

XI. TRANSPORTATION

A. Introduction

The Transportation element of the Master Plan is not simply a list of future projects, but is an infrastructure plan that establishes the overall goals and guiding policies for addressing transportation issues within Salem. This chapter has direct relationships with the land use, population and housing, natural resources, and community services and facilities sections of the master plan. The transportation system and the guiding policies established in the transportation chapter can affect a community's physical, social and economic setting as follows:

Physical: The transportation system is one of the chief determinants of physical settlement patterns, and its location, design and modes have major impacts on land usage, air quality, plant and animal habitats, environmental noise, energy use, community appearance and other environmental components.

Social: The circulation system is a primary determinant of the pattern of human settlement. It has a major impact on the areas and activities which it serves (or does not serve), on the structure of the community, and on the quality of human life. The circulation system should be accessible to all segments of the population, including the young, the elderly and the economically or physically disadvantaged.

Economic: Economic activities normally require circulation for materials, products, ideas or employees, and thus the viability of the community's economy is directly affected by the transportation element. The efficiency of a community's transportation system can either contribute to or adversely affect that community's economy by enabling or hindering this flow.

In as much as the transportation system affects the shape and setting of a community, expansion in population and land use are usually the driving force and transportation improvements are in reaction to the changes being seen. The pattern in which this growth occurs will have a tremendous impact on the transportation system, and an important aspect of Salem's future development will be pattern of future commercial and residential growth. Like many other New England towns that developed along waterways and trails connecting to nearby communities, Salem's initial transportation system developed along the easiest, most convenient routes. In contemporary times, Salem has developed with primary reliance on the automobile and the highway network. Other forms of transportation, while present, contribute only a small portion of total travel. As the community has grown in size, population and commercial activity, the roadway network has expanded to serve newly developed areas and land uses. In recent years, Salem's commercial and industrial businesses have become much more of a destination point to an increasing number of nearby residents, especially cross-border shopping trips from Massachusetts. At the same time, investment in transportation infrastructure has not kept pace with that growth. The result has been that the steady increase in traffic volumes has been accompanied by a rise in congestion, traffic accidents and traffic circulation problems, particularly on and adjacent to the major thoroughfares in the town. Roadway maintenance and improvements, circulation improvements, investment in alternative modes such as transit and bicycle travel, innovative demand management techniques and wise planning of the location and

extent of further development will all play an important role in the future of the Town's transportation system.

The recently completed (January, 2000) Salem Community Profile highlighted a large number of important issues related to growth and transportation. These issues include the following:

- Poor road systems circulation, especially along the major corridors.
- Lack of public transportation (Especially for seniors).
- Inadequate capacity of major intersections, notably at "the depot" area of NH 28 and NH 97 (Main Street and Broadway Street).
- Inadequate pedestrian and bicycle facilities.
- Inadequate capacity on secondary roadways.
- "Cut through" traffic in residential areas.
- Traffic congestion on NH 28 (Broadway).

At the same time, the Community Profile also highlighted many perceived strengths in Salem's transportation system:

- Development pays for many road improvements.
- Direct access to major highway facilities.
- Good response to town road maintenance.
- Town's zoning works to counteract sprawl.
- Some parking lots and shopping centers interconnected on Broadway.

The overall objective of the Transportation Chapter should be to address the above issues and impacts through the development of a cost-effective transportation system which ensures adequate mobility to all persons, enhances the quality of life in the region, supports economic development, and makes a meaningful contribution towards achieving the environmental aims of the town. This is accomplished through the establishment of guiding policies that address system level deficiencies, and look at the "big picture" of the impacts of growth on the transportation system.

This chapter will provide an overview of Salem's transportation system, review the recommendations from previous planning documents, and attempt to address the issues presented.

B. Highways

1. Background

Salem is served by an extensive network of streets and roadways that provide connections to places within the town as well as to the surrounding communities and greater region. Exhibit 7 shows the principal roadways in and around Salem. These include Interstate 93 and NH 28, which serve primarily north-south traffic, and NH 97, NH 111, and NH 38, which serve primarily east-west traffic. The map also shows the significant network of streets and roadways that provide connections from these primary roadways to the land uses and activities that occur

throughout the town. Many of the streets discussed in the following pages are labeled on this map.

There have been a number of planning and engineering studies undertaken in Salem over the past 20 years that are shaping and influencing the transportation system that is being developed. Most of these efforts have been specific to the primary corridors within the town, and have resulted in construction projects, and plans for future improvement. Still others have set the policies, goals and objectives of the town and guide how transportation problems are resolved. A discussion of some of the more relevant studies is discussed below and provides an excellent introduction to Salem's transportation system and its problems.

Town-wide Transportation Planning Study (1987): This study is the most comprehensive look at the transportation system that Salem has occurred, and was undertaken as a response to the industrial, commercial and residential growth that the town has undergone and the increase in traffic volumes that had been measured. Significant development potential was still felt to be available along the primary transportation corridors in the town, and the impacts of that growth needed to be addressed on a level greater than the individual projects. The primary goals of the study were to define the nature and magnitude of existing traffic operations and safety problems, identify the future impacts of anticipated development, to assess alternative improvement measures within the study areas, and to develop a guide for transportation decision making related to land use and transportation system improvements. This study recommended roadway improvements in a number of areas, many of which have been implemented:

- Widen and improve the intersection of Route 28 and Veterans Memorial Parkway/Rockingham Park Boulevard
- Widen Rockingham Park Boulevard to 2 through lanes in each direction
- Improve the intersection of Route 28/Cluff Road/Cluff Crossing Road
- Modify the signal timing of the intersection of Route 38 and South Policy Street.
- Widen Pelham Road between Manor Parkway and I-93 and between I-93 and Policy Street.
- Improve the intersection of Pelham Road/Manor Parkway/Stiles Road.
- Improve Pelham Road between I-93 ramps
- Widen and improve Route 28 to a five lane cross section from Main Street to NH 111
- Widen the Route 28/Main Street intersection
- Realign the intersection of Route 28 and Old Rockingham Road so that Old Rockingham Road intersects perpendicular to Route 28.
- Improve the Route 28/Route 111/Lake Street intersection
- Upgrade the Intersections of Main Street with Millville Road, Geremonty Drive, Lawrence Road, School Street/Bridge Street, and North Main Street.

In addition to the roadway improvements listed above, the study also recommended a number of non-roadway improvements:

- Employer based ridesharing or alternative work schedule programs.
- Development Controls such as:
 - Adequate public facilities ordinance which would allow the Salem Planning Board to withhold approval of a development plan if public facilities (such as transportation) could not adequately service the proposed development.

- Growth Staging and Phasing Plan that would require that development plans be reviewed in terms of the availability of public facilities and the schedule of future capital improvements.
- Require a Transportation Access Plan for development over certain threshold limits that evaluates the impact of the proposed development on the town's transportation network, demand for parking and parking management strategies, and strategies to minimize the impact of construction
- Where possible coordinate traffic signals
- Integrate access management techniques into the development approval process
- Pedestrian crossing controls at signalized intersections where significant pedestrian activity is expected.

Salem Depot Area Study (1993): This study was undertaken to determine existing and future transportation needs of the Salem Depot area and develop a comprehensive plan and strategies to meet those needs. The study found poor operating and safety conditions at the study site during the morning, midday and afternoon peak periods. In looking at future conditions, the study examined two land use scenarios – existing zoning (five different residential business and Industrial Commercial zones), or rezoning to a single zone of mixed use development. Various alternative actions were examined and a reconstruction of the approach lanes and intersection of Route 28 and Main Street was recommended along with a new traffic signal at the intersection of Main Street and Millville Street, and an upgrade of the existing signal at Main Street and Pleasant Street. This project includes significant impacts to frontage property within the study area. The intersection improvement project is currently in the State Ten-Year Transportation Program of Projects scheduled for 2006.

