8 exit)

18 (9 enter, 9 exit)

227 (73 enter, 154 exit)

274 (169 enter, 105 exit)



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JOB Rochester - US 202 Corridor Study JOB NO. 02-402

SHEET NO. 1 OF 1

CALCULATED BY LMM DATE 1/13/03

CHECKED BY KRD DATE 1/28/03

SUBJECT TRIP GENERATION: Chestey Rd Subdivision SCALE N/A

Chestey Road Subdivision: 33 Single Family homes 100% BUILD-OUT, 2003/2013
ITE LX (210) Single-family detached housing

1) DAILY, Average Weekday

average rate = 9.57, equation = $\ln(T) = 0.920 \ln(x) + 2.707$ $R^2 = 0.96$

50% entering, 50% exiting

A) Average Rate

$t = 9.57(33) = 316$ entering = $0.5 * 316 = 158$ exiting = $0.5 * 316 = 158$

B) Equation

$\ln(t) = 0.920(33) + 2.707 = 5.861$

$T = 351$

entering = $0.5 * 351 = 176$ exiting = $0.5 * 351 = 175$

2) AM PEAK HOUR

average rate = 0.75, equation = $0.700(x) + 9.477$, $R^2 = 0.89$

25% entering, 75% exiting

A) Average Rate

$t = 0.75 * 33 = 25$ entering = $25 * 0.25 = 6$ exiting = $25 * 0.75 = 19$

B) Equation

$t = 0.700(33) + 9.477 = 33$ entering = $33 * 0.25 = 8$ exiting = $33 * 0.75 = 25$

3) PM Peak Hour

average rate = 1.01, equation = $\ln(t) = 0.901 * \ln(x) + 0.527$, $R^2 = 0.91$

64% entering, 36% exiting

A) Average Rate

$t = 1.01 * 33 = 33$ entering = $33 * 0.64 = 21$ exiting = $33 * 0.36 = 12$

B) Equation

$\ln(t) = 0.901 * \ln(x) + 0.527 = 3.677$

$t = 40$

entering = $40 * 0.64 = 26$ exiting = $40 * 0.36 = 14$

∴, to be conservative, trip generation using the equations, which yielded a higher value, was utilized & is summarized below:

Daily: 351 trips (176 entering, 175 exiting)

AM PEAK: 33 trips (8 entering, 25 exiting)

PM PEAK: 40 trips (26 entering, 14 exiting)



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JOB Rochester, US202 Corridor Study JOB NO. 02-402

SHEET NO. 1 OF 5

CALCULATED BY Lmm DATE 1/14/03

CHECKED BY KRD DATE 1/28/03

SUBJECT TRIP GENERATION: Ledgeview Drive SCALE N/A

LEDGEVIEW DRIVE SUBDIVISION(S): 140 condominiums ITE LUC (230)
104 apartments ITE LUC (220)
12 Single-family houses ITE LUC (210)

I. 2003 (OPENING YEAR)

- A. 104 APARTMENTS
- B. 80 condominiums
- C. 6 SINGLE FAMILY HOMES

II. 2013 (DESIGN YEAR)

- A. 104 APARTMENTS
- B. 140 condominiums
- C. 12 SINGLE FAMILY HOUSES

I. 2003 (OPENING YEAR) TRIP GENERATION

A. APARTMENTS (104 units) - LUC (220)

1) Daily, Weekday

Average rate = 6.63 50% entering, 50% exiting

equation: $T = 5.994(x) + 134.114$, $R^2 = 0.88$

A) Average Rate

$T = 104 * 6.63 = 690$ entering = $690 * 0.5 = 345$ exiting = $690 * 0.5 = 345$

B) Equation

$T = 5.994(104) + 134.114 = 758$ entering = $758 * 0.5 = 379$ exiting = $758 * 0.5 = 379$

2) AM Peak Hour

Average rate = 0.51, Equation = $T = 0.497(x) + 3.238$, $R^2 = 0.83$

16% entering, 84% exiting

A) Average Rate

$T = 0.51 * 104 = 53$ entering = $53 * 0.16 = 8$ exiting = $53 * 0.84 = 45$

B) Equation

$T = 0.497(104) + 3.238 = 55$ entering = $55 * 0.16 = 9$ exiting = $55 * 0.84 = 46$

3) PM Peak Hour

Average Rate = 0.62, Equation = $T = 0.541(x) + 18.743$, $R^2 = 0.75$

67% Entering, 33% exiting

A) Average Rate

$T = 0.62 * 104 = 64$ entering = $64 * 0.67 = 43$ exiting = $64 * 0.33 = 21$

B) Equation

$T = 0.541(104) + 18.743 = 75$ entering = $75 * 0.67 = 50$ exiting = $75 * 0.33 = 25$



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JOB Rochester, US 202 Corridor Study JOB NO. 02-402

SHEET NO. 2 OF 5

CALCULATED BY LMM DATE 1/14/03

CHECKED BY KRO DATE 1/28/03

SUBJECT TRIP GENERATION: LEDGEVIEW DRIVE SCALE N/A

(I. 2003 (OPENING YEAR) TRIP GENERATION, CONT.)

B. Condominiums (80 units), LUC (230)

1) DAILY WEEKDAY

Average rate = 5.86, Equation = $\ln(T) = 0.850 \ln(x) + 2.564$

50% entering, 50% exiting

A) Average Rate

$T = 5.86 \times 80 = 469$ entering = $469 \times 0.5 = 235$ exiting = $469 \times 0.5 = 234$

B) EQUATION

$\ln(T) = 0.850 \times \ln(80) + 2.564 = 6.2887$

$T = 538$ entering = $538 \times 0.5 = 269$ exiting = $538 \times 0.5 = 269$

2) Am Peak Hour

Average Rate = 0.44, Equation = $\ln(T) = 0.790 \ln(x) + 0.298$ $R^2 = 0.74$

17% entering, 83% exiting

A) Average Rate

$T = 80 \times 0.44 = 35$ entering = $35 \times 0.17 = 6$ exiting = $35 \times 0.83 = 29$

B) EQUATION

$\ln(T) = 0.790 \times \ln(80) + 0.298 = 3.7598$

$T = 43$ entering = $43 \times 0.17 = 7$ exiting = $43 \times 0.83 = 36$

3) Pm Peak Hour

Average Rate = 0.54, Equation = $\ln(T) = 0.827 \ln(x) + 0.309$ $R^2 = 0.79$

67% entering, 33% exiting

A) Average Rate

$T = 0.54 \times 80 = 43$ entering = $43 \times 0.67 = 29$ exiting = $43 \times 0.33 = 14$

B) EQUATION

$\ln(T) = 0.827 \times \ln(80) + 0.309 = 3.9329$

$T = 51$ entering = $51 \times 0.67 = 34$ exiting = $51 \times 0.33 = 17$

C) Single-Family Houses (6 units) - LUC (210)

1) Daily Weekday

Average Rate = 9.57, Equation = $\ln(T) = 0.920 \ln(x) + 2.707$, $R^2 = 0.96$

50% entering, 50% exiting

A) Average Rate

$T = 6 \times 9.57 = 57$ entering = $0.50 \times 57 = 29$ exiting = $0.50 \times 57 = 28$

B) EQUATION

$\ln(T) = 0.920 \ln(6) + 2.707 = 4.355$

$T = 78$ entering = $0.5 \times 78 = 39$ exiting = $78 \times 0.5 = 39$



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JOB Rochester, US 202 Corridor Study JOB NO. 02-402
SHEET NO. 3 OF 5
CALCULATED BY Lmm DATE 1/14/03
CHECKED BY KRD DATE 1/28/03
SUBJECT TRIP Generation : LEDGEVIEW DRIVE SCALE N/A

(I. 2003 (OPENING YEAR) TRIP GENERATION CONT.)

2) AM PEAK HOUR

average rate = 0.75, equation = $0.700(x) + 9.477$ $R^2 = 0.89$

25% entering, 75% exiting

A) average rate

$$t = 0.75 * 6 = 5 \quad \text{entering} = 0.25 * 5 = 1 \quad \text{exiting} = 0.75 * 5 = 4$$

B) equation

$$t = 0.700(6) + 9.477 = 14 \quad \text{entering} = 0.25 * 14 = 4 \quad \text{exiting} = 0.75 * 14 = 10$$

3) PM Peak Hour

average rate = 1.01, equation = $\ln(T) = 0.901 * \ln(x) + 0.527$, $R^2 = 0.91$

64% entering, 36% exiting

A) average rate

$$t = 1.01 * 6 = 6 \quad \text{entering} = 0.64 * 6 = 4 \quad \text{exiting} = 0.36 * 6 = 2$$

B) equation

$$\ln(t) = 0.901 * \ln(6) + 0.527 = 2.141$$

$$T = 9 \quad \text{entering} = 0.64 * 9 = 6 \quad \text{exiting} = 0.36 * 9 = 3$$

II. 2013 (DESIGN YEAR) TRIP GENERATION

A. APARTMENTS (104 units) - LUC (270)

(Same as 2003)

B. CONDOMINIUMS (140 units), LUC (230)

1) Daily, Week day

Average Rate = 5.86, equation = $\ln(T) = 0.850 \ln(x) + 2.564$

50% entering, 50% exiting

A) Average Rate

$$T = 5.86 * 140 = 820 \quad \text{entering} = 820 * 0.5 = 410 \quad \text{exiting} = 820 * 0.5 = 410$$

B) Equation

$$\ln(T) = 0.850 * \ln(140) + 2.564 = 6.7644$$

$$T = 866 \quad \text{entering} = 866 * 0.5 = 433 \quad \text{exiting} = 866 * 0.5 = 433$$



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JOB Rochester, US 202 corridor Study JOB NO. 02-402
SHEET NO. 4 OF 5
CALCULATED BY Lmm DATE 1/14/02
CHECKED BY KRD DATE 1/28/03
SUBJECT TRIP Generation: LEDGEVIEW DRIVE SCALE N/A

(II. 2013 (DESIGN YEAR) TRIP GENERATION - CONT.)

2) AM Peak Hour

average rate = 0.44, equation = $\ln(t) = 0.790 \ln(x) + 0.298$, $R^2 = 0.74$

17% entering, 83% exiting

A) Average Rate

$$T = 140 * 0.44 = 62 \quad \text{entering} = 62 * 0.17 = 11 \quad \text{exiting} = 62 * 0.83 = 51$$

B) Equation

$$\ln(T) = 0.790 * \ln(140) + 0.298 = 4.2019$$

$$T = \underline{67} \quad \text{entering} = 67 * 0.17 = \underline{11} \quad \text{exiting} = 67 * 0.83 = \underline{56}$$

3) PM Peak Hour

average rate = 0.54, equation = $\ln(t) = 0.827 * \ln(x) + 0.309$, $R^2 = 0.79$

67% entering, 33% exiting

A) Average Rate

$$T = 0.54 * 140 = 76 \quad \text{entering} = 76 * 0.67 = 51 \quad \text{exiting} = 76 * 0.33 = 25$$

B) Equation

$$\ln(T) = 0.827 * \ln(140) + 0.309 = 4.3957$$

$$T = \underline{81} \quad \text{entering} = 81 * 0.67 = \underline{54} \quad \text{exiting} = 81 * 0.33 = \underline{27}$$

C) Single-Family Houses (12 units) - LUC (210)

1) Daily weekday

Average Rate = 9.57, EQUATION = $\ln(T) = 0.920 \ln(x) + 2.707$, $R^2 = 0.96$

50% entering, 50% exiting

A) Average Rate

$$T = 12 * 9.57 = 115 \quad \text{entering} = 115 * 0.5 = 58 \quad \text{exiting} = 115 * 0.5 = 57$$

B) Equation

$$\ln(T) = 0.920 \ln(12) + 2.707 = 4.993$$

$$T = \underline{147} \quad \text{entering} = 147 * 0.5 = \underline{74} \quad \text{exiting} = 147 * 0.5 = \underline{73}$$

2) AM Peak Hour

average rate = 0.75, equation = $0.700(x) + 9.477$, $R^2 = 0.89$, 25% entering, 75% exiting

A) Average Rate

$$T = 0.75 * 12 = 9 \quad \text{entering} = 9 * 0.25 = 2 \quad \text{exiting} = 9 * 0.75 = 7$$

B) Equation

$$T = 0.700(12) + 9.477 = \underline{18} \quad \text{entering} = 18 * 0.25 = \underline{4} \quad \text{exiting} = 18 * 0.75 = \underline{14}$$



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JOB Rochester, US 202 Corridor JOB NO. 02-402

SHEET NO. 5 OF 5

CALCULATED BY Lmm DATE 1/14/03

CHECKED BY KRD DATE 1/28/03

SUBJECT TRIP Generation: Ledgeview Drive SCALE N/A

(II. DESIGN YEAR TRIP GENERATION (cont.))

3) PM Peak Hour

Average rate = 1.01 equation = $\ln(+)=0.901*\ln(x)+0.527$ $R^2=0.9$
64% entering, 36% exiting

A) Average Rate

$+ = 1.01 * 12 = 12$ entering = $12 * 0.64 = 8$ exiting = $12 * 0.36 = 4$

B) Equation

$\ln(+)=0.901*\ln(12)+0.527=2.766$

$T = \underline{16}$ entering = $16 * 0.64 = \underline{10}$ exiting = $16 * 0.36 = \underline{6}$

Summary:

In order to be conservative, trip generation using the equations, which yielded a higher value, was utilized

2003 (OPENING YEAR) TRIP GENERATION

	<u>Daily</u>	<u>AM PEAK</u>	<u>PM PEAK</u>
104 Apartments	758 (379 enter, 379 exit)	55 (9 enter, 46 exit)	75 (50 enter, 25 exit)
80 Condominiums	538 (269 enter, 269 exit)	43 (7 enter, 36 exit)	51 (34 enter, 17 exit)
6 Single family houses	78 (39 enter, 39 exit)	14 (4 enter, 10 exit)	9 (6 enter, 3 exit)
total: 190 units	1374 (687 enter, 687 exit)	112 (20 enter, 92 exit)	135 (90 enter, 45 exit)

2013 (DESIGN YEAR) TRIP GENERATION

	<u>DAILY</u>	<u>AM PEAK</u>	<u>PM PEAK</u>
104 Apartments	(SAME AS 2003, SEE ABOVE)		
140 condominiums	866 (433 enter, 433 exit)	67 (11 enter, 56 exit)	81 (54 enter, 27 exit)
12 Single family houses	147 (74 enter, 73 exit)	18 (4 enter, 14 exit)	16 (10 enter, 6 exit)
total: 256 units	1771 (886 enter, 885 exit)	140 (24 enter, 116 exit)	172 (114 enter, 58 exit)

Given edgeview drives proximity to NH 125 it was assumed that approx 15% would use the US 202 corridor

2003 trip (15%)	206 (103 enter, 103 exit)	17 (3 enter, 14 exit)	20 (13 enter, 7 exit)
2013 trip (15%)	266 (133 enter, 133 exit)	21 (4 enter, 17 exit)	26 (17 enter, 9 exit)



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JOB ROCHESTER-US202

JOB NO. 02-0402

SHEET NO. 1

OF

CALCULATED BY KRD

DATE 1-16-03

CHECKED BY LMM

DATE 1-28-03

SUBJECT TRIP GENERATION - FLATLEY CO.

SCALE

FLATLEY CO. PARCEL - 20 AC AT US202 (just s.o. RT. 16 SB Ramps)
PER DICK CAW, REG. DIRECTOR OF R.E. PLANNING
DEV. 300,000 SF RETAIL (GROSS LEASABLE AREA - GLA)
PROGRAM 1 OUT PARCEL FOR A RESTAURANT (7,000 SF AVG.)

1) RETAIL (ASSUME ITE L.V.C. 820 "SHOPPING CENTER")

WEEKDAY TOTALS

$$\text{AVERAGE RATE} = 42.92 \text{ TRIPS / ksf} \times 300 \text{ ksf} = 12,876 \checkmark$$

$$\star \text{ EQUATION: } \ln(T) = 0.643 \ln(X) + 5.866$$

$$T = e^{(0.643 \ln(300) + 5.866)}$$

$$T = \underline{13815 \text{ TRIPS}} \quad (50\% \text{ IN} / 50\% \text{ OUT}) \checkmark$$

AM Peak Hour

$$\star \text{ AVERAGE RATE} = 1.03 \text{ TRIPS / ksf} \times 300 \text{ ksf} = \underline{309 \text{ TRIPS}} \checkmark$$

$$\text{EQUATION: } \ln(T) = 0.596 \ln(X) + 2.329$$

$$T = e^{(0.596 \ln(300) + 2.329)}$$

$$T = \underline{307 \text{ TRIPS}} \checkmark$$

[61% ENTERING /
39% EXITING]

PM Peak Hour

$$\text{AVERAGE RATE} = 3.74 \text{ TRIPS / ksf} \times 300 \text{ ksf} = \underline{1122 \text{ TRIPS}} \checkmark$$

$$\star \text{ EQUATION: } \ln(T) = 0.660 \ln(X) + 3.403$$

$$T = e^{(0.660 \ln(300) + 3.403)}$$

$$T = \underline{1297 \text{ TRIPS}} \checkmark$$

[48% ENTERING / 52% EXITING]

SAT Peak Hour

$$\text{AVERAGE RATE} = 4.97 \text{ TRIPS / ksf} \times 300 \text{ ksf} = \underline{1491 \text{ TRIPS}} \checkmark$$

$$\text{EQUATION: } \ln(T) = 0.651 \ln(X) + 3.773$$

$$T = e^{(0.651 \ln(300) + 3.773)}$$

$$T = \underline{1783 \text{ TRIPS}} \checkmark$$

[52% ENTERING / 48% EXITING]

see pg. 2



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JOB ROCHESTER US202

JOB NO. 02-0402

SHEET NO. 2

OF

CALCULATED BY KRD

DATE 1-16-03

CHECKED BY LMM

DATE 1/28/03

SUBJECT

SCALE

Ramps)

FLATLEY CO. TRIP GEN (CONTINUED...)

[ASSUME 7,000 SF GFA]

1) RESTAURANT (ASSUME ITE L.I.C. 832 HIGH TURNOVER S.D. RESTAURANT)

WEEKDAY TOTALS

* AVERAGE RATES = 130.34 TRIPS / ksf x 7 ksf = 912 TRIPS ✓

EQUATION: NONE AVAILABLE

[50% IN / 50% OUT]

AM PEAK HOUR

* AVERAGE RATE = 9.27 trips / ksf x 7 ksf = 65 TRIPS ✓

EQUATION: NONE AVAILABLE

[52% IN / 48% OUT]

PM PEAK HOUR

* AVERAGE RATE = 10.86 trips / ksf x 7 ksf = 76 TRIPS ✓

EQUATION: NONE AVAILABLE

[60% IN / 40% OUT]

* LOW PASS-BY RATE ASSUMED DUE TO LOW VOLUME ON US202

[ASSUME 10% IN 2013 ONLY] - THIS RATE APPLIES FOR BOTH THE RETAIL & RESTAURANT DEVELOPMENTS

SAT PEAK HOUR (OF GENERATOR)

* (LIMITED DATA SET)

AVERAGE RATE = 20.00 TRIPS / ksf x 7 ksf = 140 TRIPS

EQUATION: NONE AVAILABLE

[63% ENTERING / 37% EXITING]

wb
16

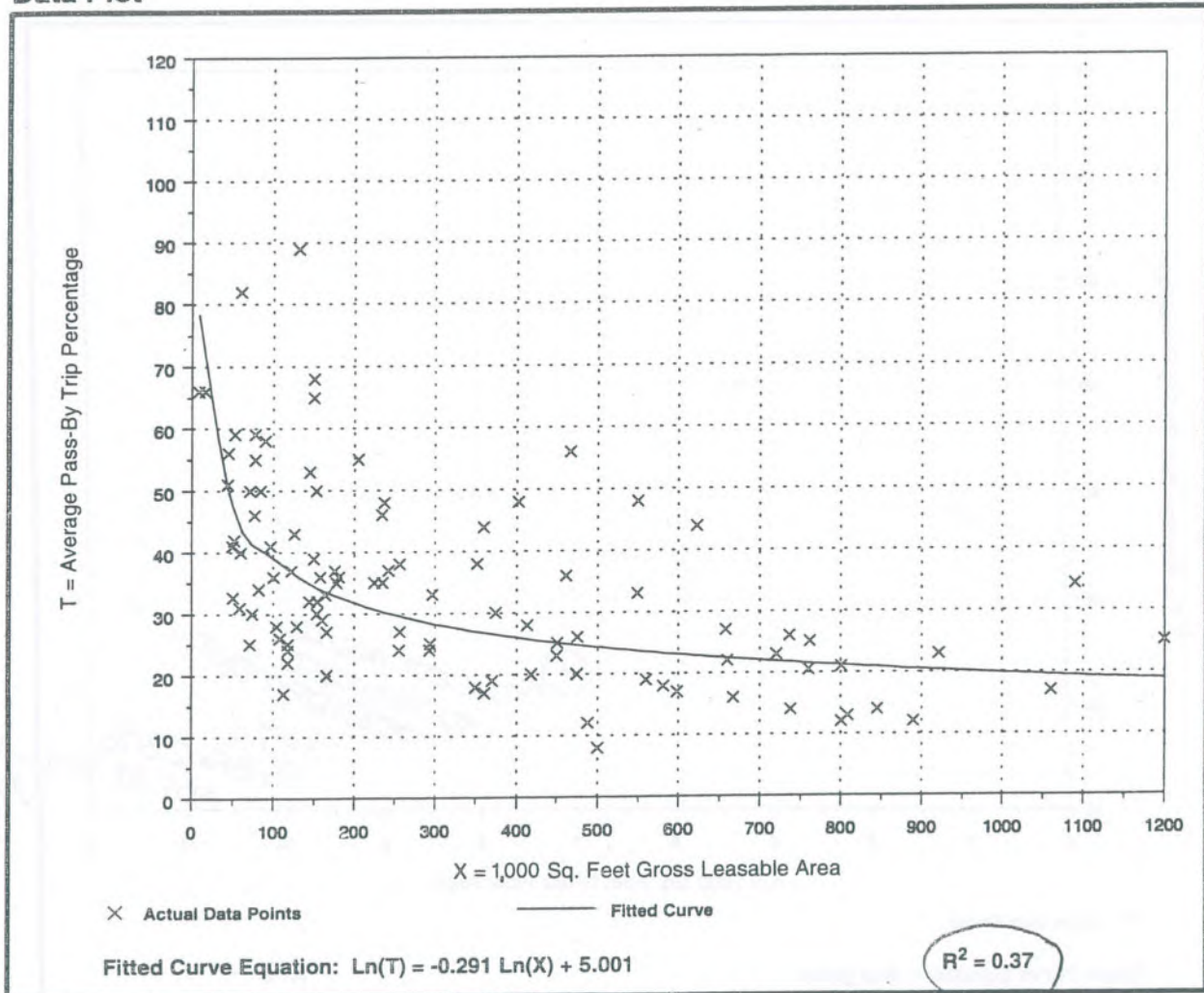
05

pg 2

Figure 5.5 Shopping Center (820)

Average Pass-By Trip Percentage vs: 1,000 Sq. Feet Gross Leasable Area
 On a: Weekday, P.M. Peak Period
 Number of Studies: 100
 Average 1,000 Sq. Feet GLA: 329

Data Plot



Proposed development = 300,000 SF GLA, $X = 300$
 % PASS-BY
 $\ln(T) = -0.291 \ln(300) + 5.001 = 3.341199$
 $T = 28$

Figure 5.8 High-Turnover (Sit-Down) Restaurant (832)

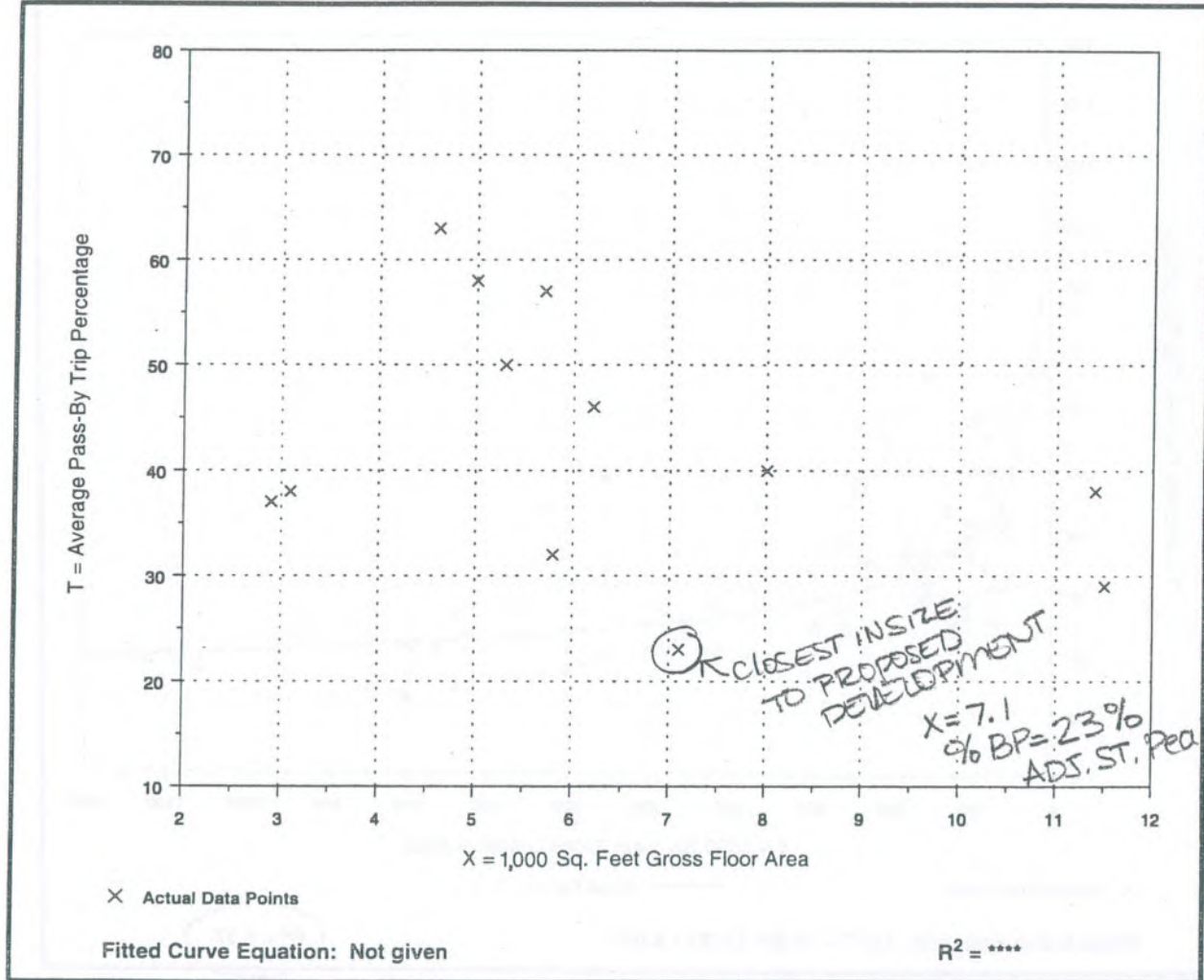
Average Pass-By Trip Percentage vs: 1,000 Sq. Feet Gross Floor Area

On a: Weekday, P.M. Peak Period

Number of Studies: 12

Average 1,000 Sq. Feet GFA: 6.4

Data Plot



Average Pass-By Trip Percentage = 43%

ADJ. ST.
2013 PM VOL = 911
2013 AM VOL = 852
ADJ. ST

$$\frac{911}{1565} = \frac{X}{23}$$

X = 13%

WORKERS	RESNAME	WRKNAME	
7	Rochester city	Fairbanks North Star Borough	ME 1
6	Rochester city	Groton town	ME 5
16	Rochester city	New London town	ME 5
20	Rochester city	Portland city	ME 5
8	Rochester city	South Portland city	ME 5
6	Rochester city	Farmington town	ME 1
6	Rochester city	Augusta city	ME 5
13	Rochester city	Hiram town	ME 1
13	Rochester city	Fairfield town	ME 1
6	Rochester city	Calais city	ME 5
7	Rochester city	Acton town	ME 1
143	Rochester city	Berwick town	ME 2
21	Rochester city	Biddeford city	ME 5
4	Rochester city	Eliot town	ME 5
5	Rochester city	Kennebunkport town	ME 5
561	Rochester city	Kittery town	ME 5
14	Rochester city	Lebanon town	ME 1
131	Rochester city	North Berwick town	ME 2
5	Rochester city	Ogunquit town	ME 5
68	Rochester city	Sanford town	ME 1
55	Rochester city	South Berwick town	ME 5
57	Rochester city	York town	ME 5
14	Rochester city	Amesbury town	MA
11	Rochester city	Andover town	MA
8	Rochester city	Haverhill city	MA
22	Rochester city	Lawrence city	MA
12	Rochester city	Lynn city	MA
11	Rochester city	Methuen town	MA
6	Rochester city	Middleton town	MA
41	Rochester city	Newburyport city	MA
5	Rochester city	Peabody city	MA
8	Rochester city	Salisbury town	MA
7	Rochester city	Arlington town	MA
6	Rochester city	Cambridge city	MA
9	Rochester city	Marlborough city	MA
7	Rochester city	North Reading town	MA
14	Rochester city	Pepperell town	MA
6	Rochester city	Wakefield town	MA
4	Rochester city	Wilmington town	MA
13	Rochester city	Woburn city	MA
8	Rochester city	Needham town	MA
7	Rochester city	Randolph town	MA

5

48 Rochester city	Boston city	MA	3	5
10 Rochester city	Worcester city	MA	3	
4 Rochester city	Alton town	NH	1	
13 Rochester city	Laconia city	NH	1	
9 Rochester city	Meredith town	NH	1	
22 Rochester city	Ossipee town	NH	1	
7 Rochester city	Wakefield town	NH	1	
18 Rochester city	Wolfeboro town	NH	1	
10 Rochester city	Carroll town	NH	1	
5 Rochester city	Hanover town	NH	4	
16 Rochester city	Bedford town	NH	3	
11 Rochester city	Hudson town	NH	3	
45 Rochester city	Manchester city	NH	3	
6 Rochester city	Merrimack town	NH	3	
13 Rochester city	Nashua city	NH	3	
17 Rochester city	Bow town	NH	4	
108 Rochester city	Concord city	NH	4	
6 Rochester city	Auburn town	NH	3	
9 Rochester city	Danville town	NH	3	
96 Rochester city	Exeter town	NH	3	
118 Rochester city	Greenland town	NH	5	
89 Rochester city	Hampton town	NH	5	
7 Rochester city	Hampton Falls town	NH	5	
16 Rochester city	Kingston town	NH	3	
8 Rochester city	Londonderry town	NH	3	
21 Rochester city	New Castle town	NH	5	
76 Rochester city	Newfields town	NH	3	
263 Rochester city	Newington town	NH	5	
20 Rochester city	Newmarket town	NH	3	
21 Rochester city	North Hampton town	NH	5	
15 Rochester city	Nottingham town	NH	3/4	
29 Rochester city	Plaistow town	NH	5	
1045 Rochester city	Portsmouth city	NH	5	
35 Rochester city	Raymond town	NH	3	
79 Rochester city	Rye town	NH	5	
28 Rochester city	Salem town	NH	5	
120 Rochester city	Seabrook town	NH	5	
14 Rochester city	South Hampton town	NH	5	
71 Rochester city	Stratham town	NH	5	
7 Rochester city	Windham town	NH	3	
129 Rochester city	Barrington town	NH	3/4	
1986 Rochester city	Dover city	NH	5	
272 Rochester city	Durham town	NH	5	

325 Rochester city	Farmington town	NH 1
69 Rochester city	Lee town	NH 3
12 Rochester city	Madbury town	NH 3
71 Rochester city	Milton town	NH 1
22 Rochester city	New Durham town	NH 1
4814 Rochester city	Rochester city	NH 2
210 Rochester city	Rollinsford town	NH 5
896 Rochester city	Somersworth city	NH 2
42 Rochester city	Strafford town	NH 4
15 Rochester city	Claremont city	NH 4
4 Rochester city	Allegheny County	Other 5
7 Rochester city	Cranston city	Other 5
3 Rochester city	Pawtucket city	Other 5
12 Rochester city	Tarrant County	Other 5
8 Rochester city	Waitsfield town	Other 10 4

AREA	TOTALS
1	629 (5.4%)
2	5088 (43.3%)
3	$589 - 62 = 527$ (4.5%)
4	267 (2.3%)
5	5236 (44.6%)

MASS/
MAINE /
POWERSMOUTH, etc.

GRAND TOTAL = 11,747

West on 202 = 7%

East on 202 = 93% (SPLITS AT RT. 16
AND OTHER CITY
CONNECTOR STREETS)

Route Map

SOUTHERN NEW HAMPSHIRE



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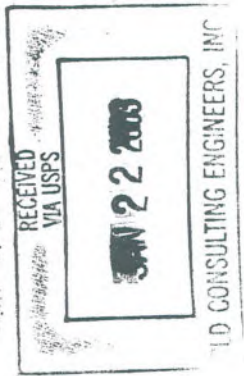
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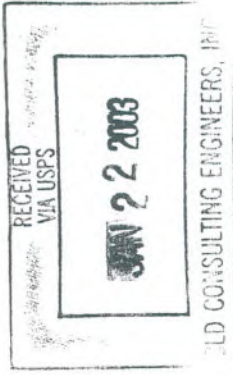


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- Infestation (Termite) Inspections VAFHA Mortgage Co. Approved
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JOB ROCHESTER US 202

JOB NO. 02-0402

SHEET NO. 1

OF 1

CALCULATED BY KRD

DATE 1-17-03

CHECKED BY _____

DATE _____

SUBJECT EXISTING TRAFFIC DISTRIBUTION

SCALE _____

VOLUMES TO/FROM THE NORTH ALONG US202/WASHINGTON
(BASED ON DISTRIBUTION CHARACTERISTICS FROM RAW AM/PM DATA)

AM

SB ON
TO ROCH. $\nearrow$ 44 (16%)
 $\longrightarrow$ 126 - 21 = 105 (37%) } 282
NB ON $\searrow$ 133 (47%)

SB OFF $\nwarrow$ 37 (12%)
FROM ROCH. $\longleftarrow$ 282 - 69 = 213 (70%) } 304
NB OFF $\swarrow$ 54 (18%)

PM

SB ON-
TO ROCH. $\nearrow$ 15 (5%)
 $\longrightarrow$ 258 - 73 = 185 (63%) } 294
NB ON- $\searrow$ 94 (32%)

SB OFF $\nwarrow$ 93 (26%)
FROM ROCH. $\longleftarrow$ 265 - 54 = 211 (60%) } 353
NB OFF $\swarrow$ 49 (14%)



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JOB ROCHESTER-US 202

JOB NO. 02-402

SHEET NO. _____

OF _____

CALCULATED BY LMM

DATE 1/24/03

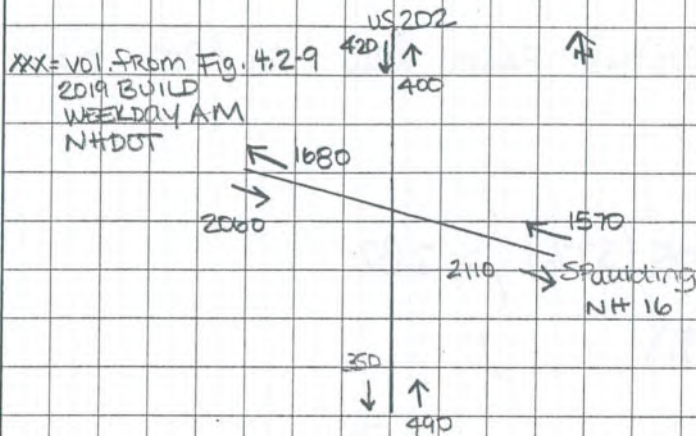
CHECKED BY KRD

DATE 1/27/03

SUBJECT TRIP DISTRIBUTION(%) - RETAIL DEVELOPMENTS

SCALE N/A

AM PEAK HOUR



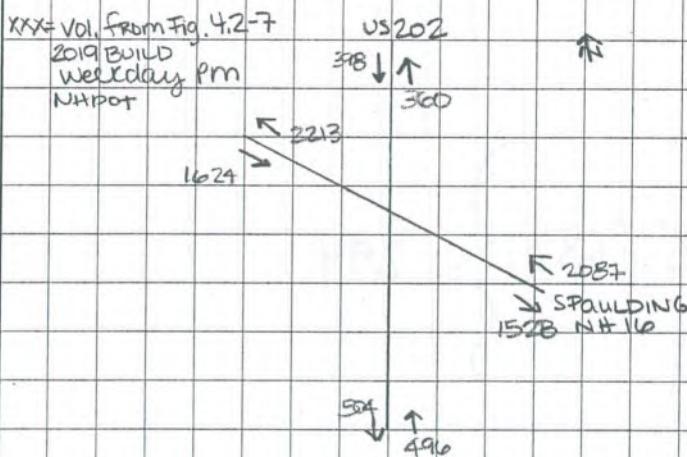
ENTERING:

FROM US 202(SOUTH) = 490 ~10%
FROM US 202(NORTH) = 420 ~10%
FROM NH 16(~~EAST~~^{SOUTH}) = 1570 ~35%
FROM NH 16(~~WEST~~^{NORTH}) = 2060 ~45%
4540

EXITING:

TO US 202(SOUTH) = 350 ~10%
TO US 202(NORTH) = 400 ~10%
TO NH 16(~~WEST~~^{SOUTH}) = 2110 ~45%
TO NH 16(~~EAST~~^{NORTH}) = 1680 ~35%
4540

PM PEAK HOUR



ENTERING:

FROM US 202(SOUTH) = 496 ~10%
FROM US 202(NORTH) = 398 ~10%
FROM NH 16(~~EAST~~^{SOUTH}) = 2087 ~45%
FROM NH 16(~~WEST~~^{NORTH}) = 1624 ~35%
4605

EXITING:

TO US 202(SOUTH) = 504 ~10%
TO US 202(NORTH) = 360 ~10%
TO NH 16(~~WEST~~^{SOUTH}) = 1528 ~30%
TO NH 16(~~EAST~~^{NORTH}) = 2213 ~50%
4605



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JOB Rochester-US 202 Corridor JOB NO. 02-402
SHEET NO. 1 OF 2
CALCULATED BY Lmm DATE 1/23/02
CHECKED BY KRD DATE 1/28/03
SUBJECT TRIP DISTRIBUTION: Highfield Commons SCALE N/A

Highfield Commons: 168 Apartments, 73 rowhouses, 127 SFR, 55+ 22, health club, day care, bed & breakfast & general store
2003 - 100% apartments - Remainder 2013

2003 (opening year): 168 Apartments

• AM PEAK HOUR: 87 trips (14 enter, 73 exit)

- 10% to/from US 202 South = $87 * 0.1 = 9$ (2 enter, 7 exit)
- 90% to/from US 202 north = $87 * 0.9 = 78$ (12 enter, 66 exit)

enter: • 12% from Rt 16 SB = $0.12 * 12 = 2$

• 70% from Rochester = $0.7 * 12 = 8$

from Brock = $(70/246) * 8 = 2$

from N. Main (N) = $(92/289) * 62$

from N. Main (E) = $(197/289) * 6 = 4$

• 18% from Rt 16 NB = $0.18 * 12 = 2$

exit: • 16% to SB on Ramp = $0.16 * 66 = 11$

• 37% to Rochester = $0.37 * 66 = 24$

to Brock = $(119/284) * 24 = 10$

to N. Main (N) = $(68/264) * 14 = 4$

to N. Main (E) = $(196/264) * 14 = 10$

• 47% to NB Ramps = $0.47 * 66 = 31$

• PM PEAK HOUR: 110 trips (74 enter, 36 exit)

• 100% to/from South = 11 (7 enter, 4 exit)

• 90% to/from North = 99 (67 enter, 32 exit)

enter: • 26% from SB off-ramp = $0.26 * 67 = 18$

• 60% from Rochester = $0.60 * 67 = 40$

• From Brock = $(101/313) * 40 = 13$

• from N. Main (N) = $(99/312) * 27 = 9$

• from N. Main (E) = $(213/312) * 27 = 18$

• 4% from NB off-ramp = $0.14 * 67 = 9$

exit: • 5% to SB on Ramp = $0.05 * 32 = 2$

• 63% to Rochester = $0.63 * 32 = 20$

to Brock = $(131/398) * 20 = 7$

to N. Main (N) = $(112/331) * 13 = 4$

to N. Main (E) = $(219/331) * 13 = 9$

• 32% to NB on Ramp = $0.32 * 32 = 10$



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JOB Rochester - US 202 Corridor JOB NO. 02-402

SHEET NO. 2 OF 2

CALCULATED BY Lmm

DATE 1/23/03

CHECKED BY KRD

DATE 1/28/03

SUBJECT TRIP DISTRIBUTION: Highfield Commons

SCALE N/A

(Cont.)

