SECTION E
VIRGINIA HIGHWAYS

As explained in the main Alliance Report, the specific highways determined to comprise the LATTS Strategic Highway System were identified using a series of criteria to help identify a network of highways which had the greatest significance regarding trade with Latin America. The 22,859-mile mainline LATTS Strategic Highway System shown in Exhibit E-1 is the result of this process.

More than seven percent of the mainline LATTS Strategic Highway System (1,663 miles) is located in Virginia (Exhibit E-2). The Virginia components[1] include the following:

- All of Virginia's 1,106 miles of interstate highways, including:
  - I-64, an important east-west interstate, linking Louisville with Norfolk via Charleston, WVA and Richmond
  - I-66 between I-81 and Washington D.C.
  - I-77, connecting Charleston, WVA with Charlotte and Columbia, SC
  - I-81, a major north-south interstate between east Tennessee and Pennsylvania
  - I-85, linking Montgomery with Atlanta, Charlotte, and Richmond
  - I-95, a major north-south interstate linking Washington D.C. with south Florida
  - Numerous urban interstates, including routes I-195, I-264, I-295, I-381, I-395, I-464, I-495, I-564, I-581, and I-664
- 557 miles of non-interstate National Highway System (NHS) facilities
  - U.S. 58 from I-95 to Norfolk (66 miles), part of Corridor 1 (S. Florida to Washington, D.C.). This highway is multi-laned with both full and partial access control.
  - U.S. 17 from the North Carolina State Line south of Norfolk (18 miles) and U.S. 460 from I-95 to Norfolk (53 miles), part of Corridor 2 (West Alabama to Norfolk) and Congressional High Priority Corridor 13 (Raleigh to Norfolk). These are mostly two-lane highways with no access control.

[1] Mileage, number of lanes, pavement condition and other data reported herein were taken from the HPMS Database, as discussed subsequently, and may differ from information in other databases.

Exhibit E-1
LATTS STRATEGIC HIGHWAY SYSTEM

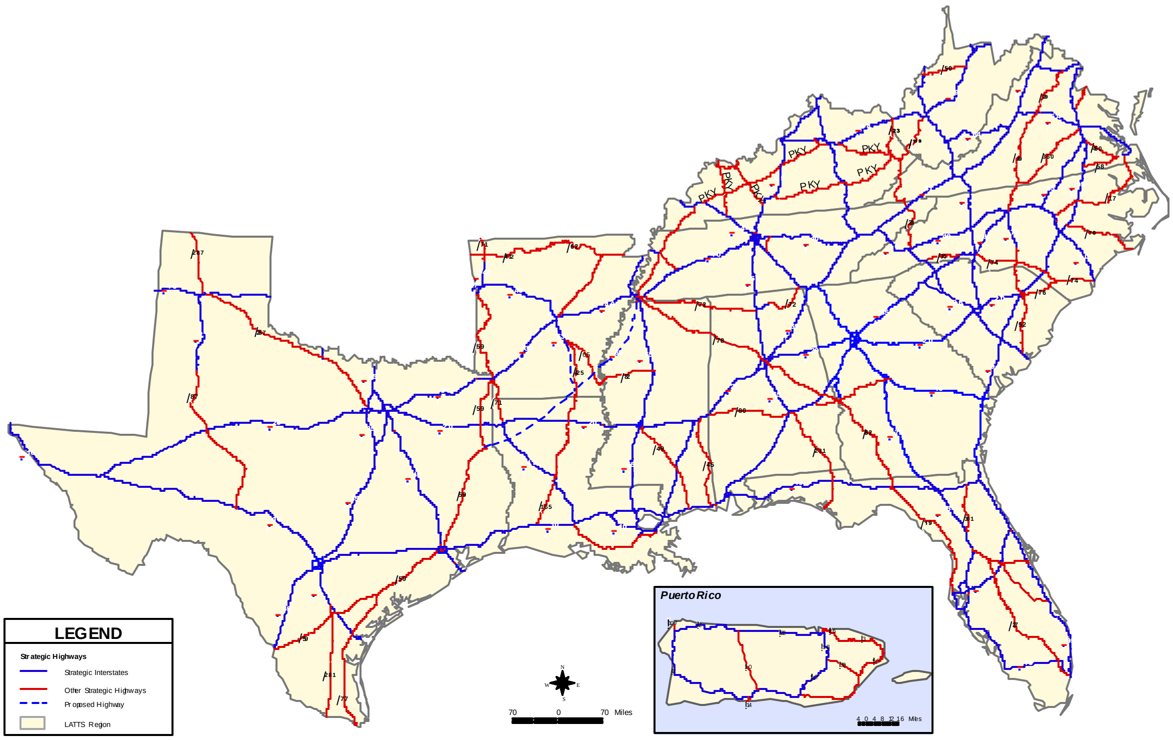
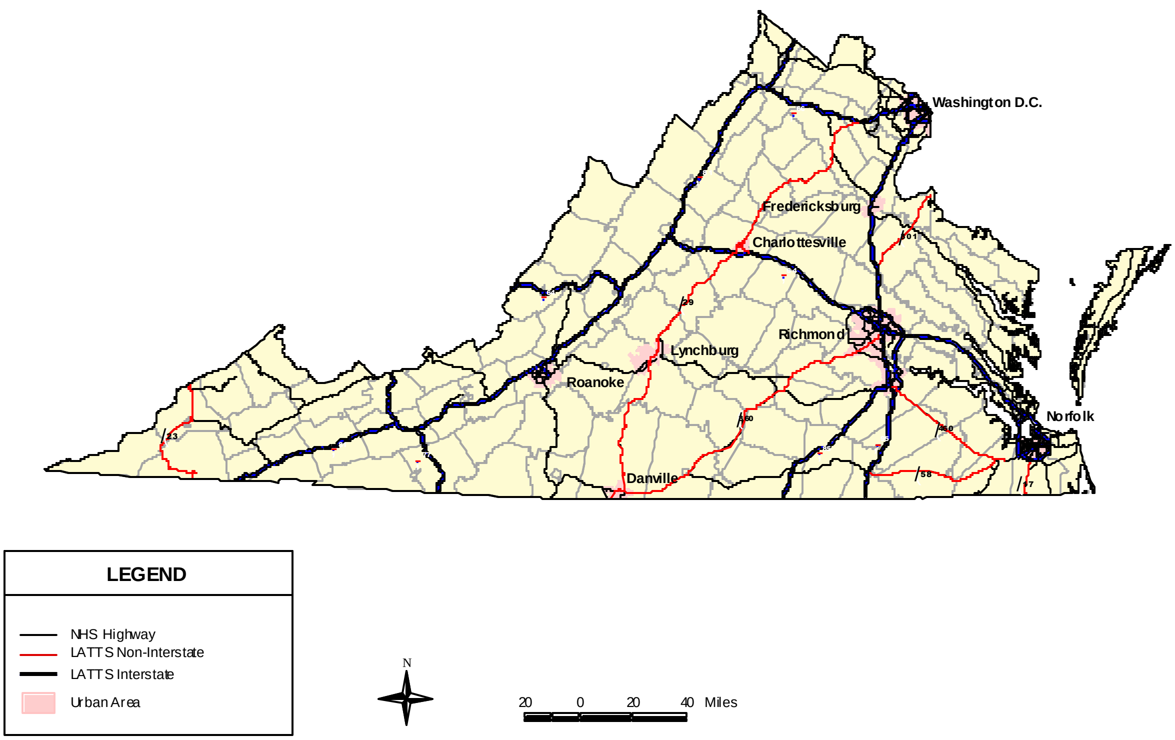


Exhibit E-2
VIRGINIA LATTS HIGHWAY SYSTEM

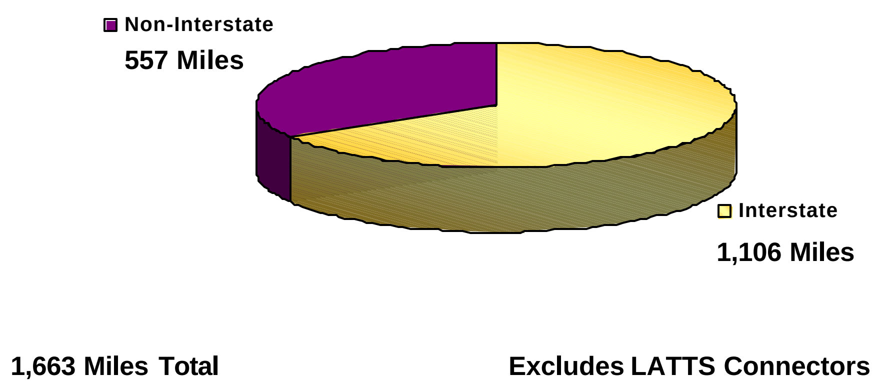


- U.S. 23 from the Tennessee State Line to the Kentucky State Line in the western portion of the state (61 miles), part of Corridor 12 (I-26, U.S. 23). This highway is multi-laned with a mix of full and partial access control.
- U.S. 29 from I-66 west of Washington, D.C. to the North Carolina State Line at Danville (213 miles) and U.S. 360 from U.S. 29 at Danville to Richmond (146 miles), part of Corridor 19. These are multi-laned highways with varying levels of access control. U.S. 29 is part of Congressional High Priority Corridor 17, Greensboro to Washington, D.C.

