CHAPTER 3

TOLL REMOVAL AT EXITS 11 AND 12 IN MERRIMACK

A significant commercial development has been proposed on Industrial Drive near Interchange 10 of the F.E. Everett Turnpike. This will result in an increase in traffic and toll revenue at this interchange. It has been suggested that when this development opens it might be feasible to eliminate ramp tolls from both Exit 11 and Exit 12. This chapter analyzes the impact of this possibility and evaluates the revenue implications if the tolls were removed.

BASIC ASSUMPTIONS

Certain given and assumed conditions were utilized in this analysis. These are listed below.

- The 500,000 square foot commercial development, the Premium Outlet Mall would open in FY 2012.
- The Premium Outlet Mall would include retail stores, restaurants and a hotel, with main access onto Industrial Drive.
- The MAAR would open in FY 2012.
- Ramp tolls and rates would remain at existing locations and levels.
- For all analyses, in this chapter, it was assumed that the MAAR would be operating under Scenario 1.

MALL DEVELOPMENT TRAFFIC

A traffic impact report was prepared for the Premium Outlet Mall in August 2007. This report contained estimates for traffic volumes generated by the mall development. For comparison purposes, mall traffic generation was recalculated for this analysis using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition. The generation rates from the category, Land Use 820, Shopping Center, were used for this calculation. A review of the traffic analysis zone for this

specific location in the Nashua Regional Planning Commission Travel Demand Model was conducted and was found to include trips from the proposed mall in their future year trip tables.

Table 3-1 shows the three different traffic projections for the proposed Premium Outlet Mall.

Table 3-1
Daily Trips To and From the Premium Outlet Mall

Source	Weekday	Saturday	Sunday
Previous Traffic Impact Report	19,311	27,973	18,742
ITE Trip Generation Manual	23,617	27,484	13,882
Nashua RPC Travel Demand Model	10,152	11,814	5,967

The ITE Trip Generation Manual rates were used in this analysis.

ANALYSIS ALTERNATIVES

Three alternatives were analyzed for the toll removal evaluation. They were:

- **Alternative 1 - MAAR Opens, Tolls Remain** – Under this condition, a 500,000 square-foot mall development in the vicinity of Exit 10 would not be built and the ramp tolls would remain at Exits 10, 11, and 12.
- **Alternative 2 – MAAR Opens, Mall Build Condition, Tolls Remain** – Under this condition, a 500,000 square-foot mall development in the vicinity of Exit 10 would be built and opened in 2012 and the ramp tolls would remain at Exits 10, 11, and 12.
- **Alternative 3 – MAAR Opens, Mall Build Condition, Tolls Removed** – Under this condition, a 500,000 square-foot mall development in the vicinity of Exit 10 would be built and opened in 2012. Ramp toll plazas at Exits 11 and 12 would be removed in conjunction with the mall opening. Tolls at Exit 10 would remain.

Model runs, using the Nashua Regional Planning Commission Travel Demand Model, were made for each alternative. The northern boundary of the Nashua Model and the southern boundary of the Manchester Model occur between the Bedford Mainline Toll Plaza and Exit 12. A post-

processing interface was developed so that the traffic volumes between the two models would be consistent.

EXISTING CONDITIONS

Figure 3-1 illustrates the actual traffic and revenue experienced at Exits 10, 11 and 12. Transactions peaked in 2006, with a total of 8.5 million. The total number of toll transactions at Exits 11 and 12 in 2006 were over 76 percent of the total transactions for all three toll plazas. There were 6.5 million transactions at Exits 11 and 12 and 2.0 million at Exit 10.

In 2009, total transactions at the three exits declined to 7.9 million, due to the economic downturn as a result of the recession. In 2009, over 78 percent of the transactions took place at Exits 11 and 12 while only 21.7 percent occurred at Exit 10. There were 6.2 million transactions at Exits 11 and 12 and 1.7 million at Exit 10.

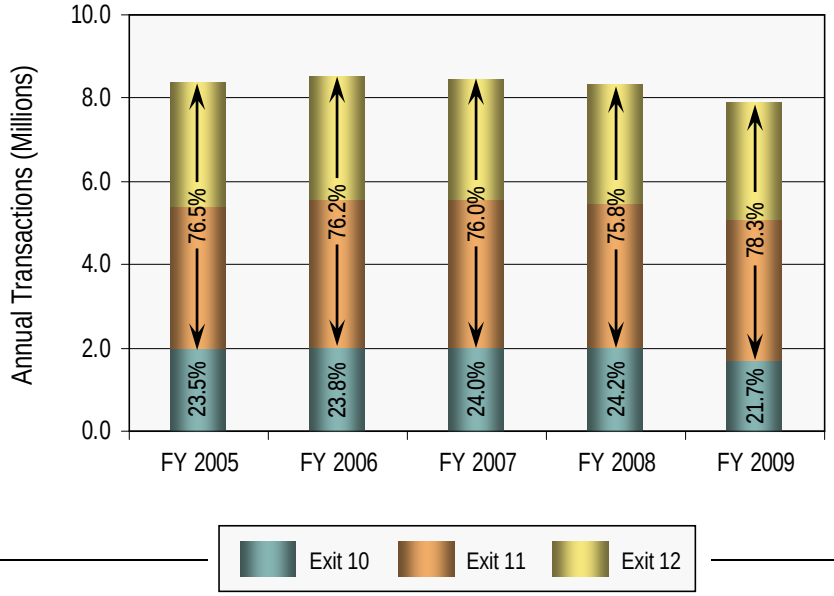
On the toll revenue side, it was a similar situation since toll rates at all three plazas are the same. Total revenue for the three interchanges peaked in 2007 with a total of $3.6 million collected. The revenue collected at Exits 11 and 12 totaled $2.7 million, while toll revenue collected at Exit 10 totaled $899,000. In 2009, $2.6 million was collected at Exits 11 and 12 and just over $758,000 at Exit 10.

Based on 2009 revenues, toll revenue at Exit 10 would have to more than triple for the toll removal at Exits 11 and 12 to be revenue neutral. This is highly unlikely given that traffic currently paying a toll at Exit 10 could then use Exit 11 under a toll free condition.

TRAVEL TIME ESTIMATES

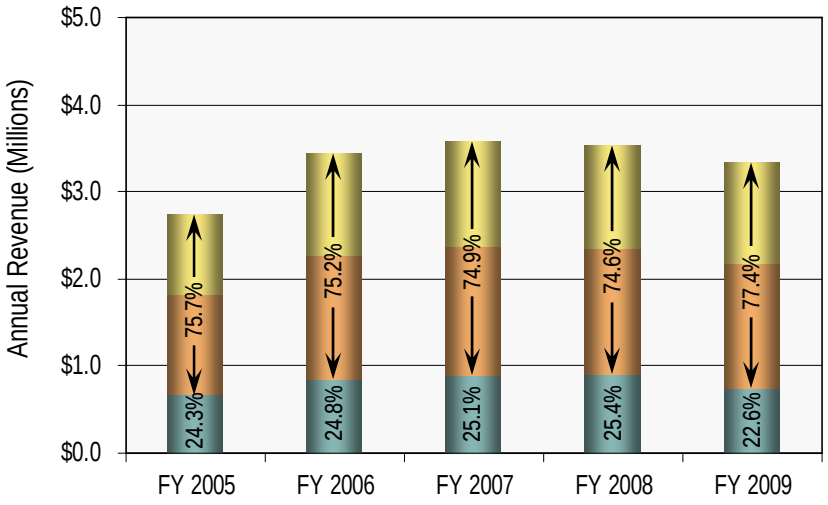
Figure 3-2 presents the travel times between Exit 7 and the intersection on Industrial Drive where the future new outlet center will be accessed. A trip via the F. E. Everett Turnpike will save about 4 minutes travel time compared to a trip using U.S 3. In the case where tolls would be removed from Exit 11, a trip with the detour through Exit 11 would be about 3.5 minutes longer than the direct route using Exit 10.

When removing the tolls at Exit 11, it can be expected that some of trips to and from the area around the new development at Exit 10 would choose to use the slightly longer, but toll-free route via Exit 11, as opposed to the tolled Exit 10 ramps.



Annual Transactions

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Exit 10	1,969,220	2,026,161	2,033,762	2,013,290	1,709,734
Exit 11	3,435,424	3,533,426	3,537,560	3,468,550	3,386,947
Exit 12	2,982,831	2,955,465	2,899,885	2,843,072	2,792,521
Total	8,387,474	8,515,052	8,471,207	8,324,912	7,889,202



Annual Gross Toll Revenue

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Exit 10	$669,057	$851,417	$898,720	$899,528	$758,050
Exit 11	$1,144,712	$1,415,509	$1,477,279	$1,456,855	$1,412,615
Exit 12	$935,932	$1,170,675	$1,210,760	$1,190,451	$1,178,469
Total	$2,749,701	$3,437,601	$3,586,759	$3,546,834	$3,349,135

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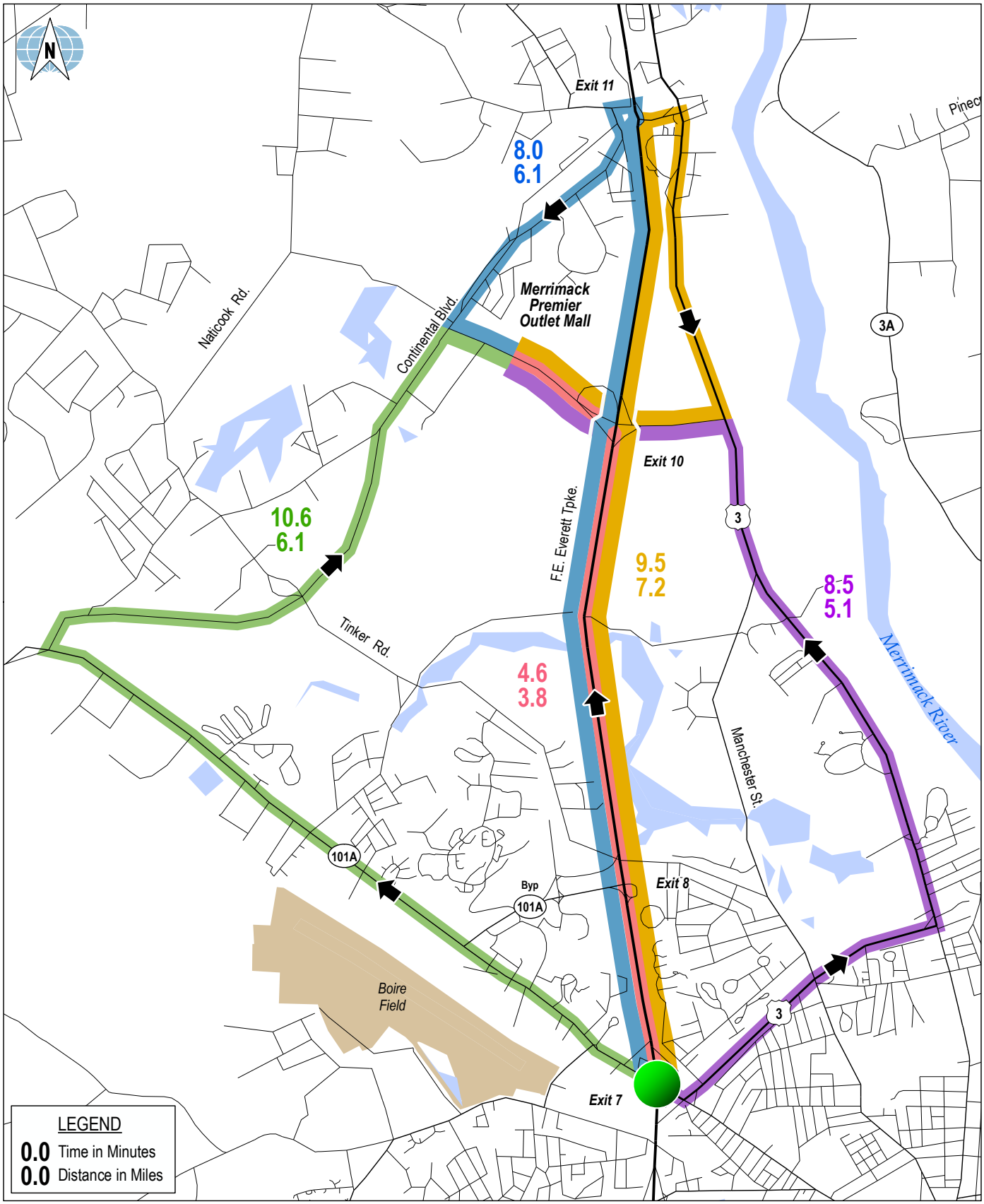

TRAVEL TIME ESTIMATES AND DISTANCES FROM EXIT 7 TO MERRIMACK PREMIER OUTLET MALL

WilburSmith ASSOCIATES

FIGURE 3-2

In addition, trips from areas east of the Merrimack River and south of the Manchester Airport in Londonderry and Litchfield will potentially change their routes for trips to Exit 11 (Figure 3-3). Today, these trips either use Route 101A in Nashua or Route 101 in Manchester to cross the river and then continue on the F. E. Everett Turnpike to reach destinations in the vicinity of Exit 11. The further south the origin of the trip is, the more likely the route through Nashua will be chosen. Once the MAAR is implemented and not being tolled, a certain amount of trips will change the routing via the new connection and approach Exit 11 from the north. This will have a small impact on toll revenue at Exit 11.

ESTIMATED TRANSACTIONS AND GROSS REVENUE

Estimates of average weekday traffic, annual toll transactions and annual gross toll revenue for the three alternatives were prepared and are presented below.

ESTIMATED ANNUAL TOLL TRANSACTIONS

Table 3-2 shows the total projected annual toll transactions for the ramp tolls at Exits 10, 11 and 12, from 2010 to 2017.

Table 3-2
Toll Removal at Exits 11 and 12 - Annual Transaction Estimates

Fiscal Year	No-Build	Alternative 1	Percent Impact	Alternative 2	Percent Impact	Alternative 3	Percent Impact
2010	7,718,079						
2011	7,873,000						
2012	8,031,000	6,533,000	-18.7%	7,870,000	-2.0%	2,339,000	-70.9%
2013	8,169,000	6,649,000	-18.6%	7,987,000	-2.2%	2,372,000	-71.0%
2014	8,310,000	6,768,000	-18.6%	8,106,000	-2.5%	2,407,000	-71.0%
2015	8,454,000	6,888,000	-18.5%	8,227,000	-2.7%	2,442,000	-71.1%
2016	8,600,000	7,011,000	-18.5%	8,350,000	-2.9%	2,477,000	-71.2%
2017	8,748,000	7,136,000	-18.4%	8,475,000	-3.1%	2,513,000	-71.3%

Note: Alternative 1: MAAR open, tolls remain at Exit 10, 11, and 12 beginning in 2012.
Alternative 2: MAAR open, Mall open, tolls remain at Exit 10, 11, and 12 beginning in 2012.
Alternative 3: MAAR open, Mall open, tolls removed at Exit 11 and 12 beginning in 2012, tolls remain at Exit 10.

Figure 3-4 shows the projected 2012 average weekday traffic on the tolled ramps at Exit 10, 11, and 12 for the No Build (MARR not implemented) condition, Alternative 1, Alternative 2, and Alternative 3.

Alternative 1 - 2012 estimates of average weekday traffic on the tolled ramps at Exit 10, 11, and 12 totals approximately 20,600, with 5,400 transactions at Exit 10 and a total of 15,200 at Exits 11 and 12. Toll

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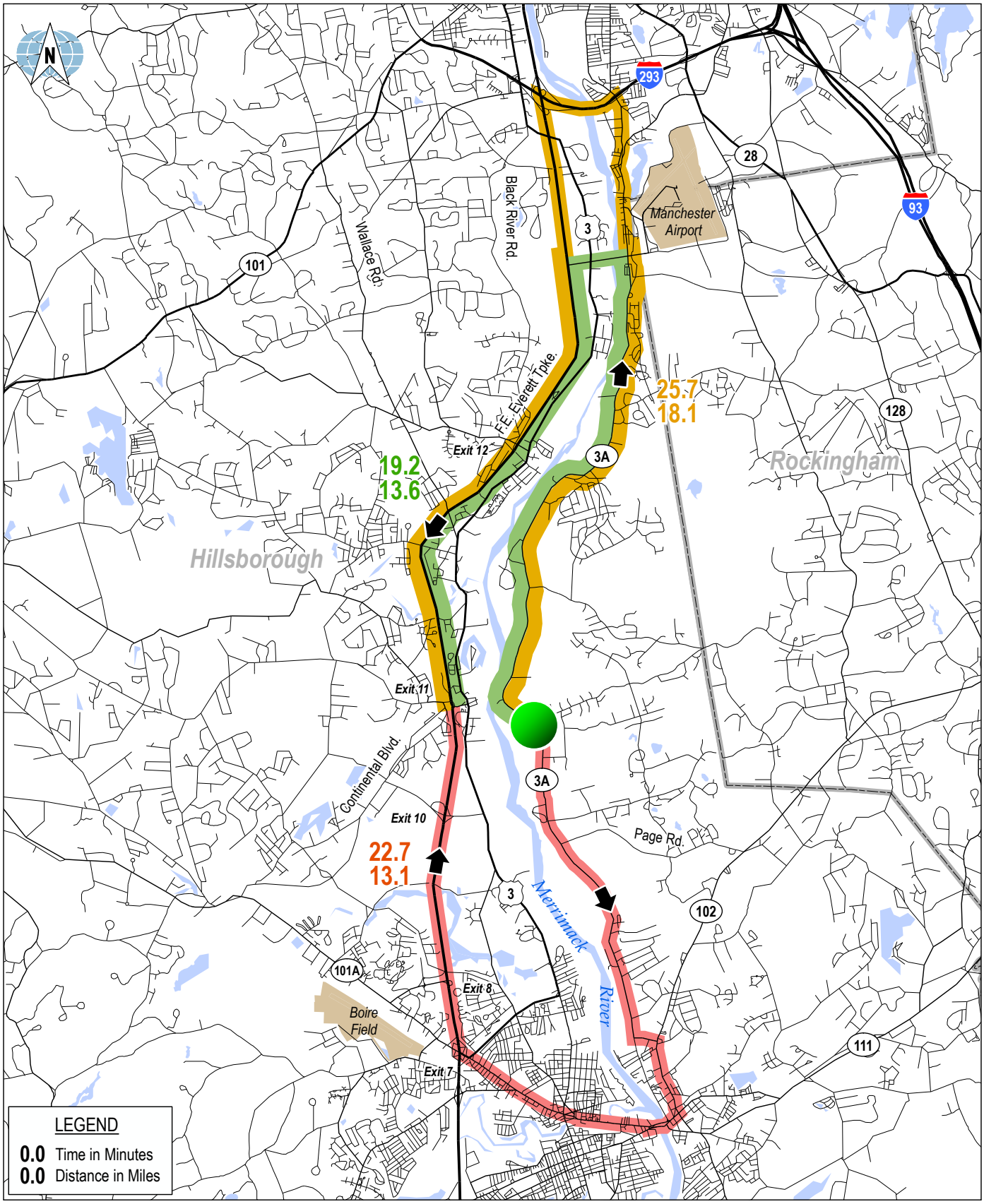

TRAVEL TIME ESTIMATES AND DISTANCES FROM LITCHFIELD TO EXIT 11

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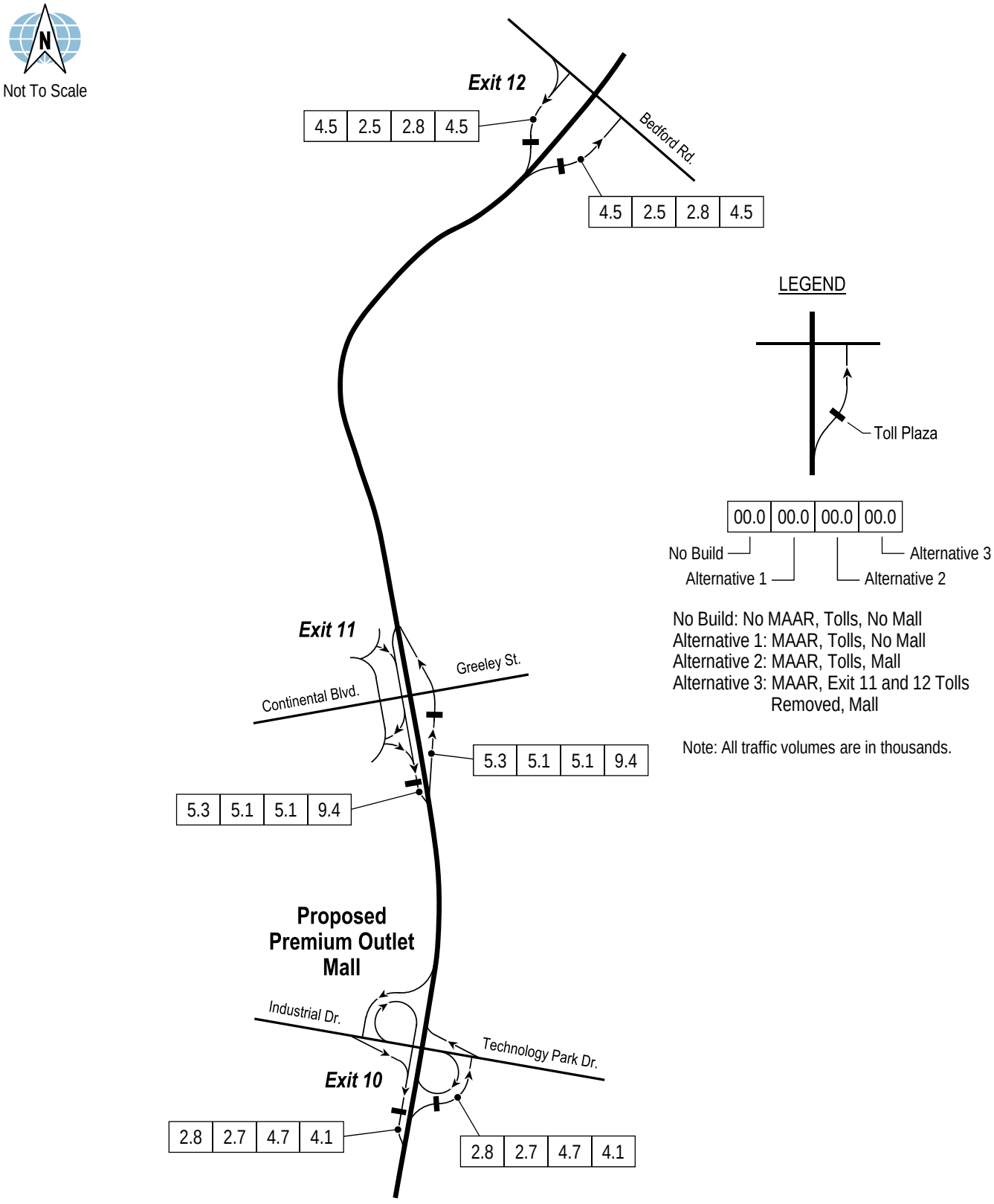
FIGURE 3-3



2012 ESTIMATED AVERAGE WEEKDAY VOLUMES AT EXITS 10, 11 AND 12 – NO BUILD, ALTERNATIVES 1, 2 AND 3

WilburSmith ASSOCIATES

FIGURE 3-4

transactions at Exit 12 are estimated to be reduced by 44 percent as compared to the No Build (MAAR not implemented) condition due to the opening of the MAAR.

