

Portland North Alternative Modes Transportation Project
Alternative Analysis

Prepared by

Maine Department of Transportation

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Executive Summary

1.0 Introduction

This Executive Summary provides an overview of the background, key issues and findings of the Portland North Alternative Modes Transportation Project, the details of which are contained in the document chapters that follow. This summary provides a project overview, purpose and need, a brief description of the study area; a summary of the screening process, and the results and recommendations from the Phase I, II and III analyses.

1.1 Project Overview

In order to address traffic congestion and mobility needs within the Portland North region, the Maine Department of Transportation (MaineDOT) is considering implementation of transit service along one of the following corridors:

- Portland through Yarmouth to Bath/Brunswick,
- Portland through Yarmouth to Lewiston/Auburn, or
- Portland to Yarmouth.

In the early stages of this project, transit alternatives were only considered for service to Auburn or Brunswick, but after further consideration and consultation with stakeholders, it appeared that there was significant enough residential and employment density in Lewiston and Bath to extend the study corridor to these communities as part of the two regional alternatives. The Portland North Alternative Modes Transportation Project (the Project) evaluated each proposed corridor, route, mode, and service alternative option within the study area and then identified the alternative which best met the purpose and need of the project. Potential federal, state, and local funding sources were then considered for implementation of the locally preferred alternative. Federal sources considered included grant programs administered by the Federal Transit Administration (FTA).

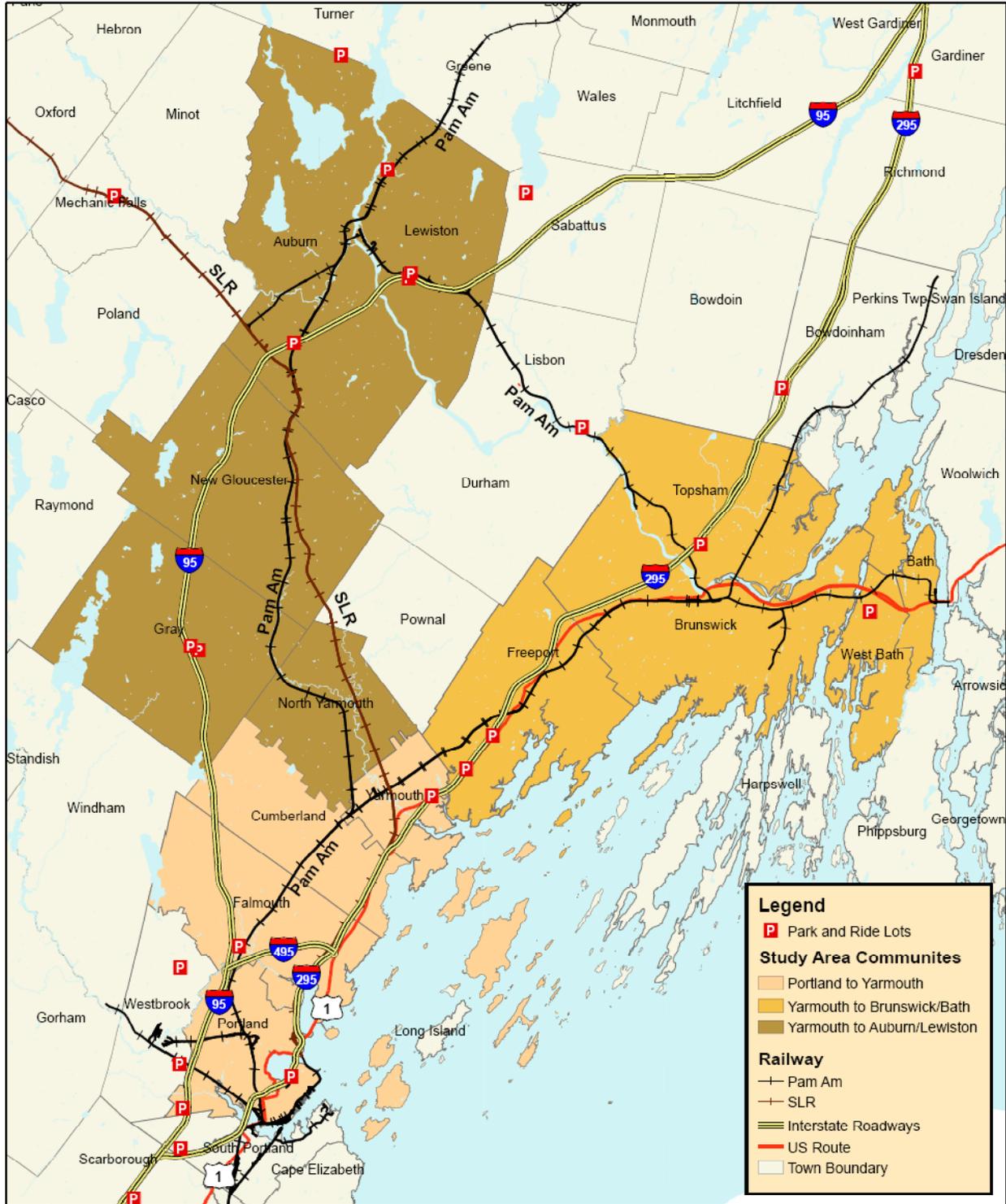
The study area is located throughout central Maine from Portland north to Lewiston and northeast to Bath. The study area is broken into three corridors that cover the proposed service alternatives bulleted above. The Portland-Yarmouth corridor includes the communities of Portland, Falmouth, Cumberland, and Yarmouth. The Yarmouth-Bath corridor includes the communities of Freeport, Brunswick and Bath. Finally, the communities of Gray, New Gloucester, North Yarmouth, Auburn and Lewiston are included in the Yarmouth-Lewiston corridor. The study area is depicted in Figure ES-1. Communities in the study area are generally those that have a proposed station located within them, but also include communities where a relevant roadway or railway is located within their boundaries.

The transportation problem to be addressed by the proposed transit project is increasingly severe highway congestion which is impacting travel times, mobility, and air quality. A MaineDOT I-295 Corridor Study Report¹ suggested transit would be one of the most effective alternatives for reducing peak hour volumes, reducing overall vehicle miles traveled, and decreasing parking needs. Transit also fits with the area's long range transportation plans seeking to integrate multi-modal transportation which, among other goals, complements "land use decisions that promote compact development, preserve community character and retain open space."²

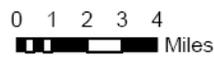
¹ MaineDOT and PACTS. *I-295 Corridor Study*, 2008.

² PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

Figure ES-1: Study Area Overview including Transportation Facilities



Source: MEGIS 2008



2.0 Project Purpose and Need

The primary purpose of the Project is to improve transit mobility options in the study corridor, which is currently experiencing major highway congestion that is expected to significantly worsen over time. Integration of the transportation improvements with land use and economic development is also central to the Project.

Project needs were identified through a public process in consultation with the MaineDOT and project stakeholders. The process first identified the existing and future transportation problems in the corridor and then formulated goals for addressing each of them. Summarized below are the four major goals of the Project, and each is followed by a summary description of the problem or need it is intended to address.

2.1 Reduce Highway Congestion

Current average annual daily traffic counts on I-295 between Exit 3 and Exit 9 consistently exceed 30,000 daily vehicles in each direction. The heaviest congestion occurs on the bridge crossing Back Cove with daily one-way traffic totals approaching 45,000 vehicles. According to MaineDOT, over the next twenty years, traffic volumes and resulting highway congestion on the I-295 corridor north of Portland are expected to increase. Traffic volumes at Back Cove are projected to rise by 20 percent, and future peak levels of service (LOS) between Yarmouth and Portland will range between D and F.

Average daily traffic volumes on the Maine Turnpike (I-95) north of Portland ranged from 10,200 to 27,900 vehicles in July 2009. Although there are no significant congestion problems currently identified on I-95 in the study area, peak highway travel times are projected to increase by 20% from Lewiston/Auburn to Portland by 32% from Gray to Portland over the next 20 years.

Because of the expected degradation of LOS and travel times, this need could be stated as improvement of commuter transportation during peak hour travel times. This improvement may be measured by improved travel times or decreased congestion. A consequential benefit of this improvement should be a reduction in congestion-related vehicular emissions.

2.2 Increase Mobility Options

One of the goals of the project is to not only improve and enhance the existing service, but to attract those that rely predominantly on an automobile for travel by providing an efficient and convenient transit alternative(s). Almost one in five households in Portland and Lewiston do not own an automobile; however, the communities located further from the urban centers average over two cars per household. The promotion of alternative modes of transportation is consistent with the State of Maine's Strategic Passenger Transportation Plan (Explore Maine) to reduce reliance on highways for movement of people and goods. US Census 2000 Journey to Work data shows a very high percentage of commuters utilizing automobile travel. This high percentage is likely tied directly to the lack of options, particularly options which reduce travel times during peak hours.

2.3 Integrate Transportation and Land Use Policy

Another goal of the project (consistent with the PACTS Regional Transportation Plan 2006 and the State Planning Office) is to strengthen the link between transportation investments and land use policies and decisions. Ensuring that land development occurs in locations where it is supported by an adequate

transportation system and preserving existing roadway capacities are two benefits that may be realized by this policy³.

2.4 Promote Community and Economic Development through Transportation Investment

An important purpose of the project is to entice investment and reinvestment in the traditional urban and small urban centers in the study area. With the inception of rail service from Portland to Boston operated by AMTRAK on its Downeaster Line, communities in Maine along that line are seeing a resurgence. Municipal leaders in Old Orchard Beach, for example, credit the Downeaster Service for spawning the 808 new year-round housing units and a luxury hotel in the community. Moreover, developers of the \$100 Million Saco Island redevelopment project, a mixed use development of retail space, condominiums, offices and a marina on a 15-acre former manufacturing mill site, state that their project “would not make sense if it were not for the train service”⁴. The City of Portland has developed a comprehensive development plan for the city’s Bayside district to redevelop the area as an attractive urban gateway featuring a compact mix of uses within walking distance of downtown.

3.0 Project Study Area

Located throughout central and mid-coast Maine, the study area covers most of the major population and employment centers in the state, even with population and employment decentralization over the last 40 years⁵. During this time period, both population and employment have been moving from the urban centers to the suburban and rural towns. This trend has dramatically increased the need for commuter transportation alternatives due to the longer distances traveled from residence to employment.

Several things are notable about the population and employment in the corridors of interest. They are:

- The highest number of jobs are located in Portland, but the job:worker ratio is highest in Bath, probably due to the location of Bath Iron Works.
- Other than Auburn, the five terminal location towns are projected to lose population from 2000 to 2030, with the highest loses expected in Portland and Bath.
- Towns with some of the lowest job:worker ratios have the most commuters to Portland.
- Freeport is the only non-terminal municipality with jobs outnumbering workers.
- The highest percentage increases in population are anticipated in New Gloucester, North Yarmouth, Gray, Cumberland, and Topsham.

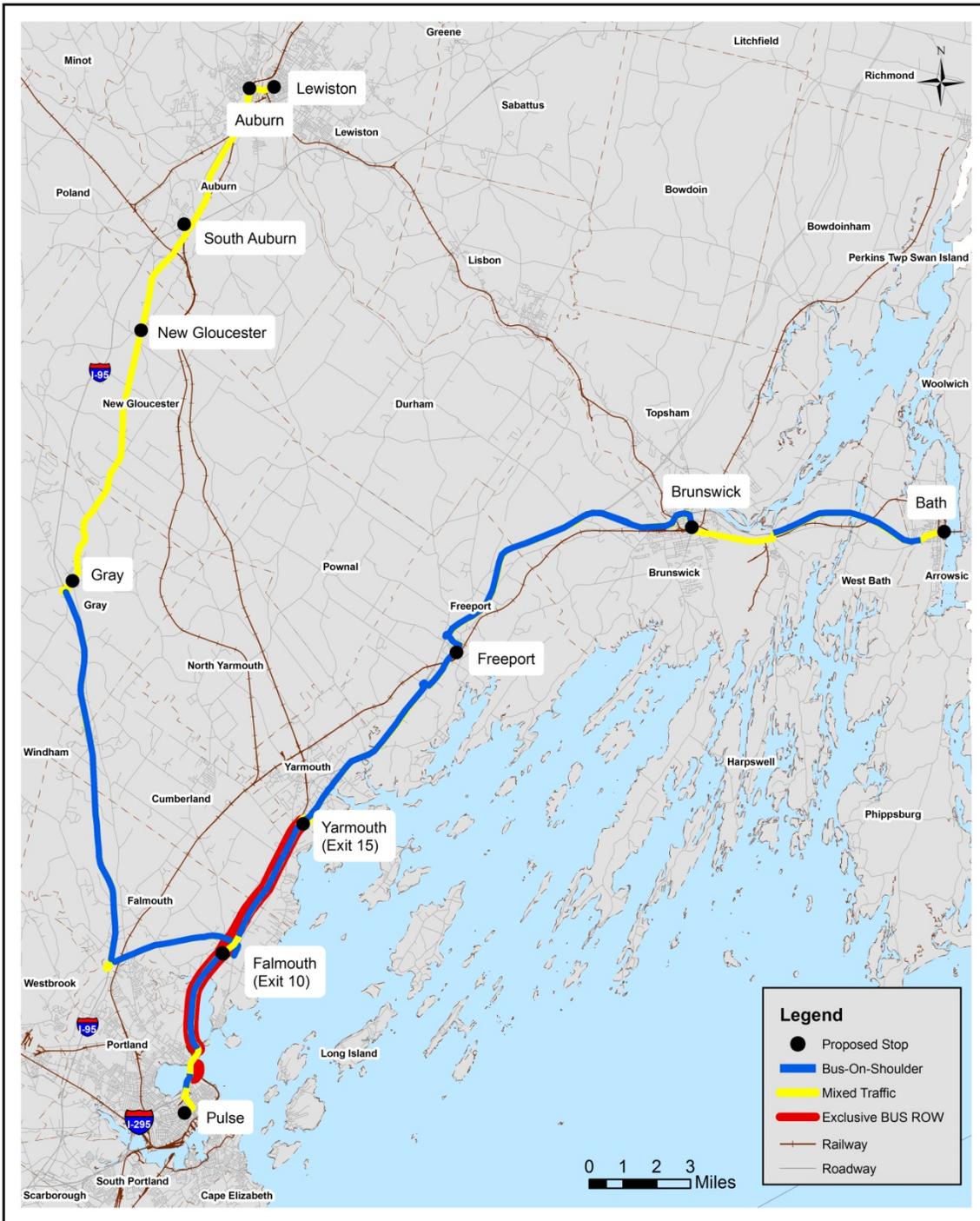
The study area is broken into three sections that coincide with the three potential service packages: Portland to Yarmouth, the I-295 corridor from Portland to Brunswick/Bath and the I-95 corridor from Portland to Auburn/Lewiston. Figure ES-2 shows the proposed transit corridors for the bus exclusive right-of-way alternatives. The rail alternatives considered would utilize the existing railroad corridors that generally parallel the alignments shown.

³ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

⁴ Portland North Expansion Review, p. 2.

⁵ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

Figure ES-2: Proposed Transit Corridor showing Exclusive ROW Operation



Source: MaineGIS 2008

3.1 Portland to Yarmouth Corridor

North of Portland, the corridor between Portland and Yarmouth is the heaviest commuter corridor. From the US Census 2000 Journey to Work information, 1,400 people commute daily from Yarmouth to Portland. Also in the southbound direction, approximately 1,200 people from Cumberland, 1,950 people from Falmouth, and 550 people from North Yarmouth commute daily to Portland in the corridor⁶. Approximately 400 people travel daily from Portland to Yarmouth in the reverse commute direction. Population density is obviously highest throughout the City of Portland, but Yarmouth also has very dense population distribution north of I-295. Population is moderately dense through areas of Falmouth, Cumberland and Yarmouth south of I-295.

3.2 Yarmouth to Brunswick/Bath Corridor

The corridor from Yarmouth to Brunswick and further to Bath is a busy link to Portland and also an important employment and residential region in and of itself. According to the US Census 2000 Journey to Work information, in the southbound direction, there are 650 daily trips from Brunswick to Portland, 1,000 trips from Freeport to Portland, and 1,400 trips from Yarmouth to Portland for 3,050 total southbound trips in the corridor. Many individuals also live in the Portland region and commute northward in the reverse commute direction. According to Portland Area Comprehensive Transportation Committee (PACTS), nearly as many people commute northward from Portland to Brunswick as commute southward, with 600 daily trips. A smaller number of people live in Portland and commute northward to Freeport and Yarmouth, with 500 and 440 daily trips, respectively. In the region north of Yarmouth along I-295, dense population distribution is greatest in Brunswick, but there are also pockets of high population density in Freeport and Bath near the major road network.

3.3 Yarmouth to Auburn/Lewiston Corridor

The corridor from Portland to Auburn and further to Lewiston is strongly linked to I-95 and US Route 202 (co-signed with Routes 4 and 100). According to the US Census 2000 Journey to Work data, in the southbound direction, there are 1,000 daily commuting trips from Lewiston and Auburn to Portland. There are far fewer trips in the reverse direction – 260 daily commuting trips. In the Portland to Lewiston region, population density is greatest in downtown Lewiston and Auburn, but is low throughout the rest of the corridor. Population growth in these communities is projected to continue at a high rate through 2030.

4.0 Screening Process

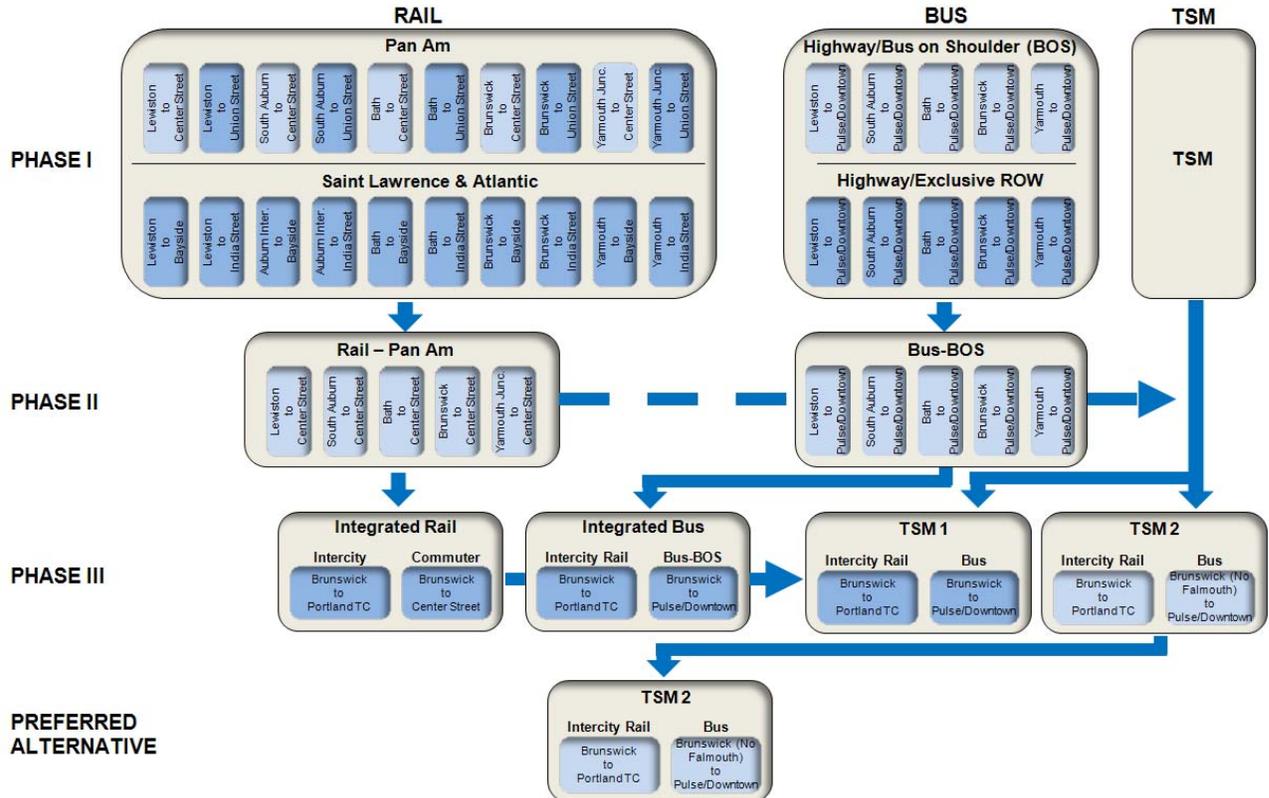
The Portland North Alternative Modes Transportation Project evaluated each proposed corridor, route, mode, and service alternative option within the study area in order to identify the alternative that best met the purpose and need of the project. For each transit corridor (Portland-Yarmouth, Portland-Brunswick (Bath), or Portland-Auburn (Lewiston)), there was a baseline express bus option that would operate on the highway shoulder, an exclusive right-of-way (ROW) express bus option and two different rail options on two existing freight lines.

The Phase I screening process was heavily weighted by ridership projections and costs to implement and operate the service. The first phase of alternative screening took a broad overview look at approximately 30 alternatives to narrow the list of alternatives down to ten options. The ten options then moved forward for further evaluation in the Phase II and Phase III alternatives analyses. The Phase II and III alternatives were comprised of options that did not utilize the Saint Lawrence and Atlantic rail rights-of-way (ROW), a

⁶ GPCOG & SMRPC. *Bus Rapid Transit and Light Rail Transit Study*, 2004.

decision based primarily on the low cost effectiveness (cost versus potential ridership) of those options. The alternatives development and screening process is shown in Figure ES-3 provided below.

Figure ES-3: Alternative Development and Screening Diagram



5.0 Phase I Alternatives Analysis

The Portland North Alternative Modes Transportation Project evaluated each proposed corridor, route, mode, and service alternative option within the study area. During the Phase I alternatives analysis, the Study identified a No-Build alternative, a Transportation Systems Management (TSM) alternative, and two groups of Build alternatives. The Build alternative evaluated both express bus and commuter rail options for the three main origin locations with service to the Portland region, the largest employment center in the State.

For each transit corridor (Portland-Yarmouth, Portland-Brunswick (Bath), or Portland-Auburn (Lewiston)), there was a baseline express bus option that would operate on the highway shoulder, an exclusive right-of-way (ROW) express bus option and two different rail options on two existing freight lines.

5.1 Phase I Alternatives Considered

The transit alternatives considered would begin in one of the following communities and serve downtown Portland (reverse commute options would also be available):

- Bath

- Brunswick
- Lewiston
- Auburn
- Yarmouth

These origin-destination pairs could be served by TSM bus service or Build alternatives consisting of either express bus service or commuter rail service. TSM bus service would operate over existing roadways in general travel lanes. With express bus service, the corridors could be served by buses operating on the shoulders of existing highways (bus on shoulder (BOS) service) where feasible, or by buses operating on an exclusive bus-only right-of-way (Exclusive ROW) located on the former Saint Lawrence and Atlantic Railroad ROW between Yarmouth Junction and Back Cove in Portland, now owned by the State of Maine. Both of these options allow the bus to operate separately from the general traffic for most of the alignment in order to adhere to the published schedule and avoid traffic delays. In Portland, the express bus would stop at the Downtown Transportation Center (also known as PULSE) near centrally located Monument Square and then enter into a downtown circulation loop to augment the existing METRO bus system.

For the commuter rail options, the trains would use the Saint Lawrence & Atlantic (SLR) railway (including the state-owned segment between Yarmouth Junction and Portland), the existing Pan Am railway, or a combination of the two freight lines. The SLR railway tracks were generally rated for freight use (Class I) at the time of the analysis and would need to be upgraded to Class III track in order to support passenger service. The Pan Am tracks were generally rated for Class III passenger speeds between Portland and Auburn at the time of the analysis and would require minimal upgrading and construction. Additionally, this analysis assumes that the Pan Am track between Portland and Brunswick will be upgraded to Class III passenger service as part of the Amtrak Downeaster extension to be funded under an American Recovery and Reinvestment Act (ARRA) High Speed Rail grant approved on January 28, 2010. For the rail alternatives, the SLR line would terminate either at a stop in Bayside or on India Street and the Pan Am line would terminate at Union Station or at a stop on Center Street. A downtown bus shuttle from the proposed rail stations was also included for all stations except Center Street, which is already centrally located downtown. Figure ES-4 shows the Portland terminal options for both bus and rail alternatives.

This combination of origin-destination pairs and bus or rail modes of operation resulted in a preliminary set of 30 transit Build alternatives. Table ES-1 describes the mode of travel for each of the 30 possible alternatives that results from combining each of the six Portland destination/mode choices with each of the five terminus points.

Figure ES-4: Potential Portland Terminals



Table ES-1: Alternatives by Mode

Terminal	Portland Destination					
	Rail				Bus	
	Union Station	Center Street	Bayside	India Street	Monument Square	Monument Square
Yarmouth	Pan Am	Pan Am	SLR	SLR	BOS	Excl. ROW
Brunswick						
Bath						
Auburn						
Lewiston						

5.2 Phase I Findings

In evaluating each alternative, screening criteria were used to determine which options combined to create the best possible project to submit to FTA (Federal Transit Administration) for review for Small Starts funding. The first phase of screening is described and conducted in this chapter. The second phase of screening is described in Chapter 3.

The first phase of alternative screening took a broad overview look at approximately 30 alternatives in order to narrow the list of alternatives down to ten alternatives (an express bus and a commuter rail option to five outer terminals – Yarmouth, Brunswick, Bath, Auburn and Lewiston). The cost per rider figure was used to choose the most cost effective route for each outer terminal – Bath, Brunswick,

Lewiston, Auburn, and Yarmouth. This narrowed list of alternatives is fully screened in terms of all evaluation criteria in the second phase of screening. The most cost effective option generated the most ridership using the least amount of money. It needed to be noted that the cost per rider measure used in this initial phase of screening differed from the FTA Small Starts criterion for cost effectiveness.

Cost (annualized operating & capital costs) per rider (base year daily boardings multiplied by 254 annual service days⁷) was estimated for each alternative. Cost ranged from a high of \$238.22 per rider for rail service on the SLR line to Lewiston (Bayside Station) to a low of \$38.25 per rider for rail service to Brunswick on the Pan Am line (Center Street Station). On the bus side, the exclusive ROW options (using the SLR) were much less cost-effective than the bus-on-shoulder options due to greater capital input required to get the service up and running.

Table ES-2 lists the most cost-effective commuter rail and express bus option for each terminal location, based on the first phase of screening. For rail service, the most cost-effective alternative was the Pan Am service to Center Street for each outer terminal except Bath. For the Bath terminal, the Pan Am service to Union Station was slightly more cost effective than the service to Center Street because the service from Bath required an additional coach to operate from Union Station to Center Street to accommodate the projected ridership. The Pan Am rail service for Bath/Brunswick option is more cost-effective than for the Lewiston/Auburn option as this alternative benefits from the upgrades that will be accomplished separately for the Amtrak Downeaster extension to Brunswick.

Similarly, for bus service, the most cost-effective alternative was the bus-on-shoulder highway running service for each terminal. Cost per passenger increased with increasing distance to Portland. However, the Bath/Brunswick express bus options were significantly less expensive than the Lewiston/Auburn options due to lower projected ridership, and additional trips and travel distance required for the Lewiston/Auburn option.

Table ES-2: Most Cost-Effective Commuter Rail and Express Bus Options

Terminal	Commuter Rail		Express Bus	
	Most Cost Effective Option	Cost per Passenger	Most Cost Effective Option	Cost per Passenger
Yarmouth	Pan Am/ Center St	\$39.95	BOS	\$10.28
Brunswick	Pan Am/ Center St	\$30.77	BOS	\$9.75
Bath	Pan Am/ Union Sta.	\$40.37	BOS	\$9.30
South Auburn	Pan Am/ Center St	\$73.11	BOS	\$16.21
Lewiston	Pan Am/ Center St	\$77.59	BOS	\$16.40

While traveling through Union Station to Center Street was additional distance, time, and initial capital input, the cost per passenger was actually lower for the Center Street option because it is centrally located in downtown Portland and would not require a rail shuttle to get passengers to their destinations. This option also allowed direct service without a transfer to another travel mode.

⁷ 254 service days equals weekdays minus holidays for the year

At the completion of Phase I screening, one bus and one rail alternative to Yarmouth, Brunswick, Bath, South Auburn and Lewiston terminals remained for further analysis. As shown previously in Figure ES-3, the bus-on-shoulder express bus option and the Pan Am to Center Street rail option for the five outer terminals continued to Phase II.

6.0 Phase II Alternatives Analysis

The Phase I preliminary alternatives narrowed down the 30 alternatives to ten options. The ten options then moved forward for further evaluation in the Phase II alternatives analyses. The Phase II alternatives are comprised of options that do not utilize the SLR rail rights-of-way (ROW), a decision based primarily on the low cost effectiveness (cost versus potential ridership) of those options.

6.1 Phase II Alternatives Considered

The initial Phase II alternatives included all Pan AM rail options and all highway/bus on shoulder bus (BOS) options:

- Rail:
 - Pan Am to Yarmouth
 - Pan Am to Auburn
 - Pan Am to Lewiston
 - Pan Am to Brunswick
 - Pan Am to Bath
- Bus:
 - Portland to Yarmouth on Highway and Shoulder
 - Portland to Auburn/Lewiston on Highway and Shoulder
 - Portland to Lewiston on Highway and Shoulder
 - Portland to Brunswick on Highway and Shoulder
 - Portland to Bath on Highway and Shoulder

The intention of the study from initiation was to develop a project that would be eligible for the Federal Transit Administration's Small Starts funding program. Therefore, in further refining alternatives a strong focus was on the ability of options to meet Small Starts requirements, such as possessing a dedicated fixed guideway for at least 50 percent of the alternative route distance.

For the rail options, providing a fixed route was simple, as the dedicated rail right-of-way by nature was a fixed route guideway, dedicated to only rail operations. For the bus options, it was a little more complex, although solved by proposed use of the highway breakdown lane for exclusive bus use during peak hour travel.

6.2 Phase II Findings

The project progressed over many years due to continuing public input, direction from FTA and the changing transportation landscape in the nation and region. One element which was in flux throughout the project timeline was the possibility of extending the successful Amtrak Downeaster service from Portland to Brunswick. Early in the process, the reality of the extension was in question, and that project was not considered in the baseline or TSM scenario. As time progressed, support for the extension grew. This combined with the opportunities presented by the American Recovery and Reinvestment Act of 2009

and High Speed Rail stimulus funding made the project more of a reality. In 2010, the Downeaster extension did receive a multi-million dollar grant to proceed with the infrastructure necessary for the project to become a reality. As a result, this project was able to assume that the Amtrak Downeaster extension would be part of the baseline condition.

The impact of that assumption resulted in a further refinement in the number of Phase II alternatives. Taking advantage of the approximately \$39 million investment in the Pan Am Railways line to Brunswick resulted in a reduction in overall costs for implementing the Brunswick alternatives. Based on this, combined with the overall higher projected ridership for the Brunswick scenarios, MaineDOT decided to eliminate the Lewston/Auburn alternatives from further consideration. Therefore, only options serving Brunswick were evaluated in Phase III.

7.0 Phase III Alternatives Analysis

Phase III focused on two key elements: further refining and defining alternatives that served the Portland to Brunswick corridor, and maximizing the use of other service proposed to be in place in the corridor. With the assumption that the Downeaster service would be in place, the MaineDOT team looked to maximize the use of the Amtrak intercity service investment and improve the Portland North options by combining intercity and commuter services.

7.1 Phase III Alternatives Considered

Alternatives considered in Phase III included the preliminary alternatives - Integrated Rail and Integrated Bus options and Coordinated Public Transport Service alternatives. These alternatives are described in more detail below.

7.1.1 Preliminary Alternatives - Integrated Rail and Integrated Bus Services

The Integrated Rail Service (IRS) builds upon the Coordinated Public Transport Service by replacing express bus service with commuter rail service. The commuter rail would operate seven roundtrips between Portland and Brunswick. The Downeaster would continue to provide three rounds trips per day. Due to operational constraints, Amtrak's midday Downeaster trips #684 and #681 will continue to stop only at Freeport and Brunswick. Additional stations at Center Street (Portland terminal), West Falmouth (Exit 53), Cumberland Center, and Yarmouth Junction would be built for commuter rail operations. Union Station would still be used to provide commuters with convenient access to the Maine Medical Center. It would also be the commuter terminal for Downeaster operated trips. Additionally, no shuttle service would be provided at Union Station for passengers boarding and alighting the Downeaster.

The Integrated Bus Service (IBS) would operate 12 bus roundtrips between Portland and Brunswick using bus on shoulder (BOS) operation on I-295 during periods of traffic congestion. Bus stations would be provided at I-295 Exits 10 and 15. The Downeaster would continue to provide three rounds trips per day and one Amtrak deadhead train would be converted to revenue service. Due to operational constraints, Amtrak's midday Downeaster trips #684 and #681 will continue to stop only at Freeport and Brunswick. Similar to the IRS option, Union Station would also used as an Amtrak stop to provide commuters with convenient access to the Maine Medical Center. Additionally, no shuttle service would be provided at Union Station for passengers boarding and alighting the Downeaster. With the Integrated Bus Service alternative as ridership grows trains could replace buses.

7.1.2 Impact of the FTA Decision on Use of Shoulder

As the project entered Phase II, a formal request was made of FTA to determine the applicability of utilizing the BOS concept from a Small Starts standpoint. In mid 2010, FTA indicated that the BOS concept, while creative and a good use of existing infrastructure investments, would not qualify as a fixed guideway under Small Starts guidance. Therefore, BOS options were eliminated from further consideration in Phase III.

As the Phase III alternatives analysis advanced, more detailed information was developed which painted a picture of the potential competitiveness of the integrated rail and bus options. MaineDOT periodically coordinated with FTA as the alternatives developed. While FTA was supportive of the efforts to combine services to maximize investment, reduce costs, improve flexibility and raise ridership, they were concerned about the ability of the alternatives to compete for New Starts funds. As time progressed, it became more evident that it would be a challenge for the integrated rail and bus options under review to rate high enough to secure Small Starts funding.

MaineDOT determined at this point that two paths could be taken. The first, could be to bring a Small Starts alternative to fruition and submit an application to FTA for consideration, knowing that the project would likely not rate highly enough by FTA to be awarded Small Starts funding. The second option could be to diverge from submitting a Small Starts application and utilize the remaining project resources to explore non-Small Starts options that might be smaller in scale, but more realistically able to be implemented. The decision made was to abandon the Small Starts path and move forward with the second option, focusing on developing a realistic project that would have a better chance of being implemented. The results of the effort moving forward, was the development of the TSM 1 and TSM 2 options (which still took advantage of the intercity service), supplementing it with a commuter bus service. Two variations of this approach (named TSM 1 and 2) are described in more detail below.

7.1.3 Coordinated Public Transport Service Alternative (CPTS) - TSM 1 and TSM 2 Options

The Coordinated Public Transport Service alternative (CPTS) is a TSM bus/rail hybrid service that would operate between Brunswick and Portland on I-295. The CPTS alternative has two options known as TSM 1 and TSM 2 and these alternatives are proposed to utilize the planned investment by others in the Amtrak Downeaster intercity rail service extension between Brunswick and Portland.

Both TSM 1 and 2 options would provide 14 roundtrips between Brunswick, Yarmouth, and Portland, enabling passengers to travel between Portland and Brunswick, on either the train or on the express bus. The TSM 2 option is almost identical to TSM 1, with the exception that there is no stop in Falmouth. Nine bus roundtrips to Brunswick would be provided, along with three Downeaster trips. Since Falmouth and Yarmouth would not be receiving Amtrak service, two short-turn roundtrips from Yarmouth and Falmouth are provided for passengers and would run at approximately the same time as the Downeaster operates.

The Falmouth stop would be located at (Exit 10) and Yarmouth stop would be at (Exit 15). It is anticipated that both stops would be offline⁸ stops.

⁸ Offline stops means they are not located on highways and would require buses to exit the highways in order to be able to pull in and out of the station.

7.2 Phase III Findings

After review of the TSM 1 and 2 alternatives, and feedback from stakeholders and other public input, it was determined that TSM 2 would be selected as the preferred alternative (see Figure ES-3). This option would provide a high level of flexibility, favorable ridership, and constitutes a reasonable and more feasible investment in capital and operating funds that would provide a much needed option for improving mobility within the Portland North study area. It also maximizes other transportation investments proposed for the study area and provides an opportunity to build support for transit service that could grow and expand as ridership improves. The summary comparison of TSM 1 and TSM 2 options are shown below in Table ES-3 (in \$2010).

Table ES-3: Comparison of TSM 1 and TSM 2 Options

Option	TSM 1	TSM 2
Weekday Boardings	665	557
Annual Operating Days	254	254
Annual Boardings	168,910	141,478
Annual Operating Costs	\$740,467	\$ 737,710
Capital Costs	\$9,800,000	\$8,600,000
Operating Costs/Boarding	\$4.38	\$5.21
Capital Cost/Boarding	\$58.01	\$60.78

8.0 Proposed Financial Plan

A proposed funding plan for TSM 2 capital cost and operating deficit is set out in this chapter, as summarized in Table ES-4 below.

Sources of funding that more directly reflect the beneficiaries of the service or that draw on the resources of the private sector may be available to the project in the future. As the project develops and the implementation schedule is established, the proposed revenues and expenditures identified in this report (which are all stated in constant 2010 dollars) should be updated to reflect inflation and changes in unit costs.

Table ES-4: Proposed TSM 2 Funding Plan

TSM 2 Sources and Uses of Funds (thousands of 2010 Dollars)	
Sources and Uses of Operations Funds	
Farebox Revenue	\$250
Section 5311 Funds	\$244
State Funds	\$244
Total Revenue	\$738
Operating Expense	\$738
Sources and Uses of Capital Funds	
In-Kind Assistance	\$994
Bond Proceeds	\$7,606
Total Capital Revenue	\$8,600
Total Capital Cost	\$8,600

Source: AECOM 2010

9.0 Public Involvement and Agency Coordination

The MaineDOT worked with the Androscoggin Valley Council of Governments (AVCOG) and the Greater Portland Council of Governments (GPCOG) to provide public outreach and technical assistance as appropriate for MaineDOT's Portland North Alternative Modes Transportation Project. The Public Participation Plan for the Portland North Alternative Modes Transportation Project forms the basic framework for achieving an interactive dialogue between community decision-makers, the MaineDOT, stakeholders, municipalities, AVCOG, GPCOG, and citizens.

The public involvement and agency coordination program consisted of the following elements:

- Public and stakeholder meetings
- General public relations, project website, and newsletters
- Project working group
- Technical advisory committee

10.0 Overview of Documents

The Portland North Alternatives Modes Transportation Project report following this executive summary includes the following chapters:

Chapter 1 – Baseline Conditions: This chapter includes an introduction with information regarding project background and history, as well as a detailed description of the purpose and need and screening processes for the project.

Chapter 2 – Description of Alternatives: This chapter defines the services along each transit corridor (Portland-Yarmouth, Portland-Brunswick (Bath), or Portland-Auburn (Lewiston)), describes the No-Build alternative, a Transportation Systems Management (TSM) alternative, and two groups of Build alternatives, presents costs for implementing and operating the service, projects ridership for the alternatives, presents screening criteria for the alternatives, and runs the preliminary set of alternatives through the first phase of screening down to one bus and one rail alternative for each terminal.

Chapter 3 – Alternatives Analysis: This chapter summarizes the ten options that moved forward for further evaluation in the Phase II and Phase III alternatives analyses. The Phase II and III alternatives are comprised of options that do not utilize the Saint Lawrence and Atlantic rail rights-of-way (ROW), a decision based primarily on the low cost effectiveness (cost versus potential ridership) of these options.

Chapter 4 – Public Involvement Process and Agency Coordination: This chapter contains a summary of public meetings and outreach.

Chapter 5 – TSM 2 Proposed Financial Plan: This chapter discusses potential funding sources and strategy for the Transportation Systems Management Option #2 (TSM 2), the preferred alternative.

Chapter 1 Baseline Conditions

1.1 Introduction

In order to address traffic congestion and mobility needs within the Portland North region, the Maine Department of Transportation (MaineDOT) is considering implementation of transit service along one of the following corridors:

- Portland through Yarmouth to Bath/Brunswick,
- Portland through Yarmouth to Lewiston/Auburn, or
- Portland to Yarmouth.

In the early stages of this project, transit alternatives were only considered for service to Auburn or Brunswick, but after further consideration and consultation with stakeholders, it appeared that there was significant enough residential and employment density in Lewiston and Bath to extend the study corridor to these communities as part of the two regional alternatives. The Portland North Alternative Modes Transportation Project (the Project) evaluated each proposed corridor, route, mode, and service alternative option within the study area and then identified the alternative which best met the purpose and need of the project. Potential federal, state, and local funding sources were then considered for implementation of the locally preferred alternative. Federal sources considered included grant programs administered by the Federal Transit Administration (FTA).

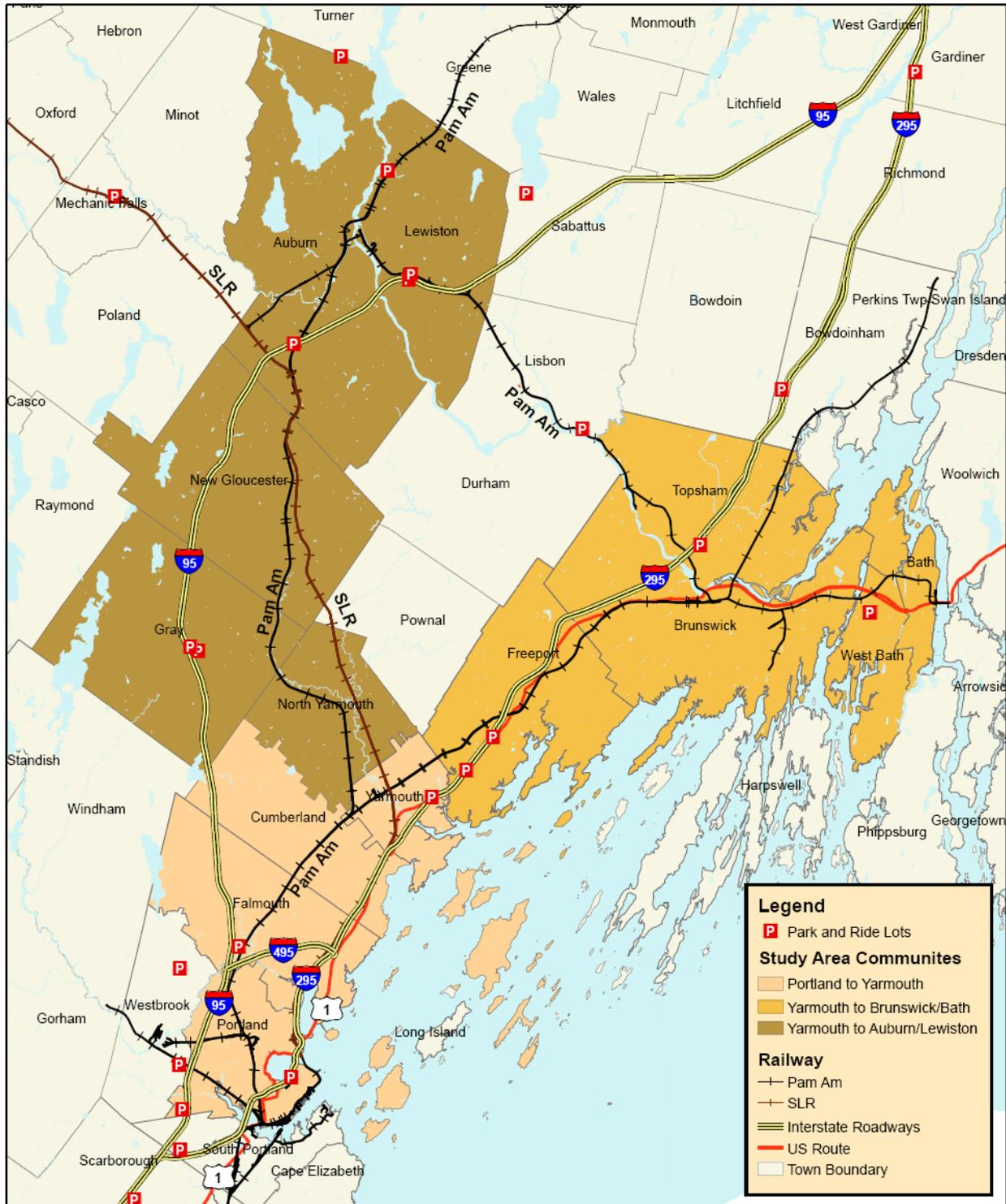
The study area is located throughout central Maine from Portland north to Lewiston and northeast to Bath. The study area is broken into three corridors that cover the proposed service alternatives bulleted above. The Portland-Yarmouth corridor includes the communities of Portland, Falmouth, Cumberland, and Yarmouth. The Yarmouth-Bath corridor includes the communities of Freeport, Brunswick and Bath. Finally, the communities of Gray, New Gloucester, North Yarmouth, Auburn and Lewiston are included in the Yarmouth-Lewiston corridor. The study area is depicted in Figure 1-1. Communities in the study area are generally those that have a proposed station located within them, but also include communities where a relevant roadway or railway is located within their boundaries.

The transportation problem to be addressed by the proposed transit project is increasingly severe highway congestion which is impacting travel times, mobility, and air quality. A MaineDOT I-295 Corridor Study Report⁹ suggested transit would be one of the most effective alternatives for reducing peak hour volumes, reducing overall vehicle miles traveled, and decreasing parking needs. Transit also fits with the area's long range transportation plans seeking to integrate multi-modal transportation which, among other goals, complements "land use decisions that promote compact development, preserve community character and retain open space."¹⁰ This chapter provides project background information and corridor description, inventories the existing transportation network (including transit) and outlines the existing and future baseline travel markets. Subsequent chapters of the report describe the transit alternatives, including capital requirements and costs, operating costs, transportation benefits, land use, and social and environmental impacts; a financial approach to meeting the costs of implementation and operation of the service; evaluation of alternatives; and finally an implementation plan. The public involvement process used for the project is also described later in the report.

⁹ MaineDOT and PACTS. *I-295 Corridor Study*, 2008.

¹⁰ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

Figure 1-1: Study Area Overview including Transportation Facilities



Source: MEGIS 2008



0 1 2 3 4
 Miles

1.2 Project Background

For over a century, the Portland area was served by intercity passenger rail service. After cessation of this historic service in 1967, Amtrak's *Downeaster* service has resumed intercity service from Portland to Boston (with several intermediate stops along the way). However, historic and current rail service is not geared toward the daily commuter in the Portland area.

For commuter travel from home to work, automobile travel is dominant. From surrounding cities to Portland, 79 to 85 percent commute via automobile alone with another 13 percent car pooling. The main highways are U.S. Route 1, U.S. Route 302, I-95 and I-295. Some fixed-route transit service operates in the study area including "Go Maine" commuter bus service. The existing highway network and transit service is presented in further detail in Section 1.5 of this report.

Per 2008 estimates from the US Census Bureau, the population in the study area is 214,206. Sixty-seven percent of the population is concentrated in the major study area cities of Portland, Lewiston, Auburn and Brunswick. Table 1-1 below lists US Census 2000 and 2008 estimated population by municipality. The larger cities have lost population over the past 8 years and suburban towns such as Gray, New Gloucester, and North Yarmouth have experienced substantial population growth. This trend will be further investigated throughout this report.

Table 1-1: Population Change 2000 - 2008 by Municipality

Municipality	2000 Population	2008 Population	% Change
Portland – Yarmouth			
Portland	64,249	62,561	-3%
Falmouth	10,310	10,724	4%
Cumberland	7,159	7,556	6%
Yarmouth	8,360	8,097	-3%
Subregional Total	90,078	88,938	-1%
Yarmouth to Brunswick/Bath			
Freeport	7,800	8,195	5%
Brunswick	21,172	21,720	3%
Topsham	9,100	9,827	8%
West Bath	1,798	1,761	-2%
Bath	9,266	8,885	-4%
Subregional Total	49,136	50,388	3%
Yarmouth to Auburn/Lewiston			
Gray	6,820	7,541	11%
New Gloucester	4,803	5,461	14%
North Yarmouth	3,210	3,570	11%
Auburn	23,203	23,177	0%
Lewiston	35,690	35,131	-2%
Subregional Total	73,726	74,880	2%
Regional Total	212,940	214,206	1%

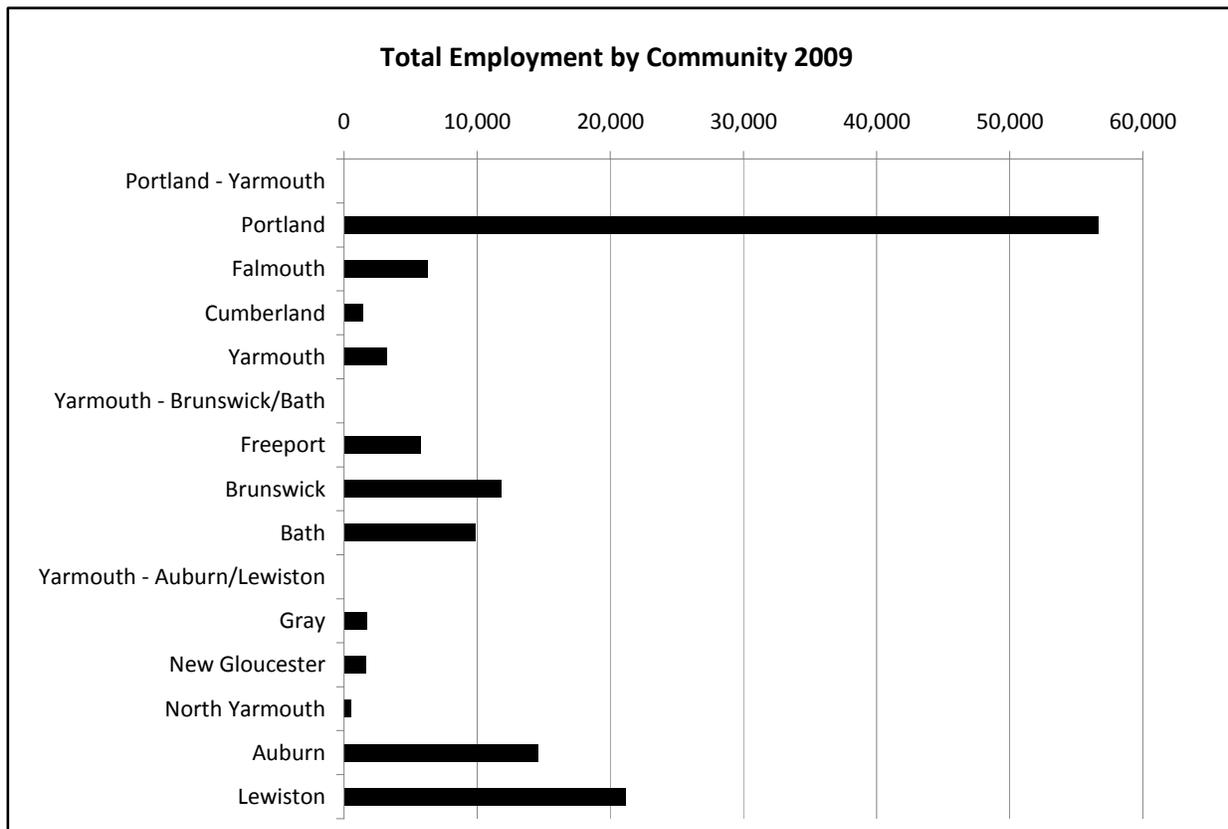
Source: US Census Bureau Website, 2009

In the study area, the population is highest in the Portland-Yarmouth region at 89,000. There are 75,000 people living in the Yarmouth-Lewiston region and 50,000 living in the Yarmouth-Bath region. The Portland-Yarmouth region has lost population during the past 8 years (1%), but both the Yarmouth-Bath and Yarmouth-Lewiston regions have gained population: 3% and 2%, respectively.

Over 30,000 workers in the study area commute daily to Portland with the highest concentrations commuting from Falmouth, Yarmouth, Cumberland and Gray. The Portland Area Comprehensive Transportation Committee (PACTS) Regional Transportation Plan 2006¹¹ projects 18 percent population growth and 19 employment growth over the next 25 years in the Portland region.

Figure 1-2 below lists total employment by municipality from 2009 Dun and Bradstreet Zapdata. Portland represents over 40% of the regional employment base. In addition to Portland, three communities host more than 10,000 jobs. Lewiston is the second largest community in the study area, with over 21,000 jobs, while Brunswick and Auburn account for about 26,000 between them. These four communities support over three-quarters of the employment base of the region.

Figure 1-2: 2009 Total Employment by Municipality



Source of Data: Dun and Bradstreet Zapdata, 2009

Several previous studies have looked at the feasibility of regional bus and rail commuter service in portions of the study area. Many of these studies are listed and described in the Bus Rapid Transit and Light Rail feasibility study conducted by GPCOG – Greater Portland Council of Governments (GPCOG)

¹¹ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

and Southern Maine Regional Planning Commission (SMRPC) in 2004¹². Information from these studies is referenced as appropriate.

1.3 Purpose and Need

The primary purpose of the Project is to improve transit mobility options in the study corridor, which is currently experiencing major highway congestion that is expected to significantly worsen over time. Integration of the transportation improvements with land use and economic development is also central to the Project.

Project needs were identified through a public process in consultation with the MaineDOT and project stakeholders. The process first identified the existing and future transportation problems in the corridor and then formulated goals for addressing each of them. Summarized below are the four major goals of the Project, and each is followed by a summary description of the problem or need it is intended to address. Refer to Section 1.5 for additional information on the existing and future baseline conditions analysis that led to establishment of these goals.

1.3.1 Reduce Highway Congestion

Current average annual daily traffic counts on I-295 between Exit 3 and Exit 9 consistently exceed 30,000 daily vehicles in each direction. The heaviest congestion occurs on the bridge crossing Back Cove with daily one-way traffic totals approaching 45,000 vehicles. Over the next twenty years, traffic volumes and resulting highway congestion on the I-295 corridor north of Portland are expected to increase. Traffic volumes at Back Cove are projected to rise by 20 percent, and future peak levels of service (LOS) between Yarmouth and Portland will range between D and F.

Average daily traffic volumes on the Maine Turnpike (I-95) north of Portland ranged from 10,200 to 27,900 vehicles in July 2009. Although there are no significant congestion problems currently identified on I-95 in the study area, peak highway travel times are projected to increase by 20% from Lewiston/Auburn to Portland by 32% from Gray to Portland over the next 20 years.

Because of the expected degradation of LOS and travel times, this need could be stated as improvement of commuter transportation during peak hour travel times. This improvement may be measured by improved travel times or decreased congestion. A consequential benefit of this improvement should be a reduction in congestion-related vehicular emissions.

1.3.2 Increase Mobility Options

One of the goals of the project is to not only improve and enhance the existing service, but to attract those that rely predominantly on an automobile for travel by providing an efficient and convenient transit alternative(s). Almost one in five households in Portland and Lewiston do not own an automobile; however, the communities located further from the urban centers average over two cars per household. The promotion of alternative modes of transportation is consistent with the State of Maine's Strategic Passenger Transportation Plan (Explore Maine) to reduce reliance on highways for movement of people and goods. US Census 2000 Journey to Work data shows a very high percentage of commuters utilizing automobile travel. This high percentage is likely tied directly to the lack of options, particularly options which reduce travel times during peak hours.

¹² GPCOG & SMRPC. *Bus Rapid Transit and Light Rail Transit Study*, 2004.

1.3.3 Integrate Transportation and Land Use Policy

Another goal of the project (consistent with the PACTS Regional Transportation Plan 2006 and the State Planning Office) is to strengthen the link between transportation investments and land use policies and decisions. Ensuring that land development occurs in locations where it is supported by an adequate transportation system and preserving existing roadway capacities are two benefits that may be realized by this policy¹³.

1.3.4 Promote Community and Economic Development through Transportation Investment

An important purpose of the project is to entice investment and reinvestment in the traditional urban and small urban centers in the study area. With the inception of rail service from Portland to Boston operated by AMTRAK on its Downeaster Line, communities in Maine along that line are seeing a resurgence. Municipal leaders in Old Orchard Beach, for example, credit the Downeaster Service for spawning the 808 new year-round housing units and a luxury hotel in the community. Moreover, developers of the \$100 Million Saco Island redevelopment project, a mixed use development of retail space, condominiums, offices and a marina on a 15-acre former manufacturing mill site, state that their project “would not make sense if it were not for the train service”¹⁴. The City of Portland has developed a comprehensive development plan for the city’s Bayside district to redevelop the area as an attractive urban gateway featuring a compact mix of uses within walking distance of downtown.

1.4 Study Area Description

Located throughout central and mid-coast Maine, the study area covers most of the major population and employment centers in the state, even with population and employment decentralization over the last 40 years¹⁵. During this time period, both population and employment have been moving from the urban centers to the suburban and rural towns. This trend has dramatically increased the need for commuter transportation alternatives due to the longer distances traveled from residence to employment. From the US Census 2000 Journey to Work information, the highest densities of commuters from the north to Portland reside in Falmouth, Yarmouth, Cumberland and Gray. Tables 1-2 and 1-3 below list US Census 2000 and projected population, jobs, workers, and job: worker¹⁶ ratios for the main towns in the study area. Several things are notable about the population and employment situation in the corridors of interest. They are:

- The highest number of jobs are located in Portland, but the job:worker ratio is not the highest in Portland. The job:worker ratio is the highest in Bath, probably due to the location of Bath Iron Works.
- Other than Auburn, the five terminal location towns are projected to lose population from 2000 to 2030, with the highest loses expected in Portland and Bath.

¹³ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

¹⁴ Portland North Expansion Review, p. 2.

¹⁵ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

¹⁶ Job:worker ratio – A job to worker ratio greater than 1 indicates that there are at least as many jobs as residents in a community. A job to worker ratio less than 1 indicates that a community has more residents than jobs. Higher job to worker ratio communities are generally employment centers and lower job to worker ratio communities are residential centers.

- The towns with some of the lowest job:worker ratios are the ones with the most commuters to Portland.
- Freeport is the only non-terminal municipality with jobs outnumbering workers.
- The highest percentage increases in population are anticipated in New Gloucester, North Yarmouth, Gray, Cumberland, and Topsham. These municipalities represent the newer outer rings of commuter radii around the employment centers.

Table 1-2: Past and Projected Population by Municipality 2000

Municipality	Population							
	2000	2005	2010	2015	2020	2025	2030	% Change 2000-2030
Portland - Yarmouth								
Portland	64,186	63,889	63,753	63,067	61,926	60,066	58,122	-9.4%
Falmouth	10,340	10,601	10,907	11,120	11,269	11,299	11,321	9.5%
Cumberland	7,198	7,656	8,166	8,625	9,049	9,388	9,728	35.1%
Yarmouth	8,357	8,257	8,314	8,233	8,093	7,860	7,616	-8.9%
Subregional Total	90,081	90,403	91,140	91,044	90,337	88,613	86,787	-3.7%
Yarmouth to Brunswick/Bath								
Freeport	7,811	8,066	8,360	8,585	8,765	8,854	8,939	14.4%
Brunswick	21,184	21,820	21,749	21,750	21,607	21,221	20,811	-1.8%
Topsham	9,125	9,939	10,401	10,940	11,444	11,833	12,196	33.7%
West Bath	1,795	1,797	1,796	1,776	1,742	1,684	1,617	-9.9%
Bath	9,252	9,257	9,245	9,137	8,956	8,649	8,297	-10.3%
Subregional Total	49,167	50,879	51,550	52,188	52,513	52,240	51,860	5.5%
Yarmouth to Auburn/Lewiston								
Gray	6,847	7,376	7,962	8,503	9,015	9,445	9,877	44.3%
New Gloucester	4,825	5,291	5,804	6,290	6,759	7,169	7,583	57.2%
North Yarmouth	3,227	3,485	3,770	4,035	4,287	4,499	4,713	46.1%
Auburn	23,190	23,602	24,038	24,395	24,612	24,682	24,642	6.3%
Lewiston	35,657	36,050	36,298	36,405	36,278	35,912	35,367	-0.8%
Subregional Total	73,746	75,804	77,872	79,628	80,950	81,706	82,183	11.4%
Regional Total	212,994	217,086	220,562	222,860	223,801	222,560	220,830	3.7%

Source: US Census Bureau, 2000; Maine State Planning Office, 2008

The Portland-Yarmouth region is projected to lose 3.7% of its population from 2000 to 2030. However, population is anticipated to grow by 11.4% in the Yarmouth-Lewiston region and by 5.5% in the Yarmouth-Bath region. In 2000, the workers in the Portland-Yarmouth region numbered approximately 50,000. Forty-three thousand workers lived in the Yarmouth-Lewiston region and 23,000 workers lived in the Yarmouth-Bath region. There were approximately 80,000 jobs in the Portland-Yarmouth region in 2000, 41,000 jobs in the Yarmouth-Lewiston region and 33,000 jobs in the Yarmouth-Bath region. The job:worker ratio is highest in the Portland-Yarmouth region at 1.6, but is also quite high in the Portland-Bath region at 1.46.

Employment was highest in the Portland-Yarmouth region from US Census 2000, with the City of Portland itself outnumbering the other two corridors put together. The community with the next highest

number of jobs was Lewiston, followed by Auburn, then Brunswick and Bath. As expected, the more suburban towns had fewer jobs available.

Table 1-3: US Census 2000 Jobs, Workers, and Job: Worker Ratio

Municipality	Jobs	Workers	Job : Worker Ratio
	2000	2000	2000
Portland - Yarmouth			
Portland	70,382	36,788	1.91
Falmouth	4,618	4,759	0.97
Cumberland	1,245	3,721	0.33
Yarmouth	3,631	4,752	0.76
Subregional Total	79,876	50,020	1.6
Yarmouth to Brunswick/Bath			
Freeport	6,189	4,755	1.3
Brunswick	12,793	8,687	1.47
Topsham	3,126	4,023	0.78
West Bath	393	1,047	0.38
Bath	10,611	4,192	2.53
Subregional Total	33,112	22,704	1.46
Yarmouth to Auburn/Lewiston			
Gray	2,032	3,972	0.51
New Gloucester	598	2,079	0.29
North Yarmouth	359	1,834	0.2
Auburn	15,502	13,420	1.16
Lewiston	22,397	21,439	1.04
Subregional Total	40,888	42,744	0.96
Regional Total	153,876	115,468	1.33

Source: US Census Bureau, 2000

Eight establishments of the 12,650 profit and non-profit businesses in the region employ 1,000 or more workers.¹⁷ Combined, large firms total nearly 16,000 jobs, which is close to 13% of the regional total, excluding government. These eight businesses are, in order:

- Maine Medical Center, Portland, 6,000 employees
- Bath Iron Works, Bath, 5,600 employees
- Fraser Paper Inc, Portland, 3,250 employees
- LL Bean Inc., Freeport, 2,450 employees
- St. Mary's Health System, Lewiston, 2,000 employees
- Unum Insurance, Portland, 1,200 employees
- Central Maine Medical Center, Lewiston, 1,190 employees
- Mercy Hospital, Portland, employees, 1,000 employees

¹⁷ Excluding government and school districts. Sources: Maine Department of Labor ES-202 Data 2008, Dunn & Bradstreet 2009, Greater Portland Council of Governments 2009, Interviews with Employers 2009

Table 1-4 lists the three largest, private, for-profit and non-profit sector employers for each city and town in the region.

Table 1-4: Largest Employers by Community

Town	Business	Industry	Jobs
Auburn	Pionite Decorative Surface	Laminated Plastics	500
	Tambrands Proctor & Gamble	Sanitary Products	450
	Formed Fiber Technologies	Carpet Weavers	375
Bath	Bath Iron Works	Shipbuilding	5,600
	CED	Social Services	175
	YMCA	Youth Organization	175
Brunswick	Bowdoin College	University	500-999
	Mid Coast Hospital	Hospitals	1,500
Cumberland	Norton Insurance	Financial Advisory Services	50-99
	Seafax Inc.	Credit Reporting Agencies	50-99
Falmouth	Tyler Technology	Software - Financial Services	430
	Sedgewood Commons	Nursing Home	100-249
	Shaw's Supermarket	Retail Grocery	100-249
Freeport	LL Bean	Retail Sporting Goods	2,450
	Harraseeket Dining Room	Restaurant	100
	Hannaford's	Grocers	100-249
Gray	Enercon Technologies	Electronic Components	100-249
	Yarmouth Lumber	Trucking	50-99
	ERI Passive Power Projects	Electronic Equipment & Supplies	53
Lewiston	Central Maine Medical Center	Hospitals	1,190
	St. Mary's Hospital	Hospitals	2,000
	LePage Bakeries	Food Processing	500-999
New Gloucester	Energy East Corporation	Electric Utility	250-499
	Pine Tree Networks	Telecom Companies	50-99
	Pinetree Garden Seeds	Retail Seeds	50-99
North Yarmouth	A H Grover	Excavating Contractors	20-49
	Anderson Landscaping	Landscape Contractors	20-49
Portland	Maine Medical Center	Hospital	6,000
	UNUM	Insurance	1,200
	Mercy Health Center	Clinics	1,000
	Brentwood Rehab & Nursing Center	Nursing Homes	100-249
Yarmouth	Cole Haan	Retail Shoes	100-249
	Delorme	Map Publishers	100-249

Sources of Data: Maine Department of Labor ES-202 Data 2008, Dunn & Bradstreet 2009, Greater Portland Council of Governments 2009, Interviews with Employers 2009

Figures 1-3 and 1-4 show total population and population density, respectively by block group for the study area from 2007 US Census estimates. Block groups with the largest total numbers of residents are

found in Portland, Lewiston, and Brunswick. Other pockets of high total numbers are spread throughout the study area, but are concentrated in the more urban areas of every community. Figure 1-4 looks at the distribution of population across the study area. The largest concentrations of residents are found throughout most of Portland and Lewiston/Auburn, and downtown in Brunswick, Bath, Freeport, Yarmouth, and Lisbon Falls. Large, widespread concentrations of population are also found throughout Falmouth, Cumberland, Yarmouth, Brunswick, Topsham, and Lewiston.

