Chapter 4: Alternatives Analysis

Introduction

The analysis of existing conditions in Chapter 3 described the current traffic safety and congestion problems the PACTS region is experiencing. The future trends analysis forecast worsening traffic conditions should current trends continue. Chapter 3 also documented current deficiencies in the passenger transportation network.

The foundation of the ***Destination Tomorrow*** alternatives analysis was formed by:

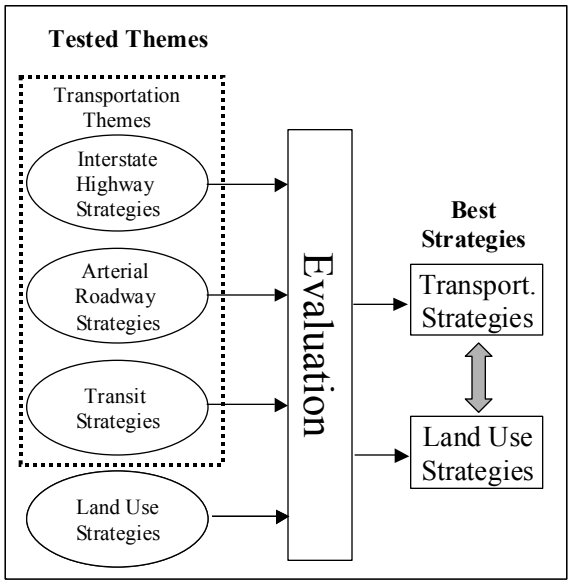
- the analyses of Chapter 3;
- examination of present transportation and land use policies;
- input from PACTS members, private citizens and interested stakeholders; and
- previous PACTS studies.

The alternatives analysis explored the impacts of potential transportation and land use strategies on the region's future transportation system. Many of the strategies tested were changes to the physical infrastructure of the transportation system, while others were aimed toward modification of policies that influence the shape of the transportation system. Both system-wide transportation impacts and facility-specific impacts were determined. Four different alternatives or "themes" were analyzed: interstate, arterial, transit and compact land use.

- Interstate Highway Theme – Emphasis on expanding and optimizing the region's interstate highways. Includes new and/or reconfigured interchanges, (the addition of auxiliary travel lanes), widened roadway segments, new alignment roadways and toll strategies.

- Arterial Roadway Theme – Significantly expands the arterial roadway system, and includes reconfigured roadways, widened roadways and new alignment roadways.

- Transit Theme – Appreciably expands the bus and passenger rail transit systems, and includes increased service frequency and expansion of service areas.



- Compact Land Use Theme – Analyzed the transportation impacts and benefits of clustering 50 percent of the region's future population and employment growth in existing or new village/urban centers.

Methodology for Alternatives Analysis

> In Chapter 4, the word "strategy" means a tested change in physical infrastructure, or change in policy.

Each theme included a number of changes to components of the transportation system. These changes included improvements, alterations and additions to existing infrastructure as well as the building of new infrastructure. To better understand the impacts of these changes, each theme was divided into several increments, or logical groupings of strategies. Each theme was also evaluated independent of the other themes by a set of system-wide quantitative measures.

Given the large impacts that substantial transportation investments can have on land use patterns, a series of **Land Use Response** forecasts was also developed. These forecasts attempted to capture the potential magnitude and direction of land use development that could occur in urban, suburban and rural areas based on the particular strategies tested in the four theme packages. For example, the Interstate Theme strategy of expanding the interstate system would be expected to further promote the dispersion of population and employment to the region's outlying rural and suburban areas due to reduced travel times and increased accessibility. The Land Use Response forecast to this strategy would therefore focus more development in the region's outlying rural and suburban areas. Subsequent to the analysis of each of the four themes, the most robust grouping from each theme was modeled with the Land Use Response forecasts.

Individual strategies within each theme were rated using a set of performance measures derived from ***Destination Tomorrow's*** Goals and Objectives. These ratings were used to develop a comprehensive transportation package that included the best potential strategies from each theme. This "best of" package represents those transportation strategies that collectively most effectively balance meeting identified transportation needs, and that are consistent with other regional objectives in the areas of economic development, land use, environmental quality, energy conservation and regional focus.

The PACTS Travel Demand Model was used to analyze each of the theme packages. The results were compared to the Year 2025 Base Model forecasts. (***Destination Tomorrow*** also used a Year 2000 Base Model that represented current conditions for comparing results.) The Year 2025 Base Model represents conditions in 2025 based on population and employment forecast prepared by GPCOG and on a "no-build" transportation network. The no-build network is today's system plus projects that have been funded and not yet built, and projects that have a very high probability of being built. Using a no-build network is standard practice in transportation forecasting, and

allows for an accurate (and unbiased by other system changes) testing of potential changes to the system.

The Model's results need to be interpreted with five caveats. **First**, to overstate the obvious, the Model is only a model. Its value lies in its ability to predict the complex impacts, within a reasonable tolerance, that result from changes in the transportation network. It is not able to precisely predict the level of traffic as a result of these changes. **Second**, it is a *closed system* modeling the p.m. peak hour (4:00 p.m. to 5:00 p.m.) therefore the total number of trips is fixed. This fixing of trips can result in an overstatement of congestion or an overstatement of the potential benefits of a particular improvement. **Third**, the destination of the trips (trip distribution) varies from theme to theme. This makes interpretation of the results more difficult than if the trip distribution were held constant. However, trip distribution is required to assess the impacts of the strategy being analyzed. **Fourth**, the model's intersection modeling function was disabled to better reflect the true capacity of the roadway and true travel demand. However, this revision can also distort the actual capacity of a roadway by eliminating the intersections potential for restricting traffic. **Lastly**, although the Model has the capability to model pedestrian, bicycle and bus transit modes of travel, it has primarily been used to analyze vehicular movements. To adequately incorporate these modes into the analyses, PACTS engineers made off-model adjustments. Prior to commencing the analyses, the PACTS engineers discussed each of these caveats and deemed them to be acceptable with results well within the expected analytical tolerance.

Evaluating the Effectiveness of the Theme Package and the Options Tested

Quantitative criteria and a list of more subjective criteria or performance measures directly related to ***Destination Tomorrow's*** goals and objectives were used to evaluate the themes and individual options within the themes. With the exception of travel time and volume changes between selected origins and destinations, the quantitative criteria were system-wide measures.

Quantitative Criteria

The quantitative criteria were:

1. Number of trips by mode – automobile, walk/bike or bus.
2. Percentage of trips by each mode – mode split.
3. Vehicle miles traveled (VMT) – aggregate number of miles driven by all vehicles.
4. Vehicle hours traveled (VHT) – aggregate number of hours spent driving by all drivers.
5. Travel time changes between selected origins and destinations.
6. Traffic volume changes at selected locations.

VMT and VHT

VMT and VHT are indicators of the magnitude of change in travel and congestion. If VMT increases, then the total amount of travel is increasing. This increase is due to an increase in the number of vehicle trips and/or the length of those trips. VHT increases indicate more hours are spent driving. Worsening congestion is indicated when VHT increases by a larger percentage than VMT. VMT and VHT are also reported by roadway functional class. From a community perspective, shifts in traffic to higher functionally classified roadways is generally preferable, e.g., a shift in traffic from collectors to arterials.

All VMT and VHT findings are presented relative to the forecasted increase in VMT of 41 percent and VHT increase of 62 percent from Base 2000 to Base 2025.

Travel Time Analysis

Travel time analysis provides useful information about changes in the time required to get between key locations, or origins and destinations. Monument Square and the Maine Mall were selected as the trip origins for comparison purposes because of their importance as economic and employment centers. Destinations were selected to be geographically representative of the evening commute from work to home for the region's residents. Destinations included:

- Route 1 in Scarborough at Dunstan Corner.
- Route 22 in South Gorham west of the Route 22/114 overlap.
- Route 25 in Gorham west of the Village and west of the probable location of the Gorham Bypass connections.
- Route 77 in the town center of Cape Elizabeth.
- Yarmouth, east of I-95.
- West Cumberland, near the Maine Turnpike and Route 26/100.
- Route 302 in Windham, south of Fosters Corner near Highland Lake.

Quantitative Criteria

The results from each of the tested alternatives were compared to the Year 2025 Base conditions. Table 4-1 lists the raw values from the PACTS Model for each of the quantitative criteria against which the results were compared. All values listed are for the p.m. peak hour values.

Table 4-1
Values for the Quantitative Criteria

	Year 2025 Base (pm peak-hour)	
	# of Trips	**Mode Share**
# of Vehicle Trips	118,642	n/a
Person Vehicle trips	143,557	91.6%
Walk/bike trips	12,627	8.1%
Bus trips	582	0.4%
Total trips	156,766	100.0%*
	Total VMT or VHT	
VMT	810,922 peak-hour miles	
VHT	27,812 peak-hour hours	

*Does not add due to rounding.
Source: PACTS Travel Demand Model

To put these numbers in perspective, the values in Figure 4-1 were converted, using generally accepted values, to average annual values and average values per household. Table 4-2 shows the average annual regional and average annual household impacts resulting from a one percent change in the system. The impacts per household were based on the 2025 forecast for the number of households in the PACTS model area.

A one percent reduction in the system would result in a reduction of 4.3 million vehicle trips within the PACTS area during one year. When divided by the population of the area, this reduction equates to 38 vehicle trips per household. Similar reductions of 220 miles of driving and seven hours of driving time would be realized per household per year.

Table 4-2
Effects of a One Percent Change in Quantitative Criteria

Quantitative Measure	Average Annual Change for the Model Area*	Average Annual Change per Household*
Number of vehicle trips	4,300,000 vehicle trips	38 vehicle trips
VMT	24,000,000 miles	220 miles
VHT	830,000 hours	7 hours

*Values in Table 4-1 were multiplied by a conversion factor of 3000. This factor was based on peak-hour traffic constituting 10% of total daily traffic, and peak-hour traffic (measured Monday-Friday plus some holidays) making up 1/300 of annual peak-hour traffic.

Performance Measures

The performance measure evaluation used a numerical rating from +5 (highest) to –5 (lowest). Ratings were based on a determination of the probable impacts that a strategy would have on each of several criteria associated with five of the Plan's six goals. Performance measures were not developed for the regional focus goal.

The +5 to -5 numerical ratings were:

- +5, strongly positively promotes the objective.
- +3, moderately positively promotes the objective.
- +1, marginally positively promotes the objective.
- 0, neutral or no impact on the objective.
- -1, marginally negatively promotes the objective.
- -3, moderately negatively promotes the objective.
- -5, strongly negatively promotes the objective.

The criteria associated with each goal are listed below.

Goal 1. Economic Development

- Provides transport linkages and modal alternatives to economic centers
- Maintains/improves travel corridor accessibility to economic centers

Goal 2. Mobility, Accessibility and Safety

- Reduces congestion and delay
- Improves safety of transportation system users
- Improves truck circulation
- Provides regional connectivity between transport modes
- Enhances transportation choice and alternatives

Goal 3. Energy Conservation

- Promotes pedestrian, bike and transit modes
- Reduces SOV trips (single occupant vehicle)
- Minimizes energy consumption

Goal 4. Land Use

- Discourages dispersed development throughout the region
- Promotes compact development within communities
- Transportation strategies that protect neighborhoods

Goal 5. Environmental Quality

- Minimizes physical environmental impacts
- Reduces vehicle emissions

The Transportation Theme Packages: The Tested Alternatives

Interstate Theme

The Interstate Theme analyzed the impacts on and magnitude of changes in the transportation system that could be derived from optimizing and/or expanding the region's interstate highways. This theme included elements such as:

- system management changes such as toll system changes and speed limit changes;
- widening of existing interstate highway segments;
- new and reconfigured interchanges; and
- new interstate highway segments.

Primary Findings

- Regional VMT increases and regional VHT decreases in each of the five interstate groupings.
- The strategies that have the strongest positive benefits in terms of congestion/ delay reduction typically have the strongest negative ratings in terms of land use and environmental measures.
- There are shifts in traffic from the arterial and collector networks to the interstate network.

The Interstate Theme was modeled in five different increments or groupings. Grouping One included primarily system management projects. Grouping Two added widening a section of the Maine Turnpike and increased Turnpike speed limits. Grouping Three added a limited access highway between Gorham and Turnpike Exit 7. Grouping Four added two additional limited access highways to Buxton and to the Sebago Lake Region. Grouping Five added a widened I-295 and I-95 to grouping one. The Groupings are listed in Table 4-3 and Figure 4-1.