▶ LATTS connectors linking a LATTS Strategic Highway with a LATTS airport or waterport were included in the Strategic Highway System. However, because of database differences, it was not possible to analyze LATTS connectors in the same manner and to the same level of detail as for mainline highways. LATTS connectors are discussed at the conclusion of Section E.

Exhibit E-3 displays the composition of Virginia's portion of the LATTS highways by system.

Exhibit E-3
LATTS MAINLINE STRATEGIC HIGHWAY SYSTEM – VIRGINIA PORTION



LATTS HIGHWAYS VS. LATTS TRADE CORRIDORS

The 22,859 miles of "mainline" LATTS Strategic Highways were grouped into 25 LATTS Trade Corridors (Exhibit E-4). The Trade Corridors were established using logical origins/destinations and assigning each highway to only one corridor. Each corridor was assigned a number (1-25) and was referred to by the primary highway within the corridor (i.e., I-40). Portions of seven LATTS Trade Corridors cross Virginia, including:

- Corridor 1 (I-95) – South Florida to Washington, D.C.
- Corridor 2 (I-85) – West Alabama to Norfolk
- Corridor 3 (I-59/66/81) – New Orleans to Washington, D.C. and Pennsylvania
- Corridor 4 (I-77/79) – Columbia, SC to Ohio and Pennsylvania
- Corridor 12 (I-26, U.S. 23) – Ohio to Charleston, SC
- Corridor 15 (I-64) – Louisville to Norfolk
- Corridor 19 (I-73, U.S. 52/29) – Maryland to Charleston, SC

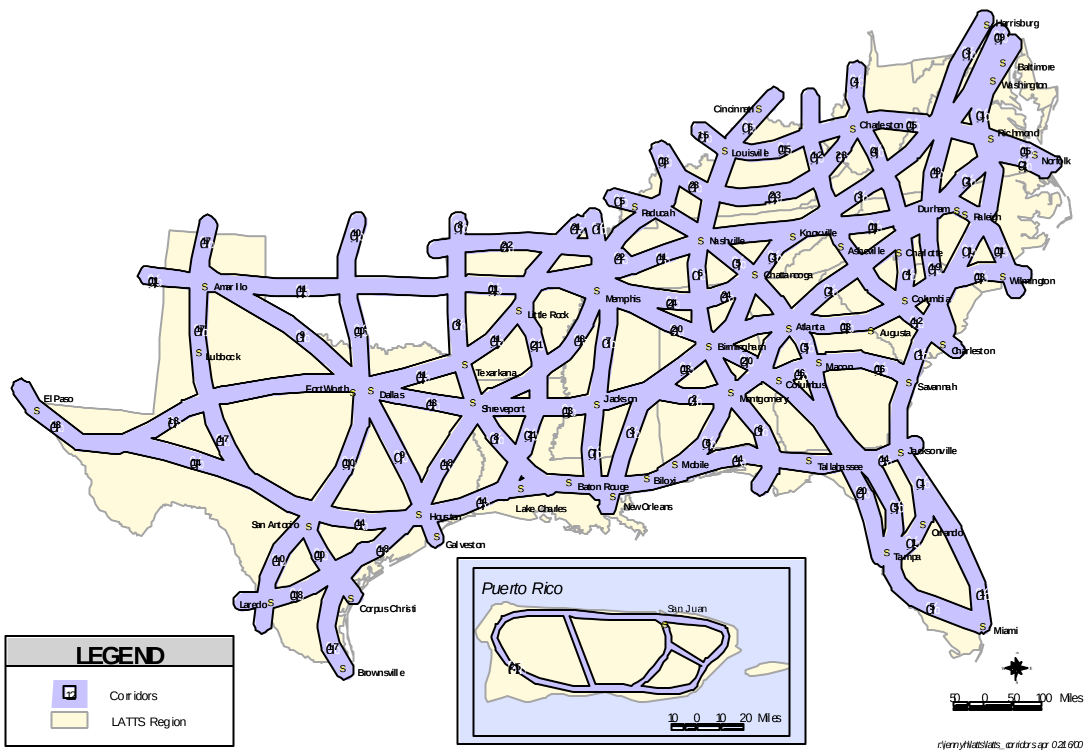
HIGHWAY DATABASES

Two main sources of data were used for the analysis of highway investment. The first one, the Highway Performance Monitoring System (HPMS), includes information about the characteristics and conditions of public highways. The second source of data was the LATTS estimates of current and forecasts of future Latin America trade flows.

HPMS Database

The HPMS database was selected for the LATTS analyses of highway system investment needs because (1) it covered the entire Alliance Region, (2) it employs a consistent format and data definitions and (3) no additional primary data collection was necessary. Nevertheless, it was recognized that (1) the data is time sensitive (i.e., since the latest available information at the time of these analyses was for 1997, it is expected that improvements and additions will have occurred subsequently) (2) the HPMS database may have minor differences relative to other databases that individual Alliance members might use for their own planning and system management purposes and (3) information is not always available for every segment of the LATTS Strategic Highway System.

Exhibit E-4
LATTS TRADE CORRIDORS



For this study, only that portion of the HPMS database corresponding to the selected LATTS Strategic Highway Network was utilized. For Virginia, the LATTS HPMS database consisted of 2,704 records describing 1,581 miles of highway on the LATTS Strategic Highway Network.

Trade Flows

As explained in the main Alliance report, 1996 and expected 2020 trade volumes with Latin America were estimated and the portion of this trade that would be using highway facilities was translated into truck flows. The truck flows were then assigned to specific highway facilities using GIS generated shortest time paths. The LATTS truck traffic assignment was then merged with the LATTS HPMS database for further analysis.

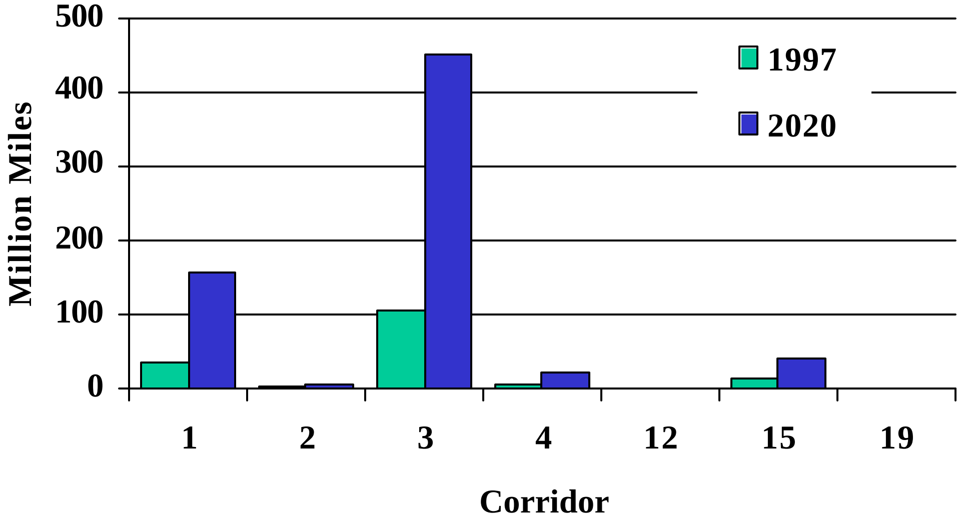
The LATTS procedure for assigning truck flows is appropriate for a macro-scale study such as LATTS. Nevertheless, it should be noted that the procedure produces approximations which may vary slightly from actual conditions. That is, an all-or-nothing assignment on the basis of shortest time paths favors high speed facilities and likely under estimates flows on facilities with lower speeds. In reality, a modest amount of truck flows could choose a lower speed path for a variety of unique reasons. Also, some LATTS trucks undoubtedly will travel on facilities other than those included in the LATTS Strategic Highway System (e.g., a local road to reach a warehouse or plant). Despite these circumstances, the LATTS procedure is deemed to be sufficiently valid for purposes of a regional transportation study.

As a result of this assignment methodology, 1,039 miles of the Strategic Highway Network in Virginia were shown to carry LATTS truck traffic. All 1,039 miles are interstate highways.