2013 (DESIGN YEAR): 168 Apart., 73 Rowhouses, 127 SFR, 22-SSR, healthclub, daycare, Bi E, & generalist

• AM PEAK HOUR: 250 trips (50 enter, 200 exit)

• 10% to/from US 202 South = $250 * 0.10 = 25$ (5 enter, 20 exit)

• 90% to/from US 202 NORTH = $250 * 0.90 = 225$ (45 enter, 180 exit)

enter: • 12% from Rte 16 SB = $0.12 * 45 = 5$

• 70% from Rochester = $0.70 * 45 = 32$

• from Brock = $(70/246) * 32 = 9$

• from N. Main (N) = $(92/289) * 23 = 7$

• from N. MAIN (E) = $(197/289) * 23 = 16$

• 18% from Rte 16 NB = $0.18 * 45 = 8$

exit: • 16% to Rte 16 SB = $0.16 * 180 = 29$

• 37% to Rochester = $0.37 * 180 = 67$

• to Brock = $(119/284) * 67 = 28$

• to N. Main (N) = $(68/264) * 39 = 10$

• to N. MAIN (E) = $(196/264) * 39 = 29$

• 47% to NB Ramps = $0.47 * 180 = 84$

• PM PEAK HOUR: 320 trips (210 enter, 110 exit)

• 10% to/from US 202 South = $320 * 0.1 = 32$ (21 enter, 11 exit)

• 90% to/from US 202 NORTH = $320 * 0.9 = 288$ (189 enter, 99 exit)

enter: • 26% from SB OFF-RAMP = $0.26 * 189 = 49$

• 60% from Rochester = $0.60 * 189 = 113$

• from Brock = $(101/313) * 113 = 36$

• from N. Main (N) = $(99/312) * 77 = 24$

• from N. MAIN (E) = $(213/312) * 77 = 53$

• 14% from NB OFF-RAMP = $0.14 * 189 = 27$

exit: • 5% to SB ON-RAMP = $0.05 * 99 = 5$

• 63% to Rochester = $0.63 * 99 = 62$

• to Brock = $(131/398) * 62 = 20$

• to N. MAIN (N) = $(112/331) * 42 = 14$

• to N. MAIN (E) = $(219/331) * 42 = 28$

• 32% to NB ON-RAMP = $0.32 * 99 = 32$



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JOB ROCHESTER US 202 Corridor Study JOB NO. 02-0402

SHEET NO. 1

OF 3

CALCULATED BY LMM

DATE 1/29/03

CHECKED BY KRD

DATE 1/29/03

SUBJECT TRIP DISTRIBUTION: SECRETARIAT ESTATES

SCALE N/A

2003 (OPENING YEAR): 50 UNITS - AGE REST. 55+

A) AM PEAK HOUR: 19 TRIPS (6 ENTER, 13 EXIT)

- 10% to/from US 202 (South) = $19 * 0.10 = 2$ (1 ENTER, 1 EXIT)
- 90% to/from US 202 (North) = $19 * 0.90 = 17$ (5 ENTER, 12 EXIT)

ENTER • 12% FROM Rte 16 SB = $0.12 * 5 = 1$

- 70% FROM ROCHESTER = $0.70 * 5 = 3$

• FROM BROCK = $(70/246) * 3 = 1$

• FROM N. MAIN (N) = $(92/289) * 2 = 1$

• FROM N. MAIN (E) = $(197/289) * 2 = 1$

- 18% FROM Rte 16 NB = $0.18 * 5 = 1$

EXIT • 16% TO SB ON-RAMP = $0.16 * 12 = 2$

- 37% TO ROCHESTER = $0.37 * 12 = 4$

• TO BROCK = $(119/284) * 4 = 2$

• TO N. MAIN (N) = $(68/264) * 2 = 1$

• TO N. MAIN (E) = $(196/264) * 2 = 1$

- 47% TO NB RAMPS = $0.47 * 12 = 6$

B) PM PEAK HOUR: 22 TRIPS (16 ENTER, 6 EXIT)

- 10% to/from US 202 (South) = $0.10 * 22 = 2$ (1 ENTER, 1 EXIT)

- 90% to/from US 202 (North) = $0.90 * 22 = 20$ (15 ENTER, 5 EXIT)

ENTER • 26% FROM Rte 16 SB RAMP = $0.26 * 15 = 4$

• 60% FROM ROCHESTER = $0.60 * 15 = 9$

• FROM BROCK = $(101/313) * 9 = 3$

• FROM N. MAIN (N) = $(99/312) * 6 = 2$

• FROM N. MAIN (E) = $(213/312) * 6 = 4$

• 14% FROM NB OFF RAMP = $0.14 * 15 = 2$

EXIT • 5% TO SB ON-RAMP = $0.05 * 5 = 0$

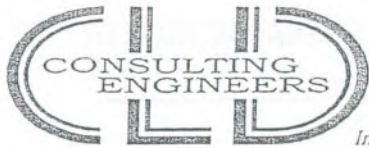
• 63% TO ROCHESTER = $0.63 * 5 = 3$

• TO BROCK = $(131/398) * 3 = 1$

• TO N. MAIN (N) = $(112/331) * 2 = 1$

• TO N. MAIN (E) = $(29/331) * 2 = 1$

• 32% TO N.B. ON-RAMP = $0.32 * 5 = 2$



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JOB ROCHESTER-US202 CORRIDOR

JOB NO. 02-0402

SHEET NO. 2

OF 3

CALCULATED BY LMM

DATE 1/29/03

CHECKED BY KRD

DATE 1/29/03

SUBJECT TRIP DISTRIBUTION: SECRETARIAT ESTATES

SCALE N/A

2013 (DESIGN YEAR) FULL-DEVELOPMENT

A) AM PEAK HOUR: 211 (65 ENTER, 146 EXIT) : "NEW" TRIPS

- 10% to/from US 202 (South) = $211 * 0.10 = 21$ (6 ENTER, 15 EXIT)
- 90% to/from US 202 (North) = $211 * 0.90 = 190$ (59 ENTER, 131 EXIT)

ENTER: 12% FROM Rte 16 SB = $0.12 * 59 = 7$

70% FROM Rochester = $0.70 * 59 = 41$

FROM Brock = $(70/246) * 41 = 12$

FROM N. MAIN (N) = $(92/289) * 29 = 9$

FROM N. MAIN (E) = $(197/289) * 29 = 20$

18% FROM Rte 16 NB = $0.18 * 59 = 11$

EXIT: 16% to SB-on Ramp = $0.16 * 131 = 21$

37% to Rochester = $0.37 * 131 = 48$

to Brock = $(119/284) * 48 = 20$

to N. MAIN (N) = $(68/264) * 28 = 7$

to N. MAIN (E) = $(196/264) * 28 = 21$

47% to NB Ramp = $0.47 * 131 = 62$

B) PM PEAK HOUR: 256 (160 ENTER, 96 EXIT) : "NEW" TRIPS

- 10% to/from US 202 (South) = $0.10 * 256 = 26$ (16 ENTER, 10 EXIT)
- 90% to/from US 202 (North) = $0.90 * 256 = 230$ (144 ENTER, 86 EXIT)

ENTER: 26% FROM Rte 16 SB = $0.26 * 144 = 38$

60% FROM Rochester = $0.60 * 144 = 86$

FROM Brock = $(101/313) * 86 = 28$

FROM N. MAIN (N) = $(99/312) * 58 = 18$

FROM N. MAIN (E) = $(213/312) * 58 = 40$

14% FROM Rte 16 NB = $0.14 * 144 = 20$

EXIT: 5% to Rte 16 SB = $0.05 * 86 = 4$

63% to Rochester = $0.63 * 86 = 54$

to Brock = $(131/308) * 54 = 18$

to N. MAIN (N) = $(112/331) * 36 = 12$

to N. MAIN (E) = $(219/331) * 36 = 24$

32% to Rte 16 NB = $0.32 * 86 = 28$



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SHEET NO. 3

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DATE 1/29/03

SUBJECT TRIP DISTRIBUTION: SECRETARIAT ESTATES SCALE N/A

2013 (DESIGN YEAR) PASS-BY TRIPS

AM PEAK HOUR: 16 (8 ENTER, 8 EXIT) "PASS-BY"

ENTER:

$$\text{FROM US 202 (NORTH)} = 8 * (216 / 541) = 3$$

$$\text{FROM US 202 (SOUTH)} = 8 * (325 / 541) = 5$$

EXIT:

$$\text{TO US 202 (NORTH)} = 8 * (325 / 541) = 5$$

$$\text{TO US 202 (SOUTH)} = 8 * (216 / 541) = 3$$

PM PEAK HOUR: 18 (9 ENTER, 9 EXIT)

ENTER:

$$\text{FROM US 202 (NORTH)} = 9 * (282 / 585) = 4$$

$$\text{FROM US 202 (SOUTH)} = 9 * (303 / 585) = 5$$

EXIT:

$$\text{TO US 202 (NORTH)} = 9 * (303 / 585) = 5$$

$$\text{TO US 202 (SOUTH)} = 9 * (282 / 585) = 4$$



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SUBJECT TRIP DISTRIBUTION: Chesley Hill Rd

SCALE N/A

Chester Hill Road Subdivision 33 SFR 100% Build-out 2003/2013

AM Peak Hour: 33 trips (8 enter, 25 exit)

• 10% to/from south = $33 * 0.1 = 3$ trips (1 enter, 2 exit)

• 90% to/from north = $33 * 0.9 = 30$ trips (7 enter, 23 exit)

enter: • 12% from SB off ramp = $0.12 * 7 = 1$

• 70% from Rochester = $0.70 * 7 = 5$

FROM Brock = $(70/240) * 5 = 1$

FROM N. MAIN(N) = $(92/289) * 4 = 1$

FROM N. MAIN(E) = $(197/289) * 4 = 3$

• 18% from NB off = $0.18 * 7 = 1$

exit: • 16% to SB on ramp = $0.16 * 23 = 4$

• 37% to Rochester = $0.37 * 23 = 8$

to Brock = $(119/284) * 8 = 3$

• to N. MAIN(N) = $(68/264) * 5 = 1$

• to N. MAIN(E) = $(196/264) * 5 = 4$

• 47% to NB on ramp = $0.47 * 23 = 11$

Pm Peak Hour: 40 trips (26 entering, 14 exiting)

• 10% to/from south = $40 * 0.1 = 4$ (3 enter, 1 exit)

• 90% to/from north = $40 * 0.9 = 36$ (23 enter, 13 exit)

enter: • 26% from SB off = $0.26 * 23 = 6$

• 60% from Rochester = $0.6 * 23 = 14$

• FROM Brock = $(101/313) * 14 = 5$

• FROM N. MAIN(N) = $(99/312) * 9 = 3$

• FROM N. MAIN(E) = $(213/312) * 9 = 6$

• 14% from NB off = $0.14 * 23 = 3$

exit: • 5% to SB on ramp = $0.05 * 13 = 1$

• 63% to Rochester = $0.63 * 13 = 8$

• to Brock = $(131/398) * 8 = 3$

• to N. MAIN(N) = $(112/331) * 5 = 2$

• to N. MAIN(E) = $(219/331) * 5 = 3$

• 32% to NB on ramp = $0.32 * 13 = 4$



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SHEET NO. 1 OF

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CHECKED BY KRD DATE 1/28/03

SUBJECT TRIP DISTRIBUTION - LEDGEVIEW DRIVE

SCALE N/A

Ledge View Drive Subdivision: 140 condos, 104 apartments, 12 SFR
Opening year (2003): 104 apartments, 80 condos, 6 SFR
Design year (2013): 104 apartments, 140 condos, 12 SFR
assume 15% development trips to/from US 202

2003 Opening year

- AM PEAK HOUR 17 (3 enter, 14 exit)
 - 50% to/from North (via ESTES) = 9 (2 enter, 7 exit)
 - 50% to/from South (via Oak/Dry Hill) = 8 (1 enter, 7 exit)
- PM PEAK HOUR 20 (13 enter, 7 exit)
 - 50% to/from North (via ESTES) = 10 (7 enter, 3 exit)
 - 50% to/from South (via Oak/Dry Hill) = 10 (6 enter, 4 exit)

2013 DESIGN YEAR

- AM PEAK HOUR 21 (4 enter, 17 exit)
 - 50% to/from north (via ESTES) = 11 (2 enter, 9 exit)
 - 50% to/from south (via Oak/Dry Hill) = 10 (2 enter, 8 exit)
- PM PEAK HOUR 26 (17 enter, 9 exit)
 - 50% to/from north (via ESTES) = 13 (9 enter, 4 exit)
 - 50% to/from south (via Oak/Dry Hill) = 13 (8 enter, 5 exit)



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JOB NO. 02-0402

SHEET NO. 1

OF 2

CALCULATED BY Umm

DATE 1/29/03

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DATE 1/27/03

SUBJECT TRIP DISTRIBUTION-FLATLEY CO.

SCALE N/A

2013 (DESIGN YEAR) : 300,000 SF RETAIL, 1 RESTAURANT (7000 SF. AVE.)

A) AM PEAK HOUR

RETAIL = 307 TRIPS (187 ENTER, 120 EXIT)

RESTAURANT = 65 TRIPS (34 ENTER, 31 EXIT)

TOTAL = 372 TRIPS (221 ENTER, 151 EXIT)

"PASS-BY" = 10% = $0.10 * 372 = 37$ (22 ENTER, 15 EXIT)

ENTER: from US 202 (north) = $(385/734) * 22 = 12$

from US 202 (south) = $(349/734) * 22 = 10$

EXIT: to US 202 (north) = $(349/734) * 15 = 7$

to US 202 (south) = $(385/734) * 15 = 8$

"NEW" = 90% = $0.90 * 372 = 335$ (199 ENTER, 136 EXIT)

ENTER: 10% from US 202 (south) = $0.10 * 199 = 20$

10% from US 202 (north) = $0.10 * 199 = 20$

35% from NH 16 (south) = $0.35 * 199 = 70$

45% from NH 16 (north) = $0.45 * 199 = 89$

EXIT: 10% to US 202 (south) = $0.10 * 136 = 14$

10% to US 202 (north) = $0.10 * 136 = 14$

45% to NH 16 (south) = $0.45 * 136 = 61$

35% to NH 16 (north) = $0.35 * 136 = 47$

B) PM PEAK HOUR

RETAIL = 1297 TRIPS (623 ENTER, 674 EXIT)

RESTAURANT = 76 TRIPS (46 ENTER, 30 EXIT)

TOTAL = 1373 (669 ENTER, 704 EXIT)

"PASS-BY" = 10% = $0.10 * 1373 = 137$ (67 ENTER, 70 EXIT)

ENTER: from US 202 (north) = $(360/761) * 67 = 32$

from US 202 (south) = $(401/761) * 67 = 35$

EXIT: to US 202 (north) = $(401/761) * 70 = 37$

to US 202 (south) = $(360/761) * 70 = 33$

"NEW" = 90% = $0.90 * 1373 = 1236$ (602 ENTER, 634 EXIT)

ENTER: 10% from US 202 (south) = $0.10 * 602 = 60$

10% from US 202 (north) = $0.10 * 602 = 60$

45% from Rte 16 (south) = $0.45 * 602 = 271$

35% from Rte 16 (north) = $0.35 * 602 = 211$



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JOB Rochester-US 202

JOB NO. 02-0402

SHEET NO. 2

OF 2

CALCULATED BY Lmm

DATE 1/29/03

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DATE 1/29/03

SUBJECT TRIP DISTRIBUTION- FIATLEY CO.

SCALE N/A

(CONT.)

EXIT: 10% to US 202(SOUTH) = $0.10 * 634 = 64$
10% to US 202(NORTH) = $0.10 * 634 = 63$
30% to NH 16(SOUTH) = $0.30 * 634 = 190$
50% to NH 16(NORTH) = $0.50 * 634 = 317$

APPENDIX F

INTERSECTION CAPACITY ANALYSES 2003 AND 2013 BUILD (RESIDENTIAL) CASES

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2003 Build
Analysis Time Period	AM Peak Hour			

Project Description: Rochester US Rte 202 (CLD No. 02-402)

East/West Street: N. Main Street

North/South Street: Walnut/Washington

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	401	105	285	294	0
Peak-Hour Factor, PHF	1.00	0.79	0.79	0.89	0.89	1.00
Hourly Flow Rate, HFR	0	507	132	320	330	0
Percent Heavy Vehicles	0	--	--	5	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	84	0	475	0	0	0
Peak-Hour Factor, PHF	0.88	1.00	0.88	1.00	1.00	1.00
Hourly Flow Rate, HFR	95	0	471	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		320	95		471			
C (m) (vph)		931	81		513			
v/c		0.34	1.17		0.92			
95% queue length		1.54	6.91		10.92			
Control Delay		10.9	246.3		50.5			
LOS		B	F		F			
Approach Delay	--	--	83.4					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential)
Analysis Time Period	AM Peak Hour			

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	540	152	411	395	0
Peak-Hour Factor, PHF	1.00	0.79	0.79	0.89	0.89	1.00
Hourly Flow Rate, HFR	0	683	192	461	443	0
Percent Heavy Vehicles	0	—	—	5	—	—

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	122	0	591	0	0	0
Peak-Hour Factor, PHF	0.88	1.00	0.88	1.00	1.00	1.00
Hourly Flow Rate, HFR	138	0	671	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0

Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		461	138		671			
C (m) (vph)		759	20		391			
v/c		0.61	6.90		1.72			
95% queue length		4.17	17.68		41.12			
Control Delay		16.8			357.2			
LOS		C	F		F			
Approach Delay	--	--	814.1					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2003 Build
Analysis Time Period	PM Peak Hour			

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	513	123	455	605	0
Peak-Hour Factor, PHF	1.00	0.90	0.90	0.92	0.92	1.00
Hourly Flow Rate, HFR	0	570	136	494	657	0
Percent Heavy Vehicles	0	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	126	0	350	0	0	0
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR	140	0	388	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		494	140		388			
C (m) (vph)		897	20		477			
v/c		0.55	7.00		0.81			
95% queue length		3.44	17.93		7.72			
Control Delay		13.8			37.8			
LOS		B	F		E			
Approach Delay	--	--	844.7					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential)
Analysis Time Period	PM Peak Hour			

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	689	191	674	813	0
Peak-Hour Factor, PHF	1.00	0.90	0.90	0.92	0.92	1.00
Hourly Flow Rate, HFR	0	765	212	732	883	0
Percent Heavy Vehicles	0	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	188	0	508	0	0	0
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR	208	0	564	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		732	208		564			
C (m) (vph)		710	0		350			
v/c		1.03			1.61			
95% queue length		18.00			33.13			
Control Delay		66.0			315.3			
LOS		F	F		F			
Approach Delay	--	--						
Approach LOS	--	--						

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM			Intersection	Washington Street @ Roy Street		
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH		
Date Performed	1/30/03			Analysis Year	2003 Build		
Analysis Time Period	AM Peak Hour						
Project Description: Rochester US Rte 202 (CLD No. 02-402)							
East/West Street: Roy Street				North/South Street: Washington Street			
Intersection Orientation: North-South				Study Period (hrs): 0.25			

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	19	327	0	0	350	0
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.69	0.69
Hourly Flow Rate, HFR	22	380	0	0	507	0
Percent Heavy Vehicles	0	—	—	2	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	2	0	85
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.87	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	2	0	97
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	22						99	
C (m) (vph)	1068						559	
v/c	0.02						0.18	
95% queue length	0.06						0.64	
Control Delay	8.4						12.8	
LOS	A						B	
Approach Delay	—	—					12.8	
Approach LOS	—	—					B	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *Washington Street @ Roy Street*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Roy Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	26	482	0	0	510	0
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.69	0.69
Hourly Flow Rate, HFR	30	560	0	0	739	0
Percent Heavy Vehicles	0	—	—	2	—	—

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LT				TR
Upstream Signal		0			0

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	3	0	114
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.87	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	3	0	131
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	30						134	
C (m) (vph)	876						406	
v/c	0.03						0.33	
95% queue length	0.11						1.42	
Control Delay	9.3						18.2	
LOS	A						C	
Approach Delay	--	--				18.2		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *Washington St @ Roy Street*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Roy Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	89	390	0	0	390	3
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR	95	419	0	0	428	3
Percent Heavy Vehicles	2	—	—	1	—	—

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LT				TR
Upstream Signal		0			0

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	3	0	43
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.70	1.00	0.70
Hourly Flow Rate, HFR	0	0	0	4	0	61
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	95						65	
C (m) (vph)	1129						571	
v/c	0.08						0.11	
95% queue length	0.28						0.38	
Control Delay	8.5						12.1	
LOS	A						B	
Approach Delay	—	—					12.1	
Approach LOS	—	—					B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	Washington St @ Roy Street
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/30/03	Analysis Year	2013 Build (Residential)
Analysis Time Period	PM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Roy Street		North/South Street: Washington Street	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	119	580	0	0	611	4
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR	127	623	0	0	671	4
Percent Heavy Vehicles	2	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	4	0	58
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.70	1.00	0.70
Hourly Flow Rate, HFR	0	0	0	5	0	82
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	127						87	
C (m) (vph)	916						387	
v/c	0.14						0.22	
95% queue length	0.48						0.85	
Control Delay	9.6						17.0	
LOS	A						C	
Approach Delay	--	--				17.0		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM	Intersection	Washington/Woodlawn/Brock					
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH					
Date Performed	1/30/03	Analysis Year	2003 Build					
Analysis Time Period	AM Peak Hour							
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>								
East/West Street: <i>Woodlawn Avenue/Brock Street</i>		North/South Street: <i>Washington Street</i>						
Intersection Orientation: <i>North-South</i>		Study Period (hrs): <i>0.25</i>						
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	0	206	143	232	201	2		
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.79	0.79	0.79		
Hourly Flow Rate, HFR	0	234	162	293	254	2		
Percent Heavy Vehicles	1	—	—	2	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	79	0	140	0	0	2		
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.50	0.50	0.50		
Hourly Flow Rate, HFR	111	0	197	0	0	4		
Percent Heavy Vehicles	6	6	6	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	293		308			4	
C (m) (vph)	1315	1163		273			789	
v/c	0.00	0.25		1.13			0.01	
95% queue length	0.00	1.00		13.15			0.02	
Control Delay	7.7	9.1		133.8			9.6	
LOS	A	A		F			A	
Approach Delay	—	—	133.8			9.6		
Approach LOS	—	—	F			A		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *Washington/Woodlawn/Brock*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Woodlawn Avenue/Brock Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	320	223	311	310	3
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.79	0.79	0.79
Hourly Flow Rate, HFR	0	363	253	393	392	3
Percent Heavy Vehicles	1	—	—	2	—	—

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LTR			LTR	
Upstream Signal		0		0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	123	0	188	0	0	3
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.50	0.50	0.50
Hourly Flow Rate, HFR	173	0	264	0	0	6
Percent Heavy Vehicles	6	6	6	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	393		437			6	
C (m) (vph)	1169	964		97			659	
v/c	0.00	0.41		4.51			0.01	
95% queue length	0.00	2.01		46.06			0.03	
Control Delay	8.1	11.3					10.5	
LOS	A	B		F			B	
Approach Delay	—	—				10.5		
Approach LOS	—	—	F			B		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Washington/Woodlawn/Brock
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2003 Build
Analysis Time Period	PM Peak Hour			
Project Description Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Woodlawn Avenue/Brock Street			North/South Street: Washington Street	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	3	299	146	165	267	1
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.90	0.90	0.90
Hourly Flow Rate, HFR	3	347	169	183	296	1
Percent Heavy Vehicles	2	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	125	0	178	2	0	2
Peak-Hour Factor, PHF	0.76	0.76	0.76	0.25	0.25	0.25
Hourly Flow Rate, HFR	164	0	234	8	0	8
Percent Heavy Vehicles	1	1	1	25	25	25
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	3	183		398			16	
C (m) (vph)	1264	1055		279			134	
v/c	0.00	0.17		1.43			0.12	
95% queue length	0.01	0.63		21.74			0.40	
Control Delay	7.9	9.1		246.1			35.5	
LOS	A	A		F			E	
Approach Delay	--	--		246.1			35.5	
Approach LOS	--	--		F			E	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM			Intersection	Washington/Woodlawn/Brock		
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH		
Date Performed	1/30/03			Analysis Year	2013 Build (Residential)		
Analysis Time Period	PM Peak Hour						
Project Description: Rochester US Rte 202 (CLD No. 02-402)							
East/West Street: Woodlawn Avenue/Brock Street				North/South Street: Washington Street			
Intersection Orientation: North-South				Study Period (hrs): 0.25			

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	4	457	222	221	447	1
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.90	0.90	0.90
Hourly Flow Rate, HFR	4	531	258	245	496	1
Percent Heavy Vehicles	2	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	209	0	239	3	0	3
Peak-Hour Factor, PHF	0.76	0.76	0.76	0.25	0.25	0.25
Hourly Flow Rate, HFR	275	0	314	12	0	12
Percent Heavy Vehicles	1	1	1	25	25	25
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	4	245		589			24	
C (m) (vph)	1067	835		97			23	
v/c	0.00	0.29		6.07			1.04	
95% queue length	0.01	1.23		64.90			3.06	
Control Delay	8.4	11.1					442.6	
LOS	A	B		F			F	
Approach Delay	--	--					442.6	
Approach LOS	--	--	F				F	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM			Intersection	US202 @ Rt. 16 NB Ramps			
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH			
Date Performed	1/30/03			Analysis Year	2003 Build			
Analysis Time Period	AM Peak Hour							
Project Description: Rochester US Rte 202 (CLD No. 02-402)								
East/West Street: Rt. 16 NB Ramps				North/South Street: US202				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	0	180	193	76	320	0		
Peak-Hour Factor, PHF	1.00	0.83	0.83	0.87	0.87	1.00		
Hourly Flow Rate, HFR	0	216	232	87	367	0		
Percent Heavy Vehicles	6	—	—	6	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	62	0	71	0	0	0		
Peak-Hour Factor, PHF	0.81	1.00	0.81	1.00	1.00	1.00		
Hourly Flow Rate, HFR	76	0	87	0	0	0		
Percent Heavy Vehicles	11	0	11	0	0	0		
Percent Grade (%)	-2			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		87	76		87			
C (m) (vph)		1091	285		690			
v/c		0.08	0.27		0.13			
95% queue length		0.26	1.05		0.43			
Control Delay		8.6	22.2		11.0			
LOS		A	C		B			
Approach Delay	—	—	16.2					
Approach LOS	—	—	C					

HCS2000- DETAILED REPORT

General Information				Site Information			
Analyst	LMM			Intersection	Rte 16 NB Ramp @ US Rte 202		
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas		
Date Performed	02/03/2003			Jurisdiction	Rochester, NH		
Time Period	AM Peak Hour			Analysis Year	2013 Build (Residential)		
				Project ID	Rochester US Rte 202 (CLD No. 02-0402)		

Volume and Timing Input													
		EB			WB			NB			SB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i		0	0	0	1	0	1	1	1	0	0	1	1
Lane group					L		R	L	T			T	R
Volume, V (vph)					98		95	221	316			490	100
% Heavy vehicles, %HV					2		2	2	2			2	2
Peak-hour factor, PHF					0.90		0.90	0.90	0.90			0.90	0.90
Pretimed (P) or actuated (A)					A		A	A	A			A	A
Start-up lost time, l_i					2.0		2.0	2.0	2.0			2.0	2.0
Extension of effective green, e					4.0		4.0	4.0	4.0			4.0	4.0
Arrival type, AT					3		3	4	4			3	3
Unit extension, UE					3.0		3.0	3.0	3.0			3.0	3.0
Filtering/metering, I					1.000	1.000	1.000	0.919	0.919			1.000	1.000
Initial unmet demand, Q_b					0.0		0.0	0.0	0.0			0.0	0.0
Ped / Bike / RTOR volumes		0			0		0				0		0
Lane width					12.0		12.0	12.0	12.0			12.0	12.0
Parking / Grade / Parking		N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m													
Buses stopping, N_B					0		0	0	0			0	0
Min. time for pedestrians, G_p													
Phasing	WB Only	02	03	04	NB Only			NS Perm		07	08		
Timing	G = 16.0	G =	G =	G =	G = 5.0			G = 21.0		G =	G =		
	Y = 6	Y =	Y =	Y =	Y = 6			Y = 6		Y =	Y =		
Duration of Analysis, T = 0.25								Cycle Length, C = 60.0					

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				109		106	246	351			544	111
Lane group capacity, c				531		475	366	1056			714	607
v/c ratio, X				0.21		0.22	0.67	0.33			0.76	0.18
Total green ratio, g/C				0.30		0.30	0.57	0.57			0.38	0.38
Uniform delay, d_1				15.7		15.8	9.5	6.9			16.1	12.3
Progression factor, PF				1.000		1.000	0.649	0.649			1.000	1.000
Delay calibration, k				0.11		0.11	0.24	0.11			0.31	0.11
Incremental delay, d_2				0.2		0.2	4.4	0.2			4.9	0.1
Initial queue delay, d_3												
Control delay				15.9		16.0	10.5	4.7			21.0	12.4
Lane group LOS				B		B	B	A			C	B
Approach delay				15.9			7.1			19.5		
Approach LOS				B			A			B		
Intersection delay	13.9						Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *US202 @ Rt. 16 NB Ramps*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 Build*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Rt. 16 NB Ramps*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	308	116	32	343	0
Peak-Hour Factor, PHF	1.00	0.98	0.98	0.97	0.97	1.00
Hourly Flow Rate, HFR	0	314	118	32	353	0
Percent Heavy Vehicles	0	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	64	0	112	0	0	0
Peak-Hour Factor, PHF	0.84	1.00	0.84	1.00	1.00	1.00
Hourly Flow Rate, HFR	76	0	133	0	0	0
Percent Heavy Vehicles	4	0	4	0	0	0
Percent Grade (%)	-2			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		32	76		133			
C (m) (vph)		1133	347		669			
v/c		0.03	0.22		0.20			
95% queue length		0.09	0.82		0.74			
Control Delay		8.3	18.3		11.7			
LOS		A	C		B			
Approach Delay	--	--	14.1					
Approach LOS	--	--	B					

HCS2000- DETAILED REPORT

General Information				Site Information	
Analyst	LMM			Intersection	Rte 16 NB Ramp @ US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas
Date Performed	02/03/2003			Jurisdiction	Rochester, NH
Time Period	PM Peak Hour			Analysis Year	2013 Build (Residential)
				Project ID	Rochester US Rte 202 (CLD No. 02-0402)

Volume and Timing Input

			EB			WB			NB			SB		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N _i			0	0	0	1	0	1	1	1	0	0	1	1
Lane group						L		R	L	T			T	R
Volume, V (vph)						118		151	85	496			557	75
% Heavy vehicles, %HV						2		2	2	2			2	2
Peak-hour factor, PHF						0.90		0.90	0.90	0.90			0.90	0.90
Pretimed (P) or actuated (A)						A		A	A	A			A	A
Start-up lost time, I _i						2.0		2.0	2.0	2.0			2.0	2.0
Extension of effective green, e						4.0		4.0	4.0	4.0			4.0	4.0
Arrival type, AT						3		3	4	4			3	3
Unit extension, UE						3.0		3.0	3.0	3.0			3.0	3.0
Filtering/metering, I						1.000	1.000	1.000	0.908	0.908			1.000	1.000
Initial unmet demand, Q _b						0.0		0.0	0.0	0.0			0.0	0.0
Ped / Bike / RTOR volumes			0			0		0			0			0
Lane width						12.0		12.0	12.0	12.0			12.0	12.0
Parking / Grade / Parking			N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N _m														
Buses stopping, N _B						0		0	0	0			0	0
Min. time for pedestrians, G _p														
Phasing	WB Only	02	03		04		NB Only		NS Perm		07		08	
Timing	G = 16.0	G =	G =		G =		G = 5.0		G = 21.0		G =		G =	
	Y = 6	Y =	Y =		Y =		Y = 6		Y = 6		Y =		Y =	
Duration of Analysis, T = 0.25									Cycle Length, C = 60.0					

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				131		168	94	551			619	83
Lane group capacity, c				531		475	333	1056			714	607
v/c ratio, X				0.25		0.35	0.28	0.52			0.87	0.14
Total green ratio, g/C				0.30		0.30	0.57	0.57			0.38	0.38
Uniform delay, d ₁				15.9		16.4	8.8	8.0			17.1	12.0
Progression factor, PF				1.000		1.000	0.649	0.649			1.000	1.000
Delay calibration, k				0.11		0.11	0.11	0.13			0.40	0.11
Incremental delay, d ₂				0.2		0.5	0.4	0.4			11.0	0.1
Initial queue delay, d ₃												
Control delay				16.1		16.9	6.2	5.6			28.1	12.1
Lane group LOS				B		B	A	A			C	B
Approach delay				16.6			5.7			26.2		
Approach LOS				B			A			C		
Intersection delay	16.4						Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Rt. 16 SB Ramps
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2003 Build
Analysis Time Period	AM Peak Hour			
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>				
East/West Street: <i>Rt. 16 SB Ramps</i>			North/South Street: <i>US202</i>	
Intersection Orientation: <i>North-South</i>			Study Period (hrs): <i>0.25</i>	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	64	350	0	0	308	74
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.89	0.89
Hourly Flow Rate, HFR	74	406	0	0	346	83
Percent Heavy Vehicles	6	—	—	0	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	23	0	44
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.69	1.00	0.69
Hourly Flow Rate, HFR	0	0	0	33	0	63
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-2		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	74					33		63
C (m) (vph)	1109					275		665
v/c	0.07					0.12		0.09
95% queue length	0.21					0.40		0.31
Control Delay	8.5					19.9		11.0
LOS	A					C		B
Approach Delay	--	--				14.0		
Approach LOS	--	--				B		

HCS2000- DETAILED REPORT

General Information		Site Information	
Analyst	LMM	Intersection	Rte 16 SB Ramp @ US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.	Area Type	All other areas
Date Performed	02/03/2003	Jurisdiction	Rochester, NH
Time Period	AM Peak Hour	Analysis Year	2013 Build (Residential)
		Project ID	Rochester US Rte 202 (CLD No. 02-0402)

Volume and Timing Input

			EB			WB			NB			SB		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i			1	0	1	0	0	0	0	1	1	1	1	0
Lane group			L		R					T	R	L	T	
Volume, V (vph)			30		67					507	249	103	485	
% Heavy vehicles, %HV			2		2					2	2	2	2	
Peak-hour factor, PHF			0.90		0.90					0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)			A		A					A	A	A	A	
Start-up lost time, l_i			2.0		2.0					2.0	2.0	2.0	2.0	
Extension of effective green, e			4.0		4.0					4.0	4.0	4.0	4.0	
Arrival type, AT			3		3					3	3	5	6	
Unit extension, UE			3.0		3.0					3.0	3.0	3.0	3.0	
Filtering/metering, I			1.000	1.000	1.000					1.000	1.000	0.889	0.889	
Initial unmet demand, Q_b			0.0		0.0					0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes			0		0	0			0		0			
Lane width			12.0		12.0					12.0	12.0	12.0	12.0	
Parking / Grade / Parking			N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N_m														
Buses stopping, N_B			0		0					0	0	0	0	
Min. time for pedestrians, G_p														
Phasing	EB Only	02	03		04		SB Only		NS Perm		07		08	
Timing	G = 16.0	G =	G =		G =		G = 5.0		G = 21.0		G =		G =	
	Y = 6	Y =	Y =		Y =		Y = 6		Y = 6		Y =		Y =	
Duration of Analysis, $T = 0.25$									Cycle Length, $C = 60.0$					

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	33		74					563	277	114	539	
Lane group capacity, c	531		475					714	607	357	1056	
v/c ratio, X	0.06		0.16					0.79	0.46	0.32	0.51	
Total green ratio, g/C	0.30		0.30					0.38	0.38	0.57	0.57	
Uniform delay, d_1	15.0		15.4					16.4	13.8	8.6	7.9	
Progression factor, PF	1.000		1.000					1.000	1.000	0.128	0.115	
Delay calibration, k	0.11		0.11					0.34	0.11	0.11	0.12	
Incremental delay, d_2	0.0		0.2					5.9	0.5	0.5	0.4	
Initial queue delay, d_3												
Control delay	15.0		15.6					22.3	14.4	1.6	1.3	
Lane group LOS	B		B					C	B	A	A	
Approach delay	15.4						19.7			1.3		
Approach LOS	B						B			A		
Intersection delay	11.9						Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM			Intersection	US202 @ Rt. 16 SB Ramps		
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH		
Date Performed	1/30/03			Analysis Year	2003 Build		
Analysis Time Period	PM Peak Hour						
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>							
East/West Street: <i>Rt. 16 SB Ramps</i>				North/South Street: <i>US202</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	18	349	0	0	351	56	
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.95	0.95	
Hourly Flow Rate, HFR	19	375	0	0	369	58	
Percent Heavy Vehicles	5	—	—	1	—	—	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration	LT					TR	
Upstream Signal		0			0		
Minor Street	Westbound			Eastbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume	0	0	0	75	0	124	
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.83	1.00	0.83	
Hourly Flow Rate, HFR	0	0	0	90	0	149	
Percent Heavy Vehicles	0	0	0	5	0	5	
Percent Grade (%)	0			-2			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	1	0	1	
Configuration				L		R	
Delay, Queue Length, and Level of Service							
Approach	NB	SB	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LT					L	R
v (vph)	19					90	149
C (m) (vph)	1116					339	645
v/c	0.02					0.27	0.23
95% queue length	0.05					1.05	0.89
Control Delay	8.3					19.4	12.3
LOS	A					C	B
Approach Delay	--	--				14.9	
Approach LOS	--	--				B	

