

MEMORANDUM

To: Concord-Manchester Transit Feasibility Study Steering Committee
From: Stephen Falbel
Re: Market Analysis and Needs
Date: November 7, 2013

The travel market between Concord, Manchester, and Manchester-Boston Regional Airport (MBRA) is an active one, serving many travel patterns and purposes. Prior to designing transit routes to try and capture some of that market, it is necessary to analyze the market and identify which segments of the market represent the best targets for transit service.

This memorandum presents an overview of the travel market in the study area, considering household density, demographics, employment density, commuting patterns and travel patterns for non-work trips. It then presents results from surveys of nearly 400 employees and 50 young professionals in Concord and Manchester which examined travel patterns and attitudes about potential transit services. Surveys of airport passengers and current riders on MTA Route 4 are discussed, as well as analysis of ridership on Route 4, the Concord Express. The memorandum concludes with preliminary discussion of the potential markets and service goals for future transit service connecting Concord and Manchester.

Residential Overview

While the present study is not concerned with a comprehensive look at local bus service in the Concord-Manchester region, it is useful to understand the basic characteristics of residential and employment patterns in the region to be able to design any type of new service. The maps on the next few pages illustrate the key features of development and demographics that are the most significant determinants of transit demand.

Prior to compiling data for analysis, the study team (consultant and RPC staff) defined a study area that would be used for mapping purposes. Concord, Manchester and the towns between the two cities would obviously be included, but the team decided to include one ring of towns around the central corridor as these other towns would be the most likely source of park-and-ride users. A total of 13 cities and towns comprise the study area, which is subdivided into 66 census tracts or 197 census blockgroups, depending on the data source.

Figure 1 shows the residential density of the study area in terms of households (HH) per acre. The transit industry generally considers a density of 3 households per acre—roughly equivalent to quarter-acre zoning—to be the minimum density needed to support regular local bus service.

This map uses that threshold as the dividing line between urbanized areas and more rural-style development. Blockgroups with densities of 3 HH/acre and higher are restricted to the cities of Concord and Manchester, with the exception of the southeastern corner of Goffstown. Pembroke and Allenstown have moderate density along the US 3 corridor. Otherwise, the central portions of Concord and Manchester are clearly different from the rest of the study area, with much higher densities. Not coincidentally, these areas are the focus of the CAT and MTA systems.

Figure 1: Household Density by Census Blockgroup (2010)

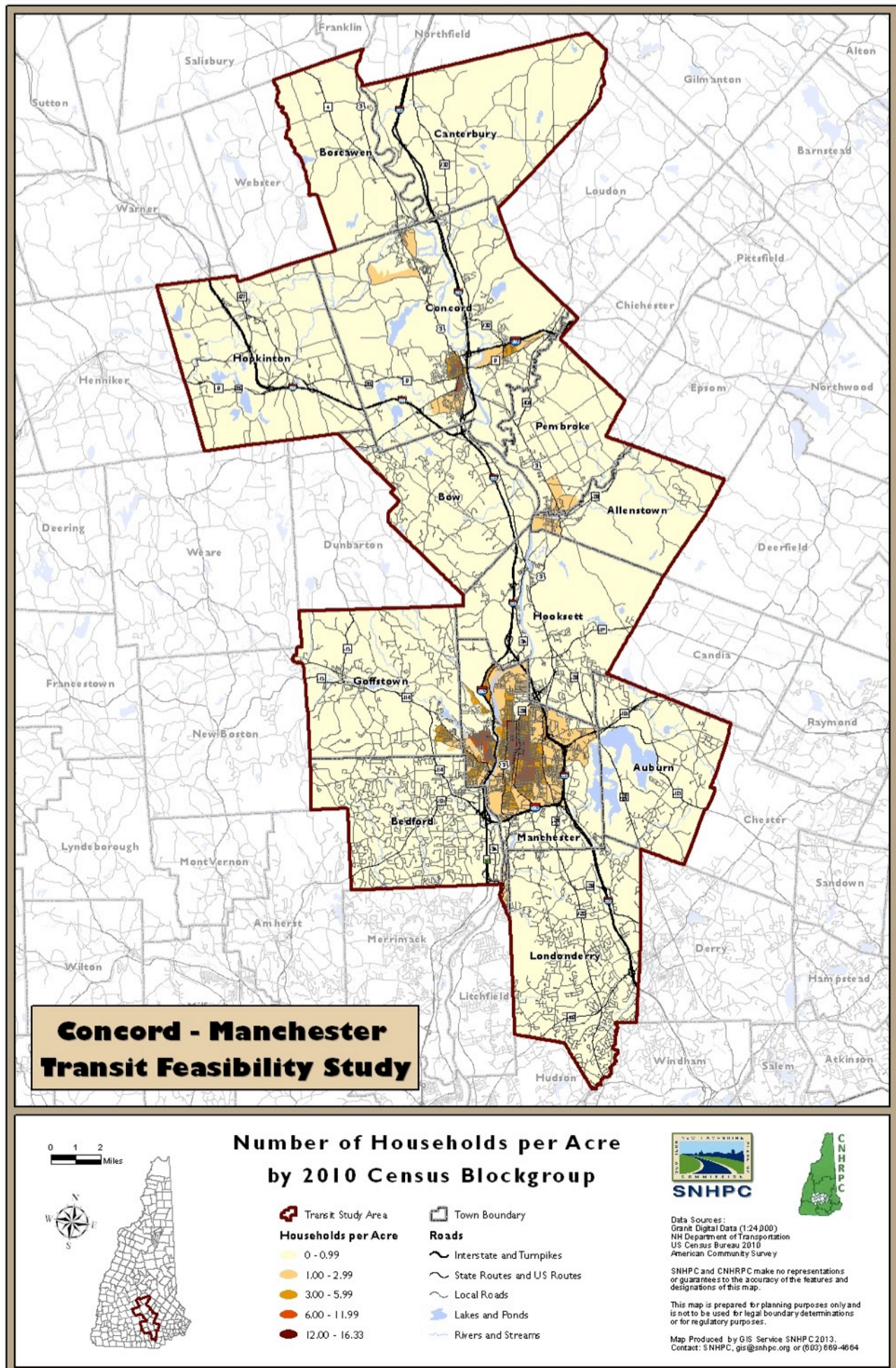
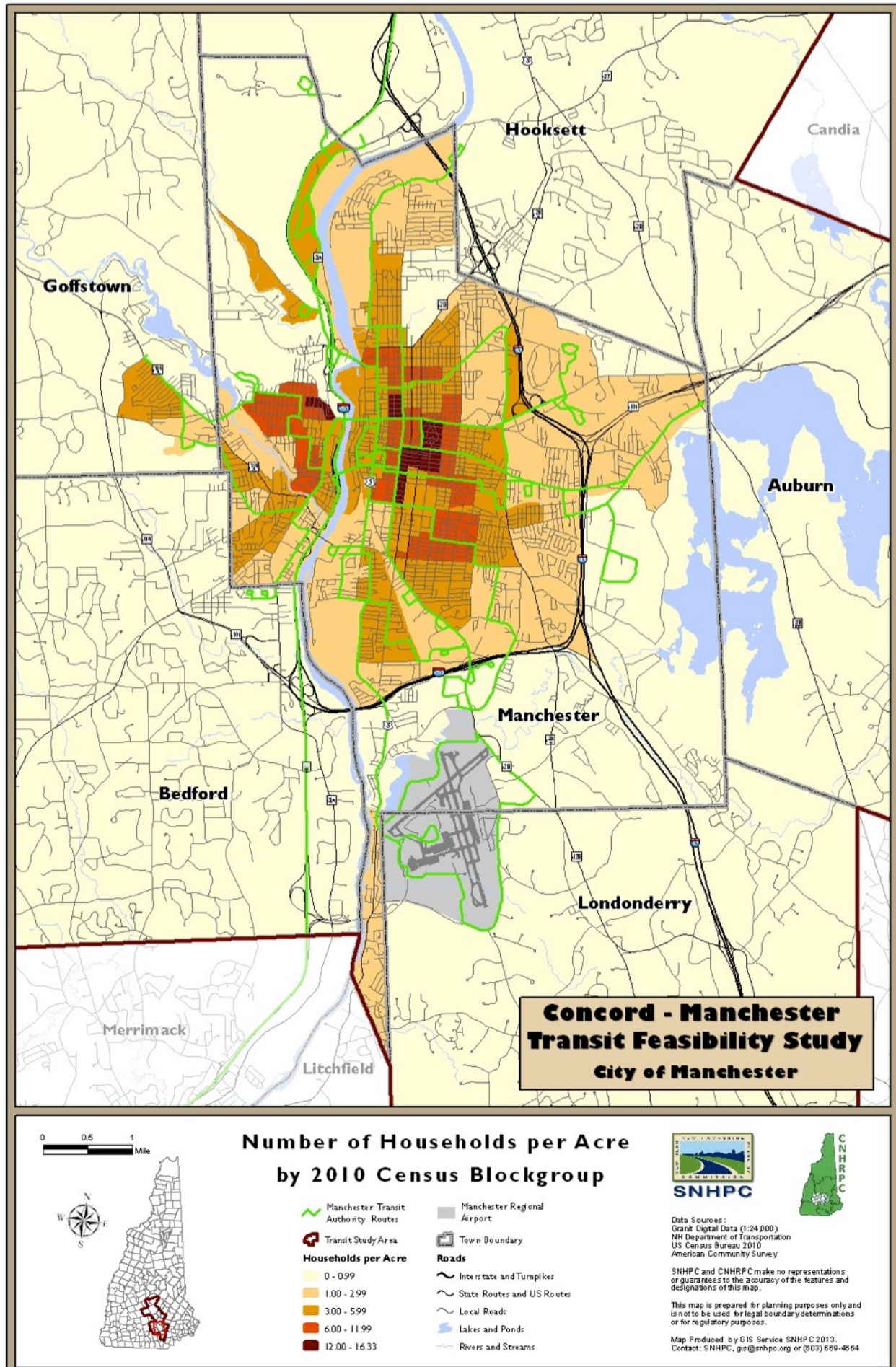


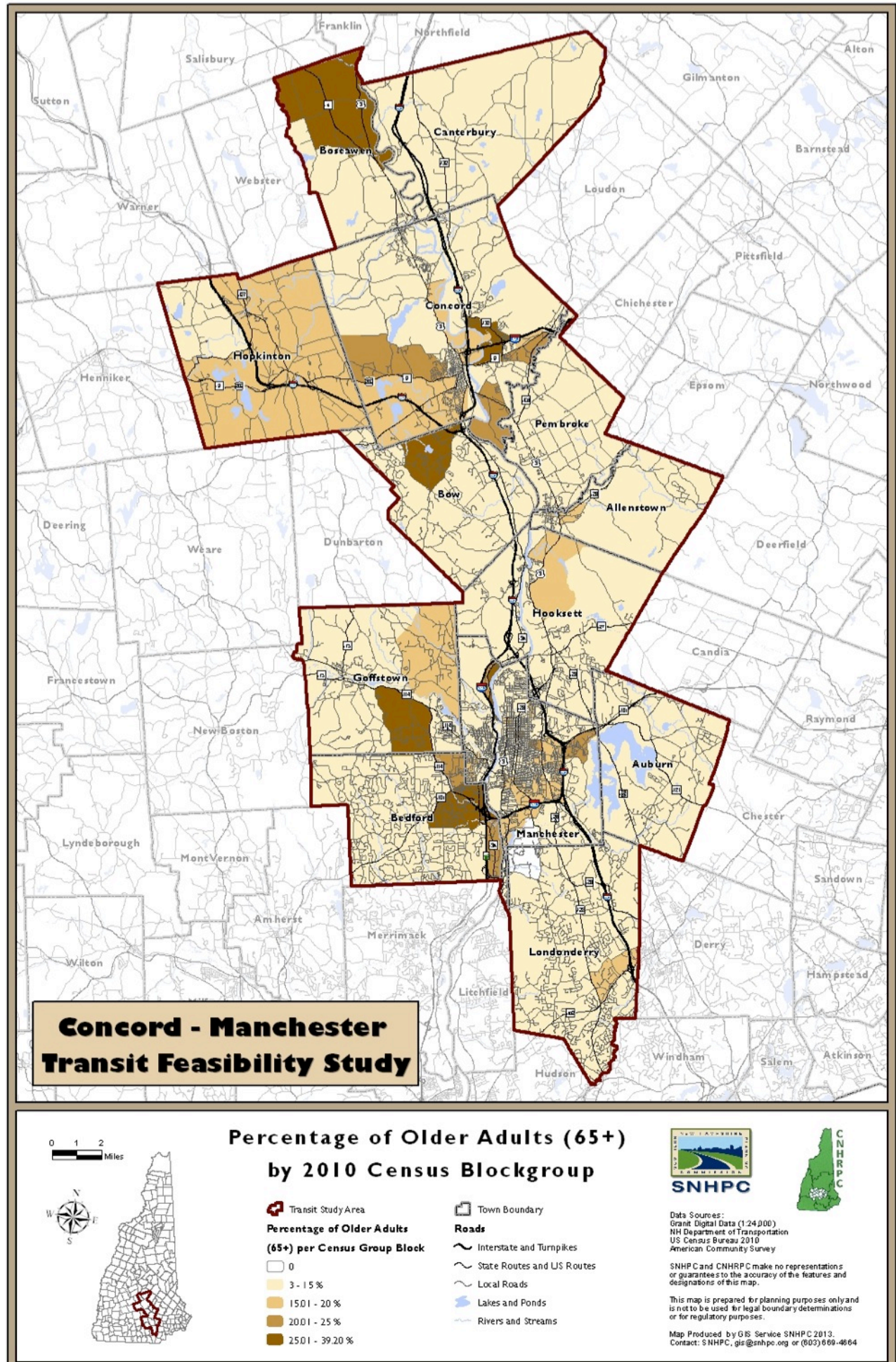
Figure 2 below shows a close-up view of household density in the City of Manchester. Overlaid on this map is the local bus route system operated by the MTA, indicated by green lines. The local route network is most dense throughout the downtown area and surrounding neighborhoods where residential density is highest, exceeding 12 households per acre for several blockgroups. By many traditional measures, the densities in Manchester indicate that a higher level of service (with more than one bus per hour on regular local routes) could be operated and would attract more riders.

Figure 2: Household Density in Manchester by Census Blockgroup (2010)



Transit studies usually consider various measures of “transit propensity” or, in other words, characteristics that indicate greater than average need for transit services. Typical measures include age (older adults, youths), income, automobile ownership, and other factors. For this study, two such maps are provided below. The first is the percentage of older adults by blockgroup, representing people 65 years and older.

