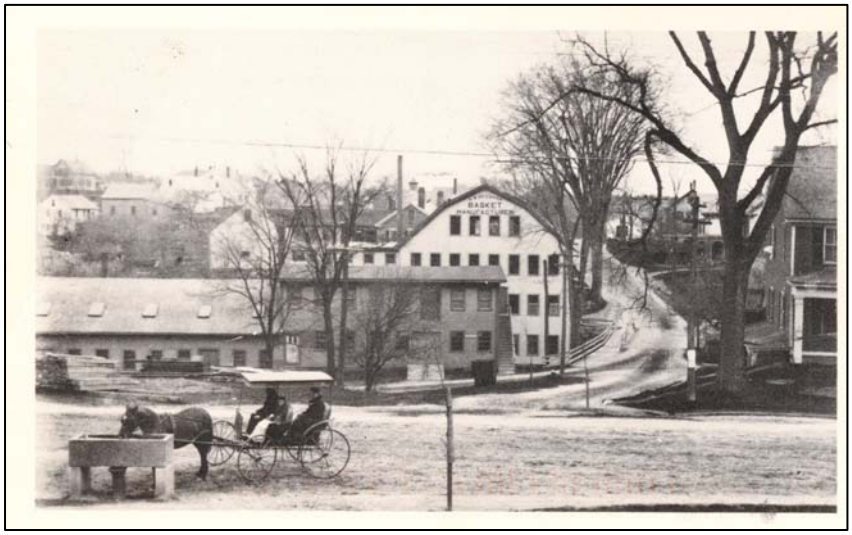
Chapter

6

TRAFFIC & TRANSPORTATION



THEN:
Elm Street from Main Street, ca 1915
From the files of the Peterborough Historical Society

NOW:
Route 101, with Mt. Monadnock in the Background

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Chapter

6

I. Introduction

RSA 674:2, VI, the statute that deals with Master Plans, calls for a transportation section that shows *". . . the location and types of facilities for all modes of transportation required for the efficient movement of people and goods into, about, and through the community."* Good transportation planning is important because of its capital-intensive nature; streets and highways represent the most significant public investment in a town's infrastructure. Outside of school taxes, the highway budget typically accounts for the largest percentage of the budget in most New Hampshire towns.

The identification of current transportation issues and/or needs is crucial to orderly development and the safe and efficient movement of traffic. This section of the Master Plan intends to present relevant information on the transportation network; analyze this information; and set forth goals, objectives, and specific recommendations as approved by the Planning Board relative to the identified issues.

A corollary purpose of this document is to assist the Town of Peterborough in fully participating in all levels of transportation planning, not only local, but regional, state, and federal, as well. Transportation infrastructure is heavily dependent on public funds. The New Hampshire Department of Transportation (NHDOT) sets the priorities for infrastructure spending through the development and implementation of a statewide Transportation Plan and Transportation Improvement Program. Both of these are required by federal law, which prescribes the federal disbursements to the states, and in order to qualify for New Hampshire's allocation of funds, the NHDOT must comply with the federal planning requirements.

To accomplish its task, the NHDOT requires each of the nine regional planning commissions in the State to develop a regional transportation plan that describes existing state road conditions, identifies problems and concerns, declares goals and objectives for the regional network, and makes specific recommendations for improvements. Local concerns must be addressed through the Regional Transportation Plan in order to be included in the State Plan. This local transportation analysis will, therefore, take the regional issues into account in the process of promoting an overall cohesive transportation network.

II. Highway Classification Systems

Part of the process of evaluating a transportation network is to define the roads by the type of service they provide or by the funding that is available to build, maintain, and repair them. There are three classification systems used to accomplish this: federal, state, and functional.

A. Federal Classification System

This classification determines whether or not a particular road is eligible for a share of federal funding for reconstruction, rehabilitation, or resurfacing activities. At this time, Peterborough has no roadways that meet federal classification criteria.

B. State Classification System

This system is used by the NHDOT for determining funding levels and maintenance responsibilities. RSA 229:5 specifies the following classes of roads within the state system:

- **Class I: Trunk Line Highways** belong to the primary state highway system. The State assumes full control and pays costs of construction, reconstruction, and maintenance.
- **Class II: State Aid Highwavs** belong to the secondary state highway system. All sections improved to the state standards are maintained and reconstructed by the state. All other sections must be maintained by the Town until brought up to state standards. The same applies to bridges on Class II highways.
- **Class III: Recreational Roads** consist of all roads leading to, and within, state reservations designated by the Legislature. The NHDOT assumes full control of reconstruction and maintenance.
- **Class IV: Town and City Streets** consist of all highways within the compact sections of towns and cities of 7,500 inhabitants and over.
- **Class V: Rural Highways** consist of all other traveled highways which the town has the duty to maintain.
- **Class VI: Unmaintained Highways** are all other existing public ways, including highways discontinued as open highways, highways closed subject to gate and bars, and highways not maintained by the Town in suitable condition for travel for five consecutive years or more.[1]

Of the six possible state classifications, Peterborough's roads fall into the following classifications:

[1] The Class VI designation is frequently applied to roads that have been abandoned or discontinued, which often leads to confusion as to the ownership of the road. If a vote was taken at Town Meeting to formally discontinue a road (or "throw it up"), that road is no longer a public way; it then belongs to the abutting landowners.

- Class I – Routes 101 and 202
- Class II – Routes 136 and 127
- Class V – all town-maintained paved and unpaved roads; and
- Class VI – all town roads that are not maintained and not paved.

Peterborough's road network is illustrated on the accompanying map by these classifications; the map also identifies private roads and trails (which very often are discontinued roads). Table #1 below lists Peterborough's road mileage by state classification.

TABLE #1:
ROAD MILEAGE BY STATE CLASSIFICATION

Classification	Mileage
Class I	15.38
Class II	8.23
Class V	69.19
Class VI	7.09
Total Mileage	**99.89**

SOURCE: NH DEPARTMENT OF TRANSPORTATION;
TOWN OF PETERBOROUGH DEPARTMENT OF PUBLIC WORKS

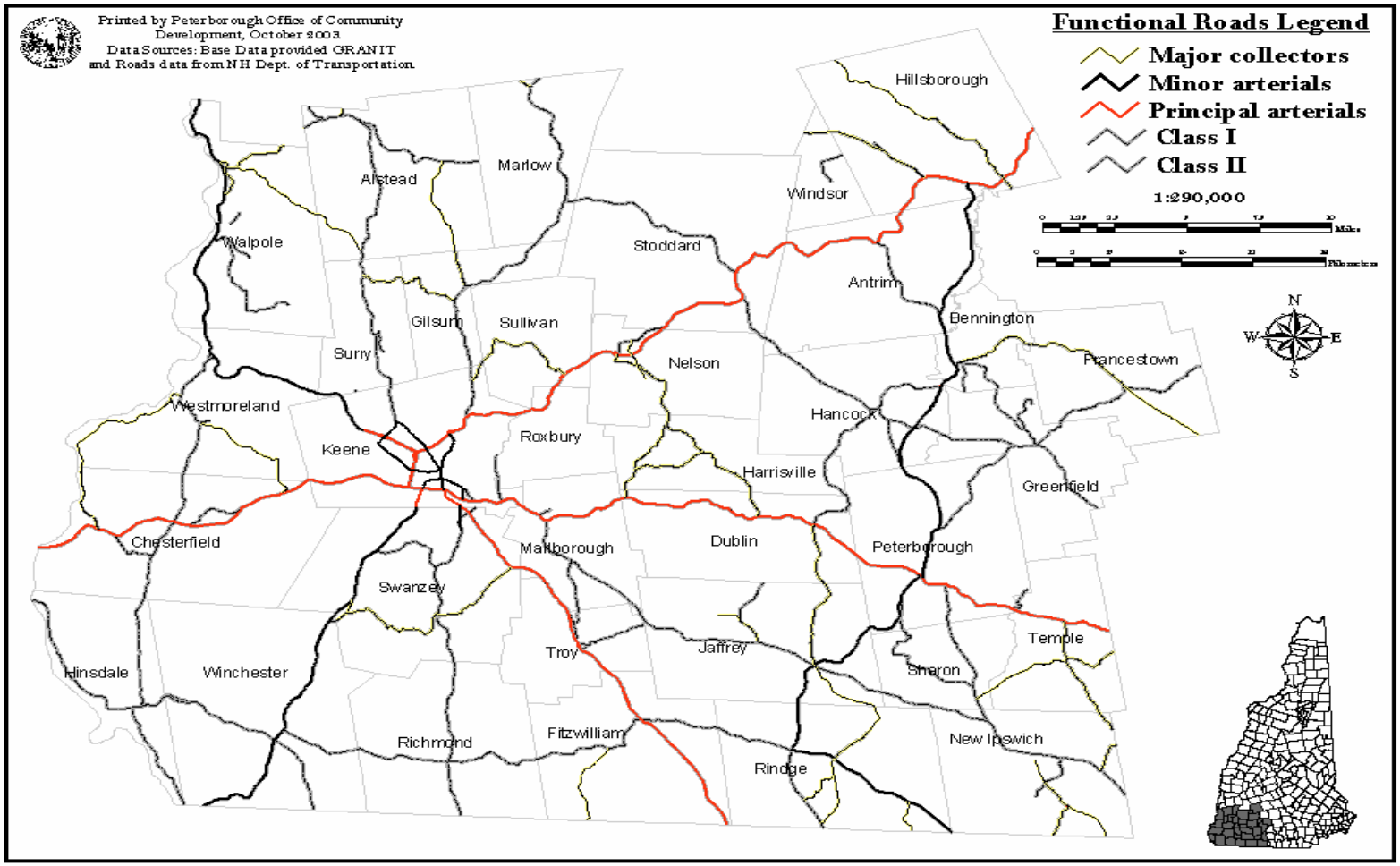
Table #1 illustrates that Peterborough's road system is typical for most New Hampshire towns in that the greatest amount of mileage is accounted for by Class V roads. Of the 69+ miles of town-maintained road, only just over two miles are unpaved.

