Chapter 6
Ground Transportation

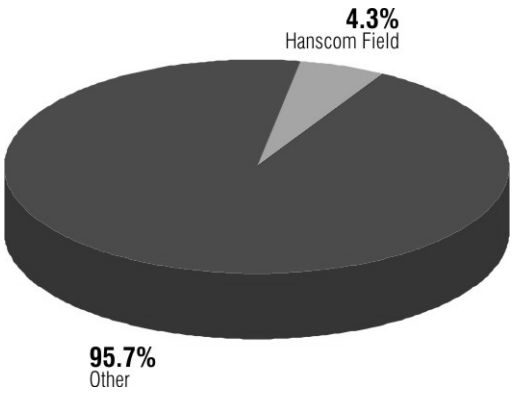
This chapter summarizes information that was included in the *Draft ESPR* for ground transportation and infrastructure and provides responses to scoping elements identified in the MEPA Certificate related to consultation efforts for the traffic study area, additional intersection operation information (i.e., volume-to-capacity ratios and delay), location of vehicular access points, Transportation Demand Management, Hanscom employee survey results, regional ground transportation projects that would affect conditions in the study area, parking fees, and cargo operations and access in the future scenarios.

Summary of the *Draft ESPR*

The *Draft ESPR* described existing and future roadway conditions in the vicinity of Hanscom Field. Future increases in weekday peak hour vehicular traffic volumes were forecasted areawide for the 2005 Moderate and High Growth scenarios and the 2015 Moderate and High Growth scenarios. Forecasted vehicular traffic volume increases in the future include vehicle trips generated by future background growth, specific planned developments in the area, and Hanscom Field. The key ground transportation findings are presented below:

- In 2002, Hanscom Field generated 161 vehicle trips during the morning peak hour (7:45 to 8:45 a.m.) and 159 vehicle trips during the afternoon peak hour (5:00 to 6:00 p.m.). In future scenarios, there would be:
  - 233-244 vehicle trips during the morning peak hour and 298-460 vehicle trips during the afternoon peak hour in the 2005 scenarios.
  - 382-405 vehicle trips during the morning peak hour and 456-654 vehicle trips during the afternoon peak hour in the 2015 scenarios.
- In 2002, Hanscom Field made up only 12-13 percent of the traffic volumes on Hanscom Drive.
- In 2002, only three to four percent of the peak hour traffic volumes along Route 2A were Hanscom Field-related. In the future scenarios, five to 15 percent of peak hour traffic volumes on Route 2A would be Hanscom Field-related. (See Figure 6-1.)
- In 2002, two of the three intersections evaluated operated at level of service (LOS) D or better. The third intersection, Hanscom Drive/Route 2A, operated at LOS F in the morning peak hour.

Figure 6-1 Afternoon Peak Hour Traffic on Route 2A (East of Hanscom Drive)



- Hanscom Field traffic increases would represent a small portion of the total increase in intersection traffic volumes. Most intersections operate at the same level of service regardless of the level of Hanscom Field-related traffic growth, with the following exceptions:

  - For the 2005 scenarios, the intersections of Hanscom Drive with Old Bedford Road and Route 2A would experience a change in level of service due to Hanscom Field-related traffic volumes.

  - For the 2015 scenarios, the intersections of Hanscom Drive/Route 2A, Old Bedford Road/Lexington Road, Old Bedford Road/Virginia Road, and Hanscom Drive/Old Bedford Road would experience a change in level of service due to Hanscom Field-related traffic volumes

The *Draft ESPR* identified measures to address these changes in level of service. These beneficial measures are further refined in this *Final ESPR* with a stronger reliance on Transportation Demand Management (TDM) measures. In particular, recommendations in the *Final ESPR* no longer include physical modifications to roadways within the Minute Man National Historical Park.

Traffic Analysis

In accordance with the MEPA Certificate on the *Draft ESPR*, this section presents additional information about the discussion with Bedford, Concord, Lexington and Lincoln town officials regarding the traffic analysis methodology and provides additional information about intersection operations (i.e., volume-to-capacity ratios and delay). The graphic that illustrates study area intersections also illustrates the location of access points that were considered for the future scenarios.

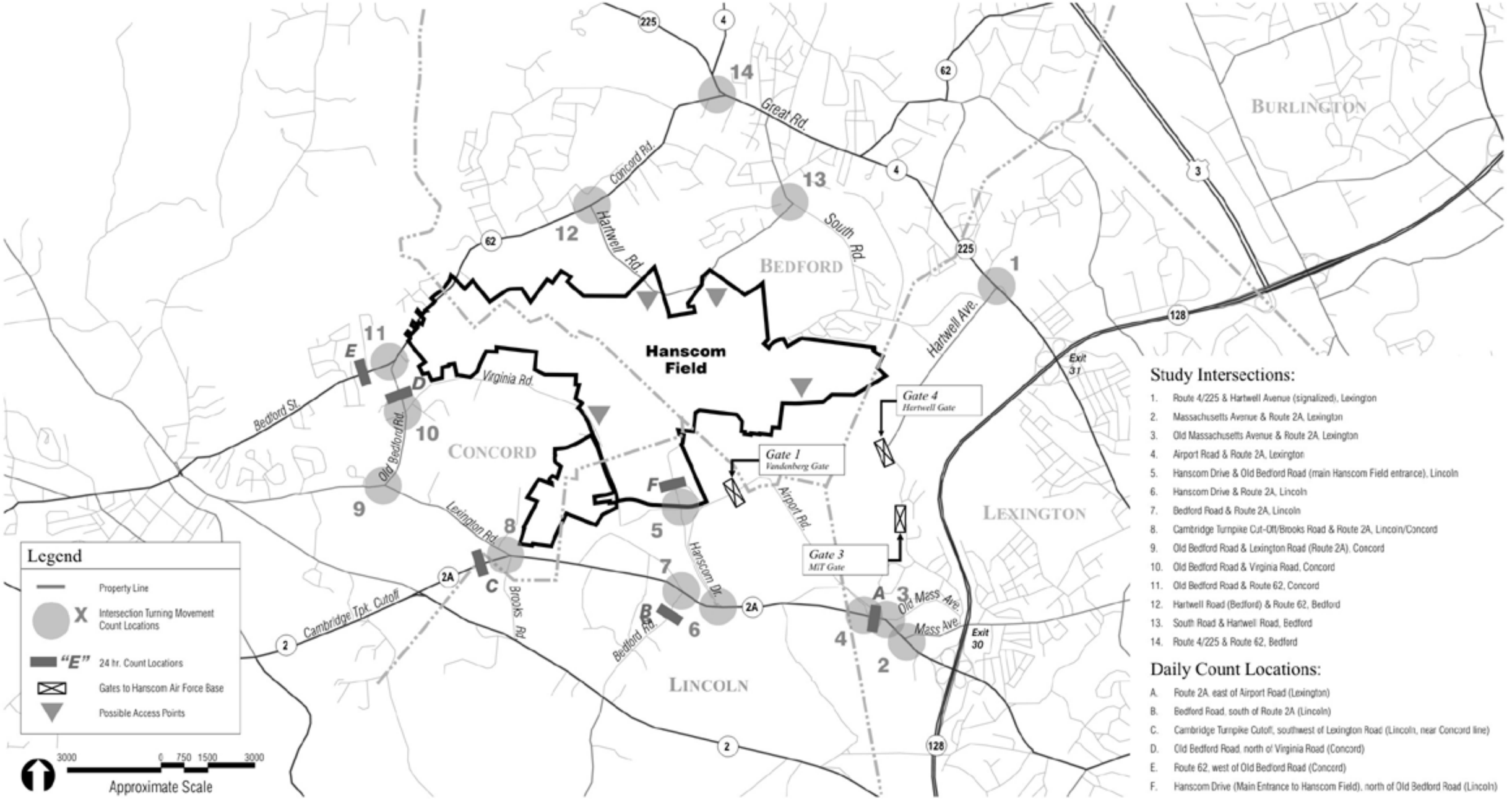
The traffic analysis evaluated intersection operations for Year 2002 conditions and future scenarios. The traffic estimates for the 2005 and 2015 Moderate and High Growth scenarios are based on aviation activity levels and land use scenarios (i.e., a hotel in the 2015 scenarios) as described in the *Draft ESPR*.