Figure 4-1 Interstate Theme Package

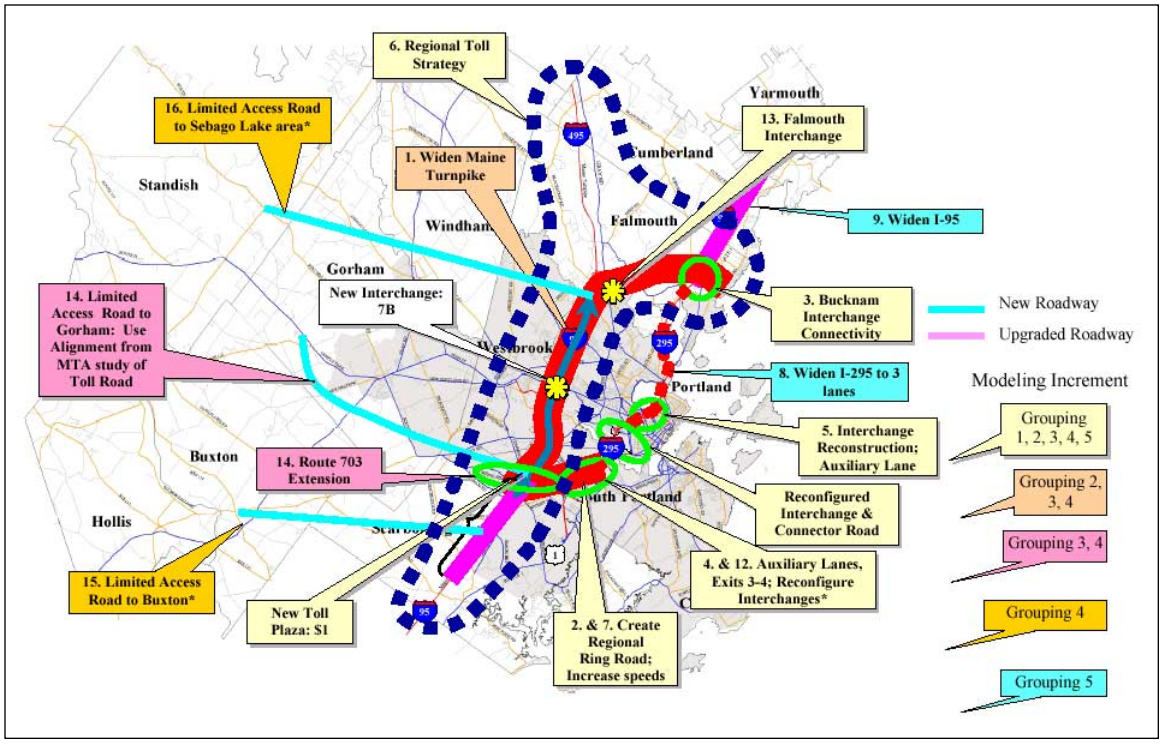


Table 4-3 Interstate Theme Strategies and Groupings

Strategies	Grouping				
	One	Two	Three	Four	Five
Increase speed limit on the Maine Turnpike from 55 mph to 60 mph between 6A and 9 and on Falmouth Spur	X	X	X	X	X
Reconfigure Falmouth Spur/I-95/I-295 Interchange in Falmouth	X	X	X	X	X
Add southbound lane on I-295 between Exit 3 (Westbrook St) and 4 (Route 1) in South Portland	X	X	X	X	X
Add northbound lane on I-295 between Exit 6 (Forest Ave) and 7 (Franklin St) in Portland	X	X	X	X	X
Regional ring road (keeps the Exit 7 Turnpike Spur as a freeway facility)	X	X	X	X	X
Reconfigure I-295 Exit 4 in South Portland	X	X	X	X	X
Ramp reconfiguration of Exit 3/Westbrook Street in South Portland	X	X	X	X	X
Full interchange at Route 26/100 and Falmouth Spur in Falmouth	X	X	X	X	X
Regional toll system with new toll plaza per latest Maine Turnpike Authority concept at Exit 7 (keeping Exit 6A plaza) and removing other plazas on Turnpike and Falmouth Spur.	X	X	X	X	X
Widen Turnpike from 6A to 9 to three lanes and increase speeds from 55 mph to 65 mph in South Portland, Portland and Falmouth		X	X	X	
Limited Access Highway to Gorham from Turnpike Exit 7 in South Portland, Westbrook, Scarborough, Gorham			X	X	
Limited access road to Buxton				X	
Limited access road from Turnpike to Sebago Lake Region				X	
Widen I-295 from Exit 3 (Westbrook Str.) to Bucknam Rd. to three lanes					X
Widen I-295 north of Bucknam Road to three lanes					X

Quantitative Evaluation

Table 4-4 summarizes the results of the quantitative evaluation. The modal split (and the associated number of trips by mode) changed negligibly for each of the five interstate groupings. In Interstate Grouping Four, which showed the largest modal split change, there were 400 more person vehicle trips and 400 less walk/bike trips. These changes resulted in a change to the mode split of 0.2%.

Each of the five groupings resulted in regional VMT increases between 1.2% and 4.9%. Interstate Grouping Four – that includes the most new miles of new limited access highway – had the largest VMT increase (4.9%).

Regional VHT decreased in each of the five grouping with the largest decrease shown in Interstate Grouping Four (-7.4%). The Model showed a larger decrease in VHT with the shift in population and employment in the Interstate Four/Land Use Response scenario indicating that this potential shift has some regional transportation benefits.

Table 4-4
Interstate Themes: System-wide Performance Measures

Performance Measure (change from Base 2025)	Groupings					
	Interstate One	**Interstate Two**	**Interstate Three**	**Interstate Four**	**Interstate Five**	**Land Use Response-Interstate Four/LUR**
Regional VMT	**+1.2%**	+1.8%	+3.1%	+4.9%	+1.8%	+4.4%
Regional VHT	-0.2%	-1.0%	-4.5%	-7.4%	-0.7%	**-8.9%**

Source: PACTS Travel Demand Model

Each of the theme analyses also examined the impacts of the types of roads in the region, i.e., by functional classification (interstate, arterial and collector). Figures 4-2A and 4-2B show the VMT and VHT impacts of the five interstate groupings on each functional class of roadway. An increasing proportion of travel occurs on the interstate highway system. Travel on the arterial and collector roadway systems decreases overall relative to the Base 2025 scenario. The magnitude of these changes is proportional to the capacity increases on the interstates. Of note, however, is that the arterial and collector roadways show a larger decrease, on a percentage basis, in VHT than the interstate class indicating reductions in congestion for these classes of roads.

Figure 4-2A

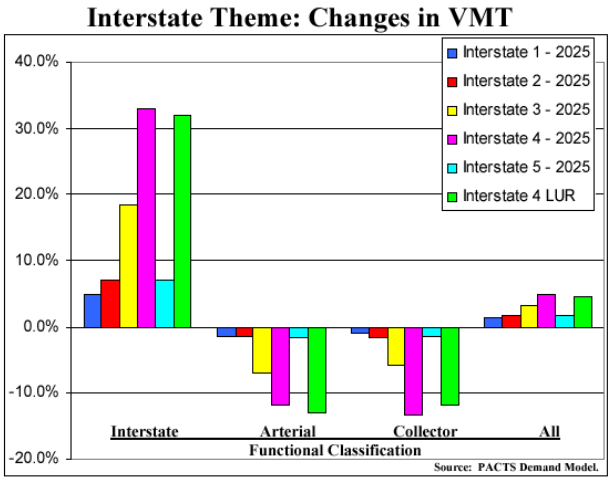
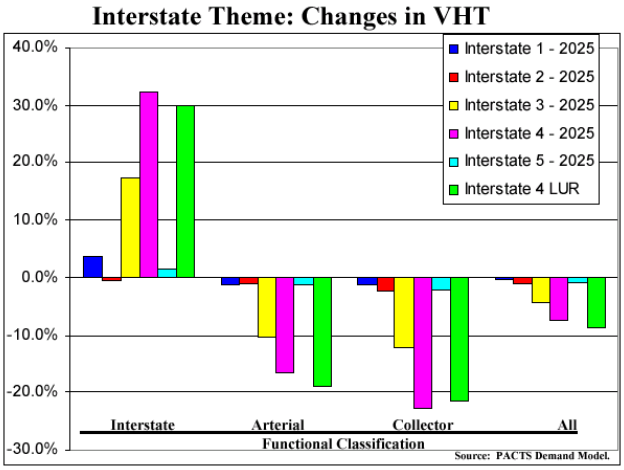


Figure 4-2B



Performance Criteria Evaluation

As expected, the tested interstate options showed an increase in regional VMT and a decrease in regional VHT. (This indicates that trip length or the number of trips is increasing but overall congestion is decreasing.) The strategies that have the strongest positive benefits in terms of congestion and delay reduction most often also have the strongest negative ratings in terms of land use and environmental measures. These options are principally new limited access highways or widening of the existing interstates for significant lengths. Many of the systems management options such as the limited widenings for auxiliary travel lanes on I-295 have moderately positive benefits in terms of congestion and delay reduction and safety and smaller negative impacts on land use and environmental measures.

Overall, the strategies are neutral to slightly negative with regard to enhancing transportation choice. By increasing automobile mobility, there is generally less incentive to use alternative modes of travel (primarily transit). Table 4-5 contains the performance criteria matrix of the strategies for each of the groupings in the Interstate Theme.

Table 4-5 -- Interstate Theme Package Strategy Rating -- Performance Criteria Matrix

	Goal Category	Economic Development		Mobility, Connectivity, Accessibility & Safety					Energy Conservation			Land Use			Environmental Quality				
	Rating of Achievement of Objectives: from a range of -5 to 5	Provide Transport Linkage and Modal Alternatives to Econ. Centers	Maintain/Improve Travel Corridor Accessibility to Econ. Centers	Reduce Congestion & Delay	Improve Safety of Transport. Users	Improve Truck Circulation	Provide Regional Connectivity between Transport Modes	Enhances Transportation Choice/Alternatives	Promote Pedestrian, Bike & Transit Modes	Reduce SOV Trips	Minimize Energy Consumption	Discourages Dispersed Development within the Region	Promotes Compact Development within Communities	Transportation Strategies that Protect Neighborhood	Minimize Physical Environmental Impacts	Reduce Vehicle Emissions	**Total**	Direct/Indirect Transportation Effects (changes in volumes, etc)	Notes/Comments
ID	**Interstate Theme**																		
Modeling Increment #1																			
2	Increase the travel speed between Exits 6A and 9, and on the Falmouth Spur.	0	1	1	0	1	1	0	0	-1	-1	-1	0	0	3	-1	3		
3	Reconfigure the I-95/I-295/Falmouth Spur interchange in order to encourage use of the Falmouth Spur.	1	3	1	1	3	3	0	0	-1	-1	0	0	1	-1	1	11		
4	Build auxiliary lanes on I-295 between Exits 3 and 4.	1	1	3	3	1	0	0	0	0	0	0	0	0	-1	1	9		
5	Build an auxiliary northbound lane between the Forest Ave and Franklin St exits.	1	1	3	3	1	0	0	0	0	0	0	0	0	-1	1	9		
6	Implementation of the regional toll system.	0	1	3	1	1	1	0	0	-3	-1	-1	0	1	3	1	7	Draws significant additional traffic to Turnpike; potential for diversion in Scarborough.	May 'Protect' neighborhoods in Turnpike communities other than Scarborough (due to potential for diversion south of new Plaza). ** Other toll plaza configurations and locations are still being considered. **
7	The "regional ring road" concept.	1	3	3	1	1	3	-1	-1	-3	-1	-1	0	1	3	1	10		
11	Reconfigure Exit 4 @ Lincoln Street/Veteran's Bridge of I-295.	1	1	1	0	3	1	0	0	0	1	0	0	1	-1	0	8		
12	The I-295 ramp deletion/ addition at Exit 3/Westbrook Street.	0	1	1	1	1	1	0	0	0	1	0	0	0	-1	0	5		
13	The creation of a new Falmouth Spur interchange at Route 26/100.	1	1	1	1	1	1	0	0	-1	-1	-1	0	3	-1	1	6		
Modeling Increment #2																			
1	Widen the turnpike between Exits 6A and 9 to six lanes; increase speeds to 65.	1	3	3	3	1	1	-3	-1	-3	1	-3	0	3	-1	-1	4		Increases VMT but reduces congestion. Draws traffic to Turnpike rather than on arterials.
Modeling Increment #3																			
14	Limited access road to Gorham from Turnpike Exit 7.	3	5	5	3	5	3	-1	-1	-5	-1	-5	-3	5	-3	-1	9	New facility carries 2000-4000 vehicles. Key Volumes: Gorh. Village/Rt 25, -30%; Overlap, -35%.	Larger traffic reductions in Gorham Village a strong positive; potential negative impacts on suburban neighborhoods. Likely to induce new trinmaking in corridor. Increases VMT
Modeling Increment #4																			
15	Limited access road to Buxton.	3	3	3	3	1	1	-1	-1	-3	-1	-3	-3	1	-3	-1	-1	New facility carries 1600-2100 vehicles. Key Volumes: Rt 22 additional reductions.	Increases VMT but reduces congestion.
16	Limited access road from the Turnpike to Sebago Lake area/Route 35.	3	3	3	3	3	3	-3	-1	-5	-1	-5	-3	1	-3	-1	-3		Increases VMT but reduces congestion.
Modeling Increment #5 (Includes increment 1 only plus below)																			
8	Widening of I-295 to six lanes from Exit 3 to Bucknam Road.	1	3	3	1	1	3	-1	-1	-3	2	-1	-1	1	-1	-1	6		
9	A widening of I-295 and I-95 north of Bucknam Road.	1	3	3	1	2	3	-1	-1	-3	1	-3	-1	1	-1	-1	4		
Additional Measures (off-model)																			
17	Incident management																0		
18	Electronic tolling																0		

Key: +5 = strongly positive; +3 = moderately positive; +1 = weakly positive. 0 = negligible/not applicable. -5 = strongly negative; -3 = moderately negative; -1 = weakly negative.

