Transit Development Plan for Advance Transit

Draft Final Report
Submitted to
Advance Transit

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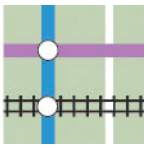

TRANSIT DEVELOPMENT PLAN
FOR ADVANCE TRANSIT

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Chapter 1: Introduction and Executive Summary

1.1 Introduction

During the fall of 2008 Tom Crikelair Associates developed a *Transit Development Plan for Advance Transit*. This work was carried out for Advance Transit with funding from the New Hampshire Department of Transportation. A subcommittee of the Advance Transit Board of Directors provided guidance and oversight for this planning effort.

This report presents the findings and recommendations of the study. It includes ten chapters:

Chapter 1 Introduction and Executive Summary
Chapter one presents a summary of the project report, including key recommendations and findings.

Chapter 2 Review of Existing Services
Chapter two presents a critical review of Advance Transit routes and services. The review process included four steps: (1) on-site inspections of Advance Transit bus routes, (2) interviews with bus drivers and operating staff, (3) analysis of ridership records, and (4) calculation of route-by-route performance measures. The chapter describes how buses are currently being used, and it identifies strengths and weaknesses of the current service design.

Chapter 3 Passenger Survey
Chapter three presents the results of a passenger survey distributed to Advance Transit bus riders on September 24, 2008. The survey examines trip purposes, transfer activity, frequency of use, commute patterns, and employment status of Advance Transit users. It asked passengers to evaluate Advance Transit bus operations and to make suggestions for improving the service. The chapter includes comparisons with similar passenger surveys carried out in 1999 and 2004.

Chapter 4 Community Involvement
Chapter four describes efforts to involve members of the public in the transportation study and to obtain ideas and suggestions for the future of Advance Transit's fixed-route transit program. The first section describes Advisory Committee meetings held during the study. The second section describes discussions with stakeholders. The third presents findings from public workshops. Section four summarizes suggestions submitted via email by people who could not attend the workshop sessions.

Chapter 5 Service Area Changes
Chapter five describes recent and anticipated land use changes in the Upper Valley that may be relevant for public transportation planning. It identifies recently permitted residential and commercial developments, along with projects where permit applications are still pending. Separate sections address anticipated growth for Dartmouth College and Dartmouth-Hitchcock Medical Center.

Chapter 6: Short Term Service Adjustments – July 2009
Chapter six recommends changes for Advance Transit bus schedules that could be introduced in July of 2009. These schedule adjustments are designed to improve the efficiency, reliability, and on-time performance of existing Advance Transit bus routes. Special attention has been paid to connections and transfers between buses. The chapter also discusses park and ride shuttle strategies for Dartmouth College.

Chapter 7: Longer Term Service Design Strategies – Core Service Area
Chapter seven presents service design alternatives that could be implemented by Advance Transit in the next two to five years. It focuses on service improvements for the four municipalities within Advance Transit's core service area: Lebanon, Hanover, Hartford, and Norwich.

Chapter 8: Longer Term Strategies – Regional Commuter Service
Chapter eight looks at possible commuter bus routes from New Hampshire towns located outside of Advance Transit's core service area. It considers possible commuter services from Enfield, Canaan, Lyme, Grantham, New London, Claremont, Cornish, and Plainfield. Residents from each of these towns came to Advance Transit's public workshops to ask for alternatives to automobile commuting.

Chapter 9: Bus Stops and Transfer Centers
Chapter nine provides a brief discussion of Advance Transit bus stops and transfer centers. Advance Transit has contracted with a traffic analysis and landscape design team to identify needed bus stop improvements in the town of Hanover. This chapter acknowledges the work of this consulting team, and suggests that similar efforts will be needed elsewhere in the Advance Transit service area.

Chapter 10: Capital and Financial Plan
Chapter ten presents a five-year capital and financial plan for Advance Transit. It includes capital and operating cost projections for the period FY 2010 through 2014, along with estimates of revenue required to pay for the service.

1.2 Project and Financial Plan Overview

Planning Context

This study addresses a wide range of service design alternatives for Advance Transit, based on anticipated future needs and on requests received from bus riders and other members of the public. Only some of the service ideas developed for this study are included in a proposed five-year financial plan. While each of the proposed services offers important community benefits, there is unlikely to be sufficient funding available to pay for all of them.

Each of the service ideas included in the plan requires additional financial support from Advance Transit's funding partners. The transit system's ability to implement these proposed services depends on whether this additional money will be made available. If the required funding is not forthcoming, Advance Transit may need to postpone or cancel some of the proposed service additions.

Major uncertainties about the economic future are relevant for Advance Transit. These include:

The price of fuel - Demand for transit alternatives rises and falls with changing gasoline prices. Fuel prices are especially important for longer-distance regional commuters. Diesel prices also have a big impact on Advance Transit operating costs.

The health of the broader economy - Problems in financial markets and in the broader economy impact development plans for Advance Transit's institutional partners. Dartmouth College and Dartmouth-Hitchcock Medical Center have already decided to postpone some planned expansion. If local tax revenues decline, it may be difficult for local communities to increase their appropriations for public transportation. At the same time, if economic conditions deteriorate, the number of people who turn to Advance Transit for their local transportation needs is likely to increase.

Economic stimulus packages - It is unknown to what extent proposed economic stimulus measures will include additional capital and operating support for transit. For rural and small urban systems, perhaps the best approach would be to provide grants that state governments could use to match existing FTA program funds.

Efforts to address global climate change - It is unknown whether future government programs to address climate change will include significant expansion of public transportation alternatives.

Because of these uncertainties, this plan is more ambitious than five-year plans developed for Advance Transit in the past. The plan is designed to position Advance Transit so it can respond effectively to changing economic conditions and political expectations.

Financial projections are based on one possible scenario. The proposed expansion of Advance Transit services is ambitious, but it does not do everything that community members asked for. Other choices could have been made. A supporting cost model will allow Advance Transit to test the impact of different strategies on costs and revenues.

Service Design Choices

The cost model developed for this study includes a decision matrix that allows different service ideas to be implemented in different years. Figure 1.1 presents the set of choices utilized in the proposed financial plan.

The plan introduces an evening Blue route express in FY 2010, offers earlier 15-minute DMS service beginning in FY 2011, and extends Blue route service hours to 8:30 p.m. beginning in FY 2012. It adds a second Red route bus at the start of FY 2010 (July 1, 2009). While the consultants developed a design for later evening service on the Blue and Red routes, this change is not included in the five-year financial plan due to the cost.

The financial plan anticipates an increase in Green route frequency in FY 2013. Because of the high cost, and because of the impact on towns in Vermont and New Hampshire, the financial plan does not include increased service on the Orange route.

The plan calls for splitting the Brown route beginning in FY 2011, with improved service for Norwich, improved service for Rivercrest and CRREL, and new service for Sachem Village. It postpones implementation of Dartmouth Route 120 park and ride service until FY 2014.

The plan calls for adding Saturday service in FY 2011. It anticipates new commuter service for Centerra and Etna Road in FY 2011, and a new Mascoma Street / Centerra midday route in FY 2014. It anticipates new commuter bus service from Lyme in FY 2011, and adds an extra peak-hour bus to the Enfield / Canaan portion of the Blue route.

Figure 1.1 Advance Transit Decision Matrix

INPUT AREA: DECISION MATRIX

	Hours	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
BLUE ROUTE							
Current	10,345	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Net 09 adjustments	323		TRUE	TRUE	TRUE	TRUE	TRUE
Early Blue 15	383			TRUE	TRUE	TRUE	TRUE
Evenings Blue 8:30 p	786				TRUE	TRUE	TRUE
Evenings Blue 10:00 p	1,135						
RED ROUTE							
Current	3,081	TRUE					
2009: 2 buses	6,077		TRUE	TRUE	TRUE	TRUE	TRUE
Evenings Red	979						
ORANGE ROUTE							
Current	3,030	TRUE					
2009 adjustments	3,030		TRUE	TRUE	TRUE	TRUE	TRUE
30 minutes w/ Norwich	10,213						
GREEN ROUTE							
Current	2,954	TRUE	TRUE	TRUE	TRUE		
Net 09 adjustments	170		TRUE	TRUE	TRUE		
2 buses	6,375					TRUE	TRUE
BROWN ROUTE							
Current	2,826	TRUE	TRUE				
Net 09 adjustments	158		TRUE				
Separate Norwich 30	3,034			TRUE	TRUE	TRUE	TRUE
Sachem/Rivercrest	3,073			TRUE	TRUE	TRUE	TRUE
Evenings Sachem/Rcrst	536			TRUE	TRUE	TRUE	TRUE
SHUTTLES							
Dartmouth current	7,533	TRUE	TRUE	TRUE	TRUE	TRUE	
Dartmouth w/ 120 Lot	11,929						TRUE
DHMC	8,625	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
NEW ROUTES							
Etna/Centerra commuter	1,126			TRUE	TRUE	TRUE	TRUE
Mascoma/Centerra	1,657						TRUE
SATURDAY SERVICE							
Saturday NH	832			TRUE	TRUE	TRUE	TRUE
Saturday VT	403			TRUE	TRUE	TRUE	TRUE
REGIONAL ROUTES							
Lyme 6 trips a day	1,424			TRUE	TRUE	TRUE	TRUE
Grantham-DHMC	765						
Grantham-Etna Road	765						
Claremont-DHMC	765						
Claremont-Etna Rd	765						
Claremont-Airport	765						
Extra Canaan roundtrip	510			TRUE	TRUE	TRUE	TRUE

The cost model does not include regional commuter services from Grantham, Claremont, Cornish, and Plainfield. Additional planning work will be needed to determine the best business model for regional commuter bus alternatives. Alternative strategies for regional commuter services are discussed in chapter 8.

Five-Year Budget Projections

Five-year revenue and expense projections are summarized in Figure 1.2. Dollar amounts presented in the five-year budget are supported by a spreadsheet cost model developed for Advance Transit as part of this planning process. Year-end fund balances could be contributed to an Advance Transit capital reserve fund.

Figure 1.2 Five-Year Revenue and Expense Projections

TOTAL OPERATING REVENUE

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Federal NH	1,558,693	1,851,594	2,169,811	2,294,189	2,281,000	2,427,882
Federal VT	189,071	171,712	314,070	323,492	577,970	595,309
State NH	34,000	37,516	48,258	49,706	51,197	52,733
State VT	135,403	147,334	161,370	166,211	165,327	170,287
Municipal	443,694	497,005	665,829	686,104	806,130	859,921
Non-profits	1,021,166	1,062,008	1,203,688	1,274,742	1,312,984	1,806,126
Other businesses	0	10,220	46,977	48,386	95,671	108,310
Donations	104,094	107,217	110,433	113,746	117,159	120,673
Fare box	0	0	20,000	20,000	20,000	20,000
Other revenues	3,796	3,910	4,027	4,148	4,272	4,401
Total revenue	3,489,917	3,888,515	4,744,464	4,980,725	5,431,710	6,165,642

TOTAL OPERATING COSTS

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Regular routes	1,809,343	2,169,283	2,954,056	3,112,565	3,503,678	3,765,093
Contract shuttles	1,314,776	1,354,220	1,394,846	1,436,692	1,479,792	1,938,862
ADA	123,762	127,475	155,674	184,384	189,916	195,613
Rideshare	170,123	175,227	180,483	185,898	191,475	197,219
Total Cost	3,418,005	3,826,204	4,685,060	4,919,539	5,364,861	6,096,787
Surplus / Deficit	71,912	62,311	59,404	61,186	66,850	68,855

1.3 Summary of Findings and Recommendations

Review of Existing Service

1. Advance Transit has experienced steady and remarkable growth in regularly scheduled fixed-route ridership over the course of the past decade. In the most recent five-year period, regular route ridership increased 85%. For individual routes, the greatest increase in total riders occurred on the Blue Route, with a five-year gain of 91,350 riders. The second largest increase occurred on the Red route, with a five-year increase of 52,702. The largest percentage increase occurred on the Green route, with five-year growth of 152%.

2. Commuter trips from Canaan and Enfield often operate with standing room only. This is particularly true for the morning express that departs Canaan at 7:00 a.m. People who commute from Canaan and Enfield continue to ask for an evening express bus that operates from Hanover and DHMC to Enfield and Canaan without passing through downtown Lebanon.

3. Blue route buses are sometimes delayed by traffic congestion on Route 120, particularly near Interstate 89. It would be better if they could travel directly from downtown Lebanon to the high school and the medical center via Mount Support Road. This would require a new "bus way" overpass across I-89 and upgrading of Mount Support Road.

4. The Red route averages 37 riders per revenue service hour, which is twice the productivity rate for many small urban transit programs. The Red route generates this level of use despite the fact that a bus is available only once per hour, resulting in significant inconvenience for many riders.

5. Much of the Route 12A Plaza area lacks appropriate bus stops. Buses must either make unappealing stops on the side of the highway, or they must travel time-consuming diversions through crowded shopping center parking lots.

6. While many commuters use the Green route, the route offers area workers limited convenience because of a 60-minute wait between buses. Green route commuters also want later departures from Hanover.

7. VA Hospital employees who ride the Red route from downtown Lebanon must wait 30 minutes for their connecting Orange route bus in West Lebanon. Hospital employees would benefit from an Orange route trip that departs West Lebanon at 7:30 a.m. and arrives at the VA at 7:43 a.m. VA employees would likewise benefit from an afternoon bus that departs the VA Hospital at 4:43 p.m.

8. Brown route drivers have difficulty completing round trips in the available 30-minute window, particularly during peak commuting hours. The bus sometimes runs more than 10 minutes behind schedule.

9. Commuters from Norwich have no parking lot where they can leave their cars to board the Brown route bus. Members of the local American Legion have suggested using the Legion Hall parking lot, or the nearby Huntley Field parking area.

10. The Dartmouth / Downtown shuttle suffers from a measure of complexity, which results from changing the service pattern at different times of the day. The service would be easier to understand if it followed a consistent pattern throughout the day.

Passenger Survey

11. Surveys were distributed on Advance Transit's five regular bus routes on September 24, 2008. A total of 593 surveys were distributed and 572 were returned, for a response rate of 96.5%%.

12. Twenty-six percent of regular route riders said their trip involved a transfer between bus routes. Sixty-nine percent gave "work" as their primary trip purpose. The Blue and Brown routes had the highest percentage of work trips. Eighty-two percent of Blue route trips were work related, while 71% of Brown route trips were work related. "Work" was the primary purpose for 67% of Green route riders, 54% of Red route riders, and 46% of Orange route riders.

13. Nearly half of Advance Transit bus riders said they use the bus service five days a week. Another 33% said they ride 3 or 4 days a week. The combined total for people who ride 3 or more days a week was 82%.

14. Thirty-three percent of survey respondents said they started using Advance Transit within the last year. This is similar to the response to this question in 1999 and 2004.

15. Thirteen percent of survey respondents indicated that they were enrolled as students at Dartmouth College. Nineteen percent of Dartmouth student bus riders were undergraduates, and 81% were graduate students.

16. Twenty-eight percent of the Advance Transit passengers who participated in the survey are employed by Dartmouth College. Survey results suggest that Dartmouth employees and students together account for 41% of Advance Transit ridership.

17. Twelve percent of Advance Transit passengers said they are employed by the Dartmouth-Hitchcock Medical Center. The distribution of DHMC employees was 82% on the Blue route, 7% on the Orange route, 4% on the Green route, 3% on the Brown route, and 3% on the Red route.

18. Fifty-three percent of Advance Transit survey respondents indicated that they had a car available for their trip. The percentage of Advance Transit riders who chose to ride instead of drive increased from 25% in 1999 and 43% in 2004 to 53% in 2008. Sixty percent of Advance Transit riders indicated that they have a valid drivers license.

19. There has been some shift in passenger perception about the availability of seats. In the 1999 survey, 66% of riders said it was nearly always easy to find a seat. In 2000, 71% said that it was nearly always easy to find a seat. In the 2008 survey, this number dropped to 55%.

20. There is very strong support for continuing the Advance Transit program, with 99% of survey respondents agreeing that this is "very important," and the remaining 1% saying "somewhat important." Eighty percent of participating groups feel that it is "very important" to keep the service free, while an additional 17% said free service is "somewhat important." Two percent of participating groups suggested that keeping Advance Transit free is "unimportant."

"What do you like about Advance Transit bus service?"

21. Many survey participants offered words of praise and appreciation for Advance Transit. They like the friendly and helpful drivers. They like that it is free. And they appreciate the environmental benefits of the service. A Hanover resident said: "This is a wonderful community service. The drivers are very dedicated to providing excellent service. I really enjoy riding the bus even though I have a car available. Keep up the great work!"

22. A Lebanon resident said: "AT provides a wonderful and vital service to the community. The drivers are always cheerful, polite, and helpful. It's fantastic that it's free. The community needs to continue to support public transportation alternatives like the AT."

23. A Blue route commuter who lives in Grafton said: "I very much appreciate the service. It is convenient, environmentally right, and economically important in these trying times." A Lebanon resident said: "The drivers are all extremely nice and professional. This is a great service for the Upper Valley."

24. An Enfield resident said: "I think it is very important to decrease the number of cars on the road and reduce America's carbon footprint. That's why I think the service should be free – to reward and encourage those who are willing to use mass transit."

25. Many riders said they would have difficulty getting to work without the service. A Canaan resident said: "This is my only way to get to and from work, as I don't drive." A Lebanon resident said: "In this economy, I believe more and more people will come to rely on your service." An Enfield resident said: "I'm a new mother without a license. I'd have no other way to get to work. Thank you for your service." A Lebanon resident said: "Without it, I'd spend $30-$40 a day in taxi fares."

26. A Green route passenger from White River Junction said: "I'm so impressed with how the drivers communicate to make sure transfers are taken care of." A Green route rider from Hartford Village said: "I like that one bus will wait for a short time for transfers. This is something I really appreciate. In the big cities this is never done."

27. A West Lebanon resident on the Red route said: "Reduces traffic, saves on gas." A Red route rider from Hanover said: "It helps me get my child around. I am very low on money, so it is very helpful." A Canaan resident said: "I like that the AT is free and available to all." A West Lebanon resident said: "Everyone is treated respectfully." Another West Lebanon resident said: "Every diver is very understanding of the passengers' needs. I am going blind."

28. A Norwich resident on the Brown route said: "The drivers are very helpful with new people, almost like ambassadors for the town & college. They remind you if you forget things on the bus and wait if they see you running. I think it's one of the best things about living here." Another Brown route rider from Norwich said: "Great service. Love the bus. More convenient than driving and having to park. Free is important."

29. An Orange route rider from White River Junction said: "I'm a student with limited finances. I don't yet have a license, and my husband is physically unable to drive (legally blind). These buses have enabled me and my husband to continue school, do our grocery shopping, and get to the doctors, which are all very important. Definitely keep AT!!"

"What can we do to improve the service?"

30. While passengers praised Advance Transit, they also offered suggestions for improving the service. A Lebanon resident said: "More frequent buses between Lebanon and West Lebanon would be nice. However, the primary flaw of AT is the lack of evening and weekend service."

31. A Blue route passenger from Lebanon said: "Extend hours for 12.5 hour employees at DHMC." A Red route passenger said: "I work late and don't have a ride. So I think you should do some night service to help people who don't have a license." A Norwich commuter on the Brown route said: "I know lots of people who don't ride because they usually stay on campus late and there is no service then."

32. A Lebanon resident on the Red route said: "There are many new grad students and others without cars. We don't want to be stuck at home every weekend."

33. Many commuters from Canaan and Enfield said more seats are needed during peak commute times. They also asked for an evening express that bypasses downtown Lebanon. There were also several requests for midday bus service to Enfield and Canaan.

34. Riders associated with Dartmouth Medical School said that 15-minute service between DMS and DHMC should start earlier in the morning. A faculty member suggested that the 15-minute headways should begin at 7:30 a.m. instead of 9:00 a.m.

35. Several people asked for better information about bus stops. A Lebanon resident on the Blue route wrote: "A more detailed map of the bus stops online would be helpful." Another Lebanon resident said: "Once you know the routes it is easy to use the service, but learning where a route goes if you haven't taken it before is very difficult."

36. Some people asked for a direct commuter route to job sites at Centerra Park. Others asked for midday bus service to the Co-op at Centerra.

37. Many Green route passengers asked for later service on their route. One Green route rider said: "Even one more southbound trip from Hanover at night would help. 5:30 p.m. for the last bus is just not late enough." Another said: "I work until 5:30 p.m. some days and am unable to take the bus those days. Extend the hours (even one hour later!) please."

38. Several people asked for more frequent service to improve connections between buses that meet in West Lebanon. A Red route passenger said: "Add a bus to the Red line for every 1/2 hour to the plazas. This would reduce crowding and be more convenient for workers and shoppers."

39. Several Norwich residents suggested extending the Brown route to the Huntley Meadow playing fields on Turnpike Road. Another Norwich resident said: "All bus stops in Hanover need shelters, especially by Parkhurst."

40. Bus riders asked Advance Transit to add bus service to surrounding towns. Suggested communities included Lyme, Grafton, Cornish, Plainfield, and West Hartford.

41. A Dartmouth Medical School faculty member said that Advance Transit should add a secure donation link to its web site through Groundspring.org. A Lebanon resident suggested: "Start a 'Friends of Advance Transit' group to spread the word."

Community Involvement

42. A subcommittee of the Advance Transit Board of Directors served as the Advisory Committee for this planning effort. The Advisory Committee met during the planning effort to discuss the goals of the project, to review draft materials, and to provide guidance to the consultant on future steps.

43. The consultant and Advance Transit management discussed the future of Advance Transit services with key Upper Valley stakeholders. Interested groups included:

- Dartmouth College officials
- Dartmouth Hitchcock Medical Center and Dartmouth Medical School officals
- Airport Industrial Park planners and developers
- Human resource officials from Creare and Hypertherm representing Etna Road businesses

44. Public workshops to discuss the future of Advance Transit's fixed-route transit program were held on September 22, 2008. Workshops were held at the Hanover Town Office, at the Dartmouth-Hitchcock Medical Center, and at the senior center in downtown Lebanon.

45. Over 125 people participated in the three planning workshops. Chapter 4 documents 88 comments and suggestions offered by members of the public during this process.

46. Many of the comments involved requests for more service. Community members want weekend bus service, they want later evening bus service, and they want regional commuter bus service from outlying communities. Several people asked for bus service to Alice Peck Day Hospital.

Service Area Changes

47. Over 300 new residential units are planned for Mount Support Road. Approximately 200 residential units have been constructed in recent years along nearby Wolf Road. Blue route buses operated on Mount Support Road several years ago, but were switched to Route 120 because of deteriorating roadway conditions. Mount Support Road will need to be resurfaced before Advance Transit can return to serve these new developments.

48. Plans call for workforce housing, combined with commercial, retail, and office development on Prospect Street in Hartford. This development will require improved Orange and Green route bus stops on both sides of Route 4 between the river and railroad bridges.

49. The largest residential development underway in Hanover is located on the Gile Tract, near the intersection of Route 120 and Medical Center Drive. Plans call for 120 residential homes, including some affordable units. There has been some discussion of a pathway between the Gile Tract development and Advance Transit bus stops on Route 120. This presents a possible safety issue for residents who utilize northbound buses – because they would be required to walk across Route 120 to reach this stop. While it may involve a longer walk, it may be safer for Gile Tract residents to utilize a bus stop on Medical Center Drive. This will likely require construction of an appropriate northbound bus stop and shelter on Medical Center Drive.

50. Hypertherm currently employs between 600 and 700 employees at its manufacturing facility on the Etna Road. Most day shift workers arrive between 6:30 and 7:30 a.m. and leave between 3:30 and 4:30 p.m.

51. As of September 2008, Creare had 116 employees at its Etna Road site, including engineers, support techs, and office support workers. Creare has an environmentally conscious workforce. The company would like its employees to have affordable and sustainable transportation alternatives.

52. Stryker expects to expand its workforce at the Airport Industrial Park and would like to be able recruit workers with limited automobile access. Allyon Solutions plans to develop additional parcels at the Airport Industrial Park for future bioresearch tenants.

53. Dartmouth College will add 300 new residential units at Rivercrest on the Lyme Road. The first 100 units are likely to open in the fall of 2009. The residential complex will need frequent shuttle links to Hanover and the Dartmouth campus.

54. The college provides about 250 units of graduate student housing units at Sachem Village on Route 10 south of downtown Hanover. Residents would benefit from improved shuttle transportation to the college campus.

55. DHMC has plans to build a new Koop Medical Science Complex that may require a net increase of about 300 additional parking spaces. Improved and expanded commuter bus service might help limit requirements for a new parking garage.

56. There are currently about 500 DHMC employees who work at various buildings in the Centerra Business Park. These workers would benefit from improved commuter access. Workers say that transferring from the Blue route to the DHMC Centerra shuttle takes too long. Employees want direct transportation to and from their job site.

57. The medical center anticipates an ongoing 2% annual growth in overall demand, utilization, and employment. Advance Transit should work with DHMC to develop strategies to help accommodate these increases in visitor, patient, and employee traffic.

Short Term Service Adjustments – July 2009

58. The plan recommends changes for Advance Transit bus schedules that could be introduced in July of 2009. These schedule adjustments are designed to improve the efficiency, reliability, and on-time performance of existing Advance Transit bus routes.

59. Changes are recommended in the service pattern and travel times for the Canaan / Enfield segment of the Blue route. This includes proposed introduction of an afternoon express bus that will depart DHMC at 5:10 p.m. Proposed changes in afternoon service to Canaan and Enfield are shown in Figure 1.3.

Figure 1.3 Current and Proposed Afternoon Service to Canaan

CURRENT AFTERNOON SERVICE TO CANAAN

DMS	DHMC	Lebanon	Enfield	Canaan
		2:15 p	2:25 p	2:40 p
3:30 p	3:44 p	4:00 p	4:10 p	4:25 p
4:38 p	5:03 p	5:16 p	5:26 p	5:41 p
5:43 p	5:57 p	6:10 p	6:20 p	6:35 p

PROPOSED AFTERNOON SERVICE TO CANAAN

DMS	DHMC	Lebanon	Enfield	Canaan
		2:50 p	3:00 p	
3:40 p	3:54 p	4:07 p		
		4:20 p	4:30 p	4:45 p
4:40 p	5:05 p	5:18 p		
4:55 p	5:10 p	EXPRESS	5:25 p	5:40 p
5:15 p	5:32 p	5:45 p		
		5:45 p	5:55 p	6:10 p

Shaded times operate during the school year only.

60. The current Advance Transit timetable includes a 6:05 p.m. northbound departure from DHMC that offers stops in Norwich. The new plan calls for this bus to also offer stops on request in Wilder Village. It also adds a 6:40 p.m. northbound departure from DHMC, with through service on request to Wilder Village.

61. The service plan includes a second Red route bus that will operate from 6:45 a.m. to 6:45 p.m. This results in 30-minute headways on the route throughout the day. The new schedule includes two morning trips to the Airport Industrial Park, and three afternoon trips to this industrial work site.

62. Orange route buses have difficulty completing round trips between West Lebanon and Hanover in the available 30-minute schedule window. Two changes are proposed to address this situation. With the new timetable, Orange route buses will no longer operate to the circle at Vail. Instead, they will travel north on College Street to Maynard Street, and then proceed south on Main Street. The new timetable also calls for Orange route buses to depart West Lebanon for Hanover at 25 minutes past the hour, instead of half past the hour.

63. The Green route typically runs behind schedule. The proposed solution is to limit the number of trips to Hartford Village. The new schedule calls for most round trips to provide service to Hartford Village in one direction only. Hartford Village stops were selected carefully in an effort to accommodate Hanover commuters, while preserving commuter trips from Hartford Village to downtown Lebanon and direct shopping trips between Hartford Village and the Route 12A plazas.