Traffic Study Area

As part of the traffic scope review process, Massport's transportation planning consultant met with the town planners of Bedford, Concord and Lexington and the Secretary of the Lincoln Planning Board prior to initiating work on the traffic study for the *Draft ESPR*. At these meetings, town officials provided information about recently completed and planned development projects and transportation projects within the study area. The proposed study area and approach were reviewed at these meetings

Figure 6-2 illustrates the intersections that were evaluated as part of the *Draft ESPR* analysis and are presented with additional volume-to-capacity and delay information. In addition, this figure illustrates the schematic location of four access points that were considered for the future scenarios. These locations, which were discussed in the *Draft ESPR*, would require appropriate security measures: they are located at an existing gate on Virginia Road for access to the Pine Hill area; at Hartwell Road to possible hangar locations in the North Airfield area; at South Road to possible hangar locations in the North Airfield area; and at Hartwell Avenue for possible uses on the East Ramp.

8796_traffic_study_area.cdr



Study Intersections:

1. Route 4/225 & Hartwell Avenue (signalized), Lexington
2. Massachusetts Avenue & Route 2A, Lexington
3. Old Massachusetts Avenue & Route 2A, Lexington
4. Airport Road & Route 2A, Lexington
5. Hanscom Drive & Old Bedford Road (main Hanscom Field entrance), Lincoln
6. Hanscom Drive & Route 2A, Lincoln
7. Bedford Road & Route 2A, Lincoln
8. Cambridge Turnpike Cut-Off/Brooks Road & Route 2A, Lincoln/Concord
9. Old Bedford Road & Lexington Road (Route 2A), Concord
10. Old Bedford Road & Virginia Road, Concord
11. Old Bedford Road & Route 62, Concord
12. Hartwell Road (Bedford) & Route 62, Bedford
13. South Road & Hartwell Road, Bedford
14. Route 4/225 & Route 62, Bedford

Daily Count Locations:

A. Route 2A, east of Airport Road (Lexington)
B. Bedford Road, south of Route 2A (Lincoln)
C. Cambridge Turnpike Cutoff, southwest of Lexington Road (Lincoln, near Concord line)
D. Old Bedford Road, north of Virginia Road (Concord)
E. Route 62, west of Old Bedford Road (Concord)
F. Hanscom Drive (Main Entrance to Hanscom Field), north of Old Bedford Road (Lincoln)

massport

RIZZO ASSOCIATES
A TETRA TECH COMPANY

2000 Hanscom Field Final ESPR
Bedford, Concord, Lexington and Lincoln, Massachusetts

Traffic Study Area

Figure 6-2

As described in the *Draft ESPR*, automatic traffic counts were taken over a 48-hour period at six locations and peak hour traffic counts were taken at fourteen intersection locations. The peak hour intersection counts were collected from 7:00-9:00 a.m. and 4:00-6:00 p.m. and, with the automatic traffic count data, were used to determine the morning and evening peak hours for the study area.

Analysis of Intersection Operations

In accordance with the MEPA Certificate, the *Final ESPR* provides additional information (i.e., volume-to-capacity ratios and delay) about the operation of study area intersections. Appendix H - Ground Transportation in the *Draft ESPR* provided information about delay and the information that was used to calculate volume-to-capacity (v/c) ratios. This section provides that data and additional information to complement the analysis that was included in the *Draft ESPR*. Background information is summarized below on the screening of study area intersections for analysis and on level of service calculations, which was presented in the *Draft ESPR*.