HCS2000- DETAILED REPORT

General Information				Site Information	
Analyst	LMM			Intersection	Rte 16 SB Ramp @ US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas
Date Performed	02/03/2003			Jurisdiction	Rochester, NH
Time Period	PM Peak Hour			Analysis Year	2013 Build (Residential)
				Project ID	Rochester US Rte 202 (CLD No. 02-0402)

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N _i	1	0	1	0	0	0	0	1	1	1	1	0
Lane group	L		R					T	R	L	T	
Volume, V (vph)	101		222					480	144	43	632	
% Heavy vehicles, %HV	2		2					2	2	2	2	
Peak-hour factor, PHF	0.90		0.90					0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)	A		A					A	A	A	A	
Start-up lost time, l _i	2.0		2.0					2.0	2.0	2.0	2.0	
Extension of effective green, e	4.0		4.0					4.0	4.0	4.0	4.0	
Arrival type, AT	3		3					3	3	6	5	
Unit extension, UE	3.0		3.0					3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000	1.000					1.000	1.000	0.835	0.835	
Initial unmet demand, Q _b	0.0		0.0					0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0			0		0			
Lane width	12.0		12.0					12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N _m												
Buses stopping, N _B	0		0					0	0	0	0	
Min. time for pedestrians, G _p												
Phasing	EB Only	02	03	04	SB Only	NS Perm	07	08				
Timing	G = 16.0	G =	G =	G =	G = 5.0	G = 21.0	G =	G =				
	Y = 6	Y =	Y =	Y =	Y = 6	Y = 6	Y =	Y =				
Duration of Analysis, T = 0.25				Cycle Length, C = 60.0								

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	112		247					533	160	48	702	
Lane group capacity, c	531		475					714	607	371	1056	
v/c ratio, X	0.21		0.52					0.75	0.26	0.13	0.66	
Total green ratio, g/C	0.30		0.30					0.38	0.38	0.57	0.57	
Uniform delay, d ₁	15.7		17.4					16.0	12.7	7.9	9.0	
Progression factor, PF	1.000		1.000					1.000	1.000	0.115	0.128	
Delay calibration, k	0.11		0.13					0.30	0.11	0.11	0.24	
Incremental delay, d ₂	0.2		1.0					4.3	0.2	0.1	1.3	
Initial queue delay, d ₃												
Control delay	15.9		18.4					20.3	12.9	1.0	2.5	
Lane group LOS	B		B					C	B	A	A	
Approach delay	17.6						18.6			2.4		
Approach LOS	B						B			A		
Intersection delay	11.7						Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/30/03	Analysis Year	2003 Build
Analysis Time Period	AM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Hussey Hill / Chesley Hill		North/South Street: US202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	384	5	16	200	0
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87
Hourly Flow Rate, HFR	0	479	6	18	229	0
Percent Heavy Vehicles	6	--	--	8	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	36	1	1	1
Peak-Hour Factor, PHF	0.61	0.61	0.61	0.38	0.38	0.38
Hourly Flow Rate, HFR	11	0	59	2	2	2
Percent Heavy Vehicles	6	6	6	0	0	0
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	18		70			6	
C (m) (vph)	1316	1047		510			386	
v/c	0.00	0.02		0.14			0.02	
95% queue length	0.00	0.05		0.47			0.05	
Control Delay	7.7	8.5		13.2			14.5	
LOS	A	A		B			B	
Approach Delay	--	--	13.2			14.5		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Hussey/Chesley Rd*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Hussey Hill / Chesley Hill*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	631	7	19	331	0
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87
Hourly Flow Rate, HFR	0	788	8	21	380	0
Percent Heavy Vehicles	6	—	—	8	—	—

Median Type

Undivided

RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street

	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	9	0	40	1	1	1
Peak-Hour Factor, PHF	0.61	0.61	0.61	0.38	0.38	0.38
Hourly Flow Rate, HFR	14	0	65	2	2	2
Percent Heavy Vehicles	6	6	6	0	0	0

Percent Grade (%)

4

-4

Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	21		79			6	
C (m) (vph)	1157	800		300			196	
v/c	0.00	0.03		0.26			0.03	
95% queue length	0.00	0.08		1.03			0.09	
Control Delay	8.1	9.6		21.2			23.9	
LOS	A	A		C			C	
Approach Delay	--	--		21.2			23.9	
Approach LOS	--	--		C			C	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/30/03	Analysis Year	2003 Build
Analysis Time Period	PM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Hussey Hill / Chesley Hill		North/South Street: US202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	304	4	31	351	2
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.87	0.87	0.87
Hourly Flow Rate, HFR	1	366	4	35	403	2
Percent Heavy Vehicles	4	—	—	5	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	5	0	23	4	1	0
Peak-Hour Factor, PHF	0.58	0.58	0.58	0.60	0.60	0.60
Hourly Flow Rate, HFR	8	0	39	6	1	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		4			-4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	35		47			7	
C (m) (vph)	1143	1172		545			258	
v/c	0.00	0.03		0.09			0.03	
95% queue length	0.00	0.09		0.28			0.08	
Control Delay	8.2	8.2		12.2			19.3	
LOS	A	A		B			C	
Approach Delay	--	--		12.2			19.3	
Approach LOS	--	--		B			C	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential)
Analysis Time Period	PM Peak Hour			
Project Description: Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Hussey Hill / Chesley Hill			North/South Street: US202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	501	4	34	600	3
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.87	0.87	0.87
Hourly Flow Rate, HFR	1	603	4	39	689	3
Percent Heavy Vehicles	4	—	—	5	—	—

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	27	6	1	0
Peak-Hour Factor, PHF	0.58	0.58	0.58	0.60	0.60	0.60
Hourly Flow Rate, HFR	12	0	46	9	1	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		4			-4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	39		58			10	
C (m) (vph)	894	957		297			106	
v/c	0.00	0.04		0.20			0.09	
95% queue length	0.00	0.13		0.71			0.30	
Control Delay	9.0	8.9		20.0			42.5	
LOS	A	A		C			E	
Approach Delay	—	—		20.0			42.5	
Approach LOS	—	—		C			E	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM			Intersection	US202 @ Estes Road			
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH			
Date Performed	1/30/03			Analysis Year	2003 Build			
Analysis Time Period	AM Peak Hour							
Project Description: Rochester US Rte 202 (CLD No. 02-402)								
East/West Street: Estes Road				North/South Street: US202				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	5	260	2	19	169	20		
Peak-Hour Factor, PHF	0.81	0.81	0.81	0.83	0.83	0.83		
Hourly Flow Rate, HFR	6	320	2	22	203	24		
Percent Heavy Vehicles	7	—	—	9	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	5	13	61	68	40	14		
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.88	0.88	0.88		
Hourly Flow Rate, HFR	6	16	76	77	45	15		
Percent Heavy Vehicles	3	3	3	3	3	3		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	6	22		98			137	
C (m) (vph)	1312	1199		601			378	
v/c	0.00	0.02		0.16			0.36	
95% queue length	0.01	0.06		0.58			1.62	
Control Delay	7.8	8.1		12.2			19.8	
LOS	A	A		B			C	
Approach Delay	--	--	12.2			19.8		
Approach LOS	--	--	B			C		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Estes Road*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Estes Road*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	7	466	3	25	289	27
Peak-Hour Factor, PHF	0.81	0.81	0.81	0.83	0.83	0.83
Hourly Flow Rate, HFR	8	575	3	30	348	32
Percent Heavy Vehicles	7	—	—	9	—	—

Median Type	<i>Undivided</i>					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	17	81	91	54	19
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.88	0.88	0.88
Hourly Flow Rate, HFR	8	21	101	103	61	21
Percent Heavy Vehicles	3	3	3	3	3	3

Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	8	30		130			185	
C (m) (vph)	1152	962		377			178	
v/c	0.01	0.03		0.34			1.04	
95% queue length	0.02	0.10		1.51			8.78	
Control Delay	8.1	8.9		19.5			131.7	
LOS	A	A		C			F	
Approach Delay	—	—		19.5			131.7	
Approach LOS	—	—		C			F	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM	Intersection	US202 @ Estes Road				
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH				
Date Performed	1/30/03	Analysis Year	2003 Build				
Analysis Time Period	PM Peak Hour						
Project Description: Rochester US Rte 202 (CLD No. 02-402)							
East/West Street: Estes Road		North/South Street: US202					
Intersection Orientation: North-South		Study Period (hrs): 0.25					

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	13	231	6	63	232	61
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89
Hourly Flow Rate, HFR	15	271	7	70	260	68
Percent Heavy Vehicles	3	--	--	4	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	33	47	31	30	6
Peak-Hour Factor, PHF	0.72	0.72	0.72	0.80	0.80	0.80
Hourly Flow Rate, HFR	1	45	65	38	37	7
Percent Heavy Vehicles	3	3	3	5	5	5
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	15	70		111			82	
C (m) (vph)	1226	1273		466			280	
v/c	0.01	0.05		0.24			0.29	
95% queue length	0.04	0.17		0.92			1.19	
Control Delay	8.0	8.0		15.1			23.1	
LOS	A	A		C			C	
Approach Delay	--	--	15.1			23.1		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *US202 @ Estes Road*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Estes Road*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	18	400	8	84	441	82
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89
Hourly Flow Rate, HFR	21	470	9	94	495	92
Percent Heavy Vehicles	3	--	--	4	--	--

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LTR			LTR	
Upstream Signal		0			0

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	44	64	42	40	8
Peak-Hour Factor, PHF	0.72	0.72	0.72	0.80	0.80	0.80
Hourly Flow Rate, HFR	1	61	88	52	49	9
Percent Heavy Vehicles	3	3	3	5	5	5
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	21	94		150			110	
C (m) (vph)	983	1073		246			95	
v/c	0.02	0.09		0.61			1.16	
95% queue length	0.07	0.29		3.60			7.43	
Control Delay	8.7	8.7		40.1			223.4	
LOS	A	A		E			F	
Approach Delay	--	--		40.1			223.4	
Approach LOS	--	--		E			F	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US202 @ Dry Hill Rd.
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/30/03	Analysis Year	2003 Build
Analysis Time Period	AM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Dry Hill Road / Oak Street		North/South Street: US202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	256	42	2	174	12
Peak-Hour Factor, PHF	0.79	0.79	0.79	0.88	0.88	0.88
Hourly Flow Rate, HFR	0	324	53	2	197	13
Percent Heavy Vehicles	1	—	—	4	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	21	2	0	11	5	2
Peak-Hour Factor, PHF	0.63	0.63	0.63	0.57	0.57	0.57
Hourly Flow Rate, HFR	33	3	0	19	8	3
Percent Heavy Vehicles	0	0	0	6	6	6
Percent Grade (%)		4			-4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	2		36			30	
C (m) (vph)	1367	1171		430			448	
v/c	0.00	0.00		0.08			0.07	
95% queue length	0.00	0.01		0.27			0.21	
Control Delay	7.6	8.1		14.1			13.6	
LOS	A	A		B			B	
Approach Delay	--	--		14.1			13.6	
Approach LOS	--	--		B			B	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Dry Hill Rd.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Dry Hill Road / Oak Street*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	462	57	3	296	16
Peak-Hour Factor, PHF	0.79	0.79	0.79	0.88	0.88	0.88
Hourly Flow Rate, HFR	0	584	72	3	336	18
Percent Heavy Vehicles	1	—	—	4	—	—

Median Type	<i>Undivided</i>				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	<i>LTR</i>			<i>LTR</i>	
Upstream Signal		0		0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	27	3	0	14	7	3
Peak-Hour Factor, PHF	0.63	0.63	0.63	0.57	0.57	0.57
Hourly Flow Rate, HFR	42	4	0	24	12	5
Percent Heavy Vehicles	0	0	0	6	6	6
Percent Grade (%)		4			-4	
Flared Approach		<i>N</i>			<i>N</i>	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		<i>LTR</i>			<i>LTR</i>	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	<i>LTR</i>	<i>LTR</i>		<i>LTR</i>			<i>LTR</i>	
v (vph)	0	3		46			41	
C (m) (vph)	1210	922		221			249	
v/c	0.00	0.00		0.21			0.16	
95% queue length	0.00	0.01		0.76			0.58	
Control Delay	8.0	8.9		25.5			22.3	
LOS	A	A		D			C	
Approach Delay	--	--		25.5			22.3	
Approach LOS	--	--		D			C	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM			Intersection	US202 @ Dry Hill Rd.		
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH		
Date Performed	1/30/03			Analysis Year	2003 Build		
Analysis Time Period	PM Peak Hour						
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>							
East/West Street: <i>Dry Hill Road / Oak Street</i>				North/South Street: <i>US202</i>			
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	1	241	25	0	230	9	
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	
Hourly Flow Rate, HFR	1	264	27	0	252	9	
Percent Heavy Vehicles	7	—	—	5	—	—	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Westbound			Eastbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume	37	6	5	4	4	0	
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.50	0.50	0.50	
Hourly Flow Rate, HFR	44	7	6	8	8	0	
Percent Heavy Vehicles	2	2	2	0	0	0	
Percent Grade (%)	4			-4			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	NB	SB	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR		LTR			LTR
v (vph)	1	0		57			16
C (m) (vph)	1275	1254		466			446
v/c	0.00	0.00		0.12			0.04
95% queue length	0.00	0.00		0.41			0.11
Control Delay	7.8	7.9		13.8			13.4
LOS	A	A		B			B
Approach Delay	—	—	13.8			13.4	
Approach LOS	—	—	B			B	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM			Intersection	US202 @ Dry Hill Rd.		
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH		
Date Performed	1/30/03			Analysis Year	2013 Build (Residential)		
Analysis Time Period	PM Peak Hour						
Project Description: Rochester US Rte 202 (CLD No. 02-402)							
East/West Street: Dry Hill Road / Oak Street				North/South Street: US202			
Intersection Orientation: North-South				Study Period (hrs): 0.25			

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	413	33	0	438	12
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate, HFR	1	453	36	0	481	13
Percent Heavy Vehicles	7	-	-	5	-	-
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	49	8	7	6	6	0
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.50	0.50	0.50
Hourly Flow Rate, HFR	59	9	8	12	12	0
Percent Heavy Vehicles	2	2	2	0	0	0
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	0		76			24	
C (m) (vph)	1044	1059		243			238	
v/c	0.00	0.00		0.31			0.10	
95% queue length	0.00	0.00		1.29			0.33	
Control Delay	8.5	8.4		26.4			21.8	
LOS	A	A		D			C	
Approach Delay	--	--	26.4			21.8		
Approach LOS	--	--	D			C		

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM	Intersection	US 202/Highfield Commons Dr.				
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH				
Date Performed	1/30/03	Analysis Year	2003 Build				
Analysis Time Period	AM Peak Hour						
Project Description: Rochester US Rte 202 (CLD No. 02-0402)							
East/West Street: Highfield Commons Drive		North/South Street: US Route 202					
Intersection Orientation: North-South		Study Period (hrs): 0.25					

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	2	419	0	0	209	12
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	2	465	0	0	232	13
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	66	0	7
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	73	0	7
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	2					73		7
C (m) (vph)	1321					401		801
v/c	0.00					0.18		0.01
95% queue length	0.00					0.66		0.03
Control Delay	7.7					16.0		9.5
LOS	A					C		A
Approach Delay	--	--				15.4		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM			Intersection	US 202/Highfield Commons Dr.		
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH		
Date Performed	1/30/03			Analysis Year	2013 Build (Residential)		
Analysis Time Period	AM Peak Hour						
Project Description: Rochester US Rte 202 (CLD No. 02-0402)							
East/West Street: Highfield Commons Drive				North/South Street: US Route 202			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	5	667	0	0	330	45	
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly Flow Rate, HFR	5	741	0	0	366	50	
Percent Heavy Vehicles	2	-	-	0	-	-	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration	LT					TR	
Upstream Signal		0			0		
Minor Street	Westbound			Eastbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume	0	0	0	180	0	20	
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly Flow Rate, HFR	0	0	0	200	0	22	
Percent Heavy Vehicles	0	0	0	2	0	2	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	1	0	1	
Configuration				L		R	
Delay, Queue Length, and Level of Service							
Approach	NB	SB	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LT					L	R
v (vph)	5					200	22
C (m) (vph)	1143					221	658
v/c	0.00					0.90	0.03
95% queue length	0.01					7.45	0.10
Control Delay	8.2					84.1	10.7
LOS	A					F	B
Approach Delay	--	--				76.8	
Approach LOS	--	--				F	

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM			Intersection	US 202/Highfield Commons Dr.			
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH			
Date Performed	1/30/03			Analysis Year	2003 Build			
Analysis Time Period	PM Peak Hour							
Project Description: <i>Rochester US Rte 202 (CLD No. 02-0402)</i>								
East/West Street: <i>Highfield Commons Drive</i>				North/South Street: <i>US Route 202</i>				
Intersection Orientation: <i>North-South</i>				Study Period (hrs): <i>0.25</i>				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	7	324	0	0	380	67		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	7	360	0	0	422	74		
Percent Heavy Vehicles	2	—	—	0	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	0	0	0	32	0	4		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	0	0	0	35	0	4		
Percent Heavy Vehicles	0	0	0	2	0	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	1	0	1		
Configuration				L		R		
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	7					35		4
C (m) (vph)	1068					337		602
v/c	0.01					0.10		0.01
95% queue length	0.02					0.34		0.02
Control Delay	8.4					16.9		11.0
LOS	A					C		B
Approach Delay	—	—				16.3		
Approach LOS	—	—				C		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US 202/Highfield Commons Dr.
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential)
Analysis Time Period	PM Peak Hour			
Project Description: Rochester US Rte 202 (CLD No. 02-0402)				
East/West Street: Highfield Commons Drive			North/South Street: US Route 202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	21	513	0	0	626	189
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	23	570	0	0	695	210
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	99	0	11
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	110	0	12
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	23					110		12
C (m) (vph)	752					146		385
v/c	0.03					0.75		0.03
95% queue length	0.09					4.56		0.10
Control Delay	9.9					81.1		14.7
LOS	A					F		B
Approach Delay	--	--				74.6		
Approach LOS	--	--				F		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US 202/Secretariat Estates Dr.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2003 Build*

Project Description *Rochester US Rte 202 (CLD No. 02-0402)*

East/West Street: *Secretariat Estates Drive*

North/South Street: *US Route 202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	286	0	0	192	5
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	1	317	0	0	213	5
Percent Heavy Vehicles	2	—	—	0	—	—

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	12	0	1
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	13	0	1
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	1					13		1
C (m) (vph)	1352					506		824
v/c	0.00					0.03		0.00
95% queue length	0.00					0.08		0.00
Control Delay	7.7					12.3		9.4
LOS	A					B		A
Approach Delay	--	--				12.1		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US 202/Secretariat Estates Dr.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential)*

Project Description *Rochester US Rte 202 (CLD No. 02-0402)*

East/West Street: *Secretariat Estates Drive*

North/South Street: *US Route 202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	11	383	0	0	264	62
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	12	425	0	0	293	68
Percent Heavy Vehicles	2	—	—	0	—	—

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LT				TR
Upstream Signal		0		0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	136	0	18
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	151	0	20
Percent Heavy Vehicles	0	0	0	2	0	2

Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	12					151		20
C (m) (vph)	1198					362		714
v/c	0.01					0.42		0.03
95% queue length	0.03					2.00		0.09
Control Delay	8.0					21.9		10.2
LOS	A					C		B
Approach Delay	--	--				20.5		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US 202/Secretariat Estates Dr.
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2003 Build
Analysis Time Period	PM Peak Hour			
Project Description: Rochester US Rte 202 (CLD No. 02-0402)				
East/West Street: Secretariat Estates Drive			North/South Street: US Route 202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	262	0	0	252	15
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	1	291	0	0	280	16
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	5	0	1
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	5	0	1
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	1					5		1
C (m) (vph)	1265					476		751
v/c	0.00					0.01		0.00
95% queue length	0.00					0.03		0.00
Control Delay	7.8					12.6		9.8
LOS	A					B		A
Approach Delay	--	--				12.2		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US 202/Secretariat Estates Dr.
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/30/03	Analysis Year	2013 Build (Residential)
Analysis Time Period	PM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-0402)			
East/West Street: Secretariat Estates Drive		North/South Street: US Route 202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	21	356	0	0	339	148
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	23	395	0	0	376	164
Percent Heavy Vehicles	2	—	—	0	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	91	0	14
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	101	0	15
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	23					101		15
C (m) (vph)	1028					302		603
v/c	0.02					0.33		0.02
95% queue length	0.07					1.43		0.08
Control Delay	8.6					22.8		11.1
LOS	A					C		B
Approach Delay	--	--				21.3		
Approach LOS	--	--				C		

APPENDIX G

INTERSECTION CAPACITY ANALYSES 2013 BUILD (RESIDENTIAL/MALL) CASES

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information				
Analyst	LMM			Intersection	Strafford Square			
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH			
Date Performed	1/30/03			Analysis Year	2013 Build (Residential/Mall)			
Analysis Time Period	AM Peak Hour							
Project Description: Rochester US Rte 202 (CLD No. 02-402)								
East/West Street: N. Main Street				North/South Street: Walnut/Washington				
Intersection Orientation: East-West				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	0	540	155	418	395	0		
Peak-Hour Factor, PHF	1.00	0.79	0.79	0.89	0.89	1.00		
Hourly Flow Rate, HFR	0	683	196	469	443	0		
Percent Heavy Vehicles	0	--	--	5	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	123	0	596	0	0	0		
Peak-Hour Factor, PHF	0.88	1.00	0.88	1.00	1.00	1.00		
Hourly Flow Rate, HFR	139	0	677	0	0	0		
Percent Heavy Vehicles	5	0	5	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		469	139		677			
C (m) (vph)		756	19		390			
v/c		0.62	7.32		1.74			
95% queue length		4.37	17.91		41.93			
Control Delay		17.2			365.9			
LOS		C	F		F			
Approach Delay	--	--	855.7					
Approach LOS	--	--	F					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Strafford Square
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential/Mall)
Analysis Time Period	PM Peak Hour			

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *N. Main Street*

North/South Street: *Walnut/Washington*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	689	202	697	813	0
Peak-Hour Factor, PHF	1.00	0.90	0.90	0.92	0.92	1.00
Hourly Flow Rate, HFR	0	765	224	757	883	0
Percent Heavy Vehicles	0	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	198	0	530	0	0	0
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR	220	0	588	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT	L		R			
v (vph)		757	220		588			
C (m) (vph)		703	0		348			
v/c		1.08			1.69			
95% queue length		20.56			36.11			
Control Delay		80.1			349.2			
LOS		F	F		F			
Approach Delay	—	—						
Approach LOS	—	—						

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *Washington Street @ Roy Street*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential/Mall)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Roy Street*

North/South Street: *Washington Street*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	26	488	0	0	521	0
Peak-Hour Factor, PHF	0.86	0.86	1.00	1.00	0.69	0.69
Hourly Flow Rate, HFR	30	567	0	0	755	0
Percent Heavy Vehicles	0	--	--	2	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	3	0	117
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.87	1.00	0.87
Hourly Flow Rate, HFR	0	0	0	3	0	134
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	30						137	
C (m) (vph)	865						398	
v/c	0.03						0.34	
95% queue length	0.11						1.51	
Control Delay	9.3						18.7	
LOS	A						C	
Approach Delay	--	--				18.7		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Washington St @ Roy Street
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential/Mall)
Analysis Time Period	PM Peak Hour			
Project Description: Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Roy Street			North/South Street: Washington Street	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	127	615	0	0	647	4
Peak-Hour Factor, PHF	0.93	0.93	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR	136	661	0	0	710	4
Percent Heavy Vehicles	2	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	4	0	62
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.70	1.00	0.70
Hourly Flow Rate, HFR	0	0	0	5	0	88
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			-3		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	136						93	
C (m) (vph)	886						365	
v/c	0.15						0.25	
95% queue length	0.54						1.00	
Control Delay	9.8						18.2	
LOS	A						C	
Approach Delay	--	--				18.2		
Approach LOS	--	--				C		

TWO-WAY STOP CONTROL SUMMARY

General Information				Site Information			
Analyst	LMM			Intersection	Washington/Woodlawn/Brock		
Agency/Co.	CLD Consulting Engineers, Inc.			Jurisdiction	Rochester, NH		
Date Performed	1/30/03			Analysis Year	2013 Build (Residential/Mall)		
Analysis Time Period	AM Peak Hour						
Project Description: Rochester US Rte 202 (CLD No. 02-402)							
East/West Street: Woodlawn Avenue/Brock Street				North/South Street: Washington Street			
Intersection Orientation: North-South				Study Period (hrs): 0.25			

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	326	228	311	324	3
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.79	0.79	0.79
Hourly Flow Rate, HFR	0	370	259	393	410	3
Percent Heavy Vehicles	1	—	—	2	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	129	0	188	0	0	3
Peak-Hour Factor, PHF	0.71	0.71	0.71	0.50	0.50	0.50
Hourly Flow Rate, HFR	181	0	264	0	0	6
Percent Heavy Vehicles	6	6	6	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	393		445			6	
C (m) (vph)	1151	953		89			644	
v/c	0.00	0.41		5.00			0.01	
95% queue length	0.00	2.05		47.98			0.03	
Control Delay	8.1	11.4					10.6	
LOS	A	B		F			B	
Approach Delay	--	--					10.6	
Approach LOS	--	--	F				B	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	Washington/Woodlawn/Brock
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential/Mall)
Analysis Time Period	PM Peak Hour			
Project Description Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Woodlawn Avenue/Brock Street			North/South Street: Washington Street	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	4	500	244	221	487	1
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.90	0.90	0.90
Hourly Flow Rate, HFR	4	581	283	245	541	1
Percent Heavy Vehicles	2	—	—	1	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	288	0	239	3	0	4
Peak-Hour Factor, PHF	0.76	0.76	0.76	0.25	0.25	0.25
Hourly Flow Rate, HFR	378	0	314	12	0	16
Percent Heavy Vehicles	1	1	1	25	25	25
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	4	245		692			28	
C (m) (vph)	1027	783		68			16	
v/c	0.00	0.31		10.18			1.75	
95% queue length	0.01	1.34		81.20			4.08	
Control Delay	8.5	11.7					852.3	
LOS	A	B		F			F	
Approach Delay	—	—					852.3	
Approach LOS	—	—		F			F	

HCS2000- DETAILED REPORT

General Information				Site Information			
Analyst	LMM			Intersection	Rte 16 NB Ramp @ US Rte 202		
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas		
Date Performed	02/03/2003			Jurisdiction	Rochester, NH		
Time Period	AM Peak Hour			Analysis Year	2013 Build (Residential/Mall)		
				Project ID	Rochester US Rte 202 (CLD No. 02-0402)		

Volume and Timing Input														
			EB			WB			NB			SB		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i			0	0	0	1	0	1	1	1	0	0	1	1
Lane group						L		R	L	T			T	R
Volume, V (vph)						168		95	268	327			510	100
% Heavy vehicles, %HV						2		2	2	2			2	2
Peak-hour factor, PHF						0.90		0.90	0.90	0.90			0.90	0.90
Pretimed (P) or actuated (A)						A		A	A	A			A	A
Start-up lost time, I_i						2.0		2.0	2.0	2.0			2.0	2.0
Extension of effective green, e						4.0		4.0	4.0	4.0			4.0	4.0
Arrival type, AT						3		3	4	5			3	3
Unit extension, UE						3.0		3.0	3.0	3.0			3.0	3.0
Filtering/metering, I						1.000	1.000	1.000	0.866	0.866			1.000	1.000
Initial unmet demand, Q_b						0.0		0.0	0.0	0.0			0.0	0.0
Ped / Bike / RTOR volumes			0			0		0			0			0
Lane width						12.0		12.0	12.0	12.0			12.0	12.0
Parking / Grade / Parking			N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m														
Buses stopping, N_B						0		0	0	0			0	0
Min. time for pedestrians, G_p														
Phasing	WB Only	02	03		04		NB Only		NS Perm		07		08	
Timing	G = 16.0	G =	G =		G =		G = 6.0		G = 20.0		G =		G =	
	Y = 6	Y =	Y =		Y =		Y = 6		Y = 6		Y =		Y =	
Duration of Analysis, $T = 0.25$									Cycle Length, $C = 60.0$					

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				187		106	298	363			567	111
Lane group capacity, c				531		475	364	1056			683	580
v/c ratio, X				0.35		0.22	0.82	0.34			0.83	0.19
Total green ratio, g/C				0.30		0.30	0.57	0.57			0.37	0.37
Uniform delay, d_1				16.4		15.8	10.5	7.0			17.3	12.9
Progression factor, PF				1.000		1.000	0.649	0.128			1.000	1.000
Delay calibration, k				0.11		0.11	0.36	0.11			0.37	0.11
Incremental delay, d_2				0.4		0.2	12.1	0.2			8.5	0.2
Initial queue delay, d_3												
Control delay				16.8		16.0	18.9	1.1			25.8	13.1
Lane group LOS				B		B	B	A			C	B
Approach delay				16.5			9.1			23.7		
Approach LOS				B			A			C		
Intersection delay	16.5						Intersection LOS			B		

HCS2000- DETAILED REPORT

General Information

Analyst LMM
Agency or Co. CLD Consulting Engineers, Inc.
Date Performed 02/03/2003
Time Period PM Peak Hour

Site Information

Intersection Rte 16 NB Ramp @ US Rte 202
Area Type All other areas
Jurisdiction Rochester, NH
Analysis Year 2013 Build (Residential/Mall)
Project ID Rochester US Rte 202 (CLD No. 02-0402)

Volume and Timing Input

			EB			WB			NB			SB		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N _i			0	0	0	1	0	1	1	1	0	0	1	1
Lane group						L		R	L	T			T	R
Volume, V (vph)						389		151	402	561			617	75
% Heavy vehicles, %HV						2		2	2	2			2	2
Peak-hour factor, PHF						0.90		0.90	0.90	0.90			0.90	0.90
Pretimed (P) or actuated (A)						A		A	A	A			A	A
Start-up lost time, I _i						2.0		2.0	2.0	2.0			2.0	2.0
Extension of effective green, e						4.0		4.0	4.0	4.0			4.0	4.0
Arrival type, AT						3		3	4	5			3	3
Unit extension, UE						3.0		3.0	3.0	3.0			3.0	3.0
Filtering/metering, I						1.000	1.000	1.000	0.568	0.568			1.000	1.000
Initial unmet demand, Q _b						0.0		0.0	0.0	0.0			0.0	0.0
Ped / Bike / RTOR volumes			0			0		75				0		0
Lane width						12.0		12.0	12.0	12.0			12.0	12.0
Parking / Grade / Parking			N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N _m														
Buses stopping, N _B						0		0	0	0			0	0
Min. time for pedestrians, G _p														
Phasing	WB Only	02	03		04		NS Perm		NB Only		07		08	
Timing	G = 25.0	G =	G =		G =		G = 36.0		G = 11.0		G =		G =	
	Y = 6	Y =	Y =		Y =		Y = 6		Y = 6		Y =		Y =	
Duration of Analysis, T = 0.25									Cycle Length, C = 90.0					

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				432		84	447	623			686	83
Lane group capacity, c				531		475	484	1138			787	668
v/c ratio, X				0.81		0.18	0.92	0.55			0.87	0.12
Total green ratio, g/C				0.30		0.30	0.61	0.61			0.42	0.42
Uniform delay, d ₁				29.2		23.3	30.0	10.2			23.8	15.9
Progression factor, PF				1.000		1.000	0.548	0.129			1.000	1.000
Delay calibration, k				0.35		0.11	0.44	0.15			0.40	0.11
Incremental delay, d ₂				9.4		0.2	15.5	0.3			10.5	0.1
Initial queue delay, d ₃												
Control delay				38.6		23.5	32.0	1.6			34.3	15.9
Lane group LOS				D		C	C	A			C	B
Approach delay				36.1			14.3			32.3		
Approach LOS				D			B			C		
Intersection delay	25.0						Intersection LOS			C		

HCS2000- DETAILED REPORT

General Information				Site Information	
Analyst	LMM			Intersection	Rte 16 SB Ramp @ US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas
Date Performed	02/03/2003			Jurisdiction	Rochester, NH
Time Period	AM Peak Hour			Analysis Year	2013 Build (Residential/Mall)
				Project ID	Rochester US Rte 202 (CLD No. 02-0402)

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	1	0	1	0	0	0	0	1	1	1	1	0
Lane group	L		R					T	R	L	T	
Volume, V (vph)	30		156					565	310	103	575	
% Heavy vehicles, %HV	2		2					2	2	2	2	
Peak-hour factor, PHF	0.90		0.90					0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)	A		A					A	A	A	A	
Start-up lost time, l_i	2.0		2.0					2.0	2.0	2.0	2.0	
Extension of effective green, e	4.0		4.0					4.0	4.0	4.0	4.0	
Arrival type, AT	3		3					3	3	4	6	
Unit extension, UE	3.0		3.0					3.0	3.0	3.0	3.0	
Filtering/metering, l	1.000	1.000	1.000					1.000	1.000	0.839	0.839	
Initial unmet demand, Q_b	0.0		0.0					0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0			0		0			
Lane width	12.0		12.0					12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0		0					0	0	0	0	
Min. time for pedestrians, G_p												
Phasing	EB Only	02	03	04	SB Only	NS Perm	07	08				
Timing	$G = 16.0$	$G =$	$G =$	$G =$	$G = 5.0$	$G = 21.0$	$G =$	$G =$				
	$Y = 6$	$Y =$	$Y =$	$Y =$	$Y = 6$	$Y = 6$	$Y =$	$Y =$				
Duration of Analysis, $T = 0.25$							Cycle Length, $C = 60.0$					

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	33		173					628	344	114	639	
Lane group capacity, c	531		475					714	607	331	1056	
v/c ratio, X	0.06		0.36					0.88	0.57	0.34	0.61	
Total green ratio, g/C	0.30		0.30					0.38	0.38	0.57	0.57	
Uniform delay, d_1	15.0		16.5					17.2	14.6	9.1	8.6	
Progression factor, PF	1.000		1.000					1.000	1.000	0.649	0.115	
Delay calibration, k	0.11		0.11					0.41	0.16	0.11	0.19	
Incremental delay, d_2	0.0		0.5					12.2	1.2	0.5	0.8	
Initial queue delay, d_3												
Control delay	15.0		17.0					29.4	15.8	6.4	1.8	
Lane group LOS	B		B					C	B	A	A	
Approach delay	16.7						24.6			2.5		
Approach LOS	B						C			A		
Intersection delay	15.1						Intersection LOS			B		

HCS2000- DETAILED REPORT

General Information				Site Information	
Analyst	LMM			Intersection	Rte 16 SB Ramp @ US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas
Date Performed	02/03/2003			Jurisdiction	Rochester, NH
Time Period	PM Peak Hour			Analysis Year	2013 Build (Residential/Mall)
				Project ID	Rochester US Rte 202 (CLD No. 02-0402)

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N _i	1	0	1	0	0	0	0	1	1	1	1	0
Lane group	L		R					T	R	L	T	
Volume, V (vph)	101		433					862	334	43	963	
% Heavy vehicles, %HV	2		2					2	2	2	2	
Peak-hour factor, PHF	0.90		0.90					0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)	A		A					A	A	A	A	
Start-up lost time, I _s	2.0		2.0					2.0	2.0	2.0	2.0	
Extension of effective green, e	4.0		4.0					4.0	4.0	4.0	4.0	
Arrival type, AT	3		3					5	5	4	5	
Unit extension, UE	3.0		3.0					3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000	1.000					1.000	1.000	0.353	0.353	
Initial unmet demand, Q _b	0.0		0.0					0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		125	0			0		0			
Lane width	12.0		12.0					12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N _m												
Buses stopping, N _B	0		0					0	0	0	0	
Min. time for pedestrians, G _p												
Phasing	EB Only	02	03	04	NS Perm	SB Only	07	08				
Timing	G = 20.0	G =	G =	G =	G = 47.0	G = 5.0	G =	G =				
	Y = 6	Y =	Y =	Y =	Y = 6	Y = 6	Y =	Y =				
Duration of Analysis, T = 0.25				Cycle Length, C = 90.0								

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	112		342					958	371	48	1070	
Lane group capacity, c	433		387					1014	862	531	1242	
v/c ratio, X	0.26		0.88					0.94	0.43	0.09	0.86	
Total green ratio, g/C	0.24		0.24					0.54	0.54	0.67	0.67	
Uniform delay, d ₁	27.4		32.8					19.2	12.2	5.6	11.7	
Progression factor, PF	1.000		1.000					0.203	0.203	0.383	0.150	
Delay calibration, k	0.11		0.41					0.46	0.11	0.11	0.39	
Incremental delay, d ₂	0.3		20.7					16.6	0.3	0.0	2.4	
Initial queue delay, d ₃												
Control delay	27.7		53.5					20.5	2.8	2.2	4.2	
Lane group LOS	C		D					C	A	A	A	
Approach delay	47.1						15.6			4.1		
Approach LOS	D						B			A		
Intersection delay	16.1						Intersection LOS			B		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Hussey/Chesley Rd
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential/Mall)
Analysis Time Period	AM Peak Hour			
Project Description <i>Rochester US Rte 202 (CLD No. 02-402)</i>				
East/West Street: <i>Hussey Hill / Chesley Hill</i>			North/South Street: <i>US202</i>	
Intersection Orientation: <i>North-South</i>			Study Period (hrs): <i>0.25</i>	

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	650	7	20	340	0
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87
Hourly Flow Rate, HFR	0	812	8	22	390	0
Percent Heavy Vehicles	6	--	--	8	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	9	0	41	1	1	1
Peak-Hour Factor, PHF	0.61	0.61	0.61	0.38	0.38	0.38
Hourly Flow Rate, HFR	14	0	67	2	2	2
Percent Heavy Vehicles	6	6	6	0	0	0
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	22		81			6	
C (m) (vph)	1147	783		288			186	
v/c	0.00	0.03		0.28			0.03	
95% queue length	0.00	0.09		1.13			0.10	
Control Delay	8.1	9.7		22.3			25.0-	
LOS	A	A		C			C	
Approach Delay	--	--		22.3			25.0-	
Approach LOS	--	--		C			C	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *US202 @ Hussey/Chesley Rd*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential/Mall)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Hussey Hill / Chesley Hill*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	558	4	36	663	3
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.87	0.87	0.87
Hourly Flow Rate, HFR	1	672	4	41	762	3
Percent Heavy Vehicles	4	—	—	5	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	0	29	7	1	0
Peak-Hour Factor, PHF	0.58	0.58	0.58	0.60	0.60	0.60
Hourly Flow Rate, HFR	12	0	50	11	1	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	4			-4		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	41		62			12	
C (m) (vph)	839	902		257			80	
v/c	0.00	0.05		0.24			0.15	
95% queue length	0.00	0.14		0.92			0.50	
Control Delay	9.3	9.2		23.4			57.8	
LOS	A	A		C			F	
Approach Delay	--	--	23.4			57.8		
Approach LOS	--	--	C			F		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Estes Road*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential/Mall)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Estes Road*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	7	479	3	26	297	27
Peak-Hour Factor, PHF	0.81	0.81	0.81	0.83	0.83	0.83
Hourly Flow Rate, HFR	8	591	3	31	357	32
Percent Heavy Vehicles	7	--	--	9	--	--