Arterial Theme

The Arterial Theme assessed the transportation system impacts and benefits from an expansion of arterial roadway capacity. The Arterial Theme was modeled in three groupings, and included elements such as:

- reconfiguration of existing arterial roadway segments within existing roadway widths;
- widening of existing arterial roadway segments; and
- new arterial roadway segments.

Primary Findings

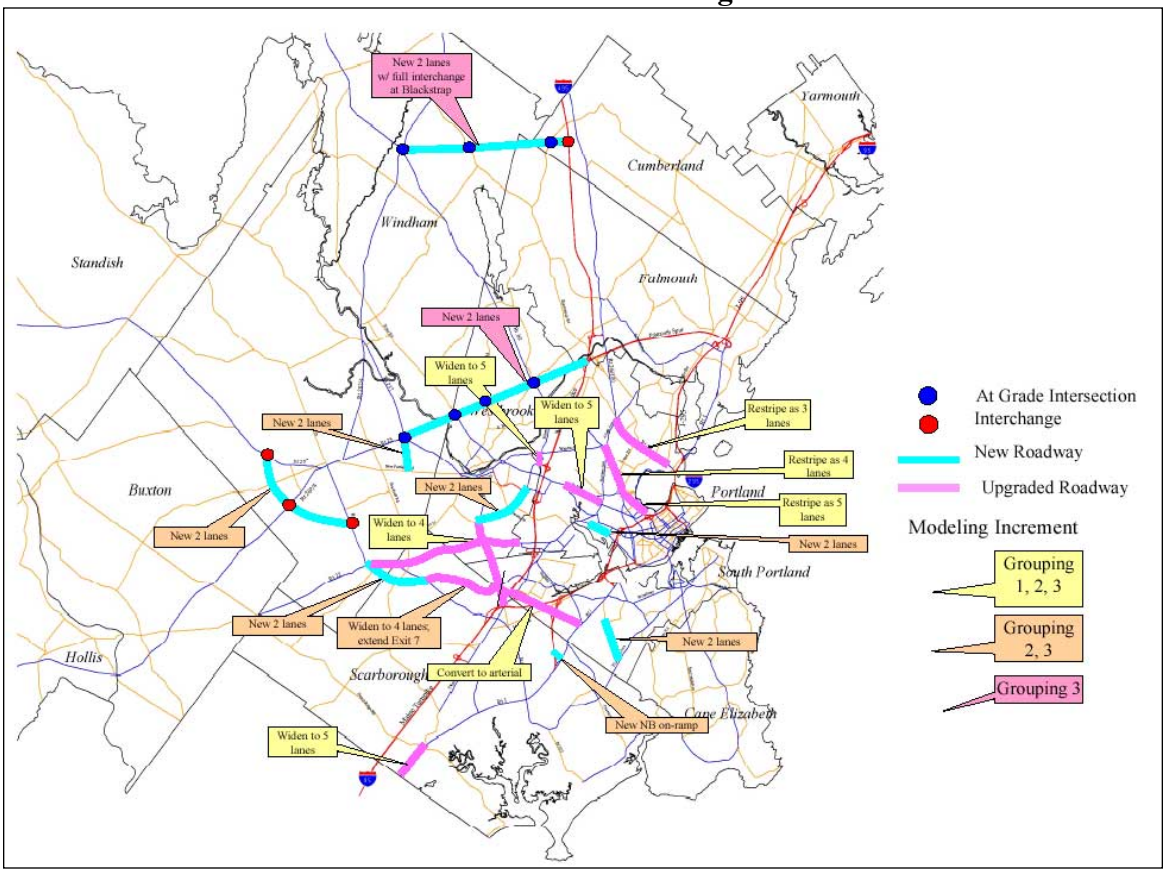
- Regional VMT shows minimal system-wide increases in each of the arterial groupings (less than 1%), with increases on the arterials and decreases on the collectors and interstates.
- The strategies with the strongest performance measure scores in terms of congestion/delay reduction also most often have the weakest scores with respect to land use and environmental measures.
- Regional VHT decreases in each of the arterial groupings (approximately 5%).

The arterial theme package in Figure 4-3 and the strategies are listed in Table 4-6.

Table 4-6
Arterial Theme Strategies and Groupings

Strategy	Grouping		
	One	Two	Three
Convert Route 703 between Exit 7 Turnpike Spur & and I-295 to arterial roadway without the spur extension to Running Hill Road in South Portland (see below)	X	X	X
Widen Spring/Cummings Road & Congress St/County Road segments, in South Portland, Westbrook, Scarborough and Portland	X	X	X
Reconfigure/widen three Portland arterials (Brighton, Forest and Washington Avenues), in Portland	X	X	X
Widen Riverside Street at Exit 8 of the Turnpike, in Portland	X	X	X
Widen Route 1 from Saco town line to Dunstan Corner/Payne Road, in Scarborough	X	X	X
Gorham Bypass, Phase I, in Gorham		X	X
Southwest overlap bypass from Running Hill Road to Routes 25/114, South Portland, Scarborough and Gorham		X	X
Widen Running Hill Road (with Turnpike Exit 7 Spur extension), in South Portland		X	X
Gorham Industrial Park Road, in Gorham		X	X
I-295 Connector Road, phase II extension west to Congress Street, in Portland		X	X
Larrabee Road extension to Spring Street at Eisenhower Drive, in Westbrook		X	X
Northbound Route 1 On-ramp to Scarborough Connector, in Scarborough		X	X
Construct Highland Ave connector to Rumery Road/Route 1, in South Portland		X	X
Falmouth Spur extension arterial to Gorham/Moshers Corner, in Falmouth, Westbrook, Gorham			X
Arterial roadway from Maine Turnpike to Route 302/Moshers Corner in Windham			X

Figure 4-3
Arterial Theme Package



Quantitative Evaluation

The modal split (and the associated number of trips by mode) changed negligibly for each of the three arterial groupings. Arterial Grouping Three showed the largest change in modal split; there were 300 fewer walk/bike trips and bus trips were essentially unchanged. This resulted in a change to the modal split of 0.1%.

Table 4-7 presents the system-wide changes in VMT and VHT for each of the arterial groupings. Each of the groupings shows a decrease in regional VHT, from a low of –1.6% to a high of –5.1%. These potential reductions in VHT are realized despite a minimal increase in regional VMT.

Table 4-7
Arterial Themes: System-wide Performance Measures

Performance Measure (change from Base 2025)	Groupings			
	Arterial One	Arterial Two	Arterial Three	Land Use Response-Arterial Three/LUR
Regional VMT	0.0%	0.4%	0.3%	0.3%
Regional VHT	-1.6%	-3.2%	-5.0%	-5.1%

Source: PACTS Travel Demand Model

Figures 4-4A and 4-4B present data on the impacts that each of the arterial groupings have on the regional distribution of VMT and VHT by functional classification. Figure 4-4A shows that a modestly larger proportion of regional travel occurs on arterial roadways, with the size of the increase being proportional to the increase in capacity. VHT decreases slightly across all functional classes with the largest decreases for the collector road network.

Performance Criteria Evaluation

Most of the arterial strategies provide moderate to marginal positive benefits with regard to the economic development and mobility and safety related criteria. Similar to the interstate strategies, the arterial strategies that are the most effective at reducing congestion and /or delay may also have the most negative impacts in the environmental and land use performance measures. Table 4-8 includes the performance criteria evaluation of each of the strategies in each of the arterial groupings.

Figure 4-4A

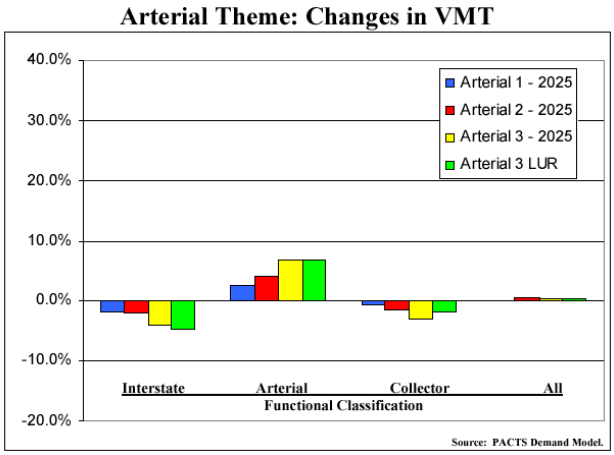


Figure 4-4B

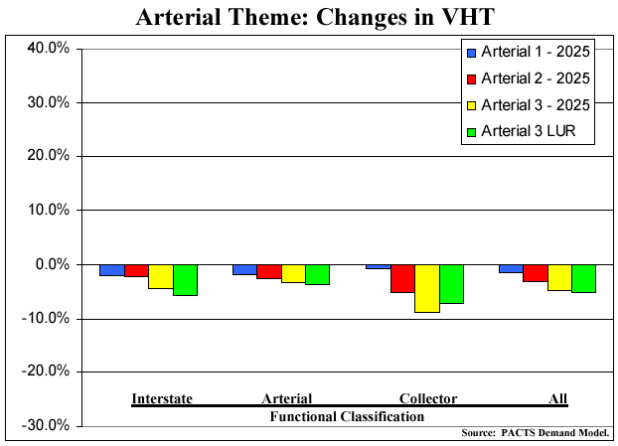


Table 4-8 -- Arterial Theme Package Strategy Rating - Performance Criteria Matrix

	Goal Category	Economic Development		Mobility, Connectivity, Accessibility & Safety					Energy Conservation			Land Use				Environmental Quality				
	Rating of Achievement of Objectives: from a range of -5 to 5	Provide Transport Linkages and Modal Alternatives to Econ. Centers	Maintain/Improve Travel Corridor Accessibility to Econ. Centers	Reduce Congestion & Delay	Improve Safety of Transport. Users	Improve Truck Circulation	Provide Regional Connectivity between Transport Modes	Enhances Transportation Choice/Alternatives	Promote Pedestrian, Bike & Transit Modes	Reduce SOV Trips	Minimize Energy Consumption	Discourages Dispersed Development within the Region	Promotes Compact Development within Communities	Transportation Strategies that Protect Neighborhoods	Minimize Physical Environmental Impacts	Reduce Vehicle Emissions	Total	Direct/Indirect Transportation Effects (changes in volumes, etc)	Notes/Comments
	Arterial Theme Package																			
Modeling Increment #1																				
3	Reconfigure Exit 7 spur (Route 703) to an arterial.	3	3	1	1	0	1	0	0	0	0	0	0	1	-1	0	9		
4	Widen sections of Spring/Cummings in Westbrook and South Portland, Outer Congress in Portland.	3	3	1	3	1	1	1	1	-1	-1	-1	0	1	0	1	13		
6	Widen & Reconfigure intersections/segments on																		
	b. Brighton -- widen to 5 lanes and 3 lanes with reversible lane in peak direction	1	3	1	1	1	1	1	-1	-1	0	-1	0	-1	0	1	6		
	c. Forest -- restripe as 5 lanes (1. south of Woodfords) and 4 lanes (2. betw. Woodfords and Morrills Corner)	1	3	3	1	1	1	-1	-1	-1	0	-1	0	-1	1	1	7		Less room for cyclists on road.
	d. Washington -- restripe as 3 lanes	1	1	1	1	1	1	-1	-1	-1	0	-1	0	0	1	1	4		Less room for cyclists on road.
11	Widen Route One near Dunstan's Corner.	0	1	1	1	1	1	0	0	0	0	0	0	-3	-1	1	2		
13	Widen Riverside Street between Exit 8 and Warren Avenue	0	3	1	1	1	1	1	1	0	0	-1	0	0	-1	1	8		
Modeling Increment #2																				
1	Build a Gorham Village bypass.	3	3	3	1	3	3	1	0	-3	-1	-3	0	3	-3	-1	9	Smaller traffic reductions on Rt 25 in Gorham Village than I3 strategy (above); reductions in Village a positive; potential negative impacts on suburban neighborhoods. Likely to induce new tripmaking in corridor.	Improved bicycle-pedestrian environment in Gorham Village. Adds to higher VMT but lowers VHT.
2A	Build the Route 22/114 southwest bypass.	3	3	3	1	3	3	0	0	-3	-1	-3	0	1	-3	-1	6		
2B	Extend Turnpike Exit 7 Spur westward to Running Hill Road, and widen of Running Hill to four lanes.	3	3	3	1	3	3	0	0	-3	-1	-3	0	1	-3	-3	4		Adds to higher VMT but lowers VHT.
5	Build Gorham's proposed Industrial Park road.	3	0	0	0	3	1	0	0	0	0	0	1	1	0	0	9		
7	Extend the I-295 Connector Road westward beyond Sewall Street.	3	3	3	1	1	3	0	0	-1	0	-1	0	1	-1	1	13	Makes Phase I of I-295 Connector more effective at drawing additional traffic.	Mixed: Positive impacts directly along Congress Street; potential negative on local streets along alignment.
8	Build the Larrabee Road extension to Spring Street.	3	1	1	1	1	3	0	0	-1	-1	0	0	1	-3	-1	5		J. Bennett proposes to connect further to Gorham Ind. Park Road (#5).
9	Build the Route 1 Southbound ramp to Northbound Scarborough Connector.	1	1	1	0	3	3	0	0	0	0	0	0	3	0	0	12		Proposed to remove trucks from Rt 1 in So. Portland.
12	Highland Avenue connector road to Rumery Road.	1	0	0	0	1	1	0	0	0	-1	0	0	1	-1	0	2		
Modeling Increment #3																				
10	Falmouth Spur extension west to Route 25/Moshers Corner, Gorham.	1	1	1	1	3	3	0	0	-1	-1	-3	0	-1	-3	-3	-2	Adds back traffic to Route 25 in Gorham.	Adds to higher VMT but lowers VHT.
17	Turnpike connector to Route 302/Fosters Corner, Windham	1	1	1	1	3	3	0	0	-1	-1	-3	0	1	-3	-3	0		Adds to higher VMT but lowers VHT.
Additional Measures (off-model)																				
14	Street interconnectivity -- Collector roads																			
15	Access management																			

Key: +5 = strongly positive; +3 = moderately positive; +1 = weakly positive. 0 = negligible/not applicable. -5 = strongly negative; -3 = moderately negative; -1 = weakly negative.