Table 6-1 Intersections with More Than Ten Percent Hanscom Field Traffic

Intersection*		Analysis Scenario			
		2005		2015	
		Moderate	High	Moderate	High
#5)	Hanscom Drive/Old Bedford Road (Lincoln)	a.m., p.m.	a.m., p.m.	a.m., p.m.	a.m., p.m.
#6)	Hanscom Drive/Route 2A (Lincoln)	a.m., p.m.	a.m., p.m.	a.m., p.m.	a.m., p.m.
#10)	Old Bedford Road/Virginia Road (Concord)	a.m., p.m.	a.m., p.m.	a.m., p.m.	a.m., p.m.
#2)	Massachusetts Avenue/Route 2A (Lexington)	p.m. only	p.m. only	a.m., p.m.	a.m., p.m.
#3)	Old Massachusetts Avenue/Route 2A (Lexington)	p.m. only	p.m. only	a.m., p.m.	a.m., p.m.
#4)	Airport Road /Route 2A (Lexington)	p.m. only	p.m. only	a.m., p.m.	a.m., p.m.
#11)	Old Bedford Road /Route 62 (Concord)	p.m. only	p.m. only	p.m. only	a.m., p.m.
#14)	Route 4-225/Route 62 (Bedford)	-	p.m. only	p.m. only	p.m. only
#7)	Bedford Road /Route 2A (Concord)	-	-	-	p.m. only
#8)	Cambridge Tpk. Cut-off/Lexington Road /Rt. 2A (Lincoln)	-	-	-	p.m. only
#9)	Old Bedford Road /Lexington Road (Concord)	-	-	-	p.m. only
#12)	Hartwell Road /Route 62 (Bedford)	-	-	-	a.m. only

Source: Based on traffic volume estimates for the four potential future scenarios calculated using the Hanscom Trip Generation Model, Rizzo Associates, Inc., 2002. The intersections noted above will have one or more traffic movement with more than ten percent Hanscom-related traffic for the future scenarios as noted.

* Intersection for which Hanscom Field traffic accounts for ten percent or more of the total traffic volume for one or more individual traffic movement.

Intersection Screening Process

The *Draft ESPR* presented the evaluation of intersection level of service for intersections that met the MEPA threshold for identifying intersections with significant impacts related to Hanscom Field. Based on the MEPA definitions, Hanscom Field traffic is considered to impact an intersection if one or more of the intersection's individual traffic movement(s) consists of ten or more percent Hanscom Field-related traffic. Intersection operations were calculated for year 2002 conditions for intersections with individual turning movements that meet or exceed the ten percent MEPA threshold. Table 6-1 presents a summary of intersections that exceeded the ten percent threshold in 2002, when traffic data were collected, and in the future scenarios.

Level of Service

Table 6-2 Intersection Level of Service Criteria

Level of Service	Average Delay per Vehicle (Seconds)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	≤ 10.0
B	> 10.0 and ≤ 20.0	> 10.0 and ≤ 15.0
C	> 20.0 and ≤ 35.0	> 15.0 and ≤ 25.0
D	> 35.0 and ≤ 55.0	> 25.0 and ≤ 35.0
E	> 55.0 and ≤ 80.0	> 35.0 and ≤ 50.0
F	> 80.0	> 50.0

Source: Transportation Research Board, *Highway Capacity Manual*, Special Report 209, Third Edition, National Research Council, Washington, DC, 2000.

Level of service is a term used to describe the quality of the traffic flow on a roadway facility at a particular point in time. It is an aggregate measure of travel delay, travel speed, congestion, driver discomfort, convenience, and safety based on a comparison of roadway system capacity to roadway system travel demand. Operating level of service is reported on a scale of A to F, with A representing the best operating conditions and F representing the worst operating conditions. LOS A represents uncongested conditions with little or no delay to motorists, while LOS F represents a forced-flow condition with delays and traffic demands that have been identified as exceeding roadway capacity. Roadway operating levels of service are calculated following procedures defined in the *2000 Highway Capacity Manual (HCM)*, published by the Transportation Research Board for signalized and unsignalized intersections as described in Table 6-2.

While levels of service for both signalized and unsignalized intersections are based on delay, care should be used when comparing results for the two different intersection types. The calculated average delay per vehicle for signalized intersections applies to all vehicles entering the intersection and under control of the traffic signal. For unsignalized intersections, it is assumed that through movements on the major street have the right of way and are not delayed by side street traffic. Consequently, the total delay values in Table 6-2 for unsignalized intersections apply only to the minor street intersection approaches or to left turns from the major street into the minor street which must yield to oncoming traffic.

Existing Conditions

The procedures described above were used to determine existing weekday peak hour operating levels of service at the study intersections. Existing 2002 peak hour traffic operations for these intersections are summarized in Table 6-3. As indicated in the *Draft ESPR*, two of the three intersections operate at LOS D or better in the morning and evening peak hours. The intersection of Hanscom Drive and Route 2A operates at LOS F in the morning peak hour due to delays on the Hanscom Drive southbound left-turn approach. There are not sufficient gaps in the Route 2A traffic for these left-turns from Hanscom Drive. This intersection operates at LOS D with police officer control in the evening peak hour.

Table 6-3 2002 Morning and Evening Peak Hour Level of Service

	Morning			Evening		
	LOS	Delay	V/C	LOS	Delay	V/C
#5) Hanscom Drive/Old Bedford Road (Lincoln)						
Hanscom Dr. NB LT	A	7.9	0.25	A	7.6	0.10
Hanscom DR. SB LT	A	7.4	0.05	A	7.3	0.06
Old Bedford Rd. WB TR	C	16.2	0.01	B	12.5	0.25
Old Bedford Rd. EB LT	D	32.7	0.49	B	11.7	0.01
#6) Hanscom Drive/Route 2A (Lincoln)						
Rt. 2A EB L	C	15.1	0.51	D	42.8	0.92
Hanscom Dr. SB L	F	>200	>1.2			
Hanscom Dr. SB R	C	21.9	0.48			
#10) Old Bedford Road/Virginia Road (Concord)						
Virginia Rd. WB LT	C	17.7	0.16	C	16.0	0.24
Old Bedford Rd. SB LT	A	9.4	0.37	A	7.8	0.12

Notes:
Intersections where Hanscom-related traffic represents greater than 10 percent of any one movement
Hanscom Drive/Route 2A, which operates with police officer control in the evening peak hour, was evaluated as a signalized intersection in the evening peak hour.
LOS - level of service
Delay - Average delay in seconds per vehicle
V/C - Volume-to-capacity ratio

2005 Scenarios

Tables 6-4 and 6-5 present the comparison of traffic operations for the 2005 scenarios with and without anticipated Hanscom Field traffic increases. These results indicate that most intersections operate at the same level of service regardless of the level of Hanscom Field-related traffic growth. Of the intersections that were evaluated, the new vehicle trips generated by Hanscom Field would result in a change in level of service to LOS F only at the intersection of Hanscom Drive/Route 2A for the evening peak hour in the 2005 High Growth scenario. In 2015, this intersection is predicted to operate at LOS F regardless of any potential changes at Hanscom.

