

TRAFFIC AND PEDESTRIAN IMPROVEMENT EVALUATION

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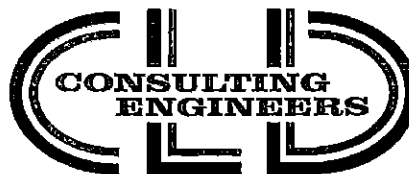
MILFORD DOWNTOWN AREA MILFORD, NEW HAMPSHIRE

March 2009

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*FINAL
REPORT*

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

I.	Purpose and Scope	1
II.	Review of Previous Studies	2
III.	Data Collection.....	3
	A. Traffic Volumes.....	3
	B. Crash Locations	4
	C. Pedestrians	5
	D. Parking Space Usage and Availability.....	6
IV.	Data Analysis Procedures	7
V.	Issue Identification.....	8
	A. Oval Area	9
	B. Nashua Street Area	12
	C. Southern South Street Area	13
	D. Triangle Area	16
	E. Westside Neighborhood Area	18
VI.	Development of Conceptual Improvements.....	18
	A. South Street TE Area.....	20
	B. Oval Area	20
	C. Nashua Street Area	24
	D. Southern South Street Area	26
	E. Triangle Area	27
	F. Westside Neighborhood Area	31
VII.	Project Funding and Timing	32
VIII.	Summary of Findings	34

LIST OF TABLES

Table 1	Downtown Area Crash Summary	5
Table 2	Downtown Area Crash Data with Department Head Priorities	9
Table 3	Oval Area No-Build Capacity Analysis.....	10
Table 4	Nashua Street Area No-Build Capacity Analysis.....	14
Table 5	Southern South Street Area No-Build Capacity Analysis.....	15
Table 6	Triangle Area No-Build Capacity Analysis.....	17
Table 7	Westside Neighborhood Area No-Build Capacity Analysis	19



TABLE OF CONTENTS (Cont.)

Table 8	Oval Area Build Capacity Analysis	23
Table 9	Nashua Street Area Build Capacity Analysis	25
Table 10	Triangle Area Build Capacity Analysis	28

LIST OF FIGURES

Figure 1	Study Area Map
Figure 2	Crash Location Map
Figure 3	Oval Area Traffic
Figure 4	Nashua Street Traffic
Figure 5	Southern South Street Traffic
Figure 6	Triangle Area Traffic
Figure 7	Westside Neighborhood Traffic
Figure 8	South Street Improvements
Figure 9	Conceptual Improvements Oval Area
Figure 10	Conceptual Alternatives Nashua St/Edgewood Plaza
Figure 11	Conceptual Alternatives Southern South Street
Figure 12	Conceptual Alternatives Triangle Area
Figure 13	Conceptual Improvements Westside Neighborhood Area

APPENDICES

- A. Automatic Traffic Recorder Counts
- B. Turning-Movement Counts
- C. Crash Data
- D. Oval Area No-Build Capacity Sheets
- E. Nashua Street No-Build Capacity Sheets
- F. Signal Warrants at Tonella Road
- G. Southern South Street No-Build Capacity Sheets
- H. Triangle Area No-Build Capacity Sheets
- I. Westside Neighborhood No-Build Capacity Sheets
- J. Oval Area Build Capacity Sheets
- K. Nashua Street Build Capacity Sheets
- L. Triangle Area Build Capacity Sheets



EXECUTIVE SUMMARY

The Town of Milford desires to improve their Downtown area by making traffic and pedestrian improvements along South Street, as well as in the whole Milford Downtown area. Figure 1 shows the study area. This report presents the results of efforts to identify operational and/or safety concerns, develop potential solutions to those concerns, and prepare conceptual improvement plans for the area.

CLD Consulting Engineers, Inc. (CLD) was retained by the Town of Milford to prepare a preliminary design for a South Street traffic and pedestrian improvement project. CLD was also to study and prepare conceptual designs for other traffic and pedestrian improvement projects around The Oval; Nashua Street from the Oval to Tonella Road; Southern South Street from Clinton Street to Prospect Street; the Triangle Area north of the Souhegan River (Mont Vernon Street, Amherst Street, and Grove Street); and the streets of the Westside Neighborhood (Cottage Street, Garden Street, Union Street and Lincoln Street).

The South Street project will be funded using a Transportation Enhancement (TE) grant from the New Hampshire Department of Transportation (NHDOT). The Downtown area projects will be funded through special funding provided through Section 1702 funds. Due to the constraints of the TE funding which limits the types of improvements that can be made under this program, some of the conceptual improvements that were developed as part of this Downtown area project have been incorporated into the South Street project.

Public participation is an essential part of the Context Sensitive Solutions (CSS) design process now incorporated into the NHDOT design process when evaluating possible transportation infrastructure changes. For this project, several meetings were held with Town officials, the Oval Area Improvement Team (OAIT, a committee designated by the Selectmen to oversee the project), local stakeholders, and the general public.

The following report presents the concepts recommended by CLD for the various focus areas. Also included are preliminary cost estimates for each conceptual design, along with figures displaying each concept.



The conceptual level costs for the improvements are outlined below.

<u>Project</u>	<u>Costs</u>
South Street (Southern South Street)	\$200,000.00
South Street (Bank to Clinton Street)	715,000.00
Railroad Crossing (South Street) *	430,000.00
Oval Area Improvements	760,000.00
Nashua Street (Boulevard)	850,000.00
Triangle Area (Roundabout)	1,500,000.00
Streets of the Westside Neighborhood	110,000.00
Total	\$4,565,000.00

Funds Available (including local match)

Transportation Enhancement (DOT Project 14837)	\$625,000.00
Section 1702 Grant	
DOT Project 14492	801,475.00
DOT Project 14492A (Appropriated)	2,003,687.75
DOT Project 14492A (Not Appropriated)	996,313.00
Railroad Crossing (DOT Project 14078)	533,632.48
Total	\$4,960,108.23

* Includes ineligible state funding work



I. PURPOSE AND SCOPE

The Town of Milford desires to improve their Downtown area by making traffic and pedestrian improvements along South Street, as well as in the whole Milford Downtown area. Figure 1 shows the study area. This report presents the results of efforts to identify operational and/or safety concerns, develop potential solutions to those concerns, and prepare conceptual improvement plans for the area.

CLD Consulting Engineers, Inc. (CLD) was retained by the Town of Milford to perform the following services:

- Prepare a preliminary design for a South Street traffic and pedestrian improvement project by developing base plans, collecting traffic data, identifying environmental constraints, and preparing conceptual plans through a public outreach process. The location of the project is shown on Figure 1.
- Prepare conceptual designs for other Downtown area traffic and pedestrian improvement projects. Five primary focus areas were identified, as shown on Figure 1:
 - The Oval;
 - Nashua Street between the Oval and Tonella Road;
 - Southern South Street from Clinton Street to Prospect Street;
 - The Triangle Area north of the Souhegan River (Mont Vernon Street, Amherst Street, Grove Street); and
 - The Westside Neighborhood, which includes Cottage Street, Garden Street, Union Street, and Lincoln Street.

At the start of this study, the South Street project was to be funded using a Transportation Enhancement (TE) grant from the New Hampshire Department of Transportation (NHDOT). The Downtown area projects were to be funded through special funding provided through Section 1702 earmarked funds. Due to the constraints of the TE funding which limits the types of improvements that can be made under this program, some of the conceptual improvements that were developed as part of this Downtown area project have been incorporated into the South Street project, as noted later in this report.

Public participation is an essential part of the Context Sensitive Solutions (CSS) design process now incorporated into the NHDOT design process when evaluating possible transportation infrastructure changes. For this project, several meetings were held with Town officials, the Oval Area Improvement Team (OAIT, a committee designated by the Selectmen to oversee the project), local stakeholders, and the general public.

This report summarizes the process and results of the various Downtown area improvement projects.



II. REVIEW OF PREVIOUS STUDIES

The following reports were reviewed to determine what improvements had previously been considered within the study area:

- Milford Oval Traffic Study, Dufresne-Henry, 1987. This 20-year-old report shows some information and improvements, some of which have been implemented.
- Improvements at South Street/Prospect Street/Marshall Street Intersection, Nashua Regional Planning Commission (NRPC), 1988. Shows possible improvements to this intersection.
- Intersection Improvements to Nashua Street/Clinton Street and Nashua Street/Powers Street, NRPC, 1993. This report gives recommendations for making Clinton Street two-way, which it is now.
- Draft Traffic Impact and Corridor Study, Proposed Elderly Living Facility, Steve Pernaw, 1999. Presents some recommendations to improve the area near Nashua Street/Tonella Road.
- Non-Residential Development: Community Character Guidelines, NRPC, 2000.
- Access Management Guidelines, NRPC, 2002.
- Route 101A Corridor Master Plan and Improvements Program, NRPC, 2002. Studies the corridor outside the study area for this project – study ends just west of NH Route 101 interchange.
- Traffic Signal Warrants Evaluation – Nashua Street, Steve Pernaw, 2004. These intersections are outside the study area.
- Transportation and Community and Systems Preservation Study, NRPC, 2006.
- Town of Milford – Corridor Design Guidelines, NRPC, 2007 (Draft).
- Milford – Nashua and Elm Streets Corridor Overlay District, Proposed Zoning Regulations Outline (Draft), Milford Department of Planning and Community Development, 9/26/07.
- The Nashua and Elm Streets Corridor Overlay District – A Citizens' Guide (Draft), Milford Department of Planning and Community Development, 2007.
- Evaluation of Highway Improvement Alternatives in Milford, New Hampshire, Hoyle Tanner Associates, 2002. This report summarizes many of the above reports, and presents recommendations for highway improvements both inside and outside the study area.
- Construction Documents and Specifications for Downtown Revitalization, The Cavendish Partnership, Inc. and Dufresne-Henry, 1995. These are the construction plans for the Oval area.
- Downtown Parking Study, NRPC, 2007.

III. DATA COLLECTION

A. Traffic Volumes

1. Automatic Traffic Recorders (ATR)

In order to determine hourly and daily traffic patterns throughout the area, CLD conducted ATR counts at the following locations in June, October, and November 2007. The data are included in Appendix A.

- Tonella Road at the Railroad Tracks
- Nashua Street west of Tonella Road
- Nashua Street east of Clinton Street
- Nashua Street east of School Street
- Amherst Street east of Summer Street
- Mont Vernon Street at the Souhegan River
- Mont Vernon Street west of Granite Street
- Elm Street east of Union Street
- Elm Street west of Cottage Street
- Union Street north of Lincoln Street
- Lincoln Street west of South Street
- South Street north of High Street
- Clinton Street south of Nashua Street

In addition, the NRPC conducted the following ATR counts in October 2007 as part of their routine traffic-counting program in Milford for the NHDOT.

- South Street south of Marshall Street
- Lincoln Street east of Oak Street
- Nashua Street east of South Street

2. Turning-Movement Counts (TMC)

In order to determine how traffic moves through intersections, manual TMCs were performed in October 2007 at the following intersections during typical weekday morning (7 to 9 AM) and evening (4 to 6 PM) commuter peak hours, as well as the Saturday midday peak hours (11 AM to 1 PM). The data are included in Appendix B.

- Nashua Street/Tonella Road
- Nashua Street/Clinton Street



- Nashua Street/Edgewood Shopping Center Main Entrance (PM and Saturday data only)
- Nashua Street/Edgewood Shopping Center Secondary Entrance (PM and Saturday data only)
- Tonella Road/Shopping Center Entrance (PM and Saturday data only)
- Nashua Street/School Street
- South Street/Elm Street/Nashua Street
- Middle Street at Oval
- West End of the Oval
- Union Street/Elm Street
- Mont Vernon Street/Amherst Street
- Mont Vernon Street/Grove Street
- Amherst Street/Grove Street
- Elm Street/Cottage Street
- Garden Street/Union Street
- Union Street/Lincoln Street
- South Street/Clinton Street
- South Street/Lincoln Street
- South Street/Prospect Street/Marshall Street

B. Crash Locations

Crash data for the period January 1, 2004 to October 24, 2007 was received from the Milford Police Department (MPD). The data are included in Appendix C. The data included all crashes reported to the MPD for the study area. Each of the individual crash records was examined, and 143 of those crashes had enough information that they could be attributed to particular intersections or roadway segments within the study area (see Figure 2). However, there was not enough information provided to determine crash types (angle, rear end, etc.). The major crash locations are shown in Table 1 below, with other crashes scattered throughout the study area.

**Table 1 - Downtown Area Crash Summary
(January 1, 2004 – October 24, 2007)**

<u>Location</u>	<u>Number of Crashes</u>
Oval Area (includes Elm/Union and Nashua/School)	46
Triangle Area	29
Nashua Street Area (Clinton Street to Tonella Road)	20
Nashua Street/Cumberland Farms	10
Southern South Street (Clinton Street to Prospect Street)	5
Westside Neighborhood (Elm Street to South Street)	2

C. Pedestrians

A vibrant Downtown area depends on encouraging safe pedestrian travel between various places of interest. In the Oval area, “Yield to Pedestrians” signs are conspicuously displayed to reinforce that this is a heavily utilized pedestrian area, even at the expense of improved vehicular traffic flow. However, it was realized that a quantitative analysis of the level of pedestrian activity would not yield any meaningful data. Instead, pedestrian movements in and around the Oval were observed and the following general patterns were noted as a qualitative assessment. These will be taken into account when considering conceptual improvements in the Oval area.

- Around the Oval, there are many conveniently placed crosswalks and pedestrians used them almost exclusively. The exception occurs on the west side of the Oval, where the only crosswalks are at the north and west islands, and pedestrians “jaywalked” between the Center Island and the west side.
- In general, drivers were well aware of the pedestrian crossings and yielded to pedestrians in the crossings.
- Pedestrians still used the existing crosswalk between the Middle Island and the North Island, in spite of the restricted ability of drivers to see the pedestrians because of obstructed views due to plantings on the Middle Island and parked vehicles on the east side of the island.
- “Jaywalkers” were observed on Mont Vernon Street at the Post Office, as well as on South Street near the bank, where no crosswalks exist but on-street parking is available across the street.
- During the afternoon school peak for the Jacques Memorial Elementary School on Elm Street, many parents park on Union Street, “jaywalk” across Union Street and walk through the park to reach the School on Elm Street, where there is a crossing guard. After picking up their children, they return in the same manner.

D. Parking Space Usage and Availability

1. Nashua Regional Planning Commission (NRPC) Study

The NRPC conducted a parking study of Downtown Milford on Thursday, January 11, 2007 and Saturday, March 24, 2007. The study area included street and other public parking spaces near the Oval. That study identified and mapped parking spaces in the Downtown area, and determined how the parking spaces are used during the course of the day.

The study found that on the days of the study, there were many spaces available at all times. During the peak time, nearly 70% of the spaces around the Oval were occupied. These counts were taken in the winter and early spring, so it is likely that parking spaces have more utilization during the warmer months. Casual observations by CLD in the fall of 2007 corroborate this assumption.

The NRPC parking study also noted that several spaces were occupied by the same vehicle for several hours of the day. Most were in parking spots not directly on the Oval, but a few were on the Oval. These long-term parkers on the Oval take up spaces that could be used by customers of the various businesses in the area. However, given the number of vacant spaces, these long-term parkers do not appear to cause a parking shortage at this time.

2. Comments from Public Outreach

CLD compiled the comments made about parking in the Downtown area from the minutes from several meetings, including those conducted for this study.

There is much concern about the parking availability for long-term parkers – those that work in the Downtown. Many employees park in the municipal lot on Putnam Street, which is designated for long-term parking. However, as documented in the Parking Study and casually observed by CLD, there are places where the same vehicle is parked for long periods in spaces around the Oval. Although there are signs on the outskirts of the business district stating “Business District 2 Hour Parking Limit,” the time limits for these spaces are not clearly posted on the Oval, and the limit does not appear to be strictly enforced. Indeed, the Parking Study showed that 30% or more of the spaces were vacant at any time, so there does not appear to be the need for enforcement of a time limit.

