

August 13, 2004

TO: DTx Committee

FROM: Bruce Hyman, AICP

SUBJECT: Alternatives Analysis: Interstate & Arterial Packages

TECHNICAL MEMO

Introduction

This Technical Memorandum documents the methodology and preliminary findings related to the Interstate and Arterial Alternatives Analysis as part of the update of the PACTS Long Range Transportation Plan, Destination Tomorrow. Previously, findings for the Existing Conditions and Future Trends scenarios have been reported to the Committee.

Methodology

Based upon the Existing Conditions and Future Trends Analyses and based upon interviews with the eight new PACTS communities, potential transportation system improvement strategies were identified. The strategies are intended to address transportation safety and level of service deficiencies as well as provide improve accessibility to complement existing and/or future economic development.

Potential improvement strategies were identified for 1) Interstate Highways (two packages), 2) Arterial Roadways (one package) and 3) the Transit system (two packages). The strategies were grouped into five packages and modeled using the PACTS Travel Demand Model. This Model forecasts future traffic volumes for the year 2025 for a 'typical weekday afternoon peak hour', 4pm to 5pm. The forecasts use population and employment forecasts for 2025 prepared by PACTS and GPCOG.

In addition, each of the five packages assumes/includes a set of transportation strategies termed 'Best Of' strategies derived from Destination Tomorrow, adopted by PACTS in April 2003. These strategies have represent the strategies included in the 'Investment Framework' adopted as part of Destination Tomorrow (see Final Report).

Table 1 documents the transportation strategies included in the 'Best Of' package as well as the five new packages of strategies (Packages 1 to 5). Each strategy and its location is identified. For the five new packages, the 'purpose' of each strategy is documented. Figures 1, 2 and 3 show the location and content of each strategy.

While ideally it would be desirable to model each strategy individually, the grouping of similar strategies generally allows the assessment of the order of magnitude benefits of each strategy

Albany NY, Anaheim CA, Atlanta GA, Baltimore MD, Bangkok Thailand, Burlington VT, Charleston SC, Charleston WV, Chicago IL, Cincinnati OH, Cleveland OH, Columbia SC, Columbus OH, Dallas TX, Dubai UAE, Falls Church VA, Greenville SC, Harrisburg PA, Hong Kong, Houston TX, Iselin NJ, Kansas City MO, Knoxville TN, Lansing MI, Lexington KY, London UK, Milwaukee WI, Mumbai India, Myrtle Beach SC, New Haven CT, Orlando FL, Philadelphia PA, Pittsburgh PA, Portland ME, Poughkeepsie NY, Raleigh NC, Richmond VA, Salt Lake City UT, San Francisco CA, Tallahassee FL, Tampa FL, Tempe AZ, Trenton NJ, Washington DC