LATTS TRUCK TRAFFIC IN VIRGINIA

The LATTS highway database was used to quantify the LATTS truck traffic in terms of annual Vehicle Miles of Travel (VMT) and to compare LATTS truck traffic to total truck traffic (LATTS and others). Results of this analysis by corridor for 1997 and 2020 are illustrated in Exhibit E-5. More detailed information is presented in Exhibit E-6.

Exhibit E-5
LATTS ANNUAL TRUCK VMT IN VIRGINIA



Of the seven LATTS corridors crossing Virginia, only five were assigned LATTS truck traffic. Corridor 12 (I-26/U.S. 23 from Charleston, SC to Ohio) and Corridor 19 (I-73/U.S. 52/U.S. 29 from Charleston, SC to Maryland) were not assigned any LATTS traffic in Virginia. In Virginia, these two corridors are comprised of U.S. Routes as opposed to interstates.

Exhibit E-6
VIRGINIA LATTS TRUCK TRAFFIC

Corridor/ Functional Class	Length (Miles)	1997 Annual Truck VMT (Million Miles)				2020 Annual Truck VMT (Million Miles)			
		All Trucks Full Network	All Trucks Part. Network(1)	LATTS Trucks Only	LATTS Percent (2)	All Trucks Full Network	All Trucks Part. Network(1)	LATTS Trucks Only	LATTS Percent (2)
1	**I-95, I-4**		**South Florida to Washington, DC**						
R.Interstate	105.06	443.36	443.36	19.83	4.5%	573.68	573.68	86.18	15.0%
R.Other PA	48.76	49.52	-	-	0.0%	97.51	-	-	0.0%
U.Interstate	154.46	674.73	561.54	16.49	2.9%	896.84	767.98	70.37	9.2%
U.Other Fwy.	12.13	14.09	-	-	0.0%	33.58	-	-	0.0%
U.Other PA	4.69	1.89	-	-	0.0%	2.18	-	-	0.0%
TOTAL	325.10	1,183.59	1,004.90	36.32	3.6%	1,603.79	1,341.67	156.55	11.7%
2	**I-85**		**West Alabama to Norfolk, VA**						
R.Interstate	61.19	112.17	112.17	1.86	1.7%	199.80	199.80	6.59	3.3%
R.Other PA	46.03	44.86	-	-	0.0%	72.79	-	-	0.0%
U.Interstate	7.93	21.72	21.72	0.24	1.1%	24.63	24.63	0.85	3.5%
U.Other PA	24.73	15.50	-	-	0.0%	28.54	-	-	0.0%
TOTAL	139.88	194.26	133.90	2.10	1.6%	325.75	224.42	7.44	3.3%
3	**I-59, I-81, I-66**		**New Orleans, LA to DC and Pennsylvania**						
R.Interstate	322.50	1,054.44	1,029.21	88.11	8.6%	1,976.38	1,938.53	377.15	19.5%
U.Interstate	85.50	264.68	232.34	17.41	7.5%	483.31	436.24	74.94	17.2%
TOTAL	408.00	1,319.12	1,261.55	105.52	8.4%	2,459.69	2,374.77	452.09	19.0%
4	**I-77, I-79**		**Columbia, SC to Ohio and Pennsylvania**						
R.Interstate	59.72	133.03	133.03	4.60	3.5%	183.75	183.75	21.98	12.0%
U.Interstate	0.82	1.25	1.25	0.06	4.7%	2.12	2.12	0.29	13.5%
TOTAL	60.54	134.27	134.27	4.66	3.5%	185.87	185.87	22.26	12.0%
12	**I-26, US 23**		**Charleston, SC to Ohio**						
R.Other PA	54.50	18.75	-	-	0.0%	36.32	-	-	0.0%
U.Other Fwy.	2.73	0.88	-	-	0.0%	1.19	-	-	0.0%
U.Other PA	3.96	2.02	-	-	0.0%	2.17	-	-	0.0%
TOTAL	61.19	21.65	-	-	0.0%	39.67	-	-	0.0%
15	**I-64**		**Louisville, KY to Norfolk, VA**						
R.Interstate	165.11	205.65	205.65	6.97	3.4%	328.90	328.90	21.26	6.5%
U.Interstate	143.16	265.79	215.67	6.72	3.1%	445.29	347.19	20.19	5.8%
TOTAL	308.27	471.44	421.32	13.69	3.2%	774.19	676.10	41.45	6.1%
19	**I-73, US 52, US 29**		**Charleston, SC to Maryland**						
R.Other PA	234.19	224.95	-	-	0.0%	360.06	-	-	0.0%
U.Other Fwy.	16.41	11.45	-	-	0.0%	18.41	-	-	0.0%
U.Other PA	27.11	88.77	-	-	0.0%	223.12	-	-	0.0%
TOTAL	277.71	325.17	-	-	0.0%	601.59	-	-	0.0%
ALL CORRIDORS									
R.Interstate	713.58	1,948.64	1,923.41	121.37	6.3%	3,262.51	3,224.66	513.15	15.9%
R.Other PA	383.48	338.07	-	-	0.0%	566.68	-	-	0.0%
U.Interstate	391.87	1,228.17	1,032.52	40.92	4.0%	1,852.18	1,578.16	166.64	10.6%
U.Other Fwy.	31.27	26.42	-	-	0.0%	53.19	-	-	0.0%
U.Other PA	60.49	108.19	-	-	0.0%	256.00	-	-	0.0%
TOTAL	1,580.69	3,649.48	2,955.93	162.29	5.5%	5,990.55	4,802.82	679.79	14.2%

Notes: (1) Total truck VMT for highways carrying LATTS traffic only.
(2) Percentage calculated based on Partial Network.

Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington D.C. and Pennsylvania) and Corridor 1 (I-95/I-4 from South Florida to Washington, D.C.) carry the most LATTS traffic in terms of VMT (452 and 156 million miles respectively in 2020) and in terms of average annual daily LATTS truck volume (3,036 and 1,319 daily LATTS trucks respectively in 2020).

Of LATTS truck traffic in Virginia, three-fourths is on the rural interstate system and one-fourth is on the urban interstate system.

The percentage of LATTS trucks to total trucks is expected to grow from 5.5 percent in 1997 to 14 percent in 2020 on those highways carrying LATTS traffic (from 4 to 11 percent for the entire LATTS strategic network). This growth in LATTS share of total truck traffic is due to the fact that LATTS truck traffic is expected to increase 4.2 fold between 1997 and 2020 while overall truck traffic would increase by 1.5 fold only without LATTS trucks and 1.6 fold with LATTS trucks. LATTS truck share of total trucks varies from corridor to corridor. The highest share in Virginia is 19 percent on Corridor 3.

IMPACT MEASURES

The purpose of the highway analysis portion of this study was to quantify the LATTS Strategic Network total investment needs and the incremental investment needs that could be attributed to LATTS truck traffic specifically. Because of the macro-scale nature of this study, the investment needs analysis focused on capacity and pavement resurfacing needs.

In order to identify needs due to expected traffic (cars and trucks) other than LATTS and needs specifically attributable to LATTS traffic, two sets of capacity and pavement needs were estimated. First, future needs were estimated based on the "normal" traffic as defined by the HPMS database which includes AADT, truck percentages, and growth rate. Future needs were estimated a second time with the same HPMS traffic plus the "additional" LATTS truck traffic above and beyond the traffic that would be estimated using the "normal" growth. The difference in needs between the two was considered the incremental needs due to growth in LATTS traffic.

Minimum tolerable conditions (MTCs) for both congestion (capacity) and pavement conditions were applied uniformly to all segments of the LATTS Strategic Highway System. These MTCs are described in more detail in the main Alliance report and are summarized below.

- Capacity needs were based on Level of Service (LOS) not exceeding:
  - LOS C for rural highways
  - LOS D for urban highways
- Pavement resurfacing needs were based on the following minimum pavement condition rating:
  - Interstate type facilities: PSR 3.0
  - Other facilities: PSR 2.5

The LATTS minimum tolerable conditions are in no way intended to replicate or replace values that individual members of the Alliance might consider to be more appropriate for their circumstances. The LATTS MTCs were established for this study so as to be consistent for all the Alliance members.

To price the identified capacity or pavement needs, the same unit costs were used consistently throughout the Alliance Region. These unit costs were provided by the FHWA and correspond to 1997 national averages. To maintain consistency throughout the Region, no attempt was made to tailor these unit costs to each state beyond the stratification provided by the FHWA.