The perception may be that there are not enough parking spaces, but the data does not bear this out. However, the perception of the lack of parking may be that parking is not readily available adjacent to the business destination for that trip and, consequently, may be enough to keep potential customers from shopping in the Downtown Area. In any case, the owners and employees of businesses near the Oval should not park around the Oval, but rather in long-



term spaces, thus freeing up the Oval spaces for short-term parking for customers.

Two areas were identified during the public outreach as having potential for long-term parking. The area north of the bridge would be convenient for long-term parking, as would the area behind the insurance agency on Elm Street. It was mentioned that locations for long-term parking in these areas should be explored.

There apparently is also a need for parking for residents of the Downtown area who do not have dedicated parking spaces at their residences. Options for this parking category should be explored.

It was also mentioned that the "Bradler" lot off South Street is currently used for private parking. It appears to some that this lot, perhaps in conjunction with the adjacent bank lot, could be reconfigured to provide additional parking as well as loading and unloading activities for the nearby buildings while improving the aesthetics of the area and reducing the number of curb cuts onto South Street.

3. Observations

CLD observed traffic, parking, and pedestrian characteristics in the Oval area at various times during the course of the study. Although we did not take any parking counts, we observed that the parking spaces were utilized consistent with the NRPC Parking Study. This includes seeing the same vehicles parked in the same locations at various different times (long-term parkers) around the Oval. We observed a delivery truck using the loading zone next to the North Island to make deliveries to several businesses, including some on South Street. We also observed a delivery truck parked in a non-loading area on South Street at the intersection with Nashua Street. We understand that delivery trucks routinely park in the traveled way along the Oval. There is a need to provide loading areas for these trucks, preferably at the rear of the buildings. However, some buildings do not have a rear access or are not able to accommodate large delivery trucks.

We also observed and experienced parking and non-parking maneuvers. As may be expected, backing out of a diagonal parking spot is difficult, and traffic on the street does not seem to be inclined to stop to let vehicles out of these spots. During peak periods such maneuvers are especially difficult.

IV. DATA ANALYSIS PROCEDURES

The 2007 turning-movement counts and ATR counts collected for this study were summarized and evaluated to determine the peak one-hour traffic numbers at each location for the weekday AM, PM, and Saturday Midday peak hours for analysis using the standard techniques outlined in the *2000 Highway Capacity Manual*. Using standard



procedures accepted by the NHDOT for traffic analysis, the data were factored to a 2007 average weekday for the AM and PM peak hour data or to a 2007 average Saturday midday peak hour, as appropriate. The data are shown for the five focus area in Figures 3 to 7.

In order to estimate how traffic will increase over the next 10 years or so, data from the Nashua Regional Planning Commission (NRPC) 2002 and 2017 traffic models for the area were obtained for several locations in the Downtown Milford area. The average growth rates for these locations ranged between 0.01% and 0.77% per year, with an overall average of 0.29% per year. An average growth rate of 0.50% per year was used to estimate traffic volumes in the projection year of 2017.

Because of the atypical geometries and traffic control measures at some of the intersections, it was not possible to evaluate all of them using standard capacity analysis techniques. However, each area was evaluated, often with alternative techniques, in an attempt to quantify the traffic flow characteristics for both 2007 and 2017, with the results presented in the sections below for comparison purposes when alternative conceptual improvement options were evaluated. The *Synchro* software program was used to evaluate the traffic data. The output sheets are presented in the Appendices. Note that the sheets for 2017 use the 2007 data with a growth rate applied. The growth factor is not shown on the output sheets.

The typical unsignalized intersection traffic analysis procedures produce a level of service (LOS) that ranges from A to F, depending on the amount of delay that a vehicle encounters. LOS A indicates very little delay, and LOS F indicates very long delays and forced flow of the traffic. LOS E is considered to be the capacity for a particular movement.

V. ISSUE IDENTIFICATION

Based on the input received during the public outreach efforts, issues were identified and possible solutions were suggested for the various study areas encompassing this project. These have been organized by subarea and discussed below. Later sections will address conceptual solutions to these issues. As mentioned above, the South Street project was not included in this process because the issues for that project had previously been identified.

Several Town of Milford Department heads participated in an exercise of prioritizing locations in the Downtown area to find out where they think improvements are most needed. The results of that exercise and the corresponding number of crashes at each of the priority areas are shown below in Table 2. Other crashes were scattered throughout the study area. It can be seen in the table that the perception of the Department heads with respect to the need for improvements does not necessarily correspond with the number of crashes.

**Table 2 - Downtown Area Crash Data
With Department Head Priorities**

<u>Location</u>	<u>Dept. Head Score</u>	<u>Number of Crashes</u>
Oval Area (includes Elm/Union and Nashua/School)	51	46
Nashua Street Area (Clinton Street to Tonella Road)	29	20
Southern South Street (Clinton Street to Prospect Street)	15	5
Triangle Area	13	29
Westside Neighborhood (Elm Street to South Street)	3	2
South Street Parking	4	0
Nashua Street/Cumberland Farms	2	10

A. Oval Area

1. Traffic Operations

The Oval itself has several types of unsignalized intersections within it. The intersection of Nashua Street with South Street has four approaches. It is a two-way stop-controlled intersection, but because the stop signs are not on opposite approaches, it can not be analyzed as a typical two-way-stop intersection. The intersection at Middle Street also has four approaches, but in this case only one is stop-controlled and traditional methods could be used. The intersection at Elm Street is a three-way intersection, but because it does not have any legs under stop control, it also can not be analyzed traditionally.

The entire Oval can also be considered a roundabout (albeit, a large one) for analysis purposes. Characteristics of a roundabout include a center island which traffic moves around in a continuous flow, with vehicles merging with and diverging from the traffic in the roundabout at the various approaches.

Performing the analysis of the Oval as a roundabout yields a poor Level of Service (LOS) D for the AM peak hour and E for the PM and Saturday peak hours in 2007. For 2017, the analysis shows that the Oval would operate at LOS E during the AM and Saturday peak hours, and at LOS F during the PM peak hour. Table 3 contains a summary of the results, and the calculation sheets are included in Appendix D. However, during the peak hours, the actual delays are likely somewhat larger than the analysis shows. The extra delay is caused by the "friction" in the Oval, especially between vehicles interacting with pedestrians and parking maneuvers.

Table 3 – Oval Area No-Build Capacity Analysis

<u>Approach</u>	<u>Movement</u>	<u>No-Build</u>			
		<u>2007</u>		<u>2017</u>	
		<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>
Oval as a Roundabout					
	<i>AM Peak Hour</i>	27	D	36	E
	<i>PM Peak Hour</i>	44	E	59	F
	<i>Sat Peak Hour</i>	36	E	49	E
Elm St./Union St.					
	<i>AM Peak Hour</i>				
Elm St.	WB Left	9	A	9	A
Union St.	NB Left/Right	25	D	29	D
	<i>PM Peak Hour</i>				
Elm St.	WB Left	10	B	11	B
Union St.	NB Left/Right	58	F	85	F
	<i>Sat Peak Hour</i>				
Elm St.	WB Left	9	A	9	A
Union St.	NB Left/Right	18	C	19	C
Nashua St./School St.					
	<i>AM Peak Hour</i>				
Nashua St.	EB Left	1	A	1	A
School St.	SB Left/Right	18	C	19	C
	<i>PM Peak Hour</i>				
Nashua St.	EB Left	1	A	1	A
School St.	SB Left/Right	25	D	27	D
	<i>Sat Peak Hour</i>				
Nashua St.	EB Left	1	A	1	A
School St.	SB Left/Right	39	E	46	E

Delay – Average delay in seconds per vehicle

LOS – Level of Service

EB, WB, NB, SB – East-, West-, North- and Southbound respectively

Also in the Oval area, the intersection of Union Street at Elm Street is also not a traditional intersection in that none of the approaches is stop-controlled. However, the Union Street approach is effectively stop-controlled and, therefore, a capacity analysis was performed, with the results shown in Table 3. Even though the capacity analysis produces the results shown in the table, it should be noted that traffic from the Oval often backs up to and through this intersection. Therefore, the delays and capacities experienced at the intersection are apt to be worse than what is shown in the analyses.

Also in the Oval area, the intersection of Nashua Street with School Street is a traditional three-way intersection, with School Street being stop-controlled. The capacity analysis results are also shown in Table 3. Because of the very

low volumes making the left turn into School Street from Nashua Street, that movement operates at LOS A (very good). The School Street approach has LOS C to E, as it is stop-controlled and must deal with the heavy traffic on Nashua Street. Also, Nashua Street is often backed up from the Oval past School Street, exacerbating the difficult turns from School Street. In addition, vehicles parked along the north side of Nashua Street often block the view of traffic exiting from School Street.

2. Crashes

As shown earlier in Table 1, there were 46 crashes in the Oval area between January 1, 2004 and October 24, 2007. This is the largest number of crashes of those areas in this study. The Department heads rated this area as their highest priority for improvement.

3. Human-Vehicle Interaction in the Oval

Approximately 28,000 vehicles per day enter the Milford Oval, with about 1750, 2400, and 2200 entering the Oval during the AM, PM, and Saturday peak hours, respectively. Many of the trips pass through without stopping, but those people that do stop become parkers and pedestrians. They vie with the traffic for parking maneuvering space and walking space. The crosswalks provide a legal way to cross the street with minimal interference from vehicles.

Because of the shape of the Downtown area, there are many opportunities for the parking of cars and pedestrians to affect traffic flow. Conversely, the traffic flow affects the parking of cars and pedestrians. Those who wish to be downtown for its amenities deserve a safe environment, but the through vehicles have limited opportunities to avoid the area.

It has been seen that traffic in the Oval is generally observant of the laws requiring that pedestrians be given the right-of-way within the crosswalk. The Town has provided many crosswalks in the area, and they are properly used by the large majority of the pedestrians. However, given all the distractions in the area that a motorist must contend with, it is possible for the motorist and the pedestrian to come into conflict in the crosswalk area. The best way to avoid this conflict is to make the crosswalk very visible to the motorist. This could be done with paint, lights, or various other means.

Lighting the crosswalks was mentioned as one possibility for improving recognition of the crosswalks. Pedestrian-activated in-pavement lighting can be very effective at pointing out the crosswalk to motorists. However, they are expensive to install and especially difficult to maintain in New Hampshire's climate.

Raised or stamped crosswalks can be effective at delineating the crossing, and also may force speed reduction by the vehicles. Again, because of New Hampshire's weather, additional maintenance may be required.

"Bump-outs" are extensions of the sidewalk into the roadway. They narrow the roadway, usually by extending past parking spaces, giving the pedestrians a shorter distance to walk across the roadway. Again, winter maintenance is a problem, and the bump-out needs to be tapered to ease maintenance, especially for snow plowing. Milford already has a bump-out on the south side of the Oval. There are also several "painted bump-outs" that attempt to serve the same purpose, but these tend to be squeezed between parking spaces, making it difficult for motorists to see pedestrians. If bump-outs were to be implemented where the painted bump-outs are now, several parking spaces would be lost.

Diagonal parking is an effective way to create more parking spaces than parallel parking if there is sufficient pavement width. Drivers do not enter or leave their cars immediately adjacent to the traveled way, a safety plus. However, as mentioned above, diagonal parking spaces can be difficult to back out of, especially if there is heavy traffic on the street. Most of the parking in Downtown Milford is already diagonal parking.

Off-street parking is the best place for long-term parkers. The parkers-turned-pedestrians can exit their cars safely and then can use sidewalks and crosswalks to get to their destination. Of course, this leaves the on-street parking available for short-term parkers (shoppers). The NRPC Parking Study found that several Downtown parking spots were occupied by long-term parkers. Moving these vehicles to off-street parking would increase the available parking supply for the short-term parkers.

The lack of loading zones at the rear of Milford's Downtown businesses means that delivery trucks must park on the street. There is one official loading zone on the Oval adjacent to the North Island. However, trucks frequently stop in the travelled way at other locations for loading and unloading, blocking lanes and forcing traffic to move around them. Visibility for pedestrians at crosswalks can also be affected.

All of these considerations were evaluated in order to develop the conceptual improvements in the Oval area that will be described later.

B. Nashua Street Area

1. Traffic Operations

There are four major unsignalized intersections along Nashua Street in this part of the study area - Tonella Road; Clinton Street; and the two entrances/exits at the Edgewood Plaza. All can be analyzed for capacity using traditional techniques. There are also several driveways to business that have minor traffic flows and were not analyzed. Note that the secondary entrance



to the Plaza is marked to be an exit only, but was observed being used as both an entrance and an exit. Table 4 presents the results of the capacity analysis, with the calculation sheets in Appendix E. The entrances to the Plaza were not analyzed for the AM traffic.

Because of the heavy traffic flows on Nashua Street, vehicles from the side roads and driveways have a difficult time making the left turn onto Nashua Street, regardless of demand, resulting in low levels of service for those movements, especially at the Plaza drives.

The traffic volumes at the intersection of Nashua Street/Tonella Road were also evaluated to determine if traffic signals are warranted at the intersection, based on criteria in the *Manual on Uniform Traffic Control Devices*. Traffic volumes must meet certain volume criteria over eight hours on both the major street and the side street to meet the warrant. In this case, the hourly traffic volumes on Tonella Road are not high enough during even one hour and, therefore, signals are not warranted. See Appendix F for the calculation sheets.

2. Crashes

This area of Nashua Street has had a large number of crashes. As shown in Table 1, there were 20 crashes in the area between January 1, 2004 and October 24, 2007. This is the third largest number of crashes of those areas in this study. The Department heads rated this area as their second highest priority for improvement.

C. **Southern South Street Area**

1. Traffic Operations

The intersections along South Street in this area from Clinton Street to Prospect Street can be analyzed as typical intersections, although it is recognized that the South Street/Prospect Street intersection is wide open, allowing traffic to flow rather haphazardly between South Street, Prospect Street, Marshall Street, and the parking spaces in front of the area businesses. The results of the capacity analysis are shown in Table 5, and the calculation sheets are in Appendix G.

Traffic on South Street and the side streets in this area is relatively light and, therefore, traffic turning onto South Street from the various side streets and driveways experience a LOS C or better during the peak hours.

