SECTION E
ARKANSAS 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 6 percent of the mainline LATTS Strategic Highway System (1,481 miles) is located in Arkansas (Exhibit E-2). The Arkansas components[1] include the following:

- All of Arkansas's 631 miles of interstate highways, including:
  - I-30, connecting Little Rock with Dallas/Ft. Worth
  - I-40, a major east-west interstate linking Texas with Little Rock, Memphis, Nashville, and Wilmington
  - I-55, a major north-south interstate linking New Orleans with Memphis and St. Louis
  - I-530, a new route linking Little Rock and Pine Bluff (to be extended south to I-69)
  - I-540, connecting Ft. Smith and Fayetteville
  - Several urban interstates, including routes I-430, I-440, and I-630
- 850 miles of non-interstate National Highway System (NHS) facilities
  - U.S. 71 from the Missouri State Line to the Texas State Line, part of LATTS Corridor 8 (I-49, U.S. 71) and Congressional High Priority Corridor 1 (Kansas City to Shreveport). A portion of this route (I-540) has already been upgraded to interstate standards. The remainder is mostly two-lane highway with no access control.
  - U.S. 65/82 from Pine Bluff to the Mississippi State Line at Greenville, U.S. 67 from U.S. 412 to Little Rock, and U.S. 425 from Pine Bluff to the Louisiana State Line, all part of Corridor 21. A section of U.S. 67 northeast of Little Rock has

[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

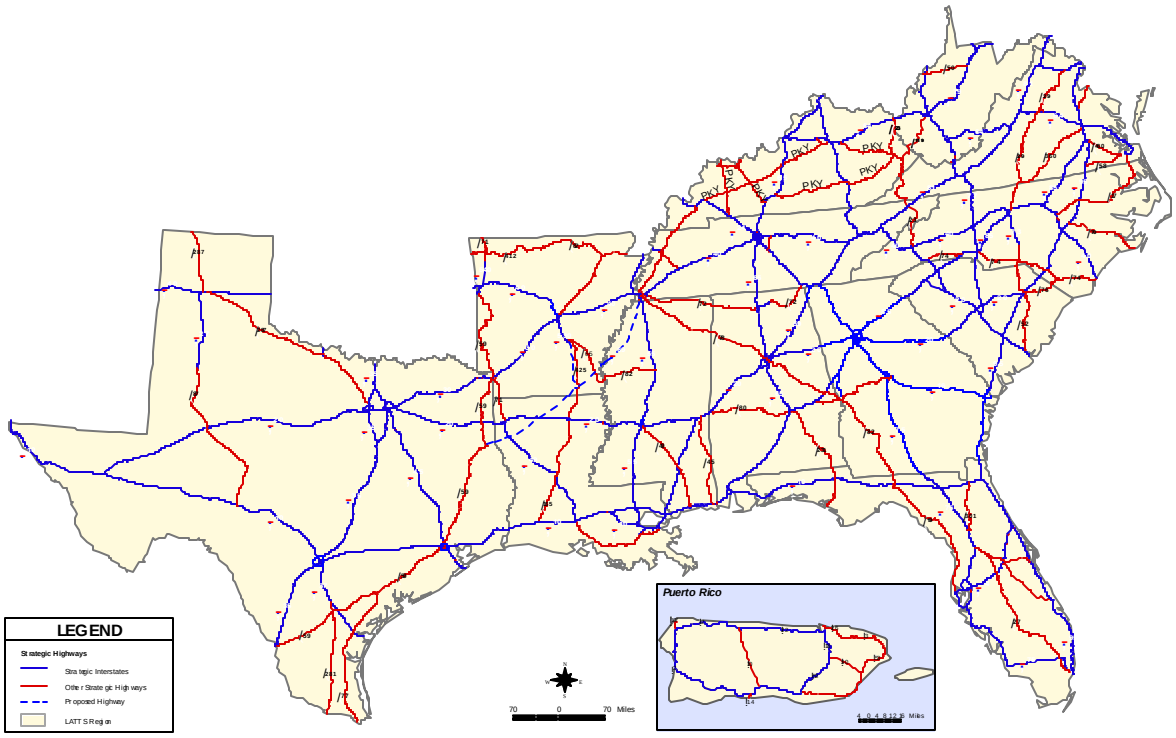
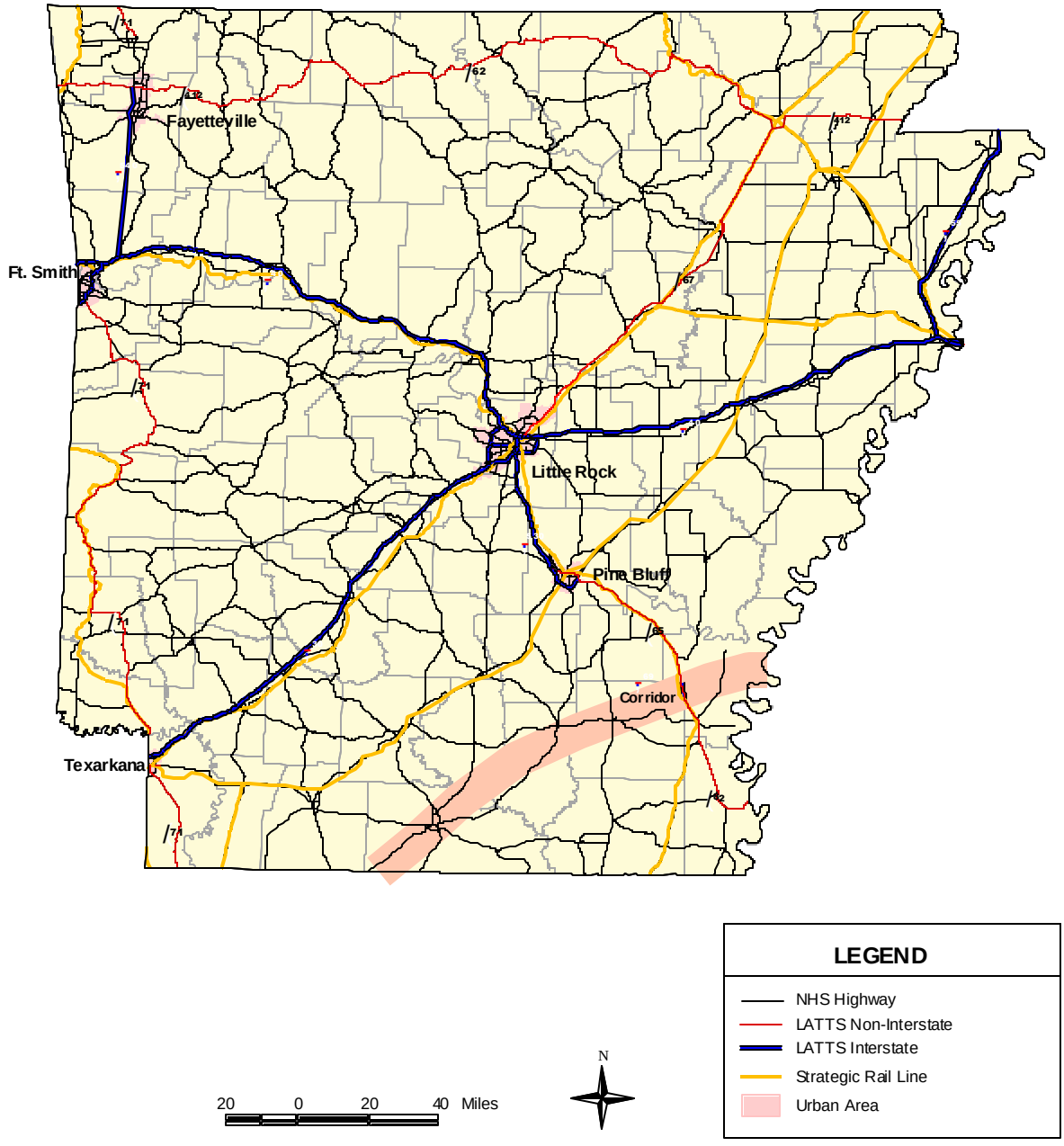