64, The Brown route required major adjustments because of scheduling pressures. For the middle of the day, the route has been redesigned to operate with 40-minute headways. During commute times, timetables were adjusted to provide targeted connections – for Norwich residents transferring to the Blue route to reach DHMC, and for Lebanon residents transferring from the Blue route to reach CRREL.

65. The new plan offers three morning departures from the Huntley Meadow ball field lot located west of downtown Norwich, and four late afternoon return trips to this location. Midday buses would continue to reverse direction via Hazen Street. Midday buses could offer drop off's on request at the satellite lot.

Longer-Term Service Design Strategies – Core Service Area

66. The consultants developed a range of longer-term service design alternatives for Lebanon, Hanover, Hartford, and Norwich. A catalogue of possible service additions is presented in Figure 1.4. Service ideas include:

- A separate Bus for Norwich to maintain 30-minute headways, while serving a park and ride lot west of downtown
- A new Sachem Village & Rivercrest shuttle
- More frequent Orange route service, on a route extended to Norwich
- More frequent Green route service
- Commuter service from downtown Lebanon to Etna Road and Centerra
- A new Mascoma Street / Centerra midday route that would include service to Alice Peck Day Hospital
- Saturday service
- Evening service for the Blue and Red routes
- Earlier 15-minute Blue route service for Dartmouth Medical School

67. Saturday service in New Hampshire would include hourly service on a portion of the Blue route and hourly service on the full Red route:

- Hanover Inn – DHMC – Downtown Lebanon
- Downtown Lebanon – West Lebanon – Route 12A Plazas

68. Saturday service in Vermont would involve hourly service on two segments:

- Hanover Inn – Norwich – Wilder – Hartford Village – West Lebanon
- West Lebanon – White River Junction – Aquatic Center – West Lebanon

69. The New Hampshire Saturday plan could be implemented by itself. The Vermont plan relies on the New Hampshire service for links to major shopping destinations. If Saturday service is implemented in both states, coordinated transfers between the two services would be available at the Hanover Inn and West Lebanon hubs.

Longer Term Strategies – Regional Commuter Service

70. The consultants identified three different business models for regional commuter service.

- Regular Advance Transit buses based in Wilder
- Subscription service, with buses based in outlying towns
- Subsidized vanpools

Advance Transit will need to decide which approach offers the best fit with system operations, regional geography, and available funding.

71. Advance Transit may find that different strategies are appropriate for different corridors. For example, Lyme commuter service could be operated with buses based in Wilder, while service from Claremont and New London could be provided with vanpool equipment based in outlying communities. Canaan service could involve a combination of strategies. Some trips could be provided with buses based in Wilder. Extra overflow trips could be operated with buses based overnight in Canaan.

72. Advance Transit currently provides free bus rides throughout its service area. The consultants suggest that the Advance Transit should consider limiting free service to its core service area, while introducing deeply discounted weekly or monthly fares for longer-distance commuter services.

73. Long-distance bus fares allow employers to leverage their support for bus alternatives. This in turn should increase employers' willingness to support additional longer-distance buses as demand increases in the future.

74. Larger parking lots or newly designated parking areas may need to be added in some communities before commuter bus service can be introduced.

Figure 1.4 Catalogue of Advance Transit Service Design Alternatives

	Cost FY 2009	*Suggested cost sharing strategy*	*Additional buses*
BLUE ROUTE			
Current	841,773		
Net 09 adjustments	26,283	FTA, DHMC, Dartmouth College	
Early Blue 15	31,165	FTA, Dartmouth Medical School	
Evenings Blue 8:30 p	63,957	FTA, DHMC for nursing staff	
Evenings Blue 10:00 p	92,355	FTA, DHMC, Dartmouth, Lebanon, Hanover	
RED ROUTE			
Current	250,701		
2009: 2 buses	494,485	CMAQ, Lebanon, Airport Ind Park, businesses	1 heavy
Evenings Red	79,661	FTA, Lebanon	
ORANGE ROUTE			
Current	246,551		
30 minutes w/ Norwch	831,032	VT 80%, towns 20% / NH 50%, towns 50%	2 medium
GREEN ROUTE			
Current	240,367		
Net 09 adjustments	13,833	FTA, State of Vermont	
2 buses	518,734	FTA, VTrans, towns	1 medium
BROWN ROUTE			
Current	229,952		
Net 09 adjustments	12,856	FTA, NHDOT, VTrans	
Separate Norwich 30	246,877	VTrans & Norwich	1 medium
Sachem/Rivercrest	250,050	FTA, Dartmouth, Hanover	
Evenings Sachm/Rcrst	43,614	FTA, Dartmouth	
SHUTTLES			
Dartmouth current	612,960		
Dartmouth w/ 120 Lot	970,663	Dartmouth to cover increased cost	1 medium
DHMC current	701,816		
NEW ROUTES			
Etna/Centerra comutr	91,623	FTA, Centerra and Etna Road employers	1 medium
Mascoma/Centerra	134,830	FTA, Lebanon, AP Day, Co-op	
SATURDAY SERVICE			
Saturday NH	67,700	FTA, NHDOT, Lebanon, Hanover	
Saturday VT	32,792	FTA, VTrans, Hartford, Norwich	
REGIONAL ROUTES			
Lyme 6 trips a day	115,871	Town to match JARC grant	1 medium
Grantham-DHMC	62,248	Towns & employers to match JARC grant	1 medium
Grantham-Etna Road	62,248	Towns & employers to match JARC grant	1 medium
Claremont-DHMC	62,248	Towns & employers to match JARC grant	1 medium
Claremont-Etna Rd	62,248	Towns & employers to match JARC grant	1 medium
Claremont-Airport	62,248	Towns & employers to match JARC grant	1 medium
Extra Canaan trip	41,499	DHMC & Dartmouth to match JARC grant	1 medium

Figure 1.5 Lyme Service with Three Round Trips per Day

DHMC	Hanover High School	Hanover Inn	DMS	arrive Lyme	depart Lyme	DMS	Hanover Inn	Hanover High School	DHMC
		6:00 a	6:02 a	6:17 a	6:30 a	6:47 a	6:50 a	6:53 a	7:00 a
7:00 a	-	7:10 a	7:12 a	7:27 a	7:30 a	7:47 a	7:50 a	7:53 a	8:00 a
8:00 a	-	8:10 a	8:12 a	8:27 a	8:30 a	8:47 a	8:50 a		
	4:00 p	4:05 p	4:07 p	4:22 p	4:35 p	4:53 p	4:56 p	-	5:06 p
5:10 p	5:15 p	5:20 p	5:22 p	5:37 p	5:40 p	5:57 p	6:00 p		
		6:00 p	6:02 p	6:17 p	6:20 p	6:37 p	6:40 p		

75. The consultants developed three timetable alternatives for Lyme. This included hourly service throughout the day, limited peak-hour service between Lyme and Hanover, and limited peak-hour service with some through service to DHMC. Figure 1.5 presents a timetable that offers two through trips to DHMC in the morning, and one through trip from DHMC in the afternoon.

76. If 20 regular Lyme commuters pay a fare of $20 per week, this would leave an estimated annual deficit of $92,0000. If 30 regular riders pay $20 a week, the deficit drops to $82,000. If 50% FTA 5311 or JARC funding can be obtained for this service, the resulting local subsidy requirement would be between $41,000 and $46,000 per year.

77. The plan provides a preliminary discussion of possible commuter bus services from New London, Grantham, Claremont, Cornish, and Plainfield. These routes could be operated as regular commuter bus routes, or they could be structured as vanpools and operated with small 10-passenger buses.

Bus Stops and Transfer Centers

78. A *Hanover Bus Stop Feasibility Study* has suggested design changes for key bus stop locations in Hanover, including the transfer hub near the Hanover Inn. Planners have suggested changes in parking, roadway design, pedestrian crossings, and general landscaping to improve aesthetics and to enhance pedestrian safety, while also accommodating local and intercity bus activity at this location.

79. The bus stop consultants recommend improved signage for all stops in the community. They also pointed out pedestrian access and crossing issues, and identified locations where turnouts and bus shelters should be added.

80. Once the Hanover bus stop study has been completed, Advance Transit should be in a position to seek a federal grant to implement the proposed bus stop improvements.

81. In downtown Lebanon, it may be possible to move the transfer hub from Court Street to the front of Lebanon City Hall. This would require relocating handicapped parking spaces, and eliminating parking directly in front of the city building. In West Lebanon, improvements are needed for the Advance Transit bus stop on Main Street in front of the anticipated new library.

82. Advance Transit should seek design and construction funding from VTrans to develop new bus turnouts and bus shelters along the Green, Orange, and Brown routes in Vermont. The improved bus stop and shelter in front of Datamann in Wilder Village could serve as a model for other locations along these routes.

83. Advance Transit should work with NHDOT and city officials to determine an appropriate route for buses in a redesogmed plaza area. This should take advantage of planned roadway changes near the Interstate 89 interchange. Once an appropriate bus route has been determined, Advance Transit should ask NHDOT to design and construct bus turnouts and shelters to facilitate convenient, safe, and efficient movements for pedestrians and buses throughout the plaza area.

Financial Plan

84. Assumption made in the financial plan and its supporting cost model include the following:

- Costs are projected to increase 3% each year due to inflation. Financial support for existing services from Advance Transit's federal, state, and local funding partners is also projected to increase by 3% per year.

- FTA Section 5311 subsidies provided by NHDOT are projected to increase from about $1.56 million in FY 2009 to nearly $2.89 million by FY 2014. The plan also includes modest increases in New Hampshire state funding to help pay for ADA service on Saturdays.

- The plan assumes that combined federal and state support from Vermont will increase from roughly $300,000 in FY 2010 to $765,600 by FY 2014.

- It assumes that Dartmouth College will provide approximately $80,000 a year in additional operating support beginning in FY 2011, with most of this used for shuttle service to Rivercrest and Sachem Village. Expenditures for a Route 120 parking lot shuttle have been postponed until FY 2014.

- It assumes that DHMC will provide roughly $65,000 a year in additional operating support to reduce parking demand at the main hospital campus. Roughly $35,000 of this amount would be used to extend Blue route service until 8:30 p.m. to accommodate 12-hour nursing shifts, beginning in FY 2012.

- The plan suggests that Dartmouth Medical School will provide an additional $12,500 a year beginning in FY 2011 to begin 15-minute DHMC shuttles at 7:45 a.m. instead of 9:00 a.m.

- It calls upon the city of Lebanon to support two important service additions, more frequent Red route service and limited Saturday service. It includes local support for a new Mascoma Street / Centerra route, beginning in FY 2014.

- The plan assumes that Hanover and Norwich will provide local support for restructured Brown route service, as well as for limited Saturday service. It calls upon Hartford to provide local match for more frequent Green route service beginning in FY 2013.

- The plan introduces limited peak-hour service for the town of Lyme in FY 2011, and assumes that funding for this service would come from a combination of passenger fares, FTA 5311 grants, and municipal appropriations. If federal support is available, the cost to the town for six round trips a day could equal roughly $50,000 per year.

- The financial plan assumes that new financial support will be provided by a number of employers and private businesses. This includes employers at the Airport Industrial Park, Centerra, and on the Etna Road, as well as retail businesses on the Red route and at Centerra. It anticipates about $40,000 in annual support from Alice Peck Day Hospital for a new Mascoma Street route proposed for implementation in FY 2014.

85. The financial plan makes important assumptions about future funding to pay for expanded Red route service. The plan anticipates increased FT 5311 funding, increased support form the city of Lebanon, and new financial participation from employers and retail businesses. Advance Transit will need to take steps to ensure that this ongoing support for expanded Red route service is in place. This should be done before Advance Transit moves ahead with plans for Saturday service, or other service expansion ideas for the city of Lebanon.

Chapter 2: Review of Existing Services

This chapter presents a critical review of Advance Transit routes and services. The review process included four steps: (1) on-site inspections of Advance Transit bus routes, (2) interviews with bus drivers and operating staff, (3) analysis of ridership records, and (4) calculation of route-by-route performance measures. The chapter describes how buses are currently being used, and it identifies strengths and weaknesses of the current service design.

This effort is important in part because it helps to identify needed service improvements. But it is also important to help ensure that any proposed changes do not undermine the strengths of existing services.

The consultant spent time riding Advance Transit buses at different times of the day. This was done to gain a first-hand understanding of who is riding and how buses are being used. The consultant looked for strengths in service design and service delivery. And he looked for inconveniences, inefficiencies, scheduling and on-time performance problems, missed connections, and other issues that might discourage use or reduce customer satisfaction.

The chapter begins with an overview of Advance Transit ridership. The second section examines performance and productivity for individual bus routes. Sections 4.3 through 4.9 discuss individual Advance Transit bus routes. The final section addresses the Centerra Shuttle operated by DHMC. The chapter is structured as follows:

2.1 System Ridership

Fixed Route Ridership

Advance Transit has experienced steady and remarkable growth in regularly scheduled fixed-route ridership over the course of the past decade. In the mid 1990's, the system provided roughly 10,000 passenger trips per month. In fiscal year 2008, regular-route buses provided an average of 38,000 rides per month. During this most recent year, there were five months when monthly boardings exceeded 40,000. This is a fourfold increase from regular-route demand experienced in 1993 and 1994.

In the most recent five-year period, regular route ridership increased 85%. FY 2008 totals were 15% higher than FY 2007, and 22% higher than FY 2006. For individual routes, the greatest increase in total riders occurred on the Blue Route, with a five-year gain of 91,350 riders. The second largest increase occurred on the Red route, with a five-year increase of 52,702. The largest percentage increase occurred on the Green route, with five-year growth of 152%.

Recent increases for individual fixed routes are presented in Figure 2.1. Fifteen-year monthly ridership results are presented in Figure 2.2.

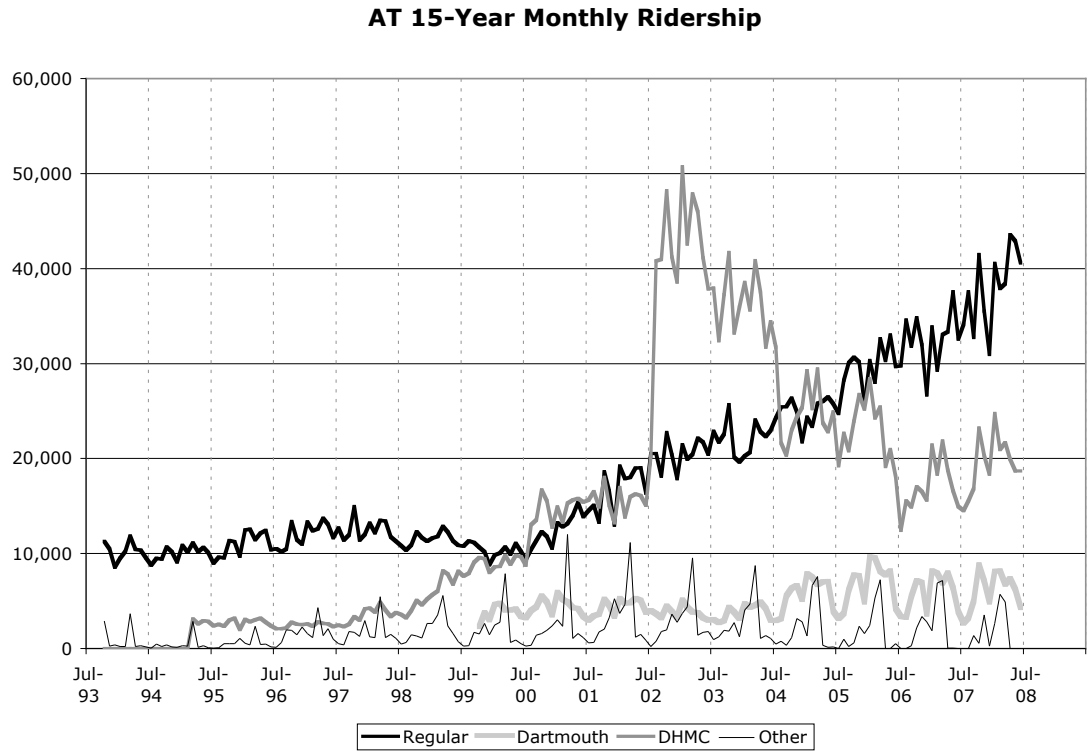
Figure 2.1 Recent Increases in AT Fixed-route Ridership

Route	*FY 08 Riders*	*Five-year Increase*	*Five-year Increase*	*One-year Increase*	*One-year Increase*
BLUE	197,233	91,350	86%	36,260	23%
GREEN	49,007	29,560	152%	8,291	20%
RED	109,559	52,702	93%	13,976	15%
BROWN	41,405	16,713	68%	4,194	11%
ORANGE	59,029	19,590	50%	4,145	8%
TOTAL	456,233	209,915	85%	66,866	15%

Dartmouth / Hanover Shuttle

Parking lot shuttle service in Hanover was separated from regular route service in FY 2000. In FY 2005, two parking lot routes were combined to create a combined campus / downtown shuttle. In the five-year period from FY 2003 to FY 2008, shuttle ridership in Hanover increased by 58%, from 45,860 to 72,676. Between FY 2007 and FY 2008, shuttle usage increased by 2%. Between FY 2006 and FY 2008, shuttle usage decreased by 10%.

Figure 2.2 Advance Transit 15-Year Monthly Ridership



Note: Regular route ridership dropped somewhat in FY 2000 when some Blue route riders were shifted to a new Dartmouth / Hanover shuttle.

DHMC Parking Lot Shuttles

Advance Transit has operated parking lot shuttles serving patients, visitors, and employees at Dartmouth-Hitchcock Medical Center since March of 1995. Ridership grew steadily between FY 1998 and FY 2002, and then increased dramatically in FY 2003. Shuttle usage remained high for two years while the medical center constructed a large new parking lot opposite the hospital's east entrance. In the most recent two years, DHMC shuttles have generally provided between 15,000 and 20,000 rides per month, or roughly 750-900 rides per day.

2.2 Route-by-Route Performance Measures

Performance measures were calculated for individual routes and service components for the month of April 2008. The consultants measured riders per month, riders per day, riders per revenue service hour, and riders per scheduled round trip. The results are presented in Figure 2.3.

Figure 2.3 Advance Transit Performance Measures for April 2008

	Monthly Riders	Daily Riders	Riders per Hour	Riders per Round Trip
BLUE	19,530	888	21	26
GREEN	4,650	211	18	19
RED	9,876	449	37	37
BROWN	4,065	185	17	9
ORANGE	5,448	248	21	21
DARTMOUTH	7,350	334	11	5
DHMC	19,914	905	27	7
TOTAL	70,833	3,220	21	9
FIXED-ROUTE	43,569	1,980	23	22

During April of 2008, regular fixed-route buses carried 43,569 riders, for an average of 1,980 riders per day. They provided an average of 23 passenger trips per revenue service hour, and 22 rides per scheduled round trip.

This level of productivity is remarkably high for a rural public transit system. In fact, Advance Transit's performance is better than many small urban transit providers. In a peer comparison of small urban transit systems carried out in 2001 for the Lewiston-Auburn Transit Committee[1], ten of twelve small urban systems carried fewer than 23 riders per service hour.

The Blue route is busiest in terms of total passengers, with 888 riders per day. The Blue route generated 21 rides per hour, and approximately 26 rides per round trip.

The Red route is the busiest in terms of riders per bus, with 37 riders per hour and 37 riders per round trip. The Orange route generated 21 trips per hour, the Green route generated 18 trips per hour, and the Brown route generated 17 trips per hour. The average productivity for small urban systems in the 2001 study was about 17 trips per hour. This means that AT's least productive fixed route matched the average productivity for small urban service in 2001.

AT's campus shuttle provided 11 rides per hour, while the DHMC shuttle generated 27 rides per hour. The campus shuttle transported an average of 5 riders per round trip, while the medical center shuttle transported an average of 7 riders per round trip. These per-trip averages reflect high peak-hour usage and lower midday demand. Parking lot shuttles are not highly productive during the middle of the day, but frequent midday service provides an important measure of convenience for parking lot users.

[1] *Evaluation of the Fixed Route Bus system in Lewiston-Auburn,* April 2001, Tom Crikelair Associates with Multisystems, Inc. and the University of Maine.

2.3 Blue Route

Advance Transit's Blue route includes three components:

- All-day 30-minute service between downtown Lebanon and downtown Hanover, including service to the Dartmouth-Hitchcock Medical Center and Dartmouth College
- Limited commuter service to Enfield and Canaan
- 15-minutes scheduled service between the Dartmouth Medical School and DHMC during midday hours

Blue route market segments include:

- Commuters traveling to jobs at Dartmouth College, DHMC, downtown Hanover, downtown Lebanon, and elsewhere
- Dartmouth Medical School students traveling between the medical school and the hospital
- Dartmouth College students traveling to classes, and others who use the bus for shopping and errands
- DHMC patients and visitors
- Residents of Hanover, Canaan, and Enfield who transfer to the Red Route in Lebanon to reach West Lebanon and the Route 12A shopping plazas

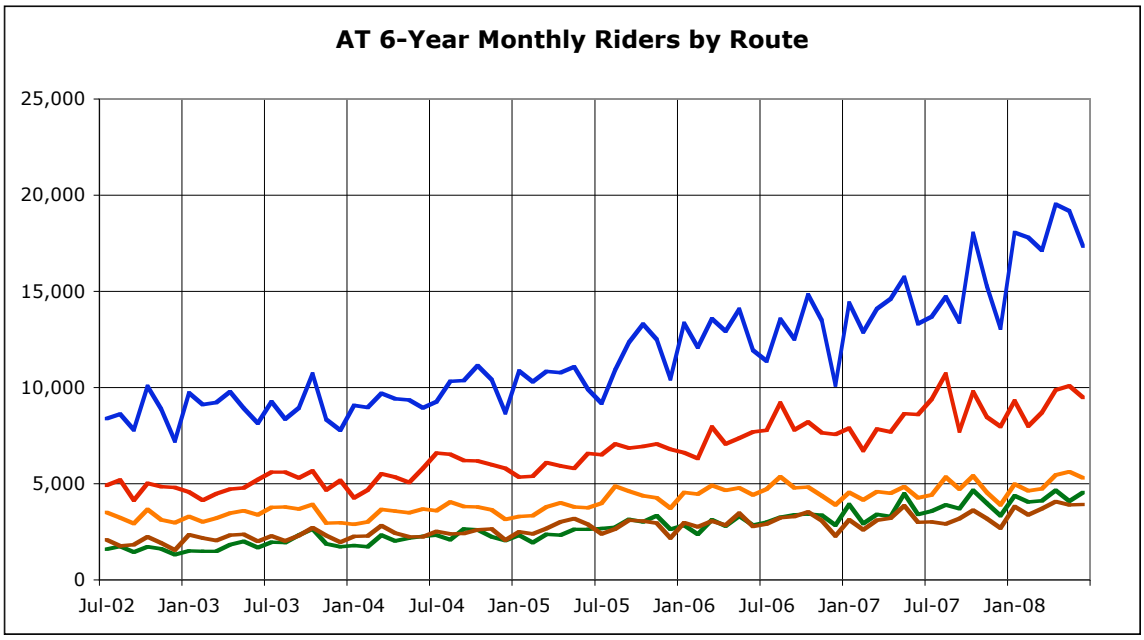
The Blue route is Advance Transit's busiest route, with nearly 900 riders per day. Blue route ridership has increased by 86% in the past five years. Monthly totals for the most recent 12 years are presented in Figure 2.4.

During May of 2008, four Blue Route bus stops accounted for 70% of passenger boardings on the route. The busiest stop was DHMC, with 27% of Blue Route boardings. Since most people travel round trip, this suggests that the medical center accounts for just over half of Blue route usage. The Lebanon Mall generated 18% of Blue route boardings, while the Dartmouth Bookstore accounted for 16% of boardings and Vail/DMS generated 8%.

Other busy stops include Canaan Church, Enfield, Lebanon Towers, Wolf Road, and various locations on the Dartmouth campus and in downtown Hanover.

Significant improvements have been made to the Blue route in past years, resulting in a relatively fast and streamlined service between Lebanon and Hanover. The route offers convenient front-door service at the DHMC East Entrance and at the Dartmouth Medical School, plus centrally located bus stops in downtown Hanover and downtown Lebanon. It provides timed connections with Red route buses in downtown Lebanon, and reasonably good connections with Green, Orange, and Brown route buses in Hanover.

Figure 2.4 Advance Transit Monthly Riders by Route



There are a number of issues and concerns that could be addressed in future service planning for the Blue Route:

1. Commuter trips from Canaan and Enfield often operate with standing room only. This is particularly true for the morning express that departs Canaan at 7:00 a.m.

2. The express bus from Canaan often arrives late, due in part to the time required for large numbers of passengers to get on and off the bus. AT operations staff have suggested that the morning departure be moved ten minutes earlier.

3. DHMC operates a shuttle between DHMC and Centerra, but this service does not begin until 7:10 a.m. Regular Blue route buses offers stops on request at the Coop in Centerra before 7:00 a.m. Diversions to Centerra add 3-4 minutes to Blue route running times. This causes on-time performance problems for the bus that serves DHMC northbound at 6:30 a.m. and southbound at 6:52 a.m. It would be helpful if the first morning trip to Canaan and Enfield could be moved ten minutes earlier to accommodate these stops at Centerra.

4. It may be appropriate to consider routing some evening trips via Centerra, provided this does not involve busy commuter buses that are already filled with workers trying to get home.

5. The Canaan Select Board recently voted to cut funding for outside agencies, including Advance Transit. As a result, it may be necessary to redesign the Canaan and Enfield portion of the Blue route and to terminate the route in Enfield or at Mascoma High School.

6. Blue route buses are sometimes delayed by traffic congestion on Route 120, particularly near Interstate 89. It would be better if they could travel directly from downtown Lebanon to the high school and the medical center via Mount Support Road. This would require a new overpass across I-89 and upgrading of Mount Support Road.

7. Current timetables allow eight minutes for buses to travel northbound from DHMC to Vail/DMS. Bus drivers have suggested that this be changed to 9 or 10 minutes. They report that 8 minutes is not enough even in the best conditions.

8. People who commute from Canaan and Enfield continue to express interest in an evening express bus that operates from Hanover and DHMC to Enfield and Canaan without passing through downtown Lebanon.

9. There is currently no northbound service from downtown Lebanon between 5:50 p.m. and 7:00 p.m. It might be appropriate to add a 6:15 p.m. northbound departure from the Lebanon mall to Hanover.

10. The 4:00 p.m. bus from Lebanon to Canaan misses a connection with the Red route bus that arrives from West Lebanon at 4:10 p.m. This connection would work if the Blue route departure could be moved later to 4:15 p.m. The impact of such a change on other riders needs to be evaluated.

11. The 2:56 p.m. pick up in Enfield occurs before the 3:00 p.m. Mascoma High School dismissal time.

12. An improved park and ride lot is needed on the Enfield/Canaan route segment. This in turn will likely create an even greater need for more seating capacity for peak-hour commuters. The regional planning commission is currently studying park and ride options for this area.

2.4 Red Route

The Red route connects downtown Lebanon with West Lebanon and the Route 12A Plazas. Area residents use the Red route bus to reach a variety of shopping destinations, including Wal-Mart, Shaws, and others. The Red route is also used by people traveling to job sites located along Route 4, in West Lebanon, and in the plaza area. The Red route connects with the Blue route in downtown Lebanon and with the Orange and Green routes in West Lebanon. Some commuters from Lebanon ride the Red Route and transfer to the Orange route in West Lebanon to reach the VA Hospital in White River Junction.