Table 1: Strategy Packages

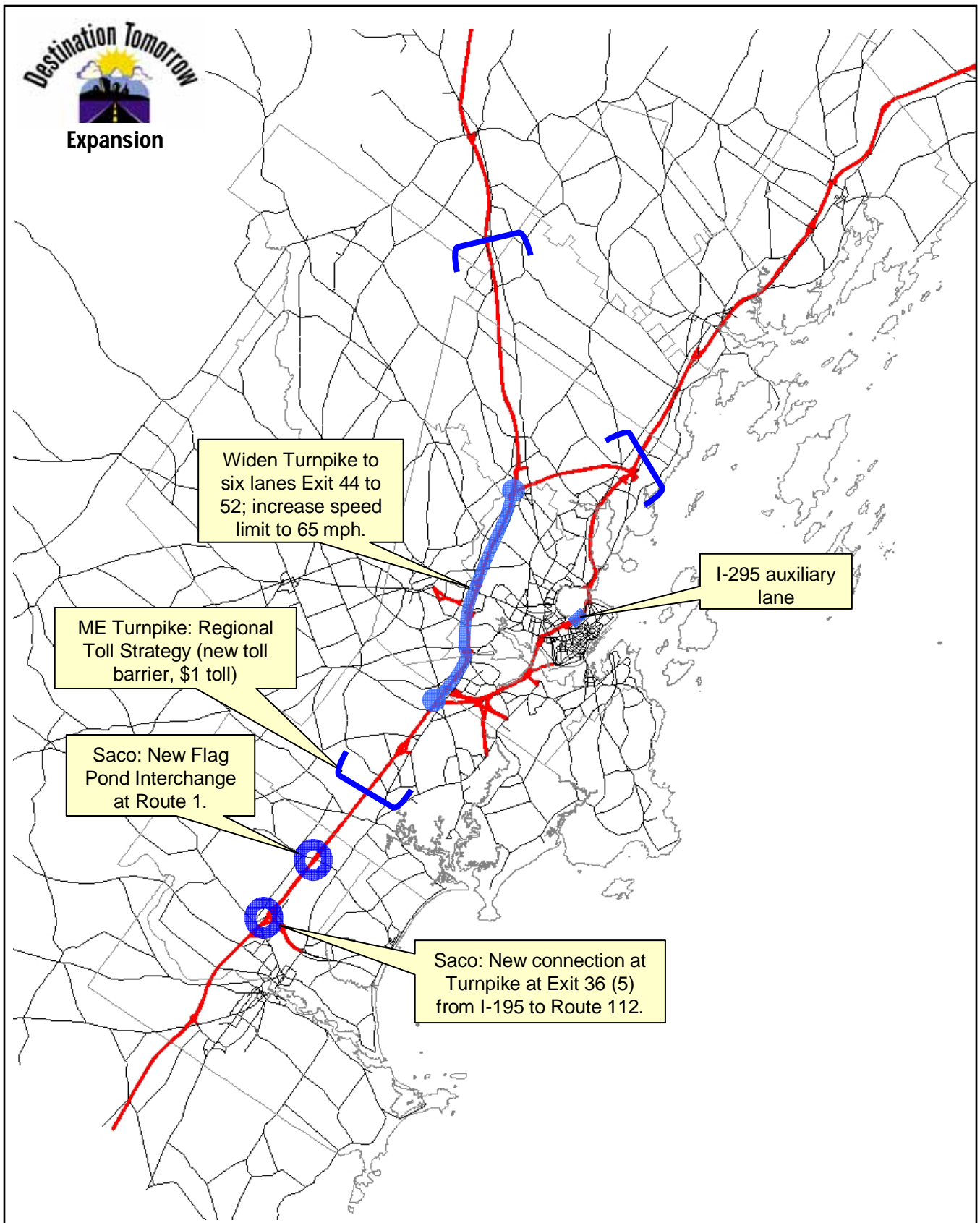
Package / Strategies		
'Best Of' DT Package	Location	Purpose
Rebuild I-295/Forest Ave interchange	Portland	Safety; Improve operations at interchange
Relocate existing NB entry ramp to I-295 from Westbrook St	South Portland	Safety; Improve operations/access.
New NB exit ramp from I-295 to Route 1 at Exit 4	South Portland	Improve access; truck access to industrial areas & Route 1/So. Portland
Add 3rd lane on NB and SB I-295 between Forest and Franklin interchanges (increase capacity to 9600 veh./hour)	Portland	Safety; Improve operations; reduce weaving.
Add 3rd lane on NB and SB I-295 between Westbrook St and Route 1 interchanges	South Portland	Safety; Improve operations; reduce weaving.
Modify Route 703 ramps at Maine Mall Rd	South Portland	Improve access to Maine Mall; reduce traffic on ME Mall Road
Extend Route 703 across Turnpike to intersect with Running Hill Road	South Portland	Reduce traffic on ME Mall Road; increase E-W access/mobility
Widen Running Hill to 4 lanes (Spring to Route 114)	South Portland/ Scarborough	Improve E-W access/ mobility; Linkage to new connector to ME Tpk
Widen Cummings/Spring to four lanes (Payne to Eisenhower)	South Portland/ Westbrook	Linkage to new connector to ME Tpk/ Running Hill Road
Extend Larrabee Road to Eisenhower/Spring intersection	Westbrook	Improve Collector Road connectivity between Turnpike and Industrial/Commerical Areas; Access to new areas of development
New Industrial Park Rd from Saco/Eisenhower Dr to Moshers Corner (Route 25)	Gorham	Improve Collector Road connectivity; Access to new areas of development
Widen Congress St to 5 lanes between Sewall and Stevens	Portland	Reduce traffic congestion/ improve LOS
Extend METRO service to Falmouth/Exit 10	Portland/Falmouth	Access to new developing area
Extend METRO service to Walmart/Payne Rd in Scarborough	Scarborough	Access to retail/job sites
Double frequency on all existing METRO and South Portland Bus routes	South Portland	Increase access; attract 'choice' riders to system.
New bus service between Gorham and Portland via Westbrook	Portland/South Portland/Gorham	New transit access to university/ village center; new E-W transit access.
New bus service between Portland and Dunstan Corner	Scarborough/South Portland/Portland	New suburban-urban transit service to growth area/village center.
New commuter bus service between North Windham and Portland via Westbrook	Windham/ Westbrook/Portland	New commuter transit service to large retail/employment/ suburbanizing residential area.