C. Functional Classification System

A functional classification system identifies roads by the type of service provided and by the role of each highway within the state system, based on standards developed by the USDOT. The purpose of utilizing such a system is to correlate the land planning and traffic planning functions of the Master Plan. Recognition of the principal function that a highway, road, or street is intended to serve can reduce potential conflicts between land use activities and traffic movements. According to this system, there are two categories of functional classes: Rural and Urban. Rural is the category that would apply to Peterborough and contains the following types of roads:

- **PRINCIPAL ARTERIAL/CONTROLLED ACCESS**: These consist of interstates and some primary state routes. They are designed to move large volumes of truck and car traffic through and between population centers without disturbing local traffic and land uses. Controlled access is a means of minimizing the number of curb cuts, thereby controlling the amount of traffic crossing lands and stopping on the road.

FUNCTIONAL ROAD CLASSIFICATION, SOUTHWEST REGION



- **ARTERIAL SYSTEM - MAJOR AND MINOR:** These are the streets and highways that connect communities and regions. They are designed to move large volumes of traffic to and from large traffic generators without disturbing local traffic and land uses. Minor arterials distribute traffic to smaller geographic areas. The minor system places more emphasis on providing land access than the major arterial system.

- **THE COLLECTOR SYSTEM - MAJOR AND MINOR**: Major collectors are designed to move medium traffic volumes at low speeds between or within communities. It differs from the arterial system in that collector streets go through residential neighborhoods, distributing traffic from the arterials through the area to their ultimate destination. Minor collectors provide alternative routes to major collectors.

- **THE LOCAL STREET SYSTEM:** This system includes all streets not classified in one of the other higher systems. Its primary function is to provide direct access to abutting properties and access to higher order systems. It offers the lowest level of mobility, and through-traffic is deliberately discouraged.

The map on the opposite page illustrates the Functional Classification System for the Southwest Region. The only roads in Peterborough that are included in this system, other than the local streets, are US 202 which is classified as a Minor Arterial, funneling traffic to the "higher order" arterials of Routes 9, 10, and 12; and NH 101 which is classified as a Principal Arterial. Within the Southwest Region, Route 9 east-west, Route 12 north-south, and NH 101 are the highest order roadways.

On a local level, of course, there are several roads that play a greater role in the transportation network: Route 136, Route 123, Old Street Road, and Sharon Road, for example.

D. Scenic Roads

In addition to the state-aid classifications, RSA 231:157 allows towns by a vote at Town Meeting to designate any road other than a Class I or II highway as a Scenic Road. The effect of this designation is that, except in emergency situations, there shall be no tree cutting or alteration of stone walls within the right-of-way without the written approval of the Planning Board. This law does not affect the rights of individual property owners; nor does it affect land uses as permitted by local zoning. In 1991 the statute was amended to allow towns to adopt provisions that are different, or in addition to, what is spelled out in the law. At this time the following roads in Peterborough are designated as Scenic:

- Carley Road
- Cornish Road
- Crosby Road
- Four Winds Road
- Gulf Road
- Old Dublin Road
- Old Greenfield Road
- Old Jaffrey Road
- Old Town Farm Road
- Powersbridge Road
- Slab Road
- Windy Row

III. Road and Bridge Conditions

A. Roadway Surface Management System

In order to evaluate the surface conditions of roads, the Peterborough Department of Public Works uses a method called the "Roadway Surface Management System" (RSMS), which is described below.

In most municipalities throughout the United States, road and street surfaces are the largest single cost of building and maintaining a transportation system. In Peterborough, 30% of funds spent on the Highway Department operating budget are for the road surface. For many smaller communities, this percentage can be much higher. Because of this tremendous investment in roadway systems, Peterborough must control costs by slowing roadway surface deterioration. This requires making cost-effective decisions regarding the maintenance, repair, rehabilitation, and reconstruction of the municipal roadway network. Developing a maintenance budget based on cost-effective decisions requires a rational, systematic process. We need to evaluate the condition of the road network and allocate funds where they can do the most good.

Highway maintenance budgets can be developed without a systematic, decision-making process. However, typically, many towns develop road maintenance budgets using one or more of the following methods:

Road Maintenance Budget Methods

1.	Last Year's Budget	This year's budget is last year's budget, with an arbitrary increase or decrease.
2.	Standard Program	Establish a program based on periodic maintenance, such as seal coats every five years and overlays every ten years.
3.	Squeaky Wheel	Respond to emergency demands and citizen complaints as they arise.
4.	Worst First	Major maintenance is prioritized on a "worst first" basis. Those streets that look bad get attention. This approach has a certain logical (although not correct) appeal that satisfies the public and city council.
5.	Political Pressure	Use political considerations to establish programs and budgets.
6.	Gut Feel	Base the budget on the knowledge, experience, and "gut feel" of managers and experienced employees.

Currently, the repair strategy followed by the Public Works Department targets nearly 40% of the road miles for routine maintenance, while about 30% of the work is deferred. These criteria, separately or in combination, are adequate only if a town has the required funds and the majority of surfaces are in satisfactory condition. In nearly all towns and cities, the road network is in bad shape and getting worse, and funding sources are becoming scarce as governing bodies are under pressure to lower taxes. It is clear that towns need a better

decision-making process based on reliable information. In this tight fiscal environment, municipal officials might ask the following types of question:

- How many miles of roads do we have, and what types of pavement must we maintain?
- Should maintenance resources be used on our best or our worst roads?
- What will happen to our road system if maintenance funds are increased or decreased by some percentage?
- Is it more cost-effective to repair and seal, overlay, recycle, or completely reconstruct a particular road?
- What are our maintenance and rehabilitation requirements over the next five years?
- How can available money be spent in the most cost-effective way?

In these tough economic times, we must answer these questions. Peterborough needs a system that enables us to assess the condition of the network, with alternatives, and establish long-term programs and budgets. We need an effective road surface management system. The RSMS described below is one such system.

Pavement Costs

Unfortunate but true, many municipalities allow their roads and streets to deteriorate. Although built at considerable cost, many roads now show signs of major distress. If these problems are not corrected, the cost to bring the road to an acceptable condition can be many times more expensive than the cost of timely repair. Too often treatment is deferred. Problems worsen to the point where complete reconstruction may be necessary. As municipal roads worsen, maintenance budgets need to increase. There are more deteriorated streets each year, and the cost per mile for maintenance increases disproportionately. This is a recipe for economic disaster.

The reason for this chronic crisis: road or street costs "sky-rocket" if delayed beyond a certain point. Figure#1 illustrates the relationship between pavement condition and service life. It also shows the cost of pavement rehabilitation in relation to when the rehabilitation takes place. After the first 75 percent of a pavement's service life, the performance level only drops from excellent to fair -- a 40 percent drop in quality. In other words, after 10-12 years, it is still in satisfactory condition. To the untrained eye, it looks good. However, in the next 12 years of life, the quality of the pavement drops an additional 40 percent. The performance level drops from fair to very poor. More importantly, a pavement that would cost a dollar to renovate at 75 percent of its life will cost $5 to $8 to renovate at 87 percent of its life. Allowing the pavement condition to deteriorate from fair to very poor will increase repair costs five times.

There are a variety of appropriate types of maintenance and rehabilitation techniques required to upgrade the condition as pavement ages. Repair of a pavement in fair condition requires only preventative maintenance, such as an overlay. If the Town delays until the 16-year mark, the pavement requires reconstruction, which is much more expensive. The rate of deterioration rapidly increased after the 75% use point. Beyond that point a much more expensive rehabilitation procedure is necessary to upgrade the street. Therefore, the primary goal of any pavement management system is to keep the good streets in good shape.

Peterborough should rehabilitate streets in bad shape with special funds, reserving normal funds for routine and preventive maintenance.