Pelham Road Corridor Study (1990): This feasibility study was undertaken as expansion of the work performed in the Town-wide Transportation Study completed in 1987. The study examined the feasibility of upgrades to Pelham Road from the intersection of North and South Policy Streets westerly through the I-93 Exit 2 interchange, Keewaydin Drive, Stiles Road/Manor Parkway intersections, and to Commercial Drive. The study examined existing conditions, and estimated 20-year conditions (2010) for land use and traffic in the area. Improvements were recommended for additional through lanes in each direction on Pelham Road, as well as exclusive turn lanes on Pelham, Stiles Road and Manor Parkway. The I-93 Exit 2 ramps were recommended to be relocated and capacity increased with exclusive turn lanes. Additional long-term improvements were recommended as well, such as additional through lanes on portions of Pelham Road, additional exclusive turn lanes, and double turn lanes in some instances.

PLACE HOLDER FOR EXHIBIT 7
MAP OF SALEM W/ ROADWAYS

Impact Fee System (1988): The impact fee assesses new development a proportional share of capital costs of roadway improvements made necessary by growth in general. The Town-wide Transportation Study serves as the basis for this program, providing the baseline data analysis and recommended future roadway improvements for the primary corridors within the town. The baseline data, particularly volumes, provides a basis from which to estimate the changes in traffic resulting from any particular development. The recommended future roadway improvements provide specific projects with estimated costs, as well as estimated future capacity and flow improvements.

I-93 Expansion (Current): The planned reconstruction of Interstate 93 from the NH/MA state line to Manchester will have a major and prolonged impact on the Town from the project which begins construction in 2004. The current plan is to improve I-93 to 4 lanes from the state line to Exit 3 in Windham, where it will decrease to 3 lanes each direction between there and Manchester. However, placing 4 lanes each direction along the entire length is also an option. This project will also include a Transit component as well as extensive use of Intelligent Transportation Systems (ITS) technologies. The transit component will primarily take the form of intercity bus service along the corridor and south into the Merrimack Valley towns, Boston, and other areas of Massachusetts. This service will stop at park and rides that will be located at Exits 2-5 in New Hampshire. The ITS strategies that could potentially be used during and after construction include changeable message signs to alert drivers to congestion, lane closures and other information, synchronized and/or adjustable traffic signal timing, as well as other methods. The state is also investigating the use of Transportation Systems Management (TSM) and Transportation Demand Management (TDM) improvements. TSM measures are generally low cost, temporary solutions that work within existing right of way to reduce congestion and/or improve safety. TDM measures are designed to change personal travel behavior to reduce the demand for auto use and the need for larger capacity expansions. Finally, the improvements in the I-93 corridor will include planning for a future rail corridor within the I-93 right of way. What this means at this point is that space will be reserved within the design of the highway improvements to allow room for a future rail line that will follow the median of the highway. This would allow each of the proposed park and rides to be expanded to serve as rail stations in the future as well, and would limit the impacts of a new rail line on community downtown areas. As this project progresses through construction, it is likely that some highway traffic will divert to surface streets (notably NH 28 and other parallel roadways), and it will also likely reduce congestion on those same surface streets when complete in 2010. Even after reconstruction, Interstate 93 and the other major routes that converge (I-495, NH 28, NH 38/97, and NH 111) in and near Salem, will continue to generate traffic volumes and congestion that push local roads to their capacity.

The above studies and projects will continue to play a critical role in the development of the transportation system in Salem. Many of the projects that have been constructed in Salem over the last 15 years are the outcome of one of these projects, and many of the future improvements were initially defined from these studies.

2. Highway Classification

Salem relies primarily on its highways to provide the transportation network for private cars, trucks and buses. These roadways are each classified under two structures; The State System Classification and the Federal Functional Classification.

a. System Classification

A State law adopted in the 1940's serves as the basis for the State Road System Classification that is still in use today. This classification scheme has 8 categories of public roads and each roadway is grouped based on the role of the roadway, as well as who is responsible for maintaining it. All of the roadways in the State are classified as follows:

Class I: Trunk Line Highways – These consist of all existing or proposed highways on the primary state highway system, excepting all portions of such highways within the compact sections of towns and cities of 7,500 inhabitants and over. The state assumes full control and pays cost of construction, reconstruction and maintenance of its sections the portions in compact areas controlled by the towns and cities under Class IV highways;

Class II: State Aid Highways – Consist of all existing or proposed highways on the secondary state highway system, excepting portions of such highways within the compact sections of towns and cities of 7,500 inhabitants and over, which are classified as Class IV highways. All sections improved to the satisfaction of the commissioner are maintained and reconstructed by the State. All unimproved sections, where no state and local funds have been expended, must be maintained by the town or city in which they are located until improved to the satisfaction of the highway commissioner. All bridges improved to state standards with state bridge aid funds are maintained by the State. All other bridges shall be maintained by the city or town until such improvement is made.

Class III: Recreational Roads – Consist of all such roads leading to, and within, State Reservations designated by the Legislature. The State Highway Department assumes full control of reconstruction and maintenance of such roads.

Class IV: Town and City Streets – consist of all highways within the compact sections of towns and cities of 7,500 inhabitants and over. Extensions of Class I and Class II highways through these areas are included in this classification. At present there are 13 cities and 9 towns in this category.

Class V: Rural Highways – Consist of all other traveled highways which the town or city has the duty to maintain regularly.

Class VI: Unmaintained Highways – Consist of all other existing public ways, including highways discontinued as open highways, highways closed subject to gates and bars, and highways not maintained in suitable condition for travel for five years or more.

Class VII: Federal Agency Roads – Consists of U.S. Forest Service roads and state secondary roads maintained by the U.S. Forest Service, also other toll highways not on the state turnpike system (i.e. private toll road, Mt. Washington toll road, Monadnock toll road).

Class VIII: Interstate Highways and Ramps - This category consists of highways and their ramps that are part of the National System of Interstate and Defense Highways. These roads are also considered part of the State Primary System (Class I)

Salem is served by classifications of roadway except Classes III and VII. Class I roads are State maintained primary or trunk line highways such as NH 28 and Rockingham Park Boulevard. As shown in Table XI-1, there are presently 11.06 miles of Class I highways in Salem, of which 6.37 miles are maintained by the Town and the remaining 4.69 miles are State maintained. There are 29.183 miles of Class II, or State Secondary roads in Salem. This classification includes Main Street (NH 97), Lowell and Pelham Roads, and others, with maintenance for this classification of roadways split between the Town (16.763 Miles) and the State (12.42 Miles). Class IV roads, or town streets make up the bulk of road mileage in Salem with 133.149 miles. These are all of the Urban Compact roads within the town that are not on the State Primary or Secondary System (Class I or II), such as South Policy Street and Lawrence Road. The town is completely responsible for the maintenance of these roads. Salem also has 82.37 miles of Rural Highways (Class V). This classification includes all town roads that are outside of the Urban Compact boundaries such as portions of Pelham Road and North Main Street. The Town also has a small amount of Class VI or non-maintained roadways (3.23 miles). These roads are ones that have not been maintained for at least 5 years and are subject to gates and bars. Finally, within the Town are 18.613 miles of Class VIII roadways. These are the highways and their ramps that are part of the National System of Interstates and Defense Highways. The north and south segments of the highway are counted as individual facilities which explains why the mileage of this class is higher than expected.