Under this alternative, total annual transactions among Exits 10, 11, and 12 are reduced by nearly 19 percent in FY 2012 due to the opening of the MAAR which will draw traffic away from Exit 12, since these trips will now be toll-free and for some trips this also may be a shorter and/or quicker route to their ultimate destination. From FY 2012, transactions are forecast to modestly increase over the years and are projected to reach 7.1 million by FY 2017.

Alternative 2 – 2012 estimates of average weekday traffic at all six ramp toll plazas total 25,200 with the opening of the Outlet Mall. There are 9,400 transactions estimated at Exit 10 and a total of 15,800 estimated at Exits 11 and 12.

In FY 2012, transactions are estimated to be only 2 percent lower than the No Build (MARR not implemented) condition as the new demand due to the opening of the Mall will all but make up for the reduced toll trips due to the MAAR opening. Toll transactions will increase slightly each year through FY 2017. Compared to the number of transactions without the Mall (Alternative 1), transactions are estimated to be about 20 percent higher.

Alternative 3 – Total traffic for the northbound off ramps and southbound on ramps at the three locations is 36,000 vehicles per day. Of these, 8,200 are toll transactions at Exit 10 and 27,800 are toll-free vehicles at Exits 11 and 12.

When the Mall opens and the ramp tolls are removed from Exits 11 and 12, toll transactions are projected to be 71 percent lower than the No Build (MAAR not implemented) condition. Transactions are estimated to increase slightly from FY 2012 to FY 2017, but they will continue to be 71 percent lower than the No Build (MAAR not implemented) condition.

TOLL TRANSACTIONS SUMMARY

The impact of the Mall will be primarily at Exit 10, where total ramp toll transactions are estimated to increase by about 4,000 per day when the Mall is opened. Projected 2012 average weekday transactions at Exit 10 are estimated 5,400 vehicles, without the Outlet Mall (Alternative 1). This will increase to 9,400 on an average weekday when the Mall opens (Alternative 2). This is an increase of about 74 percent at Exit 10. This will nearly make up for the loss of transactions experienced at the ramp plazas due the opening of the MAAR. However, removing tolls at Exits 11

and 12 (Alternative 3) shows that tolled traffic would have to further increase by an additional 150 percent at Exit 10 to reach toll transaction volumes experience under Alternative 1.

TOLL REVENUE

Table 3-3 shows the projected annual gross toll revenue impacts of the three alternatives.

Table 3-3
Toll Removal at Exits 11 and 12 - Annual Gross Toll Revenue Estimates

Fiscal Year	No-Build	Alternative 1	Percent Impact	Alternative 2	Percent Impact	Alternative 3	Percent Impact
2010	$3,267,074						
2011	$3,333,000						
2012	$3,400,000	$2,771,000	-18.5%	$3,361,000	-1.1%	$1,041,000	-69.4%
2013	$3,458,000	$2,820,000	-18.4%	$3,411,000	-1.4%	$1,056,000	-69.5%
2014	$3,518,000	$2,870,000	-18.4%	$3,461,000	-1.6%	$1,072,000	-69.5%
2015	$3,579,000	$2,922,000	-18.4%	$3,513,000	-1.8%	$1,087,000	-69.6%
2016	$3,641,000	$2,974,000	-18.3%	$3,565,000	-2.1%	$1,103,000	-69.7%
2017	$3,704,000	$3,027,000	-18.3%	$3,618,000	-2.3%	$1,119,000	-69.8%

Note: Alternative 1: MAAR open, tolls remain at Exit 10, 11 and 12 beginning in 2012.
Alternative 2: MAAR open, Mall open, tolls remain at Exit 10, 11 and 12 beginning in 2012.
Alternative 3: MAAR open, Mall open, tolls removed at Exit 11 and 12 beginning in 2012, tolls remain at Exit 10.

Alternative 1 - Under this alternative, annual gross toll revenue is estimated to decline at the existing ramp plazas by more than 18 percent in FY 2012 due to the opening of the MAAR. Toll revenue is estimated to increase modestly from FY 2012 on and are projected to reach $3.0 million by FY 2017.

Alternative 2 - In FY 2012, the Premium Outlet Mall opens, and the ramp tolls remain at Exits 10, 11 and 12. In FY 2012, toll revenue is estimated to be only 1.1 percent lower than the No Build (MAAR not implemented) condition. Toll revenue is estimated to increase slightly each year through FY 2017, when the gross toll revenue for the three ramp toll plazas is projected to be $3.6 million. This is about 20 percent higher than if there was no Mall (Alternative 1).

Alternative 3 - When the Mall opens and the ramp tolls are removed from Exits 11 and 12, gross toll revenue is estimated to be reduced very significantly. In FY 2012, toll revenue is projected to be 69 percent lower than Alternative 2. Toll revenue is estimated to increase slightly from FY 2012 to FY 2017, but will continue to be over 69 percent lower than Alternative 2. In 2012, annual gross toll revenue is estimated to be $2.3 million per year less than revenue estimated in Alternative 2.

Toll Revenue Summary

The opening of the MAAR is estimated to have more than an 18 percent negative impact on the total annual gross toll revenue produced at Exits 10, 11, and 12. Annual gross toll revenue among the three interchanges is estimated to increase by about $590,000 or more than 20 percent when the Mall is opened in 2012. These two occurrences are estimated to nearly balance each other out. A removal of the tolls at Exits 11 and 12 will reduce gross toll revenue by about 69 percent due to the lost revenue associated with these ramp plazas, plus some additional diversion of traffic from the tolled Exit 10 ramps to the toll free Exit 11 ramps. Overall, Alternative 3 is estimated to generate annual toll revenue that is more than 69 percent lower than the No Build (MAAR not implemented) condition.

Summary

At the present time, gross toll revenues from Exits 11 and 12 represent over 78 percent of the total revenues from Exits 10, 11, and 12. With the opening of the MAAR, some toll traffic now using Exit 12 will divert to the MAAR, reducing toll revenues at Exit 12, and overall gross toll revenue by more than 18 percent (Alternative 1). When the Premium Outlet Mall is built, it will mean an estimated increase in transactions at Exit 10, resulting in estimated gross toll revenue similar to existing conditions (Alternative 2). If the ramp tolls at Exits 11 and 12 were removed in conjunction with the opening of the Mall, it would mean a projected loss of more than 69 percent as compared to the No Build (MAAR not implemented) condition.

CHAPTER 4

COMBINED IMPACTS OF MAAR AND TOLL REMOVAL AT EXITS 11 AND 12

It was recognized in the analyses of the MAAR scenarios and toll removal alternatives at Exits 11 and 12, that both actions had cross impacts. For example, the tolls at the Exit 12 ramps currently provide toll revenue "protection" of the existing Bedford Mainline from toll evasion. The removal of the ramp toll at Exit 12 would have different impacts depending on which scenario is implemented with the MAAR opening. The Premium Outlet Mall will also result in an increase in transactions and revenue at the Bedford Mainline toll plaza.

These cross impacts were analyzed and evaluated and the results are presented in this chapter.

BASIC ASSUMPTIONS

Certain given and assumed conditions were utilized in this analysis. These are listed below.

- The removal of ramp tolls at Exits 11 and 12 would only take place if the Premium Outlet Mall were built. If the Mall was not built, the ramp tolls would remain.
- Ramp tolls at Exits 10, 11, and 12 would remain at current toll rates.
- Based on the analyses of the Bedford MAAR scenarios, Scenarios 2 and 3 do not appear to be viable. Therefore, for these analyses, Scenario 1 and Scenario 4 were used.

CROSS IMPACT CONDITIONS

Cross-impacts were estimated under the following Scenario 1 and Scenario 4 conditions:

- **Scenario 1A** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is today, the Mall development is not built, and the ramp tolls remain at Exits 10, 11 and 12.

- **Scenario 1B** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is today, the Mall development is built and opened in 2012, and the ramp tolls remain at Exits 10, 11 and 12.

- **Scenario 1C** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is today, the Mall development is built and opened in 2012, and the ramp tolls are removed at Exits 11 and 12, but will remain at Exit 10.

- **Scenario 4A** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is and tolls are placed on the MAAR ramps to and from the south, the Mall development is not built, and the ramp tolls remain at Exits 10, 11 and 12.

- **Scenario 4B** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is and tolls are placed on the MAAR ramps to and from the south, the Mall development is built, and the ramp tolls remain at Exits 10, 11 and 12.

- **Scenario 4C** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is and tolls are placed on the MAAR ramps to and from the south, the Mall development is built, and the ramp tolls are removed at Exits 11 and 12, but will remain at Exit 10.

All six cross impact conditions were analyzed for toll transactions, gross toll revenues, operations and maintenance costs, and net toll revenue.

TRAFFIC AND GROSS TOLL REVENUE IMPACTS

The effects of the implementation of the Manchester Airport Access Road (MAAR) in combination with removing tolls at Exits 11 and 12 and implementation of the Merrimack Premium Outlet Mall was examined for Scenario 1 and Scenario 4.

Scenario 1 assumes the existing Bedford Mainline Plaza remains whereas Scenario 4 also assumes added tolling on the ramps to and from the south on the MAAR / Everett Turnpike interchange. Due to using two separate travel demand models and the fact that both models interface between Exit 12 and the Bedford Mainline Plaza, the combined effects between the

scenarios were estimated in a post-processing step based on the travel demand model results. Depending on the tolling scenario, various impacts on transactions and revenue will occur as described below. The combined results are shown in Tables 4-1 and 4-2.

Table 4-1
Estimated Annual Toll Transactions

Fiscal Year	Toll Plazas	No-Build	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 4A	Scenario 4B	Scenario 4C
2011	Bedford Mainline	17,744,000						
	10,11,&12 Total	7,873,000						
	Total	25,617,000						
2012	Bedford Mainline	18,110,000	12,839,000	13,670,000	13,670,000	18,046,000	19,213,000	16,240,000
	10,11,&12 Total	8,031,000	6,533,000	7,870,000	2,339,000	8,095,000	9,442,000	2,339,000
	Total	26,141,000	19,372,000	21,540,000	16,009,000	26,141,000	28,655,000	18,579,000
2013	Bedford Mainline	18,428,000	13,091,000	13,926,000	13,926,000	18,366,000	19,536,000	16,513,000
	10,11,&12 Total	8,169,000	6,649,000	7,987,000	2,372,000	8,225,537	9,571,537	2,372,000
	Total	26,597,000	19,740,000	21,913,000	16,298,000	26,591,537	29,107,537	18,885,000
2014	Bedford Mainline	18,751,000	13,347,000	14,185,000	14,185,000	18,691,000	19,864,000	16,790,000
	10,11,&12 Total	8,310,000	6,768,000	8,106,000	2,407,000	8,359,464	9,704,464	2,407,000
	Total	27,061,000	20,115,000	22,291,000	16,592,000	27,050,464	29,568,464	19,197,000
2015	Bedford Mainline	19,080,000	13,609,000	14,451,000	14,451,000	19,022,000	20,198,000	17,072,000
	10,11,&12 Total	8,454,000	6,888,000	8,227,000	2,442,000	8,496,822	9,841,822	2,442,000
	Total	27,534,000	20,497,000	22,678,000	16,893,000	27,518,822	30,039,822	19,514,000
2016	Bedford Mainline	19,415,000	13,876,000	14,721,000	14,721,000	19,360,000	20,539,000	17,360,000
	10,11,&12 Total	8,600,000	7,011,000	8,350,000	2,477,000	8,636,653	9,981,653	2,477,000
	Total	28,015,000	20,887,000	23,071,000	17,198,000	27,996,653	30,520,653	19,837,000
2017	Bedford Mainline	19,756,000	14,148,000	14,997,000	14,997,000	19,703,000	20,885,000	17,652,000
	10,11,&12 Total	8,748,000	7,136,000	8,475,000	2,513,000	8,780,000	10,124,000	2,513,000
	Total	28,504,000	21,284,000	23,472,000	17,510,000	28,483,000	31,009,000	20,165,000

Note: MAAR assumed to be open in 2012, except in No Build (MAAR not implemented) condition.

Table 4-2
Estimated Annual Gross Toll Revenue

Fiscal Year	Toll Plazas	No-Build	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 4A	Scenario 4B	Scenario 4C
2011	Bedford Mainline	$16,447,000						
	10,11,&12 Total	$3,333,000						
	Total	$19,780,000						
2012	Bedford Mainline	$16,794,000	$11,593,000	$12,343,000	$12,343,000	$16,726,000	$17,808,000	$15,052,000
	10,11,&12 Total	$3,400,000	$2,771,000	$3,361,000	$1,041,000	$3,427,000	$4,021,000	$1,041,000
	Total	$20,194,000	$14,364,000	$15,704,000	$13,384,000	$20,153,000	$21,829,000	$16,093,000
2013	Bedford Mainline	$17,057,000	$11,805,000	$12,558,000	$12,558,000	$16,991,000	$18,073,000	$15,277,000
	10,11,&12 Total	$3,458,000	$2,820,000	$3,411,000	$1,056,000	$3,482,735	$4,076,735	$1,056,000
	Total	$20,515,000	$14,625,000	$15,969,000	$13,614,000	$20,473,735	$22,149,735	$16,333,000
2014	Bedford Mainline	$17,325,000	$12,020,000	$12,775,000	$12,775,000	$17,261,000	$18,344,000	$15,506,000
	10,11,&12 Total	$3,518,000	$2,870,000	$3,461,000	$1,072,000	$3,539,485	$4,133,485	$1,072,000
	Total	$20,843,000	$14,890,000	$16,236,000	$13,847,000	$20,800,485	$22,477,485	$16,578,000
2015	Bedford Mainline	$17,596,000	$12,240,000	$12,997,000	$12,997,000	$17,535,000	$18,619,000	$15,738,000
	10,11,&12 Total	$3,579,000	$2,922,000	$3,513,000	$1,087,000	$3,597,267	$4,191,267	$1,087,000
	Total	$21,175,000	$15,162,000	$16,510,000	$14,084,000	$21,132,267	$22,810,267	$16,825,000
2016	Bedford Mainline	$17,872,000	$12,463,000	$13,222,000	$13,222,000	$17,814,000	$18,899,000	$15,974,000
	10,11,&12 Total	$3,641,000	$2,974,000	$3,565,000	$1,103,000	$3,657,100	$4,250,100	$1,103,000
	Total	$21,513,000	$15,437,000	$16,787,000	$14,325,000	$21,471,100	$23,149,100	$17,077,000
2017	Bedford Mainline	$18,153,000	$12,691,000	$13,453,000	$13,453,000	$18,096,000	$19,182,000	$16,212,000
	10,11,&12 Total	$3,704,000	$3,027,000	$3,618,000	$1,119,000	$3,718,000	$4,311,000	$1,119,000
	Total	$21,857,000	$15,718,000	$17,071,000	$14,572,000	$21,814,000	$23,493,000	$17,331,000

Note: MAAR assumed to be open in 2012, except in No Build (MAAR not implemented) condition.

SCENARIO 1

With tolls at Exit 11 and 12 remaining in place, toll evasion will occur not only when motorists are bypassing the Bedford Mainline Plaza via the interchanges of the Manchester Airport Access Road (MAAR) and U.S. 3, but also when a portion of the traffic currently using Exit 12 will then be routed via the MAAR interchange with U.S. 3. When tolls are removed

from Exits 11 and 12 (Scenario 1C), the additional impact results from losses in revenue from Exit 11 and 12, as well as additional toll diversion from Exit 10; users that will be using the toll-free route via Exit 11.

The implementation of the proposed Premium Outlet Mall development at Exit 10 will have a positive impact, due to the increased demand at the tolled ramps at Exit 10, but will not compensate for the reduced revenue when removing the tolls at Exits 11 and 12.

The total number of transactions at the Bedford Mainline Plaza and the ramp plazas at Exits 10, 11 and 12 combined are estimated to be 26.1 million in Fiscal Year 2012 without the Manchester Airport Access Road (MAAR) or the Premium Mall (No Build MAAR not implemented condition). The combined gross toll revenue, for this existing condition, is estimated to be $20.2 million in Fiscal Year 2012.

SCENARIO 1A - NO MALL, EXIT 10, 11, AND 12 RAMP TOLLS REMAINING

In FY 2012, with the MAAR opened, 19.4 million total transactions are projected, producing $14.4 million in gross toll revenue. The significant reduction in transactions and revenue is due to the effect of the MAAR opening discussed in previous chapters. By FY 2017, total transactions are projected to increase to 21.3 million. Gross toll revenues for FY 2017, under this condition are projected to reach $15.7 million.

SCENARIO 1B - MALL OPENED, EXIT 10, 11, AND 12 RAMP TOLLS REMAINING

With the mall opened in FY 2012, total toll transactions are estimated to reach 21.5 million. This is 10.8 percent higher than without the Mall. Gross toll revenues are projected at $15.7 million, or 9.3 percent higher than without the Mall. By FY 2017, total transactions are estimated to grow to 23.5 million and gross toll revenues to $17.1 million.

SCENARIO 1C - MALL OPENED, EXIT 11 AND 12 RAMP TOLLS REMOVED

If, in FY 2012, the ramp tolls at Exits 11 and 12 are removed in conjunction with the opening of the Premium Outlet Mall, total toll transactions for the Bedford Mainline and Exit 10 are estimated at 16.0 million, with gross toll revenue projected at $13.4 million. This is an estimated loss of 5.5 million toll transactions and $2.3 million in gross toll revenue versus Scenario 1B. By FY 2017, total toll transactions are estimated to increase to 17.5 million, with gross toll revenues projected to increase to $14.6 million.

SCENARIO 1 SUMMARY

Under Scenario 1, the significant loss in transactions and toll revenue due to the implementation of the MAAR, without changing the location of the Bedford Mainline Toll Plaza will not be compensated by the

implementation of the Premium Outlet Mall. In addition, if tolls at Exits 11 and 12 are removed, transaction and revenue losses will be even higher and compared to the FY 2012 situation (status quo without the MAAR), over 10.1 million total toll transactions and $6.8 million in gross toll revenue is the projected loss.

SCENARIO 4

SCENARIO 4A - NO MALL, EXIT 10, 11, AND 12 RAMP TOLLS REMAINING

In FY 2012, with the MAAR opened, 26.1 million total transactions are projected, producing $20.2 million in gross toll revenue. This is essentially equivalent to the No Build (MAAR not implemented) condition. By FY 2017, total transactions are estimated to have increased to 28.5 million and gross toll revenues are estimated to increase to $21.8 million.

SCENARIO 4B - MALL OPENED, EXIT 10, 11, AND 12 RAMP TOLLS REMAINING

With the mall opened in FY 2012, total toll transactions are estimated to increase to 28.7 million. This is 9.6 percent higher than without the Mall. Gross toll revenues are projected at $21.8 million, or 8.3 percent higher than without the Mall. By FY 2017, total transactions are estimated to grow to 31.0 million and gross toll revenues to $23.5 million.

SCENARIO 4C - MALL OPENED, EXIT 11 AND12 RAMP TOLLS REMOVED

If, by FY 2012, the ramp tolls at Exits 11 and 12 have been removed in conjunction with the opening of the Premium Outlet Mall, total toll transactions for the Bedford Mainline and Exit 10 are estimated at 18.6 million, with gross toll revenue projected at $16.1 million. This is a loss of 10.1 million toll transactions and $5.7 million in gross toll revenue as compared to Scenario 4B. In the out year of FY 2017, total toll transactions are estimated to rise to 20.2 million, with gross toll revenues projected to $17.3 million.

SCENARIO 4 SUMMARY

Under Scenario 4, the potential significant loss in transactions and toll revenue due to the implementation of the MAAR is all but eliminated with the tolling of the ramps to and from the south at the MAAR. The opening of the Premium Outlet Mall will have a positive increase on the revenue potential of the Everett. Ramp tolls at Exit 11 and 12 provide protection of the new toll ramps to and from the south at the MAAR. If tolls at Exits 11 and 12 are removed, transaction and revenue losses will occur at the Bedford Mainline and from the loss of toll revenue at Exits 11 and 12. If the investment in Scenario 4 was to be made, the ramp tolls at Exits 11 and 12 would need to remain in place.

TOLL OPERATION AND MAINTENANCE COST ESTIMATES

For the above six conditions, toll operation and maintenance (O&M) cost estimates were calculated based on data provided by NHDOT and include the plaza operation cost and cost for back office electronic transaction processing. It is assumed that the cost for accounts serviced remains constant under these scenarios and therefore these costs are not included in the O&M costs shown in this chapter.

Cost estimates are based on data for FY 2009 inflated at 2 percent per year. The toll cost for cash collection is shown in Table 4-3. The lane maintenance costs are presented in Table 4-4.

Table 4-3
Estimated Annual Cash Toll Collection Cost

Fiscal Year	Toll Plazas	No-Build	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 4A	Scenario 4B	Scenario 4C
2011	Bedford Mainline	$1,379,000						
	10,11,&12 Total	$1,379,000						
	Total	$2,758,000						
2012	Bedford Mainline	$1,406,000	$1,406,000	$1,406,000	$1,406,000	$2,343,000	$2,343,000	$2,343,000
	10,11,&12 Total	$1,406,000	$1,406,000	$1,406,000	$625,000	$1,406,000	$1,406,000	$625,000
	Total	$2,812,000	$2,812,000	$2,812,000	$2,031,000	$3,749,000	$3,749,000	$2,968,000
2013	Bedford Mainline	$1,434,000	$1,434,000	$1,434,000	$1,434,000	$2,390,000	$2,390,000	$2,390,000
	10,11,&12 Total	$1,434,000	$1,434,000	$1,434,000	$638,000	$1,434,000	$1,434,000	$638,000
	Total	$2,868,000	$2,868,000	$2,868,000	$2,072,000	$3,824,000	$3,824,000	$3,028,000
2014	Bedford Mainline	$1,463,000	$1,463,000	$1,463,000	$1,463,000	$2,438,000	$2,438,000	$2,438,000
	10,11,&12 Total	$1,463,000	$1,463,000	$1,463,000	$650,000	$1,463,000	$1,463,000	$650,000
	Total	$2,926,000	$2,926,000	$2,926,000	$2,113,000	$3,901,000	$3,901,000	$3,088,000
2015	Bedford Mainline	$1,492,000	$1,492,000	$1,492,000	$1,492,000	$2,487,000	$2,487,000	$2,487,000
	10,11,&12 Total	$1,492,000	$1,492,000	$1,492,000	$663,000	$1,492,000	$1,492,000	$663,000
	Total	$2,984,000	$2,984,000	$2,984,000	$2,155,000	$3,979,000	$3,979,000	$3,150,000
2016	Bedford Mainline	$1,522,000	$1,522,000	$1,522,000	$1,522,000	$2,536,000	$2,536,000	$2,536,000
	10,11,&12 Total	$1,522,000	$1,522,000	$1,522,000	$677,000	$1,522,000	$1,522,000	$677,000
	Total	$3,044,000	$3,044,000	$3,044,000	$2,199,000	$4,058,000	$4,058,000	$3,213,000
2017	Bedford Mainline	$1,552,000	$1,552,000	$1,552,000	$1,552,000	$2,587,000	$2,587,000	$2,587,000
	10,11,&12 Total	$1,552,000	$1,552,000	$1,552,000	$690,000	$1,552,000	$1,552,000	$690,000
	Total	$3,104,000	$3,104,000	$3,104,000	$2,242,000	$4,139,000	$4,139,000	$3,277,000

Note: MAAR assumed to be open in 2012, except in No Build (MAAR not implemented) condition. Costs inflated by 2 percent per year.