Exhibit E-2
ARKANSAS LATTS HIGHWAY SYSTEM



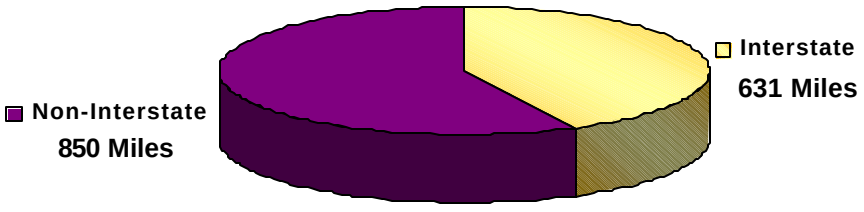
been upgraded to interstate standards, while the remainder is mostly two-lane highway with no access control. U.S. 425 is to be upgraded from Pine Bluff south to new I-69 (Corridor 18) as an extension of I-530.

- U.S. 62/63/65/412 from the Oklahoma State Line to the Tennessee State Line across the northern portion of the state, part of LATTS Corridor 22 (Tulsa to Nashville) and Congressional High Priority Corridor 8. These highways are mostly two-lane with no access control.
- LATTS/Congressional High Priority Corridor 18 is proposed to cross southeastern Arkansas on new location, and is referred to as I-69. Various studies have been performed regarding this facility and they confirm its need and justification. Accordingly, it was included in the LATTS Strategic Highway System. However, it was not possible within the work scope of LATTS to undertake an assessment of I-69 similar to the analyses conducted for existing facilities. It also was not possible to assess the impact construction of I-69 would have on other Arkansas facilities included in the Strategic Highway System. However, there is evidence from I-69 studies that it will attract LATTS and other traffic away from existing facilities. Therefore, the analysis reported herein potentially overstates deficiencies for I-30 and I-40 (part of LATTS Trade Corridor No.1) and perhaps other facilities.

▶ 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 Arkansas's portion of the LATTS highways by system.