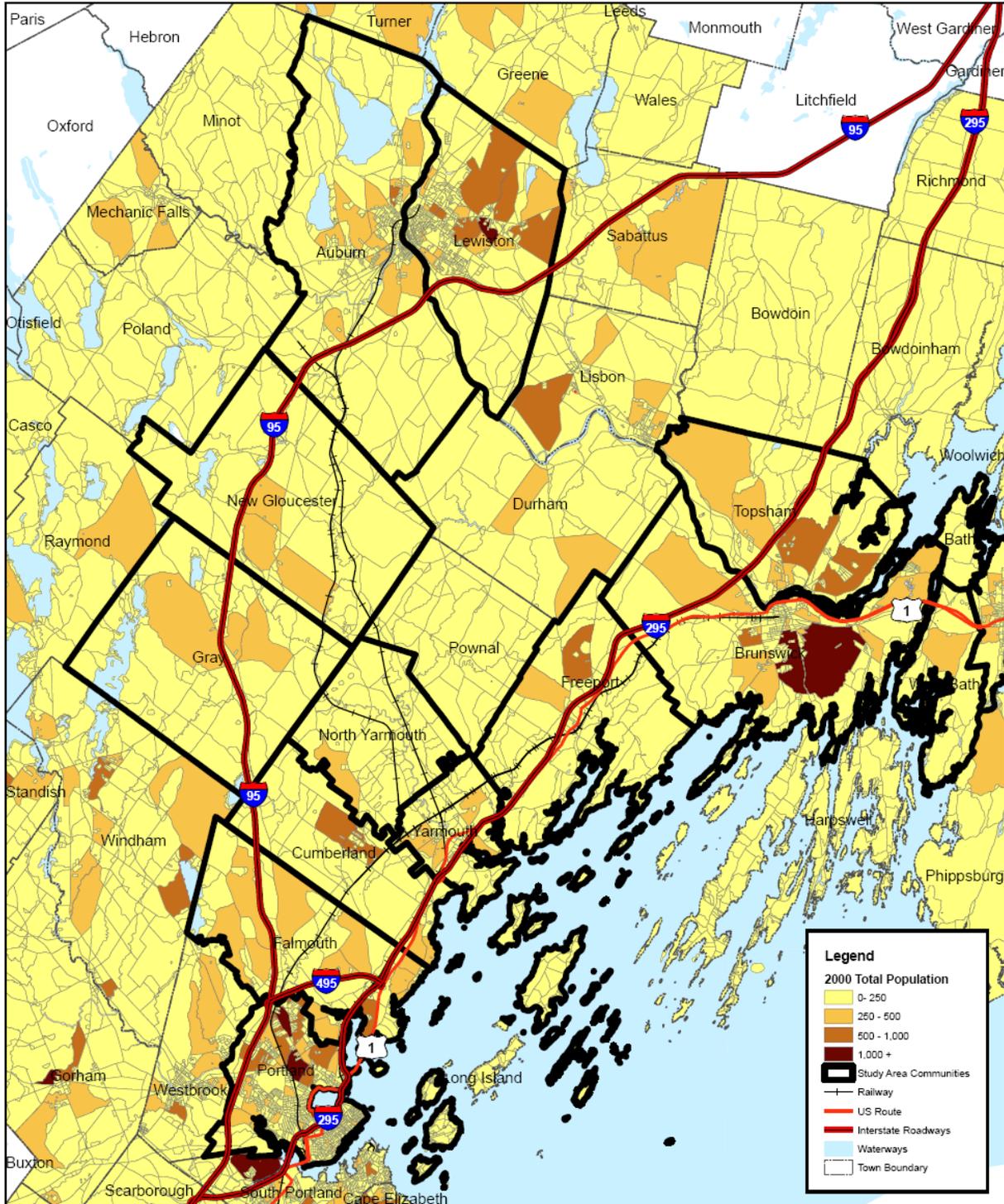
To show another view of employment, the Maine Department of Labor also publishes regional figures of number of employers, average employment, and average wages. The table below lists the number of employers (units), the average employment, and the average wages for the Brunswick Micropolitan Area, the Lewiston-Auburn Metropolitan Statistical Area (MSA), and the Portland-South Portland MSA. It is important to note that these regions are quite large and cover municipalities not included as part of this study. The information does, however, show how employment has changed in recent years in the different regions. Wages have increased approximately 30% from 2000 to 2008 in all regions. The Brunswick area has gained new employers since 2000, but the number of people employed has remained the same. The Lewiston-Auburn region gained both employers and employees from 2000 to 2008, as did the Portland-South Portland region.

Table 1-5: 2000-2008 Average Employment and Wages by Region

Region	2000			2008			% Change		
	# Units	Average Employment	Average Wages	# Units	Average Employment	Average Wages	# Units	Average Employment	Average Wages
Brunswick Micropolitan	2,004	30,465	\$28,554	2,339	30,431	\$37,143	17%	0%	30%
Lewiston-Auburn MSA	2,792	47,061	\$26,206	3,030	48,702	\$34,412	9%	3%	31%
Portland-South Portland MSA	12,673	182,686	\$30,381	14,412	192,700	\$40,317	14%	5%	33%

Source: Maine Department of Labor, Center for Workforce Information and Research, Quarterly Census of Employment and Wages, 2008

Figure 1-3: Study Area Total Population by Block Group

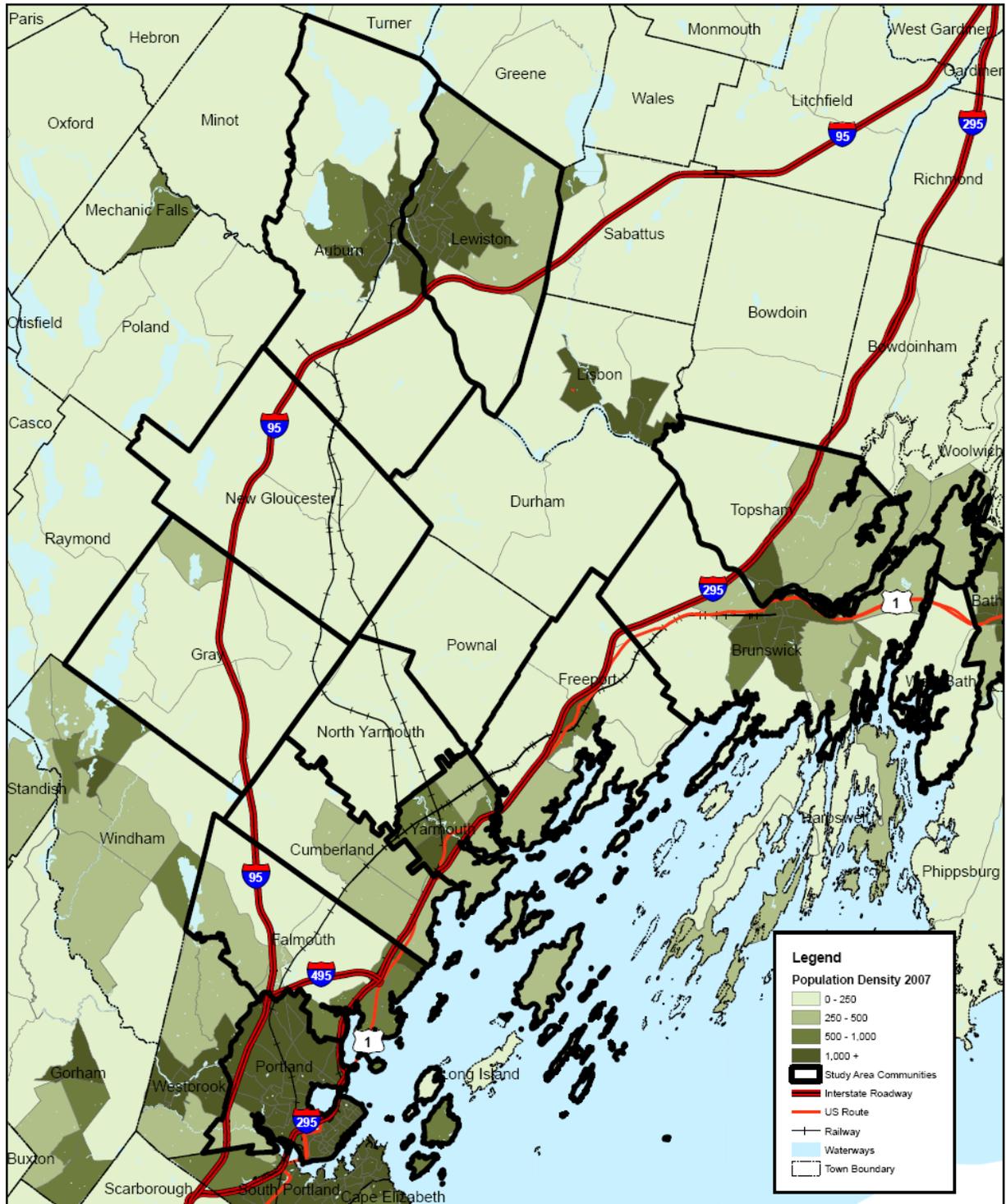


Source: MEGIS 2000



0 1 2 3 4
 Miles

Figure 1-4: Study Area Population Density by Block Group



Source: ESRI, US Census 2007 estimates



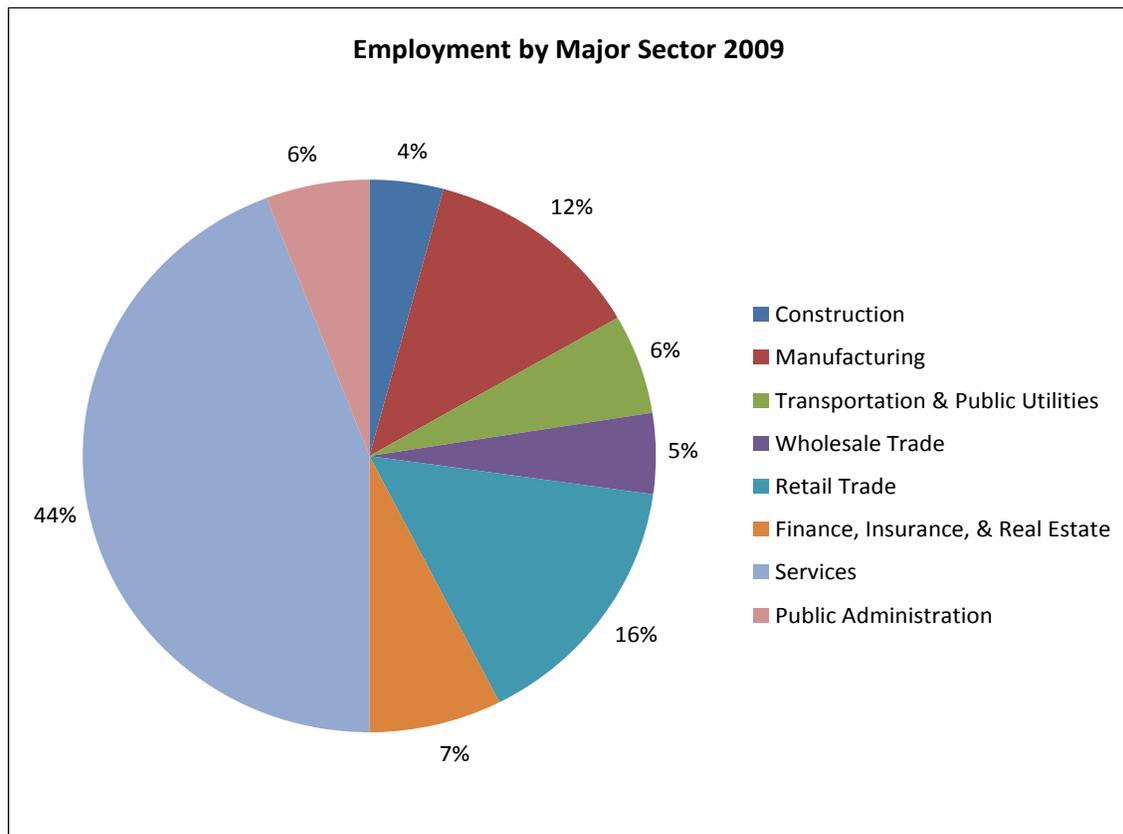
0 1 2 3 4
 Miles

The largest employment sector in study area is services, which accounts for 58,000 jobs (44% of the total employment), followed by retail (21,000 jobs, or 16% of total employment) and manufacturing (16,000 jobs or 13% of total employment). Compared to statewide totals, the Study Area has a greater concentration of service jobs and manufacturing jobs, but a lower concentration of retail employment despite the inclusion of Freeport and Portland.¹⁸ Major industries within these sectors are noted below:

- The key regional industries are shipbuilding and food processing which account for almost half of the region’s manufacturing base.
- For services, the four major subsectors are health care, business services, education, and social services, which combine for 73% of all services in the region.
- Restaurants (counted under retail) and lodging (counted as a service) together account for over 8,000 jobs.

Employment by sector for the study area is shown in the Figure 1-5 below.

Figure 1-5: 2009 Study Area Employment by Sector



Source of Data: Dun and Bradstreet Zapdata, 2009

¹⁸ This comparison is based on Dun and Bradstreet Zapdata. This is an important distinction because Zapdata uses the older Standard Industrial Classification codes, which counts printing and publishing as manufacturing jobs. The more modern North American Industry Classification System lists these industries under Information sector, outside of manufacturing. Other major accounting differences are in services and retail trade, which both include multiple sectors that are broken out separately under NAICS

In the study area, there is also a large range of housing costs from affordable to cost prohibitive for the average worker. Housing costs are a major determinant in deciding where to live and links from affordable housing to employment centers provide a view of probable commuter corridors. Municipalities with affordable housing are thus probable trip origins. Housing characteristics for both owner-occupied housing and rental housing are provided in Table 1-6. The average value of an owner-occupied unit (more than likely a single family home in this region), is \$139,000. Average monthly mortgage payment is \$1,100 and the average monthly rental payment is \$616. The most affordable municipality in the corridor to live in with regard to home value is Auburn. With regard to rental payment, the most affordable municipality is Lewiston. Falmouth has the highest home values and rental payments.

In the Portland-Yarmouth region, home values, mortgage payments and rents are the highest of the three study area corridors. Home values, mortgage payments and rent are all higher in the Yarmouth-Bath region than in the Yarmouth-Lewiston region, but not by a substantial amount.

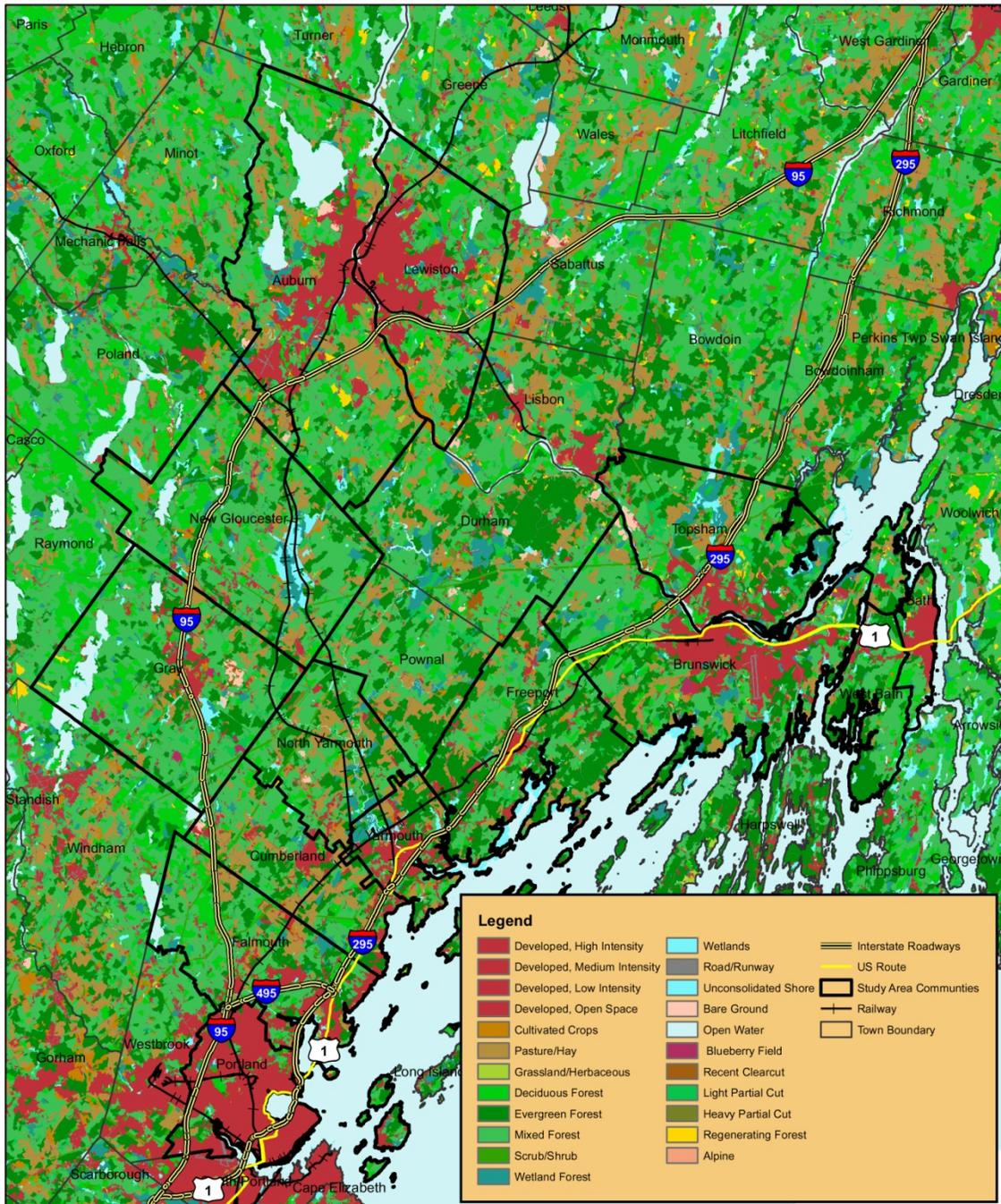
Table 1-6: 2000 Housing Characteristics by Municipality

Community	Median Value of Owner-Occupied Units	Median Mortgage Cost for Owner-Occupied Units	Median Gross Rent of Renter-Occupied Units
Portland - Yarmouth			
Portland	\$121,200	\$1,088	\$598
Falmouth	\$215,500	\$1,549	\$847
Cumberland	\$185,800	\$1,397	\$765
Yarmouth	\$184,400	\$1,444	\$745
Subregional Average	\$176,725	\$1,370	\$739
Yarmouth to Brunswick/Bath			
Freeport	\$169,800	\$1,214	\$603
Brunswick	\$135,000	\$1,111	\$534
Topsham	\$118,700	\$1,076	\$636
West Bath	\$147,500	\$970	\$557
Bath	\$95,200	\$919	\$519
Subregional Average	\$133,240	\$1,058	\$570
Yarmouth to Auburn/Lewiston			
Gray	\$124,600	\$1,049	\$695
New Gloucester	\$124,000	\$1,018	\$621
North Yarmouth	\$151,600	\$1,230	\$653
Auburn	\$86,700	\$922	\$446
Lewiston	\$87,200	\$938	\$408
Subregional Average	\$114,820	\$1,031	\$565
Regional Average	\$96,240	\$964	\$473

Figure 1-6 shows general land cover for the study area to show relative levels of development, open space, etc. for the region from 2004. As expected, the developed areas correspond to the areas of high population density and the locations of major employers. Portland has the widest spread of development outward from its downtown, but Lewiston/Auburn and Brunswick/Bath also have developed areas as significant percentages of their land areas. Along the corridors, there are developed areas generally

following the path of the highway network, but also in downtown pockets in study area communities. In between the pockets of development along the corridors are mostly forest and grassland open space land uses.

Figure 1-6: Study Area Land Cover Overview



Source: MEGIS 2004



0 1 2 3 4
 Miles

What follows is the detailed description of the study area broken into three sections that coincide with the three potential service packages. First, the main corridor, from Portland to Yarmouth, will be discussed. The description of the main trunk will be followed by the descriptions of the I-295 corridor from Yarmouth to Brunswick/Bath and the I-95 corridor from Yarmouth to Auburn/Lewiston. Topics of discussion include population and employment characteristics, land use, future development, trends, and roadways and transit. More detailed discussion of highways and transit services in the region follow the corridor descriptions.

1.4.1 Portland to Yarmouth Corridor

North of Portland, the corridor between Portland and Yarmouth is the heaviest commuter corridor. From the US Census 2000 Journey to Work information, 1,400 people commute daily from Yarmouth to Portland. Also in the southbound direction, approximately 1,200 people from Cumberland, 1,950 people from Falmouth, and 550 people from North Yarmouth commute daily to Portland in the corridor¹⁹. Approximately 400 people travel daily from Portland to Yarmouth in the reverse commute direction.

Figure 1-7 shows 2007 population density by block group for the communities in the Portland-Yarmouth corridor. Population density is obviously highest throughout the City of Portland, but Yarmouth also has very dense population distribution north of I-295. Population is moderately dense through areas of Falmouth, Cumberland and Yarmouth south of I-295.

The following sections provide pertinent information on population and employment characteristics and pertinent land use/future development information for each community in the corridor.

1.4.1.1 Portland

Like many older urban centers in the Northeast, Portland has lost population over the last four decades, but has been stabilizing recently. Between 1960 and 2000, the city's population dropped from 72,600 to 64,000 as younger more affluent families were attracted by the burgeoning suburban areas²⁰. The US Census Bureau estimates the 2008 resident population of Portland at 62,500²¹. Despite recent declines, the population of the City is projected to increase by 5% from 2000 to 2025, reaching 67,500²².

Housing costs in Portland are generally higher than in the other cities in the study area, but much lower than the surrounding suburbs. From US Census 2000, average home value was \$121,000 and average monthly mortgage cost was \$1,100. Averagely monthly rent was \$598.

Employment in Portland continues to be the highest in the state, but other rapidly developing suburban towns in the region have recently seen the largest percentage increases in employment. Job growth in Portland and the region as a whole has been due in part to a fundamental change in the type of employment from a manufacturing/industrial base to a services/retail base. In 2000, employment in the City of Portland was 70,806, an increase of 50% from 1980. For the Portland/South Portland Metropolitan Statistical Area (MSA) the 2000 average employment was 182,686 and the 2008 average employment was 192,700, an increase of 5.5%.

¹⁹ GPCOG & SMRPC. *Bus Rapid Transit and Light Rail Transit Study*, 2004.

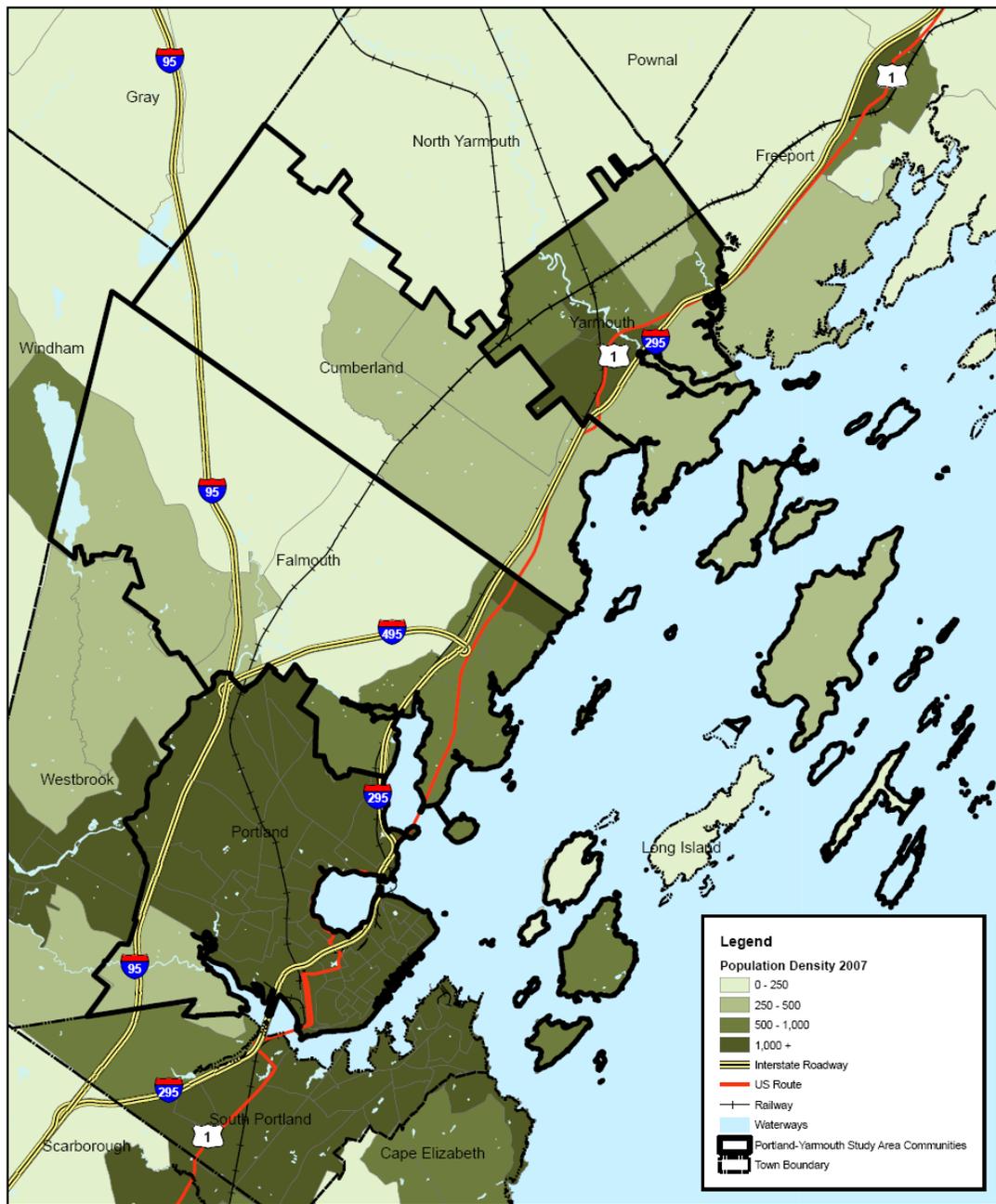
²⁰ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

²¹ US Census Bureau. Population Finder, 2008.

²² PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

The City itself employed between 1,500 and 2,000 people in 2009, according to the Maine Department of Labor. Other major employers in the City include Maine Medical Center (5,500-6,000 employees), Unum Provident (3,000-3,500 employees), and Mercy Hospital (1,500-2,000 employees)²³.

Figure 1-7: Portland-Yarmouth Population Density by Block Group



Source: ESRI, US Census 2007 estimates



²³ Maine Department of Labor, Center for Workforce Research and Information, 2009.

Within the City, several mixed-use neighborhoods adjacent to downtown, such as Old Port, Munjoy Hill and the West Side, experienced a period of decline during the 1960's and early 1970's followed by a renaissance brought about by re-investment, historic preservation and "gentrification." During this same period, the occupancy rate in the downtown core along Congress Street experienced significant ups and downs yet downtown remains the region's largest concentration of office space. The peninsula as a whole has recently attracted increased development and redevelopment interest through projects such as the Bayside Plan, and plans for redevelopment of the waterfront on and adjacent to the former Bath Iron Works (BIW) Ship Repair Facility²⁴.

1.4.1.2 Falmouth

Falmouth is a fast-growing suburban town located immediately north of Portland. Falmouth's population in 2008 was 10,724 people, an increase of 4% since 2000. According to the US Census 2000, there were 4,585 jobs in Falmouth, which represented an increase of 95% since 1980.

Housing costs in Falmouth area the highest in the corridor. In 2000, the US Census Bureau reported that the average home value was \$216,000 with an average monthly mortgage payment of \$1,500. Average rent was \$850.

In the future, two-thirds of residential growth is expected to occur within the Woodville and Falmouth Center areas of the town, with the other third of the development occurring in the Rural Residential districts (Poplar Ridge, Highland Lake, Leighton Hill, and Hurricane Valley) located in the western portion of the town.

Major commercial redevelopment and commercial growth is anticipated along the Route 1 corridor, in the Foreside section. This area contains approximately 1 million square feet of existing commercial space, including office. Another proposed growth area is the Exit 10 Development District – "a planned mixed-use development in keeping with the semi-rural character of West Falmouth and its neighborhoods."²⁵

1.4.1.3 Cumberland

Cumberland's population was 7,159 in 2000 and is 7,556 in 2008, an increase of 6%. Employment is also on an increasing trend. In 2000, there were 1,187 jobs in Cumberland, which represented a 139% increase since 1980. Growth in Cumberland has traditionally followed major roads.

Housing costs in Cumberland are among the highest in the study corridor. According to the US Census 2000, the average home value in Cumberland was \$186,000 with an average monthly mortgage payment of \$1,400. Average monthly rental payments were \$750.

The town is characterized by a moderately-densely developed town center, with a second concentration of development along the coastline. Cumberland Foreside and Cumberland Center remain the most dominant centers within the town with some mix of uses and denser development. In the remaining rural sections of the town, development is scattered. Residential development makes up approximately 90% of the town's land with the predominance of new lots being created in the Rural Residential district. The downside of growing subdivisions in the rural districts is that the development is scattered throughout town. Agriculture has declined in Cumberland and the number of acres classified as Tree Growth

²⁴ Maine Department of Labor, Center for Workforce Research and Information, 2009.

²⁵ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

decreased due to the conversion of the land into subdivisions. Commercial districts continue to locate along arterial roads that connect Cumberland to surrounding communities: Route 100, U.S. Route 1, and Route 9. I-295 also serves Cumberland residents and Exits 16 and 17 are anticipated to have areas for future development. Route 1 has also recently had substantial development activity and this trend is expected to continue. The majority of the commercial development has occurred along Route 1 and also Route 26/100²⁶. A lack of collector roadways in Cumberland has led to the absence of an organizing framework for new development. In recent years, several attempts to increase street connectivity between new and existing residential developments have failed.

One of the goals of the Town Comprehensive Plan is to explore methods of projecting long-term development patterns within the community and to develop strategies for managing long-term growth. The town will maintain a right-of-way for future road connections, and direct growth to the areas where public facilities are nearby. These areas may include Cumberland Foreside, Cumberland Center, and areas along Tuttle Road. The Zoning Ordinance also includes protection of fragile areas from development through the Shoreland Zoning provisions and the Aquifer Protection Districts. More than half of the town is over a sand and gravel aquifer²⁷.

1.4.1.4 Yarmouth

Yarmouth's 2008 estimated population is 8,097, a decrease of 3% since 2000. In 2000, the number of jobs in Yarmouth was 3,638, which represented an increase of 150% since 1980. Housing costs in Yarmouth are among the highest in the study corridor with an average home value of \$184,000 from US Census 2000. Average monthly mortgage payment in Yarmouth was \$1,400 and average monthly rent payment was \$750.

According to Yarmouth's 2009 Comprehensive Plan Update, Yarmouth has a well-defined, historic pattern of development with a compact, walkable village center surrounded by relatively dense older residential neighborhoods and a rural/coastal hinterland. While development on the fringe of the Village over the past thirty years has somewhat compromised this historic development pattern, future development must be guided and encouraged to emulate the historic pattern. Main Street, and the Village Center immediately adjacent to it, is the heart of Yarmouth. The Plan comments that this area must continue to be a vibrant, pedestrian friendly, visually attractive, mixed-use area. Also, Yarmouth has traditionally offered a diversity of housing opportunities that resulted in a somewhat diverse population in terms of age and income. That diversity has recently been threatened by escalating real estate values and the pattern of residential development. Creating the opportunity for the development of a wide range of housing types and sizes is essential if Yarmouth is going to remain a community with a somewhat diverse population²⁸. In the Comprehensive Plan, growth areas are defined in and around the traditional village center, and in the commercial districts along Route 1. Other residential development is included in growth areas along the fringe of existing moderate density residential areas.

From *Destination Tomorrow*, there are some highway and roadway concerns in Yarmouth given the current roadway configurations. Exit 17 off of I-295 often experiences congestion caused by confusing turning movements and is also a high crash location. The Route 1/Route 115 interchange creates problems for trucks, and thus would have a similar impact on buses. Future development of Route 1 is

²⁶ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

²⁷ Greater Portland Council of Governments, Central Corridors Coalition. Phase I Report, 2003.

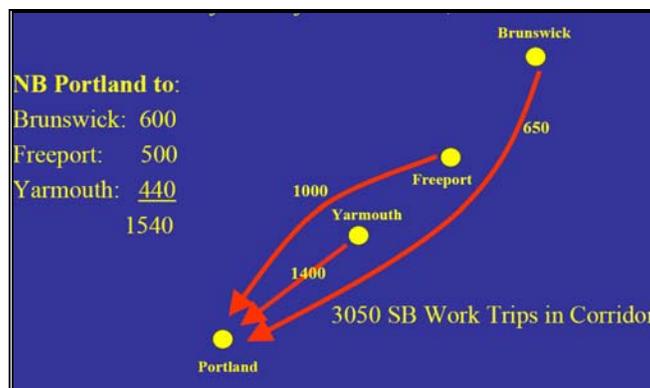
²⁸ Town of Yarmouth. Comprehensive Plan Update Draft Documents, September 2009.

also being debated within the Town and there is discussion on whether or not it should be functionally reclassified as a minor arterial as opposed to staying an urban collector. Weight limits on the highway currently push heavy trucks onto Route 1. Internal discussion is also underway on the potential for a multimodal transportation center in Yarmouth as well as the impact of potential passenger rail service on growth and development patterns in the Town²⁹.

1.4.2 Yarmouth to Brunswick (Bath) Corridor

The corridor from Yarmouth to Brunswick and further to Bath is a busy link to Portland and also an important employment and residential region in and of itself. Figure 1-8 shows daily commuting trips in the corridor from Brunswick to Portland and the reverse from US Census 2000 Journey to Work information. In the southbound direction, there are 650 daily trips from Brunswick to Portland, 1,000 trips from Freeport to Portland, and 1,400 trips from Yarmouth to Portland for 3,050 total southbound trips in the corridor. Many individuals also live in the Portland region and commute northward in the reverse commute direction. According to PACTS, nearly as many people commute northward from Portland to Brunswick as commute southward, with 600 daily trips. A smaller number of people live in Portland and commute northward to Freeport and Yarmouth, with 500 and 440 daily trips, respectively.

Figure 1-8: Daily Commuting Trips between Portland and Brunswick

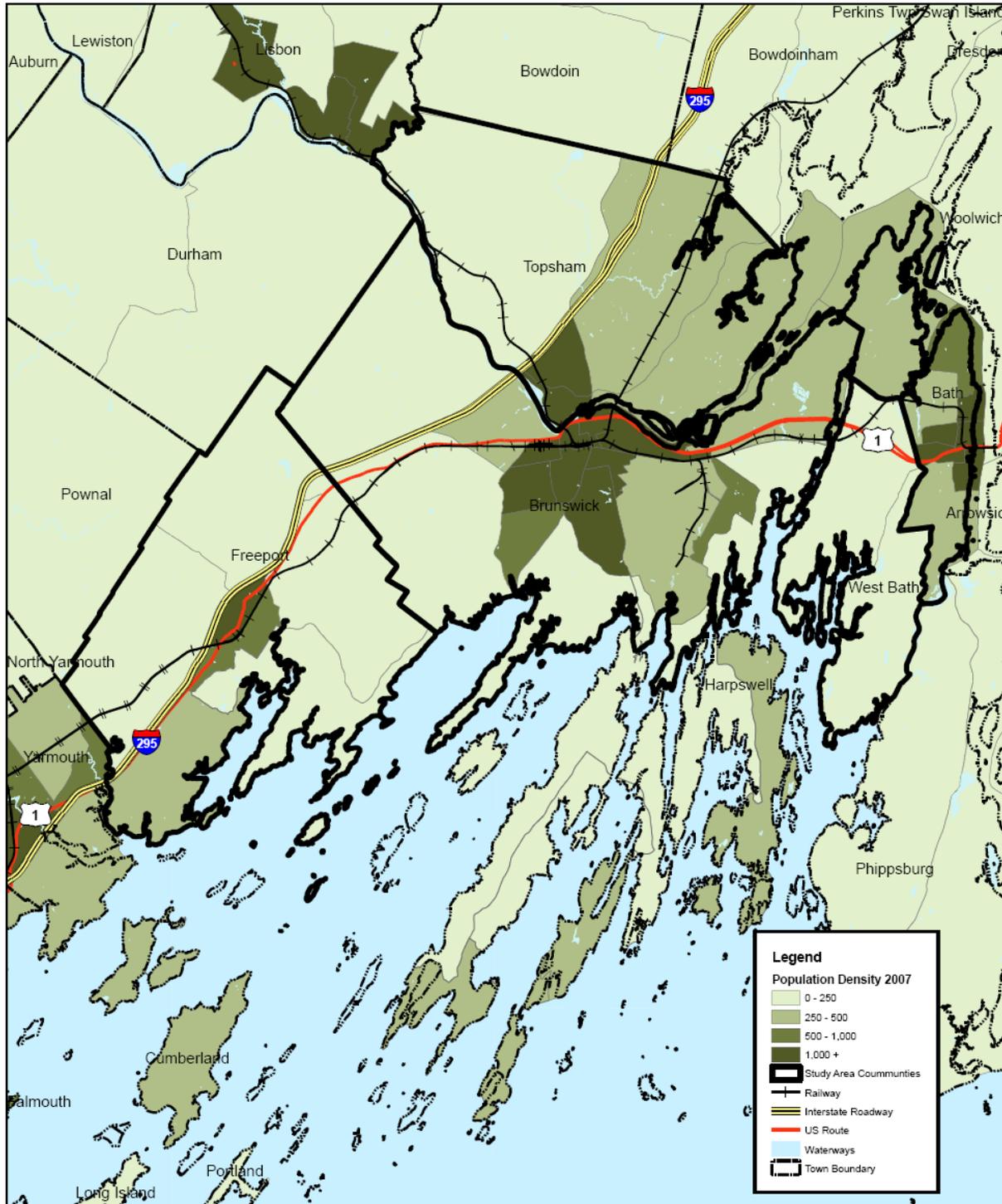


Source: PACTS Destination Tomorrow Alternatives Analysis: Transit Findings. October 21, 2004

Population density (2007) is shown for the Yarmouth-Bath region in Figure 1-9. In the region north of Yarmouth along I-295, dense population distribution is greatest in Brunswick, but there are also pockets of high population density in Freeport and Bath near the major road network.

²⁹ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

Figure 1-9: Yarmouth-Brunswick/Bath Population Density by Block Group



Source: ESRI, US Census 2007 estimates



The following sections provide pertinent information on population and employment characteristics and pertinent land use/future development information for each community in the corridor.

1.4.2.1 Freeport

According to the US Census Bureau, the population in Freeport in 2000 was 7,800. The 2008 population estimate was 8,195, which is an increase of 5% over the period.

Housing costs in Freeport are in the middle of the pack among the suburban towns in the study area. From US Census 2000, average home value was approximately \$179,000 with an average mortgage payment of \$1,200. Average monthly rent payment was approximately \$600.

In 2000, Freeport employment totaled 6,536 jobs, which represented an increase of 166% since 1980. LL Bean is the major employer in Freeport, with facilities providing various functions located throughout the town. According to the Town of Freeport Planning Department, LL Bean employed 3,440 during the peak season and 2,410 people during the off-peak season in its Freeport facilities in 2002.

In October 2007, the Town of Freeport conducted a survey of residents (mailed survey to households) regarding transportation. From the survey, 33% of residents said they would be likely to use public transportation to other communities if it were available. Fifty-eight percent said they were unlikely to use public transportation to other communities. Further, residents were asked to which towns public transportation should be operated. Respondents could list more than one town in their response. Seventy-five percent of respondents said that they would like to see public transportation to Brunswick. Other towns with high response rates were Portland (56%), Yarmouth (49%), and Falmouth (29%). All of these destinations are located within the study area for this project.

As part of this study, another survey was conducted in August 2008 in the Town of Freeport. Visitors to Freeport were surveyed to help gauge how many travelers may use transit service in the Brunswick study corridor. There were 435 respondents to the survey. Visitors were split into categories of residence location for Maine residents, New Hampshire residents, Canadian residents, and visitors from other US states. Local visitors were generally traveling alone or with friends and it was not their first trip to Freeport. Visitors from afar were more likely to be traveling with family in larger groups and also more likely to be on their first trip to Freeport. Overall, 54.2% of respondents said that they would prefer to use the proposed Amtrak service to travel to Freeport and 46% said they would prefer a proposed Portland North transit service to travel to Freeport. Of the study corridor residents, the split was 60% preferring the Portland North proposed service to 40% preferring the proposed Amtrak service to Freeport.

According to *Destination Tomorrow*, there are a few traffic congestion and safety issues in Freeport. First, there is a traffic bottleneck at the railroad overpass just south of the central business district. On either side of the bridge, the roadway has already been widened. Also, there are trucks that are diverting to Route 1 because of weight limits on I-95, which create noise and traffic issues incompatible with the Freeport village area. Traffic and parking are of concern in the Freeport village area. Traffic is also increasing on Routes 125 and 136 due to residential development in both Freeport and adjacent communities³⁰.

³⁰ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

1.4.2.2 Brunswick

With the impending closure of the Brunswick Naval Air Station in 2011 and the corresponding loss of both population and employment, the town is going through a transitional phase. The population of Brunswick is estimated at 21,720 for 2008, which is a 3% increase since 2000. Employment (number of jobs) in 2000 was 12,793. Also according to the US Census 2000, average home value in Brunswick was approximately \$135,000, the highest among the potential terminal cities and higher than other suburbs. Average monthly mortgage payment was \$1,100 and average monthly rent payment was approximately \$500.

At Bowdoin College, both a major employer and a large residential concentration in Brunswick, the Fall 2008 enrollment was 1,723 undergraduates. For the 2008-2009 school year, instructional faculty numbered 206³¹. The Maine Department of Labor puts Bowdoin College in the category of 1,000-1,500 employees for 2009. Mid Coast Hospital is another major employer in Brunswick in the category of 500-1,000 employees³².

Three current planning studies have relevance to this study: the Brunswick Naval Air Station (BNAS) Reuse Master Plan, Maine Street Station project, and Gateway Route 1 Study. While the base closing has regional impacts in other arenas, the transit impact is more localized in the Brunswick area, as is the Maine Street Station project. The Gateway Route 1 Study is regional in nature and encompasses the entire Mid Coast area.

Brunswick Naval Air Station (BNAS)

With the base closure, access and movement in and around the site will change dramatically, according to the BNAS Reuse Master Plan. Access to the area will no longer need to be controlled and new entrances and exits will improve ingress/egress and provide more options for circulation throughout the area. These changes allow for easier access in general, but also easier access and more options for transit services. The redeveloped area with its varied land uses will also serve as a major trip generator and Coastal Trans, the local transit authority, has already been involved with the creation of the plan in order to ensure bus stops will be in appropriate locations. Also, downtown Brunswick's Maine Street Station is expected to be served by the Amtrak Downeaster service in 2012, which presents a potential multimodal link opportunity. Additionally, mention has been made of making sure the site is both pedestrian and bicycle friendly³³.

Main Street Station

The goal of the Maine Street Station project is to create a multimodal facility in downtown Brunswick with train, bus, bicycle and pedestrian access to office, service, retail, entertainment and residential space. This multimodal facility would be a major trip generator in downtown Brunswick, but could also serve as a hub for Coastal Trans (including administrative office space) and a transfer location for local and regional bus services and regional train services³⁴.

³¹ Bowdon College Website, www.bowdoin.edu. 2008-2009 Common Data Set.

³² Maine Department of Labor, Center for Workforce Research and Information, 2009.

³³ Midcoast Regional Redevelopment Authority. BNAS Reuse Master Plan, 2009.

³⁴ Brunswick Economic Development. Maine Street Station website, <http://www.brunswickme.org/ecdev/mssic/>. December 2007.

Gateway 1

The study area for the Gateway Route 1 Study extends from Brunswick all the way to Prospect. Gateway 1 is “an innovative, community-led land use and transportation project for Maine’s Mid Coast.” Thus far in the project, two potential development patterns have emerged for the region: Micropolitan and Transit-Oriented Corridor (TOC). The second of these is most relevant to this project, as several study towns have already been recognized by Maine DOT as “Townships of Opportunity” for new or enhanced transit service including Brunswick and Bath.

The TOC approach purposefully clusters commercial and residential developments at nodes along Route 1 (and other routes that radiate from the traditional town centers) with sufficient density to allow for transit usage. Nodes can be single purpose or multi-purpose as long as they are sufficiently dense. The TOC pattern of development has strong potential for economic development, ties well into the goal of transit service augmentation, and allows the areas between the nodes to retain their rural character³⁵.

1.4.2.3 Bath

In 2008, the population in Bath was estimated at 8,885 by the US Census Bureau, a decrease of 4% since 2000. From US Census 2000, employment in Bath was listed as 10,611 jobs. Bath is home to Bath Iron Works, an employer of approximately 6,000 people in the region (Bath and Brunswick sites)³⁶. Thus, a single employer provides most of the jobs in the community.

Housing costs in Bath are quite low, closer to those in Lewiston/Auburn than in Brunswick. Average home value in Bath was approximately \$95,000 from US Census 2000. Average monthly mortgage cost in Bath was approximately \$900 in 2000 and average monthly rent payments were \$500.

According to the 2009 New Draft Comprehensive Plan for Bath, the land use pattern in the City of Bath is traditional, with high density and mixed uses in the center, a somewhat lesser density and less mixed uses moving away from the center, and very low density at the outer edge. (Whereas this traditional land use pattern is often depicted as concentric circles or rings around a downtown center, Bath’s pattern shows decreasing densities and fewer types of uses north and south from the downtown center.) The activities that made Bath a thriving shipbuilding city were located in the center. Even today, the center—the downtown—is a mix of residential, retail, office, and civic uses; at its edge is part of the marine-manufacturing working waterfront. Residential development has been almost exclusively confined to lot-by-lot development in a 35-lot subdivision approved in the 1980s and in the City’s growth area. The only larger scale development in Bath in recent years has been the Wing Farm Business Park built in 1998 off outer Centre Street.

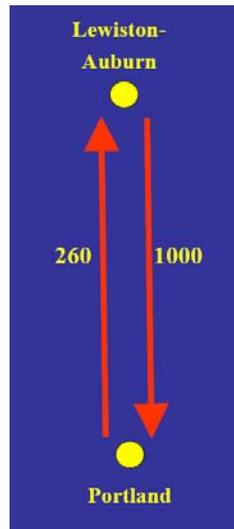
1.4.3 Yarmouth to Auburn (Lewiston) Corridor

The corridor from Portland to Auburn and further to Lewiston is strongly linked to I-95 and US Route 202 (co-signed with Routes 4 and 100). Figure 1-10 shows PACTS estimated daily commuting trips from Lewiston and Auburn to Portland and the reverse from US Census 2000 Journey to Work data. In the southbound direction, there are 1,000 daily commuting trips from Lewiston and Auburn to Portland. There are far fewer trips in the reverse direction – 260 daily commuting trips.

³⁵ MaineDOT. Gateway 1 Plan Website, www.gateway1.org. December 2007.

³⁶ Bath Iron Works Employment Office, e-mail of August 28, 2009.

Figure 1-10: Daily Commuting Trips between Lewiston/Auburn and Portland from US Census 2000



Source: PACTS Destination Tomorrow Alternatives Analysis: Transit Findings. October 21, 2004

In the Yarmouth to Lewiston region, population density is greatest in downtown Lewiston and Auburn, but is low throughout the rest of the corridor. Figure 1-11 presents 2007 population estimates by block group for the corridor.

The following sections provide pertinent information on population and employment characteristics and pertinent land use/future development information for each community in the corridor.

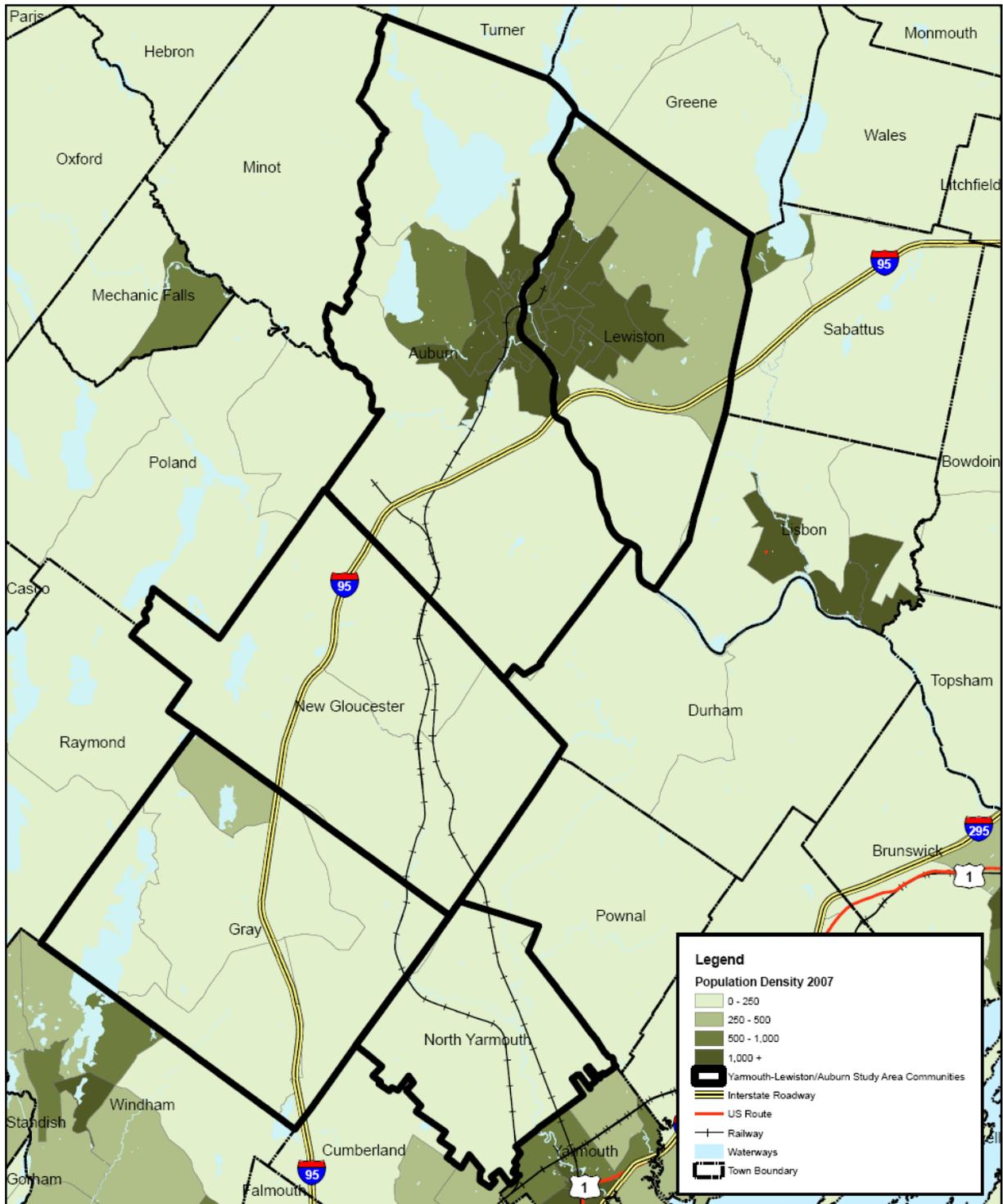
1.4.3.1 Gray

Gray is a fast-growing suburban community. From 2000 to 2008, the population grew from 6,820 to 7,541, an increase of 11% according to the US Census Bureau. Gray was also home to 2,032 jobs in 2000.

Gray is one of the more affordable communities in the study area. Average home value in 2000 was approximately \$125,000, as reported by the US Census Bureau. The average mortgage payment was approximately \$1,000 and the average monthly rent was \$700.

In general, the land use pattern in Gray is linear in shape. Commercial and residential development in Gray is stretched out along the major transportation lines, including Route 302, Route 121, and Route 100 (from south of the downtown northeast towards New Gloucester). Linear development is also found in the areas of Crystal Lake, along Route 26 to the downtown, and along Route 115 from the downtown east. Most of the recent development has been on the west side of the community between the Turnpike and Little Sebago Lake. Regardless of zoning district, single-family residential development is the dominant use in the town. Of the 2,930 developed acres within the town, 91% are devoted to single-family residential uses. Another 42 acres are developed as multi-family, mostly in the Medium Density Residential District.

Figure 1-11: Yarmouth-Lewiston/Auburn Population Density by Block Group



Source: ESRI, US Census 2007 estimates



There are several locations of commercial development within the town: retail and restaurant uses along Route 100/26 and Route 4/202 in the Commercial District, and services in the downtown area within the Village Aquifer Protection District, and in the Business Development District near Exit 11 of the Maine Turnpike including areas off Route 202/4/115 and Dutton Hill Road. According to the Comprehensive Plan, new growth will be accommodated to the extent that the natural environment is preserved and the rural character is maintained. The Village Center will continue to be an active retail and service center; however, due to certain environmental constraints, particularly the aquifer recharge areas, the Village Center is not expected to be the site of any major new development or any increase in intensity. Due to the environmental constraints of the Village Center and the desire to avoid strip development, many of the existing commercially zoned areas may be changed in the zoning revision³⁷.

1.4.3.2 New Gloucester

New Gloucester is a growing town of 5,461 people³⁸. Population growth in New Gloucester was the highest in the study area from 2000 to 2008 at 14%. New Gloucester is primarily a residential community with only 598 jobs in 2000.

Housing values are low in New Gloucester. According to the US Census 2000, the average home value was approximately \$124,000. Average monthly mortgage payment was \$1,000 and average monthly rent was approximately \$600.

Pineland Farms is a 5,000 acre working farm, diverse business campus and educational and recreational venue located in New Gloucester. Pineland Center was formerly a home for the mentally handicapped with 28 buildings covering 1,600 acres, which closed in 1996. The Pineland property has gone through major renovations and land purchases since 2000 and now consists of a 19-building campus. The campus is now home to office space, a conference center, a YMCA, guest houses, and a catering service/cafeteria.

Development in New Gloucester has mostly occurred in the Rural Residential zone (min. lot size 2 acres) and in the Farm and Forest District (min. lot size of 5 acres). Only 7% of new development has occurred in areas designed for growth – Village and Business Districts. There was insignificant business development in the town and a lot of residential development occurred in the business zone. Current zoning policies and requirements for the minimum lot sizes of 2 and 5 acres contributed to the current pattern of residential sprawl. There remains little development in the area of industrial and commercial land use. The Shaker Village, located in the town, has developed a fairly substantial business that includes sale of goods and a tourist attraction. The town encourages development on Route 100 near Auburn. The Business Growth District provides an area within the town that will be suitable for future commercial growth and would be located near the Auburn border in close proximity to the Upper Village along Route 100. Village Growth Areas will encourage a mix of uses, higher residential densities, and pedestrian linkages. The Institutional Growth Area includes Pineland Center, the significant employment center for the town.

³⁷ Greater Portland Council of Governments, Central Corridors Coalition. *Phase I Report*, 2003.

³⁸ US Census Bureau, 2008.

1.4.3.3 North Yarmouth

North Yarmouth is a small town of 3,570 people (2008 estimate from the US Census Bureau). According to the US Census 2000, the population of North Yarmouth was 3,227. This indicates there was 11% growth in population from 2000 to 2008. Also as reported by the US Census 2000, employment in North Yarmouth was modest with 421 jobs, an increase of 175% since 1980.

North Yarmouth has mid-level housing costs in the study corridor as compared to the other municipalities. According to the US Census 2000, the average home value in North Yarmouth was approximately \$152,000. Average mortgage payment was reported as approximately \$1,200 and rent was approximately \$700.

The land use pattern in North Yarmouth is linear in shape. The whole community, including commercial and residential growth, is stretched out along the main transportation lines. This is especially obvious in the Village area. Route 9 and 115 are built up for extended distances around Walnut Hill. North Road is well developed in a linear pattern, as are most of the roads south of the Central Maine Power Company (CMP) easement. While there is a concentration of historic buildings in the Walnut Hill area, residential development is mostly scattered throughout the town. The residential development has been modest in scale within the Rural District that is located along major roadways throughout the town. Currently, land near existing roads is used for agriculture, and their conversion to the residential use will result in visual change from open fields to relatively smaller house lots and suburban appearance. Efforts to control residential growth through the imposition of a three-acre minimum lot size in the Farm and Forest District added to the increase in home sale prices and did not prevent further land subdivision. Commercial development has been generally insignificant and mostly concentrated in the Village Center District near the intersection of Routes 115 and 9. Despite the development pressures, North Yarmouth still has a rural appearance with much of the forested land and wildlife habitats. Undeveloped areas comprise 84% of the total town area³⁹.

Development in the town will be guided to the Village area with the minimum lot size of 1 acre and to the Rural Zoning District. The Farm and Forest District can accommodate significant growth; however, the minimum lot size of 3 acres and the required minimum road frontage of 200 feet are designed to prevent fast consumption of the land in these areas. North Yarmouth will continue to develop in linear pattern into the future supported by the Town Zoning Ordinance.

1.4.3.4 Auburn

The population in Auburn from Census 2000 was 23,203. The 2008 estimate of population is 23,177 – a change of less than 1%. Also in 2000, employment in Auburn numbered 15,502 jobs.

Housing costs in Auburn are by far the lowest in the study corridor (along with Lewiston). From Census 2000, average home value in Auburn was approximately \$87,000 with an average mortgage payment of approximately \$900 and average rent of approximately \$450.

A major feature in the region, the Androscoggin River, separates Auburn and Lewiston. The Androscoggin Transportation Resource Center projects that future residential development will occur on either side of Center Street, west and east of Taylor Pond, and south of New Auburn near Main Street. Commercial development is located in areas convenient to major residential concentrations and adjacent

³⁹ Greater Portland Council of Governments, Central Corridors Coalition. *Phase I Report*, 2003.

to high volume arterials. Center Street is Auburn's main commercial area. The Minot Avenue corridor is also an important commercial area. Commercial development is anticipated to continue in the Center Street and Minor Avenue areas. Industrial uses were concentrated in the area between Minot Avenue and Washington Street, but the development of the City-sponsored Kittyhawk Industrial Park and the Airport Industrial Park has changed industrial concentration in the City. There is interest in securing additional land for industrial development, particularly land adjacent to railroad corridors or the Turnpike exit⁴⁰.

1.4.3.5 Lewiston

From Census 2000, the population of Lewiston was 35,690. The 2008 estimate is 35,131, a decline of 2% over the period. Also from Census 2000, employment in Lewiston was 22,397 jobs. The Lewiston School Department is a major employer in the State and employees 500-1,000 people, according to the Maine Department of Labor.

As noted, housing costs in the corridor are lowest in Auburn and Lewiston. In Lewiston, average home value was reported as approximately \$87,000 and average mortgage payment as approximately \$900 (same as Auburn)⁴¹. Average rent in Lewiston was a little lower than Auburn at approximately \$400.

Lewiston's 1988 comprehensive plan encouraged rural housing development, but their 1995 plan describes the need to limit sprawl by building within the existing public service structure of the City. As of 1995, however, there were still many approved subdivisions in rural areas that had not been developed. Commercial development in Lewiston is primarily located in the downtown area and along the major arterials. Lisbon Street from the Turnpike Exit 80 through downtown is Lewiston's main commercial area. The 1995 plan comments that much land currently zoned as industrial is not suitable for development and industrial land adjacent to rail access is limited. The plan recommends exploring other land to meet industrial needs of the City.

1.4.4 Summary of Corridor Characteristics

From US Census 2000 Journey to Work (JTW) data, 1,400 people commute daily from Yarmouth to Portland. The I-295 corridor is the heaviest commuter corridor north of Portland. Daily on I-295, 1,650 people commute from Brunswick and Freeport to Portland. On the I-95 side, 1,000 people commute from Lewiston/Auburn to Portland. However, on the I-295 side of the corridor, there is also substantial reverse commuting – 1,100 people commute from Portland to Freeport and Brunswick daily, as well as the 440 people commuting daily from Portland to Yarmouth. Reverse commuting to L/A from Portland is much smaller at 260 daily trips.

Population growth has recently (2000-2008) been the greatest in the suburban towns in the Yarmouth-Lewiston region. Population growth in these communities is projected to continue at a high rate through 2030. In the Portland-Yarmouth corridor, Cumberland is expected to continue expanding population at a high rate, as is Topsham in the Yarmouth-Bath corridor.

Employment has grown at the highest rate in the Brunswick Micropolitan region from 2000 to 2008. Employment growth was also high in the Portland-South Portland MSA. The total number of jobs in 2008 were roughly equal in Portland and L/A, with jobs in Brunswick and Bath equaling approximately a third of

⁴⁰ City of Auburn. *Auburn Tomorrow Comprehensive Plan Inventory, 1995-2005*.

⁴¹ US Census Bureau. *Census 2000*.

the larger cities' totals. The region's largest employers are located in Portland, Freeport, Bath, Brunswick, and Lewiston.

In 2000, home ownership was the most affordable in the cities of the Yarmouth-Lewiston corridor and in Bath. Rent was the most affordable in the cities of both the Yarmouth-Lewiston and Yarmouth-Bath corridor.

1.5 Existing Transportation Network

The following two sections detail both the existing highway and transit networks in the study area. Projections for future highway use and congestion are also included.

1.5.1 Highway

Two major interstate highways pass through Portland: I-95 (Maine Turnpike) and I-295. For travel to and from the Portland area, the major routes used are I-295 to Yarmouth, Freeport, Brunswick, and Topsham and I-95 (via the I-295 connector) to Gray, New Gloucester, Auburn, and Lewiston. Figure 1-12 shows the existing study area road network. The Interstate Highways perform a critical role in the region's (and states) transportation system. They provide a high degree of accessibility and mobility into and through the region. The Maine Turnpike (portions of I-95) provides major north-south access to and through the region. In 2005, the Maine Turnpike Authority completed a widening of the Turnpike south of Exit 44 in South Portland to three lanes in each direction. I-295 begins at Maine Turnpike Exit 44 and provides north-south access to and from the Turnpike and the Maine Mall Area (South Portland). From its terminus at Exit 44, I-295 heads north through the City of Portland and through the northern communities in the study area, eventually rejoining the Turnpike in Gardiner north of the study area. In the future, the Maine Turnpike Authority has funding in its 20-year capital plan for the upgrade/expansion of the Turnpike from Exit 44 to Exit 53 (West Falmouth). Currently the Turnpike north of Exit 44 is underutilized, worsened by the fact that many through-travelers use I-295 to avoid paying tolls⁴².

1.5.1.1 I-95 Maine Turnpike

Table 1-7 lists average daily traffic by interchange for April 2009 to show a 'normal' day and July 2009 to show a 'seasonal' day on the highways for study area interchanges on the Maine Turnpike. Average daily traffic volumes on the Maine Turnpike (I-95) north of Portland (I-95 Exit 52 through I-95 Exit 80, including I-95 New Gloucester Barrier) ranged from 10,200 to 18,800 vehicles in April 2009 and from 11,000 to 27,900 vehicles in July 2009, as listed in the table.

On an average day, approximately 41,000 vehicles exit the highway on the three Portland interchanges (I-95 Exit 46, I-95 Exit 47, and I-95 Exit 48). In Auburn, on average, 16,000 vehicles exit daily and in Lewiston, approximately 12,000 vehicles exit daily. Daily through traffic at the New Gloucester Barrier totals about 18,800 vehicles.

⁴² MaineDOT and PACTS. *I-295 Corridor Study*, 2008.

