CHAPTER 12: TRANSPORTATION

1. INTRODUCTION

This chapter provides guidance, recommendations and context for addressing Hanover's transportation needs over the next ten years. The dominant theme is to meet transportation needs while maintaining and enhancing Hanover's environment and quality of life. The transportation infrastructure must be designed to serve local needs and be compatible with local land use and character while integrating the transportation needs of the region.

Hanover has a number of transportation modes. While dominated by the automobile, much of the downtown area provides a pleasant walking and bicycling environment. The Route 120 corridor and Route 10 corridor in Hanover are linked to Norwich, Wilder, Hartford, West Lebanon and Lebanon by a free-fare public transit system. The Town's inter-regional transportation needs are served by nearby bus, rail, air terminals, and the interstate highway system. Nevertheless, traffic in Town is intrusive and, at times, congested. There are several contributing factors: the Town is an employment center; there are currently few alternatives to the automobile for addressing the transportation needs of residents in outlying areas; and Hanover's road system is part of the commuting routes of many people in the region. As a result, most residents would agree that traffic is detrimental to the quality of life in Hanover. The Planning Board accepts this as a serious concern and one of the major issues to be addressed in this Master Plan and in their project reviews as transportation and land use are intimately linked.

2. COMMUNITY VISION AND GOALS

In 1994, the Hanover Planning Board surveyed the opinions of Hanover's residents as the initial step toward updating the Town Master Plan. Earlier surveys were done in 1974 and 1981. Below is a synopsis of those 1994 survey questions that pertain to transportation issues:

Attitudes about traffic/parking When offered a list of characteristics that could be disliked, of all the dislikes listed, the traffic/parking category took top ranking with 62% of the respondents registering dissatisfaction, exceeding both taxes (50%) and cost of housing (49%). The survey indicates that this sentiment was shared by all age groups.

Attitudes about growth and associated traffic congestion A majority (56%) considered the growth rate between 1980 and 1990 to be just about right, while 17% found growth in Hanover too rapid. In the 1970's and 80's, concern about rapid growth was much more widespread. The 1994 figure is nonetheless interesting in that concern about rapid growth remains primarily tied to concern about traffic congestion. Almost all of those who thought that growth was too rapid were either "greatly concerned" or "somewhat concerned" about traffic congestion. No other growth concern rose to that level.

Public transportation The percentage of residents who saw a need to expand public transportation decreased from 73% in 1981 to 48% in 1994, apparently reflecting the success of the expansion in Advance Transit bus service over that time period. Based on the survey, only a small percentage of Hanover's residents use the local public transportation system on

a regular basis. In spite of the low ridership numbers for Hanover's residents, most respondents wish to maintain the current level of support for Advance Transit; many more respondents support increasing the financial support for public transportation than those that want to decrease the support.

Bike paths/trails Of the twenty categories listed as needed, recreational facilities, bicycle paths/lanes and trails for walking were selected more frequently than any other form of recreation. A 1991 survey undertaken by the Hanover Conservation Commission and Hanover Conservation Council shows that less than 20% of respondents show strong support for horseback riding, 6% show strong support for mountain biking, 3% show strong support for snowmobiling and 2% show strong support for motorized ATV use.

Town road maintenance Hanover's residents are well satisfied with the Town's road maintenance program, as indicated by the high percentage of respondents, overall approximately 80%, who indicated that they were "pleased." Another question asked how satisfied respondents were with a variety of Town services. The Hanover Highway Department received ratings similar to other Town departments. Most respondents were either "very satisfied" or "satisfied" with the Highway Department's services.

The 1999 Guiding Growth survey of approximately 800 households of rural Hanover asked a number of questions related to transportation. Most respondents were quite concerned about the large and growing volume of traffic, and the attendant noise, speed and congestion as is evidenced by the number of comments they wrote about the subject. While over two thirds of respondents did not want roads widened and straightened, there was no clear direction as to how speed controls should be instituted. There was broad agreement on the desirability of unpaved roads and more scenic roads. Very few respondents said they would use bike paths, buses or ride-share as alternatives to automobile use.

Hanover's transportation goals are based on the aforementioned public opinions. They provide the basis for assessing how well the Town's transportation needs and critical issues are being met, and for identifying directions for future changes. Land use proposals or infrastructure expansions that do not support these goals should be modified to support the goals before proceeding. These goals are to:

- *Make more efficient use of the Town's existing road and highway capacity without significantly expanding roads or highways*. Since roads and highways impact so directly on the Town's environment and quality of life, it is important that the Town view any expansion with a critical eye.

- *Support and enhance the quality of life for the residents of Hanover*. The Town must shape and manage the transportation system and infrastructure to meet the Town's needs. At the same time, the Town needs to preserve and enhance those elements of the community and environment that make Hanover an attractive place to live and work.

- *Provide residents better access to community services, cultural centers, businesses, friends, and neighbors*. Access is improved when it becomes safer, more efficient, less intrusive, and

more convenient. Planning that integrates land use and transportation system planning will help to avoid separating or isolating elements of the community. Appropriate land use planning with alternatives to the automobile will serve well in this regard.

- *Enhance Hanover's economic opportunities.* The health and vitality of the Town is intimately tied to the health and vitality of the Town's businesses and institutions. They serve residents and, for many, provide employment and economic security. An appropriately designed transportation infrastructure will materially enhance the opportunities for economic growth. Attempts to improve the community's economic opportunities should be consistent with preserving the environment and quality of life.

- *Provide efficient and convenient access to the Hanover community for visitors, customers and employees from other communities with the goal of avoiding increased congestion.* The Town depends on others from outside the community to enhance the Town's social and economic environment. This is particularly true with the visitors to the major institutions in and around Hanover. The challenge is providing this access while doing so in a manner that doesn't adversely impact the Town.

- *Preserve the existing character of the Town roads which access the College*. The tree-lined, pedestrian and bicycle friendly nature of these streets needs to be reinforced, improved and preserved. These streets function as important thoroughfares, but also as important open spaces which create a context for the College campus.

3. COMMUNITY TRANSPORTATION NEEDS, CRITICAL ISSUES & EXISTING SYSTEM

Transportation Needs of Hanover Residents

The Town must move in the direction of more efficient, lower impact transportation systems to preserve and enhance neighborhoods and community atmosphere while providing improved access to community services. Factors to be considered include zoning, roadway design, walkways, bikeways, and an explicit consideration of the impacts rural housing has on the quality of the Town's life.