Table 1: Strategy Packages

Package / Strategies		
Package #1: Interstate ME Turnpike	Location	Purpose
Widen SB 295 to 3 lanes between Washington Ave exit and Franklin Arterial exit ramp	Portland	Improve freeway operations; safety (eliminates need to merge prior to Franklin Street exit for SB traffic).
Regional toll; barrier south of Exit 6A; \$1 each direction	Greater Portland	Improve local intra-regional access to ME Tpk; Attract usage to Tpk from I-295; work in conjunction with widened road.
Widen Turnpike to six lanes between 6A and 9 (increase capacity from 6400 to 9600 veh./ hour).	South Portland/Portland	Accommodate traffic growth/ improve traffic operations; attract through traffic from I-295.
Increase Turnpike speed limit to 65mph	South Portland/Portland	Complement widened Turnpike to attract through traffic from I-295.
New Turnpike interchange at Flag Pond Rd/ Route 1 in Saco	Saco	Improve ME Tpk access to/ relieve traffic on Route 1 & Saco.
Extend I-195 through Turnpike interchange to SR 112	Saco	Allow full interchange usage by Route 112 traffic.
Package #2: Interstate I-295	Location	Purpose
Widen SB I-295 to 3 lanes between Washington Ave exit and Franklin Arterial exit ramp	Portland	Improve freeway operations; safety (eliminates need to merge prior to Franklin Street exit for SB traffic).
New I-295 interchange in Freeport near Old County Rd	Freeport	Improve I-295 access to developing area along Route 1.
Expand current I-295 NB entry/exit interchange north of Freeport to full interchange	Freeport	Increase accessibility to/from interstate/I-295.
New I-295 interchange with Route 1 near Tuttle Road in Cumberland	Cumberland	Improve I-295 access to developing area along Route 1.
Provide NB entry ramp to I-295 from Route 1 at existing Yarmouth interchange, Exit 15 (16)	Yarmouth	Increase accessibility to/from interstate/I-295; reduce traffic that has to traverse Route 1 Yarmouth.
Widen I-295 to six lanes between Tukey's Bridge and Brunswick	Brunswick to Portland	Improve Level of Service/operations and safety on I-295.
Package #3: Arterial	Location	Purpose
New Lakes region connector between Turnpike and Fosters Corner	Cumberland to Windham	Improve E-W access to/from Turnpike to Lakes Region; reduce seasonal traffic on 302.
Widen SR 111 to 4 lanes from Route 1 westward	Biddeford westward	Improve Level of Service/ operations/safety connecting to rapidly developing commercial area at Turnpike interchange.
Widen Route 1 between Precourt and Campground in Biddeford	Biddeford	Improve access from Route 1/ industrial area to ME Turnpike.