Often, pavement maintenance is a case of being "penny wise and dollar foolish." As the Fram oil filter TV commercial stated, "Pay me a little now or a lot later." It makes little sense to save "pennies" now by putting off needed maintenance if those repairs are going to cost "dollars" later. A good comparison is that deferred maintenance is like a debt at very high interest rates. The debt will have to be paid at some time in the future, and the longer the agency puts it off, the more the repair is going to cost.

The following is an example of how the cost of pavement maintenance can drastically increase. Suppose a section of pavement that was built 12 years ago needs a preventive maintenance treatment, such as a chip seal, estimated at $15,000. If the action is deferred for four years, the pavement will become structurally damaged, and require a thick overlay. It will now cost $45,000 to $60,000 to rehabilitate the same pavement to an acceptable condition. If the rehabilitation treatment is deferred until complete reconstruction of the roadway is needed, then an expenditure of $150,000 may be necessary.

The problem becomes more complicated in that cities and towns must manage a network of roads. The roads have various levels of condition and different rates of deterioration. Moreover, there is seldom enough money to adequately fund all maintenance needs for the entire roadway network. Therefore, as stated earlier, local agencies need a systematic, rational approach to invest their limited funds in the most cost-effective manner possible. Instituting a pavement management system (PMS) is a big step in that direction.

Pavement Management Systems

The pavement management system is based on the pavement deterioration curve shown in Figure #1, which shows that roads in good shape cost less to maintain than roads in bad shape. With that concept in mind, pavement management systems were created to provide a structured framework for keeping the network in good shape. The main goal of pavement maintenance is to assist the CIP, Budget Committee, Selectmen, and the town voters in developing cost-effective strategies. The available maintenance funds should first be spent on the good roads, and any additional monies spent on the remaining streets.

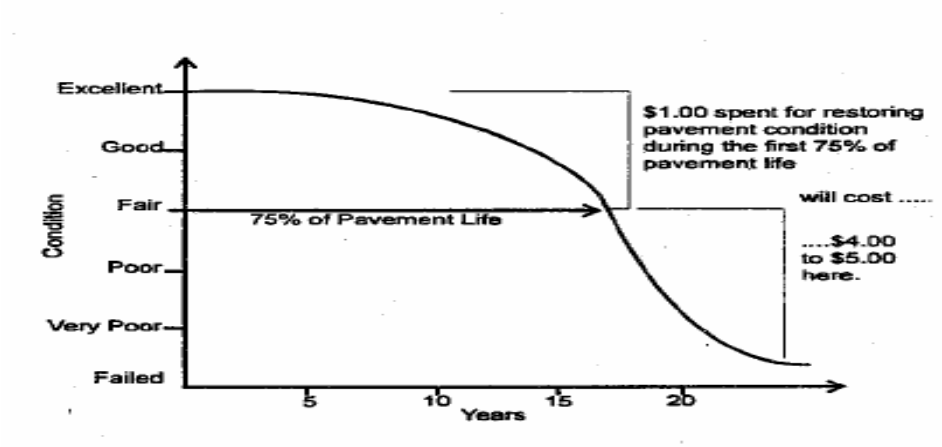


FIGURE #1: RELATIONSHIP OF PAVEMENT REPAIR TO COSTS

Using the methodology and software provided by the University of New Hampshire Technology Transfer Center, the following steps were taken to develop the 2003 inventory and condition survey of Peterborough's roadway system. In addition, the Roadway Surface Management System will be used for the following planning purposes:

1. Prioritize maintenance and repair requirements.
2. Choose maintenance or repair methods appropriate to each condition or pavement distress.
3. Determine unit costs of maintenance and repair methods.
4. Select maintenance or repair methods for each section of road.
5. Establish long-range work and budget plans.

Finally, residents of Peterborough will be able to correlate expenditures invested in roadway maintenance with the resulting conditions of town roads over a period of time. The Pavement Condition Index (PCI) shown in the following Condition Survey reflects pavement distresses such as alligator cracking, edge cracking, longitudinal and transverse cracking, roughness, rutting, and drainage deficiencies. A PCI of 100 indicates a road in good condition. Streets with low PCI's are in poorer condition, and the cost to maintain and/or rehabilitate will be much more expensive. For instance, it costs the Town about $6.00 per square yard to reclaim (grind-up) and repave versus less than $1.00 per square yard to chip seal roads. Using this methodology, Peterborough's town-maintained paved roads have a PCI of 77, and the unpaved town-maintained roads have a PCI of 61. (See the Appendix for the detailed information on this pavement condition inventory.)

B. Roadway Construction Standards

The NHDOT publishes guidelines for the construction of roads. These address pavement width, geometry, and design standards. Most towns in New Hampshire follow these guidelines. The "Minimum Geometric and Structural Guides for Local Roads and Streets" was published in 1986 and updated in 1990; and the design standards were updated in 1995 (see Figure #2 following; the accompanying text can be found in the Appendix).

Presently, Town regulations require a twenty-four (24) foot paved roadway in subdivisions. However, we have recommended that the Town adopt a modified NHDOT Typical Roadway cross-section for local roads and streets based upon the average daily traffic (assuming eight vehicle trips per residence). Based on these standards, the minimum roadway width for 0 – 50 Average Daily Traffic would be 18-foot gravel with gravel shoulders for fire and emergency access. These standards reflect a sliding scale of road width based on the number of trips per day – the more vehicles, the wider the traveled way and shoulder. The use of grass shoulders (or "Cape Cod" berms) is also a technique that allows the Town to keep pavement, and its associated issues, at a minimum, while still providing for a safe and efficient travel way.

Paved roadway sections that are wider than warranted for traffic volumes will increase vehicle speed, increase future Town repair costs (up to 20%), and increase stormwater runoff with more "urban feel" of pavement in lieu of trees and open space.

FIGURE #2:
NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION
MINIMUM GEOMETRIC & STRUCTURAL GUIDES FOR LOCAL ROADS AND STREET

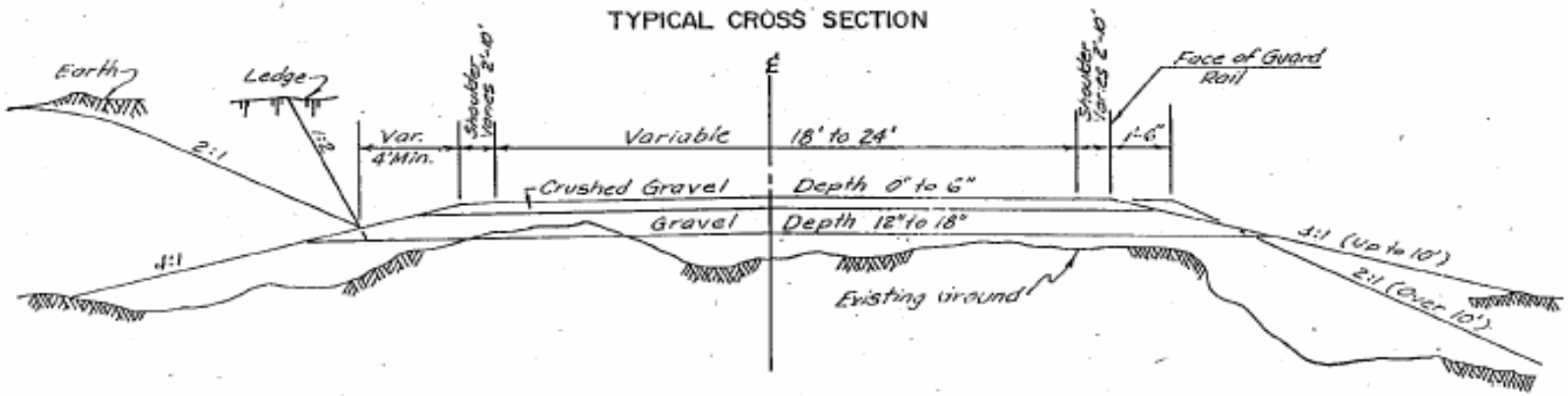
NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

MINIMUM GEOMETRIC & STRUCTURAL GUIDES FOR LOCAL ROADS AND STREETS

Average Daily Traffic (Veh./Day)	0–50	50–200	200–750	750–1500	1500 & OVER
Pavement Width (Feet)	18 min.	20	20	22	24
Shoulder Width (Feet)	2	2	4	4	8–10
Center of Road to Ditch Line	15	16	18	19–21	Varies
Pavement Type	Gravel	Asph. Surface Treated	Hot Bituminous	Hot Bituminous	Hot Bituminous
Slope of Roadway	1/2" per Ft.	3/8" per Ft.	1/4" per Ft.	1/4" per Ft.	1/4" per Ft.
Base Course Depth – (Gravel)	12"	12"	12"	12"	18"
(Cr. Gravel)	–	–	4"	6"	6"

Notes
1. Gravel Surface should be Paved where Steep Grades occur.
2. For Average Daily Traffic over 1000 Veh./Day Paved Shoulders should be considered.
3. Base Course Depths may need to be increased in areas of Poor Soils.