Table 4 – Nashua Street Area No-Build Capacity Analysis

<u>Approach</u>	<u>Movement</u>	<u>No-Build</u>			
		<u>2007</u>	<u>2017</u>	<u>2007</u>	<u>2017</u>
		<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>
Nashua St./Clinton St.					
<i>AM Peak Hour</i>					
Nashua St.	WB Left	9	A	10	A
Clinton St.	NB Left/Right	17	C	19	C
<i>PM Peak Hour</i>					
Nashua St.	WB Left	9	A	10	A
Clinton St.	NB Left/Right	15	C	16	C
<i>Saturday Peak Hour</i>					
Nashua St.	WB Left	9	A	10	A
Clinton St.	NB Left/Right	35	D	44	E
Nashua St./Plaza Main Entrance					
<i>AM Peak Hour not counted</i>					
<i>PM Peak Hour</i>					
Nashua St.	WB Left/Thru	1	A	1	A
Main Ent.	NB Left	70	F	90	F
Main Ent.	NB Right	14	B	14	B
<i>Saturday Peak Hour</i>					
Nashua St.	WB Left/Thru	1	A	2	A
Main Ent.	NB Left	61	F	76	F
Main Ent.	NB Right	14	B	15	B
Nashua St./Plaza Secondary Entrance					
<i>AM Peak Hour not counted</i>					
<i>PM Peak Hour</i>					
Nashua St.	WB Left/Thru	1	A	1	A
Sec. Ent.	NB Left	52	F	63	F
Sec. Ent.	NB Right	13	B	14	B
<i>Saturday Peak Hour</i>					
Nashua St.	WB Left/Thru	1	A	1	A
Sec. Ent.	NB Left	40	E	46	E
Sec. Ent.	NB Right	14	B	15	B
Nashua St./Tonella Rd.					
<i>AM Peak Hour</i>					
Nashua St.	WB Left/Thru	1	A	1	A
Tonella Rd.	NB Left/Right	21	C	22	C
<i>PM Peak Hour</i>					
Nashua St.	WB Left/Thru	1	A	1	A
Tonella Rd.	NB Left/Right	38	E	46	E
<i>Saturday Peak Hour</i>					
Nashua St.	WB Left/Thru	2	A	2	A
Tonella Rd.	NB Left/Right	33	D	39	E

Delay – Average delay in seconds per vehicle

LOS – Level of Service

EB, WB, NB, SB – East-, West-, North- and Southbound respectively



Table 5 – Southern South Street Area No-Build Capacity Analysis

<u>Approach</u>	<u>Movement</u>	<u>No-Build</u>			
		<u>2007</u>	<u>2007</u>	<u>2017</u>	<u>2017</u>
		<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>
South St./Clinton St.					
<i>AM Peak Hour</i>					
South St.	SB Left/Thru	1	A	1	A
Clinton St.	WB Left/Right	13	B	13	B
<i>PM Peak Hour</i>					
South St.	SB Left/Thru	1	A	1	A
Clinton St.	WB Left/Right	20	C	22	C
<i>Saturday Peak Hour</i>					
South St.	SB Left/Thru	1	A	1	A
Clinton St.	WB Left/Right	18	C	19	C
South St./Lincoln St.					
<i>AM Peak Hour</i>					
South St.	NB Left/Thru	1	A	1	A
Lincoln St.	EB Left/Right	15	B	15	C
<i>PM Peak Hour</i>					
South St.	NB Left/Thru	2	A	2	A
Lincoln St.	EB Left/Right	17	C	18	C
<i>Saturday Peak Hour</i>					
South St.	NB Left/Thru	1	A	1	A
Lincoln St.	EB Left/Right	18	C	19	C
South St./Prospect St.					
<i>AM Peak Hour</i>					
South St.	SB Left/Thru	1	A	1	A
Clinton St.	WB Left/Right	11	B	11	B
<i>PM Peak Hour</i>					
South St.	SB Left/Thru	2	A	2	A
Clinton St.	WB Left/Right	12	B	12	B
<i>Saturday Peak Hour</i>					
South St.	SB Left/Thru	2	A	2	A
Clinton St.	WB Left/Right	11	B	11	B
Prospect St./Marshall St.					
<i>AM Peak Hour</i>					
Prospect St.	WB Left/Thru	0	--	0	--
Marshall St.	NB Left/Right	9	A	9	A
<i>PM Peak Hour</i>					
Prospect St.	WB Left/Thru	0	--	0	--
Marshall St.	NB Left/Right	9	A	9	A
<i>Saturday Peak Hour</i>					
Prospect St.	WB Left/Thru	0	--	0	--
Marshall St.	NB Left/Right	9	A	9	A

Delay – Average delay in seconds per vehicle
 EB, WB, NB, SB – East-, West-, North- and Southbound respectively

LOS – Level of Service
 -- - No data

2. Crashes

As shown in Table 1, there were five crashes in this area between January 1, 2004 and October 24, 2007. Even with this relatively low number of crashes, the Department heads rated this area third in importance for improvement.

D. Triangle Area

1. Traffic Operations

The three intersections in this area cannot be analyzed using traditional methods since the stop-controlled approaches are not opposite each other. Instead, they are analyzed by making changes to the intersection configuration in the software to more closely resemble the existing intersection operations. However, the results of the analyses are useful for comparing the various options.

- a. Amherst Street at Mont Vernon Street has stop signs on two of the three legs. Northbound traffic leaving the Oval is free-flowing so that traffic does not back up into the Oval due to a stop condition at this intersection. The westbound Amherst Street traffic, almost all of which turns left, is stop-controlled, as is the southbound Mont Vernon Street traffic. For analysis purposes, both of the Mont Vernon approaches are treated as not being stop-controlled.
- b. Grove Street at Mont Vernon Street has stop signs on three of the four legs, with only the northbound traffic on Route 13 flowing freely through the intersection. For analysis purposes, the Rite-Aid driveway was assumed to be combined with the Grove Street approach as one leg of a theoretical three-way intersection, and the southbound Mont Vernon Street stop control was removed.
- c. Grove Street at Amherst Street has stop signs on two of the four legs, but the stop signs are on Grove Street and Summer Street, and those two legs of the intersection are not opposite each other. For analysis purposes, the traffic for Summer Street and Grove Street were combined to make a three-way intersection.

The 2007 and 2017 capacity analyses for the intersections in this area as currently configured are summarized in Table 6, and the calculation sheets are in Appendix H.

The turning movements from both Grove Street and Amherst Street onto Mont Vernon Street experience LOS F in the PM peak, as well as at other times. Traffic turning from Grove Street onto Amherst Street has a good LOS C, but because the intersection is at an acute angle, drivers must “crane” their necks to see the eastbound traffic on Amherst Street.

Table 6 – Triangle Area No-Build Capacity Analysis

<u>Approach</u>	<u>Movement</u>	<u>No-Build</u>			
		<u>2007</u>		<u>2017</u>	
		<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>
Mont Vernon St./Amherst St.					
<i>AM Peak Hour</i>					
Amherst St.	WB Left/Right	53	F	73	F
Mt Vernon St.	SB Left/Thru	1	A	1	A
<i>PM Peak Hour</i>					
Amherst St.	WB Left/Right	336	F	438	F
Mt Vernon St.	SB Left/Thru	1	A	1	A
<i>Saturday Peak Hour</i>					
Amherst St.	WB Left/Right	99	F	143	F
Mt Vernon St.	SB Left/Thru	1	A	1	A
Mont Vernon St./Grove St.					
<i>AM Peak Hour</i>					
Grove St. & Pharmacy	WB Left/Right	16	C	17	C
Mt Vernon St.	SB Left/Thru	4	A	4	A
<i>PM Peak Hour</i>					
Grove St. & Pharmacy	WB Left/Right	75	F	110	F
Mt Vernon St.	SB Left/Thru	3	A	3	A
<i>Saturday Peak Hour</i>					
Grove St. & Pharmacy	WB Left/Right	22	C	25	D
Mt Vernon St.	SB Left/Thru	3	A	3	A
Amherst St./Grove St.					
<i>AM Peak Hour</i>					
Grove & Summer St.	EB Left/Right	18	C	19	C
Amherst St.	NB Left/Thru	1	A	1	A
<i>PM Peak Hour</i>					
Grove & Summer St.	EB Left/Right	18	C	19	C
Amherst St.	NB Left/Thru	1	A	1	A
<i>Saturday Peak Hour</i>					
Grove & Summer St.	EB Left/Right	16	C	17	C
Amherst St.	NB Left/Thru	1	A	1	A

Delay – Average delay in seconds per vehicle

LOS – Level of Service

EB, WB, NB, SB – East-, West-, North- and Southbound respectively

2. Crashes

As shown in Table 1, there were 29 crashes in this area between January 1, 2004 and October 24, 2007. The Department heads rated this area fourth in importance for improvement.

E. Westside Neighborhood Area

1. Traffic Movement

By using Cottage, Garden, Union, and Lincoln Streets it is possible for motorists travelling between Elm Street and South Street to avoid the traffic congestion in the Oval. There are several stops and turns involved in using this route, and it is not suitable for large trucks, but it is used by residents who know the area well.

Table 7 shows the results of the capacity analyses for the intersections along these streets. Except for traffic entering Elm Street from Cottage Street, the intersections operate at LOS C or better. See the calculation sheets in Appendix I.

2. Crashes

As shown in Table 1, there were two crashes on these streets between January 1, 2004 and October 24, 2007. The Department heads rated this area fifth in importance for improvement.

VI. DEVELOPMENT OF CONCEPTUAL IMPROVEMENTS

The recommendations or suggestions from the previous studies listed in Section II above for improvements to the Downtown area were reviewed to determine if they are still applicable today. Based on that review, issues and suggestions brought out in the Department head meetings and public participation process, and in the observations and analyses performed by CLD, alternative concepts were developed for each area that could help improve vehicular flow and overall pedestrian safety in the entire Downtown study area. The various concepts developed using these processes are described in the sections below.

The concepts were next presented to Department heads and the Oval Area Improvement Team (OAIT). Through several discussions about concepts, a consensus was reached as to which concepts should go forward. These concepts were then presented to the Board of Selectmen. The recommended improvements are outlined for each area below.

Table 7 –Westside Neighborhood Area No-Build Capacity Analysis

<u>Approach</u>	<u>Movement</u>	<u>No-Build</u>			
		<u>2007</u>	<u>LOS</u>	<u>2017</u>	<u>LOS</u>
		<u>Delay</u>			
Elm St./Cottage St.					
<i>AM Peak Hour</i>					
Elm St.	WB Left/Thru	1	A	1	A
Cottage St.	NB Left/Right	23	C	25	D
<i>PM Peak Hour</i>					
Elm St.	WB Left/Thru	1	A	1	A
Cottage St.	NB Left/Right	32	D	37	E
<i>Saturday Peak Hour</i>					
Elm St.	WB Left/Thru	1	A	1	A
Cottage St.	NB Left/Right	26	D	29	D
Union St./Garden St.					
<i>AM Peak Hour</i>					
Union St.	NB Left/Thru	2	A	2	A
Garden St.	EB Left/Right	11	B	11	B
<i>PM Peak Hour</i>					
Union St.	NB Left/Thru	3	A	3	A
Garden St.	EB Left/Right	12	B	12	B
<i>Saturday Peak Hour</i>					
Union St.	NB Left/Thru	3	A	3	A
Garden St.	EB Left/Right	10	B	10	B
Union St./Lincoln St.					
<i>AM Peak Hour</i>					
Union St.	SB Left/Thru	3	A	3	A
Lincoln St.	WB Left/Right	15	B	15	C
<i>PM Peak Hour</i>					
Union St.	SB Left/Thru	2	A	2	A
Lincoln St.	WB Left/Right	12	B	13	B
<i>Saturday Peak Hour</i>					
Union St.	SB Left/Thru	5	A	5	A
Lincoln St.	WB Left/Right	14	B	15	B
South St./Lincoln St. – See Table 5					

Delay – Average delay in seconds per vehicle

LOS – Level of Service

EB, WB, NB, SB – East-, West-, North- and Southbound respectively

A. South Street TE Area (Figure 8)

The South Street project has been treated separately from the rest of the downtown Milford area. The scope of this project had been essentially determined by previous studies as a sidewalk improvement along South Street from approximately 200 feet south of Nashua Street to Clinton Street, a total distance of 700 feet. This project has been designated as a Transportation Enhancement (TE) funded improvement and was to have design plans completed for the sidewalk ready for construction first.

During the conceptual design and public participation processes concerning this project, it was determined that the desired undergrounding of the utilities along South Street could not be paid for using the TE funds. The project was expanded to include the entire length of South Street from Nashua Street to just south of the railroad tracks, a total distance of 1,000 feet. The project would include the conceptual improvements to South Street as proposed for the Oval Area (described below) as well as a railroad improvement project that was already under design by others. Sidewalk improvements along the entire length would be eligible for the TE funds, whereas other improvements not eligible for these funds could be paid for from either earmark or railroad funds, as appropriate. In addition, a possible future extension of the sidewalk along South Street to Prospect Street could also be funded with the TE funds, but is not included in the current design.

Figure 8 shows the overall improvement plan for this project on South Street, for which design plans are being prepared for Summer 2009 construction.

B. Oval Area (Figure 9)

1. Conceptual Improvements

The following improvements to the Oval shown in Figure 9 were proposed in order to provide increased safety for pedestrians and to make truck movements easier, while still facilitating other vehicular flow:

a. North Side

- Remove posts and adjust curb on south side of North Island so trucks won't shy away.
- Eliminate crosswalk between North Island and Center Island (or move it eastward to improve visibility).
- Remove the northernmost parking space on the east side of the Center Island to provide appropriate sight distance for pedestrians using the North Island to Center Island crosswalk.
- Provide a cobblestone mountable truck apron on the inside of the turn to accommodate turning radius of large trucks.
- Relocate the fire hydrant on the east side of the Center Island.



- Extend North Island to the east.
- b. North End of Oval
 - Move crosswalk at the Bridge/Diner to the intersection with Bridge Street
 - Extend sidewalk on east and west sides to create bump-outs
 - Shift two east side parking spaces to the north of the proposed crosswalk
- c. West Side
 - Add crosswalk and bump-out between the Center Island and the west side of Union Square
- d. Southwest Corner
 - Move island to southwest to provide a larger turning radius for trucks
 - Provide a cobblestone-mountable truck apron on the inside of the turn to accommodate turning radius of large trucks
 - Add bump-out on south side crosswalk
- e. East Side
 - Extend Plaza in front of the Town Hall as a potential gathering area, still providing 24 feet of roadway pavement width
 - Make Middle Street one-way from Putnam Street to the Oval
 - Place diagonal parking on Middle Street next to Town Hall
 - Place diagonal parking on Middle Street where right-angle parking now exists
 - Place bump-out at northeast corner of Middle Street/Putnam Street
 - Add bump-out at Center Island for crosswalk to Town Hall Plaza
 - Place a loading zone on the south side of Nashua Street at South Street
- f. Union Street
 - Add splitter island to define left- and right-turn lanes exiting Union Street
 - Realign crosswalk
 - Place Stop signs on Union Street approach
- g. School Street
 - Remove one parking space west of the intersection to improve visibility.

- Remove overhead banners from the Oval to reduce visual “noise”. The banners could be placed at the gateways described in the following sections.

h. South Street/Nashua Street

- Shift the northbound lane on South Street eastward to be next to the curb, with a painted or textured area placed between the northbound and southbound lanes to provide the extra width needed by large trucks making the turn. Remove two parking spaces on South Street to accommodate the lane shift. No additional ROW would be required.

An alternate to the above South Street/Nashua Street concept is to widen South Street to the west to improve the eastbound to southbound turn at the South Street intersection to allow trucks to make the turn without encroaching on the existing northbound lane of South Street. That lane would remain as currently configured, and the sidewalk on the west side of South Street would be moved to accommodate the trucks. Because the intersection would be widened, an island would be constructed in South Street to provide refuge for pedestrians using the crosswalk. Two parking spaces on the Oval would be removed to accommodate the widening. This option would require acquisition of additional right-of-way (ROW), including the building, on the southwest corner of the intersection. This option is also shown as an inset in Figure 9.

2. Recommended Improvements

Following discussions with the Department heads and OAIT team, the concepts listed above were chosen for implementation and final design, except as follows:

- Do not install the western crosswalk (from the Center Island to the west side of Union Square)
- Implement the first South Street/Nashua Street intersection improvement. This improvement has been added to the South Street TE project.

Capacity changes due to the proposed improvements are shown in Table 8, with the backup calculation sheets in Appendix J. The only improvement that would be expected to make a capacity improvement is the installation of the formal left-turn lane at Elm Street/Union Street. The proposed configuration with the separate left-turn lane has somewhat lower LOS for the left turn and somewhat better LOS for the right turn, compared to the current combined left and right turns. All the other improvements to the Oval area will better define and improve traffic and pedestrian flow and safety, but generally will not result in additional traffic capacity.