CAPACITY NEEDS

A needs analysis model was developed to analyze capacity needs for 1997 and 2020. For the year 2020, capacity needs with and without the “additional” LATTS traffic were estimated. The model was then applied to every one of the HPMS records comprising the Virginia LATTS highway database and the results were summarized. This model applied the same methodology, outlined in the main Alliance report, and found in the HPMS Analytical Package, to calculate capacity needs. The results reflect the information contained in the HPMS Database and do not consider any improvements that may have occurred subsequently or any planned improvements.

Detailed results for Virginia are presented in Exhibit E-7. The total number of Virginia LATTS Strategic Highway Network road miles with capacity deficiencies in 1997 and 2020 are shown in columns 4 through 6. For 2020, the amount of capacity deficiencies with and without the “additional” LATTS traffic is shown.

Exhibit E-7
VIRGINIA CAPACITY INVESTMENT NEEDS

Corridor/ Functional Class	Length (Miles)	Existing Lane Miles	Capacity Analysis: Deficient Mileage: 1997	Deficient Mileage: 2020 W/O LATTS Added Traffic	Deficient Mileage: 2020 With LATTS Added Traffic	2020 Needed Lane Miles: Base	2020 Needed Lane Miles: With LATTS Added Traffic	2020 Cost in $Million: Base	2020 Cost in $Million: With LATTS Added Traffic	2020 Cost in $Million: % Increase Due to LATTS
1	**I-95, I-4**		**South Florida to Washington, DC**							
R.Interstate	105.06	542.90	61.33	63.60	77.76	167.64	205.24	203	238	17.1%
R.Other PA	48.76	195.04	-	-	-	-	-	-	-	0.0%
U.Interstate	154.46	1,015.82	49.19	75.77	78.09	307.78	318.56	1,068	1,106	3.5%
U.Other Fwy.	12.13	55.00	-	6.53	6.53	13.06	13.06	45	45	0.0%
U.Other PA	4.69	18.76	-	-	-	-	-	-	-	0.0%
TOTAL	325.10	1,827.52	110.52	145.90	162.38	488.48	536.86	1,317	1,389	5.5%
2	**I-85**		**West Alabama to Norfolk, VA**							
R.Interstate	61.19	244.76	-	18.25	18.25	36.50	36.50	41	41	0.0%
R.Other PA	46.03	184.12	-	-	-	-	-	-	-	0.0%
U.Interstate	7.93	31.72	-	0.73	0.73	1.46	1.46	5	5	0.0%
U.Other PA	24.73	75.53	1.58	11.95	11.95	24.64	24.64	51	51	0.0%
TOTAL	139.88	536.13	1.58	30.93	30.93	62.60	62.60	97	97	0.0%
3	**I-59, I-81, I-66**		**New Orleans, LA to DC and Pennsylvania**							
R.Interstate	322.50	1,303.51	61.46	286.81	312.34	603.29	662.87	682	743	9.0%
U.Interstate	85.50	404.37	13.44	43.65	57.57	153.99	185.59	535	644	20.5%
TOTAL	408.00	1,707.88	74.90	330.46	369.91	757.28	848.46	1,216	1,388	14.1%
4	**I-77, I-79**		**Columbia, SC to Ohio and Pennsylvania**							
R.Interstate	59.72	245.30	-	31.77	36.55	63.54	75.70	81	99	22.1%
U.Interstate	0.82	3.28	-	-	-	-	-	-	-	0.0%
TOTAL	60.54	248.58	-	31.77	36.55	63.54	75.70	81	99	22.1%
12	**I-26, US 23**		**Charleston, SC to Ohio**							
R.Other PA	54.50	218.00	-	1.65	1.65	3.30	3.30	6	6	0.0%
U.Other Fwy.	2.73	10.92	-	-	-	-	-	-	-	0.0%
U.Other PA	3.96	15.84	0.57	-	-	1.14	1.14	2	2	0.0%
TOTAL	61.19	244.76	0.57	1.65	1.65	4.44	4.44	8	8	0.0%
15	**I-64**		**Louisville, KY to Norfolk, VA**							
R.Interstate	165.11	660.44	34.23	66.89	68.25	162.32	174.46	160	168	4.5%
U.Interstate	143.16	722.86	25.31	93.52	93.52	334.67	334.67	1,162	1,162	0.0%
TOTAL	308.27	1,383.30	59.54	160.41	161.77	496.99	509.13	1,322	1,329	0.6%
19	**I-73, US 52, US 29**		**Charleston, SC to Maryland**							
R.Other PA	234.19	923.90	2.09	24.48	24.48	49.04	49.04	54	54	0.0%
U.Other Fwy.	16.41	65.64	-	0.54	0.54	1.08	1.08	4	4	0.0%
U.Other PA	27.11	129.59	0.26	13.84	13.84	44.22	44.22	90	90	0.0%
TOTAL	277.71	1,119.13	2.35	38.86	38.86	94.34	94.34	147	147	0.0%
ALL CORRIDORS										
R.Interstate	713.58	2,996.91	157.02	467.32	513.15	1,033.29	1,154.77	1,167	1,289	10.4%
R.Other PA	383.48	1,521.06	2.09	26.13	26.13	52.34	52.34	59	59	0.0%
U.Interstate	391.87	2,178.05	87.94	213.67	229.91	797.90	840.28	2,770	2,917	5.3%
U.Other Fwy.	31.27	131.56	-	7.07	7.07	14.14	14.14	49	49	0.0%
U.Other PA	60.49	239.72	2.41	25.79	25.79	70.00	70.00	143	143	0.0%
TOTAL	1,580.69	7,067.30	249.46	739.98	802.05	1,967.67	2,131.53	4,189	4,457	6.4%

These analyses indicate that 249 of the LATTS roadway miles in Virginia, or 16 percent of the Virginia portion of the Strategic Network, have existing capacity problems. The analyses also show that the majority of the capacity deficiencies will occur in the next 20 years unless capacity is added.

With the expected “normal” growth (as defined by the HPMS database), a total of 740 road miles or 47 percent of the LATTS network will have congestion problems by 2020. The “additional” LATTS trucks are expected to increase the total to 802 miles or 51 percent of total mileage as noted in Exhibit E-8. In other words, LATTS truck will increase congested miles of roadway and needed lane miles by about 8 percent. These percentages are significant but they also indicate that the majority of the congestion problems in Virginia are not due solely to LATTS traffic but expected overall growth in total traffic. However, unless these capacity needs are met, LATTS truck traffic will be affected by these capacity deficiencies regardless of the source of traffic. As congestion increases, LATTS trucks like other traffic, will experience lower operating speeds, frequent speed changes, lower reliability, and increased operating costs.

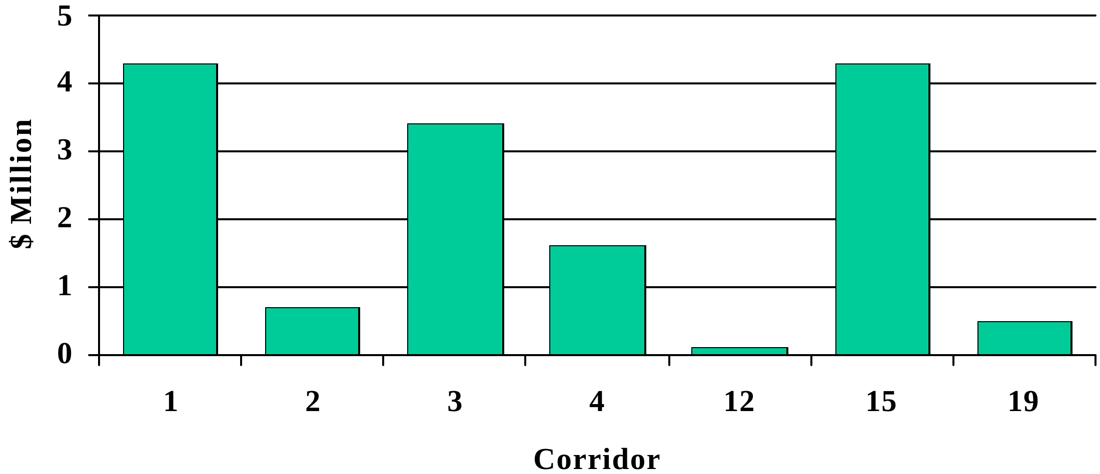
Exhibit E-8
VIRGINIA 2020 CAPACITY NEEDS
LATTS Strategic Network

	Deficient Miles	% of Total Miles	Needs (Billion)
"Normal" Growth	740	47%	$4.2
"Additional" LATTS Traffic	62	4%	$0.3
Total	802	51%	$4.5

Based on the HPMS expected growth in traffic, nearly $4.2 billion will be required in the next 20 years to address congestion problems on the Virginia portion of the LATTS Strategic Network. The "additional" LATTS traffic will bring that total to $4.5 billion, a 6.4 percent increase. The dollar increase in capacity needs due to LATTS traffic is lower than the corresponding increase in terms of needed lane miles because a majority of LATTS truck traffic occurs on rural highways which are less expensive to improve than urban highways.