Between 2003 and 2008, Red route ridership increased by 93% to 109,559 riders. This translates to a daily average of 449 riders transported with a single bus. For comparison, it is worth noting that 100 riders a day per bus is a typical goal for a non-urban transit service. As noted earlier, the Red route averages 37 riders per revenue service hour, which is twice the productivity rate for many small urban transit programs.

The Red route generates this level of use despite the fact that a bus is available on the route only once per hour, resulting in significant inconvenience for many riders.

The busiest stop on the Red route is downtown Lebanon, with 27% of Red route boardings in May of 2008. Downtown West Lebanon is a close second, with 24% of Red route boardings. Wal-Mart accounted for 12%, while the Shaws plaza generated 6%.

In May of 2008, stops south of West Lebanon accounted for 31% of Red route boardings. Since most people ride round trip, this suggests that destinations along Route 12A generate about 60% of Red route ridership. Wal-Mart and nearby stores appear to have accounted for about 24% of Red route ridership, or just under 40% of trips to the Route 12A Plazas.

Red route issues include the following:

1. Sixty-minute headways result in inconvenient schedules with long waits between buses.

2. The Red route sometimes operates with standing room only. This is most common in the afternoon.

3. The Red route bus often has a hard time maintaining its schedule through the plaza area because of afternoon traffic congestion. This situation is likely to worsen during 2009 and 2010 when the Route 10 / Interstate 89 interchange is being reconstructed.

4. Much of the Route 12A plaza area lacks appropriate bus stops. Buses must either make unsafe stops on the side of the highway, or they must travel time-consuming diversions through crowded shopping center parking lots. Some stops are available for drop-offs only. This situation can be confusing and upsetting for inexperienced riders who are unsure about where to wait to reboard the bus.

5. Some people ride the Red route bus to reach job sites at the Airport Industrial Park. They must ride all the way to Wal-Mart and back before they reach their stop, and then they must walk a long distance up the airport access road.

6. Red route buses offer only some connections with Orange and Green route buses. In particular, Lebanon residents who work at the VA Hospital in White River Junction must wait a half hour in West Lebanon before continuing their bus ride to work in the morning. This situation could be corrected when a second bus is added to the Red route.

2.5 Green Route

The Green route bus operates between Hanover and West Lebanon via Wilder and Hartford Village. It carries riders to Hanover, where it connects with the Blue and Brown routes, and to West Lebanon, where it connects with the Red and Orange routes. It carries a variety of commuters, including people who work at Dartmouth College and CRREL. Some Green route commuters work at job sites on Route 5 in Vermont. The Green route also provides Wilder and Hartford Village residents with access to the Route 12A Plazas via a connection with the Red route in West Lebanon.

Green route boardings are fairly evenly distributed along the route. In May of 2008, 20% of Green route boardings occurred in West Lebanon and 20% occurred in Hanover. Hartford Village and Wilder Village each accounted for 15% of passenger boardings. Another 16% boarded on Route 5 between Chandler Road and Hartford High School, while 5% boarded on Route 5 north of Wilder. The remaining 8% boarded between Hartford Town Hall and the intersection of Routes 5 and 14.

Morning boardings in Hartford Village involve mostly the northbound bus. In May of 2008, the morning driver recorded 115 boardings on Route 14 on the northbound segment, and only 11 boardings on Route 14 on the southbound segment. The midday and afternoon Green route driver recorded 164 boardings along Route 14 northbound, and 319 boardings along route 14 southbound.

Issues for the Green route include the following:

1. Green route drivers have difficulty completing round trip service on the route within the available 60-minute schedule window. This results in some system-wide service disruption, as other buses wait for transferring Green route passengers.

2. Delayed Green route buses sometimes miss connections with the Red route in West Lebanon and with the Blue route at Vail. This is particularly true at 7:10 a.m. in West Lebanon and at 7:38 a.m. at Vail.

3. It may be possible to limit service through Hartford Village to northbound only on some morning trips, and southbound only on some afternoon trips. Limiting Hartford Village to one direction only would provide sufficient time for passenger boardings, traffic congestion, and wheelchair assists. Care must be taken, however, to ensure that Hartford Village residents can return home from West Lebanon and the Route 12A plazas in the afternoon.

4. Ongoing roadway construction on Route 5 between the high school and the elementary school often puts the Green route bus behind schedule. It might be possible to bypass this section of Route 5 by using Christian and Bugbee on some trips. However these trips would need to be chosen carefully, because there appear to be about 25 boardings a day along this portion of Route 5.

5. The Green route and Red route each use one bus to offer hourly service. West Lebanon is the midpoint on the Red route, with service continuing to downtown Lebanon on the hour and to the Route 12A plazas at 30 minutes past the hour. Given this configuration, direct connections are not available in all directions. In the morning, Green route passengers have a direct connection to the plazas, and a 30-minute wait for travel to Lebanon. In the afternoon they have a direct connection for return trips from the plazas, and a 30-minute wait for return trips from downtown Lebanon. This situation could be corrected by using two buses to offer 30-minute headways on the Red route, or by using two buses to offer 30-minute headways on the Green route.

6. While many commuters use the Green route, the route offers area workers limited convenience because of the 60-minute wait between buses.

2.6 Orange Route

The Orange route links White River Junction with West Lebanon and downtown Hanover. On the Vermont side of the Connecticut River, the Orange route serves downtown White River Junction, nearby residential neighborhoods, social service agencies at the Gilman Center, the Greyhound terminal, and the VA Hospital. In New Hampshire, the route serves West Lebanon, residences adjacent to Route 10, graduate student housing at Sachem Village, downtown Hanover, and the Dartmouth College campus.

The Orange route offers connections with the Red and Green routes in West Lebanon, and with the Brown and Blue routes in Hanover. It provides car-free access to the local Amtrak station and the Greyhound bus terminal.

In May of 2008, 38% of Orange route passengers boarded in White River Junction, 37% boarded within the town of Lebanon, and 26% boarded in Hanover. The busiest stop on the route was West Lebanon, which accounted for 29% of Orange route boardings. The next busiest stops were the Coolidge Hotel and the Dartmouth Bookstore, with 10% each. The VA Hospital accounted for 5% of Orange route boardings.

Orange route issues include the following:

1. Orange route buses often run behind schedule, especially on the West Lebanon-Hanover portion of the route. Aside from traffic congestion, the main cause of schedule delays appears to be stops that are made to pick up and discharge passengers along the route. Steps will be needed to shorten or streamline the route in New Hampshire if this segment is going to continue to fit within the available 30-minute window. The best opportunity may be to reverse directions at the Hanover Green, instead of continuing north to the circle at Dartmouth Medical School.

2. The first Orange route bus is scheduled to arrive at Vail at 6:42 a.m. The first Brown route bus is scheduled to depart Vail for CRREL at 6:37 a.m. Because there is typically an Orange route passenger trying to reach CRREL at this time in the morning, the Brown route bus waits for the Orange route bus to arrive. This puts the Brown route driver behind schedule by at least five minutes at the start of this shift.

3. VA Hospital employees who ride the Red route from downtown Lebanon must wait 30 minutes for their connecting Orange route bus in West Lebanon. The Orange route offers an 8:13 a.m. arrival at the VA Hospital. The typical work shift begins at 8:00 a.m. Hospital employees would benefit from an Orange route trip that departs West Lebanon at 7:30 a.m. and arrives at the VA at 7:43 a.m.

4. VA employees would likewise benefit from an afternoon bus that departs the VA Hospital at 4:43 p.m. This bus would arrive in West Lebanon at 4:55 p.m., resulting in a direct connection with the Red route bus that departs West Lebanon for downtown Lebanon at 5:00 p.m.

5. A new swim club is currently under construction a short distance beyond the VA Hospital. There may be some interest in bus transportation to the new municipal facility. There may also be potential for commuters to use this location as a park and ride lot.

2.7 Brown Route

The Brown route includes two route segments. It provides 30-minute bus service between Norwich and Hanover, and it provides 30-minute service linking Hanover and the Dartmouth College campus with CRREL, Rivercrest, and the Kendal retirement community. The Brown route connects with the Blue, Green, and Orange routes at Vail/DMS, and with the Green and Orange routes at the Hanover Inn.

Norwich residents use the Brown route to commute to jobs in Hanover and Lebanon, including Dartmouth College, CRREL, and DHMC. They also use the bus for a variety of midday errands in Hanover and elsewhere. Passengers on the New Hampshire segment include CRREL commuters, Kendal and Rivercrest residents, and some middle school students.

In May of 2008, 32% of boardings on the Brown route occurred in Norwich. Since most of these passengers probably traveled round trip to Hanover, this suggests that Norwich riders account for about 64% of Brown route usage. The busiest Brown route stop was Dan & Whit's, with 26% of Brown route boardings, followed by Vail/DMS with 20% and the Hanover Inn with 11%.

Boardings on the Dartmouth College campus and at the Hanover Inn accounted for 42% of Brown route boardings. The combined percentage for the fire station, CRREL, Rivercrest, and Kendal was 24%.

Brown route issues include the following:

1. Brown route drivers have difficulty completing round trips in the available 30-minute window, particularly during peak commuting hours. The bus sometimes runs more than 10 minutes behind schedule. The schedule is too tight, and allows little or no time for wheelchair assists or driver bathroom breaks.

2. Commuters from Norwich and adjacent towns have no parking lot where they can leave their cars to board the Brown route bus. Members of the local American Legion have suggested using the Legion Hall parking lot, or other potential nearby sites. The amount of space available at the Legion Hall is limited, and the location is not ideal. Extending the route to this location would require addition of a second bus to maintain existing 30-minute headways.

3. Other park and ride locations need to be explored. The Hanover Coop currently shuttles employees from the Coop's farmer's market site on Route 5. There may be some potential for expanding parking this at site and adding it to a restructured Brown route service.

4. Residents of the Kendal retirement community have expressed an interest in evening service between Hanover and Kendal to allow residents to return home from evening cultural events.

5. Dartmouth College has future plans to expand its residential facilities at Rivercrest. And residents of Lyme have expressed an interest in shuttle service to Hanover. These developments may be relevant for the future design of the Lyme Road segment of the Brown route.

2.8 Dartmouth / Hanover Shuttle

Advance Transit operates a local shuttle service for Dartmouth College and the town of Hanover. The shuttle connects parking lots at Dewey and the Thompson Arena with downtown Hanover and various locations on the Dartmouth College campus.

The number of buses and shuttle headways vary according to season and time of day, as shown in the following tables:

Full Academic Session

	Number of Buses	Headways
7:00 a.m. – 10:00 a.m.	3	10 minutes
10:00 a.m. – 3:00 p.m.	2	15 minutes
3:00 p.m. – 7:00 p.m.	3	10 minutes
7:00 p.m. – 9:00 p.m.	1 (Hanover-Tuck-Dewey)	15 minutes

Summer, Vacations, and Holidays

	Number of Buses	Headways
7:00 a.m. – 10:00 a.m.	2	15 minutes
10:00 a.m. – 3:00 p.m.	2	15 minutes
3:00 p.m. – 7:00 p.m.	2	15 minutes
7:00 p.m. – 9:00 p.m.		

Evening service is offered during the regular academic season only. The evening route links the Hanover Inn with Tuck and the Dewey parking lot. There is no evening service through downtown Hanover to the Thompson parking lot.

The combined Dartmouth/Hanover shuttle was designed to accommodate students and staff displaced from closed parking lots. It also handles previously existing demand from people who park in the Thompson and Dewey lots. The shuttle also facilitates various movements across the Dartmouth campus, as well as trips between college facilities and downtown Hanover.

Use of parking lot shuttles increased significantly when individual routes were combined into a unified system in 2005. Ridership has been greatest during periods when campus construction projects interfere with existing on-campus parking.

There are a number of service design issues for the Dartmouth/Downtown shuttle:

1. The service suffers from a measure of complexity, which results from changing the service pattern at different times of the day. Variations are designed to control costs, to avoid early-morning congestion in downtown Hanover, and to facilitate access from Dewey to Tuck in the morning, and from Tuck to Dewey in the afternoon. The service would be easier to understand if it followed a consistent pattern throughout the day.

2. Shuttle users could benefit from clearly marked bus stops and from outdoor signs that display the shuttle route and related information.

3. It may be necessary to modify the shuttle route to include additional off-site parking lots as they are developed. This may require modifications to how shuttles serve the Thompson Arena parking lot.

2.9 DHMC Parking Lot Shuttles

Advance Transit operates parking lot shuttles at DHMC that benefit patients, visitors, and employees. Two buses serve Lot 9, while one bus serves Lot 20. Continuous service is available on both routes, with buses approximately every five minutes. The Lot 9 shuttle operates from 6:30 a.m. to 6:00 p.m. The Lot 20 shuttle operates from 6:00 a.m. to 6:00 p.m.

AT assigns large buses to these shuttle routes because of high demand during peak periods. There is some perceived inefficiency during the middle of the day, as large buses circle the parking areas with only a small handful of riders.

The DHMC shuttles provide a high level of convenience for individuals traveling to and from the medical center. While it might be possible to lower costs by reducing the frequency of midday service, this is likely to reduce people's willingness to park in outlying parking lots.

2.10 DHMC Centerra Shuttle

Dartmouth-Hitchcock Medical Center operates a free shuttle service linking the East Entrance of the medical center with offices and businesses at Colburn Hill and Centerra. DHMC added a Centerra stop at the Coop in 2005 when Advance Transit discontinued midday Blue route service to Centerra. AT passengers who wish to reach Centerra can transfer to the DHMC shuttle at the medical center.

DHMC uses two small buses to provide 15-minute headways on the Centerra route. Fifteen-minute headways begin at 7:10 a.m. and continue until 3:00 p.m. Between 3:00 p.m. and 5:00 p.m., headways change to 30 minutes. The last bus departs Centerra just after 5:00 p.m.

Advance Transit offers on-request drop offs at the Coop in Centerra before 7:00 a.m. There are roughly 7-10 people a day who currently take advantage of this service. Morning Blue route timetables need to be adjusted to allow extra time for these diversions. AT also offers a 6:00 p.m. pick up at the Coop, but no riders are currently boarding at this time. The impact of this diversion on other Advance Transit commuters should be assessed. There may be a better way to serve this location in the evening without delaying regular commuters.

There is no mention of the DHMC Centerra shuttle in Advance Transit's published timetable. More of Advance Transit's regular riders might take advantage of the service if it were publicized. Such publicity might, however, place some stress on a shuttle program designed to accommodate medical center employees.

Chapter 3: Passenger Survey

This chapter presents the results of a passenger survey distributed to Advance Transit bus riders on September 24, 2008. The survey examines trip purposes, transfer activity, frequency of use, commute patterns, and employment status of Advance Transit users. It asked passengers to evaluate Advance Transit bus operations and to make suggestions for improving the service. The chapter includes comparisons with similar passenger surveys carried out in 1999 and 2004.

A copy of the survey form is included in Appendix A. A full transcription of passenger comments is presented in Appendix B.

The chapter is structured as follows:

3.1 Methodology and Response

Advance Transit bus riders were surveyed on September 24, 2008. Surveys were distributed on Advance Transit's five regular bus routes. This included the Blue, Red, Orange, Green, and Brown routes. Surveys were not distributed on the Dartmouth/Downtown Shuttle or on DHMC parking lot shuttles.

Passengers were handed a survey form and a pencil when they boarded the bus. Individuals were asked to complete only one copy of the survey form. Passengers turned in completed forms as they exited the bus. Most individuals who were offered a survey form agreed to take one. In 2008, 593 surveys were distributed and 572 were returned, for a response rate of 96.5%%.

A total of 572 completed surveys were collected. This compares with 346 completed surveys in 2004 and 117 completed surveys in 1999.

Surveys were divided among bus routes using a distribution that matched the May 2008 ridership distribution. Figure 3.1 shows the distribution of completed 2008 surveys by bus route. Figure 1 also shows the distribution of ridership by route for May 2008 (excluding campus and parking lot shuttles).

Figure 3.1 Survey and Ridership Distribution

	Survey Respondents	Survey Distribution	May 08 Ridership Distribution
Blue	257	45%	45%
Red	133	23%	23%
Green	61	11%	11%
Orange	65	11%	12%
Brown	54	9%	9%
Total	570	100%	100%

3.2 Transfers between Routes

Twenty-six percent of regular route riders said their trip involved a transfer between bus routes. This is significantly higher than the percentage of transfers reported in 2004 and 1999. In both of the previous surveys, 14% of regular route riders said they used two buses to complete their trip.

The routes with the highest number of reported transfers were the Blue and the Red routes, with 71 and 70 transfers respectively. Twenty-five percent of Blue route trips included transfers. Twenty-three of the Blue route transfers involved the Red route, 21 involved the Brown route, 14 involved the Orange route, and 13 involved the Green route.

Forty-one percent of Red route trips included transfers. Twenty-three of the Red route transfers involved the Blue route, 29 involved the Orange route, and 18 involved the Green route.

Forty-one Green route trips involved transfers. This represents 54% of Green route trips. This included 18 transfers between Green and Red, 13 between Green and Blue, 7 between Green and Orange, and 3 between Green and Brown.

Forty-six Orange route trips involved transfers. This involved 51% of Orange route rides. Orange/Red accounted for 29 transfers, Orange / Blue accounted for 14, Orange / Green 7, and Orange / Brown 3.

Twenty-seven Brown route trips involved transfers. This was 36% of Brown route rides. The most common was Brown / Blue with 21 transfers, followed by Brown / Orange and Brown / Green, with 3 each.

The route pair accounting for the largest number of transfers was Red / Orange, with 29. The next most common were Red / Blue, with 23, and Blue / Brown, with 21. The number of transfers for individual route pairs is shown in Figure 3.2.

Figure 3.2 Route Pairs and Transfers

Route pair	*Transfers*
Red/Orange	29
Red/Blue	23
Blue/Brown	21
Red/Green	18
Blue/Orange	14
Blue/Green	13
Orange/Green	7
Brown/Orange	3
Brown/Green	3

The busiest transfer hub was West Lebanon, with 54 transfers. (This total assumes that all 7 Green / Orange transfers occurred in West Lebanon. While it is less likely, some of these Green / Orange transfers could have taken place in Hanover.) Hanover accounted for 44 transfers. Downtown Lebanon accounted for 23 transfers.

3.3 Trip Purpose

Passengers were asked to identify the primary purpose of their bus trip. The results are presented in Figure 3.3. Advance Transit continues to carry a much higher percentage of commuters (69%) than most other rural public transit systems. The percentage of work trips increased between 2004 and 2008 from 62% to 69%, while the percentage of shopping trips decreased from 14% to 9%.

Figure 3.3 Trip Purpose

	2008	*2004*	*1999*
Work	69%	62%	72%
Shopping	9%	14%	13%
School or college	11%	11%	10%
Medical	4%	6%	2%
Recreation/Social	4%	4%	3%
Other	3%	4%	
	100%	100%	100%

The lower percentage of shopping trips in 2008 is somewhat surprising, given the significant growth in Red route ridership that has occurred since 2004. It turns out that Red route growth is not entirely explained by an increase in shopping trips. Only 21% of Red route riders indicated that shopping was their primary trip purpose.

The Blue and Brown routes had the highest percentage of work trips. Eighty-two percent of Blue route trips were work related, while 71% of Brown route trips were work related. "Work" was the primary purpose for 67% of Green route riders, 54% of Red route riders, and 46% of Orange route riders.

Fifty-seven percent of Advance Transit riders who said their primary trip purpose was "shopping" were on the Red route.

Forty-nine percent of "school or college" trips involved the Blue route, while 18% of students were on Orange and 16% were on Brown. Students accounted for 12% of Blue route riders, 17% of Orange route riders, and 20% of Brown route riders.

3.4 Residence by Town

The distribution of bus riders by town is presented in Figure 3.4. This includes a comparison with 2004 and 1999 survey results.

Figure 3.4 Residence of Advance Transit Bus Riders

	2008	*2004*	*1999*
Lebanon	44%	41%	51%
Hartford	18%	16%	16%
Hanover	11%	13%	9%
Norwich	6%	11%	1%
Canaan	6%	5%	12%
Enfield	6%	5%	3%
Other	9%	8%	7%

Advance Transit ridership increased significantly between 2004 and 2008. The survey results suggest that the city of Lebanon and the town of Hartford have experienced somewhat higher levels of ridership growth than the other towns.

The 2008 distribution of bus riders by town and by route is presented in Figure 3.5. Forty-four percent of Blue route riders live in Lebanon, while 14% of Blue route riders live in Hanover. Canaan and Enfield together accounted for 23% of Blue route riders.

Figure 3.5 Distribution of Riders by Town of Residence and by Route

	Blue	Red	Green	Orange	Brown
Lebanon	44%	78%	13%	35%	2%
Hartford	3%	14%	75%	43%	6%
Hanover	14%	2%	5%	17%	21%
Norwich	2%	1%	2%	0%	54%
Canaan	12%	2%	0%	2%	0%
Enfield	11%	2%	0%	0%	0%
Other	14%	1%	5%	3%	17%

Lebanon residents accounted for 78% of Red route riders, while the town of Hartford accounted for 14%. (Riders could choose “Lebanon” or “West Lebanon.” 47% of Red route riders said they live in Lebanon while 32% live in West Lebanon.)

Hartford residents accounted for 75% of Green route riders and 43% of Orange route riders. Forty-seven percent of Orange route riders live in Lebanon.

Fifty-four percent of Brown route riders were Norwich residents, while 21% live in Hanover. Two-thirds of the people who live in "other" towns outside Advance Transit's service area were on the Blue route. Fifteen percent of those who live in "other" towns rode the Brown route.

The biggest percentage change since 2004 involved use of the Orange route by residents of Hanover. In 2004, there were no Orange route riders who said they lived in Hanover. In 2008, 17% of Orange route riders said they live in Hanover. Another change involved an increase in the percentage of Green route riders who live in the town of Hartford – from 61% in 2004 to 75% in 2008.

3.5 Transit Use Patterns

Nearly half of Advance Transit bus riders said they use the bus service five days a week. Another 33% said they ride 3 or 4 days a week. The combined total for people who ride 3 or more days a week was 82%. Ten percent said they ride 1 or 2 days a week, while 8% said they ride less than once a week. This is essentially the same distribution found in 2004 and 1999.

Figure 3.6 Number of Years Riding Advance Transit

When did you first begin using Advance Transit?

	2008	*2004*	*1999*
Within 1 year	33%	31%	34%
1-5 years	45%	46%	23%
More than 5 years	22%	23%	42%

Thirty-three percent of survey respondents said they started using Advance Transit within the last year. This is similar to the response to this question in 1999 and 2004. The route with the highest percentage of new riders was the Brown route, where 41% said they started using Advance Transit within the past year. Seventy percent of these new Brown route riders said their primary trip purpose was "work," while 20% said "school or college."

3.6 Dartmouth Students

Thirteen percent of survey respondents indicated that they were enrolled as students at Dartmouth College. The percentage of Advance Transit riders that are enrolled at Dartmouth has increased slightly since 2004 (from 12% to 13%), but the distribution of students by type has changed significantly. In 2004, undergraduates accounted for 46%, while 54% were graduate students. In 2008, 19% of Dartmouth student bus riders were undergraduates, and 81% were graduate students. The distribution of Dartmouth students by type is presented in Figure 3.7.

Figure 3.7 Distribution of Dartmouth Students

	2008	2004
Undergraduate	19%	46%
Tuck	8%	10%
Thayer	11%	5%
Medical School	19%	5%
Arts & Science Graduate	41%	24%
Other Graduate	3%	10%
	100%	100%

The greatest increases involved Arts & Science graduate students (from 24% to 41%) and Medical School students (from 5% to 19%). Increased usage by medical students reflects introduction of 15-minute headways between Dartmouth Medical School and DHMC.

Thirty-four percent of the Dartmouth students who participated in the survey live in Hanover, 31% live in downtown Lebanon, and 11% live in West Lebanon. Seven percent said they live in Norwich, and 6% live in Wilder.

3.7 Employment Status and Work Sites

Sixty-six percent of Advance Transit bus riders said they are employed full-time. Another 16% said they are employed part-time. Six percent are retired, and 6% are unemployed. Another 6% chose "other" as their employment status. Entries under "other" included student, disabled, medical leave, volunteer, mother, visitor, and underage.

Thirty-three percent of survey participants said that they work in Hanover, 16% said they work at the DHMC complex, and 9% said they work in West Lebanon. Five percent said they work in White River Junction, 4% said downtown Lebanon, and 4% said the Route 12A plazas.

Twenty-eight percent of the Advance Transit passengers who participated in the survey are employed by Dartmouth College. Survey results suggest that Dartmouth employees and students together account for 41% of Advance Transit ridership.

The distribution of Dartmouth College employees was 60% on the Blue route, 18% on the Brown route, 9% on the Green route, 9% on the Orange route, and 4% on the Red route.

Twelve percent of Advance Transit passengers said they are employed by the Dartmouth-Hitchcock Medical Center. The distribution of DHMC employees was 82% on the Blue route, 7% on the Orange route, 4% on the Green route, 3% on the Brown route, and 3% on the Red route.

Advance Transit passengers were asked: "Who is your employer?" In response, riders named over 125 additional businesses. Companies that account for between one and two percent of Advance Transit ridership include Shaws, the Hanover School District, the VA Hospital, and Wal-Mart. Employers that accounted for approximately1% of survey responses include CRREL, Kendal, Tele Atlas, the Co-op, Home Depot, Wendy's, Concepts NREC, and the town of Hanover.

3.8 Automobile Availability

Forty-seven percent of Advance Transit survey respondents said they had no car available. This compares with 57% who said they had no car available in 2004 and 75% who had no car available in 1999.

Stated differently, the percentage of Advance Transit riders who chose to ride instead of drive increased from 25% in 1999 and 43% in 2004 to 53% in 2008. The percentage of Advance Transit riders that left cars at home increased from 23% in 2004 to 29% in 2008. The percentage that parked near an Advance Transit bus stop increased from 8% to 10%.

Fifty-one bus riders said they parked their cars near Advance Transit bus stops. Of this group, 45% parked in Canaan, 20% parked in Enfield, 16% parked their cars in Norwich, and 8% left their cars in downtown Lebanon.

Sixty percent of Advance Transit riders indicated that they have a valid drivers license.

Figure 3.8 Automobile Usage

If you have a car available for your use, where is this car now?

	2008	*2004*
No car available	47%	57%
Home	29%	23%
DHMC Lot	1%	0%
Dartmouth or Hanover lot	3%	2%
Someone else is using it	7%	8%
Garage for repairs	1%	1%
Near AT bus stop	10%	8%
Other	2%	2%
TOTAL	100%	100%

3.9 Service Evaluation

Passengers were asked to evaluate the quality of service provided by Advance Transit. They were asked to rate the cleanliness of buses and the politeness of bus drivers. They were asked if buses are comfortable, whether seats are readily available, whether buses ran on time, if bus schedules are easy to find, and if schedules are easy to understand. Riders were also asked about transfers between routes.

Figure 3.9 Evaluation of Service Quality for 2008

	Nearly Always	*Usually*	*Sometimes*	*Almost Never*
Buses are clean	82%	16%	2%	0%
Buses are comfortable	73%	22%	4%	1%
It is easy to find a seat	55%	34%	10%	1%
Drivers are polite and helpful	78%	19%	3%	0%
Drivers are safe	76%	21%	3%	0%
Buses are on-time in the morning	56%	34%	8%	2%
Buses are on time in the afternoon	46%	38%	13%	3%
Bus schedules are easy to find	74%	20%	5%	1%
Bus schedules are easy to understand	63%	29%	7%	2%
Transfers between routes are easy	60%	32%	7%	1%

Ninety-eight percent of Advance Transit passengers said buses were usually or nearly always clean. Ninety-five percent said that buses were usually or nearly always comfortable. Ninety-seven percent said that bus drivers are usually or nearly always polite and helpful. Ninety-seven percent said that drivers were usually or nearly always safe. These findings are consistent with rider responses to the same questions in 2004 and 1999.