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



1,481 Miles Total **Excludes LATTS Connectors**

LATTS HIGHWAYS VS. LATTS TRADE CORRIDORS

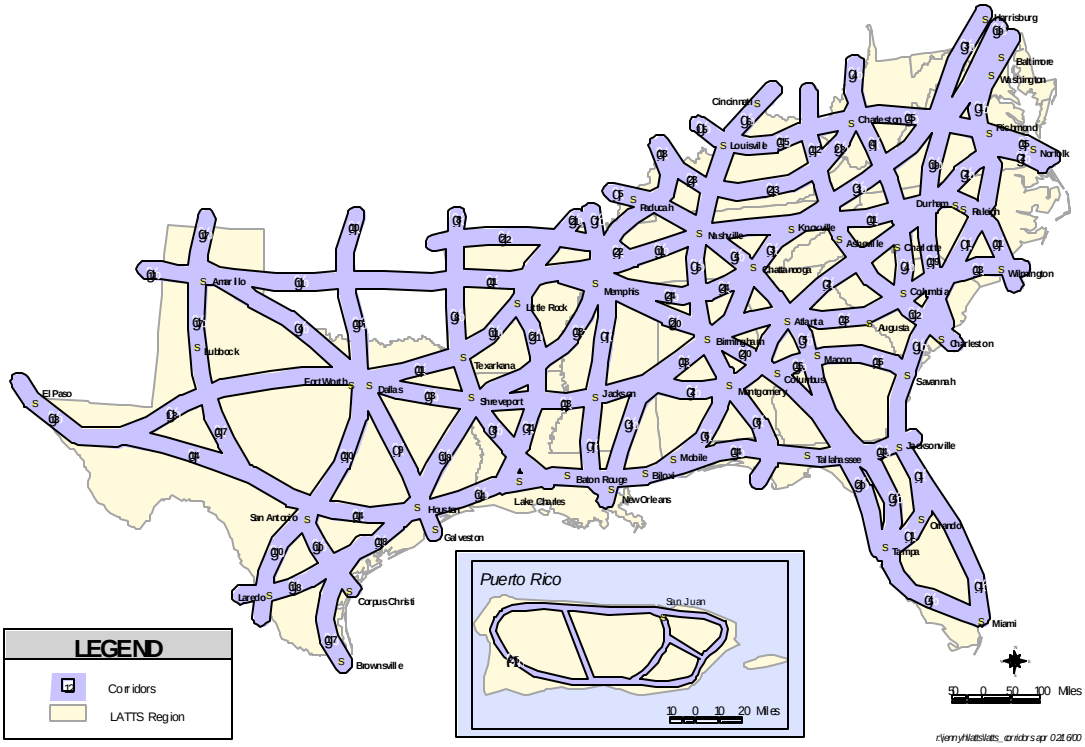
The 22,859 miles of "mainline" LATTS Strategic Highways were grouped into 25 LATTS Trade Corridors (Exhibit E-4). The Trade Corridors were established using logical origins/destinations and assigning each highway to only one corridor. Each corridor was assigned a number (1-25) and was referred to by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

- Corridor 7 (I-55) – St. Louis to New Orleans
- Corridor 8 (I-49, U.S. 71) – New Orleans to Kansas City
- Corridor 11 (I-40) – North Texas to Wilmington
- Corridor 21 (U.S. 65/67/165) – St. Louis to Lake Charles, LA
- Corridor 22 (U.S. 412) – Tulsa to Nashville

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.

Exhibit E-4
LATTS TRADE CORRIDORS



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.

For this study, only that portion of the HPMS database corresponding to the selected LATTS Strategic Highway Network was utilized. For Arkansas, the LATTS HPMS database consisted of 1,671 records describing 1,389 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.

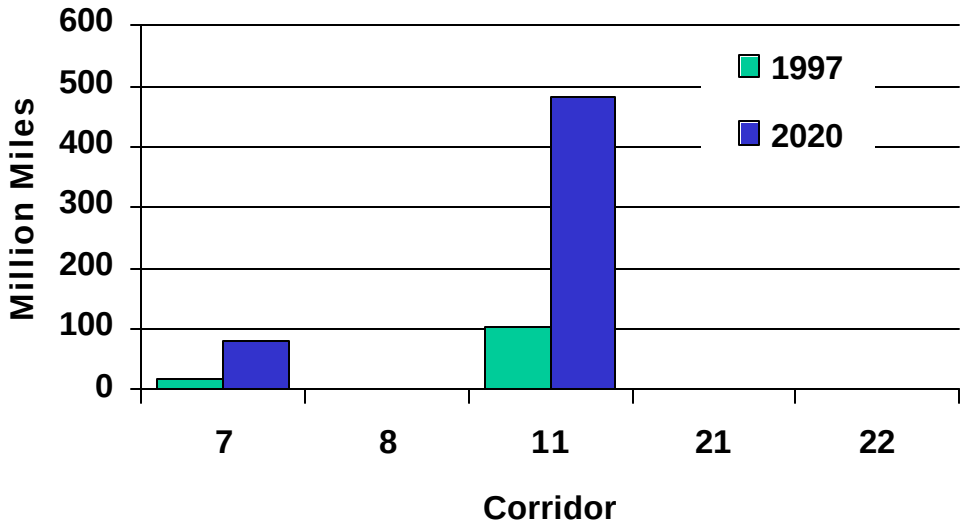
The LATTS procedure for assigning truck flows is appropriate for a macro-scale study such as LATTS. Nevertheless, it should be noted that the procedure produces approximations which may vary slightly from actual conditions. That is, an all-or-nothing assignment on the basis of shortest time paths favors 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, 508 miles of the Strategic Highway Network in Arkansas were assigned LATTS truck traffic. Nearly all interstate highways (94 percent) were assigned some LATTS truck traffic. Of those highways which were not assigned LATTS truck traffic, the vast majority (96 percent) are U.S. or state highways rather than interstate highways.

LATTS TRUCK TRAFFIC IN ARKANSAS

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 ARKANSAS



Of the five LATTS corridors crossing Arkansas, only two were assigned LATTS truck traffic based upon study procedures. In fact, two of the corridors not assigned LATTS traffic in Arkansas, Corridor 20 (U.S.19/U.S.78/U.S.280 from Tampa, FL to Memphis, TN) and Corridor 22 (U.S.412 from Tulsa, OK to Nashville, TN), were not assigned any LATTS traffic in any Alliance member. They are comprised of U.S. Routes as opposed to interstates.