Table 1-7: Average Daily Traffic by Interchange

Turnpike Interchange	Average Daily Traffic	
	April 2009	July 2009
I-295 - Exit 44	19,506	24,373
I-95 South Portland - Exit 45	23,329	25,397
I-95 Congress St./Jetport - Exit 46	15,360	16,854
I-95 Rand Road/Westbrook Arterial - Exit 47	8,052	8,784
I-95 Portland/Westbrook - Exit 48	17,508	20,490
I-95 Falmouth - Exit 52	11,022	13,926
I-95 West Falmouth - Exit 53	10,210	11,024
I-95 Gray - Exit 63	14,027	17,262
I-95 New Gloucester Barrier	18,830	27,889
I-95 Auburn - Exit 75	16,000	17,912
I-95 Lewiston - Exit 80	11,875	12,383

Source: Maine Turnpike Authority

During the summer, as tourists fill the State, average daily traffic increases dramatically. At the three Portland interchanges, the daily traffic counts are increased by 5,200 vehicles during the summer. At the New Gloucester Barrier, there are 9,000 additional vehicles on the highway daily during the summer versus the off-peak seasons.

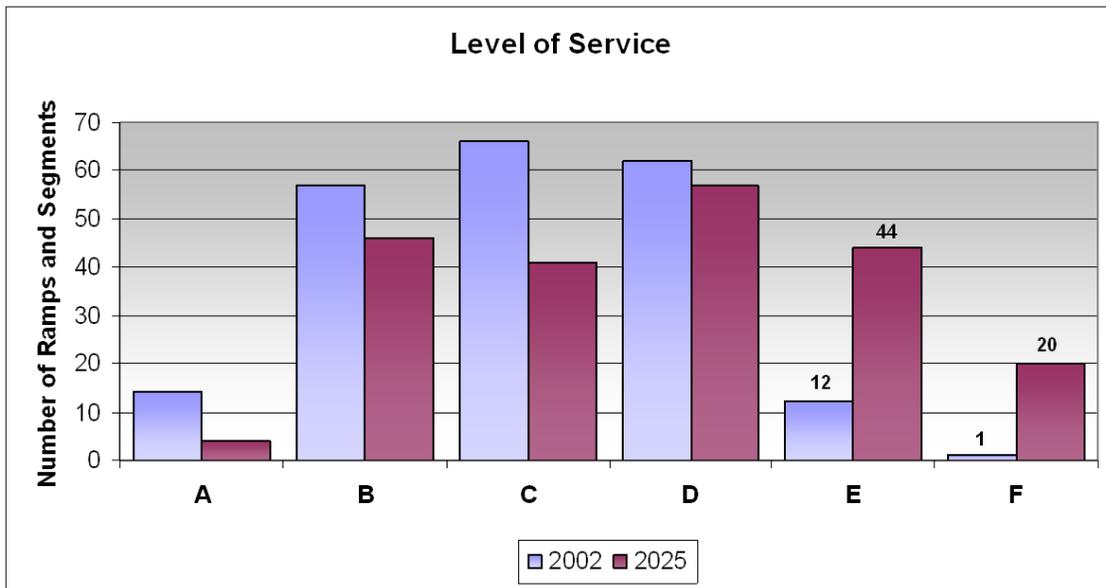
1.5.1.2 I-295

According to the I-295 Corridor Study, average daily traffic on I-295 in Portland is between 70,000 and 85,000 vehicles on most segments and 50,000 vehicles between Falmouth and Brunswick. Highway congestion levels and travel times are expected to increase across the network as population and economic activity grow. Average daily traffic volumes on I-295 north of Portland ranged from 45,000 to 55,000.

Peak-hour traffic projections prepared by MaineDOT in 2005 for the year 2025 illustrated severe degradation for Levels of Service (LOS) along I-295 in the project corridor. In 2002, thirteen ramps or highway segments demonstrated a LOS of E or F. By 2025, 64 ramps or highway segments are projected to have LOS E or F. As predicted in the I-295 Corridor Study, Figure 1-13 illustrates the impact of population and employment growth if highway or transit measures are not implemented.

Levels-of-service “A”, “B” and “C” generally represent extremely favorable to fair levels of traffic flow. At LOS “D”, delays increase and the influence of congestion becomes noticeable. LOS “E” is considered to be the limit of acceptable delay for most motorists. LOS “F” is considered to be unacceptable to most motorists, with traffic flow at, or exceeding, the capacity of the roadway.

Figure 1-13: Highway Level of Service Comparison



Source: I-295 Corridor Study Highlights, January 2008

Vehicle miles traveled (VMT) are projected to increase from 2002 to 2025 by 25 percent. Due to the growth in highway congestion levels, vehicle hours traveled (VHT) are projected to increase by an average of 33 percent from 2002 to 2025. Because VHT is projected to increase faster than VMT, a

reduction in travel speed would occur, and highway travel times are projected to increase up to 44 percent⁴³. Projected travel times are shown in Table 1-8.

Table 1-8: Peak Highway Travel Times to Downtown Portland

Origin	Route	2002 Travel (Minutes)	2025 Travel (Minutes)	Percent Increase
Yarmouth	I-295	16	23	44%
Freeport	I-295	24	31	29%
Brunswick	I-295	32	40	25%
Topsham	I-295	31	39	26%
Bath	Rt. 1/I-295	43	52	21%
Gray	I-95	25	33	32%
Lewiston	I-95	41	49	20%
Auburn	I-95	40	48	20%

Source: Maine DOT, 2005

There is limited opportunity to provide additional capacity on I-295. According to the Interstate I-295 Corridor Study, on the segment from Scarborough to Brunswick, the geometric design of I-295 is dated. Closely-spaced interchanges, short weaving lengths and tight curves on ramps lead to a reduction in level of service (LOS) on the interstate. An analysis was undertaken as part of the Corridor Study to investigate the effectiveness of auxiliary lanes to improve traffic flow. The results of the analysis indicated that even with the addition of auxiliary lanes, there would still be five locations on I-295 with deficient capacity:

- Northbound from Exit 5 to Exit 6
- Northbound from Exit 7 to Exit 8
- Northbound from Exit 8 to Exit 9
- Southbound at Exit 6
- Southbound from Exit 5 to Exit 4

According to the I-295 Corridor Study, the auxiliary lanes are either not feasible or cost-prohibitive. Measures other than low-cost auxiliary lanes, such as more costly addition of highway capacity in an urban environment, transportation demand management strategies, transit or a combination are needed to address the deficiencies⁴⁴. Capacity increases in the form of adding travel lanes would likely be cost-prohibitive due to the urbanized nature of the area and the expense of widening river and stream crossings such as Tukey's Bridge over Back Cove.

1.5.2 Transit

The low percentage of commuters using modes other than automobile (as shown in the Journey to Work data) correlates with the limited existing transit options in the corridor. There are no current passenger rail

⁴³ PACTS. *Destination Tomorrow* Regional Transportation Plan, 2006.

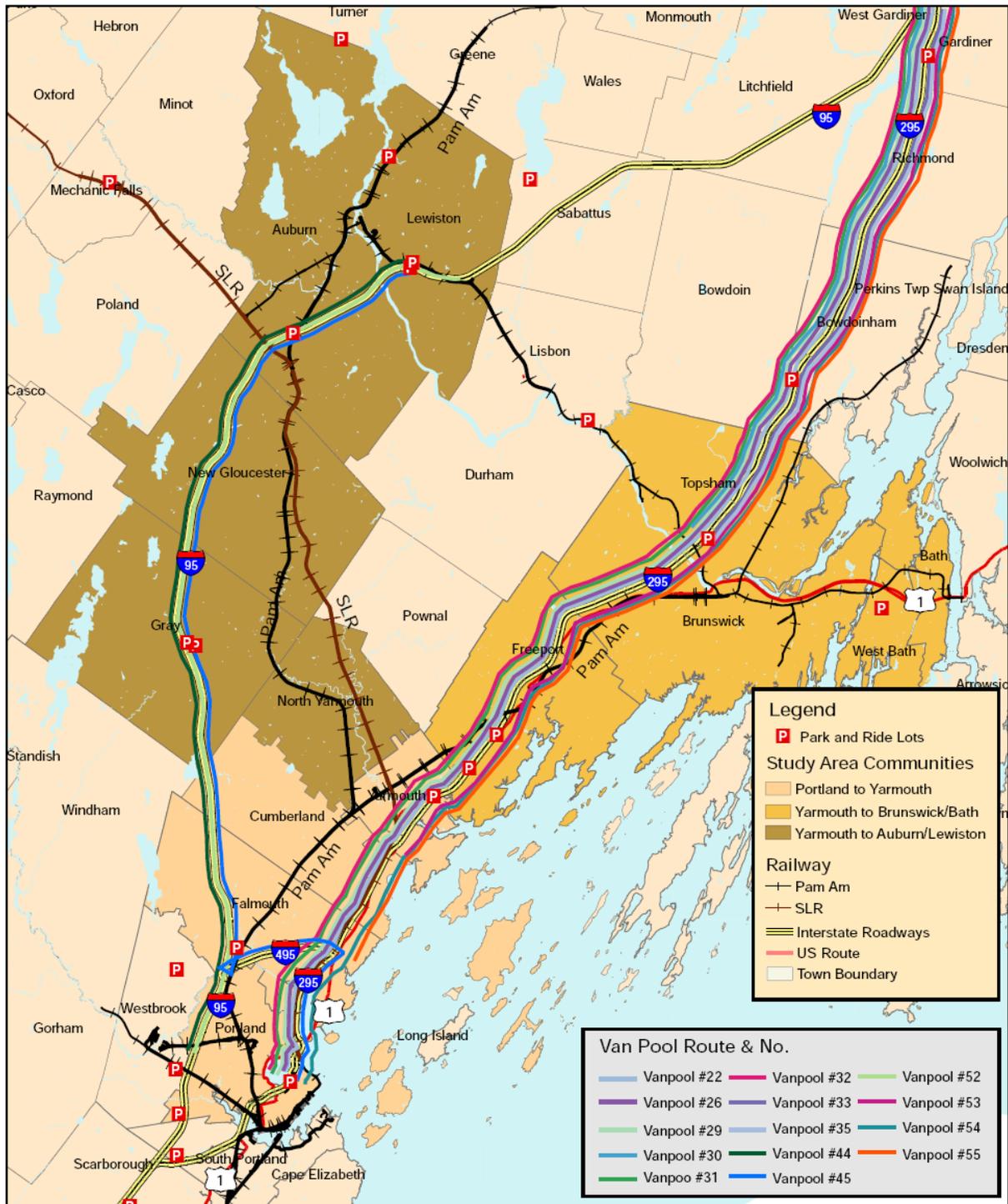
⁴⁴ MaineDOT and PACTS. *I-295 Corridor Study*, 2008.

services north of Portland and a limited number of public bus transportation options for travel to the north of Portland in the project corridor. Figure 1-14 presents the existing transit options within the study area.

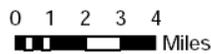
Within the city of Portland, local transportation services are provided by the Greater Portland Transit District (METRO), along with other smaller providers (listed below). In Lewiston/Auburn, citylink operates fixed route bus service, and in Brunswick, Coastal Trans operates paratransit service and a shuttle. From the 2004 BRT & LRT study⁴⁵ along with revisions, updates and new inclusions, descriptions of transit services in the corridor are listed below and shown in Figure 1-14.

⁴⁵ GPCOG & SMRPC. *Bus Rapid Transit and Light Rail Transit Study*, 2004.

Figure 1-14: Study Area Existing Transit Network



Source: GPCOG, AVCOG, & GoMaine, 2008



- **Greater Portland Transit District (METRO)** – Serves the communities of Portland, Westbrook, Falmouth and the Maine Mall area of South Portland with eight routes. Figure 1-15 shows the Metro Routes updated in May 2009.
- **Regional Transportation Program (RTP)** – RTP operates express bus service between Saco, Westbrook, Portland, Brunswick and Bath for employees of Bath Iron Works (BIW).
- **GoMaine** – A free statewide commuter services program helping Maine commuters and employees with economical, healthy and environmentally friendly travel options: carpool matching, vanpool formation, transit information, Park and Ride lots and the Emergency Ride Home Guarantee. GoMaine, along with MaineDOT and the Maine Turnpike Authority, also provides 24 vanpools linking Augusta with Portland, Brunswick, Auburn, and Lewiston. Table 1-9 lists the vanpool routes operating in the study area and how many seats are open as of September 2009. Overall, 60% of all GoMaine vanpools are full.

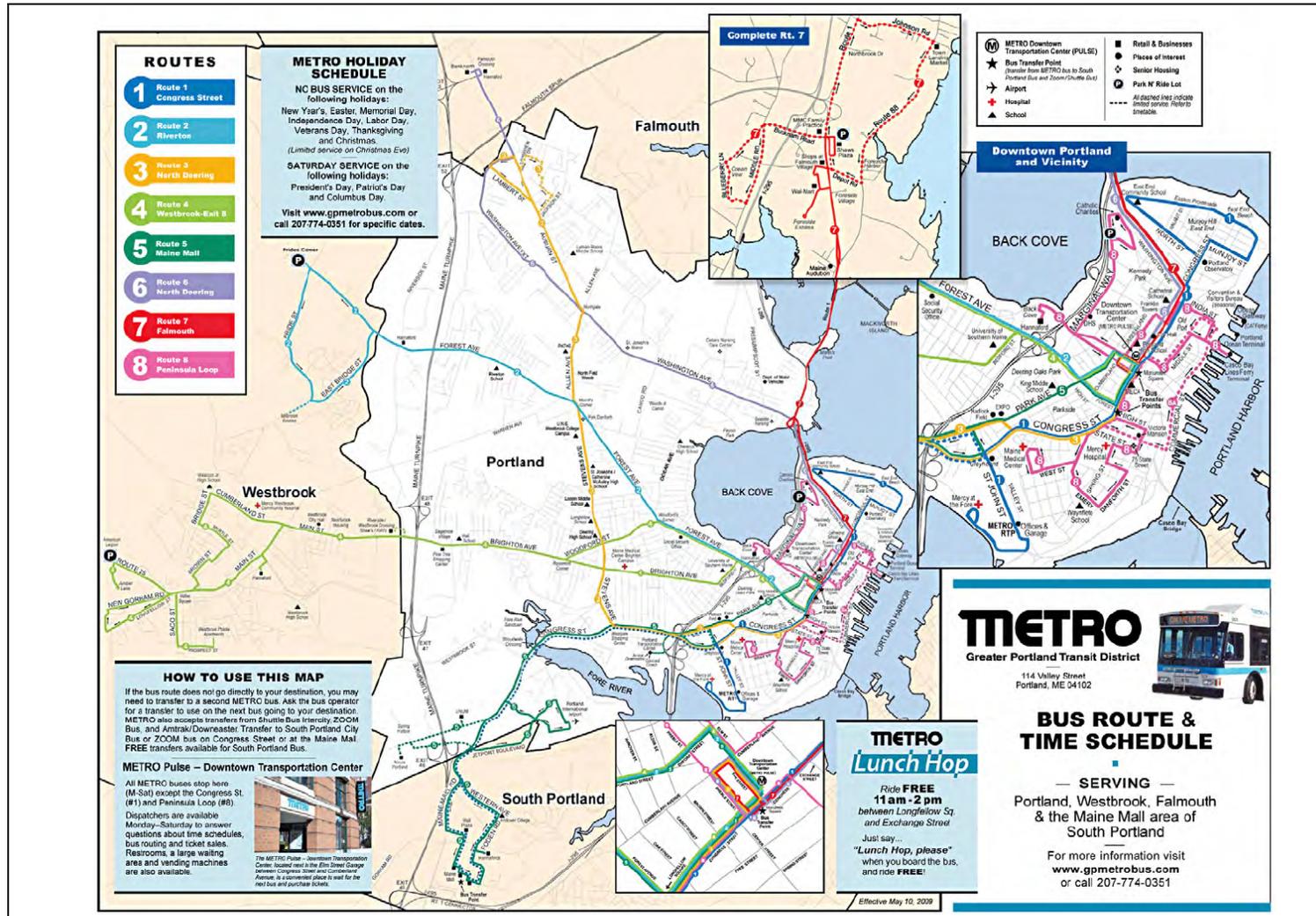
Table 1-9: GoMaine Vanpool Routes in Portland North Region

Van #	Route	Seats Open
22	Portland–Yarmouth to Augusta–North	1
23	Yarmouth–Freeport to Augusta–Capital	1
24	Portland–Yarmouth to Augusta–North	FULL
33	Falmouth–Togus	FULL
29	Portland–Yarmouth to Augusta–East	FULL
39	Portland to Lewiston	FULL
44	Lewiston - Portland (outer Congress)	3
45	Lewiston - Portland (intown)	FULL

Source: Go Maine website, September 3, 2009

- **Park and Ride Lots** – An important element of the carpool and vanpool network in Maine, providing a safe and convenient location for commuters to meet and leave their cars. These facilities also provide a ready-made platform for commuter services like ZOOM and the BIW shuttle. Lots are owned and maintained by a number of different entities including the State, Maine Turnpike Authority, municipalities, nonprofit organizations and businesses. Although there are 20 MaineDOT Park-n-Ride lots within the project corridor, half of which are served directly by either I-95 or I-295, there is no bus service provided from any of these lots. GO MAINE Commuter Connections provides online ridematching in order to encourage carpooling. Carpools and several vanpools depart from several of these Park-n-Ride lots. Figure 1-14 identifies Park and Ride lots within the study area.
- **citylink** – Androscoggin Transportation Resource Center (ATRC) operates nine routes in Lewiston and Auburn. The Downtown Shuttle is a free route that serves to connect Lewiston routes and Auburn routes, and provides a fast and easy alternative for people working and traveling in the two downtowns. citylink also operates Free Fare Zones within busy sections of three of its other routes. These allow passengers to make multiple boardings in the Mall and Main Street retail areas without paying a fare. citylink also provides complementary door-to-door paratransit service for individuals unable to use the regular route buses. The citylink system is provided in Figure 1-16.

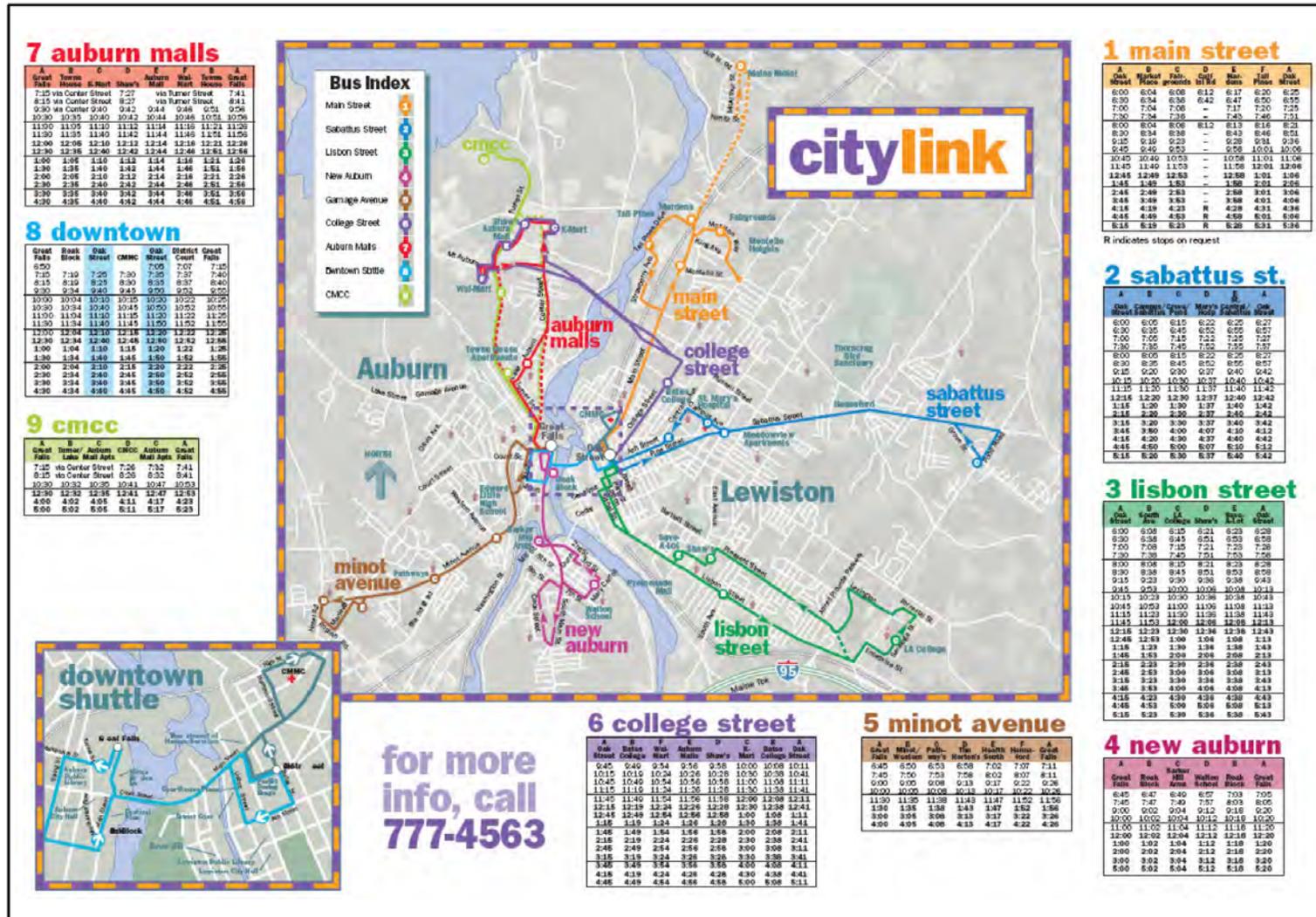
Figure 1-15: Portland Metro System



Source: Metro, May 2009



Figure 1-16: Citylink System



- **Coastal Trans** – a State-designated Regional Transportation provider and a MaineCare Transportation provider. Coastal Trans provides transportation services for residents of Knox, Lincoln, and Sagadahoc Counties as well as the Towns of Brunswick and Harpswell. Coastal Trans provides non-emergency medical transportation for both MaineCare eligible riders and elderly, disabled, and low income persons. Coastal Trans operates demand response service on vans and in sedans, organizes volunteer drivers, and also operates the 'MidCoast Shuttle' that provides peak period service from Brunswick to Edgecomb.

- Other transit service providers also operating out of Portland include the following:
 - Portland Explorer
 - VIP Tour and Charter Company
 - South Portland Bus Service (SPBS)
 - Casco Bay Island Transit District (CBITD)
 - Concord Trailways
 - Greyhound/Vermont Transit
 - Independent Transportation Network (ITN)
 - Mermaid Transportation
 - Chebeague Transportation Company (CTC)
 - Biddeford-Saco-Old Orchard Beach Transit Committee (ShuttleBus): The ShuttleBus is responsible for the ZOOM Turnpike Express, which provides commuter express bus service on the Maine Turnpike between Biddeford, Saco and Portland.
 - Northern New England Passenger Rail Authority (NNEPRA)⁴⁶: In conjunction with Amtrak and the State of Maine, NNEPRA operates the Downeaster rail service between Boston's North Station and the Portland Transportation Center with 5 weekday trains in each direction. Intermediate stops in Maine include Wells, Saco and Old Orchard Beach.

1.6 Travel Markets

Approximately 300,000 residents live within the study area occupying 125,000 households (per the 2000 US Census). Population densities are greatest surrounding Portland and along the coast. Those communities further removed from Portland and to the north/northwest are generally less densely populated. However, a higher pace of population growth has been predicted by local planners in the Lewiston and Auburn area due to the presence of more affordable housing.

Employment concentrations are located around Portland, Lewiston, Auburn, Bath and Brunswick. Of the 300,000 residents within the project area, more than 30,000 commute to Portland. Journey to work data from the 2000 Census Transportation Planning Package indicates 79 to 85 percent commute from the north to Portland via automobile alone with another 13 percent car pooling. This data also shows the highest density of commuters to Portland reside in Falmouth, Yarmouth, Cumberland and Gray. The concentration of commuters stretching from Portland to Yarmouth, a distance of about ten miles, can be viewed as a daily commuter corridor. The additional dispersion of commuters toward Brunswick, Lewiston, and Auburn – a distance of about thirty miles from Portland – can be viewed as a regional travel corridor.

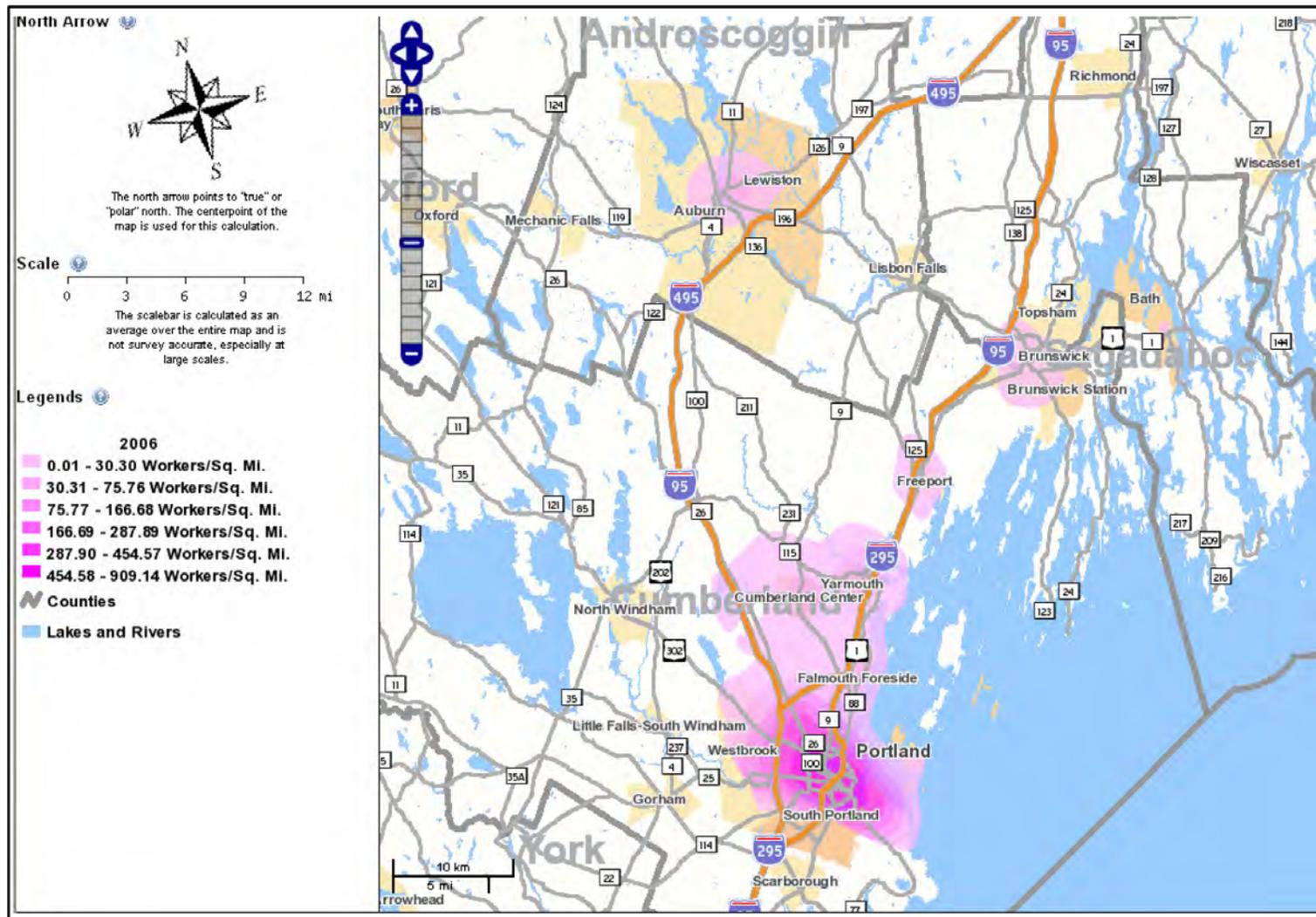
⁴⁶ NNEPRA is a State of Maine public benefit corporation established in 1995 to promote passenger rail service within and to Maine.

The US Census Bureau has a program called Longitudinal Employer-Household Dynamics (LEHD). The program collects data from local and state agencies and uses it to model employer-household relationships. The LEHD program has to-date produced datasets of commuting patterns and demographic characteristics of workers from 2002 through 2006. The following figures present commuter density (number of workers per square mile) from the 2006 LEHD data.

In Figure 1-17, commuter densities are shown into Portland. In other words, this figure shows residence locations/concentrations of workers who work in Portland. This figure and the others in this section only depict workers who live inside the study area for this transportation alternatives analysis. Portland workers generally live in small radius in Portland and its surroundings (again, this figure only considers workers living inside the study area for this project north of Portland). However, there is also a continuous commuter radius northward from the city through Falmouth, Cumberland, and Yarmouth. There are other smaller concentrations of Portland workers who live in Freeport, Lewiston/Auburn and Brunswick.

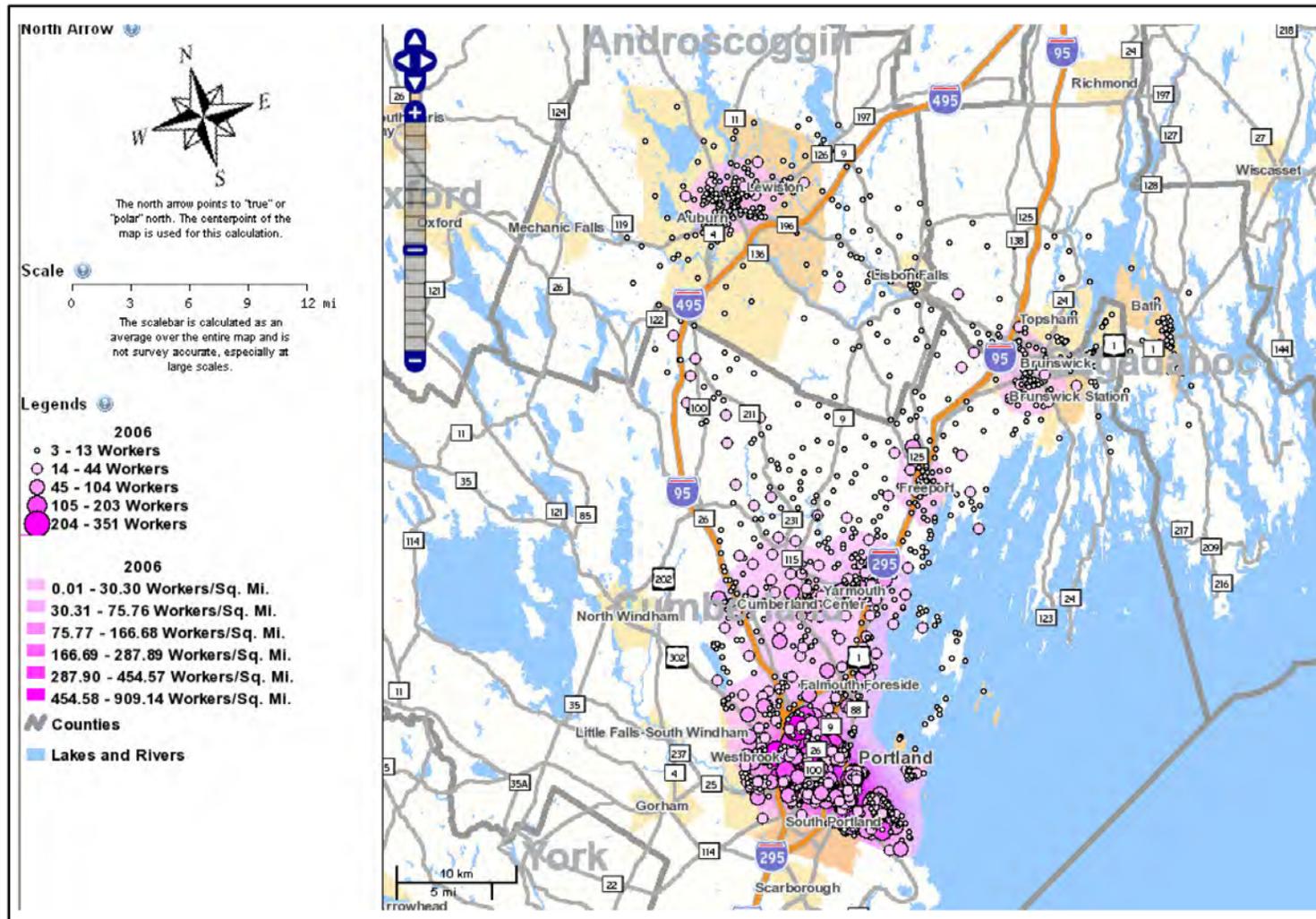
Figure 1-18 is the same as Figure 1-17, but shows further detail on the location of commuters into Portland through the use of individual dots that represent numbers of workers. This figure shows that there are also many commuters into Portland who live between I-95 and I-295 north of Yarmouth.

Figure 1-17: Commuter Density into Portland from the Study Area (2006 LEHD)



Source: US Census, 2006

Figure 1-18: Commuter Density into Portland from the Study Area with Detail (2006 LEHD)



Source: US Census, 2006

Commuter travel demand in the Portland North Corridor to Portland is forecast to increase by 24% percent in 2025. Table 1-10 presents a trip table showing the forecast change in peak hour vehicle trips in the Portland North Corridor between 2000 and 2025. As seen in the table, peak hour vehicle trips in the study area from points north of the Portland Metropolitan Planning Organization (MPO) boundaries (which includes Auburn) to Portland are forecast to increase by 1,343 trips, of which 32 percent (434 trips) are destined to Portland. Peak hour vehicles trips from other locations in the Portland North Study Area to Portland are forecast to increase as well, as shown for the following selected areas:

- Yarmouth- total increase of 526 peak hour trips, with 99 (18.8%) destined to Portland
- North Yarmouth –total increase of 216 peak hour trips, with 43 (19.9%) destined to Portland
- Falmouth – total increase of 806 peak hour trips, with 466 (57.8%) destined to Portland
- Cumberland – total increase of 444 peak hour trips, with 177 (39.9%) destined to Portland

The data indicates that some reverse commuting is forecast to increase. Peak hour vehicle trips from Portland to Falmouth, for example, are forecast to increase by 182 trips, or 26.5% of the increase in all peak hour trips destined to Falmouth. Current reverse commuting is discussed following Table 1-10.

Table 1-10: Change in Peak Hour Vehicle Trips 2000-2025 from Portland North Corridor Communities to Portland

Change in Peak Hour Vehicle Trips 2000-2025		From											Total	From Total Portland	Share of Trips From Portland
		North Externals	Brunswick	Durham	Pownal	Freeport	Yarmouth	North Yarmouth	Falmouth	New Gloucester	Cumberland	Gray			
To	North Externals	0	56	38	30	252	66	59	41	140	57	155	905	11	1.2%
	Brunswick	26	-2	1	1	13	2	2	0	0	1	-1	42	-1	-2.4%
	Durham	-20	0	-4	-4	-6	-5	-1	-1	3	-2	-3	-48	-5	10.4%
	Pownal	5	-1	3	3	11	1	6	-2	7	0	-1	36	4	11.1%
	Freeport	441	11	2	11	562	91	31	9	25	28	9	1,217	-3	-0.2%
	Yarmouth	90	1	-7	9	86	136	33	17	8	28	19	437	17	3.9%
	North Yarmouth	14	0	-2	3	23	11	11	2	13	15	8	121	23	19.0%
	Falmouth	102	3	-2	3	47	34	9	202	6	59	43	688	182	26.5%
	New Gloucester	122	-1	4	5	39	22	12	7	45	11	42	328	20	6.1%
	Cumberland	53	-2	-1	1	30	48	10	29	16	42	14	295	55	18.6%
	Gray	76	1	-2	-7	15	21	1	16	29	28	96	301	27	9.0%
	Portland-Peninsula	226	-1	-5	6	35	63	29	244	12	85	23	717		
	Portland-Rest	208	-1	-5	-1	17	36	14	242	10	92	57	669		
	Total	1,343	64	20	60	1,124	526	216	806	314	444	461	5708		
Total to Portland	434	-2	-10	5	52	99	43	486	22	177	80	1386			
% to Portland	32.3%	3.1%	50.0%	8.3%	4.6%	18.8%	19.9%	60.3%	7.0%	39.9%	17.4%	24.2%			

Source: PACTS, April 3, 2008

In the study area, there is also significant commuting from other study area towns to terminals Lewiston/Auburn and Brunswick/Bath, as well as intermediate Freeport. These reverse commuting corridors can also be described using the 2006 LEHD data from the US Census Bureau. The following figures show commuter density (number of workers per square mile) for each of the reverse commute destinations. In each case, the first the first the first the first the first It is important to note that the scale of commuter density varies from place to place on the figures based on the overall number of employees.

Figures 1-19 and 1-20 show that most people who work in Lewiston/Auburn also live in Lewiston/Auburn. There are other smaller pockets of L/A commuters west to Lisbon Falls, in Brunswick, and in Portland.

As was the situation in Portland, Figure 1-20 shows that there are also many commuters to L/A who live between I-95 and I-295, the primary corridors of interest for this study.

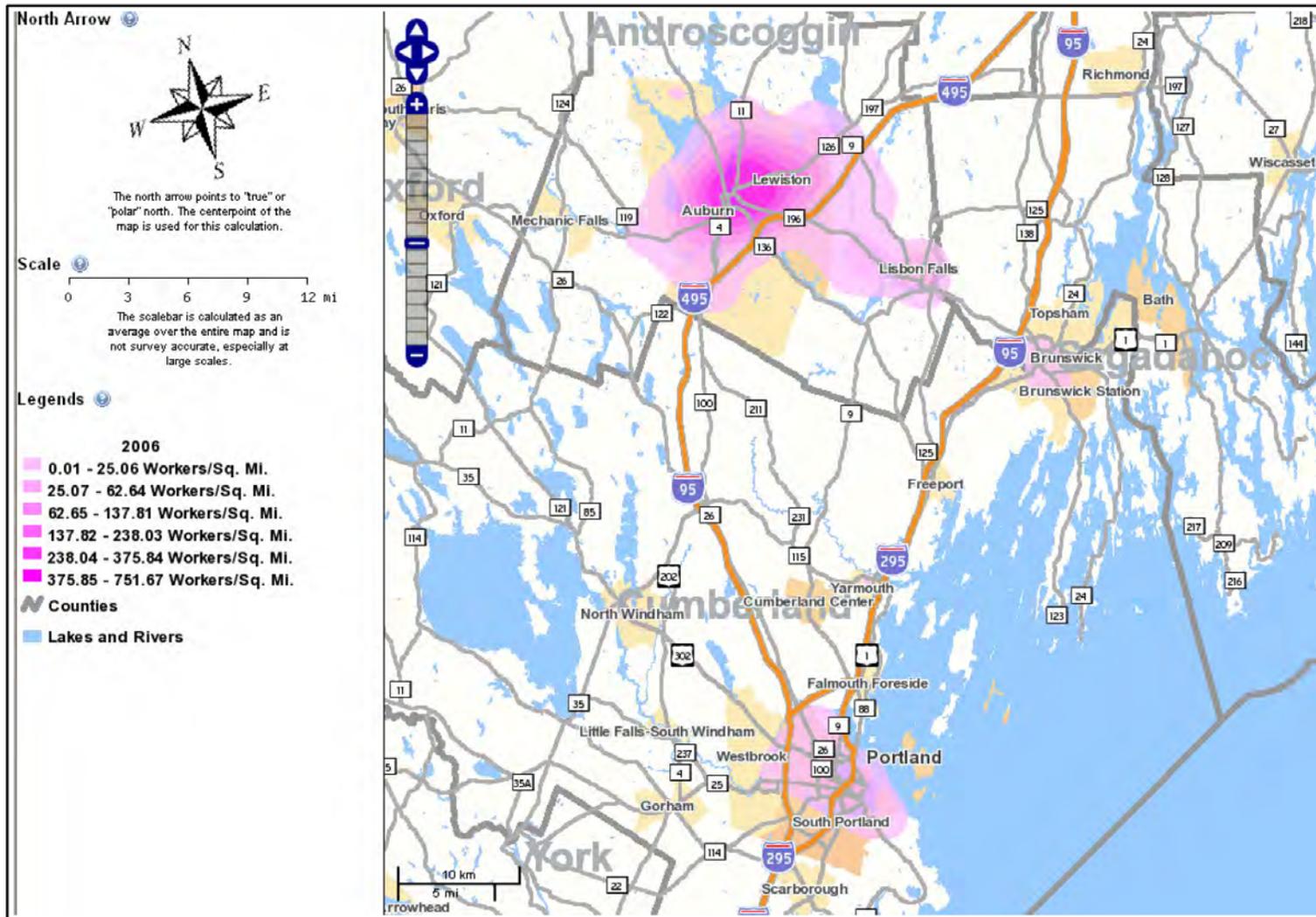
In Brunswick and Bath, workers have a wider commutershed than do L/A workers, as is shown in Figure 1-21. While the largest numbers of commuters live in Brunswick and Bath, a continuous commutershed extends east beyond Lisbon Falls almost to L/A, and south to Freeport, then beyond to Yarmouth and Portland.

As with the other employment destinations, the further detail in Figure 1-22 shows that there are other commuters in smaller concentrations that live along the corridor between I-95 and I-295.

Figures 1-23 and 1-24 describe the commuter density for people who work in Freeport and live in the study area. Freeport has the widest continuous commutershed of all the employment destinations in the study area, with the understanding that the scale of density is different for every employment destination. Freeport employees live all over the study area, with secondary concentrations in Brunswick, Bath, Portland, and to a slightly lesser extent, L/A.

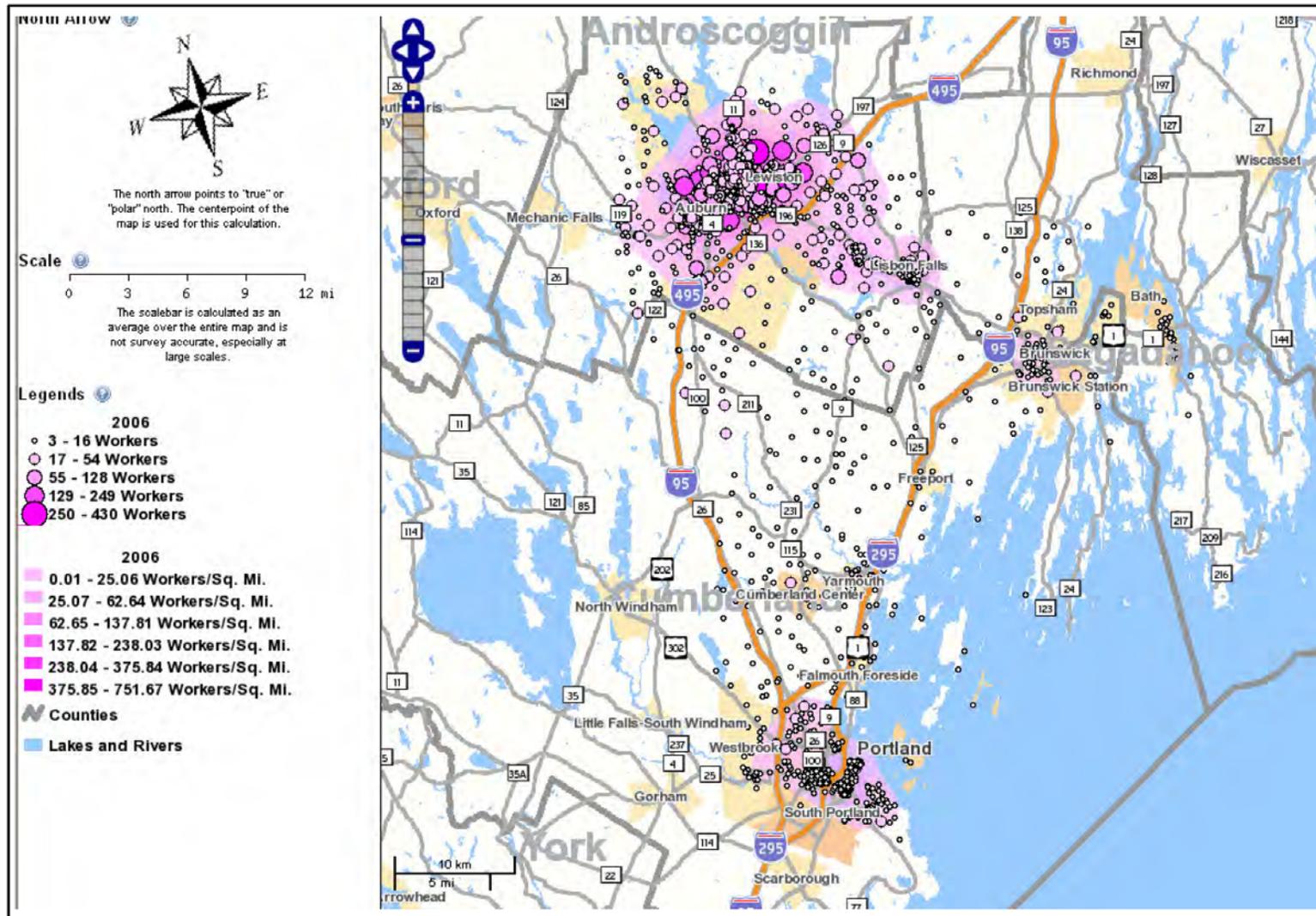
Figure 1-24 provides further detail on the Freeport commutershed.

Figure 1-19: Commuter Density into Lewiston/Auburn (2006 LEHD)



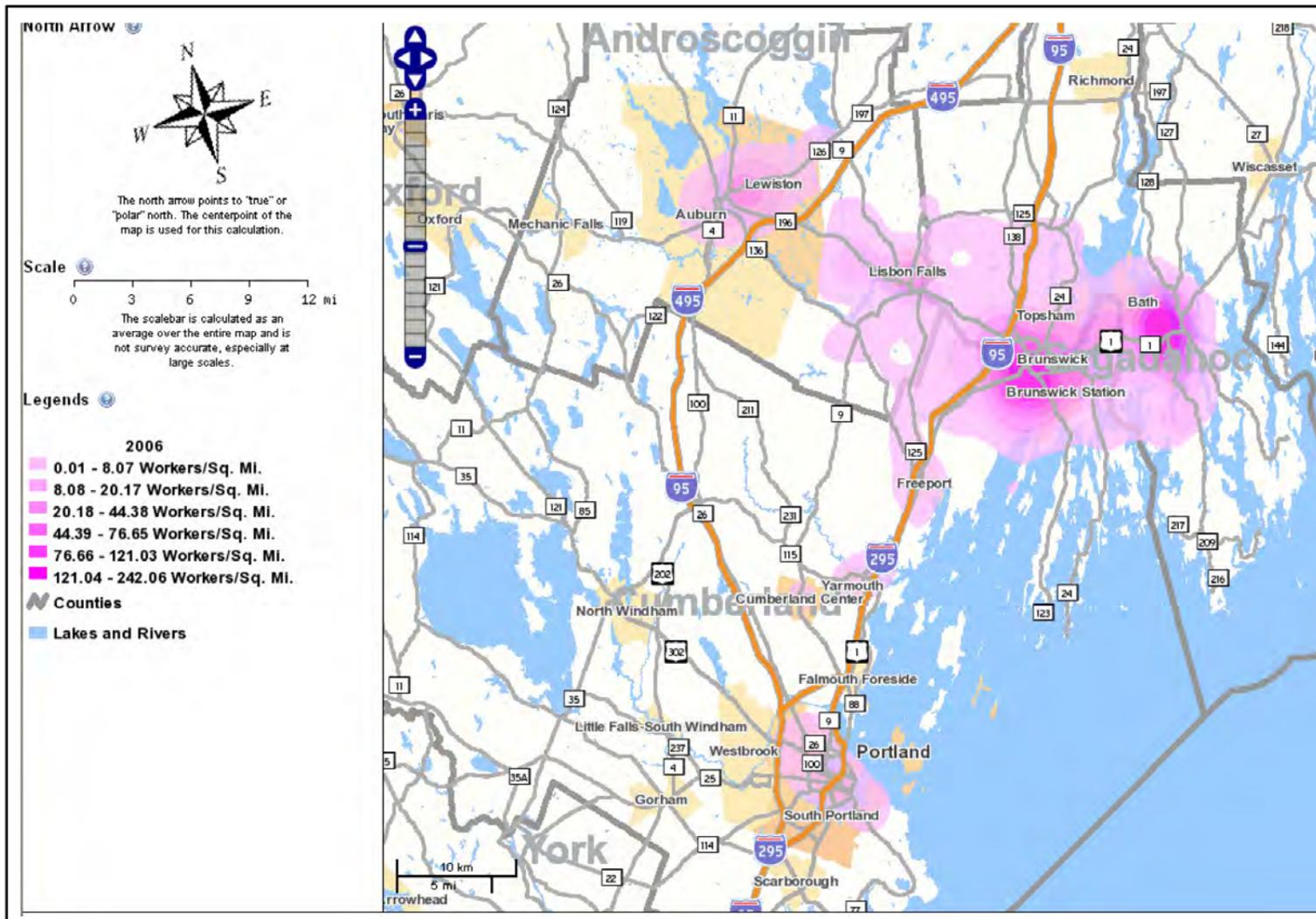
Source: US Census, 2006

Figure 1-20: Commuter Density into Lewiston/Auburn with Detail (2006 LEHD)



Source: US Census, 2006

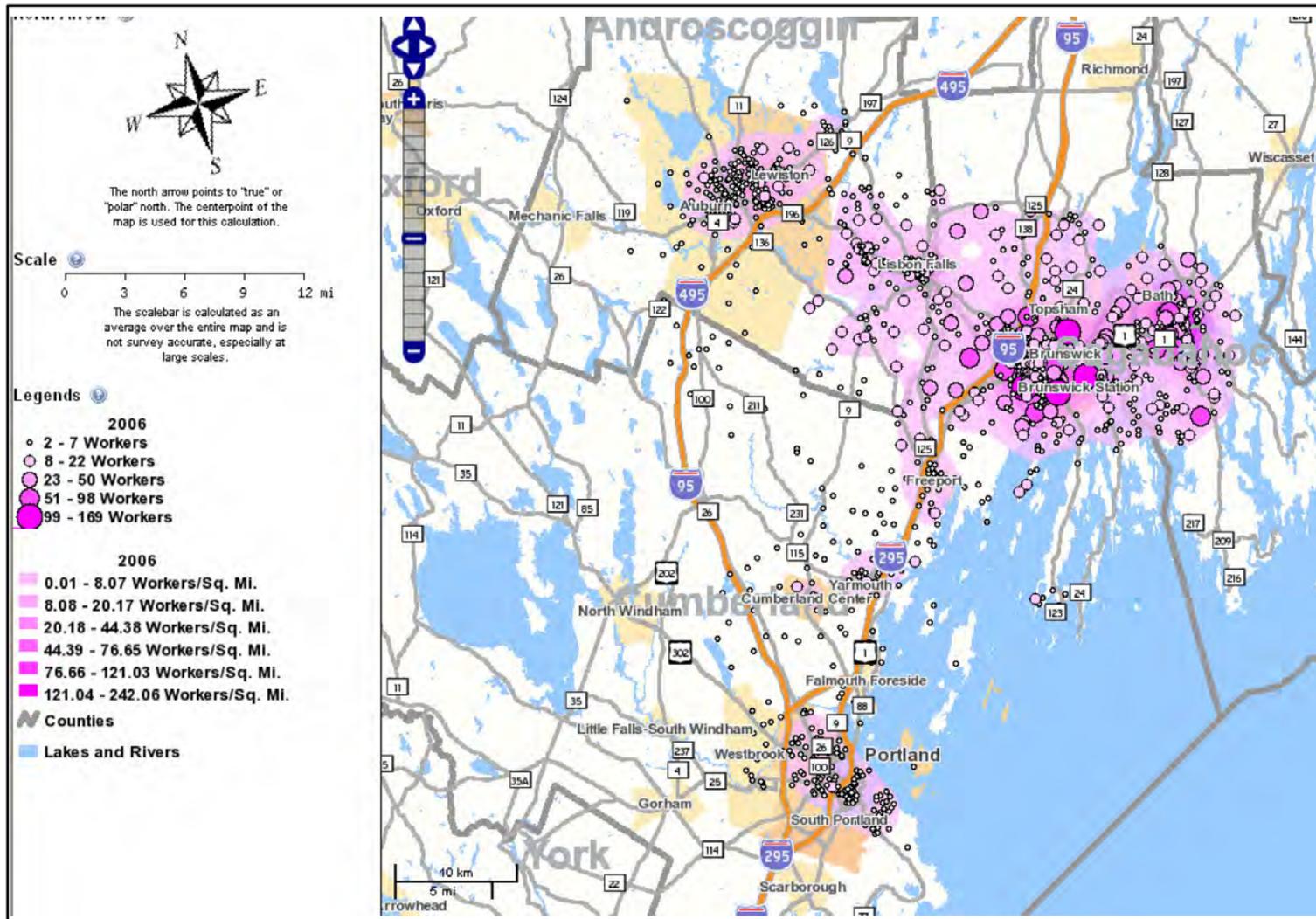
Figure 1-21: Commuter Density into Brunswick/Bath (2006 LEHD)



Source: US Census, 2006

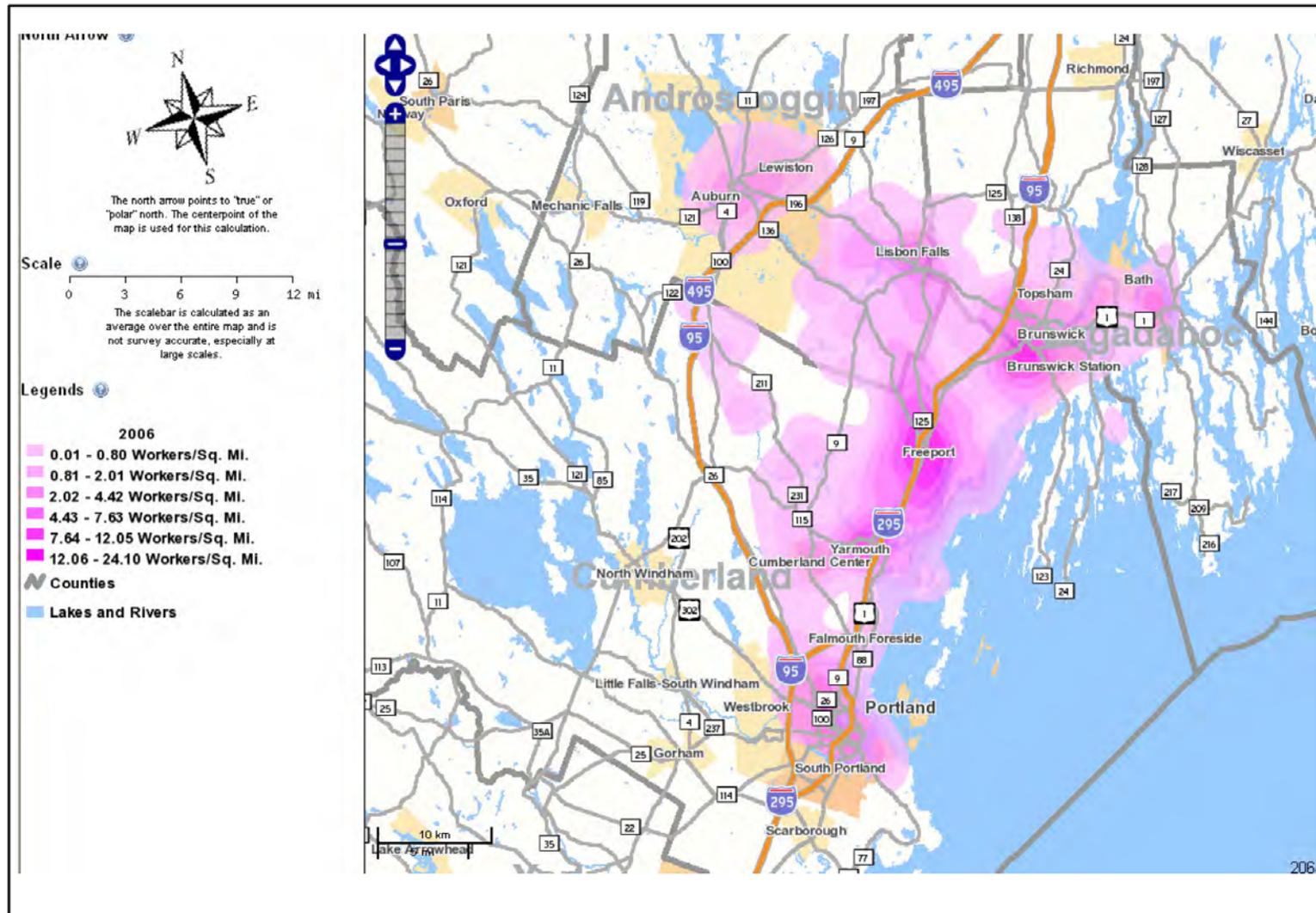


Figure 1-22: Commuter Density into Brunswick/Bath with Detail (2006 LEHD)



Source: US Census, 2006

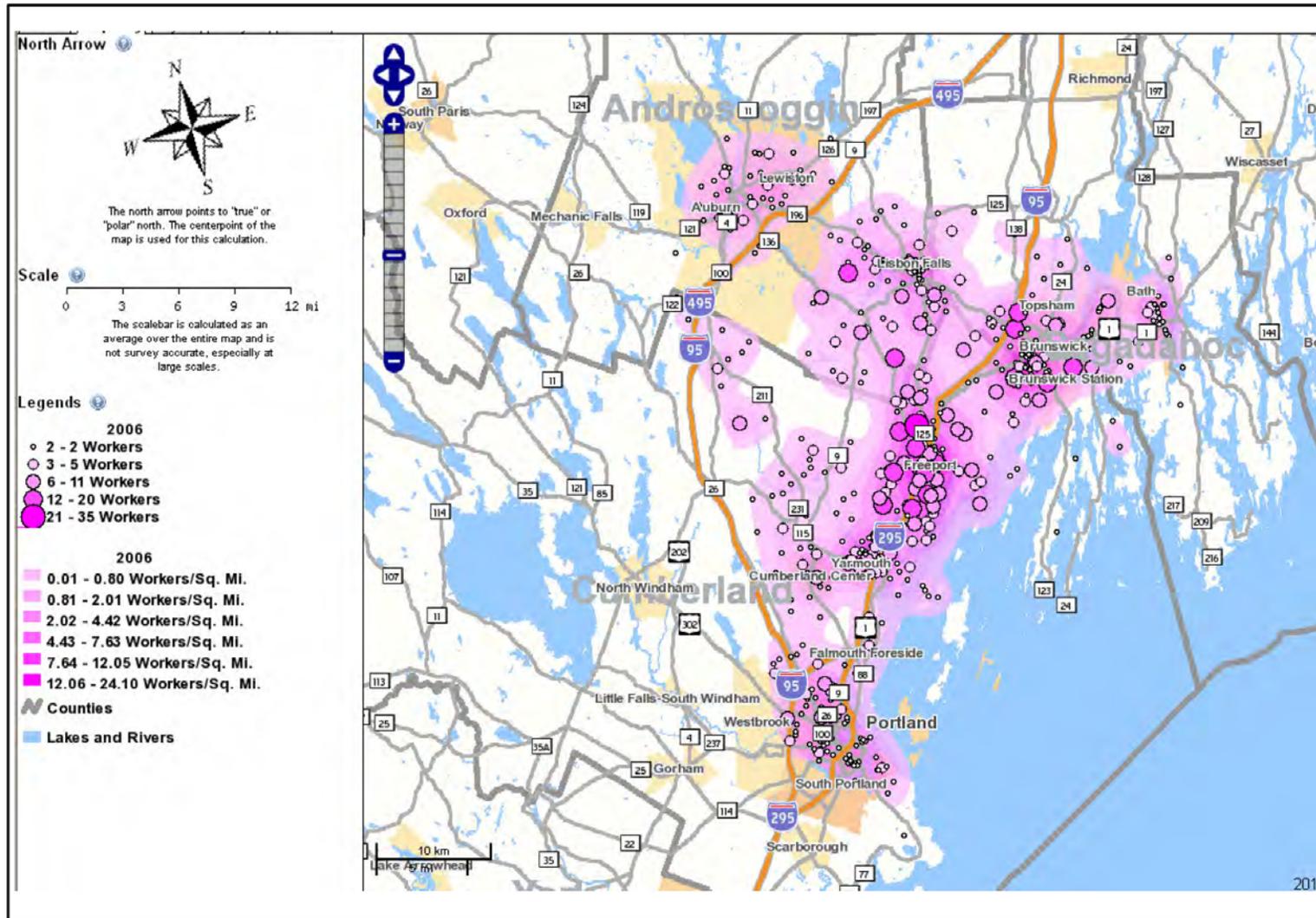
Figure 1-23: Commuter Density into Freeport (2006 LEHD)



Source: US Census, 2006



Figure 1-24: Commuter Density into Freeport with Detail (2006 LEHD)



Source: US Census, 2006

US Census 2000 also provides information on travel time to work and mode of transportation to work. Table 1-11 lists average travel time to work by municipality as well as the number of residents using carpooling and public transportation commute options. Travel times to work are lowest in the Yarmouth to Bath region at 20 minutes. Travel times to work are longest in the Yarmouth to Lewiston region, at 24 minutes. Overall, of the communities listed, the shortest commute times are found in Bath, at 17 minutes and the longest commute times are found in North Yarmouth, at 28 minutes. Shorter commute times indicate local commuting to residence or adjacent community, while longer commute times indicate more regional travel.

Not surprisingly, the most commuters using non-single occupancy modes of vehicle transportation (e.g. transit) are located in the cities where public transportation is most widely available – Portland, Auburn, and Lewiston. There are also substantial numbers of commuters using carpools to get to work in Portland, Brunswick, Auburn, and Lewiston.

Table 1-11: Average Travel Time to Work and Multiple-Rider Modes of Transportation

Municipality	Mean Travel Time to Work	Carpooled	Used Public Transportation
Portland - Yarmouth			
Portland	19	3,748	1,533
Falmouth	22	276	18
Cumberland	23	167	27
Yarmouth	23	302	8
Subregional Total	22	4,493	1,586
Yarmouth to Brunswick/Bath			
Freeport	22	429	49
Brunswick	19	1,079	89
Topsham	19	405	16
West Bath	20	125	0
Bath	17	588	46
Subregional Total	20	2,626	200
Yarmouth to Auburn/Lewiston			
Gray	27	338	16
New Gloucester	26	303	9
North Yarmouth	28	124	23
Auburn	22	1,641	104
Lewiston	19	2,140	316
Subregional Total	24	4,546	468
Regional Total	22	11,665	2,254

Source: US Census, 2000

1.6.1 Travel Market Summary

Commuters in the study area are primarily destined for Portland. There are, however, reverse commute markets to Brunswick/Bath, Freeport, and L/A. As is the case in most places, the largest concentrations of residents live within the community or adjacent to the community of their employer. This pattern, however, is magnified in L/A, where the concentration of resident workers is greatest in the study area. The other employment centers draw from a wider commutershed than L/A. This can be explained partially by the fact that L/A has some of the most affordable housing in the region, which means that people who work in L/A also live in L/A. People who work in other, more expensive employment centers also live in L/A.

Most commuters drive alone to work, but some also carpool and a few use public transportation. Most commuters into Portland from the study area come from the towns just north of the City: Falmouth, Cumberland, and Yarmouth. Commute time in this region averages 22 minutes. Further north, the commuting corridor along I-295 stands out due to the traffic associated with workers and jobs located in Brunswick and Bath, as well as in Freeport, an intermediate location along the corridor with major employment and residential concentration. While the commuting corridor between L/A and Portland along I-95 is also busy, it lacks a large intermediate draw such as Freeport on the I-295 side.

Chapter 2 Description of Alternatives

In order to address traffic congestion and mobility needs within the Portland North region, the Maine Department of Transportation (MaineDOT) considered implementation of transit service along one of the following corridors:

- Portland through Yarmouth to Bath/Brunswick,
- Portland through Yarmouth to Lewiston/Auburn, or
- Portland to Yarmouth.

The Portland North Alternative Modes Transportation Project evaluated each proposed corridor, route, mode, and service alternative option within the study area in order to identify the alternative that best met the purpose and need of the project. The Study identified a No-Build alternative, a Transportation Systems Management (TSM) alternative, and two groups of Build alternatives. The Build alternative evaluated both express bus and commuter rail options for the three main origin locations with service to the Portland region, the largest employment center in the State.

For each transit corridor (Portland-Yarmouth, Portland-Brunswick (Bath), or Portland-Auburn (Lewiston)), there was a baseline express bus option that would operate on the highway shoulder, an exclusive right-of-way (ROW) express bus option and two different rail options on two existing freight lines. This chapter defines these types of services, describes the alternatives, presents costs for implementing and operating the service, projects ridership for the alternatives, presents screening criteria for the alternatives, and runs the preliminary set of alternatives through the first phase of screening down to one bus and one rail alternative for each terminal.