Table 4-4
Estimated Annual Lane Maintenance Cost

Fiscal Year	Toll Plazas	No-Build	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 4A	Scenario 4B	Scenario 4C
2011	Bedford Mainline	$191,000						
	10,11,&12 Total	$318,000						
	Total	$509,000						
2012	Bedford Mainline	$195,000	$195,000	$195,000	$195,000	$292,000	$292,000	$292,000
	10,11,&12 Total	$325,000	$325,000	$325,000	$129,000	$325,000	$325,000	$129,000
	Total	$520,000	$520,000	$520,000	$324,000	$617,000	$617,000	$421,000
2013	Bedford Mainline	$199,000	$199,000	$199,000	$199,000	$298,000	$298,000	$298,000
	10,11,&12 Total	$331,000	$331,000	$331,000	$132,000	$331,000	$331,000	$132,000
	Total	$530,000	$530,000	$530,000	$331,000	$629,000	$629,000	$430,000
2014	Bedford Mainline	$203,000	$203,000	$203,000	$203,000	$304,000	$304,000	$304,000
	10,11,&12 Total	$338,000	$338,000	$338,000	$135,000	$338,000	$338,000	$135,000
	Total	$541,000	$541,000	$541,000	$338,000	$642,000	$642,000	$439,000
2015	Bedford Mainline	$207,000	$207,000	$207,000	$207,000	$310,000	$310,000	$310,000
	10,11,&12 Total	$345,000	$345,000	$345,000	$137,000	$345,000	$345,000	$137,000
	Total	$552,000	$552,000	$552,000	$344,000	$655,000	$655,000	$447,000
2016	Bedford Mainline	$211,000	$211,000	$211,000	$211,000	$316,000	$316,000	$316,000
	10,11,&12 Total	$351,000	$351,000	$351,000	$140,000	$351,000	$351,000	$140,000
	Total	$562,000	$562,000	$562,000	$351,000	$667,000	$667,000	$456,000
2017	Bedford Mainline	$216,000	$216,000	$216,000	$216,000	$322,000	$322,000	$322,000
	10,11,&12 Total	$359,000	$359,000	$359,000	$143,000	$359,000	$359,000	$143,000
	Total	$575,000	$575,000	$575,000	$359,000	$681,000	$681,000	$465,000

Note: MAAR assumed to be open in 2012, except in No Build (MAAR not implemented) condition. Costs inflated by 2 percent per year.

Operations and maintenance costs for Scenario 1A and Scenario 1B are the same as under the No Build (MAAR not implemented) condition since no operational changes are made. Under Scenario 1C, since the ramp tolls are removed at Exits 11 and 12, about $800,000 in cost savings is realized with the removal of cash collection and another $200,000 in lane maintenance cost reductions.

In Scenario 4A and 4B the operation and maintenance costs increase due to the implementation of tolls on the ramps to and from the south at the MAAR. The increase in cost for toll collection is based on the assumption that the ramps, to and from the south, connecting the MAAR with the Everett Turnpike will have two cash and one E-ZPass lane per direction. FY 2012 cash collection cost will increase from $2.8 million in Scenario 1 to $3.7 million in Scenario 4 due to four additional cash lanes at the MAAR ramps. The ETC processing fees are assumed to increase from $520,000 per year under Scenario 1 to $617,000 per year under Scenario 4A and Scenario 4B. Under Scenario 4C, since the ramp tolls are removed at Exits 11 and 12, about $800,000 in cost savings is realized with the removal of cash collection and another $200,000 in lane maintenance cost reductions.

The total toll operation and maintenance cost is shown in Table 4-5 and the resulting annual net revenue estimates are presented in Table 4-6. After the MAAR is in operation in FY 2012, in Scenario 1A and 1B, the annual O&M cost estimates are $3.3 million with tolls at Exits 11 and 12 and roughly $2.4 million when tolls are removed. In scenario 4A and 4B, starting in FY 2012, the total O&M costs are estimated at $4.4 million with tolling of Exits 11 and 12 and about $3.4 million when tolls are removed. As mentioned earlier, the totals do not reflect cost for accounts serviced since it is assumed that the amount of accounts will not vary significantly enough between the various tolling scenarios.

Table 4-5
Estimated Annual Operation and Maintenance Cost

Fiscal Year	Toll Plazas	No-Build	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 4A	Scenario 4B	Scenario 4C
2011	Bedford Mainline	$1,570,000						
	10,11,&12 Total	$1,697,000						
	Total	$3,267,000						
2012	Bedford Mainline	$1,601,000	$1,601,000	$1,601,000	$1,601,000	$2,635,000	$2,635,000	$2,635,000
	10,11,&12 Total	$1,731,000	$1,731,000	$1,731,000	$754,000	$1,731,000	$1,731,000	$754,000
	Total	$3,332,000	$3,332,000	$3,332,000	$2,355,000	$4,366,000	$4,366,000	$3,389,000
2013	Bedford Mainline	$1,633,000	$1,633,000	$1,633,000	$1,633,000	$2,688,000	$2,688,000	$2,688,000
	10,11,&12 Total	$1,765,000	$1,765,000	$1,765,000	$770,000	$1,765,000	$1,765,000	$770,000
	Total	$3,398,000	$3,398,000	$3,398,000	$2,403,000	$4,453,000	$4,453,000	$3,458,000
2014	Bedford Mainline	$1,666,000	$1,666,000	$1,666,000	$1,666,000	$2,742,000	$2,742,000	$2,742,000
	10,11,&12 Total	$1,801,000	$1,801,000	$1,801,000	$785,000	$1,801,000	$1,801,000	$785,000
	Total	$3,467,000	$3,467,000	$3,467,000	$2,451,000	$4,543,000	$4,543,000	$3,527,000
2015	Bedford Mainline	$1,699,000	$1,699,000	$1,699,000	$1,699,000	$2,797,000	$2,797,000	$2,797,000
	10,11,&12 Total	$1,837,000	$1,837,000	$1,837,000	$800,000	$1,837,000	$1,837,000	$800,000
	Total	$3,536,000	$3,536,000	$3,536,000	$2,499,000	$4,634,000	$4,634,000	$3,597,000
2016	Bedford Mainline	$1,733,000	$1,733,000	$1,733,000	$1,733,000	$2,852,000	$2,852,000	$2,852,000
	10,11,&12 Total	$1,873,000	$1,873,000	$1,873,000	$817,000	$1,873,000	$1,873,000	$817,000
	Total	$3,606,000	$3,606,000	$3,606,000	$2,550,000	$4,725,000	$4,725,000	$3,669,000
2017	Bedford Mainline	$1,768,000	$1,768,000	$1,768,000	$1,768,000	$2,909,000	$2,909,000	$2,909,000
	10,11,&12 Total	$1,911,000	$1,911,000	$1,911,000	$833,000	$1,911,000	$1,911,000	$833,000
	Total	$3,679,000	$3,679,000	$3,679,000	$2,601,000	$4,820,000	$4,820,000	$3,742,000

Note: MAAR assumed to be open in 2012, except in No Build (MAAR not implemented) condition. Costs inflated by 2 percent per year.

Table 4-6
Estimated Annual Revenue (Gross Toll Revenue Minus Operating and Maintenance Cost)

Fiscal Year	Toll Plazas	No-Build	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 4A	Scenario 4B	Scenario 4C
2011	Bedford Mainline	$14,877,000						
	10,11,&12 Total	$1,636,000						
	Total	$16,513,000						
2012	Bedford Mainline	$15,193,000	$9,992,000	$10,742,000	$10,742,000	$14,091,000	$15,173,000	$12,417,000
	10,11,&12 Total	$1,669,000	$1,040,000	$1,630,000	$287,000	$1,696,000	$2,290,000	$287,000
	Total	$16,862,000	$11,032,000	$12,372,000	$11,029,000	$15,787,000	$17,463,000	$12,704,000
2013	Bedford Mainline	$15,424,000	$10,172,000	$10,925,000	$10,925,000	$14,303,000	$15,385,000	$12,589,000
	10,11,&12 Total	$1,693,000	$1,055,000	$1,646,000	$286,000	$1,717,735	$2,311,735	$286,000
	Total	$17,117,000	$11,227,000	$12,571,000	$11,211,000	$16,020,735	$17,696,735	$12,875,000
2014	Bedford Mainline	$15,659,000	$10,354,000	$11,109,000	$11,109,000	$14,519,000	$15,602,000	$12,764,000
	10,11,&12 Total	$1,717,000	$1,069,000	$1,660,000	$287,000	$1,738,485	$2,332,485	$287,000
	Total	$17,376,000	$11,423,000	$12,769,000	$11,396,000	$16,257,485	$17,934,485	$13,051,000
2015	Bedford Mainline	$15,897,000	$10,541,000	$11,298,000	$11,298,000	$14,738,000	$15,822,000	$12,941,000
	10,11,&12 Total	$1,742,000	$1,085,000	$1,676,000	$287,000	$1,760,267	$2,354,267	$287,000
	Total	$17,639,000	$11,626,000	$12,974,000	$11,585,000	$16,498,267	$18,176,267	$13,228,000
2016	Bedford Mainline	$16,139,000	$10,730,000	$11,489,000	$11,489,000	$14,962,000	$16,047,000	$13,122,000
	10,11,&12 Total	$1,768,000	$1,101,000	$1,692,000	$286,000	$1,784,100	$2,377,100	$286,000
	Total	$17,907,000	$11,831,000	$13,181,000	$11,775,000	$16,746,100	$18,424,100	$13,408,000
2017	Bedford Mainline	$16,385,000	$10,923,000	$11,685,000	$11,685,000	$15,187,000	$16,273,000	$13,303,000
	10,11,&12 Total	$1,793,000	$1,116,000	$1,707,000	$286,000	$1,807,000	$2,400,000	$286,000
	Total	$18,178,000	$12,039,000	$13,392,000	$11,971,000	$16,994,000	$18,673,000	$13,589,000

Note: MAAR assumed to be open in 2012, except in No Build (MAAR not implemented) condition.

ANNUAL RESULTANT TOLL REVENUE (GROSS TOLL REVENUE MINUS TOLL OPERATION AND MAINTENANCE COST)

Annual resultant toll revenue (Table 4-6) is calculated as difference between estimated annual gross revenue (Table 4-2) and total annual toll operation and maintenance cost excluding cost for accounts serviced (Table 4-5).

In FY 2012, the resultant toll revenue for the Bedford Mainline location as well as for Exits 10, 11 and 12 for the No Build (MAAR not implemented) condition is expected to be $16.9 million. After opening of the Manchester Airport Access Road, FY 2012 resultant toll revenue is estimated to be $11.0 million, $12.4 million, and $11.0 million for Scenarios 1A, 1B, and 1C, respectively.

Under Scenario 4, FY 2012 resultant toll revenue is estimated to be $15.8 million, $17.5 million, and $12.7 million for Scenario 4A, 4B, and 4C, respectively. If tolls were to be removed under Scenario 4, resultant toll revenue would be significantly impacted due to the high amount of toll evasion at Exit 12 around the new toll ramps to the MAAR.

PRELIMINARY CAPITAL COST ESTIMATES

Preliminary capital cost estimates were prepared based on unit cost estimates provided by the New Hampshire Department of Transportation and conceptual design drawings. These estimates are of preliminary nature and will have to be refined once a final alternative has been selected and a more detailed design is available.

Toll removal costs at Exits 11 and 12 are estimated at $1.0 million and $0.5 million, respectively. The Construction cost for Scenario 4B is estimated at $2.1 million. These estimates do include 10 percent contingency and are inflated by 3 percent annually. It is also assumed that the cost of building the MAAR ramps to and from the south would have to be reimbursed to FHWA since they are being tolled in Scenario 4. The reimbursement is estimated to be $14.3 million. Annualized over 20 years at a 5 percent interest rate the total of capital cost and reimbursement would result in annualized capital cost of $1.3 million.

CHAPTER 5
RELOCATION SCENARIOS

INTRODUCTION

Open Road Tolling (ORT) permits drivers to pay their tolls without stopping at a toll booth in a toll plaza. Vehicles with transponders (E-ZPass) can remain on the highway mainline and have their transponders read by an antenna mounted on an overhead structure called a gantry. The toll is paid as the vehicle passes under the gantry at highway speed. Vehicles without transponders must exit to a conventional toll plaza, normally located to the right of the ORT lanes, and pay the cash toll.

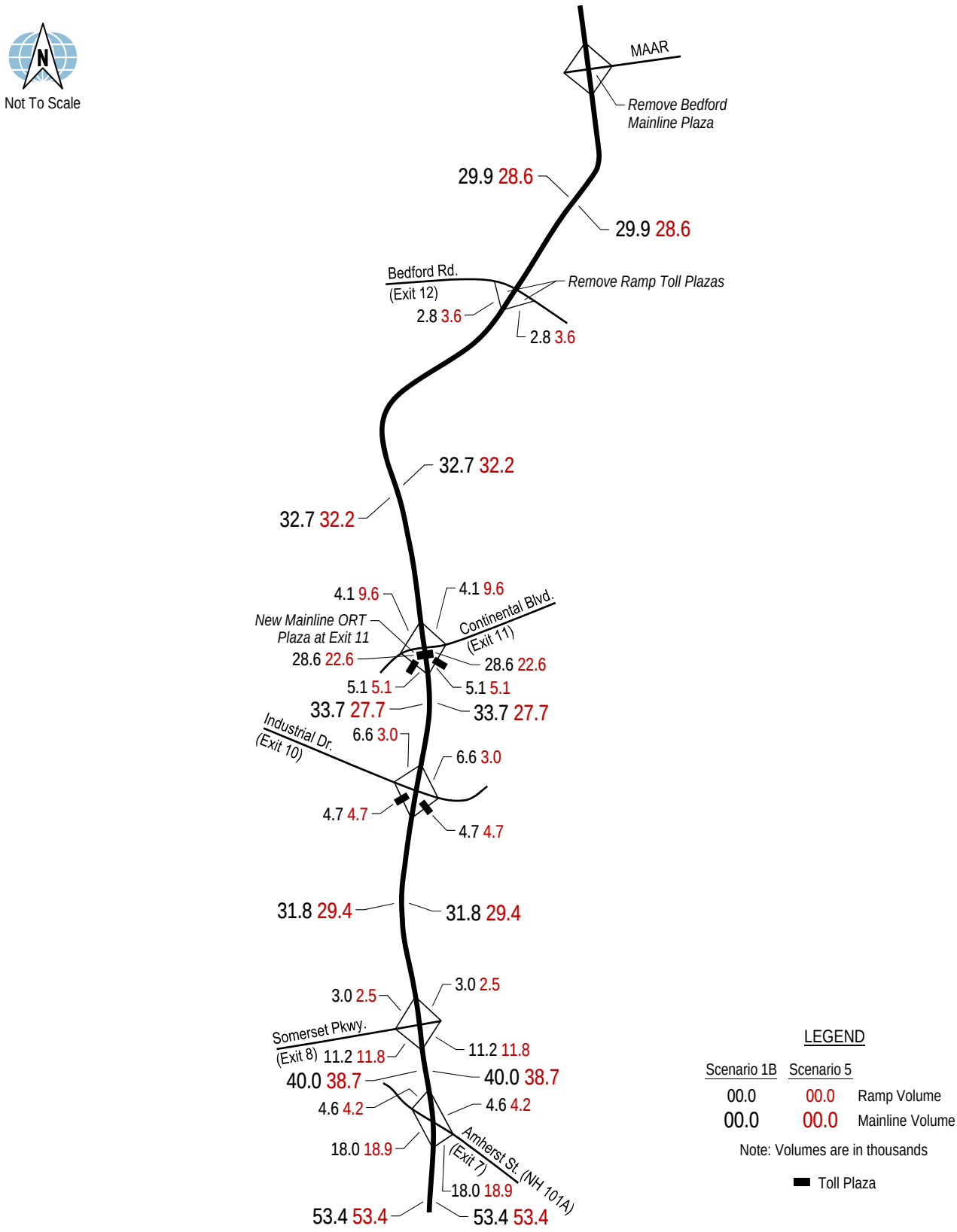
Four relocation scenarios which utilize ORT technology were analyzed for this study. These will be discussed in detail below.

SCENARIO 5 – ORT AT EXIT 11

Under this scenario, the Bedford Mainline Toll Plaza would be removed as well as the northbound off and southbound on ramp toll plazas at Exit 12. The existing ramp tolls at Exit 10 and 11 would remain. A new ORT plaza would be constructed just south of Continental Boulevard/Greeley Street, at Exit 11. This new plaza would incorporate some of the existing ramp toll facilities presently at Exit 11. There would be two ORT lanes in each direction and five cash lanes and one E-ZPass lane to the right of the ORT lanes, in each direction. One E-ZPass lane and one cash lane would be needed to process those vehicles that were exiting the Everett Turnpike, northbound, and the same for those vehicles entering the Turnpike, southbound at Exit 11. Figure 5-1 presents a schematic representation for Scenario 5. The ramp tolls at Exit 10 would remain in place, as they are today.

TOLL RATES

The ORT mainline toll rate for vehicles with E-ZPass tags registered in New Hampshire would be $0.70 for automobiles. Automobiles with out-



ESTIMATED 2012 AVERAGE WEEKDAY TRAFFIC SCENARIO 5

of-state E-ZPass or paying cash would pay $1.00. Those vehicles exiting northbound or entering southbound at Exit 10 or 11, would pay $0.50 for cash or out-of-state E-ZPass and $0.35 for New Hampshire E-ZPass.

Scenario 5 Basic Assumptions

The following assumptions apply to Scenario 5:

- The proposed retail shopping mall, to be located in the northwest quadrant of Exit 10, would be opened in 2012.
- The MAAR would be opened for traffic in Fiscal Year 2012.
- No major improvements would be made to parallel roadways such as I-93, U.S. 3 or Route 3A.
- No significant physical improvements were assumed for the Everett Turnpike.
- Potential traffic from the proposed Londonderry Development, adjacent to the Airport, was not considered.
- Operations and Maintenance Costs were assumed to be for toll functions only. Highway O&M costs were not included.
- Capital costs were for acquisition and installation of toll-related materials, equipment and software.
- Preliminary estimates of highway construction costs were also developed.
- Cash collection cost per attended lane hour.
- ETC transaction cost per E-ZPass lane.

Operating Characteristics

Figure 5-1 displays 2012 estimates of average weekday traffic for Scenario 1B and Scenario 5. Under Scenario 5, diversion around the new mainline plaza located at Exit 11 would occur. In the southbound direction, a significant increase in traffic would be expected to occur at the Exit 11 southbound off ramp where traffic is estimated to increase due to toll diversion of the new mainline toll plaza and due to the addition of a free movement due to the ramp tolls being removed from the Exit 12 southbound on ramp. In addition, traffic that previously exited the Turnpike at Exit 10 will now utilize the Exit 11 off ramp to avoid paying the mainline toll. The northbound entrance ramp at Exit 11 would see a similar impact as the southbound off ramp to Exit 11. At Exits 7 and 8, some additional traffic would be expected to exit the Turnpike in the northbound direction and enter the Turnpike in the southbound direction as they avoid paying the mainline toll at Exit 11.

TRAVEL TIMES

Figure 5-2 shows the results of travel time/distance runs between Exit 7 and Exit 11. Using the Everett Turnpike between Exit 7 and Exit 11 takes about 5.0 minutes over a distance of 4.6 miles.

Drivers with destinations oriented to Exits 10 and 11, coming from the south would not be significantly affected by Scenario 5 since their toll rate will not be different than today. Many of those coming from the north would likely get off the Everett Turnpike at Exit 11 and use local streets such as Continental Boulevard and Greeley Street to complete their trips to work in the area.

To avoid the mainline and ramp tolls altogether in the northbound direction would entail using U.S. 3, from Exit 7 to Exit 11 and would cover a distance of 5.5 miles and would take almost 10 minutes (an additional 5 minutes). Traveling along Continental Boulevard and Route 101A from Exit 11 to Exit 7 would take 13 minutes (an additional 8 minutes) and would be a distance of 7.2 miles, with no toll.

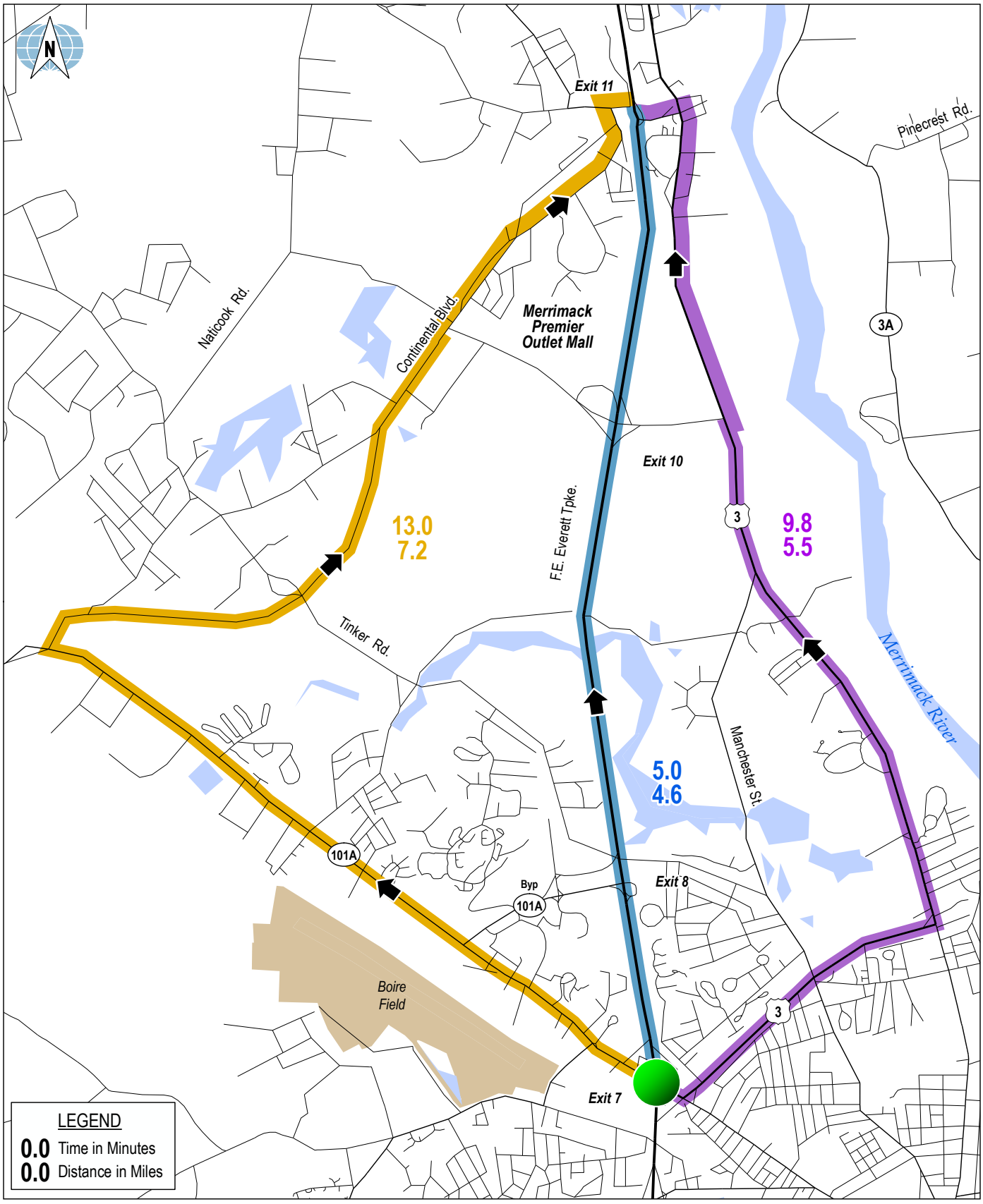
TRANSACTIONS, TOLL REVENUE, AND COST ESTIMATES

Table 5-1 provides the annual toll transactions, toll revenue, and cost projections for Scenario 5. The No Build (MAAR not implemented) condition and Scenario 1B are shown for comparison purposes.