Corridor 11 (I-40 from North Texas to Wilmington, NC) was assigned the most LATTS traffic in terms of VMT. But the highest volume of LATTS trucks is on Corridor 7 (I-55 from New Orleans, LA to St. Louis, MO) with 2020 average annual daily LATTS truck volume of 3,155 versus 2,793 on Corridor 11.

Exhibit E-6

ARKANSAS LATTS TRUCK TRAFFIC

Corridor/ Functional Class	Length (Miles)	1997 Annual Truck VMT (Million Miles) All Trucks Full Network	All Trucks Part. Network(1)	LATTS Trucks Only	LATTS Percent (2)	2020 Annual Truck VMT (Million Miles) All Trucks Full Network	All Trucks Part. Network(1)	LATTS Trucks Only	LATTS Percent (2)
7	**I-55**		**New Orleans, LA to St. Louis, MO**						
R.Interstate	60.29	173.41	173.41	15.75	9.1%	453.21	453.21	73.84	16.3%
U.Interstate	9.71	35.89	35.89	1.54	4.3%	79.23	79.23	6.79	8.6%
TOTAL	70.00	209.30	209.30	17.30	8.3%	532.44	532.44	80.62	15.1%
8	**I-49, US 71**		**New Orleans, LA to Kansas City, MO**						
R.Other PA	199.59	98.92	-	-	0.0%	205.57	-	-	0.0%
U.Other Fwy.	25.82	31.07	-	-	0.0%	77.07	-	-	0.0%
U.Other PA	21.68	30.18	-	-	0.0%	51.97	-	-	0.0%
TOTAL	247.09	160.16	-	-	0.0%	334.61	-	-	0.0%
11	**I-40**		**North Texas to Wilmington, NC**						
R.Interstate	333.54	1,120.33	1,120.33	84.51	7.5%	2,575.10	2,575.10	392.97	15.3%
U.Interstate	138.56	436.70	397.00	19.02	4.8%	936.47	862.47	88.39	10.2%
TOTAL	472.10	1,557.03	1,517.33	103.53	6.8%	3,511.57	3,437.56	481.36	14.0%
21	**US 67, US 65, US 165**		**Lake Charles, LA to St. Louis, MO**						
R.Other PA	290.36	171.81	-	-	0.0%	346.24	-	-	0.0%
U.Other Fwy.	17.14	19.09	-	-	0.0%	35.61	-	-	0.0%
U.Other PA	11.42	9.31	-	-	0.0%	18.95	-	-	0.0%
TOTAL	318.92	200.21	-	-	0.0%	400.81	-	-	0.0%
22	**US 412**		**Tulsa, OK to Nashville, TN**						
R.Other PA	259.87	84.71	-	-	0.0%	166.51	-	-	0.0%
U.Other PA	20.69	18.26	-	-	0.0%	37.03	-	-	0.0%
TOTAL	280.56	102.97	-	-	0.0%	203.54	-	-	0.0%
ALL CORRIDORS			**-**						
R.Interstate	393.83	1,293.74	1,293.74	100.27	7.8%	3,028.31	3,028.31	466.81	15.4%
R.Other PA	749.82	355.44	-	-	0.0%	718.33	-	-	0.0%
U.Interstate	148.27	472.59	432.89	20.56	4.7%	1,015.70	941.70	95.17	10.1%
U.Other Fwy.	42.96	50.16	-	-	0.0%	112.68	-	-	0.0%
U.Other PA	53.79	57.75	-	-	0.0%	107.95	-	-	0.0%
TOTAL	1,388.67	2,229.67	1,726.63	120.83	7.0%	4,982.97	3,970.00	561.98	14.2%

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

Of LATTS truck traffic in Arkansas, 83 percent is on the rural interstate system and 17 percent is on the urban interstate system.

The percentage of LATTS trucks relative to total trucks is expected to grow from 7 percent in 1997 to 14 percent in 2020 on those highways carrying LATTS traffic (from 5 to 11 percent for the entire LATTS strategic network). This growth in the LATTS share of total truck traffic is due to the fact that LATTS truck traffic is expected to increase 4.7 fold between 1997 and 2020 while overall truck traffic in Arkansas would increase by 2 fold only without LATTS trucks and 2.2 fold with LATTS trucks. The LATTS truck share of total trucks is 15 percent on Corridor 7 and 14 percent on Corridor 11.

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:
  - LOC 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 Arkansas 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 Arkansas are presented in Exhibit E-7. The total number of Arkansas 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.

These analyses indicate that 447 of the LATTS roadway miles in Arkansas, or 32.2 percent of the Arkansas 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.