2.1 Service Alternative Summary

The transit alternatives considered would begin in one of the following communities and serve downtown Portland (reverse commute options would also be available):

- Bath
- Brunswick
- Lewiston
- Auburn
- Yarmouth

These origin-destination pairs could be served by TSM bus service or Build alternatives consisting of either express bus service or commuter rail service. TSM bus service would operate over existing roadways in general travel lanes. With express bus service, the corridors could be served by buses operating on the shoulders of existing highways (bus on shoulder (BOS) service) where feasible, or by buses operating on an exclusive bus-only right-of-way (Exclusive ROW) located on the former Saint Lawrence and Atlantic Railroad ROW between Yarmouth Junction and Back Cove in Portland, now owned by the State of Maine. Both of these options allow the bus to operate separately from the general traffic for most of the alignment in order to adhere to the published schedule and avoid traffic delays. In Portland, the express bus would stop at the Downtown Transportation Center (also known as PULSE) near centrally located Monument Square and then enter into a downtown circulation loop to augment the existing METRO bus system.

For the commuter rail options, the trains would use the Saint Lawrence & Atlantic (SLR) railway (including the state-owned segment between Yarmouth Junction and Portland), the existing Pan Am railway, or a combination of the two freight lines. The SLR railway tracks were generally rated for freight use (Class I) at the time of the analysis and would need to be upgraded to Class III track in order to support passenger service. The Pan Am tracks were generally rated for Class III passenger speeds between Portland and Auburn at the time of the analysis and would require minimal upgrading and construction. Additionally, this analysis assumes that the Pan Am track between Portland and Brunswick will be upgraded to Class III passenger service as part of the Amtrak Downeaster extension to be funded under an American Recovery and Reinvestment Act (ARRA) High Speed Rail grant approved on January 28, 2010. For the rail alternatives, the SLR line would terminate either at a stop in Bayside or on India Street and the Pan Am line would terminate at Union Station or at a stop on Center Street. A downtown bus shuttle from the proposed rail stations was also included for all stations except Center Street, which is already centrally located downtown. Figure 2-1 shows the Portland terminal options for both bus and rail alternatives.

Figure 2-1: Potential Portland Terminals



This combination of origin-destination pairs and bus or rail modes of operation resulted in a preliminary set of 30 transit Build alternatives. Table 2-1 describes the mode of travel for each of the 30 possible alternatives that results from combining each of the six Portland destination/mode choices with each of the five terminus points.

Table 2-1: Alternatives by Mode

Terminal	Portland Destination					
	Rail				Bus	
	Union Station	Center Street	Bayside	India Street	Monument Square	Monument Square
Yarmouth	Pan Am	Pan Am	SLR	SLR	BOS	Excl. ROW
Brunswick						
Bath						
Auburn						
Lewiston						

Service headways would be the same for all bus and rail alternatives: 30 minutes in the peak and 60 minutes in the off-peak. The peak period was assumed to be from 6:30 to 9:00 AM in the morning and from 4:00 to 6:30 PM in the evening. The first trip of the day would arrive in Portland at 6:45 AM and the last trip of the day would depart Portland at 10:55 PM, providing service for 254 weekdays per year. No weekend or holiday service was planned. Each of the alternatives is described in greater detail in the following sections.

2.1.1 No-Build Alternative

The No-Build alternative provides the point of comparison against which all other alternatives are measured. It consists of the existing regional transportation network plus projects identified in the adopted long-range transportation plan. *Connecting Maine* is the State of Maine’s integrated, long-range, multimodal transportation plan for implementation by the year 2030. The No-Build alternative would only include transportation improvements already contained in the financially constrained long-range plan for the Portland region.

2.1.2 TSM Alternative

TSM alternative generally consists of strategies aimed at improving the overall performance of the transportation network without resorting to large-scale, capital intensive improvements and without adding lanes to an existing road or providing a new road. The TSM alternative integrates various techniques from across disciplines to increase safety, efficiency and capacity for all modes in the designated transportation system. TSM measures commonly include system improvements such as traffic signal timing or phasing adjustments, access management improvements, and improved signage or pavement markings.

A TSM alternative with bus service in mixed traffic has been identified for the Portland North project, which consists of the No-Build Alternative plus other low-cost roadway and transit system improvements that can be implemented with little or no additional infrastructure requirements, and have the capability to:

- Better manage and operate existing transportation facilities;
- Enhance system accessibility and safety;
- Reduce the amount and frequency of commuter trips;
- Improve the use of alternative modes such as carpools, vanpools or transit;
- Improve the flow and operations of vehicular traffic in the commuter corridor.

The TSM alternative will include more frequent service on existing regional rail and bus lines, expanded express bus services and park-and-ride facilities, Intelligent Transportation Systems (ITS), and improved intermodal connectivity between regional and local transit services.

The TSM alternative service plan would provide a total of seven to 11 roundtrips between downtown Portland, Yarmouth, Auburn and Brunswick. This range of roundtrips includes 3 roundtrips in the weekday AM peak period, one to three mid-day roundtrips, three roundtrips in the PM peak period, and finally two roundtrips in the post-PM peak period. The AM and PM peak period services have headways of approximately 45 minutes in each direction.

2.1.3 Build Alternative - Express Bus (Bus-on-Shoulder and Exclusive ROW)

For all express bus options, 22 roundtrips per day were proposed. There would be 6 morning peak trips into Portland and 6 evening peak trips back to the outer terminals. The travel times are based on the following assumptions:

- One minute dwell time at typical bus stops,
- 30 second dwell times at Downtown Portland distribution route bus stops,
- Bus-only use on shoulders for travel on I-95, I-295, and the limited access highway portions of Route 1
- Buses do not travel on shoulder on :
 - I-295 between the Veranda Street Bridge (Falmouth) and Exit 8 (Portland)
 - All on- and off ramps
 - Exclusive ROW speed of 65 mph,
- Speeds
 - 65 mph speeds on I-95 and I-295,
 - 55 mph speeds on State Highways,
 - 35 mph maximum speed when operating on shoulder
 - 25 mph speeds on all local roads.
- Bus capacity is 50 passengers per bus
- Approximately 1/3 of all day travel occurs during peak hours
- Layover and recovery of 7% of one-way trip time¹

Commuter buses would be 50-passenger over-the-road coaches in either the bus-on-shoulder or the exclusive ROW express bus option. Stations would be located in downtown areas where possible and along major roadways where necessary. Individual station locations will be discussed in greater detail in the next phase of screening.

A downtown distribution loop for express bus service was assumed for all of the service options, which adds approximately 3.5 additional miles, and 17 to 19 additional minutes to each trip.

¹ Per industry practice, a 7% pad time has been added onto the running time for each trip to account for normal service perturbations.

2.1.4 Build Alternative - Commuter Rail

For all commuter rail options, 22 roundtrips per day were proposed. There would be 6 morning peak trips into Portland and 6 evening peak trips back to the outer terminals. The calculations for running times and proposed service assumed the use of Diesel Multiple Units (DMU) equipment. Service design for the commuter rail service was impacted by other operators using the same track. Conflicts in scheduling were assumed to occur with the Amtrak Downeaster service and require infrastructure improvements to allow 'meets' to occur safely and to avoid schedule disruption.

Commuter rail service also included shuttle buses from Union Station, Bayside, and India Street Terminals to transport rail passengers closer to the destinations in downtown Portland. Shuttle buses were not assumed for rail service to Center Street as this station as it is assumed that service Center Street would include a stop at Union Station in order to provide service to the two biggest employment districts in the city – Maine Medical and the downtown central business core.

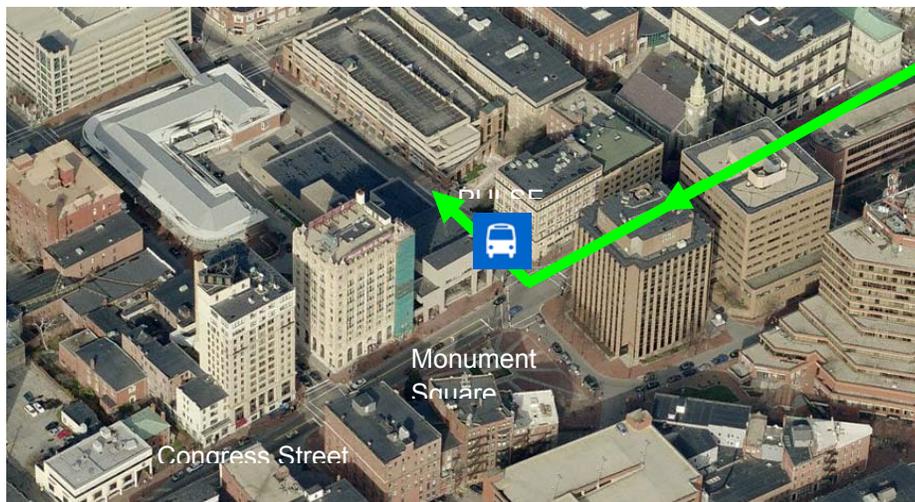
2.2 Modes of Service

The transit Build Alternatives in this study included both express bus and rail modes of travel, and each is described below.

2.2.1 Express Bus

Express buses would operate along the major highways in the region, on the shoulders of the highways, or in an exclusive ROW created by paving over an existing rail ROW. Most proposed service alternatives included a combination of each of these operating options. All of the express bus options served the Pulse Station near Monument Square in downtown Portland. At the Pulse, riders would be able to walk to downtown attractions and employment, or transfer to other Metro services. The Metro service used the Pulse location at the time of the analysis, so no new stop would need to be added to the local bus service. Figure 2-2 shows the location of the Pulse at the intersection of Elm Street and Congress Street.

Figure 2-2: Pulse Station in Downtown Portland



Downtown Distribution Loop

Express buses were also assumed to operate a distribution route upon arriving in downtown Portland through joining up with existing METRO bus service. Service would be provided to the major employment centers on the Portland peninsula, primarily located in the vicinity of Maine Medical Center (MMC) in the west, Monument Square and Commercial Street in central downtown Portland, and to the Back Cove to the north.

There are two routing options from I-295 to the PULSE. One option uses the Franklin Arterial to access Monument Square. The other option, suggested by Portland METRO, accesses PULSE from by way of Prebble Street (dashed yellow line in Figure 2-3).² Operation of the route on Prebble Street enables a new stop in the Back Cove (Bayside) area.

Operation of the distribution loop at the Portland end of an express bus route was estimated to add an additional 17 to 19 minutes to the one-way trip travel time and increase the one-way trip mileage by 3.5 miles (from the PULSE) per trip. Operation of a downtown distribution loop increased the cycle time of each option by 30 minutes. Figure 2-3 shows how the distribution loop could join into existing local Portland METRO bus service. Both distribution loops provide service to stops 2 through 7 and the PULSE at the beginning and end of the distribution loop.

Should a bus option be advanced, a detailed analysis regarding the estimated downtown distribution trip times should be conducted to determine the necessary time to operate the loop, and its variation over the course of a day.

Figure 2-3: Downtown Distribution Loop



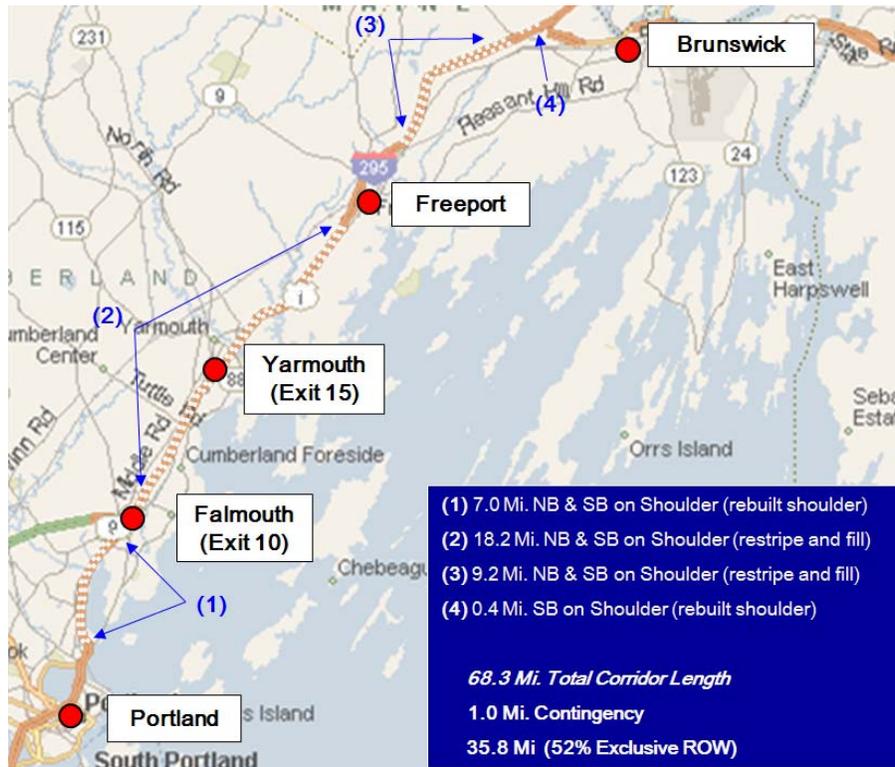
² Meeting with Bill Needleman from Portland METRO. February 9, 2011.

Express bus stations were located either in major downtown centers or along the highway route. Stations located in downtown centers required only limited parking and were chosen for proximity to employment, residential concentrations, and other attractions. At these stations, walking and transit-oriented development were emphasized. For the 'online' stations along the highways, the parking lots were assumed to be larger to encourage patrons to 'park and ride' to work from a variety of residential locations. It was the goal of the analysis to have a mix of both downtown center and online stations for each transit alternative. Proposed locations of individual stations are described in the sections on the service corridors that follow the discussion on overall modes of service.

Bus-on-Shoulder

Bus-on-shoulder operations have been in practice in the United States for more than ten years and present a low-cost, relatively easily-implemented strategy to reduce bus running times and increase schedule reliability. Use of the shoulders also promotes "rapid transit" like service with buses easily exiting and entering the highway network in stark contrast to bus use of HOV lanes. When possible, buses would operate on the shoulder of I-95, I-295, and Route 1 (between I-295 and Bath). Since portions of I-295 are not a feasible corridor (such as between Exit 8 and downtown Portland) for a dedicated bus lane or high-occupancy-vehicle lane, express buses would travel in mixed traffic with other highway vehicles. Figure 2-4 is a map of the overall corridor showing where the express bus would operate on the shoulder and where it would operate in mixed traffic.³ Detailed maps of individual corridor segments are provided later in this chapter.

Figure 2-4: Bus-On-Shoulder Operation



³ Bus-on-shoulder operations was developed in an effort to meet the 50% dedicated fixed guideway requirement of the FTA small starts funding program.

Total miles of shoulder operation for each terminal option are provided in Table 2-2. Yarmouth, Brunswick and Bath have higher percentage of bus-on-shoulder operation because the express buses for these terminal options would operate on the shoulder of I-295 and Route 1 for most part of the corridor. Lewiston and Auburn have lower percentage of bus-on-shoulder operation because the express buses for these terminal options would operate on the shoulder of I-295 until Falmouth and I-95 until Gray. From Gray, the express buses would operate on mixed traffic along Route 4.

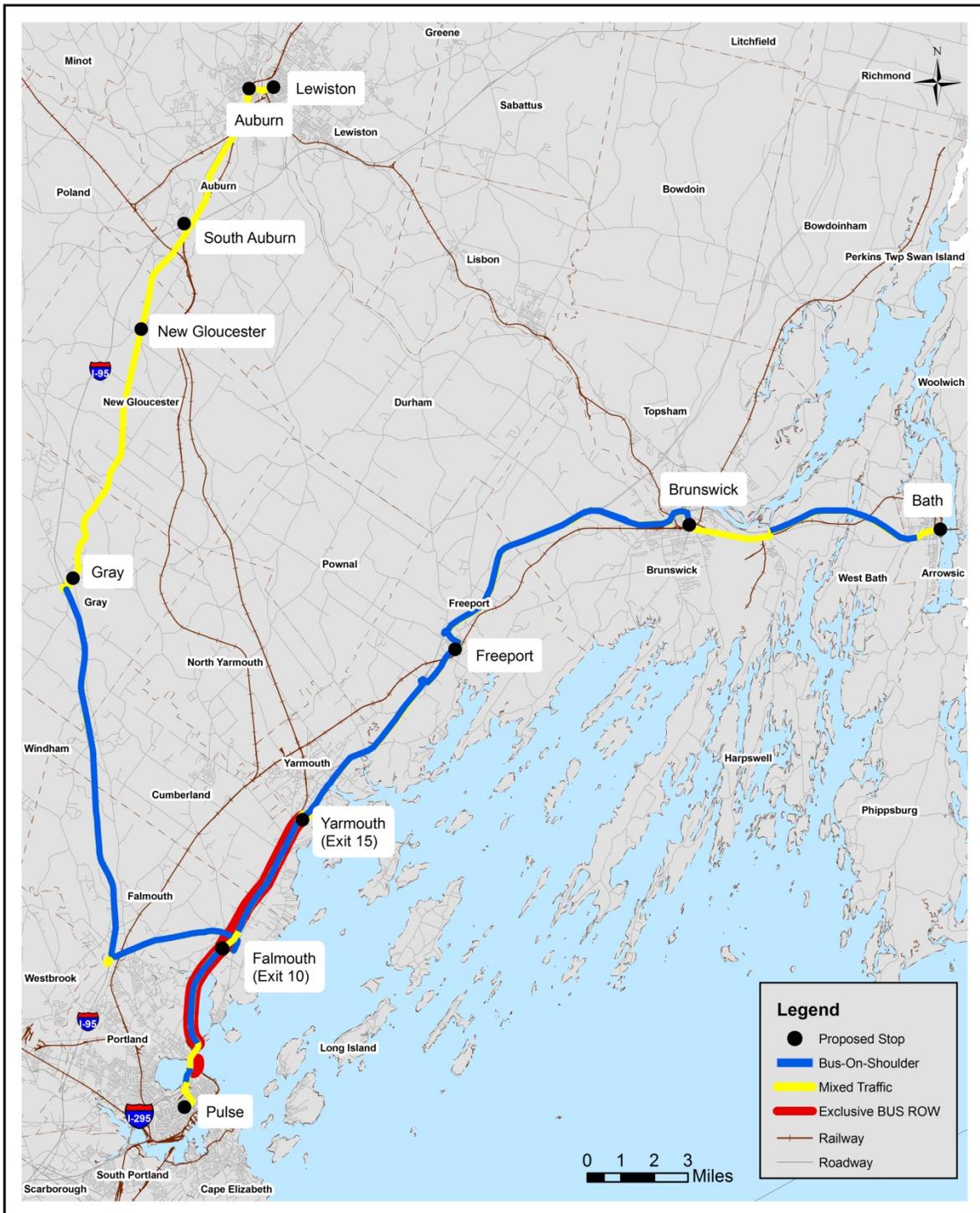
Table 2-2: Bus-on-Shoulder Service Statistics

Terminal	Total Miles of Shoulder Operation	Total Miles	% Operated on Shoulder
Yarmouth	8.3	10.5	79%
Brunswick	21.3	28.5	75%
Bath	26.1	36.7	71%
Auburn	20.3	35.1	58%
Lewiston	20.3	41.0	50%

Exclusive ROW

Express buses used in the exclusive ROW option would operate on the shoulder of the existing interstate and highway network from the outer northern terminals until either Falmouth or Yarmouth. At either location (depending on whether the route is coming from the north or east), express buses would exit I-295 and get on to an exclusive bus-only ROW for the remainder of the trip to Portland. The bus would operate on the former Saint Lawrence and Atlantic ROW, now owned by the State of Maine, which would have to be paved and used exclusively for the express bus operation. Conversion of this rail corridor into an exclusive express bus facility would also entail upgrading or replacing various bridge structures and at-grade crossings. Figure 2-5 maps the proposed ROW and BOS operation for each service alternative.

Figure 2-5: Exclusive ROW Operation



Source: MaineGIS 2008

The percentage of BOS and exclusive ROW operation for each terminal option is shown in Table 2-3. The table shows that Auburn and Lewiston terminal options have lower percentage of BOS and exclusive ROW operation than Yarmouth, Brunswick and Bath because the express buses for Auburn and Lewiston terminal options would operate along the paved express bus facility to be incorporated within the existing inactive SLR ROW from Falmouth to Marginal Way in Portland while, the express buses for the Yarmouth, Brunswick and Bath terminal options would operate along a paved bus-only roadway to be built within the existing SLR ROW from Yarmouth to Marginal Way in Portland.

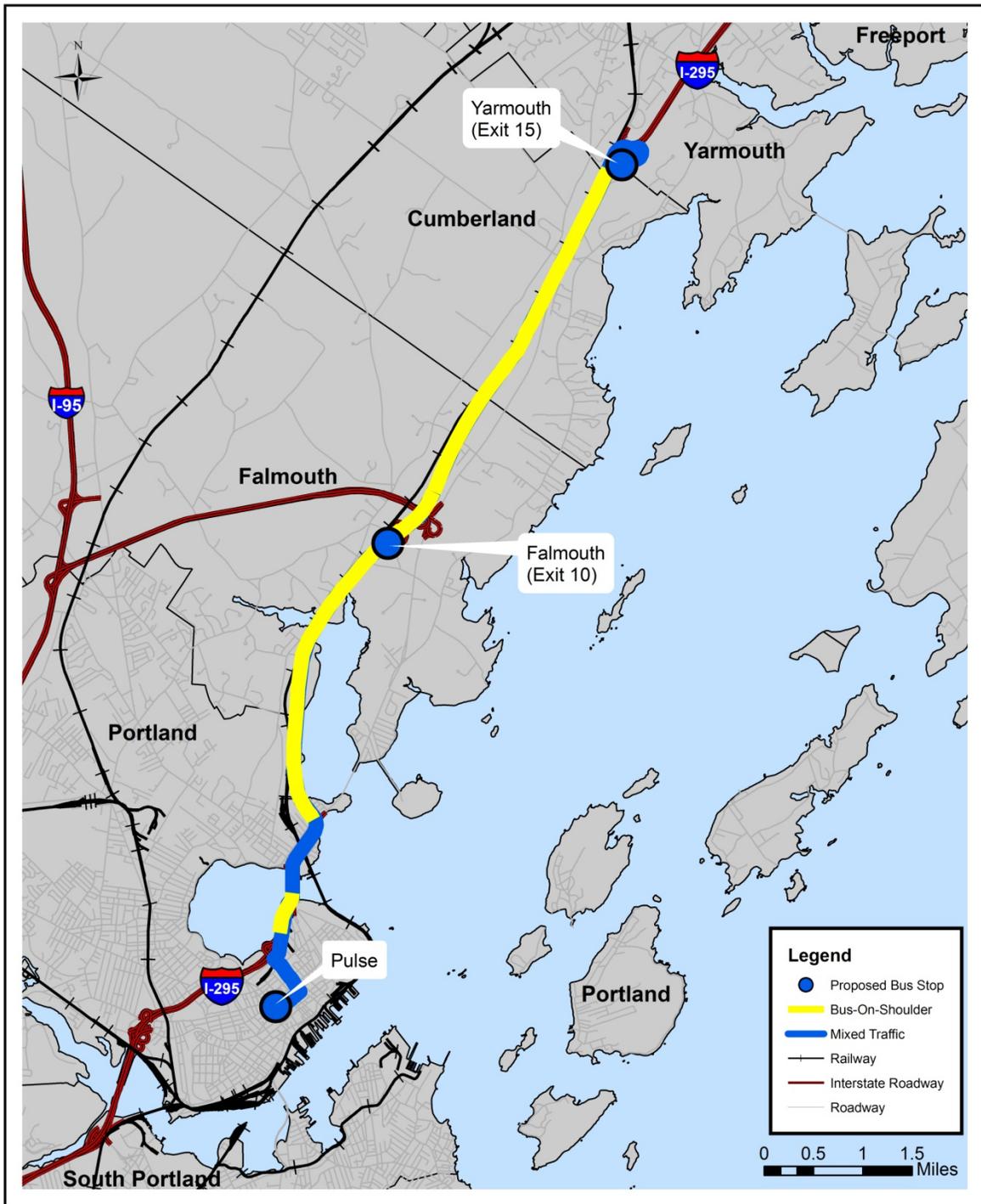
Table 2-3: Bus-on-Shoulder with Exclusive Right-of-Way Service Statistics

Terminal	Miles of BOS Operation	Miles of ROW Operation	Total Miles of BOS & ROW Operation	Total Miles	% Operated on ROW & Shoulder
Yarmouth	0.0	9.0	9.0	10.4	87%
Brunswick	12.7	9.0	21.7	28.1	77%
Bath	17.5	9.0	26.5	36.3	73%
Auburn	16.2	4.4	20.6	34.6	60%
Lewiston	16.2	4.4	20.6	40.5	51%

Yarmouth Service

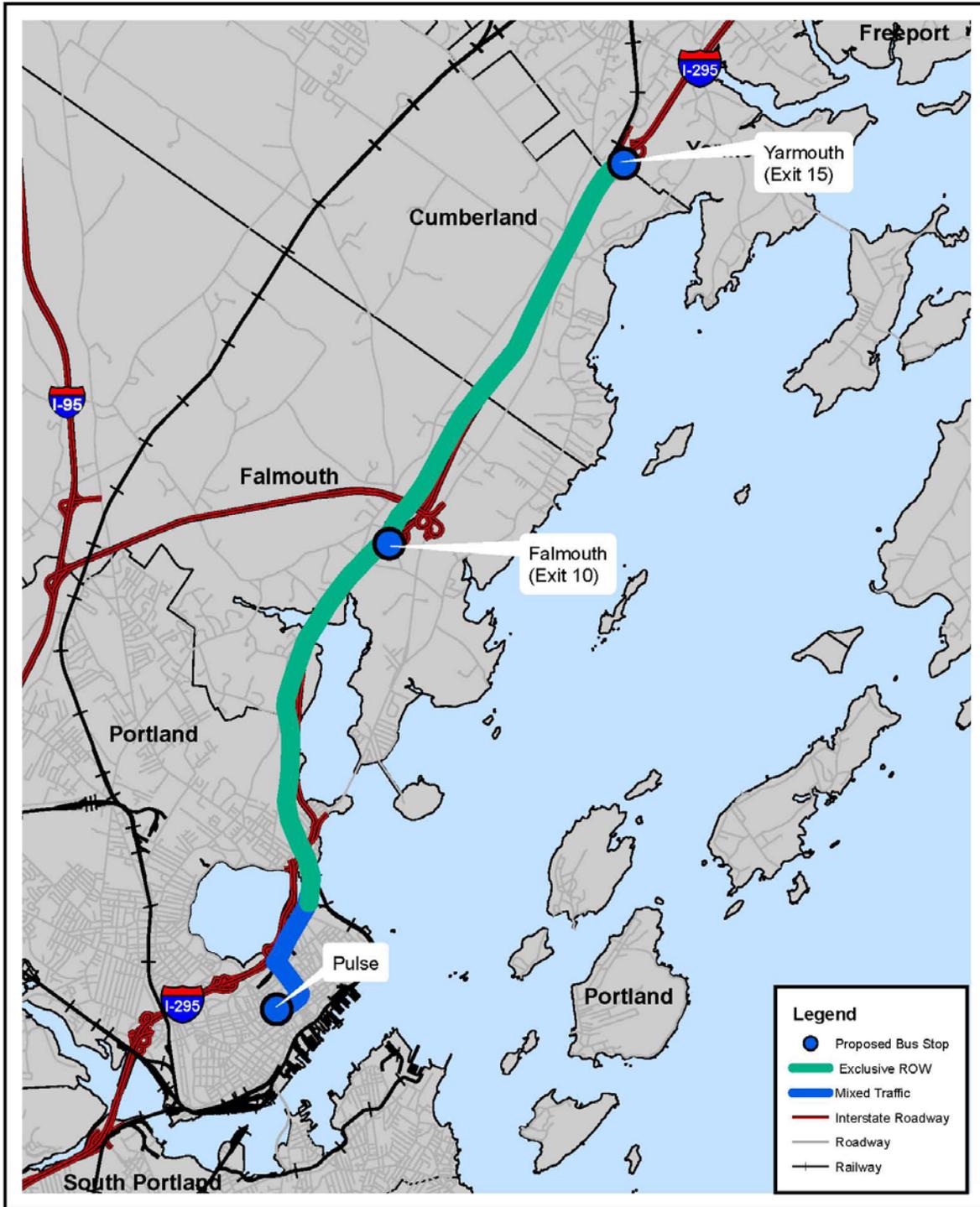
The express bus would operate on I-295 and in the case of the exclusive ROW option, along a paved bus-only roadway to be built within the existing SLR ROW from Yarmouth to Marginal Way in Portland. All bus options included an intermediate stop in Falmouth and terminal stop in Yarmouth. The Falmouth stop was located at Exit 10 off of I-295. The Yarmouth terminal was located near Exit 15 of I-295. Figures 2-6 and 2-7 shows the proposed bus-on-shoulder and exclusive ROW express bus options to Yarmouth.

Figure 2-6: Yarmouth Bus-on-Shoulder Express Bus Option



Source: MaineGIS 2008

Figure 2-7: Yarmouth Exclusive ROW Express Bus Option



In Falmouth, the station for the BOS option would be located at Exit 10 on I-295. This park and ride stop location would require a walking ramp over the highway to access the parking lot located on the northbound side of the highway. Figure 2-8 is a generalized view of the station location. Figure 2-9 provides a more detailed view of the station and layout of the parking and pedestrian walk paths. It would be an online station with 150 proposed parking spaces. Buses would be able to pull in and out of the station without exiting the highway.

Figure 2-8: Falmouth (Bus On Shoulder) Station Location

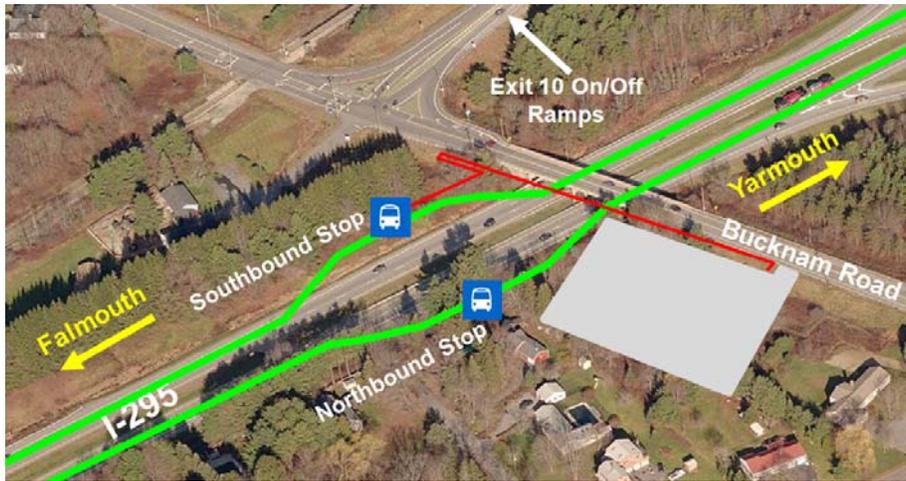
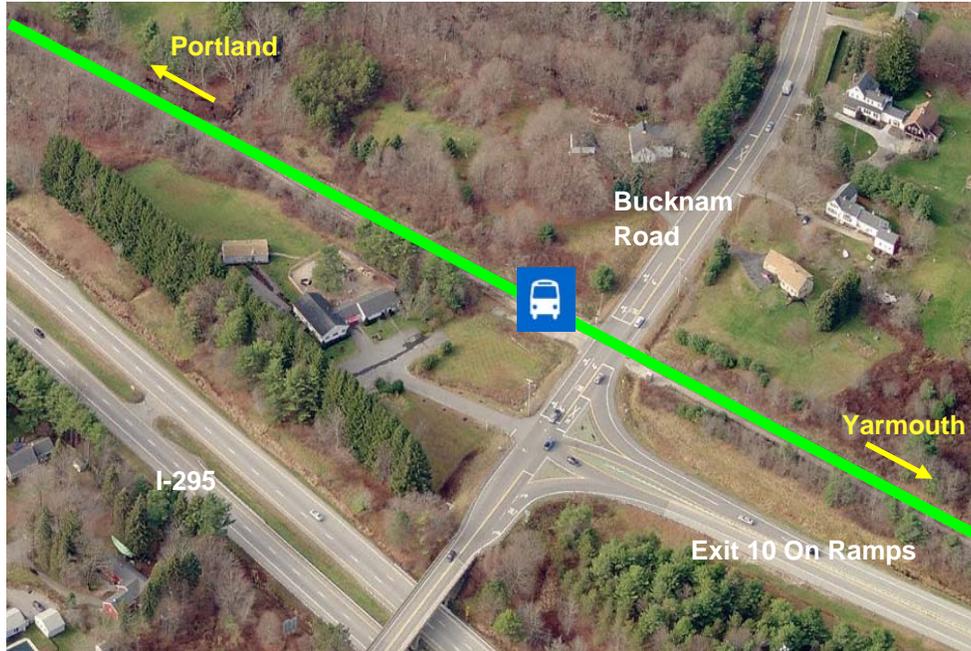


Figure 2-9: Falmouth (Bus On Shoulder) Station and Parking Layout



For the Exclusive ROW option in Falmouth, the station is proposed near the ROW on Bucknam Road. This station is also an online stop and has a proposed 150 parking spaces. Figure 2-10 shows the generalized location of the proposed station.

Figure 2-10: Falmouth (Exclusive ROW) Station Location



For service terminating in Yarmouth, two station locations were proposed, one for each mode of service. For service extending beyond Yarmouth, two additional online station locations were proposed for through service.

For service terminating in Yarmouth, the station would be located offline on property owned by MaineDOT. A new access road connecting US Route 1 and the I-295 southbound ramp would need to be constructed. In this scenario at this station site, 100 parking spaces were proposed. Figure 2-11 is an overview of the Yarmouth BOS proposed station location. Figure 2-12 provides a more detailed view of the station and layout of the parking and pedestrian walk paths.

Figure 2-11: Yarmouth (Bus On Shoulder) Station Location - Terminal Location

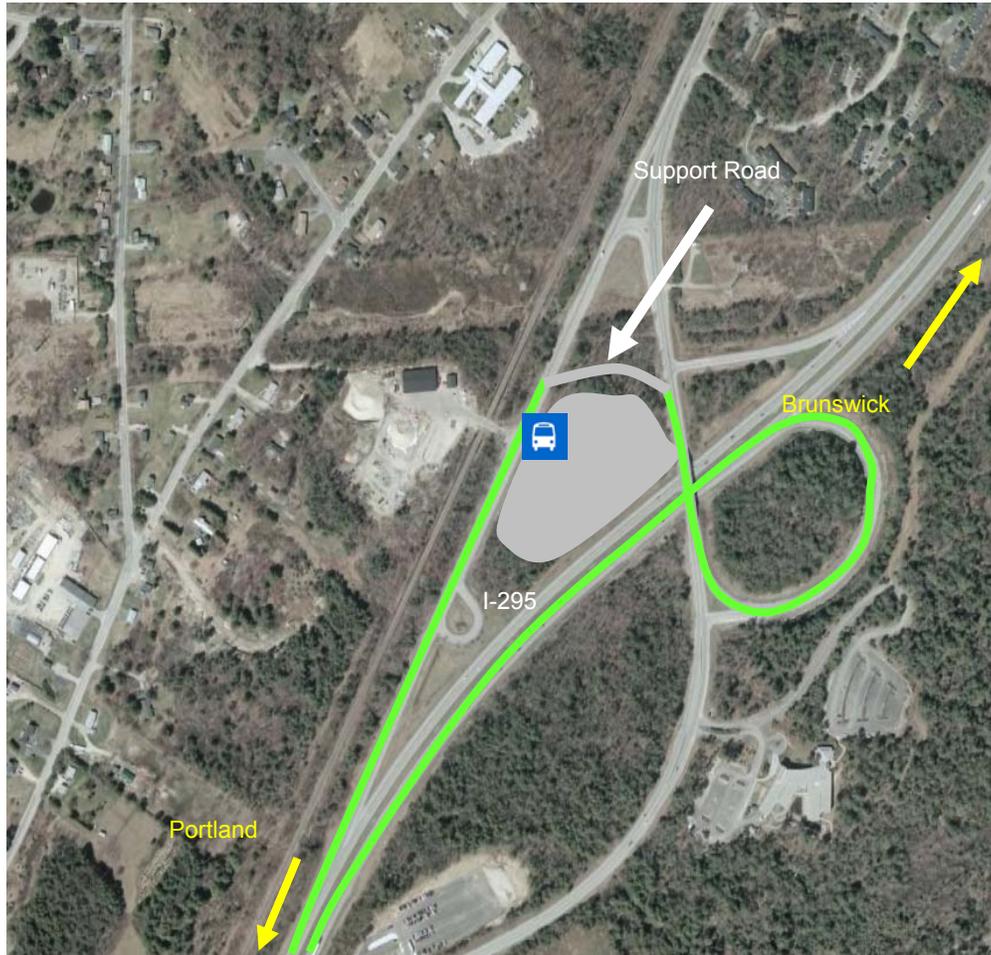
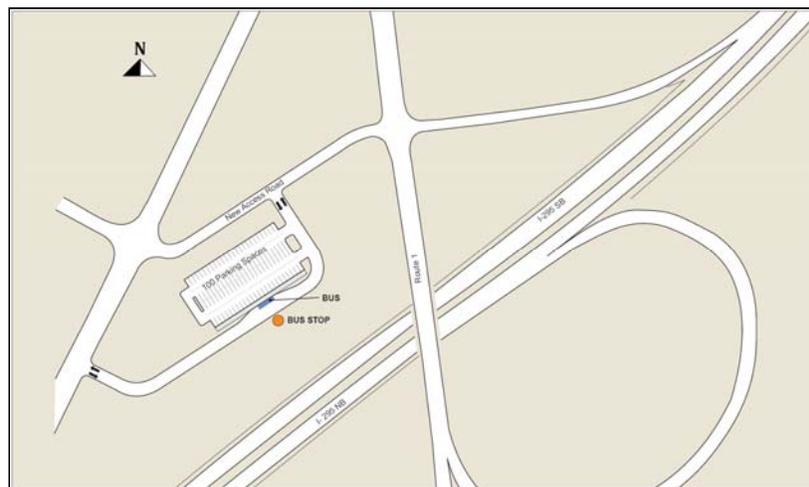
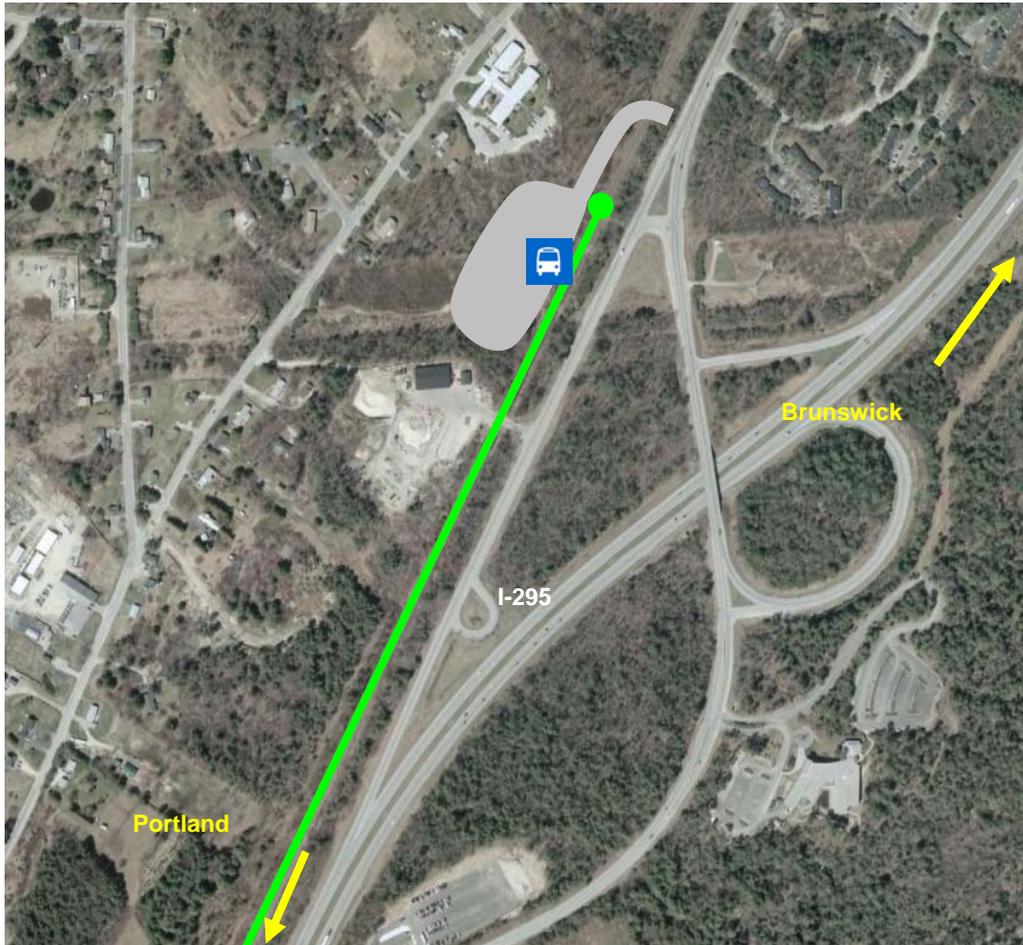


Figure 2-12: Yarmouth (Bus On Shoulder) Station and Parking Layout - Terminal Location



For exclusive ROW service terminating in Yarmouth, the proposed station would be located near the Exit 15 southbound ramp of I-295 on land owned by MaineDOT. A turnaround loop would be needed. The station would be a park and ride facility with 100 parking spaces. Figure 2-13 shows the proposed configuration for the exclusive ROW service terminating in Yarmouth.

Figure 2-13: Yarmouth (Exclusive ROW) Station Location - Terminal Location



For service extending beyond Yarmouth to either Bath/Brunswick or Lewiston/Auburn, other or modified stops were proposed. In this scenario, for BOS service the Yarmouth station would be an online park-and-ride stop with 100 parking spaces. Buses would be able to pull in and out of the station without exiting the highway. Figure 2-14 describes the general location of the proposed BOS thru station in Yarmouth. Figure 2-15 provides a more detailed view of the station and layout of the parking and pedestrian walk paths.

Figure 2-14: Yarmouth (Bus On Shoulder) Station Location - Thru Location

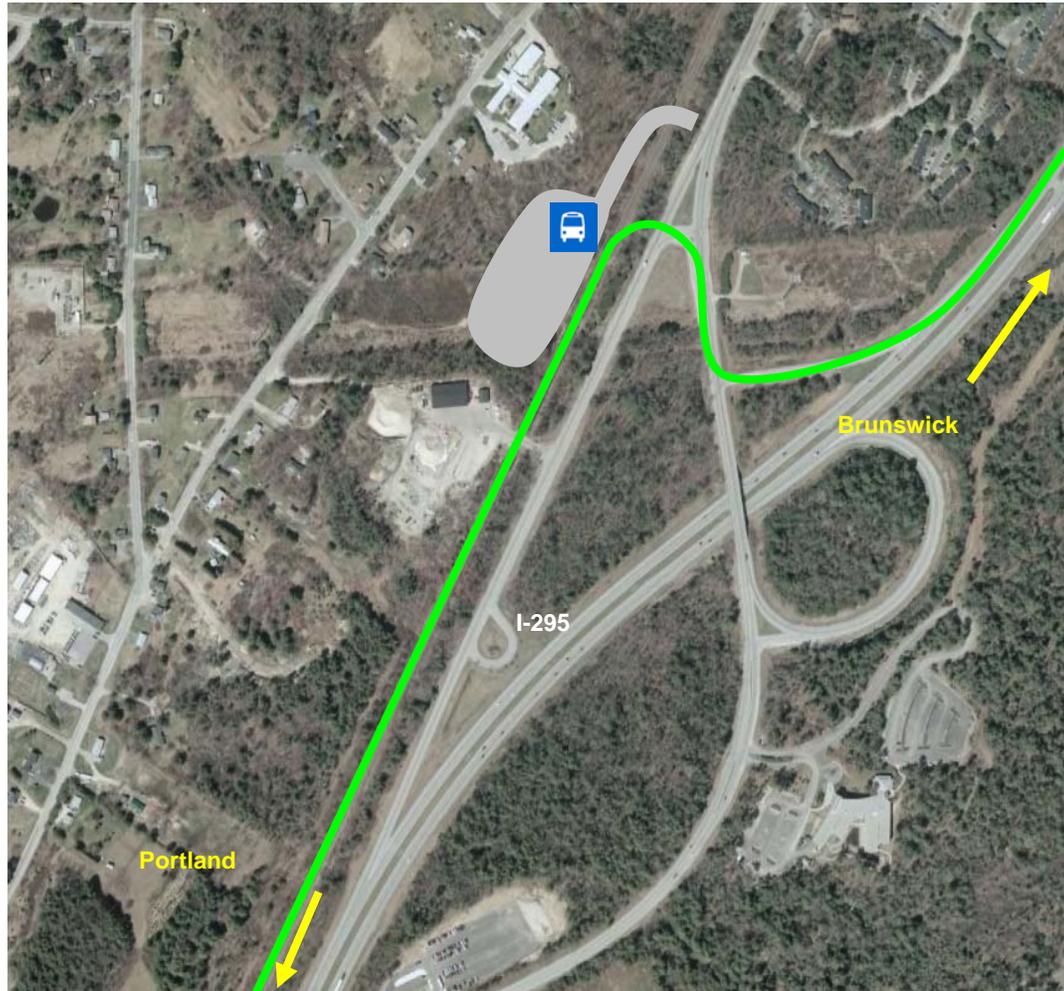


Figure 2-15: Yarmouth (Bus On Shoulder) Station and Parking Layout - Thru Location



For the exclusive ROW service, the Yarmouth thru station would be an offline stop similar to the proposed Yarmouth terminal station. However, for this option, no turnaround loop was needed. Parking for 100 vehicles was proposed. Figure 2-16 shows an overview of the configuration for the thru exclusive ROW operation in Yarmouth.

Figure 2-16: Yarmouth (Exclusive ROW) Station Location - Thru Location



Brunswick/Bath Service

All options for bus service to Brunswick and Bath include intermediate stops in Falmouth, Yarmouth and Freeport. Express buses would operate along I-295, Route 1, and in the case of the exclusive ROW option, in the refurbished existing SLR ROW from Yarmouth to Marginal Way in Portland. For the two bus options, the intermediate stops were located in approximately the same locations – Exit 10 online on I-295 in Falmouth and Exit 15 online on I-295 in Yarmouth. The Freeport stop was located in the town center in both options. Figures 2-17 and 2-18 describe the bus-on-shoulder and exclusive ROW express bus alternatives from Portland to Brunswick and Bath.

Figure 2-17: Brunswick/Bath Bus-on-Shoulder Express Bus Option

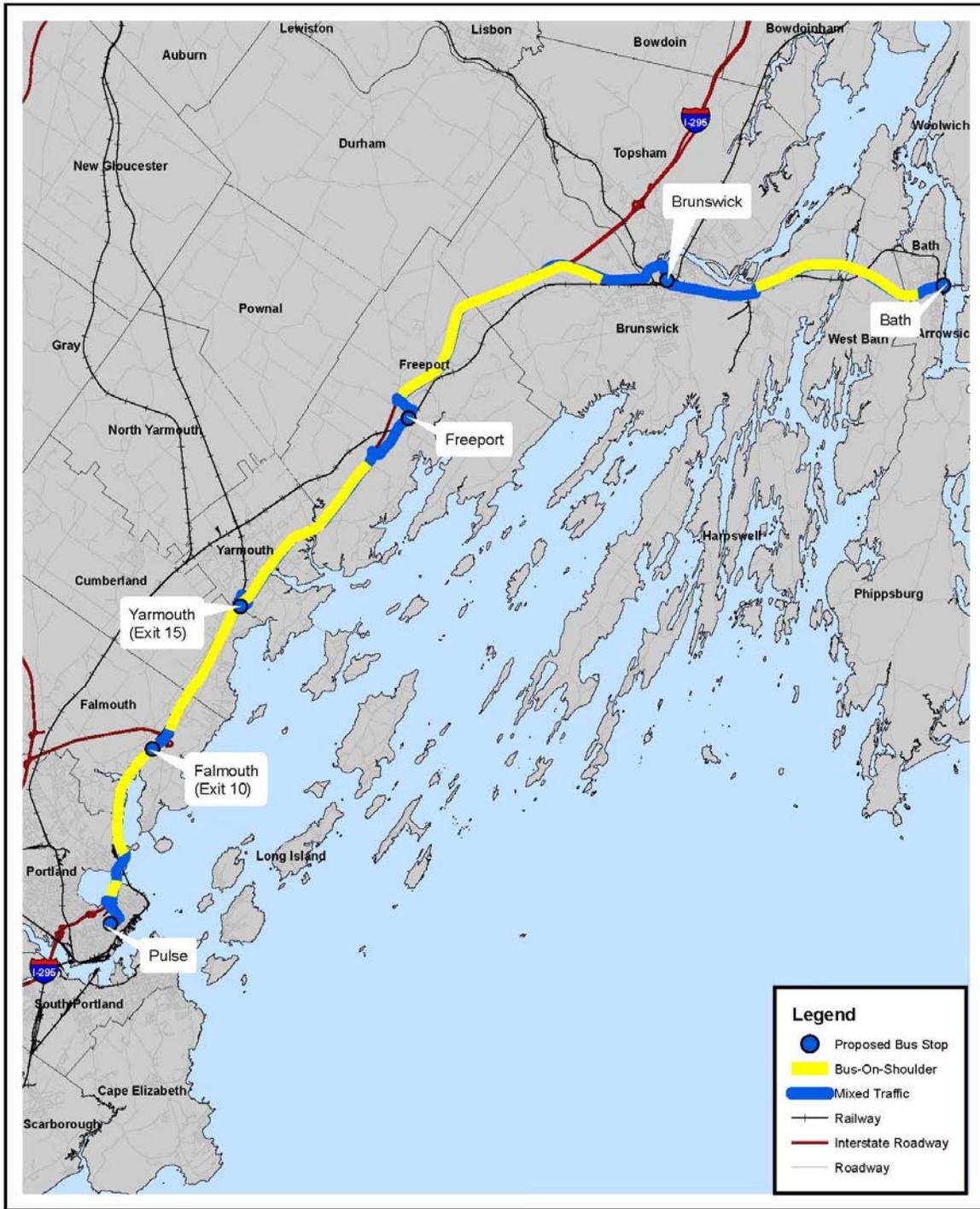
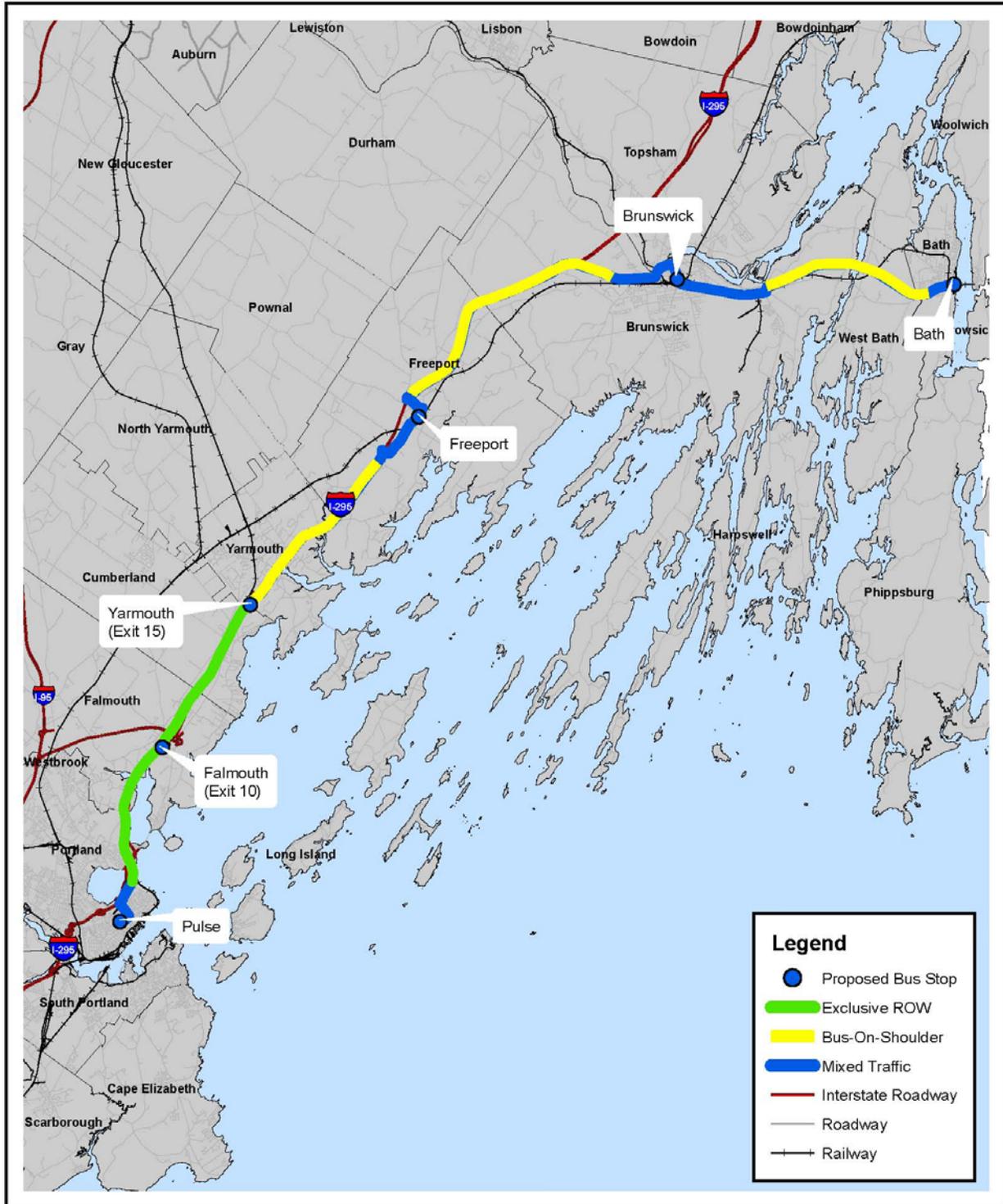


Figure 2-18: Brunswick/Bath Exclusive ROW Express Bus Option



Stations in Falmouth and Yarmouth were discussed in the previous section. The Freeport Station would be located at the intersection of Bow Street and Main Street in the heart of the retail district for both the BOS and Exclusive ROW options. It was estimated that approximately 100 spaces would be needed at the Freeport Stop. For this downtown station, parking was not planned for a single parking lot, but rather would be spread out within a reasonable walking distance from the station location. Figure 2-19 shows the general location of the proposed Freeport Station.

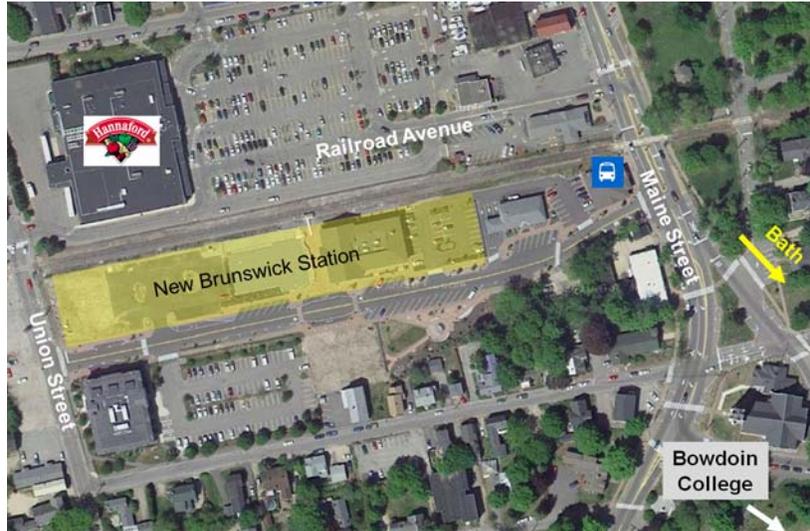
Figure 2-19: Freeport Station Location (Both Bus Options)



The Brunswick Stop is proposed for a downtown location adjacent to the proposed Brunswick Rail Station (for the Amtrak Downeaster extension) on Maine Street near Bowdoin College adjacent to Hannaford's. It would be the same for both bus service options. It was estimated that 100 parking spaces would be needed in Brunswick. Parking is proposed at the site where seasonal Maine Eastern train service to Rockland currently boards⁴. The general location of the proposed station is shown in Figure 2-20.

⁴ Once Brunswick Station is built, the boarding location for the Maine Eastern will relocate to the new station building.

Figure 2-20: Brunswick Station Location (Both Bus Options)



In Bath, the stop would be located downtown near Bath Iron Works adjacent to the existing Bath train station at 15 Commercial Street. The stop would be the same for either of the two bus options. No additional parking was proposed for the stop because of the adjacent employment and residential areas and the existing parking supply. Figure 2-21 is an overview of the proposed Bath Station.

Figure 2-21: Bath Station Location (Both Bus Options)



Lewiston/Auburn Service

The bus service alternatives to Auburn and Lewiston were proposed to have intermediate stops in Falmouth off of Exit 10 on I-295 (described in the Yarmouth section), in Gray and New Gloucester on I-95, and in South Auburn off of Exit 75 of I-95. Express buses would operate along I-295, I-95, Route 4,

and, in the case of the exclusive ROW option, along the paved express bus facility to be incorporated within the existing inactive SLR ROW from Falmouth to Marginal Way in Portland. The express bus alternatives to Auburn and Lewiston are mapped in Figures 2-22 and 2-23.

Figure 2-22: Auburn/Lewiston Bus-on-Shoulder Bus Option

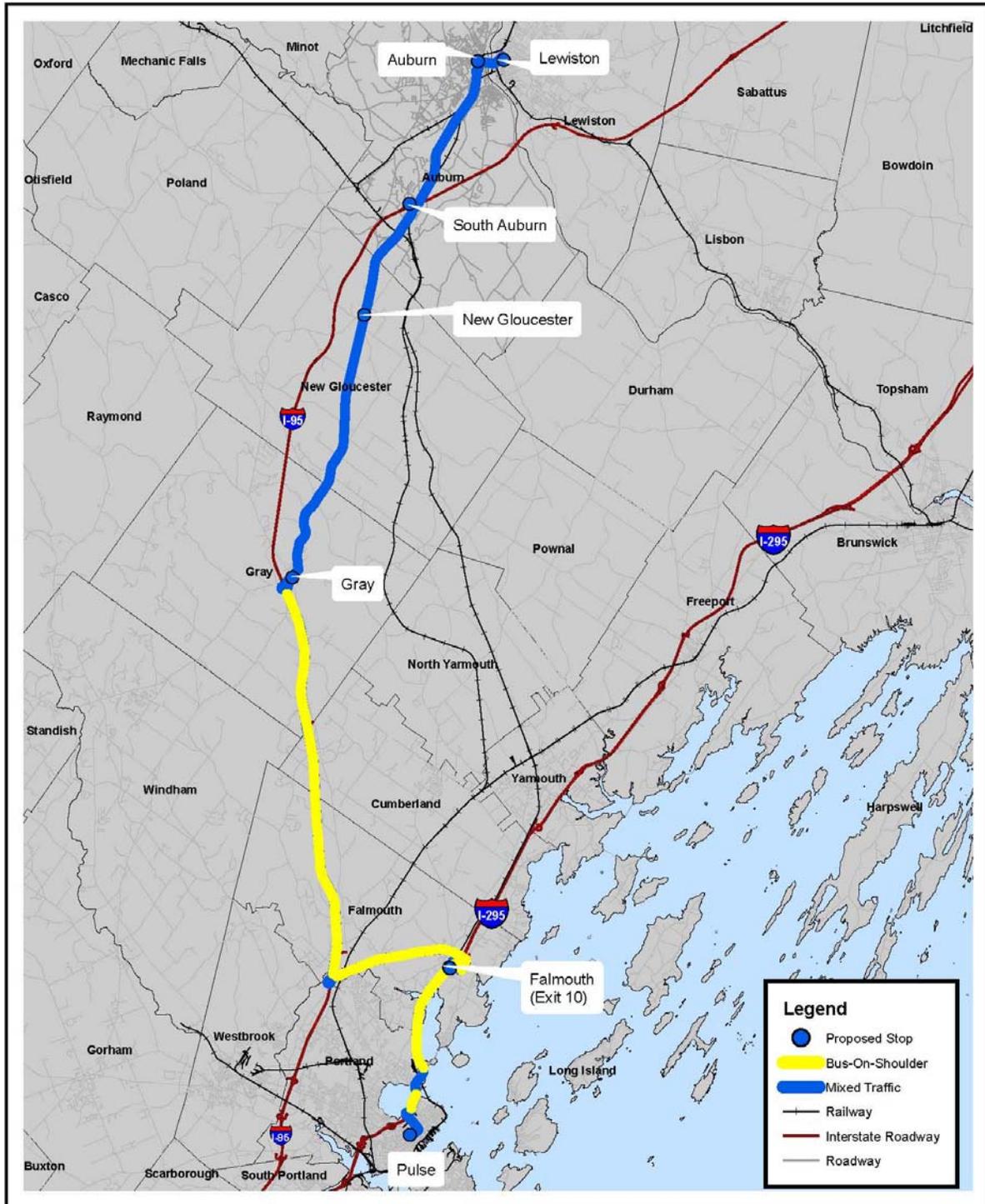
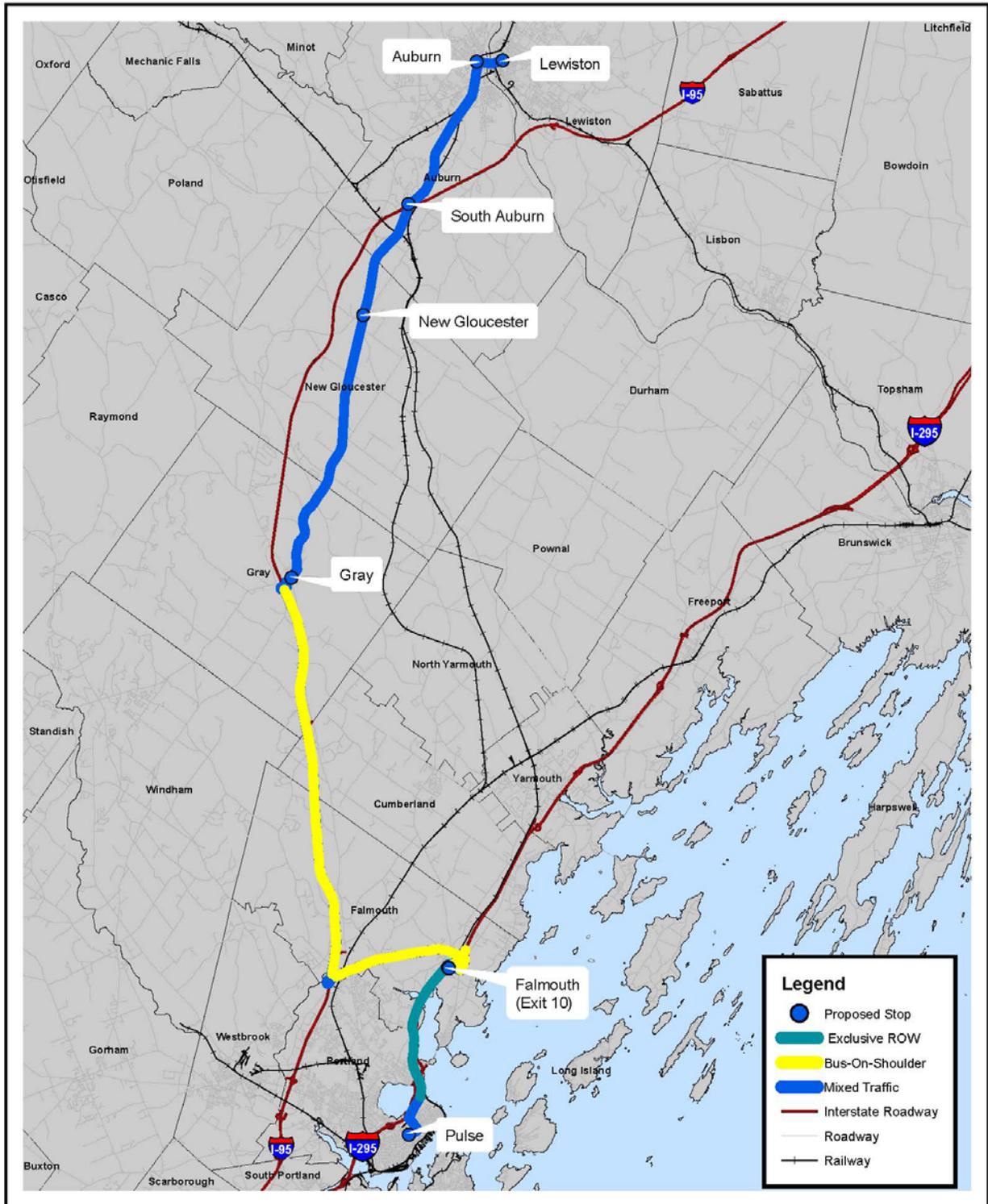


Figure 2-23: Auburn/Lewiston Exclusive ROW Bus Option



The Gray Station was proposed to be located in the center of the Town of Gray on Route 4 near Shaker Street. The proposed site was the same for both bus options. Parking with 40-100 spaces was proposed

for the station. Figure 2-24 describes the general location of the Proposed Gray Station. Figure 2-25 provides a more detailed view of the station and parking layout.