Table 8 - Oval Area Build Capacity Analysis

		<u>No-Build</u>				<u>Build</u>			
		<u>2007</u>		<u>2017</u>		<u>2007</u>		<u>2017</u>	
<u>Approach</u>	<u>Movement</u>	<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>
Oval as a Roundabout									
	<i>AM Peak Hour</i>	27	D	36	E	<div>No Change</div>			
	<i>PM Peak Hour</i>	44	E	59	F				
	<i>Saturday Peak Hour</i>	36	E	49	E				
Elm St./Union St.									
	<i>AM Peak Hour</i>								
Elm St.	WB Left	9	A	9	A	9	A	10	A
Union St.	NB Left/Right	25	D	29	D	--	--	--	--
Union St.	NB Left	--	--	--	--	39	E	44	E
Union St.	NB Right	--	--	--	--	17	C	18	C
	<i>PM Peak Hour</i>								
Elm St	WB Left	10	B	11	B	11	B	11	B
Union St.	NB Left/Right	58	F	85	F	--	--	--	--
Union St.	NB Left	--	--	--	--	87	F	112	F
Union St.	NB Right	--	--	--	--	19	C	20	C
	<i>Saturday Peak Hour</i>								
Elm St.	WB Left	9	A	9	A	9	A	9	A
Union St.	NB Left/Right	18	C	19	C	--	--	--	--
Union St.	NB Left	--	--	--	--	32	D	35	D
Union St.	NB Right	--	--	--	--	15	B	15	C
Nashua St./School St.									
	<i>AM Peak Hour</i>								
Nashua St.	EB Left	1	A	1	A	<div>No Change</div>			
School St.	SB Left/Right	18	C	19	C				
	<i>PM Peak Hour</i>								
Nashua St.	EB Left	1	A	1	A				
School St.	SB Left/Right	25	D	27	D				
	<i>Saturday Peak Hour</i>								
Nashua St.	EB Left	1	A	1	A				
School St.	SB Left/Right	39	E	46	E				

Delay – Average delay in seconds per vehicle

LOS – Level of Service

EB, WB, NB, SB – East-, West-, North- and Southbound respectively

-- - Not Applicable

Proposed improvements to the Oval area will reduce the number of parking spaces. Those improvements include the six proposed bump-outs at crosswalks, with each one removing at least one space. These actions would help pedestrian and traffic flow, but remove parking supply. Some spaces would be added on Middle Street by the proposed improvements to the Oval, but they would not compensate for all the removed spaces. More long-term



parking spaces beyond the Oval area and removing long-term parkers from the Oval would help to offset this loss of parking on the Oval.

The total estimated cost of the Oval area improvements is \$760,000, including the South Street/Nashua Street intersection improvements. These recommended South Street/Nashua Street intersection improvements have been incorporated into the South Street sidewalk improvements design to provide a complete South Street design, but will not use TE funding.

C. Nashua Street Area (Figure 10)

1. Conceptual Improvements

Three options were considered for Nashua Street between Clinton Street and Tonella Road, shown in Figure 10.

- a. The Center Turn-Lane Option would provide a center left-turn lane to service the driveways along both sides the road. The two entrances to the Plaza would be consolidated. Widening of Nashua Street would be required, and some parking in the Plaza would be reconfigured. Additional right-of-way would have to be acquired, likely from the Plaza side.
- b. The Center Boulevard Option would provide landscaped islands in the center of the road to provide a "gateway" for the Town. Limited left-turn access to driveways along the north side of the road would be provided. The two entrances to the Plaza would be consolidated. Widening of Nashua Street would be required, and some parking in the Plaza would be reconfigured. Some right-of-way would have to be acquired.
- c. The Center Turn Lane with Landscaping Option would provide landscaping along the Plaza side of Nashua Street plus the center turn lane to service adjacent driveways. The Plaza entrances would be consolidated and moved to the west end of the Plaza. Parking in the Plaza would be reconfigured. Some right-of-way would have to be acquired.

For all options outlined above, the intersections of Nashua Street with Clinton Street and Tonella Road will remain essentially as they are now, with striping and curbing improvements to improve traffic flow and facilitate proper turns. It should be noted that consolidating the two driveways to the Plaza means that all the Plaza traffic would use one driveway instead of two driveways (discounting the Tonella Road driveway, which would remain). As seen in the Build capacity analysis in Table 9 (with the calculation sheets in Appendix K), this means that the delay for exiting left turns would be even longer than it is with the current two driveways used for exits. Eliminating one driveway improves the travel on Nashua Street but degrades the left turns out of the Plaza. Because of the potential delays, some of those left turns will likely use the driveway on Tonella Road, adding traffic there and, therefore, lowering the LOS of that intersection.

Table 9 - Nashua Street Area Build Capacity Analysis

Approach	Movement	No-Build				Build				
		2007		2017		2007		2017		
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	
Nashua St./Tonella Rd.										
<i>AM Peak Hour</i>										
Nashua St.	WB Left/Thru	1	A	1	A	No Change				
Tonella Rd.	NB Left/Right	21	C	22	C					
<i>PM Peak Hour</i>										
Nashua St.	WB Left/Thru	1	A	1	A					
Tonella Rd.	NB Left/Right	38	E	46	E					
<i>Saturday Peak Hour</i>										
Nashua St.	WB Left/Thru	2	A	2	A					
Tonella Rd.	NB Left/Right	33	D	39	E					
Nashua St./Clinton St.										
<i>AM Peak Hour</i>										
Nashua St.	WB Left	9	A	10	A	No Change				
Clinton St.	NB Left/Right	17	C	19	C					
<i>PM Peak Hour</i>										
Nashua St.	WB Left	9	A	10	A					
Clinton St.	NB Left/Right	15	C	16	C					
<i>Saturday Peak Hour</i>										
Nashua St.	WB Left	9	A	10	A					
Clinton St.	NB Left/Right	35	D	44	E					
Nashua St./Plaza Main Entrance										
<i>AM Peak Hour not counted</i>										
<i>PM Peak Hour</i>										
Nashua St.	WB Left/Thru	1	A	1	A	1	A	1	A	
Main Ent.	NB Left	70	F	90	F	139	F	200	F	
Main Ent.	NB Right	14	B	14	B	15	B	15	C	
<i>Saturday Peak Hour</i>										
Nashua St.	WB Left/Thru	1	A	2	A	2	A	2	A	
Main Ent.	NB Left	61	F	76	F	112	F	160	F	
Main Ent.	NB Right	14	B	15	B	16	C	17	C	
Nashua St./Plaza Secondary Entrance										
<i>AM Peak Hour not counted</i>										
<i>PM Peak Hour</i>										
Nashua St.	WB Left/Thru	1	A	1	A	--	--	--	--	
Sec. Ent.	NB Left	52	F	63	F	--	--	--	--	
Sec. Ent.	NB Right	13	B	14	B	--	--	--	--	
<i>Saturday Peak Hour</i>										
Nashua St.	WB Left/Thru	1	A	1	A	--	--	--	--	
Sec. Ent.	NB Left	40	E	46	E	--	--	--	--	
Sec. Ent.	NB Right	14	B	15	B	--	--	--	--	

Delay – Average delay in seconds per vehicle

EB, WB, NB, SB – East-, West-, North- and Southbound respectively

LOS – Level of Service

-- - Not Applicable



It should also be noted that either the Center Boulevard Option or the Center Turn Lane with Landscaping Option would likely require that shared and cross-access agreements between properties on the north side of Nashua Street be implemented.

For each option, no left-turn lane on Nashua Street is provided for traffic turning onto Tonella Road (as is currently the case). This effectively creates some gaps in westbound traffic as those left-turners wait to make the turn and block the through traffic, consequently creating more gaps further downstream for the turns out of the Plaza.

2. Recommended Improvements

After discussion with OAIT and Department heads, the Center Boulevard option is recommended for further design. As mentioned above, right-of-way must be acquired and access/egress issues to the parcels on the north side of Nashua Street resolved. Since this will be one of the gateways into the Town, the banner posts could be located here.

The intersections at Clinton Street and Tonella Road would remain essentially as they are, with just some striping and curb changes.

The estimated cost of the recommended improvements is \$850,000.

D. **Southern South Street Area (Figure 11)**

1. Conceptual Improvements

Two options were considered for this area, as seen in Figure 11. The differences in the options are in the treatment of the open area at South Street and Prospect Street near United Auto Body. The remaining improvements are sidewalk and parking improvements between Lincoln Street and Clinton Street. The turning radii at the Lincoln Street and Clinton Street intersections would be improved to accommodate busses.

- a. The Traditional Option allows for on-street parking just north of Prospect Street. Prospect Street is brought out to South Street using curbs and sidewalks, and the parking area in the southeast corner of the intersection is delineated.
- b. The Gateway Option provides a small landscaped island and off-street parking in the current open area, but otherwise is similar to the Traditional Option.

For each of the options, sidewalk and curb improvements are suggested along South Street and at the intersections with Lincoln Street and Clinton Street. Curb radii should accommodate school busses without encroachment into opposing lanes, which may necessitate the shifting of existing sidewalks. Driveway access to adjacent businesses will be maintained.



Because the options considered for this area are essentially intersection delineation only, there will be no changes in the capacity analyses of the intersections. The No-Build capacity information shown in Table 5 is the same as the Build-capacity information.

2. Recommended Improvements

Based on discussions with the OAIT and department heads, the Gateway Option was selected for implementation. Access to the auto body business on the east side of the street is provided, as well as parking and sidewalks. Since this will be one of the gateways into the Town, banner posts could be located on the island.

The rehabilitation of the railroad crossing has been planned under a separate design project. In order to do all construction on this corridor at one time, that project will also be integrated into the South Street Sidewalks Improvement. However, it should be noted that there is possible soil contamination in the vicinity of the tracks that must be considered in the design of the project. It should also be noted that the drainage system in the area needs improvement, requiring coordination with the Public Works Department.

The estimated cost of the Southern South Street intersection improvements excluding the railroad crossing, drainage and utility work, is \$200,000.

E. Triangle Area (Figure 12)

1. Conceptual Improvements

Four options were considered for this area. Table 10 shows the results of the capacity analysis, with the calculation sheets in Appendix L. The options are shown in Figure 12.

- a. The Roundabout Option would place a roundabout at the intersection of Mont Vernon Street and Amherst Street, providing a gateway into the Town on the north side of the Souhegan River.
 - This option would require the acquisition and demolition of the existing gas station property at the intersection. The portion of that property not required for the roundabout could be used for parking or various other redevelopment uses.
 - An optional treatment for Grove Street is a partial closure between Mont Vernon Street and Highland Avenue, forcing the Grove Street traffic to use the roundabout and simplifying traffic movements at the Mont Vernon Street/Grove Street/Pharmacy driveway and eliminating the stop control on Mont Vernon Street eastbound. Doing so simplifies the intersection and may reduce the number of crashes at this intersection.
 - On-street parking spaces on Mont Vernon Street would be removed.

Table 10 - Triangle Area Build Capacity Analysis

Approach	Movement	No-Build			Roundabout Option			One-Way Pair Option			Grove Street One-Way Option								
		2007			2017			2007			2017			2007			2017		
		Delay	LOS	2017	Delay	LOS	2017	Delay	LOS	2017	Delay	LOS	2017	Delay	LOS	2017	Delay	LOS	2017
Mont Vernon St./Amherst St.																			
<i>AM Peak Hour</i>																			
Amherst St.	WB Left/Right	53	F	73	F	--	--	--	--	--	--	--	400	F	524	F	--	--	--
Mt Vernon St.	SB Left/Thru	1	A	1	A	--	--	--	--	9	A	9	--	--	--	--	--	--	--
	SB Left	--	--	--	--	--	--	--	--	--	--	--	9	A	9	A	--	--	A
	Roundabout	--	--	--	--	B	14	B	--	--	--	--	--	--	--	--	--	--	--
<i>PM Peak Hour</i>																			
Amherst St.	WB Left/Right	336	F	438	F	--	--	--	--	--	--	--	730	F	933	F	--	--	--
Mt Vernon St.	SB Left/Thru	1	A	1	A	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	SB Left	--	--	--	--	--	--	--	--	11	B	11	--	B	11	B	--	--	B
	Roundabout	--	--	--	--	B	15	B	--	--	--	--	--	--	--	--	--	--	--
<i>Saturday Peak Hour</i>																			
Amherst St.	WB Left/Right	99	F	143	F	--	--	--	--	--	--	--	335	F	447	F	--	--	--
Mt Vernon St.	SB Left/Thru	1	A	1	A	--	--	--	--	10	A	10	--	--	--	--	--	--	--
	SB Left	--	--	--	--	--	--	--	--	--	--	--	10	A	10	A	--	--	A
	Roundabout	--	--	--	--	B	15	C	--	--	--	--	--	--	--	--	--	--	--
Mont Vernon St./Grove St.																			
<i>AM Peak Hour</i>																			
Grove St. & Pharmacy	WB Left/Right	16	C	17	C	B	13	B	--	--	--	--	--	--	--	--	--	--	--
	WB Left	--	--	--	--	--	--	--	164	F	16	C	--	C	17	C	--	--	C
	WB Right	--	--	--	--	--	--	--	10	B	10	B	--	B	10	B	--	--	B
Mt Vernon St.	SB Left/Thru	4	A	4	A	A	1	A	--	--	--	--	--	--	--	--	--	--	--
<i>PM Peak Hour</i>																			
Grove St. & Pharmacy	WB Left/Right	75	F	110	F	D	29	D	--	--	--	--	--	--	--	--	--	--	--
	WB Left	--	--	--	--	--	--	--	295	F	21	C	--	C	23	C	--	--	C
	WB Right	--	--	--	--	--	--	--	20	C	20	C	--	C	22	C	--	--	C
Mt Vernon St.	SB Left/Thru	3	A	3	A	A	1	A	--	--	--	--	--	--	--	--	--	--	--
<i>Saturday Peak Hour</i>																			
Grove St. & Pharmacy	WB Left/Right	22	C	25	D	C	17	C	--	--	--	--	--	--	--	--	--	--	--
	WB Left	--	--	--	--	--	--	--	129	F	16	C	--	C	17	C	--	--	C
	WB Right	--	--	--	--	--	--	--	12	B	12	B	--	B	13	B	--	--	B
Mt Vernon St.	SB Left/Thru	3	A	3	A	A	1	A	--	--	--	--	--	--	--	--	--	--	--

Continued on next page.

Continued on next page



Table 10 - Triangle Area Build Capacity Analysis (Continued)

Approach	Movement	No-Build			Roundabout Option			One-Way Pair Option			Grove Street One-Way Option			
		2007		2017	2007		2017	2007		2017	2007		2017	
		Delay	LOS	Delay	Delay	LOS	Delay	Delay	LOS	Delay	Delay	LOS	Delay	LOS
Anherst St./Grove St.														
<i>AM Peak Hour</i>														
Grove & Summer St.	EB Left/Right	18	C	19	13	B	14	12	B	13	14	B	15	B
Anherst St.	NB Left/Thru	1	A	1	1	A	1	1	A	1	1	A	1	A
<i>PM Peak Hour</i>														
Grove & Summer St.	EB Left/Right	18	C	19	17	C	18	14	B	15	13	B	14	B
Anherst St.	NB Left/Thru	1	A	1	1	A	1	3	A	3	1	A	1	A
<i>Sat Peak Hour</i>														
Grove & Summer St.	EB Left/Right	16	C	17	14	B	14	14	B	14	12	B	13	B
Anherst St.	NB Left/Thru	1	A	1	1	A	1	3	A	3	1	A	1	A

Delay - Average delay in seconds per vehicle

LOS - Level of Service

EB, WB, NB, SB - East, West, North- and Southbound respectively

-- - Not Applicable



- The intersection of Amherst Street/Grove Street/Summer Street would be re-striped to accommodate the changes in traffic patterns.
 - As shown in Table 10, the proposed roundabout is expected to operate at LOS B or C. Because the only minor traffic flows would be entering Amherst Street at Summer Street and entering Mont Vernon Street at the Pharmacy, those intersections would operate at LOS B or better.
- b. The One-Way Pair Option would make Amherst Street one-way eastbound and Grove Street one-way westbound.
- Grove Street at Mont Vernon Street would have separate left and through lanes.
 - Parallel parking could be added along Amherst Street, as only one lane would be needed for traffic movement.
 - A southbound left turn lane on Mont Vernon Street at Amherst Street would be required, and the on-street parking spaces near the Post Office on Mont Vernon Street would be eliminated.
 - The Pharmacy drive would be relocated along Grove Street to simplify the intersection and possibly reduce the number of crashes at the intersection.
 - The intersection of Amherst Street/Grove Street/Summer Street would be re-striped to accommodate the changes in traffic patterns.
 - As shown in Table 10, traffic making the left turn from Grove Street to Mont Vernon Street would experience LOS F delays, but other movements in the area would operate at LOS C or better.
- c. The Grove Street One-Way Option would make Grove Street one-way westbound and move the Grove Street eastbound traffic to Amherst Street.
- A southbound left-turn lane on Mont Vernon Street at Amherst Street would be required, and the on-street parking spaces on Mont Vernon Street near the Post Office would be eliminated.
 - On-street parking could be added to Grove Street because only one lane is needed for traffic flow.
 - The intersection of Amherst Street/Grove Street/Summer Street would be re-striped to accommodate the changes in traffic patterns.
 - As shown in Table 10, traffic making the left turn from Amherst Street to Mont Vernon Street would be at LOS F, but other movements in the area would be at LOS C or better.
- d. The Striping and Curbing Improvements Option would leave traffic patterns as they are now, but would better define the intersections and roadways with curbs and striping. The Pharmacy drive would be

relocated along Grove Street. The capacity analysis is the same as for the No-Build Option shown in Table 6.