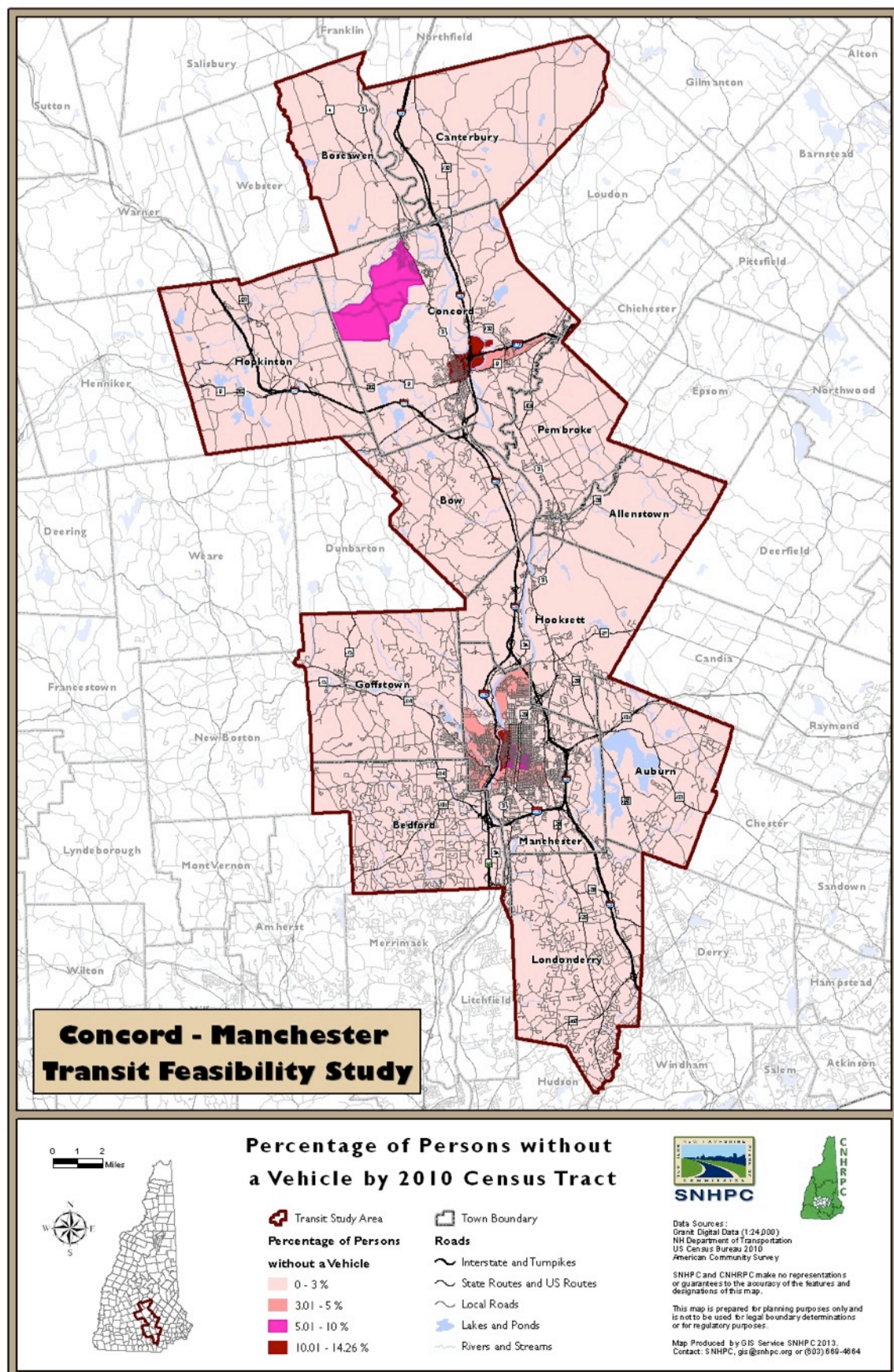
Figure 3: Percentage of Older Adults by Census Blockgroup (2010)



It should be noted that the blockgroups with the highest residential density on figures 1 and 2 are not the same as those with higher percentages of older adults. The densely developed downtown areas of Concord and Manchester are occupied more by younger families or single individuals. Housing developments for seniors, such as Havenwood in Concord, are located outside of the downtown. Some blockgroups in Bow, Boscawen, Goffstown and Bedford have the highest percentage of seniors, between 25% and 39%. To some extent, these high percentages reflect the overall lower number of people in these more rural areas, in that a small senior housing development could push up the percentage for the blockgroup significantly.

Perhaps the single greatest indicator of need for transit is the percentage or number of people with zero vehicles available. This statistic is displayed in Figure 4.

Figure 4: Percentage of Persons without a Vehicle by Census Blockgroup (2010)



With the exception of the blockgroup in northwestern Concord that includes the Penacook neighborhood, all of the areas that have higher-than-average percentages of auto-less persons are located in or near the downtown areas of Concord and Manchester. Being close to the downtowns allows these residents to complete most or all of their trips (to work, shopping, etc.) by walking or taking local transit services.

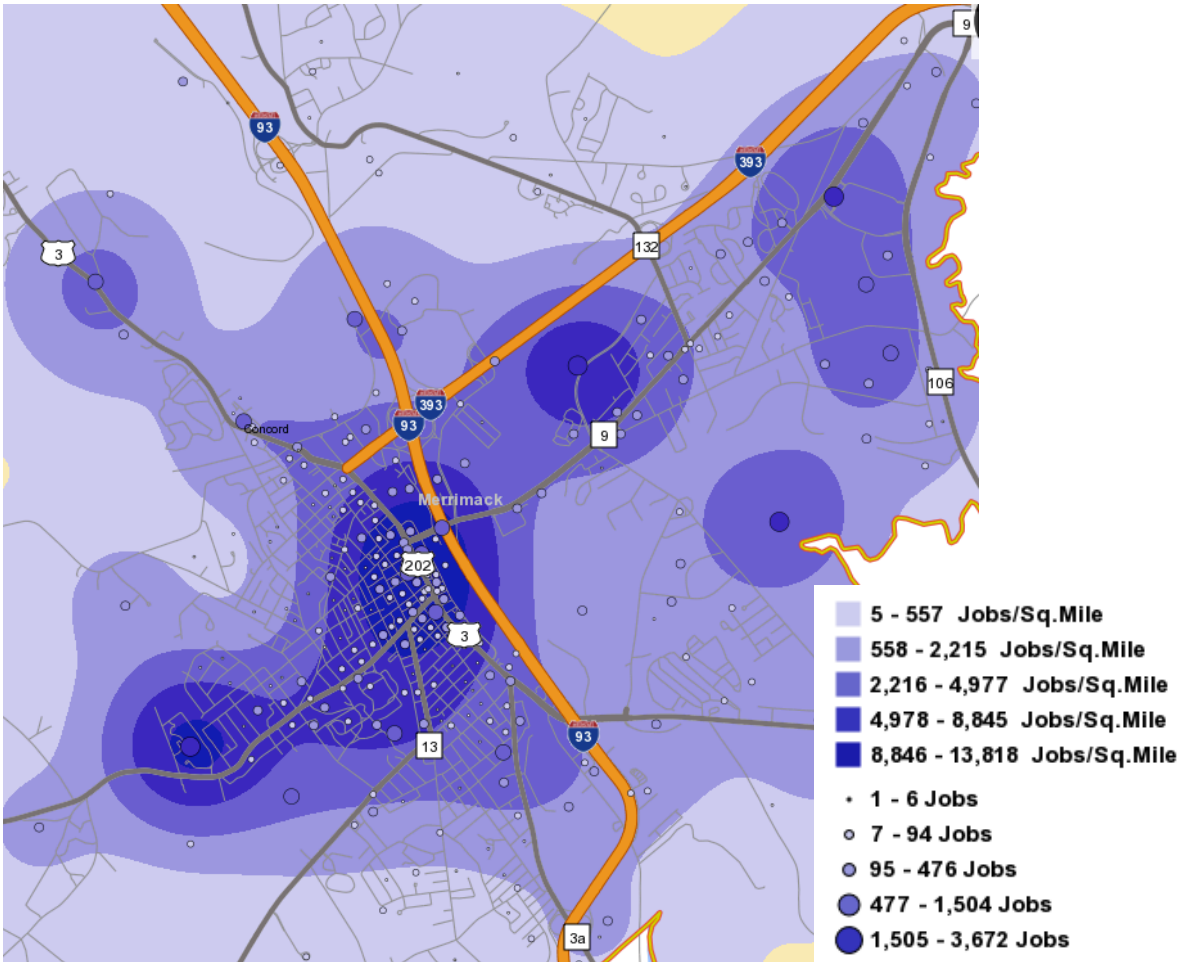
The residential analysis has demonstrated that the downtown-to-downtown market for transit travel is potentially strong. There is transit-supportive density in both downtowns and significant numbers of people without cars available. While there are not large concentrations of older adults in the downtown areas, there are many near to the downtowns. These indicators show why local transit service is viable within both downtowns, but they also suggest that transit service between the two downtowns may also be viable, as will be established more directly below. As no transit services have yet been designed within this study, it is impossible to say to what extent riders would be expected to walk to stops in downtown areas or drive to park-and-ride lots near roadway interchanges, but it is clear that densely-developed downtown areas are essential for successful transit routes at the destination end, and strongly correlated with successful routes when they are at the origin end as well.

Employment Overview

Transit routes are most competitive to driving when they serve an area with many jobs located within a short walking distance of a single point. Not only does this development pattern allow for efficient bus route design (without a lot of meandering through low density office parks), but high-density job centers also typically have constrained parking with significant (more than a dollar or two) daily parking fees. As will be discussed later, parking cost and availability is a key factor in determining transit demand.

The Longitudinal Employment-Household Dynamics (LEHD) database maintained by the US Census provides a wealth of data on the location of employment and its relationship to residences. The following maps, shown in figures 5 and 6, display the employment density of the cities of Concord and Manchester. Darker colors show greater employment density.

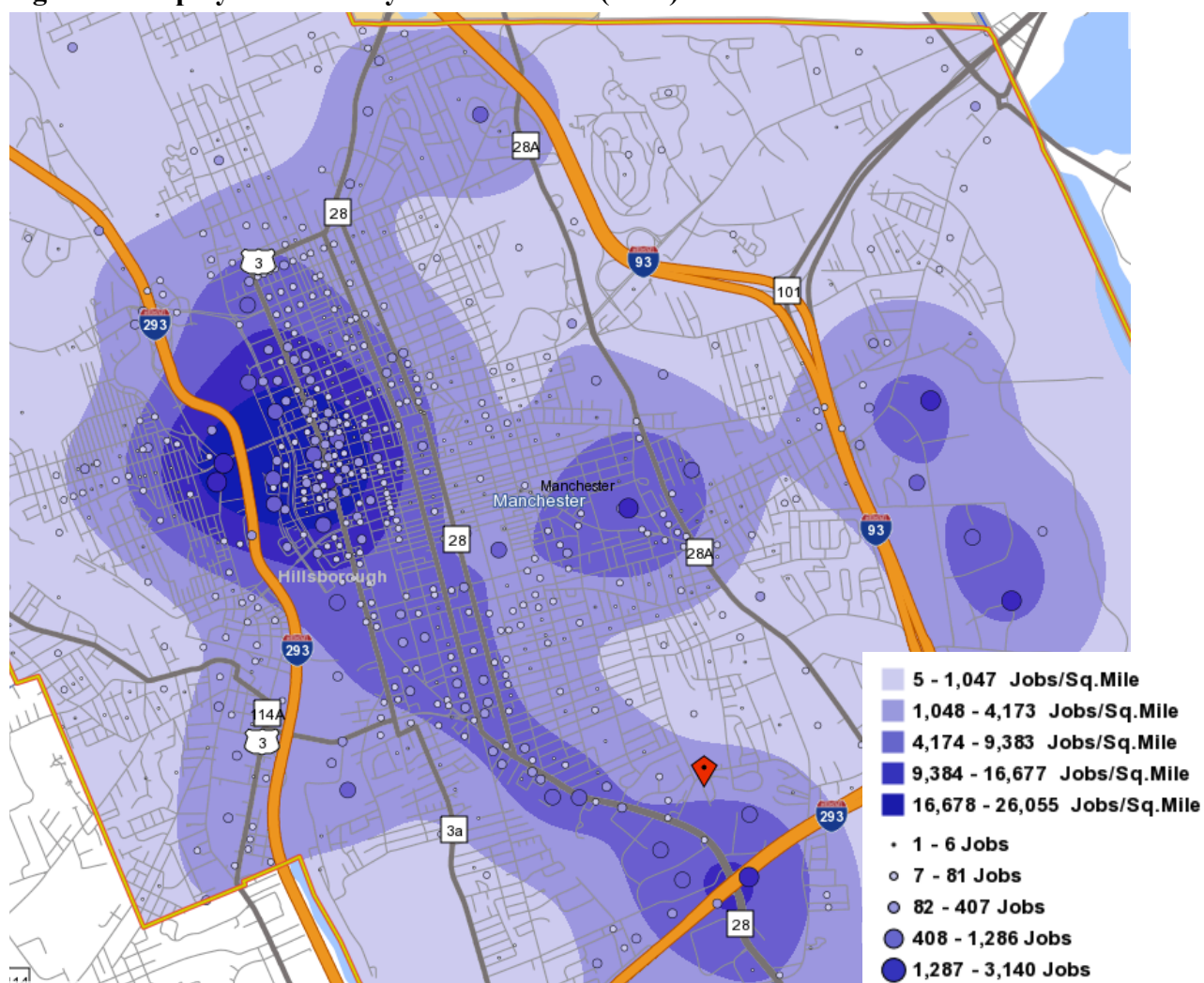
Figure 5: Employment Density in Concord (2011)



The highest concentration of jobs in Concord is the downtown area along and to the west of North Main Street, from Court Street in the north to Thorndike Street in the south. Much of the employment in this area consists of State offices and other public agencies. Other concentrations in Concord occur at Concord Hospital, at the State office complex on Hazen Drive, and along and south of Loudon Road, encompassing Steeplegate Mall plus other “big box” stores.