TDM or potential intersection improvements would be needed with or without anticipated Hanscom Field traffic increases. This includes the intersection of Hanscom Drive/Route 2A, which could benefit today from a police traffic officer in the morning peak hour. No other improvements are proposed for this intersection.

2015 Scenarios

Tables 6-6 and 6-7 present the comparison of traffic operations for the 2015 scenarios with and without anticipated Hanscom Field traffic increases. These results indicate that most intersections operate at the same level of service regardless of the level of Hanscom Field-related traffic growth. Level of service would change to LOS E at three intersections as a result of anticipated Hanscom Field traffic increases. These inter-

sections are Hanscom Drive/Route 2A in Lincoln during the morning peak hour for both 2015 scenarios; Old Bedford Road/Lexington Road in Concord during the evening peak hour for the 2015 High Growth scenario; and, Old Bedford/Virginia Road in Concord during the morning and evening peak hours for both 2015 scenarios. A fourth intersection, Hanscom Drive/Old Bedford Road, would experience a change in LOS as a result of anticipated Hanscom Field traffic increases, but would operate at LOS D or better.

TDM or potential intersection improvements would be needed with or without anticipated Hanscom Field traffic increases. This includes the intersection of Hanscom Drive/Route 2A, which could benefit today from a police traffic officer in the morning peak hour. No other intersection improvements are proposed for this intersection.

Table 6-4 Level of Service Results for 2005 Morning Peak Hour

	2002			2005 Background Growth Only			2005 Moderate Growth			2005 High Growth		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
#5) Hanscom Drive/Old Bedford Road (Lincoln)												
Hanscom Dr. NB LT	A	7.9	0.25	A	8.0	0.26	A	8.0	0.20	A	8.0	0.20
Hanscom DR. SB LT	A	7.4	0.05	A	7.4	0.05	A	7.4	0.00	A	7.4	0.00
Old Bedford Rd. WB TR	C	16.2	0.01	C	18.4	0.06	C	20.4	0.03	C	20.4	0.03
Old Bedford Rd. EB LT	D	32.7	0.49	E	36.4	0.56	E	43.8	0.64	E	43.8	0.64
#6) Hanscom Drive/Route 2A (Lincoln)												
Rt. 2A EB L	C	15.1	0.51	C	16.8	0.56	C	17.8	0.58	C	17.9	0.58
Hanscom Dr. SB L	F	>200	>1.2	F	>200	>1.2	F	>200	>1.2	F	>200	>1.2
Hanscom Dr. SB R	C	21.9	0.48	D	26.2	0.56	D	27.7	0.59	D	27.9	0.59
#10) Old Bedford Road/Virginia Road (Concord)												
Virginia Rd. WB LT	C	17.7	0.16	C	22.9	0.23	C	23.4	0.24	C	23.7	0.24
Old Bedford Rd. SB LT	A	9.4	0.37	B	10.1	0.45	B	10.1	0.46	B	10.1	0.46

Notes:
Intersections where Hanscom-related traffic represents greater than 10 percent of any one movement
LOS - level of service
Delay - Average delay in seconds per vehicle
V/C - Volume-to-capacity ratio

Table 6-5 Level of Service Results for 2005 Evening Peak Hour

	2002			2005 Background Growth Only			2005 Moderate Growth			2005 High Growth		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	RV/C	LOS	Delay	V/C
#2) Massachusetts Avenue/Route 2A (Lexington)												
Signalized intersection	-	-	-	B	17.7	0.68	B	18.9	0.71	B	19.6	0.73
#3) Old Massachusetts Avenue/Route 2A (Lexington)												
Old Mass. Ave. SB LR	-	-	-	F	>200	0.91	F	>200	0.96	F	>200	1.10
Route 2A EB LT	-	-	-	B	10.7	1.06	B	10.8	1.15	B	11.3	>1.2
#4) Airport Road/Route 2A (Lexington)												
Route 2A EB LT	-	-	-	B	10.2	1.09	B	10.3	1.19	B	10.6	>1.2
Airport Rd. LR	-	-	-	E	38.1	0.01	E	41.6	0.01	E	48.9	0.01
#5) Hanscom Drive/Old Bedford Road (Lincoln)												
Hanscom Dr. NB LT	A	7.6	0.10	A	7.6	0.11	A	7.8	0.16	A	8.0	0.23
Hanscom DR. SB LT	A	7.3	0.06	A	7.3	0.06	A	7.4	0.10	A	7.6	0.17
Old Bedford Rd. WB TR	B	12.5	0.25	B	13.3	0.27	C	15.1	0.33	C	18.3	0.41
Old Bedford Rd. EB LT	B	12.2	0.01	B	12.9	0.01	C	16.2	0.02	C	21.4	0.04
#6) Hanscom Drive/Route 2A (Lincoln)												
Police Control	D	42.8	0.92	E	57.8	1.01	E	70.9	1.07	F	97.0	1.16
#10) Old Bedford Road/Virginia Road (Concord)												
Virginia Rd. WB LT	C	16.0	0.24	C	19.4	0.29	C	20.7	0.31	C	21.7	0.32
Old Bedford Rd. SB LT	A	7.8	0.12	A	7.9	0.19	A	8.0	0.21	A	8.0	0.21
#11) Old Bedford Road/Route 62 (Concord)												
Old Bedford Rd. NB L	-	-	-	F	>200	>1.2	F	>200	>1.2	F	>200	>1.2
Old Bedford Rd. NB R	-	-	-	B	13.5	0.43	B	13.6	0.44	B	13.9	0.45
Route 62 WB LT	-	-	-	A	8.4	0.16	A	8.4	0.16	A	8.5	0.17
#14) Route 4 & 225/Route 62 (Bedford)												
Route 4 & 225 NB L	-	-	-	B	11.4	0.50	-	-	-	B	11.4	0.50
Route 62 EB R	-	-	-	C	16.5	0.49	-	-	-	C	16.5	0.49
Route 62 EB L	-	-	-	F	>200	>1.2	-	-	-	F	>200	>1.2

Notes: Intersections where Hanscom-related traffic represents greater than 10 percent of any one movement
Hanscom Drive/Route 2A, which operates with police officer control in the evening peak hour, was evaluated as a signalized intersection.
Massachusetts Avenue/Route 2A traffic signal is currently operational.
LOS - level of service
Delay - Average delay in seconds per vehicle
V/C - Volume-to-capacity ratio