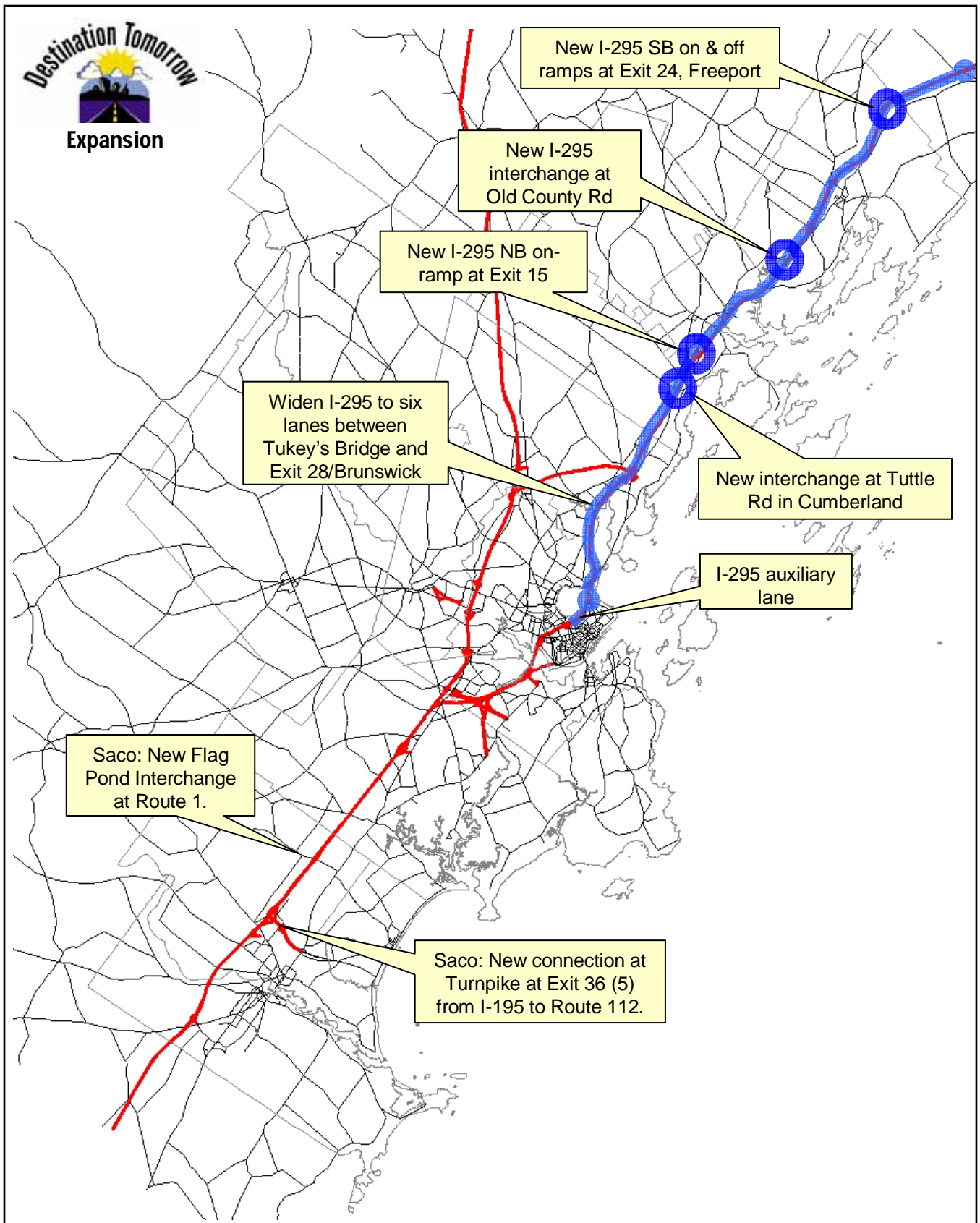
Table 1: Strategy Packages

Package / Strategies		
Widen River Rd in Windham from Route 202 to Westbrook CL	Windham / Westbrook	
Widen SR 115 between Route 302 and Falmouth Rd in Windham	Windham	Improve level of service/ operations/safety to major commercial/employment center toward Maine Turnpike in Gray.
Widen SR 112 in Saco between Jenkins and Shadagee	Saco	Improve access from Route 1/ industrial area to Route 1.
Package #4: Increase Existing Transit	Location	Purpose
Double bus frequency for Tri-Town Service	Biddeford/Saco/OOB	Increase transit mobility; attract 'choice' riders.
Double bus frequency for Biddeford-Sanford	Biddeford to Sanford	Increase transit mobility; attract 'choice' riders.
Double bus frequency for Biddeford-Kennebunk	Biddeford to Kennebunk	Increase transit mobility; attract 'choice' riders.
Double bus frequency for Biddeford-Portland	Biddeford to Portland	Increase transit mobility; attract 'choice' riders.
Package #5: New Transit Service	Location	Purpose
Passenger/Commuter Rail Service to Windham	Windham to Portland	New transit accessibility between metro areas; reduce commuter trips.
Passenger/Commuter Rail Service to L/A	Lew/Auburn to Portland	New transit accessibility between metro areas; reduce commuter trips.
Bus Transit Service to Waterboro	Bidd/Saco to Waterboro	Transit access to new service area.
Commuter Bus to Pineland	Portland to Pineland	Transit access to growing employment center.