There has been some shift in passenger perception about the availability of seats. In the 1999 survey, 66% of riders said it was nearly always easy to find a seat. In 2000, 71% said that it was nearly always easy to find a seat. In the 2008 survey, this number dropped to 55%.

For the system as a whole, 10% of riders said it is "sometimes" easy to find a seat. For both the Blue and Red routes, 13% said seats are "sometimes" easy to find. This response was offered by 7% of Orange route riders, 3% of Green route riders, and by no Brown route riders.

There continue to be some concerns about on-time performance. Ten percent of Advance Transit riders said buses were "sometimes" or "almost never" on time in the morning. The Green route had the highest percentage of concerns about on-time performance in the morning. Twenty percent of Green route riders said buses are "sometimes" or "almost never" on time in the morning. Concerns about morning on-time performance were expressed by 11% of Orange route riders, 10% of Brown route riders, and 8% of Blue route riders.

Sixteen percent said buses were "sometimes" or "almost never" on time in the afternoon. Concerns about afternoon on-time performance were expressed by 23% of Green route riders, 21% of Orange route riders, and 20% of Brown route riders. This was an issue for 14% of Blue route riders and 13% of Red route riders.

Ninety-four percent of riders felt that schedules are "nearly always" or "usually" easy to find. Ninety-two said schedules are "nearly always" or "usually" easy to understand. Schedule availability was an issue for 14% of riders in 1999, 6% in 2004, and 6% in 2008. Understanding schedules was a concern for 18% of riders in 1999, 13% in 2004, and 9% in 2008.

The percentage of riders who said that transfers between routes are "nearly always" easy was 46% in 1999, 58% in 2004, and 60% in 2008. The percentage who said transfers are "sometimes" or "almost never" easy changed from 9% in 1999 and 6% in 2004 to 8% in 2008.

3.10 Advance Transit Future

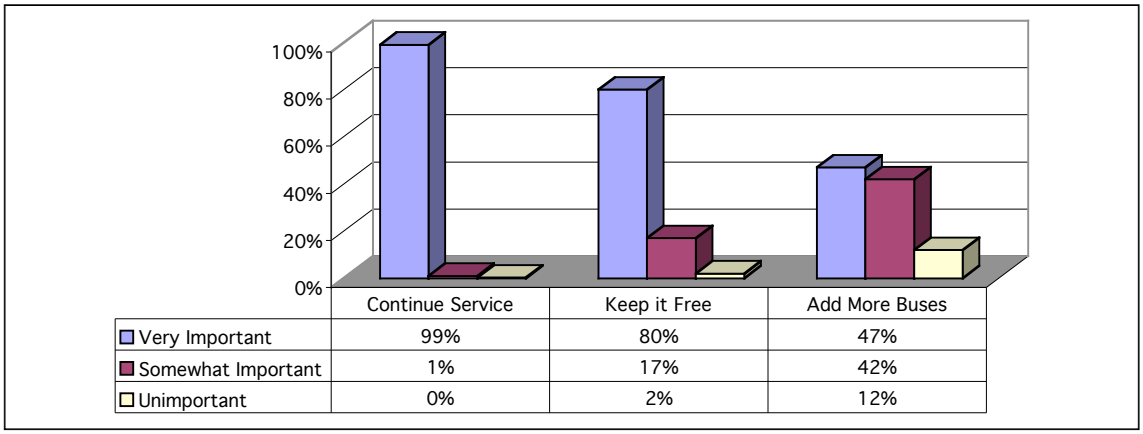
The survey included three questions about the future of Advance Transit service. Groups were asked to rate each item as "very important," "somewhat important," or "unimportant."

Passengers were asked:

- Should we continue to provide this service?
- Should we continue to offer free service?
- Should we add more buses to increase seating capacity and service frequency?

Responses to the three questions are summarized in Figure 3.10.

Figure 3.10 Advance Transit Future – 2008 Onboard Survey



	Continue Service	Keep it Free	Add More Buses
Very Important	99%	80%	47%
Somewhat Important	1%	17%	42%
Unimportant	0%	2%	12%

There is very strong support for continuing the Advance Transit program, with 99% of survey respondents agreeing that this is "very important," and the remaining 1% saying "somewhat important." Eighty percent of participating groups feel that it is "very important" to keep the service free, while an additional 17% said free service is "somewhat important." Two percent of participating groups suggested that keeping Advance Transit free is "unimportant."

Forty-seven percent feel it is "very important" to add buses to increase seating capacity and service frequency. Forty-one percent said this is "somewhat important" and 12% said it is "unimportant."

3.11 Demographics

Forty-seven percent of 2008 survey participants were male, and 53% were female. In 2004, 43% were male and 57% were female. In 1999, the number of men and women was evenly divided.

The percentage of female riders is greater from the outlying towns of Enfield and Canaan. Sixty-four percent of Canaan bus riders were women, and 81% of Enfield riders were women.

Figure 3.11 Distribution of Advance Transit Riders by Age Group

	2008	*2004*	*1999*
Under 18	3%	8%	1%
18-25	22%	21%	17%
26-40	29%	24%	39%
41-65	41%	40%	37%
Over 65	5%	8%	5%

Distribution by age group is shown in Figure 3.11. Results for 2008 show a small decline in the percentage of riders in the youngest and oldest age groups. The percentage of riders over the age of 65 was greatest on the Brown (10%), Orange (9%), and Red (9%) routes.

3.12 Weekend and Saturday Service

The survey form did not ask any questions about weekend or evening service. Without prompting, 109 Advance Transit riders included requests for weekend service. Weekend requests were made by 18% of the Advance Transit riders who participated in the survey. Nine-two individuals requested evening service. Evening requests were made by fifteen percent of survey participants.

Thirty-five percent of the requests for weekend service came from Blue route riders. Thirty-two percent came from Red route riders. Fourteen percent came from Orange route riders, while the Brown and Green routes each accounted for 9% of weekend requests.

Lebanon residents accounted for fifty-six percent of requests for weekend service. Hanover accounted for 12% of weekend requests, White River Junction accounted for 15%, and Wilder and Norwich residents each accounted for 7%. There were no requests for weekend service from residents of Hartford Village.

Thirty-nine percent of the requests for evening service came from Blue route riders. Twenty-two percent came from Red route riders. Nine percent came from Orange route riders, 14% came from Brown route riders, and 16% came from Green route riders. Residents of Lebanon accounted for 51% of evening service requests.

3.13 Passenger Comments and Suggestions

Passengers were asked "What do you like about Advance Transit bus service?" and "What can we do to improve the service?"

3.13.1 "What do you like about Advance Transit bus service?"

Many survey participants offered words of praise and appreciation for Advance Transit. They like the friendly and helpful drivers. They like that it is free. And they appreciate the environmental benefits of the service. A Hanover resident said: "This is a wonderful community service. The drivers are very dedicated to providing excellent service. I really enjoy riding the bus even though I have a car available. Keep up the great work!"

A Lebanon resident said: "AT provides a wonderful and vital service to the community. The drivers are always cheerful, polite, and helpful. It's fantastic that it's free. The community needs to continue to support public transportation alternatives like the AT."

A Blue route commuter who lives in Grafton said: "I very much appreciate the service. It is convenient, environmentally right, and economically important in these trying times." A Lebanon resident said: "The drivers are all extremely nice and professional. This is a great service for the Upper Valley."

An Enfield resident said: "I think it is very important to decrease the number of cars on the road and reduce America's carbon footprint. That's why I think the service should be free – to reward and encourage those who are willing to use mass transit."

Many riders said they would have difficulty getting to work without the service. A Canaan resident said: "This is my only way to get to and from work, as I don't drive." A Lebanon resident said: "In this economy, I believe more and more people will come to rely on your service." An Enfield resident said: "I'm a new mother without a license. I'd have no other way to get to work. Thank you for your service." A Lebanon resident said: "Without it, I'd spend $30-$40 a day in taxi fares."

A Green route passenger from White River Junction said: "I'm so impressed with how the drivers communicate to make sure transfers are taken care of." A Green route rider from Hartford Village said: "I like that one bus will wait for a short time for transfers. This is something I really appreciate. In the big cities this is never done."

A West Lebanon resident on the Red route said: "Reduces traffic, saves on gas." A Red route rider from Hanover said: "It helps me get my child around. I am very low on money, so it is very helpful." A Canaan resident said: "I like that the AT is free and available to all." A West Lebanon resident said: "Everyone is treated respectfully." Another West Lebanon resident said: "Every diver is very understanding of the passengers' needs. I am going blind."

A Norwich resident on the Brown route said: "The drivers are very helpful with new people, almost like ambassadors for the town & college. They remind you if you forget things on the bus and wait if they see you running. I think it's one of the best things about living here." Another Brown route rider from Norwich said: "Great service. Love the bus. More convenient than driving and having to park. Free is important."

An Orange route rider from White River Junction said: "I'm a student with limited finances. I don't yet have a license, and my husband is physically unable to drive (legally blind). These buses have enabled me and my husband to continue school, do our grocery shopping, and get to the doctors, which are all very important. Definitely keep AT!!"

3.13.2 "What can we do to improve the service?"

While passengers praised Advance Transit, they also offered suggestions for improving the service. The most common requests were for weekend buses and for later evening service, as discussed above in Section 3.12. A Lebanon resident said: "More frequent buses between Lebanon and West Lebanon would be nice. However, the primary flaw of AT is the lack of evening and weekend service."

A Blue route passenger from Lebanon said: "Extend hours for 12.5 hour employees at DHMC." A Red route passenger said: "I work late and don't have a ride. So I think you should do some night service to help people who don't have a license." A Norwich commuter on the Brown route said: "I know lots of people who don't ride because they usually stay on campus late and there is no service then."

A Lebanon resident on the Red route said: "There are many new grad students and others without cars. We don't want to be stuck at home every weekend."

Many commuters from Canaan and Enfield said more seats are needed during peak commute times. They also asked for an evening express that bypasses downtown Lebanon. There were also several requests for midday bus service to Enfield and Canaan.

One person said: "Continued service to Canaan is needed, even if a small fee is required of its riders."

Several people asked for more direct service between Hanover and the Route 12A plazas. Three people associated with Dartmouth Medical School said that 15-minute service between DMS and DHMC should start earlier in the morning. A faculty member suggested that the 15-minute headways should begin at 7:30 a.m. instead of 9:00 a.m.

A number of people said they did not like bus drivers playing commercial radios. A Hanover resident on the Blue route said: "Some bus drivers have radio loud enough they cannot hear passengers." A Blue route passenger said: "Please no country music and Dr. Laura!"

Several people asked for better information about bus stops. A Lebanon resident on the Blue route wrote: "A more detailed map of the bus stops online would be helpful." Another Lebanon resident said: "Once you know the routes it is easy to use the service, but learning where a route goes if you haven't taken it before is very difficult."

A Norwich commuter suggested that another bus, or a larger bus, is needed for travel from Norwich to Hanover between 7:00 and 8:00 a.m. "The Norwich stop at 7:30 a.m. at Dan and Whit's is so crowded with middle and high school students. They are loud, rude, and fill up most of the bus! It's sometimes hard to find a seat." A Brown route commuter who lives in Thetford asked: "Aren't there school buses available for these students?"

Some people asked for a direct commuter route to job sites at Centerra Park. Others asked for midday bus service to the Co-op at Centerra.

A Blue route commuter suggested eliminating the bus stop on Route 120 near the Route 120 / Etna Road intersection, and instead operating all Blue route buses via Old Etna Road. Another Blue route passenger said: "I live near the Old Etna bus stop and would prefer it if there is more frequent service, at least every 1/2 hour rather than every hour."

Many Green route passengers asked for later service on their route. One Green route rider said: "Even one more southbound trip from Hanover at night would help. 5:30 p.m. for the last bus is just not late enough." Another said: "I work until 5:30 p.m. some days and am unable to take the bus those days. Extend the hours (even one hour later!) please."

Several people asked for more frequent service to improve connections between buses that meet in West Lebanon. A Red route passenger said: "Add a bus to the Red line for every 1/2 hour to the plazas. This would reduce crowding and be more convenient for workers and shoppers."

Several Norwich residents suggested extending the Brown route to the Huntley Meadow playing fields on Turnpike Road. Another Norwich resident said: "All bus stops in Hanover need shelters, especially by Parkhurst."

Bus riders asked Advance Transit to add bus service to surrounding towns. Suggested communities included Lyme, Grafton, Cornish, Plainfield, and West Hartford.

A Dartmouth Medical School faculty member said that Advance Transit should add a secure donation link to its web site through Groundspring.org. A Lebanon resident suggested: "Start a 'Friends of Advance Transit' group to spread the word."

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Chapter 4: Community Involvement

This chapter describes efforts to involve members of the public in the transportation study and to obtain ideas and suggestions for the future of Advance Transit's fixed-route transit program. The first section describes Advisory Committee meetings held during the study. The second section describes discussions with stakeholders. The third presents findings from public workshops. Section four summarizes suggestions submitted via email by people who could not attend the workshop sessions.

The chapter is structured as follows:

4.1 Advisory Committee Meetings

The Advance Transit Board of Directors' Planning Committee served as the Advisory Committee for this planning effort. The Advisory Committee met during the planning effort to discuss the goals of the project, to review draft materials, and to provide guidance to the consultant on future steps.

September 25, 2008

At this introductory meeting, the consultant provided an overview of the scope of work for the transit study. He described each of the planning steps, and explained that he would provide draft chapters for each of the identified project tasks.

The consultant told the committee that he expects to develop three types of service design strategies.

- The first set of strategies will focus on short-term adjustments to routes and timetables to fix on-time performance problems, including missed connections. In particular, time constraints for the Orange, Brown, and Green routes need to be addressed. All three routes provide connections with the Blue Route in Hanover. The consultant will also provide route and timetable alternatives for a second Red route bus. These will include commuter access to the Airport Industrial Park.

- The second set of strategies will address expansion options in Advance Transit's core service area for the next two to five years. Possible strategies include increased frequency on the Orange, Brown, and Green routes, improved shuttle services for expanded Dartmouth College residential complexes, and the possible addition of commuter routes to work sites in the Centerra Business Park and on the Etna Road.

- The third set of strategies will address requests for regional commuter services from people who live in communities located outside of AT's core service area. Communities that are possible candidates for workforce transportation include Lyme, Grafton, New London, Claremont, Plainfield, and Cornish.

The Advisory Committee discussed public participation at service planning workshops, and stakeholder meetings in Hanover and Lebanon. The consultant reported positive rider reaction and high response rates to the onboard passenger survey. The group also discussed the importance of a well-designed transit hub in downtown Hanover to facilitate transfers between bus routes.

December 19, 2008

The consultant presented a brief overview of background tasks completed to date, including results from the onboard passenger survey. The committee agreed with the consultant's suggestion that the survey analysis be posted on the Advance Transit web site, along with a transcription of passenger comments.

The consultant reviewed a catalogue of service design concepts, and explained cost estimates for each idea. He presented a decision matrix for choosing which strategies to include within a five-year planning horizon. After reviewing alternative scenario choices, he went discussed proposed funding strategies for individual design concepts.

The Advisory Committee provided guidance on a number of issues and choices.

- Some committee members were uncomfortable with a proposed 2% annual inflation rate estimate. The consultant agreed to change these estimates to 3% for each of the five years addressed by the plan.

- The consultant asked if service design choices should include an earlier start of 15-minute service on the Blue route, as requested by some passengers from Dartmouth Medical School. The committee suggested including this in the cost model, beginning in fiscal year 2011.

- The committee suggested postponing implementation of 30-minute Green route service until FY 2012, because of uncertainties about local funding from Hartford over the near term.

- Because of the impact on local funding, the group suggested deferring the proposed doubling of service on the Orange route. Instead, the matrix will include a restructuring of the Brown route, without an increase in Orange route service. This will involve one bus operating between Norwich and Hanover, and a second bus operating between Sachem Village and Rivercrest.

- A representative from Dartmouth College suggested deferring the Route 120 parking lot shuttle until FY 2014.

- The group agreed that bus service for Alice Peck Day should be included, beginning in FY 2014.

The consultant explained that the cost model will clearly present the cost implications of the plan for each of Advance Transit's funding partners. Committee members suggested that this information be shared with officials from Dartmouth College and DHMC before project findings and recommendations are presented at public workshops.

4.2 Outreach to Stakeholders

The consultant and Advance Transit management discussed the future of Advance Transit services with key Upper Valley stakeholders. Interested groups included:

- Dartmouth College officials
- Dartmouth Hitchcock Medical Center and Dartmouth Medical School officals
- Airport Industrial Park planners and developers
- Human resource officials from Creare and Hypertherm representing Etna Road businesses

Dartmouth College

The discussion with Dartmouth College officials covered a variety of important planning and development issues.

1. The college will add 300 new residential units at Rivercrest on the Lyme Road. The first 100 units are likely to open in the fall of 2009. The facility will need frequent shuttle links to Hanover and the Dartmouth campus. Frequent service should continue until at least 6:30 or 6:45 p.m. Residents would benefit from evening service, which could be less frequent.

2. There is a continuing need for a park and ride lot in Norwich. Norwich residents have suggested sites located west of the downtown. While this location is less than ideal for many commuters, it would be better than the current situation with few, if any parking options for people who work in Hanover.

3. The group discussed the potential for routing Brown and Green route buses via Old Tuck Drive to avoid eastbound traffic delays at the intersection of Main and Wheelock.

Participants felt that this might be possible, with a gate that limits vehicle access to transit buses.

4. Dartmouth officials described the college's efforts to introduce college-sponsored vanpools from New London/Grantham and from St. Johnsbury. They discussed the potential for subscription commuter bus service on key commuter routes. Dartmouth officials indicated that they are willing to share employee zip code information with Advance Transit.

5. Dartmouth College plans to construct a 390-car parking lot near the DHMC Lot 9 on Route 120. The lot could open in September 2009. Initially, roughly half of the lot will be reserved for construction firms who will provide their own transportation to and from campus job sites. The college will require frequent peak-hour shuttle bus service between the new lot and a full range of destinations on the college campus. The transit plan should address strategies for designing the service and for integrating it with the existing Dartmouth/Downtown Shuttle. (Dartmouth College announced in the fall of 2008 that plans for the Route 120 lot have been temporarily suspended.)

6. The group discussed the importance of an improved bus stop and transit hub on Wheelock Street in front of the Hopkins Center. A new visual arts center is planned between this location and Lebanon Street. The site design calls for improved pedestrian flows to and from the new arts center. This should result in improved pedestrian access between Wheelock Street and Lebanon Street. This might enable Advance Transit to consider shifting the Blue route from Main and Lebanon Streets to Wheelock and Park Streets to bypass downtown traffic delays.

DHMC and Dartmouth Medical School

Officials from the medical center and the medical school said both organizations are pleased with Advance Transit's 15-minute midday shuttle service between DHMC and DMS. They also said that shifting buses to the Cancer Center / East Entrance has worked well. They reported they are unaware of any problems with Advance Transit passengers utilizing the DHMC shuttle for travel to and from Centerra.

The group discussed a number of items relevant for Advance Transit's future:

1. There are currently about 500 DHMC employees who work at various buildings in the Centerra Business Park. These workers would benefit from improved commuter access. Transferring from the Blue route to the DHMC Centerra shuttle takes too long. Employees want direct transportation to and from their job sites.

2. Most DHMC employees who work at Centerra do not need transportation to and from the medical center during their workday. The current hospital shuttle appears to be meeting needs that do arise.

3. The medical center has received reports of overcrowded buses from Canaan and Enfield. More capacity is needed for DHMC employees on this route. Requests have also been received for commuter transportation from Lyme, Claremont, Newport, and Grantham.

4. DHMC has about 70 employees who work on the Labombard Road. About 8 of these individuals have requested midday shuttle links with the medical center campus.

5. DHMC will develop a new ambulatory surgery unit at the south end of Lot 20. There will be pedestrian access, but no driveway access between Lahaye Drive and Lot 20. Blue Route buses could serve this location by traveling clockwise through the Lot 20 northbound and counterclockwise southbound.

6. DHMC will build a new Koop Medical Science Complex that may require a net increase of about 300 additional parking spaces. Improved and expanded commuter bus service might help limit new requirements for a new parking garage.

7. The medical center anticipates an ongoing 2% annual growth in overall demand, utilization, and employment. The transit program should plan for ways to help accommodate these increases in visitor, patient, and employee traffic.

8. Medical School officials were unaware of any demands for 15-minute headways earlier or later in the day. Fifteen-minute service is currently available from 9:00 a.m. until 4:30 p.m.

9. Given the anticipated need for expanded parking at the main DHMC campus, increasing commuter service to this location should probably be given a higher priority than bus service to Centerra. The primary focus should be on removing cars from the main hospital site.

10. While public use of the DHMC Centerra shuttle is working satisfactorily, hospital officials felt that it is probably not a good idea to publicize this service in Advance Transit's published Rider's Guide at this time.

Airport Industrial Park

Planners, municipal officials, employers, and developers associated with the Airport Industrial Park met at Lebanon City Hall to discuss possible roles for Advance Transit at this location. Attendees included representatives of Stryker, Allyon Solutions, the Airport Advisory committee, the Upper Valley Transportation Management Association, and Advance Transit. Lebanon municipal officials included the city engineer, the interim airport manager, a city planner, and the public works director.

The human resources director for Stryker reported that some employees currently walk from the Advance Transit bus stop on Route 12A. The company expects to expand its workforce and would like to be able recruit workers with limited automobile access. Workers in Stryker's manufacturing department work from 7:00 a.m. to 7:00 p.m. or from 7:00 a.m. to 3:30 p.m. Most support groups work from 8:00 a.m. until 5:00 p.m.

Allyon representatives described efforts to develop additional parcels at the Airport Industrial Park. The developer would like to assist with efforts to relieve traffic congestion on Route 12A, while ensuring an adequate workforce for future tenants. In the future, biotech firms are expected to recruit workers locally and in more distant communities, including Claremont and Newport.

The interim airport manager described recent interest in developing a multimodal transportation center at the Lebanon airport. Such a facility could include commercial air service, Dartmouth Coach, and Greyhound, with shuttle service to the Amtrak station in White River Junction. He suggested that this might include a new I-89 interchange for the airport site.

The Lebanon public works director discussed the anticipated schedule for reconstruction of the route 12A / I-89 interchange. He said that work during the first two years of the three-year project is supposed to proceed without interfering with traffic on Route 12A. In response to questions from AT's transit consultant, he said that the NHDOT project does not include bus stop turnouts or other transit related improvements.

The group discussed possible mechanisms for local businesses to support expanded transit operations for Route 12A and the airport. Participants suggested establishing a "benefit assessment district" to collect fees from businesses in this area that are served by Advance Transit.

Participants agreed that they would like Advance Transit to improve transit access to the airport. This should be done with three major goals in mind:

- Improve employment opportunities for area residents without cars.
- Assist employers with worker retention and recruitment, both locally and regionally.
- Reduce traffic congestion of Route 12A, enabling expansion plans to move forward at the industrial park.

Etna Road Employers

A representative from the Upper Valley Transportation Management Association arranged a meeting with Etna Road employers. Human resource officials from Hypertherm and Creare participated in the meeting, along with officials from UVTMA and Advance Transit.

The Creare representative reported that the firm has 115 employees, including engineers, support techs, and office support workers. Core business hours are from 9:00 a.m. to 4:00 p.m. Many engineers work from 8:30 a.m. to 5:30 p.m. Most tech support workers start at 7:00 a.m. and work until 3:00 or 3:30 p.m.

While the company has some local workers, many employees commute from surrounding towns, with one-way commute times generally from 20 to 60 minutes. Employee zip code information will be provided to Advance Transit and its planners. The firm's recruitment area has been expanding. Creare has an environmentally conscious workforce. The company would like its employees to have affordable and sustainable transportation alternatives.

Hypertherm operates in nine locations in the Upper Valley region. The Etna Road facility is the largest, with between 600 and 700 employees. The manufacturing division operates three shifts six days a week. Most day shift workers arrive between 6:30 and 7:30 a.m. and leave between 3:30 and 4:30 p.m. Transit planners should probably focus on a 6:45 a.m. arrival and a 3:45 p.m. departure.

Workers commute to Hypertherm from towns throughout the region, including Claremont, Cornish, Plainfield, Enfield, and Bradford, VT. Workers from Cornish who travel northbound on Route 12A in the morning sometimes return southbound on Route 120 to avoid afternoon traffic congestion near the Route 12A plazas.

Hypertherm will develop a 160,000 square foot manufacturing facility on the Heater Road. The project will be developed in stages and will eventually employ between 400 and 500 workers. The facility is expected to open in 2010.

There are other businesses on the Etna Road that might benefit from commuter bus service for their employees. The Dartmouth Coach terminal is also located on Etna Road. While some people without cars walk to this facility, more convenient car-free access to Dartmouth Coach is available via the Advance Transit bus stop near the Hanover Inn.

4.3 Public Workshops – September 22, 2008

Public workshops to discuss the future of Advance Transit's fixed-route transit program were held on September 22, 2008. Workshops were held at the Hanover Town Office, at the Dartmouth-Hitchcock Medical Center, and at the senior center in downtown Lebanon.

Hanover Town Office

Approximately 50 people participated in a public workshop at the Hanover Town Office. This session lasted from 12:00 noon until 2:00 p.m. Public comments included the following:

1. A workshop participant urged Advance Transit to extend transit service to the town of Lyme.

2. Another individual underscored the need for bus service from Lyme to accommodate commuting workers and high school students. This person stressed the need for late afternoon service from Lebanon High School.

3. A participant asked for Saturday service, particularly to West Lebanon and the Route 12A Plazas.

4. Another person said that Advance Transit plays an important role by allowing growth to occur in the region.

5. A spokesperson for the United Valley Interfaith Project reported that this federation of 18 faith communities has identified transportation as a major issue for many people in the region, especially elderly, disabled, and low-income residents. He urged Advance Transit to pursue four strategies:

- Reach out to identify needs from community members who are not served by the current system.
- Look for ways to provide more convenient bus service to Alice Peck Day Hospital in Lebanon.
- Participate in county-wide efforts to coordinate special needs transportation in Grafton County.
- Work to increase public awareness and citizen participation in the Upper Valley Rideshare program.

6. A resident of Hanover identified a need for early morning service to connect with the 7:00 a.m. Concord Coach departure, Saturday service with frequencies of one or two hours, and evening service until 7:00 p.m.

7. Another Hanover resident expressed appreciation for Advance Transit's friendly and helpful bus drivers. She said that she rides the bus to a part-time job in Enfield, and that she needs midday service on the Lebanon-Enfield-Canaan route segment.

8. A senior citizen identified a need for improved public transportation to Hanover from points north of Hanover, including Route 10 and the River Road. He felt it would be appropriate to charge a fare for this extended service.

9. Another senior citizen who is a regular AT rider identified a need for Saturday service to West Lebanon, White River Junction, and DHMC weekend programs. He suggested that weekday bus service operate until 7:00 p.m. If a fare is going to be introduced, he urged that a reduced fare be available for senior citizens.

10. A Wilder resident said that better connections are needed between the Green route and the Red route for Wilder residents who commute to jobs in downtown Lebanon. Current schedules require him to wait thirty minutes between buses in West Lebanon.

11. An individual who lives on Mount Support Road described how difficult it is to get to and from the nearest Blue Route bus stop. He urged Advance Transit to look for ways to provide more convenient bus access for people who live in his area.