Hanover's transportation infrastructure should be responsive to multiple constituencies including automobiles, bicyclists, and pedestrians whether walking, jogging or skating. Priority may be given to one constituency as compared to another and may differ depending on the local context; thus the design of streets will necessarily vary across town depending on the users contemplated and level of use.

The 2000 Census reports that the mean travel time to work for Hanover residents was 13.9 minutes, the lowest in the Upper Valley region and lower than the county (21.3) or state (25.3) means. However, even though the travel times to work are low, for most households, this still results in a vehicle on the road. Of particular concern are the unintended consequences of managing rural development through minimum acreage and frontage requirements. Existing zoning has created an emphasis on separated linear development with subdivisions isolated from their neighbors, schools, employment, and community services without the population density to be served by a transit

system. Instead, residents of these areas have become dependent on a system of local and feeder streets and highways for commuting in single-occupancy vehicles.

While the lack of connectivity between adjacent subdivisions minimizes traffic within the subdivision, it adds to the traffic on the connecting highways by further separating us from our neighbors and services, and increasing our dependence on the automobile. Going to the store requires an additional trip in the car. The result is an increase in the congestion and traffic. Public transportation, which could help to reduce some of this congestion, is rendered less practical by a population dispersed along a large road network.

Many of these issues can be addressed through a more neighborhood- or village-oriented subdivision model for the design of new development in Hanover. In this model, the emphasis can be on pedestrian access to neighbors and local services, where alternatives to the family car become viable for connecting with other parts of the community. For Hanover, this approach would represent a departure from the current pattern of subdivision and zoning regulations. The objective would be to encourage development with compact housing surrounding basic commercial services in villages. The approach would be combined with other subdivision and zoning regulations which would discourage dense development in all other areas of Town.

Transportation and the Economic Vitality of the Community

To preserve and enhance economic vitality the Town must provide residents, customers, visitors, and employees with efficient and convenient access to local businesses and institutions. Hanover has always been a working community, providing employment and economic security for its residents, as well as neighbors. The Town's transportation infrastructure plays a central role in preserving and enhancing these institutions and businesses.

Dartmouth College and knowledge-based and light manufacturing businesses blend well within the community. Hanover's Zoning Ordinance has identified and zoned areas for expansion of such employment opportunities, particularly the area south of Mink Brook and east of NH Route 120. Access to this area should be from Route 120 south of Mink Brook only, in order to preserve the residential nature of Greensboro Road and to avoid the costs and environmental impacts of developing access points across Mink Brook.

The historical pattern in which community services, commercial uses and residences have been largely isolated from one another needs to be re-examined. When land uses are mixed, fewer demands are placed on the Town's transportation system. One of the defining characteristics of suburban sprawl is the separation and segregation of different uses and its resulting impact on traffic. Conversely, the traditional New England village gained its vitality and charm by the diversity of activities brought together in one place. The Town should re-examine this traditional pattern and adopt appropriate elements for Hanover.

Dartmouth College, the Downtown and In-town Neighborhoods

The Dartmouth College campus and the downtown represent the focus of the Town's economy. This economic center is surrounded by well established highly desirable neighborhoods. This in–town area also provides the focus for some of the most challenging transportation issues facing the community. The downtown provides employment for many Hanover and Upper Valley residents. It serves as an entertainment and shopping destination for visitors from the local area, as well as the neighboring states. Several thousand people per day are drawn to Hanover by the businesses and institutions in this area as employees or customers, and in so doing help maintain the economic vitality of the Town.

At the same time, the downtown serves as a major traffic corridor for employees and visitors passing through Town. The current highway system provides few alternatives for traffic from Vermont, Lyme, and West Lebanon other than to travel through the downtown, to destinations on the far side of Hanover such as Centerra and Dartmouth Hitchcock Medical Center.

The Town must work to reduce traffic congestion and increase the accessibility of the downtown to residents, employees, and visitors to maintain the attractiveness of the campus and vitality of the downtown. This will require continuing efforts to reduce traffic in this area by using public transit, pedestrian and bicycle travel and not merely transferring the congestion to other neighborhoods. The College has initiated an aggressive transportation demand program to reduce single-occupancy vehicle use, traffic and parking demand.

Traffic calming is the combination of primarily physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. Traffic calming should be provided where feasible for enhancing or restoring the livability of neighborhoods through reduction of cut through traffic, truck traffic, and excessive speeds and noise. Traffic calming should be provided for safety of all street users and implemented to improve conditions for non-motorized users of streets. Successful traffic calming on neighborhood streets, according to the Selectmen's Traffic Calming Policy of 2003, will result in greater use of the Town's arterial streets adding to greater congestion.

For a number of years Hanover has actively encouraged use of alternative modes of transportation and peripheral parking for downtown employees. The Town must continue and extend these initiatives while simultaneously recognizing employees' legitimate need for reasonable access to their place of work. Similarly, the Town and Dartmouth College should continue to work together to manage both employee and student automobile use so as to minimize the congestion and parking demand in the downtown.

Etna Village

Etna Village presents a critical planning problem which cuts to the heart of preserving the character of the Village. Threatened by increased traffic volume and traffic speeds, downtown Etna has become a dangerous thoroughfare. The volume and speed of automotive traffic sometimes interferes with pedestrian and bicyclist safety in the village. Between Ruddsboro Road and Cuttings Corner, each intersection with the Hanover Center Road has safety problems, yet each year more house lots are approved which depend on these intersections for access. High traffic speeds also make some

driveway exits unsafe. The Town should work closely with the State and local residents to address these issues.

Regional Transportation Issues

Regardless of the growth or rate of growth that occurs in Hanover, the region will continue to grow and this regional growth will impact road use. To manage and minimize the adverse impacts of commuter and through traffic on the community, the Town must actively foster and support regional solutions to transportation issues. Strategies to be considered include facilitating demand management to reduce congestion, improving the capacity of the regional highway network in a way that does not impact any community negatively, expansion of the regional highway network, and increased use of rideshare and public transit. Land use considerations also come into play. Locating more housing near employment or adjacent to it in mixed use developments could reduce the need for expanded transportation capacity as a requisite to expanded employment. The Upper Valley Transportation Management Association regularly convenes municipalities and employers to address regional transportation issues. A Route 120 corridor study is necessary. Resolution of regional commuter through-traffic problems in Hanover is a regional issue. The construction of a Dartmouth Hitchcock Medical Center/Centerra connection to I-91 or I-89 should be studied.