Exhibit E-7
ARKANSAS CAPACITY INVESTMENT NEEDS

Corridor/ Functional Class	Length (Miles)	Existing Lane Miles	Capacity Analysis: Deficient Mileage			2020 Needed Lane Miles		2020 Cost in $Million		
			1997	2020 W/O LATTS Added Traffic	2020 With LATTS Added Traffic	Base	With LATTS Added Traffic	Base	With LATTS Added Traffic	% Increase Due to LATTS
7	**I-55**		**New Orleans, LA to St. Louis, MO**							
R.Interstate	60.29	241.16	-	21.17	25.30	42.34	50.60	44	53	19.5%
U.Interstate	9.71	40.02	-	8.45	8.45	15.72	15.72	55	55	0.0%
TOTAL	70.00	281.18	-	29.62	33.75	58.06	66.32	99	108	8.8%
8	**I-49, US 71**		**New Orleans, LA to Kansas City, MO**							
R.Other PA	199.59	463.32	147.77	184.89	184.89	395.42	395.42	315	315	0.0%
U.Other Fwy.	25.82	103.28	-	19.07	19.07	73.58	73.58	255	255	0.0%
U.Other PA	21.68	82.96	1.13	5.19	5.19	10.38	10.38	17	17	0.0%
TOTAL	247.09	649.56	148.90	209.15	209.15	479.38	479.38	587	587	0.0%
11	**I-40**		**North Texas to Wilmington, NC**							
R.Interstate	333.54	1,334.16	15.89	259.44	268.14	561.90	585.48	578	598	3.6%
U.Interstate	138.56	648.34	28.27	82.07	84.32	331.18	345.66	1,150	1,200	4.4%
TOTAL	472.10	1,982.50	44.16	341.51	352.46	893.08	931.14	1,727	1,798	4.1%
21	**US 67, US 65, US 16**		**Lake Charles, LA to St. Louis, MO**							
R.Other PA	290.36	755.08	29.50	189.07	189.07	386.28	386.28	295	295	0.0%
U.Other Fwy.	17.14	68.56	-	5.89	5.89	15.46	15.46	54	54	0.0%
U.Other PA	11.42	33.84	3.77	6.50	6.50	13.00	13.00	21	21	0.0%
TOTAL	318.92	857.48	33.27	201.46	201.46	414.74	414.74	370	370	0.0%
22	**US 412**		**Tulsa, OK to Nashville, TN**							
R.Other PA	259.87	578.67	217.69	232.23	232.23	590.77	590.77	489	489	0.0%
U.Other PA	20.69	74.60	3.20	6.54	6.54	13.26	13.26	22	22	0.0%
TOTAL	280.56	653.27	220.89	238.77	238.77	604.03	604.03	511	511	0.0%
ALL CORRIDORS										
R.Interstate	393.83	1,575.32	15.89	280.61	293.44	604.24	636.08	622	651	4.7%
R.Other PA	749.82	1,797.07	394.96	606.19	606.19	1,372.47	1,372.47	1,099	1,099	0.0%
U.Interstate	148.27	688.36	28.27	90.52	92.77	346.90	361.38	1,204	1,254	4.2%
U.Other Fwy.	42.96	171.84	-	24.96	24.96	89.04	89.04	309	309	0.0%
U.Other PA	53.79	191.40	8.10	18.23	18.23	36.64	36.64	60	60	0.0%
TOTAL	1,388.67	4,423.99	447.22	1,020.51	1,035.59	2,449.29	2,495.61	3,294	3,373	2.4%

With the expected "normal" growth (as defined by the HPMS database), a total of 1,021 road miles or 73 percent of the LATTS network will have congestion problems by 2020. The "additional" LATTS trucks are expected to increase the total to 1,036 miles or 75 percent of total mileage as noted in Exhibit E-8. In other words, LATTS truck will increase congested miles of roadway by only 1 percent and the number of needed lane miles by 2 percent. These percentages are significant but they also indicate that the majority of the congestion problems in Arkansas 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
ARKANSAS 2020 CAPACITY NEEDS
LATTS Strategic Network

	Deficient Miles	% of Total Miles	Needs (Billion)
"Normal" Growth	1,021	73%	$3.3
"Additional" LATTS Traffic	15	1%	$0.1
Total	1,036	75%	$3.4

Based on the HPMS expected growth in traffic, nearly $3.3 billion will be required in the next 20 years to address congestion problems on the Arkansas portion of the LATTS Strategic Network. The "additional" LATTS traffic will bring that total to $3.4 billion, a 2.4 percent increase.

Capacity needs by corridor are illustrated in Exhibit E-9. Corridor 11 (I-40 from North Texas to Wilmington, NC) has the highest capacity needs both in terms of total needs ($1.8 billion by 2020) and average needs per roadway mile.