2. Recommended Improvements

The Roundabout Option is recommended for implementation as the only real capacity improvements to these intersections without consideration of a traffic signal. With an expected LOS B, traffic would flow smoothly through the area without backing up into the Oval. Closing Grove Street would help to make the traffic flow better by making the intersection of the Pharmacy with Mont Vernon Street a "standard" intersection, thus possibly reducing the number of crashes there. In addition, with the smoothing of the traffic it is expected that pollutants from vehicles would then decrease. The cost of the improvements is estimated to be \$1,500,000.

The improvement of this area has been given the lowest priority by OAIT. Therefore, as an interim "low-cost" improvement, the Striping and Curbing Improvements Option could be implemented. Many of the improvements for this option are within the capabilities of Town Public Works forces to implement at relatively low cost.

F. Westside Neighborhood Area (Figure 13)

1. Conceptual Improvements

Several improvements to the streets in this area are proposed to improve traffic flow (Figure 13).

- a. Signs should be placed at each intersection to identify the location of upcoming intersecting streets along the bypass route.
- b. At the Elm Street/Cottage Street intersection, formalize the eastbound right-turn lane, and make curb and sidewalk improvements. Extend the sidewalk on the east side of Cottage Street from Elm Street to Garden Street (it is our understanding that right-of-way has been reserved along the bank property for such a purpose). The "shadow" of the eastbound right-turn lane on Elm Street could become a bump-out for the existing crosswalk, as well as room for a gateway treatment entering Town from the west.
- c. At the Cottage Street/Garden Street intersection, place curbs and striping to delineate the intersection. Curb radii should accommodate school busses without encroachment into opposing lanes, and as a result the sidewalk on the northeast corner may need to be shifted. To help avoid confusion as to who has right-of-way at the intersection, the intersection should be all-way stop-controlled.

- d. At the Union Street/Garden Street intersection, replace curbs. Curb radii should accommodate school busses without encroachment into opposing lanes, which may necessitate the shifting of sidewalks and acquisition of easements or right-of-way. A utility pole may be affected.
- e. At the Union Street/Lincoln Street intersection, replace curbs. Curb radii should accommodate school busses without encroachment into opposing lanes, which may necessitate the shifting of sidewalks and acquisition of easements or right-of-way.
- f. The intersection improvements at South Street/Lincoln Street are included in the design of the Southern South Street project.

The improvements will better delineate the travel lanes and make travel along this corridor somewhat easier. No capacity changes will result from these improvements, so the capacity analysis shown in Table 7 for the No-Build case applies.

2. Recommended Improvements

All the improvements listed above are recommended for eventual implementation. As noted, the improvements at the South Street/Lincoln Street intersection will be completed as part of other projects. The remaining improvements may be implementable as part of other upcoming projects. The railroad crossing of Union Street has been scheduled for upgrading for several years and potentially could include the proposed alterations to the Union Street/Garden Street and Union Street/Lincoln Street intersections. Water and sewer work is anticipated along Cottage Street, along with remediation of the Fletcher site, and should be coordinated with the proposed alterations at the two Cottage Street intersections. Alternatively, many of these projects are relatively small and may be within the capabilities of Town Public Works forces to implement. The estimated cost of all the improvements is \$110,000.

VII. PROJECT FUNDING AND TIMING

The limitations of eligible project activities under the two Federal funding programs, particularly the TE program, will govern how and where the available funds will be spent. TE projects are typically for sidewalks and streetscape improvements and not for road widening or overlays, while the Section 1702 funds allow more flexibility in application.

Initial information showed that the Town has \$625,000 in TE funds available for the South Street TE project (\$500,000 federal, \$125,000 local match), and \$3,500,000 (\$2,800,000 federal, \$700,000 local match) will eventually be available under the Section 1702 grant. All local matching funds have been approved and are available for design and construction activities. The Town has also petitioned the NHDOT for advancement of these funds to 2009 to coordinate the South Street project with a railroad crossing



project just south of Clinton Street, now scheduled for 2009. Updated funding information, as provided by the NHDOT, is provided below the project cost estimates.

The conceptual level costs for the improvements are outlined below.

<u>Project</u>	<u>Costs</u>
South Street (Southern South Street)	\$200,000.00
South Street (Bank to Clinton Street)	715,000.00
Railroad Crossing (South Street) *	430,000.00
Oval Area Improvements	760,000.00
Nashua Street (Boulevard)	850,000.00
Triangle Area (Roundabout)	1,500,000.00
Streets of the Westside Neighborhood	110,000.00
Total	\$4,565,000.00

Funds Available (including local match)

Transportation Enhancement (DOT Project 14837)	\$625,000.00
Section 1702 Grant	
DOT Project 14492	801,475.00
DOT Project 14492A (Appropriated)	2,003,687.75
DOT Project 14492A (Not Appropriated)	996,313.00
Railroad Crossing (DOT Project 14078)	533,632.48
Total	\$4,960,108.23

* Includes ineligible state funding work

The South Street project is the immediate priority from the Town's perspective. Relocation of utility poles away from the curbline (in some places underground) and better definition of sidewalks and driveways will provide a wider and safer travel way for both vehicles and pedestrians in this narrow corridor.

The proposed schedule would move the project forward to have Part B – Final Design completed so that the project would be advertised in Spring 2009 for construction in 2009. It is also the intent to coordinate other pieces along South Street (the Nashua Street intersection and the railroad project) as part of one project to avoid disruptions along the corridor over several construction seasons.

The OAIT also established design priorities for the Section 1702 projects, taking into consideration, among other things, impact with the public, likely property acquisitions, and costs. All projects would go through final design, but be implemented over time as other work occurs. Based on their discussions, the prioritized list of projects for design and/or construction is:

1. Westside Neighborhood streets (Cottage, Garden, Union, Lincoln Streets), design only. Construction to be completed as Fletcher site remediation and other DPW projects in the area are completed in the next 3-5 years.



2. Oval area improvements final design and construction. To be done in conjunction with the Westside Neighborhood street improvements.
3. South/Prospect/Lincoln Streets and South/Nashua Street Intersection – final design and construction to be coordinated with the South Street TE and railroad crossing projects (2009).
4. Nashua/Clinton/Edgewood Plaza/Tonella subarea – Center Boulevard option final design and construction.
5. Roundabout Option at Amherst/Grove/Mont Vernon Streets – final design and construction for a long-term solution.

VIII. SUMMARY OF FINDINGS

CLD Consulting Engineers, Inc. was retained by the Town of Milford to perform the following services:

- Prepare a preliminary design for a South Street traffic and pedestrian improvement project by developing base plans, collecting traffic data, identifying environmental constraints, and preparing conceptual plans through a public outreach process.
- Prepare conceptual designs for other Downtown area traffic and pedestrian improvement projects. Five primary focus areas were identified:
 - The Oval;
 - Nashua Street between the Oval and Tonella Road;
 - Southern South Street from Clinton Street to Prospect Street;
 - The triangle area north of the Souhegan River (Mont Vernon Street, Amherst Street, Grove Street); and
 - Streets of the Westside Neighborhood, including Cottage Street, Garden Street, Union Street, and Lincoln Street.

Through an extensive public participation process, conceptual improvements were endorsed by the OAIT:

- **Oval Area**
 - North Side
 - Remove posts and adjust curb on South side of North Island so trucks won't shy away
 - Eliminate crosswalk between North Island and Center Island (or move it eastward to improve visibility)
 - Remove the northernmost parking space on the east side of the Center Island to provide appropriate sight distance for pedestrians using the North Island to Center Island crosswalk



- Provide a cobblestone-mountable truck apron on the inside of the turn to accommodate turning radius of large trucks
- Relocate the fire hydrant on the east side of the center island
- Extend North Island to the east
- North End of Oval
 - Move crosswalk at the Bridge/Diner to the intersection with Bridge Street
 - Extend sidewalk on east and west sides to create bump-outs
 - Shift two east side parking spaces to the north of the proposed crosswalk
- Southwest Corner
 - Move island to southwest to provide a larger turning radius for trucks
 - Provide a cobblestone-mountable truck apron on the inside of the turn to accommodate turning radius of large trucks
 - Add bump-out on south side crosswalk
- East Side
 - Extend plaza in front of the Town Hall as a potential gathering area, still providing 24 feet of roadway pavement width
 - Make Middle Street one-way from Putnam Street to the Oval
 - Place diagonal parking on Middle Street next to Town Hall
 - Place diagonal parking on Middle Street where right angle parking now exists
 - Place bump-out at northeast corner of Middle Street/Putnam Street
 - Add bump-out at Center Island for crosswalk to Town Hall Plaza
 - Place a loading zone on the south side of Nashua Street at South Street
- Union Street
 - Add splitter island to define left- and right-turn lanes exiting Union Street onto Elm Street
 - Realign crosswalk
 - Place Stop Signs on Union Street approach
- School Street
 - Remove one parking space west of the intersection to improve visibility
 - Remove overhead banners from the Oval to reduce visual “noise.” The banners could be placed at the gateways described in the following sections.
 - South Street/Nashua Street -- Shift the northbound lane on South Street eastward to be next to the curb, with a painted or textured area placed between the northbound and southbound lanes to provide the extra width needed by

large trucks making the turn. Remove two parking spaces on South Street to accommodate the lane shift. No additional right-of-way would be required.

- **Nashua Street Area**

- The Center Boulevard Option would provide landscaped islands in the center of the road to provide a "gateway" for the Town. Limited left-turn access to driveways along the north side of the road would be provided. The two entrances to the Plaza would be consolidated. Widening of Nashua Street would be required, and some parking in the Plaza would be reconfigured. Some right-of-way would have to be acquired.

- **Southern South Street Area**

- A Gateway Option provides a small landscaped island and off-street parking in the current open area, sidewalk, and curb improvements are suggested along South Street and at the intersections with Lincoln Street and Clinton Street. Curb radii should accommodate school busses without encroachment into opposing lanes, which may necessitate the shifting of existing sidewalks. Driveway access to adjacent businesses will be maintained.

- **Triangle Area**

- The Roundabout Option is recommended for implementation as the only real capacity improvements to these intersections without consideration of a traffic signal. With an expected level of service (LOS) B, traffic would flow smoothly through the area without backing up into the Oval. Closing Grove Street would help to make the traffic flow better by making the intersection of the pharmacy with Mont Vernon Street a "standard" intersection, thus possibly reducing the number of crashes there.

- **Westside Neighborhood Area**

Several improvements to these streets are proposed to improve traffic flow.

- Signs should be placed at each intersection to identify the location of upcoming intersecting streets.
- At the Elm Street/Cottage Street intersection, formalize the eastbound right-turn lane, and make curb and sidewalk improvements. Extend the sidewalk on the east side of Cottage Street from Elm Street to Garden Street (it is our understanding that right-of-way has been reserved along the bank property for such a purpose). The "shadow" of the eastbound right-turn lane on Elm Street could become a bump-out for the existing crosswalk as well as room for a gateway treatment entering Town from the west.
- At the Cottage Street/Garden Street intersection, place curbs and striping to delineate the intersection. Curb radii should accommodate school busses without encroachment into opposing lanes, and as a result the sidewalk on the northeast corner may need to be shifted. To help avoid confusion as to who has right-of-way at the intersection, the intersection should be all-way stop-controlled.

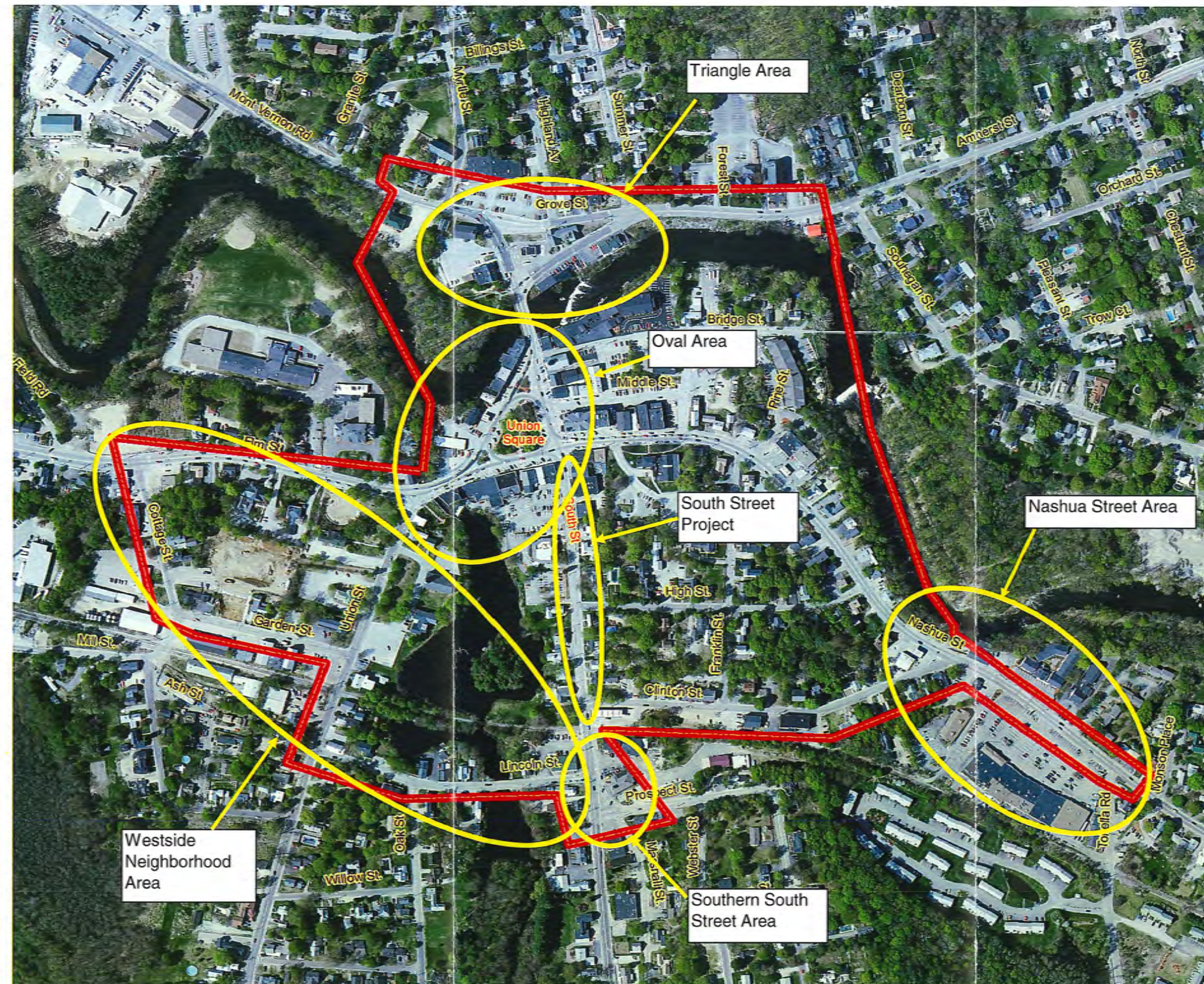
- At the Union Street/Garden Street intersection, replace curbs. Curb radii should accommodate school busses without encroachment into opposing lanes, which may necessitate the shifting of sidewalks and acquisition of easements or right-of-way. A utility pole may be affected.
- At the Union Street/Lincoln Street intersection, replace curbs. Curb radii should accommodate school busses without encroachment into opposing lanes, which may necessitate the shifting of sidewalks and acquisition of easements or right-of-way.
- The intersection improvements at South Street/Lincoln Street are included in the design of the South Street project.