In addition, Hanover's cultural and economic vitality is a reflection of the Town's convenient access to regional air, highway, and rail transportation systems. As a community, Hanover should work with its neighbors to ensure the continued viability of these regional transportation assets.

Road Network

There are approximately 108 road miles within Hanover, of which about 81% are municipally maintained roads. The major arteries of the road network are the primary state highways: NH Route 10, which provides access to Lyme and West Lebanon; NH Route 120, connecting to Lebanon and I-89; and West Wheelock Street (NH Route 10A), providing the access across the Connecticut River into Vermont and I-91. The primary state highways link the Region's two interstate highways which serve the area between Boston, New York City, and Montreal. The interstate highway system allows residents of Hanover easy access to Boston, Montreal, and New York City. Roads in Hanover are shown on the Transportation Map at the end of this chapter.

This Master Plan does not propose significant added infrastructure. Instead, congestion should be accepted as a necessary condition to motivate people to make better transportation decisions such as use transit, carpool, travel at a different time, etc. In appropriate areas, new roads should promote connectivity in the road network, in lieu of cul-de-sacs. In general, dirt roads should not be paved and roads should be paved only where use levels require it. The Town should adopt highway design standards that provide flexibility based on the character of the area and traffic volume. Conventional highway design wisdom is not necessarily good for our community.

Classification of Highways and Roads

Similar to the NHDOT road classification system, Hanover defines its road system as shown in Figure 12-1.

Currently Town road design standards result in roads that are wider than needed to handle traffic volumes with the result that there is more pavement to maintain, more environmental impact

and faster traffic speeds. The road classification shown above should serve as the basis for new flexible design standards that are more appropriate to the surroundings and the function of the road than the standards used by the Town today.

Class VI Roads

The Town's highway funds may not be used to maintain Class VI roads. The Town still owns and controls the Class VI road right-of-way, but it is relieved of any obligation to maintain the road surface, culverts, or bridges and of the liability for damages. Town Ordinance #4 regulates private construction on Class VI roads. No person may improve a Class VI road without first obtaining a permit from the Director of Public Works.

In Hanover, a lot must have a required minimum frontage on a Class V or better public street; other means of access must be approved by the Zoning Board of Adjustment. A Class VI road does not meet the requirement of a public street. A landowner cannot obtain a building permit for development if the only lot frontage is on a Class VI highway, unless the landowner receives a Special Exception for using the Class VI highway as "other means of access" from the Zoning Board of Adjustment. In addition, RSA 674:41 regulates approval of applications for building permits on Class VI roads. Building permits may not be issued for any buildings on lots which rely on Class VI roads for access unless:

- The Selectmen after review and comment by the Planning Board have voted to authorize the issuance of building permits for erection of buildings on a Class VI road;
- The town neither assumes responsibility for maintenance of the Class VI road nor liability for any damages resulting from the use thereof; and
- Prior to the issuance of a building permit, the applicant shall produce evidence that notice of the limits of municipal responsibility and liability has been recorded in the Registry of Deeds.

Figure 12-1 Roads by Functional Classification

Type	Description	Speed
Arterials	Relatively high volume, priority given to automobiles, connect major activity centers, handle commuter traffic, 12 foot lanes, 6 foot shoulders with bike lanes or bike paths. These include the Primary State Highways and the state highways in Hanover's compact area, e.g. Route 10, Route 120.	30-50 mph
Collectors	Moderate volume, principal traffic conveyor between arterials and lower volume local/neighborhood roads, shared use-automobile and bicycle with pedestrian as the lowest priority, 9-10 foot lanes, and either 4-5 foot bicycle lanes or 2 foot shoulders. These include Hanover Center Road, Trescott Road, Greensboro Road.	25-35 mph
Local/neighborhood roads	Low volume, provide frontage and access to residential lots with some through traffic, shared use with bicycles and pedestrians having priority in residential clusters/neighborhoods, 8-9 foot lanes, with 0-2 foot shoulders depending on expected traffic.	20-25 mph
Local access lanes	Very low volume, cul-de-sacs, with no through traffic, shared use, bicycle and pedestrian given priority, 7-8 foot lanes.	10-15 mph
Class VI Highways	Highways discontinued as open highways, highways closed and subject to gates and bars, and highways not maintained in suitable condition for vehicular travel for five successive years or more. These roads are not maintained with Town highway funds.	
Total Road Mileage 108.44		

Figure 12-2 Class VI Roads

Bridle Road	Knapp Road	Pipers Lane Ext.
Chandler Road	Miller Road	Plummer Road
Coleman Road	Mountain Road Ext.	Stewart Lane
Corey Road	North Tunis Road	Visiting Road
Etna Highland Road (2 parts)	Old Spencer Road	Wardrobe Road
Goss Road Ext.	Paine Road	Wolfeboro Road (7 parts)
Highway No. 34	Pasture Road	

Scenic Roads

RSA 253, Sections 17 and 18, allows towns to designate by town meeting vote any road (other than Class I or Class II state highways) as a scenic road. The main purpose of a scenic road designation is to help protect the scenic qualities of that road. To the property owners who live on or travel along that road daily, the trees and stone walls may have a great deal of meaning in terms of visual quality and contribution to the rural character of the area. The designation of a road as scenic is a declaration by the town that the road has important visual qualities which must be recognized and treated with care. Routine maintenance and repairs of the road are not affected by this law.