12. A DHMC employee said that many direct care nurses need to arrive at the Medical Center by 6:50 a.m. They work 12-hour shifts that end at 7:30 p.m. These workers cannot use public transportation unless Advance Transit extends its service hours into the early evening.

13. Another individual identified a need for bus access to Saturday programs at DHMC.

14. A representative from the Upper Valley Hostel said that visitors often need evening and weekend service. She said the out-of-town hostel guests with disabilities have difficulty qualifying for ADA paratransit service. She also suggested a possible bus stop on South Street.

15. Another individual asked for weekend service for shopping and for access to DHMC programs. This person also identified a need for transportation from evening cultural events.

16. A Hanover resident asked for scheduled service from Hanover to the Route 12A Plazas that does not require a 30-minute layover in West Lebanon. This person also suggested that bus service is needed for the Quail Hollow retirement community.

17. An individual stressed the need for weekend and evening transportation for people who seek retail jobs in the Route 12A Plaza area. People without cars cannot afford to use taxis for their weekend commutes.

18. An employee of the town of Hanover reiterated the need for Saturday service. She also pointed out that inexperienced bus users are sometimes confused about bus stop locations, especially in the 12A Plazas.

19. Someone suggested better, more visible bus stop signs. It might also be helpful if AT displayed timetables at key transfer points.

20. Several participants expressed their support for extending and improving bus service on the Lyme Road. A Lyme resident who attends Lebanon High School said that high school students would benefit from a bus that arrives at Lebanon High School before 8:00 a.m. She suggested that a late afternoon bus should depart Lebanon High School for Lyme at about 5:30 p.m. for students who participate in after school sports.

21. A local resident reported that Hanover middle school students have a positive attitude about Advance Transit, and that many of them take advantage of the Brown route. She expressed appreciation for the bicycle racks on AT buses. She requested that Advance Transit look into adding ski racks during the winter season.

22. A Dartmouth College employee talked about the needs of international students without cars who live at Sachem Village. He said the current Orange route bus stop is too far away. He suggested that buses might be able to travel to a bus stop that could be added part way down the Sachem Village access road.

23. An individual who lives on the Lyme Road said that college and DHMC employees need Brown route service that starts earlier in the day and that ends later in the evening.

24. Participants asked for commuter bus service from points south (Claremont, Cornish, Plainfield) and from points north (Orford).

25. A Kendal resident said that workers at local stores and garages are not familiar with Advance Transit schedules and services. She suggested that Advance Transit add a color-coded route map to its published timetable.

26. A Stagecoach commuter from Vermont said that commuter park and ride lots are packed.

27. An Advance Transit passenger urged the transit company to adopt a policy of no cell phone use on buses.

28. Participants discussed the choice between charging a fare and seeking rider donations. While some people supported adding a fare, others suggested expanding fund raising efforts by installing donation boxes and encouraging automated monthly donations.

29. Participants discussed the need for strategic planning for the region to anticipate future increases in the cost of gasoline.

30. A long-time commuter from Lebanon to Dartmouth suggested adding hourly evening service to the Blue route until 10:00 or 11:00 p.m. He cited a need for weekend service, especially on Saturdays. He suggested that it might be appropriate to reduce service levels during the middle of the day.

Dartmouth-Hitchcock Medical Center

Approximately 50 people participated in a public workshop at DHMC. This session lasted from 4:00 p.m. until 6:00 p.m. Public comments included the following:

31. A medical center employee who lives in Norwich said he sometimes must wait 15 minutes for connections between Blue and Brown route buses.

32. A participant suggested that better transportation is needed to and from college laboratories at Centerra. This individual would like to be able to commute by bus from Wilder to Centerra.

33. An individual said that it is difficult for people who live on Greensboro Road to get to and from the Advance Transit bus stop on Route 120.

34. An individual from Grantham said many people want bus service from his area. He said he spoke for a group of 20 people. Ten other people in the room said they too want bus service from Grantham. They need a bus that arrives at the medical center between 7:00 and 7:30 a.m. and departs at about 5:15 p.m.

35. A medical center employee who lives on Wolf Road said many people would use Advance Transit if buses could operate on Mount Support Road, with a bus stop near Memorial Drive.

36. Five people requested commuter bus service from Lyme. One person said that high school students also need bus service from Lyme.

37. Someone requested Saturday service from downtown Lebanon.

38. Another person identified a need for bus service to Alice Peck Day Hospital.

39. Someone suggested that radio communication is needed between Advance Transit and other regional commuter bus operators.

40. A graduate student who lives on the Green route said that Green route buses need to operate later in the day. With the current schedules, the only way to catch the last Green route departure from Hanover is by boarding a northbound Blue route bus that departs the medical center at 5:05 p.m.

41. Another graduate student said that many international graduate students do not have cars. She said they work long hours during the week, and need access to shopping on weekends.

42. Someone suggested that transit access is needed for doctor's offices on Bush Road.

43. Another individual said bus stops need to be identified more clearly.

44. A group from Canaan and Enfield asked for an afternoon express bus. They also said more capacity is needed on this route.

45. A DHMC employee said she cannot make it to the South Entrance in time to catch the 5:03 p.m. bus to Canaan. She suggested moving this departure to 5:10 p.m.

46. A representative of the Lebanon Chamber of Commerce asked Advance Transit to reconsider bus service for Quail Hollow. He said this senior citizen facility has recently doubled in size.

47. Someone suggested that more convenient bus service is needed for Sachem Village.

48. Another participant said that elderly and low-income people need Saturday bus service.

49. Someone else encouraged Advance Transit to seek increased donations instead of returning to a fare system.

50. An official from DHMC said the medical center wants to do everything it can to reduce its environmental impact. He asked if Advance Transit has considered the possible use of smaller buses on parking lot routes during the middle of the day.

51. Someone suggested that a local feeder route could operate in Lebanon between the Lebanon Mall and Alice Peck Day Hospital.

52. A number of people felt that large employers and retail businesses should provide financial support for local bus service.

53. Another individual asked for commuter bus service from Grantham and New London.

54. Someone suggested that some bus stops in Hanover are located too close together.

55. A participant suggested that bus stop locations should be listed and clearly identified on the Advance Transit web site.

56. Someone else asked for bus service between Hartland and the VA Hospital.

57. Another participant asked officials to remember that many lower income bus riders do not have access to the Internet. He suggested that Advance Transit print a bus schedule that includes color-coded route maps.

58. A former member of the DHMC nursing staff said that most nurses work 12-hour shifts. A large number of employees might benefit from buses that arrive before 7:00 a.m. and depart after 7:30 p.m.

59. Someone asked for midday service to Enfield. This person also suggested that a church located behind the fire station on Rudsboro Road could provide as many as 70 parking spaces for park and ride commuters.

Lebanon Senior Center

Twenty-eight people participated in a public workshop at the Lebanon Senior Center. This session lasted from 7:00 p.m. until 9:00 p.m. Public comments included the following:

60. A passenger said that Advance Transit bus drivers are great. This person said she drives from Plainfield to Lebanon where she boards the Blue route. She transfers to the Brown route in Hanover to reach her job on Reservoir road.

61. Several people requested weekend or Saturday service. One person suggested that Advance Transit charge a fare for weekend service, with special passes available for purchase by weekend bus riders.

62. Someone asked that the Canaan route be extended to Grafton.

63. An Advance Transit rider suggested that more attention should be paid to the timing of connections between the Blue and Brown routes.

64. Another individual suggested that Advance Transit buses should be given priority at traffic signals and on the Ledyard Bridge.

65. Someone suggested that a second bus is needed for southbound departures from DHMC after 5:00 p.m.

66. A graduate student suggested that later service is needed, especially for graduate students whose lab work extends into the evening.

67. Municipal officials from Plainfield, Cornish, and Meriden asked what they could do in their communities to help establish commuter bus access to Upper Valley job sites. Planning board members from Plainfield and Cornish traveled to Lebanon for the meeting because they are concerned about the amount of money that local residents are paying for auto commuting.

68. Residents of Lyme asked for bus service for their community.

69. Another individual requested bus service to DHMC from Claremont.

70. Someone suggested real-time bus departure information at the Lebanon Mall bus stop so passengers know if their bus has left yet.

71. Another participant suggested that Advance Transit operate a plaza circulator to link the various shopping destinations at the Route 12A Plazas.

72. Several people asked for direct access to Centerra work sites.

73. Another Advance Transit rider asked for better bus stop signs, more shelters, and trash containers at existing shelters. She cited Lebanon Towers as a location that needs a trash container.

74. Someone praised the job that Advance Transit drivers do in communicating with each other about transfers.

75. Another individual said he wished Blue route buses still ran through to CRELL.

76. Someone said he wished there was a way for Advance Transit drivers to communicate with DHMC Centerra Shuttle drivers.

77. Someone suggested that the Red route needs to operate every 30 minutes.

78. Another commuter said he needs an earlier Red route bus so he can transfer to a Blue route bus and arrive at DHMC by 7:00 a.m.

79. An official from Resource Systems Group urged Advance Transit's Rideshare program to consider non-traditional on-demand ridesharing. He said this is now being developed in Europe.

80. An official from Upper Valley United Way highlighted the transportation needs of lower income workers who have evening jobs at the 12A Plazas. She also suggested there was a need for commuter bus service to the Airport Industrial Park.

81. Someone requested that the Blue route bus that departs Lebanon northbound at 5:45 a.m. include a stop on Old Etna Road. Someone else suggested that Advance Transit make sure that stops at Lebanon High School are scheduled at the appropriate times.

82. An individual who works for Tele Atlas would like to be able to commute from West Lebanon to Centerra. He said he can work from 7:00 a.m. until 3:30 p.m. or from 8:00 a.m. until 4:00 p.m.

83. Someone asked about the future of Advance Transit bus service for Canaan.

84. Another workshop participant urged Advance Transit to offer weekend service.

4.4 Email Comments and Suggestions

A number of people submitted comments and suggestions via email.

85. A municipal official said that constituents who commute from Lebanon to the VA Hospital would like a direct connection in West Lebanon. She also said she has heard from people who would like Advance Transit to increase it bike capacity to more than two bicycles per bus.

86. A Wilder resident said he would like to use Advance Transit to commute to his job in Lebanon. He said the connections between the Green and Red routes do not work for his commute. He works in Lebanon from 8:00 a.m. until 5:00 p.m. He needs a Green to Red connection that will get him to work by 8:00 a.m. He needs a direct Red to Green connection in West Lebanon at 5:30 p.m.

87. A Dartmouth College Assistant Dean suggested reestablishing a route that operates on Christian Street between Hartford Village and Wilder. She also suggested establishing a park and ride lot along Route 5 in Wilder. She suggested the empty parking lot across from Datamann, or the corporate park across from Dothan Brook as candidate locations.

88. Another Dartmouth Assistant Dean endorsed her colleague's two suggestions, and added a request for bus shelters at more Advance Transit bus stops. She cited the corner of Route 5 and 'A' Street as a location where people stand outside in all kinds of awful weather waiting for Advance Transit buses.

Chapter 5: Service Area Changes

This chapter describes recent and anticipated land use changes in the Upper Valley that may be relevant for public transportation planning. It identifies recently permitted residential and commercial developments, along with projects where permit applications are still pending. Separate sections address anticipated growth for Dartmouth College and Dartmouth-Hitchcock Medical Center.

The chapter is structured as follows:

5.1 Residential Development

The Upper Valley has a wide variety of residential projects in varying stages of development. Projects located adjacent to existing Advance Transit bus routes include:

- Ramano Place/Ramano Circle – 16 low income units are planned for this site located on Route 12A between downtown West Lebanon and the Route 12A shopping plazas. This is an expansion of a housing development currently served by a Red route bus stop.

- Westboro Woods – 34 townhouse and single-family homes are planned for this development on Seminary Hill, near an existing Red route bus stop.

- The Falls – 52 single family homes will be developed near the Orange route between downtown West Lebanon and downtown Hanover.

- Prospect Street – Plans call for workforce housing, combined with commercial, retail, and office development on Prospect Street. Prospect Street intersects Route 4 just east of the Connecticut River bridge in White River Junction. This development will require improved Orange and Green route bus stops on both sides of Route 4 between the river and railroad bridges.

- Butternut Road/Acorn Street – The town of Hartford anticipates additional single family and duplex housing in this development adjacent to Sykes Mountain Avenue. Orange route buses serve this area.

- 'A Street' in Wilder – Fifteen apartments are due to be added on 'A Street' is Wilder, near the Green route.

- Prospect Hills – 170 higher-income single-family homes are planned for a subdivision west of downtown Lebanon. This development is located on the Canaan/Enfield portion of the Blue Route

Significant residential development is anticipated for Mount Support Road.

- Ivy Commons – 252 studio, one, and two-bedroom apartments are planned for this development on Mount Support Road.

- Wyman Landing – This Mount Support Road project will eventually include 40 condominium townhouses. Nineteen are currently under construction.

- Reed Court – Approximately 25 condominium townhouses are planned for this Mount Support Road development.

Approximately 200 residential units have been constructed in recent years along nearby Wolf Road. Blue route buses operated on Mount Support Road several years ago, but were switched to Route 120 because of deteriorating roadway conditions. Mount Support Road will need to be resurfaced before Advance Transit can return to serve these new developments.

The largest residential development underway in Hanover is located on the Gile Tract, near the intersection of Route 120 and Medical Center Drive. Plans call for 120 residential homes, including some affordable units.

There has been some discussion of a pathway between the Gile Tract development and Advance Transit bus stops on Route 120. This presents a possible safety issue for residents who utilize northbound buses – because they would be required to walk across Route 120 to reach this stop. While it may involve a longer walk, it may be safer for Gile Tract residents to utilize a bus stop on Medical Center Drive. This will likely require construction of an appropriate northbound bus stop and shelter on Medical Center Drive.

There are two apartment complexes planned for South Block in downtown Hanover. One project currently being developed will include a total of 41 apartments. Another future South Block development will include a total of 103 apartments.

Other planned residential development includes:

- Rocky Ridge – 140 higher income single-family homes and duplexes are planned for this subdivision on Mascoma Street in Lebanon.

- Mascoma Shore – 69 single-family homes and duplexes are planned for this site near Mascoma Lake.

- King's Grant – Roughly 100 single-family homes are planned for this subdivision located south of the Miracle Mile segment of Mechanic Street.

- Greensboro Road – Sixty-five single-family homes and townhouses are under construction at this Hanover site.

- Buck Road – Seventy-five higher-income condominium units are anticipated for this location just north of Medical Center Drive in Hanover. The project is currently under review and has not yet been approved.

- Route 10 in Hanover – A 15-unit apartment building is planned for a site located south of the Hanover Middle School. The building will front on Curtis Street, but will likely include pedestrian access to a bus stop on the Lyme Road.

- Future residential development is anticipated near East Wheelock and Valley Road. These are likely to be higher income single family homes.

Pre-existing residential developments include:

- Emerson Gardens – These 160 apartments are located within reasonable walking distance of the transit hub in downtown Lebanon. These units were completed about five years ago.

- Renahan Meadows – There are about 150 condominium apartments located at this site on Mascoma Street. These units are approximately 20 years old.

- Wolf Road – As mentioned earlier, roughly 200 condominiums and townhouse units have been developed on Wolf Road. Individuals who live at the south end of Wolf Road currently walk to the Blue route bus stop on Heater Road.

Additional residential development is planned adjacent to Alice Peck Day Hospital. The hospital expects to add 69 independent living units for senior citizens. This will be added to existing nursing home and assisted living accommodations on the hospital site.

The Haven is a domestic shelter located on the Green route in Wilder. The facility currently has space for up to eight families. The organization has sought approval for a plan to expand to accommodate up to 30 people at this site.

5.2 Retail and Commercial Development

Lebanon anticipates the construction of a new Home Depot store on Route 12A, south of the terminus of the Red route. The town of Hartford anticipates future retail development along Sykes Mountain Avenue, although no particular projects are being planned at the current time. Hartford expects some retail businesses will be included in the Prospect Street development adjacent to the Green and Orange routes.

A three-year roadway construction project is planned for the Route 12A / Interstate 89 interchange. Despite the fact that this project is located in the region's busiest and most congested retail area, impact on Advance Transit buses should be minimal during the first two years of the project. Lebanon officials report that work on the Interstate overpass should proceed during the first two years without disrupting traffic flows on Route 12A. Temporary changes to Red route bus schedules will likely be needed during the third year of the project.

A 69-room hotel is planned for South Street in downtown Hanover. An application for this project is currently being reviewed by the town of Hanover.

5.3 Industrial Development

Hypertherm

Hypertherm plans to construct a 160,000 square foot manufacturing and warehouse facility on Heater Road, east of Route 120. The site will be developed in stages and will eventually employ between 400 and 500 workers. The facility is expected to open in 2010.

Hypertherm currently employs between 600 and 700 employees at its manufacturing facility on the Etna Road. The manufacturing division operates three shifts, six days a week. Most day shift workers arrive between 6:30 and 7:30 a.m. and leave between 3:30 and 4:30 p.m. Transit planners should probably focus on a 6:45 a.m. arrival and a 3:45 p.m. departure.

Workers commute to Hypertherm from towns throughout the region, including Claremont, Cornish, Plainfield, Enfield, and Bradford, VT. Workers from Cornish who travel northbound on Route 12A in the morning sometimes return southbound on Route 120 to avoid afternoon traffic congestion near the Route 12A plazas.

Creare

As of September, 2008, Creare had 116 employees, including engineers, support techs, and office support workers. Core business hours are from 9:00 a.m. to 4:00 p.m. Many engineers work from 8:30 a.m. to 5:30 p.m. Most tech support workers start at 7:00 a.m.

and work until 3:00 or 3:30 p.m. Creare has an environmentally conscious workforce. The company would like its employees to have affordable and sustainable transportation alternatives.

Creare employs 83 workers who live in New Hampshire, and 33 who live in Vermont. Zip code data was analyzed to determine regional commute patterns.

- 21 Creare employees live in the Grafton-Canaan-Enfield corridor. Of these 15 are exempt, while 6 are non-exempt. These workers might be able to use existing Advance Transit buses from Canaan, transferring in downtown Lebanon to a possible Etna Road bus.

- 14 workers live in Wilder, White River Junction, West Lebanon, or Lebanon. Nine are exempt, 5 are non-exempt. Eight of these individuals live in Lebanon. These workers could transfer in Lebanon from existing Advance Transit routes. Some of the Lebanon residents may live within walking distance of the Lebanon transit hub.

- Nine workers live in the I-89 corridor, and are possible candidates for park and ride service from Grantham or New London. Four are exempt and five are non-exempt.

- Eight exempt workers live in Hanover, and three live in Norwich.

- A Claremont / Plainfield route could serve 6 exempt and 6 non-exempt workers. A Claremont / Cornish route could serve 5 exempt and 4 non-exempt Creare employees.

Airport Industrial Park

Stryker expects to expand its workforce at the Airport Industrial Park and would like to be able recruit workers with limited automobile access. Most people employed in Stryker's manufacturing department work from 7:00 a.m. to 7:00 p.m., or from 7:00 a.m. to 3:30 p.m. Most support groups work from 8:00 a.m. until 5:00 p.m.

Allyon Solutions plans to develop additional parcels at the Airport Industrial Park for future bioresearch tenants.

Centerra / Route 120

There are a number of sites on Route 120 between the Etna Road and DHMC that are candidates for future industrial laboratories. A business incubator known as the Dartmouth Regional Tech Center is planned for Centerra Business Park.

5.4 Dartmouth College

Dartmouth College has plans to construct a 390-car parking lot near the DHMC Lot 9 on Route 120. The lot was originally expected to open in September 2009. Initially, one-half of the lot was going to be used for college staff, with the other half reserved for construction firms who would provide their own transportation to and from campus job sites. Dartmouth announced in the fall of 2008 that it was postponing development of this lot due to economic conditions. If the Route 120 parking lot is developed in the future, the college will require frequent peak-hour shuttle bus service to a full range of destinations on the college campus.

The college will add 300 new residential units at Rivercrest on the Lyme Road. The first 100 units are likely to open in the fall of 2009. The facility will need frequent shuttle links to Hanover and the Dartmouth campus until at least 6:30 or 6:45 p.m. Residents would also benefit from evening service.

Dartmouth College will construct new buildings adjacent to the existing Advance Transit bus stop at Dartmouth Medical School. Advance Transit uses the circle at the medical school to facilitate transfers between bus routes. An alternate site would be needed for this transfer activity if the circle at DMS/Vail were to become unavailable due to the construction project.

The college provides about 250 units of graduate student housing units at Sachem Village on Route 10 south of downtown Hanover. Residents have access to infrequent Orange route bus service if they are willing to walk roughly one-half mile to Route 10. Residents would benefit from improved shuttle transportation to the college campus. Possible improvements include a convenient bus stop located within the housing complex, frequent service, and evening service.

Dartmouth College plans to develop a new visual arts center adjacent to the Hopkins Center in downtown Hanover. This facility will include convenient pedestrian access to Advance Transit's transfer hub near the Hanover Inn. Advance Transit shuttles from the Dewey and Thompson parking lots may help reduce parking pressures related to Dartmouth's new visual arts facility. Future Route 120 parking lot shuttles will probably be less relevant for special events at this site because of the distance involved.

5.5 Dartmouth-Hitchcock Medical Center

DHMC has plans to build a new Koop Medical Science Complex that may require a net increase of about 300 additional parking spaces. Improved and expanded commuter bus service might help limit new requirements for a new parking garage.

DHMC will develop a new ambulatory surgery unit at the south end of Lot 20. There will be pedestrian access from Lot 20, but no driveway link between Lahaye Drive and Lot 20. Blue Route buses could serve this location by traveling clockwise through the Lot 20 northbound and counterclockwise southbound.

There are currently about 500 DHMC employees who work at various buildings in the Centerra Business Park. These workers would benefit from improved commuter access. Workers say that transferring from the Blue route to the DHMC Centerra shuttle takes too long. Employees want direct transportation to and from their job site.

The medical center anticipates an ongoing 2% annual growth in overall demand, utilization, and employment. Advance Transit should work with DHMC to develop strategies to help accommodate these increases in visitor, patient, and employee traffic.

Chapter 6: Short Term Service Adjustments – July 2009

This chapter recommends changes for Advance Transit bus schedules that could be introduced in July of 2009. These schedule adjustments are designed to improve the efficiency, reliability, and on-time performance of existing Advance Transit bus routes. Special attention has been paid to connections and transfers between buses. The chapter also discusses park and ride shuttle strategies for Dartmouth College.

The chapter includes eight sections:

6.1 Blue Route

The Blue route accounts for 41% of Advance Transit's regular route ridership, excluding campus and DHMC parking lot shuttles. Blue route buses connect with the Red route in downtown Lebanon, and with the Orange, Green, and Brown routes in Hanover.

A proposed timetable for Blue route service is included in Appendix C. The new schedule includes the following changes:

1. Early morning buses from Canaan will depart earlier to allow these buses to arrive on time at DHMC and in Hanover. The first trip from Canaan departs five minutes earlier. The second Canaan trip departs ten minutes earlier.

2. The time interval from DHMC to DMS/Vail northbound has been changed from 8 minutes to 10 minutes. Drivers report that this segment needs 10 minutes in the best of circumstances. This shortens layovers in downtown Lebanon from 10 to 8 minutes.

3. The timetable offers additional peak-hour trips via Old Etna Road. Survey participants who board at this location asked for more service at their bus stop.

4. The late afternoon bus to Enfield has been moved later so high school students can board after the end of their school day. This trip will no longer operate to Canaan. This trip will be offered during the school year only.

5. The southbound bus that previously departed Vail at 3:30 p.m. has been shifted to 3:40 p.m. Passengers who board this trip heading to Enfield and Canaan will arrive in downtown Lebanon at 4:07 p.m. and then transfer to a bus that departs downtown Lebanon at 4:20 p.m.

6. The 3:44 p.m. southbound departure from DHMC to Enfield and Canaan has shifted to 4:05 p.m. There will be no transfer in downtown Lebanon for people who board at DHMC.

7. The regular Blue route bus that currently departs Vail at 4:38 and DHMC at 5:03 has been moved seven minutes later. The new schedule calls for this bus to depart Vail at 4:45 and DHMC at 5:10 p.m. This bus will continue on to Enfield and Canaan, but only after a 22-minute layover in downtown Lebanon. People traveling to Enfield and Canaan would more likely wait to board the bus that departs Vail at 5:15 p.m. and DHMC at 5:32 p.m. The 5:10 p.m. bus from DHMC will not arrive in Lebanon in time to connect with the 5:15 p.m. Red route bus to West Lebanon. A 5:32 p.m. departure from DHMC will connect with the 5:45 p.m. Red route bus to West Lebanon.

8. A new afternoon EXPRESS will depart Vail at 4:55 p.m. and DHMC at 5:10 p.m. The express bus will not stop in downtown Lebanon.

9. There will no longer be a southbound bus to Canaan departing Vail at 5:43 and DHMC at 5:57 p.m. Instead, an earlier bus to Canaan will depart Vail at 5:15 p.m. and DHMC at 5:32 p.m.

Afternoon changes for Canaan and Enfield are summarized in Figure 6.1.

Figure 6.1 Current and Proposed Afternoon Service to Canaan

CURRENT AFTERNOON SERVICE TO CANAAN

DMS	DHMC	Lebanon	Enfield	Canaan
		2:15 p	2:25 p	2:40 p
3:30 p	3:44 p	4:00 p	4:10 p	4:25 p
4:38 p	5:03 p	5:16 p	5:26 p	5:41 p
5:43 p	5:57 p	6:10 p	6:20 p	6:35 p

PROPOSED AFTERNOON SERVICE TO CANAAN

DMS	DHMC	Lebanon	Enfield	Canaan
		2:50 p	3:00 p	
3:40 p	3:54 p	4:07 p		
		4:20 p	4:30 p	4:45 p
4:40 p	5:05 p	5:18 p		
4:55 p	5:10 p	EXPRESS	5:25 p	5:40 p
5:15 p	5:32 p	5:45 p		
		5:45 p	5:55 p	6:10 p

Shaded times operate during the school year only.

10. The current timetable includes a 6:05 p.m. northbound departure from DHMC that offers stops in Norwich. The new plan calls for this bus to also offer stops on request in Wilder Village. It also adds a 6:40 p.m. northbound departure from DHMC, with through service on request to Wilder Village.

11. Currently, the last northbound Blue route bus departs downtown Lebanon at 7:00 p.m. The new schedule offers a final northbound Blue route bus from downtown Lebanon at 6:45 p.m.

There is some uncertainty about the future of bus service to Canaan, because the town has failed to pass a budget that includes funding for Advance Transit. If Canaan does not provide municipal support, Advance Transit could turn Blue route buses at the Canaan town line. Or the Canaan-Enfield segment could be reclassified as a "regional commuter service" with weekly fares and a different subsidy arrangement. This idea is discussed in Chapter 8.

6.2 Red Route

A second bus is needed to accommodate high demand on the Red route. A second bus will also offer better connections with Green and Orange route buses, eliminating 30-minute layovers for some transferring passengers. It will result in connections with more Blue route buses. The second bus also provides an opportunity to introduce new service to the Airport Industrial Park.

A proposed Red route timetable is included in Appendix C. The new schedule includes the following:

1. A second Red route bus will operate from 6:45 a.m. to 6:45 p.m. This results in 30-minute headways on the route throughout the day.

2. The new schedule includes two morning trips to the Airport Industrial Park, and three afternoon trips to this industrial work site. Buses will arrive at the Stryker plant at 6:35 a.m. and 7:35 a.m. They will depart Stryker at 3:35 p.m., 5:05 p.m., and 6:05 p.m.

3. Buses that serve the Airport Industrial Park will not serve the Upper Valley Plaza, BJ's, or Shaws. These buses will travel from West Lebanon directly to the Airport.