Transactions - It is estimated that there will be 21.3 million toll transactions in 2012. This is about 1 percent lower than Scenario 1B.

Gross Toll Revenue - The 2012 annual gross toll revenue is projected at $16.6 million. The estimated annual gross toll for this scenario is 6.0 percent higher than Scenario 1B.

Annual Cash Collection Costs - Cash collection costs, for 2012, for Scenario 5 are estimated at $3.0 million. This is 5.5 percent higher than Scenario 1B. Under Scenario 1B, there are a total of 14 cash lanes including Bedford Plaza and the ramp toll plazas at Exits 10, 11, and 12. Four of these lanes (two at Exit 11 and 2 at Exit 12) are only open from 5:00 AM to 9:00 PM. In Scenario 5, there are also a total of 14 cash lanes (10 at the new ORT plaza and 4 at Exit 10). All of the Scenario 5 cash lanes are open 24 hours per day. This is why the cash collection costs for Scenario 5 are slightly higher than Scenario 1B.



TRAVEL TIME ESTIMATES AND DISTANCES FROM EXIT 7 TO EXIT 11

WilburSmith ASSOCIATES

FIGURE 5-2

Table 5-1
Scenario 5 - Transaction and Revenue Projections
2012

Transactions/Revenues	No-Build[1] (No MAAR)	with Bedford 10, 11 & 12 tolled Scenario 1B[2]	no Bedford[2] no Exit 12 Scenario 5	% Difference from Scenario 1B
Annual Transactions/Volumes	26,141,000	21,540,000	21,309,000	-1.1%
Annual Gross Toll Revenue	$20,194,000	$15,704,000	$16,647,000	6.0%
Annual Cash Collection Costs[3]	$2,812,000	$2,812,000	$2,967,000	5.5%
Lane Maintenance Costs[3]	$520,000	$520,000	$389,000	-25.2%
Annual O&M Costs[3]	$3,332,000	$3,332,000	$3,356,000	0.7%
Annual Resultant Revenue[4]	$16,862,000	$12,372,000	$13,291,000	7.4%
Total Estimated Capital Cost	$0	$0	$24,670,000	
Annualized Capital Cost[5]	$0	$0	$1,980,000	
Net Toll Revenue (6)	$16,862,000	$12,372,000	$11,311,000	-8.6%

(1) MAAR not implemented
(2) MAAR and Mall Opened
(3) O&M cost does include plaza operation cost exclusive of fees for accounts serviced.
(4) Resultant revenue reflects deductions for O&M cost.
(5) Assumes 20-year debt service at 5% interest
(6) Net revenue = Resultant revenue minus annualized capital cost

Lane Maintenance Costs - The 2012 lane maintenance costs for Scenario 5 are projected to be $389,000 which is 25 percent lower than Scenario 1B.

Total Annual Operations & Maintenance Costs - The 2012 total cost of operations & maintenance costs for Scenario 5 is estimated at $3.4 million, compared to $3.3 million for Scenario 1B. This is a difference of 0.7 percent.

Annual Resultant Revenue - The 2012 annual resultant revenue estimated for Scenario 5 is $13.3 million. Annual resultant revenue for Scenario 1B is $12.4 million. The Scenario 5 resultant revenue is 7.4 percent higher than Scenario 1B.

Capital Cost – The total capital cost for Scenario 5 is estimated at $24.7 million.

Annualized Capital Cost – The annualized capital cost for Scenario 5 is $2.0 million.

Net Toll Revenue – The estimated annual net toll revenue under Scenario 5 is 8.6 percent lower than Scenario 1B.

SCENARIO 6 – ORT SOUTH OF EXIT 10

Under this scenario, the Bedford Toll Plaza would be removed as well as the northbound off and southbound on ramp toll plazas at both Exits 11 and 12.

DESCRIPTION

A new ORT plaza would be constructed just south of Industrial Drive/Technology Park Drive at Exit 10. This new plaza would incorporate some of the existing ramp toll facilities. There would be two ORT lanes and three cash lanes, in each direction, for through traffic. There would be two combination cash/E-ZPass lanes each for northbound exiting traffic and southbound entering traffic and a single E-ZPass only lane for each direction. Figure 5-3 presents a schematic representation for Scenario 6.

TOLL RATES

Toll rates at the new ORT mainline plaza would be the same as for Scenario 5. The ORT toll rate at the mainline plaza, for vehicles with E-ZPass tags registered in New Hampshire, would be $0.70 for automobiles. Automobiles with out-of-state E-ZPass would pay $1.00. The cash toll rate would be $1.00 for passenger vehicles. Those vehicles exiting northbound or entering southbound at Exit 10, would pay $0.50 for cash or out-of-state E-ZPass and $0.35 for NH E-ZPass users.

SCENARIO 6 BASIC ASSUMPTIONS

The following assumptions apply to Scenario 6:

- The proposed retail shopping mall, to be located in the northwest quadrant of Exit 10, would be opened in 2012.
- The MAAR would be opened for traffic in Fiscal Year 2012.
- No major improvements would be made to parallel roadways such as I-93, Route 3 or Route 3A.
- No significant physical improvements were assumed for the Everett Turnpike.
- Potential traffic from the proposed Londonderry Development, adjacent to the Airport, was not considered.

- Operations and Maintenance Costs were assumed to be for toll functions only. Highway O&M costs were not included.
- Capital costs were for acquisition and installation of toll-related materials, equipment and software.
- Preliminary estimates of highway construction costs were also developed.
- Cash collection cost per attended lane hour.
- ETC transaction cost per E-ZPass lane.

OPERATING CHARACTERISTICS

Figure 5-3 displays 2012 estimates of average weekday traffic for Scenario 1B and Scenario 6. Scenario 6 would result in diversion of the new mainline plaza located at Exit 10. In the southbound direction, the significant impact would occur at the Exit 10 off ramp where traffic is estimated to increase due to toll diversion of the new mainline toll plaza and due to the addition of free movements due to the ramp tolls being removed from the Exit 11 and 12 southbound on ramps. The northbound entrance ramp at Exit 10 would see a similar impact as the southbound off ramp at Exit 10. At Exits 7 and 8, additional traffic would be expected to exit the Turnpike in the northbound direction and enter the Turnpike in the southbound direction as they avoid paying the mainline toll at Exit 10.

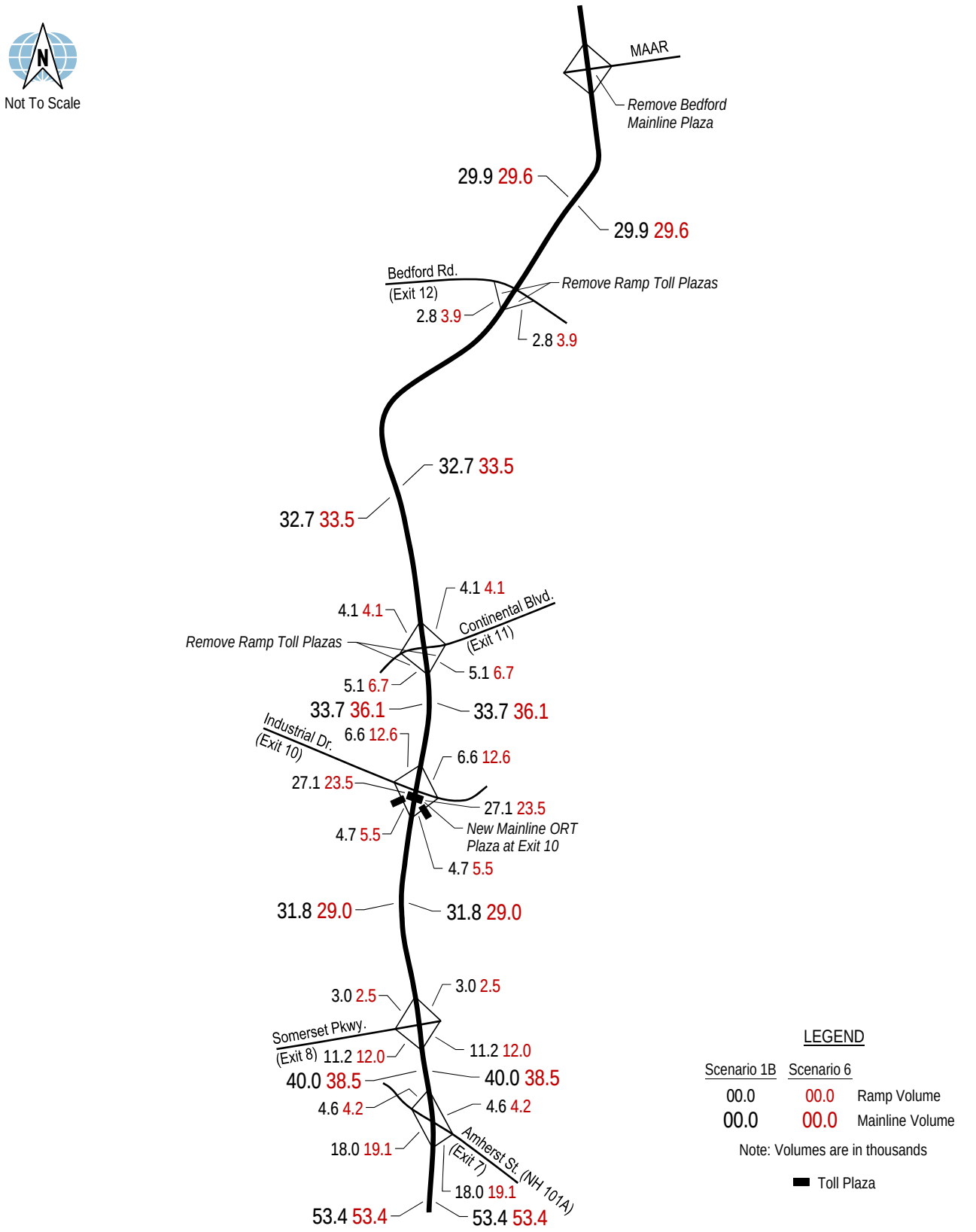
TRANSACTIONS, TOLL REVENUE, AND COST ESTIMATES

Table 5-2 provides the annual toll transactions, toll revenue, and cost projections for Scenario 6. The No Build (MAAR not implemented) condition and Scenario 1B are shown for comparison purposes.

Transactions - It is estimated that there will be 19.0 million toll transactions in 2012. This is nearly 12 percent lower than Scenario 1B.

Gross Toll Revenue - The 2012 annual gross toll revenue is projected at $16.0 million. The estimated annual gross toll for this scenario is 2.0 percent higher than Scenario 1B.

Annual Cash Collection Costs - Cash collection costs, for 2012, for Scenario 6 are estimated at $1.6 million. This is 44.5 percent lower than Scenario 1B. Under Scenario 1B, there are a total of 14 cash lanes including Bedford Plaza and the ramp toll plazas at Exits 10, 11, and 12. Four of these lanes (two at Exit 11 and two at Exit 12) are only open from 5:00 AM to 9:00 PM. In Scenario 6, there are a total of only 10 cash lanes at the new ORT plaza. This is why the cash collection costs for Scenario 6 are lower than Scenario 1B.



ESTIMATED 2012 AVERAGE WEEKDAY TRAFFIC
SCENARIO 6

WilburSmith ASSOCIATES

FIGURE 5-3

Table 5-2
Scenario 6 - Transaction and Revenue Projections
2012

Transactions/Revenues	No-Build[1] (No MAAR)	with Bedford 10, 11 & 12 tolled Scenario 1B[2]	no Bedford[2] no Exit 11 and 12 Scenario 6	% Difference from Scenario 1B
Annual Transactions/Volumes	26,141,000	21,540,000	19,047,000	-11.6%
Annual Gross Toll Revenue	$20,194,000	$15,704,000	$16,024,000	2.0%
Annual Cash Collection Costs[3]	$2,812,000	$2,812,000	$1,562,000	-44.5%
Lane Maintenance Costs[3]	$520,000	$520,000	$260,000	-50.0%
Annual O&M Costs[3]	$3,332,000	$3,332,000	$1,822,000	-45.3%
Annual Resultant Revenue[4]	$16,862,000	$12,372,000	$14,202,000	14.8%
Total Estimated Capital Cost	$0	$0	$18,415,000	
Annualized Capital Cost[5]	$0	$0	$1,478,000	
Net Toll Revenue [6]	$16,862,000	$12,372,000	$12,724,000	2.8%

(1) MAAR not implemented
(2) MAAR and Mall Opened
(3) O&M cost does include plaza operation cost exclusive of fees for accounts serviced.
(4) Resultant revenue reflects deductions for O&M cost.
(5) Assumes 20-year debt service at 5% interest
(6) Net revenue = Resultant revenue minus annualized capital cost

Lane Maintenance Costs - The 2012 lane maintenance costs for Scenario 6 are projected to be $260,000. This is approximately 50 percent less than the processing fees for Scenario 1B. This is because the lane maintenance costs are calculated based on the number of toll collection lanes. Under Scenario 1B, there are a total of 33 toll collection lanes. Scenario 6 has only 16 toll collection lanes (12 conventional and 4 ORT lanes).

Total Annual Operations & Maintenance Costs - The 2012 total cost of Operations & Maintenance for Scenario 6 is estimated at $1.8 million, compared to $3.3 million Scenario 1B. This is a difference of 45 percent.

Annual Resultant Revenue - The 2012 annual resultant revenue calculated for Scenario 6 is $14.2 million. This is nearly 15 percent higher than Scenario 1B.

Capital Cost - The total estimated capital cost for Scenario 6 is $18.4 million.

Annualized Capital Cost – The annualized capital cost for Scenario 6 is $1.5 million.

Net Toll Revenue – Annual net toll revenue under Scenario 6 is estimated to be 2.8 percent higher than Scenario 1B.

SCENARIO 7 – ORT TOLLS AT EXITS 1 AND 2

Under this scenario, the Bedford Mainline Toll Plaza would be removed as well as the northbound off and southbound on ramp toll plazas at Exits 10, 11 and 12.

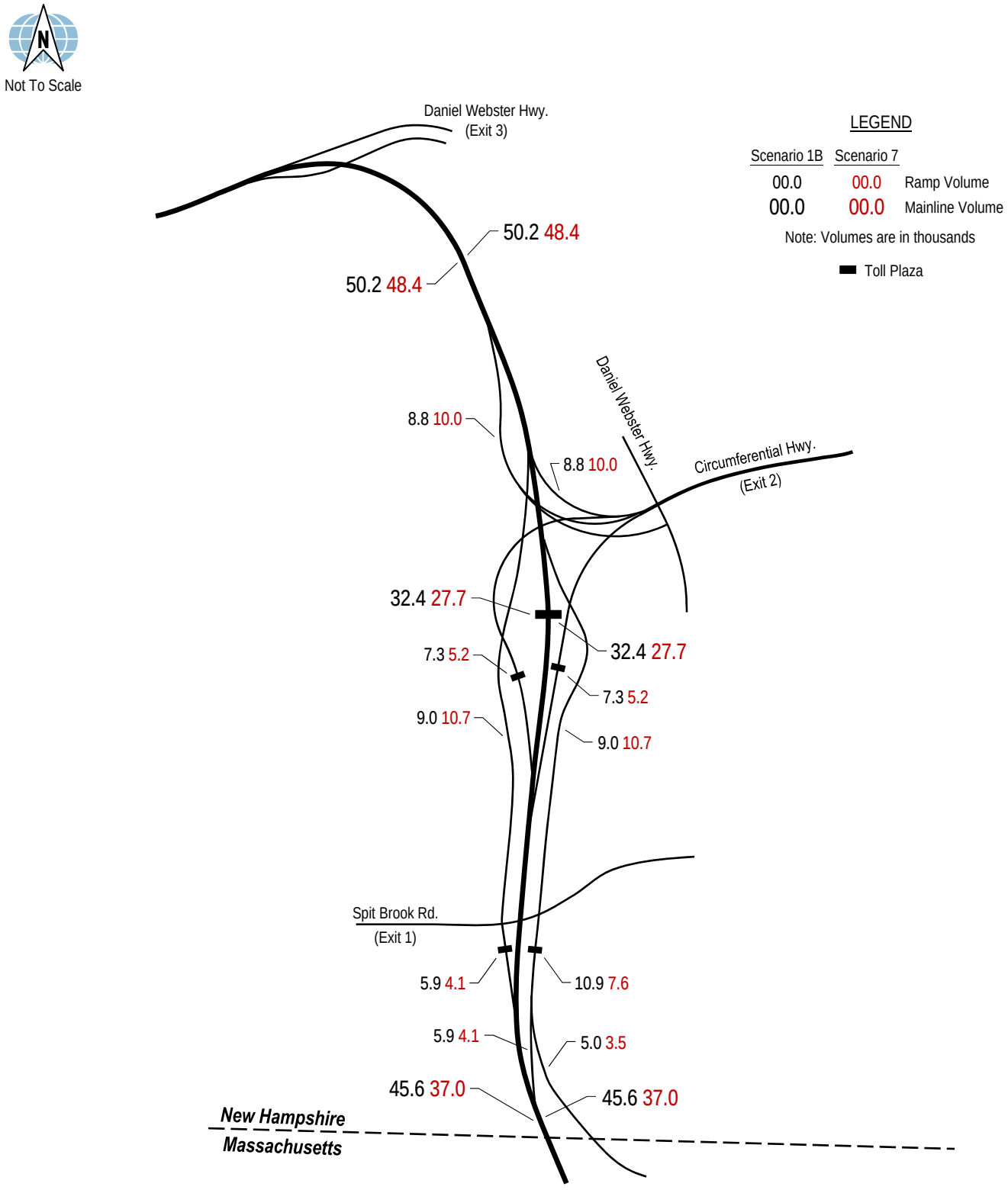
DESCRIPTION

A new mainline ORT plaza, with two lanes in each direction, would be constructed in Nashua south of Exit 2, Circumferential Highway, connecting the Everett Turnpike with Daniel Webster Highway and Route 3A. Figure 5-4 presents a schematic representation of Scenario 7. In addition to the ORT mainline, ramp toll plazas would be located to and from the south at Exit 1 and Exit 2. The mainline plaza would have two ORT lanes per direction and five conventional toll collection lanes at the right-hand side of the roadway in the southbound direction and six in the northbound direction which also serve the northbound Exit 2 off-ramp. The southbound on-ramps at Exits 1 and 2 are assumed to have three conventional toll collection lanes each. The plaza located at the collector-distributor road connecting the northbound off-ramp at Exit 1 and the Exit 36 on-ramp would have 4 conventional toll collection lanes. Compared to Scenario 1B (33 toll collection lanes total) the amount of toll collection lanes in Scenario 7 would be reduced to a total of 25 toll collection lanes.

SCENARIO 7 BASIC ASSUMPTIONS

The following assumptions apply to Scenario 7:

- The proposed retail shopping mall, to be located in the northwest quadrant of Exit 10, would be opened in 2012.
- The MAAR would be opened for traffic in Fiscal Year 2012.
- No major improvements would be made to parallel roadways such as I-93, Route 3 or Route 3A.
- No significant physical improvements were assumed for the Everett Turnpike.
- Potential traffic from the proposed Londonderry Development, adjacent to the Airport, was not considered.
- Operations and Maintenance Costs were assumed to be for toll functions only. Highway O&M costs were not included.
- Capital costs were for acquisition and installation of toll-related materials, equipment and software.



ESTIMATED 2012 AVERAGE WEEKDAY TRAFFIC
SCENARIO 7

WilburSmith ASSOCIATES

FIGURE 5-4

- Preliminary estimates of highway construction costs were also developed.
- Cash collection cost per attended lane hour.
- ETC transaction cost per E-ZPass lane.

Operating Characteristics

Figure 5-4 display 2012 estimated average weekday volumes along the mainline and at each on and off ramp location along the Turnpike between the State Line and Exit 3. Scenario 7 would result in diversion around the ramp plazas at Exit 1 and Exit 2 and the new mainline plaza. Traffic at the mainline plaza is estimated to decrease by nearly 15 percent, while traffic at the Exit 1 and Exit 2 ramp plazas would be expected to decrease by roughly 30 percent. Traffic at the border would be reduced by an estimated 19 percent. The ramps to and from the north at Exits 1 and 2 would be expected to increase by 19 percent and 14 percent, respectively. This is a result of the diverted traffic rejoining the Turnpike in the northbound direction after diverting around the Mainline Toll Plaza. In the southbound direction, the off ramps at Exits 1 and 2 serve as the point of diversion to avoid the Mainline Toll Plaza.

Travel Times

Figure 5-5 illustrates the travel time and distance estimates for various routes in the vicinity of Scenario 7. For both northbound and southbound trips, the likely diversion route would be to use Exit 2 (southbound off or Northbound on) and Daniel Webster highway to Exit 36 (southbound on or Northbound off) in Massachusetts. This would be a five-mile trip that would take slightly less than 8 minutes. This would be about 4 minutes and 0.8 miles longer than using the Everett and paying the toll. Other alternatives (Exit 3 or Exit 1, Spit Brook Road, and Route 113 to U.S. 3 Exit 35) would take longer.

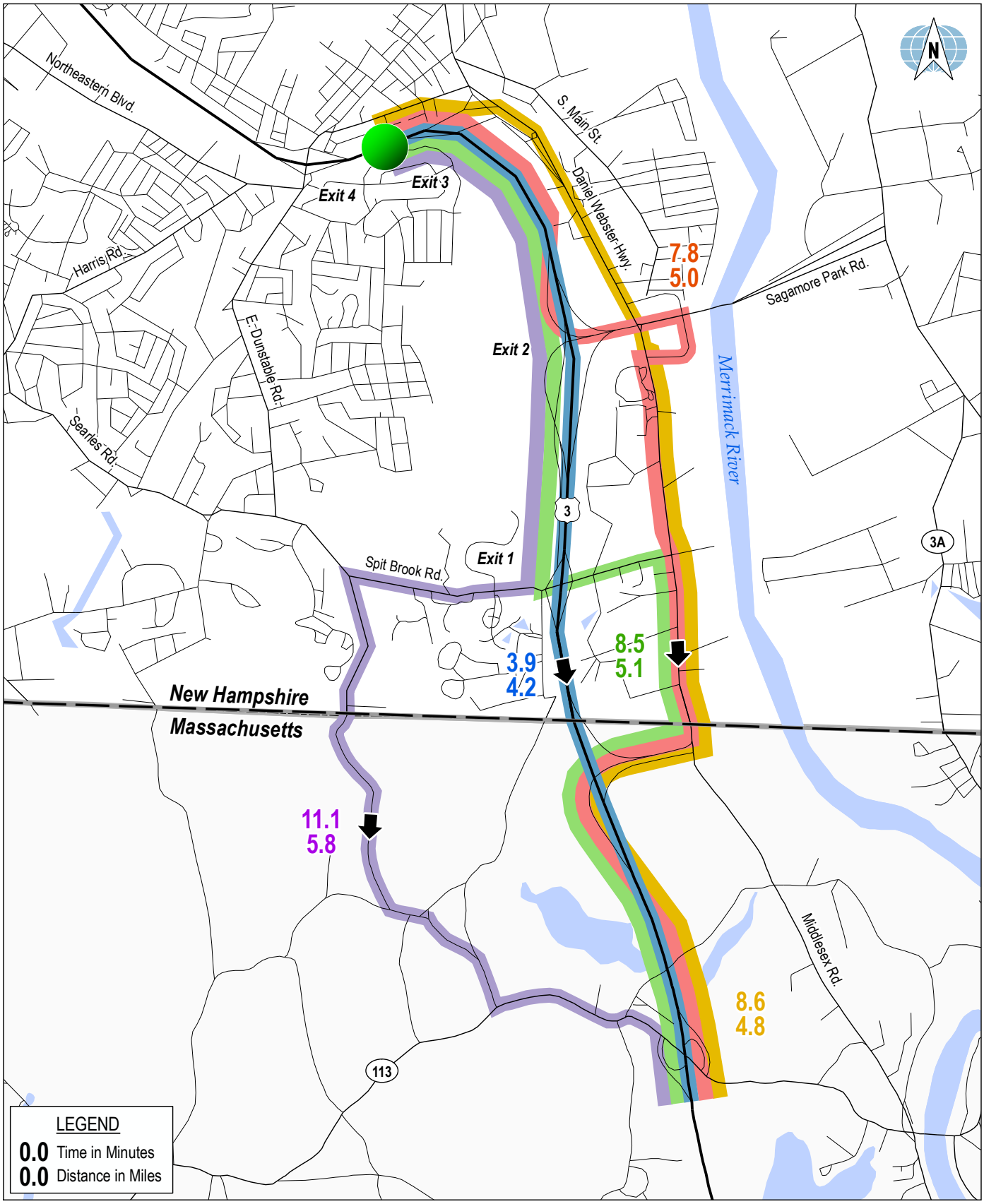
Transactions, Toll Revenue, and Cost Estimates

Table 5-3 provides the annual toll transactions, toll revenue, and cost projections for Scenario 7. The No Build (MAAR not implemented) condition and Scenario 1B are shown for comparison purposes.