The Town of Hanover has adopted a "Scenic Road Policy Statement" that strengthens the New Hampshire law. This policy statement is as follows:

> "If any road is designated by a Town Meeting vote to be a scenic road as provided in RSA 253:17 and 18, then the Town of Hanover will use its best efforts to make certain that any repair, maintenance, reconstruction, or paving work required on such road in order to keep the road suitable for travel as required by State Law will be performed in such a manner, to the extent possible, to maintain and preserve the aesthetic qualities of the scenic roads and unique flora and natural and historical landmarks. This commitment is made having in mind that the primary purpose of highways is for vehicular and pedestrian travel under conditions to allow such travel to be done safely. Before any reconstruction or reworking beyond routine regularly scheduled maintenance is undertaken, all abutters and the general public shall have the opportunity to review and comment on plans at a public meeting.
> Routine, regularly scheduled maintenance is defined as grading, sealing, or overlays where applicable; clearing ditches and removing brush and tree limbs which impair the sight distance in the traveled way or impair the effectiveness of the ditching process; and the replacement of culverts and removal of dead trees where necessary."

The town should be alert to opportunities to extend the scenic road system to Tunis Road, the eastern portion of Wolfeboro Road, Thompson Road, Old Dana Road and Rennie Road.

Figure 12-3 Scenic Roads

Clement Road	King Road	River Road
Ferson Road	Moose Mountain Road	Rope Ferry Road
Goodfellow Road	Pinneo Hill Road	Ruddsboro Road
Goose Pond Road	Pleasant Street	Three Mile Road
Goss Road	Occom Ridge Road	
Hilton Field Lane	Reservoir Road	

Access to Roads and Highways

An important piece of State Legislation pertinent to roads in Hanover is Access to Highways (RSA 236:13). For any town which has adopted subdivision regulations, the State Legislation confers upon the planning board "the same powers concerning highways under their jurisdiction as are conferred upon the Commissioner of Transportation by paragraphs I, II, III and IV, and they *shall* promulgate such rules and regulations as are necessary to carry out the provisions of this section." In accordance with this State law, the Hanover Planning Board has the power to regulate access to any Town maintained road. The Town adopted driveway standards in 1988 which ensure safe and controlled driveways access to all town-maintained roads in all seasons of the year.

Highway Traffic Counts

Annually for the past 15 years, Hanover has monitored average daily traffic volumes at a number of locations in town. These counts are summarized in Figure 12-5. At most count locations, traffic volumes have increased. In recent years, there has been notably more traffic in Etna Village, on Trescott Road, east of Grasse Road, and at the Lebanon City line on Route 120.

Although most of Hanover's roadways and intersections are not currently congested, many residents note that some roads at some times of the day are congested and that additional traffic should be discouraged because of the potential for increased congestion to spread traffic onto secondary streets. Hanover residents are reluctant to expand their roads to accommodate increased traffic volumes because of the loss of aesthetic qualities and the fact that expansion tends to attract more traffic and exacerbate the problem.

Hanover has four roads where current traffic volumes impede vehicle flow during peak periods. There are also five other roads where high traffic projections indicate likely future congestion. These findings are based on average daily traffic data collected by Upper Valley Lake Sunapee Regional Planning Commission at key Hanover locations. The problems that these nine roads face are more significant when realizing that these roads are substantially complete in their present form and are not likely to be expanded. This assertion comes with the assumption that the current land use will remain the same. Future changes such as the re-location of the middle school, could dramatically change the results. These heavily traveled roads with varying degrees of congestion are:

West Wheelock Street	NH Route 10 between Park Street and Reservoir Road
Park Street	Lebanon Street
NH Route 120	South Main Street

Intersection Congestion

Turning movement counts are used to determine intersection congestion or level of service (LOS). Turning movements are all the legal turns a vehicle could execute in an intersection. Intersection analysis uses turning movement data to calculate the LOS.

LOS describes the mathematical results of an intersection analysis in a qualitative manner. LOS has six stages, which range from "A" to "F" and are very similar to school grades. LOS "A" has no delay and LOS "F" has extreme delays and congestion. Figure 12-4 displays the criteria for each LOS stage.

Figure 12-4 Intersection Level of Service (LOS) Criteria for Intersections

		Un-signalized Intersections	Signalized Intersections
LOS	**Characteristics**	**Total delay (seconds)**	**Total Delay (seconds)**
A	Little or no delay	≤10.0	≤10.0
B	Short delays	10.1-15.0	10.1-15.0
C	Average delays	15.1-25.0	20.1-35.0
D	Long delays	25.1-35.0	35.1-55.0
E	Very long delays	35.1-50.0	55.1-80.0
F	Extreme delays	>50.0	>80.0

Figure 12-5 Average Daily Traffic Volumes 1990-2001

Location	1990	1991	1992	1993	1994	1995	1996	1998	1999	2001
Gateway Roads										
Rt 10 at Lyme town line		3400	3560	3300	3900	3790	3990	3720	3748	3878
Rt 120 at Lebanon city line		9070	9220	9800	9870	11960	9800	11380	13695	14633
W Wheelock at VT state line	17250	14800	15770	14060	14200	15390	22520		16373	16059
Rt 10 at Lebanon city line	8830	7590	7910	8280	9070	7880	12710	8090	7980	9322
Local Roads										
E Wheelock, east of Park Street	4400	3300	3750	3950	3640	3710	5030	4300	3868	4442
Rt 10, south of Reservoir Road	9250	8100	8220	8660	8890	8940	9400	8460	10115	10527
Etna Rd, north of Trescott Rd		2220	1750	1990	2000	2030	2030	2280	3432	3700
Rt 120, north of Greensboro Rd	13610	13450	13130	13960	13440	16840	14700	17580	18578	15466
Trescott Rd, east of Grasse Rd	0							1365	1383	1763
Rennie Rd, east of Goose Pond Rd									892	820
Ruddsboro Rd, east of Etna Rd									788	750
Hanover Center Rd, north of Dogford Rd		2660	790	920	880	960	900	1170	1243	1711

No traffic counts were taken in 1997 and 2000
Source: Hanover Traffic Surveys, 1990-2001