Table XI-1: State System Classification & Mileage

Class/Code	Description	Mileage
Class I: State Primary System		
11	State Maintained	4.69
14	Town Maintained (Urban Compact)	<u>6.37</u>
	TOTAL	11.06
Class II: State Secondary System		
22	State Maintained	12.42
24	Town Maintained (Urban Compact)	<u>16.763</u>
	TOTAL	29.183
Class IV: Town/City Streets (Urban Compact)		
44	Town Maintained	133.149
Class V: Rural Highways		
55	Town Maintained	82.37
Class VI: Non-Maintained Roadways		
66	Non-Maintained	3.23
Class VIII: Highways and Ramps (National Interstate Highway System)		
81	State Maintained	18.613

Class IV and V roads are the only road type that has grown appreciably in the past several decades. New residential subdivision streets that are turned over to the Town become Class V roads once they become public.

b. Functional Class

In addition to the State classification scheme, there is a Federal Functional Classification system, which consists of 4 primary types of road and was developed based on the type of service that is intended to be provided by each category of roadway. In 1993 the NHDOT, in cooperation with the Federal Highway Administration and regional planning commissions, established a revised functional classification of all highways in New Hampshire. These classifications, which complement the State classifications, are primarily based on the traffic capacity and volumes attributed to the roads and are divided into rural and urban systems. They are important because they are used to determine where and under what conditions Federal Highway funds may be utilized. Roads that have a functional class of Collector or higher are eligible for Federal highway funds. There are four classes, each represented in Salem as described below and illustrated in Table XI-2:

Principal Arterial: Serves primary centers of activity, the highest traffic volume corridors, and the longest routes. In addition they generally carry the major portion of traffic entering and exiting the community. This category is further divided into Principal Arterial (Interstate), Principal Arterial (Other Freeways and Expressways, and Other Principal Arterials - Urban) In Salem, this category is represented by Interstate 93 for both Rural and Urban classifications. In addition, NH 28 (Broadway) and NH 111 are considered Other Principal Arterials under the urban system.

Minor Arterial: Links and supports the principal arterial system. Minor arterials are roads which place a greater emphasis on land access than the principal arterial and therefore offer a lower level of mobility. They serve as links between larger and smaller towns or as connections between collectors and the primary arterials. In Salem, Main Street, Rockingham Park Boulevard, Lawrence Road and a number of other streets perform this function.

Collector: Provides both access to land uses along the roadway and circulation within residential

Table XI-2: Functional Class of Salem Roadways

Salem Roadways	Classification						
	Interstate	Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Collector	
I-93	[
NH 28 (Mass SL to NH 111)		[
NH 111		[
NH 97			[
NH 38							[
Lawrence Road			[
Kelly Road			[
Policy Street			[
South Policy St			[
Hampshire St							[
Veterans Memorial Parkway							[
Geremonty Dr							[
Butler Street							[
Bridge Street							[
Wheeler Street							[
Hampstead Rd							[
Bluff Street							[
Millville Street							[
Lake Street							[
Zion's Hill Road							[

neighborhoods, and commercial and industrial areas. It differs from the arterial system in that the facilities on the collector system may penetrate residential neighborhoods. Conversely, the collectors also collect traffic from the local streets in residential neighborhoods and channel it into the arterial system. In Salem, streets such as North Main Street and Veteran’s Memorial Parkway are considered collectors along with Millville Street, School Street, Bridge Street, Geremonty Drive, and others.

Local Roads: Comprise all facilities not on one of three systems described above. Their function is to primarily provide direct access to abutting land and access to the higher order systems. They offer the lowest level of mobility, and service to through traffic movement is usually deliberately discouraged. Roads categorized as local are generally not eligible for federal funding for improvements or maintenance. Local roads are ineligible for Federal highway aid to assist in paying for improvements.

3. Traffic Volumes and Growth

Salem has exhibited significant increases in traffic volumes over the past several decades. In an effort to monitor changes in traffic volumes the NHDOT and RPC conduct annual traffic counts using automatic recorders at varying locations throughout the region. In addition, the NHDOT maintains a network of permanent counters at key locations around the State to monitor long-term trends. There is one of these devices in Salem, located on Interstate 93 at the Massachusetts/New Hampshire State Line, and Table XI-3 shows the volumes that have been measured at that location since 1979. Overall, volume on Interstate 93 has increased on 1993 from an Average Daily Traffic (ADT) of nearly 42,000 cars per day in 1979 to approximately 112,500 cars per day in the year 2000. This translates to an overall average growth rate of 4.95% per year.

The NHDOT’s Bureau of Transportation Planning Traffic Research Section monitors traffic growth throughout New Hampshire and publishes monthly Automatic Traffic Recorder Reports for many locations. In addition, NHDOT conducts traffic counts during the summer months at additional locations and will respond to community requests. Over the years, the NHDOT has monitored traffic volumes at approximately 110 locations within Salem. Many of these locations are monitored only infrequently, while others are monitored every few years. In addition data from studies performed by NHDOT, Salem, The Rockingham Planning Commission, and other agencies is available to supplement the regularly (or irregularly) scheduled traffic counts. The most recent counts from some of these locations are shown in Table XI-4 on the following page. The volumes are

Table XI-3
Permanent Recorder Counts

SALEM/I-93 STATE LINE		
YEAR	ADT	GAIN/LOSS
1979	41,967	NA
1980	41,733	-0.6%
1981	43,898	4.9%
1982	49,390	11.1%
1983	54,893	10.0%
1984	60,443	9.2%
1985	67,040	9.8%
1986	75,383	11.1%
1987	80,996	6.9%
1988	83,251	2.7%
1989	86,376	3.6%
1990	87,307	1.1%
1991	85,557	-2.0%
1992	89,729	4.6%
1993	92,923	3.4%
1994	96,083	3.3%
1995	99,121	3.1%
1996	100,970	1.8%
1997	101,676	0.7%
1998	104,903	3.1%
1999	110,596	5.1%
2000	112,495	1.7%

shown in Annualized Average Daily Traffic or AADT. AADT is the average daily traffic that has been adjusted to eliminate seasonal fluctuations.

Table XI-4: Selected Salem Traffic Counts 1996-2000

Location	1996	1997	1998	1999	2000
NH 28 at Windham Town Line			12000		
NH 28 South of NH 111			17067		
North Broadway North of Dyer Avenue		19000			20609
NH 28 North of Main Street		28000			
NH 28 South of Main Street		24000			
NH 28 North of Rockingham Blvd	26000	24000			
NH 28 South of Rockingham Blvd		30000			
NH 28 North of Lawrence Road			21000		
NH 28 at NH/Mass State Line		27000	27000		
Pelham Road West of I-93		15000			
Pelham Road West of N & S Policy Streets	20000	17000	19000		
Main Street West of NH 38			12000		
Main Street East of Route 28			14977		
Main Street East of Millville Rd	15000	15000		14000	15943
Main Street East of Merrill Avenue		12000			12788
Main Street East of School Street		16000			23694
Main Street At NH/MA State Line	11000			12000	14557
Geremonty Drive South of Main St (NH 97)			7900		
Lawrence Road South of NH 97 (Main St)	10000				12096
Lawrence Road South of Veterans Parkway			8600		
Lawrence Road South of Tyler Street			4500		
Lawrence Road East of NH 28		5300			5832
Rockingham Blvd West of NH 28		31000			
Veterans Memorial Parkway East of NH 28	14000			20000	
Veterans Parkway West of Lawrence Road		9700			10946
Cluff Crossing Road West of NH 28		16000			11872
NH 38 (Pleasant St) South of Main Street	4800			4700	
NH 38 East of South Policy Street			9800		
NH 38 West of I-93			12000		
Policy Street at Windham/Salem Town Line	4100			6900	
North Policy Street North of Pelham Road		10000			11299
Policy Street South of Main Street		9900			11212
Lake Street South of Bluff Street	4700		5100		
School Street East of Millville Street			7700		
School Street North of Main Street (NH 97)		5700			6214
Bridge Street South of Main Street (NH 97)	5700			5200	
North Main Street North of Bluff Street			8300		7541
North Main Street North of Main Street (NH 97)			7100		
NH 111 East of NH 28		17000		17000	
NH 111 at Windham/Salem Town Line		19000			21113

4. Circulation

North and South Broadway (NH 28) and Interstate 93 act as the central spine for travel in Salem, connecting the Town with Massachusetts to the South and Windham to the North. In addition, Route 28 provides connections to the many of the other arterials and collectors in Salem.