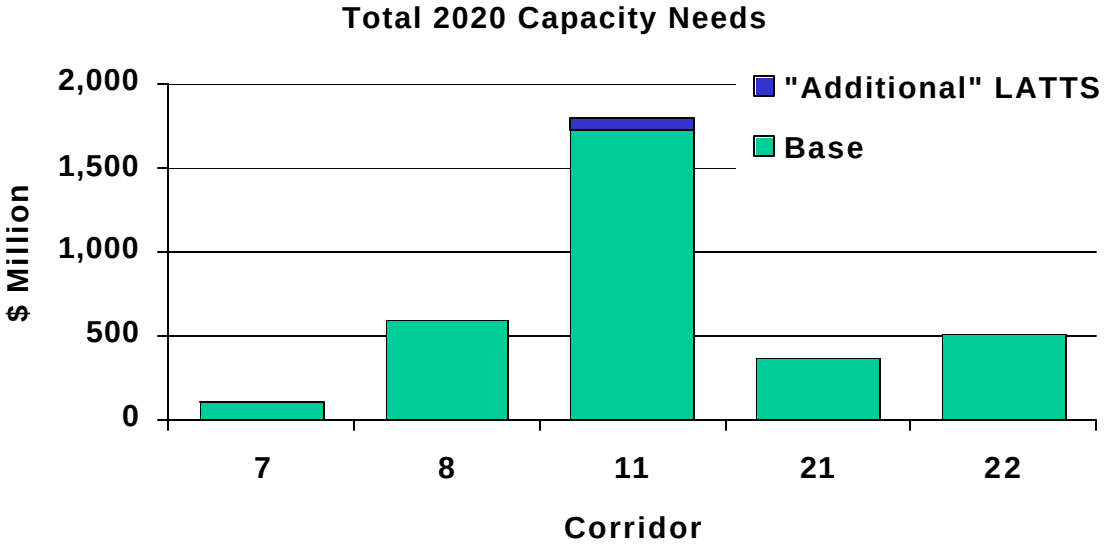
PAVEMENT NEEDS

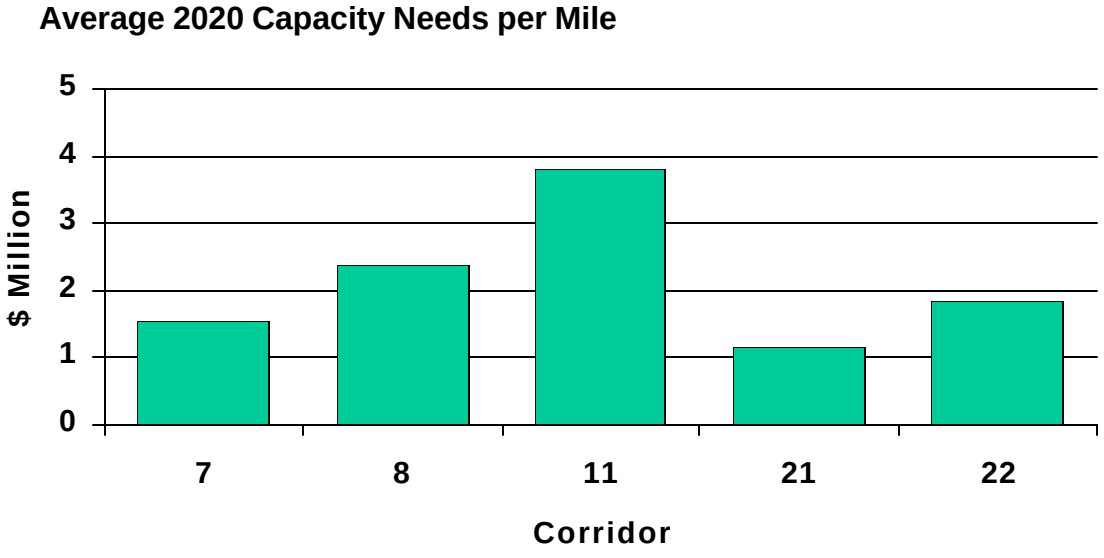
For purposes of this study, average annual pavement needs in 2020 were estimated. The number of years it would take for the pavement to deteriorate from new in 2020 to a deficient PSR rating (as defined by the minimum tolerable conditions presented earlier) was calculated for each highway segment. As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

Exhibit E-9
ARKANSAS STRATEGIC HIGHWAY NETWORK
Capacity Needs by Corridor





Each highway segment pavement life was calculated twice. An initial calculation was made using the "base" car and truck traffic from the Arkansas 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 the analysis of Arkansas pavement needs for the LATTS Strategic Highway Network are presented in Exhibit E-10. Based on the HPMS data, only 10 percent or 133 miles of the Arkansas overall LATTS Strategic Highway Network had existing (1997) pavement deficiencies. However, all pavement deficiencies are concentrated on the Interstate System used by LATTS trucks. Nearly 13.6 percent of the rural Interstate System and 29.5 percent of the urban interstate system had existing pavement deficiencies.

Future (2020) pavement needs are summarized in Exhibit E-11. Pavement life for the Arkansas portion of the LATTS Strategic Highway Network will average 6.3 years in 2020 with and without the "additional" LATTS truck traffic. The annual resurfacing costs for the Arkansas portion of the LATTS Strategic Highway Network is estimated to amount to $110 million with and without LATTS "additional" truck traffic. LATTS "additional" truck traffic is expected to have a negligible impact on Arkansas pavement resurfacing needs.