Figure 2-24: Gray Station Location (Both Bus Options)

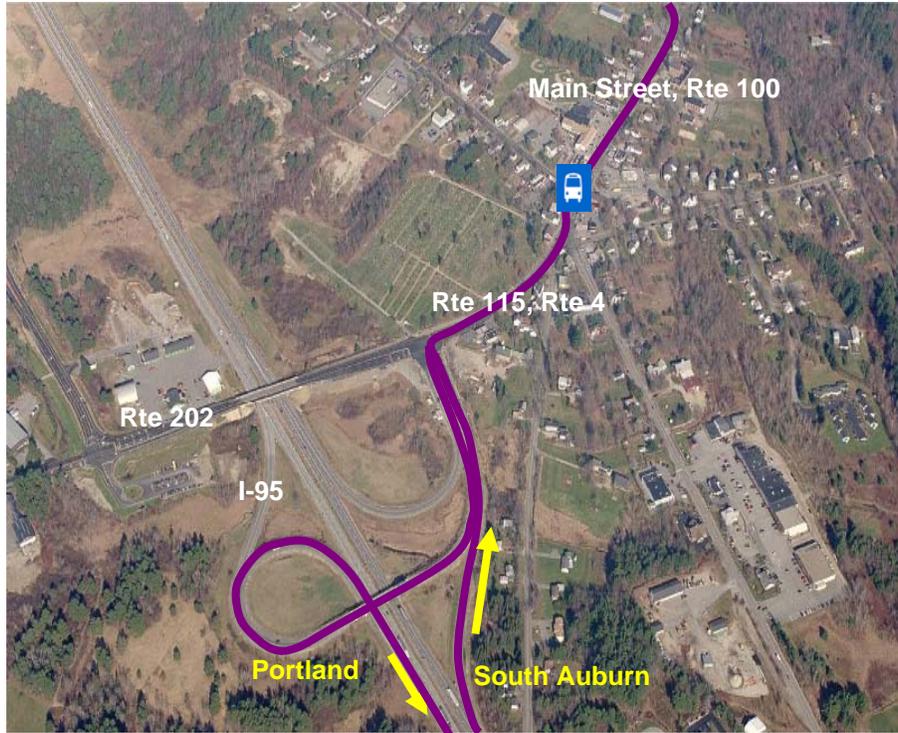


Figure 2-25: Gray Station and Parking Layout (Both Bus Options)



In New Gloucester, the proposed station is located at the intersection of Routes 4 & 202 and Peacock Hill Road. The same site was proposed for both bus options. An estimated 50 parking spaces were recommended for this station. Figure 2-26 shows the proposed location of the New Gloucester Station. Figure 2-27 provides a more detailed view of the station and parking layout.

Figure 2-26: New Gloucester Station Location (Both Bus Options)

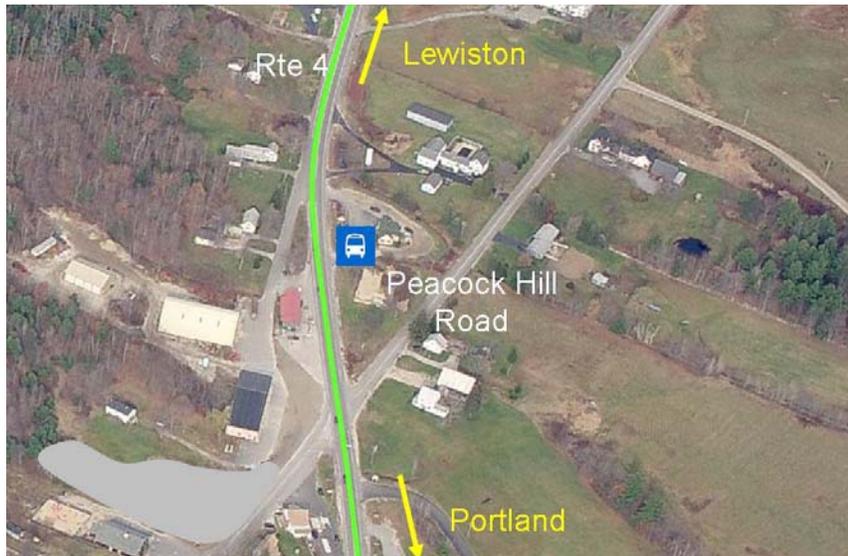


Figure 2-27: New Gloucester Station and Parking Layout (Both Bus Options)

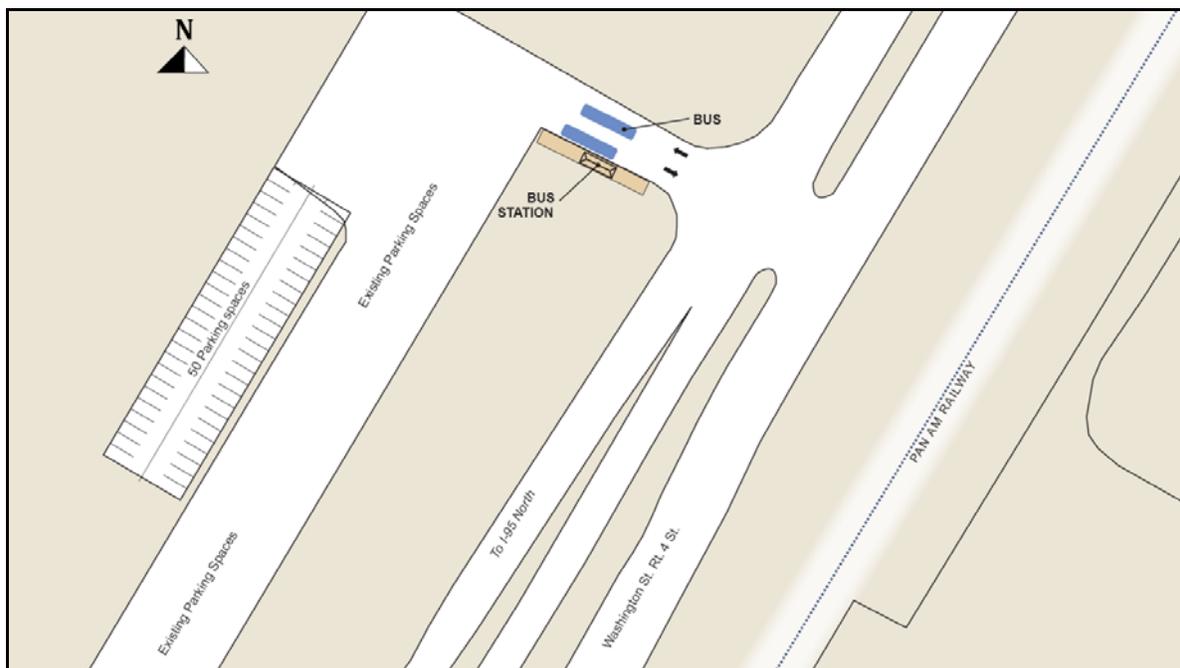


The proposed station in South Auburn was situated at the existing park & ride lot at Exit 75 on I-95. To accommodate the new express bus passengers, it was estimated that an additional 150 parking spaces would be needed. The South Auburn Station was the same for both bus options. Figure 2-28 shows the location of the bus routing and existing Exit 75 park & ride lot. Figure 2-29 provides a more detailed view of the station and parking layout.

Figure 2-28: South Auburn Station (Both Bus Options)



Figure 2-29: South Auburn Station and Parking Layout (Both Bus Options)



A downtown Auburn Station was also proposed for walking and drop-off service. No parking spaces were recommended. The downtown station was located at 95 Spring Street (Hannaford Supermarket) and would be the same for either bus option. Figure 2-30 is a map of the proposed downtown station. Figure 2-31 provides a more detailed view of the station layout.

Figure 2-30: Auburn Station Location (Both Bus Options)

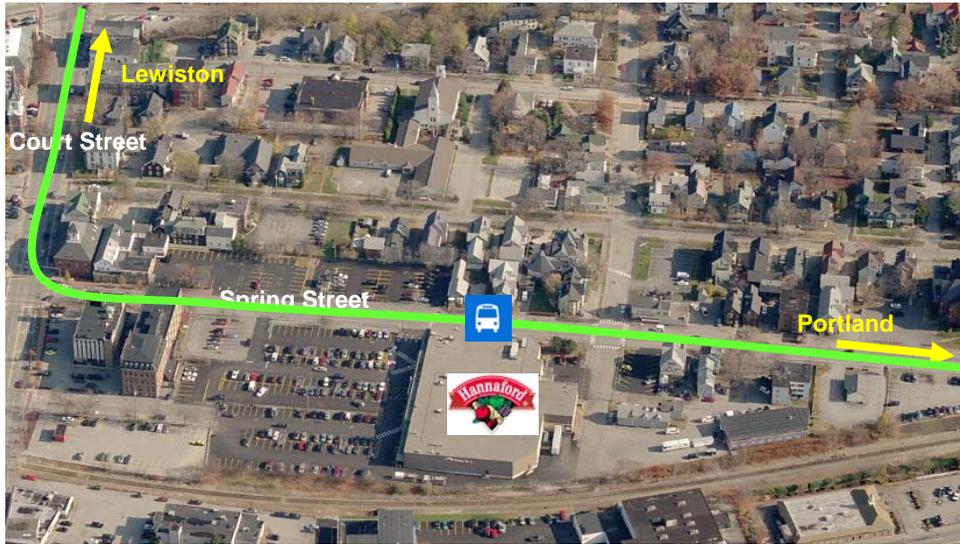
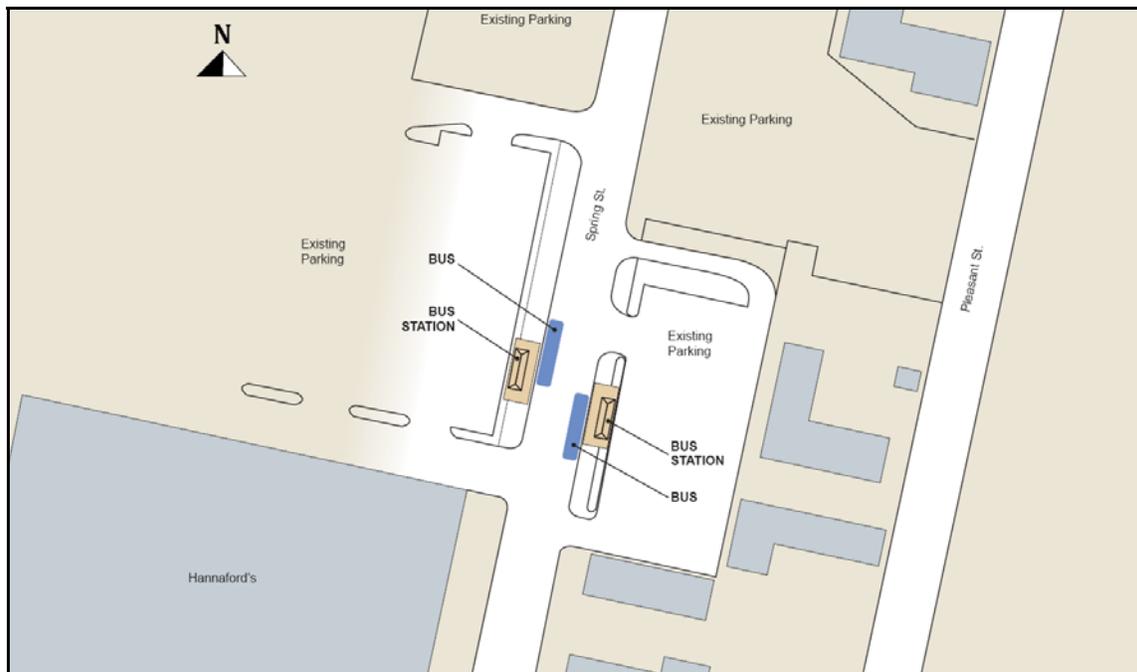
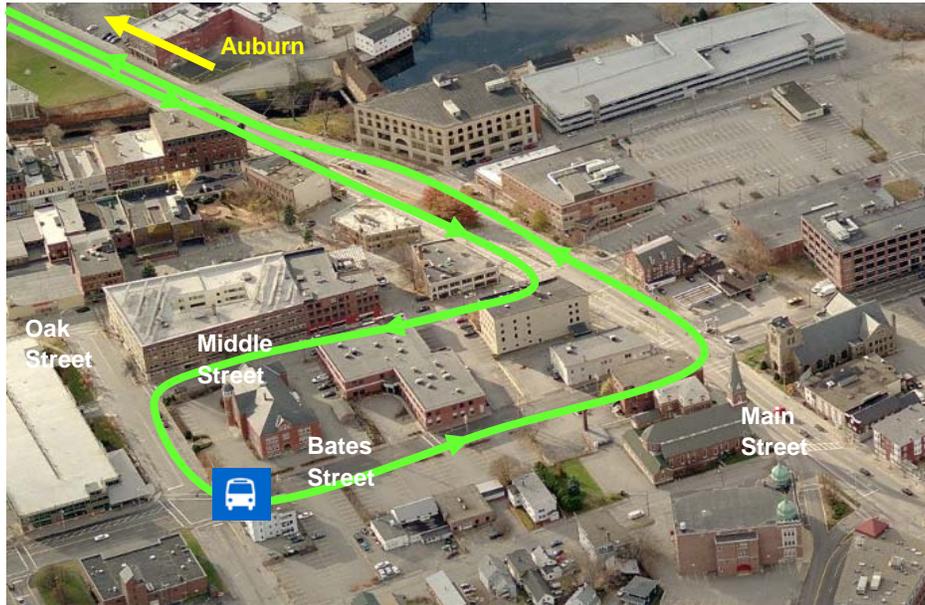


Figure 2-31: Auburn Station Layout (Both Bus Options)



In Lewiston, the station was proposed for downtown in order to attract walkers and drop-offs in close proximity to both residential areas and employment. The proposed station was situated at the intersection of Bates Street and Oak Street. The location of the station would be the same for either of the bus options. Figure 2-32 shows the general location of the proposed Lewiston Station downtown.

Figure 2-32: Lewiston Station Location (Both Bus Options)



2.2.2 Commuter Rail

Commuter rail service would be operated on either the SLR or the Pan Am railways. The SLR ROW is owned by the State of Maine between Yarmouth Junction and Back Cove in Portland. The Downeaster extension from Portland to Brunswick was approved during the analysis and was designed to operate on Pan Am track. Construction and upgrades associated with the Downeaster extension to Brunswick were assumed to be completed prior to the beginning of the proposed commuter rail service. Other railways were used for small stretches of the lines and are described in the individual sections below. Table 2-4 lists route miles from the Portland terminals to the outer terminals by service alternative.

Table 2-4: Route Miles by Alternative

Outer Terminal	Pan Am		SLR	
	Union Station	Center Street	Bayside	India Street
Yarmouth	13.7	15.8	9.3	10.1
Brunswick	27.7	29.8	25.8	26.6
Bath	36.2	38.3	34.3	35.1
South Auburn	30.2	32.3	27.9	28.7
Lewiston	35.5	37.6	33.7	34.5

Overall, stations have been located in downtown areas where possible and along major roadways where necessary. Individual station locations are described in the sections that follow.

Each station would have a 200 foot long ADA-compliant platform and be consistent with station design criteria used on the Amtrak Downeaster extension.⁵ Two ticket machines would be provided for passengers at each non-terminal station, and terminal stations would each have four ticket machines. All stations would be monitored by a Closed Circuit TV (CCTV) security system. Service would be provided on trains where coaches were assumed to be able to carry 100 passengers.

Each rail alternative and station is described in the following sections.

Saint Lawrence and Atlantic (SLR) Stations

In downtown Portland, the SLR line would bring passengers either to the proposed Bayside Terminal or the proposed India Street Terminal. The Bayside Terminal would be located near Exit 7 on I-295 at the Franklin Arterial on a new rail that would need to be constructed by MaineDOT on the southeastern toe-of-slope of I-295. A stub track would have to be built at Bayside. Since Bayside is the downtown terminal, it is assumed that no parking would be required above existing city parking. Service to Bayside assumes the need to construct a new rail bridge across Back Cove to replace the existing moveable span rail bridge, which has been out of service since being weakened as a result of a 1984 fire.

The alternate India Street Terminal would be located in downtown Portland at the intersection of India Street and Commercial Street, across from the Casco Bay Ferry Terminal. Like Bayside, India Street would need a stub track. Also like Bayside, it was assumed that no parking would be required above city parking. Similar to the Bayside Terminal option, service to India Street assumes the need to construct a new rail bridge across Back Cove.

The commuter service between Portland and Yarmouth Junction would only travel over the former SLR ROW now owned by the State of Maine.

At Yarmouth Junction, the service would use tracks owned by Pan Am Railways to Brunswick. Between Brunswick and Bath, the route would use the Rockland Branch that was recently refurbished, and is owned by the State of Maine.

From Yarmouth Junction to Auburn Intermodal, the service would use tracks owned by SLR. From Auburn Intermodal to downtown Lewiston, the service would use track owned by the Lewiston Auburn Railroad (LARR). Table 2-5 lists the stations served by the SLR routes to the different outer terminals.

⁵ The Americans with Disabilities Act of 1990 (ADA) prohibits discrimination and ensures equal opportunity and access for persons with disabilities. Where it is not operationally or structurally feasible to meet gap requirements, assistive boarding devices (e.g., ramps or bridge plates, car-borne or platform-mounted lifts, mini-high platforms) are permissible means to accommodate passengers with disabilities. Platform length is not mandated by the ADA.

Table 2-5: Stations Served Using the Saint Lawrence and Atlantic (SLR) Route

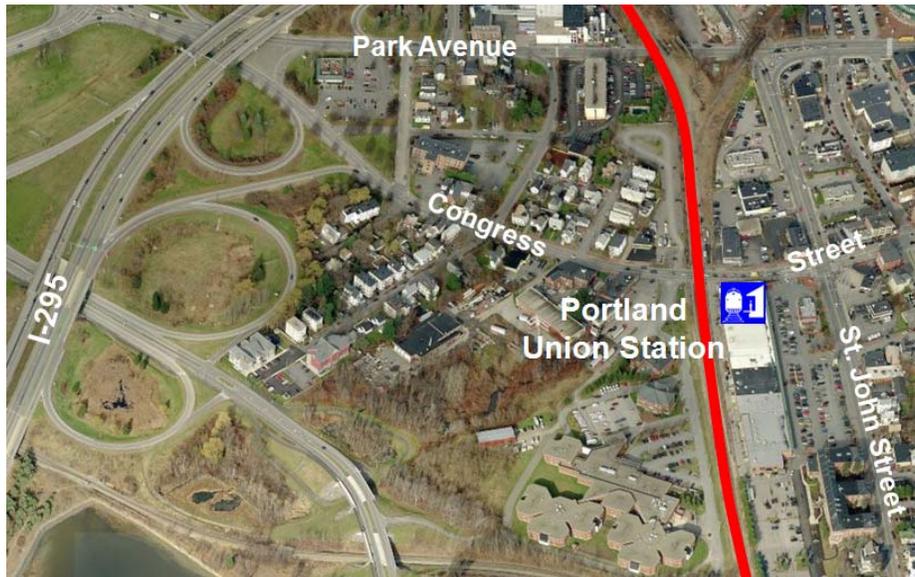
Stations Served	Yarmouth		Brunswick		Bath		Auburn Intermodal		Lewiston	
	Bayside	India Street	Bayside	India Street	Bayside	India Street	Bayside	India Street	Bayside	India Street
Bayside	x		x		x		x		x	
India Street		x		x		x		x		x
Falmouth (Exit 10)	x	x	x	x	x	x	x	x	x	x
Yarmouth (Exit 15)	x	x	x	x	x	x	x	x	x	x
Freeport			x	x	x	x				
Brunswick			x	x	x	x				
Bath					x	x				
Pinelands East							x	x	x	x
Auburn Intermodal							x	x	x	x
Lewiston									x	x

Pan Am Route Stations

In downtown Portland, the Pan AM line would bring passengers either to the proposed Union Station Terminal or the proposed Center Street Terminal. The Union Station Terminal would be located near the location of the historic Portland Union Station on St. John Street (See Figure 2-33). Like Center Street, a stub track would be built at the terminal. Depending on the Portland terminal chosen for the commuter service, there are two possible station scenarios for Union Station.

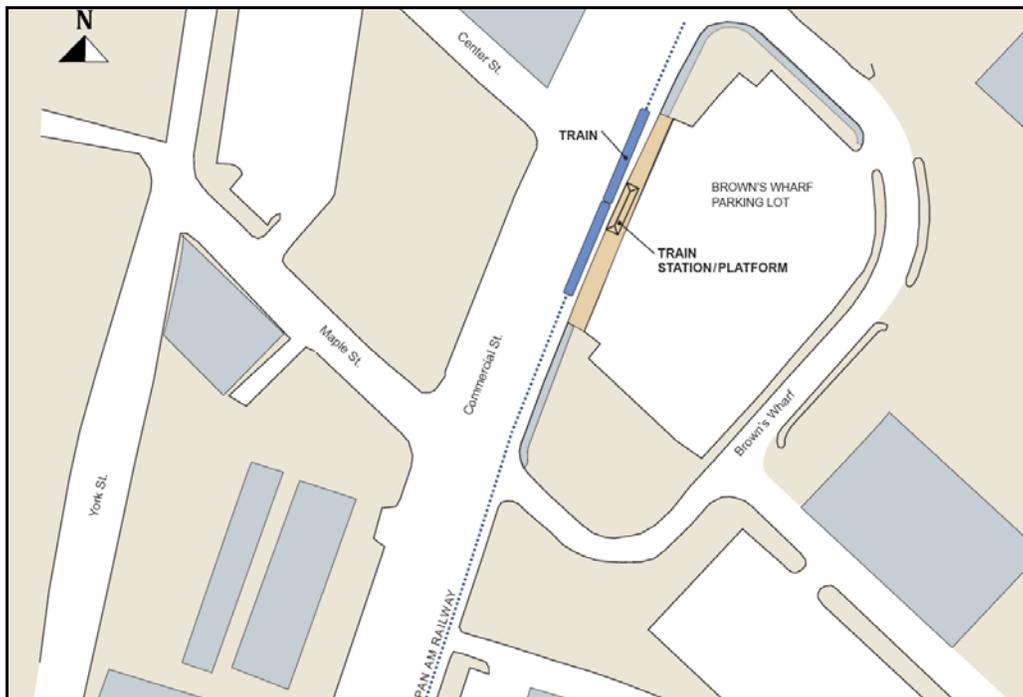
- **Through Station:** The first option for Portland Union was that it would be a through station for service terminating at Center Street. In this scenario, a center island platform would be required. It was assumed that no station parking would be required since it would be located in downtown Portland.
- **Terminal Station:** If service to downtown Portland terminated at Union Station, a stub track would be required. This is necessary because it would be located on the Pan Am mainline, which is used by both Amtrak and Pan Am railways. A stub track with an island platform would provide a clearance free and train-free path around the station for non-commuter operations. Like Center Street, it was assumed that no station parking is required.

Figure 2-33: Portland Union Station Location



The Center Street Terminal for commuter rail service would be located in a parking lot at the intersection of Center Street and Brown's Wharf Street in downtown Portland. A stub-track would be built at the station. It was assumed that since Center Street is a downtown terminal station, no station parking is required. Each trip to Center Street adds an additional 2.1 miles from Union Station to Center Street. Service to Center Street also adds six minutes of travel time to each trip. Figure 2-34 depicts the Portland Center Street stub-track station.

Figure 2-34: Portland Center Street Station Layout (Stub-Track)



Commuter service from Portland to Yarmouth would only travel over tracks owned by Pan Am Railways. The commuter service from Yarmouth to Brunswick would follow the same route as the Amtrak Downeaster service to Brunswick up to Royal Junction (near Yarmouth Junction) on Pan Am Railway track. North of Royal Junction, the route would continue to travel on track owned by Pan Am to Brunswick. Between Brunswick and Bath, the route would use the Rockland Branch that was recently refurbished, and owned by the State of Maine.

After Royal Junction, the route would continue to travel on track owned by Pan Am to South Auburn and Lewiston. Table 2-6 lists the stations served by the Pan Am routes to the outer terminals.

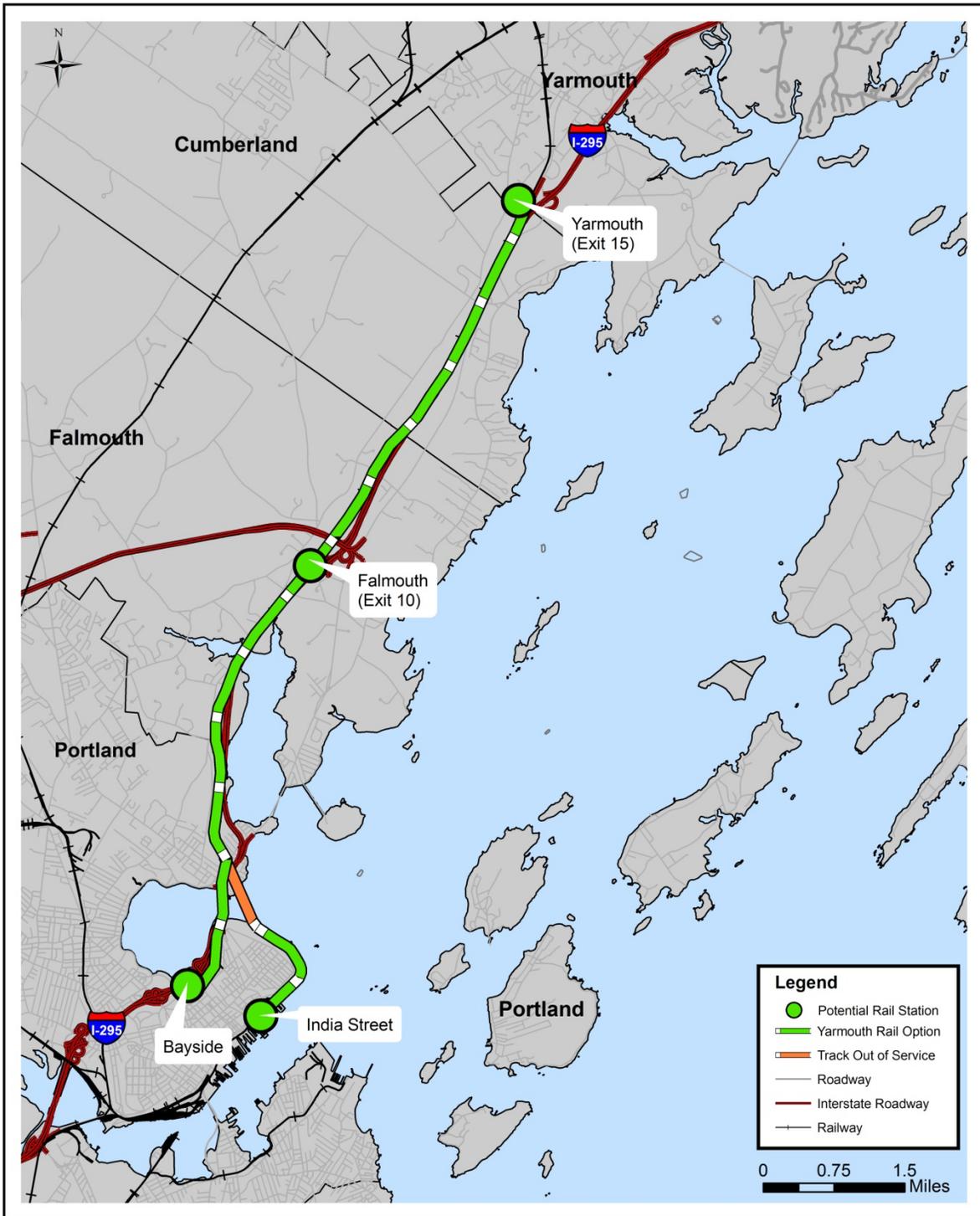
Table 2-6: Stations Served using the Pan Am Route

Stations Served	Yarmouth		Brunswick		Bath		South Auburn		Lewiston	
	Union Station	Center Street								
Center Street		x		x		x		x		x
Portland Union	x	x	x	x	x	x	x	x	x	x
West Falmouth (Exit 53)	x	x	x	x	x	x	x	x	x	x
Cumberland	x	x	x	x	x	x	x	x	x	x
Yarmouth Jct	x	x	x	x	x	x				
Freeport			x	x	x	x				
Brunswick			x	x	x	x				
Bath					x	x				
Pinelands West							x	x	x	x
South Auburn (Exit 75)							x	x	x	x
Auburn									x	x
Lewiston									x	x

Yarmouth Service

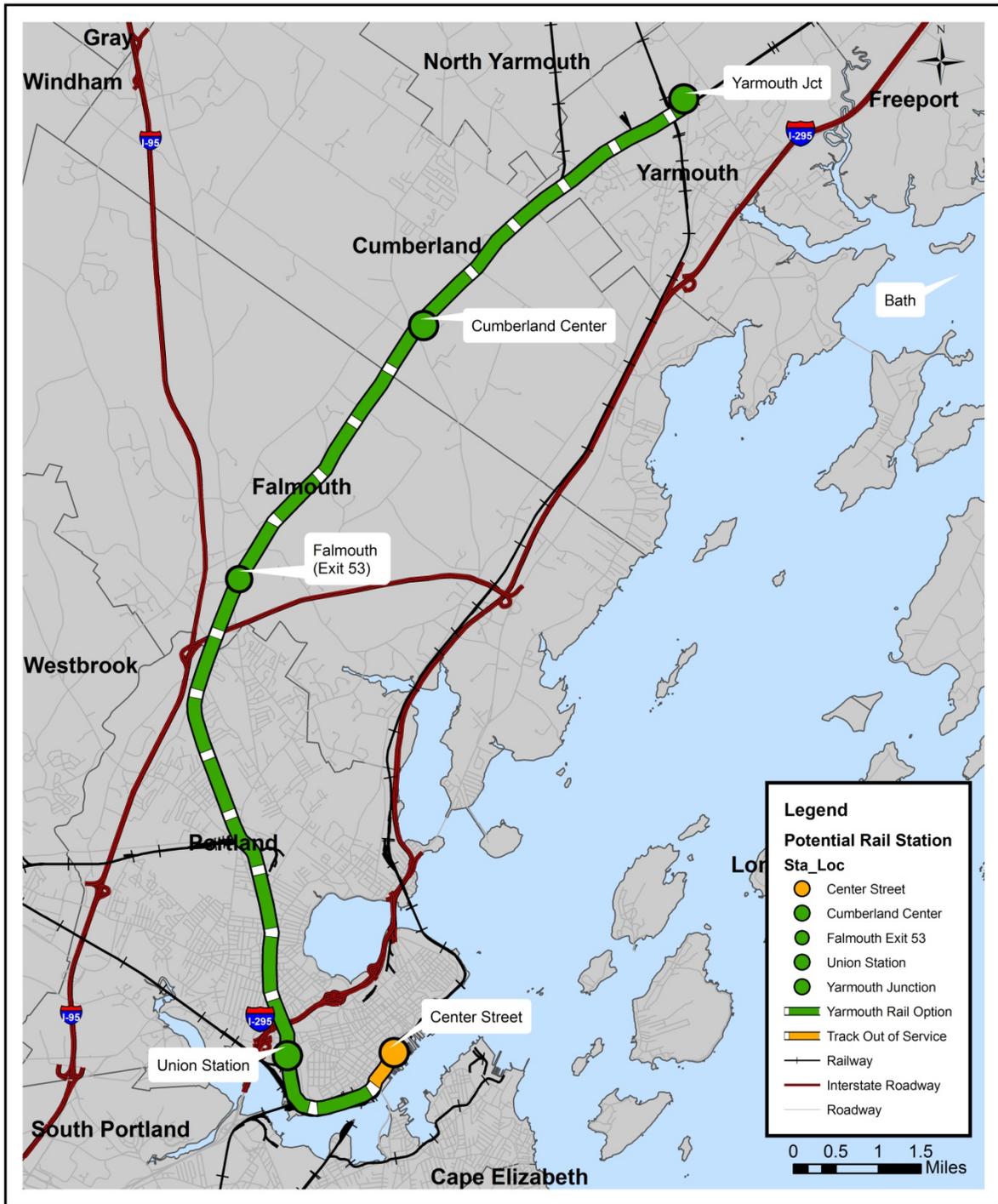
Both rail options include an intermediate stop in Falmouth and a terminal stop in Yarmouth. The Pan Am alternatives are the only rail scenarios which also includes a stop in Cumberland. On the SLR line, the Falmouth stop would be located at Exit 10 off of I-295. With the Pan Am rail alternative, the stop would be located near Exit 53 off of I-95. For service on the SLR line, the Yarmouth terminal would be located near Exit 15 off of I-295. With the Pan Am rail alternative, the stop would be located at Yarmouth Junction. Figures 2-35 and 2-36 show the routing of proposed rail service from Portland to Yarmouth.

Figure 2-35: Yarmouth Rail Option – SLR Line



Source: MaineGIS 2008

Figure 2-36: Yarmouth Rail Option – Pan Am Line



Source: MaineGIS 2008

The Falmouth Station on the SLR route would be developed as a park and ride station near the junction of I-95 and I-295 at the Falmouth Spur (Exit 10 off of I-295). It was estimated that 150 parking spaces would be needed at the Falmouth SLR Station. Figure 2-37 below shows the existing transportation network in the vicinity of the station.

Figure 2-37: Falmouth Station Location (SLR Route)



The proposed Yarmouth Station on the SLR Route would be located near Exit 15 off of I-295 where Route 1 crosses over the interstate. The station would be a park and ride station as it would be located approximately 1 mile south of Yarmouth Center. The station would be located on MaineDOT property in the vicinity of the MaineDOT Maintenance Depot on the entrance ramp to I-295 Southbound. The Yarmouth is either a terminal station at the end of the SLR route or a thru station to destinations to the north. The terminal station scenario would require a terminal track. In both scenarios, it was estimated that 100 parking spaces would be needed. Figure 2-38 shows an overview of the Yarmouth Station on the SLR line.

Figure 2-38: Yarmouth Station Location (SLR Route)

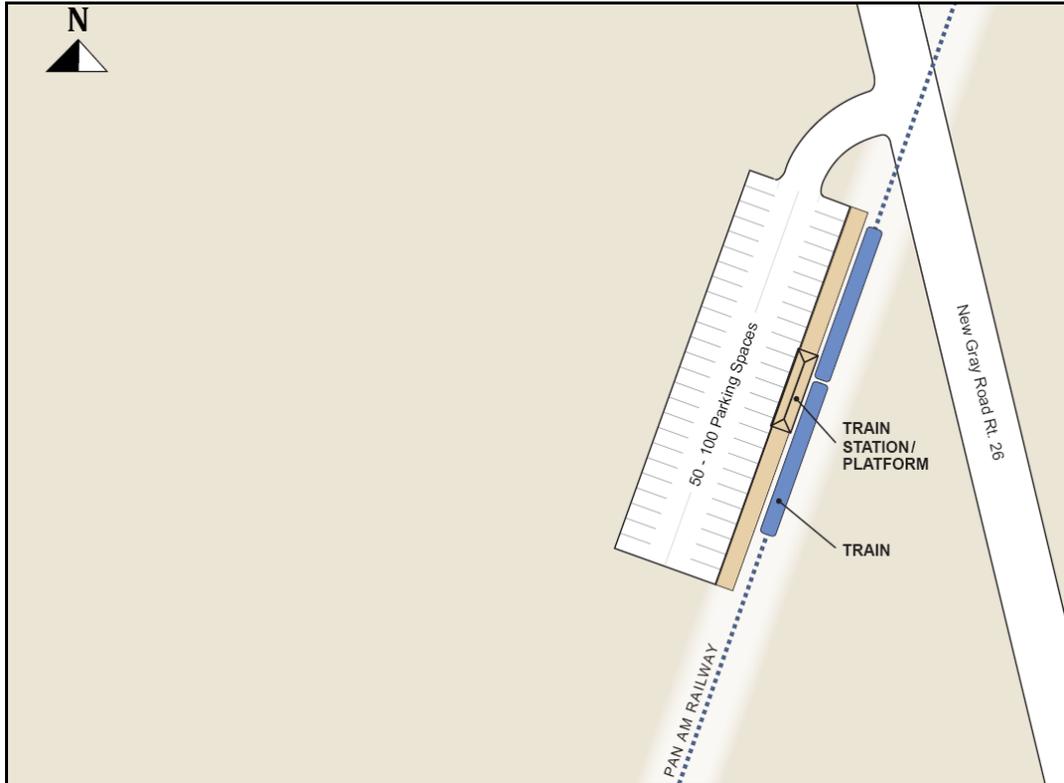


The proposed Falmouth Station on the Pan Am route would be located near Exit 53 off of I-95 and off of Gray Road, Route 26 and Route 100 near West Falmouth Corner. The station would be located in close proximity to the Hannaford Plaza and Portland North Business Park. It was estimated that 50-100 parking spaces were needed at this station. Figure 2-39 below shows an overview of the area near the proposed Falmouth Station. Figure 2-40 provides a more detailed view of the station and parking layout.

Figure 2-39: Falmouth Station Location (Pan Am Route)



Figure 2-40: Falmouth Station and Parking Layout (Pan Am Route)



The proposed Cumberland Station would be located on Longwoods Rd/Route 9. Cumberland Center is located approximately one and a half miles north of the proposed station location. It was estimated that 50-100 parking spaces would be needed at this station. Figure 2-41 describes the general location of the proposed Cumberland Station. Figure 2-42 provides a more detailed view of the station and parking layout.

Figure 2-41: Cumberland Station Location (Pan Am Route)



Figure 2-42: Cumberland Station and Parking Layout (Pan Am Route)

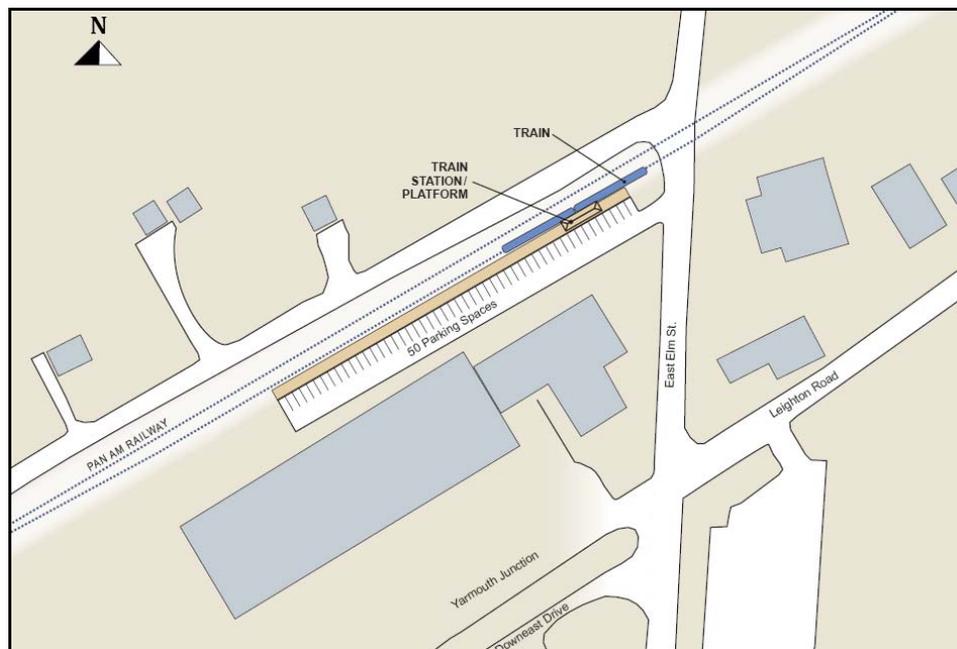


The proposed Yarmouth Station on the Pan Am line would be located off of East Elm Street near Yarmouth Junction. The proposed station location is approximately 1 mile north of downtown Yarmouth and about 0.2 miles east of Yarmouth Junction. Whether or not the station would be used as a terminal stop or a thru service to locations to the north, it was estimated that 50-100 spaces would be required for this station. If Yarmouth would be the terminal station for the commuter service, then it would require the construction of a stub track in order to accommodate the activity from the commuter service, and allow for thru moves by Amtrak service, and Pan Am (since it is located on the Pan Am mainline). Figure 2-43 below shows an overview of the proposed station location. Figure 2-44 provides a more detailed view of the station and parking layout.

Figure 2-43: Yarmouth Station Location (Pan Am Route)



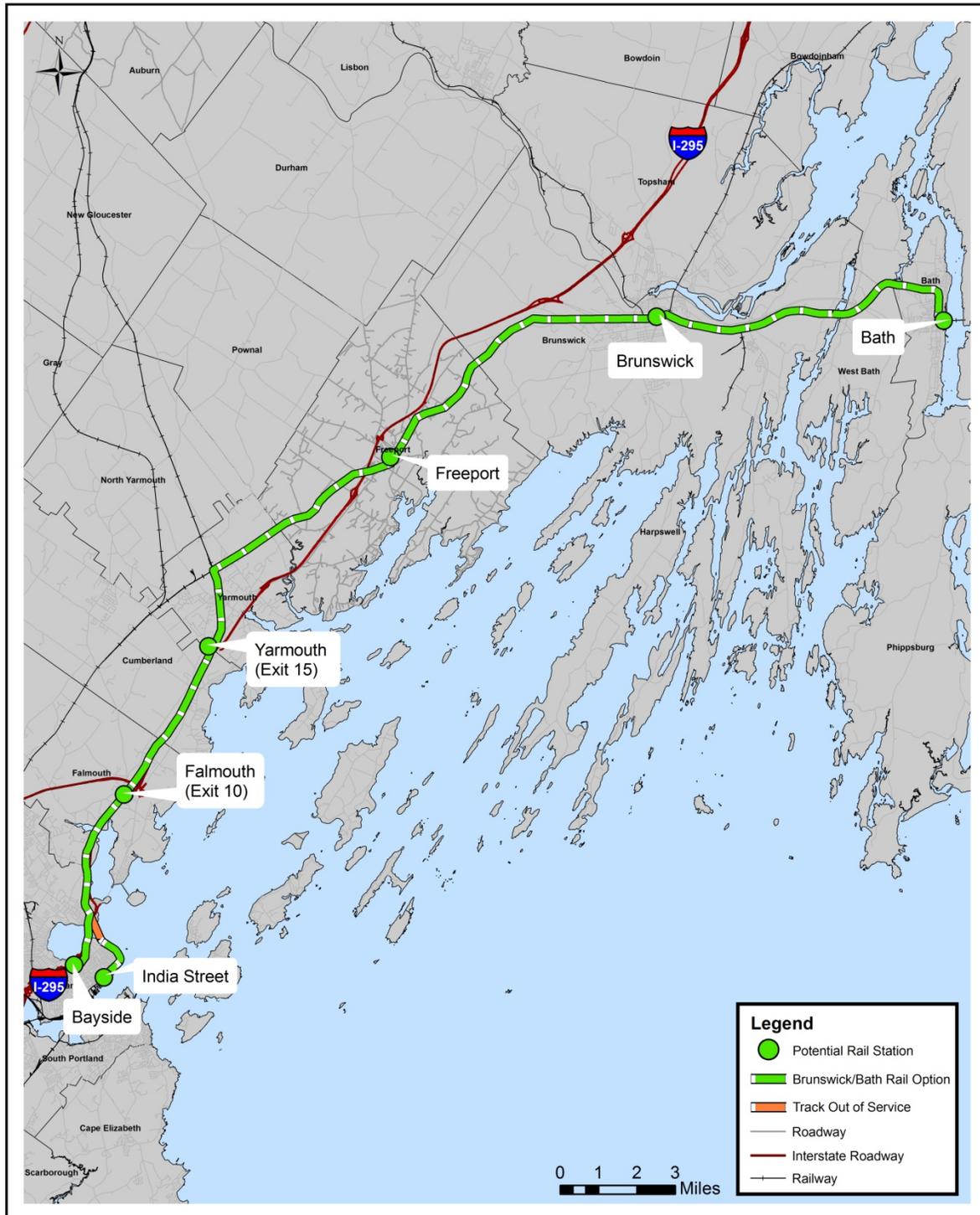
Figure 2-44: Yarmouth Station and Parking Layout (Pan Am Route)



Bath/Brunswick Service

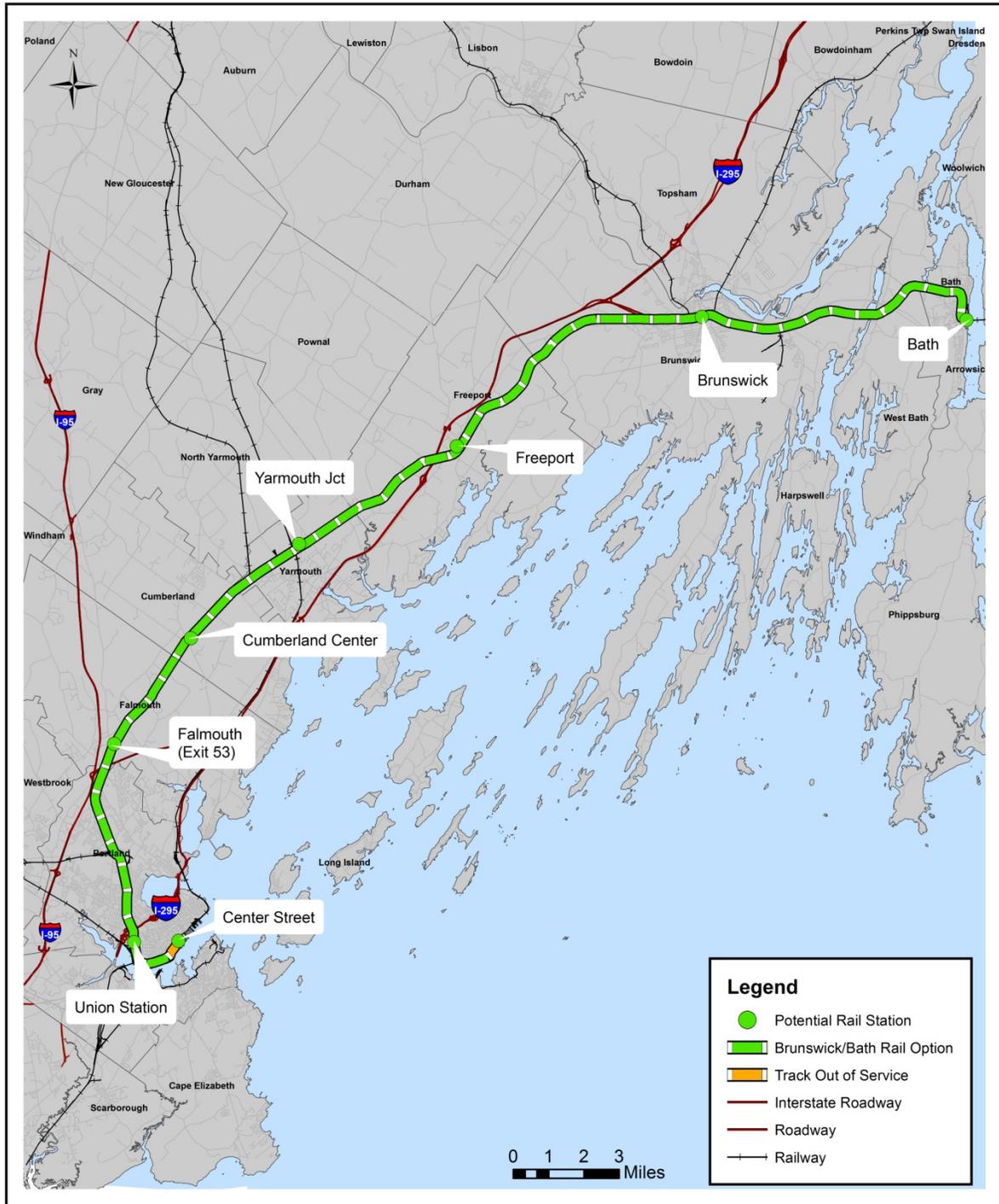
Both rail alternatives include intermediate stops in Falmouth, Yarmouth and Freeport. The Freeport stop would be located in the town center in all options. Additionally, the Brunswick and Bath stations would be the same in both the SLR and Pan Am alternatives. The Brunswick Station would be located at the Maine Street Station that has been constructed for the Amtrak Downeaster extension. The Bath Station would be located at the existing Maine Eastern Railroad Station. Figures 2-45 and 2-46 show the commuter rail route alternatives from Portland to Brunswick and Bath.

Figure 2-45: Brunswick/Bath Rail Option – SLR Option



Source: MaineGIS 2008

Figure 2-46: Brunswick/Bath Rail Option – Pan Am Option

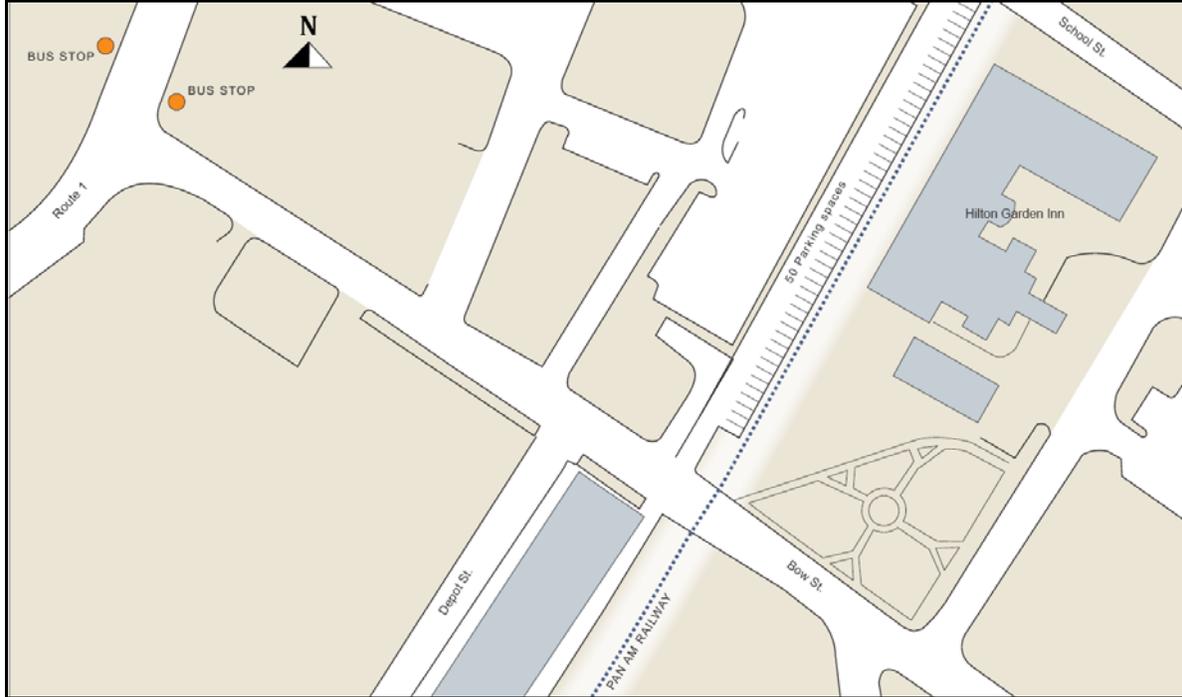


The proposed station in Freeport would be located in the same location as the proposed Amtrak Downeaster station. Thus, it was assumed that a station would not need to be constructed as one would already be operational for the Downeaster service, which is expected to be in place in 2012 or 2013. However, a second platform will need to be constructed to support the commuter service. The location of the station would be the same for either the SLR or Pan Am alternatives, as the lines share the same track through Freeport. The station was located in downtown Freeport in the heart of the retail district and in close proximity to adjacent residential areas. The station would be located off of Mill Street and Depot Street south of Route 1. A station siding would need to be constructed in the vicinity of the Freeport Station to allow for meets between the commuter service and the Amtrak service. It was estimated that 50-100 parking spaces would be needed at the Freeport Station, but there was no plan to build a parking lot. It was assumed that parking would come from existing sources. Figure 2-47 below shows an overview of the proposed station location. Figure 2-48 provides a more detailed view of the parking layout.

Figure 2-47: Freeport Station Location (SLR and Pan Am Routes)



Figure 2-48: Freeport Station Parking Layout (SLR and Pan Am Routes)



Located in downtown Brunswick, the proposed station for the commuter service would be the proposed Amtrak Downeaster Station (Maine Street Station). Therefore, no new station would be needed for the commuter service and the track would already be upgraded to support passenger service. However, a second platform would be required for the regional commuter service. The location of the station is the same for either the SLR or Pan Am alternatives as the lines share the same track through Brunswick. The station would be located adjacent to Hannaford Supermarket in the retail district and close to Bowdoin College. It was assumed that 100 parking spaces would be needed for this station regardless of whether Brunswick was the end of the line or a thru station on the way to Bath. Figure 2-49 below shows an overview of the proposed station location. Figure 2-50 provides a more detailed view of the parking layout, and Figure 2-51 with the proposed buildings and roadway access to the station.

Figure 2-49: Brunswick Station Location (SLR and Pan Am Routes)



Figure 2-50: Brunswick Station Location (SLR and Pan Am Routes)



Figure 2-51: Brunswick Station Location Schematic (SLR and Pan Am Routes)

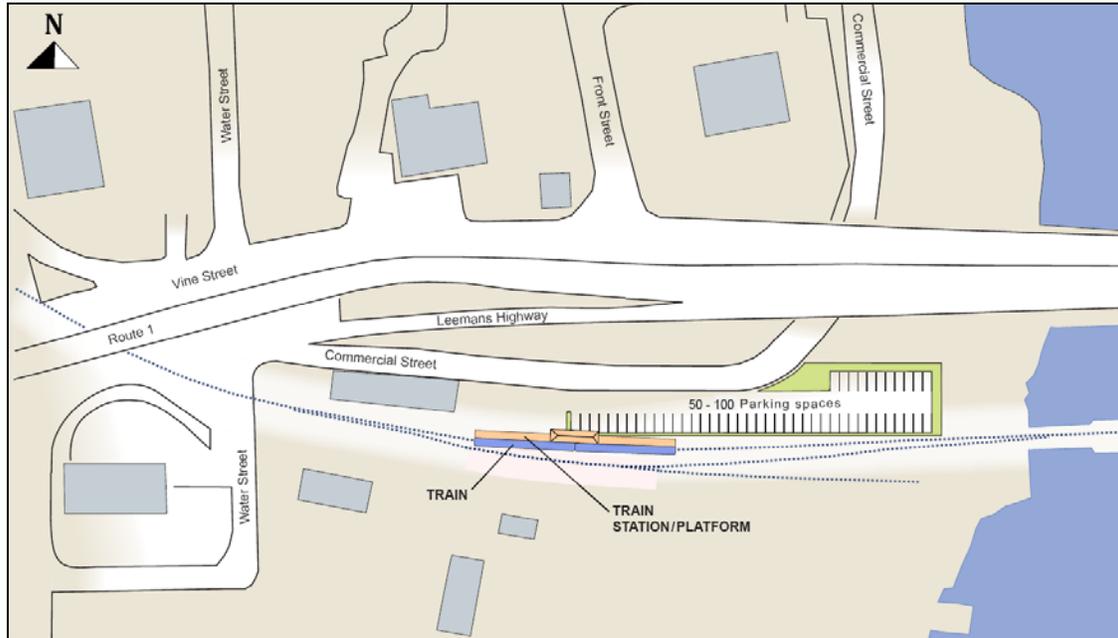


In Bath, the proposed station would be located at the existing train station off of Commercial Street serving the Maine Eastern Railroad. The station would be located downtown on the south side of the highway, just north of Bath Iron Works. The station would be the same location as the proposed bus stop for the express bus alternative. It was estimated that 50-100 parking spaces would be necessary and that a terminal track and platform would need to be constructed in order to allow for meets between commuter trains. Figure 2-52 below shows an aerial view of the station vicinity. Figure 2-53 provides a more detailed view of the station and parking layout.

Figure 2-52: Bath Station Location (SLR and Pan Am Routes)



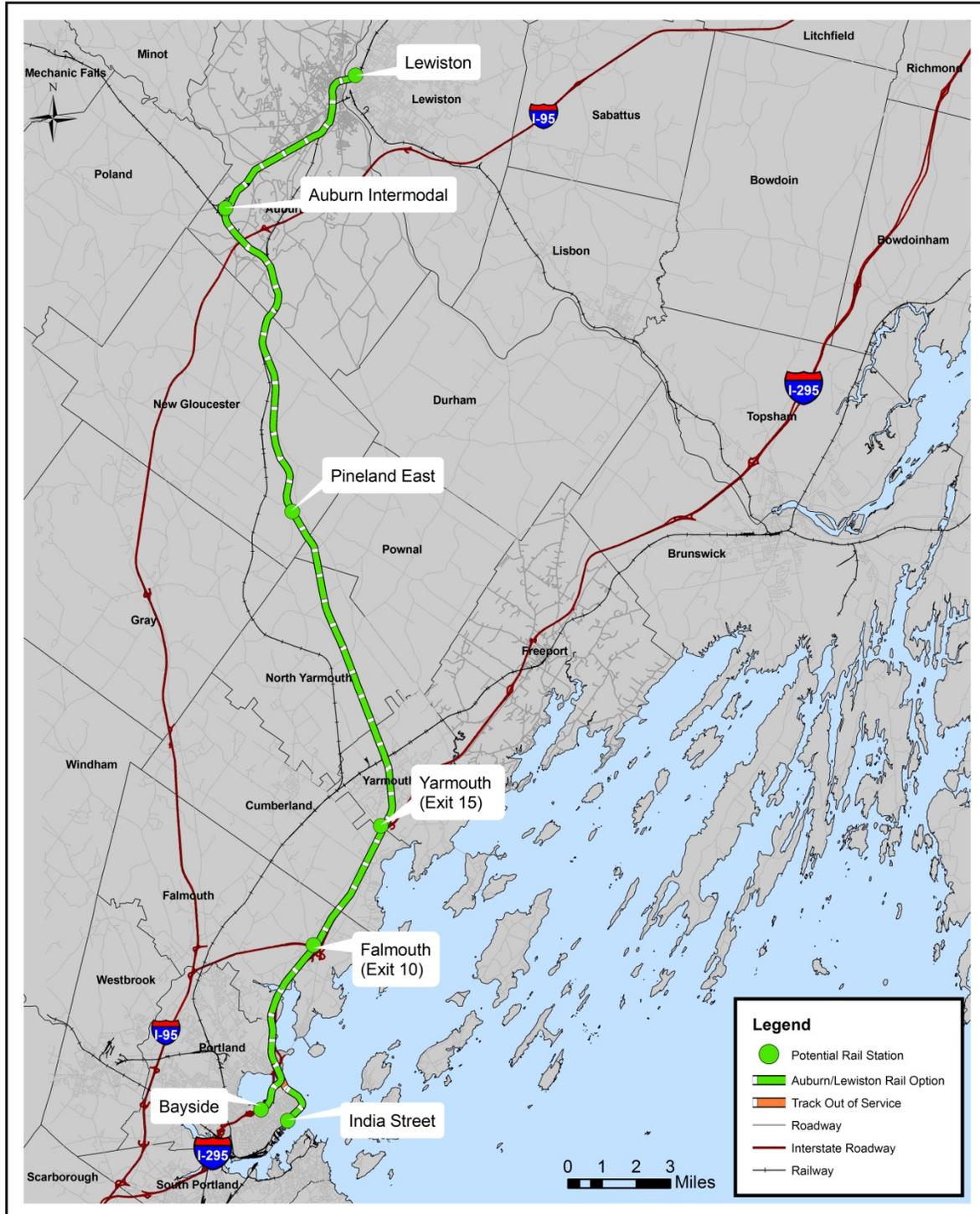
Figure 2-53: Bath Station and Parking Layout



Lewiston/Auburn Service

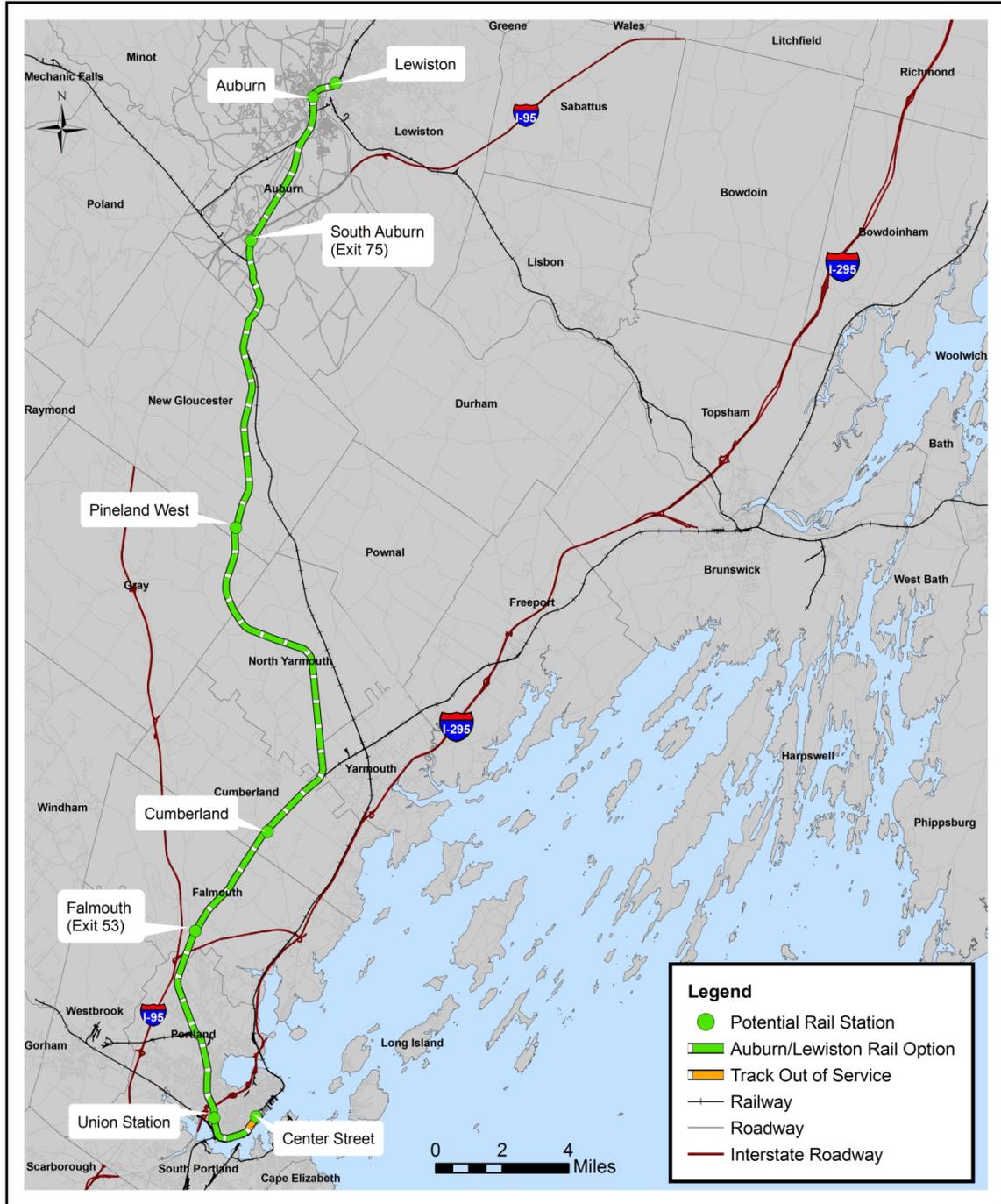
The SLR route and the Pan Am route have different intermediate stop locations for service to Auburn and Lewiston. For the SLR line, intermediate stops would be located in Falmouth off of Exit 10 on I-295, in Yarmouth off of Exit 15 on I-295, near Pinelands East (New Gloucester), and at the Auburn Intermodal Center. No downtown Auburn stop was proposed for the SLR alternative. On the Pan Am line, intermediate stops would be located in Falmouth off Exit 53 of I-95, in Cumberland, at Pinelands West (New Gloucester), in South Auburn off of Exit 75 of I-95, and in downtown Auburn. Figures 2-54 and 2-55 shows the rail alternatives for service to Auburn and Lewiston.

Figure 2-54: Auburn/Lewiston Rail Option – SLR Option



Source: MaineGIS 2008

Figure 2-55: Auburn/Lewiston Rail Option – Pan Am Option



Source: MaineGIS 2008

The Pinelands East Station was proposed for the SLR route alternative. The Pinelands East station would be a park and ride station, with 100 parking spaces located on Intervale Road (Rt 231) in New Gloucester. The communities of Gray, Pownal, and New Gloucester would be able to use the station for commuter service. Figure 2-56 is an overview of the Pineland East Station location.