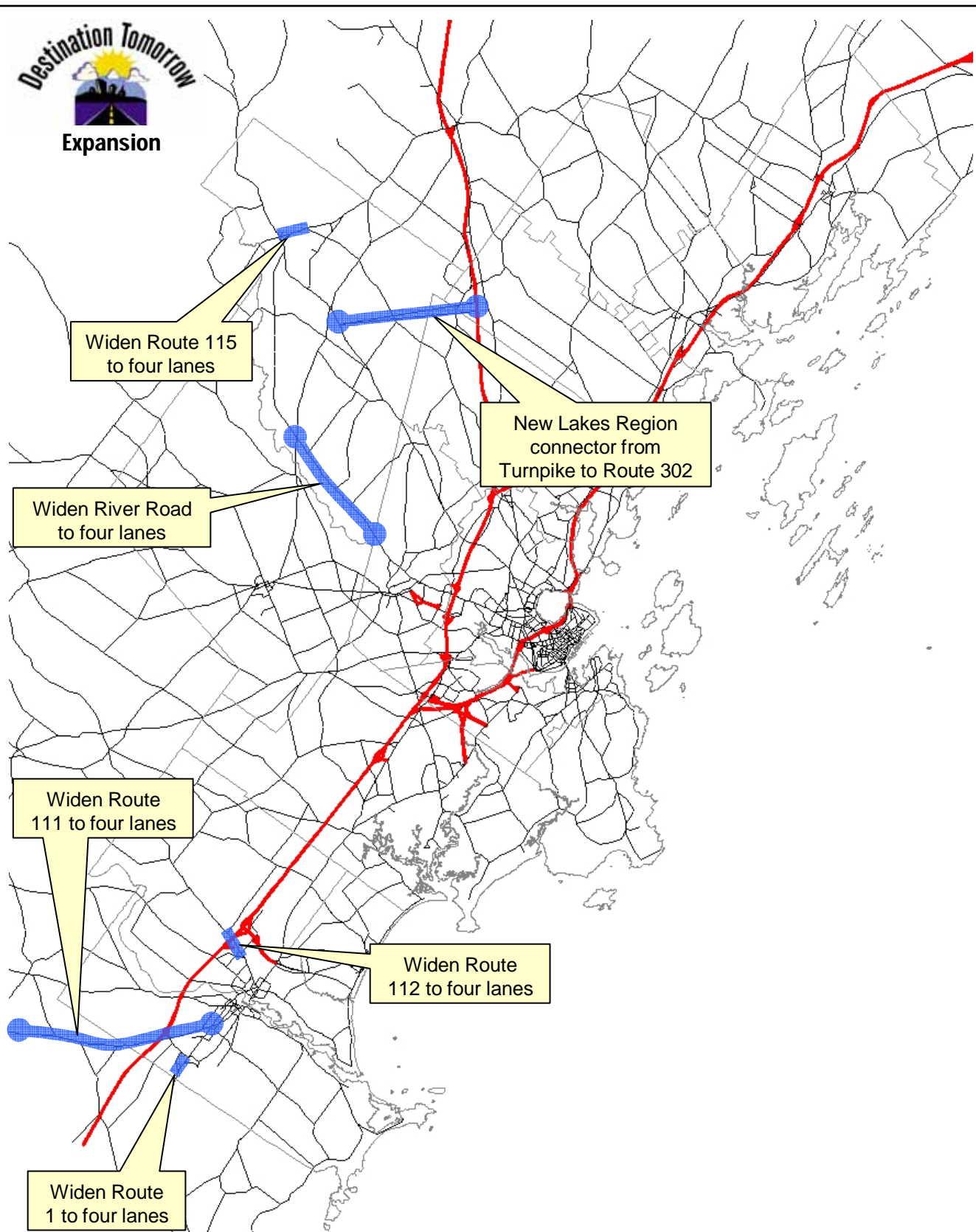
Package #1: Interstate Highway, ME Turnpike Related PACTS Destination Tomorrow Expansion

Figure 1



**Package #2: Interstate Highway, I-295 Related
PACTS Destination Tomorrow Expansion**

Figure 2



Package #3: Arterial
PACTS Destination Tomorrow Expansion

Figure 3

Destination Tomorrow Expansion (DTx): Alternatives Analysis

(“Does this strategy have enough benefit to merit further investigation?”) individually and in some cases , in combination with other strategies (e.g., Package #1: Regional Toll + Widened Turnpike + Increased Speed Limits).

Results

Regional Measures: Vehicle Miles Traveled & Vehicle Hours Traveled.

Table 2

Total Vehicle Miles Traveled			
	Total VMT (000)	Compare to 2000	Compare to 2025 No Build
2000	1,330		
2025 No Build	1,660	25%	
‘Best Of’ 2025	1,655	24%	-0.4%
Package #1: Interstate ME Turnpike	1,680	26%	+1.0%
Package #2: Interstate I-295	1,670	25%	+0.4%
Package #3: Arterial	1,665	25%	Negligible

Source: PACTS Travel Demand Model, 2004.

There is minimal difference in VMT between Packages 1, 2 and 3 and the 2025 No Build scenario.

Table3

Total Vehicle Hours Traveled			
	Total VHT	Compare to 2000	Compare to 2025 No Build
2000	37,340		
2025 No Build	49,575	33%	
‘Best Of’ 2025	49,020	31%	-1.1%
Package #1: Interstate ME Turnpike	49,125	32%	-0.9%
Package #2: Interstate I-295	48,475	30%	-2.2%
Package #3: Arterial	48,920	31%	-1.3%

Source: PACTS Travel Demand Model, 2004.