Figure 6 shows the employment density in Manchester. Like Concord, the highest density occurs in the downtown area, with approximately 20,000 jobs per square mile in the area spanning Elm Street (US 3) from Myrtle Street in the north to Lake Ave in the south. Outside of the downtown, Elliot Hospital is responsible for moderate density employment just west of Mammoth Rd, while various large employers along East Industrial Park Drive create small clusters of high employment density. The last area worth mentioning is the Mall of New Hampshire at the intersection of NH 28 (South Willow Street) and I-293. Indeed, South Willow is a relatively continuous corridor of high employment density. MTA Route 8, which runs between downtown Manchester and the Mall of New Hampshire along South Willow Street, is MTA’s highest ridership route, with between 200 and 250 boardings per day.

Figure 6: Employment Density in Manchester (2011)



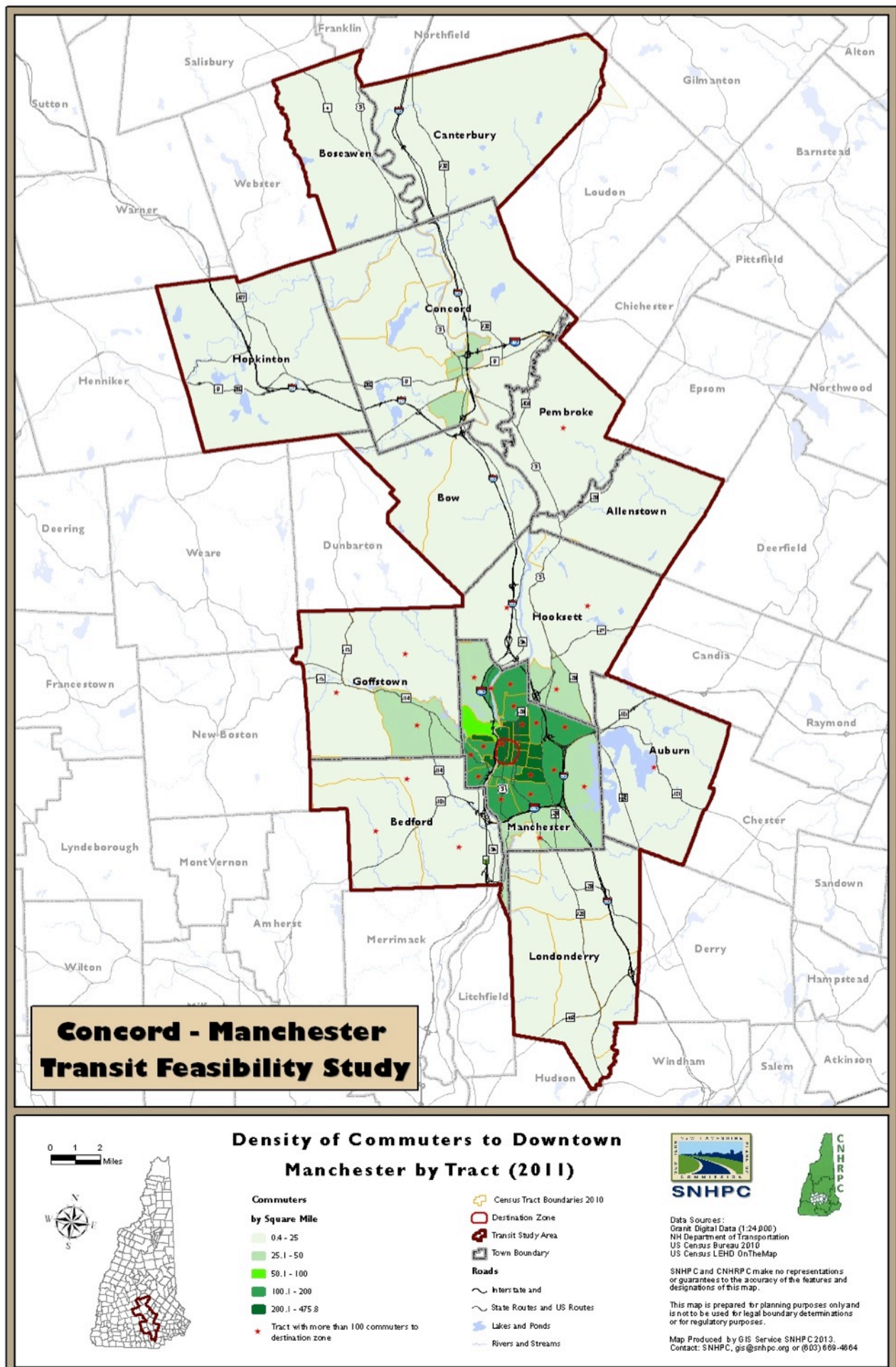
Commuting Patterns

As is evident in the above figures, there are several concentrations of employment in Concord and Manchester. The OnTheMap tool, part of the LEHD program, allows an analyst to map out the origin (home) locations of workers commuting to any destination zone. For the purpose of this analysis, five destination zones were selected and drawn using the OnTheMap tool:

- Downtown Manchester
- Manchester Airport/Mall of New Hampshire
- Downtown Concord
- Concord Hospitals
- Concord Malls

Figures 7 through 11 illustrate the commuting patterns to these five employment zones. The maps show the density of residences of commuters (commuters per square mile) by Census tract. Density is used because the tracts vary widely in size, and a compact tract with fewer commuters is a better potential transit market than a very large tract with more commuters. Nonetheless, the maps do show which tracts send more than 100 commuters to the destination zone, as indicated by a red star.

Figure 7: Commuters to Downtown Manchester (2011)



The greatest concentration of commuters to the downtown area of Manchester is located in the set of tracts to the north and east of downtown. Indeed almost the entire city has a high density of commuters. Neighboring tracts in Hooksett and Goffstown have a moderate density of commuters, and tracts in surrounding towns to the east, west, and north all send more than 100 people to work in downtown Manchester every day. Outside of these close-in areas, though, the highest concentration of downtown Manchester commuters is located in downtown Concord. While these tracts in Concord do not have more than 100 commuters traveling to downtown Manchester, their relatively high density of commuters (compared to other outlying areas) means that downtown Concord represents a good transit commuting market.

The second job center, illustrated in Figure 8, includes the Mall of New Hampshire and Manchester-Boston Regional Airport. This job center has far fewer commuters than Downtown Manchester (2,700 residing within the study area, compared to 6,500 for Downtown) and so there are only a few tracts with more than 100 commuters. The highest concentrations of commuters are all located within the City of Manchester, except for one tract located in downtown Concord. Again, this concentration indicates some potential for a transit route connecting downtown Concord to the mall and airport.

For the third job center, Downtown Concord, shown in Figure 9, the highest densities occur in the tracts adjacent to downtown on the south and east. Outside of the City of Concord, the only other tracts with concentrations of commuters are located in downtown Manchester and across the river in the western part of the city. Similar to the reverse situation, these tracts in Manchester do not send more than 100 commuters to Concord, as do tracts in Bow, Pembroke, and Hopkinton, but they have higher concentrations, which make them a better target market for a commuter bus service. Overall, Downtown Concord is the third largest of the five job centers, with 3,300 jobs held by study area residents.

The “hospitals” area of Concord includes both Concord Hospital (HealthSouth Rehabilitation Hospital) and New Hampshire Hospital. There are also many doctors’ offices located in the area between the two hospitals. As shown in Figure 10, the same tracts within Concord that generated commuting trips to the downtown area also generated commuters for the hospitals area. Also, similar to Figure 9, the only concentrations of commuters outside of Concord are in the downtown area of Manchester. The hospitals area is the smallest of the five job centers, with about 2,300 jobs held by study area residents.

The final map in the series, Figure 11, shows the commuting pattern for the “malls” area of Concord, which includes the Thomson State Office Complex (Hazen Drive), Steeplegate Mall, and various big box stores south of Loudon Road. This area, generating 3,700 commuting trips from study area residents, has an even stronger association with downtown Manchester than other employment zones in Concord. While the City of Concord, particularly the southeastern quadrant, has high concentrations of workers in the malls area, many tracts within Manchester have more than 50, and four have over 100, commuters per square mile to the Concord malls zone.

The series of commuting maps has established that there is a strong commuting connection between the downtown areas of Concord and Manchester, and between those cities’ downtowns and other job centers located within the municipal borders. While tracts in other towns may send higher absolute numbers of commuters to these job centers, a transit route works best when it serves a high density of demand so that people are able to walk a reasonable distance to reach the bus route. The service design phase of this study will determine whether a route connecting downtown Concord to downtown Manchester can also provide access from the surrounding areas to the downtowns via park-and-ride or local stops. The key trade-off will be between travel time/directness of service and the coverage/degree of access. Making more stops opens up the route to more potential riders, but at the same time makes the route less attractive to riders who want a fast, direct trip.

Figure 8: Commuters to Mall of New Hampshire and MBRA (2011)

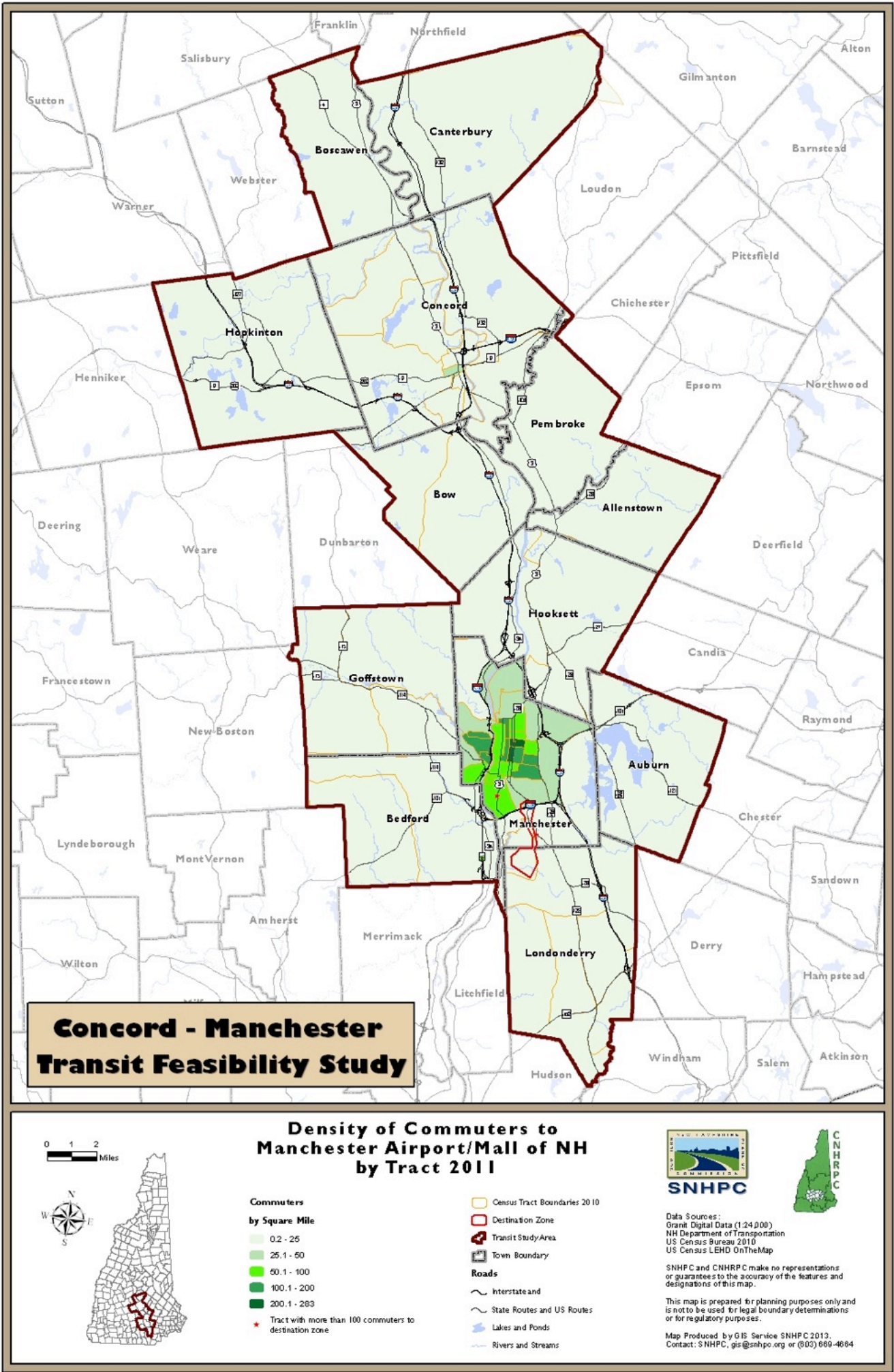


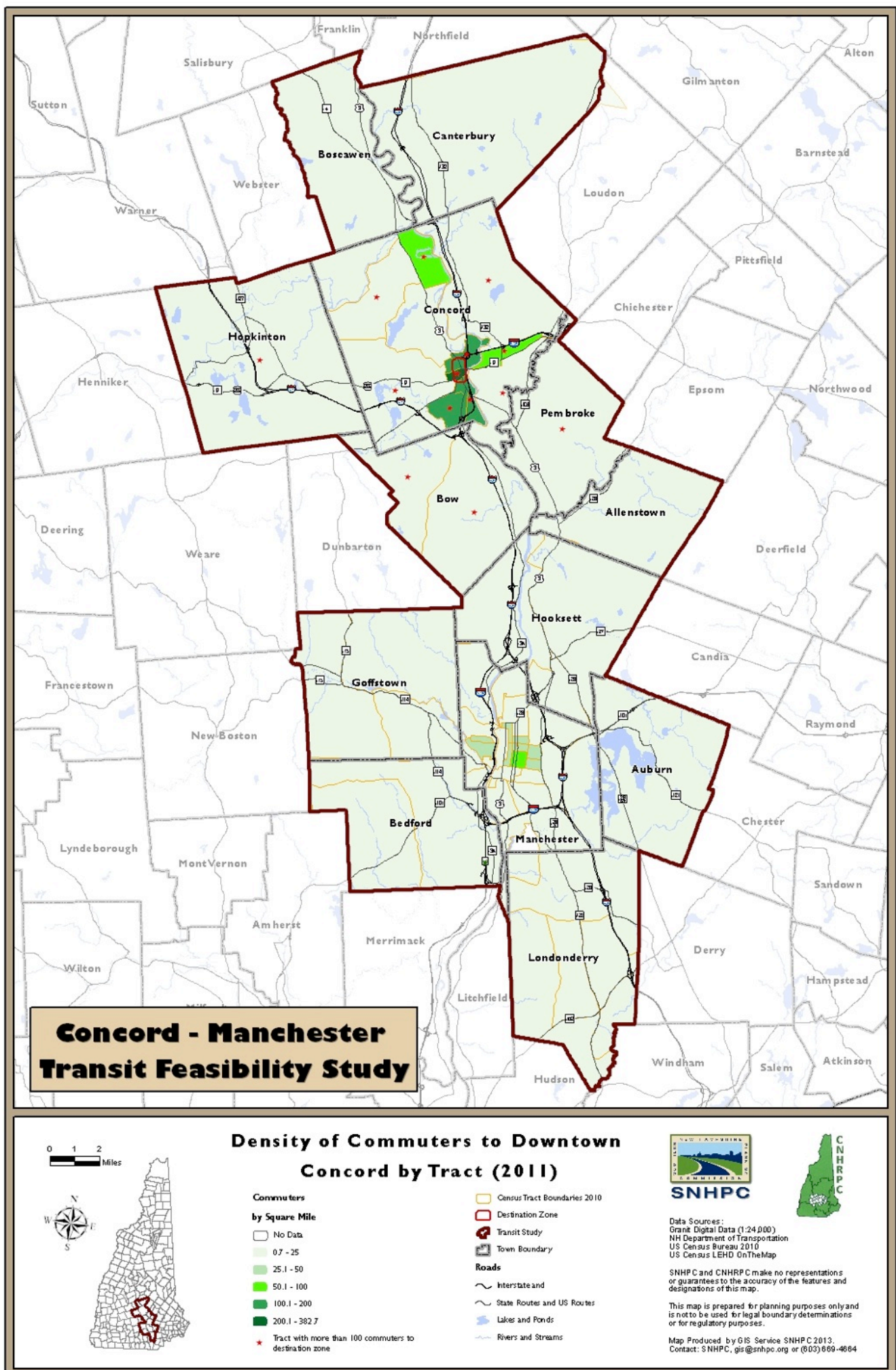
Figure 9: Commuters to Downtown Concord (2011)