Transit Theme

The Transit Theme analyzed the transportation system benefits and impacts that could be derived from a variety of transit strategies. Elements in the Transit Theme included:

- increasing service frequency on existing fixed-routes;
- adding fixed-route service to new areas;
- extending existing routes to serve activity centers;
- enhancing bus service along six major regional corridors to Bus Rapid Transit standards including new alignments for exclusive bus use, dedicated bus lanes on arterial roadways, automatic vehicle location, traffic signal priority/pre-emption, bus shelters and fast fare collection;
- passenger rail along four corridors; and
- circulator rail/transit on the Portland peninsula.

Primary Findings

- The Transit Theme is the only Transportation Theme that reduces both regional VMT *and* regional VHT. (The Interstate Theme and Arterial Theme both increase regional VMT.)
- Changes in traffic volumes are generally less than five percent and broadly distributed across the roadway system.

The Transit Theme was modeled in four groupings; these groupings are displayed in Figures 4-5 through 4-7. Groupings 3A and 3B add bus rapid transit and commuter rail, respectively, to the expanded bus transit system. Table 4-9 lists each of the strategies for each of the groupings.

Figure 4-5

Bus Transit: Grouping 1 & 2

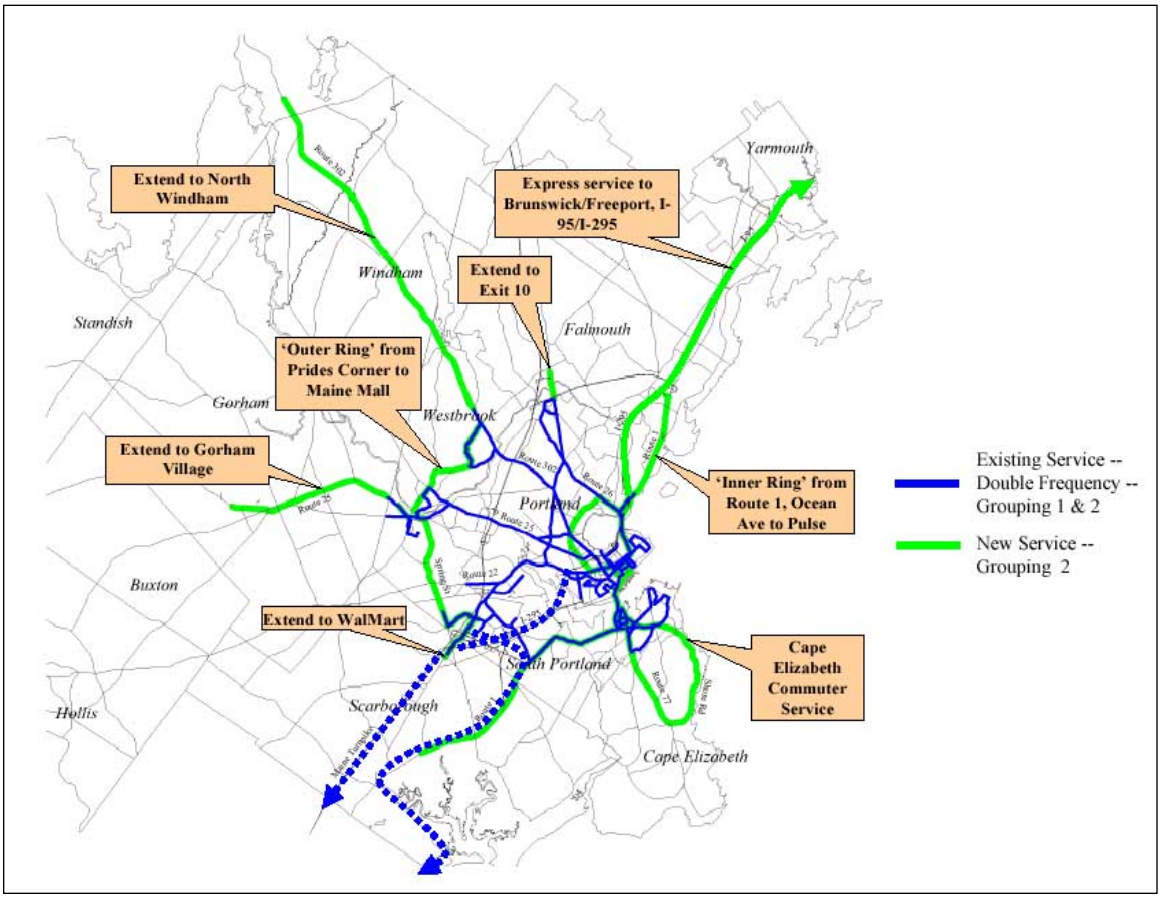


Figure 4-6
Transit Theme Grouping 3A: Bus Rapid Transit

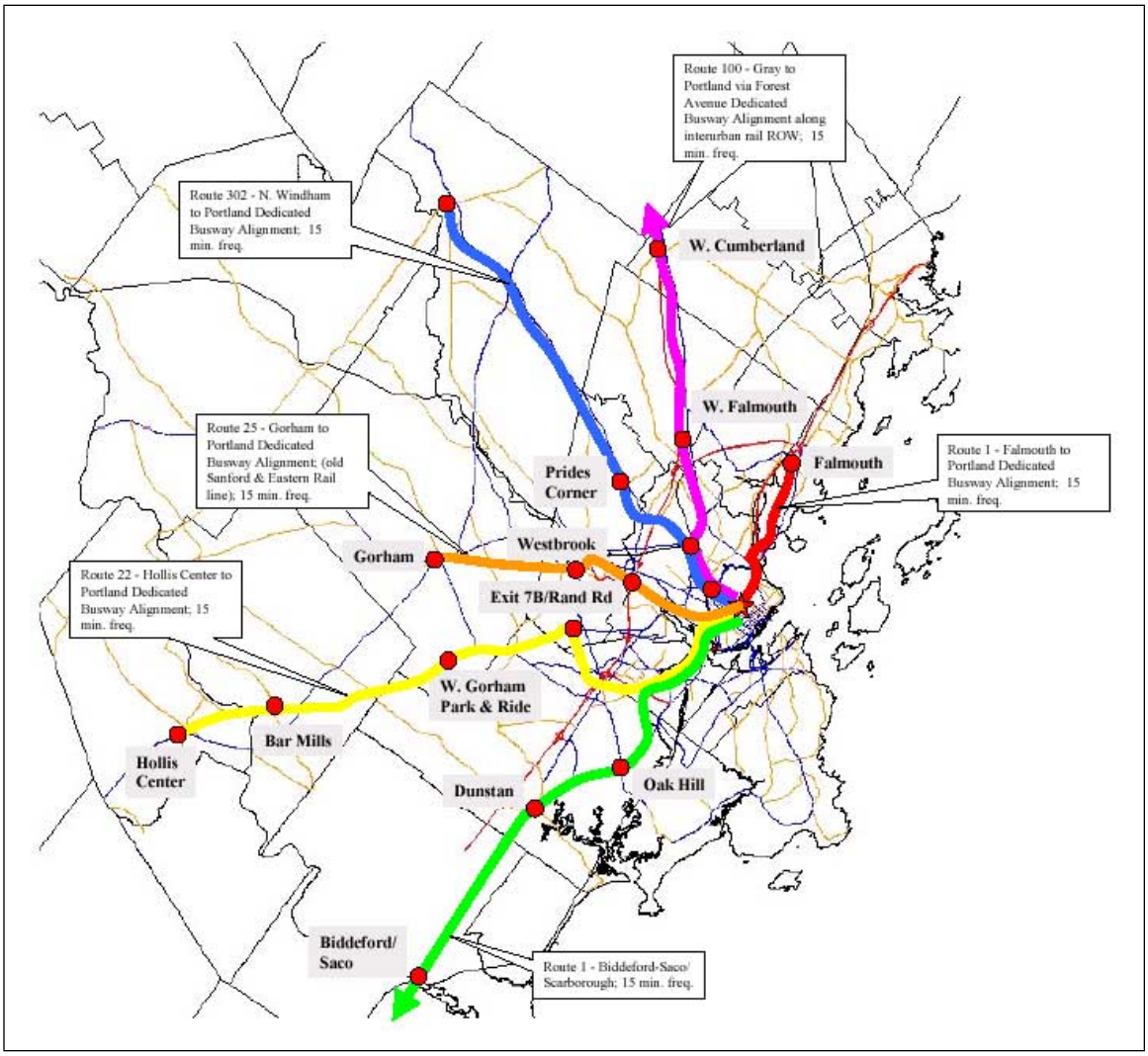


Figure 4-7
Transit Theme Grouping 3B: Rail

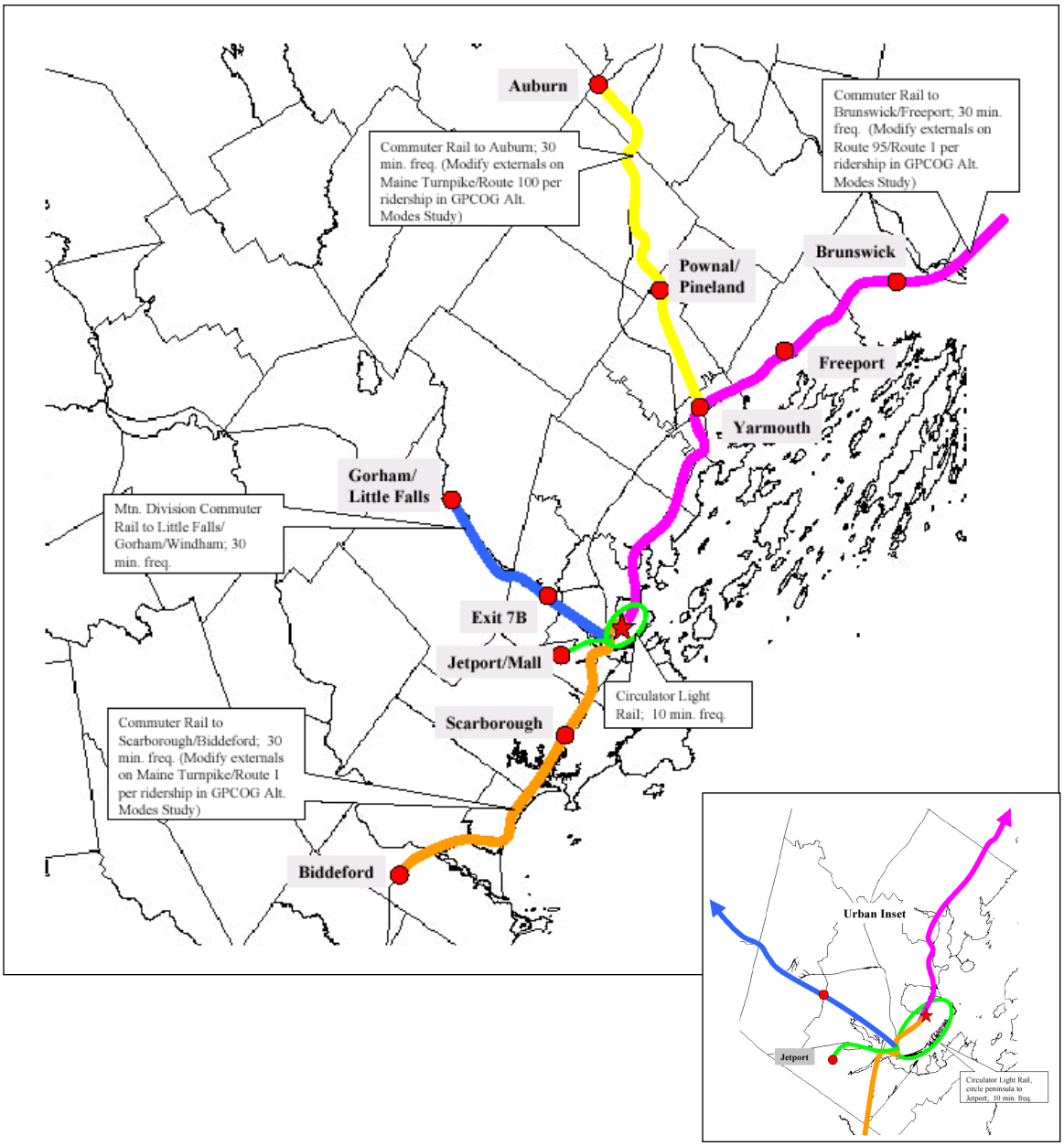


Table 4-9
Transit Theme Strategies and Groupings

Strategy	Grouping			
	One	Two	Three-BRT	Three-Rail
Double existing route frequencies on METRO routes	X	X	X	X
Double existing route frequencies on South Portland Bus Service (SPBS) routes	X	X	X	X
Double existing route frequencies on Biddeford Saco Old Orchard Beach routes	X	X	X	X
Extend SPBS route from Maine Mall to WalMart, in South Portland and Scarborough		X	X	X
Extend METRO service to West Falmouth Crossing/Turnpike Exit 10 (Portland and Falmouth)		X	X	X
New 'Outer Ring' Metro route from Prides Corner to Downtown Westbrook to Maine Mall (Westbrook and South Portland)		X	X	X
New 'Inner Ring' METRO route from Route 1 Falmouth to Ocean Avenue to Pulse (Falmouth and Portland)		X	X	X
Extension of METRO Route 4 along Route 25 to Gorham Village and new Park and Ride lots (Gorham and Westbrook)		X	X	X
New service connecting to METRO Route 2/FAST service from Windham to Prides Corner (Windham and Westbrook)		X	X	X
New Cape Elizabeth Commuter Service from Shore Road/Route 77 in Cape Elizabeth to Knightville/ Millcreek in South Portland and Downtown Portland (Cape Elizabeth, South Portland and Portland)		X	X	X
New express bus service from Brunswick/Freeport to Portland (Brunswick, Freeport and Portland)		X	X	X
Port Shuttle circulator between passenger transportation centers (Portland)		X	X	X
Bus Rapid Transit along: Route 1 north to Falmouth; Route 26/100 to Cumberland; Route 302 to Windham; Route 25 to west of Gorham Village; Route 22 to Hollis Center; along Route 1 south to Biddeford/Saco.			X	
Passenger Rail: north to Brunswick; north to Lewiston/Auburn; west to Gorham/Little Falls; south to Biddeford/Saco				X
Portland peninsula circulator rail or shuttle (Portland)				X

Quantitative Evaluation

Table 4-10 presents the system-wide quantitative evaluation for each of the transit groupings. All four variations of Transit Grouping Three show a more than four-fold increase in the number of transit trips during the p.m. peak-hour. Transit Grouping One and Two each show a more modest increase in the number of transit trips. Transit Grouping Three: BRT/LUR shows the greatest increase in transit trips (+2600), reflecting a higher proportion of growth in the urban core.

The four variations of Transit Grouping Three each showed a greater than one percentage point gain in modal split. Under each of these grouping the transit modal split increased from 0.4% in the 2025 Base to between 1.6% and 2.0%. The increases would be higher in the specific corridors where transit is located.

The Transit Theme was the only theme analyzed that showed a decrease in both regional VMT and VHT. The four variations of Transit Grouping Three showed the most promising results among the transit themes.

Table 4-10
Transit Themes: System-wide Performance Measures

Performance Measure (change from Base 2025)	Strategy Groupings					
	Transit One	Transit Two	Transit Three - BRT	Transit Three - Rail	Transit Three – BRT/ LUR	Transit Three – Rail/ LUR
Change in Number of Transit Trips	+170	+560	+2300	+2000	+2600	+2300
Mode Split (Percentage Point Increase by Transit Mode)	+0.1%	+0.3%	+1.4%	+1.2%	+1.6%	+1.4%
Regional VMT	-0.1%	-0.2%	-2.4%	-1.9%	-3.0%	-2.5%
Regional VHT	-0.5%	-0.8%	-4.4%	-2.5%	-5.9%	-4.1%

Source: PACTS Travel Demand Model

The region-wide reductions in VMT and VHT were also exhibited on each functional class of roadway. These reductions are shown in Figure 4-8A and 4-8B. The reduction in VHT for the Transit Grouping Three: Bus Rapid Transit is of the same magnitude as Interstate Grouping Three and Arterial Grouping Three.

Figure 4-8A

Transit Theme: Changes in VMT

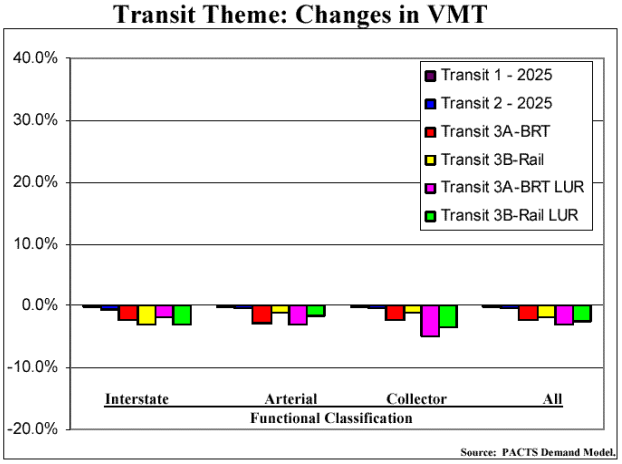
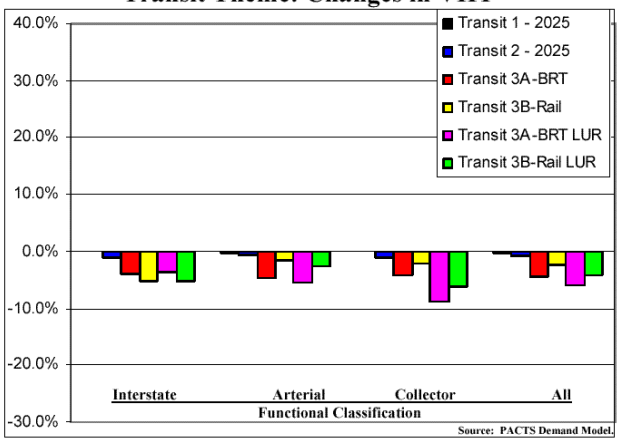


Figure 4-8B

Transit Theme: Changes in VHT



Performance Criteria Evaluation

Table 4-11 includes the performance criteria evaluation matrix for each of the strategies in each of the transit groupings.

Table 4-11 -- Transit Theme Package Strategy Rating - Performance Criteria Matrix

	Goal Category	Economic Development		Mobility, Connectivity, Accessibility & Safety					Energy Conservation			Land Use			Environmental Quality				