TYPICAL CROSS SECTION



C. Bridges

Bridges are rated by the NHDOT, using a system based on federal standards for type of construction, width, surface conditions, ability to handle traffic volumes, etc. Table #2 presents selected information collected by the DOT on each of the sixteen bridges in Peterborough; these bridges are also identified on the accompanying map.

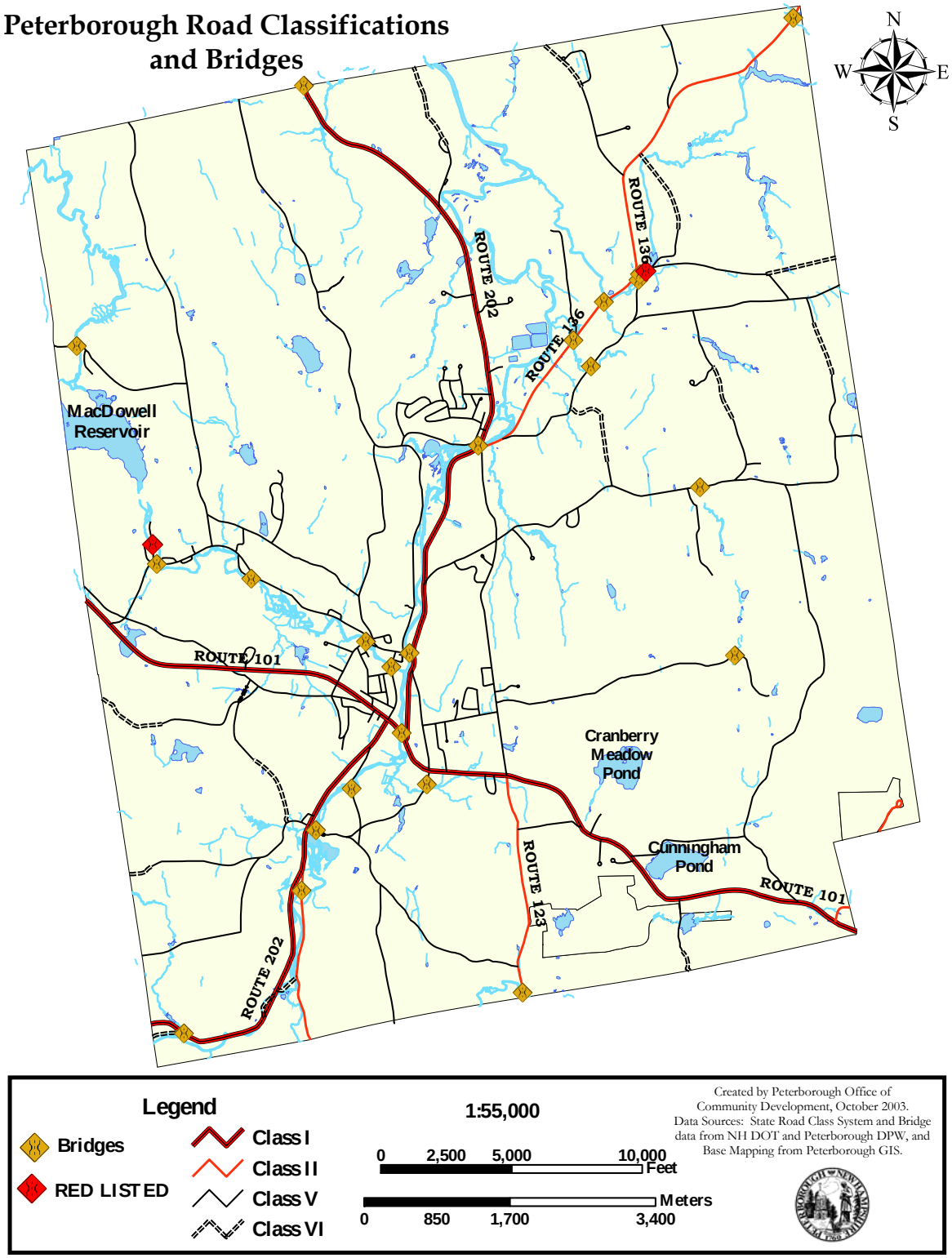
Of these 16 bridges, three are rated "red," which means that it is structurally deficient; they are, however, slated for reconstruction at some point. As the table indicates, however, most of the bridges in Town are rated E2, which carries no restrictions with that designation.

TABLE #2:
INVENTORY OF EXISTING BRIDGES, TOWN OF PETERBOROUGH

Bridge #	Location	NHDOT Recommended
050/141	Spring Road over Nubanusit Brook	No Weight Posting
055/112*	**Wilder Street over Nubanusit Brook**	**Gross Weight Limit/10 Tons or 50% of legal loads. Scheduled for reconstruction in 2004**
057/108	Union Street over Nubanusit Brook	E2 until evaluated for certified load
069/101	Steele Road over Nubanusit Brook	No Weight Posting
08 1/069	Morison Road over Contoocook River	E2 until evaluated for certified load, Narrow Bridge.
084/090	Elm Street over Nubanusit Brook	Reconstructed in 2003
087/087	Grove Street over Nubanusit Brook	E2
091/067	Powersbridge Road over Brook	E2
092/089	Main Street over Contoocook River	E2
126/1 26	Old Greenfield Road over Bogle Brook	E2
132/1 34	Slab Road over Otter Brook	E2, Narrow Bridge
133/1 36*	**Gulf Road over Brook**	**Complete 6/1/Q3, No Weight Limit**
135/136*	**Gulf Road over Otter Brook**	**Gross Weight Limit 15 tons or 80% of legal loads, Narrow Bridge**
139/079	Carley Road over Brook	E2, One lane bridge
140/103	Sand Hill Road over Bogle Brook	E2
075/063	Old Sharon Rd over Contoocook River	Closed

* Red listed

SOURCES: NH DOT;
TOWN OF PETERBOROUGH DEPARTMENT OF PUBLIC WORKS


Peterborough Road Classifications and Bridges
N
W
E
S
ROUTE 202
ROUTE 136
ROUTE 136
MacDowell Reservoir
ROUTE 101
Cranberry Meadow Pond
Cunningham Pond
ROUTE 101
ROUTE 123
ROUTE 202
Legend
Bridges
RED LISTED
Class I
Class II
Class V
Class VI
1:55,000
0 2,500 5,000 10,000 Feet
0 850 1,700 3,400 Meters
Created by Peterborough Office of Community Development, October 2003.
Data Sources: State Road Class System and Bridge data from NH DOT and Peterborough DPW, and Base Mapping from Peterborough GIS.

IV. Traffic Volumes

Information on traffic volumes is collected and made available by the NHDOT on a regular basis. The NHDOT maintains some permanent traffic counters in various locations around the State; in addition, temporary counters are set out on a rotating basis around the State at different times, generally during the months of May to October for a one-week period. The permanent counters are placed only on state roads; temporary counters are placed on state and local roads.

Table #3 presents available information on average daily traffic in Peterborough from 1994 to 2001; Figure #3 presents this in graph form. Over this time period, traffic counts were taken at 33 locations; only one, however, on Route 101 at the Dublin town line, is a permanent counter, therefore providing annual counts. This location registered a decrease in traffic overall, although the counts from year-to-year fluctuated by a few hundred in one direction or the other. The three locations carrying the most amount of traffic in Peterborough are Main Street at the Library bridge, and two locations on Route 202: south of Route 101, and south of Sand Hill Road.