Transactions - It is estimated that there will be 25.8 million toll transactions in 2012. This is nearly 20 percent higher than Scenario 1B.

Gross Toll Revenue - The 2012 annual gross toll revenue is projected at $23.9 million. The estimated annual gross toll for this scenario is more than 50 percent higher than Scenario 1B.

NH 104151 / Graphics / Arcview / TS-Travel Times & Distances Between Ex 4-Ex 35.mxd



TRAVEL TIME ESTIMATES AND DISTANCES BETWEEN EXIT 4 AND EXIT 35

WilburSmith ASSOCIATES

FIGURE 5-5

Table 5-3
Scenario 7 - Transaction and Revenue Projections
2012

Transactions/Revenues	No-Build[1] (No MAAR)	with Bedford 10, 11 & 12 tolled Scenario 1B[2]	no Bedford[2] no Exit 10, 11 and 12 Scenario 7	% Difference from Scenario 1B
Annual Transactions/Volumes	26,141,000	21,540,000	25,786,000	19.7%
Annual Gross Toll Revenue	$20,194,000	$15,704,000	$23,911,000	52.3%
Annual Cash Collection Costs[3]	$2,812,000	$2,812,000	$3,749,000	33.3%
Lane Maintenance Costs[3]	$520,000	$520,000	$405,000	-22.1%
Annual O&M Costs[3]	$3,332,000	$3,332,000	$4,154,000	24.7%
Annual Resultant Revenue[4]	$16,862,000	$12,372,000	$19,757,000	59.7%
Total Estimated Capital Cost	$0	$0	$43,440,000	
Annualized Capital Cost[5]	$0	$0	$3,486,000	
Net Toll Revenue [6]	$16,862,000	$12,372,000	$16,271,000	31.5%

(1) MAAR not implemented
(2) MAAR and Mall Opened
(3) O&M cost does include plaza operation cost exclusive of fees for accounts serviced.
(4) Resultant revenue reflects deductions for O&M cost.
(5) Assumes 20-year debt service at 5% interest
(6) Net revenue = Resultant revenue minus annualized capital cost

Annual Cash Collection Costs - Cash collection costs, for 2012, for Scenario 7 are estimated at $3.75 million. This is one third higher than Scenario 1B. Under Scenario 1B, there are a total of 14 cash lanes including Bedford Plaza and the ramp toll plazas at Exits 10, 11, and 12. Four of these lanes (two at Exit 11 and 2 at Exit 12) are only opened from 5:00 AM to 9:00 PM. In Scenario 7, there are a total of 16 cash lanes at the new ORT plaza and the ramp tolls at Exits 1 and 2. All of these cash lanes would be open 24 hours a day. This is why the cash collection costs for Scenario 7 are significantly higher than for Scenario 1B.

Lane Maintenance Costs - The 2012 lane maintenance costs for Scenario 7 are projected to be $405,000. This is approximately 22 percent less than Scenario 1B. This is because the lane maintenance costs are calculated based on the number of toll collection lanes. Under Scenario 1B, there are a total of 33 toll collection lanes. Scenario 7 has only 25 toll collection lanes (21 conventional and 4 ORT lanes).

Total Annual Operations & Maintenance Costs - The 2012 total cost of operations & maintenance for Scenario 7 are estimated at $4.2 million,

compared to $3.3 million for Scenario 1B. This is a difference of almost 25 percent.

Annual Resultant Revenue - The 2012 annual resultant revenue estimated for Scenario 7 is $19.8 million. This is nearly 60 percent higher than Scenario 1B.

Capital Cost - The total capital cost estimated for Scenario 7 is $43.4 million.

Annualized Capital Costs – The annualized capital cost for Scenario 7 is $3.5 million.

Net Toll Revenue – Annual net toll revenue under Scenario 7 is estimated to be more than 31 percent higher than Scenario 1B, but still nearly $600,000 lower than the No Build (MAAR not implemented) condition.

SCENARIO 8 – ORT TOLLS AT EXIT 2

Under this scenario, the Bedford Mainline Toll Plaza would be removed as well as the northbound off and southbound on ramp toll plazas at Exits 10, 11 and 12.

DESCRIPTION

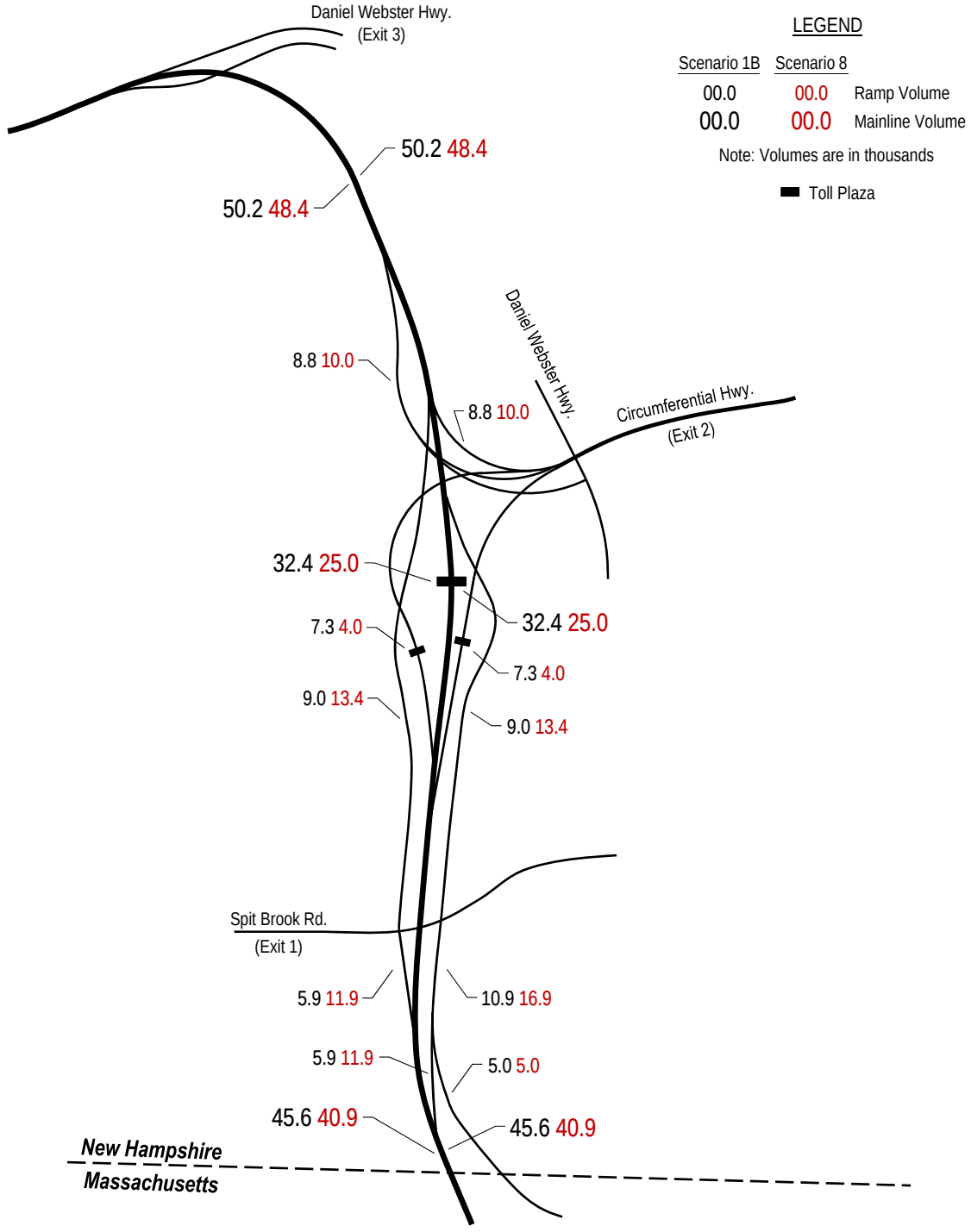
A new mainline ORT plaza would be constructed south of Exit 2 in Nashua. This plaza would be exactly the same as the ORT plaza described in Scenario 7. The only difference, in this scenario, is there would be no ramp tolls at Exit 1. Figure 5-6 presents a schematic representation of Scenario 8.

SCENARIO 8 BASIC ASSUMPTIONS

The following assumptions apply to Scenario 8:

- The proposed retail shopping mall, to be located in the northwest quadrant of Exit 10, would be opened in 2012.
- The MAAR would be opened for traffic in Fiscal Year 2012.
- No major improvements would be made to parallel roadways such as I-93, Route 3 or Route 3A.
- No significant physical improvements were assumed for the Everett Turnpike.
- Potential traffic from the proposed Londonderry Development, adjacent to the Airport, was not considered.

Not To Scale



ESTIMATED 2012 AVERAGE WEEKDAY TRAFFIC
SCENARIO 8

WilburSmith ASSOCIATES

FIGURE 5-6

- Operations and Maintenance Costs were assumed to be for toll functions only. Highway O&M costs were not included.
- Capital costs were for acquisition and installation of toll-related materials, equipment and software.
- Preliminary estimates of highway construction costs were also developed.
- Cash collection cost per attended lane hour.
- ETC transaction cost per E-ZPass lane.

Operating Characteristics

Between Exit 1 and Exit 2 (where the ORT toll plaza is located), the Scenario 8 volumes are projected to be nearly 23 percent lower than the Scenario 1B condition. Significantly more toll diversion around the mainline as compared to Scenario 7 is a result of not tolling the ramps to and from the south at Exit 1. Northbound drivers could avoid the tolls by exiting the Everett at the Exit 1 northbound off ramp (where there is no toll). These vehicles could then re-enter the Everett at the Exit 1 northbound on ramp (which bypasses the ORT toll plaza). Additional diversion occurs with southbound vehicles as they could cross Spit Brook Road from the Exit 1 southbound off ramp (which actually splits off from the mainline slightly north of Exit 2) and re-enter the Everett on the toll-free Exit 1 southbound on ramp. Removal of the Exit 1 ramp tolls in this scenario results in the potential for very significant toll diversion.

Transactions, Toll Revenue, and Cost Estimates

Table 5-4 provides the annual toll transactions, toll revenue, and cost projections for Scenario 8. The No Build (MAAR not implemented) condition and Scenario 1B are shown for comparison purposes.

Transactions - It is estimated that there will be 19.3 million toll transactions in 2012. This is more than 10 percent lower than Scenario 1B.

Gross Toll Revenue - The 2012 annual gross toll revenue is projected at $17.9 million. The estimated annual gross toll for this scenario is 14 percent higher than Scenario 1B.

Annual Cash Collection Costs - Cash collection costs, for 2012, for Scenario 8 are estimated at $2.8 million. Cash collection costs for Scenario 8 are the same as Scenario 1B.

Table 5-4
Scenario 8 - Transaction and Revenue Projections
2012

Transactions/Revenues	No-Build[1] (No MAAR)	with Bedford 10, 11 & 12 tolled Scenario 1B[2]	no Bedford[2] no Exit 10, 11 and 12 Scenario 8	% Difference from Scenario 1B
Annual Transactions/Volumes	26,141,000	21,540,000	19,310,000	-10.4%
Annual Gross Toll Revenue	$20,194,000	$15,704,000	$17,906,000	14.0%
Annual Cash Collection Costs[3]	$2,812,000	$2,812,000	$2,812,000	0.0%
Lane Maintenance Costs[3]	$520,000	$520,000	$292,000	-43.8%
Annual O&M Costs[3]	$3,332,000	$3,332,000	$3,104,000	-6.8%
Annual Resultant Revenue[4]	$16,862,000	$12,372,000	$14,802,000	19.6%
Total Estimated Capital Cost	$0	$0	$41,490,000	
Annualized Capital Cost[5]	$0	$0	$3,329,000	
Net Toll Revenue [6]	$16,862,000	$12,372,000	$11,473,000	-7.3%

(1) MAAR not implemented
(2) MAAR and Mall Opened
(3) O&M cost does include plaza operation cost exclusive of fees for accounts serviced.
(4) Resultant revenue reflects deductions for O&M cost.
(5) Assumes 20-year debt service at 5% interest
(6) Net revenue = Resultant revenue minus annualized capital cost

Lane Maintenance Costs - The 2012 lane maintenance costs for Scenario 8 are projected to be $292,000. This is approximately 44 percent less than Scenario 1B. This is because lane maintenance costs are calculated based on the number of toll collection lanes. Under Scenario 1B, there are a total of 33 toll collection lanes. Scenario 8 has only 18 toll collection lanes (14 conventional and 4 ORT lanes).

Total Annual Operations & Maintenance Costs - The 2012 total cost of operations & maintenance costs for Scenario 8 is estimated at $3.1 million, or 6.8 percent lower than Scenario 1B.

Annual Resultant Revenue - The 2012 annual resultant revenue estimated for Scenario 8 is $14.8 million. This is nearly 20 percent higher than Scenario 1B.

Capital Cost - The total capital cost for Scenario 8 is $41.5 million.

Annualized Capital Costs – The annualized capital cost for Scenario 8 is $3.3 million.

Net Toll Revenue – Annual net toll revenue under Scenario 8 is estimated to be 7 percent lower than Scenario 1B.

SUMMARY

A financial comparison of the four relocation scenarios indicates that Scenario 7 produces the highest amount of net toll revenue among the four relocation scenarios. It also requires the highest capital investment. Scenario 5 and Scenario 8 are estimated to generate similar amounts of annual net toll revenue. For Scenario 5 and Scenario 8, annual net toll revenue is actually below estimates for Scenario 1B or the "do nothing" scenario. Scenario 6 is estimated to produce slightly more net toll revenue as compared to Scenario 1B. Among these four relocation scenarios, Scenario 8 is clearly the less favorable alternative when compared to Scenario 7 and was excluded from further evaluation.

CHAPTER 6
AET SCENARIOS

INTRODUCTION

All Electronic Tolling (AET) permits drivers to pay their tolls without stopping at a toll booth in a toll plaza. No cash transaction is available at the tolling location. Vehicles with and without transponders (E-ZPass) can remain on the highway mainline and either have their transponders read by an antenna, or their vehicle license plate photographed by a closed circuit video camera, mounted on an overhead structure called a gantry. For the vehicles with valid transponders, the toll is paid as the vehicle passes under the gantry at highway speed. For those without transponders, an invoice is mailed out, for the toll and a processing charge, after their license plate has been identified and their address has been determined through the department of motor vehicles files.

Under this system there are no toll collection personnel and no cash collection costs in the "field". This would result in a significant savings in operating costs. However, this savings can be offset by toll "leakage" and additional back office costs. Leakage is the result of several factors. Some license plates will not be able to be identified. As one example, a car may have snow on the bumper and may inhibit the license plate from being read. In addition, some addresses obtained from motor vehicle files will not be valid. Finally, some individuals will not respond to invoices, violation notices or legal collection actions. All of these will add up to some percentage of lost toll revenue.

The following three AET scenarios were analyzed for this study:

- **Scenario 9** – This scenario is identical to Scenario 6 except that the tolling location would operate as a cashless system. Vehicles without a transponder would have their license plate captured by video and post billed. A $1.00 surcharge in addition to the base toll rate was assumed for video users.

- **Scenario 10** - This scenario is identical to Scenario 7 except that the tolling location would operate as a cashless system. Vehicles without a transponder would have their license plate captured by video and post billed. A $1.00 surcharge in addition to the base toll rate was assumed for video users.

- **Scenario 11 –** This scenario assumes a new AET location just south of the MAAR and also assumes that the existing Bedford mainline and the ramp plazas at Exits 10, 11, and 12 are removed.

The scenarios are being discussed in detail in the sections below.

SCENARIO 9 – AET SOUTH OF EXIT 10

Under this scenario the Bedford Mainline Toll Plaza would be removed as well as the ramp toll plazas at Exits 10, 11, and 12.

DESCRIPTION

A new AET plaza would be constructed just south of Industrial Drive/Technology Park Drive, between Exits 8 and 10. There would be two AET lanes in each direction. Figure 6-1 shows a schematic for the AET toll plaza location in Scenario 9.

TOLL RATES

The AET toll rate for vehicles, with E-ZPass tags registered in New Hampshire, would be $0.70 for automobiles. Automobiles with out-of-state E-ZPass would pay $1.00. The "video" toll rate would be a total of $2.00 for both in-state and out-of-state autos. This represents the current $1.00 base toll rate and a $1.00 service charge to cover the cost of processing the transaction (identifying the license plate, mailing the invoice, pursuing the toll collection if the invoice is not paid promptly, etc).

SCENARIO 9 BASIC ASSUMPTIONS

The following assumptions apply to Scenario 9:

- The proposed mall development, to be located in the northwest quadrant of Exit 10, would be opened in 2012.
- The MAAR would be opened for traffic in Fiscal Year 2012.
- No major improvements would be made to parallel roadways such as I-93, U.S. 3 or Route 3A.
- No significant physical improvements were assumed for the Everett Turnpike.

- Potential traffic from the proposed Londonderry Development, adjacent to the Airport, was not considered.
- Operations and maintenance costs were assumed to be for toll functions only. Highway O&M costs were not included.
- Capital costs were for acquisition and installation of toll-related materials, equipment and software.
- Preliminary estimates of highway construction costs were also developed.

Operating Characteristics

The potential travel times for diversion routes are identical to the ones shown in Chapter 5 for Scenario 6. With Scenario 9, traffic volumes in 2012 (Figure 6-1) north of Exit 12 will be slightly lower than Scenario 1B. This impact reflects reduced traffic due to video tolling and the increased rate for non-E-ZPass users. A similar reduction is shown south of Exit 7. Volumes north of Exit 8 are 17 percent lower in Scenario 9 than for Scenario 1B due to the amount of traffic diverting around the AET toll location. Correspondingly, volumes at the Exit 7 and 8 ramps to and from the south and traffic volumes at the Exit 10 ramps to and from the north increase due to a certain amount of vehicles exiting the Everett to avoid the AET toll plaza south of Exit 10. In addition, due to removing tolls from the Exit 11 and 12 ramps, more traffic will enter at these locations and travel toll free between the ramps to and from the north at Exit 10. There will be an estimated 53,000 toll transactions per weekday under Scenario 9, through the new AET toll plaza.

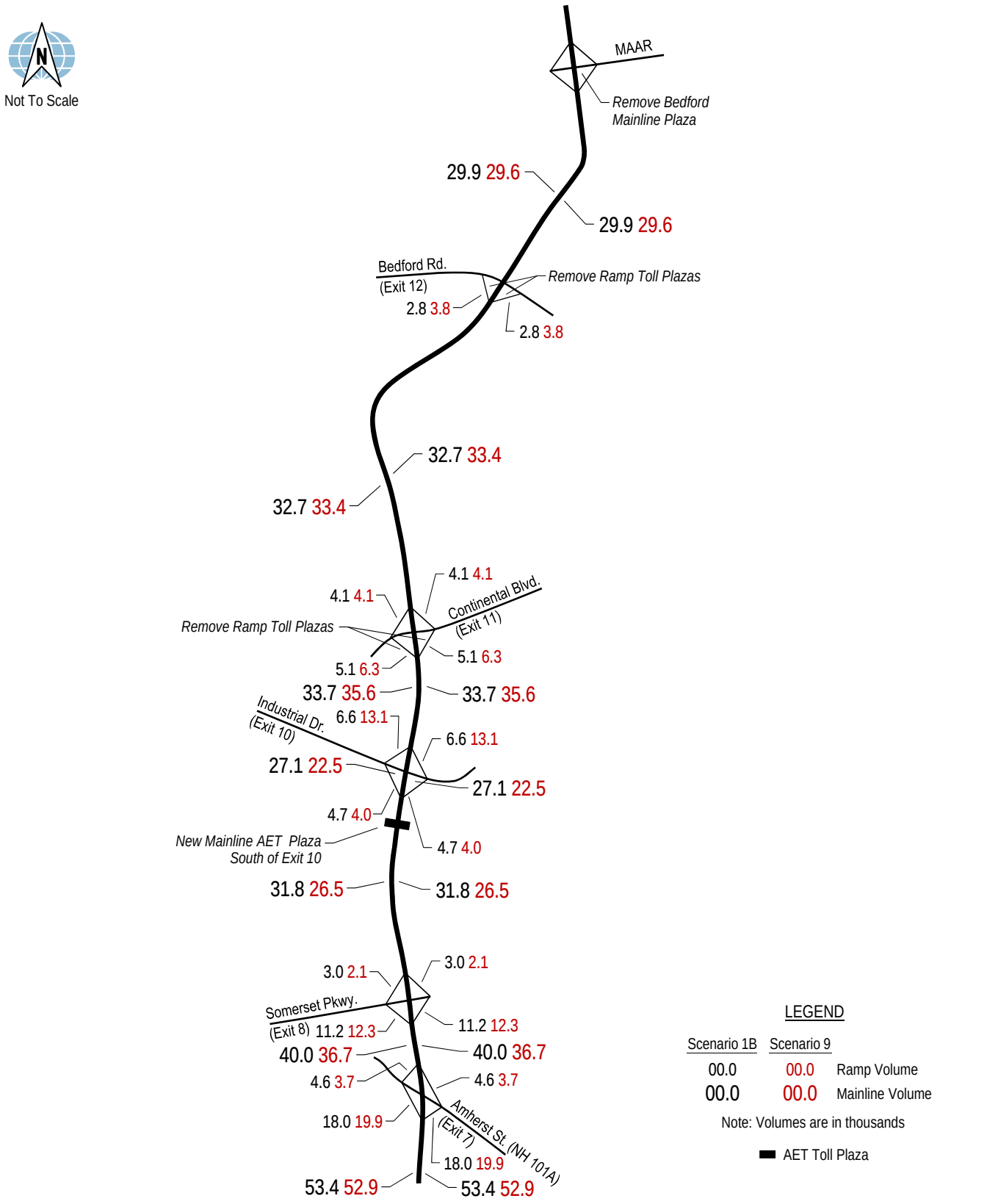
Transactions, Toll Revenue and Cost Estimates

Table 6-1 shows annual traffic and gross revenue projections as well as related cost components and annual net revenue for Scenario 9.

Transactions - It is estimated that there will be 18.0 million toll transactions in 2012. This is 16.4 percent lower than Scenario 1B.