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	7	17	84	94	54	19
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.88	0.88	0.88
Hourly Flow Rate, HFR	8	21	104	106	61	21
Percent Heavy Vehicles	3	3	3	3	3	3
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	8	31		133			188	
C (m) (vph)	1143	949		367			168	
v/c	0.01	0.03		0.36			1.12	
95% queue length	0.02	0.10		1.62			9.74	
Control Delay	8.2	8.9		20.3			160.5	
LOS	A	A		C			F	
Approach Delay	--	--		20.3			160.5	
Approach LOS	--	--		C			F	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US202 @ Estes Road
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/30/03	Analysis Year	2013 Build (Residential/Mall)
Analysis Time Period	PM Peak Hour		
Project Description Rochester US Rte 202 (CLD No. 02-402)			
East/West Street: Estes Road		North/South Street: US202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	18	442	8	95	482	93
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89
Hourly Flow Rate, HFR	21	519	9	106	541	104
Percent Heavy Vehicles	3	—	—	4	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	44	73	48	40	8
Peak-Hour Factor, PHF	0.72	0.72	0.72	0.80	0.80	0.80
Hourly Flow Rate, HFR	1	61	101	59	49	9
Percent Heavy Vehicles	3	3	3	5	5	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	21	106		163			117	
C (m) (vph)	935	1029		215			63	
v/c	0.02	0.10		0.76			1.86	
95% queue length	0.07	0.34		5.22			10.81	
Control Delay	8.9	8.9		60.5			546.5	
LOS	A	A		F			F	
Approach Delay	--	--		60.5			546.5	
Approach LOS	--	--		F			F	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *AM Peak Hour*

Site Information

Intersection *US202 @ Dry Hill Rd.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential/Mall)*

Project Description *Rochester US Rte 202 (CLD No. 02-402)*

East/West Street: *Dry Hill Road / Oak Street*

North/South Street: *US202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	474	57	3	303	17
Peak-Hour Factor, PHF	0.79	0.79	0.79	0.88	0.88	0.88
Hourly Flow Rate, HFR	0	599	72	3	344	19
Percent Heavy Vehicles	1	—	—	4	—	—

Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	27	3	0	15	7	3
Peak-Hour Factor, PHF	0.63	0.63	0.63	0.57	0.57	0.57
Hourly Flow Rate, HFR	42	4	0	26	12	5
Percent Heavy Vehicles	0	0	0	6	6	6
Percent Grade (%)		4			-4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	0	3		46			43	
C (m) (vph)	1201	910		213			239	
v/c	0.00	0.00		0.22			0.18	
95% queue length	0.00	0.01		0.80			0.64	
Control Delay	8.0	9.0		26.5			23.3	
LOS	A	A		D			C	
Approach Delay	--	--		26.5			23.3	
Approach LOS	--	--		D			C	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US202 @ Dry Hill Rd.
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential/Mall)
Analysis Time Period	PM Peak Hour			
Project Description: Rochester US Rte 202 (CLD No. 02-402)				
East/West Street: Dry Hill Road / Oak Street			North/South Street: US202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	453	33	0	477	14
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate, HFR	1	497	36	0	524	15
Percent Heavy Vehicles	7	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	49	8	8	7	6	0
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.50	0.50	0.50
Hourly Flow Rate, HFR	59	9	9	14	12	0
Percent Heavy Vehicles	2	2	2	0	0	0
Percent Grade (%)		4			-4	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	1	0		77			26	
C (m) (vph)	1005	1020		214			207	
v/c	0.00	0.00		0.36			0.13	
95% queue length	0.00	0.00		1.55			0.42	
Control Delay	8.6	8.5		31.0			24.9	
LOS	A	A		D			C	
Approach Delay	--	--		31.0			24.9	
Approach LOS	--	--		D			C	

HCS2000- DETAILED REPORT

General Information				Site Information	
Analyst	LMM			Intersection	Flatley Company Dr/US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas
Date Performed	02/03/2003			Jurisdiction	Rochester, NH
Time Period	AM Peak Hour			Analysis Year	2013 Build (Residential/Mall)
				Project ID	Rochester US Rte 202 (CLD No. 02-0402)

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N _i	0	0	0	1	0	1	0	1	1	2	1	0
Lane group				L		R		T	R	L	T	
Volume, V (vph)				22		129		746	30	191	540	
% Heavy vehicles, %HV				2		2		2	2	2	2	
Peak-hour factor, PHF				0.90		0.90		0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)				A		A		A	A	A	A	
Start-up lost time, I _s				2.0		2.0		2.0	2.0	2.0	2.0	
Extension of effective green, e				4.0		4.0		4.0	4.0	4.0	4.0	
Arrival type, AT				3		3		3	3	4	5	
Unit extension, UE				3.0		3.0		3.0	3.0	3.0	3.0	
Filtering/metering, I				1.000	1.000	1.000		1.000	1.000	1.000	1.000	
Initial unmet demand, Q _b				0.0		0.0		0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0			0		0	0		0			
Lane width				12.0		12.0		12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N _m												
Buses stopping, N _B				0		0		0	0	0	0	
Min. time for pedestrians, G _p												
Phasing	WB Only		02	03		04	SB Only		Thru & RT		07	08
Timing	G = 8.0		G =	G =		G =	G = 8.0		G = 41.0		G =	
	Y = 6		Y =	Y =		Y =	Y = 6		Y = 6		Y =	
Duration of Analysis, T = 0.25								Cycle Length, C = 75.0				

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				24		143		829	33	212	600	
Lane group capacity, c				236		507		1068	1203	458	1416	
v/c ratio, X				0.10		0.28		0.78	0.03	0.46	0.42	
Total green ratio, g/C				0.13		0.32		0.57	0.76	0.13	0.76	
Uniform delay, d ₁				28.6		19.1		12.3	2.2	30.0	3.2	
Progression factor, PF				1.000		1.000		1.000	1.000	1.000	0.208	
Delay calibration, k				0.11		0.11		0.33	0.11	0.11	0.11	
Incremental delay, d ₂				0.2		0.3		3.7	0.0	0.7	0.2	
Initial queue delay, d ₃												
Control delay				28.7		19.4		16.0	2.2	30.8	0.9	
Lane group LOS				C		B		B	A	C	A	
Approach delay				20.7			15.4			8.7		
Approach LOS				C			B			A		
Intersection delay	12.9						Intersection LOS			B		

HCS2000™ DETAILED REPORT

General Information				Site Information	
Analyst	LMM			Intersection	Flatley Company Dr/US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas
Date Performed	02/03/2003			Jurisdiction	Rochester, NH
Time Period	PM Peak Hour			Analysis Year	2013 Build (Residential/Mall)
				Project ID	Rochester US Rte 202 (CLD No. 02-0402)

Volume and Timing Input

			EB			WB			NB			SB		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i			0	0	0	1	0	1	0	1	1	2	1	0
Lane group						L		R		T	R	L	T	
Volume, V (vph)						97		607		589	95	574	822	
% Heavy vehicles, %HV						2		2		2	2	2	2	
Peak-hour factor, PHF						0.90		0.90		0.90	0.90	0.90	0.90	
Pretimed (P) or actuated (A)						A		A		A	A	A	A	
Start-up lost time, l_i						2.0		2.0		2.0	2.0	2.0	2.0	
Extension of effective green, e						4.0		4.0		4.0	4.0	4.0	4.0	
Arrival type, AT						3		3		3	3	4	5	
Unit extension, UE						3.0		3.0		3.0	3.0	3.0	3.0	
Filtering/metering, I						1.000	1.000	1.000		1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b						0.0		0.0		0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes			0			0		0	0		0			
Lane width						12.0		12.0		12.0	12.0	12.0	12.0	
Parking / Grade / Parking			N		N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m														
Buses stopping, N_B						0		0		0	0	0	0	
Min. time for pedestrians, G_p														
Phasing	WB Only	02	03		04		SB Only		Thru & RT		07		08	
Timing	G = 14.0	G =	G =		G =		G = 17.0		G = 31.0		G =		G =	
	Y = 6	Y =	Y =		Y =		Y = 6		Y = 6		Y =		Y =	
Duration of Analysis, $T = 0.25$									Cycle Length, $C = 80.0$					

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v				108		674		654	106	638	913	
Lane group capacity, c				354		772		768	1049	815	1304	
v/c ratio, X				0.31		0.87		0.85	0.10	0.78	0.70	
Total green ratio, g/C				0.20		0.49		0.41	0.66	0.24	0.70	
Uniform delay, d_1				27.3		18.3		21.3	4.9	28.6	7.1	
Progression factor, PF				1.000		1.000		1.000	1.000	1.000	0.167	
Delay calibration, k				0.11		0.40		0.38	0.11	0.33	0.27	
Incremental delay, d_2				0.5		10.8		9.1	0.0	5.0	1.7	
Initial queue delay, d_3												
Control delay				27.8		29.1		30.4	4.9	33.6	2.9	
Lane group LOS				C		C		C	A	C	A	
Approach delay				28.9			26.8			15.5		
Approach LOS				C			C			B		
Intersection delay	21.7						Intersection LOS			C		

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	LMM		Intersection	US 202/Highfield Commons Dr.
Agency/Co.	CLD Consulting Engineers, Inc.		Jurisdiction	Rochester, NH
Date Performed	1/30/03		Analysis Year	2013 Build (Residential/Mall)
Analysis Time Period	AM Peak Hour			
Project Description: Rochester US Rte 202 (CLD No. 02-0402)				
East/West Street: Highfield Commons Drive			North/South Street: US Route 202	
Intersection Orientation: North-South			Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	5	687	0	0	340	45
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	5	763	0	0	377	50
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	
Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	180	0	20
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	200	0	22
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	5					200		22
C (m) (vph)	1132					211		648
v/c	0.00					0.95		0.03
95% queue length	0.01					8.00		0.11
Control Delay	8.2					96.4		10.8
LOS	A					F		B
Approach Delay	--	--				88.0		
Approach LOS	--	--				F		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *US 202/Highfield Commons Dr.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential/Mall)*

Project Description *Rochester US Rte 202 (CLD No. 02-0402)*

East/West Street: *Highfield Commons Drive*

North/South Street: *US Route 202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	21	573	0	0	691	189
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	23	636	0	0	767	210
Percent Heavy Vehicles	2	--	--	0	--	--

Median Type	Undivided				
RT Channelized			0		0
Lanes	0	1	0	0	1
Configuration	LT				TR
Upstream Signal		0			0

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	99	0	11
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	110	0	12
Percent Heavy Vehicles	0	0	0	2	0	2

Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	23					110		12
C (m) (vph)	706					121		350
v/c	0.03					0.91		0.03
95% queue length	0.10					5.77		0.11
Control Delay	10.3					126.5		15.7
LOS	B					F		C
Approach Delay	--	--				115.6		
Approach LOS	--	--				F		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	LMM	Intersection	US 202/Secretariat Estates Dr.
Agency/Co.	CLD Consulting Engineers, Inc.	Jurisdiction	Rochester, NH
Date Performed	1/30/03	Analysis Year	2013 Build (Residential/Mall)
Analysis Time Period	AM Peak Hour		
Project Description: Rochester US Rte 202 (CLD No. 02-0402)			
East/West Street: Secretariat Estates Drive		North/South Street: US Route 202	
Intersection Orientation: North-South		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	11	395	0	0	271	62
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	12	438	0	0	301	68
Percent Heavy Vehicles	2	—	—	0	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	136	0	18
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	151	0	20
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	12					151		20
C (m) (vph)	1190					352		707
v/c	0.01					0.43		0.03
95% queue length	0.03					2.08		0.09
Control Delay	8.1					22.7		10.2
LOS	A					C		B
Approach Delay	—	—				21.2		
Approach LOS	—	—				C		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst *LMM*
 Agency/Co. *CLD Consulting Engineers, Inc.*
 Date Performed *1/30/03*
 Analysis Time Period *PM Peak Hour*

Site Information

Intersection *US 202/Secretariat Estates Dr.*
 Jurisdiction *Rochester, NH*
 Analysis Year *2013 Build (Residential/Mall)*

Project Description *Rochester US Rte 202 (CLD No. 02-0402)*

East/West Street: *Secretariat Estates Drive*

North/South Street: *US Route 202*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	21	396	0	0	378	148
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	23	440	0	0	420	164
Percent Heavy Vehicles	2	—	—	0	—	—
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	91	0	14
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR	0	0	0	101	0	15
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (vph)	23					101		15
C (m) (vph)	991					268		569
v/c	0.02					0.38		0.03
95% queue length	0.07					1.68		0.08
Control Delay	8.7					26.3		11.5
LOS	A					D		B
Approach Delay	—	—				24.4		
Approach LOS	—	—				C		

APPENDIX H

CONCEPTUAL ALTERNATIVE PLANS

[illegible]

OPTION 2
TWO-LANE WITH PARKING - PLAN VIEW

LEGEND

	SIDEWALK
	UTILITY STRIP
	TRAVEL WAY
	SHOULDER
	PARKING

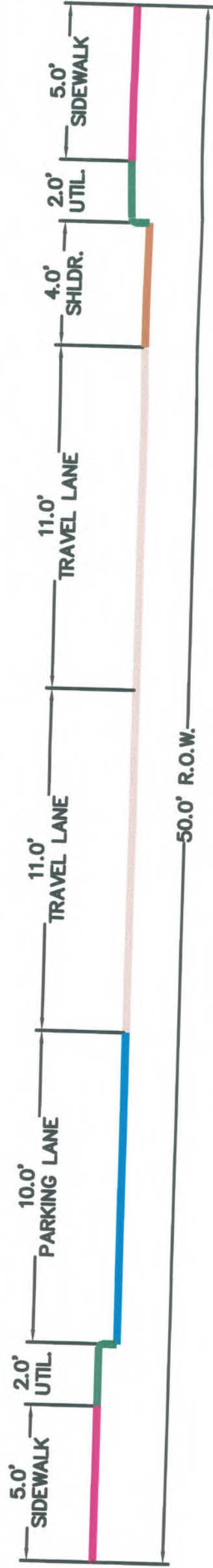
GLORIA STREET

OPTION 2

WASHINGTON STREET

OAK STREET

HARVARD ST

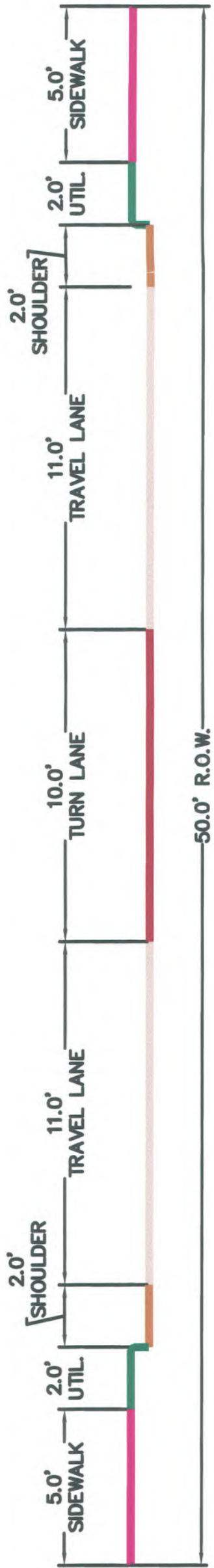
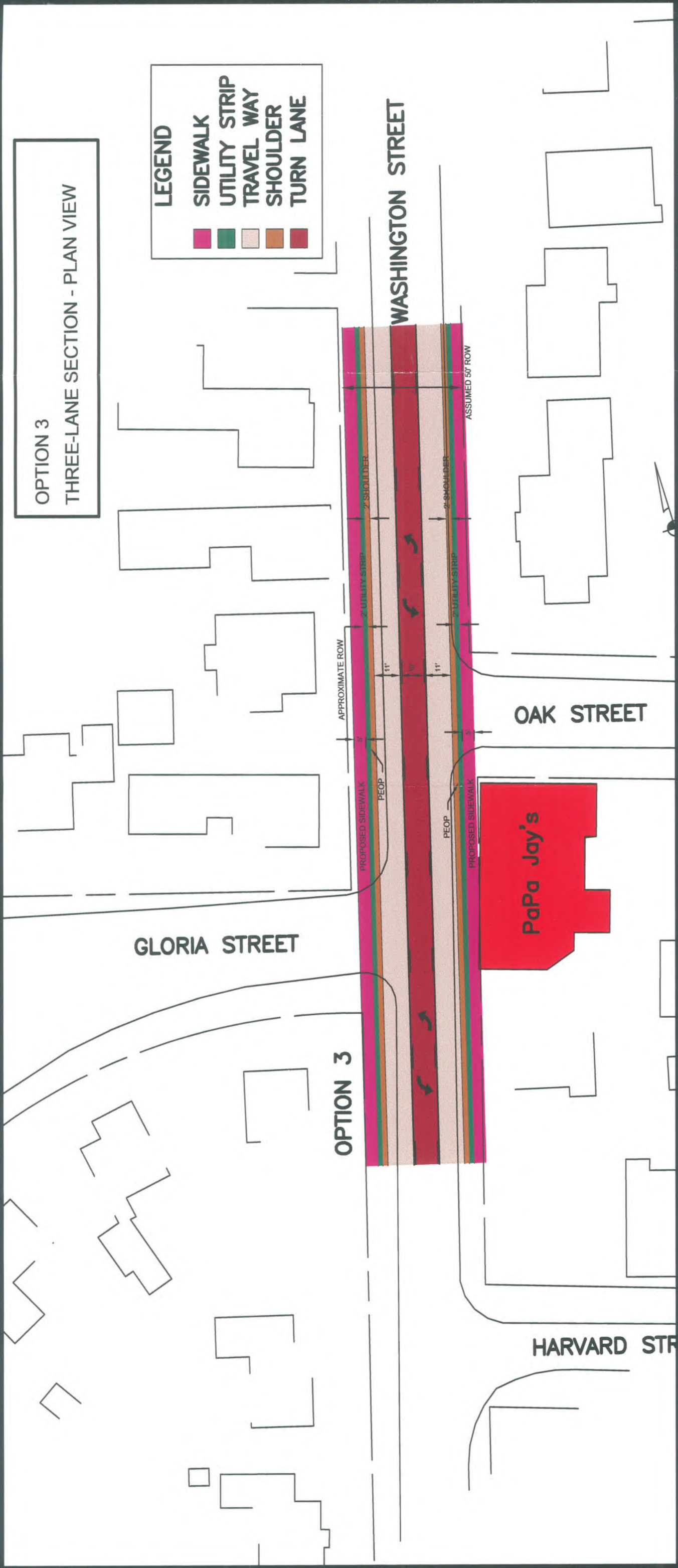


OPTION 2 - TWO LANES W/PARKING LANE

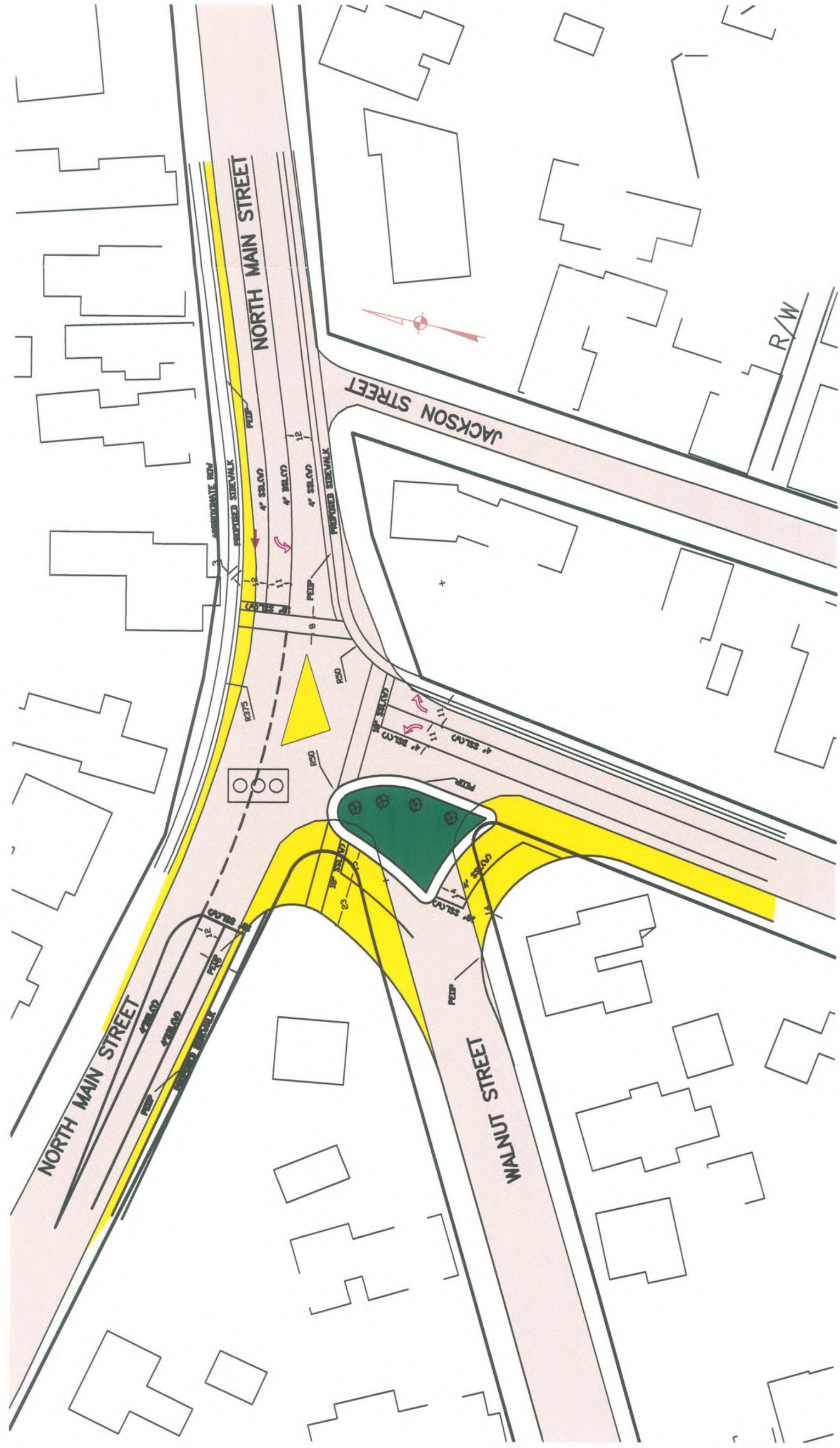
OPTION 3
THREE-LANE SECTION - PLAN VIEW

LEGEND

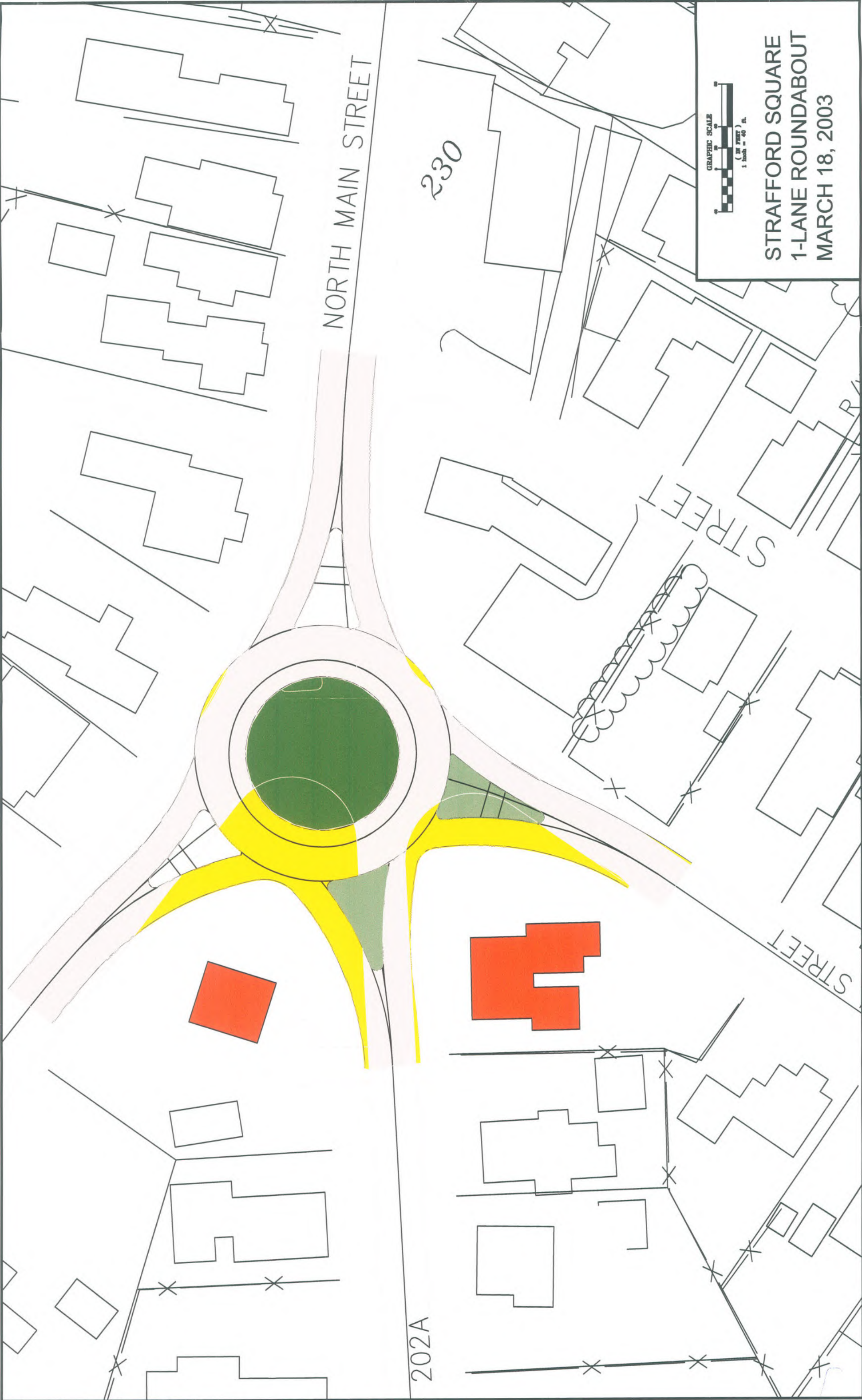
	SIDEWALK
	UTILITY STRIP
	TRAVEL WAY
	SHOULDER
	TURN LANE



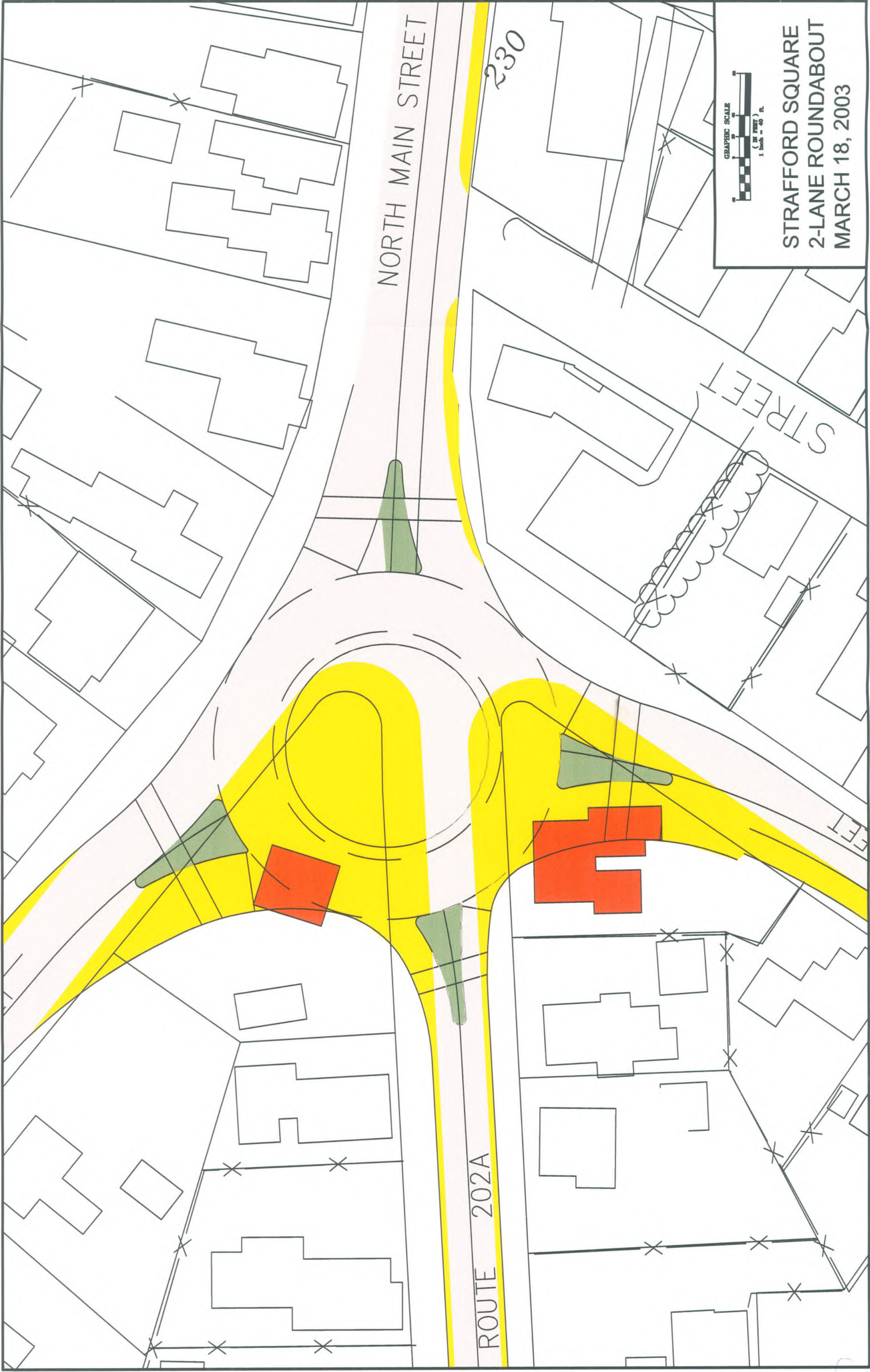
OPTION 3 - TWO LANES W/TURN LANE



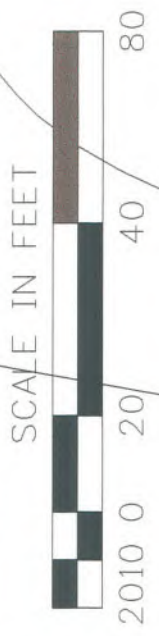
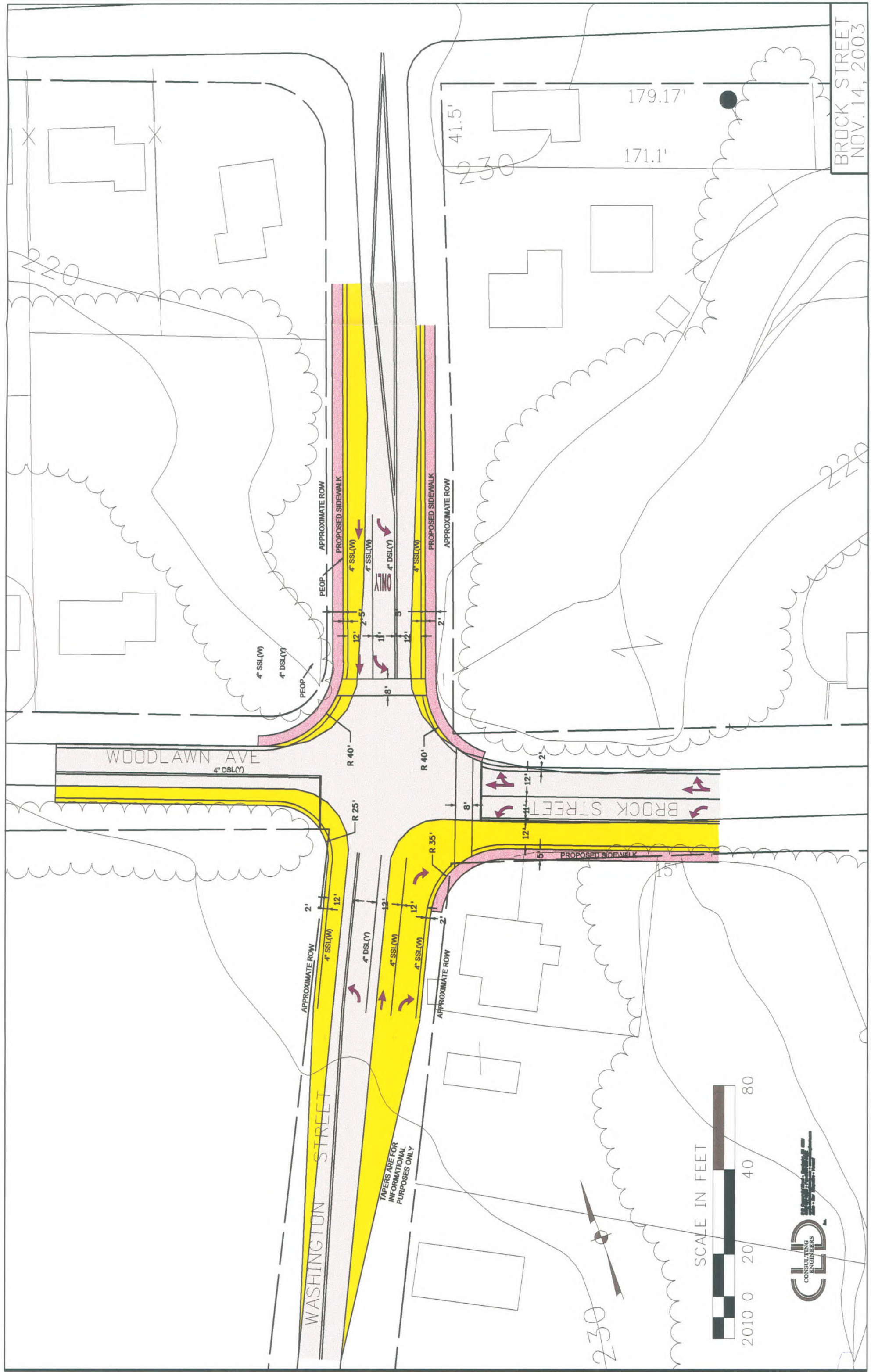
STRAFFORD
SQUARE SLIP RAMP
MARCH 18, 2003



STRAFFORD SQUARE
1-LANE ROUNDABOUT
MARCH 18, 2003



STRAFFORD SQUARE
2-LANE ROUNDABOUT
MARCH 18, 2003



APPENDIX I

STRAFFORD SQUARE INTERSECTION CAPACITY ANALYSES

- **Signalized**
- **Roundabout**

HCS2000- DETAILED REPORT

General Information				Site Information			
Analyst	LMM			Intersection	Walnut St & North Main		
Agency or Co.	CLD Engineers, Inc.			Area Type	All other areas		
Date Performed	03/18/2003			Jurisdiction			
Time Period	PM Peak Hour			Analysis Year	2013 Full Build (Res/Mall)		
				Project ID	US Route 202 Corridor Study (CLD No. 02-0402)		

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	0	1	1	1	1	0	1	0	1	0	0	0
Lane group		T	R	L	T		L		R		LR	
Volume, V (vph)		689	202	697	813		194		383	147		4
% Heavy vehicles, %HV		2	2	2	2		2		2	2		2
Peak-hour factor, PHF		0.90	0.90	0.90	0.90		0.90		0.90	0.90		0.90
Pretimed (P) or actuated (A)		A	A	A	A		A		A	A		A
Start-up lost time, l_i		2.0	2.0	2.0	2.0		2.0		2.0		2.0	
Extension of effective green, e		4.0	2.0	4.0	4.0		4.0		4.0		4.0	
Arrival type, AT		3	3	3	3		3		3		3	
Unit extension, UE		3.0	3.0	3.0	3.0		3.0		3.0		3.0	
Filtering/metering, I		1.000	1.000	1.000	1.000		1.000	1.000	1.000		1.000	
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0		0.0		0.0		0.0	
Ped / Bike / RTOR volumes	0		101				0		4	0		0
Lane width		12.0	12.0	12.0	12.0		12.0		12.0		12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0		0		0		0	
Time for pedestrians, G_p												

Phasing	WB Only	EW Perm	03	04	NB Only	SB Only	07	08
Timing	G = 36.0	G = 37.0	G =	G =	G = 13.0	G = 10.0	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 6	Y = 6	Y =	Y =
Duration of Analysis, $T = 0.25$				Cycle Length, $C = 120.0$				

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		766	112	774	903		216		421		167	
Lane group capacity, c		605	488	622	1258		221		699		177	
v/c ratio, X		1.27	0.23	1.24	0.72		0.98		0.60		0.94	
Total green ratio, g/C		0.32	0.31	0.67	0.68		0.13		0.44		0.10	
Uniform delay, d_1		40.5	30.9	35.0	12.3		52.3		25.5		53.7	
Progression factor, PF		1.000	1.000	1.000	1.000		1.000		1.000		1.000	
Delay calibration, k		0.50	0.11	0.50	0.28		0.48		0.19		0.46	
Incremental delay, d_2		132.5	0.2	123.1	2.0		53.9		1.5		51.3	
Initial queue delay, d_3												
Control delay		173.0	31.1	158.1	14.3		106.2		27.0		105.0	
Lane group LOS		F	C	F	B		F		C		F	
Approach delay	154.9			80.7			53.8			105.0		
Approach LOS	F			F			D			F		
Intersection delay	96.2						Intersection LOS			F		

Intersection v/c Ratio = 1.02

HCS2000- DETAILED REPORT

General Information				Site Information			
Analyst	LMM			Intersection	North Main/Washington		
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas		
Date Performed	03/18/2003			Jurisdiction	Rochester, NH		
Time Period	PM Peak Hour			Analysis Year	2013 Full-Build (Res/Mall)		
				Project ID	US Route 202 Corridor Study (CLD No. 02-0402)		

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	0	1	1	1	1	0	1	0	1	0	0	0
Lane group		T	R	L	T		L		R			
Volume, V (vph)		689	202	697	813		198		530			
% Heavy vehicles, %HV		2	2	2	2		2		2			
Peak-hour factor, PHF		0.90	0.90	0.90	0.90		0.90		0.90			
Pretimed (P) or actuated (A)		A	A	A	A		A		A			
Start-up lost time, I_i		2.0	2.0	2.0	2.0		2.0		2.0			
Extension of effective green, e		4.0	4.0	4.0	4.0		4.0		4.0			
Arrival type, AT		3	3	3	3		3		3			
Unit extension, UE		3.0	3.0	3.0	3.0		3.0		3.0			
Filtering/metering, I		1.000	1.000	1.000	1.000		1.000	1.000	1.000			
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0		0.0		0.0			
Ped / Bike / RTOR volumes	0		84				0		72	0		
Lane width		12.0	12.0	12.0	12.0		12.0		12.0			
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0		0		0			
Min. time for pedestrians, G_p												
Phasing	WB Only	EW Perm	03	04	NB Only		06		07		08	
Timing	G = 43.0	G = 46.0	G =	G =	G = 13.0		G =		G =		G =	
	Y = 6	Y = 6	Y =	Y =	Y = 6		Y =		Y =		Y =	
Duration of Analysis, T = 0.25							Cycle Length, C = 120.0					

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		766	131	774	903		220		509			
Lane group capacity, c		745	884	769	1506		221		844			
v/c ratio, X		1.03	0.15	1.01	0.60		1.00		0.60			
Total green ratio, g/C		0.40	0.56	0.81	0.81		0.13		0.53			
Uniform delay, d_1		36.0	12.8	30.0	4.3		52.5		19.3			
Progression factor, PF		1.000	1.000	1.000	1.000		1.000		1.000			
Delay calibration, k		0.50	0.11	0.50	0.19		0.50		0.19			
Incremental delay, d_2		40.4	0.1	34.1	0.7		59.2		1.2			
Initial queue delay, d_3												
Control delay		76.4	12.8	64.1	4.9		111.6		20.5			
Lane group LOS		E	B	E	A		F		C			
Approach delay	67.1			32.2			48.0					
Approach LOS	E			C			D					
Intersection delay	45.2						Intersection LOS			D		

INTERSECTION v/c ratio = 1.02

Rochester: US Route 202 Corridor Study 2002 Existing Year Roundabout Analysis

28-Jan-2003

Strafford Square (N. Main/Walnut/Washington)

Time	Approach	Intersection turning mvmts			Roundabout volume (unadj)			Roundabout volume (PHF=0.9)			Single lane roundabout		95% ^{ib} queue	Double lane roundabout		95% ^{ib} queue
		Left	Through	Right	Circulating	Entering	Exiting	Circulating	Entering	Exiting ³	Approach capacity ¹	Saturation	(1 lane)	Approach capacity ²	Saturation	(2 lanes)
2002 AM	Northbound	15	68	196	546	279	312	607	310	347	882	0.35	1.6	1990	0.16	0.3
	Southbound	373	92	1	271	466	344	301	518	382	1048	0.49	2.9	2208	0.23	0.5
	Eastbound	3	170	23	662	196	75	736	218	83	811	0.27	1.1	1897	0.11	0.2
	Westbound	197	59	273	86	529	739	96	588	821	1160	0.51	3.0	2356	0.25	0.5
2002 PM	Northbound	28	112	219	607	359	334	674	399	371	845	0.47	2.7	1941	0.21	0.4
	Southbound	498	99	5	438	602	702	487	669	780	947	0.71	6.9	2076	0.32	0.7
	Eastbound	3	106	22	810	131	230	900	146	256	722	0.20	0.8	1780	0.08	0.1
	Westbound	213	197	587	143	997	823	159	1108	914	1125	0.98	36.6	2310	0.48	1.4

Notes 1. From Roundabouts: An Informational Guide, exhibit 4-3

2. Ibid, exhibit 4-4.

3. For information only; volume is not used in computations.

Saturation legend

0.00 - 0.85 (recommended range of operation)

0.86 - 1.00 (approach is nearing capacity)

> 1.00 (approach is over capacity)

Rochester: US Route 202 Corridor Study 2003 No-Build Roundabout Analysis

28-Jan-2003

Strafford Square (N. Main/Walnut/Washington)

Time	Approach	Intersection turning mvmts			Roundabout volume (unadj)			Roundabout volume (PHF=0.9)			Single lane roundabout		95% ^{le} queue		Double lane roundabout		95% ^{le} queue	
		Left	Through	Right	Circulating	Entering	Exiting	Circulating	Entering	Exiting ³	Approach capacity ¹	Saturation	(1 lane)	Approach capacity ²	Saturation	(2 lanes)		
2003 AM	Northbound	16	73	212	587	301	336	652	334	373	857	0.39	1.9	1957	0.17	0.3		
	Southbound	401	99	1	292	501	370	324	557	411	1035	0.54	3.4	2192	0.25	0.5		
	Eastbound	3	183	25	712	211	81	791	234	90	781	0.30	1.3	1858	0.13	0.2		
	Westbound	212	64	294	92	570	796	102	633	884	1156	0.55	3.6	2351	0.27	0.6		
2003 PM	Northbound	29	115	226	625	370	344	694	411	382	834	0.49	2.9	1927	0.21	0.4		
	Southbound	513	102	5	451	620	723	501	689	803	939	0.73	7.8	2065	0.33	0.7		
	Eastbound	3	109	23	834	135	237	927	150	263	707	0.21	0.8	1761	0.09	0.1		
	Westbound	219	203	605	147	1027	848	163	1141	942	1123	1.02	*	2307	0.49	1.5		

- Notes 1. From Roundabouts: An Informational Guide , exhibit 4-3
2. Ibid, exhibit 4-4.
3. For information only; volume is not used in computations.