FIGURE #3:
AVERAGE DAILY TRAFFIC, 1994 – 2001

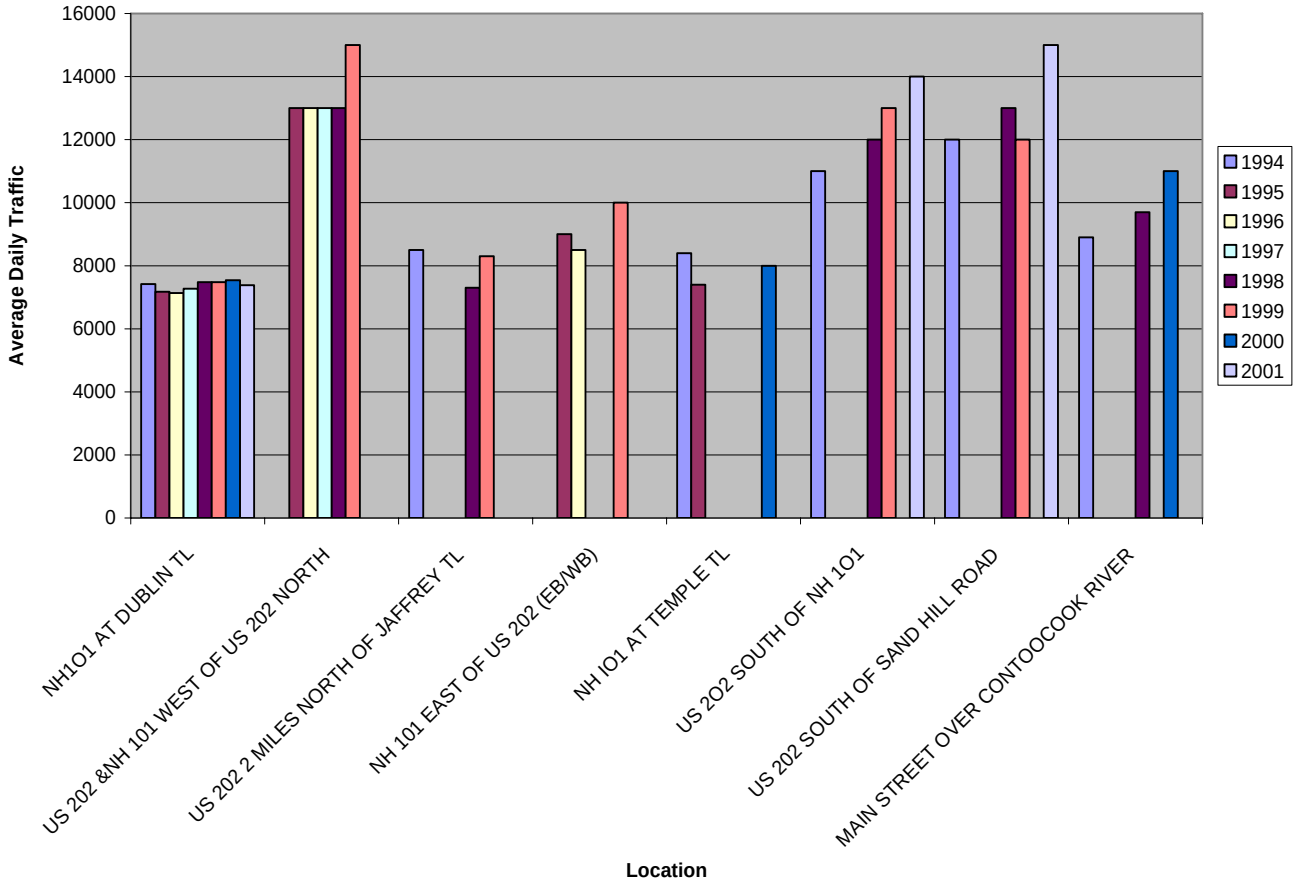


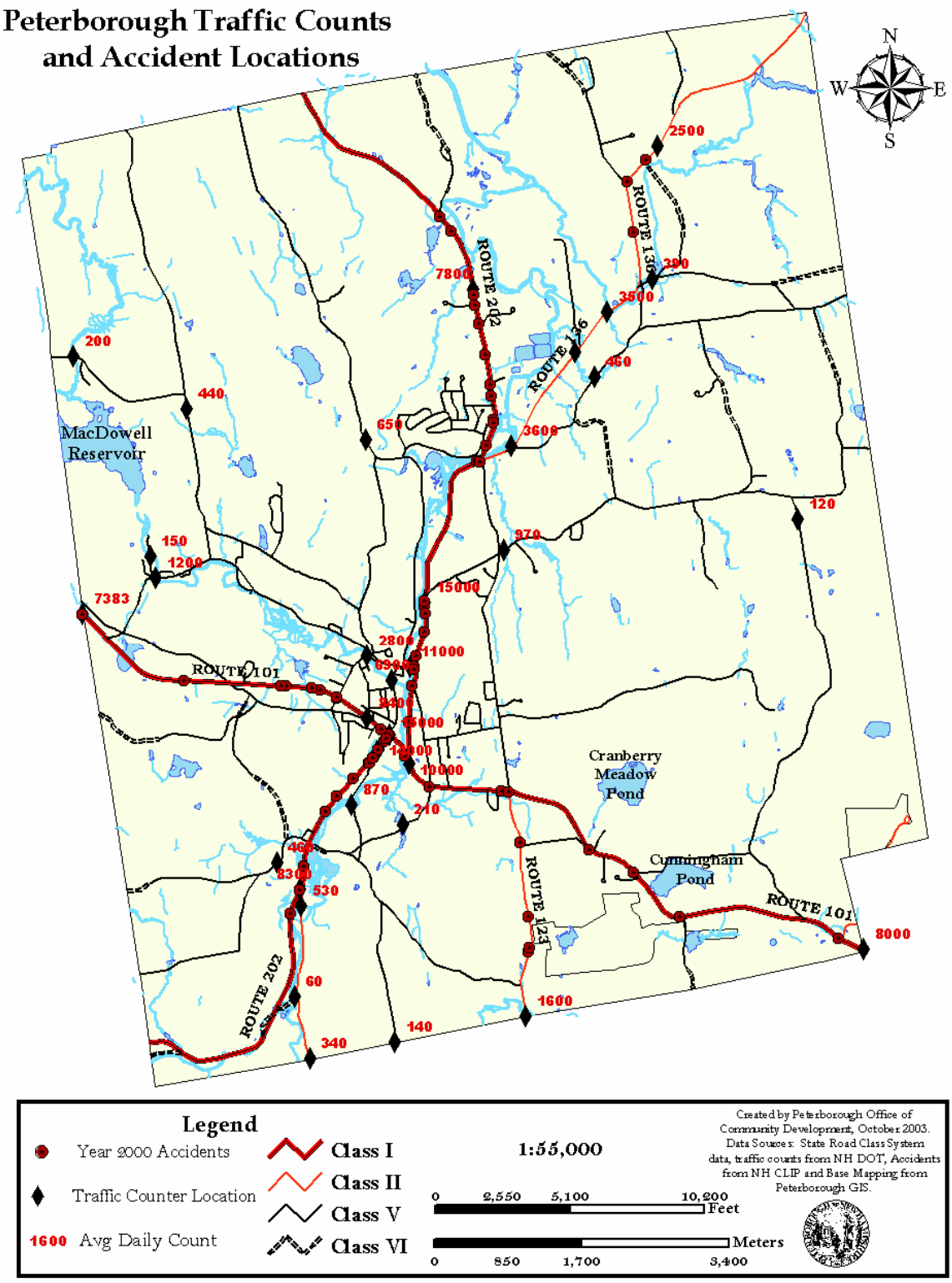
TABLE #3:
AVERAGE DAILY TRAFFIC, 1994 – 2001

	FC[2]	1994	1995	1996	1997	1998	1999	2000	2001
NH 1O1 AT DUBLIN TL	02	7418	7174	7132	7271	7482	7482	7537	7383
(EB-WB) (01363002-01363									
NH 136 EAST OF US 202	07	3300	*	*	*	3600	*	*	*
US 202 &NH 101 WEST OF US 202 NORTH	06	*	13000	*	*	13000	15000	*	*
US 202 2 MILES NORTH OF JAFFREY TL	06	8500	*	*	*	7300	8300	*	
NH 101 EAST OF US 202 (EB/WB)	02	*	9000	8500	*	*	10000	*	*
(81363100-81363101)									
NH I23 AT SHARON TL	07	1400	*	*	1500	*	1600	*	1600
(SB-NB) (613 63010-363 011)									
NH 1O1 AT TEMPLE TL	02	8400	7400	*	*	*	*	8000.	*
(EB-WB) (81363012-363013)									
US 2O2 SOUTH OF NH 1O1	06	11000	*	*	*	12000	13000	*	14000
US 202 SOUTH OF SAND HILL ROAD	06	12000	*	*	*	13000	12000	*	15000
WINDY ROAD SOUTH OF RICHARDSON RD	09	*	*	*	440	*	*	*	*
US 202 & NH 123 NORTH OF HIGH SCHOOL	06	5800	*	*	*	7400	7800	*	*
MIDDLE HANCOCKRD NORTH OF HUNT RD	09	*	*	*	650	*	*	*	*
NH 136 SOUTH OF OLD BENNINGTON ROAD	07	‘	*	2500	*	*	*	*	*
SAND HILL ROAD EAST OF OLD STREET ROAD	09	1000	*	*	*	840	*	*	970
OLD SHARON ROAD AT SHARON TL	09	*	*	140	*	*	*	*	*
SHARON ROAD AT SHARON TL	09	370	*	*	*	390	340	*	*

[2] FC = Functional Classification: 02= Rural Arterial; 06=Major Collector; 07=Minor Collector; 09=Local Road.