Gross Toll Revenue - The 2012 annual gross toll revenue is projected at $20.9 million. The estimated annual gross toll revenue for this scenario is 33.5 percent higher than for Scenario 1B.

Video Processing Fees – There are no cash collection costs associated with toll operations in Scenario 9. There are, however, video processing fees which include video processing, account servicing, mailing, and DMV lookup fees. This is estimated to be $6.7 million, which is based on an average video processing fee of $1.40 per transaction. Approximately 4.8 million video transactions (or 27 percent of total transactions) are estimated for 2012.



ESTIMATED 2012 AVERAGE WEEKDAY TRAFFIC SCENARIO 9

FIGURE 6-1

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Table 6-1
Scenario 9 - Transaction and Revenue Projections
2012

Transactions/Revenues	No-Build[1] (No MAAR)	with Bedford 10, 11 & 12 tolled Scenario 1B[2]	no Bedford[2] no Exit 10, 11 and 12 Tolls Scenario 9	% Difference from Scenario 1B
Annual Transactions/Volumes	26,141,000	21,540,000	18,010,000	-16.4%
Annual Gross Toll Revenue	$20,194,000	$15,704,000	$20,968,000	33.5%
Annual Cash Collection Costs[3]	$2,812,000	$2,812,000	---	---
Lane Maintenance Cost[3]	$520,000	$520,000	$98,000	-81.2%
Estimated Annual Video Processing Cost[7]	---	---	$6,700,000	---
Total Annual O&M Costs	$3,332,000	$3,332,000	$6,798,000	104.0%
Estimated Incremental Leakage AET Revenue[8]	---	---	$742,000	---
Annual Resultant Revenue[4]	$16,862,000	$12,372,000	$13,428,000	8.5%
Total Estimated Capital Cost	---	---	$7,991,000	---
Annualized Capital Cost[5]	---	---	$641,000	---
Net Toll Revenue[6]	$16,862,000	$12,372,000	$12,787,000	3.4%

(1) MAAR not implemented
(2) MAAR and Mall Opened
(3) O&M cost does include plaza operation cost exclusive of fees for accounts serviced.
(4) Resultant revenue reflects deductions for O&M cost and AET revenue leakage.
(5) Assumes 20-year debt service at 5% interest
(6) Net revenue = Resultant revenue minus annualized capital cost
(7) Annual video processing cost is based on a per video transaction fee of $1.32 in 2009 Dollars inflated with 2% per year.
(8) Incremental revenue leakage is assumed to be 10 % of video tolls due to non-collectible video toll revenue.

Lane Maintenance Cost – Lane maintenance cost for Scenario 9 are projected to be $98,000 in 2012. This is approximately 81 percent less than the lane maintenance cost for Scenario 1B.

Total Annual Operations & Maintenance Costs **-** The 2012 total cost of operations & maintenance for Scenario 9 is estimated at $6.8 million, compared to $3.3 million for Scenario 1B (about 104 percent higher).

Incremental Revenue Leakage – Due to non-collectible AET revenue which is assumed to be 10 percent of the video toll transactions, an estimated incremental annual amount of revenue leakage of $0.7 million is assumed for Scenario 9.

Annual Resultant Revenue - The resultant 2012 annual net revenue estimated for Scenario 9 is $13.4 million. This includes deductions for toll operations and maintenance cost as well as leakage of video toll revenue. Annual resultant revenue for Scenario 1B is $12.4 million or 8.5 percent lower than Scenario 6.

Capital Cost - The total capital cost for the AET implementation and removal of the Bedford and the ramp toll plazas for Scenario 9 is $8.0 million.

Annualized Capital Costs - Annualized capital cost for Scenario 9 would be $641,000 based on a 20 year time period and 5 percent annual interest rate.

Net Toll Revenue - The estimated annual net toll revenue after deduction of all relevant cost items from the gross toll revenue is estimated to be $12.8 million in Scenario 9 compared to $12.4 million in Scenario 1B (3.4 percent higher).

SCENARIO 10 – AET SOUTH OF EXIT 1

Under this scenario, the Bedford Toll Plaza would be removed as well as the ramp toll plazas at Exits 10, 11 and 12.

DESCRIPTION

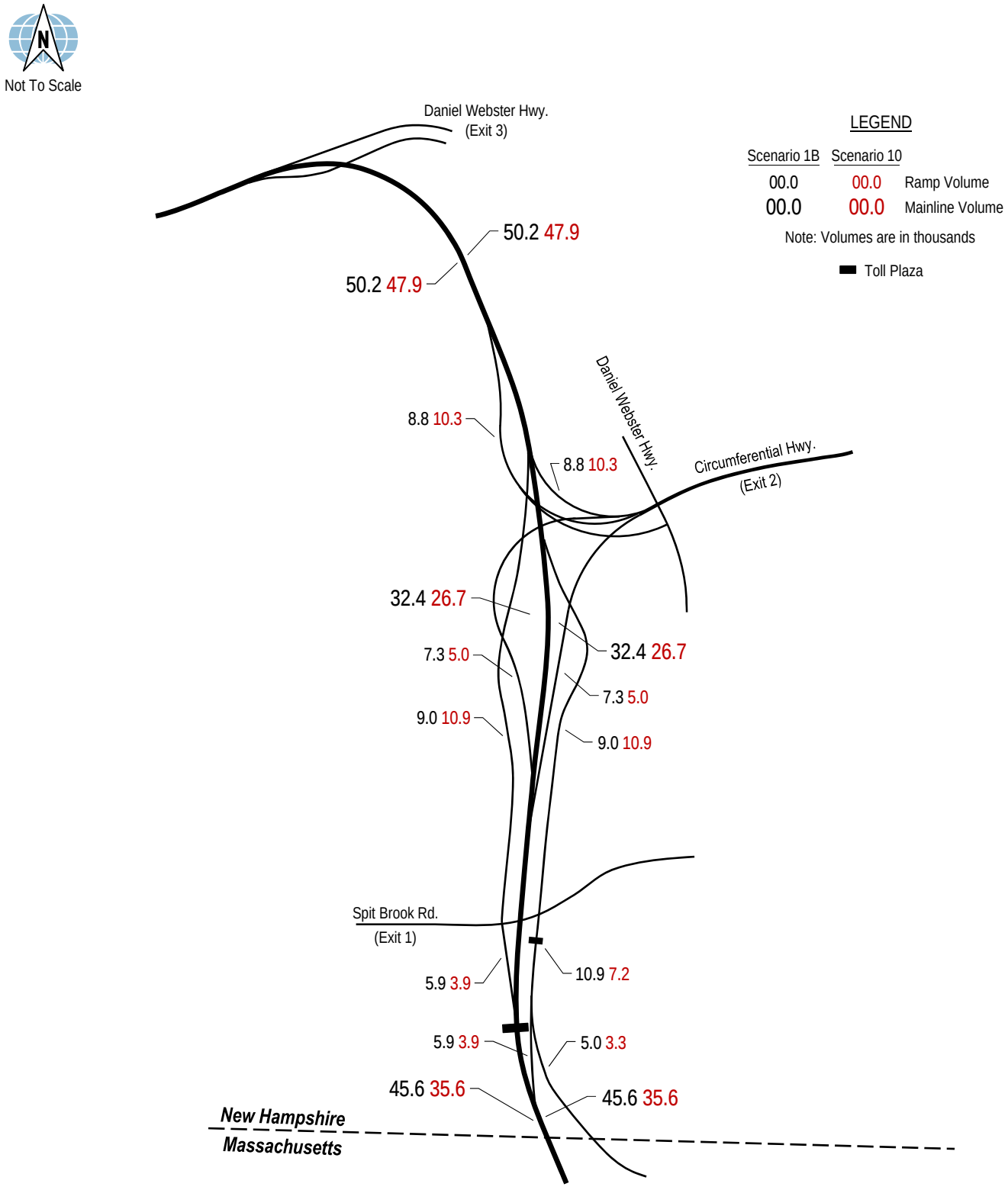
Three AET gantries would be installed south of Exit 1. The first, to cover southbound traffic, would be placed across the southbound main lanes just south of the Exit 1 southbound on-ramp. The second would be across the northbound main lanes just north of the Exit 1 northbound off- ramp and the third gantry would span the collector-distributor road connecting the Exit 36 northbound on-ramp (Massachusetts) and the Exit 1 northbound off-ramp just south of the Exit 1. Figure 6-2 is a schematic representation of Scenario 10.

TOLL RATES

Toll rates would be the same as for Scenario 9. The AET toll rate, for vehicles with E-ZPass tags registered in New Hampshire, would be $0.70 for automobiles. Automobiles with out-of-state E-ZPass would pay $1.00. The video toll rate would be a total of $2.00 for both in-state and out-of-state autos, as described in Scenario 9, above.

SCENARIO 10 BASIC ASSUMPTIONS

The following assumptions apply to Scenario 10:



ESTIMATED 2012 AVERAGE WEEKDAY TRAFFIC
SCENARIO 10

WilburSmith ASSOCIATES

FIGURE 6-2

- The proposed retail shopping mall, to be located in the northwest quadrant of Exit 10, would be opened in 2012.
- The MAAR would be opened for traffic in Fiscal Year 2012.
- No major improvements would be made to parallel roadways such as I-93, Route 3 or Route 3A.
- No significant physical improvements were assumed for the Everett Turnpike.
- Potential traffic from the proposed Londonderry Development, adjacent to the Airport, was not considered.
- Operations and maintenance costs were assumed to be for toll functions only. Highway O&M costs were not included.
- Capital costs were for AET implementation and toll removal cost for Exits 10, 11 and 12 and Bedford plaza.

OPERATING CHARACTERISTICS

In Scenario 10, 2012 traffic volumes south of Exit 3, on the mainline Everett Turnpike, are estimated to be lower than in Scenario 1B due to toll evasion as a result of the mainline toll in Scenario 10 (reduction of 2,300 vehicles per direction on an average weekday basis). In addition ramp volumes on the Exit 1 and 2 ramps to and from the north are estimated to increase due to traffic that will use these ramps to divert around the AET plaza location. Traffic passing the State Line at the AET Mainline and ramp locations drops from 96,200 vehicles on an average weekday in Scenario 1B to 74,500 in Scenario 10 due to toll evasion through the local road network. There will be an estimated 74,500 toll transactions per weekday under Scenario 10 through the AET toll plaza.

TRANSACTIONS, TOLL REVENUE AND COST ESTIMATES

Table 6-2 shows the traffic and revenue projections and cost assumptions for Scenario 10.

Transactions - It is estimated that there will be 24.8 million toll transactions in 2012. This is 15 percent higher than Scenario 1B.

Gross Toll Revenue - The 2012 annual gross toll revenue is projected at $28.9 million, which is 83.8 percent higher than Scenario 1B.

Video Processing Fees – There are no cash collection costs associated with toll operations in Scenario 10. There are, however, video processing fees which include video processing, account servicing, mailing, and DMV lookup fees, totaling an estimated $9.2 million. This estimated cost is based on an average video processing fee of $1.40 per transaction.

Table 6-2
Scenario 10 - Transaction and Revenue Projections
2012

Transactions/Revenues	No-Build[1] (No MAAR)	with Bedford 10, 11 & 12 tolled Scenario 1B[2]	no Bedford(2) no Exit 10, 11 and 12 Tolls Scenario 10	% Difference from Scenario 1B
Annual Transactions/Volumes	26,141,000	21,540,000	24,788,000	15.1%
Annual Gross Toll Revenue	$20,194,000	$15,704,000	$28,858,000	83.8%
Annual Cash Collection Costs[3]	$2,812,000	$2,812,000	---	---
Lane Maintenance Cost[3]	$520,000	$520,000	$129,000	-75.2%
Estimated Annual Video Processing Cost[7]	---	---	$9,222,000	---
Total Annual O&M Costs	$3,332,000	$3,332,000	$9,351,000	180.6%
Estimated Incremental Leakage AET Revenue[8]	---	---	$1,457,000	---
Annual Resultant Revenue[4]	$16,862,000	$12,372,000	$18,050,000	45.9%
Total Estimated Capital Cost	---	---	$19,260,000	---
Annualized Capital Cost[5]	---	---	$1,545,000	---
Net Toll Revenue[6]	$16,862,000	$12,372,000	$16,505,000	33.4%

(1) MAAR not implemented
(2) MAAR and Mall Opened
(3) O&M cost does include plaza operation cost exclusive of fees for accounts serviced.
(4) Resultant revenue reflects deductions for O&M cost and AET revenue leakage.
(5) Assumes 20-year debt service at 5% interest
(6) Net revenue = Resultant revenue minus annualized capital cost
(7) Annual video processing cost is based on a per video transaction fee of $1.32 in 2009 Dollars inflated with 2% per year.
(8) Incremental revenue leakage is assumed to be 15 % of video tolls due to non-collectible video toll revenue.

Lane Maintenance Cost – Lane maintenance cost for Scenario 10 are projected to be $129,000 in 2012. This is approximately 75 percent less than the lane maintenance cost for Scenario 1B.

Total Annual Operations & Maintenance Costs - The 2012 total cost of operations & maintenance for Scenario 10 is estimated at $9.4 million, compared to $3.3 million Scenario 1B (about 181 percent higher).

Incremental Revenue Leakage – Due to non-collectible AET revenue which is assumed to be 15 percent of the video toll transactions, an estimated incremental annual amount of revenue leakage of $1.5 million is assumed for Scenario 10. A higher amount of leakage would be expected in Nashua due to the higher proportion of out-of-state traffic.

Annual Resultant Revenue **-** The resultant 2012 annual net revenue estimated for Scenario 10 is $18.1 million. This includes deductions for toll operations and maintenance cost as well as leakage of video toll revenue. Compared to the annual resultant revenue for Scenario 1B of $12.4 million, Scenario 10 resultant revenue is almost 46 percent higher.

Capital Cost - The total capital cost for the AET implementation and removal of the Bedford and the ramp toll plazas for Scenario 10 is estimated to be $19.3 million.

Annualized Capital Costs – The annualized capital cost for Scenario 10 would be $1.5 million per year based on a 20 year time period and 5 percent annual interest rate.

Net Toll Revenue **-** The estimated annual net toll revenue after deduction of all relevant cost items from the gross toll revenue is estimated to be $16.5 million in Scenario 10 compared to $12.4 million in Scenario 1B (33.4 percent higher). However, the annual net toll revenue is approximately $350,000 lower than the No Build (MAAR not implemented) condition.

SCENARIO 11 – AET SOUTH OF MAAR

Under this scenario the Bedford Toll Plaza would be removed as well as the ramp toll plazas at Exits 10, 11, and 12.

DESCRIPTION

A new AET plaza would be constructed just south of the ramps to and from the south at the MAAR interchange. There would be two AET lanes in each direction. Figure 6-3 is a schematic representation of Scenario 11.

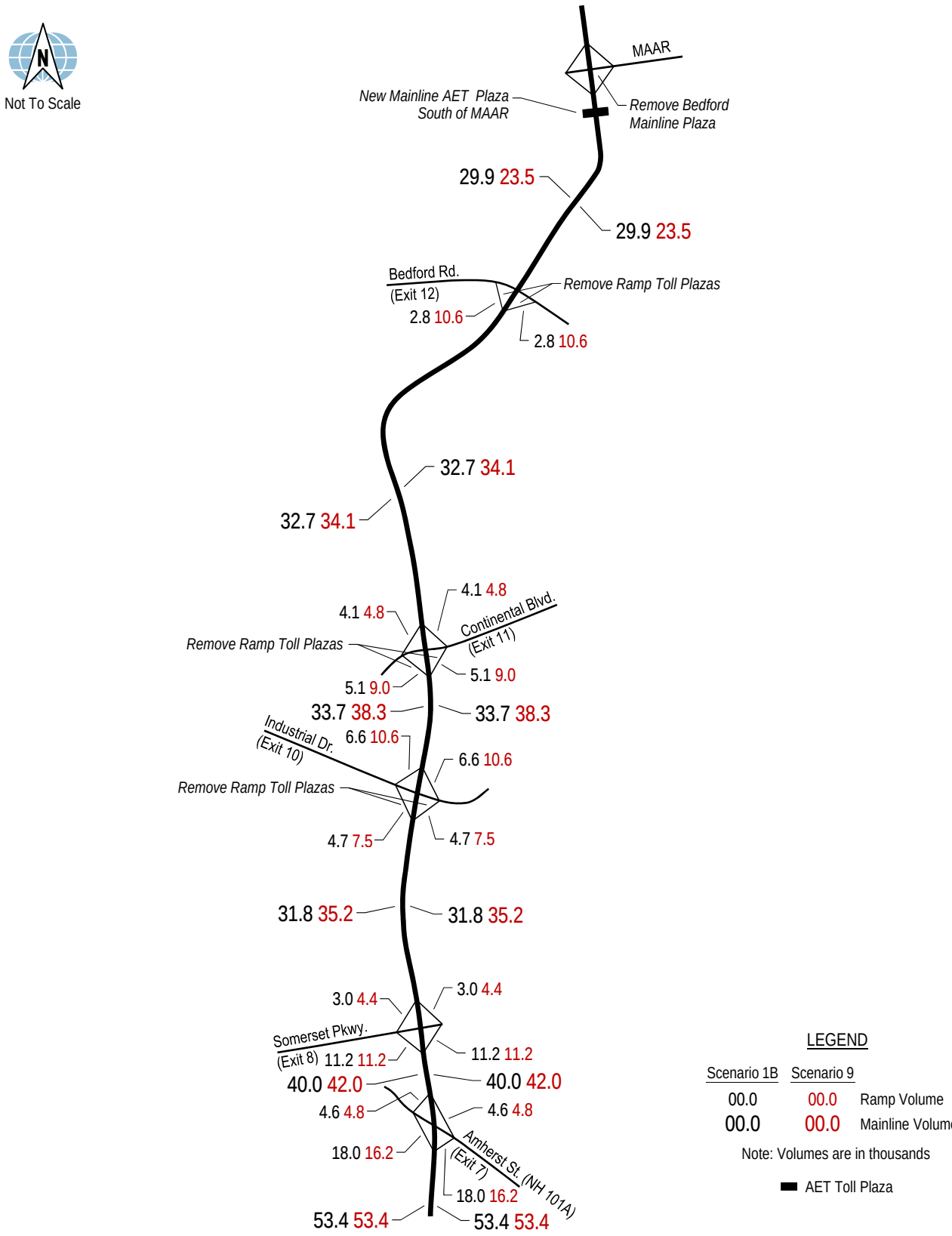
TOLL RATES

Toll rates would be the same as for Scenario 9 and 10. The AET toll rate, for vehicles with E-ZPass tags registered in New Hampshire, would be $0.70 for automobiles. Automobiles with out-of-state E-ZPass would pay $1.00. The video toll rate would be a total of $2.00 for both in-state and out-of-state autos, as described in Scenario 9 and 10, above.

SCENARIO 11 ASSUMPTIONS

The following assumptions apply to Scenario 11:

- The proposed retail shopping mall, to be located in the northwest quadrant of Exit 10, would be opened in 2012.



ESTIMATED 2012 AVERAGE WEEKDAY TRAFFIC SCENARIO 11

FIGURE 6-3

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- The MAAR would be opened for traffic in Fiscal Year 2012.
- No major improvements would be made to parallel roadways such as I-93, Route 3 or Route 3A.
- No significant physical improvements were assumed for the Everett Turnpike.
- Potential traffic from the proposed Londonderry Development, adjacent to the Airport, was not considered.
- Operations and maintenance costs were assumed to be for toll operation only. Highway O&M costs were not included.
- Capital costs include estimates for AET implementation and toll removal at Exits 10, 11, and 12, and the Bedford Mainline Plaza.

OPERATING CHARACTERISTICS

With Scenario 11, the 2012 average weekday traffic volumes north of Exit 12 are estimated to drop from 59,800 in Scenario 1B to roughly 47,000 in Scenario 11. This large reduction is caused by traffic avoiding the mainline AET toll location by diverting to the local road network via the toll free Exit 12 ramps. A significant number of drivers will leave the Turnpike at Exit 12 and either re-enter at the MAAR interchange or use the MAAR bridge to reach their destination without paying the mainline toll. Similar diversion will apply to reciprocal movements in the southbound direction when traffic diverts around the AET location in Scenario 11 via the MAAR interchange, U.S. 3, and the Exit 12 ramps. This diversion of traffic will result in large amount of additional traffic using Daniel Webster Highway. Usage of the Merrimack interchanges would be expected to increase significantly under this scenario as more local trips would be made on the Turnpike within Merrimack due to the tolls being removed at Exits 10, 11 and 12.

TRANSACTIONS, TOLL REVENUE AND COST ESTIMATES

Table 6-3 shows the traffic and revenue projections for Scenario 11.

Transactions - It is estimated that there will be 15.7 million toll transactions in 2012. This is 27 percent lower than Scenario 1B. The lower amount of transactions is a result of the higher toll rate being charged to video users, the availability of the alternate toll-free routing via Exit 12, and tolls being removed at Exit 10, 11, and 12.

Gross Toll Revenue - The 2012 annual gross toll revenue is projected at $18.3 million which is 16 percent higher than Scenario 1B.

Video Processing Fees – There are no cash collection costs associated with toll operations in Scenario 11 but video processing fees are estimated to be $5.8 million for video processing, account servicing, mailing, and

DMV lookup fees. This estimated cost is based on an average video processing fee of $1.40 per transaction.

Table 6-3
Scenario 11 - Transaction and Revenue Projections
2012

Transactions/Revenues	No-Build(1) (No MAAR)	with Bedford 10, 11 & 12 tolled Scenario 1B(2)	no Bedford(2) no Exit 10, 11 and 12 Tolls Scenario 11	% Difference from Scenario 1B
Annual Transactions/Volumes	26,141,000	21,540,000	15,683,000	-27.2%
Annual Gross Toll Revenue	$20,194,000	$15,704,000	$18,259,000	16.3%
Annual Cash Collection Costs(3)	$2,812,000	$2,812,000	---	---
Lane Maintenance Cost(3)	$520,000	$520,000	$98,000	-81.2%
Estimated Annual Video Processing Cost(7)	---	---	$5,835,000	---
Total Annual O&M Costs	$3,332,000	$3,332,000	$5,933,000	78.1%
Estimated Incremental Leakage AET Revenue(8)	---	---	$846,000	---
Annual Resultant Revenue(4)	$16,862,000	$12,372,000	$11,480,000	-7.2%
Total Estimated Capital Cost	---	---	$7,938,000	---
Annualized Capital Cost(5)	---	---	$637,000	---
Net Toll Revenue(6)	$16,862,000	$12,372,000	$10,843,000	-12.4%

(1) MAAR not implemented
(2) MAAR and Mall Opened
(3) O&M cost does include plaza operation cost exclusive of fees for accounts serviced.
(4) Resultant revenue reflects deductions for O&M cost and AET revenue leakage.
(5) Assumes 20-year debt service at 5% interest
(6) Net revenue = Resultant revenue minus annualized capital cost
(7) Annual video processing cost is based on a per video transaction fee of $1.32 in 2009 Dollars inflated with 2% per year.
(8) Incremental revenue leakage is assumed to be 10 % of video tolls due to non-collectible video toll revenue.

Lane Maintenance Cost – Lane maintenance cost for Scenario 10 are projected to be $98,000 in 2012. This is approximately 81 percent less than the lane maintenance cost for Scenario 1B and reflects the reduction of toll lanes in operation between Scenario 1B and Scenario 11.

Total Annual Operations & Maintenance Costs - The 2012 total cost of operations & maintenance for Scenario 11 is estimated at $5.9 million, compared to $3.3 million Scenario 1B (about 78 percent higher).

Incremental Revenue Leakage – Due to non-collectible AET revenue which is assumed to be 10 percent of the video toll transactions, an estimated incremental annual amount of revenue leakage of $846,000 is assumed for Scenario 11.