Table 6-6 Level of Service Results for 2015 Morning Peak Hour

	2002			2015 Background Growth Only			2015 Moderate Growth			2015 High Growth		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
#2) Massachusetts Avenue/Route 2A (Lexington)												
Signalized Intersection	-	-	-	C	21.7	0.81	C	32.6	0.87	C	32.8	0.87
#3) Old Massachusetts Avenue/Route 2A (Lexington)												
Old Mass. Ave. SB LR	-	-	-	F	>200	0.88	F	>200	0.99	F	>200	1.00
Route 2A EB LT	-	-	-	C	16.3	>1.2	C	17.9	>1.2	C	18.0	>1.2
#4) Airport Road/Route 2A (Lexington)												
Route 2A EB LT	-	-	-	B	11.1	>1.2	B	11.5	>1.2	B	11.6	>1.2
Airport Rd. LR	-	-	-	F	>200	0.05	F	>200	0.06	F	>200	0.06
#5) Hanscom Drive/Old Bedford Road (Lincoln)												
Hanscom Dr. NB LT	A	7.9	0.18	A	8.3	0.28	A	8.6	0.30	A	8.7	0.30
Hanscom Dr. SB LT	A	7.4	0.00	A	7.4	0.00	A	7.6	0.00	A	7.6	0.00
Old Bedford Rd. WB TR	C	16.2	0.01	D	25.9	0.11	D	28.5	0.06	D	29.0	0.07
Old Bedford Rd. EB LT	D	32.7	0.49	F	163.9	1.04	F	>200	1.2	F	>200	1.2
#6) Hanscom Drive/Route 2A (Lincoln)												
Rt. 2A EB L	C	15.1	0.51	D	26.5	0.73	E	38.8	0.85	E	39.9	0.85
Hanscom Dr. SB L	F	>200	>1.2	F	>200	>1.2	F	>200	>1.2	F	>200	>1.2
Hanscom Dr. SB R	C	21.9	0.48	E	43.3	0.74	F	61.9	0.87	F	64.1	0.88
#10) Old Bedford Road/Virginia Road (Concord)												
Virginia Rd. WB LT	C	17.7	0.16	D	33.3	0.34	E	37.2	0.38	E	38.9	0.40
Old Bedford Rd. SB LT	A	9.4	0.37	B	11.1	0.58	B	11.4	0.62	B	11.4	0.63
#11) Old Bedford Road/Route 62 (Concord)												
Old Bedford Rd. NB L	-	-	-	F	190.4	0.67	-	-	-	F	>200	0.84
Old Bedford Rd. NB R	-	-	-	F	55.7	0.90	-	-	-	F	62.9	0.93
Route 62 WB LT	-	-	-	B	13.3	0.47	-	-	-	B	13.8	0.50
#12) Hartwell Road/Route 62 (Bedford)												
Hartwell Road NB LR	-	-	-	F	>200	0.24	-	-	-	F	>200	0.24
Route 62 WB LT	-	-	-	B	12.7	1.19	-	-	-	B	12.8	>1.2

Notes: Intersections where Hanscom-related traffic represents greater than 10 percent of any one movement
Massachusetts Avenue/Route 2A traffic signal is currently operational.

LOS - level of service
Delay - Average delay in seconds per vehicle
V/C - Volume-to-capacity ratio

Table 6-7 Level of Service Results for 2015 Evening Peak Hour

	2002			2015 Background Growth Only			2015 Moderate Growth			2015 High Growth		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
#2) Massachusetts Avenue/Route 2A (Lexington)												
Signalized intersection	-	-	-	C	23.5	0.78	C	27.7	0.83	C	32.3	0.87
#3) Old Massachusetts Avenue/Route 2A (Lexington)												
Old Mass. Ave. SB LR	-	-	-	F	>200	>1.2	F	>200	>1.2	F	>200	>1.2
Route 2A EB LT	-	-	-	B	11.6	>1.2	B	12.3	>1.2	B	12.9	>1.2
#4) Airport Road/Route 2A (Lexington)												
Route 2A EB LT	-	-	-	B	11.0	>1.2	B	11.4	>1.2	B	11.8	>1.2
Airport Rd. LR	-	-	-	F	57.6	0.01	F	72.4	0.02	F	86.3	0.02
#5) Hanscom Drive/Old Bedford Road (Lincoln)												
Hanscom Dr. NB LT	A	7.6	0.10	A	7.7	0.13	A	8.0	0.24	A	8.3	0.34
Hanscom Dr. SB LT	A	7.3	0.06	A	7.3	0.06	A	7.6	0.16	A	7.8	0.24
Old Bedford Rd. WB TR	B	12.5	0.25	B	14.4	0.33	C	19.5	0.48	D	25.7	0.62
Old Bedford Rd. EB LT	B	12.2	0.01	B	13.8	0.01	C	23.2	0.04	E	38.5	0.08
#6) Hanscom Drive/Route 2A (Lincoln)												
Police Control	D	42.8	0.92	F	96.0	1.16	F	137.4	>1.2	F	168.8	>1.2
#7) Bedford Road/Route 2A (Lincoln)												
Bedford Rd. NB LR	-	-	-	F	>200	0.33	-	-	-	F	>200	0.37
Route 2A WB LT	-	-	-	B	11.3	>1.2	-	-	-	B	12.0	>1.2
#8) Cambridge Turnpike Cut-off/Lexington Road/Route 2A (Lincoln)												
Brooks Rd. NB LTR	-	-	-	F	111.5	0.09	-	-	-	F	142.4	0.09
Lexington Rd. SB LT	-	-	-	F	>200	0.85	-	-	-	F	>200	1.07
Route 2A WB LT	-	-	-	A	8.0	0.62	-	-	-	A	8.1	0.67
Cambridge Tpk. Cut-off EB LT	-	-	-	A	9.3	0.47	-	-	-	A	9.5	0.53
#9) Old Bedford Road/Lexington Road (Concord)												
Lexington Rd. EB LT	-	-	-	A	9.8	0.29	-	-	-	A	9.9	0.31
Old Bedford Rd. SB R	-	-	-	D	25.9	0.69	-	-	-	D	27.8	0.72
Old Bedford Rd. SB L	-	-	-	D	34.4	0.46	-	-	-	E	38.7	0.51

Table 6-7 Level of Service Results for 2015 Evening Peak Hour (cont.)