Capacity needs by corridor are illustrated in Exhibit E-9. Total capacity needs by corridor are related to the total length of the corridor: the longer the corridor, the higher the needs. Corridor 1 (I-95/I-4 from South Florida to Washington, D.C.), Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington D.C. and Pennsylvania), and Corridor 15 (I-64 from Louisville, KY to Norfolk, VA) which are the longest in Virginia, have the highest capacity needs ($1.4 billion, $ 1.4 billion and $ 1.3 billion respectively by 2020). These three corridors also have the highest average capacity needs by roadway mile.

Exhibit E-9
VIRGINIA STRATEGIC HIGHWAY NETWORK
Capacity Needs by Corridor
Average 2020 Capacity Needs per Mile



Corridor 3 will also experience the highest incremental needs due to LATTS "additional" traffic, $ 171 million by 2020. This is due to the large amount of LATTS truck traffic expected to travel on this corridor as described in the previous section. It should be noted that by 2020, 91 percent of Corridor 3 in Virginia will require capacity improvements.

PAVEMENT NEEDS

For purposes of this study, average annual pavement needs in 2020 were estimated. The number of years it would take for the pavement to deteriorate from new in 2020 to a deficient PSR rating (as defined by the minimum tolerable conditions presented earlier) was calculated for each highway segment. As an indicator of the existing condition of the network, pavement deficiencies were identified for 1997.

Pavements typically are designed to last for a fairly long time. However, as they age and are subjected to traffic loads, they deteriorate. The pavement life measure used in these analyses is dependent on the amount of traffic using the highway and, more specifically, truck traffic (car traffic is a factor in the pavement deterioration rate but it has far less impact). The type of pavement (for example high flexible versus high rigid) is also an important factor affecting pavement deterioration rates. The pavement type on each highway segment, as indicated by the 1997 HPMS database, was used in the estimation of the deterioration rates. The number of lanes indicated for 1997 was used in the calculation of pavement deterioration rate and resurfacing costs. No attempt was made to measure the impact on pavement needs of adding lanes to address the congestion problems identified earlier. Finally, the HPMS-AP methodology for deteriorating pavement was applied in this study. It is based on the concept of 18Kip Equivalent Single Axle Loads. Weather condition or type of subsoil can also influence pavement deterioration rates but, for this study, no other factors beyond traffic and pavement type were used to differentiate pavement deterioration rates between sections.

Each highway segment pavement life was calculated twice. An initial calculation was made using the "base" car and truck traffic from the Virginia HPMS database. The second calculation was made with the "additional" LATTS traffic added to it. The difference in the two pavement lives is a measure of the impact of LATTS traffic.

Results of Virginia pavement needs for the LATTS Strategic Highway Network are presented in Exhibit E-10. Based on the HPMS data, about 9 percent or 145 miles of the Virginia portion of the LATTS Strategic Highway Network have existing (1997) pavement deficiencies. Many of these pavement deficiencies are concentrated on the urban interstate system with 15 percent of this system having existing pavement deficiencies.

Exhibit E-10
VIRGINIA PAVEMENT RESURFACING INVESTMENT NEEDS

Corridor/ Functional Class	Length (Miles)	Existing Lane Miles	1997 Deficient Mileage	Pavement Analysis: 2020 Pavement Life (Years) W/O LATTS Added Traffic	With LATTS Added Traffic	2020 Average Annual Cost ($1,000) W/O LATTS Added Traffic	With LATTS Added Traffic	% Increase Due to LATTS
1	**I-95, I-4**		**South Florida to Washington, DC**					
R.Interstate	105.06	542.90	15.85	6.2	5.5	10,194	11,307	10.9%
R.Other PA	48.76	195.04	1.21	4.8	4.8	2,894	2,894	0.0%
U.Interstate	154.46	1,015.82	26.22	5.3	5.3	43,986	44,593	1.4%
U.Other Fwy.	12.13	55.00	0.25	3.9	3.9	2,898	2,898	0.0%
U.Other PA	4.69	18.76	1.14	14.2	14.2	186	186	0.0%
TOTAL	325.10	1,827.52	44.67	5.6	5.3	60,158	61,878	2.9%
2	**I-85**		**West Alabama to Norfolk, VA**					
R.Interstate	61.19	244.76	-	7.1	7.0	4,135	4,147	0.3%
R.Other PA	46.03	184.12	13.02	11.8	11.8	1,097	1,097	0.0%
U.Interstate	7.93	31.72	-	4.4	4.3	1,517	1,524	0.5%
U.Other PA	24.73	75.53	6.53	10.1	10.1	1,089	1,089	0.0%
TOTAL	139.88	536.13	19.55	9.0	9.0	7,838	7,857	0.2%
3	**I-59, I-81, I-66**		**New Orleans, LA to DC and Pennsylvania**					
R.Interstate	322.50	1,303.51	31.17	5.8	4.9	25,782	30,974	20.1%
U.Interstate	85.50	404.37	7.38	4.3	4.3	20,202	20,371	0.8%
TOTAL	408.00	1,707.88	38.55	5.5	4.8	45,983	51,346	11.7%
4	**I-77, I-79**		**Columbia, SC to Ohio and Pennsylvania**					
R.Interstate	59.72	245.30	1.64	9.0	8.5	3,201	3,380	5.6%
U.Interstate	0.82	3.28	-	6.4	5.6	107	120	12.1%
TOTAL	60.54	248.58	1.64	8.9	8.4	3,308	3,500	5.8%
12	**I-26, US 23**		**Charleston, SC to Ohio**					
R.Other PA	54.50	218.00	9.16	14.1	14.1	1,321	1,321	0.0%
U.Other Fwy.	2.73	10.92	-	10.1	10.1	218	218	0.0%
U.Other PA	3.96	15.84	-	12.4	12.4	183	183	0.0%
TOTAL	61.19	244.76	9.16	13.8	13.8	1,723	1,723	0.0%
15	**I-64**		**Louisville, KY to Norfolk, VA**					
R.Interstate	165.11	660.44	3.90	9.4	9.3	8,846	8,954	1.2%
U.Interstate	143.16	722.86	23.88	5.5	5.4	30,466	30,594	0.4%
TOTAL	308.27	1,383.30	27.78	7.3	7.3	39,313	39,547	0.6%
19	**I-73, US 52, US 29**		**Charleston, SC to Maryland**					
R.Other PA	234.19	923.90	0.12	11.1	11.1	6,206	6,206	0.0%
U.Other Fwy.	16.41	65.64	1.27	7.3	7.3	2,134	2,134	0.0%
U.Other PA	27.11	129.59	2.25	8.3	8.3	2,764	2,764	0.0%
TOTAL	277.71	1,119.13	3.64	10.6	10.6	11,104	11,104	0.0%
ALL CORRIDORS								
R.Interstate	713.58	2,996.91	52.56	7.0	6.5	52,159	58,763	12.7%
R.Other PA	383.48	1,521.06	23.51	10.8	10.8	11,518	11,518	0.0%
U.Interstate	391.87	2,178.05	57.48	5.2	5.1	96,278	97,201	1.0%
U.Other Fwy.	31.27	131.56	1.52	6.1	6.1	5,250	5,250	0.0%
U.Other PA	60.49	239.72	9.92	9.6	9.6	4,223	4,223	0.0%
TOTAL	1,580.69	7,067.30	144.99	7.3	7.1	169,427	176,955	4.4%

One would expect that the corridors with the highest concentration of LATTS truck traffic would show the largest impact from LATTS. Exhibit E-10 confirms this expectation. Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington, D.C. and Pennsylvania) has the highest concentration of LATTS trucks in terms of daily traffic and the highest reduction in pavement life from 5.5 years to 4.8 years.

Total resurfacing costs are a function of the average pavement life and the length of the highways. Corridor 1 (I-95/I-4 from South Florida to Washington, D.C.), Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington D.C. and Pennsylvania), and Corridor

15 (I-64 from Louisville, KY to Norfolk, VA), the longest in Virginia, have the highest average annual resurfacing needs ($ 62 million, $ 51 million and $ 40 million respectively with LATTS traffic). With the largest reduction in average pavement life due to LATTS, Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington, D.C. and Pennsylvania) has the largest incremental resurfacing needs due to LATTS trucks, $ 5.4 million annually or 12 percent.