The improvements will better delineate the travel lanes and make travel along these streets somewhat easier.

The South Street sidewalk project will be funded using a Transportation Enhancement (TE) grant from the New Hampshire Department of Transportation (NHDOT). The Downtown area projects will be funded through special funding provided through Section 1702 earmarked funds. Due to the constraints of the TE funding which limits the types of improvements that can be made under this program, some of the conceptual improvements that were developed as part of this Downtown area project have been incorporated into the South Street project.

LIST OF FIGURES

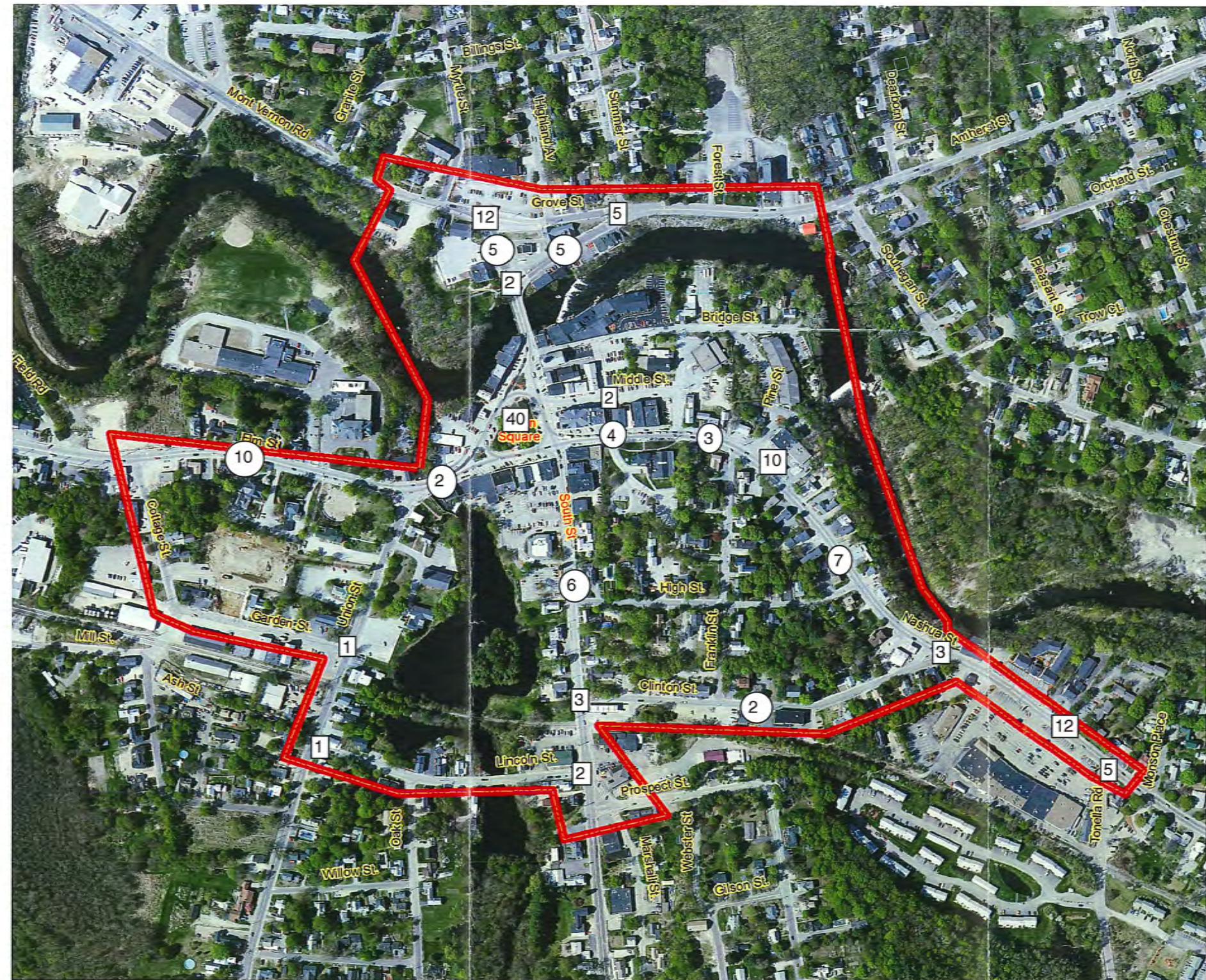
- Figure 1 Study Area Map
- Figure 2 Crash Location Map
- Figure 3 Oval Area Traffic
- Figure 4 Nashua Street Traffic
- Figure 5 Southern South Street Traffic
- Figure 6 Triangle Traffic
- Figure 7 Westside Neighborhood Traffic
- Figure 8 South Street Improvements
- Figure 9 Conceptual Improvements Oval Area
- Figure 10 Conceptual Alternatives Nashua Street/Edgewood Plaza
- Figure 11 Conceptual Alternatives Southern South Street
- Figure 12 Conceptual Alternatives Triangle Area
- Figure 13 Conceptual Improvements Westside Neighborhood Area



CLD Ref. 07-0171

——— Study Area Boundary

Figure 1
Milford Downtown Study Area



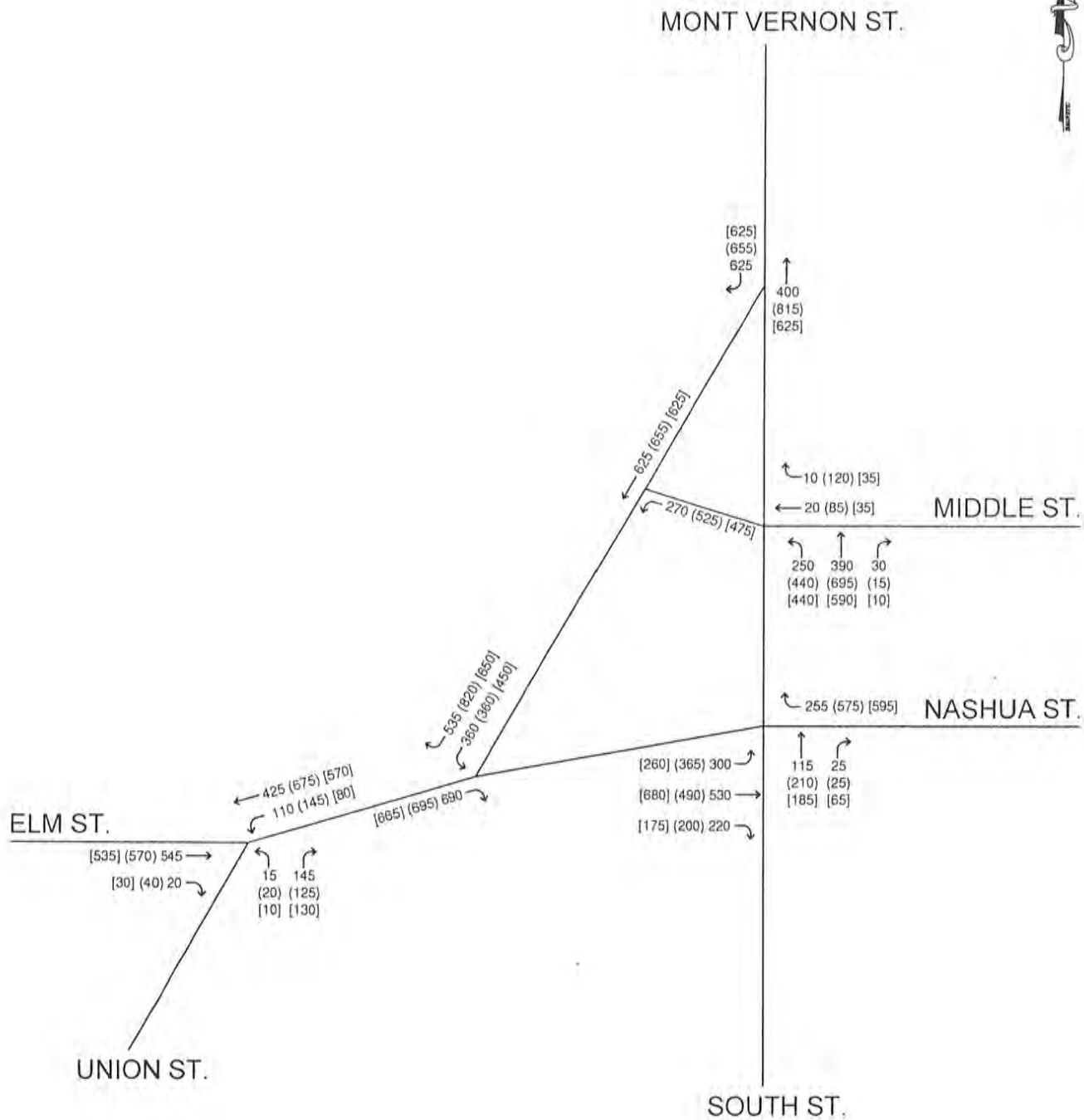
CLD Ref. 07-0171

Legend

- XX Number of Intersection Crashes
- XX Number of Roadway Crashes
- Study Area Boundary

Source - Milford Police Department. Data for 1/1/2004 through 10/24/2007

Figure 2
Study Area Crash Locations



NOT TO SCALE

FIGURE 3

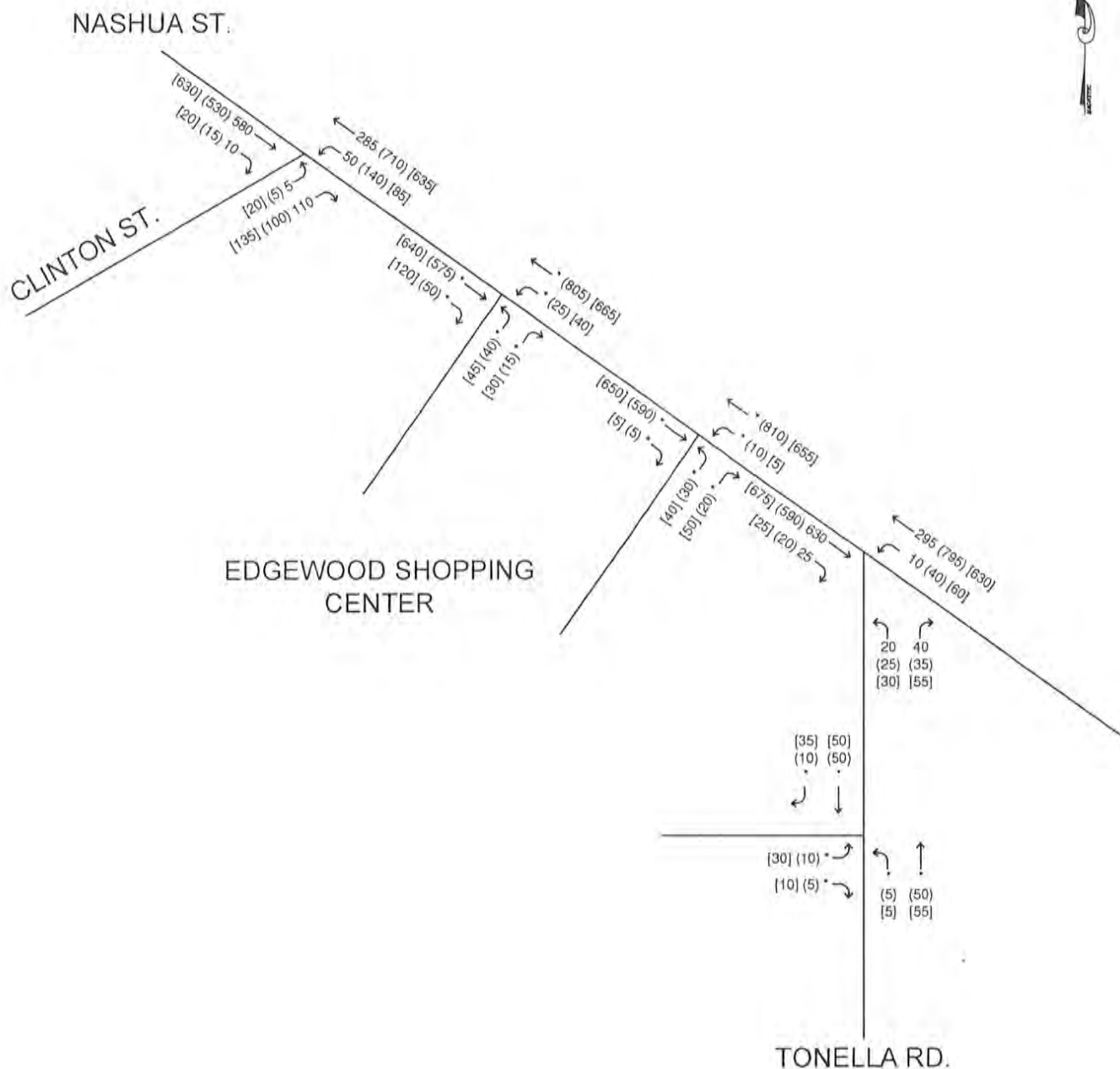
MILFORD

OVAL AREA TRAFFIC
CLD REFERENCE # 07-0171

XX - 2007 A.M. PEAK HOUR
(XX) - 2007 P.M. PEAK HOUR
[XX] - 2007 SATURDAY PEAK HOUR




540 Commercial Street - Manchester, NH 03101
(603) 668-8223 - Fax: (603) 668-8902
cld@cldeengineers.com - www.cldeengineers.com
Maine - New Hampshire - Vermont



NOT TO SCALE

XX - 2007 A.M. PEAK HOUR
 (XX) - 2007 P.M. PEAK HOUR
 [XX] - 2007 SATURDAY PEAK HOUR
 * - NO AM TRAFFIC COUNT

FIGURE 4
MILFORD
NASHUA ST. TRAFFIC
CLD REFERENCE # 07-0170



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SOUTH ST.



[205] [25]
(170) (15)
175 10
↓

↶ 10 (30) [15]
↷ 55 (165) [130]

CLINTON ST.

↑ 155 105
(250) (85)
[285] [120]

[95] [240]
(130) (205)
40 200
↓

LINCOLN ST.

↶ [135] (60) 85
↷ [40] (30) 45
↑ 30 170
(45) (295)
[20] [270]

[235] [45]
(190) (35)
215 25
↓

↶ 35 (35) [40]
↷ 10 (10) [5]

← 35 (35) [25]
↶ 0 (0) [0]

PROSPECT ST.

↑ 170 10
(305) (10)
[250] [10]
↶ [30] (40) 25
↷ [15] (5) 10
↶ 10 (10) (0)
[20] [5]

SOUTH ST.

MARSHALL ST.