Figure 10: Commuters to Concord Hospitals (2011)

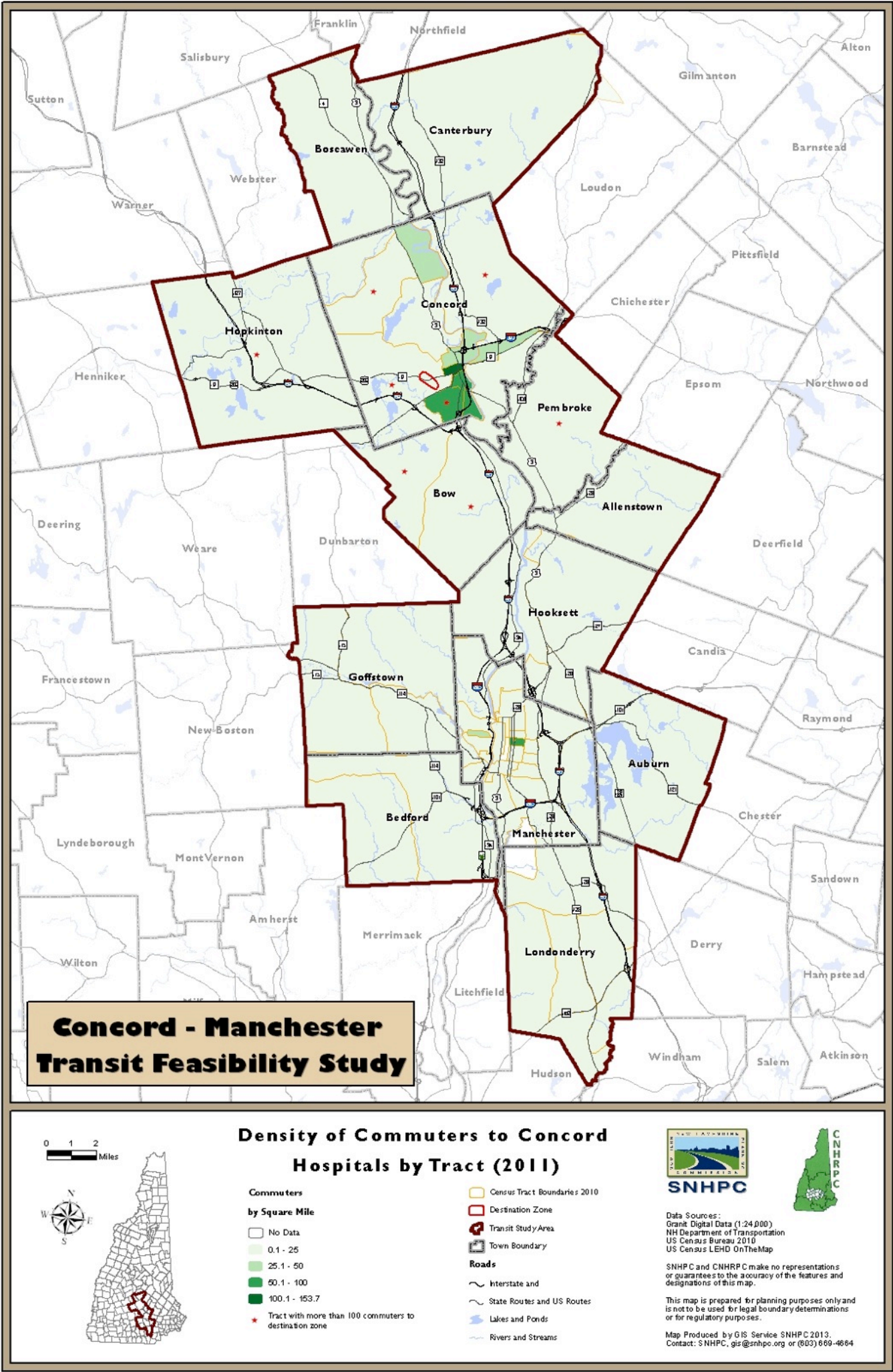
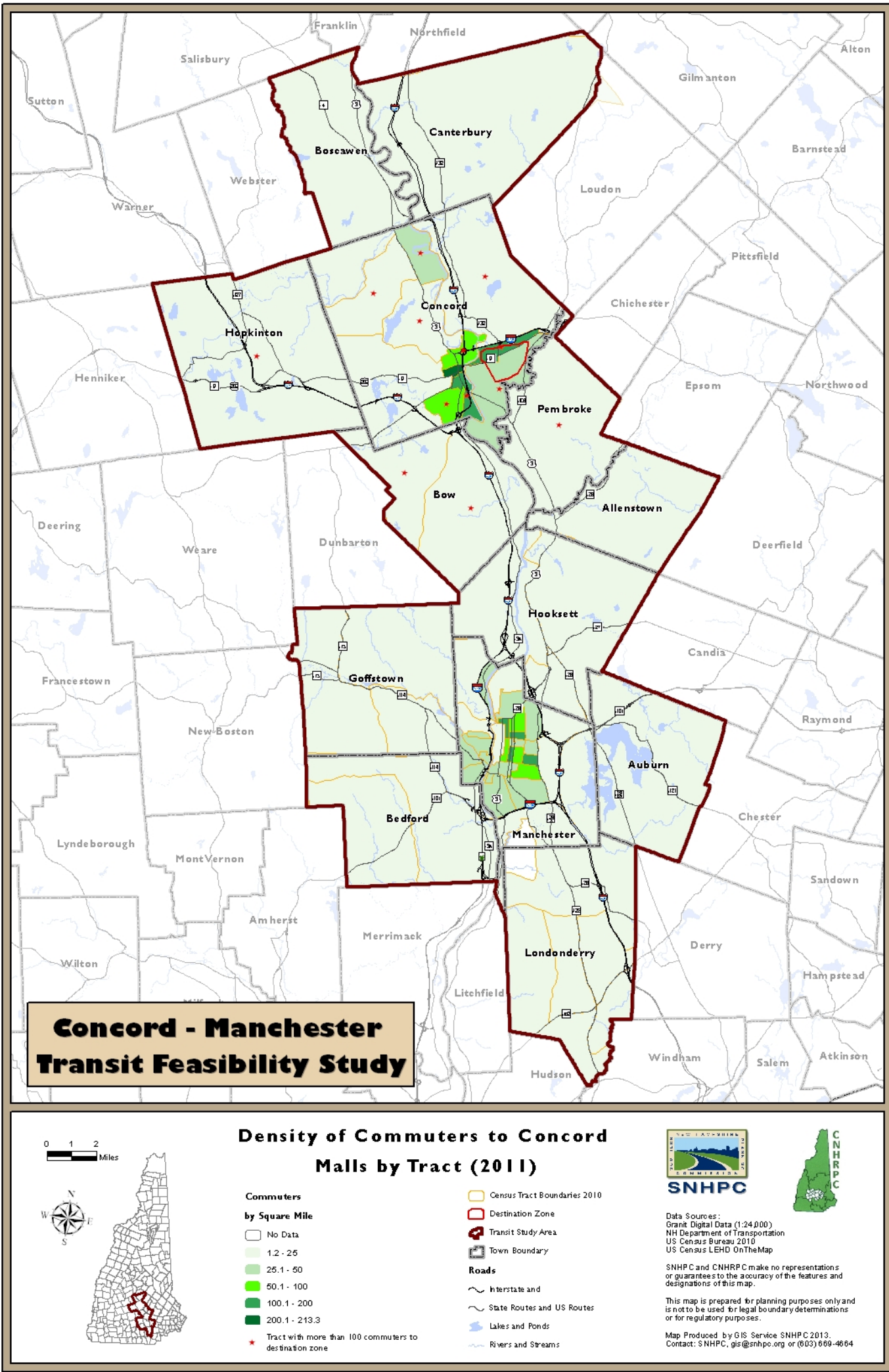


Figure 11: Commuters to Concord Malls (2011)



Non-work Travel

Of course, commuting to work is not the only type of travel in the region. The regional model maintained by SNHPC contains a table listing trips by various purposes, including shopping, social/recreational, school, and other. These trips each have an origin traffic zone and a destination traffic zone. There are approximately 270 traffic zones in the model. It is important to note that the model does not cover towns north of Hooksett, since that is the limit of the SNHPC region. Trips coming into the region from the north are represented by three “external” zones.

Figure 12 displays the origin locations of non-work trips destined to Downtown Manchester. This map combines the trip purposes of home-based shopping, social, and other. Home-based school trips and non-home-based trips were not included in this analysis as they were judged to be less susceptible to capture by a new transit service linking Concord and Manchester.

The highest densities of trip origins are within the City of Manchester and in the immediately adjacent zones in Bedford, Goffstown and Hooksett. Derry and Londonderry also show moderate densities of trip origins. While it is not possible to determine how many non-work trips come from Concord, the large circle, representing the external zone that accesses the Manchester region via I-93, shows that more than 2,000 non-work trips destined for downtown Manchester come from the north on that roadway. Based on the commuting analysis presented above, it is safe to assume that a significant number of those trips do come from the City of Concord.

Survey Results

In addition to the analysis of data from the Census, LEHD, and the regional model, the project team collected new data as part of this study. Three surveys were undertaken:

- Survey of employees in Concord and Manchester
- Survey of young professionals in Concord and Manchester
- Survey of riders on MTA Route 4
- Survey of exiting passengers at Manchester-Boston Regional Airport (MBRA)

The goal of these surveys was to learn more about travel patterns in the region and to understand why these commuters and travelers make the transportation choices they do.

Employee Survey

A web-based survey was set up by CNHRPC using Survey Monkey, and employees at State agencies and at private sector firms in Manchester and Concord were invited to participate. Nearly 400 individuals took the survey, residing in 77 communities, all but 3 of which were in New Hampshire. Manchester had by far the highest number of responses, with 116, followed by Concord with 36. Bedford, Hooksett, and Goffstown were in the range of 20 responses. In terms of workplace location, 290 respondents work in Manchester, and 88 work in Concord. The other respondents were scattered among 14 other towns. The specific workplace locations of survey respondents are shown below in Figure 13.

Figure 12: Non-work Travel in Manchester Region (2010)