4. The two morning trips to the Airport and one of the afternoon trips to the Airport will continue to Wal-Mart and then return directly to West Lebanon. Because of peak-hour traffic delays, the bus that departs the Airport at 5:10 p.m. will not serve Wal-Mart, but will instead leave the Airport and return directly to West Lebanon. To maintain hourly afternoon service to Shaws, the bus that departs the airport at 3:35 p.m. will skip Wal-Mart, and head instead to Shaws.

5. The new timetable calls for Red route buses to depart West Lebanon for the Plazas five minutes earlier, at 25 and 55 minutes past the hour. They will continue to depart West Lebanon for downtown Lebanon on the hour and half-hour. This will allow up to 35 minutes for a round trip through the plaza area. When traffic flows smoothly, the driver will end up with a ten-minute layover in West Lebanon between Plaza and downtown Lebanon segments.

6. To accommodate afternoon traffic delays in the plaza area, individual Red route trips will alternate between serving the Upper Valley Plaza and Shaws. The Upper Valley Plaza will have bus service at 12:00 p.m., 1:00 p.m., 2:00 p.m., 3:00 p.m. 4:00 p.m., and 5:30 p.m. Shaws will be served at 11:40 a.m., 12:40 p.m., 1:40 p.m., 2:40 p.m., 3:40 p.m., 4:40 p.m., and 5:40 p.m. When shopping centers are bypassed, it might be possible to stop near these mall entrances on Route 12A, although safety concerns may make this undesirable.

7. The consultant initially suggested using deadheading buses to offer early morning trips from West Lebanon to Lebanon, with West Lebanon departures at 5:55 a.m. and 6:25 a.m. Advance Transit management pointed out that Red route buses do not deadhead to Lebanon via West Lebanon because of weight restrictions on the bridge between White River Junction and West Lebanon.

8. The consultant also considered the idea of diverting a Red route bus to White River Junction between 7:30 and 8:00 a.m. and between 4:30 and 5:00 p.m. This would fill a gap in Orange route service and would benefit people commuting to and from the VA Hospital. This was not included, in part because it would disrupt the Red route service

pattern, and in part because extra Red route service hours are paid for with grant funding from the state of New Hampshire.

The change described in item five will improve on-time performance, but it is a less than ideal solution, because it will shift some of the time pressure from the Route 12A plaza segment to the Lebanon to West Lebanon segment. For the longer-term future, better bus stops and traffic flows are needed in the plaza area.

6.3 Orange Route

Orange route buses have difficulty completing round trips between West Lebanon and Hanover in the available 30-minute schedule window. Two changes are proposed to address this situation.

1. With the new timetable, Orange route buses will no longer operate to the circle at Vail. Instead, they will travel north on College Street to Maynard Street, and then proceed south on Main Street. This will shorten the amount of time spent in Hanover by two or three minutes.

2. The new timetable calls for Orange route buses to depart West Lebanon for Hanover at 25 minutes past the hour, instead of half past the hour. This will give these buses up to 35 minutes for a round trip between West Lebanon and Hanover. Northbound Orange route buses may need to wait for connecting passengers transferring in West Lebanon from other routes.

The need exists for additional trips from West Lebanon to White River Junction at 7:30 a.m. and at 4:30 p.m. Service to fill these gaps was requested by employees of the VA Hospital who commute from downtown Lebanon. This was not included in the new timetable because there appears to be no vehicle available at these times. These gaps in Orange route service will be addressed in longer-term strategies.

6.4 Green Route

The Green route typically runs behind schedule. Part of the delay has been caused by construction on Route 5. This work appeared to be nearing completion in the fall of 2008. Once the roadwork is finished, the operating window is still likely to be too tight.

The proposed solution is to limit the number of diversions to Hartford Village. The new schedule calls for most round trips to provide service to Hartford Village in one direction only. Some trips include a northbound stop at Hartford Village, while some trips stop there southbound. Four trips include both northbound and southbound stops. The last northbound bus offers Hartford Village drop off's on request.

Hartford Village stops were selected carefully in an effort to accommodate Hanover commuters, while preserving commuter trips from Hartford Village to downtown Lebanon and direct shopping trips between Hartford Village and the Route 12A plazas.

Other proposed Green route changes include the following:

1. Proposed Green route service starts earlier to offer additional morning commuter connections.

2. The 23-minute morning layover at Vail was eliminated. This will allow people who commute from Hanover to Wilder to arrive at work on time. The new schedule offers a 7:25 a.m. departure from Vail and a 7:35 a.m. arrival in Wilder.

3. The new timetable offers an additional evening northbound departure from West Lebanon to Wilder. This deadheading bus will drop off riders on request in Hartford Village. This change is designed to accommodate Wilder and Hartford Village residents who depart downtown Lebanon on the Red route at 5:45 p.m., along with people who depart Wal-Mart on the Red route at 5:35 p.m.

4. Advance Transit currently offers direct service from DHMC to Norwich, using a deadheading bus that departs the medical center at 6:05 p.m. The new plan calls for this bus to also offer drop off's on request in Wilder Village. It also adds a 6:30 p.m. departure from DHMC that will offer on-request drop-off's in Wilder. These changes will provide later buses for Wilder residents who work at DHMC and in Hanover, as requested by several public workshop participants.

6.5 Brown Route

The Brown route required major adjustments because of scheduling pressures. In normal conditions, drivers have been barely able to stay within the available 30-minute schedule window. The current schedule includes no time for traffic delays or wheelchairs.

For the middle of the day, the route has been redesigned to operate with 40-minute headways. During commute times, timetables were adjusted to provide targeted connections – for Norwich residents transferring to the Blue route to reach DHMC, and for Lebanon residents transferring from the Blue route to reach CRREL.

These targeted commuter connections result in longer layovers in Norwich. This provided an opportunity to add service to a proposed park and ride lot at the athletic fields located a few minutes west of downtown Norwich. Members of the American Legion and other local residents submitted a formal request for park and ride bus service to this part of town.

The new plan offers three morning departures from the ball field lot, and four late afternoon return trips to this location. Midday buses would continue to reverse direction via Hazen Street. Midday buses could offer drop off's on request at the satellite lot.

6.6 Connections and Transfers

Connections between all regular route buses were analyzed using linked computer spreadsheets. Transfer movements include:

- Canaan and Enfield residents who transfer between the Blue route and the Red route to reach West Lebanon and the Route 12A plazas
- West Lebanon residents who transfer between Red and Blue routes to reach jobs at DHMC and Centerra
- People who live in downtown Lebanon who transfer between Red and Orange to reach the VA hospital and other White River Junction destinations.
- Lebanon residents who transfer between Blue and Brown to reach jobs at CRREL
- Norwich residents who transfer between Brown and Blue to reach DHMC
- Wilder residents who transfer between Green and Blue to reach DHMC
- Wilder residents who transfer between Green and Brown to reach CRREL
- West Lebanon residents who use Orange and Brown to reach CRREL
- Wilder residents who use Green and Red to reach jobs in downtown Lebanon

Available connections for all of these route pairs are displayed in Appendix D. Color-coding is used to flag missed connections, as well as tight connections that may cause occasional delays. These matrices also highlight connections that are too long for most travelers.

Most of the longer transfer times involve less common travel patterns. Examples include transfers between the Orange route and the Brown route for trips to Norwich, and transfers between Green route and Orange route in Hanover. In some instances, better transfer times will require more frequent service on the Orange and Green routes. More frequent Orange and Green route service will be addressed in a longer-term service design chapter.

6.7 Dartmouth Campus and Parking Lot Shuttles

Dartmouth College has designed a new off-campus parking lot on Route 120 several miles south of downtown Hanover. This parking lot was originally due to open in the fall of 2009 with 200 parking spaces. Plans call for the lot to expand in future years to 400 parking spaces.

Due to changes in the national economy, college officials announced in November of 2008 that they are suspending development plans for the Route 120 parking lot, while also looking for ways to reduce costs throughout the college system. This section presents a service design for shuttle operations that could be implemented if and when plans for the Route 120 lot move forward.

Advance Transit operates a local shuttle service for Dartmouth College and the town of Hanover. The shuttle connects parking lots at Dewey and the Thompson Arena with the Dartmouth College campus and downtown Hanover. The service pattern, the number of buses, and shuttle headways vary according to time of day and season.

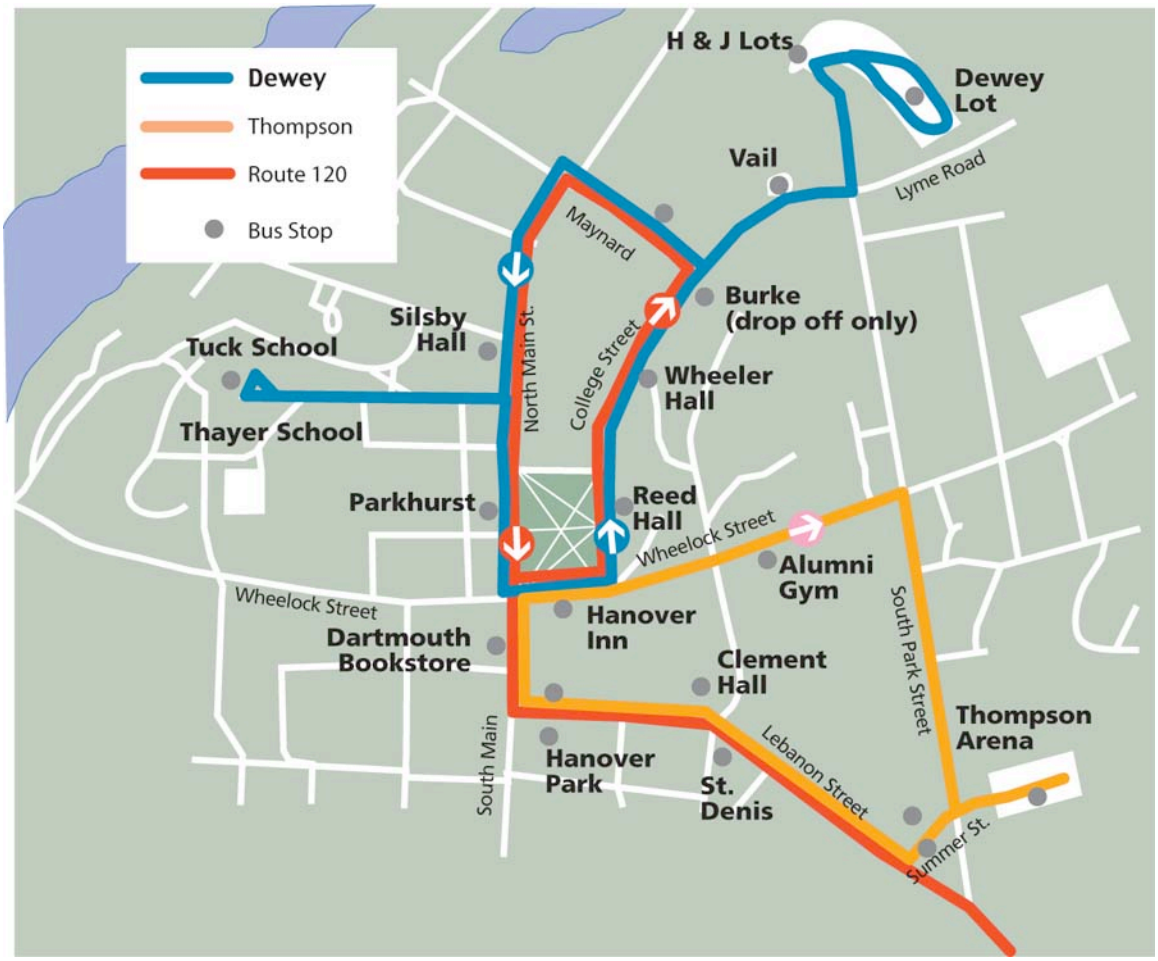
While it would be possible to simply layer a new Route 120 shuttle on top of the existing campus shuttle service, this would result in too many buses operating an inefficient and overly complex service pattern. A more promising approach is to redesign the entire campus shuttle service. Among other things, a new plan should strive to simplify the service so that bus operations are more consistent throughout the day.

A future Dartmouth shuttle system could consist of three components:

Dewey Shuttle	This route would serve the 1,200-car Dewey parking lot at the north end of the Dartmouth campus. A bus would travel from the Dewey lot to Tuck Drive to serve Tuck and Thayer, from Tuck Drive to the Hanover Inn, and from the Hanover Inn to the Dewey lot.
Thompson Shuttle	This route would start and end at the 350-car parking lot at the Thompson ice arena. It would operate a one-way loop via Summer Street, Lebanon Street, Main Street, Wheelock Street, and Park Street. It would serve shuttle stops in downtown Hanover and on Wheelock, including Advance Transit's transit hub near the Hanover Inn.
Route 120 Shuttle	A third shuttle route would begin and end at the proposed 400-car Route 120 parking lot. These buses could operate northbound via Lebanon and Main Streets to the Hanover Inn transit hub. They would serve the Dartmouth campus via College, Maynard, and North Main Streets. They would then return to Route 120 via South Main Street and Lebanon Street.

Two buses could provide 10-minute headways on the Dewey route during peak commuter hours. Midday, evening, and summer season service could be provided every fifteen minutes on the Dewey route with one bus.

Figure 6.2 Map of Proposed Dartmouth Shuttle Routes



One bus could offer 10-minute peak-hour headways on the Thompson route. If there is sufficient midday demand, the same bus could continue every 15 minutes during the middle of the day. An alternative strategy would be to have Route 120 shuttles operate via Summer Street during midday hours. Thompson lot users would be required to walk to or from the Summer Street stop during non-peak times. The Thompson shuttle would likely operate year-round.

Three buses could provide 15-minute headways on a Route 120 shuttle route during peak hours. Two buses could provide 20-minute headways during the middle of the day. College officials do not anticipate a need for Route 120 parking lot shuttles during the summer season, at least for the near-term future.

The current shuttle program offers peak-hour service from 7:00 a.m. to 10:00 a.m., and from 3:00 p.m. to 7:00 p.m. This same peak-hour pattern could be used for future Dewey and Thompson shuttles. Route 120 afternoon peak-hour headways could be provided from 4:00 p.m. to 6:00 p.m. Evening service for Dewey and Route 120 could continue until 9:00 p.m.

If Thompson lot service operates throughout the day, the three shuttle routes will result in a combined total of 66 vehicle hours per day during the main school year. This is a net increase of 33 hours per day when compared with the current Dartmouth Downtown shuttle program. If Thompson service is limited to peak hours only, this will save 5 hours a day, resulting in a daily total of 61 hours, a net gain of 28 hours.

If service during the summer season and vacation days is limited to one bus each for the Dewey and Thompson routes, this will involve 24 vehicle hours per day, the same level of service currently provided during the summer.

If Thompson lot service is limited during the school year to peak hours only, the combined shuttle program will involve 11,809 vehicle hours per year. This is a net increase of 4,396 hours when compared with the existing Dartmouth Downtown shuttle program. Projected service hours for an expanded Dartmouth shuttle program are presented in Figure 6.3.

Figure 6.3 Anticipated Hours for an Expanded Dartmouth Shuttle Program

ANTICIPATED HOURS FOR AN EXPANDED DARTMOUTH SHUTTLE

	Academic Year	Summer and Vacations	Combined Total
Days	157	93	250
Hours per Day	61*	24	
Total Hours	9,577	2,232	11,809

*Assumes no separate Thompson shuttle between 10:00 a.m. and 3:00 p.m.

If Thompson shuttles operate all day during the school year, the total increases to 12,594 hours per year, for a net gain of 5,181 hours when compared with the current program. The net impact of adding a midday bus to the Thompson route is 785 hours per year.

6.8 Service Hours and Costs

Figure 6.4 shows the impact of proposed short-term changes on Advance Transit's revenue service hours, along with operating cost estimates. Cost estimates for minor adjustments use a marginal cost rate that includes direct operations and maintenance. Cost estimates for major additions use fully allocated costs. These preliminary estimates are based on budgeted 2009 unit costs. Longer-term impacts and possible cost sharing strategies are discussed in a financial plan chapter.

Figure 6.4 Anticipated Impact on Hours and Operating Costs

Route	*Net Hours*	*Cost*
Blue	323	The anticipated marginal cost impact is estimated to be $19,819 per year.
Red	2,996	At the budgeted 2009 unit cost of $81.37 per hour, the estimated cost is $243,785.
Orange	0	
Green	170	The anticipated marginal cost impact is estimated to be $10,413 per year.
Brown	158	The anticipated marginal cost impact is estimated to be $9,695 per year.
Dartmouth Shuttle	4.396	At the current 2008 unit cost of $81.37 per hour, the estimated cost is $357,703.

The combined estimated cost of regular route adjustments is $283,712. This combined estimate does not include a new Dartmouth Route 120 parking lot shuttle.

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Chapter 7: Longer Term Service Design Strategies – Core Service Area

This chapter presents service design alternatives that could be implemented by Advance Transit in the next two to five years. It focuses on service improvements for the four municipalities within Advance Transit's core service area (Lebanon, Hanover, Hartford, and Norwich). Strategies for extending service to surrounding communities are addressed in Chapter 8.

The first four sections discuss restructuring the Brown route and increasing the frequency of the Orange and Green routes. The fifth section looks at new commuter bus service to employment centers at Centerra and on the Etna Road. Section 6 describes a possible new route to serve Alice Peck Day hospital and Mascoma Street residential neighborhoods. Sections 7 and 8 present possible strategies for Saturday and evening bus service. The final section considers more frequent early morning Blue route service for Dartmouth Medical School

The chapter includes nine sections:

7.1 Separate Bus for Norwich

Revisions to Brown route service will result in reduced headways on the route. Midday buses will operate every 40 minutes. Peak-hour buses will be scheduled every 45-60 minutes. The key to providing more frequent service on the Brown route is to divide it into two separate routes, using one bus for Norwich-Hanover, and a second bus for Rivercrest-Hanover-Sachem Village.

The Norwich route would begin in Norwich at a proposed ball field park and ride lot. Buses would pick up riders at the parking and ride lot and then proceed into downtown Norwich. Stops at Dan & Whit's could be scheduled on the hour and half-hour. Buses would proceed into Hanover, where they stop at the Hanover Inn before serving the Dartmouth campus via College, Maynard, and North Main Street.

Buses would return to Norwich, stopping at Tracy Hall and Hazen Street before returning to the park and ride lot. A timetable for proposed Norwich service is presented in Appendix E.

The draft Norwich timetable shows service operating from 6:26 a.m. until 6:03 p.m. This will result in 11.6 revenue service hours per day, or 2,962 hours per year. This is roughly twice the service hours currently provided for Norwich by the existing Brown route bus.

7.2 Revised New Hampshire Brown Route: Sachem & Rivercrest Shuttle

If a separate bus serves Norwich, the New Hampshire portion of the Brown route could be extended to include Sachem Village. One bus could provide 40-minute headways on a route that operates between Rivercrest and Sachem Village via downtown Hanover and the Dartmouth campus. A timetable for this service is presented in Appendix E.

The New Hampshire portion of the Brown route would continue to provide bus service to CRREL, Kendall, and the Hanover Middle School.

The proposed schedule calls for the first northbound bus to depart Sachem Village at 6:40 a.m. The first southbound bus would depart Rivercrest at 6:53 a.m. Service on the route should continue until 6:43 p.m. As an option, the service day could be extended to 10:08 p.m. to benefit Dartmouth graduate students.

If service ends at 6:43 p.m., the route will involve 12 revenue service hours per day, or 3,000 hours per year. If service continues until 10:00 p.m., it will involve 15.5 hours per day, or 3,950 hours per year. Annual service hours could be reduced to 3,609 if evening service is limited to the fall, winter, and spring terms only. This last figure represents a net increase of roughly 2,000 hours a year when compared with current service on the CRREL/Kendall segment of the Brown route.

7.3 More Frequent Orange Route Service, Extended to Norwich

Buses linking West Lebanon with Hanover and with White River Junction currently operate once every 60 minutes. More frequent service is needed to fill in service gaps and to increase the overall level of convenience for people who live along this route.

It would be possible to extend the Orange route to Norwich, and to use three buses to provide consistent 30-minute service on a combined route throughout the day. This approach offers a number of important features:

- Consistent 30-minute service for White River Junction, West Lebanon, and Norwich
- Improved travel times and better connections for commuters who work at the VA Hospital
- Better connections for White River Junction and Norwich residents traveling to the Route 12A plazas
- Hourly bus service to the new Aquatic Center in White River Junction
- A schedule window that provides more time for traffic congestion in downtown Hanover

The extended Orange route takes advantage of the fact that a round trip between West Lebanon and Hanover needs more than 30 minutes, while a round trip between Hanover and Norwich requires less than 30 minutes. Combining the two route segments allows the West Lebanon-Hanover segment to use some of the minutes that are not needed for the Hanover-Norwich segment.

A timetable for revised Orange route service is presented in Appendix E. The proposed schedule offers service on the White River Junction segment from 6:20 a.m. until 7:30 p.m., on the West Lebanon-Hanover segment from 6:11 a.m. until 7:45 p.m., and on the Norwich segment from 6:00 a.m. until 8:00 p.m.

The proposed schedule includes a 7:18 p.m. departure from White River Junction to Hanover and Norwich, resulting in a new connection with the Amtrak train that arrives WRJ from points south at 6:45 p.m.

The current service pattern involves one bus for Orange and half a bus for Norwich. This is equivalent to half a bus on each of the three route segments. The new service design doubles the existing service to three full-time buses. This adds one bus for Vermont, and half a bus for New Hampshire.

Additional service hours result from extending service until 7:30 and 8:00 p.m. The new plan involves about 40 revenue service hours per day. If service operates 255 days per year, this will mean a total of 10,200 service hours per year. This represents an increase of about 5,600 hours when compared with existing Orange route and Norwich bus service.

7.4 More Frequent Green Route Service

Ridership on the Green route has increased dramatically in recent years. To better accommodate people along this route, Advance Transit should consider increasing the service frequency to every 30 minutes. This could be accomplished by adding a second full-time bus to the route. A timetable for 30-minute Green route service is included in Appendix E.

The new schedule calls for the first southbound bus to depart Wilder Village at 5:45 a.m. The first northbound bus would depart West Lebanon at 6:00 a.m. The first southbound bus would depart Hanover at 6:30 a.m. The last northbound bus would depart West Lebanon at 6:00 p.m. The last southbound bus would depart Hanover at 6:25 p.m.

The new timetable offers hourly service to Hartford Village, with northbound stops at five minutes past the hour and southbound stops at 15 minutes past the hour.

Expanded Green route service adds one full-time bus in Vermont. It involves 25 revenue service hours per day, or an estimated 6,250 revenue service hours per year. This represents an increase of approximately 3,187 hours when compared with current Green route service.

7.5 Etna Road and Centerra Commuters

One bus could be used to link the downtown Lebanon transit hub with the Etna Road and with Centerra. Advance Transit currently offers no bus service to these employment centers. The bus could alternate between Lebanon-Etna Road and Lebanon-Centerra.

The bus could depart Lebanon for Hypertherm and Creare at 6:15 a.m., 7:05 a.m., and 8:05 a.m. It would arrive at 6:25 a.m., 7:15 a.m., and 8:15 a.m. The same bus could depart downtown Lebanon for Centerra at 6:40 a.m. and 7:40 a.m. It would arrive at Centerra at 6:48 a.m. and 7:48 a.m.

Departures from Hypertherm could be scheduled for 3:35 p.m., 4:30 p.m., and 5:30 p.m. The same bus would depart Centerra at 4:00 p.m. and 5:00 p.m. A timetable is included in Appendix E.

The Etna Road / Centerra bus would connect with Blue and Red route buses in downtown Lebanon. It would operate 2.2 hours in the morning and 2.2 hours in the afternoon for a total of 4.4 hours per day. It would operate an estimated 1,104 revenue service hours per year.

7.6 Mascoma Street Route

Several public workshop participants asked Advance Transit to add bus service to Alice Peck Day Hospital. A new Mascoma Street route could begin at the Renehan Meadows apartment complex, serve Alice Peck Day hospital, and then continue to the downtown Lebanon transit hub. The consultants developed two strategies for providing midday service to the hospital and residential neighborhoods along Mascoma Street.

One strategy uses one bus to provide 30-minute headways on a Mascoma Street route. The alternate approach would offer hourly midday service to Mascoma Street, and combine this with hourly midday service to the Coop at Centerra. After arriving in downtown Lebanon from Mascoma Street, the bus could continue to the Coop at Centerra. After returning to downtown Lebanon, it would continue to Mascoma Street. This would give Lebanon residents midday access to a local grocery store that currently has no Advance Transit service. Timetables for both alternatives are presented in Appendix E.

Midday service could be provided with the same bus that serves Etna Road and Centerra during peak commute hours. Service on the route would operate from 8:45 a.m. until 3:05 p.m. This would result in 6.5 revenue service hours per day, or an estimated 1,625 hours per year.

7.7 Saturday Service

Saturday service was a recurring theme at public workshops and in written comments on passenger surveys. Many people explained that they work throughout the week, and can only do their shopping on weekends. Dartmouth graduate students were among those who said they need weekend bus service for essential errands.

The consultants developed separate Saturday plans for New Hampshire and Vermont. The New Hampshire plan uses two buses to serve the Red route and portions of the Blue route. The Vermont plan uses one bus to serve the Green route and portions of the Brown and Orange routes.

Saturday service in New Hampshire would include hourly service on a portion of the Blue route and hourly service on the full Red route:

- Hanover Inn – DHMC – Downtown Lebanon
- Downtown Lebanon – West Lebanon – Route 12A Plazas

Saturday service in Vermont would involve hourly service on two segments:

- Hanover Inn – Norwich – Wilder – Hartford Village – West Lebanon
- West Lebanon – White River Junction – Aquatic Center – West Lebanon

Both Saturday service plans utilize transfer hubs in West Lebanon and at the Hanover Inn. The New Hampshire plan could be implemented by itself. The Vermont plan relies on the New Hampshire service for links to major shopping destinations. If Saturday service is implemented in both states, coordinated transfers between the two services would be available at the Hanover Inn and West Lebanon hubs.

Timetables for Saturday service are presented in Appendix E. New Hampshire service would operate from 9:00 a.m. until 6:00 p.m. with two buses, for a total of 16 revenue service hours per day, or 832 hours per year. Saturday service in Vermont would operate from 9:00 a.m. until 4:45 p.m., or approximately 8 hours per day and 416 hours per year.

7.8 Evening Service

Many public workshop and onboard survey participants suggested that buses should be available later in the evening. Requests for evening service came from Dartmouth graduate students who work late at laboratories, from DHMC nurses who work 12-hour shifts that end at 7:00 or 7:30 p.m., from individuals who work evening shifts in the Route 12A plazas, and others.

The consultants developed a variety of strategies for possible evening service. These services could be implemented separately, or they could be combined to allow transfers and expanded travel opportunities for more residents. Proposed evening timetables are included in Appendix E.

Extend Blue route service to 8:30 p.m. to accommodate 12-hour nursing shifts
This would provide northbound pick-ups at DHMC at 7:05, 7:38, and 8:25 p.m. It would provide southbound DHMC stops at 6:54, 7:40, and 8:02 p.m. This would involve 2.9 additional service hours a day, or 744 hours per year.

Extend Blue route service hourly until 10:00 p.m.
With this approach, one Blue route bus would remain in service until 9:47 p.m., offering final DHMC stops southbound at 8:59 p.m. and northbound at 9:35 p.m. This involves 4.4 hours a day, or 1.5 hours more than the limited evening plan discussed above. This works out to 1,135 hours per year, an incremental increase of 391 hours.