NOT TO SCALE

FIGURE 5

MILFORD

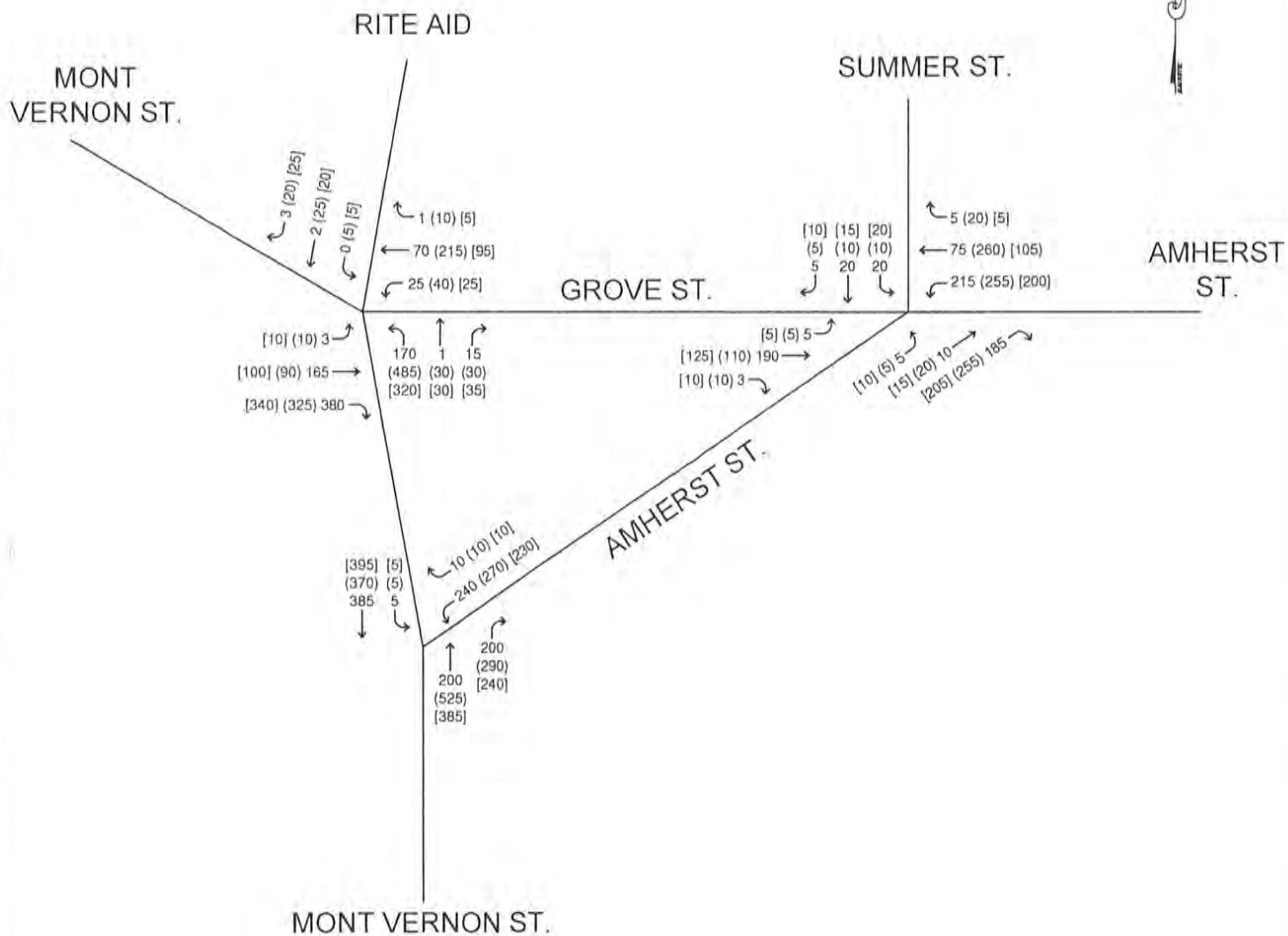
SOUTHERN SOUTH ST. TRAFFIC

CLD REFERENCE # 07-0171

XX - 2007 A.M. PEAK HOUR
(XX) - 2007 P.M. PEAK HOUR
[XX] - 2007 SATURDAY PEAK HOUR



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NOT TO SCALE

FIGURE 6

MILFORD

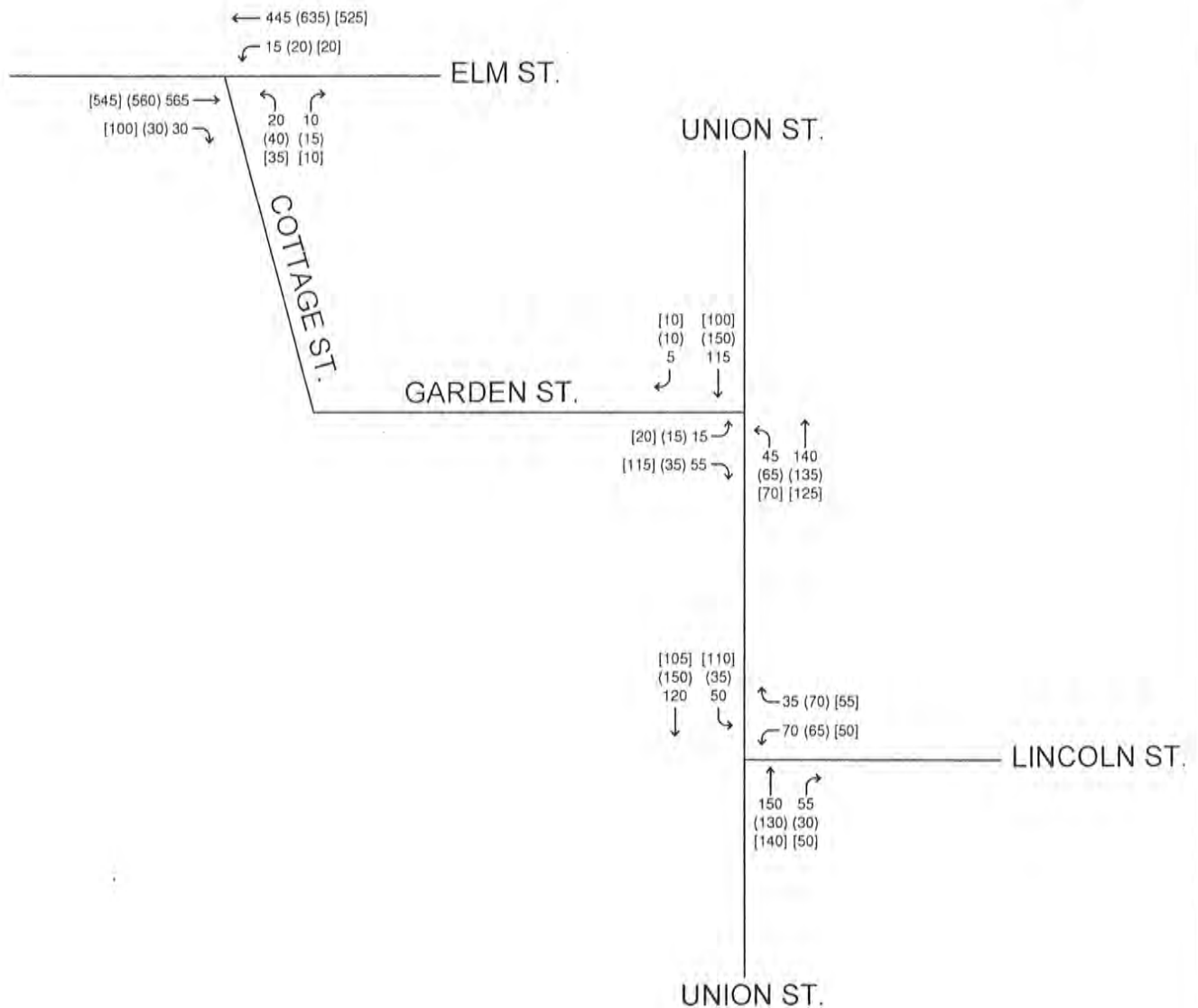
TRIANGLE AREA TRAFFIC

CLD REFERENCE # 07-0171

XX - 2007 A.M. PEAK HOUR
 (XX) - 2007 P.M. PEAK HOUR
 [XX] - 2007 SATURDAY PEAK HOUR



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 Maine - New Hampshire - Vermont



NOT TO SCALE

FIGURE 7

MILFORD

WESTSIDE NEIGHBORHOOD TRAFFIC
CLD REFERENCE # 07-0171

XX - 2007 A.M. PEAK HOUR
(XX) - 2007 P.M. PEAK HOUR
[XX] - 2007 SATURDAY PEAK HOUR



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Maine • New Hampshire • Vermont

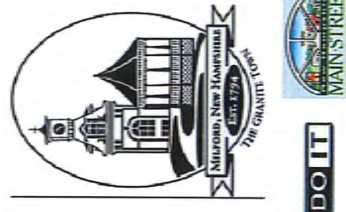


FIGURE 9
CONCEPTUAL IMPROVEMENTS
OVAL AREA



CENTER TURN LANE



CENTER BOULEVARD



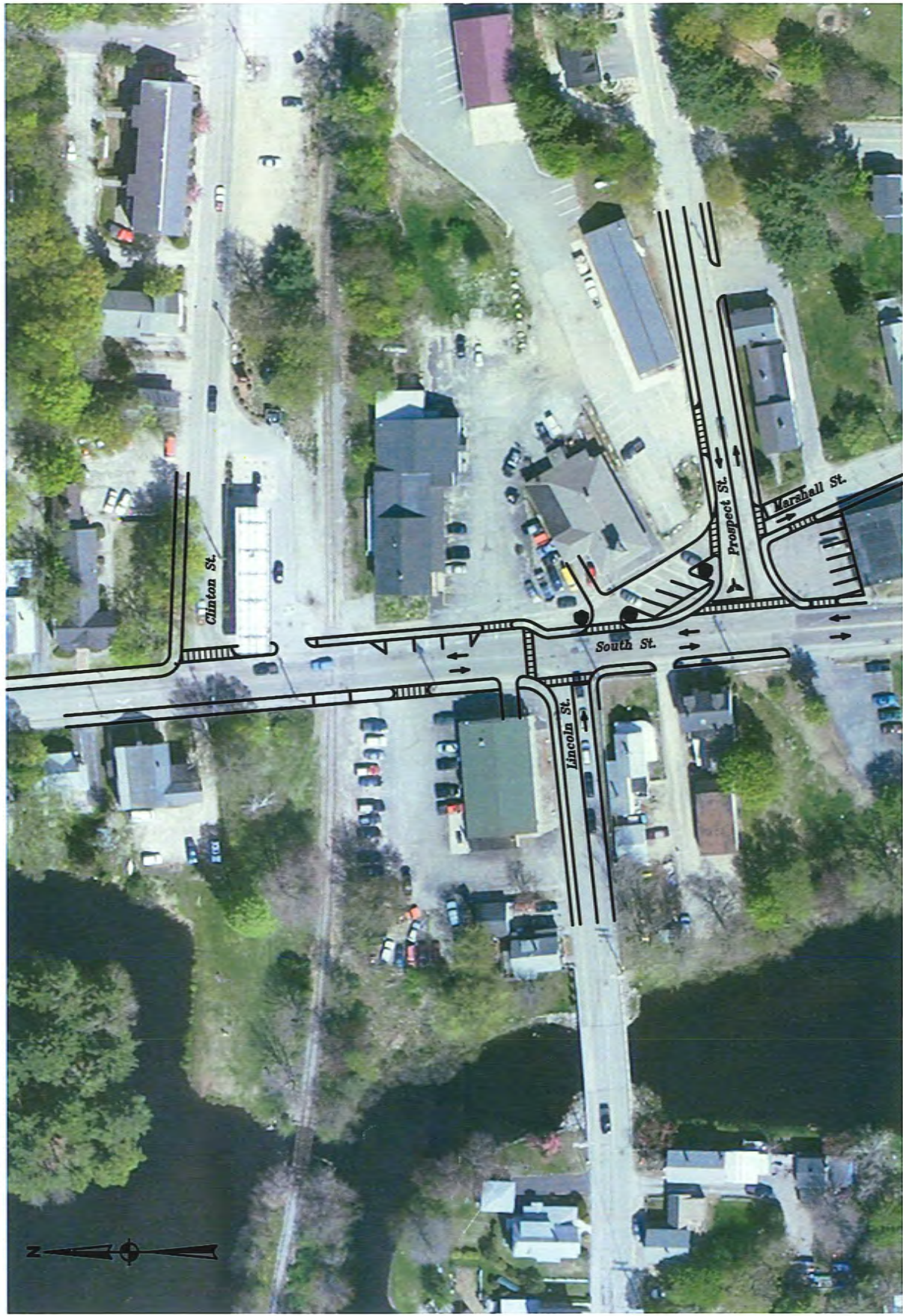
CENTER TURN LANE W/ LANDSCAPING



FIGURE 10
CONCEPTUAL ALTERNATIVES
NASHUA ST. / EDGEWOOD PLAZA



GATEWAY



TRADITIONAL 2-WAY

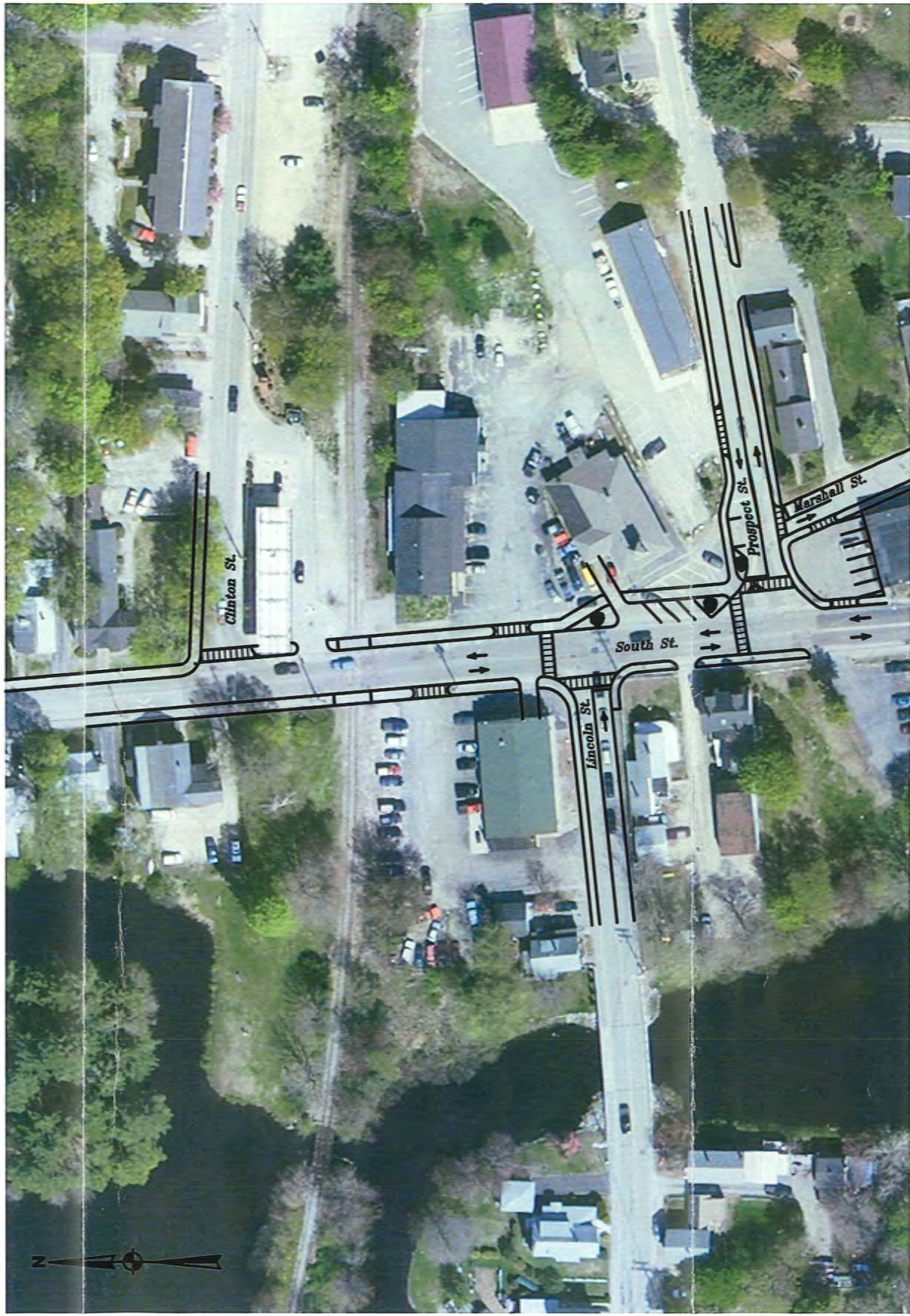
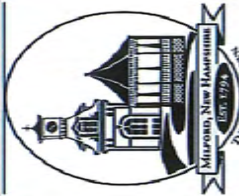