Saturation legend
0.00 - 0.85 (recommended range of operation)
0.86 - 1.00 (approach is nearing capacity)
> 1.00 (approach is over capacity)

Rochester: US Route 202 Corridor Study 2013 No-Build Roundabout Analysis

28-Jan-2003

Strafford Square (N. Main/Walnut/Washington)

Time	Approach	Intersection turning mvmts			Roundabout volume (unadj)			Roundabout volume (PHF=0.9)			Single lane roundabout		95% ^{le} queue (1 lane)	Double lane roundabout		95% ^{le} queue (2 lanes)
		Left	Through	Right	Circulating	Entering	Exiting	Circulating	Entering	Exiting ³	Approach capacity ¹	Saturation		Approach capacity ²	Saturation	
2013 AM	Northbound	22	98	284	790	404	452	878	449	502	734	0.61	4.6	1796	0.25	0.5
	Southbound	540	133	1	393	674	497	437	749	552	974	0.77	9.2	2111	0.35	0.8
	Eastbound	4	246	33	959	283	108	1066	314	120	632	0.50	2.9	1661	0.19	0.3
	Westbound	286	85	395	124	766	1070	138	851	1189	1137	0.75	8.4	2325	0.37	0.9
2013 PM	Northbound	39	155	303	840	497	462	933	552	513	704	0.78	9.7	1756	0.31	0.7
	Southbound	689	137	7	607	833	972	674	926	1080	845	1.10	*	1941	0.48	1.4
	Eastbound	4	147	30	1121	181	319	1246	201	354	534	0.38	1.8	1532	0.13	0.2
	Westbound	295	273	813	198	1381	1139	220	1534	1266	1092	1.40	*	2267	0.68	3.1

- Notes 1. From Roundabouts: An Informational Guide , exhibit 4-3
2. Ibid, exhibit 4-4.
3. For information only; volume is not used in computations.

Saturation legend

0.00 - 0.85 (recommended range of operation)
0.86 - 1.00 (approach is nearing capacity)
> 1.00 (approach is over capacity)

Rochester: US Route 202 Corridor Study 2003 Build Roundabout Analysis

30-Jan-2003

Strafford Square (N. Main/Walnut/Washington)

Time	Approach	Intersection turning mvmts			Roundabout volume (unadj)			Roundabout volume (PHF=0.9)			Single lane roundabout		95% ^{le} queue		Double lane roundabout		95% ^{le} queue	
		Left	Through	Right	Circulating	Entering	Exiting	Circulating	Entering	Exiting ³	Approach capacity ¹	Saturation	(1 lane)	Approach capacity ²	Saturation	(2 lanes)		
2003 AM	Northbound	16	81	232	587	329	350	652	366	389	857	0.43	2.2	1957	0.19	0.3		
	Southbound	401	104	1	301	506	378	334	562	420	1030	0.55	3.6	2185	0.26	0.5		
	Eastbound	3	183	25	726	211	81	807	234	90	773	0.30	1.3	1847	0.13	0.2		
	Westbound	221	64	294	100	579	816	111	643	907	1151	0.56	3.7	2344	0.27	0.6		
2003 PM	Northbound	29	123	241	625	393	393	694	437	437	834	0.52	3.2	1927	0.23	0.4		
	Southbound	513	118	5	484	636	731	538	707	812	919	0.77	9.2	2039	0.35	0.8		
	Eastbound	3	109	23	883	135	237	981	150	263	678	0.22	0.9	1722	0.09	0.1		
	Westbound	252	203	605	155	1060	863	172	1178	959	1118	1.05	*	2301	0.51	1.6		

Notes 1. From Roundabouts: An Informational Guide, exhibit 4-3

2. Ibid, exhibit 4-4.

3. For information only; volume is not used in computations.

Saturation legend

0.00 - 0.85 (recommended range of operation)
0.86 - 1.00 (approach is nearing capacity)
> 1.00 (approach is over capacity)

Rochester: US Route 202 Corridor Study 2013 Build (Residential) Roundabout Analysis

30-Jan-2003

Strafford Square (N. Main/Walnut/Washington)

Time	Approach	Intersection turning mvmts			Roundabout volume (unadj)			Roundabout volume (PHF=0.9)			Single lane roundabout		95% ^{1b} queue	Double lane roundabout		95% ^{1b} queue
		Left	Through	Right	Circulating	Entering	Exiting	Circulating	Entering	Exiting ³	Approach capacity ¹	Saturation	(1 lane)	Approach capacity ²	Saturation	(2 lanes)
2013 AM	Northbound	22	118	345	790	485	510	878	539	567	734	0.73	7.7	1796	0.30	0.6
	Southbound	540	151	1	433	692	517	481	769	574	950	0.81	11.3	2080	0.37	0.9
	Eastbound	4	246	33	1017	283	108	1130	314	120	596	0.53	3.3	1615	0.19	0.4
	Westbound	326	85	395	144	806	1131	160	896	1257	1125	0.80	10.7	2309	0.39	0.9
2013 PM	Northbound	39	184	361	840	584	615	933	649	683	704	0.92	20.4	1756	0.37	0.9
	Southbound	689	184	7	713	880	1001	792	978	1112	780	1.25	*	1857	0.53	1.7
	Eastbound	4	147	30	1274	181	319	1416	201	354	384	0.52	3.2	1411	0.14	0.2
	Westbound	401	273	813	227	1487	1197	252	1652	1330	1075	1.54	*	2243	0.74	4.1

- Notes 1. From Roundabouts: An Informational Guide , exhibit 4-3
2. Ibid, exhibit 4-4.
3. For information only; volume is not used in computations.

Saturation legend

0.00 - 0.85 (recommended range of operation)
0.86 - 1.00 (approach is nearing capacity)
> 1.00 (approach is over capacity)

Rochester: US Route 202 Corridor Study
2013 Build (Residential & Mall) Roundabout Analysis

30-Jan-2003

Strafford Square (N. Main/Walnut/Washington)

Time	Approach	Intersection turning mvmts			Roundabout volume (unadj)			Roundabout volume (PHF=0.9)			Single lane roundabout		95% ^{le} queue	Double lane roundabout		95% ^{le} queue
		Left	Through	Right	Circulating	Entering	Exiting	Circulating	Entering	Exiting ³	Approach capacity ¹	Saturation	(1 lane)	Approach capacity ²	Saturation	(2 lanes)
2013 AM	Northbound	22	119	350	790	491	521	878	546	579	734	0.74	8.0	1796	0.30	0.7
	Southbound	540	154	1	440	695	518	489	772	576	946	0.82	11.8	2074	0.37	0.9
	Eastbound	4	246	34	1027	284	108	1141	316	120	590	0.53	3.4	1607	0.20	0.4
	Westbound	333	85	395	145	813	1136	161	903	1262	1124	0.80	11.1	2309	0.39	1.0
2013 PM	Northbound	42	194	383	840	619	651	933	688	723	704	0.98	28.4	1756	0.39	1.0
	Southbound	689	195	7	739	891	1011	821	990	1123	765	1.29	*	1836	0.54	1.7
	Eastbound	4	147	32	1308	183	322	1453	203	358	347	0.59	4.0	1384	0.15	0.3
	Westbound	424	273	813	240	1510	1219	267	1678	1354	1067	1.57	*	2233	0.75	4.4

- Notes 1. From Roundabouts: An Informational Guide , exhibit 4-3
2. Ibid, exhibit 4-4.
3. For information only; volume is not used in computations.

Saturation legend

0.00 - 0.85 (recommended range of operation)
0.86 - 1.00 (approach is nearing capacity)
> 1.00 (approach is over capacity)

APPENDIX J

LEFT-TURN WARRANTS ANALYSES

	LEFT-TURN WARRANTS													
	2002 Existing		2003 No-Build		2003 Build		2013 No-Build		2013 Build (Res)		2013 Bld (Res/Mall)			
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM		
INTERSECTION														
US 202(NB)/Secretariat Estates	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NO	NO	PM	PM	
US 202(NB)/Dry Hill	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
US 202(SB)/Dry Hill	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
US202 (NB)/Estes Rd	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
US202 (SB)/Estes Rd	NO	Y(BP)	NO	Y(BP)	NO	Y(BP)	NO	Y(LT)	NO	Y(LT)	Y(BP)	Y(LT)	Y(LT)	
US 202(NB)/Hussey Hill	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
US 202(SB)/Chesley Hill	NO	NO	NO	NO	NO	NO	NO	NO	NO	Y(BP)	Y(BP)	Y(BP)	Y(BP)	
US 202(NB)/Highfield Commons	N/A	N/A	N/A	N/A	NO	NO	NO	N/A	NO	NO	NO	NO	NO	
US 202(NB)/Rte 16 SB Ramps (EX)	NO	NO	Y(BP)	NO	Y(LT)	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	
US 202(SB)/Rte 16 SB Ramps (NHDOT)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y(LT)	Y(BP)	Y(LT)	Y(LT)	Y(LT)	Y(BP)	
US 202(SB)/Rte 16 NB Ramps (EX)	Y(BP)	NO	Y(BP)	NO	Y(LT)	Y(BP)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
US 202(NB)/Rte 16 NB Ramps (NHDOT)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y(BP)	NO	Y(LT)	Y(LT)	Y(LT)	Y(LT)	
Washington(NB)/Woodlawn	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Washington(SB)/Brock	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	Y(LT)	
Washington(NB)/Roy	NO	Y(LT)	NO	Y(LT)	NO	Y(LT)	NO	Y(BP)	Y(LT)	Y(BP)	Y(BP)	Y(LT)	Y(LT)	

INTERSECTION	2002 Existing Conditions		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202(NB)/Dry Hill/Oak			
Advancing	262	238	50
Opposing	162	213	
LT Vol	0	1	
Threshold (Bypass Lane)	63+	63+	
LT WARR MET	NO	NO	
US 202(SB)/Dry Hill/Oak			
Advancing	162	213	50
Opposing	262	238	
LT Vol	2	0	
Threshold (Bypass Lane)	41+	63+	
LT WARR MET	NO	NO	
US 202(NB)/Estes			
Advancing	234	228	50
Opposing	179	319	
LT Vol	5	13	
Threshold (Bypass Lane)	63+	63+	
LT WARR MET	NO	NO	
US 202(SB)/Estes			
Advancing	179	319	50
Opposing	234	228	
LT Vol	16	54	
Threshold (Bypass Lane)	51+	54	
LT WARR MET	NO	YES, BP	
US 202(NB)/Hussey			
Advancing	340	282	50
Opposing	181	325	
LT Vol	0	1	
Threshold (Bypass Lane)	55	52	
LT WARR MET	NO	NO	
US 202(SB)/Hussey			
Advancing	181	325	50
Opposing	340	282	
LT Vol	8	8	
Threshold (Bypass Lane)	51+	46	
LT WARR MET	NO	NO	

INTERSECTION	2002 Existing Conditions		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202/Rte 16 SB Ramps			
Advancing	285	305	40
Opposing	335	313	
LT Vol	44	15	
Threshold (Bypass Lane)	64	61	
LT WARR MET	NO	NO	
US 202/Rte 16 NB Ramps			
Advancing	352	296	40
Opposing	262	363	
LT Vol	71	31	
Threshold (Bypass Lane)	57	46	
LT WARR MET	YES, BP	NO	
US 202(SB)/Brock/Woodlawn			
Advancing	391	373	40
Opposing	284	401	
LT Vol	215	160	
Threshold (Bypass Lane)	48	29	
LT WARR MET	YES (2X)LT	YES (2X)LT	
US 202(NB)/Brock/Woodlawn			
Advancing	284	401	40
Opposing	391	373	
LT Vol	0	3	
Threshold (Bypass Lane)	51	33	
LT WARR MET	NO	NO	
US 202/Roy			
Advancing	295	442	40
Opposing	312	334	
LT Vol	18	86	
Threshold (Bypass Lane)	64	36	
LT WARR MET	NO	YES (2X)LT	

INTERSECTION	2003 No-Build		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202(NB)/Dry Hill/Oak			
Advancing	282	246	50
Opposing	174	219	
LT Vol	0	1	
Threshold (Bypass Lane)	79	63+	
LT WARR MET	NO	NO	
US 202(SB)/Dry Hill/Oak			
Advancing	174	219	50
Opposing	282	246	
LT Vol	2	0	
Threshold (Bypass Lane)	51+	63+	
LT WARR MET	NO	NO	
US 202(NB)/Estes			
Advancing	252	235	50
Opposing	192	329	
LT Vol	5	13	
Threshold (Bypass Lane)	63+	63+	
LT WARR MET	NO	NO	
US 202(SB)/Estes			
Advancing	192	329	50
Opposing	252	235	
LT Vol	17	56	
Threshold (Bypass Lane)	51+	52	
LT WARR MET	NO	YES, BP	
US 202(NB)/Hussey			
Advancing	367	291	50
Opposing	195	335	
LT Vol	0	1	
Threshold (Bypass Lane)	47	47	
LT WARR MET	NO	NO	
US 202(SB)/Hussey			
Advancing	195	335	50
Opposing	367	291	
LT Vol	9	8	
Threshold (Bypass Lane)	51+	43	
LT WARR MET	NO	NO	

INTERSECTION	2003 No-Build		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202/Rte 16 SB Ramps			
Advancing	306	314	40
Opposing	360	323	
LT Vol	47	15	
Threshold (Bypass Lane)	43	53	
LT WARR MET	YES, BP	NO	
US 202/Rte 16 NB Ramps			
Advancing	378	305	40
Opposing	282	374	
LT Vol	76	32	
Threshold (Bypass Lane)	50	39	
LT WARR MET	YES, BP	NO	
US 202(SB)/Brock/Woodlawn			
Advancing	421	384	40
Opposing	306	414	
LT Vol	232	165	
Threshold (Bypass Lane)	42	29	
LT WARR MET	YES (2X)LT	YES (2X)LT	
US 202(NB)/Brock/Woodlawn			
Advancing	306	414	40
Opposing	421	384	
LT Vol	0	3	
Threshold (Bypass Lane)	31	31	
LT WARR MET	NO	NO	
US 202/Roy			
Advancing	318	453	40
Opposing	336	344	
LT Vol	19	89	
Threshold (Bypass Lane)	49	34	
LT WARR MET	NO	YES (2X)LT	

INTERSECTION	2013 No-Build		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202(NB)/Dry Hill/Oak			
Advancing	380	329	50
Opposing	235	294	
LT Vol	0	1	
Threshold (Bypass Lane)	41	44	
LT WARR MET	NO	NO	
US 202(SB)/Dry Hill/Oak			
Advancing	235	294	50
Opposing	380	329	
LT Vol	3	0	
Threshold (Bypass Lane)	55	47	
LT WARR MET	NO	NO	
US 202(NB)/Estes			
Advancing	339	316	50
Opposing	258	442	
LT Vol	7	18	
Threshold (Bypass Lane)	46	31	
LT WARR MET	NO	NO	
US 202(SB)/Estes			
Advancing	258	442	50
Opposing	339	316	
LT Vol	23	75	
Threshold (Bypass Lane)	58	28	
LT WARR MET	NO	YES (2X)LT	
US 202(NB)/Hussey			
Advancing	492	392	50
Opposing	262	450	
LT Vol	0	1	
Threshold (Bypass Lane)	28	22	
LT WARR MET	NO	NO	
US 202(SB)/Hussey			
Advancing	262	450	50
Opposing	492	392	
LT Vol	12	11	
Threshold (Bypass Lane)	35	28 -	
LT WARR MET	NO	?, BP	

INTERSECTION	2013 No-Build		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202/Rte 16 SB Ramps			
Advancing	488	403	40
Opposing	413	422	
LT Vol	103	43	
Threshold (Bypass Lane)	26	28	
LT WARR MET	YES (2X)LT	YES, BP	
US 202/Rte 16 NB Ramps			
Advancing	248	389	40
Opposing	510	410	
LT Vol	64	21	
Threshold (Bypass Lane)	55	29	
LT WARR MET	YES, BP	NO	
US 202(SB)/Brock/Woodlawn			
Advancing	566	516	40
Opposing	411	555	
LT Vol	311	221	
Threshold (Bypass Lane)	32-	32-	
LT WARR MET	YES (2X)LT	YES (2X)LT	
US 202(NB)/Brock/Woodlawn			
Advancing	411	555	40
Opposing	566	516	
LT Vol	0	4	
Threshold (Bypass Lane)	26-	32-	
LT WARR MET	NO	NO	
US 202/Roy			
Advancing	427	612	40
Opposing	452	462	
LT Vol	26	119	
Threshold (Bypass Lane)	26	32-	
LT WARR MET	YES, BP	YES (2X)LT	

INTERSECTION	2003 Build AM PEAK HR	PM PEAK HR	Chart Used (MPH)
US 202/Secretariat Estates			
Advancing	287	263	
Opposing	197	267	
LT Vol	1	1	50
Threshold (Bypass Lane)	70	63+	
LT WARR MET	NO	NO	
US 202(NB)/Dry Hill/Oak			
Advancing	298	267	
Opposing	188	239	
LT Vol	0	1	50
Threshold (Bypass Lane)	64	75	
LT WARR MET	NO	NO	
US 202(SB)/Dry Hill/Oak			
Advancing	188	239	
Opposing	298	267	
LT Vol	2	0	50
Threshold (Bypass Lane)	51+	63+	
LT WARR MET	NO	NO	
US 202(NB)/Estes			
Advancing	267	250	
Opposing	208	356	
LT Vol	5	13	50
Threshold (Bypass Lane)	81	57	
LT WARR MET	NO	NO	
US 202(SB)/Estes			
Advancing	208	356	
Opposing	267	250	
LT Vol	19	63	50
Threshold (Bypass Lane)	63+	44	
LT WARR MET	NO	YES, BP	
US 202(NB)/Hussey			
Advancing	389	309	
Opposing	216	384	
LT Vol	0	1	50
Threshold (Bypass Lane)	41	36	
LT WARR MET	NO	NO	

INTERSECTION	2003 Build	PM	Chart
	AM PEAK HR	PEAK HR	Used (MPH)
US 202(SB)/Hussey			
Advancing	216	384	
Opposing	389	309	
LT Vol	16	31	50
Threshold (Bypass Lane)	63	34	
LT WARR MET	NO	NO	
US 202/Highfield Commons			
Advancing	421	331	
Opposing	221	447	
LT Vol	2	7	50
Threshold (Bypass Lane)	37	28	
LT WARR MET	NO	NO	
US 202/Rte 16 SB Ramps			
Advancing	414	367	
Opposing	382	407	
LT Vol	64	18	40
Threshold (Bypass Lane)	31	30	
LT WARR MET	YES (2X) LT	NO	
US 202/Rte 16 NB Ramps			
Advancing	396	375	
Opposing	373	424	
LT Vol	76	32	40
Threshold (Bypass Lane)	33	29	
LT WARR MET	YES (2X) LT	YES, BP	
US 202(SB)/Brock/Woodlawn			
Advancing	435	433	
Opposing	349	448	
LT Vol	232	165	40
Threshold (Bypass Lane)	35	26	
LT WARR MET	YES (2X) LT	YES (2X) LT	
US 202(NB)/Brock/Woodlawn			
Advancing	349	448	
Opposing	435	433	
LT Vol	0	3	40
Threshold (Bypass Lane)	30	26	
LT WARR MET	NO	NO	
US 202/Roy			
Advancing	346	479	
Opposing	350	393	
LT Vol	19	89	40
Threshold (Bypass Lane)	41	28	
LT WARR MET	NO	YES (2X) LT	

INTERSECTION	2013 Build (Residential)		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202/Secretariat Estates			
Advancing	394	377	50
Opposing	326	487	
LT Vol	11	21	
Threshold (Bypass Lane)	31	22-	
LT WARR MET	NO	?BP	
US 202(NB)/Dry Hill/Oak			
Advancing	519	447	50
Opposing	315	450	
LT Vol	0	1	
Threshold (Bypass Lane)	28-	28-	
LT WARR MET	NO	NO	
US 202(SB)/Dry Hill/Oak			
Advancing	315	450	50
Opposing	519	447	
LT Vol	3	0	
Threshold (Bypass Lane)	26	28-	
LT WARR MET	NO	NO	
US 202(NB)/Estes			
Advancing	476	426	50
Opposing	341	607	
LT Vol	7	18	
Threshold (Bypass Lane)	28-	22-	
LT WARR MET	NO	?BP	
US 202(SB)/Estes			
Advancing	341	607	50
Opposing	476	426	
LT Vol	25	84	
Threshold (Bypass Lane)	26	31-	
LT WARR MET	NO	YES (2X) LT	
US 202(NB)/Hussey			
Advancing	638	506	50
Opposing	350	637	
LT Vol	0	1	
Threshold (Bypass Lane)	31-	28-	
LT WARR MET	NO	NO	

INTERSECTION	2013 Build (Residential)		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202(SB)/Hussey			
Advancing	350	637	50
Opposing	638	506	
LT Vol	19	34	
Threshold (Bypass Lane)	18-	31-	
LT WARR MET	YES, BP	YES, BP	
US 202/Highfield Commons			
Advancing	672	534	50
Opposing	375	815	
LT Vol	5	21	
Threshold (Bypass Lane)	31-	28-	
LT WARR MET	NO	?BP	
US 202/Rte 16 SB Ramps			
Advancing	588	675	40
Opposing	756	624	
LT Vol	103	43	
Threshold (Bypass Lane)	32-	36-	
LT WARR MET	YES (2X) LT	YES, BP	
US 202/Rte 16 NB Ramps			
Advancing	537	581	40
Opposing	590	632	
LT Vol	221	85	
Threshold (Bypass Lane)	32-	32-	
LT WARR MET	YES (2X) LT	YES (2X) LT	
US 202(SB)/Brock/Woodlawn			
Advancing	624	669	40
Opposing	543	683	
LT Vol	311	221	
Threshold (Bypass Lane)	32-	36-	
LT WARR MET	YES (2X) LT	YES (2X) LT	
US 202(NB)/Brock/Woodlawn			
Advancing	543	683	40
Opposing	624	669	
LT Vol	0	4	
Threshold (Bypass Lane)	32-	36-	
LT WARR MET	NO	NO	
US 202/Roy			
Advancing	508	699	40
Opposing	510	615	
LT Vol	26	119	
Threshold (Bypass Lane)	26-	36-	
LT WARR MET	YES, BP	YES (2X) LT	

INTERSECTION	2013 Build (Residential/Mall)		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202/Secretariat Estates			
Advancing	406	417	50
Opposing	333	526	
LT Vol	11	21	
Threshold (Bypass Lane)	30	22-	
LT WARR MET	NO	?BP	
US 202(NB)/Dry Hill/Oak			
Advancing	531	487	50
Opposing	323	491	
LT Vol	0	1	
Threshold (Bypass Lane)	28-	28-	
LT WARR MET	NO	NO	
US 202(SB)/Dry Hill/Oak			
Advancing	323	491	50
Opposing	531	487	
LT Vol	3	0	
Threshold (Bypass Lane)	24	28-	
LT WARR MET	NO	NO	
US 202(NB)/Estes			
Advancing	489	468	50
Opposing	350	670	
LT Vol	7	18	
Threshold (Bypass Lane)	28-	28-	
LT WARR MET	NO	NO	
US 202(SB)/Estes			
Advancing	350	670	50
Opposing	489	468	
LT Vol	26	95	
Threshold (Bypass Lane)	24	31-	
LT WARR MET	YES, BP	YES (2X) LT	
US 202(NB)/Hussey			
Advancing	657	563	50
Opposing	360	702	
LT Vol	0	1	
Threshold (Bypass Lane)	31-	31-	
LT WARR MET	NO	NO	

INTERSECTION	2013 Build (Residential/Mall)		Chart Used (MPH)
	AM PEAK HR	PM PEAK HR	
US 202(SB)/Hussey			
Advancing	360	702	50
Opposing	657	563	
LT Vol	20	36	
Threshold (Bypass Lane)	22-	31-	
LT WARR MET	?BP	YES, BP	
US 202/Highfield Commons			
Advancing	692	594	50
Opposing	385	880	
LT Vol	5	21	
Threshold (Bypass Lane)	31-	31-	
LT WARR MET	NO	NO	
US 202/Rte 16 SB Ramps			
Advancing	678	1006	40
Opposing	875	1196	
LT Vol	103	43	
Threshold (Bypass Lane)	36-	36-	
LT WARR MET	YES (2X) LT	YES, BP	
US 202/Rte 16 NB Ramps			
Advancing	595	963	40
Opposing	610	692	
LT Vol	268	402	
Threshold (Bypass Lane)	32-	36-	
LT WARR MET	YES (2X) LT	YES (2X) LT	
US 202(SB)/Brock/Woodlawn			
Advancing	638	709	40
Opposing	554	748	
LT Vol	311	221	
Threshold (Bypass Lane)	32-	37-	
LT WARR MET	YES (2X) LT	YES (2X) LT	
US 202(NB)/Brock/Woodlawn			
Advancing	554	748	40
Opposing	638	709	
LT Vol	0	4	
Threshold (Bypass Lane)	32-	36-	
LT WARR MET	NO	NO	
US 202/Roy			
Advancing	514	742	40
Opposing	521	651	
LT Vol	26	127	
Threshold (Bypass Lane)	32-	36-	
LT WARR MET	?BP	YES (2X) LT	

APPENDIX K

RIGHT-TURN WARRANTS ANALYSES

[illegible]

INTERSECTION	2002 Existing Conditions		Design Speed (MPH)
	AM PEAK HR	PM PEAK HR	
US 202(NB)/Dry Hill/Oak			
Total DHV	262	238	50
RT Vol	38	18	
US 202(SB)/Dry Hill/Oak			
Total DHV	162	213	50
RT Vol	11	9	
US 202(NB)/Estes			
Total DHV	234	228	50
RT Vol	2	6	
US 202(SB)/Estes			
Total DHV	179	319	50
RT Vol	19	59	
US 202(NB)/Hussey			
Total DHV	340	282	50
RT Vol	4	1	
US 202(SB)/Hussey			
Total DHV	181	325	50
RT Vol	0	2	
US 202/Rte 16 SB Ramps			
Total DHV	335	313	40
RT Vol	69	54	
US 202/Rte 16 NB Ramps			
Total DHV	262	363	40
RT Vol	135 (115)	97	
US 202 (NB)/Brock/Woodlawn			
Total DHV	284	401	40
RT Vol	119 (99)	131	
US 202 (SB)/Brock/Woodlawn			
Total DHV	391	373	40
RT Vol	2	1	
US 202/Roy			
Total DHV	312	334	40
RT Vol	0	3	

Note: For highways with a design speed below 50 mph and DHV less than 300 and Right Turns greater than 40, an adjustment should be used. To read the vertical axis of the chart (Figure 7-25 (a) Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways), subtract 20 from the actual number of right turns. If applicable, this number is denoted using ().

INTERSECTION	2003 No-Build		Design Speed (MPH)
	AM PEAK HR	PM PEAK HR	
US 202(NB)/Dry Hill/Oak			
Total DHV	282	246	50
RT Vol	41	19	
US 202(SB)/Dry Hill/Oak			
Total DHV	174	219	50
RT Vol	12	9	
US 202(NB)/Estes			
Total DHV	252	235	50
RT Vol	2	6	
US 202(SB)/Estes			
Total DHV	192	329	50
RT Vol	20	61	
US 202(NB)/Hussey			
Total DHV	367	291	50
RT Vol	4	1	
US 202(SB)/Hussey			
Total DHV	195	335	50
RT Vol	0	2	
US 202/Rte 16 SB Ramps			
Total DHV	360	323	40
RT Vol	74	56	
US 202/Rte 16 NB Ramps			
Total DHV	282	374	40
RT Vol	145 (125)	100	
US 202 (NB)/Brock/Woodlawn			
Total DHV	306	414	40
RT Vol	128	135	
US 202 (SB)/Brock/Woodlawn			
Total DHV	421	384	40
RT Vol	2	1	
US 202/Roy			
Total DHV	336	344	40
RT Vol	0	3	

Note: For highways with a design speed below 50 mph and DHV less than 300 and Right Turns greater than 40, an adjustment should be used. To read the vertical axis of the chart (Figure 7-25 (a) Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways), subtract 20 from the actual number of right turns. If applicable, this number is denoted using ().

INTERSECTION	2013 No-Build		Design Speed (MPH)
	AM PEAK HR	PM PEAK HR	
US 202(NB)/Dry Hill/Oak			
Total DHV	380	329	50
RT Vol	55	25	
US 202(SB)/Dry Hill/Oak			
Total DHV	235	294	50
RT Vol	16	12	
US 202(NB)/Estes			
Total DHV	339	316	50
RT Vol	3	8	
US 202(SB)/Estes			
Total DHV	258	442	50
RT Vol	27	82	
US 202(NB)/Hussey			
Total DHV	492	392	50
RT Vol	6	1	
US 202(SB)/Hussey			
Total DHV	262	450	50
RT Vol	0	3	
US 202/Rte 16 SB Ramps			
Total DHV	413	422	40
RT Vol	195	134	
US 202/Rte 16 NB Ramps			
Total DHV	510	410	40
RT Vol	100	75	
US 202 (NB)/Brock/Woodlawn			
Total DHV	411	555	40
RT Vol	172	181	
US 202 (SB)/Brock/Woodlawn			
Total DHV	566	516	40
RT Vol	3	1	
US 202/Roy			
Total DHV	452	462	40
RT Vol	0	4	

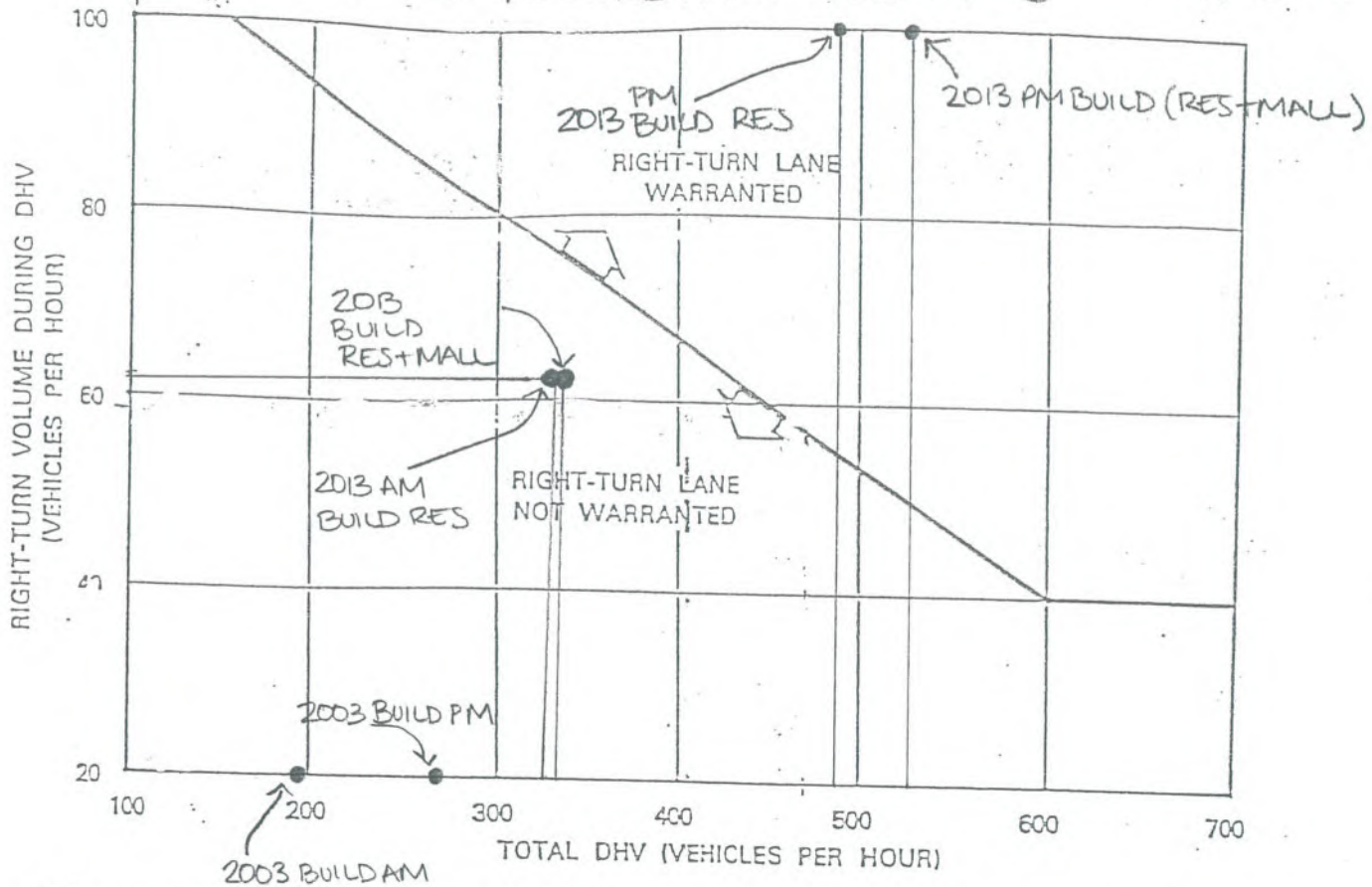
INTERSECTION	2003 Build AM PEAK HR	PM PEAK HR	Design Speed (MPH)
US 202/Secretariat Estates			
Total DHV	197	267	50
RT Vol	5	15	
US 202(NB)/Dry Hill/Oak			
Total DHV	298	267	50
RT Vol	42	25	
US 202(SB)/Dry Hill/Oak			
Total DHV	188	239	50
RT Vol	12	9	
US 202(NB)/Estes			
Total DHV	267	250	50
RT Vol	2	6	
US 202(SB)/Estes			
Total DHV	208	356	50
RT Vol	20	61	
US 202(NB)/Hussey			
Total DHV	389	309	50
RT Vol	5	4	
US 202(SB)/Hussey			
Total DHV	216	384	50
RT Vol	0	2	
US 202/Highfield Commons			
Total DHV	221	447	50
RT Vol	12	67	
US 202/Rte 16 SB Ramps			
Total DHV	382	407	40
RT Vol	74	56	
US 202/Rte 16 NB Ramps			
Total DHV	373	424	40
RT Vol	193	116	
US 202 (NB)/Brock/Woodlawn			
Total DHV	349	448	40
RT Vol	143	146	
US 202 (SB)/Brock/Woodlawn			
Total DHV	435	433	40
RT Vol	2	1	
US 202/Roy			
Total DHV	350	393	40
RT Vol	0	3	