Exhibit E-10
ARKANSAS PAVEMENT RESURFACING NEEDS

Corridor/ Functional Class	Length (Miles)	Existing Lane Miles	Pavement Analysis					
			1997	2020 Pavement Life (Years)		2020 Average Annual Cost ($1,000)		
			Deficient Mileage	W/O LATTS Added Traffic	With LATTS Added Traffic	W/O LATTS Added Traffic	With LATTS Added Traffic	% Increase Due to LATTS
7	**I-55**		**New Orleans, LA to St. Louis, MO**					
R.Interstate	60.29	241.16	14.01	3.7	3.6	7,176	7,244	0.9%
U.Interstate	9.71	40.02	2.13	3.5	3.5	2,282	2,291	0.4%
TOTAL	70.00	281.18	16.14	3.6	3.6	9,458	9,535	0.8%
8	**I-49, US 71**		**New Orleans, LA to Kansas City, MO**					
R.Other PA	199.59	463.32	5.85	9.1	9.1	4,043	4,043	0.0%
U.Other Fwy.	25.82	103.28	-	3.8	3.8	5,555	5,555	0.0%
U.Other PA	21.68	82.96	3.37	5.4	5.4	2,362	2,362	0.0%
TOTAL	247.09	649.56	9.22	7.8	7.8	11,960	11,960	0.0%
11	**I-40**		**North Texas to Wilmington, NC**					
R.Interstate	333.54	1,334.16	39.44	3.9	3.8	37,612	37,908	0.8%
U.Interstate	138.56	648.34	41.66	4.4	4.4	32,998	33,123	0.4%
TOTAL	472.10	1,982.50	81.10	4.1	4.0	70,610	71,031	0.6%
21	**US 67, US 65, US 16**		**Lake Charles, LA to St. Louis, MO**					
R.Other PA	290.36	755.08	13.53	8.1	8.1	8,032	8,032	0.0%
U.Other Fwy.	17.14	68.56	10.12	4.3	4.3	3,324	3,324	0.0%
U.Other PA	11.42	33.84	0.40	8.2	8.2	651	651	0.0%
TOTAL	318.92	857.48	24.05	7.8	7.8	12,007	12,007	0.0%
22	**US 412**		**Tulsa, OK to Nashville, TN**					
R.Other PA	259.87	578.67	2.18	11.3	11.3	4,334	4,334	0.0%
U.Other PA	20.69	74.60	0.40	8.3	8.3	1,461	1,461	0.0%
TOTAL	280.56	653.27	2.58	10.9	10.9	5,795	5,795	0.0%
ALL CORRIDORS								
R.Interstate	393.83	1,575.32	53.45	3.8	3.8	44,788	45,152	0.8%
R.Other PA	749.82	1,797.07	21.56	9.4	9.4	16,409	16,409	0.0%
U.Interstate	148.27	688.36	43.79	4.4	4.4	35,280	35,414	0.4%
U.Other Fwy.	42.96	171.84	10.12	4.0	4.0	8,879	8,879	0.0%
U.Other PA	53.79	191.40	4.17	7.0	7.0	4,474	4,474	0.0%
TOTAL	1,388.67	4,423.99	133.09	6.3	6.3	109,829	110,328	0.5%

Exhibit E-11
ARKANSAS 2020 PAVEMENT NEEDS
LATTS Strategic Network

	Pavement Life (Years)	Annual Resurfacing Cost ($Million)
"Normal" Growth	6.3	$110
With "Additional" LATTS Traffic	6.3	$110

It was necessary for purposes of these analyses to use 1997 pavement condition data. It should be noted that Arkansas has undertaken an extensive Interstate Rehabilitation Program (IRP) using GARVEE financial bonds as well as dedicated state revenues. Under this program, approximately 380 miles of Interstates will be rehabilitated at a cost of approximately $1 billion. This program should mitigate some of the pavement needs identified on the LATTS Strategic Highway System.

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 Arkansas portion of the LATTS Strategic Highway Network are presented on Exhibit E-12. In this exhibit, Arkansas 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.

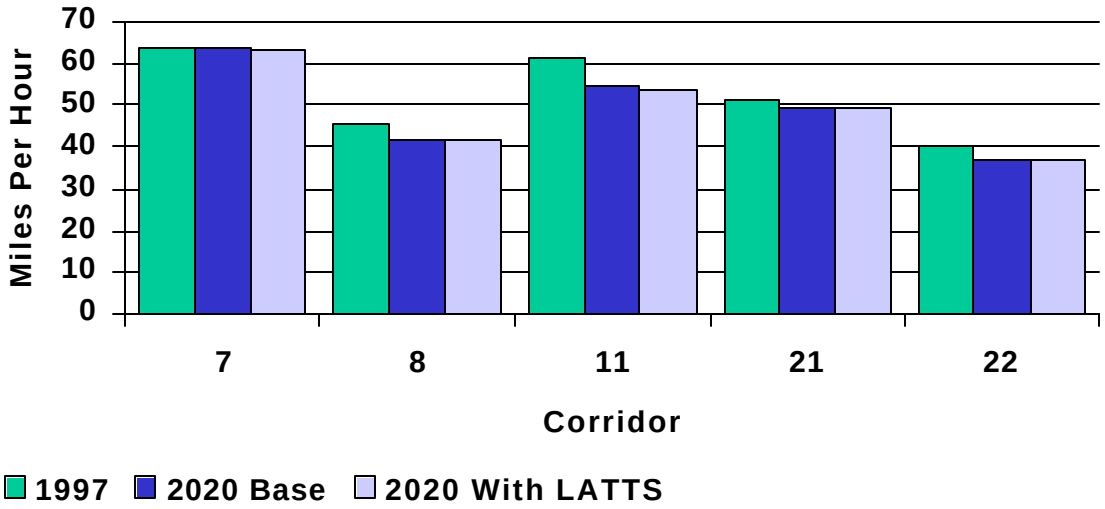
Exhibit E-12
ARKANSAS TRUCK OPERATING SPEEDS