FIGURE 11
CONCEPTUAL ALTERNATIVES
SOUTHERN SOUTH STREET

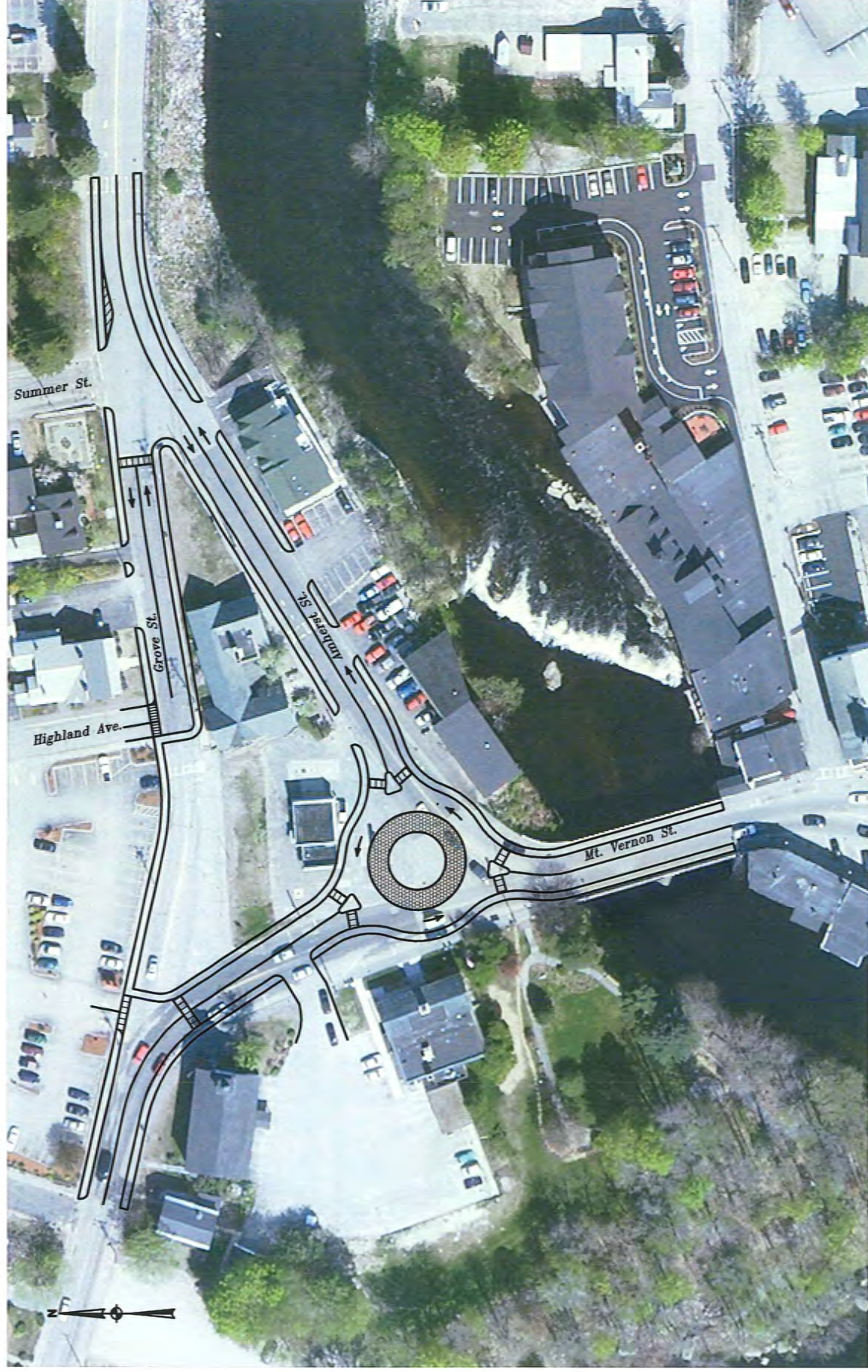


DOT



KNOWLES
DESIGN

ROUNDABOUT



ONE-WAY PAIR

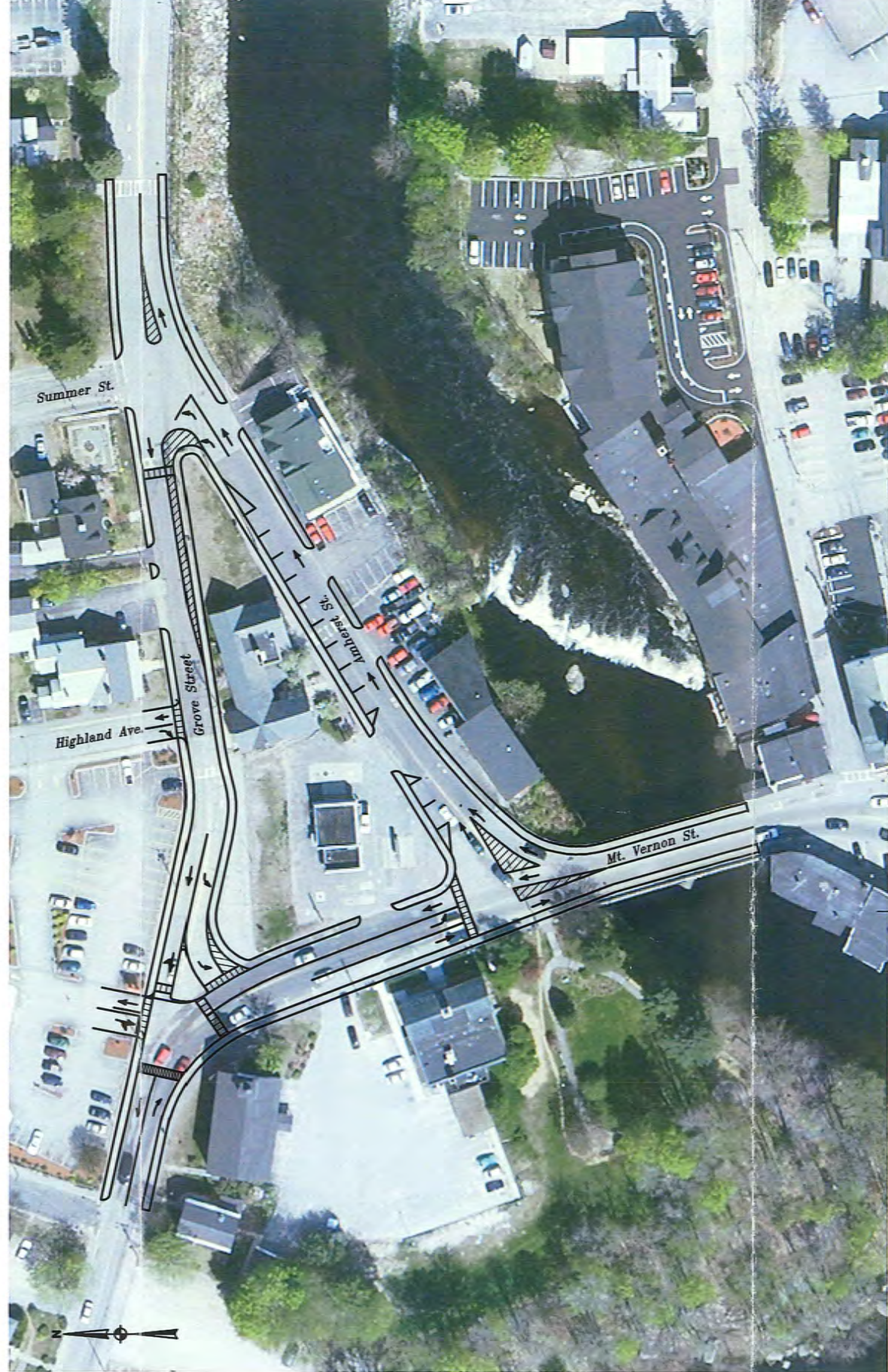


FIGURE 12
CONCEPTUAL ALTERNATIVES
TRIANGLE AREA



GROVE STREET ONE-WAY



STRIPING AND CURBING IMPROVEMENTS

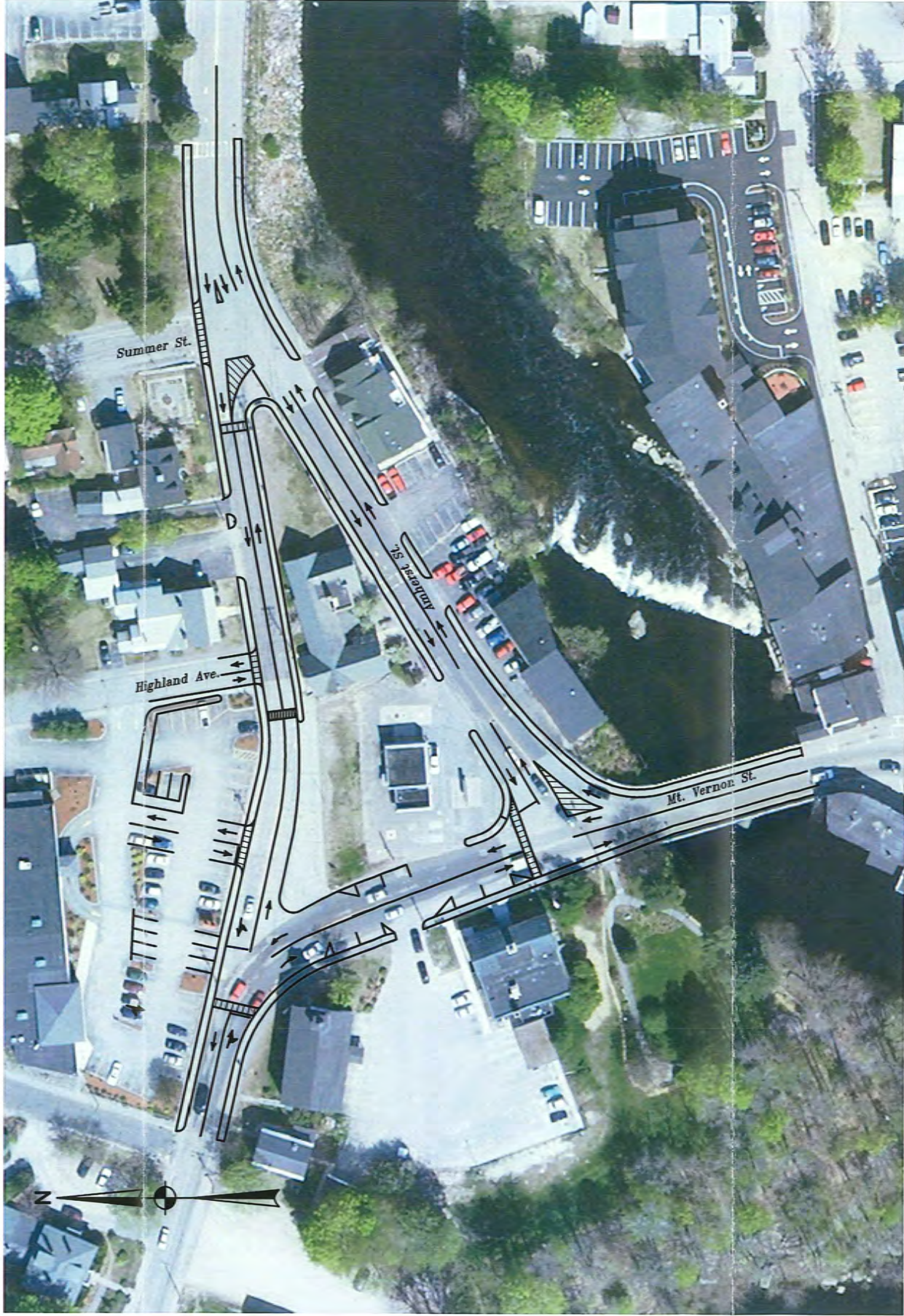
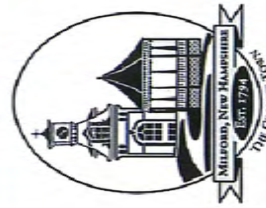
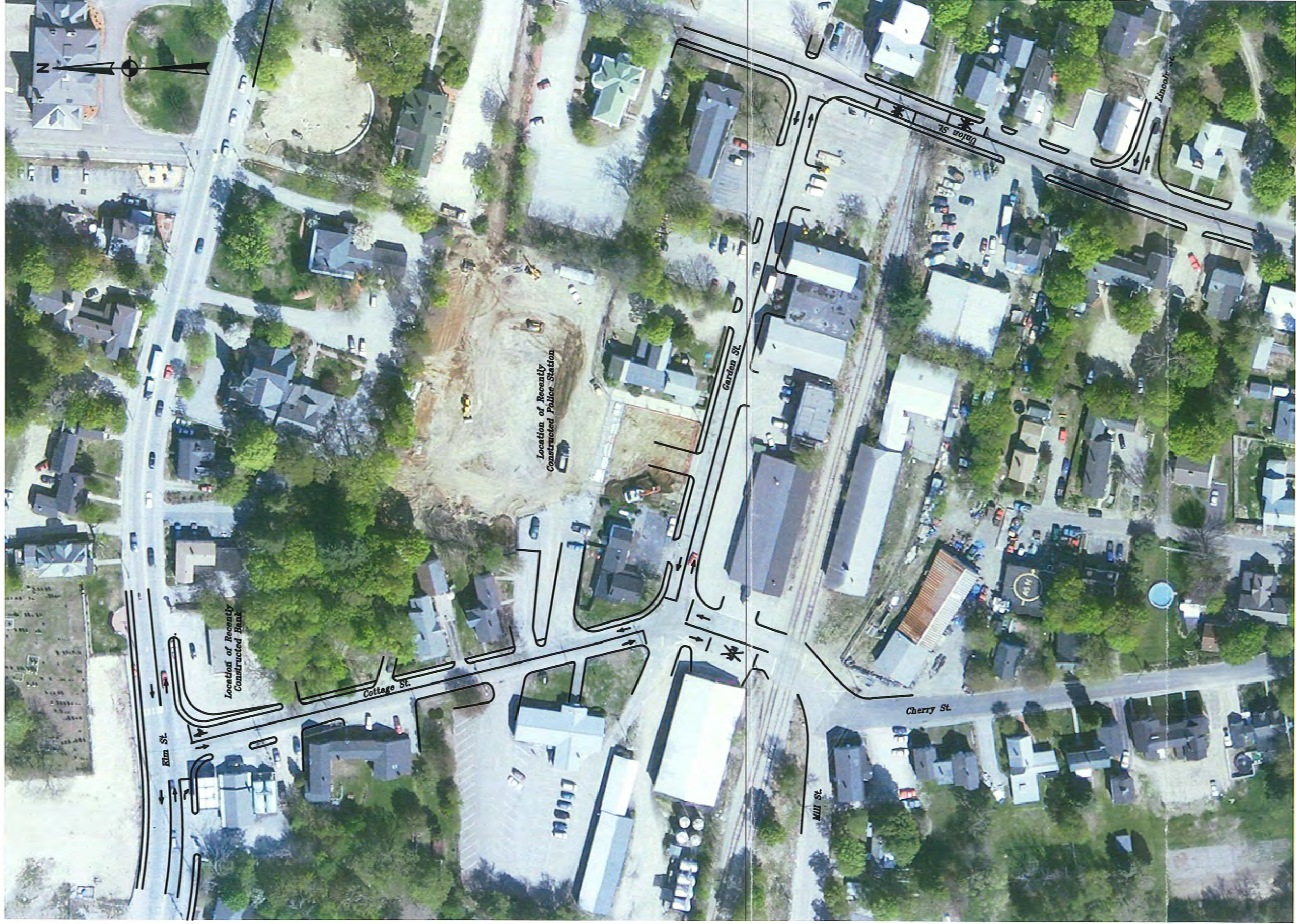


FIGURE 12 (CONT.)
CONCEPTUAL ALTERNATIVES
TRIANGLE AREA





DOIT

FIGURE 13
CONCEPTUAL IMPROVEMENTS
WESTSIDE NEIGHBORHOOD AREA



KNOWLES
 DESIGN