Future (2020) pavement needs are summarized in Exhibit E-11. Pavement life for the Virginia portion of the Strategic Highway Network will average 7.3 years in 2020 without the "additional" LATTS truck traffic and 7.1 years with it. The annual resurfacing costs for the Virginia portion of the LATTS Strategic Highway Network is estimated to exceed $169 million without LATTS "additional" truck traffic and $177 million with it, an increase which is less than 1 percent.

Exhibit E-11
VIRGINIA 2020 PAVEMENT NEEDS
LATTS Strategic Network

	Pavement Life (Years)	Annual Resurfacing Cost ($Million)
"Normal" Growth	7.3	$169
With "Additional" LATTS Traffic	7.1	$177

OPERATING SPEEDS

Truck operating speed was chosen as a key study performance measure for the LATTS Strategic Highway Network. Truck operating speeds were estimated for each LATTS roadway segment based on the conditions of the roadway, including roadway geometry and alignment, pavement condition, speed limit and traffic volumes. The operating speed calculation for each sample segment or link was based on the methodology of the HPMS Analytical Package used by FHWA to estimate highway needs.

Two types of operating speeds were calculated. One was the average daily operating speed and the other was the peak hour operating speed as defined by the peak hour factor or "K" factor for each road segment. Because it is not known when a truck would travel over a specific highway section during the peak hour, the peak hour operating speed assumed that every section was traveled during peak hour. As a result, the calculated peak hour speed and travel time for an entire corridor is probably somewhat overstated, as it is unlikely that a truck would travel every section during peak hour conditions.

Truck operating speeds were calculated for each LATTS roadway section. Operating speeds over a combination of segments were then calculated by adding travel time and distance for each segment and calculating the new speed.

Truck operating speeds on the Virginia portion of the LATTS Strategic Highway Network are presented on Exhibit E-12. In this exhibit, Virginia truck operating speeds estimates are presented by functional class. The total lengths of all the segments, which were used in the analysis of the corridor, are listed first. This is followed by items describing the characteristics of the segments, including average number of lanes, speed limit, and AADT. The purpose of listing these items is to facilitate better understanding of the calculated operating speeds. For example, two/three-lane highways have lower operating speeds than equivalent four-lane highways because of passing difficulties. Similarly, low speed limits will result in low operating speeds on facilities no matter what the road conditions are.

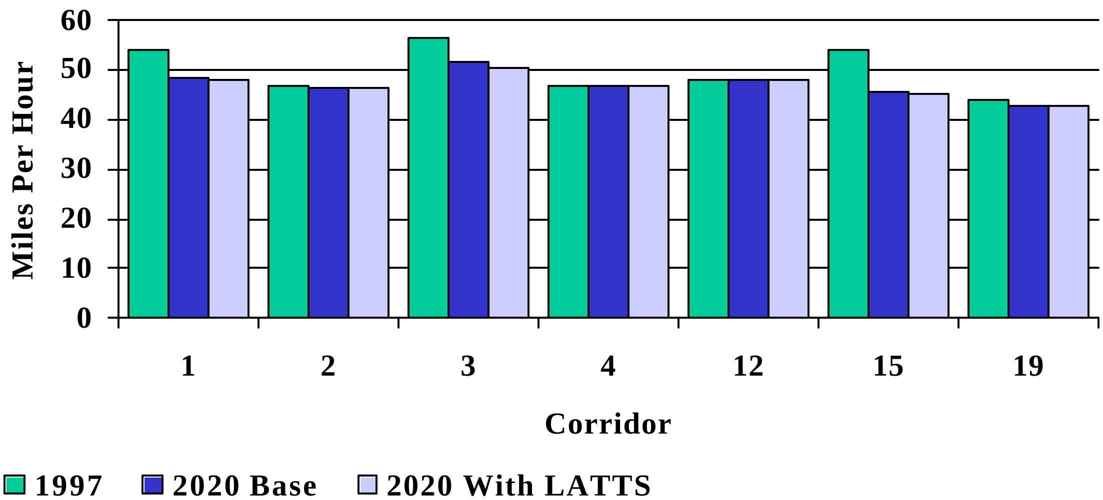
Exhibit E-12
VIRGINIA TRUCK OPERATING SPEEDS

Corridor/ Functional Class	Length (Miles)	Average No. Lane	Speed Limit (MPH)	Average 1997 AADT	1997 Truck Speed (MPH) Daily Average	1997 Truck Speed (MPH) Peak Hour	2020 Truck Speed (MPH) W/O Added LATTS Traffic Daily Average	2020 Truck Speed (MPH) W/O Added LATTS Traffic Peak Hour	2020 Truck Speed (MPH) With Added LATTS Traffic Daily Average	2020 Truck Speed (MPH) With Added LATTS Traffic Peak Hour
1	**I-95, I-4**		**South Florida to Washington, DC**							
R.Interstate	105.10	5.2	62.8	62,151	58.1	42.8	56.1	37.8	55.8	37.7
R.Other PA	48.80	4.0	55.0	11,592	53.8	53.8	53.8	53.2	53.8	53.2
U.Interstate	154.50	6.6	59.0	97,896	51.9	24.0	42.9	21.8	42.7	21.8
U.Other Fwy.	12.10	4.5	55.0	26,513	57.4	56.9	57.2	31.4	57.2	31.4
U.Other PA	4.70	4.0	48.8	19,529	33.7	33.7	33.7	33.7	33.7	33.7
TOTAL	**325.10**	**5.6**	**59.2**	**69,606**	**53.8**	**32.0**	**48.3**	**28.8**	**48.1**	**28.8**
Time (HR)					**6.0**	**10.1**	**6.7**	**11.3**	**6.8**	**11.3**
2	**I-85**		**West Alabama to Norfolk, VA**							
R.Interstate	61.20	4.0	63.1	18,976	58.1	58.1	57.9	44.8	57.9	44.8
R.Other PA	46.00	4.0	55.0	11,164	52.4	52.4	52.4	52.4	52.4	52.4
U.Interstate	7.90	4.0	55.1	32,646	50.4	50.4	50.2	41.8	50.2	41.8
U.Other PA	24.70	3.1	55.0	14,696	27.7	26.6	26.5	16.1	26.5	16.1
TOTAL	**139.90**	**3.8**	**58.3**	**16,424**	**46.9**	**46.3**	**46.2**	**35.2**	**46.2**	**35.2**
Time (HR)					**3.0**	**3.0**	**3.0**	**4.0**	**3.0**	**4.0**
3	**I-59, I-81, I-66**		**New Orleans, LA to DC and Pennsylvania**							
R.Interstate	322.50	4.0	65.0	31,666	59.3	51.9	55.9	30.7	54.5	28.6
U.Interstate	85.50	4.7	56.2	63,671	48.7	32.2	39.7	21.3	39.3	19.8
TOTAL	**408.00**	**4.2**	**62.9**	**38,373**	**56.7**	**46.0**	**51.5**	**28.1**	**50.4**	**26.2**
Time (HR)					**7.2**	**8.9**	**7.9**	**14.5**	**8.1**	**15.6**
4	**I-77, I-79**		**Columbia, SC to Ohio and Pennsylvania**							
R.Interstate	59.70	4.1	65.0	28,874	46.8	45.3	46.7	38.6	46.7	37.7
U.Interstate	0.80	4.0	55.0	26,000	48.6	48.6	48.6	48.1	48.6	48.1
TOTAL	**60.50**	**4.1**	**64.8**	**28,835**	**46.8**	**45.3**	**46.7**	**38.7**	**46.7**	**37.8**
Time (HR)					**1.3**	**1.3**	**1.3**	**1.6**	**1.3**	**1.6**
12	**I-26, US 23**		**Charleston, SC to Ohio**							
R.Other PA	54.50	4.0	55.0	8,679	50.1	50.1	50.1	49.7	50.1	49.7
U.Other Fwy.	2.70	4.0	55.0	11,000	56.9	56.9	56.9	56.9	56.9	56.9
U.Other PA	4.00	4.0	44.3	27,515	27.2	24.1	27.2	26.8	27.2	26.8
TOTAL	**61.20**	**4.0**	**54.2**	**10,002**	**47.8**	**47.1**	**47.8**	**47.4**	**47.8**	**47.4**
Time (HR)					**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
15	**I-64**		**Louisville, KY to Norfolk, VA**							
R.Interstate	165.10	4.0	64.9	25,890	56.4	48.2	54.2	41.6	54.1	41.6
U.Interstate	143.20	5.0	55.2	67,334	51.8	26.2	38.3	19.0	38.1	19.0
TOTAL	**308.30**	**4.5**	**60.0**	**45,137**	**54.2**	**34.7**	**45.5**	**26.7**	**45.3**	**26.7**
Time (HR)					**5.7**	**8.9**	**6.8**	**11.5**	**6.8**	**11.5**
19	**I-73, US 52, US 29**		**Charleston, SC to Maryland**							
R.Other PA	234.20	3.9	55.0	12,744	46.6	45.8	46.4	44.1	46.4	44.1
U.Other Fwy.	16.40	4.0	51.6	20,296	44.3	44.3	44.3	38.7	44.3	38.7
U.Other PA	27.10	4.8	44.0	37,071	29.7	28.0	25.7	17.1	25.7	17.1
TOTAL	**277.70**	**4.0**	**53.5**	**15,565**	**44.0**	**43.0**	**42.9**	**38.0**	**42.9**	**38.0**
Time (HR)					**6.3**	**6.5**	**6.5**	**7.3**	**6.5**	**7.3**

Average daily and peak period speeds/travel times for trucks also are presented for the base year (1997). Further, truck operating speeds are listed twice for year 2020. The first time, truck operating speeds were calculated assuming the base growth rate, i.e. the growth rate indicated by the HPMS database. The second time, truck operating speeds were calculated with the LATTS "additional" traffic. Overall results for the entire corridor within Virginia are then listed, as well as the overall time required to travel the entire corridor. By comparing these speed and travel time values (based on present conditions), it is possible to determine which facilities are most efficient today, which facilities are going to experience deteriorating conditions due to traffic growth regardless of LATTS impact, and finally which facilities are going to be most affected by LATTS traffic.