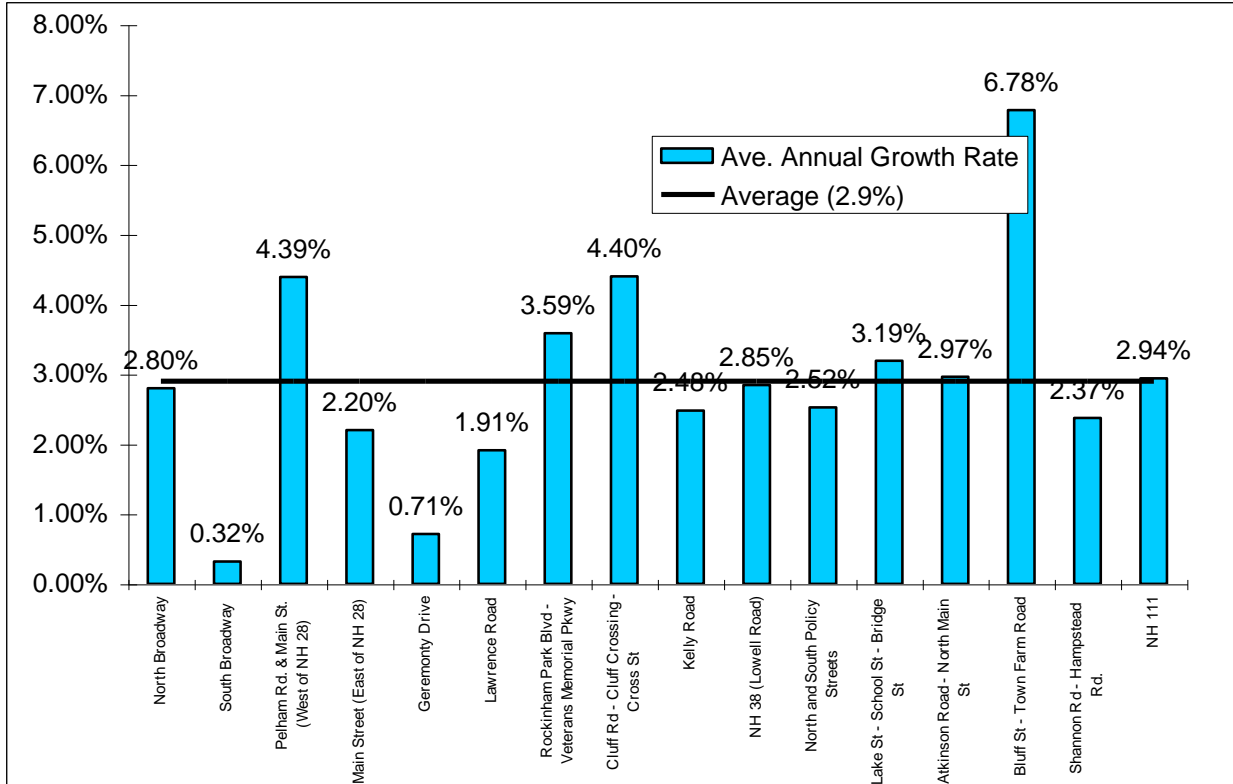
East-west circulation in Salem is accomplished primarily via Main Street (NH 97) and Veterans Memorial Parkway on the east side of Route 28. In addition, Lake Street and Bluff Street also perform the role of east-west collectors of residential traffic. West of Route 28, Pelham Road and Lowell Road play an important role in carrying traffic to and from the west.

Lawrence Road and Policy Street are minor arterials which serve to relieve Route 28 of some of its traffic and are used by many to avoid congestion on Interstate 93 South Broadway, and Main Street.

Growth in the Pelham Road Corridor has been significant during the 1980's and 90's and the segment of the road west of Interstate 93 has shown almost an 8.5% average annual growth rate. In 1983 average annual daily traffic volumes were at approximately 4600 cars per day. By 1994 volumes were up to approximately 14,000 cars per day. Most recently growth has appeared to have slowed on the corridor, and the most recent traffic count performed in 1997 had only seen a small increase over 1994 to 15,000 cars per day. The section of Pelham Road between Interstate 93 and Policy Street has also seen substantial growth. In 1981, that portion of the roadway was carrying approximately 8500 cars per day on average. By 1990 this had increased to 10700, and in 1998 was up to 19000. This is an overall average growth rate of 4.7% per year. Overall, the traffic corridor of Pelham Road and Main Street west of Route 28 has shown an average growth rate of approximately 4.4% per year. The average annual growth rate for many of the primary transportation corridors in Salem, including Pelham Road, is shown in Figure XI-1 below.

Figure XI-1 shows in the columns the average annual growth rates for many of the primary transportation corridors in Salem. In addition, it has a line that shows the average growth rate for these corridors, which is approximately 2.9% per year. Many of the higher volume roadways are showing growth rates lower than the average, notably South Broadway, Main Street, and Lawrence Road. On the other hand, Bluff Street is showing an extremely high growth rate along its length (6.78% per year). This high growth rate is partially due to the small volumes of traffic that have historically used that roadway (the highest measured location increased from 1200 vehicles per day in 1990 to approximately 3800 in 2000), and that small changes in actual volume can lead to large percentage changes. However, this also points to a trend of steadily increasing volumes on the town secondary road system. While the volumes on many of these roads are still relatively small, they are showing high growth rates as they serve more residential development, and also carry through traffic that is taking a "shortcut" or is avoiding congestion on one or more of the primary roadways.

Figure XI-1: Average Annual Growth Rates of Traffic



5. Commuting Patterns

Until the 2000 Census information on commuting patterns becomes available sometime in 2002, the most reliable information available on commuting patterns comes from the 1990 Census (See Table XI-5). In that Census, it was reported that just over 14,000 workers lived in Salem and approximately 9,500 commuted to other towns or cities for work. Of those workers who did not work in Salem/Windham, the vast majority (85%) worked in Massachusetts. Of the workers living in Salem, about 32% of workers also work there, and an additional 31% work nearby in the Merrimack Valley. The remaining 37% of workers are spread out through the remainder of New Hampshire and Massachusetts. In addition, there are approximately 6,200 New Hampshire residents and 3,000 Massachusetts residents that commute to jobs in Salem. The New Hampshire residents primarily come from Southern New Hampshire towns and the Cities of Nashua and Manchester. Those commuting from Massachusetts come primarily from the Merrimack Valley cities and towns and the Boston Metro area.

The survey developed for the 2001 Master Plan update indicates that about 34% of those surveyed that are working do so in Salem, while another 55% work in Massachusetts. While this survey data does have a biased sample of the population [bias towards individuals older than 55 and against those younger than 35], it does generally reflect that the commuting pattern seen in the 1990 census still holds true. Salem and the Merrimack Valley in Massachusetts remain significant work destinations for a large number of the resident Salem workforce. This would seem to provide a strong basis for the implementation of transit service both within Salem, and between Salem and the Merrimack Valley towns.