Package #2 reduces Regional VHT the most (-2.2%) compared to the 2025 No Build scenario, but the decreases are small compared to the increase from 2000 Existing Conditions to 2025 No Build (+33%). Reductions for the other two strategies (#1 and #3) are comparable (-1% +/-).

Roadway Network Impacts and Strategy Benefits

For Packages 1, 2 and 3, Table 4 lists the strategies, traffic volumes associated with each strategy (for the various modeling scenarios: 2000, 2005 No Build, and 2025 ‘Best Of’, and the Strategy Packages) and the order of magnitude potential benefits of each strategy (last column).

Table 4: Strategy Results/Benefits

** All volumes are raw (unadjusted) model output.**
 Bold figures are two way volumes.

Package / Strategies	Location	2000	2025 NB	'Best Of'	Interstate #1	Interstate #2	Arterial	Benefits
Package #1: Interstate ME Turnpike								
Regional toll; barrier south of Exit 6A; \$1 each direction	Greater Portland							Difficult to isolate the individual effects of these three complementary actions. In general, the strategies attract lesser amounts of traffic to the Turnpike outside of So. Portland/Portland and higher amounts from Exits 45-52. Numbers don't indicate that the strategies draw traffic from the I-295 corridor to the Turnpike. Improves LOS on Turnpike. Shows reductions on Route 1 in Scarborough.
Widen Turnpike to six lanes between 6A and 9 (increase capacity from 6400 to 9600 veh./ hour).	South Portland/Portland							
Increase Turnpike speed limit to 65mph	South Portland/Portland							
Maine Turnpike Volumes								
<i>I-95/Maine Turnpike s/o Exit 32 (4)</i>	Arundel/Biddeford	3995	5045	5010	5070			Negligible change from No Build & 'Best Of'
NB		2025	2550	2540	2550			
SB		1970	2495	2470	2520			
<i>I-95/Maine Turnpike s/o Exit 36 (5)</i>	Biddeford/Saco	5185	6830	6830	7320			+500 veh from No Build & 'Best Of'
NB		2085	2795	2800	3120			
SB		3100	4035	4030	4200			
<i>I-95/Maine Turnpike s/o Exit 42 (6)</i>	Saco/Scarborough	6000	7820	7820	8980			+1200 veh from No Build & 'Best Of'
NB		2250	2860	2860	3330			+500 from No Build & 'Best Of'
SB		3750	4960	4960	5650			+700 from No Build & 'Best Of'
<i>I-95/Maine Turnpike n/o Exit 42 (6)</i>	Scarborough	6710	8840	8800	9495			+650 veh from No Build & 'Best Of'
NB		2580	3390	3330	3645			+250
SB		4130	5450	5470	5850			+400
<i>I-95/Maine Turnpike: n/o Exit 44 (6A)</i>	South Portland	4369	5730	5700	6080			+400 veh from No Build & 'Best Of'
NB		1710	2210	2290	2430			
SB		2659	3520	3410	3650			
<i>I-95/Maine Turnpike: n/o Exit 45 (7)</i>	South Portland/Portland	4710	5880	5690	6910			+1000 veh from No Build & +1200 from 'Best Of'
NB		2360	3000	2790	3470			+470 from No Build
SB		2350	2880	2900	3440			+560 from No Build
<i>I-95/Maine Turnpike: n/o Exit 48 (8)</i>	Portland	4660	5700	5820	7610			+1900 from No Build; +1800 from 'Best Of'
NB		2890	3490	3580	4690			+1200 veh from No Build; +1100 from 'Best Of'
SB		1770	2210	2240	2920			+700 from No Build & 'Best Of'
<i>I-95/Maine Turnpike: n/o Exit 53 (10)</i>	Falmouth	2680	3680	3690	4040			+360 from No Build & 'Best Of'
NB		1880	2630	2640	2850			Marginal change
SB		800	1050	1050	1190			Marginal change
<i>Falmouth Spur</i>	Falmouth	2310	2800	2950	3530			+730 from No Build; +580 from 'Best Of'
NB		1170	1260	1390	1800			+540 from No Build; +400 from 'Best Of'
SB		1140	1540	1560	1730			+200 from No Build & 'Best Of'
I-295 Volumes								
<i>I-295: n/o Exit 3/Westbrook St (3)</i>	South Portland	7180	8670	8470	8430			Marginal change
NB		2770	3270	3130	3060			
SB		4410	5400	5340	5370			
<i>I-295: n/o Exit 6/Forest Ave (6)</i>	Portland	5960	6635	6700	6580			Marginal from No Build & 'Best Of'
NB		3500	3975	3900	3700			
SB		2460	2660	2800	2880			
<i>I-295 @ Tukey's Bridge</i>	Portland	7870	9250	9050	8600			-650 (-7%) from No Build; -450 (-5%) from 'Best Of'
NB		5300	6440	6250	5900			Higher reductions for NB direction than SB
SB		2570	2810	2800	2700			



Table 4: Strategy Results/Benefits

** All volumes are raw (unadjusted) model output.**

Bold figures are two way volumes.