	Rating of Achievement of Objectives: from a range of -5 to 5	Provide Transport Linkages and Modal Alternatives to Econ. Centers	Maintain/Improve Travel Corridor Accessibility to Econ. Centers	Reduce Congestion & Delay	Improve Safety of Transport. Users	Improve Truck Circulation	Provide Regional Connectivity between Transport Modes	Enhances Transportation Choice/Alternatives	Promote Pedestrian, Bike & Transit Modes	Reduce SOV Trips	Minimize Energy Consumption	Discourages Dispersed Development within the Region	Promotes Compact Development within Communities	Transportation Strategies that Protect Neighborhoods	Minimize Physical Environmental Impacts	Reduce Vehicle Emissions	Total	Direct/Indirect Transportation Effects (changes in volumes, etc)	Notes/Comments
	Transit Theme																		
Modeling Increment #1																			
1	Double frequencies on existing fixed route service for METRO, SPBS and BSOOB	1	3	1	0	0	3	3	3	3	1	0	0	3	1	3	25	Increases Base25 ridership by 30%	Reduces short trips/cold starts (highest emission/mile trips).
Modeling Increment #2																			
2	Route extensions and new routes																	Doubles ridership over Base25	
	a. Mall to Walmart.	1	1	1	0	0	1	1	1	1	1	0	0	0	1	1	10		
	b. West Falmouth Crossing	1	1	1	0	0	1	1	1	1	1	0	0	1	1	1	11		
	c. Outer ring route.	1	1	1	0	0	3	3	1	1	1	-1	0	3	1	1	16		
	d. Inner ring route.	1	1	1	0	0	3	3	1	1	1	-1	0	3	1	1	16		
	e. Gorham Bus Service.	1	3	1	0	0	3	3	1	3	1	-1	0	3	1	1	20		
	f. North Windham Commuter Service.	3	3	1	0	0	3	3	3	3	1	-1	0	3	1	1	24		
	g. Cape Elizabeth Commuter Service	1	1	1	0	0	3	3	1	1	1	-1	0	1	1	1	14		
	h. Brunswick to Portland Express Bus	1	3	1	0	0	3	5	3	3	1	0	0	0	1	3	24		
	i. Port Shuttle (not modeled)	3	1	1	0	0	5	3	1	0	1	0	0	1	1	1	18		
Modeling Increment #3A																			
6	Bus Rapid Transit: New alignment BRT																	1720 PM Peak Hour Trips	
	a. Falmouth Route 1	3	1	1	1	0	3	3	1	1	1	-1	1	1	unk	1	17	Forecasted ridership = 165	Unknown BRT Env. Impacts - depends on use of existing vs. new alignment.
	b. Gray via Route 100 Corridor	3	3	3	1	0	3	5	3	3	3	-3	1	1	unk	5	31	Forecasted ridership = 410	Unknown BRT Env. Impacts - depends on use of existing vs. new alignment.
	c. Windham via Route 302 Corridor	3	3	3	1	0	3	5	3	3	3	-3	1	1	unk	3	29	Forecasted ridership = 275	Unknown BRT Env. Impacts - depends on use of existing vs. new alignment.
	d. Gorham via Route 25 Corridor	3	3	3	1	0	3	5	1	3	3	-1	3	1	unk	3	31	Forecasted ridership = 280	Unknown BRT Env. Impacts - depends on use of existing vs. new alignment.
	e. Hollis Center via Route 22 Corridor	3	3	3	1	0	3	5	3	1	3	-3	1	1	unk	3	27	Forecasted ridership = 165	Unknown BRT Env. Impacts - depends on use of existing vs. new alignment.
	f. Biddeford/Saco via Turnpike/Route 1 Coridor	5	3	3	1	0	3	3	3	3	3	-1	3	1	unk	5	35	Forecasted ridership = 425	
Modeling Increment #3B (with increment #1 & #2 only)																	0		
5	Commuter Rail/Light Rail																0	1700 PM Peak Hour Trips	
	a. Brunswick to Portland	5	3	3	1	0	3	5	3	3	3	-3	1	1	3	5	36	Forecasted ridership = 500	
	b. Lewiston-Auburn to Portland	5	1	3	1	0	3	5	3	3	3	-3	1	1	2	3	31	Forecasted ridership = 340	
	c. Gorham to Portland	3	1	3	1	0	3	3	3	3	1	-3	3	3	2	1	27	Forecasted ridership = 370	
	d. Biddeford to Portland	5	3	1	1	0	3	5	3	3	2	-1	3	1	3	3	35	Forecasted ridership = 175	
	e. Peninsula Circulator Light Rail	5	3	1	1	0	5	5	5	1	1	1	1	3	-3	1	30	Forecasted ridership = 330	
Additional Measures (off-model)																			
7	High Speed Ferry																		
3	Regional ITS implementation (AVL, Smart Cards, passenger kiosks)																		
4	Bus Rapid Transit: System improvements, signal preemption																		

Key: +5 = strongly positive; +3 = moderately positive; +1 = weakly positive. 0 = negligible/not applicable. -5 = strongly negative; -3 = moderately negative; -1 = weakly negative.

Compact Land Use Theme

Compact land use is a land use pattern that is less consumptive in its use of land compared to suburban-style development. Traditional New England villages, town centers and downtowns are examples of a compact land use pattern. Most development pre-dating 1950 was in a compact form.

Over the last 40 years, a majority of development has occurred outside of these traditional centers in the form of suburban commercial development (regional shopping malls, strip retail development, office parks) and contemporary residential subdivisions. The land use pattern for much of this development has been to spread individual homes and commercial developments over a significantly larger area when compared to the traditional compact form of development.

Key Findings
- Most effective theme at system-wide VMT reductions (-4%). Reductions across all road classes.
- Third most effective at system-wide VHT reductions (-6%). Reductions highest on collector and local roads.
- Reductions in traffic volumes are widely distributed and generally less than 5 percent at specific locations.

The Compact Land Use Theme was developed to answer the question: "Are there transportation benefits to a regional development pattern in a compact land use form?" To help answer this question, the PACTS model was used to evaluate a regional compact land use development scenario. In this scenario, 50 percent of the population and employment growth forecasted for each community was shifted within that community to one or more identified growth areas. The total amount of population and employment growth for each community remained the same. The growth areas are primarily those areas are identified within the community's comprehensive plan or other development plans. In some cases, residential growth was shifted to areas that have high amounts of employment but very little nearby housing to increase the amount of mixed-use development. These "compact development areas" are shown in Figure 4-9. A summary of the changes in system-wide VMT and VHT are shown in Table 4-12. Appendix G provides the relevant data from this analysis.