Table XI-5: Commuting Patterns

<u>Residents Commuting FROM Salem TO A New Hampshire Workplace</u>		
WORKPLACE	WORKERS	% OF TOTAL
Salem	4419	73.87%
Nashua Area	339	5.67%
Londonderry	215	3.59%
Manchester Area	254	4.25%
Windham	160	2.67%
Derry	87	1.45%
Plaistow	84	1.40%
Hampstead	77	1.29%
Pelham	55	0.92%
Remainder of NH	292	4.88%
Total Workers	5982	

<u>Residents Commuting TO Salem FROM A New Hampshire Residence:</u>		
RESIDENCE	WORKERS	% OF TOTAL
Salem	4419	41.42%
Derry	1357	12.72%
Londonderry	537	5.03%
Windham	486	4.56%
Manchester	476	4.46%
Nashua	437	4.10%
Pelham	303	2.84%
Hampstead	285	2.67%
Atkinson	256	2.40%
Raymond	227	2.13%
Hudson	220	2.06%
Plaistow	194	1.82%
Sandown	148	1.39%
Goffstown	103	0.97%
Merrimack	101	0.95%
Remainder of NH	1119	10.49%
Total Workers	10668	

<u>Residents Commuting FROM Salem TO A Massachusetts Workplace</u>		
WORKPLACE	WORKERS	% OF TOTAL
Boston & Surroundings	2541	31.69%
Andover	1174	14.64%
Lawrence	1170	14.59%
Methuen	885	11.04%
Lowell Area	821	10.24%
North Andover	588	7.33%
Rest of Merrimack Valley	508	6.33%
Remainder of Mass	332	4.14%
Total Workers	8019	

<u>Residents Commuting TO Salem FROM A Massachusetts Residence:</u>		
RESIDENCE	WORKERS	% OF TOTAL
Methuen	692	23.62%
Boston & Surroundings	509	17.37%
Lawrence	377	12.87%
Remainder of Mass	374	12.76%
Haverhill	296	10.10%
Rest of Merrimack Valley	161	5.49%
Andover	158	5.39%
North Andover	150	5.12%
Lowell	113	3.86%
Dracut	100	3.41%
Total Workers	2930	

6. Public Safety and Highway Accidents

The State Traffic Accidents Database shows that in the period between 1993-1999 there were approximately 7,900 reported accidents in Salem, 75% of which involved a collision between two or more motor vehicles. Of these accidents, there were 18 with fatalities (19 total fatalities) and 1575 with injuries for a total of 2234 injuries. Of accidents with injuries, Main Street has the most entries in the database with 126, followed by South Broadway with 107. There were 185 injury accidents that were related to parking lots and driveways/entrances.

a. Accident Types

The most prevalent type of accident in Salem were those that occurred “Along the Road”, and if accidents that occurred at driveway access points are included, this type of accident makes up 44% of all those recorded between 1993-1999. Intersection related accidents make up another 32% of accidents in Salem. The high volume and percentage of accidents that are occurring

Table XI-6: Accident Types

Accident Location	Number	%
At Intersection	1727	21.9 %
Intersection Related	783	9.9 %
Along the Road	2673	33.4 %
Along Road at Driveway Access	840	10.6 %
Off Roadway on Shoulder/Median	195	2.5 %
Off Roadway Beyond Shoulder	103	1.3 %
Ramp/Rotary	115	1.5 %
In a Driveway	73	.9 %
In a Parking Lot	1183	15 %
Other	232	2.9 %

along the roadway can be an indicator of both congestion, as well as inadequate access/egress from driveways. Vehicles stopping in the travel lane to make right or left turns can cause many of these accidents as drivers are not expecting traffic to stop. Not knowing what vehicles were doing immediately prior to the accident limits the conclusions that can be drawn from the analysis, but it does point out that there is a problem.

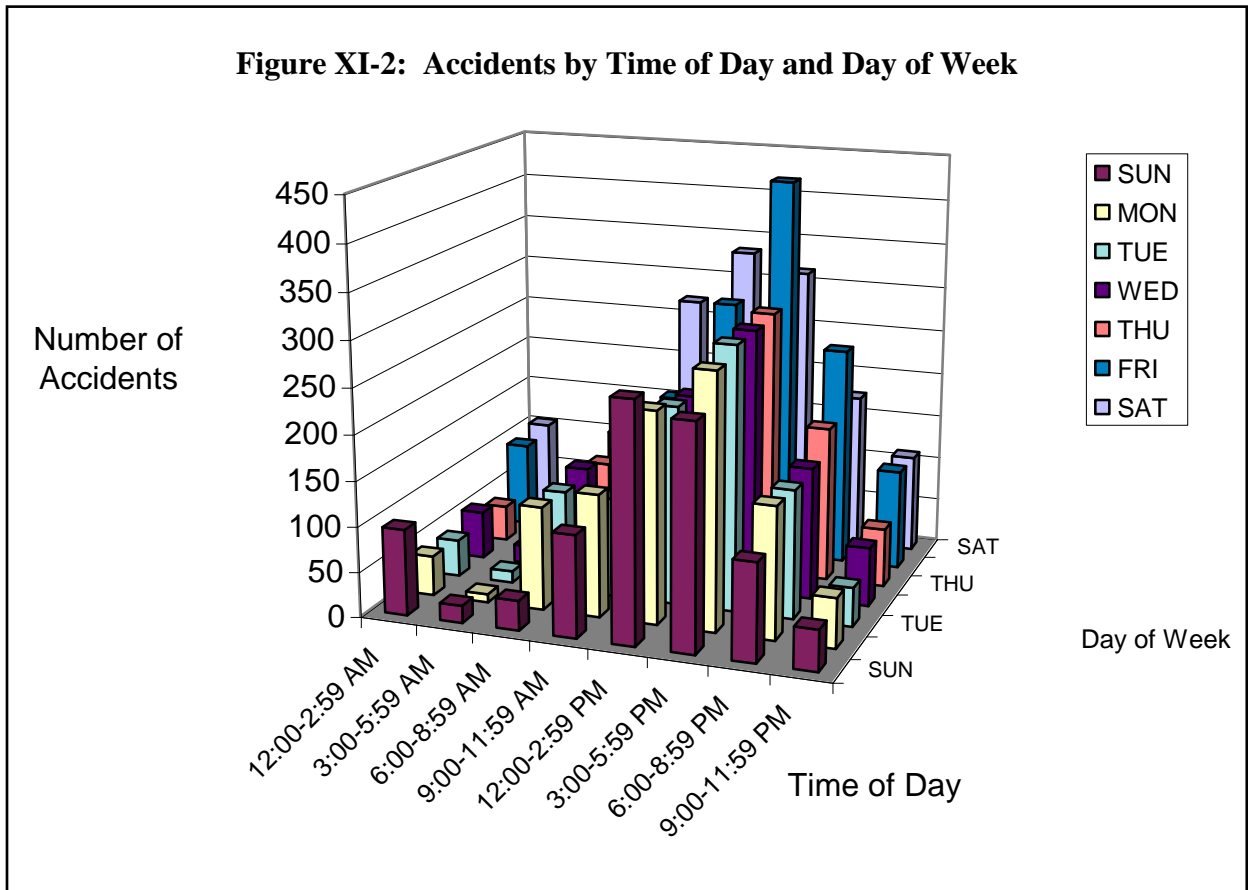
b. Accident Locations

There are several locations in Town with a particularly high incidence of traffic accidents. Many of these locations are characterized by high traffic volumes and/or multiple curb cuts. Main Street in particular has a large number of accidents that occur on, or at an intersection with it. There are nearly 1200 accidents in the database where Main Street is referenced either as the street on which the accident occurred, or as the intersecting street. Of the 706 accidents with Main Street listed as the “Accident Street”, 326 occurred at an intersection or were related to an intersection. An additional 330 accidents occurred along the roadway, with 150 of these being at driveway access points. There are nearly 500 accidents where Main Street is listed as the intersecting street. 170 of these occurred at the intersection with Main Street, or where related to an intersection with Main Street. An additional 275 accidents occurred along the roadway or at driveway access points, with the closest intersection being that with Main Street.

c. Accident Timing

Another trend in traffic accidents in Salem is that generally the number of accidents during any particular day increases throughout the day to a peak during the afternoon commuting time.

There is an additional spike at around midnight, especially on Friday, Saturday, and Sunday mornings (Thursday, Friday, and Saturday Nights) which is partly due to increased



entertainment/recreation based travel that tends to occur on those nights, as well as the tendency of drivers to be tired. Accidents in Salem also follow the general trend of being lowest on Sunday and increasing through the week with the highest number of accidents occurring on Friday. If a combination of these two variables are examined, it shows that Friday during the afternoon commute (3-6 PM) is a high frequency time, as well as Saturday through the middle of the day (9:00 AM – 6:00 PM), and Friday and Saturday nights from 9:00 to midnight, and carrying over into Sunday Morning from Midnight to 3:00 AM. The peak hour accidents have the most impact on the transportation system of the town, in that they increase delays during an already congested time, and can lead to additional accidents from impatient or inattentive drivers. High volumes of night-time accidents can point to an enforcement issue for the police, but it can also show where there might be poor lighting conditions or some other roadway issues with the roadway.