Figure 2-56: Pinelands East Station Location (SLR Route)



On the SLR line, the proposed Auburn Intermodal Station would be located at the Lewiston-Auburn Regional Airport.⁶ The station would require construction of a new rail spur to connect to the airport. The spur was planned to run parallel to Flight Line Drive. This location would also require a station siding on the spur to allow meets between commuter trains at the station. This station would allow for intermodal connections and access to the surrounding employment in this commercial and warehousing region. The Auburn Intermodal Station would either be the northern terminus of the SLR route or a through station to Lewiston. In either scenario, it was estimated that there would be a need for up to 150 parking spaces. The station would be located approximately 1 mile away from Exit 75 off of I-95. The figure below shows an aerial view of the proposed intermodal station site. Figure 2-57 is an overview of the Auburn Intermodal Station location.

⁶ This site was the focus of a previous Environmental Assessment (EA), which identified a proposed configuration for an intermodal facility. It is assumed that any facility/station associated with this project would be integrated with the plan identified in the Auburn Intermodal EA.

Figure 2-57 Proposed Auburn Intermodal Station (SLR Route)



The Pinelands West Station was proposed in New Gloucester off of Morse Road near the Pinelands Campus (approximately 1 mile west of the campus) serving the communities of Gray, Pownal, and New Gloucester. The station would be a park and ride station. It was assumed that 50-100 parking spaces would be necessary at this station. Figure 2-58 below shows an aerial overview of the Pinelands region. Figure 2-59 provides a more detailed view of the station and parking layout.

Figure 2-58: Pinelands West Station Location (Pan Am Route)

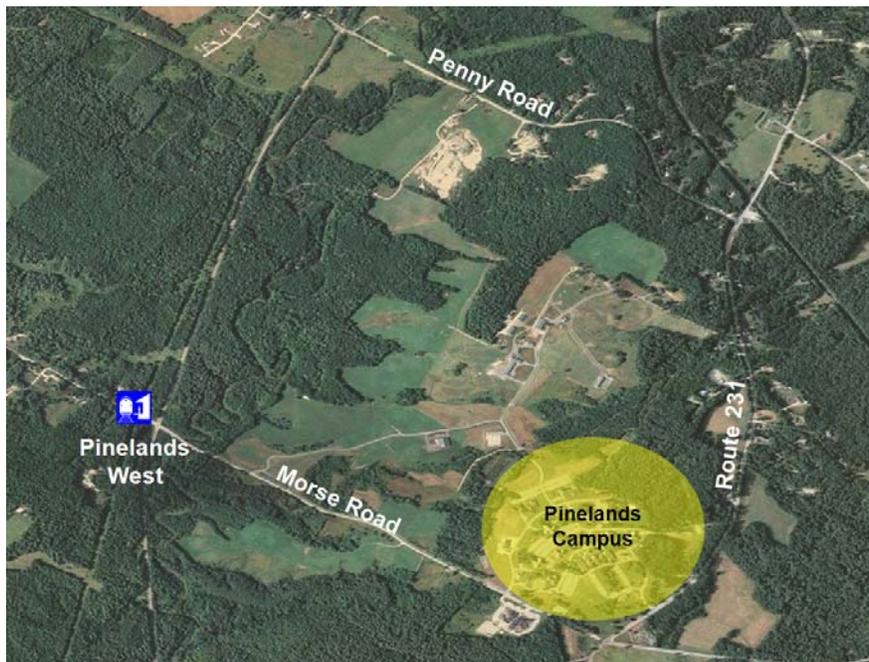
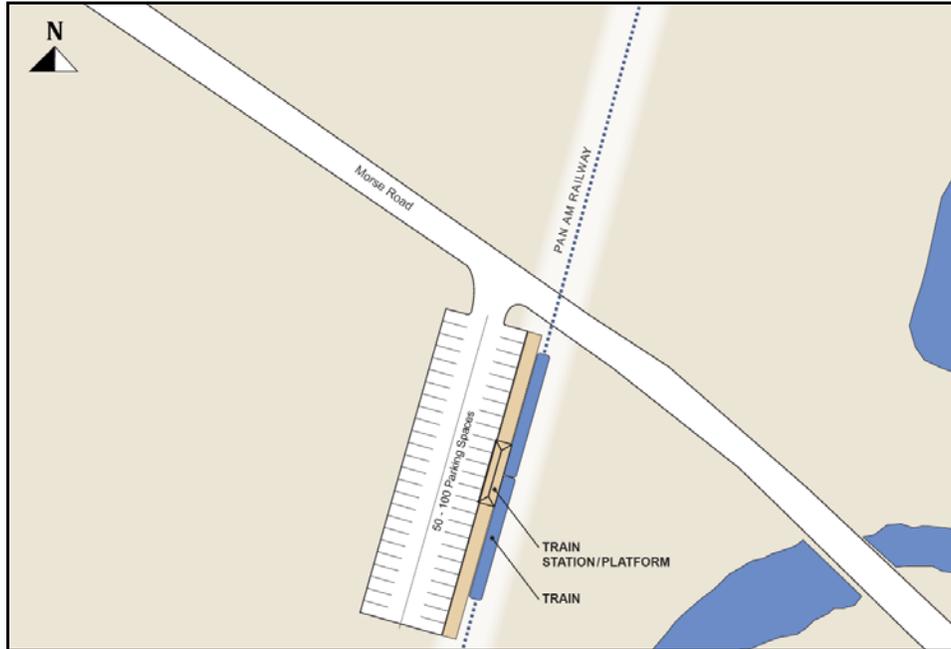


Figure 2-59: Pinelands West Station and Parking Layout (Pan Am Route)

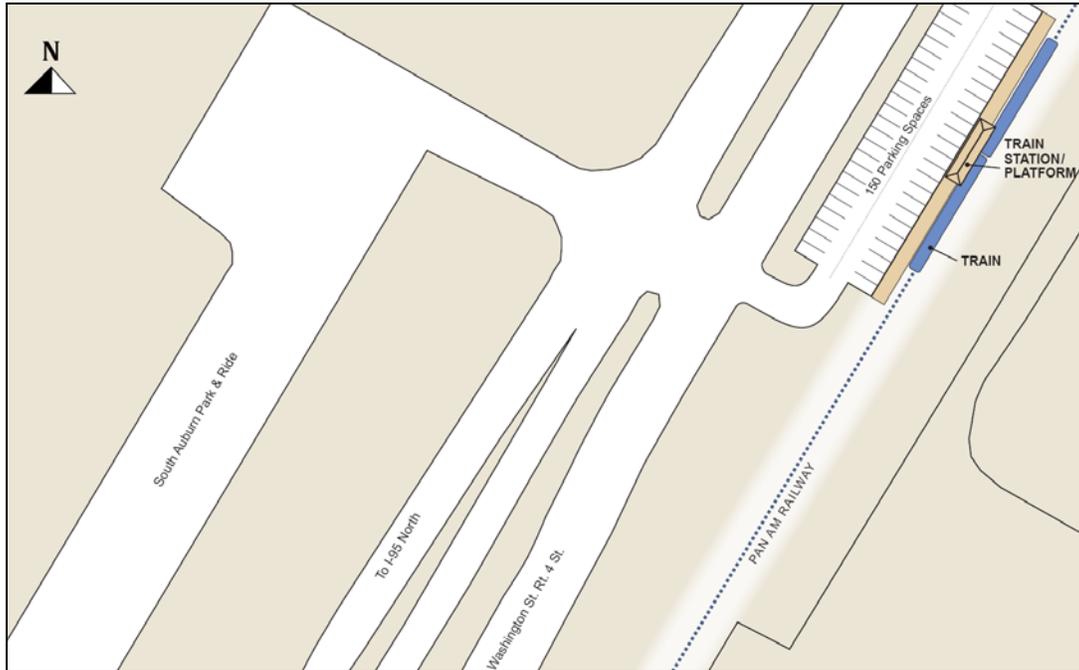


The proposed South Auburn Station would be located across the street from the existing Washington Street park-and-ride lot off Exit 75 of I-95. The station would be located approximately 1.5 miles south of the Lewiston-Auburn Airport and about 1 mile north of Danville Junction. A station siding would be necessary in South Auburn to allow for meets between commuter trains and to minimize interference with Pan Am operations. It was estimated that an additional 150 parking spaces would need to be constructed throughout the site, in addition to the existing park-and-ride spaces at this station. Figure 2-60 shows the general location of the downtown Auburn station. Figure 2-61 provides a more detailed view of the station and some parking options.

Figure 2-60: South Auburn Station Location (Pan Am Route)



Figure 2-61: South Auburn Station and Parking Layout (Pan Am Route)



A downtown Auburn Station was also proposed on the Pan Am route for walking and drop-off service. No parking spaces were recommended. The station was situated on a segment of tangent track⁷, located between Drummond Street and Elm Street. Figure 2-62 shows the general location of the downtown Auburn station. Figure 2-63 provides a more detailed view of the station and parking layout.

Figure 2-62: Auburn Station Location (Pan Am Route)



⁷ "Tangent track" is a standard railroad terminology for a length of track that is absolutely straight.

Figure 2-63: Auburn Station and Parking Layout (Pan Am Route)



The proposed Lewiston Station would be located in the downtown near the Central Maine Medical Center, immediately north of the Androscoggin River at the historical MEC location in Lewiston. Due to a significant grade differential between the two tracks on the western bank of the Androscoggin River, it is not possible to provide a connection between the two railroads to service Lewiston in one location.

There is a concentration of both residential and commercial land uses near the proposed station site, so the station was designed for walking and drop off access. Therefore, no parking was proposed for the station. The station would be served only by the Pan Am line. A terminal track would be needed to avoid obstruction with the mainline.

Service to Lewiston via the LARR and SLR would terminate at the historical Grand Trunk Railroad Station located on Lincoln Street. Extensive infrastructure upgrades would be required to provide service to Lewiston in this location. Also, the service to Lewiston via the LARR and SLR would require converting the existing Auburn Riverwalk trail over the trestle bridge into a railroad use. Figure 2-64 below provides an aerial view of the proposed station location via SLR. Figure 2-65 provides an aerial view of the proposed Lewiston Station via Pan Am Line and 2-66 provides a more detailed view of the station and parking layout.

Figure 2-64: Lewiston Station Location (SLR)

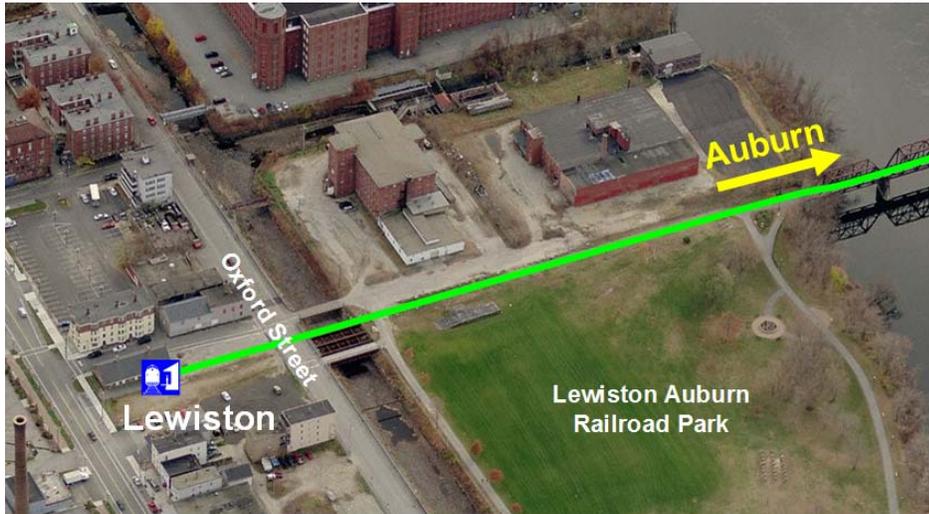
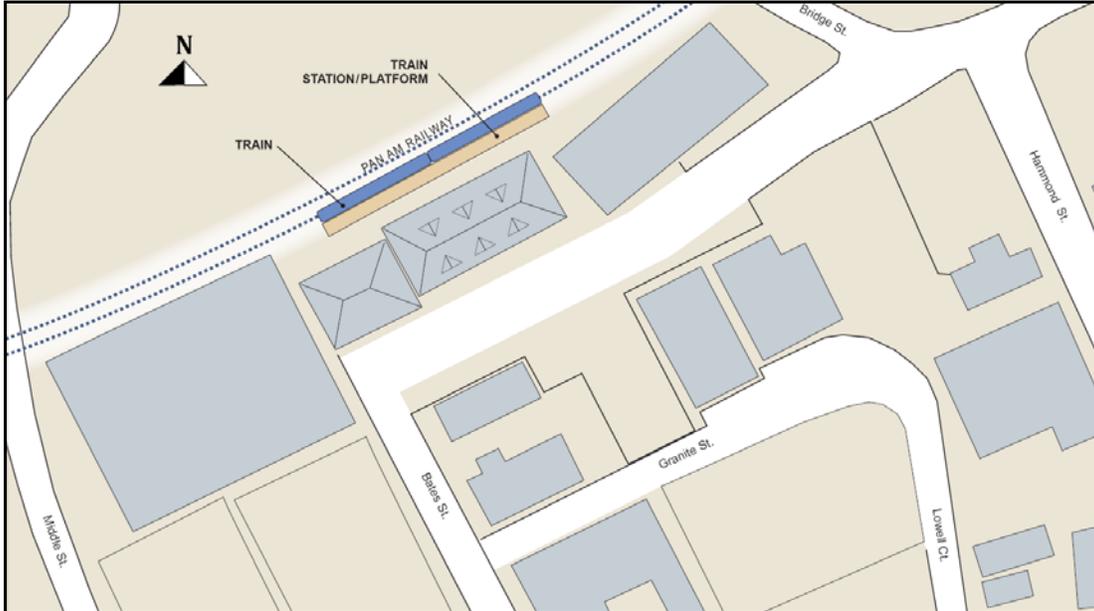


Figure 2-65: Lewiston Station Location (Pan Am Line)



Figure 2-66: Lewiston Station and Parking Layout (Pan Am Line)



Bus Shuttle

Shuttle buses were planned to transport passengers from the downtown Portland terminal to the major employment zones on the Portland peninsula for all Portland terminal stations except for Center Street because the Center Street Station is already centrally located downtown and also because it is assumed that a Union Station stop would also be in service providing convenient access to the western employment districts located around the Maine Medical Center.

These employment zones were centered in the vicinity of Maine Medical Center (MMC) in the west, Monument Square in central downtown Portland, 29 Pearl Street to the east, and 130 Marginal Way to the north. Figure 2-67 maps these employment centers and corresponding employment zones. For the purposes of evaluating potential station sites in downtown Portland, it was necessary to divide Portland into four employment zones. The centroids of each zone were the geographically central locations of business activities in the zone. A typical walking speed of 3.0 mph was assumed. It was also assumed that passengers would be willing to walk to their destination as long as it was less than $\frac{3}{4}$ of a mile from the terminal. All passengers whose destination was outside of the $\frac{3}{4}$ mile radius would take the shuttle. This translates into an access and egress time no greater than 15 minutes to and from the terminal.

For all terminals except Center Street (in concert with a stop at Union Station), shuttle service was required to provide passengers with convenient access to employment centers lying outside of the $\frac{3}{4}$ mile radius. It was assumed that passengers headed towards the northern centroid from Center Street would still be willing to walk to the centroid since the distance between the two is slightly more than $\frac{3}{4}$ of a mile to the destination (approximately 0.8 miles).

Table 2-7 shows the distances to each employment centroid for all four terminals and the mode of transport used to access each employment district.

Table 2-7: Walking Distances and Times from Rail Stations to Major Employment Centroids in Downtown Portland

	Pan Am				SLR			
	Center Street		Union Station		Bayside		India Street	
	Miles to Centroid	Mode to Centroid						
North	0.8	Walk	1.3	Bus	0.2	Walk	1.2	Bus
East	0.3	Walk	1.8	Bus	0.9	Bus	0.2	Walk
West			2.2	Walk	1.1	Bus	1.6	Bus
Central	0.4	Walk	12	Bus	0.6	Walk	0.6	Walk

Figure 2-67: Portland Employment Zones



Source: MEGIS 2008



0 0.2 0.4 0.6
Miles

Shuttle routes were designed to provide service from the downtown terminal to the major employment centers on the peninsula located outside of a ¼ mile radius from the terminal. Regardless of the proximity of the centroid to the downtown station, all routes were designed to either pass by or within 500 feet of the centroid of each employment zone. Each employment zone that was outside of the walking distance would receive a shuttle route. Each zone requiring shuttle service would receive a dedicated route.

Shuttles would be timed to meet all peak trains (every 30 minutes) and all off-peak trains (every 60 minutes). Service would operate from 6:45 AM (first arrival of the day in Portland) until 10:55 PM (the last departure of the day in Portland). The peak period would be 2.5 hours long. Morning peak service would operate from approximately 6:45 AM to 9:15 AM; with evening peak service from 4:15 PM to 6:45 PM. It was assumed that there would be 254 weekday service days, with no weekend service and no holiday service. The peak shuttle cycle time would be 30 minutes and off-peak shuttle cycle times would be one hour. Buses would lie over at the rail terminal. Shuttle buses were assumed to operate at 12.0 mph.

Shuttle buses were further assumed to be the New Flyer model D40LF (a popular urban transit bus). These buses were 40 foot long, low-floor buses with a maximum capacity of 83 people (39 seated and up to 44 standees).⁸ Figure 2-68 shows the picture of the New Flyer model D40LF. For planning purposes, all passengers were assumed to have a seat on the shuttle bus.

Figure 2-68: New Flyer D40LF Bus



Source: http://www.newflyer.com/index/photos_of_buses

Table 2-8 is a summary of shuttle bus characteristics based on the preceding assumptions and analysis. Every downtown Portland terminal except Center Street would require shuttle service to get patrons to their final destinations.

⁸ "Diesel Vehicle Specifications". Accessed on August 12, 2009. Available : http://www.newflyer.com/index/diesel_d30_35_40_601

Table 2-8: Summary of Shuttle Bus Characteristics

	Union Station	Bayside	India Street
Routes			
Peak	3	2	2
Offpeak	1	1	1
Buses Required			
Peak Service	3	2	2
Offpeak Service	1	1	1
Fleet Size (incl. spare)	4	3	3
Revenue Miles			
Daily Revenue Miles	215	148	157
Annual Revenue Miles	54,661	37,490	39,827
Bus Hours			
Daily Bus Hours	26:10	21:10	21:10
Annual Bus Hours	6,646	5,376	5,376

The following sections provide details on the types of service and proposed operating statistics along with projected costs to implement and operate the service.

2.3 Express Bus and Rail Service Statistics

An overview of express bus and rail operational statistics is provided in this section. As previously noted, service headways would be 30 minutes in the peak and 60 minutes in the off-peak. The first trip of the day would arrive in Portland at 6:45 AM and the last trip of the day would depart Portland at 10:55 PM. No weekend or holiday service was planned during the analysis.

2.3.1 Bus Alternatives

With the express bus alternatives, there are two options:

- Highway and highway shoulders (BOS)
- Highway, shoulders, and exclusive ROW (BOS & ROW)

Buses could operate on the highway and highway shoulders, or on the highway, shoulders, and on an exclusive ROW near Portland. Additionally, with either bus option, a downtown Portland distribution loop would operate to get riders closer to their final destinations and would operate within and augment the existing METRO system. Table 2-9 is a summary of the express bus service alternatives.

Table 2-9: Summary of Express Bus Service Alternatives

Service Statistics	Yarmouth		Brunswick		Bath		Auburn		Lewiston	
	BOS	BOS & ROW	BOS	BOS & ROW	BOS	BOS & ROW	BOS	BOS & ROW	BOS	BOS & ROW
Roundtrip Travel Time	30	22	72	64	92	84	88	82	108	102
<i>with Loop</i>	47	39	89	81	109	101	105	99	125	119
Cycle Time	30	30	90	90	120	90	90	90	120	120
<i>with Loop</i>	60	60	90	90	120	120	120	120	150	120
Route Miles	10.5	28.5	36.7	35.1	41	10.4	28.1	36.3	34.6	40.5
<i>with Loop</i>	14	32	40.2	38.6	44.5	13.9	31.6	39.8	38.1	44
Daily Revenue Miles*	616	1,408	1,769	1,698	1,958	612	1,390	1,751	1,676	1,936
Daily Revenue Hours*	18:08	16:00	29:20	27:44	34:40	32:32	32:00	29:52	37:20	35:12

**statistics include distribution loop operated through downtown Portland*

Service to five outer terminals was evaluated with the intent that service to only one of these outer terminals will be proposed at the completion of the overall analysis.

2.3.2 Rail Alternatives

The rail service would terminate in downtown Portland at either a Bayside or India Street Station on the SLR line, or at Union Station or a Center Street Station on the Pan Am line. In Portland, all terminals except Center Street would require operation of a shuttle bus service to get riders closer to their final destinations in downtown. Table 2-10 provides a summary of service statistics for the commuter rail alternatives.

Table 2-10: Summary of Commuter Rail Alternatives

		Daily Trips	Route Miles	Daily Rev. Miles	Daily Rev. Hours
Pan Am	Union Station				
	Yarmouth	44	13.7	603	36
	Brunswick	44	27.7	1,219	45
	Bath	44	36.2	1,593	59
	South Auburn	44	30.2	1,329	43
	Lewiston	44	35.5	1,560	57
Pan Am	Center Street				
	Yarmouth	44	15.8	695	36
	Brunswick	44	29.8	1,311	45
	Bath	44	38.3	1,685	59
	South Auburn	44	32.3	1,421	43
	Lewiston	44	37.6	1,652	57
SLR	Bayside				
	Yarmouth	44	9.3	409	32
	Brunswick	44	25.8	1,135	44
	Bath	44	34.3	1,509	58
	South Auburn	44	27.9	1,228	40
	Lewiston	44	33.7	1,483	54
SLR	India Street				
	Yarmouth	44	10.1	444	32
	Brunswick	44	26.6	1,170	44
	Bath	44	35.1	1,544	58
	South Auburn	44	28.7	1,263	40
	Lewiston	44	34.5	1,518	54

2.4 Fleet Requirements

For bus and rail alternatives, fleet size (number of vehicles or rail consists⁹) was determined based on projected service miles and hours. Fleet size was further modified to ensure that all projected riders would have a seat for their trip to Portland (or to the outer terminal for reverse commuting).

2.4.1 Express Bus

For both express bus options – BOS or BOS & ROW – the fleet size would be the same for each outer terminal. The commuter buses are assumed to be 80-passenger 55-foot over-the-road double decker buses, similar to the buses operated by MegaBus. The fleet size includes spare vehicles at a spare ratio of 15%, an industry standard. The fleet size also includes the necessary buses to operate the downtown distribution loop. Table 2-11 lists the total number of vehicles required for each of the express bus alternatives. Fleet requirements are higher for Bath service because of the longer distance to Portland and also because of the higher projected ridership (See Section 2.6). Longer travel times contribute to

⁹ A rail consist is used to describe the group of rail vehicles which make up a train. When referring to motive power, consist refers to the group of locomotives powering the train.

the size of the Auburn and Lewiston fleet requirements, but lower projected ridership keep the fleet size lower than that of Bath.

Table 2-11: Express Bus Fleet Requirements

Fleet Requirements	Yarmouth		Brunswick		Bath		Auburn		Lewiston	
	BOS	BOS & ROW	BOS	BOS & ROW	BOS	BOS & ROW	BOS	BOS & ROW	BOS	BOS & ROW
Buses Required	2	2	5	5	6	6	5	5	6	6
Spares¹⁰	1	1	1	1	1	1	1	1	1	1
Total Fleet Size	3	3	6	6	7	7	6	6	7	7

The size of the maintenance facility for each service option was based upon the number of coaches.

2.4.2 Commuter Rail

The commuter rail options are assumed to operate Diesel Multiple Units (DMU)¹¹ equipment for operation on the tracks and shuttle buses for the rail shuttles from the stations to downtown Portland.¹² It was further assumed that each train coach would have the capacity for 100 seated passengers. For the shuttle bus, it was assumed that each bus could carry 83 passengers – 39 seated and up to 44 standees. Table 2-12 lists the fleet requirements for each service alternative in terms of both DMUs and shuttle buses.

Overall, regardless of line alternative, five DMUs would be required for service to Brunswick or Auburn, and six DMUs would be required for service to Bath or Lewiston. For service to Yarmouth, three DMUs would be required with the SLR alternative and four DMUs would be required for the Pan Am alternative. The difference in the number of DMUs required is because they go into different terminals in Portland (SLR to India Street or Bayside and Pan AM into Center Street or Union Station) and because of the added cost of bus circulation at three of the four potential terminals. The fleet for each alternative included one spare DMU. For rail, the size of the maintenance facility for each service option was also based upon the number of vehicles (DMUs and shuttle buses). Significant infrastructure investment is required for commuter rail service in addition to the vehicles that operate the service. Those capital investments are discussed in Section 2.5.

¹⁰ 15% spare ratio

¹¹ A Diesel Multiple Unit (DMU) is a multiple unit train consisting of multiple carriages powered by one or more onboard diesel engines.

¹² All Portland terminal stations with the exception of Center Street (Pan Am) assume a bus shuttle from the proposed rail station to downtown.

Table 2-12: Commuter Rail Fleet Requirements

		DMUs	Shuttle Buses (including spares)
Pan Am	Union Station		
	Yarmouth	4	4
	Brunswick	5	4
	Bath	6	4
	South Auburn	5	4
	Lewiston	6	4
Pan Am	Center Street		
	Yarmouth	4	0
	Brunswick	5	0
	Bath	12 ¹³	0
	South Auburn	5	0
	Lewiston	6	0
SLR	Bayside		
	Yarmouth	3	3
	Brunswick	5	3
	Bath	6	3
	South Auburn	5	3
	Lewiston	6	3
SLR	India Street		
	Yarmouth	3	3
	Brunswick	5	3
	Bath	6	3
	South Auburn	5	3
	Lewiston	6	3

2.5 Infrastructure Upgrades and Construction

Infrastructure includes all other capital requirements other than vehicles. For every alternative, both upgrading and new construction would be necessary. Express bus service is far less infrastructure-intensive than rail service. Capital costs related to infrastructure needs for each alternative are presented in Section 2.7.2.

2.5.1 Express Bus

Highway-only BOS service requires limited infrastructure improvements including site development, stations, parking, ticket vending machines, and security systems. A 3,000 square foot (200 ft x 15 ft) strip of asphalt would be constructed adjacent to the interstate shoulder at all online stops to allow buses to pull out of the way of the highway travel lanes to safely load and unload passengers. Additional support roadwork would be required at Falmouth and Yarmouth stops. At this first screening phase, it is assumed that the shoulder is wide-enough for BOS operations, and that no roadwork will be needed beyond the those listed in this section.

¹³ Six DMUs and six coaches are required.

All other upgrades were limited to bus stop and parking facilities. Table 2-13 lists the infrastructure needs for the BOS express bus service.

Table 2-13: Infrastructure Upgrades for Bus On-Shoulder (BOS) Express Bus Service

Item	Units	Yarmouth	Brunswick	Bath	South Auburn	Lewiston
Station						
Online Hwy Station	Each	1	2	2	1	1
Vertical Circulation	Each	2	4	4	2	2
Add'l Support Roadwork	Mile	0.4	0.6	0.6	0.3	0.3
Offline Station	Each	1	2	3	4	6
Site Development	Each	2	4	5	4	6
Ticket Vending Machine	Each	10	14	16	14	18
CCTV	System	1	1	1	1	1
Maintenance Facility						
Maintenance Facility	No. of Vehicles to be serviced	3	6	7	6	7

For exclusive ROW service, additional infrastructure requirements would be necessary. The ROW would need to be constructed – in other words, the existing abandoned ROW owned by the State of Maine would need to have the track removed and be paved to support high-speed bus service. Priority signals at intersections with regular roadways would also be necessary for safety and to ensure priority for transit service. The exclusive ROW would also require a new two-lane bridge across Back Cove. Table 2-14 lists the infrastructure requirements for the exclusive ROW express bus options. Infrastructure requirements are less intensive for a highway only option than an exclusive bus only ROW option.

Table 2-14: Infrastructure Upgrades for an Exclusive Bus ROW

Item	Units	Yarmouth	Brunswick	Bath	South Auburn	Lewiston
Exclusive ROW						
30 ft wide ROW	Mile	8.4	8.3	8.3	4.1	4.1
Priority Traffic Signals	Each	7	7	7	3	3
Bridge over Back Cove	Lump Sum	1	1	1	1	1
Station						
Online Hwy Station	Each	0	0	0	0	0
Vertical Circulation	Each	0	0	0	0	0
Add'l Support Roadwork	Mile	0.1	0	0	0	0
Offline Station	Each	2	4	5	4	6
Site Development	Each	2	4	5	4	6
Ticket Vending Machine	Each	10	14	16	14	18
CCTV	System	1	1	1	1	1
Maintenance Facility						
Maintenance Facility	No. of Vehicles to be serviced	3	6	7	6	7

2.5.2 Commuter Rail

Prior to the implementation of this potential service, it is assumed that the Amtrak Downeaster extension to Brunswick will be implemented and use the Pan Am route from Portland. It is also assumed that the

State of Maine's Freight Rail Interchange Project (FRIP) at Danville Junction will be completed, and that the track in the vicinity of Danville Junction will be upgraded to Centralized Traffic Control (CTC) signalization, including interlockings.

For the portions of routes where commuter service shares the track with the Downeaster, the infrastructure requirements described in this document are those required above and beyond the infrastructure improvements necessary for the Amtrak service. The capital improvements made on this line as part of the Downeaster project anticipated:

- replacing 28.7 track miles of jointed rail with Continuous Welded Rail (CWR)
- replacing 30,000 ties
- repairing 13 culverts
- addressing drainage issues
- improving protection at 36 grade crossings
- signalizing the Brunswick Branch
- extending a passing siding at Brunswick
- constructing platforms in Freeport and Brunswick

It is also assumed that Pan Am railways, the State of Maine's Rockland Branch, and the Lewiston Auburn Railroad (LARR) will have Positive Train Control (PTC)¹⁴ installed for other services operating on those routes.¹⁵ PTC upgrades will be limited to any new track. (It is generally assumed that Northeastern Railways operated by Northern New England Passenger Rail Authority (NNEPRA) will install an Advanced Civil Speed Enforcement System (ACSES) PTC system.)

For the SLR line, it is assumed that PTC will be installed as far south as Danville Junction. Given the few customers south of Danville Junction, and the limited amount of volume traveling on using the SLR main¹⁶, PTC will not be installed on track south of the junction in the absence of commuter service.

A series of track upgrades and improvements along the Pan Am route would be needed to support commuter rail service. However, as previously mentioned, it is assumed that Downeaster service to Brunswick will upgrade the rail infrastructure. This includes the following supplemental assumptions:

- Tracks have been upgraded and are maintained to Class III standards;
- All grade crossing have been upgraded and have appropriate crossing protection;
- CTC signal upgrades to the entire route from the Portland Transportation Center to Brunswick will be provided;
- Freeport and Brunswick stations are constructed and in operation; and
- A PTC system has been installed for Amtrak service.

¹⁴ Positive Train Control (PTC) is a system of monitoring and controlling train movements to provide increased safety. The main concept in PTC is that the train receives information about its location and where it is allowed to safely travel, also known as movement authorities. Equipment on board the train then enforces this, preventing unsafe movement.

¹⁵ The Rail Safety Improvement Act of 2008 (signed by the President on October 16, 2008, as Public Law 110-432) has mandated the widespread installation of PTC systems by December 2015.

¹⁶ Less than 15 million gross tons, the maximum amount of freight that can be moved in the absence of PTC.

Several tables are presented below, which include a track infrastructure and a station overview for each alternative. Table 2-15 lists the upgrades necessary to implement service to Union Station on the Pan Am line.

Table 2-15: Summary of Upgrades Required for Service to Union Station (Pan Am Service)

Trackwork and Infrastructure	Units	Yarmouth	Brunswick	Bath	South Auburn	Lewiston
New Track	Mile	0.5	0.5	0.5	0.9	0.9
Track Upgrade	Mile	2.8	2.8	2.8	2.8	4.3
3 Mi Passing Siding & Interlocking	Each	0	1	2	1	1
Station Siding & Interlocking	Each	0	1	1	1	1
Crossover & Interlocking	Each	2	2	2	2	2
Grade X-ing Upgrade for Single Track	Each	0	0	0	3	11
Grade X-ing to Replace for Double Track	Each	2	5	12	4	5
Signaling	Mile	3.3	6.8	9.8	22.3	28.7
Terminal Track	Each	2	1	2	1	2
Support Trackwork						
Handthrow Switches	Each	4	4	4	4	4
Maintenance Facility Tracks	Mile	0.2	0.2	0.2	0.2	0.2
Dispatch System	Each	0	0	0	0	0
Positive Train Control						
Dual Cab DMU Devices	Vehicle	4	5	5	5	5
Wayside PTC Devices	Mile	3.3	6.8	9.8	7.2	8.7
Central Office Equipment	Each	0	0	0	0	0

Note: It is assumed that the Downeaster service to Brunswick will make the capital improvements and upgrade rail infrastructures mentioned above.

Table 2-16 lists the required infrastructure to implement service to Center Street using the Pan Am alternative.

Table 2-16: Summary of Upgrades Required for Service to Center Street (Pan Am Service)

Trackwork and Infrastructure	Units	Yarmouth	Brunswick	Bath	South Auburn	Lewiston
New Track	mile	1.9	1.9	1.9	2.3	2.3
Track Upgrade	mile	2.8	2.8	2.8	2.8	4.3
3 Mi Passing Siding & Interlocking	each	0	1	2	1	1
Station Siding & Interlocking	each	0	1	1	1	1
Crossover & Interlocking	each	2	2	2	2	2
Grade X-ing Upgrade for Single Track	each	6	6	6	9	17
Grade X-ing to Replace for Double Track	each	3	6	13	5	6
Signaling	mile	4.7	8.2	11.2	23.7	30.1
Terminal Track	each	2	1	2	1	2
Support Trackwork						
Handthrow Switches	each	4	4	4	4	4
Maintenance Facility Tracks	mile	0.2	0.2	0.2	0.2	0.2
Dispatch System	each	0	0	0	0	0
Positive Train Control						
Dual Cab DMU Devices	vehicle	4	5	6	5	6
Wayside PTC Devices	miles	4.7	8.2	11.2	8.6	10.1
Central Office Equipment	each	0	0	0	0	0

Note: It is assumed that the Downeaster service to Brunswick will make the capital improvements and upgrade rail infrastructures mentioned above.

Table 2-17 describes the infrastructure requirements for stations on the Pan Am line.

Table 2-17: Station Requirements (Pan Am Service)

Station Requirements	Yarmouth		Brunswick		Bath		South Auburn		Lewiston	
	Union Station	Center Street								
Platform	4	5	6	7	7	8	5	6	7	8
Site Development	4	5	4	5	4	5	5	6	7	8
Ticket Vending Machines	12	14	16	18	18	20	14	16	18	20
CCTV System	1	1	1	1	1	1	1	1	1	1

Note: It is assumed that the Downeaster service to Brunswick will make the capital improvements and upgrade rail infrastructures mentioned above.

Table 2-18 is a summary of the infrastructure upgrades necessary for SLR service to Bayside Terminal.

Table 2-18: Summary of Upgrades Required for Service to Bayside Terminal (SLR Service)

Trackwork and Infrastructure	Units	Yarmouth	Brunswick	Bath	Auburn	Lewiston
New Track	Mile	10.1	12.7	12.7	27.6	32.6
Track Upgrade	Mile	0	0	0	0	0
3 Mi Passing Siding & Interlocking	Each	0	1	2	1	1
Station Siding & Interlocking	Each	1	2	2	2	2
Crossover & Interlocking	Each	0	0	0	0	2
Grade X-ing Upgrade for Single Track	Each	3	8	8	20	23
Grade X-ing to Replace for Double Track	Each	5	10	17	13	19
Signaling	Mile	10.6	16.7	19.7	31.6	36.6
Terminal Track	Each	2	1	2	1	2
Support Trackwork						
Handthrow Switches	Each	4	4	4	4	4
Maintenance Facility Tracks	Mile	0.2	0.2	0.2	0.2	0.2
Dispatch System	Each	0	0	0	1	0
Positive Train Control						
Dual Cab DMU Devices	Vehicle	3	5	6	5	6
Wayside Devices	Mile	10.6	16.7	19.7	31.6	38.8
Central Office Equipment	Each	0	0	0	0	0
Bridges						
Back Cove Bridge	Each	1	1	1	1	1
Refurbished Back Cove Bridge	Each	0	0	0	0	0
Bridge Upgrades (Back Cove to Yarmouth)	LS	1	1	1	0	0
Bridge Upgrades (Falmouth to Auburn)	LS	0	0	0	1	1
New Bridge Over Androscoggin River	Track Foot	0	0	0	0	450

Note: It is assumed that the Downeaster service to Brunswick will make the capital improvements and upgrade rail infrastructures mentioned above.

Table 2-19 lists the required infrastructure improvements needed to implement service on the SLR line to India Street.

Table 2-19: Summary of Upgrades Required for Service to India Street (SLR Service)

Trackwork and Infrastructure	Units	Yarmouth	Brunswick	Bath	Auburn	Lewiston
New Track	Mile	10.4	13	13	27.9	32.9
Track Upgrade	Mile	0	0	0	0	0
3 Mi Passing Siding & Interlocking	Each	0	1	2	1	1
Station Siding & Interlocking	Each	1	2	2	2	2
Crossover & Interlocking	Each	0	0	0	0	2
Grade X-ing Upgrade for Single Track	Each	3	8	8	20	23
Grade X-ing to Replace for Double Track	Each	7	12	19	15	21
Signaling	Mile	10.9	17	20	31.9	36.9
Terminal Track	Each	2	1	2	1	2
Support Trackwork						
Handthrow Switches	Each	4	4	4	4	4
Maintenance Facility Tracks	Mile	0.2	0.2	0.2	0.2	0.2
Dispatch System	Each	0	0	0	0	0
Positive Train Control						
Dual Cab DMU Devices	Vehicle	3	5	6	5	6
Wayside Devices	Mile	10.9	17	20	31.9	36.9
Central Office Equipment	Each	0	0	0	0	0
Bridges						
Back Cove Bridge	Each	0	0	0	0	0
Refurbished Back Cove Bridge	Each	1	1	1	1	1
Bridge Upgrades (Back Cove to Yarmouth)	LS	1	1	1	0	0
Bridge Upgrades (Falmouth to Auburn)	LS	0	0	0	1	1
New Bridge Over Androscoggin River	Track Foot	0	0	0	0	450

Note: It is assumed that the Downeaster service to Brunswick will make the capital improvements and upgrade rail infrastructures mentioned above.

Table 2-20 lists the station requirements for the SLR alternative.

Table 2-20: Station Requirements (SLR Service)

Station Requirements	Yarmouth		Brunswick		Bath		South Auburn		Lewiston	
	Bayside	India Street	Bayside	India Street	Bayside	India Street	Bayside	India Street	Bayside	India Street
Platform	3	3	5	5	6	6	5	5	6	6
Site Development	3	3	3	3	3	3	5	5	6	6
Ticket Vending Machines	10	10	14	14	16	16	14	14	16	16
CCTV System	1	1	1	1	1	1	1	1	1	1

Note: It is assumed that the Downeaster service to Brunswick will make the capital improvements and upgrade rail infrastructures mentioned above.

2.6 Projected Ridership

Ridership was projected for each of the service corridors using transportation modeling. Several methods and models were used to calculate ridership for comparison and accuracy purposes. In the end, a regional land use and transportation model was used to project ridership. Based on the Maine statewide model, the model represented all travel flows, and was calibrated based on professional experience, common sense, and local ZOOM¹⁷ bus experience. As required by FTA, there was no modeled preference for rail service as compared to bus service.

Table 2-21 lists projected boardings by alternative for the 30 rail and bus options for the build year (2015). As can be seen, boardings are projected to be highest on the Pan Am rail and express bus alternatives.

Table 2-21: Build Year (2015) Daily Boardings by Alternative

Terminal	Rail				Bus	
	Pan Am	Pan Am	SLR	SLR	BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	296	426	173	201	296	304
Brunswick	594	742	443	482	679	694
Bath	707	860	549	590	797	816
South Auburn	419	526	312	353	412	423
Lewiston	479	589	359	400	505	519

Table 2-22 lists projected boardings by alternative for the future in year 2035. As can be seen, ridership is anticipated to be higher at all outer terminals.

Table 2-22: Future Year (2035) Daily Boardings by Alternative

Terminal	Rail				Bus	
	Pan Am	Pan Am	SLR	SLR	BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	524	749	339	248	613	553
Brunswick	878	1,369	672	734	1,211	981
Bath	1,128	1,609	888	957	1,440	1,235
South Auburn	494	727	388	432	680	587
Lewiston	527	822	426	459	816	640

Table 2-23 lists the percentage difference in boardings by alternative between the build year (2015) and the future in 2035. As can be seen, the model projected that the greatest percentage increases in ridership from the build year to the future would occur on the potential SLR route between Portland and Yarmouth and in the potential express bus service from Portland to Yarmouth.

¹⁷ ZOOM is a commuter bus service that is operated by ShuttleBus and is partially funded by the Maine Turnpike Authority and the MaineDOT. Equipped with individual reading lights and air conditioners, ZOOM bus provides commuter service from Biddeford/Saco to downtown Portland.

Table 2-23: Difference in Projected Boardings by Alternative (% Increase 2015-2035)

Terminal	Rail				Bus	
	Pan Am	Pan Am	SLR	SLR	BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	77%	76%	96%	23%	107%	82%
Brunswick	48%	85%	52%	52%	78%	41%
Bath	60%	87%	62%	62%	81%	51%
South Auburn	18%	38%	24%	22%	65%	39%
Lewiston	10%	40%	19%	15%	62%	23%

From the modeling, several key factors affecting behavior emerged. First, there was a strong preference for automobile travel. It is only with increased distance that travelers will opt to let someone else drive in order to use the travel time to accomplish other tasks. Transit preference is greater with in-vehicle travel times of greater than 40 minutes. Second, there is a penalty in transit choice for walks over 10 minutes and transfers from rail or express bus service to local bus service (direct service is preferable). Third, travelers are unwilling to drive in a direction away from their destination in order to park at a station to ride transit.

2.7 Costs of Alternatives

Costs were determined for each alternative for both infrastructure and equipment (capital costs) and for operating the service (operating cost).

2.7.1 Operating Costs

Operating costs included costs associated with operating transit service on an annual basis. Costs included administration, operators/drivers, dispatch, maintenance, fuel, etc. Table 2-24 lists the estimated annual operating costs for each service alternative. In general, costs increased with distance from Portland.

For the rail alternatives, operating costs were greatest on the Pan Am line to Union Station in Portland. Operating costs were lowest on the Pan Am line to Center Street in Portland with the exception of Yarmouth service, where operating costs were lowest into Bayside. Operating costs were lowest into the proposed Center Street Station in Portland because the station would be centrally located downtown and would not require the use of a shuttle bus to get riders to their final destinations. This was the only rail alternative that did not use a feeder bus service.

For the bus options, operational costs were slightly higher for the exclusive ROW alternatives compared to the BOS options.

For all bus and rail options, the cost to operate service to Brunswick and Auburn was similar, as was the cost to operate service to Bath and Lewiston. However, the costs were slightly higher in all cases to Auburn and Lewiston because of the slightly shorter distance to Brunswick.

Table 2-24: Operating Costs by Alternative

Terminal	Rail				Bus	
	Pan Am		SLR		BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	\$ 3.3	\$ 2.8	\$ 2.4	\$ 2.4	\$0.7	\$0.9
Brunswick	\$ 4.5	\$ 3.9	\$ 4.3	\$ 4.3	\$1.4	\$1.5
Bath	\$ 5.4	\$ 6.3	\$ 5.1	\$ 5.2	\$1.6	\$1.7
South Auburn	\$ 4.6	\$ 4.1	\$ 4.4	\$ 4.5	\$1.4	\$1.5
Lewiston	\$ 5.3	\$ 4.8	\$ 5.1	\$ 5.2	\$1.6	\$1.7

\$ in millions (2009)

2.7.2 Capital Costs

Capital costs are associated with infrastructure and equipment. In general, capital costs are greatest at the outset of a project when construction, upgrades, and equipment procurement are necessary. Capital costs for commuter rail service included upgrading trackwork, extending track, technology installation and upgrades, and purchasing trainsets. For bus service, capital costs for the exclusive ROW included converting trackbeds to accommodate bus service, signals and the purchasing of vehicles. For the bus-on-shoulder bus service, capital costs included lane designations, signals, and the purchasing of vehicles. All alternatives included the construction of station structures and parking lots. Initial capital costs also included purchasing land and rights to operation along rail lines. Table 2-25 details capital costs by service alternative for each terminal.

Table 2-25: Capital Costs by Alternative

Terminal	Rail				Bus	
	Pan Am		SLR		BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	\$ 39	\$ 43	\$ 69	\$ 70	\$ 7	\$ 41
Brunswick	\$ 56	\$ 61	\$ 103	\$ 105	\$ 13	\$ 46
Bath	\$ 75	\$ 92	\$ 122	\$ 123	\$ 15	\$ 49
South Auburn	\$ 79	\$ 83	\$ 158	\$ 160	\$ 12	\$ 42
Lewiston	\$ 97	\$ 101	\$ 195	\$ 196	\$ 15	\$ 45

\$ in millions (2009)

It is important to note that these capital costs assumed that the Pan Am track between Portland and Brunswick was upgraded as part of the Amtrak Downeaster extension to Brunswick.

Capital costs were lowest for the express bus alternatives. However, the exclusive ROW bus service option required only slightly less capital input than rail service for some options. In general for the rail options, service on the SLR line would require larger capital investment than service on the Pan Am line. This was due in part to the fact that SLR rail service requires construction of a completely new bridge in Portland Harbor (reconstruction/replacement of the existing Back Cove railroad bridge that parallels Tukey's Bridge).

For comparison purposes, costs were annualized for capital expenditures. Annualizing the costs involved using the economic lifespan of infrastructure/equipment such as ROW, trackwork and vehicles. Annualizing the capital costs allowed direct comparison and combination with operating costs, which were calculated/budgeted on an annual basis. Table 2-26 lists total annualized capital costs by alternative.

Table 2-26: Annualized Capital Costs by Alternative

Terminal	Rail				Bus	
	Pan Am		SLR		BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	\$ 4.4	\$ 4.8	\$ 7.6	\$ 7.8	\$ 0.9	\$ 4.4
Brunswick	\$ 6.3	\$ 6.8	\$ 11.4	\$ 11.6	\$ 1.6	\$ 5.1
Bath	\$ 8.3	\$ 10.2	\$ 13.5	\$ 13.6	\$ 1.8	\$ 5.3
South Auburn	\$ 8.9	\$ 9.4	\$ 17.5	\$ 17.7	\$ 1.4	\$ 4.6
Lewiston	\$ 11.0	\$ 11.4	\$ 21.6	\$ 21.8	\$ 1.8	\$ 5.0

\$ in millions (2009)

Total Annualized Cost

As noted, annualizing capital costs allowed for direct comparison and combination with annual operating figures. Table 2-27 lists the total annualized cost (capital and operating together) by alternative. In general, overall costs increased with distance from Portland. For the Pan Am rail options (Union Station and Center Street downtown terminals), the Bath/Brunswick options were more expensive than the Lewiston/Auburn options. On the other hand, for the SLR rail options (Bayside and India Street downtown terminals), the reverse was true – the Bath/Brunswick options were less expensive than the Lewiston/Auburn options. The difference in the cost is due to the distance from Portland and the added cost of bus circulation service at the three of the four terminal locations in downtown Portland (all the terminals except Center Street Station would have shuttle bus service). Overall, for rail, the Pan Am options were less expensive than the SLR options. Express bus options were far less expensive than rail options.

Table 2-27: Total Annualized Cost by Alternative (Capital & Operating)

Terminal	Rail				Bus	
	Pan Am		SLR		BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	\$7.7	\$7.6	\$10.0	\$10.2	\$1.6	\$5.3
Brunswick	\$10.8	\$10.7	\$15.7	\$15.9	\$3.0	\$6.6
Bath	\$13.7	\$16.5	\$18.6	\$18.8	\$3.4	\$7.0
South Auburn	\$13.5	\$13.5	\$21.9	\$22.2	\$2.8	\$6.1
Lewiston	\$16.3	\$16.2	\$26.7	\$27.0	\$3.4	\$6.7

\$ in millions (2009)

2.8 Phase I Screening

Ridership projections and costs to implement and operate the service are combined in the following section to conduct the first phase of screening on the transit service alternatives.

In evaluating each alternative, screening criteria were used to determine which options combined to create the best possible project to submit to FTA (Federal Transit Administration) for review for Small Starts funding. The first phase of screening is described and conducted in this chapter. The second phase of screening is described in Chapter 3.

The first phase of alternative screening took a broad overview look at approximately 30 alternatives in order to narrow the list of alternatives down to six (6) alternatives (an express bus and a commuter rail option to three outer terminals – Yarmouth, Brunswick and Bath). Because so many alternatives needed to be screened out in this phase, it was impractical to complete a full screening of each alternative. Therefore, it was determined that a fair way to evaluate alternatives was to compare costs and projected ridership. The cost per rider figure was then used to choose the most cost effective route for each outer terminal – Bath, Brunswick, Lewiston, Auburn, and Yarmouth. This narrowed list of alternatives is fully screened in terms of all evaluation criteria in the second phase of screening. The most cost effective option generated the most ridership using the least amount of money. It needed to be noted that the cost per rider measure used in this initial phase of screening differed from the FTA Small Starts criterion for cost effectiveness. The FTA definition of cost effectiveness will be discussed in greater detail during the second phase of screening.¹⁸

Cost (annualized operating & capital costs) per rider (base year daily boardings multiplied by 254 annual service days¹⁹) is displayed in Table 2-28 for each alternative. Cost ranged from a high of \$238.22 per rider for rail service on the SLR line to Lewiston (Bayside Station) to a low of \$38.25 per rider for rail service to Brunswick on the Pan Am line (Center Street Station). On the bus side, the exclusive ROW options (using the SLR) were much less cost-effective than the bus-on-shoulder options due to greater capital input required to get the service up and running.

Table 2-28: Annualized Cost per Rider by Alternative

Terminal	Rail				Bus	
	Pan Am		SLR		BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	\$57.85	\$39.95	\$116.14	\$161.93	\$10.28	\$37.73
Brunswick	\$48.43	\$30.77	\$91.98	\$85.28	\$9.75	\$26.49
Bath	\$47.82	\$40.37	\$82.46	\$77.34	\$9.30	\$22.32
South Auburn	\$107.59	\$73.11	\$222.22	\$202.32	\$16.21	\$40.91
Lewiston	\$121.77	\$77.59	\$246.76	\$231.59	\$16.40	\$41.22

Table 2-29 lists the most cost-effective commuter rail and express bus option for each terminal location, based on the first phase of screening. For rail service, the most cost-effective alternative was the Pan Am service to Center Street for each outer terminal except Bath. For the Bath terminal, the Pan Am service

¹⁸ Cost effectiveness is a combined measure of annual travel time savings and annualized cost. Cost effectiveness is defined by FTA as the cost per hour of transportation system user benefits.

¹⁹ 254 service days equals weekdays minus holidays for the year

to Union Station was slightly more cost effective than the service to Center Street because the service from Bath required an additional coach to operate from Union Station to Center Street to accommodate the projected ridership. The Pan Am rail service for Bath/Brunswick option is more cost-effective than for the Lewiston/Auburn option as this alternative benefits from the upgrades that will be accomplished separately for the Amtrak Downeaster extension to Brunswick.

Similarly, for bus service, the most cost-effective alternative was the bus-on-shoulder highway running service for each terminal. Cost per passenger increased with increasing distance to Portland. However, the Bath/Brunswick express bus options were significantly less expensive than the Lewiston/Auburn options due to lower projected ridership, and additional trips and travel distance required for the Lewiston/Auburn option.

Table 2-29: Most Cost-Effective Commuter Rail and Express Bus Options

Terminal	Commuter Rail		Express Bus	
	Most Cost Effective Option	Cost per Passenger	Most Cost Effective Option	Cost per Passenger
Yarmouth	Pan Am/ Center St	\$39.95	BOS	\$10.28
Brunswick	Pan Am/ Center St	\$30.77	BOS	\$9.75
Bath	Pan Am/ Union Sta.	\$40.37	BOS	\$9.30
South Auburn	Pan Am/ Center St	\$73.11	BOS	\$16.21
Lewiston	Pan Am/ Center St	\$77.59	BOS	\$16.40

While traveling through Union Station to Center Street was additional distance, time, and initial capital input, the cost per passenger was actually lower for the Center Street option because it is centrally located in downtown Portland and would not require a rail shuttle to get passengers to their destinations. This option also allowed direct service without a transfer to another travel mode.

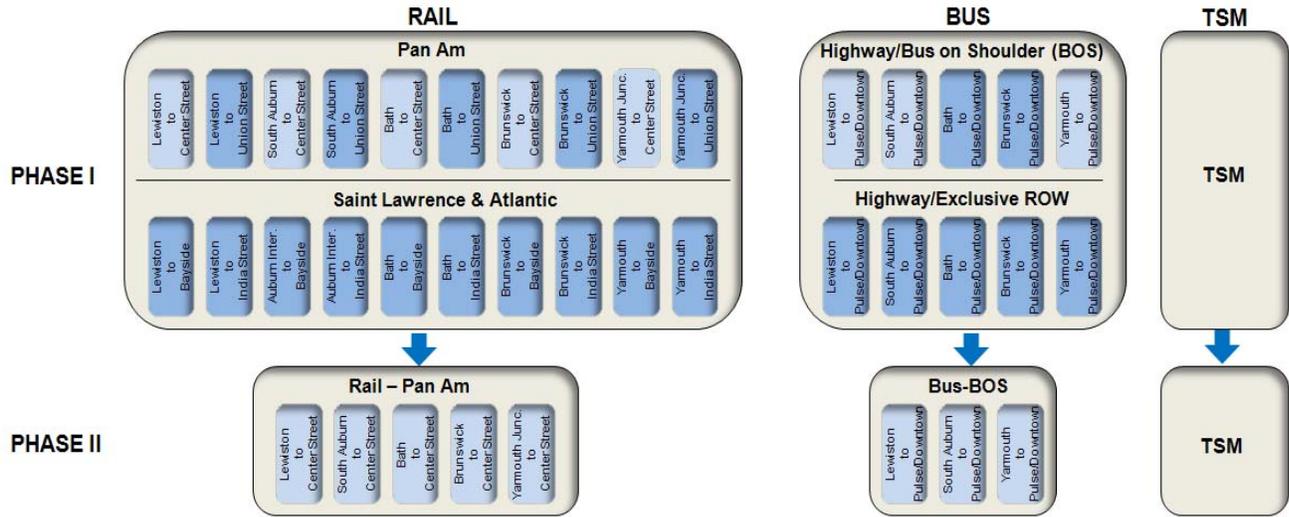
At the completion of Phase I screening, one bus and one rail alternative to Yarmouth, Brunswick, Bath, South Auburn and Lewiston terminals remained for further analysis. As shown in Table 2-30 and Figure 2-69, the bus-on-shoulder express bus option and the Pan Am to Center Street rail option for the five outer terminals continued to Phase II.

Table 2-30: Alternatives Recommended for Phase II Screening

Terminal	Rail				Bus	
	Pan Am		SLR		BOS	Excl. ROW
	Union Sta.	Center St.	Bayside	India St.		
Yarmouth	X	✓	X	X	✓	X
Brunswick	X	✓	X	X	✓	X
Bath	X	✓	X	X	✓	X
South Auburn	X	✓	X	X	✓	X
Lewiston	X	✓	X	X	✓	X

Key
 ✓ = Retain
 X = Drop

Figure 2-69: Alternative Development and Screening Diagram



2.9 Next Steps

The next step in the process is to further evaluate the narrowed list of alternatives. Each alternative is evaluated in detail down to the station sites for potential funding eligibility from federal, state, and local sources. The second phase of screening is described in Chapter 3.

Chapter 3 Alternatives Analysis

As discussed at the end of Chapter 2, after a screening process that was heavily weighted by ridership and cost considerations, the Phase I preliminary alternatives numbering approximately 30 were screened down to ten options.¹ The ten options then moved forward for further evaluation in the Phase II and Phase III alternatives analyses, which are summarized in this chapter. The Phase II and III alternatives were comprised of options that did not utilize the Saint Lawrence and Atlantic rail rights-of-way (ROW), a decision based primarily on the low cost effectiveness (cost versus potential ridership) of those options.

3.1 Phase II Alternatives Analysis

The initial Phase II alternatives included all Pan AM rail options and all highway/bus on shoulder bus (BOS) options:

- Rail:
 - Pan Am to Yarmouth
 - Pan Am to Auburn
 - Pan Am to Lewiston
 - Pan Am to Brunswick
 - Pan Am to Bath
- Bus:
 - Portland to Yarmouth on Highway and Shoulder
 - Portland to Auburn/Lewiston on Highway and Shoulder
 - Portland to Lewiston on Highway and Shoulder
 - Portland to Brunswick on Highway and Shoulder
 - Portland to Bath on Highway and Shoulder

3.1.1 Further Alternative Refinement

As noted previously, and as discussed in public meetings throughout the process, the intention of the study from initiation was to develop a project that would be eligible for the Federal Transit Administration's Small Starts funding program. Therefore, in further refining alternatives a strong focus was on the ability of options to meet Small Starts requirements, such as possessing a dedicated fixed guideway for at least 50 percent of the alternative route distance.

For the rail options, providing a fixed route was simple, as the dedicated rail right-of-way by nature was a fixed route guideway, dedicated to only rail operations. For the bus options, it was a little more complex, although solved by proposed use of the highway breakdown lane for exclusive bus use during peak hour travel.

¹ Alternatives to Auburn/Lewiston and Brunswick/Bath are considered four separate alternatives.

3.1.2 Impact of the Amtrak Downeaster Expansion on Project on Phase II Alternatives

The project progressed over many years due to continuing public input, direction from FTA and the changing transportation landscape in the nation and region. One element which was in flux throughout the project timeline was the possibility of extending the successful Amtrak Downeaster service from Portland to Brunswick. Early in the process, the reality of the extension was in question, and that project was not considered in the baseline or TSM scenario. As time progressed, support for the extension grew. This combined with the opportunities presented by the American Recovery and Reinvestment Act of 2009 and High Speed Rail stimulus funding made the project more of a reality. In 2010, the Downeaster extension did receive a multi-million dollar grant to proceed with the infrastructure necessary for the project to become a reality. As a result, this project was able to assume that the Amtrak Downeaster extension would be part of the baseline condition.

The impact of that assumption resulted in a further refinement in the number of Phase II alternatives. Taking advantage of the approximately \$39 million investment in the Pan Am Railways line to Brunswick resulted in a reduction in overall costs for implementing the Brunswick alternatives. Based on this, combined with the overall higher projected ridership for the Brunswick scenarios, MaineDOT decided to eliminate the Lewiston/Auburn alternatives from further consideration. Therefore, only options serving Brunswick were evaluated in Phase III (see Figure 3-11 in Section 3.3).

3.2 Phase III Alternatives Analysis

Phase III focused on two key elements: further refining and defining alternatives that served the Portland to Brunswick corridor, and maximizing the use of other service proposed to be in place in the corridor. With the assumption that the Downeaster service would be in place, the MaineDOT team looked to maximize the use of the intercity service investment and improve the Portland North options by combining intercity and commuter services.

3.2.1 Preliminary Alternatives - Integrated Rail and Integrated Bus Services

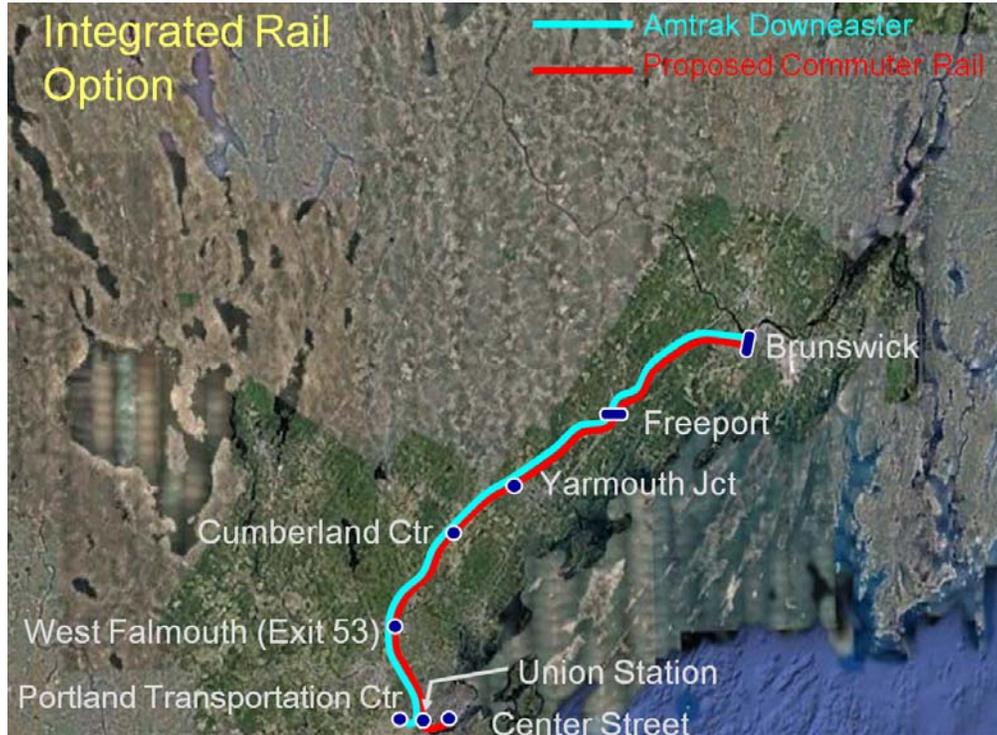
Alternatives considered in Phase III included the Integrated Rail and Integrated Bus options. Integrated Rail proposes combining intercity (Amtrak Downeaster Brunswick) service with a companion commuter rail service while the Integrated Bus combines intercity with highway and BOS bus service. These alternatives are described in more detail below.

Integrated Rail Service

The Integrated Rail Service (IRS) builds upon the Coordinated Public Transport Service by replacing express bus service with commuter rail service. The commuter rail would operate seven roundtrips between Portland and Brunswick. The Downeaster would continue to provide three rounds trips per day. Due to operational constraints, Amtrak's midday Downeaster trips #684 and #681 will continue to stop only at Freeport and Brunswick. Figure 3-1 shows the map of Integrated Rail Service.

Additional stations at Center Street (Portland terminal), West Falmouth (Exit 53), Cumberland Center, and Yarmouth Junction would be built for commuter rail operations. Union Station would still be used to provide commuters with convenient access to the Maine Medical Center. It would also be the commuter terminal for Downeaster operated trips. Additionally, no shuttle service would be provided at Union Station for passengers boarding and alighting the Downeaster. See Section 3.2.2.1 for the proposed service schedule

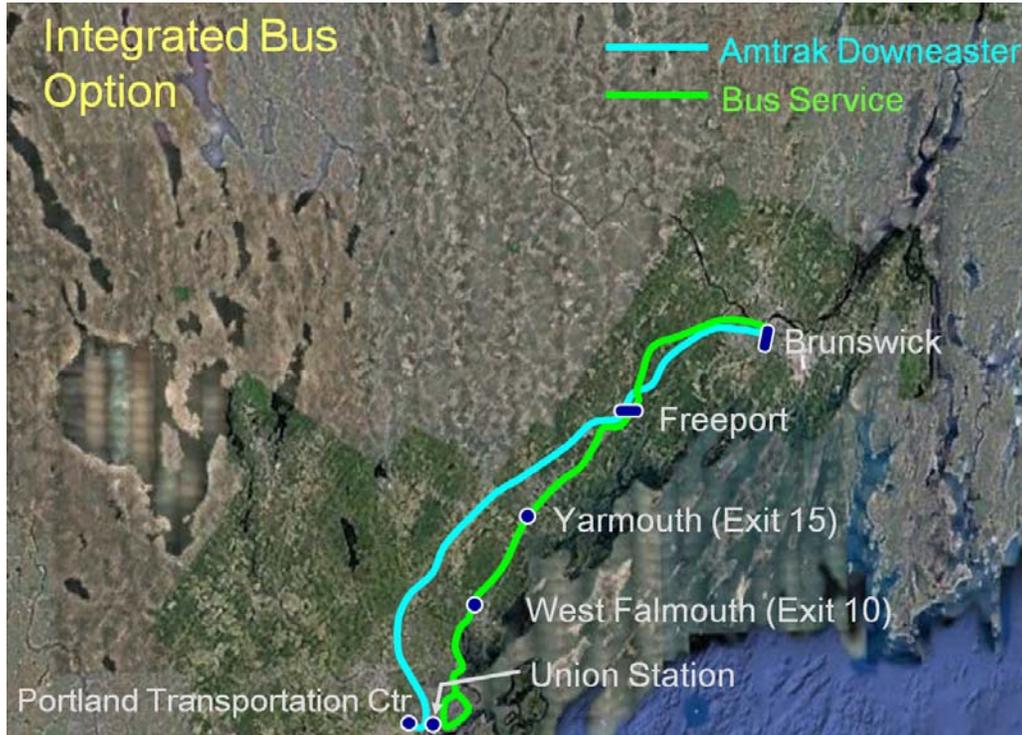
Figure 3-1: Integrated Rail Service



Integrated Bus Service

The Integrated Bus Service (IBS) would operate 12 bus roundtrips between Portland and Brunswick using bus on shoulder (BOS) operation on I-295 during periods of traffic congestion. Bus stations would be provided at I-295 Exits 10 and 15. The Downeaster would continue to provide three rounds trips per day and one Amtrak deadhead train would be converted to revenue service. Due to operational constraints, Amtrak's midday Downeaster trips #684 and #681 will continue to stop only at Freeport and Brunswick. Figure 3-2 shows the map of Integrated Bus Service. See Section 3.2.2.2 for the proposed service schedule.