Package / Strategies	Location	2000	2025 NB	'Best Of'	Interstate #1	Interstate #2	Arterial	Benefits
<i>I-295 n/o Exit 15/Falmouth Spur (11)</i>	Falmouth	5510	6090	6040	6160			Marginal from No Build & 'Best Of'
<i>NB</i>		3680	4120	4090	4100			
<i>SB</i>		1830	1970	1950	2060			
Route 1 Volumes								Instead of diversion to Route 1, shows traffic reductions.
<i>Route 1 n/o Rt 9/Broad Turn Road</i>	Scarborough	3355	3790	3760	3265			-500 from No Build & 'Best Of'
<i>Route 1 at Saco TL</i>	Scarborough	1920	1970	1980	1670			-300 from No Build & 'Best Of'
<i>Route 1 s/o I-195/Exit 36 (5)</i>	Saco	2905	3140	3195	3185			Negligible change
New Turnpike interchange at Flag Pond Rd/ Route 1 in Saco	Saco							New interchange attracts total usage of 2300 peak hour vehicles (reduced usage due to new Route 112 connector, below?).
<i>New Interchange (total volumes, 4 new ramps)</i>	Saco				2300			
<i>Route 1 s/o Flag Pond Road</i>	Saco	2025	2250	2220	2540			
<i>Route 1 n/o Flag Pond Road</i>	Saco	1910	1980	1990	1740			
<i>Flag Pond Road e/o Route 1</i>	Saco	515	715	730	1340			
Extend I-195 through Turnpike interchange to SR 112	Saco							Connector road attracts approximately 1000 peak hour vehicles (reduced usage due to new Flag Pond interchange, above?)
<i>New Connector Road (two-way volume)</i>					1050			
<i>Route 112 w/o Jenkins Road</i>		780	970	960	1200			
<i>Route 112 e/o new connector</i>		1020	1200	1170	810			
Package #2: Interstate I-295								
New I-295 interchange in Freeport near Old County Rd	Freeport							New interchange attracts total usage of 1425 peak hour vehicles. Reduces interchange usage at Desert Rd interchange/Exit 22 in Freeport by ~450 vehicles and reduction of ~ 300 vehicles at Exit 17 in Yarmouth.
<i>New Interchange (total volumes, 4 new ramps)</i>						1425		
<i>Route 1 n/o new Cnty Rd interchange</i>		510	760	765		280		-480 vehicles in peak hour
<i>Route 1s/o new Cnty Rd interchange</i>		490	715	715		210		-500 vehicles in peak hour
<i>I-295 NB n/o new Cnty Rd interchange</i>		3235	3745	3660		4355		Additional traffic on I-295
<i>I-295 SB n/o new Cnty Rd interchange</i>		1740	2000	1990		2450		Additional traffic on I-295
<i>I-295 NB s/o new Cnty Rd interchange</i>		3235	3745	3660		4570		Additional traffic on I-295
<i>I-295 SB s/o new Cnty Rd interchange</i>		1740	2000	1990		2380		Additional traffic on I-295
Expand current I-295 NB entry/exit interchange north of Freeport to full interchange	Freeport							Two new ramps attract a total of 600 peak hour vehicles. Reduces interchange usage by ~300 vehicles on SB on-off ramps at Exit 22 (Route 125/136)
<i>New Ion-Off Ramps (total volumes, 2 new ramps, I-95 SB on and off ramps)</i>						600		
<i>Total Interchange Usage</i>		580	700	675		1140		Total interchange usage increase of +450
<i>Route 1 n/o new interchange</i>		870	995	980		1090		Negligible change on Route 1.
<i>Route 1s/o new interchange</i>		700	830	790		810		Negligible change on Route 1.
New I-295 interchange with Route 1 near Tuttle Road in Cumberland	Cumberland							New interchange attracts total usage of 1900 peak hour vehicles.
<i>New Interchange (total volumes, 4 new ramps)</i>						1930		
<i>Route 1 n/o new interchange</i>		460	630	620		470		Reductions on Route 1 near new interchange.
<i>Route 1s/o new interchange</i>		665	785	770		480		Reductions on Route 1 near new interchange.