	2002			2015 Background Growth Only			2015 Moderate Growth			2015 High Growth		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
#10) Old Bedford Road/Virginia Road (Concord)												
Virginia Rd. WB LT	C	16.0	0.24	D	34.8	0.43	E	43.9	0.46	F	50.8	0.48
Old Bedford Rd. SB LT	A	7.8	0.12	A	8.0	0.21	A	8.1	0.23	A	8.1	0.24
#11) Old Bedford Road/Route 62 (Concord)												
Old Bedford Rd. NB L	-	-	-	F	>200	>1.2	F	>200	>1.2	F	>200	>1.2
Old Bedford Rd. NB R	-	-	-	C	15.2	0.51	C	16.0	0.55	C	16.5	0.57
Route 62 WB LT	-	-	-	A	8.6	0.17	A	8..6	0.18	A	8.7	0.19
#14) Route 4 & 225/Route 62 (Bedford)												
Route 4 & 225 NB L	-	-	-	B	12.4	0.55	B	12.5	0.55	B	12.5	0.55
Route 62 EB R	-	-	-	C	19.3	0.57	C	19.4	0.57	C	19.4	0.57
Route 62 EB L	-	-	-	F	>200	>1.2	F	>200	>1.2	F	>200	>1.2

Notes: Intersections where Hanscom-related traffic represents greater than 10% of any one movement
Hanscom Drive/Route 2A, which operates with police officer control in the evening peak hour, was evaluated as a signalized intersection.
Massachusetts Avenue/Route 2A traffic signal is currently operational.
LOS - level of service
Delay - Average delay in seconds per vehicle
V/C - Volume-to-capacity ratio

Potential Environmentally Beneficial Measures

The *Draft ESPR* described potential environmentally beneficial measures for intersections that saw level of service changes to LOS E or F due to Hanscom-related traffic volumes. The *Draft ESPR* also identified measures to address operational issues that were attributable to regional traffic volumes. These measures included provisions of traffic control officers, turn restrictions, roundabouts and small roadway modifications, as well as TDM measures.

Massport has refined the potential environmentally beneficial measures that could address the traffic operational effects identified in the preceding analysis. Massport will examine TDM measures as described below, particularly to address the concerns about Route 2A and roadways in the Minute Man National Historical Park. Of particular concern was the roundabout that was identified in the *Draft ESPR* for Old Bedford Road and Lexington Road (Meriam's Corner) to address Hanscom-related traffic and the roundabout that was identified for Lexington Road, the Cambridge Turnpike Cut-off, Route 2A and Brooks Road to address regional traffic. Comments received during the *Draft ESPR* public review indicated concerns that the potential construction of the roundabouts would be inconsistent with the adjacent Minute Man National Historical Park property. These roundabouts are no longer recommended.

TDM measures provide a more appropriate approach to address this effect if volumes occur as forecast. The roundabout evaluated at Old Bedford Road and Lexington Road addressed a change in level of service to LOS E in the evening peak hour of the 2015 High Growth scenario for one movement because average delay increased by four seconds on that movement. At Lexington Road, the Cambridge Turnpike Cut-off,

Route 2A and Brooks Road, the use of a traffic control officer would reduce delay without any modifications to the public right of way. This approach is recommended for consideration as a measure to address regional traffic flow in the area.

The *Draft ESPR* also identified the use of a traffic control officer at Hanscom Drive and Old Bedford Road to address operational issues associated with regional traffic flows. A second approach that will be considered in the future is the use of an all-way stop at this intersection. This approach will require minor restriping and provide a traffic calming and safety benefit by managing vehicular movements through the intersection.

Chapter 12 - Mitigation provides additional information about these and other potential beneficial measures.

Transportation Demand Management

Transportation Demand Management measures will be most successful when they are regional in scope. Hanscom Field does not have sufficient employees nor will it have a sufficient commuting population to support its own Transportation Management Association (TMA) under any of the future scenarios that are described in the *Draft ESPR*. Approximately 500 employees work at Hanscom Field, which is also home to a technical training school, East Coast Aero Tech, and two flight schools. In contrast, successful TMAs in Massachusetts have significantly larger commuting populations.

Information from CARAVAN for Commuters, Inc., an organization that facilitates the formation of TMAs in Massachusetts, indicates that the size of TMAs can vary from three employers in the Junction TMO along I-93 in Andover and Wilmington to as many as 46 employers in the River Road TMA in Andover, North Andover, Lawrence and Methuen. TMAs cover a range of employees from 2,000 commuters in the Junction TMO to nearly 60,000 commuters in the Artery Business Committee TMA in downtown Boston/Back Bay. The 128 Business Council, which covers employers in the area around Route 128 between Route 2 and Route 9, has 44 employers and approximately 10,500 commuters.

TDM measures are particularly important given the constraints of Route 2A and the need to consider the Minute Man National Historical Park, a historic site of national importance that abuts Route 2A and Hanscom Field. Massport has taken steps to develop TDM measures for Hanscom Field, including meetings to discuss TDM measures with representatives of the Hanscom AFB and the National Park Service, and plans to further pursue these efforts in the future. This section describes different activities that would support a TDM program at Hanscom Field, as well as some of the activities at the airport that help to reduce trip making.

It should be noted that Hanscom Field includes services that are typically employed in new development projects to reduce vehicular trip making from a site. A bank ATM and a sandwich shop are located in the Civil Air Terminal. These facilities provide convenient services for employees, air passengers, students and visitors to the airport that also reduce vehicular trips off-airport.