Figure 3-2: Integrated Bus Service



Similar to the IRS option, Union Station would also be used as an Amtrak stop to provide commuters with convenient access to the Maine Medical Center. Additionally, no shuttle service would be provided at Union Station for passengers boarding and alighting the Downeaster. With the Integrated Bus Service alternative as ridership grows trains could replace buses.

3.2.2 Operating Plans - Integrated Rail and Integrated Bus Services

The operating assumptions and conceptual service plans describe information such as stop patterns, number of trips and headway for the Integrated Rail and Integrated Bus Service options. They also provide a general description of where the service would operate, the primary service destinations, as well as how often or frequent service would be.

Integrated Rail Service

Table 3-1 provides a conceptual schedule of the Integrated Rail Option. As shown in the table, the Downeaster, the proposed commuter service would provide an extension to Amtrak #685 (currently scheduled to terminate at the Portland Transportation Center), out to Brunswick. Table 3-2 provides a summary of the number of the roundtrips provided with this option. The Integrated Rail Service would have a total number of six trips, three for each of the AM peak arrivals and PM peak departures.

Table 3-1: Integrated Rail Option Conceptual Schedule

Inbound (South) Service	Amtrak	Maine DOT	Amtrak	Maine DOT	Maine DOT	Maine DOT	Amtrak	Amtrak	Maine DOT	Maine DOT	Maine DOT	Amtrak	Amtrak
Trip No.	680	100	682	102	104	106	684	686	108	110	112	688	68X
Cycle	x	a	y	b	a	b	x	y	a	a	b	x	y
Brunswick	-	6:43 AM	7:01 AM	7:48 AM	10:07 AM	11:43 AM	12:55 PM	-	2:36 PM	5:06 PM	6:06 PM	-	10:19 PM
Freeport	-	6:52 AM	7:14 AM	7:57 AM	10:16 AM	11:52 AM	1:10 PM	-	2:45 PM	5:15 PM	6:15 PM	-	10:32 PM
Yarmouth Jct	-	6:59 AM	7:21 AM	8:04 AM	10:23 AM	11:59 AM	-	-	2:52 PM	5:22 PM	6:22 PM	-	10:39 PM
Cumberland Center	-	7:04 AM	7:27 AM	8:09 AM	10:28 AM	12:04 PM	-	-	2:57 PM	5:27 PM	6:27 PM	-	10:45 PM
West Falmouth	-	7:08 AM	7:32 AM	8:13 AM	10:32 AM	12:08 PM	-	-	3:01 PM	5:31 PM	6:31 PM	-	10:50 PM
Portland Union	-	7:15 AM	7:45 AM	8:20 AM	10:39 AM	12:15 PM	1:30 PM	-	3:08 PM	5:38 PM	6:38 PM	-	11:02 PM
Center Street	-	7:24 AM	-	8:29 AM	10:48 AM	12:24 PM	-	-	3:17 PM	5:47 PM	6:47 PM	-	-
Portland Transportation Center	5:55 AM	-	8:00 AM	-	-	-	1:45 PM	3:05 PM	-	-	-	8:10 PM	11:17 PM
Boston (North Station)	8:25 AM	-	10:25 AM	-	-	-	4:10 PM	5:35 PM	-	-	-	10:35 PM	-

Outbound (North) Service	Amtrak	Maine DOT	Maine DOT	Amtrak	Amtrak	Maine DOT	Maine DOT	Maine DOT	Maine DOT	Amtrak	Maine DOT	Amtrak	Amtrak
Trip No.	68XO	101	103	681	683	105	107	109	111	685	113	687	689
Cycle	y	a	b	x	y	a	a	b	a	x	b	y	x
Boston (North Station)	-	-	-	9:05 AM	11:05 AM	-	-	-	-	5:00 PM	-	6:20 PM	11:20 AM
Portland Transportation Center	5:35 AM	-	-	11:30 AM	1:30 PM	-	-	-	-	-	-	8:50 PM	1:45 AM
Center Street	-	8:30 AM	10:01 AM	-	-	1:40 PM	4:00 PM	5:00 PM	6:00 PM	-	7:29 PM	-	-
Portland Transportation Center	-	-	-	-	-	-	-	-	-	7:25 PM	7:35 PM	-	-
Portland Union	5:50 AM	8:35 AM	10:06 AM	11:45 AM	-	1:45 PM	4:05 PM	5:05 PM	6:05 PM	-	7:50 PM	9:05 PM	-
West Falmouth	5:56 AM	8:42 AM	10:13 AM	-	-	1:52 PM	4:12 PM	5:12 PM	6:12 PM	-	7:57 PM	9:18 PM	-
Cumberland Center	6:01 AM	8:47 AM	10:18 AM	-	-	1:57 PM	4:17 PM	5:17 PM	6:17 PM	-	8:01 PM	9:21 PM	-
Yarmouth Jct	6:07 AM	8:52 AM	10:23 AM	-	-	2:02 PM	4:22 PM	5:22 PM	6:22 PM	-	8:06 PM	9:33 PM	-
Freeport	6:16 AM	8:58 AM	10:29 AM	12:10 PM	-	2:08 PM	4:28 PM	5:28 PM	6:28 PM	-	8:13 PM	9:33 PM	-
Brunswick	6:31 AM	9:11 AM	10:42 AM	12:25 PM	-	2:21 PM	4:41 PM	5:41 PM	6:41 PM	-	8:26 PM	9:49 PM	-

X-fer from 685
to Maine DOT 113

Table 3-2: Integrated Rail Service Trip Summary

Type of Trip	No. of Trips
Brunswick Roundtrips	7
Downeaster to Brunswick Roundtrips	3
Additional Downeaster Brunswick Trips	1
Total AM Peak Arrivals	3
Total PM Peak Departures	3

Operations analysis of commuter rail service along the Downeaster route identified five (5) potential conflicts, which are listed below with proposed solutions:

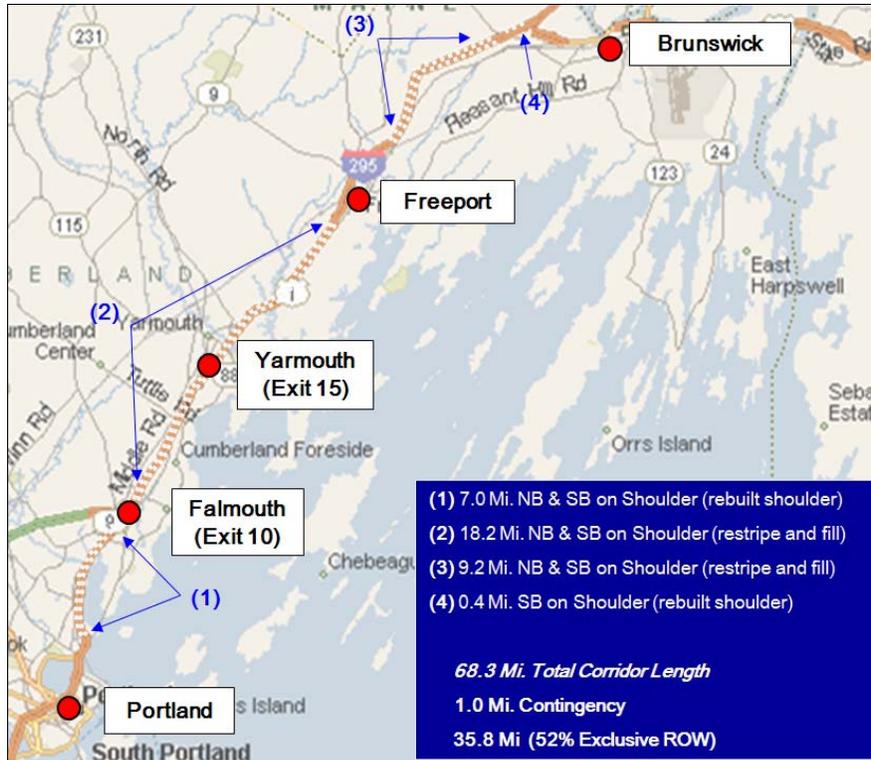
1. MaineDOT #104 westbound conflicts with MaineDOT #103 eastbound at Yarmouth Junction at 10:23 AM. This conflict is resolved by constructing a station siding in the vicinity of Yarmouth Junction to allow for meets.
2. MaineDOT #106 westbound conflicts with Amtrak Downeaster #681 at Yarmouth Junction at 12:04 PM. This conflict is resolved by constructing a station siding in the vicinity of Yarmouth Junction to allow for meets.
3. MaineDOT #110 westbound conflicts with MaineDOT #111 eastbound at Yarmouth Junction at 5:22 PM. This conflict is resolved the same way as Conflict #1.
4. MaineDOT #110 westbound conflicts with MaineDOT #109 eastbound at Yarmouth Junction at 5:22 PM. This conflict is resolved the same way as Conflict #1.
5. MaineDOT #112 westbound conflicts with MaineDOT #111 eastbound at Yarmouth Junction at 6:22 PM. This conflict is resolved the same way as Conflict #1.

Note: It is assumed that a passing siding would be extended at Brunswick as part of the upgrades associated with the Amtrak Downeaster extension project. The passing siding built at Yarmouth Junction is the only passing siding would be built for the proposed commuter service. It is assumed that any rail freight service operated between Brunswick and Portland would be coordinated to not interfere with either commuter rail or Downeaster service.

Integrated Bus Service

When possible, it is assumed that buses could operate on the shoulder/breakdown lane of I-295. As is the case in other parts of the country where this has been implemented, buses would only operate on the shoulder to avoid congestion in the regular highway travel lanes. Bus on shoulder operation is generally not feasible in areas such as between Exit 8 and downtown Portland. In this area buses would travel in mixed traffic with other highway vehicles. Figure 3-3 is a map of the overall corridor showing where the express bus is proposed to be able to operate on the shoulder and where it would operate in mixed traffic.

Figure 3-3: Bus-On-Shoulder Operation



Integrated Bus Service stations and trip times are shown in Table 3-3. All trip times reflect a 19 minute downtown distribution loop timeframe.

Table 3-3: Integrated Bus Service – Online Falmouth (Exit 10) and Yarmouth (Exit 15 Stations)

Bus Stations	Miles	Minutes
Brunswick	31.8	55
Freeport	22.3	44
Yarmouth (Exit 15)	14.0	34
Falmouth (Exit 10)	9.4	30
PULSE	3.3	19
Congress & Forest	2.9	17
ME Medical	2.2	12
Mercy Hospital	1.4	9
State & Danforth	1.2	7
Center Street	0.8	5
Market & Middle	0.4	3
PULSE	0.0	0

Integrated Bus Service trip summary is shown in Table 3-4. The proposed schedule for the Integrated Bus Service (IBS) would provide twelve bus round trips for commuters per weekday, which is more than the seven commuter rail round trips with the Integrated Rail Service (IRS). Span of service for IBS would be similar to IRS, but with more roundtrips the frequency would be somewhat higher. Use of the three planned Downeaster round trips plus conversion of a deadhead train to revenue service for commuters would be the same for the IBS as planned for the IRS.

Table 3-4: Integrated Bus Service Trip Summary

Type of Trip	No. of Trips
Brunswick Roundtrips	12
Downeaster to Brunswick Roundtrips	3
Yarmouth Short-Turns Roundtrips	2
Additional Downeaster Brunswick Trips	1
Total AM Peak Arrivals	5
Total PM Peak Departures	4

3.2.3 Fleet Size - Integrated Rail and Integrated Bus Services

For both Integrated Rail and Bus Service alternatives, fleet size (number of vehicles or rail consists) was determined based on projected service miles and hours. Fleet size was further modified to ensure that all projected riders would have a seat for their trip to Portland (or to the outer terminal for reverse commuting).

The commuter rail option is assumed to operate Diesel Multiple Units (DMU) equipment for operation on the tracks. Each train set would consist of one DMU. Three single car consists are required for service. There would be two sets of equipment (trains) in operation and a third set of equipment would be purchased and kept as a spare. For rail, the size of the maintenance facility was also based upon this number of vehicle assumption. Table 3-5 summarizes the fleet requirements for each option.

Table 3-5: Vehicle Requirements for Each Service Option

Vehicle	IRS	IBS
Double Decker Bus	-	3
DMUs	3	-
Maintenance of Way (MOW) Equipment ²	1	-

3.2.4 Infrastructure – Integrated Rail and Integrated Bus Services

Commuter Rail Infrastructure Requirements

A series of track upgrades and improvements along the Pan Am route would be needed to offer commuter rail service. The following infrastructure and service assumptions are used:

Commuter rail service builds upon the investments made to offer the coordinated public transport service.

Union Station (Portland), Freeport and Brunswick stations are constructed and in operation.

The ticket vending machines at these three stations are still operational and new ones are not required.

All tracks have been upgraded and are maintained to Class III standards for Downeaster service.

All grade crossings have been upgraded and have appropriate crossing protection for Downeaster service.

Centralized Traffic Control (CTC) signal upgrades are made to the entire route from the Portland Transportation Center to Brunswick for Downeaster service.

An Advanced Civil Speed Enforcement System (ASCES) Positive Train Control (PTC) system (commonly used on northeastern railways) has been installed for Downeaster service and freight service Amtrak service.³ PTC upgrades would be limited to any new track required to support commuter rail service.

Track Upgrades

Approximately 1.4 miles of additional new track would be required for a terminal at Center Street, Portland. Up to 0.8 miles of existing track running from the Pan Am mainline heading east along the southern tip of the Portland peninsula to a private crossing at milepost (MP) 0.6 would be replaced; Roughly 0.2 miles between the crossing at MP 0.6 and the Casco Bay Bridge would need to be constructed; and the last 0.4 miles of track from the Casco Bay Bridge to Center Street would be laid on Commercial Street. A two track terminal would be constructed at Center Street.

² Maintenance of Way equipment, often abbreviated as MOW, refers to the equipment used in performance of maintenance of railroad rights of way. It can include procedures from the initial surveying, clearing and grading of a right-of-way to its general upkeep and even eventual dismantling.

³ The Rail Safety Improvement Act of 2008 (signed by the President on October 16, 2008, as Public Law 110-432) has mandated the widespread installation of PTC systems by December 2015.

An existing ½ mile passing siding at Yarmouth Junction would need to be upgraded to provide a station siding to allow for meets between the Downeaster service and commuter trains. This involves upgrading the 0.5 miles of track and installing 2 remote controlled turnouts.

Signal and Interlocking Upgrades

The 1.4 miles of additional new track would need to have CTC signal system installed for commuter rail service. A new interlocking would be required for the terminal stub track at Center Street.

The station siding at Yarmouth Junction would also need to be signalized and have an interlocking installed.

Consist Requirements and Maintenance Facility

Three one car consists are required for service. Two consists would be used to operate the service and a third set of equipment would be kept in reserve as a spare.

A new maintenance facility would be required to maintain and repair the commuter fleet. The location of this facility would need to be identified. Two handthrow switches and 0.1 miles of maintenance facility track are necessary for this facility. A Maintenance of Way vehicle is also required.

Positive Train Control

Approximately 1.9 miles of wayside PTC devices would need to be installed for commuter service to Center Street. Three dual-cab PTC devices would need to be installed on the commuter trains.

Station Upgrades

New stations at Center Street (Portland), West Falmouth (Exit 53), Cumberland Center, and Yarmouth Junction would need to be constructed. A total of ten ticket vending machines would be required, with four of them required at Center Street, and two each at West Falmouth, Cumberland Center, and Yarmouth Junction.

Up to 100 new parking spaces would need to be built across the entire system.

A new CCTV system would need to be installed at new stations.

Grade Crossings

One grade crossing in the vicinity of Yarmouth Junction would need to be upgraded to allow for at least double track protection.

See Figure 3-4 for a graphic representation of the infrastructure upgrades needed to offer commuter rail service to Brunswick.

Figure 3-4: Infrastructure Upgrades Required for Commuter Rail Service to Brunswick

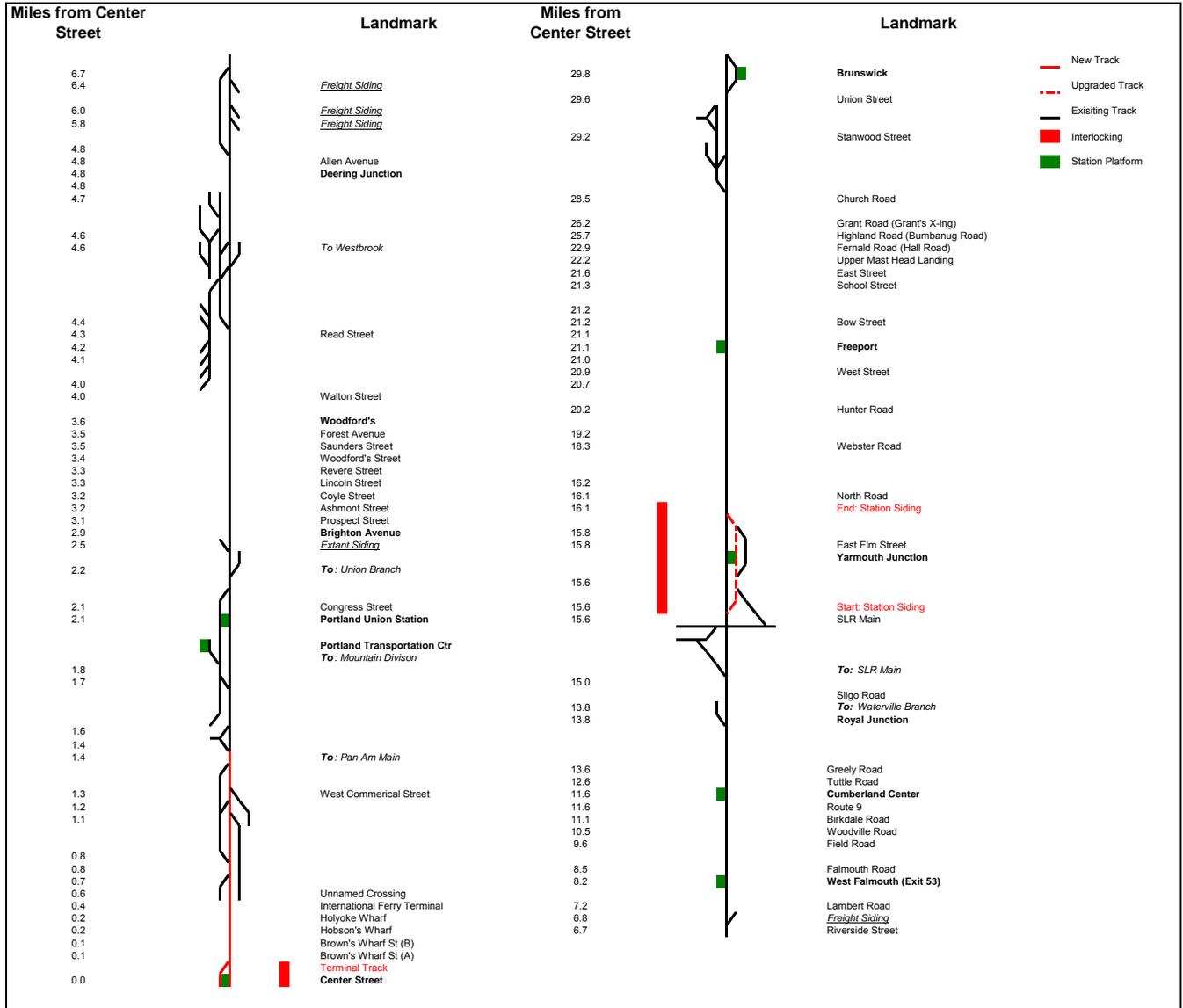


Table 3-6 shown below provides a summary of the infrastructure upgrades necessary for commuter rail service.

Table 3-6: Summary of Infrastructure Upgrades for Integrated Rail Service Option

Category	Units	Qty.
Trackwork and Infrastructure		
New Track	Track Mile	1.4
Track Upgrade	Track Mile	0.5
Rehab Siding & Interlocking	Each	1
Grade X-ing to Replace for Double Track	Each	1
Signaling	Track Mile	1.9
Terminal Track	Each	1
Support Trackwork		
Handthrow Switches	Each	2
Maintenance Facility Tracks	Track Mile	0.1
Positive Train Control		
Dual Cab DMU Devices	DMU	3
Wayside Devices	Track Mile	1.9
Central Office Equipment	Each	0
Stations		
Platform	Each	4
Parking Space	Each	100
Site Development	Each	4
Ticket Vending Machines	Each	10
CCTV System	Each	1
Maintenance Facility		
	Vehicle	3
Vehicles		
MoW Equipment	Each	1
DMU	Each	3
Coach	Each	3

Integrated Bus Service Infrastructure Requirements

The shoulder running Integrated Bus option to Brunswick requires limited infrastructure improvements including site development, stations, parking, ticket vending machines, and security systems. The rail component would require some infrastructure improvement at the terminals.

Road Upgrades

A 3,000 square foot (200 ft x 15 ft) strip of asphalt would be constructed adjacent to the interstate shoulder at all online stops to allow buses to pull out of the way of the highway travel lanes to safely load and unload passengers. Additional support roadwork would be required at Falmouth and Yarmouth stops. All other upgrades were limited to bus stop and parking facilities.

Signal Upgrades

No traffic signal upgrades are required. However, a dispatching system would be required.

Fleet Requirements and Maintenance Facility

Four double decker buses are required to provide the service. Three buses would be directly used to operate the service and a fourth bus would be kept as a spare. A new maintenance facility would be required to maintain and repair the bus fleet.

Station Upgrades

Two online roadway stops on I-295 would need to be built at Falmouth and Yarmouth. The Freeport stop would be built at the intersection of US Route 1 and Bow Street.⁴ It would be located approximately 500 feet from the Freeport Downeaster station. Passengers can park and purchase their tickets at the Freeport train station, and then walk up to the stop on Route 1. The bus stop in Brunswick would be located at the Brunswick train station. No upgrades to Brunswick are anticipated.

Based on the proposed ridership (see Section XXXX below a total of approximately 400 new parking spaces would be required to be installed across the entire system proposed.

Additionally, a train platform on Saint John Street in Portland would also be required. This would allow for passengers using the Downeaster between Freeport/ Brunswick and Portland to transfer to and from the downtown distribution loop. It is assumed that two ticket vending machines (TVM) would be installed at the former site of the Union Station, and no parking spaces are provided.

A total of 14 TVMs (two machines are included in the construction of Union Station) would need to be installed at the stations (two machines are included in the construction of Union Station). Four machines each are required at the PULSE Station near Monument Square in downtown Portland and the Brunswick Station. The remaining stations would get two TVMs each.

A Closed Circuit TV (CCTV) security system would need to be installed at all stations.

⁴ This will minimize the overall trip time for passengers heading to or from Brunswick.

Table 3-7 provides a summary of the infrastructure upgrades required to implement the Integrated Bus service.

Table 3-7: Summary of Infrastructure Upgrades for Integrated Bus Service

Category	Integrated Bus	
	Units	Qty.
Highway Work		
Shoulder Widening	Lane Mile	
Rumble Strip Filling	Lane Mile	
Stations		
Online Highway Station	Each	2
Vertical Circulation	Each	0
Additional Support Roadwork	Mile	0.7
Offline Stop	Each	0
Site Development	Each	3
Parking Space	Each	400
Ticket Vending Machine	Each	14
Union Rail Station	Each	1
Dispatching System	Each	1
CCTV	System	1
Bus Maintenance Facility	Each	1
50' Double Decker Bus (83-passenger)	Vehicle	4

3.2.5 Capital Costs

This section summarizes the capital cost methodology and results for the integrated rail and bus options being considered.

To understand the feasibility of the services identified, the cost of infrastructure construction required to operate the two service alternatives were estimated. A simple three-step process was used to estimate capital infrastructure costs.

Step 1) Estimated Quantities

The Service Design part of this document details the service requirements for offering commuter service to Brunswick. Service design provides a basis to determine the amount of infrastructure required to offer commuter service at the desired levels to downtown Portland. These requirements vary according to the alternative chosen.

Step 2) Unit Costs

The unit costs used to estimate the construction costs for each alternative were gathered from a variety of sources. The majority of cost estimates were developed by the project team, with some cost estimate information from previous commuter rail planning studies.⁵ The unit cost estimates are provided in Table 3-8 for Integrated Rail Service and in Table 3-9 for Integrated Bus Service. The unit cost estimates were developed consistent with FTA guidelines and used data drawn from sources within the MaineDOT team and from relevant prior studies, updated as necessary.

Table 3-8: Integrated Rail Unit Cost Elements

Category	Element	Unit Cost
Trackwork and Infrastructure		
New Track	Track Mile	\$928,161 ¹
Track Upgrade	Track Mile	\$40,603 ¹
Rehab Siding & Interlocking*	Each	\$1,004,914 ¹
Grade X-ing to Replace for Double Track	Each	\$258,512 ¹
Signaling	Track Mile	\$1,034,048 ²
Terminal Stub Track	Each	\$1,196,865 ²
Support Trackwork		
Handthrow Switches	Each	\$25,851 ²
Maintenance Facility Tracks	Track Mile	\$778,638 ²
Dispatch System	Each	\$284,363 ¹
Positive Train Control		
Dual Cab DMU Devices	DMU	\$95,000 ³
Wayside Devices	Track Mile	\$121,000 ³
Central Office Equipment	Each	\$5,000,000 ³
Stations		
Platform	Each	\$103,405 ¹
Parking Space	Each	\$3,619 ⁴
Site Development	Each	\$517,024 ²
Ticket Vending Machines	Each	\$89,962 ²
CCTV System	Each	\$248,172 ²
Maintenance of Equipment (MoE)⁶ Facility		
	Vehicle	\$504,895 ²

Note:

(*) Rehab siding & Interlocking includes cost of one interlocking and two turnouts.

⁵ HNTB. (2005) Draft Cost Feasibility Study for Portland Commuter Rail Study. Prepared for the Northern New England Passenger Rail Authority (NNEPRA) and the Maine Department of Transportation, Office of Passenger Transportation.

⁶ Service management of any type of equipment is Maintenance of Equipment.

Source:

1. HNTB. (2005). Draft Cost Feasibility Study for Portland Commuter Rail Study. Prepared for the Northern New England Passenger Rail Authority (NNEPRA) and the Maine Department of Transportation, Office of Passenger Transportation.
2. Jacobs Engineering Group independent estimate.
3. Jacobs Engineering Group analysis of Roskind, Frank D, Senior Industry Economist, Federal Railroad Administration, Office of Safety Analysis, Positive Train Control Systems: Economic Analysis. Department of Transportation, Federal Railroad Administration, 49 CFR PARTS 229, 234, 235, and 236 [Docket No. FRA-2006-0132, Notice No.1] RIN 2130-AC03 July 10, 2009 202 302 9704 pp 112-119 (Retrieved from http://www.fra.dot.gov/downloads/PTC_%20RIA_%20Final.pdf on July 21, 2009)
4. AECOM independent estimate June 10, 2009.

Table 3-9: Integrated Bus Unit Cost Elements

Category	Units	Cost
Highway Work		
Shoulder Widening	Lane Mile	\$700,000 ¹
Rumble Strip Filling	Lane Mile	\$100,000 ¹
Stations		
Online Highway Station	Each	\$120,862 ²
Vertical Circulation (elevator)	Each	\$134,291 ³
Support Roadwork	Mile	\$53,717 ⁴
Site Development	Each	\$517,024 ⁵
Parking	Each	\$ 3,000 ⁵
Ticket Vending Machine	Each	\$89,962
Union Rail Station	Each	\$800,353 ⁷
CCTV	System	\$275,000 ⁷
Dispatching System	Each	\$284,363
Facility		
Maintenance Facility	Vehicle	\$200,665 ²

Source:

1. AECOM independent Estimate. Received at Meeting between AECOM and Jacobs Engineering Group. July 21, 2010, in Boston, MA.
2. Harvard Transit Technology Assessment. Pg. 54. Includes a 200 ft x 15 ft asphalt pad adjacent to interstate shoulder.
3. Jacobs Engineering Group. (2008). Ruggles Station Platform Study. Prepared for: Medical Area Scientific Community Organization, pg. 73. Cost adjusted to Portland cost of living.
4. Jacobs Engineering Group Traffic Engineers Estimate. Based on 2009 MassHighway Department standard costs for brush clearing, new gravel and asphalt. The resulting value was adjusted to the Portland cost of living.
5. HNTB. (2005). Draft Cost Feasibility Study for Portland Commuter Rail Study. Prepared for the Northern New England Passenger Rail Authority (NNEPRA) and the Maine Department of Transportation, Office of Passenger Transportation.

6. AECOM independent estimate, June 10, 2009.
7. Jacobs Engineering Group independent estimate.

Step 3) Contingency and Support Costs

A 15% contingency factor was applied to the relatively predictable costs for roadway, track & signal upgrades, and new track construction. In addition to the contingency, various engineering and support costs were added to the cost estimates and are listed in Table 3-10 applied to costs for both options.

Table 3-10: Various Support Costs for Rail and Bus Scenarios

Cost Item	Budgeted Amount
Contingency	15% of construction cost
Engineering and Construction Management	15% of construction cost
Administration	4% of construction cost
Insurance and Permitting	3% of construction cost

Infrastructure Costs

Using the operational and infrastructure needs described in the documents listed in Step 1 of the cost estimation process, the study team was able to calculate the expected capital costs for infrastructure construction. The findings of the three step estimation method are presented below in Table 3-11.

Table 3-11: Estimated Infrastructure Costs

Category	Cost (\$2009, millions)	
	Integrated Rail	Integrated Bus
Road & Signals	-	\$9.2
Track, Signal, & PTC	\$6.4	-
Stations	\$4.0	\$5.8
Maintenance Facility	\$1.5	\$0.6
Contingencies	\$4.4	\$5.8
Infrastructure Total	\$16.3	\$21.4

Rolling Stock

Each train set would consist of one DMU. As previously described, three single car consists are required for service. There would be two trains in operation and a third train would be purchased and kept as a spare. Unit costs for each vehicle type are shown in Table 3-12. The fleet requirements and total rolling stock costs for each option are summarized in Table 3-13.

Table 3-12: Rolling Stock Unit Costs

Unit Type	Cost per Unit
50' Double Decker bus (83-passenger)	\$625,000 ⁷
DMU	\$2,999,000 ⁸
Maintenance	\$1,034,000

Source: Jacobs Engineering Group estimate.

Table 3-13: Vehicle Requirements and Rolling Stock Costs for each Service Option

Vehicle	Fleet Size		Rolling Stock Cost	
	IRS	IBS	IRS	IBS
Double Decker Bus	-	3	-	\$1,875,000
DMUs	3		\$8,996,000	
MOW Equipment	1		\$1,034,000	
Fleet Size	4			
Total			\$10,030,000	\$1,875,000

Total capital costs for each option are shown in Table 3-14.

Table 3-14: Total Capital Costs

Category	Cost (\$2009, millions)	
	Integrated Rail	Integrated Bus
Road & Signals	-	\$9.2
Track, Signal, & PTC	\$6.4	-
Stations	\$4.0	\$5.8
Maintenance Facility	\$1.5	\$0.6
Contingencies	\$4.4	\$5.4
Total Infrastructure Cost	\$16.3	\$21.4
Total Rolling Stock Cost	\$10.0	1.9
Total Capital Costs	\$26.4	\$23.2

⁷ Derived from Mega Bus procurement document. Accessed May 14, 2010. Available: http://www.busride.com/news.asp?N_ID=646of Business in 2008.

⁸ 2006 Colorado Railcar estimate adjusted to \$2009. Colorado Railcar went out of business in 2008.

3.2.6 Operating Costs

Integrated Rail Service Operating Costs

Four categories of operating costs were estimated for the Integrated Rail Service.

- Rail Transportation (Crew and Fuel)
- Maintenance of Equipment (MOE)
- Track Fees (Dispatching, Maintenance of Way and Inspection, and Trackage Fees)
- Administration

Whenever possible, costs associated with operation of a similar local service were used. In this case, Downeaster costs were used. Additionally, costs associated with operating the Amtrak Downeaster between Brunswick and the Portland Transportation Center are not considered in this analysis because it is assumed that Brunswick station will already be constructed and in operation as part of the Amtrak Downeaster extension project.

Rail Transportation Costs

Rail transportation costs include the direct costs for service provision including train crews and propulsion energy and train supplies. No weekend service is assumed. The following assumptions were used in transportation cost estimation:

It is assumed that the operators and conductors on a Diesel Multiple Unit (DMU) trains would cost the fully burdened rate of \$34.78/hour.⁹ Overtime is charged at 1.5 times the hourly wage, or \$52.17/staff hour. Extraboard staff cost \$34.78 per hour.

All trains would operate with a two-person crew consisting of one engineer and one conductor.

Preliminary crew rosters were developed for each of the service options.

All trains are assumed to be a one car consist (DMU).

Fuel costs are based on the 2009 average cost for diesel (\$2.33/gallon) in Maine.¹⁰

Vehicle fuel efficiency is assumed to be 1.20 mpg¹¹ for a single level DMU.

No downtown distribution service is operated.

Service operates 254 days per year.

Table 3-15 summarizes the estimated transportation expenses for operation of commuter rail service in conjunction with the Downeaster, which was calculated to be approximately \$1.1 million.

⁹ NTD NJ Transit reported operator cost in 2002. Result was inflated to 2009 dollars by 5% annually and then discounted using cost of living index for Newark, New Jersey and Portland, Maine.

¹⁰ Cost for No. 2 Diesel for the State of Maine. Available: http://www.eia.doe.gov/emeu/states/oilprices/oilprices_me.html. Site accessed on May 14, 2010.

¹¹ Colorado Railcar Manufacturing LLC, Economic and Performance Modeling of the CRM DMU for New Jersey Transit prepared for Dave Carter of New Jersey Transit, April 2004.

Table 3-15: Summary of IRS Annual Operating Costs

Rail Transportation	Cost
Train Crews	\$676,000
Fuel	\$206,000
Total	\$882,000

Mechanical Expense (MoE)

The mechanical costs include labor and materials for vehicle maintenance. It is assumed that Maine DOT would maintain the selected vehicles at costs approximating productivity elsewhere in the United States. See Table 3-16 for the unit costs used.

Table 3-16: Maintenance of Equipment Costs

Category	Cost
Annual Labor Unit Costs	
DMU	\$83,000 ¹²
Annual Materials Unit Costs	
DMU Materials (Parts)	\$61,000 ¹³

Using the costs and assumptions listed above, the estimated MoE expenses for the DMU service is shown in Table 3-17. The estimated MoE expenditure is approximately \$430,000.

Table 3-17: Estimated Annual Maintenance of Equipment Costs

Category	Unit Costs	Vehicle Qty.	Cost
Annual DMU Labor Unit Costs	\$83,000	3	\$249,000
Annual DMU Materials Unit Costs	\$61,000	3	\$183,000
Total Cost			\$432,000

Track Fees

Pan Am charges the Northern New England Passenger Rail Authority (NNEPRA) \$1.66 per revenue train mile to operate the Downeaster on its tracks.¹⁴ The Pan Am track fee includes dispatching, Maintenance of Way (MoW) and trackage fees. Above this track fee, NNEPRA also spends approximately \$100,000

¹² NJ Transit commuter rail maintenance labor cost in 2006 calculated from NTD 2002 figures for vehicle maintenance labor costs and hour. Result was inflated to 2009 dollars from 2006 by 5% annually and then reduced by the urban cost of living difference between Newark, NJ and Portland, ME.

¹³ Based on 1995 KKO survey of SPRC manufacturers inflated to 2009 dollars by 5% annually.

¹⁴ Pan Am currently charges NNEPRA \$27.72 per revenue vehicle mile. Downeaster trains operate with four coaches, one baggage car, and one locomotive. This translates into \$1.66 per train mile. Phone call with Patricia Quinn, Executive Director of NNEPRA, July 22, 2009.

per year on track inspection for the entire route, which is not accounted for in their annual MoW expense category.¹⁵ This inspection fee is approximately \$0.24 per revenue train mile.

It is assumed that the same trackage fee and inspection fee would be applicable for the Integrated Rail service, and is estimated to be \$201,342 as shown in Table 3-18.

Table 3-18: Estimated Annual Trackage Fees and Costs

Category	Unit Costs	Revenue Train Miles	Cost
Trackage Fees	\$1.66	105,970	\$175,900
Inspection	\$0.24	105,970	\$25,400
Total Cost			\$201,300

Administrative Costs

Administrative costs include revenue collection and accounting, marketing, personnel, training and safety. The 2008 national commuter rail average administration expense was determined to be 27% of the Transportation, MoE and Track Fees costs, and is estimated to cost approximately \$409,000 for this service.

Total Estimated Annual Operating Costs

Table 3-19 summarizes the forecast annual operating expenses for the IRS alternative. From this analysis, it has been determined that the Integrated Rail Service is expected to have an annual operating expenditure of \$1.9 million.

Table 3-19: Estimated Operating Expenses for Integrated Rail to Brunswick

Category	Cost
Rail Transportation	
Train Crews	\$676,000
Fuel	\$206,000
<i>Subtotal</i>	<i>\$882,000</i>
Maintenance of Equipment	
Labor	\$249,000
Materials	\$183,000
<i>Subtotal</i>	<i>\$432,000</i>
Dispatching, MoW, and Track Fees	
<i>Subtotal</i>	<i>\$201,342</i>
<i>Subtotal I</i>	<i>\$1,515,342</i>
Administration (27%)	\$409,142
Total	\$1,924,484

The transportation expenses are the largest cost driver for the commuter rail option, accounting for 46% of the total operating costs.

¹⁵ Ibid.

Integrated Bus Service Operating Costs

The estimates of annual operating cost for the integrated bus option are shown below in Table 3-20.

Table 3-20: Summary of Integrated Bus Annual Operating Costs

Option	Cost
Annual Operating Costs	\$735,413
Operating Costs/Boarding	\$3.55

Integrated Rail and Bus Ridership

A detailed ridership analysis that utilized a transportation ridership model developed for the project study area was undertaken to identify the movements and quantities of potential riders that would be attracted by each alternative. The results were forecasted to the year 2035 for each of the integrated rail and bus alternatives, and included the Amtrak intercity trips as well.

The results of the analysis indicated that the integrated bus option would create 815 weekday boardings versus the integrated train option, which would generate only 298 weekday boardings. Assuming 254 annual operating days (weekday service only) per year, which would amount to over 207,000 bus boardings versus approximately 76,000 rail boardings.

The reasons why the bus would attract substantially higher ridership are because:

- The bus option serves seven stops throughout the central business district
- The rail option serves only two stops and the Amtrak component serves only one—Union station outside CBD
- The bus option five trips to Portland (plus one Amtrak trip) in AM peak
- The rail has only two trips to Portland (plus one Amtrak trip) in AM peak

Summary

The summary comparison of the integrated rail and integrated bus options are shown below in Table 3-21.

Table 3-21: Comparison of Integrated Rail and Integrated Bus Services

Option	Integrated Rail Option	Integrated Bus Option
Weekday Boardings	298	815
Annual Operating Days	254	254
Annual Boardings	75,692	207,010
Annual Operating Costs	\$1,924,484	\$735,413
Capital Costs	\$26,353,472	\$23,229,462
Operating Costs/ Annual Boarding	\$25.43	\$3.55
Capital Cost/ Weekday Boarding	\$88,434	\$26,334

3.2.7 Impact of the FTA Decision on Use of Shoulder

As noted in Chapter 2, alternatives were developed and carried forward to the Phase II analysis that utilized existing highway infrastructure breakdown lanes in an attempt to satisfy the Small Starts fixed guideway requirement of the Small Starts funding program. As it occurs in other states today, buses would have exclusive access to the highway breakdown lanes during peak hours as a means to avoid travel delays and congestion on the highway mainline. This would in turn, assure the regular, consistent schedules necessary for the public transit service.

Although FTA had been engaged in the process, their level of involvement increased as the project alternatives became fewer and more refined. As the project entered Phase II, a formal request was made of FTA to determine the applicability of utilizing the BOS concept from a Small Starts standpoint. In mid 2010, FTA indicated that the BOS concept, while creative and a good use of existing infrastructure investments, would not qualify as a fixed guideway under Small Starts guidance. Therefore, BOS options were eliminated from further consideration in Phase III.

3.2.8 Small Starts

As the Phase III alternatives analysis advanced, more detailed information was developed which painted a picture of the potential competitiveness of the integrated rail and bus options. MaineDOT periodically coordinated with FTA as the alternatives developed. While FTA was supportive of the efforts to combine services to maximize investment, reduce costs, improve flexibility and raise ridership, they were concerned about the ability of the alternatives to compete for New Starts funds. As time progressed, it became more evident that it would be a challenge for the integrated rail and bus options under review to rate high enough to secure Small Starts funding.

MaineDOT determined at this point that two paths could be taken. The first, could be to bring a Small Starts alternative to fruition and submit an application to FTA for consideration, knowing that the project would likely not rate highly enough by FTA to be awarded Small Starts funding. The second option could be to diverge from submitting a Small Starts application and utilize the remaining project resources to explore non-Small Starts options that might be smaller in scale, but more realistically able to be implemented. The decision made was to abandon the Small Starts path and move forward with the second option, focusing on developing a realistic project that would have a better chance of being implemented. The results of the effort moving forward, was the development of the TSM 1 and TSM 2 options (which still took advantage of the intercity service), supplementing it with a commuter bus service. Two variations of this approach (named TSM 1 and 2) are described in more detail below.

3.2.9 TSM 1 and TSM 2 Alternatives

The Coordinated Public Transport Service alternative (CPTS) is a TSM bus/rail hybrid service that would operate between Brunswick and Portland on I-295. The CPTS alternative has two options known as TSM 1 and TSM 2 and these alternatives are proposed to utilize the planned investment by others in the Amtrak Downeaster rail service extension between Brunswick and Portland.

Coordinated Public Transport Service – TSM 1

The CPTS alternative, TSM 1 option would provide 14 roundtrips between Brunswick, Yarmouth, and Portland, enabling passengers to travel between Portland and Brunswick, on either the train or on the express bus. Nine bus roundtrips to Brunswick would be provided, along with three Downeaster trips. Since Falmouth and Yarmouth would not be receiving Amtrak service, two short-turn roundtrips from

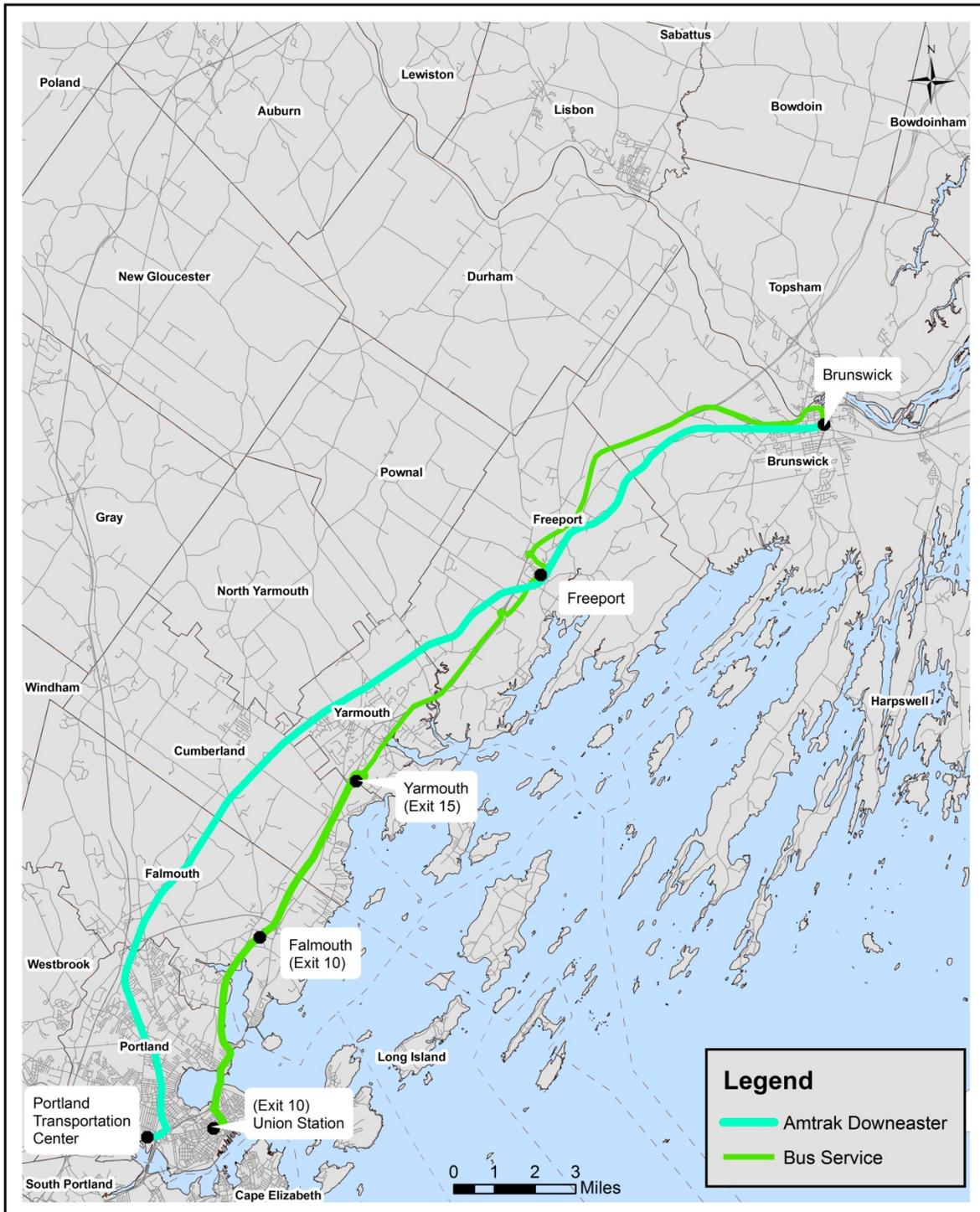
Yarmouth and Falmouth are provided for passengers and would run at approximately the same time as the Downeaster operates.

The Falmouth stop would be located at (Exit 10) and Yarmouth stop would be at (Exit 15). It is anticipated that both stops would be offline¹⁶ stops.

In order to keep the overall bus trip time to a minimum, the Freeport bus stop would be located at the corner of Bow Street and US Route 1, approximately 500 feet from the Freeport train station. Passengers would be able to park their cars, and purchase tickets at the Freeport train station and walk to the bus stop on Route 1. The Brunswick stop would be located at the Downeaster train station on Maine Street. Figure 3-5 shows the map of the proposed service and Figures 3-6 and 3-7 show a more detailed view of the offline Falmouth and Yarmouth exits.

¹⁶ Offline stops means they are not located on highways and would require buses to exit the highways in order to be able to pull in and out of the station.

Figure 3-5: Coordinated Public Transport Service – TSM 1

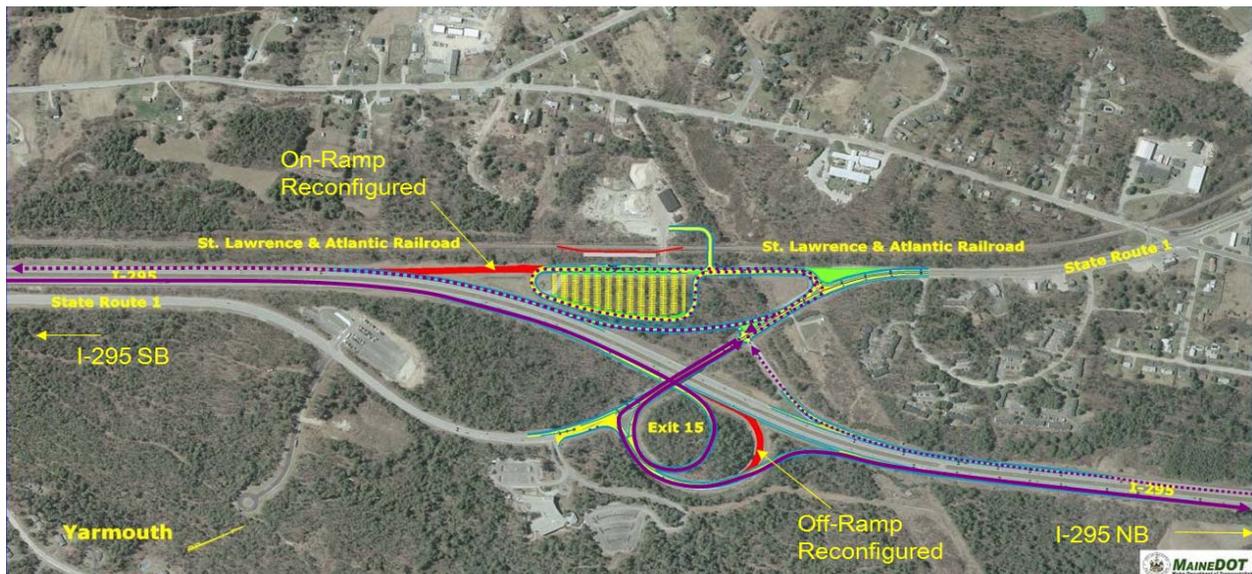


Source: MaineGIS 2008

Figure 3-6: Offline Falmouth – Exit 10



Figure 3-7: Offline Yarmouth – Exit 15



To provide commuters using the Downeaster between Freeport/Brunswick and Portland with a stop that is not removed from the downtown, a new station at the site of the former Union Station on St. John Street would need to be built for this project. The express bus service would provide shuttle service to passengers needing access to employment centers in downtown Portland (except for the Maine Medical Center, which is within a 10 minute walk from the station on St. John Street). Commuters using the Downeaster would be provided with a five minute timed transfer to the shuttle service.

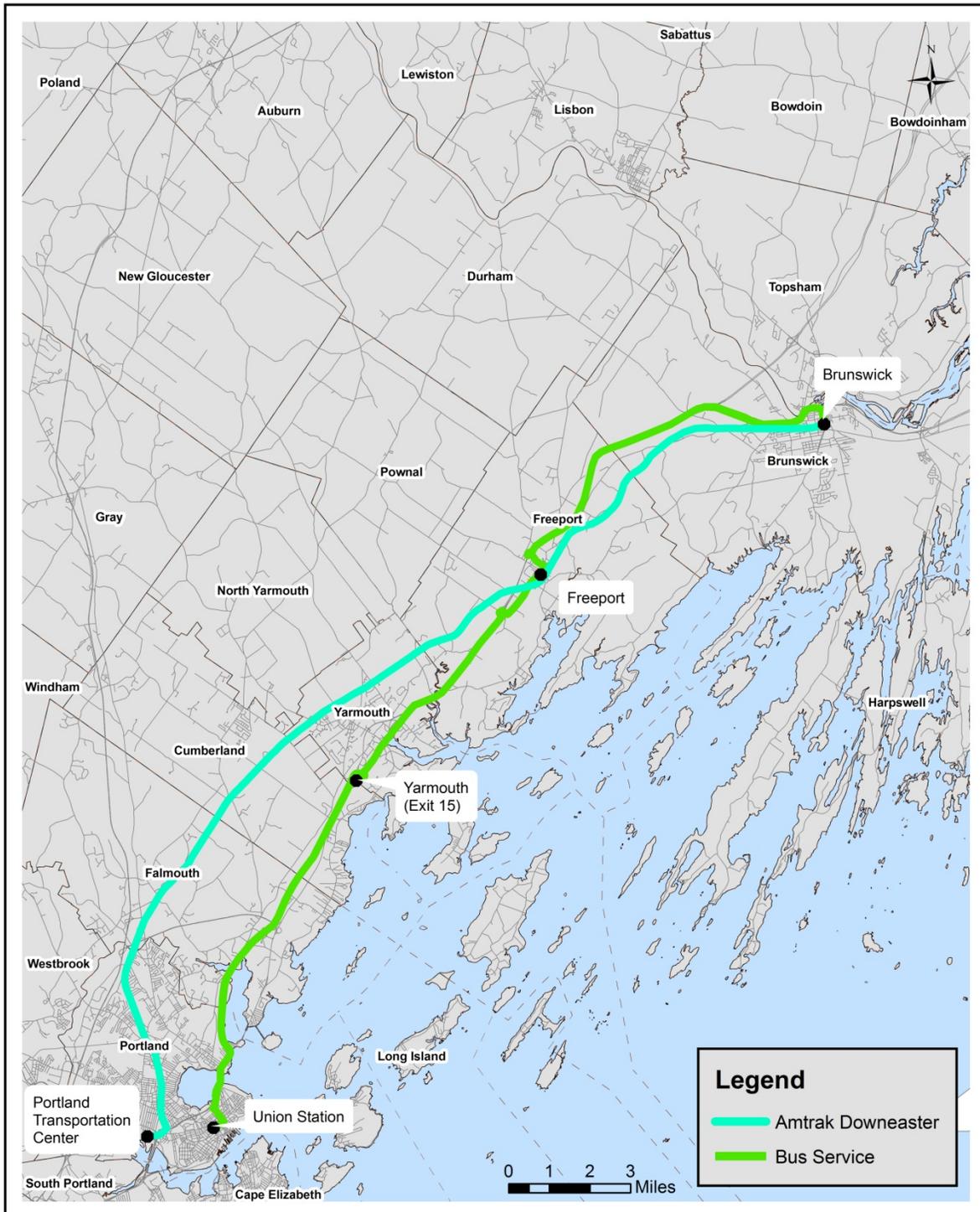
Coordinated Public Transport Service – TSM 2

The CPTS TSM 2 option is almost identical to TSM 1, with the exception that there is no stop in Falmouth. It would provide 14 roundtrips between Brunswick, Yarmouth, and Portland, enabling passengers to travel between Portland and Brunswick, on either the train or on the express bus. Nine bus roundtrips to Brunswick would be provided, along with three Downeaster trips. Since Yarmouth would not be receiving Amtrak service, two short-turn roundtrips from Yarmouth would be provided for passengers operating at approximately the same time as the Downeaster service.

The Yarmouth stop would be at Exit 15, and would be an offline stop (Refer to Figure 3-7 for the offline Yarmouth exit).

In order to keep the overall bus trip time to a minimum, the Freeport bus stop would be located at the corner of Bow Street and US Route 1, approximately 500 feet from the Freeport train station. Passengers would be able park their cars, and purchase tickets at the Freeport train station and walk to the bus stop on Route 1. The Brunswick stop would also be located at the Downeaster train station on Maine Street. See Figure 3-8 for a map of the proposed service.

Figure 3-8: Coordinated Public Transport Service – TSM 2



Source: MaineGIS 2008

To provide commuters using the Downeaster between Freeport/Brunswick and Portland with a stop that is not removed from the downtown, a new station at the site of the former Union Station on Saint John Street would need to be built. The express bus service would provide shuttle service to passengers needing to access to employment centers in downtown Portland (except for the Maine Medical Center, which is within a 10 minute walk from the station on St. John Street). Commuters using the Downeaster would be provided with a five minute timed transfer to the shuttle service.

3.2.10 Operating Plans – TSM 1 and TSM 2

The operating assumptions and service plans describe information such as stop patterns, number of trips and headway for the CPTS options. They also provide a general description of where the service would operate, the primary service destinations, as well as how often or frequent service would be.

Coordinated Public Transport Service – TSM 1

Table 3-22 shows a conceptual schedule of the Coordinated Public Transport Service, including all connections to and from Downeaster Brunswick service. As shown in Table 3-22, in addition to providing commuter service, the CPTS has been programmed to provide supplemental Downeaster service between Portland and Brunswick. There are two connections to Boston-bound Amtrak trains in Portland (Amtrak #684 and Amtrak #688), and there is one connection to an outbound train in Portland (Amtrak #685, which terminates in Portland). These three connections increase the number of daily trips between Brunswick and Boston from six to nine. Each alternative would provide connections at Portland Transportation Center with 10 minute timed transfers.

Table 3-22: Coordinated Public Transport Service Conceptual Schedule – TSM 1

Inbound (South) Service	Amtrak	Maine DOT	Maine DOT	Maine DOT	Amtrak	Maine DOT	Amtrak	Maine DOT	Maine DOT	Amtrak	Maine DOT	Maine DOT	Maine DOT	Maine DOT	Amtrak	Amtrak				
Trip No.	680	100	102	104	682	106	108	110	112	114	684	116	118	686	120	122	124	126	688	68X
Cycle	x	a	b	a	y	b	a	b	b	b	x	b	a	y	a	b	a	b	x	y
Brunswick	-	6:09 AM	6:44 AM	-	7:10 AM	-	-	8:31 AM	10:00 AM	-	12:55 PM	-	2:19 PM	-	4:58 PM	5:43 PM	7:02 PM	7:24 PM	-	10:05 PM
Freeport	-	6:23 AM	6:58 AM	-	7:25 AM	-	-	8:45 AM	10:14 AM	-	1:10 PM	-	2:33 PM	-	5:12 PM	5:57 PM	7:16 PM	7:38 PM	-	10:20 PM
Yarmouth (Exit 15)	-	6:31 AM	7:06 AM	7:21 AM	-	-	8:24 AM	8:53 AM	10:22 AM	12:36 PM	-	-	2:41 PM	-	-	-	-	7:46 PM	-	-
Falmouth (Exit 15)	-	6:36 AM	7:11 AM	7:26 AM	-	-	8:29 AM	8:58 AM	10:27 AM	12:41 PM	-	-	2:46 PM	-	-	-	-	7:51 PM	-	-
Portland PULSE	-	6:45 AM	7:20 AM	7:35 AM	-	-	8:38 AM	9:07 AM	10:36 AM	12:50 PM	-	-	-	-	5:31 PM	6:16 PM	-	-	-	-
Union Station	-	-	-	-	7:45 AM	7:50 AM	-	-	-	-	1:30 PM	1:35 PM	-	-	-	-	-	-	-	10:40 PM
Portland Transportation Center	6:55 AM	-	-	-	8:00 AM	-	-	-	-	-	1:45 PM	1:50 PM	2:55 PM	3:05 PM	-	-	7:35 PM	8:00 PM	8:10 PM	10:55 PM
Congress & Forest	-	6:47 AM	7:22 AM	7:37 AM	-	7:56 AM	8:40 AM	9:09 AM	10:38 AM	12:52 PM	-	1:41 PM	-	-	5:33 PM	6:18 PM	7:43 PM	8:08 PM	-	-
ME Medical	-	6:52 AM	7:27 AM	7:42 AM	-	8:45 AM	9:14 AM	10:43 AM	12:57 PM	-	-	2:59 PM	-	-	5:38 PM	6:23 PM	7:46 PM	8:13 PM	-	-
Mercy Hospital	-	6:55 AM	7:30 AM	7:45 AM	-	7:58 AM	8:48 AM	9:17 AM	10:46 AM	1:00 PM	-	1:43 PM	3:02 PM	-	5:41 PM	6:26 PM	7:48 PM	8:16 PM	-	-
State & Danforth	-	6:57 AM	7:32 AM	7:47 AM	-	8:00 AM	8:50 AM	9:19 AM	10:48 AM	1:02 PM	-	1:45 PM	3:04 PM	-	5:43 PM	6:28 PM	7:50 PM	8:18 PM	-	-
Center Street	-	6:59 AM	7:34 AM	7:49 AM	-	8:02 AM	8:52 AM	9:21 AM	10:50 AM	1:04 PM	-	1:47 PM	3:06 PM	-	5:45 PM	6:30 PM	7:52 PM	8:20 PM	-	-
Market & Middle	-	7:01 AM	7:36 AM	7:51 AM	-	8:05 AM	8:54 AM	9:23 AM	10:52 AM	1:06 PM	-	1:50 PM	3:08 PM	-	5:47 PM	6:32 PM	7:55 PM	8:22 PM	-	-
Boston (North Station)	8:25 AM	-	-	-	10:25 AM	-	-	-	-	-	4:10 PM	-	-	5:35 PM	-	-	-	-	10:35 PM	-
Next Trip	681	101	103	105	683	107	109	111	113	119	685	115	117	687	121	123	125	127	689	-

Notes: DH from Market St to Union Sta; X-fer at Union Sta to local bus; DH from Market St to Union Sta; X-fer at Union Sta to local bus; X-fer at PTC for train to Boston; X-fer at PTC for train to Boston

Outbound (North) Service	Amtrak	Maine DOT	Amtrak	Maine DOT	Amtrak	Maine DOT	Amtrak	Maine DOT	Maine DOT	Amtrak	Amtrak									
Trip No.	68X0	101	103	105	107	109	111	681	113	683	115	117	119	121	123	685	125	127	687	689
Cycle	y	a	b	a	b	a	a	x	b	y	a	a	b	a	b	x	a	b	y	x
Boston (North Station)	-	-	-	-	-	-	-	9:05 AM	-	11:05 AM	-	-	-	-	-	5:00 PM	-	-	6:20 PM	11:20 PM
Portland Transportation Center	6:55 AM	-	-	-	-	-	-	11:30 AM	-	1:30 PM	-	-	-	-	-	7:25 PM	7:35 PM	-	8:50 PM	1:45 AM
Congress & Forest	-	6:47 AM	7:22 AM	7:37 AM	7:56 AM	8:40 AM	9:23 AM	11:23 AM	12:00 PM	1:41 PM	4:00 PM	4:45 PM	5:33 PM	6:18 PM	7:43 PM	8:08 PM	-	-	-	-
ME Medical	-	6:52 AM	7:27 AM	7:42 AM	8:45 AM	9:14 AM	10:43 AM	12:05 PM	-	-	4:05 PM	4:50 PM	5:38 PM	6:23 PM	7:46 PM	8:13 PM	-	-	-	-
Mercy Hospital	-	6:55 AM	7:30 AM	7:45 AM	7:58 AM	8:48 AM	9:17 AM	10:46 AM	1:00 PM	1:43 PM	4:08 PM	4:53 PM	5:41 PM	6:26 PM	7:48 PM	8:16 PM	-	-	-	-
State & Danforth	-	6:57 AM	7:32 AM	7:47 AM	8:00 AM	8:50 AM	9:19 AM	10:48 AM	1:02 PM	1:45 PM	4:10 PM	4:55 PM	5:43 PM	6:28 PM	7:50 PM	8:18 PM	-	-	-	-
Center Street	-	6:59 AM	7:34 AM	7:49 AM	8:02 AM	8:52 AM	9:21 AM	10:50 AM	1:04 PM	1:47 PM	4:12 PM	4:57 PM	5:45 PM	6:30 PM	7:52 PM	8:20 PM	-	-	-	-
Market & Middle	-	7:01 AM	7:36 AM	7:51 AM	8:05 AM	8:54 AM	9:23 AM	10:52 AM	1:06 PM	1:50 PM	4:14 PM	4:59 PM	5:47 PM	6:32 PM	7:55 PM	8:22 PM	-	-	-	-
PULSE	-	7:04 AM	7:36 AM	7:53 AM	8:07 AM	8:56 AM	9:25 AM	11:34 AM	12:17 PM	1:53 PM	4:17 PM	5:02 PM	5:50 PM	6:35 PM	7:58 PM	8:25 PM	-	-	-	-
Union Station	6:10 AM	-	-	-	-	11:40 AM	11:45 AM	-	-	-	-	-	-	-	-	-	-	-	9:05 PM	-
Falmouth (Exit 15)	-	-	-	-	9:05 AM	-	-	12:26 PM	-	2:02 PM	4:26 PM	5:11 PM	5:59 PM	6:44 PM	8:04 PM	8:34 PM	-	-	-	-
Yarmouth (Exit 15)	-	7:16 AM	-	8:19 AM	9:10 AM	-	-	12:31 PM	-	2:07 PM	4:31 PM	5:16 PM	6:04 PM	6:49 PM	8:09 PM	8:39 PM	-	-	-	-
Freeport	6:35 AM	-	-	8:12 AM	-	9:18 AM	-	12:10 PM	-	2:15 PM	4:39 PM	5:24 PM	6:12 PM	6:57 PM	8:17 PM	8:47 PM	-	-	9:30 PM	-
Brunswick	6:50 AM	-	-	8:26 AM	-	9:32 AM	-	12:25 PM	-	2:29 PM	4:53 PM	5:38 PM	6:26 PM	7:11 PM	8:31 PM	9:01 PM	-	-	9:45 PM	-
Next Trip	682	104	106	110	108	112	115	684	114	686	118	120	122	124	126	688	-	-	68X	-

Notes: DH from Market St to Union Sta; X-fer at Union Sta for train to Brunswick; X-fer at PTC for train to Brunswick

Table 3-23 provides a summary of the number of trips operated per day. It shows that there are five AM peak hour trips and four PM peak hour trips.