INTERSECTION	2013 Build (Residential)		Design Speed (MPH)
	AM PEAK HR	PM PEAK HR	
US 202/Secretariat Estates			
Total DHV	326	487	50
RT Vol	62	148	
US 202(NB)/Dry Hill/Oak			
Total DHV	519	447	50
RT Vol	57	33	
US 202(SB)/Dry Hill/Oak			
Total DHV	315	450	50
RT Vol	16	12	
US 202(NB)/Estes			
Total DHV	476	426	50
RT Vol	3	8	
US 202(SB)/Estes			
Total DHV	341	607	50
RT Vol	27	82	
US 202(NB)/Hussey			
Total DHV	638	506	50
RT Vol	7	4	
US 202(SB)/Hussey			
Total DHV	350	637	50
RT Vol	0	3	
US 202/Highfield Commons			
Total DHV	375	815	50
RT Vol	45	189	
US 202/Rte 16 SB Ramps			
Total DHV	756	624	40
RT Vol	249	144	
US 202/Rte 16 NB Ramps			
Total DHV	590	632	40
RT Vol	100	75	
US 202 (NB)/Brock/Woodlawn			
Total DHV	543	683	40
RT Vol	223	222	
US 202 (SB)/Brock/Woodlawn			
Total DHV	624	669	40
RT Vol	3	1	
US 202/Roy			
Total DHV	510	615	40
RT Vol	0	4	

INTERSECTION	2013 Build (Residential/Mall)		Design Speed (MPH)
	AM PEAK HR	PM PEAK HR	
US 202/Secretariat Estates			
Total DHV	333	526	50
RT Vol	62	148	
US 202(NB)/Dry Hill/Oak			
Total DHV	531	487	50
RT Vol	57	33	
US 202(SB)/Dry Hill/Oak			
Total DHV	323	491	50
RT Vol	17	14	
US 202(NB)/Estes			
Total DHV	489	468	50
RT Vol	3	8	
US 202(SB)/Estes			
Total DHV	350	670	50
RT Vol	27	93	
US 202(NB)/Hussey			
Total DHV	657	563	50
RT Vol	7	4	
US 202(SB)/Hussey			
Total DHV	360	702	50
RT Vol	0	3	
US 202/Highfield Commons			
Total DHV	385	880	50
RT Vol	45	189	
US 202/Rte 16 SB Ramps			
Total DHV	875	1196	40
RT Vol	310	334	
US 202/Rte 16 NB Ramps			
Total DHV	610	692	40
RT Vol	100	75	
US 202 (NB)/Brock/Woodlawn			
Total DHV	554	748	40
RT Vol	228	244	
US 202 (SB)/Brock/Woodlawn			
Total DHV	638	709	40
RT Vol	3	1	
US 202/Roy			
Total DHV	521	651	40
RT Vol	0	4	

7-42 At-Grade Intersections

US 202 / SECRETARIAT ESTATES



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

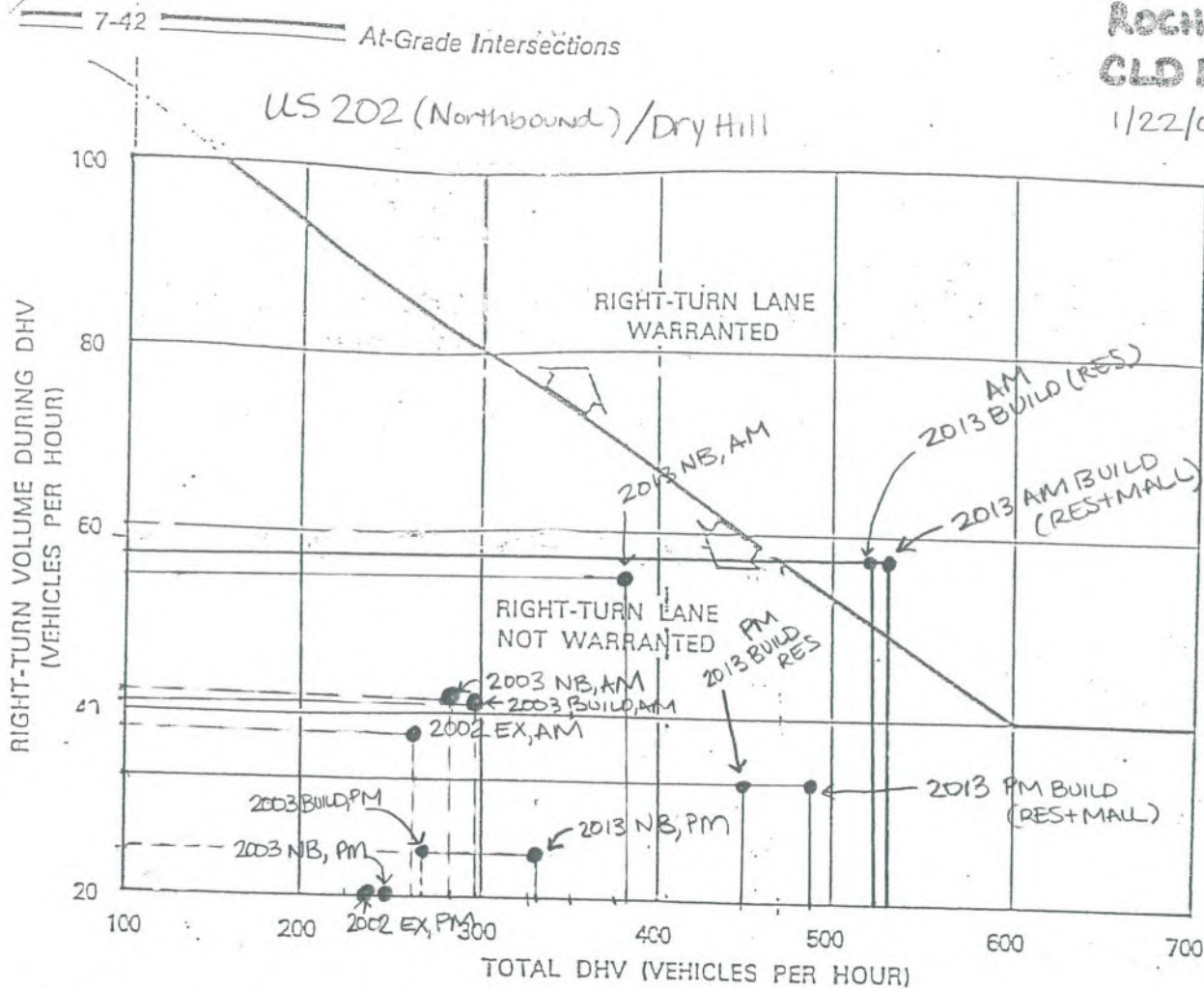
Example

Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 DHV = 250 VPH
 Right Turns = 100 VPH

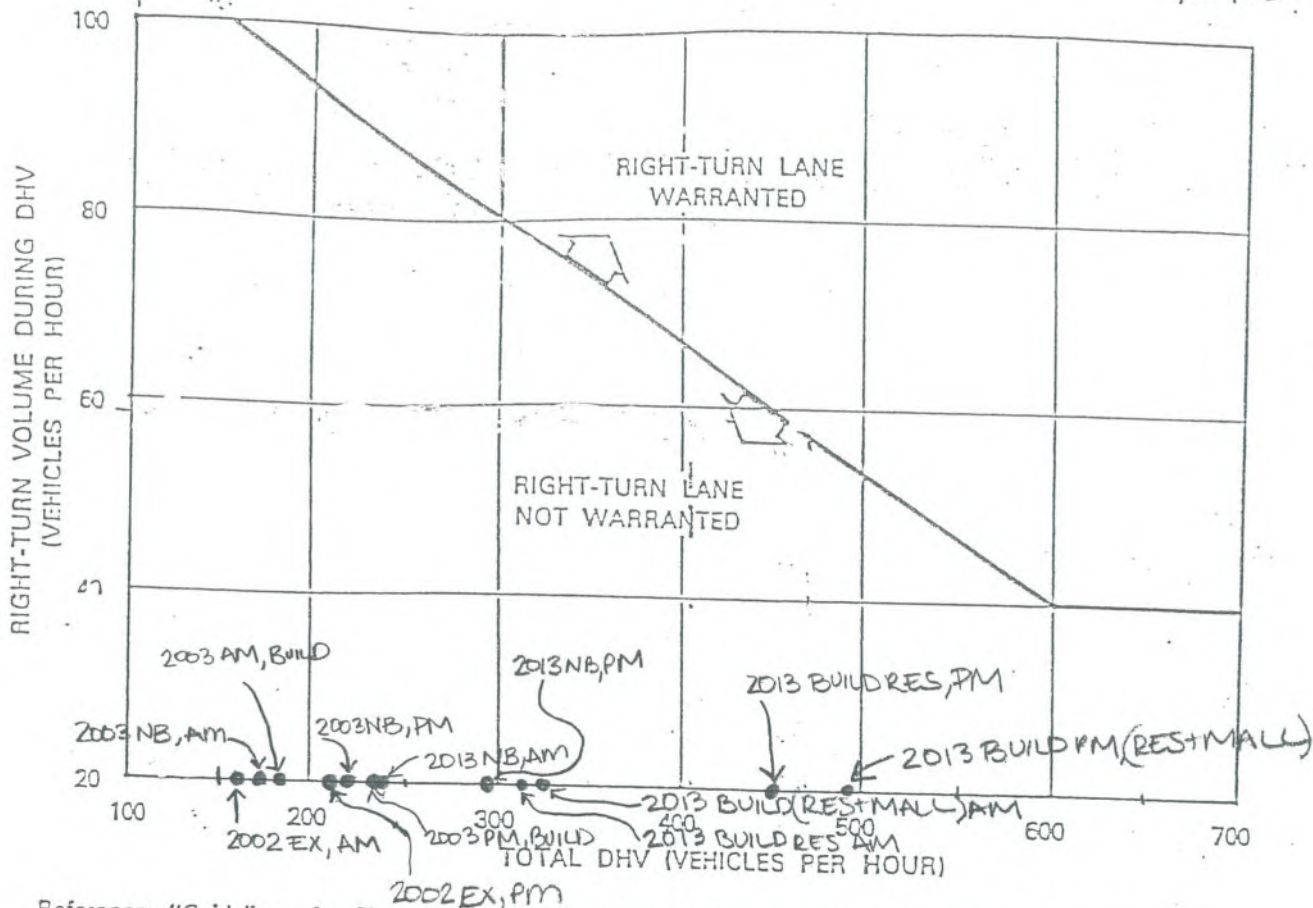
Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

7-42 At-Grade Intersections

US 202 (SOUTHBOUND)/ DRY HILL



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

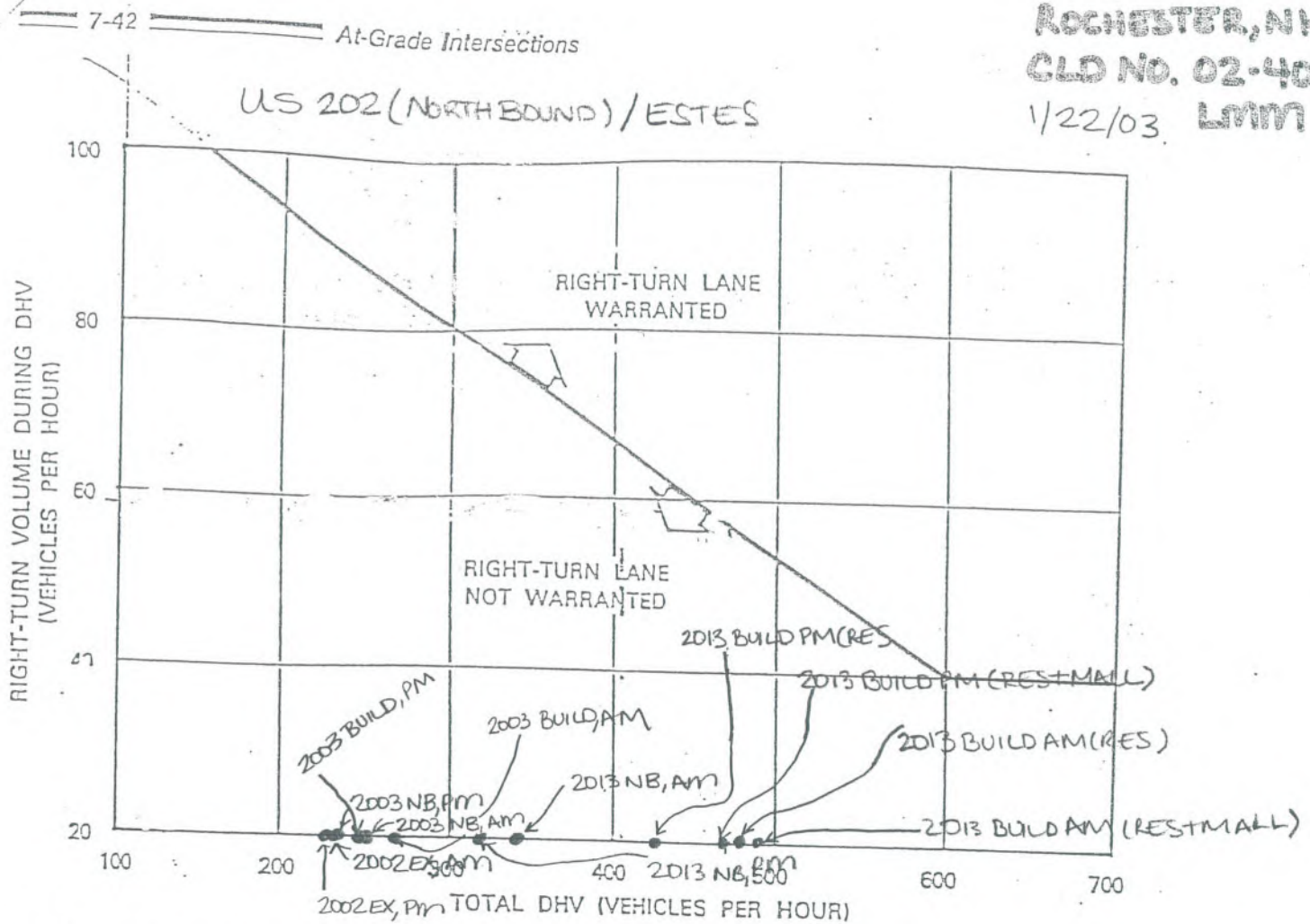
Example

Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

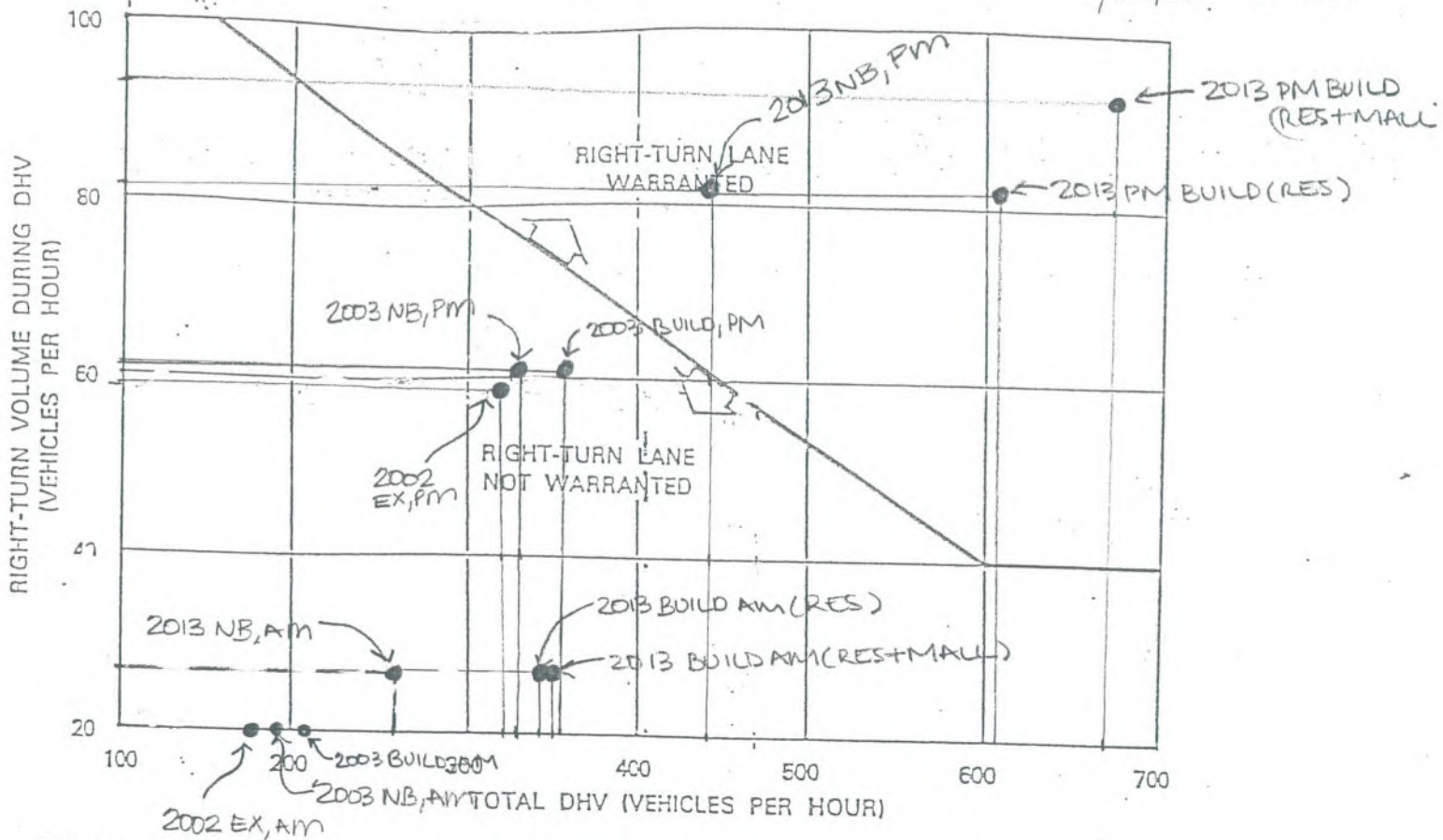
Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

7-42 At-Grade Intersections

US 202 (Southbound) / ESTES



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 DHV = 250 VPH
 Right Turns = 100 VPH

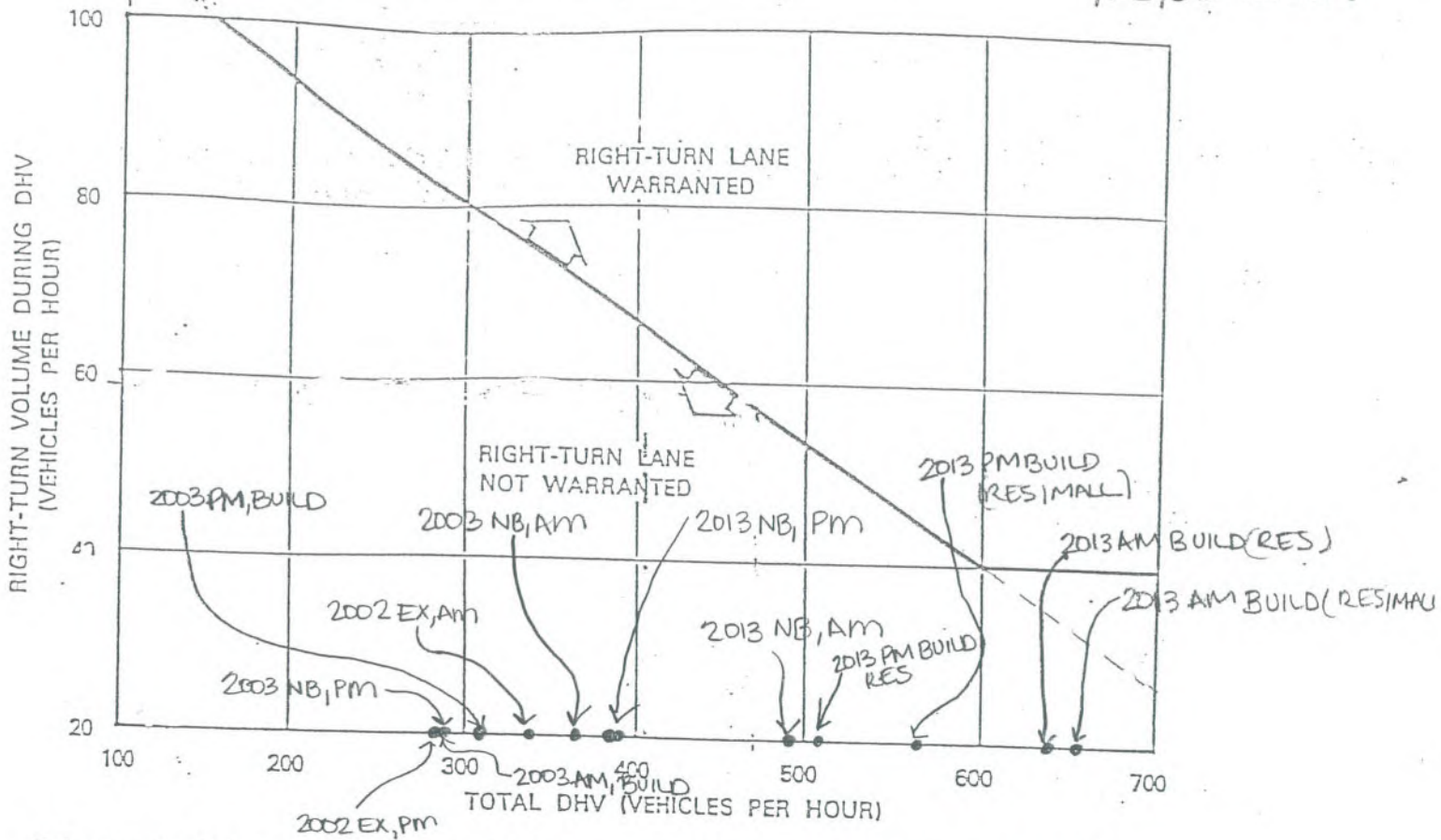
Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

7-42 At-Grade Intersections

US 202 (northbound) / Hussey



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

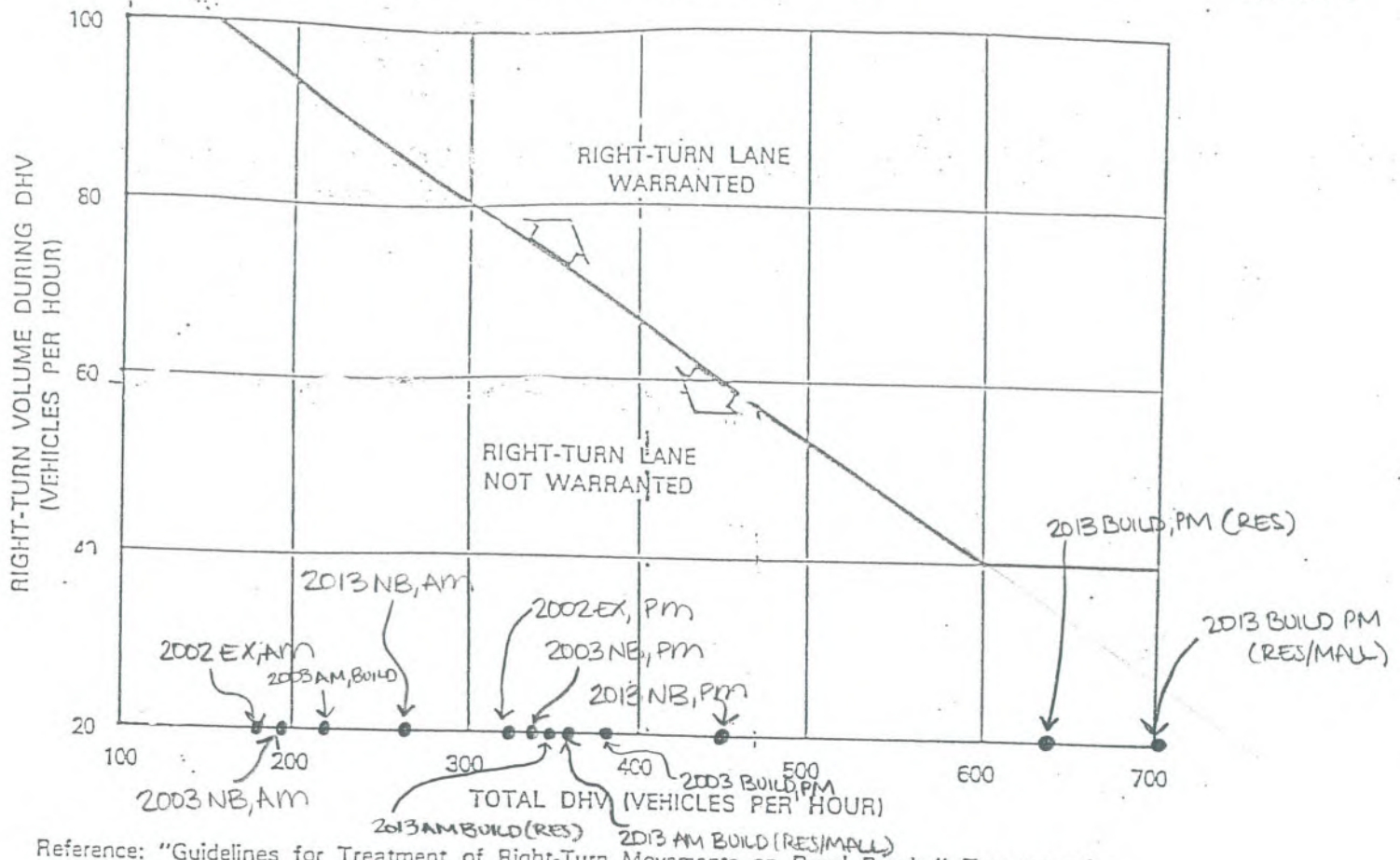
Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

7-42 At-Grade Intersections

US 202 (Southbound)/Hussey



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

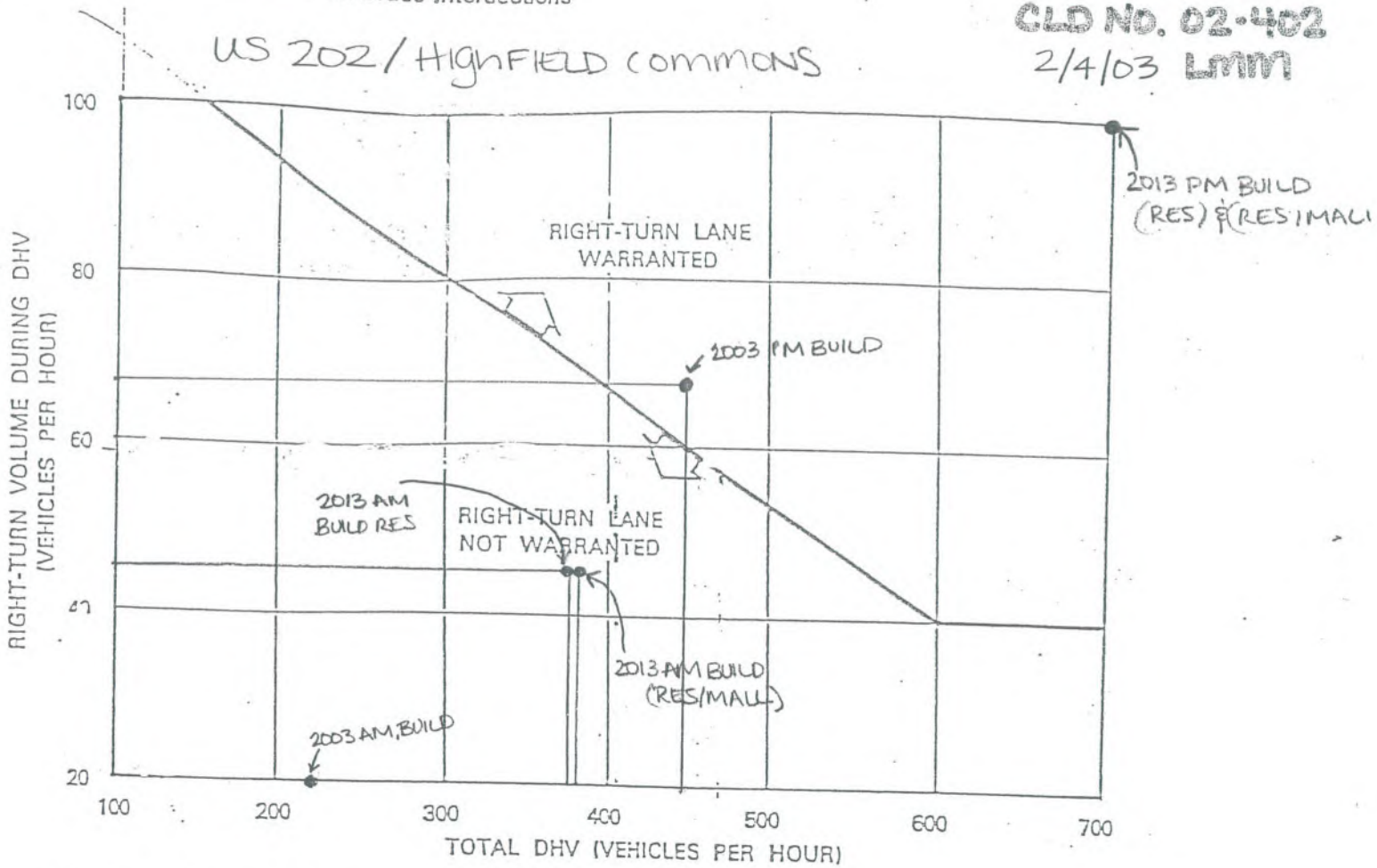
Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

7-42 At-Grade Intersections



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

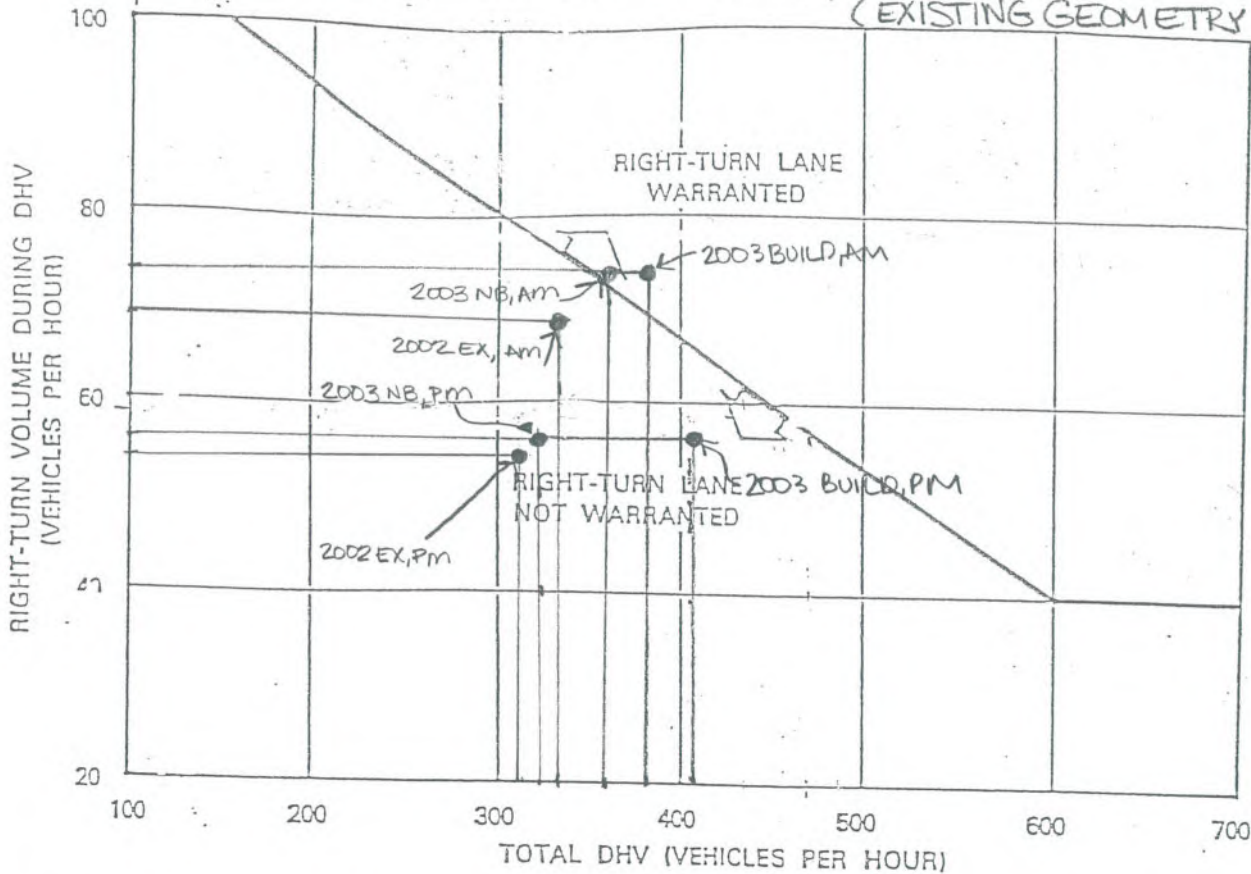
Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

7-42 At-Grade Intersections

US 202 / Rte 16 SB Ramps

(EXISTING GEOMETRY)



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 DHV = 250 VPH
 Right Turns = 100 VPH

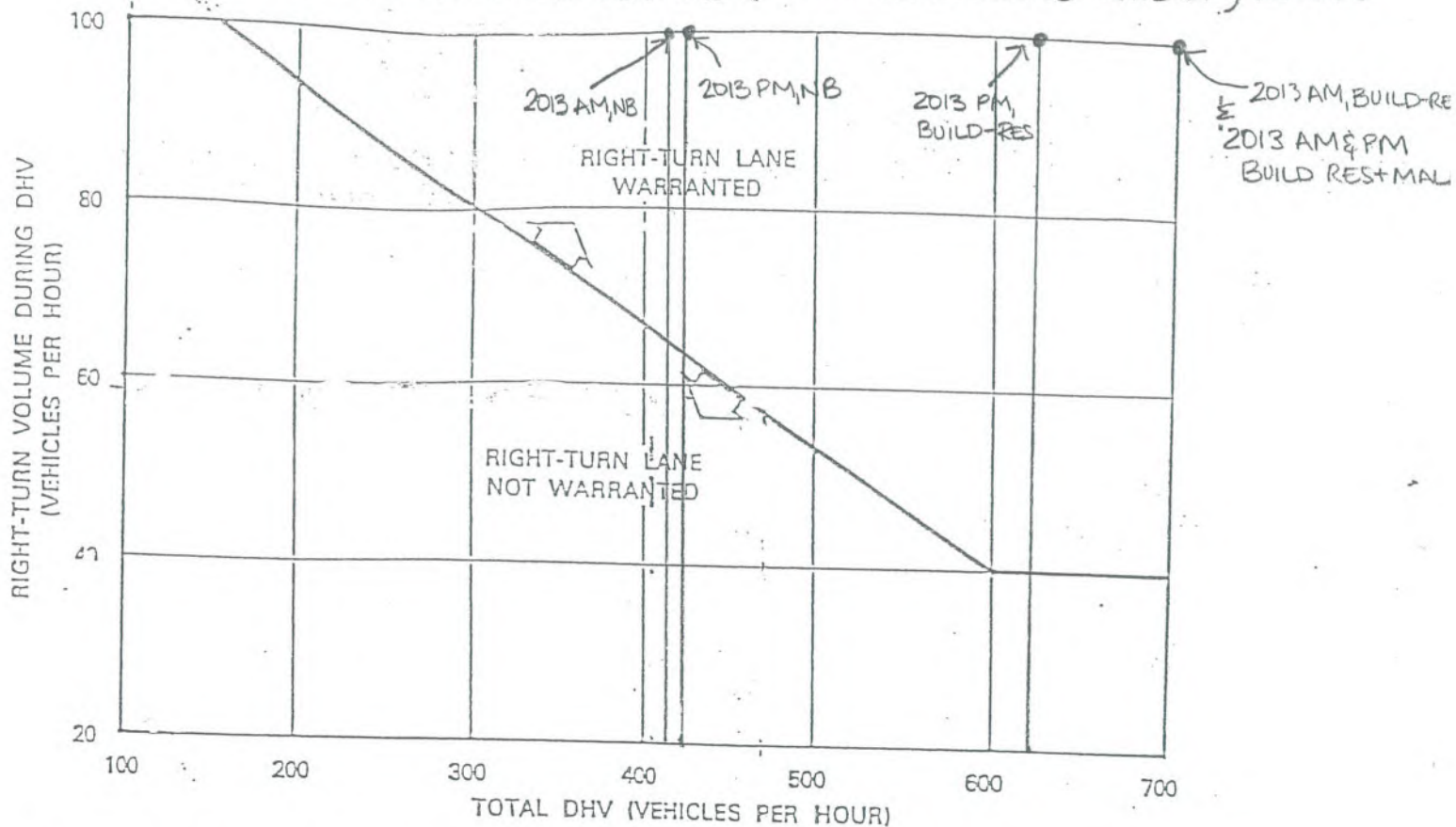
Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

7-42 At-Grade Intersections

US 202 / Rte 16 SB RAMPS (DIAMOND INTERCHG-NHDOT)