Hanscom Employee Survey Results

Massport conducted a survey of Hanscom Field employees in June 2001. This information was used in the analysis of the *Draft ESPR*, which included the mode choice results and provided details of the survey in Appendix H of the *Draft ESPR*. Nearly 600 surveys were distributed to employees at 26 companies and students at the East Coast Aero Tech. The survey had a 17.9 percent response rate with the students included and a 32.2 percent response rate without the students. The results of the survey are included in Appendix E. The survey results indicated that:

- Ninety-five percent of respondents drove alone to Hanscom Field
- Seventy-seven percent of the respondents used Route 2A to reach Hanscom Field. Approximately twenty percent used Virginia Road
- Fifty-six percent parked in an employer's parking area and 38 percent parked in the lot in front of the Civil Air Terminal

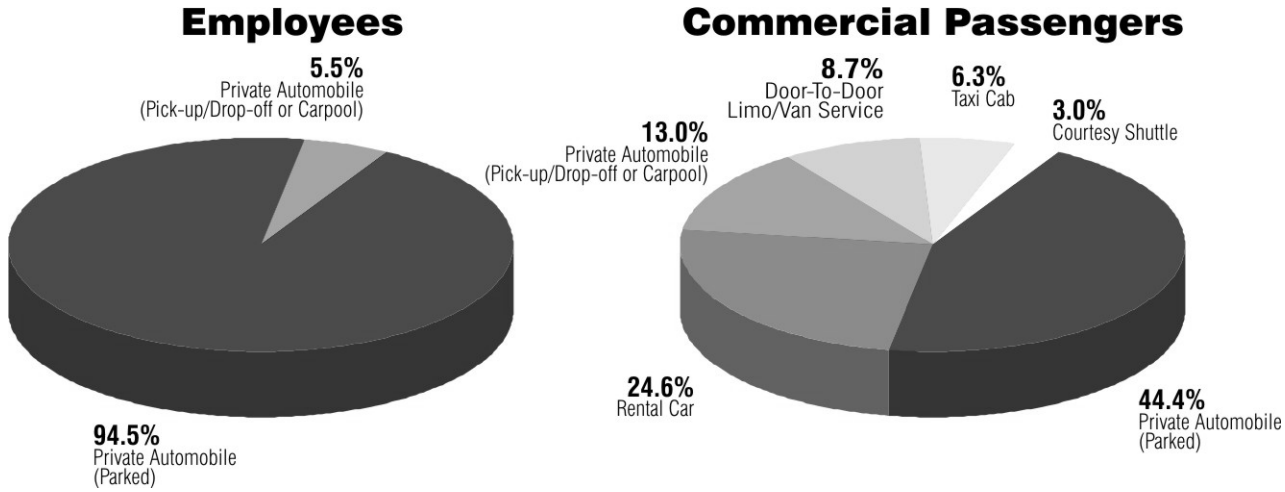
The survey also asked information about options that could encourage drivers to shift modes. Ride matching services and information about transit and commute options achieved the best results in the survey, although it should be noted that the majority of respondents indicated that none of the suggested options would provide sufficient incentive. This reflects the auto-dependent nature of this part of the metropolitan region. However, the information is informative to provide a basis for the consideration of TDM measures that are described below.

Parking Fees

The MEPA Certificate requests consideration of parking fees at Hanscom Field as part of a TDM program for the airport. Currently, Massport does not charge for parking at the airport. An opportunity exists to introduce parking fees as part of Massport's plans to resurface its parking lot in front of the Civil Air Terminal. Infrastructure for fee collection equipment will be installed as part of this project. Massport has not established a timetable to implement fee collection operations at the parking lot.

Figure 6-3 indicates that 95 percent of employees and 44 percent of air passengers drive and park at Hanscom Field. The implementation of parking fees could encourage a positive mode shift to carpooling and shared ride services particularly by students and air passengers. Tenants will not pay parking lot fees because parking costs are encompassed by their leases. Increased vehicle occupancy through higher use of shared-ride services could reduce trip making at Hanscom Field. However, some modes used by air passengers, such as drop-off/pick-up and taxi cab can result in additional trips per passenger since one of these trips to Hanscom Field (i.e., the entry or exit) is often a "deadhead" trip with no passenger. This can add to the total trips entering and exiting the airport.

Figure 6-3 Hanscom Field Mode Shares



Source: Commercial Air Passenger Survey, SH&E, 2002, and Massport Employee Survey, 2001.

Transit Service at Hanscom Field

Hanscom Field is served by MBTA Route 76, which runs through Lexington Center between Alewife Station and Hanscom AFB with a stop at the Hanscom Civil Terminal. Route 76 operates between 6:00 a.m. and 10:00 p.m. on weekdays with half-hour headways during commuter hours and hourly service midday and late evenings. The Route 76 bus combines with MBTA Route 62 for Saturday service, which runs between Alewife Station and Bedford V.A. Hospital with a stop at the Hanscom Field Civil Air Terminal and with approximately one-hour headways. Saturday service operates between 6:00 a.m. and 9:00 p.m. No MBTA service is provided for these routes on Sundays.

The stop at Hanscom Field in front of the Civil Air Terminal currently offers no amenities. Massport will explore options for installing a bus shelter with appropriate amenities to support transit use at the airport. It is anticipated that this bus shelter would also serve other airport users and would include information about transit and other non-auto modes that serve Hanscom Field such as shared ride services.

Hanscom Air Force Base

As discussed in the *Draft ESPR*, Hanscom AFB recently hired a full-time transportation coordinator who is responsible for the management of TDM programs for the base. TDM measures that have been used at Hanscom AFB to reduce the number of single occupant vehicles include ridesharing and a "Transportation Incentive Program." The Transportation Incentive Program reimburses employees who carpool or use mass transit, including bus, train, or rapid transit. Information about the Transportation Incentive Program and other TDM programs at Hanscom AFB are described on their website (www.hanscom.af.mil). The Air Force has also conducted employee surveys to evaluate travel patterns at the Hanscom AFB.

During the development of the *Final ESPR*, Massport met with representatives from Hanscom AFB to discuss collaborative TDM efforts. Massport has provided technical support to the U.S Air Force in the review of their request for a vendor to provide a shuttle service to Hanscom AFB from the Concord commuter rail station. Massport will continue to coordinate with the U.S. Air Force on this service to provide an alternative service to Hanscom Field. Massport, representatives from the Hanscom AFB, and the National Park Service also met on May 21, 2003 and discussed joint interests in TDM measures, traffic reduction methods, and partnering opportunities.

Hanscom Field Air Passenger Survey

As discussed above and in the *Draft ESPR*, Massport interviewed departing commercial airline passengers on January 22, 2002 and January 24, 2002. The survey covered all of Shuttle America's departing flights - six departures each day to Trenton and five departures each day to Philadelphia. Nearly all passengers were interviewed by a survey taker before passing through security. A small number of surveys were self-administered as passengers waited in the passenger hold room. Massport obtained survey information for 207 passengers, or 92 percent of Shuttle America's actual passenger boardings for days the survey was conducted.

Massport plans to incorporate a survey of Hanscom air passengers in the 2005 ESPR for Hanscom Field.