	FC	1994	1995	1996	1997	1998	1999	2000	2001	
OLD JAFFREY ROAD EAST OF FARM ROAD	09	*	*	460	*	*	*	*	*	
NH 101 WEST OFUS 202 SOUTH	02	*	*	*	*	*	*	8400	*	
NH 136 AT BOGLIE BROOK	07	*	*	2900	*	*	3100	*	*	
EAST MOUNTAIN RD SOUTH OF SOUND HILL RD	09	*	*	*	120	*	*	*	*	
SPRING ROAD OVER NUBANSIT BROOK	09	170	*	*	*	170	200	*	*	
WILDER ROAD OVER NUBANSIT BROOK	09	120	*	*	*	200	150	*	*	
UNION ROAD OVER NUBANUSIT BROOK	09	1300	*	4	*	1200	1200	*	*	
DRURY ROAD OVER CONTOOCOOK RIVER		00	60	*	*	*	*	*	*	*
SHARON ROAD OVER CONTOOCOOK RIVER	09	*	470	$	600	530	*	*		
MORRISON ROAD OVER CONTOOCOOK RIVER	09	280	570	*	*	830	870	*	*	
ELM STREET OVER NUBANSIT BROOK	09	2600	*	*	2900	2800	*			
GROVE STREETOVER NUBANSIT BROOK	09	6700	*	*	*	7300	6900	*		
POWERS BRIDGE ROAD OVER BROOK	09	100	*	*	*	180	*	*	210	
MAIN STREET OVER CONTOOCOOK RIVER	09	8900	*	44	*	9700	*	11000		
NH 136 OVER OTTER BROOK	07	2800	*	*	*	3000	*	*	3500	
OLD GREENFIELD RD OVER BOGGLE BROOK	09	340	*	*	390	*	*	460		
GULF ROAD OVER OTTER BROOK	09	340	*	44	*	350	*	*	390	

SOURCE: NH DOT, AUGUST 2002


Peterborough Traffic Counts
and Accident Locations
N
W
E
S
2500
ROUTE 136
390
3500
460
ROUTE 136
7800
ROUTE 202
200
440
650
3600
MacDowell
Reservoir
120
970
150
1200
15000
7383
2800
11000
ROUTE 101
8400
15000
12000
10000
Cranberry
Meadow
Pond
870
210
460
8300
530
Cunningham
Pond
ROUTE 123
ROUTE 101
8000
ROUTE 202
60
1600
140
340
Legend
Year 2000 Accidents
Traffic Counter Location
1600 Avg Daily Count
Class I
Class II
Class V
Class VI
1:55,000
0 2,550 5,100 10,200 Feet
0 850 1,700 3,400 Meters
Created by Peterborough Office of
Community Development, October 2003.
Data Sources: State Road Class System
data, traffic counts from NH DOT, Accidents
from NH CLIP and Base Mapping from
Peterborough GIS.

V. Traffic and Transportation Studies

A number of traffic studies have been conducted in recent years on various aspects of the transportation network in and around Peterborough. These studies are summarized below and are available under separate cover.

- Downtown Traffic Circulation and Street Parking Task Force Report (with input from Vanasse Hangen Brustlin, Inc., April 14, 2003)
- NH 101 Corridor Study (Southwest Region & Nashua Regional Planning Commissions, 1999)
- US 202 Corridor Study (Southwest Region Planning Commission, 2001)
- Traffic Study and Modeling at Fifteen Intersections (Edwards & Kelcey, February 2002)
- Proposed Connector Road Study for Monadnock Community Hospital (Edwards & Kelcey, January 2002)

A. Downtown Traffic Circulation and Street Parking Task Force

The Downtown Traffic Circulation and Street Parking Task Force was created by the Selectmen in May 2002 "to formulate recommendations for the Board regarding the efficiency and safety of traffic circulation and parking." Downtown was defined as the area from the Nubanusit River on the south (Grove Street) to and including Main Street on the north; also from the Granite Bank parking lot on the west to the Contoocook River (and the Main Street Bridge) on the east.

Early discussion determined that there was a need for professional assistance to determine the status quo (base line data) and to model "what-if" scenarios with the help of computer software. Thus, the committee engaged a consultant, who, during the last week of September 2002 administered a seven-day, 24-hour, bi-directional automatic traffic count at six downtown locations. One of those days was spent manually counting turning movements at four intersections, classifying vehicles, observing pedestrian activity, as well as performing an origin and destination study of Depot Square. A brief summary of the report's findings follows.

1. **Accident Statistics:** The downtown experiences relatively few accidents, most of them collisions into parked vehicles, and none resulting in more than property damage.

2. **Count Stations:** The consultant concluded that "without a change in the downtown traffic circulation system, the Town of Peterborough will begin to experience effects of traffic congestion at several key downtown intersections within the next two to three years."

3. **Traffic Counts:** Sundays were found to have the least traffic; Saturdays were nearly the same as weekdays in most locations. Downtown areas with the highest counts were the NAPA Autoparts driveway on Main Street, Summer Street, School Street east of Grove Street, and Depot Street at Main Street.

4. **Impact of Highways:** Routes 101 and 202 have considerable impact on downtown. Grove and Main Streets are sometimes used as throughways to the highways; in fact, nearly 50% of the traffic coming through Town daily does not have downtown as its destination.

5. **Intersections:** There are no failed or sub-standard intersections, even during the peak traffic hours. This situation should last until 2005. If cut-through traffic can be diverted from downtown and a light installed at the 202 dogleg, conditions may be stable through 2007. A signal at the 202/Main Street intersection improves every downtown intersection until 2016.

6. **One-Way Scenarios:** In each of several one-way scenarios tested, at least one intersection was improved. However, the improvements were negated by worsened conditions at other intersections.

7. **Downtown Safety:** Turning right onto Grove Street from School Street is often made difficult because of large vehicles that park in the last space nearest the hydrant. Removing this parking space would make this intersection safer. Turning left (westbound) onto Main Street from Grove Street can be another tricky maneuver for the same reason. Pedestrian safety is also a concern in the downtown. There have been no accidents involving pedestrians, but there have been plenty of close calls.

8. **Parking:** A survey of the Downtown businesses was administered to assess the perceived problem. The survey represented nearly 100 businesses in the Downtown. The results indicate that parking demands in Downtown Peterborough are nearly at capacity frequently during the day. Any increase in business growth and/or residential development will only exacerbate the problems.

9. **Best Alternative:** Existing downtown circulation would be improved if 25% of the downtown cut-through traffic was diverted back onto NH 101 and NH 202 through downtown traffic calming measures, signing strategies, and signal coordination, with an assumed signal installed at NH101/202. The addition of a traffic signal at Main and Concord improves downtown traffic until 2020.

B. New Hampshire Route 101 Corridor Study

Annual traffic growth along the corridor for the years 1978-1998 ranges from 2.3% to 3.0%. Traffic growth on major state routes throughout southwestern New Hampshire for the same years ranged from 2.3% to 3.9%. Highway capacity is constrained in several segments of the highway, including the US 202 dogleg in Peterborough.

Several unsignalized intersections had level-of-service ratings of "E" or "F" for some movement during the day using 1998 turning movement data: US 202 North (Granite Street); NH123 and Old Street Road. Also the signalized intersection of US 202 South and Grove Street in Peterborough had a level-of-service of "D."

State of NH accident records for the period 1993-1997 confirm opinions about hazardous areas in the corridor. There are several priority problem areas with more than ten accidents: the intersection of Upper Union Street (12, one fatal); the intersection of NH 123 (20); and the vicinity of Miller State Park (11).

Property owners express concern about traffic volumes and speed encroaching on local community life, as well as reducing the efficiency of the highway for personal travel. Business and property owners alike predicted traffic pressure to worsen in the coming years and support the use of shared driveways to improve highway capacity, safety, and the business environment.

Ten traffic volumes projected for the years 2008 and 2018 do not indicate drastic reductions in intersection or roadway efficiency, but do predict increased traffic pressure on the open road, at intersections and in settled areas.

According to recent NHDOT highway capacity analysis study based on 1997 p.m. peak period traffic, most segments of NH 101 are operating at stable flow (Level of service "C-D") during the p.m. peak. One segment of NH 101 in Peterborough, between Grove Street and NH 123 experiences unacceptable delay of forced flow (Level of Service "E-F") during the p.m. peak.

C. US Route 202 Corridor Study

As in the NH 101 Corridor Study structure, the US 202 Corridor Study was structured in much the same fashion. The Study was completed in October 2002 to develop a schedule of local road capacity and safety improvements for US 202.

Of major concerns are the places of dangerous highway geometry; growing traffic volumes; close proximity of highway traffic to residential, commercial, and public land uses (and unsafe conditions for pedestrians and local traffic); pervasive environmental impacts including noise, road dust, vehicle emissions, stormwater runoff, and constant demand for commercial access to the highway.

D. Traffic Study and Modeling at Fifteen Intersections

In September 2001, traffic consultants were hired by the Town to assess the condition of fifteen of the major intersections where it had been determined significant capacity and/or safety deficiencies existed. The consultants focused their efforts on intersections that only dealt with Town roads and prioritized the projects as follows:

1. Downtown Area.

- Main Street at Grove Street and Bank Driveway.
- Main Street at Summer and Depot Streets.
- Grove Street at School and Phoenix Lane.