Unfortunately, the traffic accidents database is deficient in several areas that make detailed analysis difficult. For instance, there is no data available that states what the vehicle was doing prior to the accident. Knowing that most vehicles involved in an accident at a particular location were making a left turn for instance is vital to solving problems at high accident locations.

C. Public Transportation

This section of the Transportation Chapter presents an examination of existing public transportation services in the region to determine what deficiencies currently exist in Salem, and to provide recommendations for improving public transportation services in Salem over the next 20 years. For the purpose of this document, public transportation is defined as any transportation service available to the general public.

When available, public transportation clearly plays an important role in addressing the traffic issues that a city or town might be facing. It represents a more efficient use of the existing roadway network, by carrying passengers that might otherwise be driving their own vehicles. A successful public transportation system can remove a significant number of vehicles from the roadways, thus reducing the amount of harmful emissions. Public transportation also offers many social benefits by providing a reliable means of travel for those unable to drive themselves.

1. Demand Responsive Service

Demand responsive service in the Salem area is generally provided by a variety of Health and Human Services agencies, each of which vary in their schedule and the clientele which they serve. Many of these agencies developed their own transportation services because their clients do not have access to or are unable to drive a motor vehicle. Recently, a new agency has been formed to help coordinate these services in the Salem and Derry area. The Greater Derry/Greater Salem Regional Transportation Authority is charged with developing a program or course of action that will effectively and efficiently meet the transportation needs of the elderly, disabled and transit dependent within the nine towns that make up its region. This agency is currently embarking on the development of a Coordinated Transit Services Plan that will help it meet its goals of making the various demand responsive services in the region more at reaching those in need of transportation services. The town of Salem currently provides some financial support for these services.

2. Fixed Route Bus Service

There is currently no fixed route local bus service in Salem. The nearest fixed route service is the Merrimack Valley Regional Transit Authority which operates just over the border in Massachusetts. The MVRTA carried approximately 1.7 million passengers during 2000 on 31 routes connecting 8 communities of the Merrimack Valley as well as providing service to Danvers and Lowell. Many routes connect the communities to train stations and park and rides, providing intermodal connections. In addition, the MVRTA provides special employment bus service between the Haverhill and Lawrence train stations and the River Road area, Lucent Technologies, the IRS center, and others. One existing transit route follows Route 28 and ends at the Massachusetts/New Hampshire border. It is possible that this route could be expanded to

provide service retail and employment locations in the Route 28 corridor in Salem, and possibly connecting to the proposed I-93 park and ride to be located at Exit 2.

3. Intercity Bus Service

Currently, intercity bus service is operating between Concord and locations in Massachusetts. As part of the Interstate 93 widening, it is planned to develop additional bus service from New Hampshire towns on the corridor to locations in Massachusetts, notably Boston, the new intermodal station in Woburn, and possibly employment centers such as the River Road Area. As part of this, park and ride facilities are being developed for the corridor. These facilities would each be located adjacent to the highway and be able to park from 300-500 motor vehicles. They would include stations to facilitate the intercity bus service, and would also be expandable to include a train station were a light rail system ever developed in the corridor. This intercity bus service would be primarily commuter oriented with destinations at major employment centers along the I-93 corridor, but would also likely provide service to Manchester and Logan Airports.

4. Passenger Rail Service

Passenger rail service is being studied as part of the I-93 widening that is in the planning and design stage at this time. While no rail infrastructure will likely be built as part of the highway widening, plans are in place to design the highway improvements so as not to preclude the future construction of a light rail system within the median of the highway. Included with this would be a passenger rail station in the I-93 Exit 2 area that would serve Salem. This proposed light rail system would go from Salem northward to the Exit 5 area or even as far as Manchester airport or downtown Manchester. The rail line would extend south from Salem to connect into existing rail lines in Massachusetts, or would tie into the new intermodal facility under construction in Woburn, where passengers could connect to Boston, as well as other areas within Massachusetts. An option for passenger rail service in the corridor is also to use the Manchester and Lawrence line that parallels Route 28.

D. Goods Movement

Freight transportation and goods movement in the Salem area is characterized as a mixture of rich availability of services and concerns from citizens about safety and congestion. Ocean, rail, truck and air cargo services are all within a short distance of Salem, and provide access to services and markets worldwide. The largest users of freight transportation services include major employers in manufacturing, wholesale, retail, and distribution.

1. Rail Freight

One active rail line exists in Salem. Known as the Manchester and Lawrence line of the B&M railroad, the line connects to the B&M Main line (running through Methuen and Lawrence) and allows a rail freight connection into Salem. This line primarily serves businesses located along the most southerly portion of the tracks. This line extends only a short distance into New Hampshire, and much of the track has been torn up. In many areas, development has encroached with crossings and even housing within the rail right-of-way. Portions of this rail line have been

proposed for conversion to a pedestrian and bike path that would begin in Salem and terminate as far north as Manchester. Guilford Corporation, which is the owner of this line, recently announced that it would be abandoning it as a freight line, and the New Hampshire Department of Transportation is currently in negotiation with them for its purchase, as well as several other facilities throughout the state.

2. Ocean

One of America's primary port facilities, the Port of Boston, is located approximately 50 miles from Salem and provides access to major shipping lines. In addition, other ports in the region, such as New York, Portsmouth, Portland, and Montreal provide additional locations to ship from or to.

3. Air Freight

Like ocean based shipping, Salem has convenient access to nearby air freight services. Boston's Logan Airport provides worldwide access to markets and services. In addition, Manchester airport, about 15 miles to the north of Salem, is a growing resource as both a passenger and air freight facility. Other airports in the region that offer freight service include Pease in Portsmouth, and Portland, Maine. Major carriers that provide services to these airports include Emery Air Freight, BAX, Federal Express, and UPS.

4. Truck Freight

The Salem region is well served by motor carriers. High quality and frequency services are provided by major local, regional and national trucking firms. National LTL (Less Than Truckload) carriers include Roadway, Yellow, Consolidated Freightways, and Con-Way. Regional LTL carriers include New Penn, Red Star (part of US Freightways) and Estes. Major TL (Truckload) carriers include J.B. Hunt and Schneider National. There are also bulk liquid carriers represented such as Superior and Matlack. There is also a large fleet of vehicles that service private companies such as the fleet of trucks that distribute goods to Wal-Mart and other major chain stores that have their own fleets.

5. Truck Routes

As the area grows, additional truck traffic can be expected and concerns rise among residents about the volume of truck traffic on specific roadways. This can be a particularly bad problem in residential neighborhoods where noise and safety issues become a great concern.. In order to assure that trucks use the proper roads, the town should enforce RSA 47:17, Section VIII "Traffic Devices and Signals" which empowers the Board of Selectmen:

"To make special regulations as to the use of vehicles upon particular highways, except as to speed, and to exclude such vehicles altogether from certain ways; to establish stop intersections, erect and provide for the control of traffic by, stop signs or other traffic devices or signals which shall conform to

standards set by the highway commissioner and shall be approved by him as to type, size, installation and method of operation.”

This RSA allows Salem to adopt an ordinance restricting vehicles above certain weights from designated Town roads during seasonally wet periods.

E. Non-Motorized Travel

1. Pedestrian Facilities

While not normally considered an alternative mode of transportation, pedestrian movement does, in fact, represent another means of travel and as such merits consideration. While the Town has a relatively limited sidewalk system, about 170 (1.2% of all workers) Salem residents walk to work (according to the 1990 census) and many children walk to and from school. In terms of location, pedestrian travel occurs most frequently on sidewalks, paved and unpaved shoulders and road rights of way. The Town of Salem Sidewalk Plan, which consists of a map of existing and proposed sidewalks, is shown in Exhibit 8.