Table 3-23: Coordinated Public Transport Service – TSM 1 Trip Summary

Type of Trip	No. of Trips
Brunswick Roundtrips	9
Downeaster to Brunswick Roundtrips	3
Yarmouth Short-Turns Roundtrips	2
Augmented Downeaster Brunswick Trips	3
Total AM Peak Arrivals	5
Total PM Peak Departures	4

Coordinated Public Transport Service – TSM 2

Table 3-24 shows a conceptual schedule of the coordinated Public Transport Service, including all connections to and from Downeaster Brunswick service. As shown in Table 3-24, and also like TSM 1, the CPTS has been programmed to provide supplemental Downeaster service between Portland and Brunswick. There are two connections to Boston-bound Amtrak trains in Portland (Amtrak #684 and Amtrak #688), and there is one connection to an outbound train in Portland (Amtrak #685, which terminates in Portland). These three connections increase the number of daily trips between Brunswick and Boston from six to nine. For all at the connections at Portland Transportation Center are provided with 10 minute timed transfers.

Table 3-24: Coordinated Public Transport Service Conceptual Schedule – TSM 2

Inbound (South) Service	Amtrak	Maine DOT	Maine DOT	Maine DOT	Amtrak	Maine DOT	Amtrak	Maine DOT	Maine DOT	Amtrak	Maine DOT	Maine DOT	Maine DOT	Maine DOT	Amtrak	Amtrak				
Trip No.	680	100	102	104	682	106	108	110	112	114	684	116	118	686	120	122	124	126	688	68X
Cycle	x	a	b	a	y	b	b	a	b	b	x	b	a	y	a	b	a	b	x	y
Brunswick	-	6:09 AM	6:44 AM	-	7:10 AM	-	-	8:31 AM	10:00 AM	-	12:55 PM	-	2:19 PM	-	4:58 PM	5:43 PM	7:02 PM	7:24 PM	-	10:05 PM
Freeport	-	6:20 AM	6:55 AM	-	7:25 AM	-	-	8:42 AM	10:11 AM	-	1:10 PM	-	2:30 PM	-	5:09 PM	5:54 PM	7:13 PM	7:35 PM	-	10:20 PM
Yarmouth (Exit 15)	-	6:30 AM	7:05 AM	7:21 AM	-	-	8:24 AM	8:52 AM	10:21 AM	12:36 PM	-	-	2:40 PM	-	-	-	-	7:45 PM	-	-
PULSE	-	6:47 AM	7:22 AM	7:38 AM	-	-	8:41 AM	9:09 AM	10:38 AM	12:53 PM	-	-	-	-	5:31 PM	6:16 PM	-	-	-	-
Union Station	-	-	-	-	7:45 AM	7:50 AM	-	-	-	-	1:30 PM	1:35 PM	-	-	-	-	-	-	-	10:40 PM
Portland Transportation Center	5:55 AM	-	-	-	8:00 AM	-	-	-	-	-	1:45 PM	-	2:55 PM	3:05 PM	-	-	7:35 PM	8:00 PM	8:10 PM	10:55 PM
Congress & Forest	-	6:49 AM	7:24 AM	7:40 AM	-	7:56 AM	8:43 AM	9:11 AM	10:40 AM	12:55 PM	-	1:41 PM	-	-	5:33 PM	6:18 PM	7:43 PM	8:08 PM	-	-
ME Medical	-	6:54 AM	7:29 AM	7:45 AM	-	8:48 AM	9:16 AM	10:45 AM	1:00 PM	-	2:59 PM	-	-	-	5:38 PM	6:23 PM	7:46 PM	8:13 PM	-	-
Mercy Hospital	-	6:57 AM	7:32 AM	7:48 AM	-	7:58 AM	8:51 AM	9:19 AM	10:48 AM	1:03 PM	-	1:43 PM	3:02 PM	-	5:41 PM	6:26 PM	7:48 PM	8:16 PM	-	-
State & Danforth	-	6:59 AM	7:34 AM	7:50 AM	-	8:00 AM	8:53 AM	9:21 AM	10:50 AM	1:05 PM	-	1:45 PM	3:04 PM	-	5:43 PM	6:28 PM	7:50 PM	8:18 PM	-	-
Center Street	-	7:01 AM	7:36 AM	7:52 AM	-	8:02 AM	8:55 AM	9:23 AM	10:52 AM	1:07 PM	-	1:47 PM	3:06 PM	-	5:45 PM	6:30 PM	7:52 PM	8:20 PM	-	-
Market & Middle	-	7:03 AM	7:38 AM	7:54 AM	-	8:05 AM	8:57 AM	9:25 AM	10:54 AM	1:09 PM	-	1:50 PM	3:08 PM	-	5:47 PM	6:32 PM	7:55 PM	8:22 PM	-	-
Boston (North Station)	8:25 AM	-	-	-	10:25 AM	-	-	-	-	-	4:10 PM	-	-	5:35 PM	-	-	-	-	10:35 PM	-
Next Trip	681	101	103	105	683	107	109	111	113	116	685	119	117	687	121	123	125	127	689	-

Notes: DH from Market St to Union Sta; X-fer at Union Sta to local bus; DH from Market St to Union Sta; X-fer at Union Sta to local bus; X-fer at PTC for train to Boston; X-fer at PTC for train to Boston

Outbound (North) Service	Amtrak	Maine DOT	Amtrak	Maine DOT	Amtrak	Maine DOT	Amtrak	Maine DOT	Maine DOT	Amtrak	Amtrak									
Trip No.	68X0	101	103	105	107	109	111	681	113	683	115	117	119	121	123	685	125	127	687	689
Cycle	y	a	b	a	b	b	a	x	b	y	a	a	b	a	b	x	a	b	y	x
Boston (North Station)	-	-	-	-	-	-	-	9:05 AM	-	11:05 AM	-	-	-	-	-	5:00 PM	-	-	6:20 PM	11:20 PM
Portland Transportation Center	5:55 AM	-	-	-	-	-	-	11:30 AM	-	1:30 PM	-	-	-	-	-	7:25 PM	7:35 PM	-	8:50 PM	1:45 AM
Congress & Forest	-	6:49 AM	7:24 AM	7:40 AM	7:56 AM	8:43 AM	11:23 AM	-	12:00 PM	-	1:24 PM	4:00 PM	4:45 PM	5:33 PM	6:18 PM	-	7:43 PM	8:08 PM	-	-
ME Medical	-	6:54 AM	7:29 AM	7:45 AM	-	8:48 AM	-	-	12:05 PM	-	4:05 PM	4:50 PM	5:38 PM	6:23 PM	7:46 PM	8:13 PM	-	-	-	-
Mercy Hospital	-	6:57 AM	7:32 AM	7:48 AM	7:58 AM	8:51 AM	11:24 AM	-	12:08 PM	-	1:26 PM	4:08 PM	4:53 PM	5:41 PM	6:26 PM	-	7:48 PM	8:16 PM	-	-
State & Danforth	-	6:59 AM	7:34 AM	7:50 AM	8:00 AM	8:53 AM	11:26 AM	-	12:10 PM	-	1:28 PM	4:10 PM	4:55 PM	5:43 PM	6:28 PM	-	7:50 PM	8:18 PM	-	-
Center Street	-	7:01 AM	7:36 AM	7:52 AM	8:02 AM	8:55 AM	11:28 AM	-	12:12 PM	-	1:30 PM	4:12 PM	4:57 PM	5:45 PM	6:30 PM	-	7:52 PM	8:20 PM	-	-
Market & Middle	-	7:03 AM	7:38 AM	7:54 AM	8:05 AM	8:57 AM	11:31 AM	-	12:14 PM	-	1:33 PM	4:14 PM	4:59 PM	5:47 PM	6:32 PM	-	7:55 PM	8:22 PM	-	-
PULSE	-	7:06 AM	7:38 AM	7:56 AM	8:07 AM	8:59 AM	11:34 AM	-	12:17 PM	-	1:36 PM	4:17 PM	5:02 PM	5:50 PM	6:35 PM	-	7:58 PM	8:25 PM	-	-
Union Station	6:10 AM	-	-	-	-	-	11:40 AM	11:45 AM	-	-	-	-	-	-	-	-	-	-	9:05 PM	-
Yarmouth (Exit 15)	-	7:18 AM	-	-	8:19 AM	9:16 AM	-	-	12:31 PM	-	1:53 PM	4:34 PM	5:19 PM	6:07 PM	6:52 PM	-	8:12 PM	8:42 PM	-	-
Freeport	6:35 AM	-	-	8:15 AM	-	9:26 AM	-	12:10 PM	-	-	2:03 PM	4:44 PM	5:29 PM	6:17 PM	7:02 PM	-	8:22 PM	8:52 PM	9:30 PM	-
Brunswick	6:50 AM	-	-	8:29 AM	-	9:37 AM	-	12:25 PM	-	-	2:14 PM	4:55 PM	5:40 PM	6:28 PM	7:13 PM	-	8:33 PM	9:03 PM	9:45 PM	-
Next Trip	682	104	106	110	108	112	115	684	114	686	118	120	122	124	126	688	-	-	68X	-

Notes: DH from Market St to Union Sta; X-fer at Union Sta for train to Brunswick; X-fer at PTC for train to Brunswick

Table 3-25 provides a summary of the number trips operated per day. It shows that there are five AM peak hour trips and four PM peak hour trips.

Table 3-25: Coordinated Public Transport Service - TSM 2 Trip Summary

Type of Trip	No. of Trips
Brunswick Roundtrips	9
Downeaster to Brunswick Roundtrips	3
Yarmouth Short-Turns Roundtrips	2
Additional Downeaster Brunswick Trips	3
Total AM Peak Arrivals	5
Total PM Peak Departures	4

3.2.11 Fleet Size – TSM 1 and TSM 2

For both TSM 1 and 2 options, fleet size (number of vehicles or rail consists) was determined based on projected service miles and hours. Fleet size was further modified to ensure that all projected riders would have a seat for their trip to Portland (or to the outer terminal for reverse commuting).

As in Phase I, express buses operating in the CPTS would be a 50-foot, 83-passenger double decker bus, currently employed by private companies such as Mega Bus. A double decker bus is assumed so as to minimize the number of peak period trips departing from Brunswick (AM peak) and returning to Brunswick in the PM peak. By reducing the required number of buses, the overall operating costs will be minimized as well. The double decker buses employed by MegaBus are approximately 18 inches taller than a conventional bus, and do not pose any clearance issues along the route between Portland and Brunswick.

Table 3-26 summarizes the fleet requirements for each option.

Table 3-26: Vehicle Requirements for Each Service Option

Vehicle	TSM 1	TSM 2
Double Decker Bus	3	3
DMUs	-	-
Maintenance of Way (MOW) Equipment ¹⁷	-	-
Fleet Size	3	3

3.2.12 Bus Infrastructure Requirements for TSM 1 and TSM 2

For a highway running option to Brunswick, and with the Downeaster running to Brunswick, some infrastructure upgrades are required.

¹⁷ Maintenance of Way equipment, often abbreviated as MOW, refers to the equipment used in performance of maintenance of railroad rights of way. It can include procedures from the initial surveying, clearing and grading of a right-of-way to its general upkeep and even eventual dismantling.

Road Upgrades

For both TSM options, no modifications to I-295 are required. Additional support roadwork is required to provide access to the offline stations. Approximately 0.5 miles of new roadwork would need to be constructed for a Falmouth stop, and 0.2 miles for a Yarmouth stop (totaling to 0.7 miles for TSM 1 and 0.2 miles for TSM 2).

Signal Upgrades

No traffic signal upgrades are required. However, a dispatching system would be required.

Fleet Requirements and Maintenance Facility

Three double decker buses are required to offer service. Two buses would be directly used to operate the service and a third bus would be kept as a spare. A new maintenance facility will be required to maintain and repair the bus fleet.

Station Upgrades

Three offline stops will need to be built at Falmouth, Yarmouth and Freeport. The Freeport stop would be built at the intersection of US Route 1 and Bow Street.¹⁸ It would be located approximately 500 feet from the Freeport Downeaster station. Passengers can park and purchase their tickets at the Freeport train station, and then walk up to the stop on Route 1. The bus stop in Brunswick would be located at the Brunswick train station. No upgrades to Brunswick are anticipated.

In total, approximately 350 new parking spaces are required for TSM 1 compared to 300 new parking spaces for TSM 2. New parking ranges from 50 to 150 spaces per station.

Additionally, a train platform on Saint John Street in Portland would also be built. This would allow for passengers using the Downeaster between Freeport/ Brunswick and Portland to transfer to and from the downtown distribution loop. It is assumed that two ticket vending machines (TVM) would be installed at the former site of the Union Station, and no parking spaces are provided.

A total of 16 TVMs (two machines are included in the construction of Union Station) would need to be installed at the stations for TSM 1 (two machines are included in the construction of Union Station) and 14 TVMs for TSM 2. Four machines each are required at the PULSE Station near Monument Square in downtown Portland and the Brunswick Station. The remaining stations would get two TVMs each.

A Closed Circuit TV (CCTV) security system would need to be installed at all stations.

Table 3-27 provides a summary of the infrastructure upgrades required to implement the Coordinated Public Transport Service TSM 1 and TSM 2.

¹⁸ This will minimize the overall trip time for passengers heading to or from Brunswick.

Table 3-27: Summary of Infrastructure Upgrades for Coordinated Public Transport Service

Category	TSM 1		TSM 2	
	Units	Qty.	Units	Qty.
Highway Work				
Shoulder Widening	Lane Mile	0.0	Lane Mile	0.0
Rumble Strip Filling	Lane Mile	0.0	Lane Mile	0.0
Stations				
Online Highway Station	Each	0	Each	0
Vertical Circulation	Each	0	Each	0
Additional Support Roadwork	Mile	0.7	Mile	0.2
Offline Stop	Each	3	Each	2
Site Development	Each	3	Each	2
Parking Space	Each	350	Each	300
Ticket Vending Machine	Each	14	Each	12
Union Rail Station	Each	1	Each	1
Dispatching System	Each	1	Each	1
CCTV	System	1	System	1
Bus Maintenance Facility	Vehicle	3	Vehicle	3
50' Double Decker Bus (83-passenger)	Each	3	Each	3

3.2.13 Capital Costs

This section summarizes the capital and operating and maintenance (O&M) cost methodology and results for the alternatives being considered.

To understand the feasibility of the services identified, the cost of infrastructure construction required to operate the two service alternatives were estimated. A simple three-step process was used to estimate capital infrastructure costs.

Step 1) Estimated Quantities

The Service Design part of this document details the service requirements for offering commuter service to Brunswick. Service design provides a basis to determine the amount of infrastructure required to offer commuter service at the desired levels to downtown Portland. These requirements vary according to the alternative chosen.

Step 2) Unit Costs

The unity costs used to estimate the construction costs for each alternative were gathered from a variety of sources. The majority of cost estimates were achieved through consultation with Jacobs' Traffic and

Rail Engineers and from cost estimates from previous commuter rail planning studies.¹⁹ The unit cost estimates are listed in Table 3-28 for the Coordinated Public Transport Service.

Table 3-28: Coordinated Public Transport Service (Bus Option) Capital Cost Elements

Category	Units	Cost
Highway Work		
Shoulder Widening	Lane Mile	\$700,000 ¹
Rumble Strip Filling	Lane Mile	\$100,000 ¹
Stations		
Online Highway Station	Each	\$120,862 ²
Vertical Circulation (elevator)	Each	\$134,291 ³
Support Roadwork	Mile	\$53,717 ⁴
Offline Station	Each	\$33,573 ²
Site Development	Each	\$517,024 ⁵
Parking	Each	\$ 3,000 ⁵
Ticket Vending Machine	Each	\$89,962
Union Rail Station	Each	\$800,353 ⁷
CCTV	System	\$275,000 ⁷
Dispatching System	Each	\$284,363
Facility		
Maintenance Facility	Vehicle	\$200,665 ²

Source:

1. AECOM independent Estimate. Received at Meeting between AECOM and Jacobs Engineering Group. July 21, 2010, in Boston, MA.
2. Harvard Transit Technology Assessment. Pg. 54. Includes a 200 ft x 15 ft asphalt pad adjacent to interstate shoulder.
3. Jacobs Engineering Group. (2008). Ruggles Station Platform Study. Prepared for: Medical Area Scientific Community Organization, pg. 73. Cost adjusted to Portland cost of living.
4. Jacobs Engineering Group Traffic Engineers Estimate. Based on 2009 MassHighway Department standard costs for brush clearing, new gravel and asphalt. The resulting value was adjusted to the Portland cost of living.
5. HNTB. (2005). Draft Cost Feasibility Study for Portland Commuter Rail Study. Prepared for the Northern New England Passenger Rail Authority (NNEPRA) and the Maine Department of Transportation, Office of Passenger Transportation.
6. AECOM independent estimate, June 10, 2009.
7. Jacobs Engineering Group independent estimate.

¹⁹ HNTB. (2005) Draft Cost Feasibility Study for Portland Commuter Rail Study. Prepared for the Northern New England Passenger Rail Authority (NNEPRA) and the Maine Department of Transportation, Office of Passenger Transportation.

Step 3) Contingency and Support Costs

A 15% contingency factor was applied to the relatively predictable costs for roadway, track & signal upgrades, and new track construction. In addition to the contingency, various engineering and support costs were added to the cost estimates and are listed in Table 3-29 applied to costs for both options.

Table 3-29: Various Support Costs

Cost Item	Budgeted Amount
Contingency	15% of construction cost
Engineering and Construction Management	15% of construction cost
Administration	4% of construction cost
Insurance and Permitting	3% of construction cost

Infrastructure Costs

Using the operational and infrastructure needs described in the documents listed in Step 1 of the cost estimation process, the study team was able to calculate the expected capital costs for infrastructure construction. The findings of the three step estimation method are presented below in Table 3-30.

Table 3-30: Estimated Infrastructure Costs

Category	Cost (\$2009, millions)	
	TSM 1	TSM 2
Road & Signals	-	-
Track, Signal, & PTC	-	-
Stations	\$5.2	\$4.3
Maintenance Facility	\$0.6	\$0.6
Contingencies	\$2.1	\$1.8
Infrastructure Total	\$7.9	\$6.7

As shown in Table 3-30, the infrastructure upgrades required to offer the two TSMs are roughly half of the Integrated Rail Service.

Rolling Stock

Buses operating in the CPTS (TSM options 1 and 2) would be a 50-foot, 83-passenger double decker bus, currently employed by private companies such as Mega Bus. The fleet requirements and total rolling stock costs for each option are summarized in Table 3-31.

Table 3-31: Vehicle Requirements and Rolling Stock Costs for each Service Option

Vehicle	Cost per Unit	Fleet Size		Rolling Stock Cost	
		TSM 1	TSM 2	TSM 1	TSM 2
50' Double Decker bus (83-passenger)	\$625,000 ²⁰	3	3	\$1,875,000	\$1,875,000
Fleet Size		3	3		
Total				\$1,875,000	\$1,875,000

Source: Jacobs Engineering Group estimate.

Total capital costs for each option are shown in Table 3-32.

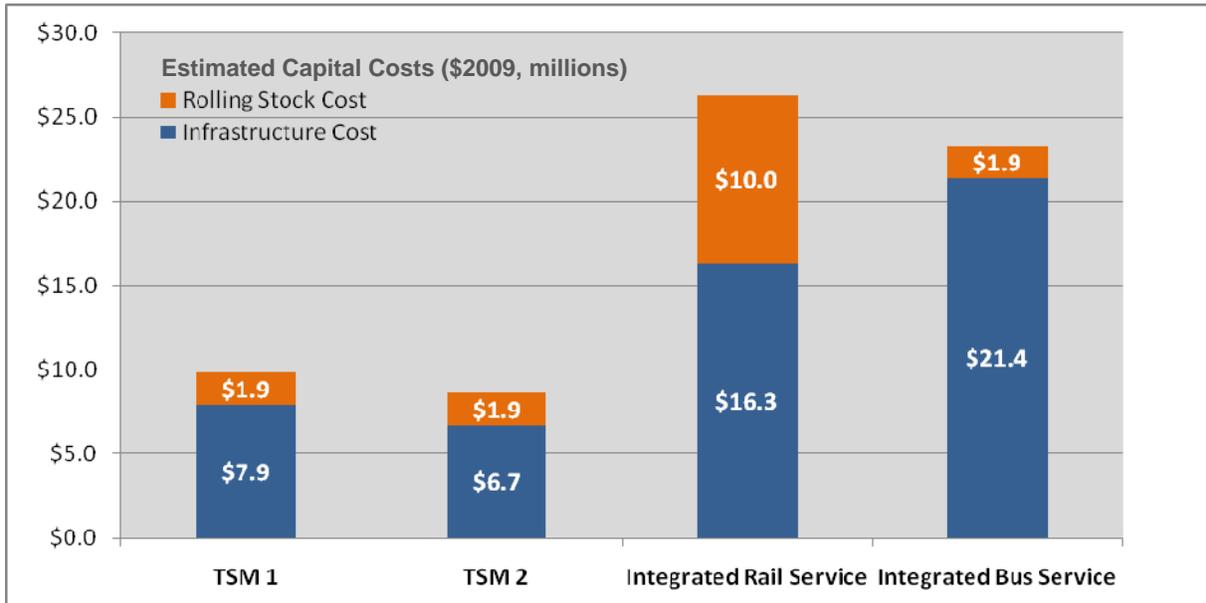
Table 3-32: Total Capital Costs

Category	Cost (\$2009, millions)	
	TSM 1	TSM 2
Road & Signals	-	-
Track, Signal, & PTC	-	-
Stations	\$5.2	\$4.3
Maintenance Facility	\$0.6	\$0.6
Contingencies	\$2.1	\$1.8
Total Infrastructure Cost	\$7.9	\$6.7
Total Rolling Stock Cost	\$1.9	\$1.9
Total Capital Costs	\$9.8	\$8.6

Figure 3-9 shows the comparison of the estimated annual capital costs of the TSM options, Integrated Rail and Integrated Bus services. As shown in the figure, total capital costs range from \$8.6 million to \$26.4 million, with each TSM costing approximately three times less than the integrated rail option.

²⁰ Derived from Mega Bus procurement document. Accessed May 14, 2010. Available: http://www.busride.com/news.asp?N_ID=646of Business in 2008.

Figure 3-9: Estimated Capital Costs (\$2009, millions)



3.2.14 Operating Costs

Coordinated Public Transport Service – TSM 1 & TSM 2

Four categories of operating costs were estimated for the Coordinated Passenger Transport Service:

- Bus Transportation (Operators and Fuel)
- Maintenance of Equipment (MOE)
- Dispatching
- Administration

Whenever possible, data from local bus services were used in this analysis. In this instance, costs associated with operation of the Zoom Turnpike Express commuter bus service and Portland METRO service were used to represent the costs of various categories that would be seen with a potential express bus service to Brunswick.

Note: The costs associated with operating the Amtrak Downeaster between Brunswick and the Portland Transportation Center are not considered in this analysis because it is assumed that Brunswick stations will already be constructed and in operation as part of the Amtrak Downeaster extension project.

Bus Transportation Costs

Transportation costs include the direct costs for service provision including bus crews and propulsion energy and bus supplies. No weekend service is assumed. The following assumptions were used in transportation cost estimation:

The fully burdened²¹ operator rate is of \$36.75/hour.²² Overtime is charged at 1.5 times the fully-loaded rate, or \$55.13/hour. Extraboard staff costs \$36.75 per hour.

Preliminary crew rosters were developed for each of the service options.

Three (3) crews are required to offer fulltime express bus service. One crew operates in the morning peak, and first part of the midday service. A hot swap²³ takes place in Brunswick during the midday.

Due to operational constraints of the service, it is assumed that the other crew would work a split shift. The crew would be in service until approximately 1:00 pm, and then go onto release time until 4:45 PM.

Fuel costs are based on the December 2009 cost for diesel (\$2.33/gallon) in Maine.²⁴

Two buses operate the service.

The derived fuel efficiency for a double decker bus is 6.17 mpg.²⁵

Service Operates 254 days per year.

From the assumptions listed above, the annual transportation costs are shown below in Table 3-33.

Table 3-33: Transportation Costs for all Bus Options

Transportation	TSM 1	TSM 2
Operators	\$336,000	\$336,000
Fuel	\$61,000	\$59,000
Total	\$397,000	\$395,000

Since TSM 2 operates fewer miles than TSM 1 (since it does not stop at Falmouth), the Transportation costs for TSM 2 are slightly less than TSM 1.

²¹ A fully-burdened labor rate is a rate which includes all the contractor costs necessary to convert an estimate of contractor hours to contractor dollars.

²² Derived from 2009 Zoom Turnpike Express Data. Received electronically from Mr. Ed Clifford, Zoom Turnpike Express General Manager. March 9, 2010.

²³ Hot swapping means replacing system components without shutting down the system.

²⁴ Cost for No. 2 Diesel for the State of Maine. Available: http://www.eia.doe.gov/emeu/states/oilprices/oilprices_me.html. Site accessed on May 14, 2010.

²⁵ "Mega Bus Implements Double Decker Fleet to Meet Demand for Low Cost Travel." Available: <http://us.megabus.com/implementns-double-decker-fleet-to-meet-demand.aspx>. Site Accessed on March 9, 2010.

Maintenance of Equipment (MOE) Costs

The mechanical costs include labor and materials for fleet maintenance. It is assumed that Maine DOT would maintain the selected vehicles at the same rates as observed on the Zoom Turnpike Express. It is also assumed that a double decker bus is maintained at a cost similar to a single level bus. See Table 3-34 for the vehicle maintenance unit costs.

Table 3-34: Maintenance of Equipment (MOE) Unit Costs

Equipment	Cost
Annual Bus Labor Costs ²⁶	\$18,000
Annual Bus Materials (Parts) Costs ²⁷	\$16,000

Using the costs and assumptions listed above, the estimated MOE expenses for express bus service are shown in Table 3-35. The estimated annual MOE expense was determined to be approximately \$0.1 million for both TSM 1 and TSM 2, since both options have the same fleet size.

Table 3-35: Estimated Annual Maintenance of Equipment (MOE) Costs for TSM 1 and TSM 2

Category	Unit Cost	Fleet Size	Total Cost
Annual Vehicle Labor	\$18,000	3	\$54,000
Vehicle Materials	\$16,000	3	\$48,000
Annual MOE Expense			\$102,000

Dispatching Costs

Portland METRO states that their annual dispatching costs are approximately \$100,000.²⁸ It is assumed that this would be the same cost for dispatching the express bus commuter service. It is further assumed that the commuter service could be dispatched using the METRO facilities.

Administrative Costs

Administration costs include revenue collection and accounting, marketing, personnel, training and safety costs. These costs are estimated at the same cost as those reported by the Zoom Turnpike Express. In this case, the administration cost was determined to be 23.6% of the Transportation, Maintenance of Equipment (MOE), Maintenance of Way (MOW), and Dispatching costs.²⁹

²⁶ Derived from 2009 Zoom Turnpike Express Data. Received electronically from Mr. Ed Clifford, Zoom Turnpike Express General Manager. March 9, 2010.

²⁷ Ibid.

²⁸ Conversation with Tom Ridge, Sr., dispatcher at Portland METRO. September 24, 2009.

²⁹ Derived from 2009 Zoom Turnpike Express Data. Received electronically from Mr. Ed Clifford, Zoom Turnpike Express General Manager. March 9, 2010.

Total Estimated Annual Operating Costs

Table 3-36 summarizes the forecast annual operating expenses for the Coordinated Passenger Transport Service.

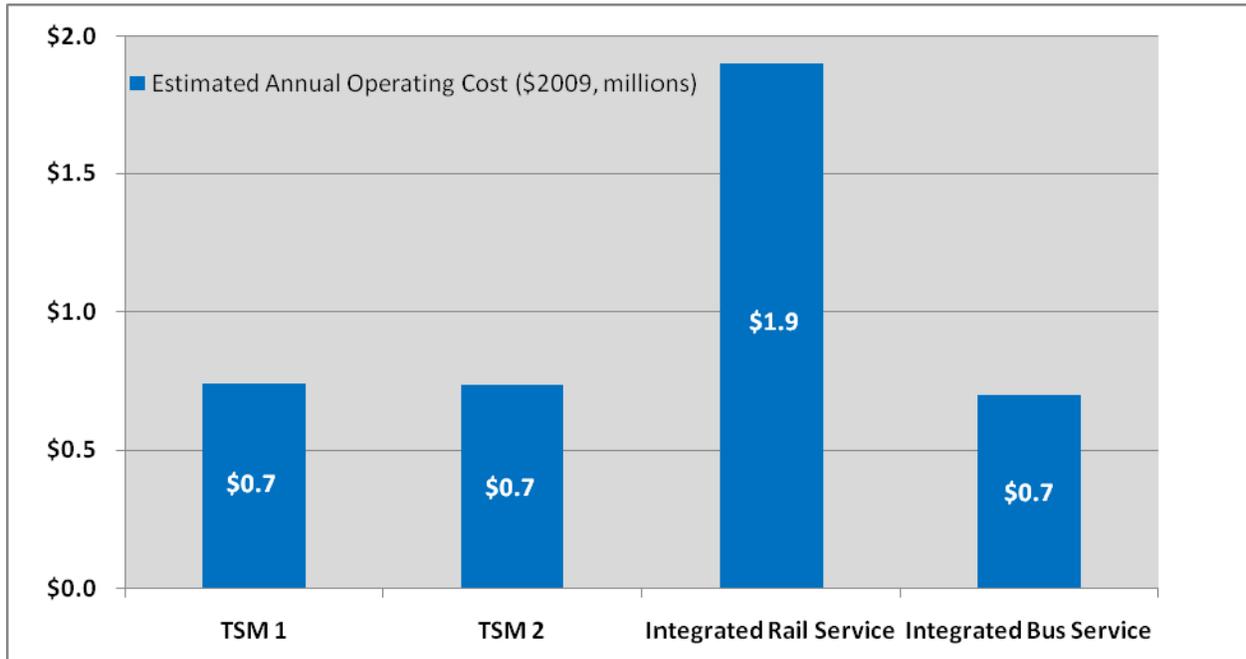
Table 3-36: Summary of CPTS Annual Operating Costs

Category	TSM 1	TSM 2
Transportation		
Operators	\$336,000	\$336,000
Fuel	\$61,000	\$59,000
Maintenance of Equipment	\$102,000	\$102,000
Dispatching	\$100,000	\$100,000
Administration (23%)	\$141,000	\$141,000
Total	\$740,000	\$738,000

Due to the similarity of the two options, the estimated annual operating cost for the two express bus options is approximately the same at \$740,000, as shown in Table 3-36. The principal difference between the two is that TSM 1 stops in Falmouth, whereas TSM 2 does not. Overall, the biggest cost driver associated with the CPTS option is the bus transportation costs, which are estimated at approximately 50% of the total overall operating expense.

Figure 3-10 shows the comparison of the estimated annual operating costs of the TSM options, Integrated Rail and Integrated Bus services. The estimated annual operating cost is approximately three times greater for the commuter rail service than the TSM options and Integrated Bus Service at \$1.9 million.

Figure 3-10: Estimated Annual Operating Costs (\$ millions)



TSM Option Ridership

A detailed ridership analysis that utilized a transportation ridership model developed for the project study area was undertaken to identify the movements and quantities of potential riders that would be attracted by each alternative. The results were forecasted to the year 2035 for each of the TSM alternatives, and included the Amtrak intercity trips as well.

The results of the analysis indicated that the TSM 1 option would attract 665 boardings per weekday versus 557 boardings for TSM 2. On an annual basis assuming 254 annual operating days (weekday service only), that amounts to approximately 169,000 boardings for TSM 1 as opposed to approximately 141,000 boardings for TSM 2. The main difference is that TSM 2 has one less bus stop, as it does not serve Falmouth like TSM 1 does.

Summary

The summary comparison of TSM 1 and TSM 2 options are shown below in Table 3-37.

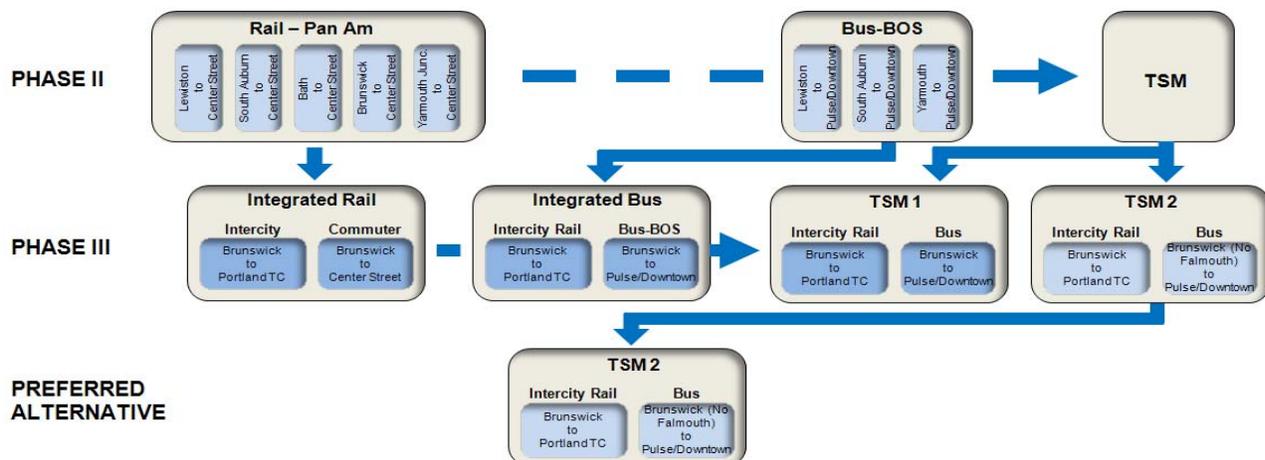
Table 3-37: Comparison of TSM 1 and TSM 2 Options

Option	TSM 1	TSM 2
Weekday Boardings	665	557
Annual Operating Days	254	254
Annual Boardings	168,910	141,478
Annual Operating Costs	\$740,467	\$ 737,710
Capital Costs	\$9,800,000	\$8,600,000
Operating Costs/Boarding	\$4.38	\$5.21
Capital Cost/Boarding	\$58.01	\$60.78

3.3 Phase III Analysis and Recommendations

After review of the TSM 1 and 2 alternatives, and feedback from stakeholders and other public input, it was determined that TSM 2 would be selected as the preferred alternative. This option would provide a high level of flexibility, favorable ridership, and constitutes a reasonable and more feasible investment in capital and operating funds that would provide a much needed option for improving mobility within the Portland North study area. It also maximizes other transportation investments proposed for the study area and provides an opportunity to build support for transit service that could grow and expand as ridership improves. The alternatives development and screening process is shown in Figure 3-11 provided below.

Figure 3-11: Alternative Development and Screening Diagram



Chapter 4 Public Involvement Process and Agency Coordination

The MaineDOT worked with the Androscoggin Valley Council of Governments (AVCOG) and the Greater Portland Council of Governments (GPCOG) to provide public outreach and technical assistance as appropriate for MaineDOT's Portland North Alternative Modes Transportation Project. The Public Participation Plan for the Portland North Alternative Modes Transportation Project forms the basic framework for achieving an interactive dialogue between community decision-makers, the MaineDOT, stakeholders, municipalities, AVCOG, GPCOG, and citizens. The objectives of the dialogue include the following objectives:

- Residents of the Androscoggin and Cumberland County become fully aware of the Project planning process;
- The public has opportunities to provide their input to the MaineDOT, AVCOG, GPCOG, and their towns¹;
- The public has access to relevant technical information and any analyses performed throughout the planning process;
- The MaineDOT, stakeholders and participating municipalities have input from the broadest range of perspectives and interest in the community as possible; and
- Such input is elicited through a variety of means (electronic, printed, and oral) in such a way that it may be carefully considered.

4.1 Outreach Program

4.1.1 Public Coordination

MaineDOT implemented the following actions to ensure that public meetings allow for an open discussion of the relevant issues at hand and that public hearings allow for appropriate testimony:

- An agenda was established that clearly defined the purpose of each stakeholder and public meeting, the items to be discussed, and any actions that may be taken.
- The scheduled date, time and place were made convenient to encourage maximum participation by Androscoggin and Cumberland County residents;
- The meeting was conducted in an orderly fashion by a clearly identifiable facilitator from MaineDOT to ensure that all attendees have an opportunity to offer comments, discuss issues or provide feedback;
- Opening remarks were provided (by the facilitator) that clearly outlined the purpose of the meeting, the procedures that the attendees should use for offering input during the meeting and how the public input would be used was described;
- As appropriate, an overview of documents or proposals to be considered was discussed;

¹ Staff also worked with Mid-Coast Council for Business Development and Planning (MCBDP) to ensure participation with Brunswick, Bath and Topsham.

- All persons attending the meeting who desire to participate should be allowed to do so. However, specific factors, such as the meeting purpose, number in attendance, time, considerations, or future opportunities to participate, may require that appropriate time constraints be applied. These time constraints were clearly outlined by the facilitator as needed;
- All attendees were encouraged to sign-in using a provided sign-in sheet;
- Summaries of the meetings were made available as soon as possible following the meeting via the devoted website to the project; and
- Special arrangements were made under the provisions of the American with Disabilities Act (ADA) with sufficient advance notice.

4.1.2 Agency Coordination

Public and Stakeholder Meetings

MaineDOT held four (4) public meetings at a number of locations to bring attention to the planning effort. MaineDOT and the Consultant (AECOM) worked closely with AVCOG to select locations convenient and accessible to the public, and suitable to the material being presented. Meetings were generally held in either the Portland or Lewiston/Auburn area.

MaineDOT staff convened a series of stakeholder meetings² between March 2008 and December 2009 and their staff worked with MaineDOT and the Consultant on the development of a comprehensive stakeholder list. In both regions the meeting location determined which agency (AVCOG or GPCOG) took the lead in organizing and documenting the meeting.

General Public Relations & Newsletters

AVCOG and GPCOG provided general public relations throughout the planning process, including preparation of newsletters and distributing them to stakeholder, official, interest groups and the general public, as appropriate. As of this writing, two newsletters were prepared and distributed in May 2008 and March 2009. AVCOG and GPCOG's websites direct internet traffic to the Portland North Alternative Modes Project website which is part of the larger MaineDOT website.³

² Although described as stakeholder meetings, all meetings were open to the public.

³ Portland North Project. <http://www.maine.gov/mdot/portlandnorth/>

Figure 4-1: Front Page of Project Newsletter

MaineDOT, AVCOG and GPCOG

Spring 2009



PORTLAND NORTH ALTERNATIVE MODES PROJECT

Implementation of Commuter Services either via Passenger Rail or Bus Rapid Transit between
Portland – Brunswick and Portland – Auburn.

INSIDE THIS ISSUE:

Route Alternatives: Pg.1

Portland Locations: Pg.2

Websites:

MaineDOT Portland North Project
<http://www.maine.gov/mdot/portlandnorth/>

FTA
www.fta.dot.gov/planning/newstarts/Planning_environment_222.html

AVCOG
www.avcog.org

GPCOG
www.gpcog.org

Project Update:

- Development of Purpose and Needs
- Development of Preliminary Changes
- Application and Development Of Transportation Models
- User Preference Surveys
- Development of FTA Initiation Report

Schedule:

- Phase 1 Screening (April '09)
- Refined Alternatives (July '09)
- Detailed Costs, Impacts Ridership (Aug '09)
- Section of Preferred Alternatives (Jan. '10)
- Small Starts Analysis (Mar. '10)

At the second Portland North Alternative Modes Project stakeholders meeting (2/11/09), AECOM provided an update on tasks accomplished since the last meeting:

1. Development of Purpose and Need
2. Development of Preliminary Alternatives
3. Application and Development of Transportation Models
4. User Preference Surveys
5. Development of FTA Initiation Report

Three options are being considered to provide a transit link between downtown Portland and Auburn or Brunswick.

Two of these are rail options would either utilize the Saint Lawrence and Atlantic (SLA) or Pan American Railway (PanAM) right-of-way. The third is a Bus Rapid Transit option that would use roadways such as I-95 to reach Auburn and I-295 to reach Brunswick. A partial-build segment providing rail or bus service to Yarmouth from Portland was also explored.

Brunswick (Bath)

Service Stats
22 roundtrips per weekday
Service headways (30/60 min. for peak/off peak)
Arrive in Portland 6:45AM
Depart Portland 10:55 PM

Terminal locations
SLA – Brunswick (Downeaster), Bath Station, Freeport Station, Yarmouth, Falmouth, Portland.
Pan Am – Brunswick (Downeaster), Bath Station, Freeport Station, Yarmouth Jct, Cumberland, Falmouth, and Portland.
Express Bus – Brunswick, Freeport, Yarmouth, Falmouth, Monument St.

South Auburn Services (Lewiston)

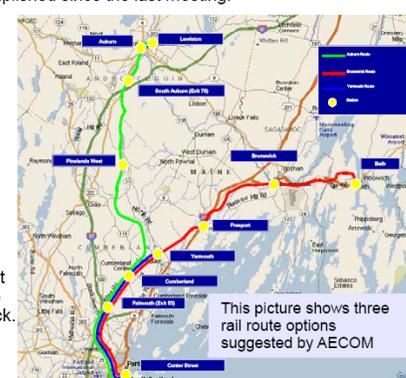
Service Stats
22 roundtrips per weekday
Service headways (30/60 min. for peak/off peak)
Arrive in Portland 6:45
Depart Portland 10:55 PM

Terminal locations
SLA – Auburn Intermodal, Auburn Station, Lewiston Station, Pinelands East, Yarmouth Jct, Falmouth, Portland.
Pan Am – South Auburn, Pinelands West, Lewiston Station, Cumberland, Falmouth, Portland.
Express Bus – South Auburn, Auburn Stop downtown, Lewiston, Gray, Falmouth, Monument Sq.

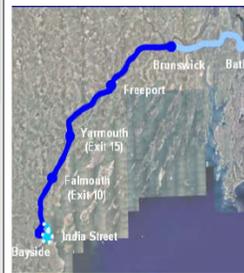
Yarmouth

Service Stats
22 roundtrips per weekday
Service headways (30/60 min. for peak/off peak)
Arrive in Portland 6:45AM
Depart Portland 10:55 PM

Terminal locations
SLA – Bayside or India, Yarmouth Station and Falmouth Station
Pan Am – Center St or Union and Yarmouth Jct, Cumberland Station, and Falmouth Station
Express Bus – Monument Sq, Yarmouth (exit 15) and Falmouth (exit 10)



This picture shows three rail route options suggested by AECOM





4.2 Summary of Outreach Activities

A summary list of public and stakeholder meetings with dates, times and locations during the Portland North Alternative Modes planning process is provided below:

Table 4-1: List of Public and Stakeholder Meetings

Date of Meeting	Meeting Topic	Items covered in the Meeting	Venue
December 13, 2010	Project Closeout Public Meeting	<ul style="list-style-type: none"> - Alternatives Analysis (Phase 1 and 2) - Bus on Shoulder Operations - Integrated Bus and Rail Options - TSM Alternatives/ Phase 3 - Recommended Alternative - Potential Funding Sources 	Brunswick Town Hall AVCOG Office
May 4, 2010	Public Meeting for the Portland North Small Starts Alternative Modes Study	<ul style="list-style-type: none"> - Progress Update and Summary of Alternatives (Phase 1 and 2) - Study Area Express Bus Routes - Ridership Projections (Regional Model Structure) - Preliminary Costs - Phase 2 Alternatives (Bus and Rail) - Small Starts - Amtrak Extension Feasibility Study 	Brunswick Town Hall
April 28th, 2010	Public Meeting at Abromson Center	<ul style="list-style-type: none"> - Progress Update and Summary of Alternatives (Phase 1 and 2) - Study Area Express Bus Routes - Ridership Projections (Regional Model Structure) - Preliminary Costs - Phase 2 Alternatives (Bus and Rail) - Small Starts - Amtrak Extension Feasibility Study 	University of Southern Maine (USM), Portland
March 30, 2010	Public Meeting	<ul style="list-style-type: none"> - Progress Update and Summary of Alternatives - Ridership Projections (Regional Model Structure) - Preliminary Costs - Phase 2 Alternatives (Bus and Rail) - Small Starts - Amtrak Extension Feasibility Study 	Brunswick Town Hall AVCOG Office

Date of Meeting	Meeting Topic	Items covered in the Meeting	Venue
December 10, 2009	Stakeholder Alternatives, Modeling and Cost update	<ul style="list-style-type: none"> - Progress Update and Summary of Alternatives - Ridership Projections (Regional Model Structure) - Preliminary Costs 	AVCOG Office
December 10, 2009	Portland Area Comprehensive Transportation Committee (PACTS)/Stakeholder Alternatives, Modeling and Cost update	<ul style="list-style-type: none"> - Small Starts Parameters - Schedule 	GPCOG Office
June 30, 2009	Town of Brunswick Stakeholder Coordination Meeting	<ul style="list-style-type: none"> - Summary of Project - Station Issues (Feedback) – Yarmouth and Brunswick Service Statistics, Brunswick Station - Summary of Small Starts Process , Criteria and Ratings - Preliminary Screening Criteria (Feedback) 	Brunswick Town Hall
June 16, 2009	Town of Cumberland Stakeholder Coordination Meeting	<ul style="list-style-type: none"> - Summary of Project - Station Issues (Feedback) – Yarmouth Service Statistics, Cumberland Station - Summary of Small Starts Process , Criteria and Ratings - Preliminary Screening Criteria (Feedback) 	Cumberland Town Hall
June 16, 2009	Town of Yarmouth Stakeholder Coordination Meeting	<ul style="list-style-type: none"> - Summary of Project - Station Issues (Feedback) – Yarmouth Service Statistics, Yarmouth Station - Summary of Small Starts Process , Criteria and Ratings - Preliminary Screening Criteria (Feedback) 	Yarmouth Town Hall
June 16, 2009	Town of Freeport Stakeholder Coordination Meeting	<ul style="list-style-type: none"> - Summary of Project - Station Issues (Feedback) – Yarmouth and Brunswick Service Statistics, Freeport Station - Summary of Small Starts Process , Criteria and Ratings - Preliminary Screening Criteria (Feedback) 	Freeport Town Hall
June 15, 2009	Town of Falmouth Stakeholder Coordination Meeting	<ul style="list-style-type: none"> - Summary of Project - Station Issues (Feedback) – Yarmouth Service Statistics, Falmouth Station - Summary of Small Starts Process , Criteria and Ratings - Preliminary Screening Criteria (Feedback) 	Falmouth Town Hall

Date of Meeting	Meeting Topic	Items covered in the Meeting	Venue
June 15, 2009	Town of Lewiston Stakeholder Coordination Meeting	<ul style="list-style-type: none"> - Summary of Project - Station Issues (Feedback) – Yarmouth and Auburn Service Statistics, Auburn and Lewiston Stations - Summary of Small Starts Process , Criteria and Ratings - Preliminary Screening Criteria (Feedback) 	AVCOG Office
May 27, 2009	City of Portland Stakeholder Coordination Meeting	<ul style="list-style-type: none"> - General Overview of Project and Service Statistics - Potential Portland Stations (Summary of Terminal Options) 	Portland City Hall
May 24, 2009	Railroad Coordination Meeting with SLR (Stakeholder Meeting)	<ul style="list-style-type: none"> - Other Issues 	St. Lawrence & Atlantic Railroad
March 24, 2009	General Stakeholder Progress Meeting	<ul style="list-style-type: none"> - Summary of Alternatives (Routes, Stations) - Key Issues Discussion (Service Design, Stations and Stops, Modes, Community Concerns, others) 	GPCOG Office
March 24, 2009	General Stakeholder Progress Meeting		AVCOG Office
March 20, 2009	Railroad Coordination Meeting with Pan Am Railways (Stakeholder Meeting)		PTC
February 11, 2009	General Stakeholder Progress Meeting	<ul style="list-style-type: none"> - Project Update, - Presentation of service alternatives, route alternatives, and Portland terminal alternatives - Travel distances and times, 	GPCOG Office
February 11, 2009	General Stakeholder Progress Meeting	<ul style="list-style-type: none"> - Comparable Routes (Shore Line East and Zoom Turnpike Express Bus) - Aggregate Rail Ridership Forecasting Model, - Project Timeline 	AVCOG Office
May 28, 2008	General Stakeholder/Kickoff Meeting	<ul style="list-style-type: none"> - Background (Existing transit services, ridesharing, population & Employment, commuting patterns, Study area Volumes), 	AVCOG
May 27, 2008	General Stakeholder/Kickoff Meeting at Falmouth	<ul style="list-style-type: none"> - Purpose and Need, - Alternatives Overview (Rail, Bus, and Transportation Systems Management alternatives), - Preliminary Evaluation Criteria. 	Town Hall

Date of Meeting	Meeting Topic	Items covered in the Meeting	Venue
March 20, 2008	Stakeholder Coordination Meeting at Freeport	<ul style="list-style-type: none">- Purpose of Study, Scope of Study,- Summary of Prior Alternatives,- FTA Small Starts Process,- Public Participation,- Study Schedule	Town Hall

4.2.1 Project Working Group

The stakeholder group is provided below:

- Chris Andreasson, President, Vermont Transit
- Stacey Benjamin, Maine State Planning Office
- Peter Butler, Federal Transit Administration (FTA)
- Deborah Cabana, Town Manager, Gray
- Christine Charette, Town Manager, Town of Durham
- Patrick Christian, Executive Director, Western Maine Transportation Services, Inc.
- Rick Cloutier, Manager, Auburn-Lewiston Municipal Airport
- William Crain, Selectman, Pownal
- Wayne Davis, Chairman, Train Riders Northeast
- Craig Denekas, Vice President, Libra Foundation
- Jay Duncan, Vice President, AECOM Transportation (Consultant Project Manager)
- John Duncan, Executive Director, PACTS
- Dawn Emerson, Town Planner, Yarmouth
- David Fink, President, Pan Am Railways
- Don Garrish, City Manager, Brunswick
- Ray Goss, General Manager, SLR
- Lucien Gosselin, Executive Director, Lewiston-Auburn Economic Growth Council
- Joseph Gray, City Manager, Portland
- Mark Hasselmann, Right of Way & Environmental Programs, Federal Highway Administration (FHWA)
- Alex Jaegerman, Chief Planner, Portland
- Robert Kahn, Architect, TrainRiders
- Dana Knapp, Maine Operations Manager, Concord Coach
Rosemary Kulow, Town Manager, New Gloucester
- Donna Larson, Town Planner, Freeport
- Chris Mann, Planning, MaineDOT
- Jeffrey Monroe, Director, Portland Ports and Transportation
- Charles Morrison, Executive Director, Androscoggin County Chamber of Commerce
- Nate Moulton, The Office of Freight and Business Services (OFBS), MaineDOT
- Phil Nadeau, Chairman, Lewiston Assistant City Manager
- Carla Nixon, Town Planner, Cumberland

- Marika O'Brien, Event Coordinator, Pinelands
- Dale Olmstead, Town Manager, Freeport
- Gordon Page, VP & Director of Passenger Operations, Maine Eastern Railroad (MERR)
- Nathan Poore, Town Manager, Falmouth
- Patricia Quinn, Executive Director, Northern New England Passenger Rail Authority (NNEPRA)
- Jamie Robinson, Safety & Training Manager, SLR
- Susan Moreau, MaineDOT (Proponent Project Manager)
- Rebecca Schaffner, Town Planner, New Gloucester
- William Shane, Town Manager, Cumberland
- Bruce Sleeper, Attorney, TrainRiders
- Laurie Smith, Acting City Manager, City of Auburn
- Amanda Stearns, Town Planner, Falmouth
- George Thebarger, Contract Planner, Gray
- Robert Thompson, Executive Director, AVCOG
- Bob Thorpe, President, Lewiston-Auburn Railroad Company
- Nathaniel Tupper, Town Manager, Yarmouth
- Conrad Welzel, Maine Turnpike Authority
- Matti Gurney, Planning Director, GPCOG

4.2.2 Technical Advisory Committee

In addition to soliciting opinions from the public about the study, the project team also relied on the expertise of a Technical Advisory Committee to help guide the project. The Technical Advisory Committee included the following members:

- Maine Department of Transportation
- Northern New England Passenger Rail Authority (NNEPRA)
- Greater Portland Council of Governments (GPCOG)
- Androscoggin Valley Council of Governments (AVCOG)
- Pan Am Railroad
- St. Lawrence & Atlantic Railroad (SLR)
- Lewiston-Auburn Railroad
- Maine Turnpike Authority (MTA)
- AECOM Transportation.



Chapter 5 TSM 2 Proposed Financial Plan

5.1 Introduction

This chapter discusses potential funding sources and strategy for the Transportation Systems Management Option #2 (TSM 2), the preferred alternative.

5.2 Existing Funding Environment

The Maine Department of Transportation (MaineDOT) Bureau of Transportation Systems Planning distributes to 21 rural and small urban transportation systems federal financial support from the Federal Transit Administration (FTA) (currently about \$5.4 million in non-urbanized area funding and \$4.48 million in urban area funding) as well as state money (currently about \$0.5 million).

Combined federal/state funds can be used to pay for 90% of capital costs (95% for clean-fuel vehicles if funding is available), 90% of administrative costs, and 60% of the operating deficit¹. MaineDOT's financial support is for the purpose of providing general public transportation and typically accounts for a small portion of each provider's overall budget. MaineDOT is appointed by the Governor to receive all FTA funds and manage their distribution.

In order to best coordinate services, MaineDOT's policy is to support a statewide system of demand response providers and to support fixed route systems that request support and meet 4 funding requirements. The 21 transit systems supported by MaineDOT fall into one of three different categories:

- Regional transportation systems.
- Fixed route transit systems.
- Transit systems supporting the tourist industry.

The proposed TSM 2 financial plan discussed below expands an innovative addition to this program: it proposes a service that may be funded with 100% combined state and federal funds.

5.3 Federal Transit Administration

The Federal Transit Administration (FTA) partners with MaineDOT on a wide range of projects and services. For the TSM 2, the Federal New Starts Program was considered for capital assistance, and Federal non-urbanized area formula funding (Section 5311) was considered for operating assistance. MaineDOT was advised that the project would not qualify for the New Starts program, but FTA funding may play a role in capital assistance from other FTA programs and in operating assistance as described in the capital and operating plans, below.

5.4 Description of the Project

The TSM 2 builds upon the \$35+ million railroad investment that will extend the Amtrak Downeaster intercity service north of Portland to Freeport and Brunswick, Maine. The new Portland North service would provide 14 roundtrips between Brunswick, Yarmouth, and Portland, enabling passengers to travel

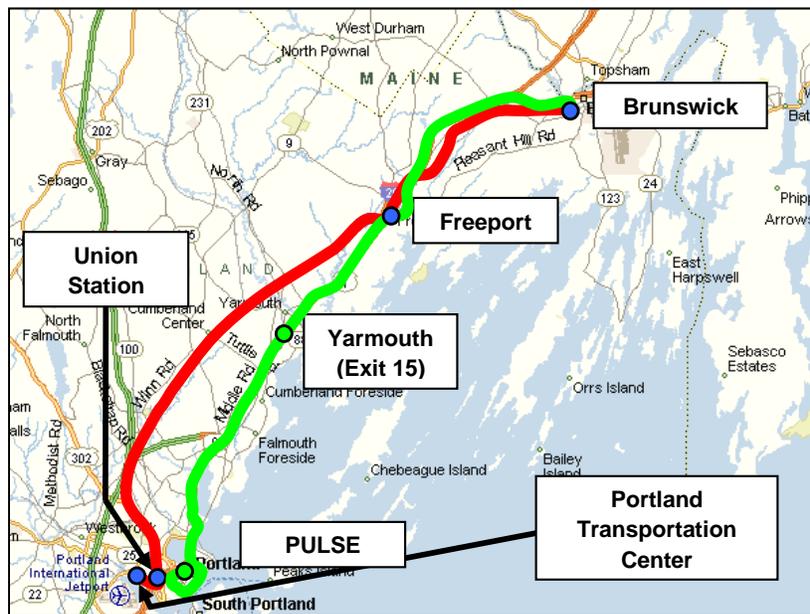
¹ Operating deficit is defined as the difference between revenue generated by the service and the total cost of operating the service, which is often a negative number (or deficit).

between Portland and Brunswick, on either the train or on the express bus. Nine bus roundtrips to Brunswick would be provided, along with three Downeaster trips.

In addition, since Yarmouth would not be receiving Amtrak service, two short-turn roundtrips from Yarmouth are provided for passengers and would run at approximately the same time as the Downeaster operates. The Yarmouth stop would be offline at Exit 15 on Interstate 295.

In order to keep the overall bus trip time to a minimum, the Freeport bus stop would be located at the corner of Bow and US Route 1, approximately 500 feet from the Freeport train station. Passengers would be able to park their cars, purchase tickets at the Freeport train station, and walk to the bus stop on Route 1. The Brunswick stop would also be located at the proposed Downeaster train station on Maine Street. See Figure 5-1 for a map of the proposed service.

Figure 5-1: Proposed TSM 2 Service



To provide commuters using the Downeaster between Freeport/Brunswick and Portland access to the downtown, a new station at the site of the former Union Station on St. John Street would need to be built where Amtrak trains could embark and disembark passengers. An express bus service would then provide shuttle service between the Union Station stop and employment centers in downtown Portland (except for the Maine Medical Center, which is within a 10 minute walk from the station on St. John Street).

Commuters using the Downeaster would be provided with a five minute timed transfer to the shuttle service. Table 5-1 below sets out the total number of vehicle trips on the Coordinated Public Transport Service.

Table 5-1: TSM 2 Trip Summary

Type of Trip	No. of Trips
Brunswick Roundtrips	9
<i>Downeaster</i> to Brunswick Roundtrips	3
Yarmouth Short-Turns Roundtrips	2
Additional Downeaster Brunswick Trips	3
Total AM Peak Arrivals	5
Total PM Peak Departures	4

Source: AECOM 2010

5.5 Capital Plan

The capital cost was estimated to be \$8.6 million in 2010 dollars as set out in Table 5-2 below. As indicated previously, any costs related to the Amtrak Downeaster service would not be borne by this project, as they would already be in place and covered under other funding sources. All costs noted below are related to bus elements.

Table 5-2: Potential TSM 2 Capital Costs

Cost Category	TSM 2 Capital Cost (\$2009, millions)
Road & Signals	-
Track, Signal, & PTC	-
Stations	\$4.3
Maintenance Facility	\$0.6
Rolling Stock	\$1.9
Contingencies	\$1.8
Total Capital Costs	\$8.6

Source: AECOM 2010

5.5.1 Revenue for Capital

MaineDOT has been advised that the project would not qualify for the FTA New Starts funding program because the specific plan for bus operation on the highway would not constitute a fixed guideway, as is required for the New Starts program. Therefore, the Department continues to explore other Federal discretionary program opportunities.

In-Kind Participation: Real Estate

A potential and applicable source of funds are in-kind sources. These include land that is currently in public ownership where no funds would be needed to acquire and utilize them to implement the proposed project. There are two potential parcels that fall into this category that are currently owned by the MaineDOT that are planned to be used for parking and bus station purposes. These are listed in Table 5-

3 below. It is our understanding that these parcels are entirely publicly owned and have not been funded with Federal funds, and that the state would not require compensation for their use in the TSM 2 project. If Federal funding is included in the program at a future date, these parcels would be considered as in-kind contributions to the project and their value would be counted as eligible non-federal match for the federal funds. The use of these parcels can offset the cost of the project either in the amount of their value or in the amount of the estimated cost of the parking spaces.

Table 5-3: Portland North Station Parcel Information - Potential In-kind Contributions

Station	Parcel ID	Size (acres)	Owner	Value
Brunswick	U16-10	5.8	State of Maine	\$363,000
Yarmouth	007-001	8.9	State of Maine	\$630,600
Total				\$993,600

Sources: Towns of Brunswick and Yarmouth Assessor's offices, 2010.

State Bond

MaineDOT participates in the proceeds from the issuance of state bonds, and the TSM 2 program is an eligible use. If Federal capital funding is identified, bond proceeds would be the principle source of matching funds. Without federal capital funding, bond proceeds would be the primary source of state capital funding.

Local Funding Possibilities

The TSM 2 project provides substantial transportation, land use, and economic benefits to the communities served. While local funding, or the use of state and/or federal funds allocated to the local communities, may be warranted and feasible in the future, no sources of local funding have been identified to date.

5.6 Operating Plan

The operating expense in 2010 dollars was estimated to be approximately \$740,000² per year, as noted in table 5-4 below.

² "Updated Portland North Meeting Service Options," memo from Jacobs to Jay Duncan, December 15, 2010.

Table 5-4: Potential TSM 2 Operating Costs

Category	TSM 2
Transportation	
Operators	\$336,000
Fuel	\$59,000
Maintenance of Equipment	\$102,000
Dispatching	\$100,000
Administration (23%)	\$141,000
Total	\$738,000

5.6.1 Revenue for Operating

Fare Policy and Revenue

The fares are assumed to be \$0.85 per boarding plus \$.05 per mile.³ This is the revenue level in 2010 dollars that was used to estimate the ridership levels.

Ridership is projected to be 557 per day. The total daily revenue is projected at \$1,213 dollars of which \$229 is estimated to be attributable to Amtrak trips. Assuming conservatively that all the Amtrak trip revenue is not credited to the TSM 2 project, the daily fare revenue is \$984⁴, and the annual revenue for 254 service days is estimated at \$249,936.

Federal Funding

FTA allocates funds to Maine for transit in non-urbanized on an annual basis. In 2010 the program for Maine was \$5,408,282. These funds when used for operating assistance must be matched with non-federal revenues on a 50-50 basis. Half of the net operating cost (after deducting fare revenues) is planned to be funded with Section 5311 funds, while the other half of the net operating costs is planned to be funded by the state, as described below.

The use of non-urbanized area funds is restricted to intercity bus service and service for non-urbanized areas. Its use for service that enters urbanized areas (such as Portland) is subject to these restrictions. Subject to clarification by FTA, the service may operate closed-door⁵ within the Portland urbanized area.

State Funding

The state has limited funding and has recently experienced revenue shortfalls. An illustrative source of state funding for the non-federal share of the assistance required for TSM 2 is State Transit Aviation and Rail (STAR) Account.

³ Marc Warner, Warner Transportation, conversation January 31, 2011.

⁴ Marc Warner, Warner Transportation, conversation January 31, 2011.

⁵ "Closed-door" in this context is used to mean only dropping off passengers in the inbound direction and only picking up passengers in the outbound direction, so that service is not provided from an urbanized area origin to an urbanized area destination.

The STAR Transportation Fund is an enterprise account established by the Legislature within the MaineDOT. Annual fees, approximately \$2 million (collected under Chapter 457, Part GGG), must be deposited into the STAR Account to support activities to manage transit, aeronautics and rail transportation. Money disbursed from the account may be used for the purpose of purchasing, operating, maintaining, improving, repairing, constructing and managing the assets of the STAR Transportation Fund including buildings, structures and improvements, and equipment.⁶

Revenues to the STAR account are all dedicated to that account by the Legislature and include railroad taxes, aviation fuel taxes, airport fees and taxes, propane fuel taxes, and miscellaneous fees.

Innovative Funding

Private sources of funding have been increasingly used for innovative transit projects in recent years. The most similar example may be the Health Line, in Cleveland, Ohio, which provided \$6.25 million from hospital resources for the naming rights. This line operates through a densely developed area, so similar revenues are unlikely for TSM 2; nevertheless, ways to offset the operating deficits with private participation would continue to be of interest.

Local Funding

There are significant economic, land use and transportation benefits from initiating the TSM 2 service. While local assistance for the service may be warranted and found to be feasible in the future, it is not included in the plan at this time.

5.7 Conclusion

A proposed funding plan for TSM 2 capital cost and operating deficit is set out in this chapter, as summarized in Table 5-5 below.

Table 5-5: Proposed TSM 2 Funding Plan

TSM 2 Sources and Uses of Funds (thousands of 2010 Dollars)	
Sources and Uses of Operations Funds	
Farebox Revenue	\$250
Section 5311 Funds	\$244
State Funds	\$244
Total Revenue	\$738
Operating Expense	\$738
Sources and Uses of Capital Funds	
In-Kind Assistance	\$994
Bond Proceeds	\$7,606
Total Capital Revenue	\$8,600
Total Capital Cost	\$8,600

Source: AECOM 2010

⁶ Findings and Recommendations Report, Task Force on Passenger Rail Funding, First Session of the 123rd Legislature's Joint Standing Committee on Transportation, January 2007

Sources of funding that more directly reflect the beneficiaries of the service or that draw on the resources of the private sector may be available to the project in the future. As the project develops and the implementation schedule is established, the proposed revenues and expenditures identified in this report (which are all stated in constant 2010 dollars) should be updated to reflect inflation and changes in unit costs.