2. Main Street at Elm, High, and Union Streets.

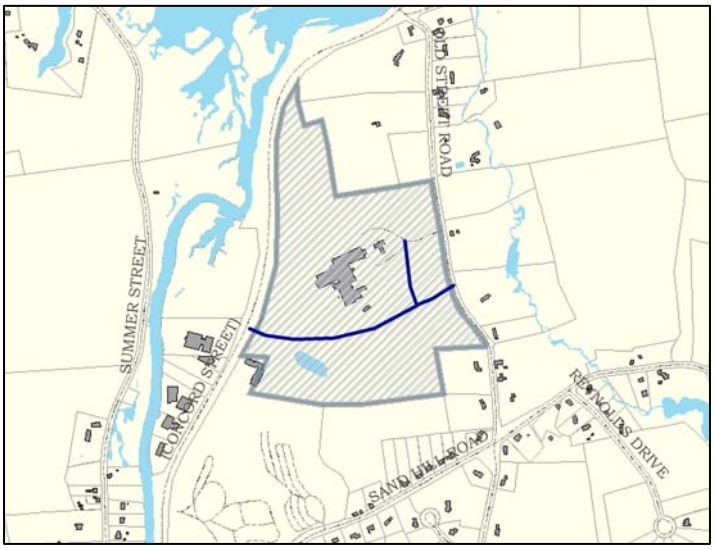
3. Sand Hill Road and Old Street Road.

Each intersection was analyzed by using automatic traffic counts as well as observation. Counts were taken at the peak evening period of each weekday, between 4:00 and 6:00 p.m. Projections for possible changing conditions were developed using the SYNCHRO analysis program. Conditions of an intersection are evaluated according to its Level of Service (LOS), "A" being the best.

Included in the report is a list of intersections determined to be "D" (the influence of congestion is noticeable), "E" (operating conditions have high delay values), or "F" (probably unacceptable to most drivers). The recommendations of this study are addressed in the Land Use Plan and Implementation sections of this Master Plan.

E. Proposed Connector Road Study for Monadnock Community Hospital

The purpose of a connector road is to provide an alternative access to the hospital and Old Street Road, reduce or eliminate cut-through traffic along Old Street and Sand Hill Roads, and improve the safety and operation of surrounding roadway intersections. Of particular safety concern is the steep downgrade on Old Street Road approaching Route 136, which is considered the most dangerous intersection in Peterborough.



The consultants concluded that the surrounding intersections are expected to experience capacity deficiencies without the construction of the connector road. Of four alternatives studied, the one providing the greatest benefit was the closure of the Old Street Road approach to Route 136 in conjunction with the hospital connector.

VI. Alternative Modes of Transportation

For means of reference, alternative transportation is defined as any transportation other than one person traveling in one car, or transportation by any means other than a car. Alternative transportation would also be any form of mass transportation. The reasons for developing these alternatives are that the rise of individual automobile use has had a cumulative negative effect on the environment, land use, the loss of open space, health, productivity, residential property values, cost of town government and services, and personal safety, among other areas.

Historically, the original forms of transportation that existed in America, as well as in Peterborough, were what people today call alternative transportation. Pedestrian travel and then various forms of mass transportation were the first to exist. In the not too distant history, Peterborough residents were able to choose among bus, rail, and taxi service.

Pedestrian travel seems to be the first and simplest form to address. Becoming pedestrian friendly is the goal of many towns or cities. Many physical improvements can be made throughout our town to achieve this: delineated crosswalks, tree plantings, park benches, street calming, curb extensions, lowered speed limit requirements, and more closely monitored speed areas can all make a town more accommodating. This form of transportation is also the one form that is the most vulnerable to harm from the other forms of transportation, most obviously, vehicular traffic.

While passenger rail service has unfortunately disappeared from Peterborough since the 1950's, (but not entirely from New Hampshire and is currently returning to some areas), bus service via the Vermont Transit Line has made a reappearance in the adjacent town of Dublin. The Traffic and Transportation Subcommittee has discussed means to accommodate a bus stop within Peterborough, perhaps next to the Town House, to encourage Vermont Transit to travel through West Peterborough and into the downtown, on its way to and from Boston.

Travel within Peterborough has also benefited in a small way by mini-buses sponsored by Senior Focus and RiverMead. Developing this type of transportation has been successful in other communities. The primary beneficiaries of this type of alternative transportation are those who, either due to age or physical or financial situation, do not have any other way to travel.

Another mode of alternative transportation that Peterborough could develop is bicycle use. While the Town currently enjoys the recently developed bike path, it would appear that this

particular effort is more for weekend recreation than for Monday through Friday transportation. Bicycle use is another form of alternative transportation that is subject to the following variables: weather, age, health, and social acceptance. (While you may see various citizens enjoying their bikes for recreation, how many of these same citizens do you see commuting to work on their bikes?) Maybe we need some role models.

To develop bike transit, the Town would need to explore various commuter routes and make accommodations on both the roads and in parking facilities. The first routes that would seem to make sense are the 202 and 101 corridors. Route 202, especially along Concord Street, enjoys a well defined "aisle" next to the travel lanes which are only used on Sundays for Church parking. Union Street would also be an area where bike lanes could be developed for commuting in from the village of West Peterborough.

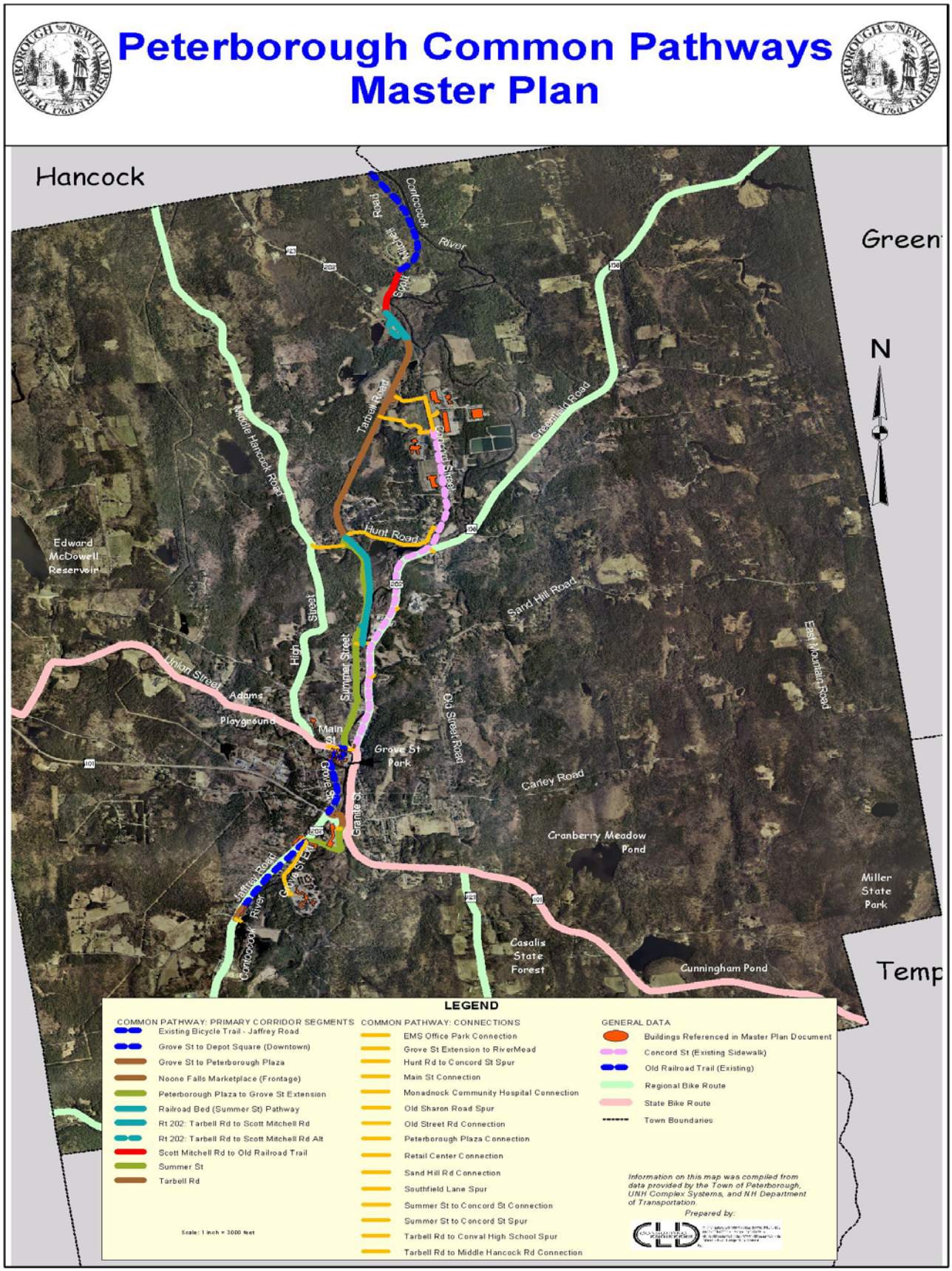
More efficient use of vehicular transportation can make more effective use of transportation. Required carpooling, off-site parking areas, and "Ride-Share" are ways to minimize the number of one person/one car travel. The number of one person/one car uses are not required or work-related. Studies indicate that 30% of all trips are errands, 30% are social and recreational, 22% are for work commuting, and 8% are for vacation.