Annual Resultant Revenue **-** The resultant 2012 annual net revenue estimated for Scenario 11 is $11.5 million. This includes deductions for toll operations and maintenance cost as well as leakage of video toll revenue. Compared to the annual resultant revenue for Scenario 1B of $12.4 million, Scenario 11 resultant revenue is about 7 percent lower.

Capital Cost - The total capital cost for the AET implementation and removal of the Bedford and the ramp toll plazas for Scenario 11 is estimated to be $7.9 million.

Annualized Capital Costs – The annualized capital cost for Scenario 11 would be $637,000 per year based on a 20 year time period and 5 percent annual interest rate.

Net Toll Revenue **-** The estimated annual net toll revenue after deduction of all relevant cost items from the gross toll revenue is estimated to be nearly $10.8 million in Scenario 11 compared to $12.4 million in Scenario 1B (12.4 percent lower).

The evaluation of the three AET scenarios indicates that Scenario 10 shows the highest net revenue reaching levels that are very near to the No Build (MAAR not implemented) condition. It shows significantly higher net revenue when compared to Scenario 1B. Scenario 9 produces roughly the same net revenue than Scenario 1B. The AET scenario showing the least favorable outcome is Scenario 11. In addition to a potentially large traffic diversion impact, the net revenue is lower than Scenario 1B. These two elements in conjunction with the necessary capital cost required for the AET implementation and the toll removal indicate that Scenario 11 is not a viable alternative, and only Scenarios 9 and 10 would be considered potential AET solutions among these three scenarios.

CHAPTER 7
SCENARIO EVALUATION

DESCRIPTION OF ALTERNATIVES

The study was performed for a total of 11 infrastructure scenarios (Scenario 1 through 11) with additional sub-alternatives regarding toll removal on Exit 11 and 12 ramps as well as assumptions regarding the Merrimack Factory Outlet Center, a 500,000 square foot mall development (Mall). Each infrastructure alternative used various assumptions regarding the location of toll plazas, as well as the type of tolling. The detailed assumptions for the various alternatives are shown in Table 7-1.

The detailed analysis for scenarios 1 through 4 are shown in Chapter 2, the effects of removing tolls on Exits 11 and 12 is presented in Chapter 3, and the combined effects are shown in Chapter 4. Results for the Relocation Open Road Tolling (ORT) Scenarios 5 through 8 are shown in Chapter 5 and Chapter 6 includes the results of the All Electronic Tolling (AET) Scenarios 9 through 11.

ELIMINATION OF PLANNING SCENARIOS

During the course of the study, six scenarios were considered non-viable when evaluated among other scenarios and therefore excluded from the final comparison due to negative impacts on the local road network and significant reduction of Turnpike traffic demand or extreme losses of revenue. Table 7-2 presents an overview of these alternatives and the reasons for their elimination.

Scenario 1C with tolls removed from Exits 11 and 12 shows revenue losses that are not being compensated by reduced operation and maintenance (O&M) cost and therefore would have a negative impact on the net revenue basis.

Table 7-1

Description of Planning Scenarios

Plaza Location	No-Build (no MAAR) Base Condition for Comparison Purposes Only	Scenario 1A, Exit 10, 11 and 12 Tolled, Bedford Mainline Tolled, No Mall	Scenario 1B, Exit 10, 11 and 12 Tolled, Bedford Mainline Tolled, Mall Open	Scenario 1C, Exit 10 Tolled, No Tolls Exit 11 and 12, Bedford Mainline Tolled, Mall Open	Scenario 2, AET MAAR Bridge, Tolls at Exits 10, 11 and 12, Bedford Mainline Tolled, No Mall	Scenario 3, Offset AET Bedford Mainline, Tolls at Exits 10, 11 and 12, No Mall	Scenario 4A, Exit 10, 11 and 12 Tolled, Bedford Mainline and MAAR Ramps to and from the South tolled, No Mall	Scenario 4B, Exit 10, 11 and 12 Tolled, Bedford Mainline and MAAR Ramps to and from the South tolled, Mall Open	Scenario 4C, Exit 10 Tolled, No Tolls at Exit 11 and 12 , Bedford Mainline and MAAR Ramps to and from the South tolled, Mall Open	Scenario 5, New ORT Plaza at Exit 11, Exit 10 Tolled, No Toll at Bedford Mainline and Exit 12, Mall Open	Scenario 6, New ORT Plaza at Exit 10, No Toll at Bedford Mainline and Exit 11 and 12, Mall Open	Scenario 7, New ORT Plaza between Exit 2 and 1, Ramp Tolls at Exit 2 and 1, No Toll at Bedford Mainline and Exits 10, 11 and 12, Mall Open	Scenario 8, New ORT Plaza between Exit 2 and 1, Ramp Tolls only at Exit 2, No Toll at Bedford Mainline and Exits 10, 11 and 12, Mall Open	Scenario 9, New AET Plaza south of Exit 10, No Toll at Bedford Mainline and Exit 10, 11 and 12, Mall Open	Scenario 10, New AET Plaza North of State Line in Nashua, No Toll at Bedford Mainline and Exits 10, 11 and 12, Mall Open	Scenario 11, New AET Plaza South of MAAR, No Toll at Bedford Mainline and Exit 10, 11 and 12, Mall Open
New Development at Exit 10	No-Build	No-Build	Build	Build	No-Build	No-Build	No-Build	Build	Build	Build	Build	Build	Build	Build	Build	Build
Manchester Airport Access Road	No-Build	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build and All Electonic Tolling (AET)	Build, Toll-Free	Ramps to and from the South Tolled	Ramps to and from the South Tolled	Ramps to and from the South Tolled	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free
Bedford Mainline Plaza	Current Condition	Current Condition	Current Condition	Current Condition	Current Condition	Offset New Bedford Mainline AET	Current Condition	Current Condition	Current Condition	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed
Proposed AET Plaza South of MAAR	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	New AET Mainline Plaza South of MAAR
Exit 12 Ramp Tolls to and from the South	Tolled	Tolled	Tolled	Tolls Removed	Tolled	Tolled	Tolled	Tolled	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed
Exit 11 Ramp Tolls to and from the South	Tolled	Tolled	Tolled	Tolls Removed	Tolled	Tolled	Tolled	Tolled	Tolls Removed	New ORT Mainline Plaza at Exit 11	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed
Exit 10 Ramp Tolls to and from the South	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	New ORT Mainline Plaza at Exit 10	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed
Proposed AET Plaza South of Exit 10	----	----	----	----	----	----	----	----	----	----	----	----	----	New AET Mainline Plaza South of Exit 10	----	----
Proposed Nashua Mainline Plaza	----	----	----	----	----	----	----	----	----	----	----	New Nashua ORT Plaza	New Nashua ORT Plaza	----	New AET Plaza North of State Line	----
Exit 2 Ramps to and from the South	----	----	----	----	----	----	----	----	----	----	----	New Exit 2 Ramp Plazas	New Exit 2 Ramp Plazas	----	New AET Plaza North of State Line	----
Exit 1 Ramps to and from the South	----	----	----	----	----	----	----	----	----	----	----	New Exit 1 Ramp Plazas	----	----	New AET Plaza North of State Line	----

Note: ORT Open Road Tolling assumes high speed electronic travel lanes for EZPass equipped vehicles close to the median and conventional cash toll collection on the right-hand side of the roadway.

AET All Electronic Tolling assumes high speed electronic toll collection for EZPass equipped vehicles and video tolling for non-equipped vehicles assuming a processing surcharge.

Table 7-2

Reasons for Elimination of Planning Scenarios

Relevant Type of Impact	Scenario 1C, Exit 10 Tolled, No Tolls Exit 11 and 12, Bedford Mainline Tolled, Mall Open	Scenario 2, AET MAAR Bridge, Tolls at Exits 10, 11 and 12, Bedford Mainline Tolled, No Mall	Scenario 3, Offset AET Bedford Mainline, Tolls at Exits 10, 11 and 12, No Mall	Scenario 4C, Exit 10 Tolled, No Tolls at Exit 11 and 12 , Bedford Mainline and MAAR Ramps to and from the South tolled, Mall Open	Scenario 8, New ORT Plaza between Exit 2 and 1, Ramp Tolls only at Exit 2, No Toll at Bedford Mainline and Exits 10, 11 and 12, Mall Open	Scenario 11, New AET Plaza South of MAAR, No Toll at Bedford Mainline and Exit 10, 11 and 12, Mall Open
Traffic Impact on Manchester Airport Access Road	----	Large reduction of MAAR traffic	----	----	----	----
Traffic Impacts Local Road Network	----	----	----	Toll diversion via Exit 12 ramps causes significant traffic impacts on local road network	Toll diversion via Exit 1 ramps causes significant traffic impacts on local road network	Toll diversion via Exit 12 ramps causes significant traffic impacts on local road network
Revenue Impacts	Revenue losses at Exits 11 and 12 are not being compensated by additional revenue from Exit 10 and Mall	Combined estimated annual net revenue is lower than No-Build	Combined estimated annual net revenue is lower than No-Build	Revenue losses at Exits 11 and 12 are not being compensated by additional revenue from Exit 10 and Mall / Significant reduction in toll revenue at Bedford Mainline Plaza due to toll diversion at Exit 12	Revenue losses due to toll evasion at Exit 1 ramps	Large reduction in toll revenue due to toll diversion at Exit 12 and toll removal at Exits 10, 11, and 12
Capital Cost	----	Additional capital cost for AET implementation on MAAR	Additional cost for AET implementation at offset mainline location and removal of existing mainline plaza.	----	Significant cost for ORT implementation at mainline and ramp location and removal of existing mainline plaza.	Additional Capital Costs For AET
Operating Cost	Savings in reduced operating cost do not compensate for revenue losses	Increased operating cost due to MAAR tolling	Additional back office costs associated with video toll collection	Savings in reduced operating cost do not compensate for revenue losses	Savings in reduced operating cost do not compensate for revenue losses	Additional back office costs associated with video toll collection
Other		Significant Reimbursement to FHWA	Reimbursement to FHWA	Reimbursement to FHWA		Reimbursement to FHWA

Tolling the MAAR on the bridge crossing the Merrimack River in Scenario 2 would result in a large reduction (35%) in MAAR traffic as compared to a non-tolled implementation of the MAAR. Additional back office operations cost would be incurred from AET operation on the MAAR. Significant reimbursement for the MARR construction to FHWA would be likely and would result in lower net toll revenue than the No Build (MAAR not implemented) condition. In addition, toll evasion would still be possible utilizing the MARR ramp connections with the Turnpike, as well as movements to U.S. 3 would be toll free.

Scenario 3 with the offset location of a new AET plaza north and south of the MAAR interchange will result in some additional gross toll revenue. However, additional back office operation costs and capital costs associated with removal of the existing Bedford Mainline plaza and AET implementation, reimbursement of funds to FHWA, and tolling traffic from the north to the MAAR would result in lower net toll revenue as compared to the No Build (MAAR not implemented) condition. These factors removed Scenario 3 from further consideration.

Scenario 4C with tolls removed from Exits 11 and 12 allows for a large amount of toll diversion via Exit 12 to U.S. 3 which results in reduced revenue at the main line location. The savings in operating costs as a result of the toll removal at Exits 11 and 12 will not compensate the revenue losses. Protection of the mainline toll would need to occur under Scenario 4 operations, otherwise the investment and revenue at the MAAR ramp tolls would be negated by the free movements at Exits 11 and 12.

Scenario 8 with tolling at the state line in Nashua by means of a new ORT plaza between Exits 1 and 2 as well as tolls at the Exit 2 ramps to and from the south will result in a reduction of revenue as compared to the No Build (MAAR not implemented) condition. This is the result of a large amount of toll evasion, via the Exit 1 ramps, which are assumed to be toll-free in this scenario. In addition, significant capital cost investment would be required. Scenario 7 is clearly the better ORT scenario among these two Nashua alternatives, and therefore, Scenario 8 was removed from further consideration.

Tolling at a new AET mainline plaza just south of the MAAR interchange while removing tolls at Exits 10, 11 and 12 (Scenario 11) will result in significant traffic impacts at the Exit 12 ramps and the adjacent local road network due to toll evading traffic. Toll revenue will significantly decrease due to the elimination of ramp tolls and toll diversion via the Exit 12 ramps. In addition, capital cost to remove the existing plazas and to build the new AET toll facility in conjunction with increased back office

cost associated with video toll collection results in lower net toll revenue than the No Build (MAAR not implemented) condition and Scenario 1B. Therefore, Scenario 11 was removed from further consideration.

COMPARISON OF THE FINANCIAL IMPLICATIONS OF TOLLING SCENARIOS

A comparison of revenue-related impacts for a No Build (MAAR not implemented) condition and Scenarios 1B, 4B, 5, 6, 7, 9 and 10 is presented in Table 7-3. The table shows estimates of annual gross toll revenue, as well as annual transactions, operation and maintenance costs, incremental leakage of video toll revenue for AET scenarios, annualized capital cost estimates, and net revenue. Annualized capital cost was derived from the preliminary construction cost estimates, for each scenario, using a 20 year period and 5 percent interest rate.

The cost estimates presented in Table 7-3 only include cost components that will change between the various alternatives. Costs that remain constant, i.e. turnpike administration, etc. are not included in these estimates.

Three different types of toll operation were examined:

- Conventional toll plazas with cash collection and separate E-ZPass lanes (currently in operation at the Bedford Mainline Toll Plaza);
- Open road tolling (ORT) with high speed E-ZPass lanes and conventional cash collection at the outside of the travel lanes (currently in operation at the Hampton Mainline Toll plaza); and
- All Electronic Tolling (AET) with high-speed toll operation for E-ZPass equipped vehicles and video tolling for non-transponder equipped vehicles.

Depending on the nature of these toll operation scenarios, differences in operation and maintenance cost, capital cost, transactions and gross revenue, net revenue, as well as toll diversion can be observed. The following cost assumptions were used to establish annualized operation and maintenance costs.

CONVENTIONAL PLAZA

Cost for cash collection and ETC transaction processing is based on per lane costs for E-ZPass processing and on attended lane-hours for cash collection. Existing FY 2009 annual costs were utilized to establish these

Table 7-3

Comparison of Revenue Related Impacts of Planning Scenarios in 2012

Item	Relevant Type of Impact	No-Build (no MAAR) Base Condition for Comparison Purposes Only	Scenario 1B Exit 10, 11 and 12 Tolled, Bedford, Mall Open	Scenario 4B, Exit 10, 11 and 12 Tolled, Bedford, MAAR Ramps to and from the South tolled, Mall Open	Scenario 5, New ORT Plaza at Exit 11, Exit 10 Tolled, No Toll at Bedford and Exit 12, Mall Open	Scenario 6, New ORT Plaza at Exit 10, No Toll at Bedford and Exit 11 and 12, Mall Open	Scenario 7, New ORT Plaza between Exit 2 and 1, Ramp Tolls at Exit 2 and 1, No Toll at Bedford and Exits 10, 11 and 12, Mall Open	Scenario 9, New AET Plaza south of Exit 10, No Toll at Bedford and Exit 10, 11 and 12, Mall Open	Scenario 10, New AET Plaza North of State Line in Nashua, No Toll at Bedford and Exits 10, 11 and 12, Mall Open
1	Annual Gross Revenue	$20,194,000	$15,704,000	$21,829,000	$16,647,150	$16,023,647	$23,911,064	$20,968,000	$28,858,000
2	Annual Transactions	26,141,000	21,540,000	28,655,000	21,309,422	19,047,147	25,785,535	18,010,000	24,788,000
3	Annual Operating Cost	$3,332,000	$3,332,000	$4,366,000	$3,356,000	$1,822,000	$4,154,000	$6,798,000	$9,351,000
4	Estimated Incremental Leakage AET Revenue	---	---	---	---	---	---	$742,000	$1,457,000
5 (= 1 - 3 - 4)	Annual Revenue Minus Operating Cost	$16,862,000	$12,372,000	$17,463,000	$13,291,150	$14,201,647	$19,757,064	$13,428,000	$18,050,000
6	Total Construction and Toll Removal Cost Estimate	---	---	$16,390,000 (2)	$24,670,000	$18,415,000	$43,440,000	$7,991,000	$19,260,000
7	Annualized Capital Cost Estimate (1)	---	---	$1,315,000	$1,980,000	$1,478,000	$3,486,000	$641,000	$1,545,000
8 (= 5 - 7)	Net Revenue	$16,862,000	$12,372,000	$16,148,000	$11,311,150	$12,723,647	$16,271,064	$12,787,000	$16,505,000
	Net Revenue Comparison against Scenario 1B	$4,490,000	---	$3,776,000	($1,060,850)	$351,647	$3,899,064	$415,000	$4,133,000

Note: (1) The annualization of the capital cost assumes a 20 year period and a 5.00% interest rate.
(2) Capital Cost assumes $14.3 million reimbursement to FHWA for tolled ramp connections to and from the south.

unit-costs and a 2 percent annual inflation rate was used to calculate future year cost.

OPEN ROAD TOLLING (ORT)

From a perspective of O&M costs, identical per lane costs were applied to the Relocation ORT scenarios 5 through 8, since the cash collection and the high speed E-ZPass lane operation and maintenance require a similar effort.

ALL ELECTRONIC TOLLING (AET)

Scenarios 9, 10 and 11 assumed AET gantries across the travel lanes. Compared to conventional plazas or an ORT configuration, only per lane costs for E-ZPass processing are applicable. In addition, cash users would be billed for each passage under an AET gantry after a picture of their license plate was taken and compared against DMV vehicle registration data. This process is called "video tolling" and has been implemented at various toll agencies nationally and internationally. The following cost assumptions were used to establish estimates for the various cost components of video tolling:

- ETC transaction cost per E-ZPass lane (identical to ORT); and
- Estimated video processing fee including fees for account servicing, mailing cost for video invoices, as well as DMV fees for verification of license plate information.

It is assumed that a video transaction account will be established for each vehicle owner and that the processing will be handled in-house using DOT staff. The cost per transaction including all these cost components is assumed to be $1.32 at 2009 levels and is inflated with 2 percent per year ($1.40 in 2012).

Due to a certain percentage of license plates that cannot be photographed properly, when passing through an AET gantry, difficulties to establish the correct vehicle owner address and potential problems to invoice out-of-state vehicles, it is assumed that about ten percent of the video toll revenue will not be captured (incremental AET revenue leakage). In Nashua, it is assumed that fifteen percent of the video toll revenue will not be captured due to a higher proportion of out-of-state travel near the State line.

The cost estimates only include cost components that will change between the various alternatives. Cost that remain constant, i.e. turnpike administration etc. are not included in these estimates.

FINANCIAL IMPLICATIONS OF TOLLING SCENARIOS

A comparison of revenue-related impacts for a No Build (MAAR not implemented) condition and Scenarios 1B, 4B, 5, 6, 7, 9 and 10 is presented in Table 7-3. This table shows estimates of annual gross toll revenue and transactions, operation and maintenance costs, incremental leakage of video toll revenue for AET scenarios, total capital costs, annualized capital cost estimates, and annual net revenue. Annualized capital costs were derived from the preliminary construction cost estimates, for each scenario, using a 20 year period and 5 percent interest rate.

Annual Net Revenue **-** When comparing the various alternatives, the hypothetical No Build (MAAR not implemented) condition and Scenario 1B were used. These scenarios represent the condition if the MAAR was not constructed (No Build) and a "do nothing" situation (Scenario 1B) which reflects the implementation of the MAAR and no changes to the current tolling operation. The comparison is shown for fiscal year 2012. The No Build (MAAR not implemented) condition is estimated to generate annual net revenue of $16.9 million. Scenario 1B is estimated to produce annual net revenue of $12.4 million, resulting in a reduction of the annual net revenue of $4.5 million compared to the No Build (MAAR not implemented) condition. This would reflect the condition after the MAAR is implemented, the Mall is open, and tolls are collected at the existing plaza locations in their present day configuration.

Scenario 4B, Scenario 7, and Scenario 10 will be able to capture a similar amount of net revenue as the No Build (MAAR not implemented) condition ($16.1 million, $16.3 million, and $16.5 million, respectively). Scenarios 6 and 9 are estimated to generate $12.7 million and $12.8 million in annual net revenue, respectively. Scenario 5 is estimated to produce the lowest net revenue at $11.3 million.

The net revenue shown includes deductions for annualized cost for capital expenditures for construction and toll removal, toll operation and maintenance cost, as well as incremental leakage due to uncollectible video tolls.

The transaction and revenue numbers shown above are relative, not absolute, numbers for purposes of comparing the various alternatives. The calculations are based on reasonable and generally accepted practices and assumptions. The capital cost totals and O&M cost assumptions are the result of preliminary cost estimates.

The results are not intended for project financing and once a scenario is determined to be implementable, a more detailed in-depth analysis will need to be performed.

DIVERSION IMPACTS

Table 7-4 presents the estimated average weekday volumes in thousands in schematic format for Scenarios 1B, 4B, 5, 6, and 9. Average weekday volumes are shown by direction on the mainline and at each on and off ramp location along the Turnpike between the MAAR and Exit 6.

Scenario 4B would result in relatively minor diversion to the Exit 12 ramp ($0.50) in order to bypass the higher toll ($1.00) at the new ramp tolls to and from the MAAR.

Scenario 5 would result in diversion around the new mainline plaza located at Exit 11. In the southbound direction, a significant impact would occur at the Exit 11 southbound off ramp where traffic is estimated to increase due to toll diversion of the new mainline toll plaza and due to the addition of a free movement due to the ramp tolls being removed from the Exit 12 southbound on ramp. In addition, traffic that previously exited the Turnpike at Exit 10 will now utilize the Exit 11 off ramp to avoid paying the mainline toll. In the northbound direction, additional traffic would be expected to exit the Turnpike at Exits 7 and 8 to avoid paying the mainline toll at Exit 11. The northbound entrance ramp at Exit 11 would see a similar impact as the southbound off ramp to Exit 11.

Scenario 6 would result in diversion of the new mainline plaza located at Exit 10. In the southbound direction, the significant impact would occur at the Exit 10 off ramp where traffic is estimated to increase due to toll diversion of the new mainline toll plaza and due to the addition of free movements due to the ramp tolls being removed from the Exit 11 and 12 southbound on ramps. In the northbound direction, additional traffic would be expected to exit the Turnpike at Exits 7 and 8 to avoid paying the mainline toll at Exit 10. The northbound entrance ramp at Exit 10 would see a similar impact as the southbound off ramp at Exit 10.

Scenario 9 would result in diversion patterns similar to Scenario 6, but with a slightly higher magnitude due to the higher toll rate for Exit 10 users and the $1.00 surcharge for all video toll users.