Figure 4-9
Compact Land Use Development Areas

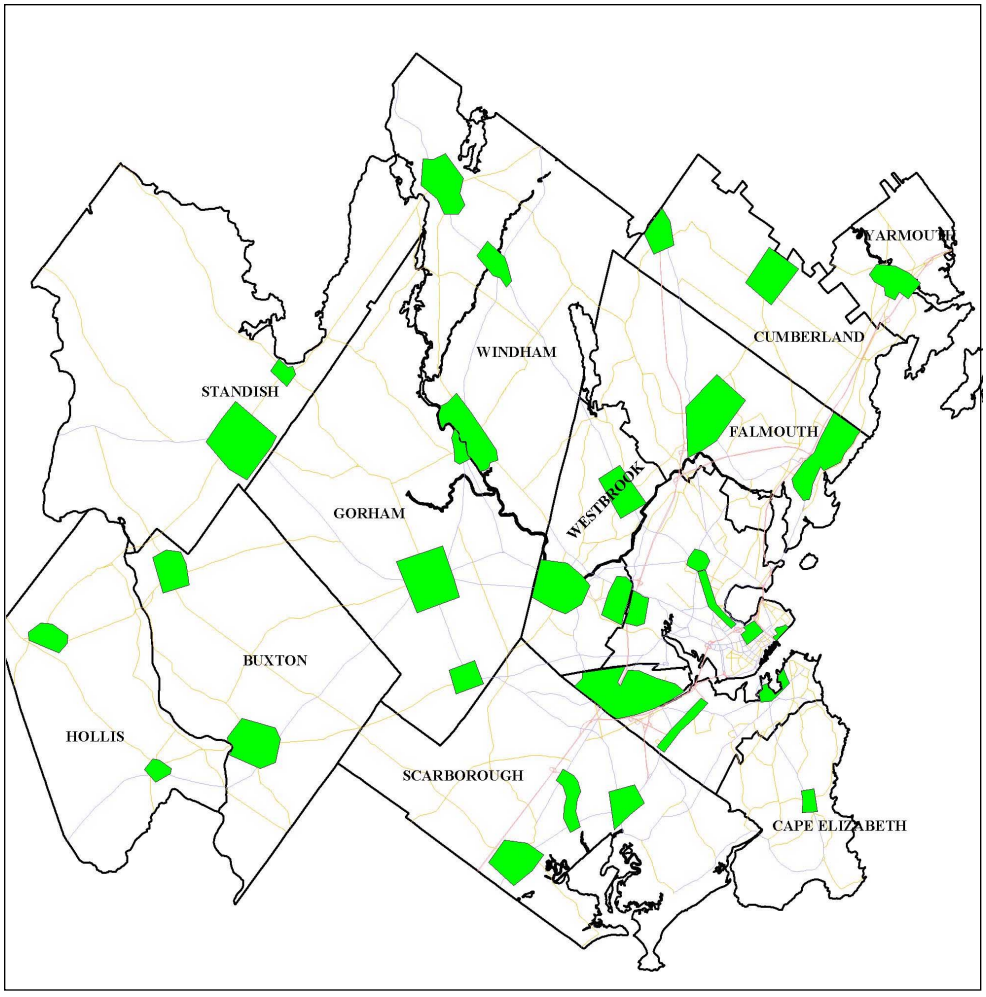


Table 4-12
Compact Land Use Scenario Benefits

Performance Measure	Change
Regional Vehicle Miles Traveled	-4%
Regional Vehicle Hours Traveled	-6%

Source: PACTS Travel Demand Model.

Selected Travel Times for Key Origins and Destinations

The time required to travel between two locations is an important indicator of the relative level of congestion. This section summarizes the results of the travel time analysis for 14 selected pairs of origins and destinations. The two origins – the Maine Mall and Downtown Portland were selected due to their prevalence as retail and employment centers. Destinations were selected to be geographically representative of the evening commute home. Appendix F provides the results of this analysis.

Key findings for changes between measure the 2000 Base and 2025 Base, and between the 2025 Base and each of the transportation themes analyzed are described below. The analysis is intended to provide an order of magnitude of the forecasted automobile travel-time savings based on the implementation of the various options and themes tested. The travel times were derived from the PACTS Travel Demand Model.

Base Scenarios: Change from 2000 to 2025.
Travel times increased by 20 percent or more for six of the 14 O-D pairs. The highest percentage increases in travel time were forecasted for Monument Square to Windham (+28%), Maine Mall to Windham (27%), Maine Mall to west of Gorham Village (+26%), and Monument Square to west of Gorham Village (+28%).

Change between Base 2025 and Interstate Theme Groupings.
Interstate Groupings Three and Four showed the largest travel time-savings for several of the O-D pairs. Interstate Grouping Three showed a 12-minute time-savings (39 to 27 minutes) between the Maine Mall area and west of the Gorham village, and an 11-minute savings (46 to 35 minutes) between Monument Square and the same Gorham destination.

Interstate Groupings One and Two had slight decreases in travel time for half of the 14 O-D pairs. Interstate Grouping Two had the largest decrease (8.5%) for a single O-D pair. This O-D pair from the Maine Mall to Yarmouth shows the benefits of the regional toll strategy in conjunction with the widening of the Maine Turnpike from Exit 6A to Exit 10.

Travel time savings for Interstate Grouping Five were generally the smallest although larger time-savings are shown for trips destined to areas in the I-95 corridor from downtown Portland, as would be expected.

Change between Base 2025 and Arterial Theme Groupings.
Arterial Grouping One revealed small travel time-savings for destinations away from the interstate corridor.

There were travel time-savings in 10 of the 14 O-D pairs in Arterial Grouping Two. The largest time-savings were from the Maine Mall to South Gorham (7 minutes), Monument Square to South Gorham (5 minutes), the Maine Mall to South Gorham (4 minutes) and the Maine Mall to Gorham, west of the Village (4 minutes).

The travel time-savings were larger in Arterial Grouping Three than in Interstate Grouping Two (with the largest decreases seen for Windham destinations) reflecting the new arterial roadway in this package.

Change between Base 2025 and Transit Theme Groupings.
The travel time figures reflect automobile travel times, not transit travel times. All of the Transit Themes have the smallest overall impact on automobile travel times for the O-D pairs analyzed. Most of the changes are negligible. However, those using transit, particularly the services described in Transit Groupings 3A and 3B, would experience sizable time-savings due to the nature of bus rapid transit (BRT) and passenger rail.

Facility-Specific Impacts of the Transportation Themes

An analysis of the facility-specific impacts of the strategies within each of the four transportation themes was undertaken to estimate the traffic volume changes at specific locations throughout the region. The results of this analysis provided a more in-depth understanding of the potential impacts of the strategies tested, and were used in the development of the "best of" theme package and in the final development of the strategies and recommendations of ***Destination Tomorrow.*** To help preserve the readability of this report, the results of the facility-specific impacts and associated data are included as Appendices H-1 and H-2.

Summary of Key Findings of the Alternatives Analysis
Mode Split and Number of Trips

- All Interstate and Arterial Themes increase the number of vehicle trips relative to Base 2025. Overall mode share remains fairly stable though, at 91.5 (+/- 0.3) percent of person trips.
- Transit Grouping Three: BRT and Transit Grouping Three: Rail both result in a four-fold increase in the number of transit trips (from 600 to 2,000-2,600) over Base 2025 levels. As expected, the BRT grouping with "Response Land Use" showed the largest increases in transit trips (3,155). This grouping also had the largest gain in transit mode split, a gain from 0.4% to 2.0%.
- Walk/bike mode split essentially remained throughout the interstate, arterial and transit themes and scenarios.

Table 4-13 shows the mode splits for the current and future base conditions and for each of the theme groupings.

Table 4-13 -- Mode Split Results for Base Conditions and All Theme Groupings

Auto-occupanc 1.21

	2000 Base		2025 Base	
	# of Trips	Mode Share	# of Trips	Mode Share
Vehicles	86,313		118,642	
Person Vehicles	104,439	91.5%	143,557	91.6%
Walk/Bike	9,268	8.1%	12,627	8.1%
Bus	492	0.4%	582	0.4%
Total	114,199		156,766	

	Interstate 1		Interstate 2		Interstate 3		Interstate 4		Interstate 5		Interstate Response Land Use	
	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share
Vehicles	118,747		118,773		118,850		118,922		118,756		118,617	
Person Vehicles	143,703	91.7%	143,753	91.7%	143,859	91.8%	143,959	91.8%	143,734	91.7%	143,469	91.5%
Walk/Bike	12,478	8.0%	12,441	7.9%	12,335	7.9%	12,231	7.8%	12,459	7.9%	12,818	8.2%
Bus	585	0.4%	582	0.4%	582	0.4%	586	0.4%	583	0.4%	489	0.3%
Total	156,766		156,776		156,776		156,776		156,776		156,776	

	Arterial 1		Arterial 2		Arterial 3		Arterial Response Land Use	
	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share
Vehicles	118,701		118,759		118,865		118,791	
Person Vehicles	143,626	91.6%	143,693	91.7%	143,819	91.7%	143,626	91.6%
Walk/Bike	12,554	8.0%	12,487	8.0%	12,354	7.9%	12,635	8.1%
Bus	586	0.4%	586	0.4%	593	0.4%	505	0.3%
Total	156,766		156,766		156,766		156,766	

	Transit 1		Transit 2		Transit 3A-BRT		LU Response BRT		Transit 3B-Rail		LU Response LRT	
	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share	# of Trips	Mode Share
Vehicles	118,522		118,223		116,789		116,699		117,031		116,983	
Person Vehicles	143,427	91.5%	143,088	91.3%	141,367	90.2%	141,307	90.1%	141,658	90.4%	141,657	90.4%
Walk/Bike	12,588	8.0%	12,531	8.0%	12,531	8.0%	12,304	7.8%	12,531	8.0%	12,296	7.8%
Bus/Rail	751	0.5%	1,147	0.7%	2,868	1.8%	3,155	2.0%	2,577	1.6%	2,823	1.8%
Total	156,766		156,766		156,766		156,766		156,766		156,776	

VMT

Tables 4-14 and 4-15 display the system-wide changes in VMT and VHT, respectively, for the current and future base conditions, and for each of the theme groupings.

- VMT increases or decreases are modest (0%-9%) for all theme and scenarios when compared to the forecasted 41 percent growth in VMT between Base 2000 and Base 2025.
- All Interstate Groupings increase system-wide VMT. Interstate Grouping Four has the largest VMT increase (4.9%), but shifts a high percentage of traffic to interstate highways (33% increase in interstate VMT) and reduces arterial and collector road VMT by 12 percent and 13 percent, respectively.
- All Arterial Groupings modestly increase system-wide VMT; arterial VMT increases while interstate and collector VMT decreases.
- The Transit Themes are the only groupings that reduce system-wide VMT. Transit Grouping Three: BRT showed the largest VMT decrease: -2.4% for fixed land use and –3.0% for response land use.

VHT

- VHT reduction is modest in all themes when compared to the forecasted 62 percent growth in system-wide VHT between Base 2000 and Base 2025.
- Interstate Grouping Four (both fixed and response land use) has the largest reduction in system-wide VHT (7.4% and 8.9%, respectively) indicating the largest congestion-reducing benefit. In these two scenarios, VHT on the interstate highways increased approximately 30 percent, and decreased on arterial and collector roads by 15 to 20 percent.
- The Arterial Groupings broadly distribute VHT reductions across the three road classifications.
- The Transit Grouping Three: BRT and Transit Grouping Three: Rail with Response Land Use showed greater decreases in VHT than with fixed land use. The reduction in VHT for the Transit Grouping Three: Bus Rapid Transit is also of the same magnitude as Interstate Grouping Three and Arterial Grouping three.