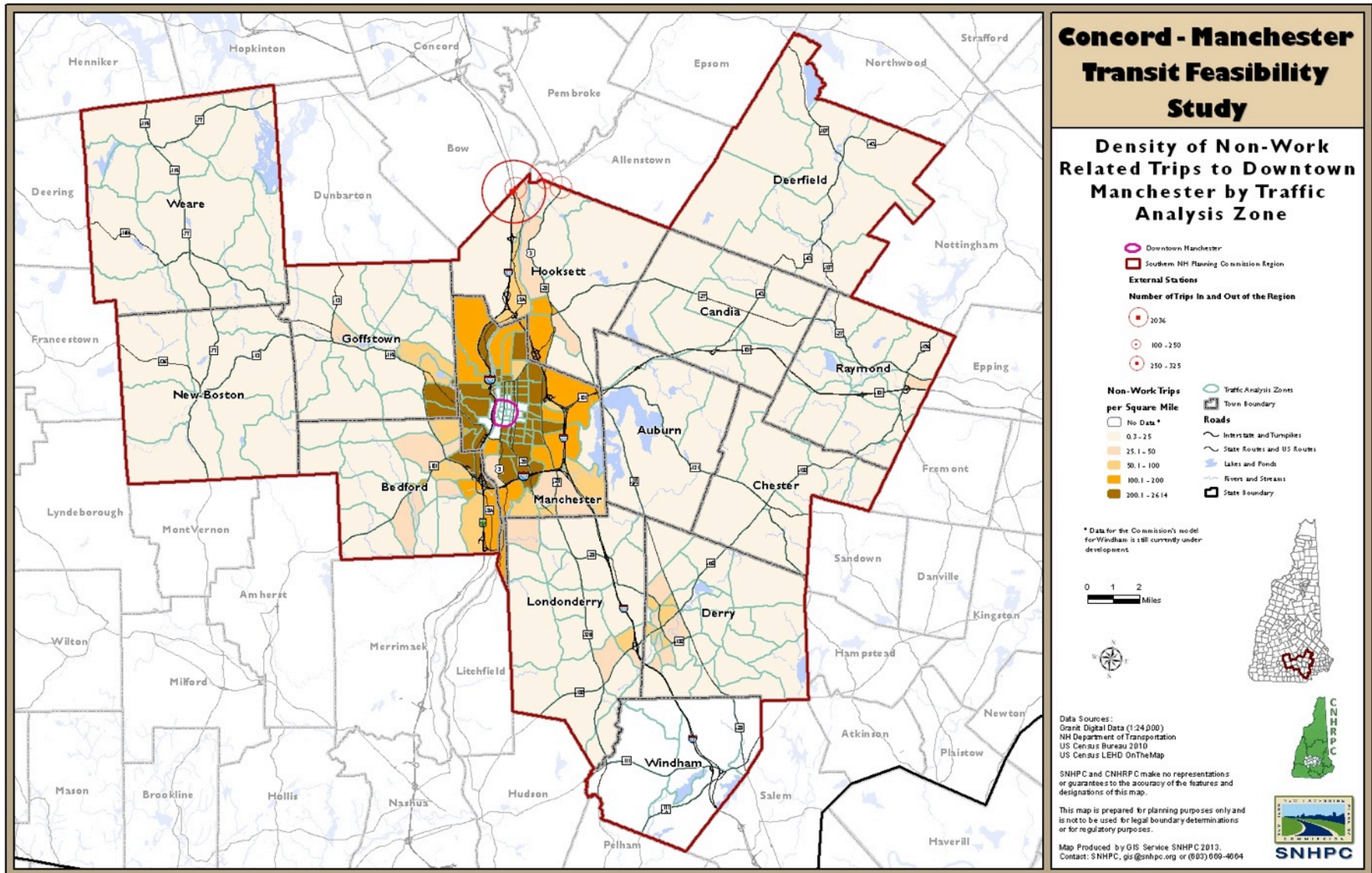
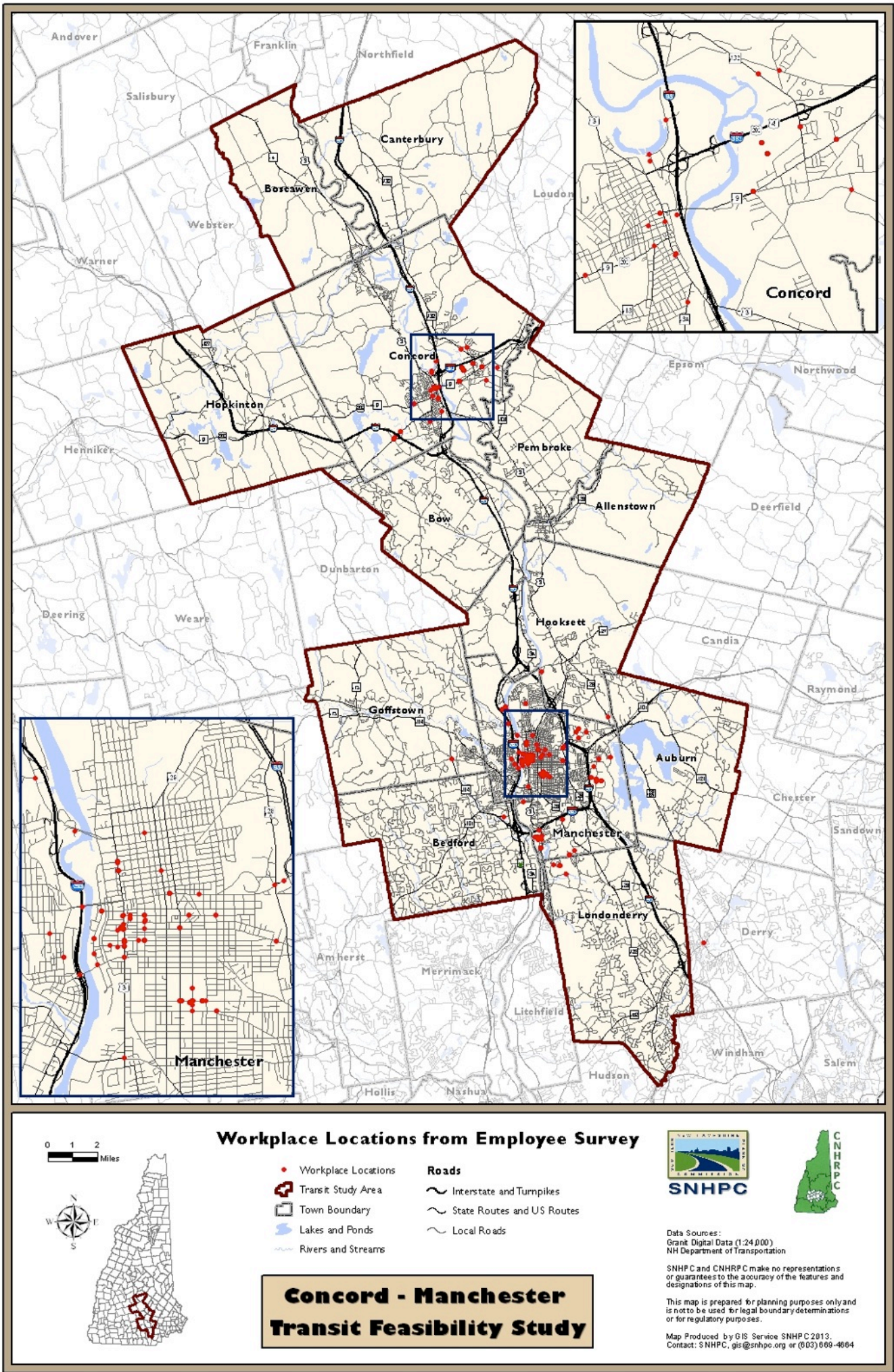
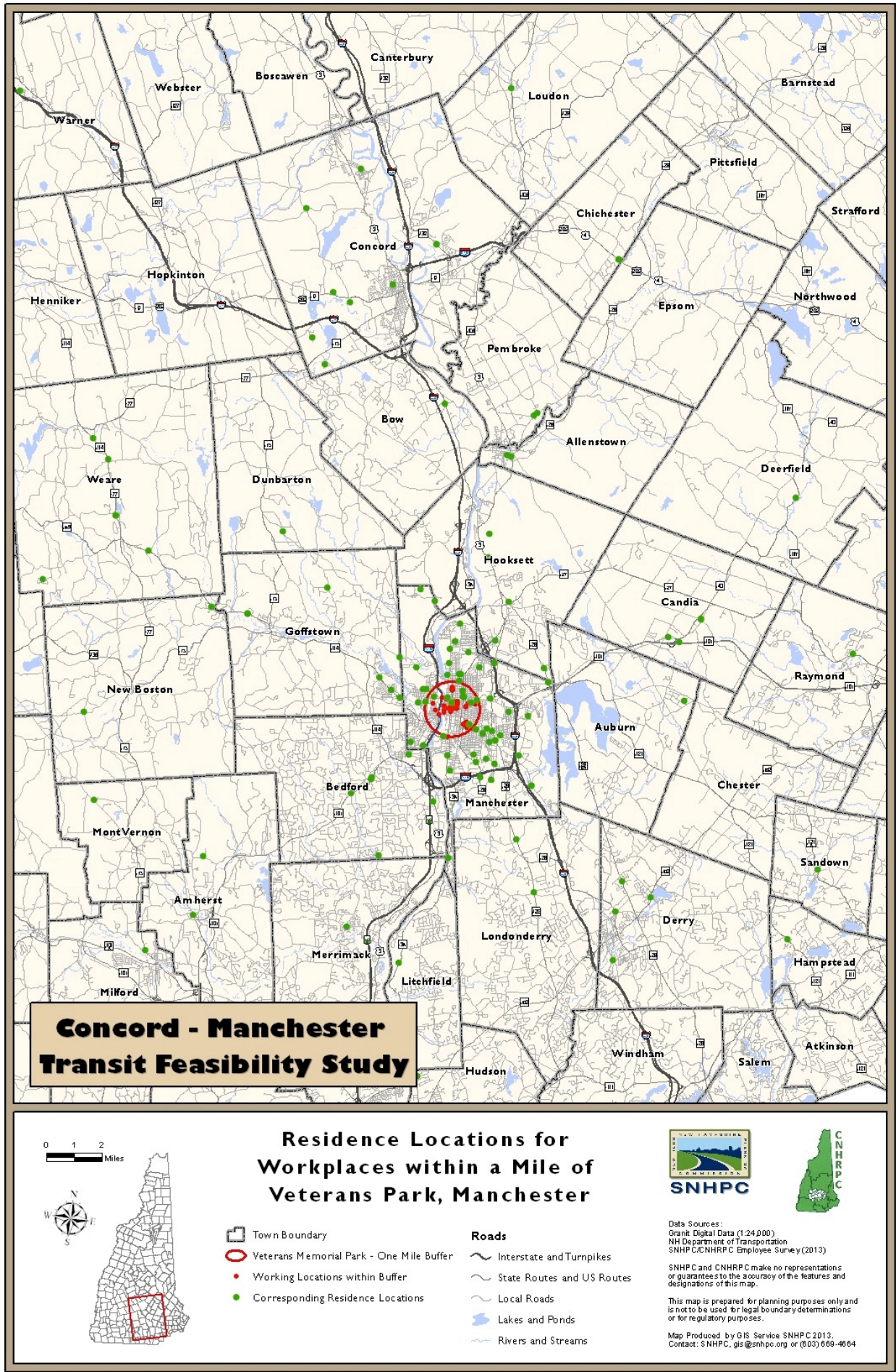


Figure 13: Workplace Locations of Employee Survey Respondents



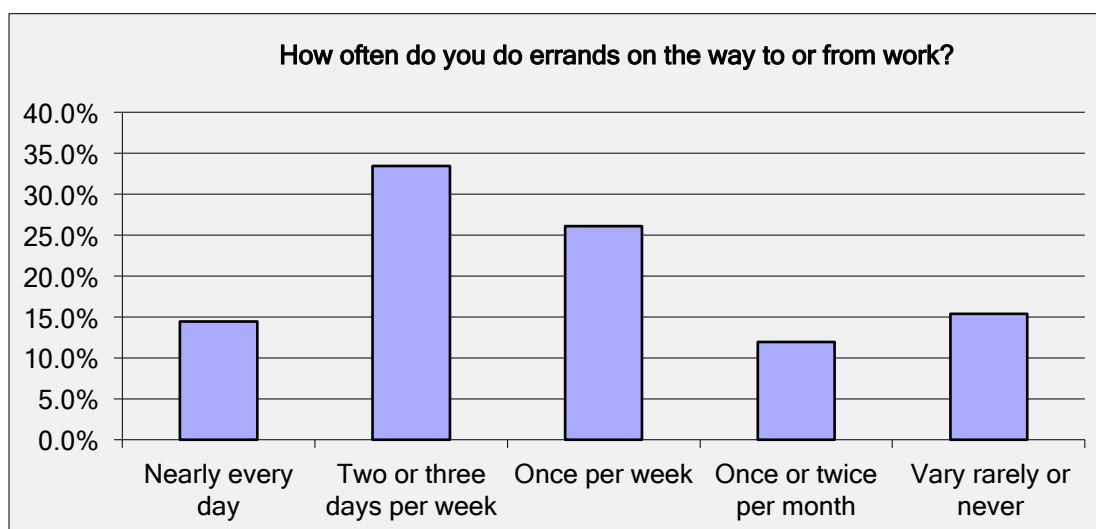
As can be seen in Figure 13, there were a significant number of work destinations in the downtown area of Manchester. Figure 14 below shows the home locations associated with these downtown Manchester workplaces. Each green dot represents a home location from which someone commutes to the workplaces represented by red dots. It can be seen that commuters to these downtown Manchester workplaces reside all over the region. Many reside in Manchester, and some reside in Concord, but practically every town on the map is represented with at least one commuter.

Figure 14: Home Locations of Commuters to Manchester in Employee Survey



Respondents were asked several questions about their current commuting trips. The results are summarized below.

- 95% of respondents drive alone to work. There were only 4 individuals who indicated using public transportation to commute.
- 87% of respondents reported that they had a free parking space at work.
- Just over half of respondents (57%) said that they start and end work at pretty much the same time every day, and another 31% said the start and end times vary by up to a half hour.
- The most common start times were as follows
 - 8:00 a.m. (159 responses)
 - 7:00 a.m. (61 responses)
 - 7:30 a.m. (56 responses)
 - 8:30 a.m. (34 responses)
 - 9:00 a.m. (25 responses)
- The most common end times were as follows
 - 5:00 p.m. (111 responses)
 - 4:00 p.m. (76 responses)
 - 3:30 p.m. (25 responses)
 - 3:00 p.m. (23 responses)
 - 5:30 p.m. and 6:00 p.m. (both with 21 responses)
- Only 27% of respondents said that they need a car during the day for work purposes.
- When asked about how often they do errands on the way to or from work, they gave a range of answers as illustrated in the graph below.



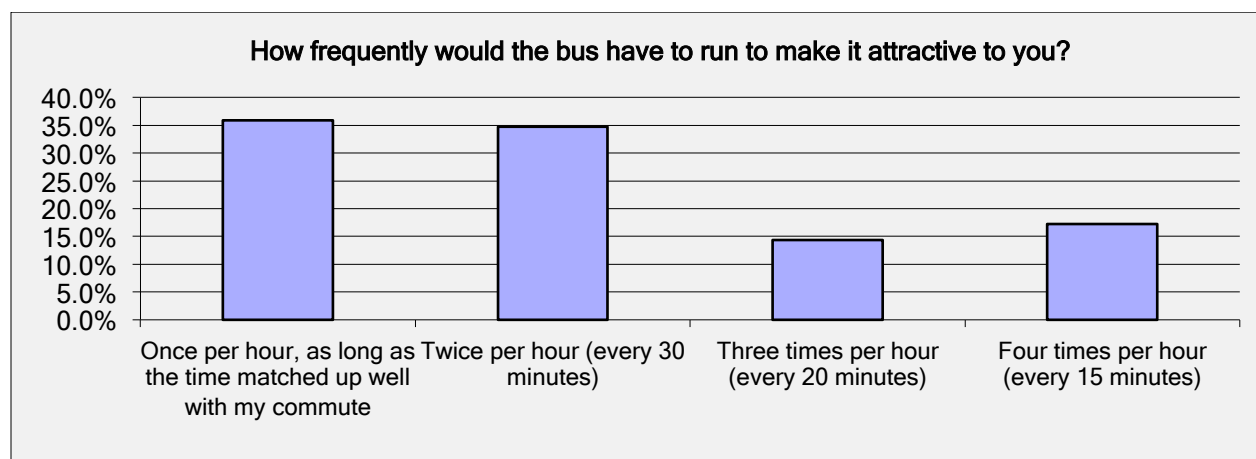
Consistent start and end times, and a relatively low percentage of people who need to do errands during the day are positive signs for potential transit use. However, widely available free parking is a major obstacle for transit.