Operate hourly Red route service until 10:10 p.m.
One Red route bus could offer four hourly departures from downtown Lebanon beginning at 6:15 p.m. The last departure from downtown Lebanon would be at 9:15 p.m. The last bus would depart Wal-Mart at 9:45 p.m. The evening Red route bus could offer some connections with evening Blue route buses in downtown Lebanon. This would involve 3.9 hours per day, or approximately 1,000 hours per year.

Operate evening shuttles to Sachem Village and Rivercrest

As discussed above in Section 7.3, evening shuttle service linking the Dartmouth campus with Sachem Village and Rivercrest could operate until 10:00 p.m. Continuing this service past 6:45 p.m. would add 3.4 revenue service hours per day, or 893 hours per year. If this evening service does not operate during the summer or during term breaks, this reduces the annual total by about 335 hours, resulting in an estimated annual increase of 536 evening hours.

7.9 Earlier 15-Minute Service for Dartmouth Medical School

The current Blue route schedule offers 15-minute shuttle service between Dartmouth Medical School and Dartmouth-Hitchcock Medical Center between 9:00 a.m. and 4:30 p.m. Before 9:00 a.m., buses operate between DMS and DHMC every 30 minutes. A number of people associated with the medical school suggested that 15-minute headways need to start earlier in the day.

Earlier 15-minute service will make it easier for DMS students and faculty to reach morning meetings at the medical center. This would also result in improved connections for DHMC commuters transferring from the Brown, Orange, and Green routes.

This change would add one and a half service hours a day, or 383 service hours per year.

Chapter 8: Longer Term Strategies – Regional Commuter Service

This chapter looks at possible commuter bus routes from New Hampshire towns located outside of Advance Transit's core service area. It considers possible commuter services from Enfield, Canaan, Lyme, Grantham, New London, Claremont, Cornish, and Plainfield. Residents from each of these towns came to Advance Transit's public workshops to ask for alternatives to automobile commuting.

The first section examines three different business models that Advance Transit could use to address regional commuting needs. The second section suggests that Advance Transit should limit free service to its core service area, and charge deeply discounted weekly or monthly rates for regional commuter routes. Section three discusses the need to expand park and ride lots in outlying communities. The remaining sections address individual commuter corridors.

The chapter includes seven sections:

8.1 Alternative Business Models

The consultants identified three different business models for regional commuter service. Advance Transit will need to decide which approach offers the best fit with system operations, regional geography, and available funding. Officials may decide that different strategies are appropriate for different commuter corridors.

Regular Advance Transit Service

Regional commuter service could follow the approach currently used for Enfield and Canaan. Advance Transit could purchase buses for this service, and base vehicles and drivers at its Wilder bus garage. Regional routes would include deadhead service from Wilder to outlying locations at the start of the day, and deadhead service back to Wilder at the end of the day.

The service could be free, as is currently the case with Enfield and Canaan. Or regional commuter fares could be introduced.

This approach would be consistent with current Advance Transit operations. It does not introduce new uncertainties regarding part-time bus drivers, limited work hours, vehicle parking, and vehicle security. The disadvantage is that it is expensive. Policies and cost structures that are appropriate for in-town transit operations may be too costly for longer-distance, limited frequency commuter services.

Subscription Service

Deadhead costs can be reduced or eliminated on commuter routes if a transit system uses part-time drivers who park buses in their home communities in the evening. Transit systems that use this approach typically use drivers who have other employment during the middle of the day. These drivers work eight hours a day for their regular daytime employer. The transit system pays them for only an hour or two in the morning, and an hour or two at the end of the day.

Downeast Transportation uses part-time drivers for three long-distance commuter routes to the Jackson Laboratory in Bar Harbor, Maine. These three buses remain parked at the laboratory during the middle of the day. The transit provider has arrangements with neighboring bus companies for back-up service if problems arise when buses are far from their home garage. Downeast Transportation reports that one of its biggest challenges is recruiting qualified CDL back-up driver from the group of regular bus riders.

These types of services typically offer a deeply discounted weekly or monthly subscription fare. Single rides are available, but for a significantly higher fee. In Maine, the Jackson Laboratory deducts subscription fares from employee paychecks and forwards this money to Downeast Transportation every pay period. Riders employed elsewhere pay fares directly to the bus company.

Subsidized Vanpools

Another approach would be for Advance Transit to use federal grants to purchase vans or small buses for regional vanpools. It might be possible, for example, to acquire fuel-efficient 10-passenger Dodge Sprinters for this service.

Vehicles can be made available to groups organized through Advance Transit's Rideshare program. Participants would pay a weekly or monthly fee to the Rideshare program. Employers could be asked to provide limited subsidies to help reduce passenger fares. Drivers would not be paid, but would ride for free. Advance Transit could handle vehicle maintenance, with repair work charged to a Rideshare account.

Vanpools can be less efficient for large groups of commuters. They are also less appealing for some people. Some commuters prefer a more anonymous service that they can use without making a long-term personal commitment. However, vanpools have several advantages:

- They are more flexible, with routes that can be customized to the needs of individual riders.
- Fewer people are required for a successful service.
- Driver recruitment is easier, because the vehicles may be less intimidating to some potential drivers, and because CDL's are not required.
- Overnight parking is less of an issue because vehicles are smaller and less conspicuous.

As indicated earlier, Advance Transit may find that different strategies are appropriate for different corridors. For example, Lyme commuter service could be operated with buses based in Wilder, while service from Claremont and New London could be provided with vanpool equipment based in outlying communities. Canaan service could involve a combination of strategies. Some trips could be provided with buses based in Wilder. Extra overflow trips could be operated with buses based overnight in Canaan.

8.2 Commuter Fares

Advance Transit currently provides free bus rides throughout its service area. The transit provider should consider limiting free service to its core service area, while introducing a new and different policy for longer-distance commuter services. There are a number of factors worth considering:

- The per-person cost to provide longer-distance bus rides is much higher than shorter in-town trips. Employers who underwrite long-distance bus service to reduce parking costs end up paying more for each parking space saved. Because the per-space cost is higher, employers may be reluctant to expand these long-distance bus services when fuel prices go up and demand increases.

- Long-distance commuters are more aware of their ongoing commuter costs. They are also much more exposed to changes in fuel prices. Individuals who accumulate large weekly mileage totals are much more likely than short-distance commuters to be willing to pay for a bus alternative.

- Long-distance bus fares allow employers to leverage their support for bus alternatives. Employer funding can be used to offer deeply discounted weekly or monthly rates. Low fares can provide visible and dramatic savings to commuting workers, resulting in full buses and a modest per-person cost for participating employers. This in turn should increase employers' willingness to support additional longer-distance buses as demand increases in the future.

Advance Transit may want to consider introducing a $15 or $20 weekly fare for existing bus service from Canaan and Enfield. This change in policy may be needed if the town of Canaan fails to approve its annual subsidy for Advance Transit. Canaan commuters would almost certainly prefer a low-cost subscription service to no service at all.

8.3 Park and Ride Lots

Many rural bus riders use their cars to reach their commuter bus routes. These people need somewhere to leave their cars during the day. A forty-passenger bus can require up to 40 all-day parking spaces.

NHDOT has established park and ride lots in many communities, but these existing lots may not be large enough to accommodate new bus commuters. During the fall of 2008, when gasoline prices approached four dollars a gallon, there were only a handful of parking spaces available at the new park and ride in Grantham. There were sometimes no parking spaces available in the New London park and ride lot.

The park and ride lot near the post office in Lyme may need to be expanded to accommodate future bus riders. Similar issues are likely to arise for Canaan, Enfield, Claremont, Cornish, and Plainfield.

It is important to note that park and ride lots can play an important cost-saving role for area residents, even when no bus service is available. State and regional planning officials are aware of a need for expanded park and ride facilities. Larger parking lots or newly designated parking areas may need to be added in some communities before commuter bus service can be introduced.

8.4 Enfield and Canaan

Proposed FY 2009 adjustments for the Blue route include introduction of an evening express bus from Hanover and DHMC to Enfield and Canaan. Like the current morning express, this afternoon bus would bypass downtown Lebanon.

It is important to note that improvements in evening commuter choices will likely lead to increased demand for existing morning commute trips. When fuel prices climbed to $4.00 a gallon in the fall of 2008, morning buses from Canaan and Enfield often operated with standing room only. These factors suggest that Advance Transit should be prepared to add an additional morning bus once an afternoon express is implemented.

If this extra bus is based in Wilder, this will result in roughly one additional vehicle service hour a day. This could increase costs by as much as $20,000 per year. It would be considerably less expensive if this extra bus could remain in Canaan overnight. This would require a part-time driver who has other employment in Hanover during the day.

Existing Canaan / Enfield service involves roughly seven revenue service hours a day. At $80 per hour, the cost comes to approximately $142,000 per year. Municipal subsidies from Canaan and Enfield total just over $11,000 per year, or roughly 8% of the cost of providing this service.

In the spring of 2008, Advance Transit typically carried about 80 commuters a day from these two towns. If 80 commuters pay a weekly commuter fare of $15, this would generate $60,000 in annual fare box revenues. A $15 weekly fare would likely result in decreased demand, limiting the need to add overflow buses. At the same time, these fare box revenues could make it easier for Advance Transit to expand service if rising gasoline prices lead to increased demand in the future.

8.5 Lyme

Many people attended Advance Transit planning workshops to request bus service between Lyme and Hanover. A Lyme resident carried out an informal survey that generated responses from over 100 individuals interested in bus service between these two communities. Most survey respondents travel to Hanover for work Monday through Friday. Most depart Lyme between 7:00 a.m. and 8:00 a.m. Most arrive back in Lyme between 5:00 and 6:00 p.m. Most indicated that they would be willing to pay a fare of between one and two dollars per ride.

Roughly half of the survey respondents said they commuted to locations beyond Hanover. The most common destination was DHMC, followed by White River Junction and Centerra. Many of the Centerra commuters pointed out that there is no direct Advance Transit bus service from Hanover to Centerra.

The consultants developed three timetable alternatives for Lyme. This included hourly service throughout the day, limited peak-hour service between Lyme and Hanover, and limited peak-hour service with some through service to DHMC. Figure 8.1 presents a timetable that offers two through trips to DHMC in the morning, and one through trip from DHMC in the afternoon.

Six daily round trips would result in 5.5 revenue service hours per day, or 1,403 hours per year. At $80 per hour, the approximate annual cost would be $112,000. If 20 regular commuters pay a fare of $20 per week, this would leave an annual operating deficit of $92,0000. If 30 regular riders pay $20 a week, the deficit drops to $82,000. If 50% FTA 5311 or JARC funding can be obtained for this service, the resulting local subsidy requirement would be between $41,000 and $46,000 per year.

Figure 8.1 Lyme Service with Three Round Trips per Day

DHMC	Hanover High School	Hanover Inn	DMS	arrive Lyme	depart Lyme	DMS	Hanover Inn	Hanover High School	DHMC
		6:00 a	6:02 a	6:17 a	6:30 a	6:47 a	6:50 a	6:53 a	7:00 a
7:00 a	-	7:10 a	7:12 a	7:27 a	7:30 a	7:47 a	7:50 a	7:53 a	8:00 a
8:00 a	-	8:10 a	8:12 a	8:27 a	8:30 a	8:47 a	8:50 a		
	4:00 p	4:05 p	4:07 p	4:22 p	4:35 p	4:53 p	4:56 p	-	5:06 p
5:10 p	5:15 p	5:20 p	5:22 p	5:37 p	5:40 p	5:57 p	6:00 p		
		6:00 p	6:02 p	6:17 p	6:20 p	6:37 p	6:40 p		

Parking and bus stop related infrastructure issues will be relevant for the future of Lyme bus service. First, as indicated earlier, it may be necessary to increase the size of the park and ride lot in Lyme to accommodate bus commuters. Second, steps may be needed to establish parking spaces for commuters and safe bus stops at intermediate locations along the roadway between Lyme and Kendal.

8.6 Grantham and New London

A commuter bus or vanpool service could begin at the New London park and ride lot, offering an intermediate stop at the Grantham park and ride lot. Separate services could operate to Creare and Hypertherm on the Etna Road, and to DHMC and Centerra on Route 120.

- A bus or van could depart New London at roughly 7:10 a.m. and arrive at Creare at about 7:45 a.m. This vehicle could depart Creare at 4:05 p.m. and arrive in New London at about 4:40 p.m.

- Another vehicle could depart New London at about 6:45 a.m. and arrive at Centerra at 7:25 a.m. This vehicle could depart Centerra at 5:00 p.m. and arrive in New London at about 5:40 p.m.

As indicated in the opening section of this chapter, these could be operated as regular bus routes or as vanpool services. The preferred strategy may be to test these markets with small 10-passenger buses operated as vanpools through Advance Transit's Rideshare program.

8.7 Claremont, Cornish, and Plainfield

Commuter bus or vanpool routes could be established for Claremont, Cornish, and Plainfield residents who commute to jobs in Lebanon. Possible routes include:

- Claremont / Cornish to DHMC / Centerra
- Claremont / Cornish to Hypertherm / Creare
- Claremont / Plainfield to the Airport Industrial Park

DHMC and Centerra service could be scheduled to arrive between 7:15 and 7:25 a.m. and to depart between 5:00 and 5:10 p.m. Service to Hypertherm and Creare could arrive at 7:45 a.m. and depart at 4:05 p.m. Service to the Airport Industrial Park could arrive at 6:45 a.m. and depart at 3:45 p.m. As with New London / Grantham service, these routes could be operated as regular commuter bus routes, or they could be structured as vanpools and operated with small 10-passenger buses.

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Chapter 9: Bus Stops and Transfer Centers

This chapter provides a brief discussion of Advance Transit bus stops and transfer centers. Advance Transit has contracted with a traffic analysis and landscape design team to identify needed bus stop improvements in the town of Hanover. This chapter acknowledges the work of this consulting team, and suggests that similar efforts will be needed elsewhere in the Advance Transit service area.

The first section highlights preliminary findings from a Hanover Bus Stop Feasibility Study. The second section discusses the need for improved transfer centers in downtown Lebanon and in West Lebanon. The third section suggests that bus stop inventories and improvement plans are needed for Advance Transit bus routes in Vermont. The fourth section identifies a need for bus stop planning in Lebanon, particularly for the Route 12A plaza area.

The chapter includes four sections:

9.1 Hanover Bus Stop Feasibility Study

A study team has identified bus stop issues and design alternatives in the town of Hanover. They carried out a complete inventory of bus stops within the town. Stops were categorized in terms of number of boardings, bus frequency, and routes served. Bus stops were photographed, and needed improvements have been identified.

The study focused considerable attention on the bus stop on Wheelock Street in front of the Hanover Inn and the Hopkins Center. The study team suggested changes in parking, roadway design, pedestrian crossings, and general landscaping to improve aesthetics and to enhance pedestrian safety, while also accommodating local and intercity bus activity at this location.

The study team suggested bus stop design changes for other key locations in Hanover. Examples include:

- Maynard Street, where a turnout is needed to allow transfers between Green, Orange, and Blue route buses

- Park Street in front of the Thompson Arena, where a turnout could allow improved efficiency in midday bus service

- Main Street and Lebanon Street in downtown Hanover, where it is difficult for buses to offer curbside stops

The bus stop consultants recommend improved signage for all stops in the community. They also pointed out pedestrian access and crossing issues, and identified locations where bus shelters should be added.

The findings reinforced the message offered by several workshop and onboard survey participants – that people who are new to the transit system have considerable difficulty understanding where Advance Transit buses will stop. Some bus riders suggested that Advance Transit should add more detailed information about bus stops to its web site. One idea would be to add the planning team's photographic inventory of Hanover bus stops to an interactive map on the Advance Transit Internet site.

Once the Hanover bus stop study has been completed, Advance Transit should be in a position to seek a federal grant to implement the proposed bus stop improvements.

9.2 Transfer Centers in Downtown Lebanon and West Lebanon

Advance Transit should look for opportunities to improve important bus transfer centers in downtown Lebanon and in West Lebanon.

In downtown Lebanon, it may be possible to move the transfer hub from Court Street to the front of Lebanon City Hall. This would require relocating handicapped parking spaces, and eliminating parking directly in front of the city building.

In West Lebanon, improvements are needed for the Advance Transit bus stop on Main Street in front of the anticipated new library. This site currently serves as a hub for three buses (one Red, one Green, and one Orange). Beginning in July of 2009, the site will need to accommodate four buses (two Red, one Green, and one Orange.) If Orange route service increases to every 30-minutes, there may eventually be a need for five buses (two Red, one Green, two Orange).

Better bus waiting areas, benches, better information and signage, a shelter, and general pedestrian and landscape enhancements should all be incorporated into landscape planning for the new library that will be constructed at this West Lebanon site.

9.3 Bus Stop Planning in Vermont

Advance Transit should seek design and construction funding from VTrans to develop new bus turnouts and bus shelters along the Green, Orange, and Brown routes in Vermont. The improved bus stop and shelter in front of Datamann in Wilder Village could serve as a model for other locations along these routes. The Datamann stop gives waiting passengers a safe and secure place to wait for the bus, without standing along the side of the road like a homeless person. There are a variety of locations in Vermont that could benefit from similar improvements. This includes the bus stop on Route 5 in front of the Advance Transit office.

Special attention should be paid to bus stops near the intersection of Route 5 and Prospect Street in White River Junction. Bus turnouts will be needed on both sides of the road to accommodate people traveling to and from the mixed-use development planned for Prospect Street.

9.4 Bus Stop Planning in Lebanon

Advance Transit should seek funding for similar bus stop planning work elsewhere in the city of Lebanon. Special attention will be needed for the Route 12A shopping plazas. Advance Transit should work with NHDOT and city officials to determine an appropriate route for buses in the plaza area. This should take advantage of planned roadway changes near the Interstate 89 interchange.

Once an appropriate bus route has been determined, Advance Transit should ask NHDOT to design and construct bus turnouts and shelters to facilitate convenient, safe, and efficient movements for pedestrians and for buses throughout the plaza area.

Chapter 10: Capital and Financial Plan

This chapter presents a five-year capital and financial plan for Advance Transit. It includes capital and operating cost projections for the period FY 2010 through 2014, along with estimates of revenue required to pay for the service.

The five-year financial projections presented in this chapter are based on strategies and assumptions identified in the written discussion and in a supporting spreadsheet cost model. Different choices and assumptions could have been made. The cost model has been designed to allow Advance Transit to test the financial impact of alternative future scenarios.

The chapter includes eight sections:

10.1 Overview and Financial Plan Highlights

This study has addressed a wide range of service design alternatives for Advance Transit, based on anticipated future needs and on requests received from bus riders and other members of the public. Only some of the service ideas developed for this study are included in the five-year financial plan. While each of the proposed services offers important community benefits, there is unlikely to be sufficient funding available to pay for all of them.

Each of the service ideas included in the plan requires additional financial support from Advance Transit's funding partners. The transit system's ability to implement these proposed services depends on whether this additional money will be made available. If the required funding is not forthcoming, Advance Transit may need to postpone or cancel some of the proposed service additions.

Major uncertainties about the economic future are relevant for Advance Transit. These include:

The price of fuel - Demand for transit alternatives rises and falls with changing gasoline prices. Fuel prices are especially important for longer-distance regional commuters. Diesel prices also have a big impact on Advance Transit operating costs.

The health of the broader economy - Problems in financial markets and in the broader economy impact development plans for Advance Transit's institutional partners. Dartmouth College and Dartmouth-Hitchcock Medical Center have already decided to postpone some planned expansion. If local tax revenues decline, it may be difficult for local communities to increase their appropriations for public transportation. At the same time, if economic conditions deteriorate, the number of people who turn to Advance Transit for their local transportation needs is likely to increase.

Economic stimulus packages - It is unknown to what extent proposed economic stimulus measures will include additional capital and operating support for transit. For rural and small urban systems, perhaps the best approach would be to provide grants that state governments could use to match existing FTA program funds.

Efforts to address global climate change - It is unknown whether future government programs to address climate change will include significant expansion of public transportation alternatives.

Because of these uncertainties, this plan is more ambitious than five-year plans developed for Advance Transit in the past. The plan is designed to position Advance Transit so it can respond effectively to changing economic conditions and political expectations.

The financial plan is based on one possible scenario. The proposed expansion of Advance Transit services is ambitious, but it does not do everything that community members asked for. Other choices could have been made. The cost model allows Advance Transit to test the impact of different strategies on costs and revenues.

Assumption made in the financial plan and its supporting cost model include the following:

1. Costs are projected to increase 3% each year due to inflation. Financial support for existing services from Advance Transit's federal, state, and local funding partners is also projected to increase by 3% per year.

2. FTA Section 5311 subsidies provided by NHDOT are projected to increase from about $1.56 million in FY 2009 to nearly $2.89 million by FY 2014. The plan also includes modest increases in New Hampshire state funding to help pay for ADA service on Saturdays.

3. The plan assumes that combined federal and state support from Vermont will increase from roughly $300,000 in FY 2010 to $765,600 by FY 2014.

4. It assumes that Dartmouth College will provide approximately $80,000 a year in additional operating support beginning in FY 2011, with most of this used for shuttle service to Rivercrest and Sachem Village. Expenditures for a Route 120 parking lot shuttle have been postponed until FY 2014.

5. It assumes that DHMC will provide roughly $65,000 a year in additional operating support to reduce parking demand at the main hospital campus. Roughly $35,000 of this amount would be used to extend Blue route service until 8:30 p.m. to accommodate 12-hour nursing shifts, beginning in FY 2012.

6. The plan suggests that Dartmouth Medical School will provide an additional $12,500 a year beginning in FY 2011 to begin 15-minute DHMC shuttles at 7:45 a.m. instead of 9:00 a.m.

7. It calls upon the city of Lebanon to support two important service additions, more frequent Red route service and limited Saturday service. It includes local support for a new Mascoma Street / Centerra route, beginning in FY 2014.

8. The plan assumes that Hanover and Norwich will provide local support for restructured Brown route service, as well as for limited Saturday service. It calls upon Hartford to provide local match for more frequent Green route service beginning in FY 2013.

9. The plan introduces limited peak-hour service for the town of Lyme in FY 2011, and assumes that funding for this service would come from a combination of passenger fares, FTA 5311 grants, and municipal appropriations. If federal support is available, the cost to the town for six round trips a day could equal roughly $52,000 per year.

10. The financial plan assumes that new financial support will be provided by a number of employers and private businesses. This includes employers at the Airport Industrial Park, Centerra, and on the Etna Road, as well as retail businesses on the Red route and at Centerra. It anticipates about $40,000 in annual support from Alice Peck Day Hospital for a new Mascoma Street route proposed for implementation in FY 2014.

10.2 Capital Plan

Advance Transit uses separate capital plans for capital purchases funded in New Hampshire and Vermont. Anticipated capital expenditures for Advance Transit are presented in Figures 10.1 and 10.2. Figure 10.3 shows combined capital expenditures and anticipated funding sources.

Advance Transit plans to purchase three replacement buses in FY 2009 and four replacement buses in FY 2012. Six of these replacement buses will be used in New Hampshire, while one bus will be used in Vermont.

Figure 10.1 Anticipated Capital Purchases: New Hampshire

Unit Purchases	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
1. Heavy-duty buses	4					
2. Medium-duty buses	3	1			3	
3. Light-duty buses				3		
4. Spare parts	1					
5. Maintenance equipment	1					
6. Computer equipment	1				4	
7. Computer software	1					
8. Radios						
9. Bus stop improvements			5	5		
10. Bus shelters	12					
11. Building expansion		1				
Unit Costs	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
1. Heavy-duty buses	330,000					
2. Medium-duty buses	158,355	163,106	167,999	173,039	178,230	
3. Light-duty buses				62,500		
4. Spare parts	150,000					
5. Maintenance equipment	25,000					
6. Computer equipment	35,000				1,500	
7. Computer software	20,000					
8. Radios						
9. Bus stop improvements			20,000	20,600	21,218	
10. Bus shelters	6,000					
11. Building expansion		1,530,000				
Expenditures	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
1. Heavy-duty buses	1,320,000	0	0	0	0	0
2. Medium-duty buses	475,065	163,106	0	0	534,690	0
3. Light-duty buses	0	0	0	187,500	0	0
4. Spare parts	150,000	0	0	0	0	0
5. Maintenance equipment	25,000	0	0	0	0	0
6. Computer equipment	35,000	0	0	0	6,000	0
7. Computer software	20,000	0	0	0	0	0
8. Radios	0	0	0	0	0	0
9. Bus stop improvements	0	0	100,000	103,000	0	0
10. Bus shelters	72,000	0	0	0	0	0
11. Building expansion	0	1,530,000	0	0	0	0
Total Capital Costs	2,097,065	1,693,106	100,000	290,500	540,690	0

Figure 10.2 Anticipated Capital Purchases: Vermont

Unit Purchases	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
1. Heavy-duty buses						
2. Medium-duty buses	2	1		1		
3. Light-duty buses						
4. Spare parts						
5. Maintenance equipment						
6. Computer equipment	2			1		
7. Computer software						
8. Radios	1					
9. Bus stop improvements	1				5	
10. Bus shelters	5					
11. Building expansion						
Unit Costs	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
1. Heavy-duty buses	330,000					
2. Medium-duty buses	158,355	163,106	167,999	173,039		
3. Light-duty buses						
4. Spare parts	150,000					
5. Maintenance equipment	25,000					
6. Computer equipment	1,500			7,500		
7. Computer software	20,000					
8. Radios	33,000					
9. Bus stop improvements	2,500		20,000	20,600	21,218	
10. Bus shelters	6,000					
11. Building expansion						
Expenditures	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
1. Heavy-duty buses	0	0	0	0	0	0
2. Medium-duty buses	316,710	163,106	0	173,039	0	0
3. Light-duty buses	0	0	0	0	0	0
4. Spare parts	0	0	0	0	0	0
5. Maintenance equipment	0	0	0	0	0	0
6. Computer equipment	3,000	0	0	7,500	0	0
7. Computer software	0	0	0	0	0	0
8. Radios	33,000	0	0	0	0	0
9. Bus stop improvements	2,500	0	0	0	106,090	0
10. Bus shelters	30,000	0	0	0	0	0
11. Building expansion	0	0	0	0	0	0
Total Capital Costs	385,210	163,106	0	180,539	106,090	0

Figure 10.3 Combined Capital Expenditures and Funding Sources

Expenditures	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
1. Heavy-duty buses	1,320,000	0	0	0	0	0
2. Medium-duty buses	1,108,485	489,317	0	346,078	534,690	0
3. Light-duty buses	0	0	0	187,500	0	0
4. Spare parts	150,000	0	0	0	0	0
5. Maintenance equipment	25,000	0	0	0	0	0
6. Computer equipment	41,000	0	0	15,000	6,000	0
7. Computer software	20,000	0	0	0	0	0
8. Radios	66,000	0	0	0	0	0
9. Bus stop improvements	5,000	0	100,000	103,000	212,180	0
10. Bus shelters	132,000	0	0	0	0	0
11. Building expansion	0	1,530,000	0	0	0	0
Total Capital Costs	2,867,485	2,019,317	100,000	651,578	752,870	0

Funding Sources	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
FTA NH (100/0/0)	0	1,530,000	0	0	0	0
FTA NH 80/10/10)	1,436,052	130,485	0	150,000	427,752	0
FTA NH (80/0/20)	241,600	0	80,000	82,400	4,800	0
FTA VT (80/10/10)	308,168	130,485	0	144,431	84,872	0
NHDOT 10%	179,507	16,311	0	18,750	53,469	0
VTrans 10%	38,521	16,311	0	18,054	10,609	0
Local	278,428	32,621	20,000	57,404	65,278	0
Total Capital Funds	2,482,275	326,211	100,000	471,039	646,780	0
Total Federal	1,985,820	1,790,969	80,000	376,831	517,424	0
Total State	218,028	32,621	0	36,804	64,078	0
Total Local	278,428	32,621	20,000	57,404	65,278	0
Combined Total	2,482,275	1,856,211	100,000	471,039	646,780	0

The plan calls for purchasing one heavy-duty bus for the Red route in FY 2009, along with three medium-duty buses for expanded shuttle operations. The three medium-duty buses were originally planned for the Dartmouth College Route 120 parking lot shuttle. They would be used instead for a Sachem / Rivercrest shuttle, for new commuter service Centerra and Etna Road, and to increase capacity on the Canaan / Enfield portion of the Blue route.