Table 4-14 System-wide VMT Changes

VMT	Interstate	Arterials	Collectors	All
For All Areas				
Change from 2000 Base				
2025 Base	49.3%	34.4%	39.9%	41.0%
Change from 2025 Base				
Interstate 1 - 2025	5.0%	-1.4%	-0.9%	1.2%
Interstate 2 - 2025	7.0%	-1.5%	-1.7%	1.8%
Interstate 3 - 2025	18.6%	-6.9%	-5.9%	3.1%
Interstate 4 - 2025	32.9%	-11.8%	-13.2%	4.9%
Interstate 5 - 2025	7.0%	-1.6%	-1.5%	1.8%
Arterial 1 - 2025	-1.9%	2.5%	-0.7%	0.0%
Arterial 2 - 2025	-2.0%	4.2%	-1.6%	0.4%
Arterial 3 - 2025	-3.9%	6.7%	-3.1%	0.3%
Transit 1 - 2025	-0.1%	-0.2%	-0.2%	-0.1%
Transit 2 - 2025	-0.6%	-0.4%	-0.5%	-0.5%
Transit 3A-BRT	-2.2%	-2.7%	-2.2%	-2.4%
Transit 3B-Rail	-3.0%	-1.2%	-1.0%	-1.9%
Interstate 4 LUR	32.0%	-12.9%	-11.8%	4.4%
Arterial 3 LUR	-4.6%	6.7%	-1.9%	0.3%
Transit 3A-BRT LUR	-1.9%	-3.0%	-5.0%	-3.0%
Transit 3B-Rail LUR	-2.9%	-1.6%	-3.5%	-2.5%

VMT	Interstate	Arterials	Collectors	All
Pennisula				
Change from 2000 Base				
2025 Base	26.2%	25.6%	20.4%	25.8%
Change from 2025 Base				
Interstate 1 - 2025	0.9%	-0.6%	-2.0%	-0.6%
Interstate 2 - 2025	2.2%	0.1%	-0.5%	0.1%
Interstate 3 - 2025	0.2%	0.2%	0.0%	0.2%
Interstate 4 - 2025	1.1%	0.8%	-0.4%	0.7%
Interstate 5 - 2025	2.1%	-0.2%	-0.9%	-0.1%
Arterial 1 - 2025	2.8%	0.9%	-0.1%	0.9%
Arterial 2 - 2025	1.2%	0.9%	-0.2%	0.8%
Arterial 3 - 2025	1.1%	0.9%	-0.1%	0.8%
Transit 1 - 2025	0.4%	-0.1%	0.1%	-0.1%
Transit 2 - 2025	-1.0%	-0.4%	-0.5%	-0.5%
Transit 3A-BRT	-5.9%	-2.1%	-4.3%	-2.4%
Transit 3B-Rail	-6.6%	-2.1%	-2.9%	-2.3%
Interstate 4 LUR	-3.1%	-3.1%	-4.3%	-3.2%
Arterial 3 LUR	-1.9%	-1.7%	-1.7%	-1.7%
Transit 3A-BRT LUR	-7.6%	-0.8%	-3.9%	-1.3%
Transit 3B-Rail LUR	-8.0%	-1.6%	-3.5%	-2.5%

VMT	Interstate	Arterials	Collectors	All
Rest PACTS				
Change from 2000 Base				
2025 Base	45.5%	30.8%	37.0%	37.2%
Change from 2025 Base				
Interstate 1 - 2025	2.0%	-1.3%	-1.0%	0.4%
Interstate 2 - 2025	5.3%	-1.5%	-2.3%	1.7%
Interstate 3 - 2025	9.3%	-10.1%	-12.9%	-1.8%
Interstate 4 - 2025	15.6%	-16.0%	-20.8%	-2.9%
Interstate 5 - 2025	3.8%	-1.5%	-1.1%	1.0%
Arterial 1 - 2025	-3.4%	4.3%	-2.3%	0.3%
Arterial 2 - 2025	-3.5%	1.8%	-3.5%	-1.0%
Arterial 3 - 2025	-4.4%	3.1%	-5.8%	-1.0%
Transit 1 - 2025	0.0%	-0.2%	-0.1%	-0.1%
Transit 2 - 2025	-0.2%	-0.4%	-0.5%	-0.5%
Transit 3A-BRT	-2.0%	-2.9%	-3.9%	-2.6%
Transit 3B-Rail	-1.9%	-1.5%	-1.0%	-1.6%
Interstate 4 LUR	13.4%	-17.7%	-23.1%	-4.9%
Arterial 3 LUR	-5.1%	2.7%	-6.7%	-1.7%
Transit 3A-BRT LUR	-1.7%	-2.8%	-4.9%	-2.6%
Transit 3B-Rail LUR	-1.6%	-1.6%	-3.5%	-2.5%

VMT	Interstate *	Arterials	Collectors	All
ME Mall Area	None defined			
Change from 2000 Base	in Mall Area			
2025 Base		27.3%	34.4%	28.1%
Change from 2025 Base				
Interstate 1 - 2025		-2.4%	5.5%	-1.5%
Interstate 2 - 2025		-3.6%	4.4%	-2.7%
Interstate 3 - 2025		-12.9%	17.1%	81.0%
Interstate 4 - 2025		-16.6%	18.9%	59.4%
Interstate 5 - 2025		-2.9%	4.6%	-2.0%
Arterial 1 - 2025		-0.5%	9.2%	0.6%
Arterial 2 - 2025		3.9%	26.4%	6.4%
Arterial 3 - 2025		2.7%	24.3%	5.1%
Transit 1 - 2025		-0.4%	-1.5%	-0.6%
Transit 2 - 2025		-0.4%	-0.5%	-0.5%
Transit 3A-BRT		-1.7%	-2.0%	-1.7%
Transit 3B-Rail		-1.1%	-1.1%	-1.1%
Interstate 4 LUR		-19.0%	17.6%	59.0%
Arterial 3 LUR		2.7%	24.8%	5.1%
Transit 3A-BRT LUR		-0.7%	0.4%	-0.6%
Transit 3B-Rail LUR		-1.6%	-3.5%	-2.5%

VMT	Interstate	Arterials	Collectors	All
Non-PACTS				
Change from 2000 Base				
2025 Base	53.8%	44.8%	41.2%	46.7%
Change from 2025 Base				
Interstate 1 - 2025	8.3%	-1.6%	-1.0%	2.3%
Interstate 2 - 2025	8.8%	-1.4%	-1.6%	2.3%
Interstate 3 - 2025	15.9%	-0.6%	-4.2%	4.3%
Interstate 4 - 2025	41.6%	-4.7%	-11.6%	10.2%
Interstate 5 - 2025	10.6%	-1.7%	-1.7%	2.9%
Arterial 1 - 2025	-0.4%	-0.2%	-0.3%	-0.3%
Arterial 2 - 2025	-0.4%	9.4%	-1.5%	1.6%
Arterial 3 - 2025	-3.5%	15.0%	-2.8%	1.3%
Transit 1 - 2025	-0.1%	-0.1%	-0.2%	-0.1%
Transit 2 - 2025	-1.0%	-0.4%	-0.5%	-0.5%
Transit 3A-BRT	-2.4%	-2.5%	-1.7%	-2.2%
Transit 3B-Rail	-4.1%	-0.6%	-1.0%	-2.1%
Interstate 4 LUR	41.8%	-4.1%	-8.9%	11.4%
Arterial 3 LUR	-4.1%	16.1%	-0.9%	2.0%
Transit 3A-BRT LUR	-2.0%	-4.1%	-5.1%	-3.7%
Transit 3B-Rail LUR	-4.3%	-1.6%	-3.5%	-2.5%

Figure 4-15 System-wide VHT Changes

VHT	Interstate	Arterials	Collectors	All
For All Areas				
Change from 2000 Base				
2025 Base	63.4%	61.3%	64.8%	62.1%
Change from 2025 Base				
Interstate 1 - 2025	3.5%	-1.3%	-1.4%	-0.2%
Interstate 2 - 2025	-0.5%	-1.0%	-2.3%	-1.0%
Interstate 3 - 2025	17.2%	-10.2%	-12.1%	-4.5%
Interstate 4 - 2025	32.2%	-16.6%	-22.7%	-7.4%
Interstate 5 - 2025	1.4%	-1.3%	-2.0%	-0.7%
Arterial 1 - 2025	-2.1%	-1.8%	-0.8%	-1.6%
Arterial 2 - 2025	-2.4%	-2.6%	-5.2%	-3.2%
Arterial 3 - 2025	-4.3%	-3.3%	-8.9%	-5.0%
Transit 1 - 2025	-0.1%	-0.4%	0.0%	-0.2%
Transit 2 - 2025	-1.1%	-0.6%	-1.0%	-0.8%
Transit 3A-BRT	-3.8%	-4.7%	-4.3%	-4.4%
Transit 3B-Rail	-5.2%	-1.6%	-2.1%	-2.5%
Interstate 4 LUR	29.8%	-18.8%	-21.5%	-8.9%
Arterial 3 LUR	-5.7%	-3.7%	-7.3%	-5.1%
Transit 3A-BRT LUR	-3.5%	-5.5%	-8.9%	-5.9%
Transit 3B-Rail LUR	-5.2%	-2.7%	-6.2%	-4.1%

VHT	Interstate	Arterials	Collectors	All
Peninsula				
Change from 2000 Base				
2025 Base	28.5%	34.8%	26.1%	34.2%
Change from 2025 Base				
Interstate 1 - 2025	1.2%	-0.5%	-2.1%	-0.6%
Interstate 2 - 2025	2.2%	1.0%	0.2%	1.0%
Interstate 3 - 2025	0.0%	1.1%	1.7%	1.2%
Interstate 4 - 2025	1.1%	2.4%	0.6%	2.2%
Interstate 5 - 2025	2.3%	0.0%	-0.2%	0.1%
Arterial 1 - 2025	3.0%	1.5%	0.1%	1.4%
Arterial 2 - 2025	1.4%	1.9%	-0.4%	1.7%
Arterial 3 - 2025	1.4%	1.2%	-0.5%	1.1%
Transit 1 - 2025	0.6%	-1.6%	19.6%	0.4%
Transit 2 - 2025	-1.0%	-2.0%	-0.4%	-1.8%
Transit 3A-BRT	-6.5%	-4.7%	-5.1%	-4.8%
Transit 3B-Rail	-7.3%	-5.6%	-3.6%	-5.4%
Interstate 4 LUR	-3.6%	-6.8%	-4.9%	-6.5%
Arterial 3 LUR	-1.9%	-5.1%	-2.4%	-4.8%
Transit 3A-BRT LUR	-8.3%	-1.0%	-4.8%	-1.5%
Transit 3B-Rail LUR	-8.7%	-1.0%	-3.5%	-1.4%

VHT	Interstate	Arterials	Collectors	All
Rest PACTS				
Change from 2000 Base				
2025 Base	57.5%	48.4%	54.2%	50.8%
Change from 2025 Base				
Interstate 1 - 2025	0.9%	-1.2%	-0.8%	-0.2%
Interstate 2 - 2025	-6.3%	-1.4%	-2.1%	-1.9%
Interstate 3 - 2025	-0.6%	-17.3%	-19.4%	-12.3%
Interstate 4 - 2025	6.0%	-24.5%	-28.9%	-16.3%
Interstate 5 - 2025	0.4%	-1.4%	-1.0%	-0.5%
Arterial 1 - 2025	-3.5%	-0.3%	-1.5%	-1.4%
Arterial 2 - 2025	-3.8%	-6.4%	-6.8%	-5.7%
Arterial 3 - 2025	-4.8%	-8.2%	-11.4%	-7.8%
Transit 1 - 2025	0.0%	-0.4%	-0.1%	-0.3%
Transit 2 - 2025	-0.4%	-0.9%	-1.0%	-0.8%
Transit 3A-BRT	-3.5%	-5.4%	-6.2%	-5.0%
Transit 3B-Rail	-3.5%	-2.1%	-2.8%	-2.6%
Interstate 4 LUR	2.8%	-27.2%	-31.6%	-19.2%
Arterial 3 LUR	-6.2%	-9.0%	-12.2%	-8.7%
Transit 3A-BRT LUR	-3.4%	-5.6%	-8.1%	-5.3%
Transit 3B-Rail LUR	-3.1%	-3.0%	-4.7%	-3.2%

VHT	Interstate *	Arterials	Collectors	All
ME Mall Area	None defined			
Change from 2000 Bas	in Mall Area			
2025 Base		36.1%	42.1%	36.8%
Change from 2025 Base				
Interstate 1 - 2025		-3.3%	5.5%	-2.4%
Interstate 2 - 2025		-4.9%	3.7%	-3.9%
Interstate 3 - 2025		-18.4%	28.9%	56.4%
Interstate 4 - 2025		-22.2%	28.3%	34.9%
Interstate 5 - 2025		-4.0%	4.3%	-3.1%
Arterial 1 - 2025		-4.8%	4.3%	-3.8%
Arterial 2 - 2025		2.2%	24.9%	4.7%
Arterial 3 - 2025		0.1%	22.1%	2.5%
Transit 1 - 2025		-0.7%	-1.8%	-0.8%
Transit 2 - 2025		-1.3%	-1.6%	-1.3%
Transit 3A-BRT		-2.8%	-2.3%	-2.7%
Transit 3B-Rail		-1.9%	-1.3%	-1.9%
Interstate 4 LUR		-25.4%	25.8%	33.0%
Arterial 3 LUR		0.2%	22.7%	2.6%
Transit 3A-BRT LUR		-1.8%	1.0%	-1.5%
Transit 3B-Rail LUR		-0.8%	3.1%	-0.4%

VHT	Interstate	Arterials	Collectors	All
Non-PACTS				
Change from 2000 Base				
2025 Base	71.7%	98.9%	70.2%	80.8%
Change from 2025 Base				
Interstate 1 - 2025	6.8%	-1.3%	-1.8%	0.0%
Interstate 2 - 2025	6.8%	-0.3%	-2.6%	0.1%
Interstate 3 - 2025	17.6%	0.4%	-10.3%	-0.5%
Interstate 4 - 2025	48.7%	-5.9%	-21.7%	-1.3%
Interstate 5 - 2025	2.7%	-0.8%	-2.5%	-0.9%
Arterial 1 - 2025	-0.5%	-4.1%	-0.6%	-2.0%
Arterial 2 - 2025	-0.8%	2.0%	-5.2%	-1.4%
Arterial 3 - 2025	-3.7%	3.3%	-8.7%	-2.9%
Transit 1 - 2025	-0.1%	-0.2%	-0.2%	-0.2%
Transit 2 - 2025	-2.0%	0.3%	-1.0%	-0.7%
Transit 3A-BRT	-4.2%	-4.0%	-3.6%	-3.9%
Transit 3B-Rail	-7.3%	-0.1%	-1.8%	-2.3%
Interstate 4 LUR	47.0%	-6.2%	-19.0%	-0.7%
Arterial 3 LUR	-5.2%	4.3%	-6.1%	-1.8%
Transit 3A-BRT LUR	-3.7%	-6.6%	-9.4%	-7.1%
Transit 3B-Rail LUR	-7.8%	-2.6%	-6.9%	-5.4%

Traffic Volumes

- Interstate Groupings Two and Three showed the greatest benefit to I-295 volumes on the Portland Peninsula, and reduced volumes to near the Year 2000 Base, or current traffic volumes.
- Interstate Groupings Two, Three and Four significantly increase volumes on the Maine Turnpike between Exit 7 and 10 due to the Turnpike widening. These groupings also significantly increase volumes on the Falmouth Spur.
- Interstate Groupings Three and Four show the greatest volume benefits to Route 25/Gorham Village and the Route 22/114 Overlap.
- Route 25/Gorham Village received significantly less benefit from Arterial Groupings Two and Three (contain short Gorham bypass) than from Interstate Grouping Three and Four (contain an 8-mile toll road). In Arterial Grouping Three, the new road connecting the Falmouth Spur to Route 25 virtually negates the benefits of the Gorham Bypass on Route 25 traffic volumes through the Gorham Village.
- Interstate Groupings Two, Three and Four and Arterial Groupings Two and Three have the ability to shift fairly large volumes of traffic within the corridors where strategies are located. The Interstate Groupings show the largest shifts.
- The Transit Groupings benefits to traffic volumes are broadly distributed and generally less than five percent (5%) at specific locations.