Figure 12-6 Level of Service (LOS) Comparison Selected Years 1986- 2001

Intersection	AM/PM	1986	1987	1988	1989	1990	1991	1998	1999	2001
Greensboro &	AM							A	A	A
Etna	PM							A	A	A
Hanover Ctr &	AM							A	A	A
Rennie	PM							A	A	A
Etna & Trescott	AM							A	A	A
	PM							A	A	A
Main & Lebanon	AM			C	C	C	B	B	C	C
	PM			C	C	C	C	B	B	B
Main & South	AM					B	B	B	B	B
	PM					B	B	B	B	B
Main & Wheelock	AM	C	C	E	E	E	C	C	F	D
	PM	D	D	D	D	D	D	C	D	C
Rt 120 & Buck	AM									
	PM							B	A	A
Rt 120 &	AM				A	B	C	B	D	B
Greensboro	PM				A	C	C	B	F	F
Park & Lebanon	AM			D	D	D	D	D	F	F
	PM			D	D	D	C	D	F	F
Park & Lyme	AM	C	C	C	C	C	B	C	F	F
	PM	D	B	F	F	F	C	C	C	D
Park & E. Wheelock	AM	B	B	C	C	C	C	C	D	E
	PM	B	B	C	C	D	B	C	F	F
South, S. College &	AM						A	A	A	A
Currier	PM						A	A	A	A
Maple & School	AM					A	A	A	A	A
	PM					A	A	A	A	A

Source: Upper Valley Lake Sunapee Regional Planning Commission annual traffic survey

Figure 12-6 presents level of service determinations for important intersections in town. Despite some short-term decreases documented in the annual *Hanover Traffic Survey* reports prepared by the Upper Valley Lake Sunapee Regional Planning Commission and available at the Town Offices, intersection traffic volumes have remained fairly constant since 1986 with a few exceptions. The 2001 survey includes this assessment of intersection performance:

> "There have been significant long- term increases in AM peak hour intersection traffic volumes at certain intersections, such as Park Street/East Wheelock Street and at Maple Street/School Street. During the PM peak periods, there have been significant long-term increases in traffic at Route 120/ Greensboro Road, Park Street/Lebanon Street, and Park Street/East Wheelock Street. At the same time of day, Main Street and Wheelock Street have experienced a significant reduction in traffic since 1986.

In 2001, two locations, Park Street/Lebanon Street and Park Street/East Wheelock Street, experienced high to extreme congestion during both AM and PM peak hours. Most notable of those is the intersection of Park Street/Lebanon Street, which continues to experience LOS F. Intersection performance continues to decline at Park Street/Lyme Road and Park Street/East Wheelock Street intersections. The Route 120/Greensboro Road intersection continues to exhibit a LOS F during the peak hour but has improved performance during the AM peak. The LOS performance improved at Main Street/Wheelock Street."

Intersection performance does correlate with traffic volumes. In general, as traffic volumes increase, intersection performance will worsen, often necessitating realignments, adding turning lanes, signalization and/or signalization optimization efforts. Volumes appreciably increased in recent years at Route 120/Greensboro Road, Main Street/Lebanon Street, Park Street/Lebanon Street, Main Street/South Street and Hanover Center Road/Trescott Road, but of these, only the first three intersections experienced significant LOS declines.

Construction activities have caused some fluctuations in volume and LOS, particularly in the reconstruction of the Ledyard Bridge, which affected Main Street/Wheelock Street, and in the construction of the water mains in Wheelock and Park Streets in 2001.

The methodology for calculating LOS as described in the *Highway Capacity Manual* was changed in 2000. Those changes make it difficult to compare LOS results year to year around that transition. Although between 1999 and 2001, there was a slight (2%) increase in peak hour traffic at the Main Street/Wheelock Street intersection, the LOS performance has improved. The methodology changes may be responsible for this unanticipated result.

Turning movement counts are not only sensitive to overall traffic volumes, but also to the percentages of each movement, (i.e. southbound vs. northbound, etc.). It is likely that as the Region grows, traffic patterns will shift and impact intersection performance based on a shift in movement patterns. For instance, fluctuations win the LOS measurements at Park Street and Lyme Road might reflect traffic reductions following DHMC's move to the current Route 120 location. Similarly, as housing developments continue to be approved and built out off Greensboro Road and in the southern Etna area, intersection turning movement breakdown at Greensboro Road/Route 120 will change. The more traffic coming from Greensboro Road, the larger the impact on Route 120.

The right turns from Greensboro Road onto Route 120 should have some impact on intersection performance. In general, right turns have much less impact than do left turns and through movements. At most intersections, there are enough openings for vehicles to make right-on-red movements. Likewise, the right-on-red movements can also negatively impact the capacity of the through movements based on the driver decision-making and the number of movements. In addition, at some intersections in Town, notably Park Street/Wheelock Street, the proportion of left-hand turns increased, thus lowering intersection efficiency.

Signal timings also affect intersection performance. The pedestrian phase at Main Street/Wheelock Street and at Main Street/Lebanon Street definitely has an impact on the vehicular

capacity at those locations. Changing the timing cycles can have a big impact on traffic and pedestrian movements.

Parking System

Providing access to convenient and adequate parking in the downtown for residents, visitors, and employees has been a subject of considerable discussion for the past several decades. It is well recognized that the continued health and vitality of the downtown is in no small measure linked to the ease of access. If Hanover becomes more of a destination shopping area (currently approximately 50% of the retail customers are from outside Hanover), the demand on the limited parking resources will continue to grow.

The issues relative to the current state of parking access within the downtown involve considerations of quality (visibility, convenience, and accessibility), as well as quantity. Ideally, we would have a mix of parking resources supplemented by frequent public transit service and easy pedestrian and bicycle access. Such a system might include:

- convenient close-by short-term access to retail establishments (1 hour or less);
- flexible, user-friendly and accessible managed parking for the tourist and destination shopper (1 to 3 hours);
- controlled lots for extended parking for those who must have accessible parking during the day (2 to 4 hours); and
- downtown and peripheral parking with frequent shuttle bus service for long-term employee parking (4 to 8 hours).

At present, the Town has examples of each of these elements of the system.

For the past twenty-five years, Hanover has devoted considerable attention and resources to providing improved access via public parking throughout the downtown. This has included an active program to encourage employees to park in peripheral lots, funding of in-town shuttle bus services, the active leasing of private property in the Institutional and Downtown zoning districts for public parking and, most recently, sponsorship of the Free Fare Zone to reduce dependence on private automobile use between Hanover, West Lebanon, Lebanon, White River Junction, Wilder and Norwich. Beginning in the January, 2002, Dartmouth College and the Dartmouth Hitchcock Medical Center have provided additional funding to Advance Transit, which has allowed the free fare program to apply to the entire route system.