At the bottom of Table 7-4, a comparison is made between each build scenario against Scenario 1B. The first comparison is for the total amount of mainline volume for the segment between the MAAR and Exit 6. A

Table 7-4
Estimated Local Diversion Impacts of Tolling Scenarios
Travel Segment between MAAR and Exit 6

Total Average Weekday Traffic in Thousands

Interchange	Scenario 1B			Scenario 4B					Scenario 5					Scenario 6					Scenario 9				
	South-bound	North-bound	Total	South-bound	North-bound	Total	Difference	Percent Difference	South-bound	North-bound	Total	Difference	Percent Difference	South-bound	North-bound	Total	Difference	Percent Difference	South-bound	North-bound	Total	Difference	Percent Difference
MAAR																							
Distance: 2.00 Miles	29.9	29.9	59.8	28.9	28.9	57.8	-2.0	**-3.3%**	28.6	28.6	57.2	-2.6	**-4.3%**	29.6	29.6	59.2	-0.6	**-1.0%**	29.6	29.6	59.2	-0.6	**-1.0%**
Bedford Road Exit 12																							
	2.8	2.8	5.6	3.8	3.8	7.6	+2.0	**+35.7%**	3.6	3.6	7.2	+1.6	**+28.6%**	3.9	3.9	7.8	+2.2	**+39.3%**	3.8	3.8	7.6	+2.0	**+35.7%**
Distance: 3.85 Miles	32.7	32.7	65.4	32.7	32.7	65.4	---	**---**	32.2	32.2	64.4	-1.0	**-1.5%**	33.5	33.5	67.0	+1.6	**+2.4%**	33.4	33.4	66.8	+1.4	**+2.1%**
	4.1	4.1	8.2	4.1	4.1	8.2	---	**---**	9.6	9.6	19.2	+11.0	**+134.1%**	4.1	4.1	8.2	---	**---**	4.1	4.1	8.2	---	**---**
Continental Blvd Exit 11																							
	5.1	5.1	10.2	5.1	5.1	10.2	---	**---**	5.1	5.1	10.2	---	**---**	6.7	6.7	13.4	+3.2	**+31.4%**	6.3	6.3	12.6	+2.4	**+23.5%**
Distance: 1.25 Miles	33.7	33.7	67.4	33.7	33.7	67.4	---	**---**	27.7	27.7	55.4	-12.0	**-17.8%**	36.1	36.1	72.2	+4.8	**+7.1%**	35.6	35.6	71.2	+3.8	**+5.6%**
	6.6	6.6	13.2	6.6	6.6	13.2	---	**---**	3.0	3.0	6.0	-7.2	**-54.5%**	12.6	12.6	25.2	+12.0	**+90.9%**	13.1	13.1	26.2	+13.0	**+98.5%**
Industrial Drive Exit 10																							
	4.7	4.7	9.4	4.7	4.7	9.4	---	**---**	4.7	4.7	9.4	---	**---**	5.5	5.5	11.0	+1.6	**+17.0%**	4.0	4.0	8.0	-1.4	**-14.9%**
Distance: 2.19 Miles	31.8	31.8	63.6	31.8	31.8	63.6	---	**---**	29.4	29.4	58.8	-4.8	**-7.5%**	29.0	29.0	58.0	-5.6	**-8.8%**	26.5	26.5	53.0	-10.6	**-16.7%**
	3.0	3.0	6.0	3.0	3.0	6.0	---	**---**	2.5	2.5	5.0	-1.0	**-16.7%**	2.5	2.5	5.0	-1.0	**-16.7%**	2.1	2.1	4.2	-1.8	**-30.0%**
Somerset Pkwy Exit 8																							
	11.2	11.2	22.4	11.2	11.2	22.4	---	**---**	11.8	11.8	23.6	+1.2	**+5.4%**	12.0	12.0	24.0	+1.6	**+7.1%**	12.3	12.3	24.6	+2.2	**+9.8%**
Distance: 0.91 Miles	40.0	40.0	80.0	40.0	40.0	80.0	---	**---**	38.7	38.7	77.4	-2.6	**-3.2%**	38.5	38.5	77.0	-3.0	**-3.8%**	36.7	36.7	73.4	-6.6	**-8.2%**
	4.6	4.6	9.2	4.6	4.6	9.2	---	**---**	4.2	4.2	8.4	-0.8	**-8.7%**	4.2	4.2	8.4	-0.8	**-8.7%**	3.7	3.7	7.4	-1.8	**-19.6%**
Amherst Street Exit 7																							
	18.0	18.0	36.0	18.0	18.0	36.0	---	**---**	18.9	18.9	37.8	+1.8	**+5.0%**	19.1	19.1	38.2	+2.2	**+6.1%**	19.9	19.9	39.8	+3.8	**+10.6%**
Distance: 0.55 Miles	53.4	53.4	106.8	53.4	53.4	106.8	---	**---**	53.4	53.4	106.8	---	**---**	53.4	53.4	106.8	---	**---**	52.9	52.9	105.8	-1.0	**-0.9%**
Broad Street Exit 6																							
Total Volume for Segment (1) (Average Weekday in Thousands)	221.5	221.5	**443.0**	220.5	220.5	**441.0**	**-2.0**	**-0.5%**	210.0	210.0	**420.0**	**-23.0**	**-5.2%**	220.1	220.1	**440.2**	**-2.8**	**-0.6%**	214.7	214.7	**429.4**	**-13.6**	**-3.1%**
Total Vehicle Miles Travelled (2) (Average Weekday in Thousands)	363.1	363.1	**726.2**	361.1	361.1	**722.2**	**-4.0**	**-0.6%**	344.6	344.6	**689.2**	**-36.9**	**-5.1%**	361.1	361.1	**722.1**	**-4.0**	**-0.6%**	352.7	352.7	**705.3**	**-20.8**	**-2.9%**

Note: (1) Difference in total of volumes represents shifting of traffic patterns from or to F.E. Everett Turnpike. Overall magnitude of negative sign is indicative of reduction of traffic using the F.E. Everett Turnpike.
(2) Vehicle miles travelled (VMT) are estimated based on mainline volumes and the distance between the middle of interchanges.
Overall magnitude of difference in VMT is indicative of additional miles travelled on local roads.

larger negative impact is indicative of a higher amount of local network diversion. A second comparison is for vehicle miles travelled on the Turnpike. Again, this percentage is indicative of the amount of toll diversion from the Turnpike onto the local network. In Scenario 5, 5.1 percent of the vehicle miles on the total segment are estimated to shift to local routes and in Scenario 9 roughly 2.9 percent of the miles travelled on the entire segment are estimated to divert to local routes. Scenario 4B and Scenario 6 would have little overall impact (only 0.6 percent of VMT diverted) on the local network.

Table 7-5 presents the estimated average weekday volumes in thousands for Scenario 1, 7, and 10. Average weekday volumes are shown by direction at the mainline and at each on and off ramp location along the Turnpike between the State Line and Exit 3. Scenario 7 would result in diversion around the ramp plazas at Exit 1 and Exit 2 and the new mainline plaza. Traffic at the mainline plaza is estimated to decrease by nearly 15 percent, while traffic at the Exit 1 and Exit 2 ramp plazas would be expected to decrease by roughly 30 percent. Traffic at the border would be reduced by an estimated 19 percent. The ramps to and from the north at Exits 1 and 2 would be expected to increase by 19 percent and 14 percent, respectively. This is a result of the diverted traffic rejoining the Turnpike in the northbound direction after diverting around the Mainline Toll Plaza. In the southbound direction, the off ramps at Exits 1 and 2 serve as the point of diversion to avoid the Mainline Toll Plaza. Scenario 10 results in similar diversion patterns to Scenario 7, except greater in magnitude due to the $1.00 surcharge for all video toll users. The same volume and VMT comparison was performed along this segment of the Turnpike.

Summary of Revenue and Diversion Potential

In evaluating the Build Scenarios of 4B, 5, 6, 7, 9 and 10, there are not only revenue implications to consider, but also the financial impacts of costs associated with the toll collection concept, and the diversion impacts to the local network. Table 7-6 displays the net revenue of each scenario, a comparison of each Build scenario net revenue against Scenario 1B, plus the percentage reduction of vehicle miles travelled (VMT) along the impacted segments of the Turnpike. The net revenue is the difference of annual revenue minus operating costs and the annualized construction and toll removal cost and incremental revenue leakage from AET users. The VMT reduction on the Turnpike is an indication of the amount of diversion to the local road network. The VMT to the local network would likely be somewhat higher than the reduction on the Turnpike due to longer travel distances; however this measure of VMT reduction on the Turnpike is a valid measure in which to assess each scenario and estimate

Table 7-5
Estimated Local Diversion Impacts of Tolling Scenarios
Travel Segment between Exit 3 and State Line

Total Average Weekday Traffic in Thousands

Interchange	Scenario 1B South-bound	Scenario 1B North-bound	Scenario 1B Total	Scenario 7 South-bound	Scenario 7 North-bound	Scenario 7 Total	Scenario 7 Difference	Scenario 7 Percent Difference	Scenario 10 South-bound	Scenario 10 North-bound	Scenario 10 Total	Scenario 10 Difference	Scenario 10 Percent Difference
Daniel Webster Hwy Exit 3													
Distance: 0.77 Miles	50.2	50.2	100.4	48.4	48.4	96.8	-3.6	**-3.6%**	47.9	47.9	95.8	-4.6	**-4.6%**
	8.8	8.8	17.6	10.0	10.0	20.0	+2.4	**+13.6%**	10.3	10.3	20.6	+3.0	**+17.0%**
Circumferential Hwy Exit 2													
Distance: 0.48 Miles	41.4	41.4	82.8	38.4	38.4	76.8	-6.0	**-7.2%**	37.6	37.6	75.2	-7.6	**-9.2%**
	9.0	9.0	18.0	10.7	10.7	21.4	+3.4	**+18.9%**	10.9	10.9	21.8	+3.8	**+21.1%**
Spit Brook Road Exit 1													
Distance: 0.49 Miles	32.4	32.4	64.8	27.7	27.7	55.4	-9.4	**-14.5%**	26.7	26.7	53.4	-11.4	**-17.6%**
Circumferential Hwy Exit 2													
	7.3	7.3	14.6	5.2	5.2	10.4	-4.2	**-28.8%**	5.0	5.0	10.0	-4.6	**-31.5%**
Distance: 0.43 Miles	39.7	39.7	79.4	32.9	32.9	65.8	-13.6	**-17.1%**	31.7	31.7	63.4	-16.0	**-20.2%**
Spit Brook Road Exit 1													
	5.9	5.9	16.8	4.1	4.1	11.7	-5.1	**-30.4%**	3.9	3.9	11.1	-5.7	**-33.9%**
Exit 36 On-Ramp		5.0			3.5					3.3			
Distance: 0.54 Miles	45.6	45.6	91.2	37.0	37.0	74.0	-17.2	**-18.9%**	35.6	35.6	71.2	-20.0	**-21.9%**
State Line													
Total Volume for Segment (1) (Average Weekday in Thousands)	209.3	209.3	**418.6**	184.4	184.4	**368.8**	**-49.8**	**-11.9%**	179.5	179.5	**359.0**	**-59.6**	**-14.2%**
Total Vehicle Miles Travelled (2) (Average Weekday in Thousands)	115.9	115.9	**231.7**	103.2	103.2	**206.4**	**-25.3**	**-10.9%**	100.7	100.7	**201.4**	**-30.4**	**-13.1%**

Note: (1) Difference in total of volumes represents shifting of traffic patterns from or to F.E. Everett Turnpike.
Overall magnitude of negative sign is indicative of reduction of traffic using the F.E. Everett Turnpike.
(2) Vehicle miles travelled (VMT) are estimated based on mainline volumes and the distance between the middle of interchanges.
Overall magnitude of difference in VMT is indicative of additional miles travelled on local roads.

the percentage of overall diversion. Scenarios 7 and 10 produce the highest amount of net revenue, but also result in the largest percentage reduction of VMT along the impacted segment of the Turnpike among the various scenarios. This would have the highest impact on the local road network. Scenario 4B produces slightly lower revenue than the No Build (MAAR not implemented) condition and also is estimated to have very low diversion impacts. Scenario 5 produces lower net revenue than Scenario 1B and has a moderate amount of VMT impact. Scenario 6 and Scenario 9 are estimated to produce revenue that is only slightly higher than Scenario 1B. Scenario 9 would be expected to have a relatively small overall diversion impact to the local network, while Scenario 6 would be expected to have a very low overall diversion impact.

Table 7-6
Comparison of 2012 Net Revenue and Diversion Impacts

Scenario	Net Revenue	Net Revenue Surplus versus Scenario 1B	% VMT Reduction on Impacted Turnpike Segment
No Build (1)	$16,862,000	$4,490,000	---
1B (2)	$12,372,000		---
4B	$16,148,000	$3,776,000	-0.6%
5	$11,311,150	($1,060,850)	-5.1%
6	$12,723,647	$351,647	-0.6%
7	$16,271,064	$3,899,064	-10.9%
9	$12,787,000	$415,000	-2.9%
10	$16,505,000	$4,133,000	-13.1%

Note: (1) No Build (no MAAR) is shown as a base condition for comparison purposes only.
(2) Scenario 1B represents the existing Bedford and Merrimack Plazas as they exist today with the MAAR and the Mall open.

ACKNOWLEDGEMENT AND ASSUMPTIONS

Traffic and revenue estimates for the F.E. Everett Turnpike corridor, included in this report, are based on travel demand data provided by the Southern New Hampshire Planning Commission and the Nashua Regional Planning Commission. The estimates were generated using widely accepted, reasonable analytical procedures. However, any deviation from the assumptions used in this study will impact results shown in this document. Actual traffic and revenue, on the F. E. Everett Turnpike, may well differ from forecasts, due to economic conditions, operational

conditions, unusual circumstances and other factors outside the control of the forecasters. Such differences could be material.

All estimates and projections in our report are based on experience and judgment and a review of information provided by the planning agencies, New Hampshire Department of Transportation, and data and information collected by WSA, additional information provided to WSA, limited visual observation of conditions at the relevant sites, and a review of other publicly available reports and information. These estimates and projections are not necessarily indicative of actual values or predictive of future results, which may ultimately be more or less favorable than those suggested by our report and are therefore subject to uncertainty.

In addition, annual revenue forecasts, included in this report, are intended to represent a general trend over the long-term of the project life, and not necessarily the revenue in any given year. Traffic and revenue in any given year may well vary from the forecast, based on circumstances which cannot be known at this time. Certain statements made in the report that are not historical facts may constitute estimates, projections, or other forward-looking statements and even though it is believed that such forward-looking statements are reasonable and are based on reasonable assumptions, as of the date in this report, such forward-looking statements, by their nature, involve risks and uncertainties that could cause actual results to differ materially from the results predicted.

This report is necessarily based upon scientific, governmental, market, economic, demographic, and other conditions as in effect on, and information made available to us, as of the date of our report. It should be understood that subsequent developments may affect the estimates or projections expressed in the report and cannot be predicted with certainty. We specifically do not guarantee or warrant any estimate or projections, contained in our report.

Appendix A
F.E. Everett License Plate Survey

APPENDIX A

LICENSE PLATE SURVEY

A vehicle license plate survey was conducted at two locations on the F.E. Everett Turnpike in order to observe the amount of New Hampshire and Massachusetts vehicles traveling northbound and southbound during a typical weekday and weekend day. In addition, trucks with 3 or more axles and vehicles from states other than New Hampshire and Massachusetts were categorized separately.

Two locations were chosen for the survey:

1. South of Exit 10 (Location 1),
2. North of the Massachusetts/New Hampshire State border (Location 2), including the Exit 36 northbound on-ramp.

The survey was conducted on Wednesday September 22, 2010 and Saturday September 25, 2010 between 6:30am and 6:30pm. The effort consisted of manually identifying the state in which vehicles are registered for a 20 minute interval within each hour in each direction. Data was aggregated to AM, Mid-day and PM periods and each category is presented as a percent of the total traffic volume within a period.

Wednesday Patterns
Location 1 – South of Exit 10
Table A-1 summarizes license plate survey data collected on Wednesday September 22, 2010 at both survey locations. New Hampshire vehicles made up 64.1 percent of total traffic in the northbound direction during the AM period and 84.0 percent during the PM period just south of Exit 10. The reverse pattern was observed in the southbound direction, where New Hampshire vehicles made up 87.5 percent of total traffic during the AM period and 64.3 percent of total traffic during the PM period.

Massachusetts vehicles made up 25.6 percent of northbound traffic during the AM period and 21.1 percent of the southbound traffic during the PM period. Truck and Other vehicle categories peaked numerically and as a percent of total traffic in both directions during the Mid-day period.

Table A-1
Everett Turnpike License Plate Survey
Wednesday September 22, 2010

Location 1 - South of Exit 10 (mile marker 8.6)

		Northbound				Southbound			
Start Time	**End Time**	NH	MA	Other	Trucks	NH	MA	Other	Trucks
6:30 AM	9:10 AM	64.1%	25.6%	7.6%	2.8%	87.5%	3.4%	7.4%	1.7%
9:10 AM	3:10 PM	64.7	16.1	14.9	4.2	61.9	14.2	19.6	4.3
3:10 PM	6:30 PM	84.0	6.1	8.4	1.5	64.3	21.1	12.7	2.0
	Total	72.8	14.1	10.4	2.7	71.8	12.2	13.3	2.7

Location 2 - South of Exit 1 (mile marker 0.1)

		Northbound				Southbound			
Start Time	**End Time**	NH	MA	Other	Trucks	NH	MA	Other	Trucks
6:30 AM	9:10 AM	18.3%	67.5%	10.7%	3.5%	77.5%	11.0%	9.7%	1.8%
9:10 AM	3:10 PM	38.0	46.2	9.6	6.1	53.4	29.1	12.3	5.2
3:10 PM	6:30 PM	61.3	22.1	14.3	2.3	29.3	55.9	12.4	2.4
	Total	45.9	38.3	12.2	3.7	58.1	27.5	11.2	3.1

Location 2 - Northbound Ramp from Daniel Webster Hwy

		Northbound				Southbound			
Start Time	**End Time**	NH	MA	Other	Trucks	NH	MA	Other	Trucks
6:30 AM	9:10 AM	42.3%	50.7%	1.4%	5.6%				
9:10 AM	3:10 PM	75.0	16.9	7.1	1.0				
3:10 PM	6:30 PM	81.6	9.9	7.6	0.8				
	Total	76.8	15.0	7.1	1.1				

Location 2 – North of Massachusetts State Border

At Location 2, South of Exit 1, Massachusetts vehicles made up the majority of northbound traffic during the AM period at 67.5 percent while New Hampshire vehicles made up 77.5 percent of southbound traffic. Again, the reciprocal pattern can be seen with New Hampshire vehicles accounting for 61.3 percent of PM northbound traffic and Massachusetts vehicles accounting for 55.9 percent of PM southbound traffic. Truck traffic at the NH/MA border peaks during the Mid-day period at 6.1 and 5.2 percent in the northbound and southbound directions, respectively. Other vehicles contributed a surprisingly high proportion of total traffic in both directions during the AM and PM periods, ranging from a low of 9.7 percent of AM southbound traffic to a high of 14.3 percent of PM northbound traffic.

The northbound on-ramp from Route 36 consisted largely of New Hampshire vehicles during the mid-day and PM periods at 75.0 percent and 81.6 percent, respectively. The reciprocal pattern is seen to a small degree during the AM period where Massachusetts vehicles made up 50.7

percent of total traffic. It should be noted that the total number of vehicles recorded during this AM period was only 71 vehicles.

Saturday Patterns

Location 1 – South of Exit 10

Table A-2 summarizes license plate survey data collected on Saturday September 25, 2010 for both locations. South of Exit 10, weekend day traffic demonstrated the same patterns observed during the weekday, but to a lesser degree. New Hampshire vehicles made up 55.8 percent of AM traffic and 72.7 percent of PM traffic in the northbound direction. Massachusetts vehicles demonstrated similar patterns to those observed during weekdays, accounting for 28.1 percent of AM northbound traffic and 22.0 percent of PM southbound traffic. The Other vehicles category again peaked during the Mid-day period, but also accounted for a significantly larger percent of total AM and PM traffic than was observed during the weekday. Truck traffic accounted for about 1 percent of the total traffic observed.

Table A -2
Everett Turnpike License Plate Survey
Saturday September 25, 2010

Location 1 - South of Exit 10 (mile marker 8.6)

		Northbound				Southbound			
Start Time	**End Time**	NH	MA	Other	Trucks	NH	MA	Other	Trucks
6:30 AM	9:10 AM	55.8%	28.1%	13.8%	2.3%	78.2%	6.1%	13.7%	2.0%
9:10 AM	3:10 PM	59.3	23.7	16.1	0.9	70.6	11.9	16.5	1.0
3:10 PM	6:30 PM	72.7	14.1	12.7	0.4	65.1	22.0	12.2	0.7
	Total	63.1	21.3	14.7	1.0	70.5	13.5	14.9	1.1

Location 2 - South of Exit 1 (mile marker 0.1)

		Northbound				Southbound			
Start Time	**End Time**	NH	MA	Other	Trucks	NH	MA	Other	Trucks
6:30 AM	9:10 AM	22.2%	66.6%	8.4%	2.8%	72.8%	14.0%	11.7%	1.5%
9:10 AM	3:10 PM	35.7	50.2	12.6	1.5	51.6	36.0	11.3	1.1
3:10 PM	6:30 PM	48.1	40.0	10.6	1.4	42.2	48.1	9.0	0.7
	Total	37.7	49.3	11.3	1.7	52.5	35.7	10.8	1.1

Location 2 - Northbound Ramp from Daniel Webster Hwy

		Northbound				Southbound			
Start Time	**End Time**	NH	MA	Other	Trucks	NH	MA	Other	Trucks
6:30 AM	9:10 AM	76.1%	23.9%	0.0%	0.0%				
9:10 AM	3:10 PM	76.2	16.9	6.7	0.2				
3:10 PM	6:30 PM	77.1	14.4	8.1	0.4				
	Total	76.6	15.9	7.2	0.3				

At Location 2, AM period traffic mirrors the patterns observed during the weekday survey with Massachusetts vehicles making up 66.6 percent of northbound traffic and New Hampshire vehicles making up 72.8 of southbound traffic. The same pattern continues through the Mid-day period, but the reciprocal pattern is seen to a lesser degree during the PM period with New Hampshire vehicles making up only 48.1 percent of northbound traffic and Massachusetts vehicles making up only 48.1 of southbound traffic.

The northbound on-ramp from Route 36 consisted largely of New Hampshire vehicles throughout Saturday ranging between 76.1 and 77.1 percent of total traffic. Massachusetts vehicles began the day at 23.9 percent of AM traffic, but proceeded to account for less of the total volume as other vehicles increased to 6.7 percent of Mid-day traffic and 8.1 percent of PM traffic.

One observation that should be noted was that PM period volumes did not return the same amount of traffic as the reciprocal AM volume in any instance. It is possible that ending data collection at 6:30 PM did not allow for all return trips to be counted. This might be particularly true under weekday conditions, given that commuters from employment centers in the Boston metro area can often extend well beyond 6:30 PM.

Summary

Table A-3 displays a summary of the weekday and weekend day travel survey at each location. For the weekday survey, 72.3 percent of vehicles identified south of Exit 10 had New Hampshire license plates. This percent drops significantly at the Massachusetts border to 53.4 percent. During the weekday survey south of Exit 10, vehicles with Massachusetts license plates accounted for only 13.2 percent of total vehicles. This proportion increased significantly to nearly a third of all traffic at the State border survey location.

Table A-3
Everett Turnpike License Plate Survey Summary (6:30 AM to 6:30 PM)

	Location 1 - South of Exit 10				Location 2 - South of Exit 1[(1)]			
Survey Date	NH	MA	Other	Trucks	NH	MA	Other	Trucks
Wenesday 9/22	72.3%	13.2%	11.7%	2.7%	53.4%	31.9%	11.4%	3.3%
Saturday 9/25	66.5%	17.7%	14.8%	1.0%	48.1%	39.9%	10.7%	1.3%

(1) Location 2 survey totals include vehicles from Northbound Ramp from Daniel Webster Hwy

Two-thirds of the Saturday traffic identified south of Exit 10 had New Hampshire license plates. This drops significantly to 48.1 percent at the State Border. Vehicles with Massachusetts license plates accounted for 39.9 percent of the total traffic at the State border.

In summary, about 65 to 70 percent of the traffic identified south of Exit 10 has New Hampshire license plates. This proportion reduces to approximately 50 percent at the Massachusetts State border.