Additional new buses include one medium-duty bus for Lyme in FY 2010, one medium-duty bus for more frequent Green route service in FY 2012, and three medium-duty buses for expanded Dartmouth shuttle service in FY 2013.

The capital plan includes $1.5 million in FY 2010 for a proposed Phase 2 expansion of the Advance Transit maintenance facility. This is above and beyond facility expansion previously funded in FY 2008. The Phase 2 expansion includes more vehicle storage space, and significant energy-saving improvements. The plan assumes that this additional work would be funded by a 100% federal stimulus grant.

The capital plan also includes capital funding for bus stop improvements. It anticipates $100,000 for New Hampshire improvements in FY 2011, $103,000 for New Hampshire improvements in FY 2012, and $106,090 for Vermont bus stop improvements in FY 2013.

10.3 Service Design Choices

Chapters 6 through 9 describe possible service design strategies for Advance Transit's future. Figure 10.4 presents a summary of service design choices in a table format. This table shows the estimated cost in 2009 dollars, vehicle requirements, and possible cost sharing strategies for each service design concept.

The Advance Transit financial plan is based on a cost model that includes a decision matrix that allows different service ideas to be implemented in different years. Figure 10.5 presents the set of choices utilized in the financial plan.

This scenario introduces an evening Blue route express in FY 2010, offers earlier 15-minute DMS service beginning in FY 2011, and extends Blue route service hours to 8:30 p.m. beginning in FY 2012. It adds a second Red route bus at the start of FY 2010 (July 1, 2009). While the consultants developed a design for later evening service on the Blue and Red routes, this change is not included in the five-year financial plan due to the cost.

The financial plan anticipates an increase in Green route frequency in FY 2013. Because of the high cost, and because of the impact on towns in Vermont and New Hampshire, the financial plan does not include increased service on the Orange route.

The plan calls for splitting the Brown route beginning in FY 2011, with improved service for Norwich, improved service for Rivercrest and CRREL, and new service for Sachem Village. It postpones implementation of Dartmouth Route 120 park and ride service until FY 2014.

The plan calls for adding Saturday service in FY 2011. It anticipates new commuter service for Centerra and Etna Road in FY 2011, and a new Mascoma Street / Centerra midday route in FY 2014. It anticipates new commuter bus service from Lyme in FY 2011, and adds an extra peak-hour bus to the Enfield / Canaan portion of the Blue route.

The cost model does not include regional commuter services from Grantham, Claremont, Cornish, and Plainfield. Additional planning work will be needed to determine the best business model for regional commuter bus alternatives. Alternative strategies for regional commuter services are discussed in chapter 8.

Figure 10.4 Catalogue of Advance Transit Service Design Alternatives

	Cost FY 2009	*Suggested cost sharing strategy*	*Additional buses*
BLUE ROUTE			
Current	841,773		
Net 09 adjustments	26,283	FTA, DHMC, Dartmouth College	
Early Blue 15	31,165	FTA, Dartmouth Medical School	
Evenings Blue 8:30 p	63,957	FTA, DHMC for nursing staff	
Evenings Blue 10:00 p	92,355	FTA, DHMC, Dartmouth, Lebanon, Hanover	
RED ROUTE			
Current	250,701		
2009: 2 buses	494,485	CMAQ, Lebanon, Airport Ind Park, businesses	1 heavy
Evenings Red	79,661	FTA, Lebanon	
ORANGE ROUTE			
Current	246,551		
30 minutes w/ Norwch	831,032	VT 80%, towns 20% / NH 50%, towns 50%	2 medium
GREEN ROUTE			
Current	240,367		
Net 09 adjustments	13,833	FTA, State of Vermont	
2 buses	518,734	FTA, VTrans, towns	1 medium
BROWN ROUTE			
Current	229,952		
Net 09 adjustments	12,856	FTA, NHDOT, VTrans	
Separate Norwich 30	246,877	VTrans & Norwich	1 medium
Sachem/Rivercrest	250,050	FTA, Dartmouth, Hanover	
Evenings Sachm/Rcrst	43,614	FTA, Dartmouth	
SHUTTLES			
Dartmouth current	612,960		
Dartmouth w/ 120 Lot	970,663	Dartmouth to cover increased cost	1 medium
DHMC current	701,816		
NEW ROUTES			
Etna/Centerra comutr	91,623	FTA, Centerra and Etna Road employers	1 medium
Mascoma/Centerra	134,830	FTA, Lebanon, AP Day, Co-op	
SATURDAY SERVICE			
Saturday NH	67,700	FTA, NHDOT, Lebanon, Hanover	
Saturday VT	32,792	FTA, VTrans, Hartford, Norwich	
REGIONAL ROUTES			
Lyme 6 trips a day	115,871	Town to match JARC grant	1 medium
Grantham-DHMC	62,248	Towns & employers to match JARC grant	1 medium
Grantham-Etna Road	62,248	Towns & employers to match JARC grant	1 medium
Claremont-DHMC	62,248	Towns & employers to match JARC grant	1 medium
Claremont-Etna Rd	62,248	Towns & employers to match JARC grant	1 medium
Claremont-Airport	62,248	Towns & employers to match JARC grant	1 medium
Extra Canaan trip	41,499	DHMC & Dartmouth to match JARC grant	1 medium

Figure 10.5 Advance Transit Decision Matrix

INPUT AREA: DECISION MATRIX

	Hours	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
BLUE ROUTE							
Current	10,345	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Net 09 adjustments	323		TRUE	TRUE	TRUE	TRUE	TRUE
Early Blue 15	383			TRUE	TRUE	TRUE	TRUE
Evenings Blue 8:30 p	786				TRUE	TRUE	TRUE
Evenings Blue 10:00 p	1,135						
RED ROUTE							
Current	3,081	TRUE					
2009: 2 buses	6,077		TRUE	TRUE	TRUE	TRUE	TRUE
Evenings Red	979						
ORANGE ROUTE							
Current	3,030	TRUE					
2009 adjustments	3,030		TRUE	TRUE	TRUE	TRUE	TRUE
30 minutes w/ Norwich	10,213						
GREEN ROUTE							
Current	2,954	TRUE	TRUE	TRUE	TRUE		
Net 09 adjustments	170		TRUE	TRUE	TRUE		
2 buses	6,375					TRUE	TRUE
BROWN ROUTE							
Current	2,826	TRUE	TRUE				
Net 09 adjustments	158		TRUE				
Separate Norwich 30	3,034			TRUE	TRUE	TRUE	TRUE
Sachem/Rivercrest	3,073			TRUE	TRUE	TRUE	TRUE
Evenings Sachem/Rcrst	536			TRUE	TRUE	TRUE	TRUE
SHUTTLES							
Dartmouth current	7,533	TRUE	TRUE	TRUE	TRUE	TRUE	
Dartmouth w/ 120 Lot	11,929						TRUE
DHMC	8,625	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
NEW ROUTES							
Etna/Centerra commuter	1,126			TRUE	TRUE	TRUE	TRUE
Mascoma/Centerra	1,657						TRUE
SATURDAY SERVICE							
Saturday NH	832			TRUE	TRUE	TRUE	TRUE
Saturday VT	403			TRUE	TRUE	TRUE	TRUE
REGIONAL ROUTES							
Lyme 6 trips a day	1,424			TRUE	TRUE	TRUE	TRUE
Grantham-DHMC	765						
Grantham-Etna Road	765						
Claremont-DHMC	765						
Claremont-Etna Rd	765						
Claremont-Airport	765						
Extra Canaan roundtrip	510			TRUE	TRUE	TRUE	TRUE

10.4 Operating Costs

Advance Transit projects that the unit cost for FY 2009 bus operations will be $81.37 per hour. The cost model increased this hourly cost by 3% per year to reflect anticipated inflation. The resulting hourly cost was multiplied by anticipated service hours to generate projected operating costs for regular route buses and for shuttle services.

Anticipated Rideshare costs for FY 2009 were increased by 3% a year. The same 3% annual inflation rate was applied to Advance Transit's 2009 ADA unit cost of $57.44 per hour. The resulting unit cost projections were used to estimate the ADA impact of extending Blue route hours in the early evening and adding new Saturday service.

The resulting cost projections are summarized in Figure 10.6. The operating costs include each of the various service components selected in the decision matrix presented in Figure 10.5.

Figure 10.6 Projected Operating Costs

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Regular routes	1,809,343	2,169,283	2,954,056	3,112,565	3,503,678	3,765,093
Contract shuttles	1,314,776	1,354,220	1,394,846	1,436,692	1,479,792	1,938,862
ADA	123,762	127,475	155,674	184,384	189,916	195,613
Rideshare	170,123	175,227	180,483	185,898	191,475	197,219
Total Cost	3,418,005	3,826,204	4,685,060	4,919,539	5,364,861	6,096,787

10.5 Ridership Projections

Advance Transit ridership is projected to increase by 37% during the five-year planning period, to an annual total of 1,045,710 riders by FY 2014. These ridership projections are based on the following assumptions:

- Ridership on existing regular routes will increase an average of 2% per year.
- Ridership on new services will increase 2% in each subsequent year.
- Extra Canaan/Enfield capacity will result in 22 new one-way trips per day.
- Early morning DMS service will generate about 8 trips per hour.
- Evening Blue route service will generate about 12 trips per hour.
- Doubling the frequency of Red route service will increase usage 35%.
- Doubling the frequency of Green route service will increase usage 35%.
- Separate Norwich service will generate between 8 and 9 trips per hour.
- Rivercrest / Sachem shuttles will generate 12 rides per hour in the daytime and 8 rides per hour in the evening.
- Dartmouth shuttle ridership will increase 2% per year.
- Route 120 shuttles will generate an average of 12 rides per vehicle service hour.
- DHMC shuttle ridership will remain constant at 27.1 trips per vehicle hour.

- Etna Road / Centerra commuter buses will carry 10 commuters per service hour.
- A midday Mascoma Street / Centerra route will generate 10 riders per hour.
- Saturday buses will generate 8 trips per hour in New Hampshire and 6 trips per hour in Vermont.
- Lyme commuter service will generate an average of 8 rides per hour, for an average of 44.7 one-way trips per day.

Ridership projections are summarized in Figure 10.7.

Figure 10.7 Advance Transit Ridership Projections

REGULAR ROUTES	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Blue route	197,590	205,417	212,590	226,273	230,799	235,415
Red route	109,684	153,140	156,203	159,327	162,514	165,764
Orange route	59,085	60,267	61,472	62,701	63,956	65,235
Green route	49,036	52,896	53,953	55,033	75,804	77,320
Brown route	41,542	44,742	65,436	66,745	68,080	69,441
Total regular routes	456,937	516,462	549,654	570,079	601,152	613,175
SHUTTLES						
Dartmouth	72,317	73,763	75,238	76,743	78,278	143,148
DHMC	233,738	233,738	233,738	233,738	233,738	233,738
Total shuttles	306,054	307,501	308,976	310,481	312,016	376,886
NEW ROUTES						
Etna/Centerra comutr	0	0	11,260	11,485	11,715	11,949
Mascoma/Co-op	0	0	0	0	0	16,570
Total new routes	0	0	11,260	11,485	11,715	28,519
SATURDAY SERVICE						
Saturday NH	0	0	6,656	6,789	6,925	7,063
Saturday VT	0	0	2,418	2,466	2,516	2,566
Total Saturday service	0	0	9,074	9,255	9,441	9,629
REGIONAL ROUTES						
Lyme 6 trips a day	0	0	11,392	11,620	11,852	12,089
Extra Canaan trip	0	0	5,100	5,202	5,306	5,412
Total regional routes	0	0	16,492	16,822	17,158	17,501
TOTAL REGULAR	456,937	516,462	586,480	607,642	639,466	668,825
TOTAL SHUTTLES	306,054	307,501	308,976	310,481	312,016	376,886
TOTAL RIDERS	762,991	823,963	895,456	918,123	951,481	1,045,710

10.6 Funding Strategies

This section describes a proposed funding strategy for each of the service changes included in the five year cost model.

10.6.1 Blue route adjustments: Add afternoon Canaan Express

The plan assumes that New Hampshire FTA 5311 funding will cover half of the incremental cost of adding an afternoon express from Hanover and DHMC to Enfield and Canaan. It assumes that the local share cost will be divided equally between Dartmouth College and DHMC.

ADD AFTERNOON CANAAN / ENFIELD EXPRESS

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Incremental cost	0	20,414	21,026	21,657	22,307	22,976
NH 5311	0	10,207	10,513	10,829	11,153	11,488
DHMC	0	5,103	5,257	5,414	5,577	5,744
Dartmouth	0	5,103	5,257	5,414	5,577	5,744

10.6.2 Add Blue route evening service until 8:30 p.m. for DHMC nurses

The plan assumes that New Hampshire FTA 5311 funding will cover half of the incremental cost of adding early evening Blue route service. It assumes that the local share cost will be covered by DHMC.

ADD BLUE ROUTE EVENING SERVICE UNTIL 8:30 P.M. FOR DHMC NURSES

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Cost	0	0	0	69,887	71,984	74,143
NH 5311	0	0	0	34,944	35,992	37,072
DHMC	0	0	0	34,944	35,992	37,072

The plan includes approximately $25,000 in additional annual ADA cost resulting from the extension of Blue route service hours. It anticipates that this cost would be included in federal dollars provided by NHDOT to support Advance Transit's ADA program.

10.6.3 Start DMS 15-minute service at 7:45 a.m.

The plan divides the cost of additional morning Blue route service between New Hampshire FTA 5311 and Dartmouth Medical School.

START DMS 15-MINUTE SERVICE AT 7:45 A.M.

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Cost	0	0	24,932	25,680	26,450	27,244
NH 5311	0	0	12,466	12,840	13,225	13,622
DMS	0	0	12,466	12,840	13,225	13,622

10.6.4 Add second Red route bus

The plan draws upon a three-year NHDOT CMAQ grant to cover 80% of the cost Red route expansion through FY 2012. For FY 2010, it assumes the city of Lebanon will provide $40,000 and that Airport Industrial Park businesses will provide $10,220. These amounts are increased 3% for inflation in FY 2011 and FY 2012.

For FY 2013 and FY 2014, the plan assumes that NHDOT FTA 5311 funding will be increased to cover half of the additional Red route cost. The plan assumes that support from the city of Lebanon will increase to $80,191 and $82,597. It relies upon Airport Industrial Park and other Red route businesses to contribute a combined total of $57,000 in FY 2013 and $58,710 in FY 2014.

These are important assumptions. Advance Transit will need to take steps to ensure that ongoing support for expanded Red route service is in place. This should be done before Advance Transit moves ahead with plans for Saturday service, or other service expansion ideas for the city of Lebanon.

ADD SECOND RED ROUTE BUS

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Incremental cost	0	251,098	258,631	266,390	274,382	282,613
CMAQ	0	200,878	206,905	213,112	0	0
Aiport Industrial Park	0	10,220	10,526	10,842	28,500	29,355
Other Red route businesses	0	0	0	0	28,500	29,355
Lebanon	0	40,000	41,200	42,436	80,191	82,597
NH 5311	0				137,191	141,307
Total	0	251,098	258,631	266,390	274,382	282,613

10.6.5 Adjust Green route service

Short-term adjustments to Green route service will result in roughly $10,000 in additional annual cost. The plan assumes that this extra cost will be covered by a combination of federal and state transit funding provided by VTrans.

ADJUST GREEN ROUTE SERVICE

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Incremental cost	0	10,744	11,066	11,398	0	0
VT 5311	0	5,372	5,533	5,699	0	0
VTrans	0	5,372	5,533	5,699	0	0
Hartford	0	0	0	0	0	0
Norwich	0	0	0	0	0	0
	0	10,744	11,066	11,398	0	0

10.6.6 Add second Green route bus

The plan calls for the frequency of Green route service to increase from every 60 minutes to every 30 minutes, beginning in FY 2013. It assumes that VTrans would cover 80% of this cost, with the remaining 20% local match provided by the town of Hartford. Advance Transit may need to look for an alternate source of local funding to reduce the impact of this service expansion on Hartford property taxpayers.

ADD SECOND GREEN ROUTE BUS

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Incremental cost	0	0	0	0	313,304	322,703
VT new starts	0	0	0	0	250,643	258,163
VTrans	0	0	0	0	0	0
Hartford	0	0	0	0	62,661	64,541
Norwich	0	0	0	0	0	0
	0	0	0	0	313,304	322,703

10.6.7 Short-term Brown route adjustments

The plan divides the $9,986 incremental cost of Brown route service adjustments four ways. It assumes that FTA funds from NHDOT and VTrans would each cover 25%, and that state funds from NHDOT and VTrans would each cover 25%.

BROWN ROUTE ADJUSTMENTS

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Incremental cost	0	9,986	0	0	0	0
VT 5311	0	2,496	0	0	0	0
NH 5311	0	2,496	0	0	0	0
VTrans	0	2,496	0	0	0	0
NHDOT	0	2,496	0	0	0	0
Total		9,986				

10.6.8 Split Brown route, add Sachem Village to Rivercrest route

Proposed changes to the Brown route will result in a net increased cost of roughly $140,000 for Vermont and $190,000 for New Hampshire. The New Hampshire cost includes evening service for two Dartmouth College graduate housing complexes.

The plan assumes that Vermont New Starts funding would cover 80% of the Vermont expansion, with the town of Norwich providing the remaining 20%. It assumes that NHDOT FTA 5311 funding would cover 50% of the New Hampshire cost. It assigns two-thirds of the local share cost to Dartmouth College, and the remaining one-third to the town of Hanover.

SPLIT BROWN ROUTE, ADD SACHEM VILLAGE TO RIVERCREST SHUTTLE

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
VT new starts	0	0	111,947	115,305	118,764	122,327
Norwich	0	0	27,987	28,826	29,691	30,582
Total Vermont	0	0	139,934	144,132	148,455	152,909
NH 5311	0	0	94,785	97,629	100,558	103,574
Dartmouth College	0	0	63,190	65,086	67,039	69,050
Hanover	0	0	31,595	32,543	33,519	34,525
Total NH	0	0	189,571	195,258	201,116	207,149

10.6.9 Dartmouth College Route 120 parking lot shuttle

Dartmouth College recently announced that it was postponing plans to develop a 400-car parking lot on Route 120. Accordingly, the cost model shows delayed implementation of shuttle service between this lot and the college campus. The financial plan assumes that this service would not be started until FY 2014. It assigns the full cost of operating this service to Dartmouth College.

DARTMOUTH COLLEGE ROUTE 120 PARKING LOT SHUTTLE

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Current shuttle	612,960	631,349	650,289	669,798	689,892	710,589
New shuttle	0	0	0	0	0	1,125,264
Incremental cost	0	0	0	0	0	414,675
NHDOT	0	0	0	0	0	0
Dartmouth	0	0	0	0	0	414,675

10.6.10 Centerra / Etna Road commuter service

The financial plan assumes that NHDOT FTA 5311 funds would cover half the cost of commuter service to Etna Road and Centerra work sites. It suggests that the remainder would be divided among large employers at the two locations.

CENTERRA / ETNA ROAD COMMUTER SERVICE

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Cost	0	0	97,202	100,119	103,122	106,216
NH 5311	0	0	48,601	50,059	51,561	53,108
Tele Atlas	0	0	12,150	12,515	12,890	13,277
DHMC	0	0	12,150	12,515	12,890	13,277
Hyperterm	0	0	12,150	12,515	12,890	13,277
Creare	0	0	12,150	12,515	12,890	13,277
	0	0	97,202	100,119	103,122	106,216

10.6.11 Mascoma Street / Centerra midday bus service

The plan assigns half the cost of a new Mascoma Street / Centerra bus route to NHDOT FTA 5311. It assumes that Alice Peck Day hospital would cover one quarter of the cost. It calls upon Centerra retail businesses to cover 6%, and assumes that the city of Lebanon would pay the remaining 19%.

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Cost	0	0	0	0	0	156,305
NH 5311	0	0	0	0	0	78,153
AP Day Hospital	0	0	0	0	0	39,076
Centerra retail businesses	0	0	0	0	0	9,769
Lebanon	0	0	0	0	0	29,307
	0	0	0	0	0	156,305

10.6.12 Saturday service

The plan assumes that NHDOT FTA 5311 funding would cover half the cost of Saturday service in New Hampshire. Two-thirds of the remaining local share is assigned to the city of Lebanon, while the remainder is assigned to the town of Hanover.

The plan assumes that Vermont New Starts funding would cover 80% of the cost of operating Saturday bus service in Vermont. Two-thirds of the remaining 20% local match is assigned to Hartford, and the remainder is assigned to Norwich.

SATURDAY SERVICE

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Cost NH	0	0	71,823	73,977	76,197	78,483
Cost VT	0	0	34,789	35,833	36,908	38,015
	0	0	106,612	109,810	113,105	116,498
NH 5311	0	0	35,911	36,989	38,098	39,241
Lebanon	0	0	23,941	24,659	25,399	26,161
Hanover	0	0	11,970	12,330	12,699	13,080
VT new starts	0	0	27,831	28,666	29,526	30,412
Hartford	0	0	4,639	4,778	4,921	5,069
Norwich	0	0	2,319	2,389	2,461	2,534
	0	0	106,612	109,810	113,105	116,498

The plan estimates that the introduction of Saturday service will increase ADA paratransit costs by $25,000 per year. It assumes that state funding from New Hampshire will cover half of this amount, and that state funding from Vermont will cover the remaining half.

10.6.13 Extra Canaan / Enfield morning bus

The plan introduces an extra morning bus to handle peak overflow crowds from Canaan and Enfield, beginning in FY 2011. It assigns half of this cost to the New Hampshire FTA JARC program. It divides the local share evenly between Dartmouth College and DHMC. The cost model leaves open the possibility that Advance Transit may decide in the future to introduce a passenger fare for Canaan / Enfield commuter service.

EXTRA CANAAN / ENFIELD MORNING BUS

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Cost	0	0	44,026	45,347	46,707	48,108
Fare box	0	0	0	0	0	0
Deficit	0	0	44,026	45,347	46,707	48,108
NH JARC	0	0	22,013	22,673	23,354	24,054
DHMC	0	0	11,006	11,337	11,677	12,027
Dartmouth College	0	0	11,006	11,337	11,677	12,027
	0	0	44,026	45,347	46,707	48,108

10.6.14 Lyme commuter service: 6 trips a day

The plan anticipates that 20 regular riders would pay a commuter fare of $20 per week. (Similar results could be obtained by assuming 27 people paying a $15 weekly fare.) It divides the deficit for the service equally between the NHDOT JARC program and the town of Lyme.

LYME COMMUTER SERVICE: 6 TRIPS A DAY

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Cost	0	0	122,927	126,615	130,414	134,326
Fare box (20 @ $20/week)	0	0	20,000	20,000	20,000	20,000
Deficit	0	0	102,927	106,615	110,414	114,326
NH JARC	0	0	51,464	53,308	55,207	57,163
Lyme	0	0	51,464	53,308	55,207	57,163
DHMC	0	0	0	0	0	0
Dartmouth College	0	0	0	0	0	0
	0	0	102,927	106,615	110,414	114,326

10.7 Operating Revenues

The financial plan increases base program revenues for existing services by 3% a year for inflation. The resulting baseline revenue projections are presented in Figure 10.8. Projected new revenues are summarized in Figure 10.9.

Figure 10.8 Baseline Revenues for Existing Services

BASELINE REVENUES

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Federal NH	1,558,693	1,638,012	1,687,153	1,737,767	1,789,900	1,843,597
Federal VT	189,071	163,843	168,758	173,821	179,036	184,407
State NH	34,000	35,020	36,071	37,153	38,267	39,415
State VT	135,403	139,465	143,649	147,959	152,397	156,969
Municipal	443,694	457,005	470,715	484,836	499,381	514,363
Non-profits	1,021,166	1,051,801	1,083,355	1,115,856	1,149,332	1,183,812
Other businesses	0	0	0	0	0	0
Donations	104,094	107,217	110,433	113,746	117,159	120,673
Fare box	0	0	0	0	0	0
Other revenue	3,796	3,910	4,027	4,148	4,272	4,401
Total base rev	3,489,917	3,596,273	3,704,161	3,815,286	3,929,745	4,047,637

Figure 10.9 New Operating Revenues for Expanded Service

NEW OPERATING REVENUE

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Federal NH	0	213,582	482,659	556,421	491,100	584,285
Federal VT	0	7,868	145,311	149,671	398,934	410,902
State NH	0	2,496	12,188	12,553	12,930	13,318
State VT	0	7,868	17,721	18,252	12,930	13,318
Municipal	0	40,000	195,115	201,268	306,749	345,558
Non-profits	0	10,207	120,333	158,886	163,653	622,314
Other businesses	0	10,220	46,977	48,386	95,671	108,310
Donations	0	0	0	0	0	0
Fare box	0	0	20,000	20,000	20,000	20,000
Other revenues	0	0	0	0	0	0
Total new revenue	0	292,242	1,040,303	1,165,439	1,501,966	2,118,005

Combined Advance Transit revenues are shown in Figure 10.10.

A breakdown of program costs for individual Advance Transit partners is presented in Appendix F. This analysis shows how much partners will be expected to pay for the existing transit program, and how much they will be asked to contribute toward the cost of proposed new services.

10.8 Five-Year Budget Projections

Five-year revenue and expense projections are summarized in Figure 10.10. Dollar amounts presented in the five-year budget are supported by a spreadsheet cost model developed for Advance Transit as part of this planning process. Year-end fund balances could be contributed to an Advance Transit capital reserve fund.

Figure 10.10 Five-Year Revenue and Expense Projections

TOTAL OPERATING REVENUE

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Federal NH	1,558,693	1,851,594	2,169,811	2,294,189	2,281,000	2,427,882
Federal VT	189,071	171,712	314,070	323,492	577,970	595,309
State NH	34,000	37,516	48,258	49,706	51,197	52,733
State VT	135,403	147,334	161,370	166,211	165,327	170,287
Municipal	443,694	497,005	665,829	686,104	806,130	859,921
Non-profits	1,021,166	1,062,008	1,203,688	1,274,742	1,312,984	1,806,126
Other businesses	0	10,220	46,977	48,386	95,671	108,310
Donations	104,094	107,217	110,433	113,746	117,159	120,673
Fare box	0	0	20,000	20,000	20,000	20,000
Other revenues	3,796	3,910	4,027	4,148	4,272	4,401
Total revenue	3,489,917	3,888,515	4,744,464	4,980,725	5,431,710	6,165,642

TOTAL OPERATING COSTS

	FY 2009	*FY 2010*	*FY 2011*	*FY 2012*	*FY 2013*	*FY 2014*
Regular routes	1,809,343	2,169,283	2,954,056	3,112,565	3,503,678	3,765,093
Contract shuttles	1,314,776	1,354,220	1,394,846	1,436,692	1,479,792	1,938,862
ADA	123,762	127,475	155,674	184,384	189,916	195,613
Rideshare	170,123	175,227	180,483	185,898	191,475	197,219
Total Cost	3,418,005	3,826,204	4,685,060	4,919,539	5,364,861	6,096,787
Surplus / Deficit	71,912	62,311	59,404	61,186	66,850	68,855

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