Other TDM Measures

As described in the *Draft ESPR*, Massport is considering other TDM measures that would support the increased use of alternative, non-auto modes to access Hanscom Field. These measures include enhanced distribution of information about transit service and High Occupancy Vehicles (HOV) by posting information and schedules in prominent locations at the airport. Massport already provides information about public

transportation access to Hanscom Field on its website. Massport is also pursuing the installation of bicycle racks at convenient locations to support bicycling as a mode of travel to the airport.

Regional Ground Transportation Documents

Regional transportation planning is conducted through the Boston Metropolitan Planning Organization (MPO), which was established to oversee federally funded transportation plans and programs. The MPO region encompasses 101 cities and towns, including Bedford, Concord, Lexington and Lincoln. The MPO has fourteen voting members:

- Five state agencies: the Executive Office of Transportation and Construction, Massachusetts Bay Transportation Authority (MBTA), Massachusetts Highway Department, Massachusetts Turnpike Authority and Massport
- Two regional organizations: MBTA Advisory Board and Metropolitan Area Planning Council
- Four cities: Boston, Everett, Newton and Peabody
- Three towns: Bedford, Hopkinton and Framingham
- Three ex-officio members: Federal Highway Administration, Federal Transit Administration and the Regional Transportation Advisory Council (RTAC)

MAPC, working jointly with the MBTA Advisory Board, administers the municipal nomination and election process. The terms of positions are currently two years in length. The terms will be increased to three years with one town and one city elected every year. Newton Hopkinton and Everett will serve until 2004. One new city and one new town were to be elected on May 28, 2003, after the document went to press.

The federal surface transportation acts set forth the requirements for the metropolitan planning process that is overseen by the MPO agencies. The MPO receives input from the RTAC, which ensures citizen participation, and the Central Transportation Planning Staff (CTPS), which is staff to the Boston MPO. The following are metropolitan planning documents that affect access to Hanscom Field.

2005-2025 Regional Transportation Plan

The Regional Transportation Plan is a long-range plan that identifies transportation facilities, programs and major investments to support and expand the region's multimodal transportation system. The plan includes both a financial plan to demonstrate how the measures included in the plan can be implemented as well as an air quality analysis to demonstrate conformity with federal standards. The plan was adopted by the MPO in January 2001 and has been updated most recently in September 2002. The next update is scheduled for September 2003.

The Regional Transportation Plan is used by the MPO to set transportation priorities among various roadway and transit projects and to consider improvements to the region's multimodal transportation system in broad terms. The Regional Transportation Plan includes the Crosby's Corner project in Lincoln and Concord, which was described in the *Draft ESPR*. This project may provide some secondary benefits for access to Hanscom Field by relieving congestion on Route 2, which is south of the airport. Plans include providing a limited-access roadway with a grade-separated connection that would allow uninterrupted through movements for eastbound and westbound traffic on Route 2 at this location.

Program for Mass Transit (PMT)

The PMT is a long-range transit plan that evaluates and recommends transit projects to preserve, enhance and expand the MBTA system. The PMT describes the MBTA's fiscally-unconstrained capital investment plan. Any transit project eligible for federal funds must be included in the PMT. The PMT completed its public comment period on March 23, 2003. There are no projects within the PMT that would affect access to Hanscom Field.

Transportation Improvements Plan (TIP)

The MPO programs federally fund roadway and transit projects through the TIP. The TIP is a five-year plan that is updated annually by the MPO. The most recent TIP was endorsed by the MPO on September 19, 2002. The TIP includes funding for the Crosby's Corner project in Fiscal Year 2005. The TIP includes Enhancement funds for improvements to Depot Park in Bedford, a terminus of the Minuteman Commuter Bikeway and the nearby Narrow Gauge Trail in Bedford. Annual funding for the regional TDM program and Suburban Mobility Program are also included in the TIP. Potential TDM measures that are developed for Hanscom Field could be eligible for funds under these programs.

Mobility in the Boston Region: The 2000 Congestion Management System Report

The Congestion Management System (CMS) report identifies mobility concerns for each subregion in the MPO region including the MAGIC subregion. Route 2A is identified as a mobility concern for the subregion based on comments. No further CMS studies were recommended pending the completion of the MAGIC subregional study (see below).

MAGIC Subregional Area Study: Phase I Report

The Minuteman Advisory Group on Interlocal Coordination (MAGIC) subregion includes the towns of Bedford, Concord, Lexington and eight other adjacent communities. This report presents recent economic and transportation data for the MAGIC subregion. While Route 2A was identified as a mobility concern, this issue received a low ranking from the MAGIC Committee and there were no recommendations for additional follow-up studies.

Cargo Operations and Access

The traffic projections for the potential cargo operations are based on the amount of air traffic forecast. Truck traffic was estimated for the peak hour by considering the amount of time to load and unload a cargo aircraft, truck size and the arrival/departure schedule of the plane. As described in the *Draft ESPR*, future scenario forecasts for based cargo operations were used to project the number, size, and arrival patterns of associated truck trips on an hourly basis.

The analysis is based on a 65 percent aircraft payload factor and a mix of three semis and four straight trucks. The estimates assume that 28 truck trips are associated with each scheduled round trip cargo flight (seven arrive and depart to off-load and seven arrive and depart to load). Forecasts indicate that cargo operations would result in the following daily truck trips for future scenarios:

- 28 truck trips per day under the 2005 Moderate Growth Scenario
- 56 truck trips per day under the 2005 High and 2015 Moderate Growth scenarios
- 84 truck trips per day under the 2015 High Growth Scenario

For arriving flights, trucks arrive within 30 minutes of departure and depart 30-60 minutes after the arriving flight. Because of weight and balance issues, more time is needed to load a plane than off-load a plane. For departing flights, trucks arrive one to two hours before flight departure and depart within one hour after the departing flight. Based on these assumptions, future based cargo activity could generate between 2 and 9 peak hour vehicular trips under the future scenarios.

It was assumed that the truck trips would use Hartwell Avenue to travel to and from the East Ramp. Access options for cargo operations could occur by having trucks drive directly to the planes using existing roadway infrastructure. Access via a new roadway connection to Hartwell Avenue is only at a conceptual level and additional planning would be needed to develop this concept further if this option becomes viable. If feasible, access and egress would occur through an area that is industrial in nature to provide connections with I-95/ Route 128.