The Recommended "Best of" Transportation Package

Based upon the alternatives analysis, a "best of" transportation strategy package was developed. The package includes transportation strategies from each of the themes. The potential benefits of some of the strategies in this package were enhanced when combined with other strategies in the package. In this way, the total "best of" package showed greater overall potential benefits than implementing individual strategies. In addition, the "best of" package contains improvements to the bicycle and pedestrian networks, freight system, and ferry system that are not project-specific. The recommended "best of" package is shown in Figure 4-10A (2004-2009) and Figure 4-10B (2010-2025). The individual strategies are identified in Table 4-16.

Figure 4-10A – "Best of" Theme Package: 2004-2009

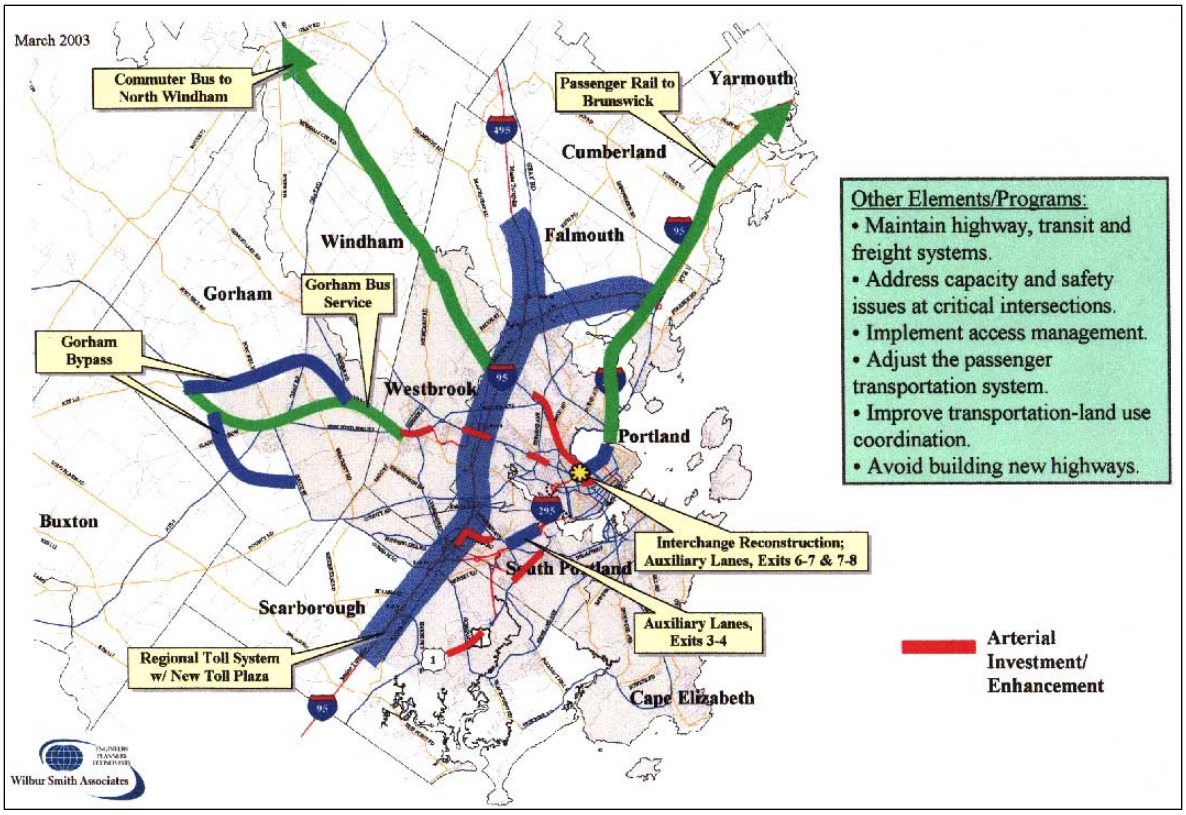


Figure 4-10B – "Best of" Theme Package: 2010-2025

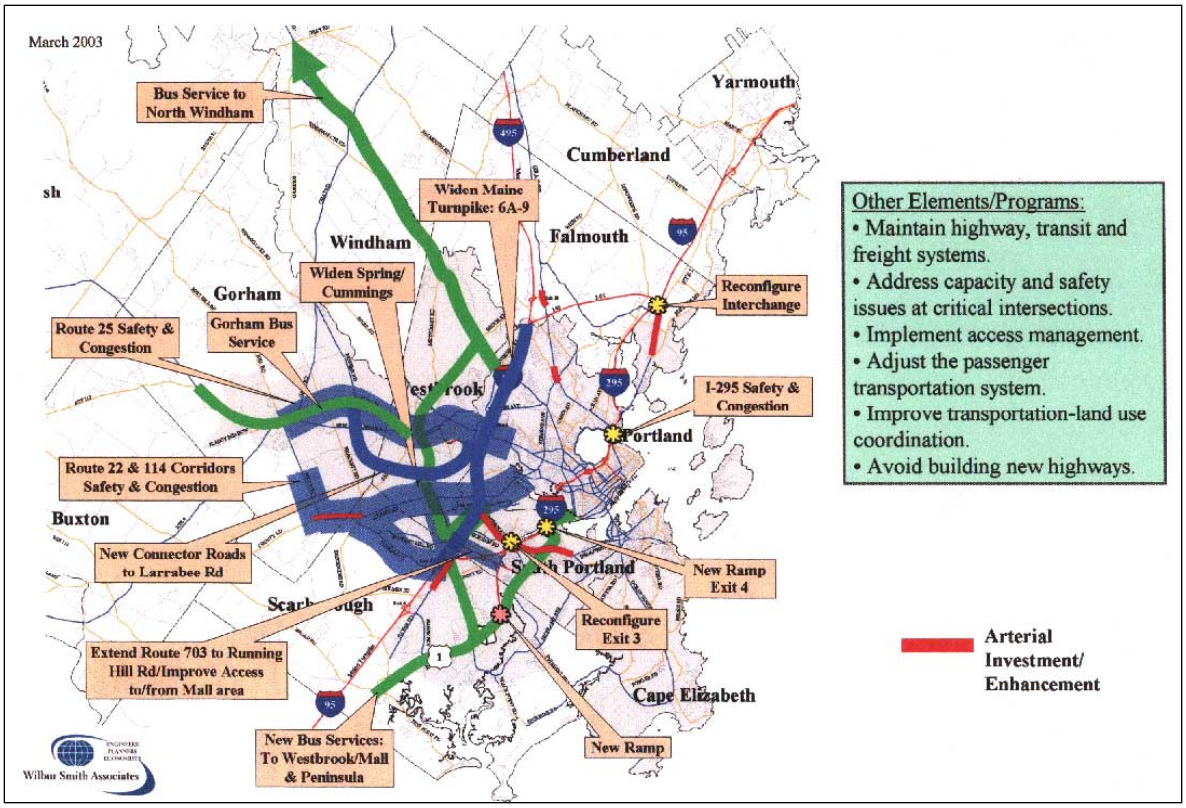


Table 4-16
"Best of" Theme Package Strategies

Strategy	Location	Municipality
Highway Strategies		
Implement Regional Toll System on Maine Turnpike	Maine Turnpike	Scarborough, So. Portland, Falmouth
Increase Turnpike speed limits to 65 mph	Maine Turnpike: Exit 6A to 9, Falmouth Spur	So. Portland, Portland, Falmouth
New Interchange	Forest Avenue Interchange at I-295	Portland
I-295 Auxiliary Lanes – Add third lane, north and southbound	Forest Avenue/Exit 6 to Franklin Street Arterial/Exit 7	Portland
	Westbrook Street/Exit 3 to Route 1/Exit 4	So. Portland
Gorham Village Bypass	Route 114 to Route 25	Gorham
	Route 25/Moshers Corner to Route 25	Gorham
Extend Turnpike Exit 7 to Running Hill Road	Maine Turnpike to Running Hill Road	So. Portland
Widen Running Hill Road to four lanes	Spring Street/Cummings Road to Route 114	So. Portland, Scarborough
Widen Cummings Road and Spring Street to four lanes	Eisenhower Drive to Payne Road	Westbrook, So. Portland, Scarborough
Extend Larrabee Road	Westbrook Arterial to Eisenhower Drive	Westbrook
New Industrial Park Road	Route 25/Moshers Corner to Saco Street/Eisenhower Drive	Gorham, Westbrook
New Interchange at Exit 3 of I-295, South Portland	Vicinity of Westbrook Street at Broadway	So. Portland
Widen Turnpike to 6 lanes	Maine Turnpike: Exit 6A to Exit 9	So. Portland, Portland, Falmouth
New I-295 Northbound Ramp	I-295 at Exit 4/Route 1	So. Portland
Transit Strategies		
New Bus Service	Prides Corner to Dunstan Corner via Westbrook Downtown, Maine Mall, Oak Hill	Westbrook, So. Portland, Scarborough
Bus Service Extensions of Existing Route	Extend METRO service to Turnpike Exit 10/Falmouth Crossing	Falmouth, Portland
	Extend METRO service to Walmart/Payne Road	So. Portland, Scarborough
New Bus Service	Gorham to Portland via Westbrook	Gorham, Westbrook
	Dunstan Corner to Portland peninsula	Scarborough, So. Portland, Portland
New Commuter Bus Service	North Windham to Portland via Westbrook	Windham, Westbrook, Portland
New Passenger Rail Service	Portland to Brunswick	Portland, Yarmouth, Freeport, Brunswick
Bus Operational Improvements – 15 min. frequency	Routes 22/25/302	Portland, Westbrook
Other Systems		
Bicycle-Pedestrian Improvements	Region-wide	
Freight/Intermodal Improvements	Region-wide	
Ferry Improvements	Portland/CBITD	
Access Management	Region-wide	
Intermodal Hubs/Terminals	Region-wide	
Intersection Improvements	Region-wide	
Arterial Investments	Region-wide	

Figures 4-11A and 4-11B show VMT and VHT benefits of the "Best of Theme" relative to the Base 2025 (relative to Base 2000) and for three other theme packages: Interstate 4, Arterial 3 and Transit 3/Rail. The Hybrid strategy package is forecasted to increase regional VMT by 2 percent and reduce VHT by 3 percent. These changes are against the backdrop of forecasted VMT and VHT increases of 41 percent and 62 percent, respectively.

Figure 4-11A
"Best of" theme package:
Changes in VMT

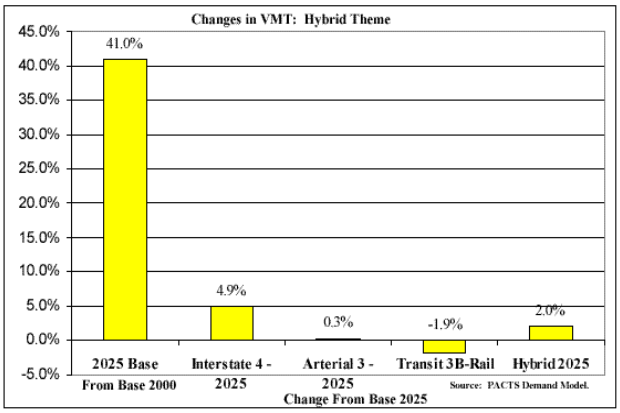


Figure 4-11B
"Best of" theme package:
Changes in VHT