The next group of questions concerned their attitudes toward a potential bus service connecting Manchester and Concord. The results for these questions are summarized below:

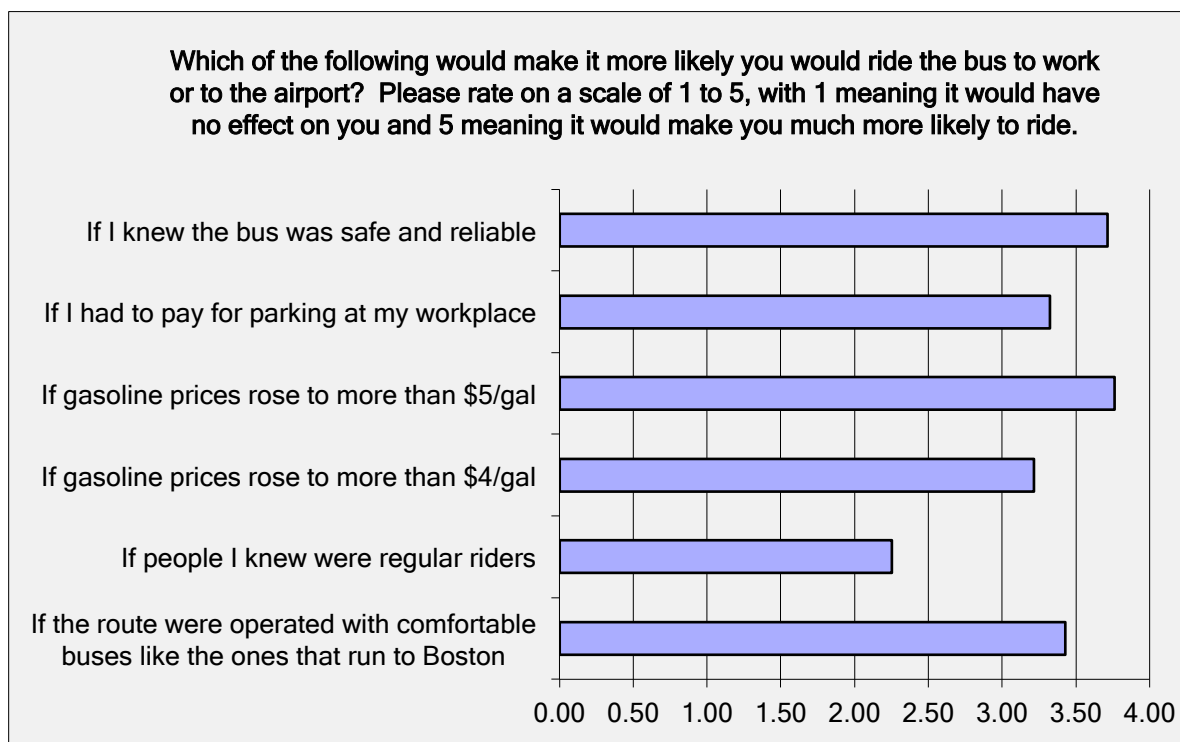
- When asked if they would use a “convenient” bus service to get to work, 61% of respondents said yes. About half of these said they would use it “some of the time”, a third said they would use it “nearly every day”, and the remaining sixth said they would use it “only occasionally.”
- Among people who said they would use the service, 65% said they would be willing to drive to a park & ride lot to catch the bus.
- Within the same group, 55% said they would be willing to transfer to an MTA or CAT bus to reach their final destination.
- When asked what the maximum round-trip fare they would be willing to pay would be, the responses ranged from zero to \$15. The most common answer was \$5 (52 responses) but 110 people cited fares of between \$1 and \$4 as the maximum they would pay.
- In a hypothetical scenario where their employer paid the bus fare, 37% of respondents said they would “definitely ride frequently” while another 31% would ride “some of the time”. The number of “no” responses dropped to 32% in this scenario.
- In another scenario where the employer offered a cash incentive to ride, 41% said they would ride frequently, 34% said they would ride some of the time, and only 25% said they would not ride.
- 40% of respondents said that they would use the route to get to the airport “unless it was really inconvenient.” Another 41% said they might use it, “depending on the schedule.”

The next group of questions considered service aspects of the bus route that would make it more or less attractive to the rider.

- Frequency of service is a key factor in the cost of operation as well as the attractiveness of service to the rider. Four potential service frequencies were offered to the respondents, and they were asked how frequently the bus would have to run to be attractive to them. The results are displayed in the graph below. A slight plurality indicated that hourly service would be sufficient, as long as the times lined up well with their schedules.



- Span of service is another critical component of service. Respondents were asked how late the bus would need to run to be attractive. 45% stated that 6:00 p.m. would be sufficient. The remaining 55% were divided relatively evenly among 7:00 p.m., 8:00 p.m. and 10:00 p.m. as desirable ending times for the bus route.
- As to potential weekend service, only 4% of respondents said they would frequently use the route on Saturdays and Sundays, and another 34% said they would occasionally use it on those days.
- Respondents were asked about six factors external to the service itself that might affect their usage of the bus. The results for each of these factors is shown in the graph below. Among the factors, a significant rise in the price of gasoline, to over \$5 per gallon, achieved the highest rating, in terms of the factor that would most influence increased use of the bus. Confidence that the bus was safe and reliable was a close second. The factor that seems to be least important is whether other people they knew used the bus regularly. While respondents may discount this factor, word of mouth and the confidence factor that riding the bus is socially acceptable and even the “smart” thing to do among their peers are key to getting “choice” riders—that is, people who are able to choose between driving and taking public transit—to ride the bus.



The final questions on the survey had to do with demographic characteristics. The survey respondents skewed toward older and more affluent people, in general. The following summarizes these results:

- 60% of survey respondents were between 45 and 64 years of age. Only 32% were between 25 and 44.
- There were no respondents from a household that had no vehicles. 82% of respondents were in households with two or more vehicles. Similarly, 85% of households had two or more licensed drivers. Thus, access to an automobile did not seem to be a significant issue for any of the respondents.
- Only 3% of respondents had annual incomes of under \$30,000. 38% of respondents had incomes over \$100,000 and another 50% had incomes of between \$50,000 and \$100,000.
- 51% of respondents were female.

Even though virtually all of the survey respondents currently drive to work, and the vast majority of them are relatively affluent, the survey did show positive attitudes toward public transportation. It is well known that stated preference surveys, such as this one, tend to overstate the potential use of future services because respondents like to give positive responses if they can. However, when it comes to actual choices to use the bus or not, people are often reluctant to try new things, and any negative aspect of the service may push them back to driving. Thus, the overall positive responses are a good sign for the potential success of future service, but it should not be assumed that the route would be an immediate success without a high-quality level of service and a significant marketing and education campaign.

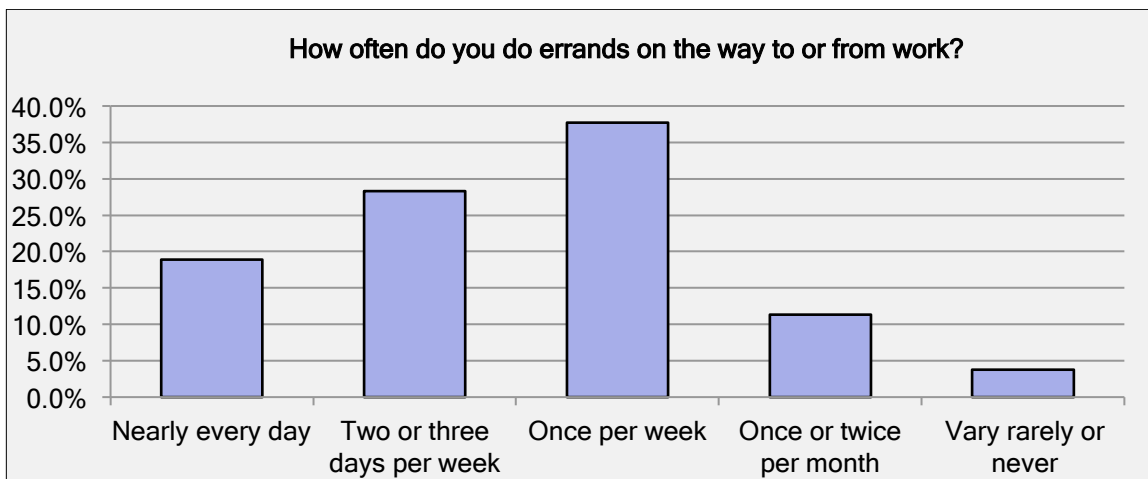
Young Professionals Survey

A second web survey was conducted in late October. Young professionals networks in Concord and Manchester were contacted through the chambers of commerce. Some 53 individuals responded to the survey, which largely mirrored the employee survey described above. Of the respondents 23 live in Concord and 7 live in Manchester. Similarly 35 work in Concord and 11 work in Manchester. Thus, this survey has a stronger bias toward Concord than the employee survey, which was more representative of Manchester.

The survey results are summarized below.

- 89% of respondents drive alone to work. Three people walked or biked and one person took public transportation.
- 92% of respondents reported that they had a free parking space at work.
- Only 28% said that they start and end work at pretty much the same time every day, about half the rate of the employee survey.
- The most common start times were as follows, generally skewed later than the employee survey results
 - 8:00 a.m. (13 responses)
 - 8:30 a.m. (12 responses)
 - 9:00 a.m. (12 responses)
 - 7:30 a.m. (2 responses)

- The most common end times were as follows
 - 5:00 p.m. (15 responses)
 - 5:30 p.m. (9 responses)
 - 6:00 p.m. (6 responses)
 - 4:00 p.m. (5 responses)
- Only 27% of respondents said that they need a car during the day for work purposes.
- When asked about how often they do errands on the way to or from work, they gave a range of answers as illustrated in the graph below. These young professionals were more likely to be running an errand on any given day than the older workers in the employee survey.



The next group of questions concerned their attitudes toward a potential bus service connecting Manchester and Concord. The results for these questions are summarized below:

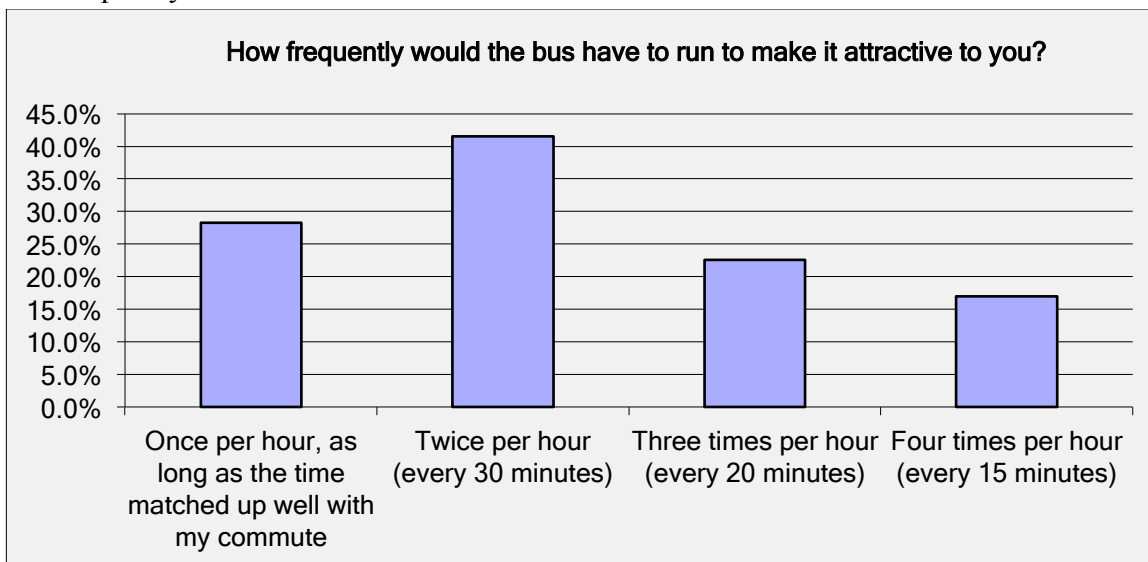
- When asked if they would use a “convenient” bus service to get to work, 83% of respondents said yes. About 40% of these said they would use it “some of the time”, a third said they would use it “nearly every day”, and the remaining 27% said they would use it “only occasionally.”
- Among people who said they would use the service, 73% said they would be willing to drive to a park & ride lot to catch the bus.
- Within the same group, 63% said they would be willing to transfer to an MTA or CAT bus to reach their final destination.
- When asked what the maximum round-trip fare they would be willing to pay would be, the responses ranged from zero to \$15. The most common answer was \$5 (8 responses) but 18 people cited fares of between \$1 and \$4 as the maximum they would pay. The average was just over \$5.
- In a hypothetical scenario where their employer paid the bus fare, 45% of respondents said they would “definitely ride frequently” while another 36% would ride “some of the time”.

- In another scenario where the employer offered a cash incentive to ride, 49% said they would ride frequently, 40% said they would ride some of the time, and only 11% said they would not ride.
- 80% of respondents said that they would use the route to get to the airport “unless it was really inconvenient.” The other 20% said they might use it, “depending on the schedule.”
- The young professionals were asked about other types of trips:
 - 75% indicated they would use the bus route for meeting up with friends
 - 85% would use it to attend restaurants and bars
 - 75% would use it to attend cultural events

In addition to this high level of interest for evening and weekend service, the young professionals indicated a willingness to pay extra for this service, with an average maximum fare of \$7 compared to \$5 for commuting trips.