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

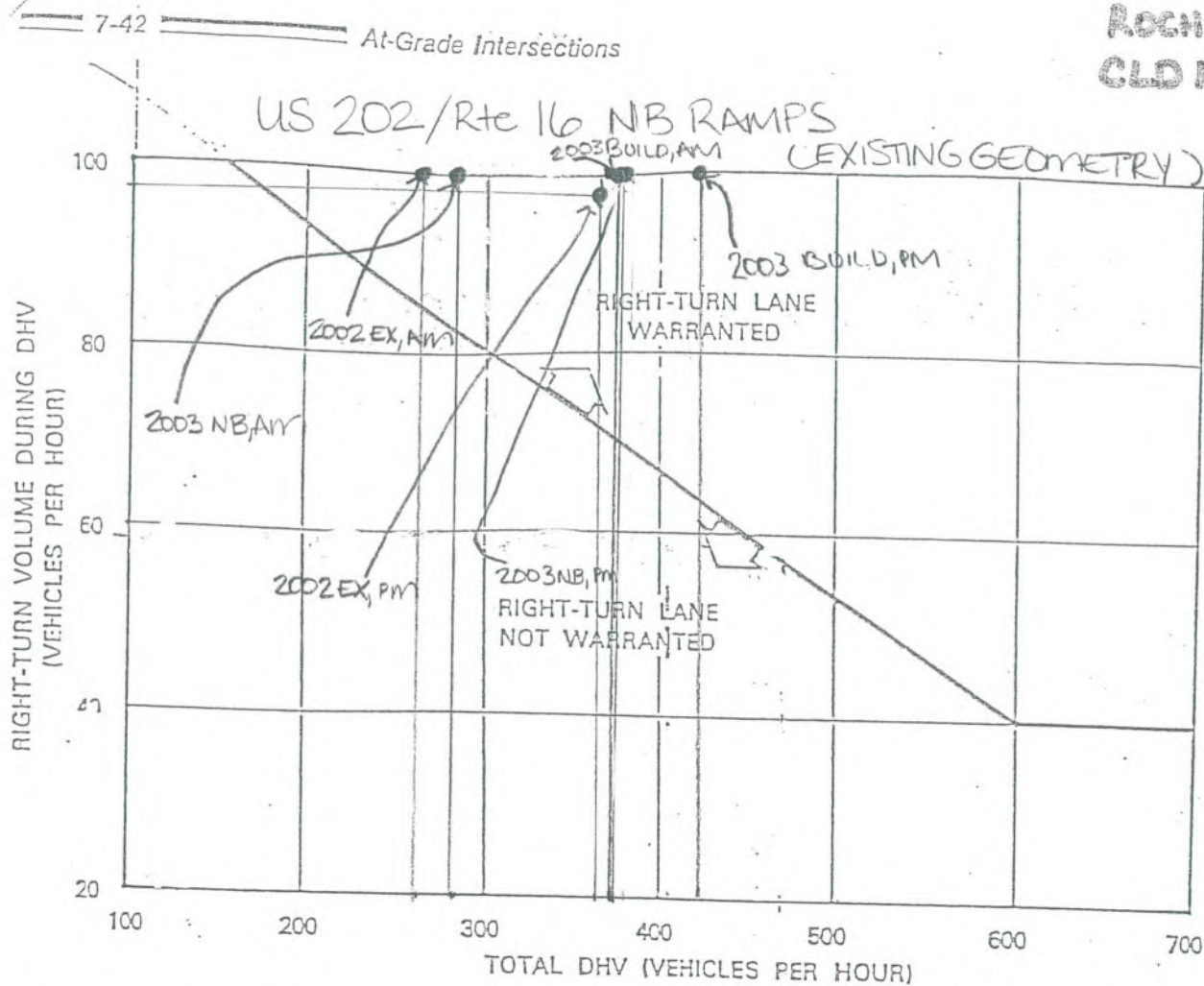
Example

Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

* Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

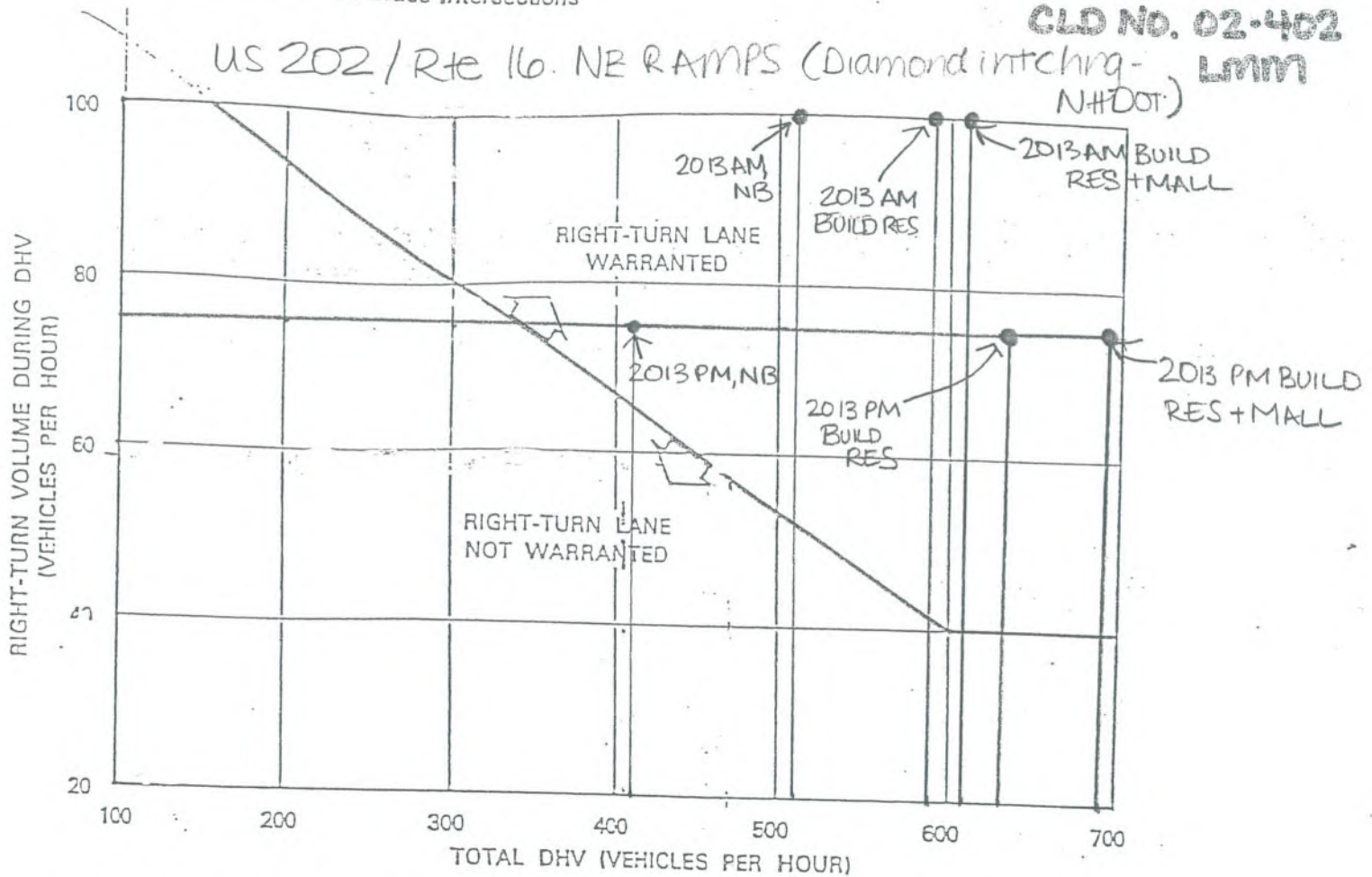
Example

Given: Design Speed = 40 mph
 DHV = 250 VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

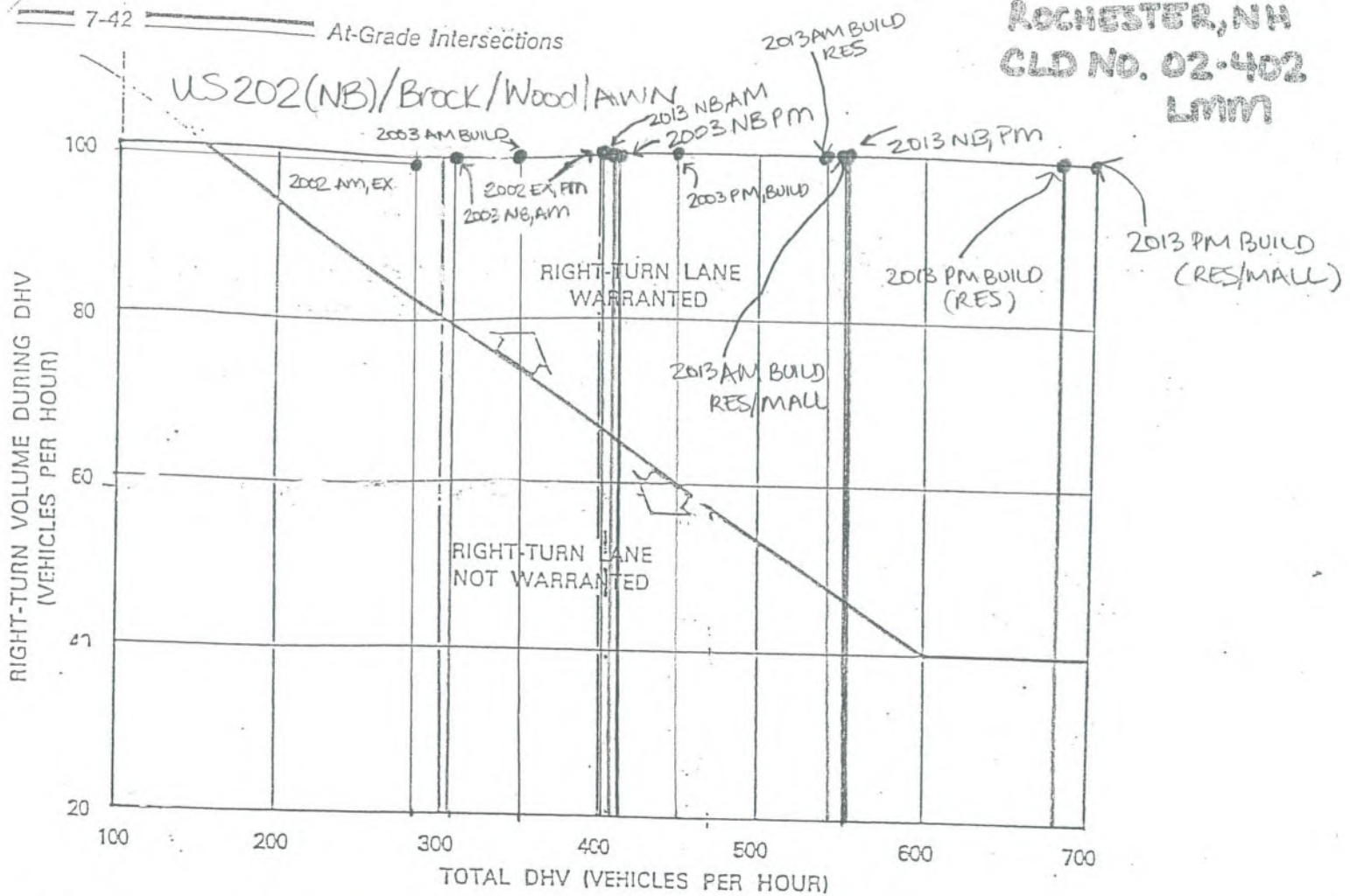
Example

Given: Design Speed = 40 mph
 DHV = 250 VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

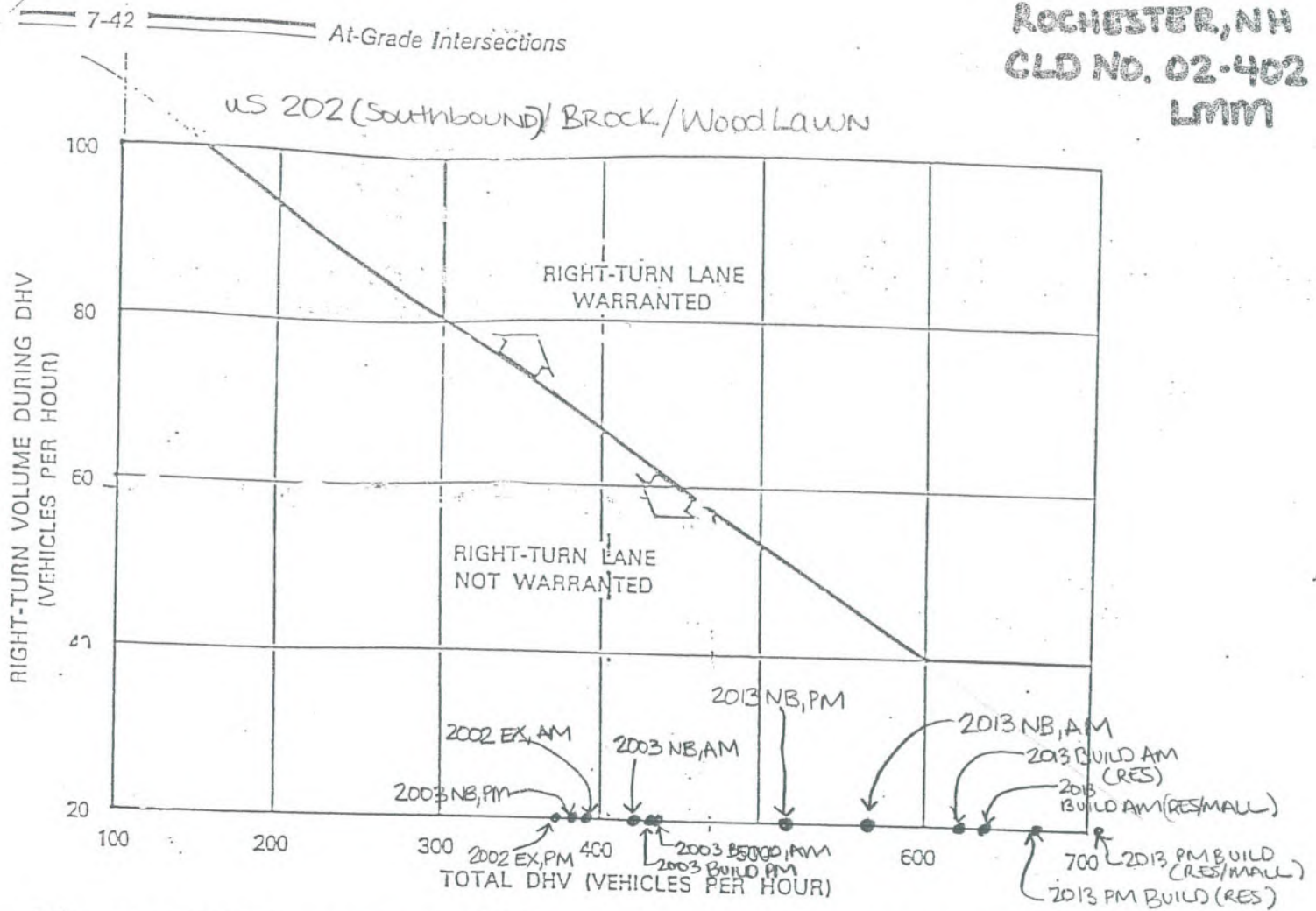
Example

Given: Design Speed = 40 mph
DHV = 250 VPH
Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 DHV = 250 VPH
 Right Turns = 100 VPH

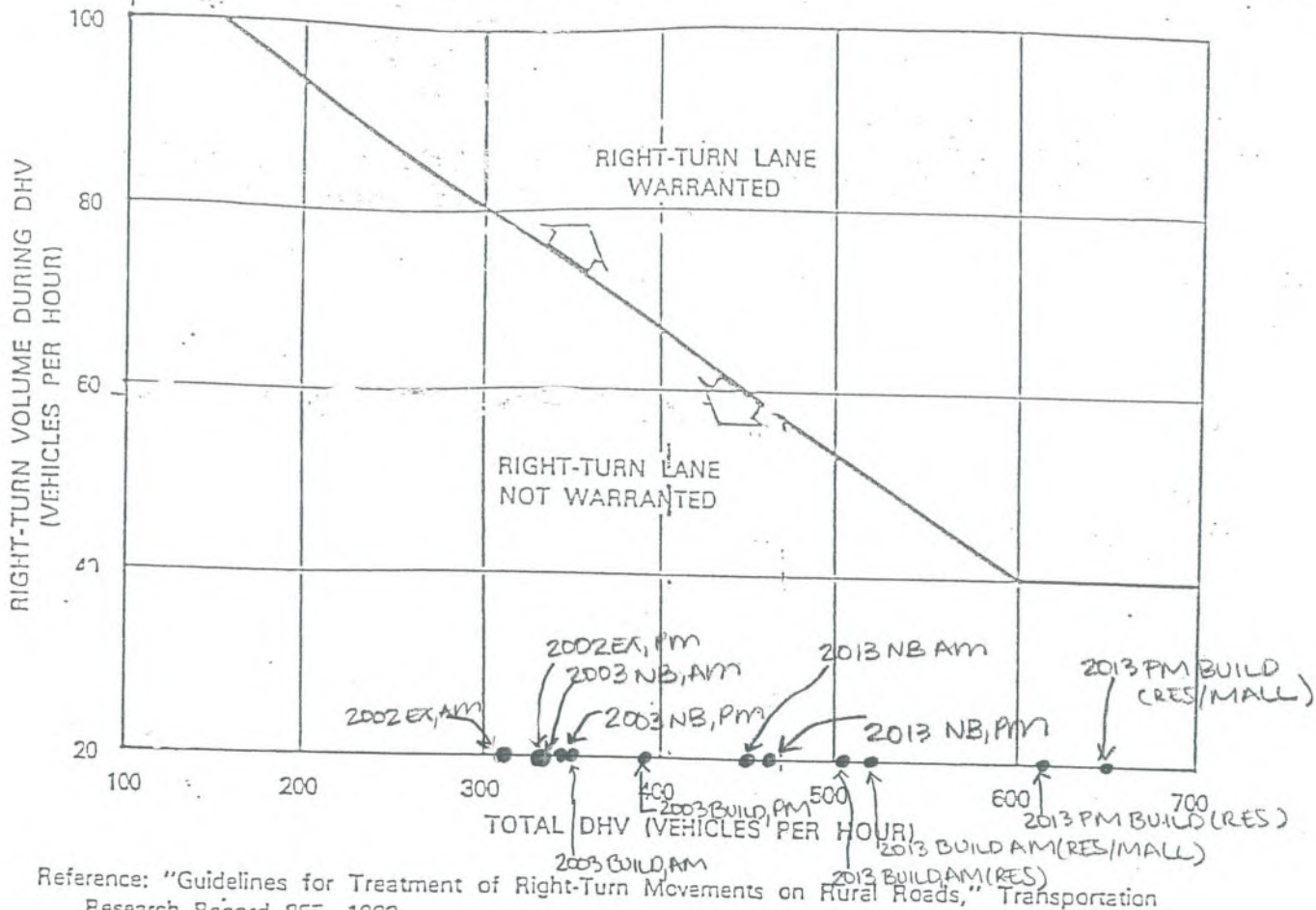
Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

7-42 At-Grade Intersections

US 202 / ROY



Note: For highways with a design speed below 50 mph and $DHV < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

APPENDIX L

TRAFFIC SIGNAL WARRANTS ANALYSIS

2002 EXISTING CONDITIONS

Traffic Signal Warrants - Brock @ Washington:

85th Percentile > 40 mph? N
Population < 10,000 people? N

Warrant 1 - One of the Following Conditions Must Be Met for 8 of 8 hours (Table 4C-1)

Condition A: Minimum Vehicular Volume

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	500	675	538	585	712	404	394	576	634
Minor	1	150	200	177	257	281	186	152	352	276
Met?			YES	YES	YES	YES	NO	NO	YES	YES

Condition B: Interruption of Continuous Traffic

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	750	675	538	585	712	404	394	576	634
Minor	1	75	200	177	257	281	186	152	352	276
Met?			NO	NO	NO	NO	NO	NO	NO	NO

Result: NOT MET

Warrant 2 - Four Hour Volumes (must be met for 4 of 8 hours)

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	Figure 4C-1	675	538	585	712	404	394	576	634
Minor	1	Figure 4C-1	200	177	257	281	186	152	352	276
Met?			YES	NO	YES	YES	NO	NO	YES	YES

Result: MET

Warrant 3 - Peak Hour Volume (must be met for 1 of 8 hours)

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	Figure 4C-3	675	538	585	712	404	394	576	634
Minor	1	Figure 4C-3	200	177	257	281	186	152	352	276
Met?			NO	NO	NO	NO	NO	NO	NO	NO

Result: NOT MET

Note: By inspection, the TMC Data shows traffic volumes that exceed those found in the ATR data for the same roadway approaches. The inclusion of the ATR data in this signal warrant analysis (in order to obtain 8 hours of data) will likely show conservative results.

2002 EXISTING CONDITIONS

BROCK STREET/WOODLAWN AVENUE APPROACH VOLUMES

CLD COUNTS DECEMBER 2002								
	Westbound (Brock)				Eastbound (Woodlawn)			
	Left	Thru	Right	Total	Left	Thru	Right	Total
7:00-8:00	70	0	130	200	0	0	2	2
8:00-9:00	49	0	128	177	1	1	1	3
2:00-3:00	74	1	182	257	1	1	0	2
4:00-5:00	89	0	192	281	2	0	2	4
CLD ATR DEC 2002 BROCK ST WEST OF JANET ST								
6:00-7:00				82				
9:00-10:00				110				
10:00-11:00				116				
11:00-12:00				152				
12:00-1:00				186				
1:00-2:00				152				
3:00-4:00				352				
5:00-6:00				276				

WASHINGTON (US 202)APPROACH VOLUMES

CLD COUNTS DECEMBER 2002							Total
	Northbound			Southbound			
	Left	Thru	Right	Left	Thru	Right	
7:00-8:00	0	165	119	215	174	2	675
8:00-9:00	0	133	96	174	135	0	538
2:00-3:00	2	146	93	195	147	2	585
4:00-5:00	4	254	119	189	146	0	712
CLD ATR DEC 2002 WASHINGTON ST SOUTH OF RTE 16 SB RAMP							
6:00-7:00	162			211			373
9:00-10:00	159			192			351
10:00-11:00	179			177			356
11:00-12:00	188			184			372
12:00-1:00	206			198			404
1:00-2:00	194			200			394
3:00-4:00	296			280			576
5:00-6:00	386			248			634

2003 NO-BUILD

Traffic Signal Warrants - Brock @ Washington:

85th Percentile > 40 mph? N
Population < 10,000 people? N

Warrant 1 - One of the Following Conditions Must Be Met for 8 of 8 hours (Table 4C-1)

Condition A: Minimum Vehicular Volume

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	500	695	554	603	733	416	406	593	653
Minor	1	150	206	182	265	289	192	157	363	284
Met?			YES	YES	YES	YES	NO	NO	YES	YES

Condition B: Interruption of Continuous Traffic

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	750	695	554	603	733	416	406	593	653
Minor	1	75	206	182	265	289	192	157	363	284
Met?			NO	NO	NO	NO	NO	NO	NO	NO

Result: NOT MET

Warrant 2 - Four Hour Volumes (must be met for 4 of 8 hours)

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	Figure 4C-1	695	554	603	733	416	406	593	653
Minor	1	Figure 4C-1	206	182	265	289	192	157	363	284
Met?			YES	NO	YES	YES	NO	NO	YES	YES

Result: MET

Warrant 3 - Peak Hour Volume (must be met for 1 of 8 hours)

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	Figure 4C-3	695	554	603	733	416	406	593	653
Minor	1	Figure 4C-3	206	182	265	289	192	157	363	284
Met?			NO	NO	NO	NO	NO	NO	NO	NO

Result: NOT MET

Note: By inspection, the TMC Data shows traffic volumes that exceed those found in the ATR data for the same roadway approaches. The inclusion of the ATR data in this signal warrant analysis (in order to obtain 8 hours of data) will likely show conservative results.

2003 NO-BUILD CONDITIONS

BROCK STREET/WOODLAWN AVENUE APPROACH VOLUMES

CLD COUNTS DECEMBER 2002									VOL 2003
	Westbound (Brock)				Eastbound (Woodlawn)				
	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00-8:00	70	0	130	200	0	0	2	2	206
8:00-9:00	49	0	128	177	1	1	1	3	182
2:00-3:00	74	1	182	257	1	1	0	2	265
4:00-5:00	89	0	192	281	2	0	2	4	289
CLD ATR DEC 2002 BROCK ST WEST OF JANET ST									
6:00-7:00				82					84
9:00-10:00				110					113
10:00-11:00				116					119
11:00-12:00				152					157
12:00-1:00				186					192
1:00-2:00				152					157
3:00-4:00				352					363
5:00-6:00				276					284

WASHINGTON (US 202) APPROACH VOLUMES

CLD COUNTS DECEMBER 2002							Total	VOL 2003
	Northbound			Southbound				
	Left	Thru	Right	Left	Thru	Right		
7:00-8:00	0	165	119	215	174	2	675	695
8:00-9:00	0	133	96	174	135	0	538	554
2:00-3:00	2	146	93	195	147	2	585	603
4:00-5:00	4	254	119	189	146	0	712	733
CLD ATR DEC 2002 WASHINGTON ST SOUTH OF RTE 16 SB RAMP								
6:00-7:00	162			211			373	384
9:00-10:00	159			192			351	362
10:00-11:00	179			177			356	367
11:00-12:00	188			184			372	383
12:00-1:00	206			198			404	416
1:00-2:00	194			200			394	406
3:00-4:00	296			280			576	593
5:00-6:00	386			248			634	653

2013 NO-BUILD

Traffic Signal Warrants - Brock @ Washington:

85th Percentile > 40 mph? N
Population < 10,000 people? N

Warrant 1 - One of the Following Conditions Must Be Met for 8 of 8 hours (Table 4C-1)

Condition A: Minimum Vehicular Volume

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	500	934	745	810	986	559	545	797	878
Minor	1	150	277	245	356	389	257	210	487	382
Met?			YES	YES	YES	YES	YES	YES	YES	YES

Condition B: Interruption of Continuous Traffic

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	750	934	745	810	986	559	545	797	878
Minor	1	75	277	245	356	389	257	210	487	382
Met?			YES	NO	YES	YES	NO	NO	YES	YES

Result: MET (Condition A)

Warrant 2 - Four Hour Volumes (must be met for 4 of 8 hours)

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	Figure 4C-1	934	745	810	986	559	545	797	878
Minor	1	Figure 4C-1	277	245	356	389	257	210	487	382
Met?			YES	YES	YES	YES	NO	NO	YES	YES

Result: MET

Warrant 3 - Peak Hour Volume (must be met for 1 of 8 hours)

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	Figure 4C-3	934	745	810	986	559	545	797	878
Minor	1	Figure 4C-3	277	245	356	389	257	210	487	382
Met?			YES	NO	YES	YES	NO	NO	YES	YES

Result: MET

Note: By inspection, the TMC Data shows traffic volumes that exceed those found in the ATR data for the same roadway approaches. The inclusion of the ATR data in this signal warrant analysis (in order to obtain 8 hours of data) will likely show conservative results.

2013 NO-BUILD CONDITIONS

BROCK STREET/WOODLAWN AVENUE APPROACH VOLUMES

CLD COUNTS DECEMBER 2002									VOL 2003	VOL 2013
	Westbound (Brock)				Eastbound (Woodlawn)					
	Left	Thru	Right	Total	Left	Thru	Right	Total		
7:00-8:00	70	0	130	200	0	0	2	2	206	277
8:00-9:00	49	0	128	177	1	1	1	3	182	245
2:00-3:00	74	1	182	257	1	1	0	2	265	356
4:00-5:00	89	0	192	281	2	0	2	4	289	389
CLD ATR DEC 2002 BROCK ST WEST OF JANET ST										
6:00-7:00				82					84	114
9:00-10:00				110					113	152
10:00-11:00				116					119	161
11:00-12:00				152					157	210
12:00-1:00				186					192	257
1:00-2:00				152					157	210
3:00-4:00				352					363	487
5:00-6:00				276					284	382

WASHINGTON (US 202) APPROACH VOLUMES

CLD COUNTS DECEMBER 2002							Total	VOL 2003	VOL 2013
Northbound			Southbound						
	Left	Thru	Right	Left	Thru	Right			
7:00-8:00	0	165	119	215	174	2	675	695	934
8:00-9:00	0	133	96	174	135	0	538	554	745
2:00-3:00	2	146	93	195	147	2	585	603	810
4:00-5:00	4	254	119	189	146	0	712	733	986
CLD ATR DEC 2002 WASHINGTON ST SOUTH OF RTE 16 SB RAMP									
6:00-7:00	162			211			373	384	516
9:00-10:00	159			192			351	362	486
10:00-11:00	179			177			356	367	493
11:00-12:00	188			184			372	383	515
12:00-1:00	206			198			404	416	559
1:00-2:00	194			200			394	406	545
3:00-4:00	296			280			576	593	797
5:00-6:00	386			248			634	653	878

HCS2000- DETAILED REPORT

General Information				Site Information			
Analyst	LMM			Intersection	Woodlawn/Brock @ US Rte 202		
Agency or Co.	CLD Consulting Engineers, Inc.			Area Type	All other areas		
Date Performed	02/03/2003			Jurisdiction	Rochester, NH		
Time Period	AM Peak Hour			Analysis Year	2013 Build (Res & Mall)		
				Project ID	Rochester US Rte 202 (CLD No. 02-402)		

Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	0	1	0	1	1	0	1	1	1	1	1	0
Lane group		LTR		L	TR		L	T	R	L	TR	
Volume, V (vph)	0	0	3	129	0	188	0	326	228	311	324	3
% Heavy vehicles, %HV	2	2	2	2	2	2	2	2	2	2	2	2
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	A	A	A	A	A	A	A	A	A	A	A	A
Start-up lost time, I_i		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Extension of effective green, e		4.0		4.0	4.0		4.0	4.0	2.0	4.0	4.0	
Arrival type, AT		3		3	3		3	3	3	3	3	
Unit extension, UE		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Filtering/metering, I		1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		2	0		94	0		114	0		1
Lane width		12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0		0	0	0	0	0	
Min. time for pedestrians, G_p												

Phasing	EW Perm	Peds Only	03	04	SB Only	NS Perm	07	08
Timing	G = 12.0	G = 18.0	G =	G =	G = 15.0	G = 21.0	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 6	Y = 6	Y =	Y =
Duration of Analysis, $T = 0.25$			Cycle Length, $C = 90.0$					

Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		1		143	104		0	362	127	346	362	
Lane group capacity, c		251		219	246		260	476	369	448	910	
v/c ratio, X		0.00		0.65	0.42		0.00	0.76	0.34	0.77	0.40	
Total green ratio, g/C		0.16		0.16	0.16		0.26	0.26	0.23	0.49	0.49	
Uniform delay, d_1		32.1		35.7	34.3		24.9	31.0	28.8	17.0	14.6	
Progression factor, PF		1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k		0.11		0.23	0.11		0.11	0.31	0.11	0.32	0.11	
Incremental delay, d_2		0.0		6.8	1.2		0.0	7.1	0.6	8.1	0.3	
Initial queue delay, d_3												
Control delay		32.1		42.5	35.5		24.9	38.0	29.3	25.2	14.9	
Lane group LOS		C		D	D		C	D	C	C	B	
Approach delay	32.1			39.6			35.8			19.9		
Approach LOS	C			D			D			B		
Intersection delay	28.6						Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	LMM	Intersection	Woodlawn/Brock @ US Rte 202
Agency or Co.	CLD Consulting Engineers, Inc.	Area Type	All other areas
Date Performed	02/03/2003	Jurisdiction	Rochester, NH
Time Period	PM Peak Hour	Analysis Year	2013 Build (Res & Mall)
		Project ID	Rochester US Rte 202 (CLD No. 02-402)

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	0	1	0	1	1	0	1	1	1	1	1	0
Lane group		LTR		L	TR		L	T	R	L	TR	
Volume, V (vph)	3	0	4	228	0	239	4	500	244	221	487	1
% Heavy vehicles, %HV	2	2	2	2	2	2	2	2	2	2	2	2
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	A	A	A	A	A	A	A	A	A	A	A	A
Start-up lost time, l_i		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Extension of effective green, e		4.0		4.0	4.0		4.0	4.0	2.0	4.0	4.0	
Arrival type, AT		3		3	3		3	3	3	3	3	
Unit extension, UE		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Filtering/metering, I		1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		2	0		120	0		122	0		0
Lane width		12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0		0	0	0	0	0	
Min. time for pedestrians, G_p												

Phasing	EW Perm	Peds Only	03	04	SB Only	NS Perm	07	08
Timing	G = 20.0	G = 18.0	G =	G =	G = 8.0	G = 30.0	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 6	Y = 6	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 100.0		

Lane Group Capacity, Control Delay, and LOS Determination

[illegible]

APPENDIX M

WARRANT THRESHOLD ANALYSIS

Threshold, Build Year Development

Development	Number of Residential Units											
	2003 Build	2004 Build	2005 Build	2006 Build	2007 Build	2008 Build	2009 Build	2010 Build	2011 Build	2012 Build	2013 Build	
Highfield Commons	168	190	212	235	257	279	301	323	346	368	390	
Secretariat Estates	50	73	95	118	140	163	185	208	230	253	275	
Chesley Hill Subdivision	33	33	33	33	33	33	33	33	33	33	33	
Ledgeview Subdivision	28	29	30	31	32	33	34	35	36	37	38	
Total	279	325	370	416	462	508	553	599	645	690	736	

Notes:

1. Assumed 15% of the Ledgeview development would use the US 202 Corridor
2. Assumed that the conservatism in the traffic generation will account for majority of the trips associated with the proposed ancillary uses
3. Interpolated between 2003 and 2013 years to develop interim years

Threshold Projections

US 202 Corridor Study
Rochester, NH
CLD No. 02-0402
LMM

	Residential Only		Residential Only								
	2003 Build	2013 Build	2004 Build	2005 Build	2006 Build	2007 Build	2008 Build	2009 Build	2010 Build	2011 Build	2012 Build
AM PEAK HOUR (7:00-8:00 AM)											
US 202/Dry Hill/Oak											
NBL	0	0	0	0	0	0	0	0	0	0	0
NBT	256	462	277	297	318	338	359	380	400	421	441
NBR	42	57	43	45	46	48	49	51	52	54	55
SBL	2	3	2	2	2	2	3	3	3	3	3
SBT	174	296	187	199	211	223	235	247	260	272	284
SBR	12	16	12	13	13	13	14	14	15	15	16
EBL	11	14	11	12	12	12	13	13	13	14	14
EBT	5	7	6	6	6	6	6	6	7	7	7
EBR	2	3	2	2	2	2	3	3	3	3	3
WBL	21	27	22	22	23	23	24	24	25	26	26
WBT	2	3	2	2	2	2	3	3	3	3	3
WBR	0	0	0	0	0	0	0	0	0	0	0
US 202/Hussey/Chesley											
NBL	0	0	0	0	0	0	0	0	0	0	0
NBT	384	631	409	433	458	483	508	532	557	582	606
NBR	5	7	5	6	6	6	6	6	6	6	7
SBL	16	19	16	16	16	17	17	17	18	18	18
SBT	200	331	213	226	240	253	266	279	292	305	318
SBR	0	0	0	0	0	0	0	0	0	0	0
EBL	1	1	1	1	1	1	1	1	1	1	1
EBT	1	1	1	1	1	1	1	1	1	1	1
EBR	1	1	1	1	1	1	1	1	1	1	1
WBL	7	9	8	8	8	8	8	8	9	9	9
WBT	0	0	0	0	0	0	0	0	0	0	0
WBR	36	40	36	37	37	38	38	39	39	39	40

Threshold Projections

US 202 Corridor Study
Rochester, NH
CLD No. 02-0402
LMM

PM PEAK HOUR (4:15-5:15 PM)	(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)		(Blnc'd)											
	2003 No-Build	2013 No-Build	2004 No-Build	2005 No-Build	2006 No-Build	2007 No-Build	2008 No-Build	2009 No-Build	2010 No-Build	2011 No-Build	2012 No-Build	2003 No-Build	2013 No-Build	2004 No-Build	2005 No-Build	2006 No-Build	2007 No-Build	2008 No-Build	2009 No-Build	2010 No-Build	2011 No-Build	2012 No-Build	2003 No-Build	2013 No-Build	2004 No-Build	2005 No-Build	2006 No-Build	2007 No-Build	2008 No-Build	2009 No-Build	2010 No-Build	2011 No-Build	2012 No-Build	
US202/Estes Rd																																		
NBL	13	18	14	14	15	15	16	16	16	17	17																							
NBT	216	290	222	229	236	243	250	258	266	274	282																							
NBR	6	8	6	7	7	7	7	7	8	8	8																							
SBL	56	75	57	59	61	63	64	66	68	70	73																							
SBT	212	285	219	225	232	239	246	253	261	269	277																							
SBR	61	82	63	64	66	68	70	73	75	77	79																							
EBL	31	42	32	33	34	35	36	37	38	39	40																							
EBT	30	40	31	32	33	34	35	36	37	38	39																							
EBR	6	8	6	7	7	7	7	7	8	8	8																							
WBL	1	1	1	1	1	1	1	1	1	1	1																							
WBT	33	44	34	35	36	37	38	39	41	42	43																							
WBR	44	60	46	47	48	50	51	53	54	56	58																							

	Residential		Residential										
	Only	Only	2003 Build	2013 Build	2004 Build	2005 Build	2006 Build	2007 Build	2008 Build	2009 Build	2010 Build	2011 Build	2012 Build
PM PEAK HOUR (4:15-5:15 PM)													
	NBL	1	21		3	5	7	9	11	13	15	17	19
	NBT	262	356		271	281	290	300	309	318	328	337	347
	SBT	252	339		261	269	278	287	296	304	313	322	330
	SBR	15	148		28	42	55	68	82	95	108	121	135
US 202/Secretariat Estates	EBL	5	91		14	22	31	39	48	57	65	74	82
	EBR	1	14		2	4	5	6	8	9	10	11	13
US202/Estes Rd	NBL	13	18		14	14	15	15	16	16	17	17	18
	NBT	231	400		248	265	282	299	316	333	350	366	383
	NBR	6	8		6	7	7	7	7	7	8	8	8
	SBL	63	84		65	67	69	71	73	75	77	80	82
	SBT	232	441		253	274	295	316	337	358	378	399	420
	SBR	61	82		63	65	67	69	71	73	75	77	80
	EBL	31	42		32	33	34	35	36	37	38	39	40
	EBT	30	40		31	32	33	34	35	36	37	38	39
	EBR	6	8		6	7	7	7	7	7	8	8	8
	WBL	1	1		1	1	1	1	1	1	1	1	1
	WBT	33	44		34	35	36	37	39	40	41	42	43
	WBR	47	64		49	51	52	54	55	57	59	60	62
US 202/Hussey/Chesley	NBL	1	1		1	1	1	1	1	1	1	1	1
	NBT	304	501		324	343	363	383	403	422	442	462	481
	NBR	4	4		4	4	4	4	4	4	4	4	4
	SBL	31	34		32	32	32	32	33	33	33	34	34
	SBT	351	600		376	401	426	451	476	500	525	550	575
	SBR	2	3		2	2	2	2	2	2	3	3	3
	EBL	4	6		4	4	5	5	5	5	5	5	5
	EBT	1	1		1	1	1	1	1	1	1	1	1
	EBR	0	0		0	0	0	0	0	*	0	0	0
	WBL	5	7		5	5	6	6	6	6	6	6	6
	WBT	0	0		0	0	0	0	0	0	0	0	0
	WBR	23	27		24	24	24	25	25	25	26	26	26

INTERSECTION	2004 Bld AM PEAK HR	2005 Bld AM PEAK HR	2006 Bld AM PEAK HR	2007 Bld AM PEAK HR	2008 Bld AM PEAK HR	2009 Bld AM PEAK HR	2010 Bld AM PEAK HR	2011 Bld AM PEAK HR	2012 Bld AM PEAK HR	Chart Used (MPH)
US 202(SB)/Chesley Hill Rd										
Advancing	229	242	256	270	283	296	310	323	336	50
Opposing	414	439	464	489	514	538	563	588	613	
LT Vol	16	16	16	17	17	17	18	18	18	
Threshold (Bypass Lane)	52	44	39	34	31	27	24	21	18	
LT WARR MET	NO	NO	NO	NO	NO	NO	NO	NO	YES, BP	