2. Bicycle Facilities

Bicycle transportation represents a seasonally dependent alternative to motorized transportation in Salem. According to the 1990 Census, few Salem residents – less than 1% -- utilize bicycles to travel to and from work. However, there is a fairly significant number of youth (primarily elementary students) who travel to and from school by bicycle. In contrast to the relatively low number of bicycling commuters, a large and growing number of individuals use bicycles for recreational purposes. Many of the roads in Salem most used by bicyclists have inadequate shoulders to accommodate them safely.

The NHDOT and Seacoast MPO have jointly developed a bicycle plan which is designed to create a basic network of bike routes statewide. This network is designed to serve both commuters as well as recreational users and is shown in Exhibit 8. A number of roads in Salem are included in the new State bicycle route network making a continuous route beginning at the Pelham town line on NH 38 following Pelham Road to Main Street through the center of town to follow Hampstead Road, Shannon Road, and Haverhill Road where it crosses NH 111 and into Derry. An offshoot of this route leaves Shannon Road and follows Hooker Farm Road (Salem Road) into Atkinson. As the State roads on this route are reconstructed in the future, 4 foot (or wider) paved shoulders will be included to be used as bike paths. As each functional segment of the bicycle network is constructed, the shoulders will be striped, and signed to invite public use. The town's planning and site review process should be cognizant of these plans and incorporate bicycle facilities in site and subdivision plans wherever appropriate along this route. In addition to the State network, there is also a regional bike network that has routes in Salem. Routes on this system include Main Street, Route 28, North and South Policy Streets, Kelly Road and NH 111. This system was developed in 1998, and is currently under revision. The focus of this revision will be to adjust the routes as necessary to get cyclists off of the most heavily traveled roadways and to balance safety with connectivity.

PLACE HOLDER FOR EXHIBIT 8

MAP OF SALEM WITH BIKE AND PEDESTRIAN FACILITIES

F. Congestion Toolbox

This section of the document is intended to provide information regarding approaches to solving traffic congestion problems. In the past, the response to congestion has generally been to build more or bigger roads. In the end, the result of that has been more traffic, higher speeds, and increased safety problems. In addition, many places have seen fragmentation of their communities and loss character as wider roads and heavy traffic have been implemented. The response to this has been the development and implementation of different types of road improvements that put the needs of the community and people above those of the automobile. This section will outline several of these techniques with the understanding that additional work would need to be done prior to implementing any of them in Salem.

1. Access Management

One approach that has been successful nation-wide in dealing with the effects of traffic congestion is known as access management. This idea is essentially that greater control be exercised in the spacing, location and design of driveways, medians and median openings, intersections, traffic signals, and interchanges with interstate highways. Some general access management techniques involve:

- Physically restricting left turns
- Restricting curb cuts and direct access driveways
- Separating obvious conflict areas
- Eliminating parking
- Locating intersections at distances greater than a set minimum
- Constructing frontage and service roads to funnel traffic from multiple businesses to nearby intersections

The primary benefits of implementing access management strategies is a reduction in traffic accidents and improvements in traffic flow (reduced congestion) along arterial roadways. Access

Table XI-7: Access Management Strategies

Access Management Changes	Land Use Modifications	Transportation Improvements	Capital Improvements
<ul style="list-style-type: none"> • Driveway Consolidation and Sharing • Driveway Spacing & Design • Corner clearance Spacing • Parking consolidation and access • Alternative parking requirements 	<ul style="list-style-type: none"> • Conditional land uses • Front setback reductions • Density and intensity incentives • Buffers and lot coverage • Dimensional requirements • Landscaping • Use limitations for corner properties 	<ul style="list-style-type: none"> • Raised medians • Access roads • Right Turn Lanes • Signal location and timing • Directional signage modifications 	<ul style="list-style-type: none"> • Project betterments • Developer agreements/ mitigation • Mitigation fees within zone

management can also reduce the need for expensive upgrades in road infrastructure such as adding additional lanes. Access management is not without costs, and the most frequently cited is the negative impact on businesses that can occur with restricted access. Surveys have shown varying results regarding the impacts on businesses however, and may depend on the type of improvements implemented, and how it is gone about. Access management techniques can be grouped into four general categories as shown in Table XI-7. This grouping is based on the where the improvements are developed and by whom. The keys to implementing successful access management strategies is integration and coordination of transportation decision making with the land use decision making. One way to ensure that this coordination occurs is to undertake access management programs on a corridor-wide basis so that a plan is developed for all segments of a particular roadway, and the “big picture” issues are addressed. This integration can also be accomplished through regulatory techniques written into the zoning code, or the creation of access management overlay districts which apply more restrictions to areas where access management is believed to be a necessary and workable part of development. Some regulatory approaches are listed in Table XI-8.¹

Table XI-8: Regulatory Access Management Techniques

- Regulate driveway spacing, sight distance & corner clearance
- Restrict number of driveways per existing parcel on developing corridors
- Increase minimum lot frontage along thoroughfares
- Encourage joint access and parking lot cross access
- Review lot splits to prevent access problems
- Regulate flat lots and lot width-to-depth
- Minimize commercial strip zoning and promote mixed use and flexible zoning
- Regulate private roads and require maintenance agreements
- Establish reverse frontage requirements for subdivision and residential lots
- Require measurement of building setbacks from future right-of-way line
- Promote unified circulation and parking plan

There are already some access management strategies being utilized in Salem in the Route 28 corridor. Some of the shopping centers along that route have consolidated and linked parking, as well as access points that are funneled towards controlled intersections.

2. Traffic Calming

Table XI-9: General Traffic Calming Methods

1. Reduce the speed at which autos travel by altering street design
2. Change the psychological feel of the street by altering street design
3. Increase incentives to use public transportation
4. Discourage use of private motor vehicles
5. Encourage more efficient travel
6. Create strong local communities

A second approach for dealing with traffic congestion is known as traffic calming. There are many different approaches to traffic calming (Table XI-9), but the primary method is to reduce the speed of traffic by altering the street. Limiting cars to more appropriate and safe speeds, has the effect of reducing noise and air pollution, lowering the number and severity of traffic accidents, as well as increasing the capacity of the roadway to

handle more vehicles. This type of traffic calming has two general approaches; active and

¹ A Toolbox For Alleviating Traffic Congestion and Enhancing Mobility, Michael D. Meyer, Institute of Transportation Engineers, Washington, DC, 1997. Pages 65-73.

passive, and many individual approaches are shown in Table XI-10. Active techniques force a driver to change their behavior (such as a barrier forcing the vehicle to turn off a street), thereby enforce themselves. Passive controls, such as a speed limit sign or other traffic sign, do not physically require a change in behavior, but instead rely on the driver to comply with local and state laws. A second approach to implement traffic calming is to change how the street feels to the motorist. By replacing wide, open streets with more narrow travel lanes, broken site lines, and generally a more closed in feeling, drivers will have a tendency to slow down. Other methodologies for implementing traffic calming require less physical infrastructure changes, and more policy and perceptual changes within a community. Encouraging the use of transit, more efficient use of transportation, and creating strong local communities require larger changes in how land use is allocated, personal preferences for where to live and how to get around.