At present, the Town maintains a total of 726 on- and off-street parking spaces, 83 on- and off-street rental spaces and 160 free peripheral parking spaces in Dartmouth College's Thompson Lot off Park Street. The spaces at Thompson will not be available after June 2003. A new parking structure located between Lebanon and East South Street has made available 289 parking spaces; 145 of these are metered and 144 are designated for long-term use by individuals and businesses. The balance of the metered spaces is located near the High School and the northern part of the Dartmouth College campus.

Together, these public and private parking spaces must serve the needs of several, often competing constituencies. One group, typically but not exclusively employees, requires accessible

long-term, four to eight hour, parking. The balance, typically visitors and customers but also including a number of part-time employees, need access to short-term, one to three hour, parking. The use of a relatively limited number of short-term parking spaces by full-time employees through the (illegal) practice of "meter feeding" should continue to be discouraged. In recent years, the Town has significantly increased both meter fees and fines.

The availability of municipal parking in the downtown has recently been significantly improved by the construction of a parking garage. Dartmouth College has plans to expand the on-campus parking supply significantly in the next ten years. The College is giving careful study to how to judiciously add to its own parking supply, while at the same time working on traffic demand management options to reduce single-occupancy vehicle trips into Hanover. The Town will continue to work closely with Dartmouth College on these issues.

In the near term, the Town should minimize the increase in the demand for parking by maximizing the use of alternatives to single occupancy vehicles. This can be accomplished using convenient public transit, walking, biking, and ridesharing; by developing housing near employment; and by pricing parking appropriately to allow free market forces to maximize efficient use of existing parking resources.

As suggested in the Brook McIlroy report to the Downtown Committee, entitled *Downtown Hanover Vision*, and dated April 2001, it may become appropriate to consider the construction of additional structured parking facilities in or near the downtown. Potential sites are identified in that study. The Downtown Committee is also currently working on the development of a program which, if approved by the Selectboard, would permit the purchase of parking credits, thereby resulting in the creation of a pool of funding available to the Town to assist in addressing parking concerns.

Hanover should encourage the establishment of appropriately located peripheral parking lots and/or park and ride facilities with frequent transit to the downtown and campus. When changes occur in any parking lot, pedestrian safety, lighting, landscaping, drainage and appearance are all important design issues.

Long-Term and Employee Parking

For some time, the Town has sponsored and financed, through the Parking Fund, free parking for employees in peripheral parking lots and associated free bus services between these lots and the downtown. The provision of peripheral parking lots for downtown employees to supplement private parking has been somewhat effective in freeing spaces for visitors and shoppers, but the demand for employee parking continues to grow. Relatively few metered spaces are available for use by employees or those that have a need to park in the downtown for longer than three hours. No special facilities are provided in the downtown for carpools; these should be considered.

Accessibility to the Thompson Lot continues to limit its use, particularly for employees whose duties require them to work after 6 PM and/or to use their cars during the day. With the tri-party agreement between Dartmouth College, the Dresden School District and the Town, the Town is likely to lose the use of the Thompson parking lot. The Town should work with interested parties

to provide replacement parking for this loss. While there are approximately forty-eight 10-hour meter spaces on Lebanon Street and Hovey Lane within walking distance of the downtown, during the school year these spaces are used almost exclusively by High School students with many of the street metered spaces taken up by leasees and High School students. In recognition of this fact, forty short-term spaces in the Marshall Lot have been converted to 10-hour meters. However, continued emphasis must be placed on working with employers and employees to make better use of the available limited resources.

Short-Term and Customer/Visitor Parking

Customers and visitors to the downtown have a variety of parking options. With the number of visitors to the downtown exceeding one to two thousand per day, parking, particularly user-friendly, accessible, short-term parking must be provided. Hanover's focus in the past has been on providing the maximum amount of short-term parking on and adjacent to Main Street. The Town attempts to ensure available patron parking through the use of two- and three-hour meters and firm parking enforcement.

Pedestrian Concerns

When we leave our cars, we become pedestrians. The pedestrian friendly nature of Hanover is a strongly supported characteristic of the downtown. This friendliness can be improved upon. If walking was truly a pleasant experience, then there would be greater incentive for people to leave cars at home (or in outer-lying lots) and spend more time in the downtown on foot, rather than at the wheel.

If a pedestrian is required to walk right next to the street, particularly where traffic is heavy, the experience is far from friendly. Examples where this occurs are Currier Place, Lebanon Street, and East Wheelock Street. If pedestrian paths are removed from the street, separated by vegetation, the walking experience improves. The downtown vision that there be a variety of setbacks helps make our pathways more interesting and attractive. Pedestrian shortcuts between streets, on well-landscaped and planned paths make the prospect of walking much more appealing; the streetscape is more interesting.

Most parking areas in Town are remarkably unattractive. For example, the spaces behind the Dartmouth Coop and behind Lou's Restaurant are dangerous for both pedestrians and cars. Except for the improved lot behind the Municipal Building, downtown parking areas are devoid of vegetation. There are few, if any, structures to help slow and filter runoff- water is directed to the streets and collected in storm drains, to become a downstream problem. The spaces behind downtown buildings may be privately owned, but they present a face to the public and should be just as attractive as the front to of those buildings. Alleys such as Allen Street serve a useful function to help divert traffic and pedestrians, and should be a design component to any new approaches to the downtown.

Upper Valley Rideshare
The Region is fortunate to have two states that have provided funds to form a strong rideshare program. Without this joint effort, many employers initially refused to allow Upper Valley Rideshare (UVR) to be offered unless it would benefit all their employees. Hanover should encourage employers to promote ridesharing.

Local Public and Private Transportation Services
Advance Transit- Advance Transit (AT) is a public transit provider moving about 500,000 riders per year to, from and between Canaan, Enfield, Hanover, Hartford, Hartland, Lebanon, and Norwich. Five routes run in and around Hanover and the downtown is the main destination of the majority of AT riders. All AT routes are now part of a free- fare zone as the result of funding commitments by numerous Upper Valley towns, including Hanover, as well as Dartmouth College and the Dartmouth Hitchcock Medical Center.

There are plans to double the service on the red route between Lebanon, West Lebanon and the Route 12 A plazas so that buses would run every half hour rather than every hour.