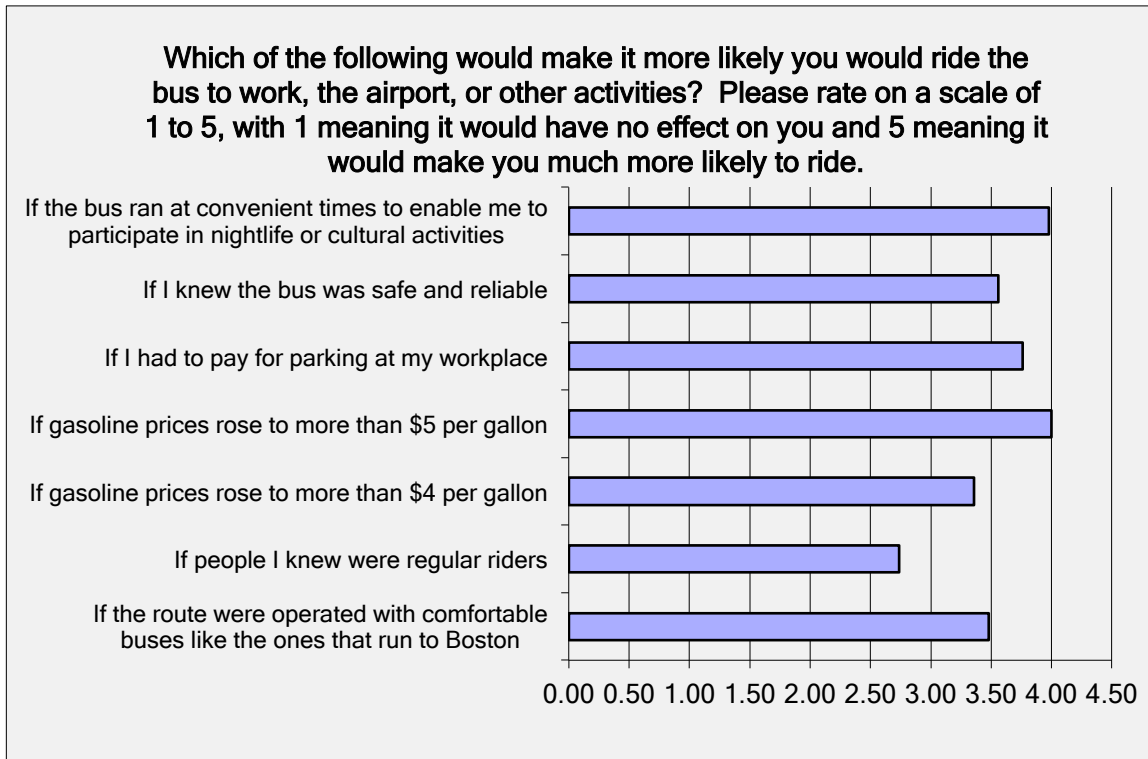
The next group of questions considered service aspects of the bus route that would make it more or less attractive to the rider.

- The young professionals were more sensitive to the frequency of service than the respondents to the employee survey, with higher percentages demanding better frequency.



- Span of service is another critical component of service. Respondents were asked how late the bus would need to run to be attractive. Only 15% stated that 6:00 p.m. would be sufficient (compared to 45% in the employee survey). A significant plurality (38%) wanted service at least until 8:00 p.m. and 32% wanted service until 10:00 p.m. or later.
- As to potential weekend service, 15% of respondents said they would frequently use the route on Saturdays and Sundays, and another 43% said they would occasionally use it on those days. These percentages were much higher than those for the employee survey.
- Respondents were asked about seven factors external to the service itself that might affect their usage of the bus. The results for each of these factors is shown in the graph below.

Among the factors, a significant rise in the price of gasoline, to over \$5 per gallon, achieved the highest rating, in terms of the factor that would most influence increased use of the bus. Access to nightlife and cultural activities was a close second. Safe and reliable service, comfortable buses, and the prospect of paying for parking at the workplace were all relatively important factors.



The final questions on the survey had to do with demographic characteristics. As intended, the survey respondents were mostly young professionals. Auto ownership and income was slightly below that of the respondents to the employee survey, but this group is still relatively affluent. The following summarizes these results:

- 56% of survey respondents were between 25 and 34 years of age. Only 33% were over 35.
- There were no respondents from a household that had no vehicles. 75% of respondents were in households with two or more vehicles. Similarly, 73% of households had two or more licensed drivers. Thus, access to an automobile did not seem to be a significant issue for any of the respondents.
- Only 15% of respondents had annual incomes of under \$40,000. 46% of respondents had incomes over \$80,000.
- 58% of respondents were female.

The young professionals show a high degree of interest in public transportation options, both for

regular commuting and social activities. They demand a somewhat higher level of service than do the older respondents in the employee survey. The sample size was relatively small and only seven respondents commuted between Concord and Manchester, but it seems that a service connecting the two cities may be attractive to this demographic.

Airport Passenger Survey

On September 24 and 25, RPC staff members conducted a survey of passengers exiting from the Manchester-Boston Regional Airport in order to understand how express service to Manchester and Concord might appeal to them. Over 90 interviews were completed, though only half of these were for people traveling from the airport to the study corridor. About 30 interviews were with people going to other towns in central New Hampshire or northern Massachusetts, and another 16 were with people traveling to the seacoast area of New Hampshire. The results presented here will focus on the 46 respondents traveling to the study area.

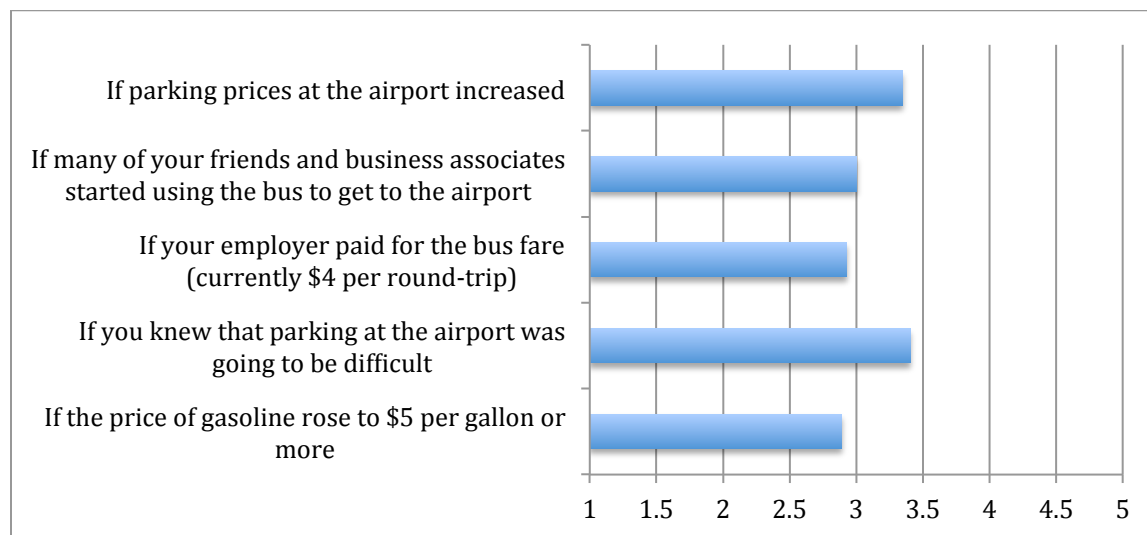
The city of Manchester was the most common destination for these exiting passengers, with most of the respondents being Manchester residents and a few traveling there on business or to visit family or friends. Nearly half of respondents had parked at the airport and would be driving their personal car home. About a third were being picked up by friends or family and about a sixth were planning to rent a car. Two respondents were planning to take a taxi and one was being picked up by a hotel shuttle. None of the respondents were planning to use public transportation to leave the airport.

Respondents were asked if they were aware of the upcoming East-West bus service to the Portsmouth area, as well as the Route 4 Concord Express. Very few people were aware of the East-West bus (about 6% of the total, and none of the people who lived in the corridor that would be served by the East-West route). In contrast, about 20% of the respondents were aware of the Concord Express. Among those who were aware of the route, they had learned of it through various means including the radio (NHPR), the newspaper, word of mouth, and seeing the bus on the street.

When asked if they would use the Concord Express for future trips to/from the airport, about a quarter of respondents said yes and a fifth said maybe. Slightly more than half said no. The usage rate among the “yes” respondents was most commonly 4 to 6 times per year, though a few people said only once per year. Among people responding “maybe,” the most significant improvement would be to operate it on weekends.

Question 6 on the survey sought to gauge the effects of various scenarios on the likelihood someone will ride the Concord Express route. The results are illustrated in the figure below. A longer bar (higher score) means that scenario would make them more likely to ride. Among these respondents, issues regarding parking at the airport seem to be the most decisive factors related to possible use of the bus. The cost of the bus fare and the cost of gasoline are

relatively less important than the cost of parking. This makes sense as the bus fare is relatively low, and most of the respondents are making relatively short trips between the airport and their local destination, so that an increase in parking cost would outweigh an increase in gas prices.



Overall, the airport survey indicates that this market may be more difficult to capture than the commuter market that was addressed in the employee survey. A smaller percentage of respondents indicated interest in using the bus route, and those that did said that they would use it only a handful of times per year. In order to build sufficient ridership, then, the route would have to achieve a high degree of awareness among the traveling public and offer trip times that were convenient for most travelers. Other issues for future airport service are discussed below.

MTA Route 4 On-board Survey

MTA's pilot test of the Route 4 – Concord Express offers an opportunity to understand the characteristics of "early adopters" of the new service. In July 2013, the first month of operation, the average daily ridership was about 30 passengers. About 72% of these boardings occurred on the "commuting hours" trips: the ones departing at 8:15, 10:45, noon, 2:15 p.m. and 5:15 p.m. Another 8% of boardings occurred on the early commuting trip, departing at 5:45 from the airport and serving a Concord-to-Manchester trip at 6:20, arriving at 6:45.

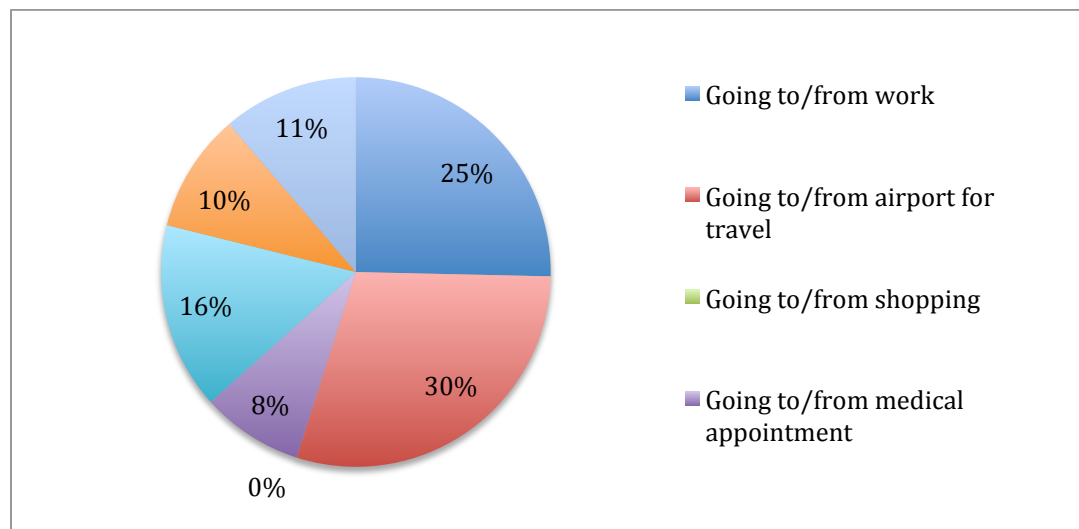
In August, average daily ridership grew to 45 riders per day. The percentage occurring during the commuting and midday trips grew to about 75% of the total. The two very early trips and the four late trips carried an average of less than two passengers per trip. The early commuting trip leaving Concord at 6:20 a.m. carried about 3 passengers per day toward Manchester. Of the 500 boardings in Concord during the month, 300 passengers alighted in Manchester, while the other 200 alighted at the airport.

In September, ridership grew further, to 49 passengers per day, but the growth curve flattened significantly. Consistent with prior months, 74% of these trips occurred on the commuting and

midday trips. The early and late trips continued to average two or fewer boardings per trip.

Finally, in October, average ridership grew to 59 passengers, a 20% increase over September. The early morning trip at 3:30 a.m. has been dropped due to poor patronage. The distribution of riders over the course of the day remains consistent with prior months.

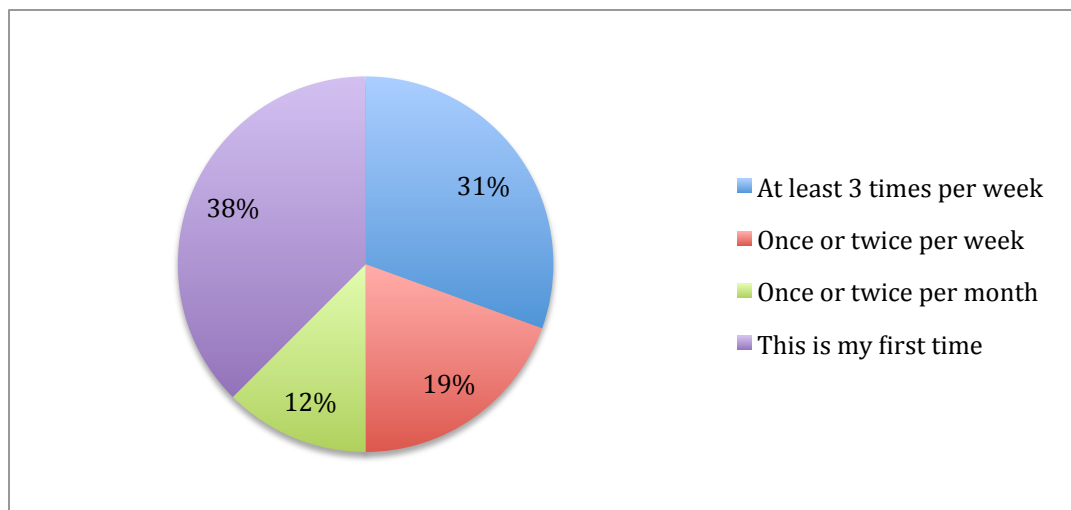
Passengers on Route 4 were surveyed during the first week of September. A total of 72 surveys were completed. The trip purposes as reported by these passengers are shown in the chart below.