Average daily truck operating speeds on Virginia LATTS corridors are summarized in Exhibit E-13.

Exhibit E-13
VIRGINIA STRATEGIC HIGHWAY NETWORK
Average Daily Truck Operating Speeds



Corridor 1 (I-95/I-4 from South Florida to Washington, D.C.), Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington D.C. and Pennsylvania), and Corridor 15 (I-64 from Louisville, KY to Norfolk, VA), which all have a majority of interstate facilities have average daily operating speeds above 50 MPH in 1997. Corridors 2, 12, and 19 have lower average daily speeds in the 40 to 50 MPH ranges because they are comprised of lower type facilities in Virginia.

The projected growth in traffic between 1997 and 2020 will affect this measure of performance. Unless additional capacity is provided, the average daily speed in several Virginia LATTS corridors will be reduced by 5 MPH or more including Corridor 1 (I-95/I-4 from South Florida to Washington, D.C.), Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington D.C. and Pennsylvania), and Corridor 15 (I-64 from Louisville, KY to Norfolk, VA).

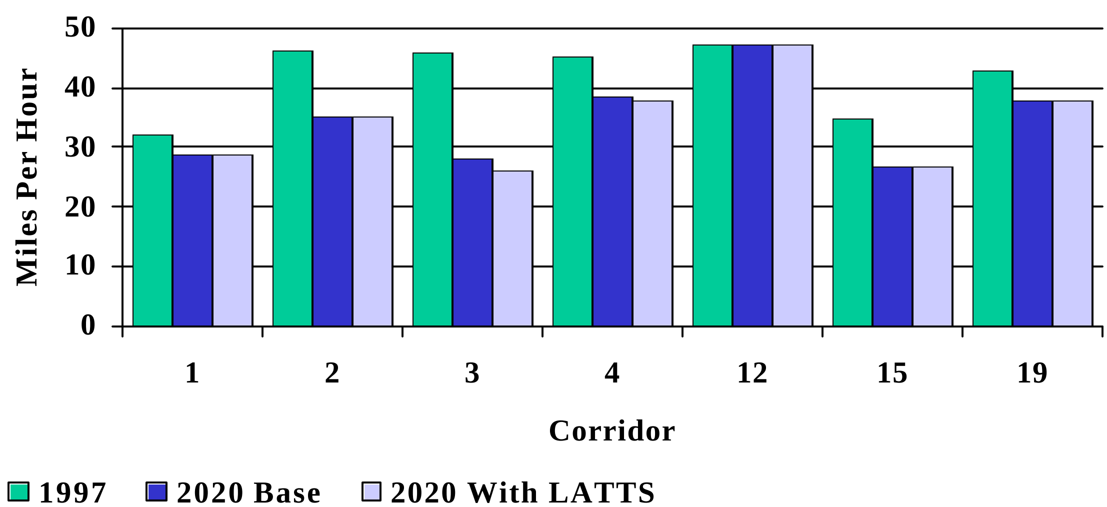
Compared to the impact of the expected traffic growth between 1997 and 2020, the impact of the “additional” LATTS traffic on average daily truck travel speed appears minor. Even the worse case, Corridor 3, will only experience an additional reduction in average daily speed of 1.1 MPH. One may wonder why there would be such an apparent small impact on average speeds when the impact of LATTS traffic on capacity appeared much more significant. The reason is due to the selected minimum tolerable standards used to identify capacity needs. The capacity needs are based on not exceeding LOS C on rural highways and LOS D on urban highways during peak hour. However, traveling speeds are most affected (change rapidly) when the LOS reaches E and F. In other words, capacity needs are based on explicit standards that are higher than those used implicitly in the LATTS speed calculation.

As noted in Exhibit E-14, the expected traffic growth in Virginia LATTS corridor will affect "peak hour" speeds more significantly up to 18 MPH for Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington D.C. and Pennsylvania) as illustrated below.

As mentioned earlier, these travel speeds are estimated assuming no change in capacity on any section of the LATTS highway network and traffic peaking patterns the same as they are today. This is unlikely given the severity of the estimated resulting congestion on some highways.

The impact of LATTS "additional traffic" is slightly more pronounced on "peak hour" speeds than on average daily speeds but still very mild compared to the impact of overall growth in total traffic.

Exhibit E-14
VIRGINIA STRATEGIC HIGHWAY NETWORK
"Peak-Hour" Truck Operating Speeds



CONCLUSIONS FOR LATTS MAINLINE HIGHWAYS

(1) LATTS truck traffic in Virginia is expected to grow at a much higher rate than the rest of the traffic in the commonwealth. From 1997 to 2020, LATTS truck traffic will increase by 319 percent while all other traffic is expected to increase by 47 percent.

(2) About 51 percent of the LATTS Strategic Highway Network in Virginia will require additional capacity by 2020 at a cost of $ 4.5 billion. More than 94 percent of these capacity needs are for the interstate system (65 percent for the urban interstate system alone). The majority of these needs are due to expected growth in the commonwealth and not to LATTS trucks only.

(3) However, LATTS truck traffic will have an increasing impact on the commonwealth highway investment needs for the Strategic Highway Network. By 2020, LATTS "additional" truck traffic will have resulted in:

- 8.4% more highway miles needing capacity improvements.
- 6.4% additional costs to address these capacity needs.
- 4.4% increase in annual pavement resurfacing costs.

(4) In Virginia, Corridor 3 (I-59/I-81/I-66 from New Orleans, LA to Washington D.C. and Pennsylvania) will be proportionally most affected by LATTS trucks because of the higher volume of LATTS trucks using this corridor.

(5) If these investment needs are not met, portions of the LATTS Strategic Highway Network in Virginia will experience significant deterioration in operating speeds especially during "peak hour."

WATERPORT AND AIRPORT INTERMODAL CONNECTORS

The focus of the highway analysis was, appropriately, on the mainline portion of the LATTS Strategic Highway System. This is the portion of the highway network carrying the vast majority of truck travel (vehicle miles) and has "needs" that could be quantified using existing databases. Additionally, the portion of the highway system connecting the LATTS mainline system with the LATTS waterports and airports also were assessed. While these highway intermodal connectors sometimes are overlooked, their deficiencies can significantly impact the efficient movement of vehicles, especially large trucks.

LATTS intermodal connectors are the highways that link the mainline LATTS Strategic System with LATTS intermodal facilities (waterports and airports). To avoid costly new data collection activities, a recently compiled database was used to conduct the connectors analysis. This database, the *NHS Connectors*, was populated by the state DOTs and compiled by the Federal Highway Administration. It includes a high quality sample of the LATTS intermodal connectors. However, it does not contain information for every LATTS intermodal connector. These analyses utilized information for those LATTS intermodal connectors for which information was available in the NHS connectors database at the time the analyzes were performed.

As noted in Exhibit E-15, Virginia has two connectors for which information was available in the *NHS Inventory Database*. Neither connector in the inventory database is owned by the commonwealth.

Exhibit E-15
LATTS INTERMODAL CONNECTORS

FACILTY ID	FACILITY NAME	LINK MILES	RURAL/URBAN DESIGNATION	OWNERSHIP	AGENCY
VA2A	Norfolk International	1.2	Urbanized (>200k)	Municipal Highway	Hampton Roads MPO
VA9P	Port of Hampton Rds - Norfolk Intl Term.	2	Urbanized (>200k)	Municipal Highway	Hampton Roads MPO

The following are the Virginia facilities that have connectors for which information was not available in the inventory database:

- Richmond International; VA3A
- Newport News/Williamsburg International; VA1A
- Richmond Deepwater terminal; VA11P
- Front Royal Inland Port

Pavement Problems

Virginia's connectors were reported to have no pavement deficiencies.