Vermont Transit- Vermont Transit Lines, a subsidiary of Greyhound Lines, is the only intercity and interstate bus service in the Region. Its regional terminal is located on Sykes Avenue in White River Junction. On average, approximately 200 people pass through the White River Junction facility daily, either departing, arriving, or transferring from one bus to another. Vermont Transit provides an important service as the only public transportation option between the Upper Valley and Manchester and Logan airports.

Vermont Transit's schedule is fully coordinated with its Greyhound connections. Four major Vermont Transit-Greyhound routes pass through or originate/terminate in White River Junction: Montreal to Boston, via Burlington with an on-call stop in Hanover; Montreal to Springfield; Newport, VT to White River Junction; and Rutland, VT to Boston.

The number of departures and arrivals fluctuates seasonally, with July, August, and December the heaviest travel months for Vermont Transit.

Dartmouth Coach- provides airport bus service from the Hanover Inn to Logan International Airport and to Boston's South Station. The company offers seven daily round trips.

Bicycling
Interest in bicycling has been high in recent years due to an increase in the public's interest in promotion of both human and environmental health, and the availability of new technology that makes bicycling easier. It has become a transportation alternative for a growing segment of the population. Although many limit their bicycling to seven months of the year, others find it viable year-round. Most people, unfortunately, are inexperienced cyclists who hesitate to use a bicycle for transportation because they fear riding under the existing road and traffic conditions. Children are inhibited from bicycle travel because of legitimate parental concern over their safety on our roads.

In Hanover, a Bike and Recreational Path Committee was established to promote biking in town. Given that 52% of Hanover residents have a commuting distance of two miles or less, it would

be feasible for many who consider themselves non-athletic to become bike commuters. Bikeways can encourage people not normally inclined toward cycling to bicycle. A bikeway, once constructed, provides a safe place for a non-polluting and inexpensive transportation mode, may help decrease traffic congestion, provides a means for improved physical and emotional health, and provides inexpensive recreation. These benefits render an area more attractive for living, shopping, business, and working. The self-interest of government, business, and industry can, therefore, be served through encouragement of wider bicycle use.

The development of bikeways for road bikes should be directed toward creating a continuous network of bicycle routes to serve Hanover and connect with a regional network of bike routes, including Norwich, Lebanon, and Lyme. Particular emphasis should be placed on serving important destinations well.

All road and intersection design should be done with consideration given to how it will accommodate bicycling. For example, signalized intersections that use traffic detectors should include sensors sensitive to bicycles. Storm drains, curb aspect, shoulder width and striping and other roadway details should be designed for safe bicycle travel. To that end, all proposed construction, re-surfacing, and other alterations should be reviewed by the Bicycle and Recreational Path Committee.

Bicycle parking has been given small, but insufficient, attention as a separate topic. Parking facilities are an important need that must be provided if cycling is to be seriously encouraged. They can be effectively installed at shopping and business areas, recreational spaces, bus stops, and other centers that generate bicycle travel. Bike parking should be located at destinations and these destinations need to be served by good bike routes. Ideally, protection from the elements should be provided.

The Route 120 to Route 10 corridor through Hanover is part of an existing regional bikeway system. Improvements are needed to increase the safety of the bikeway from the Lebanon city line to north of the downtown area. Etna Road to Greensboro Road is included as a proposed shared roadway lane in the regional system as well. Bicycle access to Hanover schools that is safe for children should be planned and implemented. The other roads included in the regional bike route system are: East and West Wheelock, Trescott, Reservoir, Etna, Hanover Center (to Rennie), Rennie, River, Goose Pond, Turnpike, Wolfeboro, Tunis and Ruddsboro.

Aviation

The City of Lebanon operates Lebanon Regional Airport to serve the aviation needs of the City and the Region. The Lebanon Regional Airport serves quite varied roles like recreational aviation, commercial air freight and passenger air service, and acts as a focal point for a regional commercial/ industrial growth center. The Lebanon Regional Airport is an integral part of this Region's economy and land use. The Airport also aids in attracting new businesses to the Region. This attraction provides the Region with an advantage over other areas.

Passenger air service is operated by USAir Express to Boston, New York City, and Philadelphia. Frequency of service among these cities varies from every three hours to once or twice a day. Air freight has become a growing area of the airport's aviation business since United Parcel Service commenced operations here.

Rail Service

AMTRAK- AMTRAK passenger rail service, operating between Saint Albans, VT and Washington, D.C. via New York City, makes two stops each day in White River Junction, about 4 miles from Hanover. Advance Transit links Hanover to the rail station.

Freight Rail Service- There currently is no direct freight rail service within Hanover.

4. RECOMMENDATIONS

Transportation recommendations fall into several categories as follows.

Land use policies are integral to traffic management in Town.

- review land use and zoning regulations with the objective of encouraging neighborhood-oriented development in certain areas of the Town. Current minimum size residential zoning encourages widely separated linear strip and cul-de-sac development that makes the automobile more viable than other transportation modes. This condition exacerbates traffic congestion and, over time, can decrease the sense of community.
- encourage the development of two new villages in the Dresden and Centerra North areas, with a community focus, compact housing and basic commercial services.
- encourage higher density residential development in select areas such as Centerra North and Dresden village centers, as described in the Land Use Chapter, surrounding the downtown and near employment centers, thereby reducing highway construction and maintenance costs and providing population centers conducive to increased use of public transit and alternative transportation (this pattern enables growth to occur while minimizing increases in traffic).
- adopt land use regulations that allow development of low (transportation) impact businesses and home-based business in Hanover. Emphasis should be on job opportunities that reduce traffic or do not increase traffic congestion.
- consider the zoning implications of the use of peripheral parking lots and shuttle service and the use of transportation demand management (TDM) measures.

Administrative and fiscal policies can promote improved transportation in Hanover:

- support and encourage transportation changes aimed at reducing our reliance on the use of single occupancy vehicles such as employee peripheral parking, ridesharing, vanpool programs.
- encourage housing options within transit areas, and walking or bicycling distance of places of employment.
- institute parking regulations that provide alternatives to on-site parking in the downtown.
- extend public transit service along Greensboro Road to Great Hollow businesses, and into the Centerra North and Dresden village centers.
- assist Dartmouth College in its efforts to reduce single-occupant vehicle presence on the campus, particularly through the creation of peripheral parking and shuttle bus possibilities, continued subsidies of the Advance Transit system, and reducing the number of student vehicles.