INTERSECTION	2004 Bld PM PEAK HR	2005 Bld PM PEAK HR	2006 Bld PM PEAK HR	2007 Bld PM PEAK HR	2008 Bld PM PEAK HR	2009 Bld PM PEAK HR	2010 Bld PM PEAK HR	2011 Bld PM PEAK HR	2012 Bld PM PEAK HR	Chart Used (MPH)
US 202(SB)/Chesley Hill Rd										
Advancing	410	435	460	485	511	535	561	587	612	50
Opposing	329	348	368	388	408	427	447	467	486	
LT Vol	32	32	32	32	33	33	33	34	34	
Threshold (Bypass Lane)	29	28-	28-	28-	28-	28-	31-	31-	31-	
LT WARR MET	YES, BP	YES, BP	YES, BP	YES, BP	YES, BP	YES, BP	YES, BP	YES, BP	YES, BP	

INTERSECTION	2004 NB PM PEAK HR	2005 NB PM PEAK HR	2006 NB PM PEAK HR	2007 NB PM PEAK HR	2008 NB PM PEAK HR	2009 NB PM PEAK HR	2010 NB PM PEAK HR	2011 NB PM PEAK HR	2012 NB PM PEAK HR	Chart Used (MPH)
US 202(SB)/Estes										
Advancing	339	348	359	370	380	392	404	416	429	50
Opposing	242	250	258	265	273	281	290	299	307	
LT Vol	57	59	61	63	64	66	68	70	73	
Threshold (Bypass Lane)	48	45	42	40	38	36	33	31	29	
LT WARR MET	YES, BP	YES, BP	YES, BP	YES, BP	YES, BP	YES, BP	YES (2X) LT	YES (2X) LT	YES (2X) LT	

INTERSECTION	2004 Bld PM PEAK HR	2005 Bld PM PEAK HR	2006 Bld PM PEAK HR	2007 Bld PM PEAK HR	2008 Bld PM PEAK HR	2009 Bld PM PEAK HR	2010 Bld PM PEAK HR	2011 Bld PM PEAK HR	2012 Bld PM PEAK HR	Chart Used (MPH)
US 202(SB)/Estes										
Advancing	381	406	431	456	481	506	530	556	582	50
Opposing	268	286	304	321	339	356	375	391	409	
LT Vol	65	67	69	71	73	75	77	80	82	
Threshold (Bypass Lane)	38	33	30	28-	28-	28-	28-	31-	31-	
LT WARR MET	YES, BP	YES (2X) LT	YES (2X) LT	YES (2X) LT	YES (2X) LT	YES (2X) LT	YES (2X) LT	YES (2X) LT	YES (2X) LT	

INTERSECTION	2013 (No-Build & Chesley Hill, 33-Lot Subdivision)		
	AM PEAK HR	PM PEAK HR	Chart Used (MPH)
US 202(SB)/Hussey			
Advancing	269	473	
Opposing	493	395	
LT Vol	19	34	50
Threshold (Bypass Lane)	34	28-	
LT WARR MET	NO	YES, BP	



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Maine • New Hampshire • Vermont

JOB ROCHESTER-US 202

JOB NO. 02-0402

SHEET NO. 1

OF 1

CALCULATED BY LMM

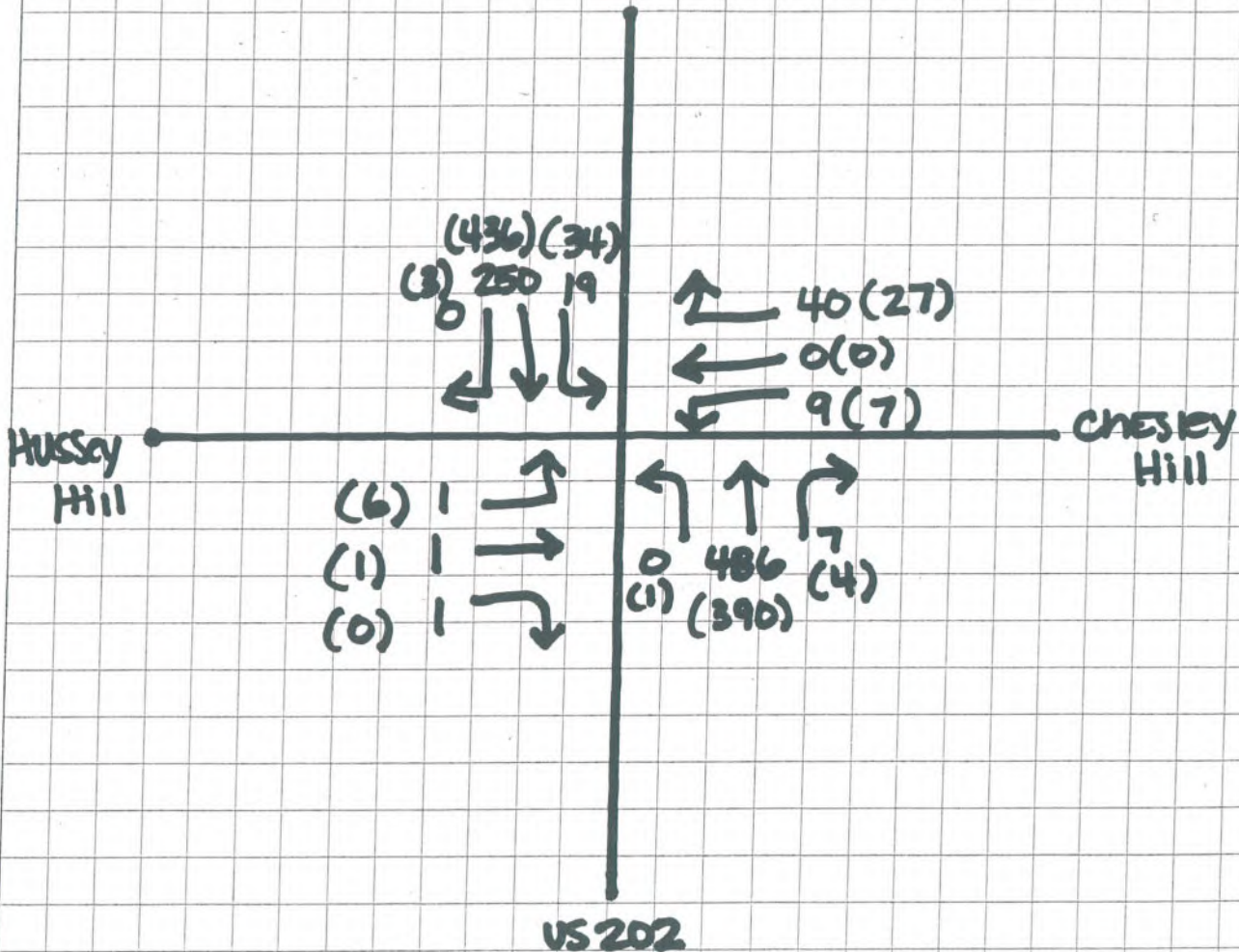
DATE 2/19/03

CHECKED BY _____

DATE _____

SUBJECT _____

SCALE N/A



XXX = AM PEAK
(XXX) = PM PEAK

2013
NO-BUILD VOL + Chesley Hill
33 LOT SUBDIVISION ONLY

Rt warrant

INTERSECTION	2004 NB	2005 NB	2006 NB	2007 NB	2008 NB	2009 NB	2010 NB	2011 NB	2012 NB
	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR
US 202(SB)/Estes									
Total DHV	339	348	359	370	380	3920	404	416	429
RT Vol	63	64	66	68	70	73	75	77	79

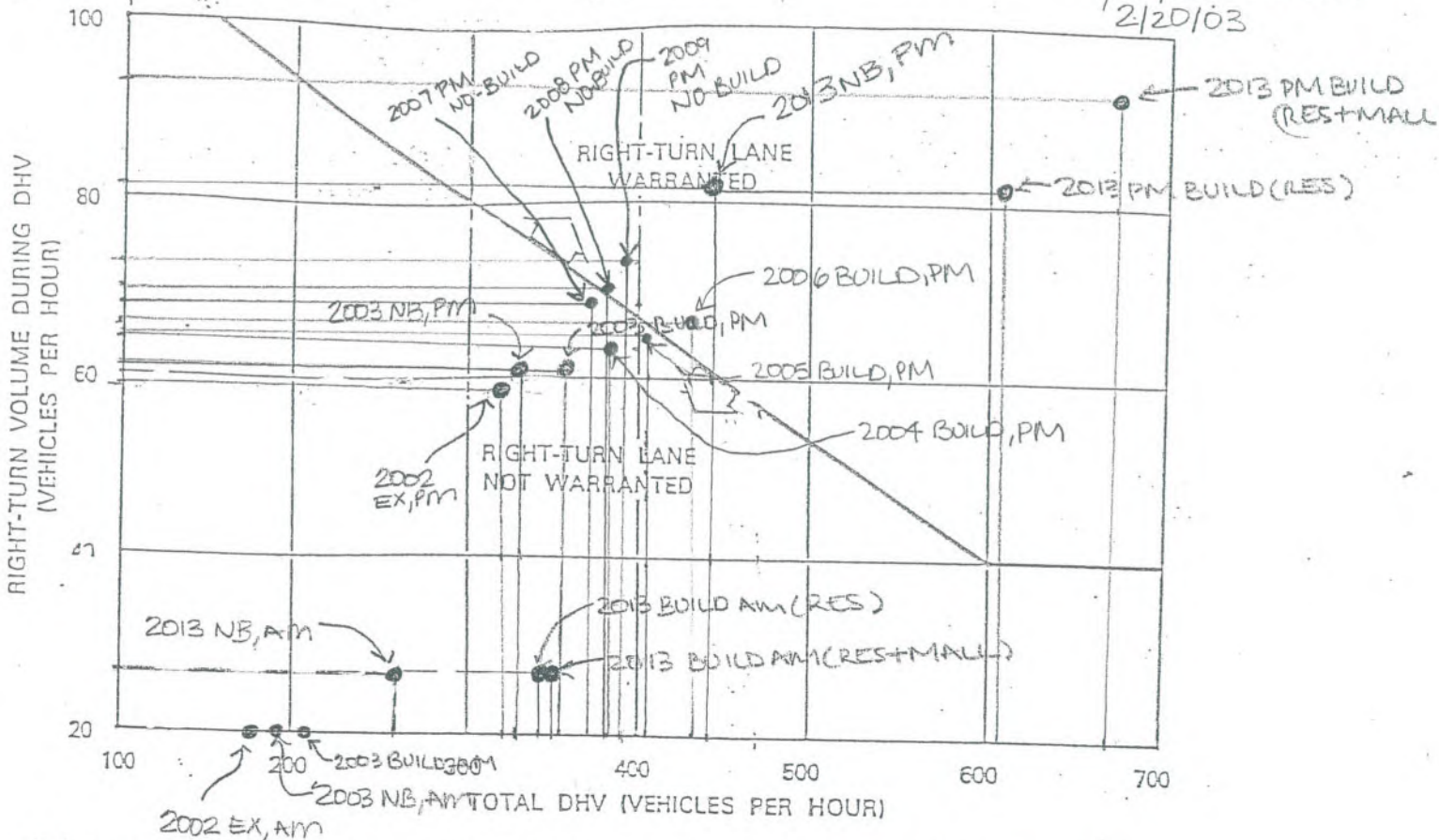
INTERSECTION	2004 Bld	2005 Bld	2006 Bld	2007 Bld	2008 Bld	2009 Bld	2010 Bld	2011 Bld	2012 Bld
	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR
US 202(SB)/Estes									
Total DHV	381	406	431	456	481	506	530	556	582
RT Vol	63	65	67	69	71	73	75	77	80

US 202 Corridor Study
 ROCHESTER, NH
 CLD NO. 02-402
 1/22/03 LMM
 2/20/03

THRESHOLD WS

7-42 At-Grade Intersections

US 202 (Southbound) / ESTES



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

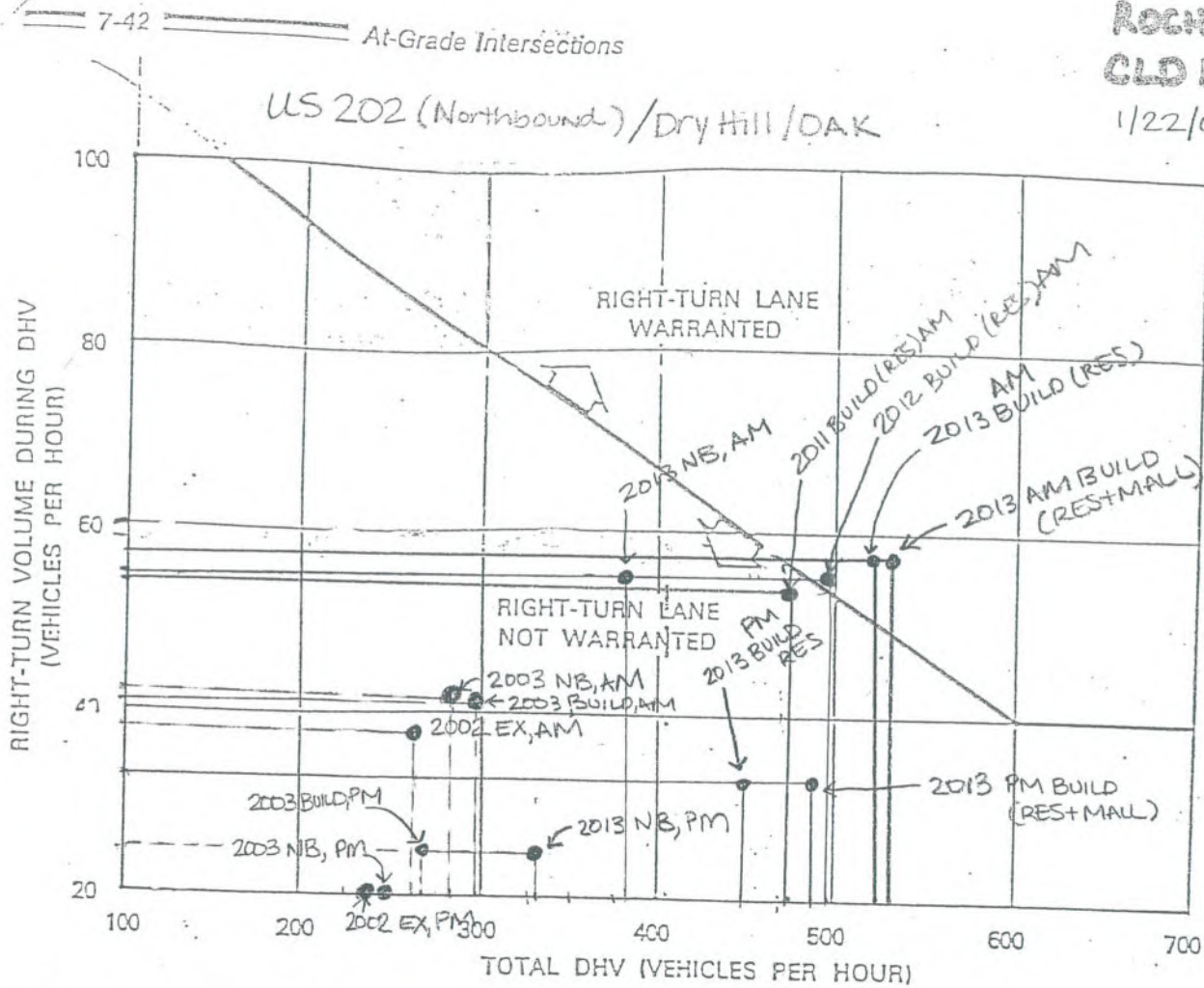
Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

INTERSECTION	2004 Bid	2005 Bid	2006 Bid	2007 Bid	2008 Bid	2009 Bid	2010 Bid	2011 Bid	2012 Bid
	AM PEAK HR	AM PEAK HR	AM PEAK HR	AM PEAK HR	AM PEAK HR	AM PEAK HR	AM PEAK HR	AM PEAK HR	AM PEAK HR
US 202 (NB)/Dry Hill Road									
Total DHV	320	342	364	386	408	431	452	475	496
RT Vol	43	45	46	48	49	51	52	54	55



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
 $DHV = 250$ VPH
 Right Turns = 100 VPH

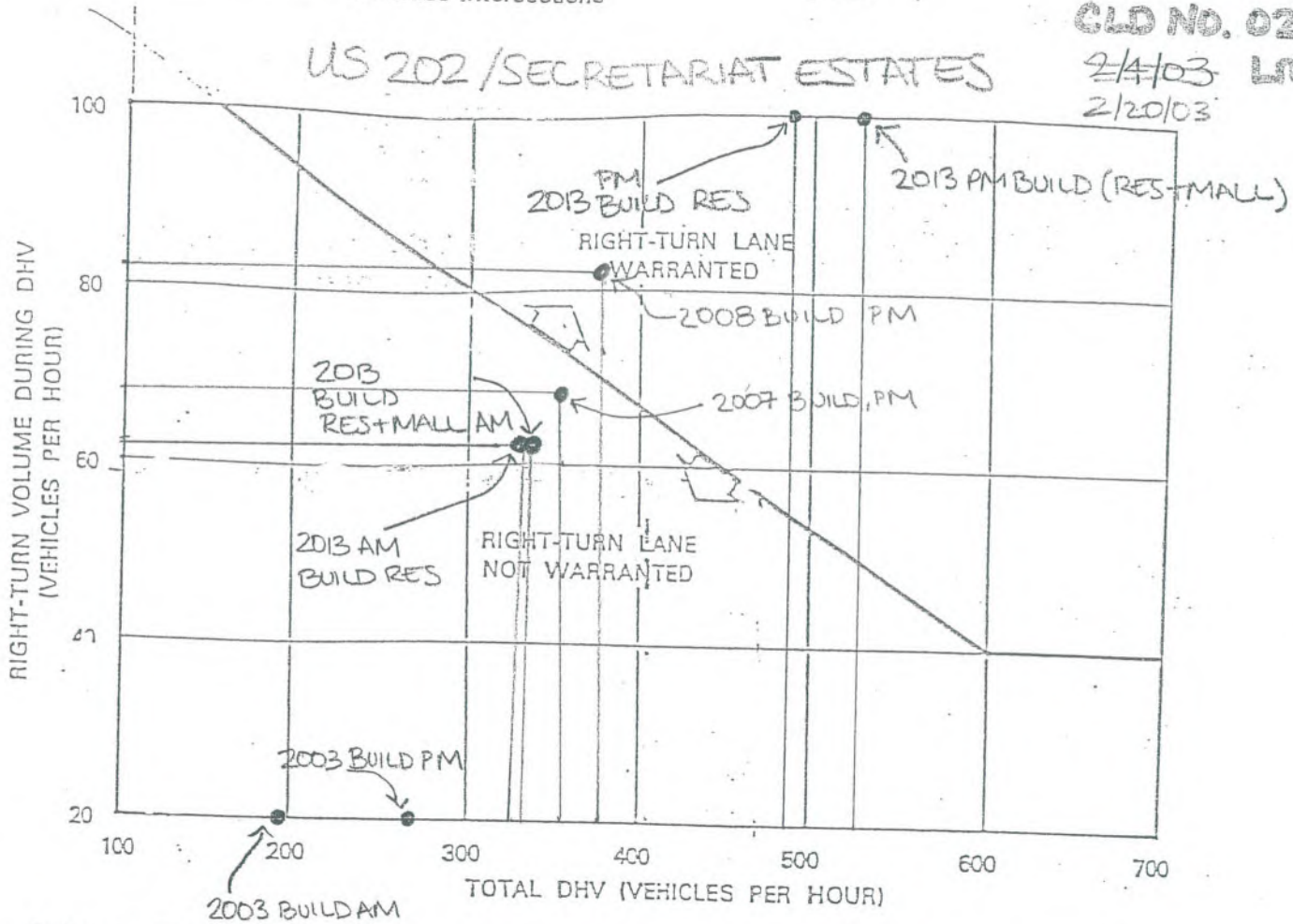
Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

INTERSECTION	2004 Bld	2005 Bld	2006 Bld	2007 Bld	2008 Bld	2009 Bld	2010 Bld	2011 Bld	2012 Bld
	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR	PM PEAK HR
US 202/Secretariat Estates									
Total DHV	289	311	333	355	378	399	421	443	465
RT Vol	28	42	55	68	82	95	108	121	135

US 202 / SECRETARIAT ESTATES



Reference: "Guidelines for Treatment of Right-Turn Movements on Rural Roads," Transportation Research Record 855, 1982.

Note: For highways with a design speed below 50 mph and $DHV' < 300$ and Right Turns > 40 , an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

Given: Design Speed = 40 mph
DHV = 250 VPH
Right Turns = 100 VPH

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use $100 - 20 = 80$ VPH. The figure indicates that a right-turn lane is not warranted, unless other factors (e.g., high accident rate) indicate a lane is needed.

Figure 7-25(a). Right-Turn Warrants at Unsignalized Intersections on 2-Lane Highways

2013 NO-BUILD CONDITIONS

BROCK STREET/WOODLAWN AVENUE APPROACH VOLUMES

CLD COUNTS DECEMBER 2002										VOL 2003	VOL 2013
Westbound (Brock)					Eastbound (Woodlawn)						
	Left	Thru	Right	Total	Left	Thru	Right	Total			
7:00-8:00	70	0	130	200	0	0	2	2	206	277	
8:00-9:00	49	0	128	177	1	1	1	3	182	245	
2:00-3:00	74	1	182	257	1	1	0	2	265	356	
4:00-5:00	89	0	192	281	2	0	2	4	289	389	
CLD ATR DEC 2002 BROCK ST											
WEST OF JANET ST											
6:00-7:00				82					84	114	
9:00-10:00				110					113	152	
10:00-11:00				116					119	161	
11:00-12:00				152					157	210	
12:00-1:00				186					192	257	
1:00-2:00				152					157	210	
3:00-4:00				352					363	487	
5:00-6:00				276					284	382	

WASHINGTON (US 202)APPROACH VOLUMES

CLD COUNTS DECEMBER 2002												VOL 2013
Northbound					Southbound				Total	VOL 2003		
	Left	Thru	Right		Left	Thru	Right					
7:00-8:00	0	165	119		215	174	2		675	695	934	
8:00-9:00	0	133	96		174	135	0		538	554	745	
2:00-3:00	2	146	93		195	147	2		585	603	810	
4:00-5:00	4	254	119		189	146	0		712	733	986	
CLD ATR DEC 2002 WASHINGTON ST												
SOUTH OF RTE 16 SB RAMP												
6:00-7:00		162				211			373	384	516	
9:00-10:00		159				192			351	362	486	
10:00-11:00		179				177			356	367	493	
11:00-12:00		188				184			372	383	515	
12:00-1:00		206				198			404	416	559	
1:00-2:00		194				200			394	406	545	
3:00-4:00		296				280			576	593	797	
5:00-6:00		386				248			634	653	878	

Warrant Thresholds:

Warrant 1: 2011 No-Build (2010 extremely close, 500 vs 499 (1-2PM))

Warrant 2: 2002 Existing

Warrant 3: 2004 No-Build (3-4PM)

VOL 2012	VOL 2011	VOL 2010	VOL 2009	VOL 2008	VOL 2007	VOL 2006	VOL 2005	VOL 2004
269	261	253	246	239	232	225	219	212
238	231	224	218	211	205	199	193	188
345	335	326	316	307	298	289	281	273
378	367	356	346	336	326	316	307	298
110	107	104	101	98	95	92	90	87
148	144	139	135	131	128	124	120	117
156	151	147	143	139	134	131	127	123
204	198	193	187	181	176	171	166	161
250	243	236	229	222	216	209	203	197
204	198	193	187	181	176	171	166	161
473	459	446	433	420	408	396	385	373
371	360	350	339	330	320	311	302	293

VOL 2011	VOL 2010	VOL 2009	VOL 2008	VOL 2007	VOL 2006	VOL 2005	VOL 2004
881	855	830	806	783	760	738	716
702	682	662	642	624	606	588	571
763	741	719	699	678	658	639	621
929	902	876	850	825	801	778	755
487	473	459	445	432	420	408	396
458	445	432	419	407	395	384	372
464	451	438	425	413	401	389	378
485	471	458	444	431	419	406	395
527	512	497	482	468	455	441	429
514	499	485	470	457	443	431	418
752	730	708	688	668	648	629	611
827	803	780	757	735	714	693	673

2010 NO-BUILD

Traffic Signal Warrants - Brock @ Washington:

85th Percentile > 40 mph? N
Population < 10,000 people? N

Warrant 1 - One of the Following Conditions Must Be Met for 8 of 8 hours (Table 4C-1)

Condition A: Minimum Vehicular Volume

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	500	855	682	741	902	512	499	730	803
Minor	1	150	253	224	326	356	236	193	446	350
Met?			YES	YES	YES	YES	YES	NO	YES	YES

Condition B: Interruption of Continuous Traffic

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	750	855	682	741	902	512	499	730	803
Minor	1	75	253	224	326	356	236	193	446	350
Met?			YES	NO	NO	YES	NO	NO	NO	YES

Result: VERY CLOSE (CONDITION A), 500 vs 499 (Major) 12-1 PM

Warrant 2 - Four Hour Volumes (must be met for 4 of 8 hours)

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	Figure 4C-1	855	682	741	902	512	499	730	803
Minor	1	Figure 4C-1	253	224	326	356	236	193	446	350
Met?			YES	YES	YES	YES	NO	NO	YES	YES

Result: MET

Warrant 3 - Peak Hour Volume (must be met for 1 of 8 hours)

Street	Lanes	Minimum Volume	TMC DATA				ATR DATA			
			7-8 AM	8-9 AM	2-3PM	4-5 PM	12:00-1:00	1:00-2:00	3:00-4:00	5:00-6:00
Major	1	Figure 4C-3	855	682	741	902	512	499	730	803
Minor	1	Figure 4C-3	253	224	326	356	236	193	446	350
Met?			NO	NO	YES	YES	NO	NO	YES	YES

Result: MET

Note: By inspection, the TMC Data shows traffic volumes that exceed those found in the ATR data for the same roadway approaches. The inclusion of the ATR data in this signal warrant analysis (in order to obtain 8 hours of data) will likely show conservative results.

APPENDIX N

QUEUE LENGTH CALCULATIONS

Intersection: US Route 202 and Brock Street/Woodlawn Avenue

Lane Group	2013 AM PEAK BUILD		2013 PM PEAK BUILD		Maximum Storage Length Required (ft)
	99% Q (# Veh.)	Storage Length (ft)	99% Q (# Veh.)	Storage Length (ft)	
EB LT-Th-RT	0	0	2	50	50
WB LT	8	200	11	275	275
WB Th-RT	11	275	14	350	350
NB LT	0	0	0	0	0
NB Th	13	325	19	475	475
NB RT	10	250	11	275	275
SB LT	10	250	9	225	250
SB Th-RT	10	250	15	375	375

Intersection: US Route 202 & Flatley Company Driveway

Lane Group	2013 AM PEAK BUILD		2013 PM PEAK BUILD		Maximum Storage Length Required (ft)
	99% Q (# Veh.)	Storage Length (ft)	99% Q (# Veh.)	Storage Length (ft)	
WB LT	2	50	5	125	125
WB RT	6	150	14	350	350
NB Th	14	350	15	375	375
NB RT	1	25	3	75	75
SB LT (2-Lanes)	6	150	12	300	300
SB Th	8	200	12	300	300

PROJECT: 02-0402
CITY/TOWN: Rochester, NH
LOCATION: US Route 202 and Brock Street/Woodlawn Avenue
CASE: 2013 PM PEAK HOUR, Build Residentail & Mall

[illegible]

PROJECT: 02-0402
CITY/TOWN: Rochester, NH
LOCATION: US Route 202 & Flatley Company Driveway
CASE: 2013 AM PEAK HOUR, Build Residentail & Mall

PROJECT: 02-0402
CITY/TOWN: Rochester, NH
LOCATION: US Route 202 & Flatley Company Driveway
CASE: 2013 PM PEAK HOUR, Build Residentail & Mall

[illegible]

APPENDIX O

CONCEPTUAL COST ESTIMATES OF CORRIDOR IMPROVEMENTS

Dated: 04/17/07

CITY OF ROCHESTER~DEPARTMENT OF PUBLIC WORKS

WASHINGTON STREET CORRIDOR RECONSTRUCTION
CONCEPTUAL COST ESTIMATE
(2007 DOLLARS)

WASHINGTON STREET CORRIDOR, INCLUDING BROCK ST INTERSECTION

City of: ROCHESTER
Name of Road: WASHINGTON STREET
Type: Full Depth Reconstruction

Estimate Prepared By: CLD Consulting Engineers

CLD Reference No. 02-0402

Dated: 17-Apr-07

ITEM NO	ITEM DESCRIPTION	UNIT	QTY	PRICE*	AMOUNT
203.1	COMMON EXCAVATION	CY	18675	\$12.00	\$224,100.00
203.2	ROCK EXCAVATION (assume 5%)	CY	934	\$100.00	\$93,375.00
209.1	GRANULAR BACKFILL	CY	1109	\$31.00	\$34,379.00
214	FINE GRADING	U	1	\$21,000.00	\$21,000.00
304.1	SAND (F)	CY	4150	\$20.00	\$83,000.00
304.2	GRAVEL (F)	CY	4150	\$25.00	\$103,750.00
304.3	CRUSHED GRAVEL (F)	CY	4150	\$30.00	\$124,500.00
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	TON	5855	\$70.00	\$409,850.00
403.12	HOT BITUMINOUS PAVEMENT, HAND METHOD	T	575	\$125.00	\$71,875.00
608.24	4" CONCRETE SIDEWALK	SY	2980	\$60.00	\$178,800.00
609.01	STRAIGHT GRANITE CURB (F)	LF	4466	\$20.00	\$89,320.00

Item Subtotal: \$1,433,949.00

Earthwork	(15%)	\$215,092.35
Retaining Walls		\$200,000.00
Erosion Control	(2%)	\$21,509.24
Disposal of Contaminated Materials		\$100,000.00
Guardrail	(1%)	\$14,339.49
Culvert Extension at Brock St. Intersection		\$10,000.00
Drainage	(35%)	\$501,882.15
(% of roadway items only)		

Item Subtotal: \$2,496,772.23

Mobilization	(10%)	\$249,677.22
Traffic Signals (Brock Street)		\$100,000.00
Signing & Striping	(5%)	\$124,838.61
Landscaping	(10%)	\$249,677.22
Traffic Control	(15%)	\$374,515.83
(Officers, flaggers & maint. of traffic)		

Item Subtotal: \$3,595,481.12

Contingencies	(10%)	\$359,548.11
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Subtotal: \$3,955,029.23

*Unit Prices based on NHDOT 2006 Q1-Q4 Group "D"
Prices and Recent Bids Prices from Similar Local Projects.

TOTAL: \$3,955,029.23

SAY: \$3,960,000

CITY OF ROCHESTER ~ DEPARTMENT OF PUBLIC WORKS

WASHINGTON STREET CORRIDOR RECONSTRUCTION
CONCEPTUAL COST ESTIMATE
(2007 DOLLARS)TWO-LANE ROUNDABOUT AT STRAFFORD SQUARE

City of: ROCHESTER
 Name of Road: WASHINGTON STREET
 Type: Full Depth Reconstruction

Estimate Prepared By: CLD Consulting Engineers

CLD Reference No. 02-0402

Dated: 17-Apr-07

ITEM NO	ITEM DESCRIPTION	UNIT	QTY	PRICE	AMOUNT
203.1	COMMON EXCAVATION	CY	8857	\$12.00	\$106,284.00
203.2	ROCK EXCAVATION (assume 5%)	CY	443	\$100.00	\$44,285.00
209.1	GRANULAR BACKFILL	CY	437	\$31.00	\$13,547.00
214	FINE GRADING	U	1	\$8,000.00	\$8,000.00
304.1	SAND (F)	CY	3800	\$20.00	\$76,000.00
304.2	GRAVEL (F)	CY	1445	\$25.00	\$36,125.00
304.3	CRUSHED GRAVEL (F)	CY	1445	\$30.00	\$43,350.00
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	TON	2038	\$70.00	\$142,660.00
403.12	HOT BITUMINOUS PAVEMENT, HAND METHOD	T	63	\$125.00	\$7,875.00
608.24	4" CONCRETE SIDEWALK	SY	892	\$60.00	\$53,520.00
609.01	STRAIGHT GRANITE CURB (F)	LF	2389	\$20.00	\$47,780.00

Item Subtotal: \$579,426.00

Earthwork	(15%)	\$86,913.90
Erosion Control	(4%)	\$23,177.04
Drainage	(25%)	\$144,856.50
(% of roadway items only)		

Item Subtotal: \$834,373.44

Mobilization	(10%)	\$83,437.34
Signing & Striping	(5%)	\$41,718.67
Landscaping	(10%)	\$83,437.34
Traffic Control	(35%)	\$292,030.70
(Officers, flaggers & maint. of traffic)		

Item Subtotal: \$1,334,997.50

Contingencies (5%) \$66,749.88

Subtotal: \$1,401,747.38

*Unit Prices based on NHDOT 2006 Q1-Q4 Group "D"
 Prices and Recent Bids Prices from Similar Local
 Projects.

TOTAL: \$1,401,747.38**SAY: \$1,405,000**

Dated: 04/17/07

CITY OF ROCHESTER ~ DEPARTMENT OF PUBLIC WORKS

WASHINGTON STREET (US ROUTE 202) CORRIDOR RECONSTRUCTION
CONCEPTUAL COST ESTIMATE
(2007 DOLLARS)

US ROUTE 202 / HUSSEY HILL RD / CHESLEY HILL ROAD INTERSECTION

City of: ROCHESTER
Name of Road: ROUTE 202
Type: Full Depth Reconstruction

Estimate Prepared By: CLD Consulting Engineers
CLD Reference No. 02-0402
Dated: 17-Apr-07

ITEM NO	ITEM DESCRIPTION	UNIT	QTY	PRICE	AMOUNT
203.1	COMMON EXCAVATION	CY	6322	\$12.00	\$75,864.00
203.2	ROCK EXCAVATION (assume 5%)	CY	316	\$100.00	\$31,610.00
214	FINE GRADING	U	1	\$7,000.00	\$7,000.00
304.1	SAND (F)	CY	1405	\$20.00	\$28,100.00
304.2	GRAVEL (F)	CY	1405	\$25.00	\$35,125.00
304.3	CRUSHED GRAVEL (F)	CY	1405	\$30.00	\$42,150.00
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	TON	1982	\$70.00	\$138,740.00
Item Subtotal:					\$358,589.00

Earthwork (10%) \$35,858.90
Drainage (5%) \$17,929.45
(% of roadway items only)

Item Subtotal: \$412,377.35

Mobilization (5%) \$20,618.87
Signing & Striping (2%) \$8,247.55
Landscaping (3%) \$12,371.32
Traffic Control (10%) \$41,237.74
(Officers, flaggers & maint. of traffic)

Item Subtotal: \$494,852.82

Contingencies (10%) \$49,485.28

Subtotal: \$544,338.10

*Unit Prices based on NHDOT 2006 Q1-Q4 Group "D"
Prices and Recent Bids Prices from Similar Local
Projects.

TOTAL: \$544,338.10

SAY: \$545,000

Dated: 04/17/07

CITY OF ROCHESTER ~ DEPARTMENT OF PUBLIC WORKS

WASHINGTON STREET (US ROUTE 202) CORRIDOR RECONSTRUCTION
CONCEPTUAL COST ESTIMATE
(2007 DOLLARS)

US ROUTE 202 / ESTES ROAD INTERSECTION

City of: ROCHESTER
Name of Road: ROUTE 202
Type: Full Depth Reconstruction

Estimate Prepared By: CLD Consulting Engineers

CLD Reference No. 02-0402

Dated: 17-Apr-07

ITEM NO	ITEM DESCRIPTION	UNIT	QTY	PRICE	AMOUNT
203.1	COMMON EXCAVATION	CY	7653	\$12.00	\$91,836.00
203.2	ROCK EXCAVATION (assume 5%)	CY	383	\$100.00	\$38,265.00
214	FINE GRADING	U	1	\$9,000.00	\$9,000.00
304.1	SAND (F)	CY	1699	\$20.00	\$33,980.00
304.2	GRAVEL (F)	CY	1699	\$25.00	\$42,475.00
304.3	CRUSHED GRAVEL (F)	CY	1699	\$30.00	\$50,970.00
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	TON	2397	\$70.00	\$167,790.00
Item Subtotal:					\$434,316.00

Earthwork (10%) \$43,431.60
Drainage (5%) \$21,715.80
(% of roadway items only)

Item Subtotal: \$499,463.40

Mobilization (10%) \$49,946.34
Signing & Striping (2%) \$9,989.27
Landscaping (3%) \$14,983.90
Traffic Control (10%) \$49,946.34
(Officers, flaggers & maint. of traffic)

Item Subtotal: \$624,329.25

Contingencies (10%) \$62,432.93

Subtotal: \$686,762.18

*Unit Prices based on NHDOT 2006 Q1-Q4 Group "D"
Prices and Recent Bids Prices from Similar Local
Projects.

TOTAL: \$686,762.18

SAY: \$690,000

Dated: 04/17/07

CITY OF ROCHESTER ~ DEPARTMENT OF PUBLIC WORKS

WASHINGTON STREET (US ROUTE 202) CORRIDOR RECONSTRUCTION
CONCEPTUAL COST ESTIMATE
(2007 DOLLARS)

US ROUTE 202 / DRY HILL ROAD INTERSECTION

City of: ROCHESTER
Name of Road: ROUTE 202
Type: Full Depth Reconstruction

Estimate Prepared By: CLD Consulting Engineers

CLD Reference No. 02-0402

Dated: 17-Apr-07

ITEM NO	ITEM DESCRIPTION	UNIT	QTY	PRICE	AMOUNT
203.1	COMMON EXCAVATION	CY	4018	\$12.00	\$48,216.00
203.2	ROCK EXCAVATION (assume 5%)	CY	213	\$100.00	\$21,305.00
214	FINE GRADING	U	1	\$5,000.00	\$5,000.00
304.1	SAND (F)	CY	947	\$20.00	\$18,940.00
304.2	GRAVEL (F)	CY	947	\$25.00	\$23,675.00
304.3	CRUSHED GRAVEL (F)	CY	947	\$30.00	\$28,410.00
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD	TON	1336	\$70.00	\$93,520.00

Item Subtotal: \$239,066.00

Earthwork (10%) \$23,906.60

Drainage (5%) \$11,953.30

(% of roadway items only)

Item Subtotal: \$274,925.90

Mobilization (10%) \$27,492.59

Signing & Striping (2%) \$5,498.52

Landscaping (3%) \$8,247.78

Traffic Control (10%) \$27,492.59

(Officers, flaggers & maint. of traffic)

Item Subtotal: \$343,657.38

Contingencies (10%) \$34,365.74

Subtotal: \$378,023.11

*Unit Prices based on NHDOT 2006 Q1-Q4 Group "D"
Prices and Recent Bids Prices from Similar Local Projects.

TOTAL: \$378,023.11

SAY: \$380,000