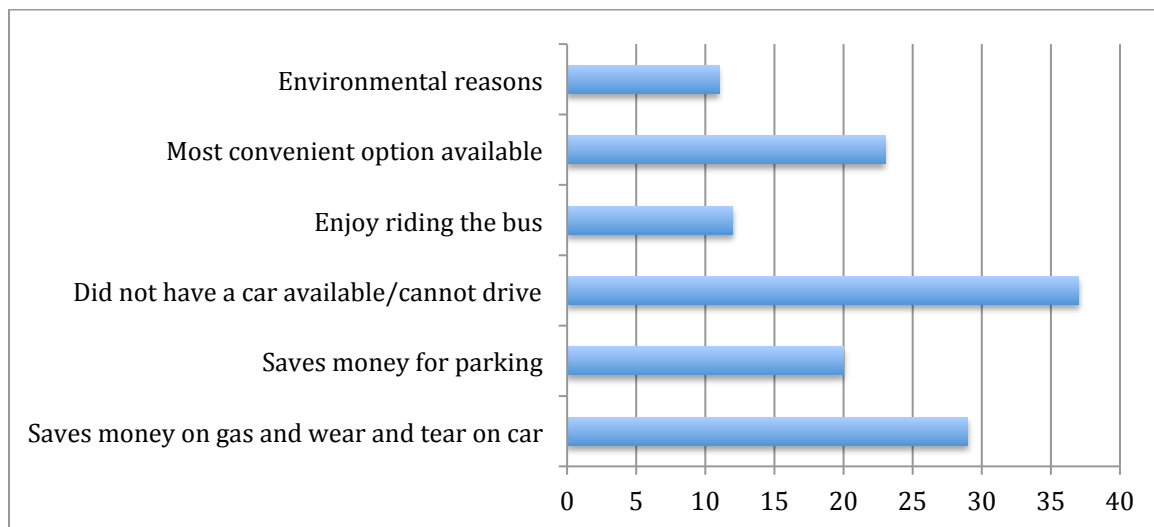
Given the ridership figures, it appears that airport passengers are overrepresented in the survey. Based on counts, boardings at the airport represent only about 10% of total boardings, though alightings at the airport represent about 22% of the total. In general, passengers seem to be using Route 4 to get to the airport about twice as often as they are using it to get home from the airport. In the survey, virtually everyone going to the airport had boarded in Concord.

Passengers were asked how they had learned of the bus route. More than half said they had found information on the MTA website and printed schedules. About a third of passengers had learned via word of mouth or seeing the bus on the street. About 10% of passengers saw an advertisement in the newspaper or heard about the route on the radio. Finally, a few passengers were referred to the route by Concord Coach.

Half of the riders on the Concord Express are regular users (riding at least once per week) of either the MTA or CAT local transit systems. Eleven respondents said they were regular users of both systems, while another 20 were regular MTA users. About a third of Route 4 riders use it multiple times per week, while nearly 4 in 10 of those surveyed were on the route for the first time. The distribution of usage rates is shown in the chart below:



When asked why they chose to ride the Concord Express, riders gave a number of reasons. The most common reason was that they did not have a car available or otherwise could not drive, followed by saving money. Several respondents chose more than one reason. The full results are shown in the chart below:



Of the 68 respondents who provided their home towns, 26 were from Manchester and 17 were from Concord. The others were from a variety of towns in New Hampshire, plus two from out of state who were using the bus to get from the airport to Concord.

The most common means of access to the bus was walking, followed by transferring from another bus route or being dropped off. These three means accounted for 77% of the responses. Only 12% of passengers drove and parked to catch the bus. Three passengers biked to reach the bus. Walking was even more common as a means of egress from the bus, accounting for more than half of the answers. Being picked up and transferring to another bus route accounted for all but two of the remaining responses.

The remainder of the survey sought input on ways to improve the service and any other comments. The most common response for a desired service improvement was service on weekends, with more than half of respondents asking for this improvement. The next most common response was more trips offered during the day. Specific times requested included the following:

- Between noon and 2:30 p.m.
- Between 5:30 a.m. and 7:30 a.m.
- Between 7:30 a.m. and 8:00 a.m.
- 4:00 or 4:30 p.m. trip from Manchester to Concord
- Trip at 10:00 a.m.
- Between 2:30 p.m. and 5:30 p.m.
- Pick up at the Radisson later in the evening (at least until 7:00 p.m.)

A few passengers asked for additional stops on the route, such as in intervening towns (Pembroke, Hooksett, Allenstown) and a stop in downtown Concord, at Eagle Square. Four passengers requested that a vehicle with a luggage rack be used for the route.

Overall, the general passenger comments about the route were positive. Some examples follow:

- “Was pleased with service, people very helpful.”
- “I love it! I tell everyone I know about it! This has helped me continue to reduce my carbon footprint!”
- “Great service, please continue”
- “Please don't take it away”
- “Glad you're here!!”

Several passengers emphasized the need for weekend service, even if it was minimal (one or two trips).

Potential Markets and Service Goals

The demographic and travel pattern analysis, along with the survey results, all indicate that there is a market for a transit connection between Concord and Manchester and that it would be successful if operated in a way that is attractive to the potential riders. The sections below describe four market segments that could be the targets for new service.

Commuting market

Perhaps the strongest of the four markets is the commuting market. The data from OnTheMap, illustrated in figures 7 through 11, demonstrate that many people commute between the two downtowns, and from one downtown to the peripheral employment centers in the other city. While it may not be possible to serve all of those connections conveniently with limited resources, some of the connections could certainly be made.

As mentioned on page 6, parking constraints and cost are a key factor in determining how large a share of the commuting travel market a transit route can capture. That is to say, even though there may be hundreds of people traveling from one area to another, few of them would choose to switch from driving to taking the bus if they know that they have a free and convenient parking space waiting for them. Very expensive gasoline can change the equation (as the employee survey showed), but parking costs seem to hit people more directly than gasoline costs when it comes to making choices about travel mode.

In the Manchester-Concord region, of the five employment centers examined earlier, only the downtown areas of Concord and Manchester charge for parking. On-street parking in Manchester costs \$4 to \$6 per day if one uses meters or \$45 per month for a permit. Off-street parking in Manchester costs \$50 per month for surface lots and \$75 per month or \$6 per day for the Victory garage.¹ Parking in downtown Concord is 50 cents per hour for on-street meters or the three downtown garages²; a commuter would expect to pay \$4.50 for all-day parking. Of course, many employees in these downtown areas have free parking provided by their employers.

The hospitals and malls areas of Concord have free parking, and the Mall of New Hampshire has free parking as well. The airport charges a one-time \$25 fee for most of the employees there, but in some cases, the employer is billed directly for this charge rather than the employee paying out of pocket. After paying this fee, parking is free on a daily basis. (Airport passengers, who do pay for parking, are discussed in the next section.) Free parking at the employment centers outside of the downtowns significantly diminish their potential as successful transit destinations. Of course, the parking rates in the downtown areas are not very high by urban standards, where parking can cost upwards of \$15/day, but \$5 per day may be noticeable enough to these commuters to have them consider other transportation options. Given the limited resources available for transit operations, further discussion of the commuting travel market will focus on the downtown areas of Concord and Manchester.

As mentioned earlier, a commuter route between the downtown areas of Concord and Manchester would need to balance two important factors: speed and access. Given widespread auto availability, the travel time on the bus would need to be close to the time for driving solo in order to be competitive. That suggests few or no stops between the two downtowns. It is also the case, however, that there are many other commuters who might like to use the route, but who do not live within walking distance of the downtowns. That suggests that additional stops at park & ride lots between Concord and Manchester would spur more ridership. In the route design phase of this study, different scenarios for operations will be considered and analyzed.

¹ <http://www.manchesternh.gov/Departments/Parking/OnStreetandOffStreetParking.aspx>

² <http://www.concordnh.gov/?nid=844>

The employee survey provided excellent information on start and end times for work and the degree to which those times varied. This information will help in schedule design. Midday and evening service on a commuter-oriented route is desirable, but not necessary, especially for initial operations. Focusing more service in the peak travel periods rather than spreading it throughout the day would convince additional choice riders to use the service, since they are sensitive to travel flexibility (i.e., the frequency of service).

Airport travel

A major impetus for the present study was the concern that large numbers of residents of the region were using express bus service to reach Logan Airport in Boston, but that other than residents of downtown Manchester, residents of this region had little or no bus access to Manchester-Boston Regional Airport (MBRA). The main question to be considered here is whether a bus service could be designed for this region that would have the same attractiveness as the Concord Coach/Boston Express service to Logan Airport. The Logan service uses comfortable coach buses with wifi available. The trip takes 95-125 minutes each way, depending on the time of day and costs \$20 one way or \$35 round-trip. The trip from Concord to Logan is about 70 miles each way and includes tolls. Not including parking costs at Logan, which are substantial, the operational cost for driving, using the federal mileage rate of 56.5 cents per mile, plus tolls, would be about \$85 for the round-trip. Thus, the express bus offers a significant savings over driving, without even taking parking cost into account. It also allows the traveler to ignore the frustration and anxiety associated with Boston area traffic.

For airport travelers to MBRA from Concord, the cost of driving is much less because the distance is only 25 miles each way. Using the same mileage rate and tolls, the operational cost for a round-trip from Concord to MBRA would be about \$30. Traffic is not a major concern when traveling to MBRA.

Mode choice for airport travel is usually a trade-off between cost and convenience. Convenience includes both travel time flexibility and the avoidance of hassles. For trips to Logan, the express bus offers advantages in both cost and convenience because of the long travel times and Boston area traffic. Many travelers choose the bus even though it limits their flexibility, as it allows them to save money and avoid a long and frustrating driving trip. While a bus service to MBRA would save travelers money, the amount saved would be much less compared to the savings for Logan trips. Further, because the trip is relatively short and traffic-free, the convenience factor tends to work against bus service to MBRA rather than in favor of it. The flexibility-limiting factor of having to follow the bus schedule rather than going when you want overwhelms the advantages of not having to drive.

Concord Coach is able to offer frequent service to Logan Airport (hourly through much of the day) because those buses also carry passengers to downtown Boston. Indeed, some 87% of the

ridership between Concord and the Boston area is destined for locations other than Logan Airport. Because of the huge draw of the Boston metro area, Concord Coach can operate frequent service that is attractive to the relatively small market of people going from Concord and surrounding towns to Logan (about 85 people per day according to a 2010 Logan Airport passenger survey). These passengers don't mind that the buses stop at South Station in Boston before getting to the airport since the extra time involved is insignificant compared to the total travel time.

The market for travel from Concord to MBRA is currently smaller than the market to Logan: about 40 passengers per day. Trying to combine travel from Concord to downtown Manchester with that from Concord to MBRA will not be attractive to people who have the option to drive to the airport, because the diversion from the highway into downtown Manchester will add a significant amount of time to a relatively short trip. With that diversion, the bus time from Concord to the airport would be twice the travel time by automobile. Also, the transit market from Concord to Manchester will never be as large as the transit market to Boston because it is too easy and inexpensive to drive the short distance between the two New Hampshire cities. In contrast, the cost savings and avoidance of traffic hassles by not driving to Boston makes transit a very appealing option for that much longer trip.

The discussion thus far has ignored parking cost. For the Boston situation, avoiding parking charges in and around Logan is really "the icing on the cake" since the cost and convenience factors already weigh heavily in favor of the bus service. For MBRA, however, avoiding parking cost may be the key factor that convinces some people to accept the relative inconvenience of the bus over driving. Parking capacity is never an issue at MBRA, as additional long-term lots are opened during times of peak demand (holidays and winter/spring vacation weeks).

Designing a successful bus service to the airport oriented toward airport passengers requires that as many of the inconvenience factors of bus service as possible be overcome. The trips would need to be timed carefully to get passengers to the airport so that they would not worry about missing their flights on the way out, and so that they would not be sitting around for a long time when they return home. Of course, flight delays increase the difficulty of having the schedule be convenient for passengers and may require the bus to offer assurance that it will meet passengers no matter how late their flight arrives. Given that planes are departing and arriving throughout the day, a high level of bus service would be needed to make sure that the majority of passengers have a convenient trip available to them.

Because most air passengers have luggage, the buses that go to the airport would need to be able to accommodate suitcases and other parcels easily. People are accustomed to airport shuttles having luggage racks, and even having assistance getting luggage on and off the bus. Few people would be expected to walk from their homes to a bus stop with a lot of luggage (unless they happened to live within a few hundred feet of the bus stop), so that park & ride or kiss & ride

access to the airport bus would be essential. Given the early morning and late night times associated with air travel at MBRA, these access points would need to have very good lighting to provide a sense of security.

Air passengers are highly focused on getting to the airport on time and then getting home quickly. This factor makes it difficult to mix airport access travel with other trip purposes. A route that tries to take people to work downtown, or to shopping at the mall, “on the way” to the airport will probably lose most of the time-sensitive airport passengers back to driving. People are used to paying top dollar for customized and attentive service to airports. If they get that and a low fare, they will be happy, but a low fare with inconvenient service will not be attractive for most of this (relatively small) market.

Non-work travel

Although there is not as much data available about non-work travel between Concord and Manchester as there is about commuting travel, the traffic volumes between the two cities indicate clearly that this is a significant market. The question is how easy it would be for a bus service connecting the two cities to capture some of this market. While the ridership on the current MTA Route 4 is low overall, the midday trips that operate between 10:45 a.m and 3:20 p.m. do as well or better than the trips that run during traditional commuting hours.

As part of a strategy toward building a successful transit connection between the two cities, it must be recognized that the non-work travel market is more difficult to capture than the commuter market. First of all, non-work trips tend to be taken less frequently than work trips, so that the route would have fewer regular daily passengers for these non-work purposes. Non-work trips also tend to be chained (with one errand following another), so that a bus service with long headways becomes an inconvenient way to get all of the errands completed. To accrue significant ridership in the non-work market, the awareness of the bus service has to be very broad. This type of awareness is easier to achieve once a route has been clearly established, and the easiest way to do that is to address the commuting market first.

A non-work trip relevant to many younger commuters is the trip to child care. Working mothers and fathers often drop their child or children off on the way to work and pick them up on the way home. Such trips are difficult to accomplish while riding a commuter bus service unless the child care center is within walking distance of either the home or the workplace of the parent. Otherwise the limited stops made by the commuter route, and the limited frequency of trips mean that it would be impossible for most parents to accomplish the daycare stop on the way to/from work using the commuter route.

Transit dependency

It is not unusual for transit agencies with limited resources to find that the great majority of their passengers are dependent on public transportation for all of their mobility. While the

demographic analysis did not find large concentrations of people with mobility deficiencies, there clearly are people in the downtown areas of Concord and Manchester who do not have access to automobiles. There are also people in the communities between the two cities, such as Pembroke and Allenstown, who have mobility needs. Instead of designing services to attract choice riders who work in the downtowns or who need to get to the airport, a bus service could be designed to provide local mobility in the travel corridor between Concord and Manchester. Such a route that ran on local roads rather than I-93, would fulfill an important social function, but would probably have a low ridership ceiling and would not develop into a more broadly attractive service.

Next Steps

The service design phase of this project will develop potential transit service to address these markets. The most promising of these will be further developed into a study recommendation for which funding and implementation can be pursued.