- encourage traffic congestion mitigation methods such as flex-time, staggered work hours, provision of additional public transit service and ridesharing.
- support the efforts of the regional Transportation Management Association (TMA) to increase the number of "park and ride" lots on Advance Transit routes in the region.
- encourage peripheral parking and shuttle bus service outside of the downtown.
- work with the Dresden School District to increase student bus ridership and to address school parking needs.

Relative to **new and improved access,** the Town should:

- pursue opportunities to provide direct access to the Centerra North multi-use zone from NH Route 120 via a new Centerra Parkway as development of this area would enhance the economic vitality of the community. Access to this area from Greensboro Road will adversely impact the residential quality of the neighborhood and should be avoided. The cost for new access should be born by the developers who will benefit.
- give careful consideration to non-automotive alternatives before seeking increased capacity improvements to the road infrastructure, instead accept congestion as a fact of vitality and a necessary condition to motivate better travel decisions such as choosing not to travel by automobile, traveling at a different time, carpooling, etc.
- consider Town, rather than State, control of Hanover Center (Etna) Road, Great Hollow Road and Greensboro Road redesign and maintenance so that traffic calming will be more easily accomplished.

Regional cooperation must be considered in all transportation planning.

- work with surrounding communities to address regional transportation issues of critical long-term importance to Hanover. These include developing regional solutions to managing commuter traffic, encouraging commuters to use rideshare and public transit, maintaining support for the Lebanon Regional Airport, and supporting regional alternative transportation initiatives.
- work with Norwich and Lebanon to create both park and ride and/or shuttle bus lots and even better Advance Transit service (hours and frequency).
- open discussions with Lebanon, Hartford, NH Department of Transportation and Vermont's Agency of Transportation, about a new parkway from Route 120 either to Route 10 and ultimately to I-91 or I-89with connections into the Dartmouth Hitchcock Medical Center/Centerra area.
- begin discussions with the Norwich Selectboard and Planning Commission about peripheral parking and transit options to relieve congestion on Ledyard Bridge and at the Wheelock/Main Street intersection.
- implement a regional pedestrian and bicycle trail system that connects the Dartmouth Hitchcock Medical Center, with the Norwich Green.

Road design considerations:

- traffic calming as defined by the Institute of Transportation Engineers is, "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users". Provide traffic calming where feasible for enhancing or restoring livability of neighborhoods through reduction of

cut-through traffic, truck traffic, excessive speed, vibration and noise. Traffic calming should be provided for safety of all street users including pedestrians, children, bicyclists, and those who wish to congregate along the street. Traffic calming should be implemented to improve conditions for non-motorized users of streets.

- re-route through traffic from local and neighborhood roads to arterial and regional roads. Traffic calming strategies should take precedence over policies to expedite traffic flow via infrastructure improvements.
- promote connectivity in new road design even though cul-de-sacs are thought to be safer than through routes.
- maintain a road system that allows multiple choice on route selection to disperse traffic impacts.
- evaluate all new street projects and reconstruction projects for potential application of traffic calming devices and techniques.
- to facilitate the flow of traffic, coordinate the timing of traffic signals throughout the urban area.
- where it helps retain and enhance neighborhood character, adopt a policy such that unpaved roads remain unpaved.
- incorporate reduced specifications and flexible designs (such as Vermont Agency of Transportation standards) into Hanover's road design guidelines to reduce the impacts on the community and environmentally sensitive and culturally significant areas and to be more appropriate to surrounding land uses..

Alternatives to automobile transportation should be encouraged and promoted:

- to reduce traffic congestion, seek opportunities to provide a safe, comprehensive system of non-motorized travel options such as bikeways, sidewalks and pedestrian and mountain bike trails throughout the town and especially between adjacent neighborhoods and schools.
- continue Town ownership of Class VI roads as recreational corridors.
- participate in the Scenic Byway program to enhance non-motorized vehicular transportation options and the provision of information about Hanover and the attractions of the Connecticut River Scenic Byway. The bicycle routes of the Byway are Route 120, Lyme Road, River Road, West Wheelock Street, North College Street and Route 10 South.
- provide an enhanced bikeway network throughout Hanover that serves both recreational and commuter needs and consider creating a bike path connecting Hanover, Lebanon and West Lebanon.
- develop a Bicycle Plan including specifics on the bikeway system in Hanover, outreach and education for motorists and cyclist safety.
- add investments in bike paths, bikeways and bicycle parking facilities to the capital budget.
- create an urban neighborhood pathway and sidewalk plan.
- improve the townwide trail plan to provide off-road options for hikers, skiers, mountain bikers, snowmobilers, ATV users and horse back riders.

Parking is a necessary part of the transportation system.

- parking lots should be attractive, with protected walkways for pedestrians.
- parking lots should be generously landscaped to make the lot more attractive, to define pedestrian passageways, and to serve the important functional purpose of helping to slow

runoff , filter pollutants, and recharge groundwater. Town boards should give serious attention to filter strips and vegetated retention areas as requirements in site plan design for all paved areas. These low tech measures for storm water detention have the potential to make a more attractive parking lot, as well as serving important environmental functions, such as moderating temperature of storm water runoff.

- the Town parking system should give parking preference to vehicles used in car pools. To reduce demand, carpooling and alternative forms of transportation should be encouraged.

Pedestrian travel through Town should be encouraged and planned**.**

- Devise an overall plan for people circulating in the downtown using sidewalks and bikeways as well as trail connections with outlying areas and trails. Landscape elements are an important component to shelter the walker from traffic and provide a pleasant escape from traffic.
- Pedestrian walkways should have landscape features that have some continuity in design, and fit into the overall pedestrian flow for the town (downtown and beyond). Safety is just one benefit of this approach.

Scenic considerations should be part of all transportation planning decisions in Hanover:

- encourage the designation of existing roads as scenic roads to preserve existing rural environments.
- continue to implement the State's scenic road law and the Town's scenic road policy.
- consider strengthening standards used in the Planning Board review of scenic roads to assist in the preservation of existing rural environments.
- preserve trees and other scenic features which make Hanover particularly attractive, avoid widening existing Town highways and avoid the construction of new roads.