The increase in car use would seem closely related to many social life style changes, not the least is the rise in personal wealth and life styles. While populations of the individual households have shrunk, the total numbers have increased (more single-parent families).

While we cannot change the world, we can effect what happens in "Our Town." As responsible town citizens, we should espouse and practice more sane land and road planning and not encourage policies that cause an increase in vehicle traffic, which would be ultimately self-defeating for this and future generations of Peterborough residents. Managing the current vehicular traffic should not segue to promoting more vehicular traffic. Other areas of our study should be reviewed individually to make sure we are not promoting any proposals that would cause harm to Peterborough's claim to fame, that it is "A Good Town to Live In."

The Common Pathway

The Common Pathway is a multi-use transportation trail in Peterborough, born of a vision of the Riverwalk Committee established in 1994. The Pathway, from its inception, was intended to serve as a transportation alternative to motor vehicles, as well as a recreation resource. Construction of the Pathway is being accomplished in phases, with most of the funding provided by the NHDOT. The primary corridor runs north-south through Town, linking neighborhoods, schools, civic and cultural spaces, and businesses. When complete, the Pathway will link with other recreation and trail resources in Town as well as to a regional and statewide bicycle and greenway system.


Peterborough Common Pathways
Master Plan
Hancock
Green
Temp
N
Contoocook River
Scott Mitchell Road
Tarbell Road
Concord Street
Greenfield Road
Middle Hancock Road
Hunt Road
Edward McDowell Reservoir
Sand Hill Road
East Mountain Road
High Street
Summer Street
Union Street
Adams Playground
Main St
Grove St Park
Old Street Road
Carley Road
Grove St
Granite St
Cranberry Meadow Pond
Jaffrey Road
Grove St Ext
Miller State Park
Casalis State Forest
Cunningham Pond
LEGEND
COMMON PATHWAY: PRIMARY CORRIDOR SEGMENTS
Existing Bicycle Trail - Jaffrey Road
Grove St to Depot Square (Downtown)
Grove St to Peterborough Plaza
Noone Falls Marketplace (Frontage)
Peterborough Plaza to Grove St Extension
Railroad Bed (Summer St) Pathway
Rt 202: Tarbell Rd to Scott Mitchell Rd
Rt 202: Tarbell Rd to Scott Mitchell Rd Alt
Scott Mitchell Rd to Old Railroad Trail
Summer St
Tarbell Rd
COMMON PATHWAY: CONNECTIONS
EMS Office Park Connection
Grove St Extension to RiverMead
Hunt Rd to Concord St Spur
Main St Connection
Monadnock Community Hospital Connection
Old Sharon Road Spur
Old Street Rd Connection
Peterborough Plaza Connection
Retail Center Connection
Sand Hill Rd Connection
Southfield Lane Spur
Summer St to Concord St Connection
Summer St to Concord St Spur
Tarbell Rd to Conval High School Spur
Tarbell Rd to Middle Hancock Rd Connection
GENERAL DATA
Buildings Referenced in Master Plan Document
Concord St (Existing Sidewalk)
Old Railroad Trail (Existing)
Regional Bike Route
State Bike Route
Town Boundaries
Information on this map was compiled from data provided by the Town of Peterborough, UNH Complex Systems, and NH Department of Transportation.
Prepared by:
Scale: 1 inch = 3000 feet

VII. Relevant Traffic and Transportation Issues in 1992 Master Plan

The 1992 Master Plan identified several transportation issues that are still relevant, which are summarized below:

A. Route 101/202 Intersection

Traffic in this intersection approximately doubled between 1973 and 1990. Daily traffic volumes in 1990 were: 101 west (7,161); 101 east (7,500); 202 north (11,500) and 202 south (10,800). The recommendation was to attract new business to this high-traffic area, while preserving the rural character of these main entrance roads. Also noted was the difficulty in turning west on Route 101 from the A & P Plaza and increased traffic on the right-of-way behind that shopping center to reach the 101/202 intersection via 202 South. No recommendations were made to remedy these issues.

B. Downtown Parking

The report noted that there had been increased demand for parking in the downtown that had been alleviated by the vacancy of the "Yankee" facility (now The Toadstool Bookshop). The recommendation was to buy the "Yankee" property and use part of its lot for municipal parking.

C. Downtown Traffic Flow

A visibility problem at Pine and Granite Streets was noted. Recommendations included cutting back the wall on the "Woodbury" property eight to ten feet or installing a mirror to see around the wall. Also, it was noted that traffic congestion on Concord Street was exacerbated by on-street parking and it was recommended that such parking be restricted.

D. Other Areas

- Restrict on-street parking on Concord Street to improve traffic flow.
- Relocate steep and dangerous intersection at Old Street Road and Route 136.
- Install a traffic light on Union Street at Adams playground to protect children crossing the street.
- Installing turn lanes and a single driveway to an industrial park were recommended to reduce interference with approaching traffic by vehicles entering Route 202 South.

VIII. Summary of Problem Area/Intersections

Based on the a review and analysis of the various transportation studies of Peterborough traffic issues, local committee investigations, and consultation with local police and emergency officials, the following is a list of locations that have been identified as being in need of improvement. The specifics for each location can be found in the Appendix.

1. Route 202 at Route 136 and Old Street Road
2. Route 202 at Main Street
3. Route 202 at Route 101
4. Route 123 at Route 101
5. Sand Hill at Old Street Road
6. Main Street at Elm Street, High Street, and Union Street
7. Downtown Area
   a. Main Street at Grove Street and the Bank Driveway
   b. Main Street at Summer Street and Depot Street
   c. Grove Street at School Street and Phoenix Hill
8. Route 202 at Route 101 and Grove Street
9. Route 202 at Grove Street and the Shopping Plaza Driveway

IX. Non-Structural Mitigation Techniques

There are several approaches to mitigating traffic problems that do not involve construction of infrastructure. Access management and traffic calming techniques are two of these, and are discussed briefly below; adjustments to the land use regulations can also have a significant impact on traffic issues.

A. Access Management

Access management means providing (or managing) access to land while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed. These techniques can be applied to maintain or enhance the capacity of existing roadway corridors without constructing new roads. See the Appendix for a more detailed description of these techniques.

- Increased access points slow traffic flows and increase potential accidents. Fifty percent (50%) of collisions are access related. There is a need to reduce curb cuts and speed of entry onto arterial highways.

  Effective access management can accomplish the following:

  - increase highway capacity 25-30%
  - extend the functional life of existing highways
  - reduce the need to spend tax dollars on capacity expansion
  - protect the economic vitality of businesses by preventing congestion that discourages tourism
  - reduce travel and delay times by 40-60%
  - decrease energy consumption by 35-50%
  - reduce vehicle emissions caused by acceleration, deceleration, and stops
  - maintain a community's existing character

- Pre-planned development (e.g. at intersections) is important. Access Management and land use should be closely coordinated between NHDOT and municipalities. Basic Implementation strategies include:

- corridor management plans as part of local master plans
- zoning and subdivision regulations and site plan reviews
- financial mechanisms, such as impact fees

- Specific techniques include:
  - interconnecting parking lots
  - turn lanes
  - shared driveways
  - service lanes
  - minimizing curb cuts
  - use of curbing to define driveways and restrict access
  - straightening intersections
  - off-road parking areas
  - keep development and driveways away from intersections
  - street widening dedication

B. Traffic Calming

Local officials seek roadway and landscape design concepts and speed enforcement approaches to accomplish traffic calming. Traffic calming techniques are found to mitigate negative impacts of start-and-stop traffic, mixed-speed traffic, and high-speed traffic, thereby providing the following results:

- Safely integrate pedestrians and bicyclists;
- Reduce traffic accidents involving vehicles, pedestrians, bicycles, property damage;
- Reduce vehicle emissions, noise, exhaust, dust, road spray; and
- Relieve intersection congestion.

C. Zoning and Subdivision Regulations

GIS analysis provides insight into the potential for additional residential and commercial development. This information should cause review of the original basis for current zoning and the expected outcomes in terms of the distribution of land uses along highways with its effects on municipal services, state and local highway capacity, and community character.

Consider adopting NHDOT Municipal Roadway cross-section based on average daily traffic. Use minimum width of 18-20 feet (gravel or paved) and two-foot shoulders for emergency access. This helps to slow traffic and the town saves 20% over resurfacing costs of 24-foot pavement.

Performance standards should be introduced into the subdivision and site plan review regulations requiring developers to minimize and provide for traffic impacts. The regulations currently allow the Planning Board to require traffic impact studies if, in its opinion, a proposal might result in undue traffic impacts at that location. In addition, it might be advisable to consider conducting traffic impact studies for some proposed zoning amendments. Understanding early on the potential for traffic being generated by certain proposed uses could minimize later concern over actual projects.