Table 4: Strategy Results/Benefits

** All volumes are raw (unadjusted) model output.**
 Bold figures are two way volumes.

Package / Strategies	Location	2000	2025 NB	'Best Of'	Interstate #1	Interstate #2	Arterial	Benefits
Provide NB entry ramp to I-295 from Route 1 at existing Yarmouth interchange, Exit 15 (16)	Yarmouth							Provides 'all direction' access to Exit 15. Attracts ~ 120 vehicles (likely reduced due to new interchange at Tuttle Rd in Cumberland).
<i>New NB on-ramp volume</i>						120		
<i>Total Interchange Usage</i>		1025	1125	1110		875		Overall usage (despite additional ramp) decreases ~ 300 from No Build, likely due to Tuttle Rd interchange in Cumberland.
<i>Route 1 n/o Exit 15 (16)</i>		1025	1140	1120		940		Decreases on Route 1 of ~ 200 peak hour vehicles.
<i>Route 1s/o Exit 15 (16)</i>		460	630	620		470		Decreases on Route 1 of ~ 150 peak hour vehicles.
Widen I-295 to six lanes between Tukey's Bridge and Brunswick	Brunswick to Portland							Improves LOS from E to likely C due to capacity increase from 6400 vehicles/hour to 9600 vehicles/hour (NB&SB).
<i>I-295 @ Tukey's Bridge NB</i>		5310	6440	6250		6710		Marginal increases in volumes.
<i>I-295 @ Tukey's Bridge SB</i>		2570	2810	2800		3020		Marginal increases in volumes.
Package #3: Arterial								
New Lakes region connector between Turnpike and Fosters Corner	Cumberland to Windham							Approximately 750 peak hour vehicles attracted to new connector road (may underestimate peak summer demand). Peak summer tourist traffic typically +40% more.
<i>Connector to NB I-95/Turnpike</i>							500	
<i>Connector to SB I-95/Turnpike</i>							260	
<i>Route 302 n/o new connector</i>		925	1080	1040			1390	~300 peak hour vehicles attracted to Route 302.
<i>Route 302 s/o new connector</i>		1010	1170	1125			910	~250 peak hour vehicles removed from Route 302.
Widen SR 111 to 4 lanes from Route 1 westward	Biddeford westward							Provides improved LOS to this busy and rapidly developing corridor (future traffic growth likely underestimated).
<i>Route 1 n/o Route 111</i>		1230	1440	1440			1510	
<i>Route 1 s/o Route 111</i>		990	990	1005			1090	
<i>Route 111 e/o Route 1</i>		640	875	870			925	
<i>Route 111 w/o Route 1</i>		1320	2010	2000			2060	
<i>Route 1 e/o Exit 32 (4)</i>		2070	2935	2935			3070	
<i>Route 111 w/o Exit 32 (4)</i>		2130	2635	2650			3155	
<i>Route 111 @ Lyman/Alfred TL</i>		1160	1410	1435			1390	
Widen Route 1 between Precourt and Campground in Biddeford	Biddeford							Provides improved LOS to this section of Route 1.
<i>Route 1 n/o Precourt</i>		1455	1445	1460			1625	
<i>Route 1 s/o Precourt</i>		795	825	850			1210	
Widen River Rd in Windham from Route 202 to Westbrook CL	Windham/Westbrook							Provides improved LOS to this section of River Rd.
<i>Windham River Rd w/o Route 202</i>		650	760	785			820	
<i>Windham River Rd e/o Route 202</i>		830	980	975			1170	
<i>Windham River Rd @ Westbrook CL</i>		865	1055	1070			1205	
<i>Route 302 @ Windham/Westbrook CL</i>		1555	1820	1765			1550	
Widen SR 115 between Route 302 and Falmouth Rd in Windham	Windham							Potential benefits likely dampened by new Lakes Region connector road (above).
<i>Route 115 e/o Route 302</i>		1130	1255	1275			1415	
<i>Route 302 n/o Route 115</i>		2240	2600	2610			2600	
<i>Route 302 s/o Route 115</i>		1455	1735	1730			1820	



Table 4: Strategy Results/Benefits

** All volumes are raw (unadjusted) model output.**
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Package / Strategies	Location	2000	2025 NB	'Best Of'	Interstate #1	Interstate #2	Arterial	Benefits
Widen SR 112 in Saco between Jenkins and Shadagee	Saco							Provides improved LOS in this increasing commuter corridor and commercial/industrial area. Would potentially complement extension of I-195 to Route 112 (Package 1)
<i>Route 112 w/o Jenkins Rd</i>		780	970	955			960	
<i>Route 112 e/o Shagadee Rd</i>		760	785	760			940	