Table XI-10: Traffic Calming Techniques

Technique	Description	Use
Speed Bumps & Speed Tables	Raised humps in road surface. Speed Tables are 8-12 feet long and comfortably crossed at 15-25 mph.	Have been shown to reduce speed and volume of traffic. Speed bumps have widespread use in parking lots, but also create hazards and plowing problems. Speed tables reduce the plowing problem by providing a more gentle slope
Rumble Strips or Changes in Roadway Surface	Patterned sections of rough pavement cause slight vibrations which cause the driver to become more alert and slowdown	Can reduce accidents if properly placed. Some concerns about bike travel and increased noise.
Diagonal Diverters	Barrier placed diagonally across a four-way intersection to separate it into 2 unconnected streets with each making a sharp turn.	Used in residential neighborhoods to eliminate cut-through traffic by making the route more circuitous. Best used as part of an overall plan for a neighborhood.
Dead-end Streets or Cul-de-sacs	Placing a barrier across one end of a street to eliminate motor vehicle traffic.	Used primarily in residential neighborhoods, eliminates cut-through traffic while still allowing pedestrian and bicycle access.
Semi-diverters, Neckdowns, Chicanes, Chokers & Protected Parking	These are methods of restricting traffic flow without eliminating it entirely. Generally the curb is pushed out into the street at a specific location or locations to create a narrowing of the roadway. Semi-diverters restrict one direction of traffic from entering a street, neckdowns and chokers reduce the width at a location to only allow one direction of travel at a time. Chicanes extend the curb on alternating sides of the street to require vehicles to adjust their path of travel at intervals, Protected parking places curb bulb-outs at either end of parking reduce street width and reduce illegal parking.	Most of these techniques are used in residential neighborhoods to reduce the volume and speed of traffic. If sloped curbing is used, emergency vehicle movement is not blocked and snowplows can have an easier time clearing the road. Semi-diverters don't allow a vehicle to enter a street from one end, but allow two way traffic on the street itself.
Traffic Circles or Roundabouts	These are raised islands usually located at the intersection of two streets. Vehicles must go around the median to continue on the same street or to make a turn. Vehicles usually must slow to 15-25 mph to navigate them.	These work best on residential non-arterial streets where they reduce speed and accidents without diverting traffic to other streets. Can also be used on arterial and collector streets as an alternative to standard traffic signals
Stop signs, Speed Limit signs, Turn prohibition signs	Signage directs traffic to operate according to certain restrictions	Stop signs assign right-of-way, turn prohibition signs limit turning movements, and speed limit signs limit speeds (somewhat). Can be used anywhere.
One-way Streets	Discourages through traffic by eliminating travel from one direction	Used on residential streets to eliminate cut-through traffic
Traffic Signals	Properly tuned traffic signals can reduce delay on arterial streets and improve traffic flow.	Use on primary arterials. Linked and coordinated signals can reduce delay and improve traffic flow and help to reduce impacts on other streets from traffic seeking alternate routes through the congested area.

G. Recommendations

The following series of recommendations are based on the information and analysis presented in this chapter, and on two other sources: recommendations generated from the Salem Community Profile completed in 2000 and the recommendations from previous master plans that continue to be valid.

It is a fundamental goal of the Town of Salem to achieve and maintain a safe, efficient transportation system which enhances the character of the community and is adequate to support its transportation needs. To attain this goal both now and in the future, the following recommendations made. First, general proposals for transportation planning will be made, followed by highway, transit, and non-motorized specific recommendations.

□ General Recommendations

- Develop a common vision for Salem, and create a transportation system to serve that vision.
- Update the town-wide transportation study completed in the late 1980's and expand it to cover additional areas of commercial and industrial development. In addition, the following changes in the Study are recommended:
 - Add an access management component to the study.
 - Add a discussion of the impacts of residential development.
 - Include a needs analysis of the town secondary road system
- The Town should work in cooperation with the NHDOT and property owners through the site plan approval process to consolidate existing curb-cuts and channel access points to signalized intersections using interior service roads.
- The Planning Board should continue the existing policy of negotiating off-site improvements for development within the Town, and where feasible utilize these improvements as local match for State-funded projects.
- Provide annual local funding to facilitate transportation improvements. In addition to any money raised by the town for specific projects, towns may add a fee of up to \$5.00 to motor vehicle registrations for transportation purposes. This money can be used to provide a local match for state and federal projects, fund local road improvements, or help pay for public transportation.
- The Town should develop and submit to the Salem-Plaistow-Windham MPO a specific list of needed transportation improvements eligible for federal funding, including highway, pedestrian, bicycle and other facilities, for consideration during the Transportation Improvement Program (TIP) development cycle.
- The Planning Board should develop and adopt a conceptual road layout map showing desired connections between existing streets and general location of any new roads and rights of way that may be required. This map should be used as a guide for the evaluation of street layout proposed for new development.
 - In preparation of the road layout map, the Planning Board should evaluate the following connections and proposed streets:

- The Town should seek to acquire the easements for critical rights-of-way that will be necessary to complete or accomplish the connections listed above.
 - The Planning Board should discourage the creation of dead-end streets, and should require the reservation of one or more right-of-way parcels at appropriate connection points in all street designs for new subdivisions
 - The Town should actively monitor changes in traffic volumes and accidents on the secondary road system and request assistance from the SPW MPO to carry out this task.
 - The Town should implement traffic calming measures, where appropriate, to reduce the volume and speed of motor vehicles on residential streets.
- Highway Specific Recommendations
- Encourage the timely construction of State/Federal transportation projects in Salem and the region. The completion of planned transportation projects in and around Salem can have a direct impact on congestion within the town.
 - Work toward early implementation of the following high priority projects:
 - Interstate 93 widening
 - Improvement of intersection of Main Street and Route 28 (“the Depot”)
 - Encourage and expand the use of Intelligent Transportation Systems (ITS) techniques to improve the movement of vehicles on the existing transportation system.
 - The interconnection and synchronization of traffic signals.
 - An incident management system can reduce the delays caused by traffic accidents.
 - Continue to require private traffic studies and road improvements as part of site plan approvals for development.
 - Implement access management techniques to reduce curb cuts and decrease the potential for traffic accidents related to driveways and turning movements. Access management also improves the flow of traffic and reduces the impacts of congestion on transportation facilities.
 - Continue support for improvements to the Main Street/ NH 28 intersection (The Depot).
 - The addition of turn lanes at this intersection should result in a decreased incidence of traffic accidents.
 - The improvements should also be made to retain the character and land uses of the Depot and its surroundings.
 - Pursue strategic intersection improvements based on results from transportation studies.

□ **Transit Recommendations**

- Consider future local bus service linking the planned I-93 express service and related park and rides with employment and commercial areas of town.
- Consider working with the Merrimack Valley Regional Transit Authority to expand fixed route transit service into Salem to connect Massachusetts residents to jobs in Salem and Salem residents to jobs in the Merrimack Valley and beyond.
- Work with Greater Derry/Greater Salem Regional Transit Authority to improve the coordination of Demand Responsive transit in Salem and to expand its coverage and efficiency.
- The Town should widely publicize the availability of the transit service that is currently in operation to the citizens of Salem, through mechanisms such as tax bill mailing, the Annual Town Report, and other community announcement media.
- The Town should take a position on the development of passenger rail in the I-93 corridor. Specifically, the town should state its preference for an alignment in the I-93 median or along the Manchester and Lawrence line that parallels Route 28.
- Explore the options for the development of a transit system in Salem. The planned Interstate 93 expansion project will include the construction of a park and ride facility near Exit 2 in Salem and regional intercity transit service as well. A local transit service to connect the park and ride to employment and residential areas in Salem can have a significant impact on traffic congestion by providing an alternate means for people to travel

□ **Non-Motorized Transportation Recommendations**

- Pursue the development of a pedestrian and bicycle facility on the former B&M rail line that parallels NH 28 through Salem.
- Continue to implement the Town Sidewalk plan and expand the sidewalks in the community to connect schools, recreation facilities, and other attractions to residential and commercial areas of town.
- Encourage private developers to include sidewalks and bicycle facilities in their plans for residential and commercial projects.
- Keep existing sidewalks clear of snow, especially those connecting to schools or on streets with significant pedestrian traffic.
- The Town should include in future construction, paved shoulders for use as bicycle/pedestrian lanes, and appropriate signage and striping on the following secondary roads:
 - Haverhill Road
 - Shannon Road
 - Others

- On the above roads, and on roads designated on the State and regional bicycle network, the Planning Board should require any road improvements brought about as a consequence of development to include shoulder improvements (widening and paving) to facilitate bicycle routes.

Supporting Studies and References

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