Geometric/Physical Problems

Virginia's connectors were reported to have very minor physical deficiencies. Each of the connectors in the inventory was reported to have only shoulder problems.

At-Grade Railroad Crossing Problems

Virginia reported no railroad crossing deficiencies.

Traffic Operations and Safety Problems

Virginia reported no operations or safety deficiencies.

Commonwealth Summary

Virginia reported virtually no connector deficiencies.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

While it is clear that improvements in highway infrastructure are required to achieve an economically efficient transportation system, truck operations also can be improved by the implementation of ITS. Transportation technologies help freight transport become more productive and more responsive to the needs of business enterprises, including those which are engaged in Latin American trade. Fortunately, a large portion of current work in the ITS arena is with commercial vehicle operations (CVO). Of significant relevance to LATTS is the Commercial Vehicle Information Systems and Networks (CVISN) that embodies a collection of information systems and communications networks that provide support to CVO.

The national ITS/CVO program encompasses numerous projects undertaken by the individual states. The national program is designed to encourage the development and implementation of technology to enhance the safe movement of commercial vehicles across the United States. There are four main areas within the national program and each of the individual states are striving to meet these goals:

- Safety Assurance – Programs and projects that are designed to assure the safety of commercial drivers, vehicles, and cargo.
- Credentials Administration – Programs and projects that are designed to improve the procedures and systems for managing motor carrier regulation.
- Electronic Screening – Programs and projects that are designed to facilitate the verification of size, weight, safety, and credentials information.
- Carrier Operations – Programs and projects that are designed to reduce congestion and manage the flow of commercial vehicle traffic.

Most of the Alliance member states have completed some type of ITS/CVO Business Plan. Many of these documents are living documents and are continually being updated and revised. Since state's ITS/CVO plans are changing frequently, the information contained below is only a snapshot of ITS information available in early 2001.

Virginia ITS/CVO Plan

Virginia is currently operating under the guidance of the *Commonwealth of Virginia ITS/CVO Business Plan*, May 1998. This document guides all CVO activities within the commonwealth, by partnering with the commercial vehicle community. The mission is to ensure the safe, legal, and efficient movement of goods and people through the innovative application of technology, services, and resources[2].

The ITS/CVO Business Plan and CVO business in general are currently under the guidance of the Department of Motor Vehicles, Virginia Department of Transportation, and the Virginia State Police. Through these agencies, the Business Plan will continue to evolve and identify technological solutions to aid in the administration of the motor carrier industry.

[2] *Commonwealth of Virginia ITS/CVO Business Plan*, Virginia Department of Transportation, May 1998

The primary focus of the Business Plan follows-up on the ITS/CVO programs that Virginia already has in place. While many of these are existing programs, some are also referenced as proposed projects because they will be updated or improved. The projects that the commonwealth currently has in place are as follows:

- One-stop Shopping (Implemented in 1995) - The program allows motor carriers to obtain all necessary documentation at one location.
- Capital Beltway Truck Rollover Warning System - Drivers are alerted when they are at-risk for rolling over on exit ramps.
- Document Readers - These are currently installed at select locations and allow drivers to present documentation to station operators on opposite sides of the roadway.
- Pen-Based Computers - Enforcement offices have access to pen-based computers to allow for faster vehicle inspection.
- Weigh-In-Motion – This technology is being utilized at many ramp locations. Motor carriers are weighed and then given clearance to pass or are signaled to come into the station.
- International Fuel Tax Agreement, Inc. - This project has been implemented by many states within the LATTS region. It allows for motor carriers to register in a home/base state. The home/base state is responsible for collecting the necessary taxes and then dispersing them to the participating states.
- International Registration Plan, Inc. - This project allows motor carriers to register in a home/base state. The motor carrier then pays the necessary taxes and the home/base state is responsible for paying the participating states.
- Liquidated Damages - This program has been automated to allow for quicker processing of citations.

The goals that were developed are intended to achieve those projects that are set forth within the Business Plan. The goals of the plan are as follows:

- Improve highway safety through the reduction in the rate and severity of accidents involving commercial vehicles.
- Streamline the administration of Motor Carrier credentials and taxation and reduce the regulatory burden on motor carriers.
- Reduce congestion costs for motor carriers at weigh stations, inspection stations, and other known congestion points.
- Ensure regulatory compliance through fair treatment of motor carriers. Those carriers that are compliant are rewarded while those that are noncompliant have greater attention placed on them.
- Preserve Virginia's investment in the highway infrastructure. Ensure that Federal weight laws are complied with and that the impacts to the commonwealth's roadway system are minimized [3].

In order to reach the goals that have been set forth, Virginia has developed a set of migration paths. These paths outline the path that the commonwealth will follow in order to reach the national goals. There are four paths and each of them corresponds with

[3] *Commonwealth of Virginia ITS/CVO Business Plan*, Virginia Department of Transportation, May 1998

one of the four national goals. However, many of the same objectives are outlined within the various paths.

- Credentials Administration Path
  - Improve one-stop shopping
  - Integrated Motor Carrier System - A new database will be completed that contains all necessary information that is relevant to motor carrier regulation in the Commonwealth of Virginia.
  - Single Service Provider - A single service provider will be organized to consolidate IFTA/IRP, Motor Fuel Road Tax, Virginia Registration, Titling, Oversize and Overweight, and Fuels Tax Services.
  - Liquidated Damages - Establish a direct electronic communication between DMV headquarters and weigh stations to facilitate the exchange of liquidated damages information.
  - Intrastate System - Create a decentralized system for motor carries to obtain necessary documentation.
  - SSRS (Single State Registration System) - Out-of-state taxes are collected and distributed to those states participating in the program.
  - Dyed Fuel Tracking System - An automated system will be developed that will track and assess dyed fuel violations from both state and federal sources.
  - IFTA Clearinghouse Project - This project has been implemented by many states within the LATTS Region. It allows for motor carriers to register in a home/base state. The home/base state is responsible for collecting the necessary taxes and then dispersing them to the participating states.
  - IRP Clearinghouse Project - This project allows motor carriers to register in a home/base state. The motor carrier then pays the necessary taxes and the home/base state is responsible for paying the participating states.
  - CVISN (Commercial Vehicle Information Systems) - Virginia and Maryland are participating in a prototype development of CVISN.
- Safety Assurance Migration Path
  - Purchase and Upgrade Pen-Based Computers – This project will purchase and upgrade pen-based computers that are provided to motor carrier enforcement officers.
  - Inspection Selection System – A program will be developed that uses a more objective means to identify those vehicles to be inspected.
  - Connection to SAFER (Safety and Fitness Electronic Records) – A program will be developed that will allow the exchange of data from the Motor Carrier Management Information System.
  - Connection to CVIEW (Commercial Vehicle Information Exchange Window) – A program to develop a wireless connectivity that will allow the exchange of safety data from any location.
- Roadside Operations Migration Path
  - Implementation of WIM (Weigh-in-Motion) – This project includes the installation of WIM at more roadside locations.
  - Electronic Screening System – This project will install Automatic Vehicle Identification (AVI) at existing weight stations. At this time of this report, the commonwealth was waiting for approval to proceed with the implementation of PrePass.

- Mainline Electronic Screening Systems – This project will allow for the electronic weighing of motor carriers. The recorded weight will be compared to the allowable weight on the permit and the compliant vehicles will be allowed to pass without stopping.
- Computer Networking - All weigh stations and other commonwealth offices will be connected to allow for easier data transmission.
- License Plate Readers in Mobile Electronic Screening (FOT-9) - Field Operation Test-9 (FOT-9) will be undertaken to determine the feasibility of utilizing license plate readers to electronically screen vehicles.
- Traffic Queue Warning System – A system will be developed that will monitor the traffic queue at weight stations and automatically open/close the stations based on this queue length.
- Document Reader System - Project will install audio-communication and closed circuit television to allow drivers to communicate with station operators across the street.

▶ Carrier Operations Migration Path

- CVO Parking Management - Parking strategies will be developed to inform drivers of the locations of appropriate parking facilities.
- CVO Fleet Management – A traffic management system will be developed that will provide commercial vehicle operators with roadway and traveler information.
- CVO Information Concept Plan – This project will evaluate other available ITS opportunities and/or strategic partnering with neighboring states.

▶ Institutional Strengthening Migration Plan

- Mainstreaming – This project is designed to help Virginia move from the ITS/CVO development stage into the ITS/CVO deployment stage.