Corridor/ Functional Class	Length (Miles)	Average No. Lane	Speed Limit (MPH)	Average 1997 AADT	1997 Truck Speed (MPH)		2020 Truck Speed (MPH) W/O Added LATTS Traffic		2020 Truck Speed (MPH) With Added LATTS Traffic	
					Daily Average	Peak Hour	Daily Average	Peak Hour	Daily Average	Peak Hour
7	**I-55**		**New Orleans, LA to St. Louis, MO**							
R.Interstate	60.30	4.0	70.0	19,361	64.3	64.2	64.1	53.7	64.0	51.3
U.Interstate	9.70	4.1	60.9	28,665	62.3	61.5	60.8	18.9	60.3	18.0
TOTAL	**70.00**	**4.0**	**68.6**	**20,651**	**64.0**	**63.8**	**63.6**	**42.8**	**63.4**	**40.8**
Time (HR)					**1.1**	**1.1**	**1.1**	**1.6**	**1.1**	**1.7**
8	**I-49, US 71**		**New Orleans, LA to Kansas City, MO**							
R.Other PA	199.60	2.3	55.0	7,190	48.0	40.8	43.6	26.9	43.6	26.9
U.Other Fwy.	25.80	4.0	68.1	28,398	61.2	60.2	55.6	20.1	55.6	20.1
U.Other PA	21.70	3.8	38.9	14,667	25.2	25.0	25.0	20.4	25.0	20.4
TOTAL	**247.10**	**2.6**	**54.1**	**10,062**	**45.5**	**40.0**	**41.8**	**25.3**	**41.8**	**25.3**
Time (HR)					**5.4**	**6.2**	**5.9**	**9.8**	**5.9**	**9.8**
11	**I-40**		**North Texas to Wilmington, NC**							
R.Interstate	333.50	4.0	70.0	25,558	62.7	59.9	59.9	35.9	59.2	33.1
U.Interstate	138.60	4.7	64.1	44,205	57.5	38.5	45.0	21.6	44.0	21.2
TOTAL	**472.10**	**4.2**	**68.2**	**31,031**	**61.1**	**51.5**	**54.6**	**30.1**	**53.7**	**28.4**
Time (HR)					**7.7**	**9.2**	**8.6**	**15.7**	**8.8**	**16.6**
21	**US 67, US 65, US 16**		**Lake Charles, LA to St. Louis, MO**							
R.Other PA	290.40	2.6	58.8	7,783	53.0	48.5	51.0	43.7	51.0	43.7
U.Other Fwy.	17.10	4.0	53.3	19,564	49.5	48.9	49.1	28.0	49.1	28.0
U.Other PA	11.40	3.0	46.6	10,863	31.4	29.6	28.2	18.5	28.2	18.5
TOTAL	**318.90**	**2.7**	**57.9**	**8,526**	**51.6**	**47.4**	**49.4**	**40.5**	**49.4**	**40.5**
Time (HR)					**6.2**	**6.7**	**6.5**	**7.9**	**6.5**	**7.9**
22	**US 412**		**Tulsa, OK to Nashville, TN**							
R.Other PA	259.90	2.2	53.2	6,282	41.5	36.1	38.4	29.0	38.4	29.0
U.Other PA	20.70	3.6	49.2	16,204	27.1	25.0	25.9	20.3	25.9	20.3
TOTAL	**280.60**	**2.3**	**52.8**	**7,014**	**39.9**	**35.0**	**37.1**	**28.1**	**37.1**	**28.1**
Time (HR)					**7.0**	**8.0**	**7.6**	**10.0**	**7.6**	**10.0**

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 Arkansas 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 Arkansas LATTS corridors are summarized in Exhibit E-13.

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



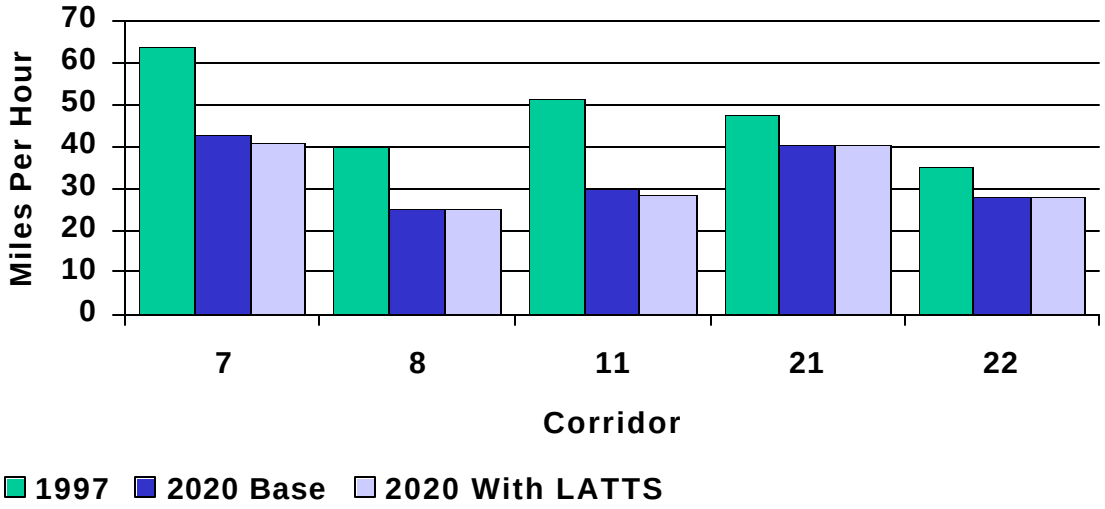
The two corridors with a majority of interstate facilities, Corridor 7 (I-55 from New Orleans, LA to ST. Louis, MO) and Corridor 11(I-40 from North Texas to Wilmington, NC), have average daily operating speeds above 50 MPH in 1997. Corridors 8 (I-49/ U.S.71 from New Orleans, LA to Kansas City, MO) and Corridor 22 (U.S.412 from Tulsa, OK to Nashville, TN) have lower average daily speeds in the 40 to 45 MPH ranges because they are comprised of lower type facilities.

The projected growth in traffic between 1997 and 2020 will affect this measure of performance significantly only in the case of Corridor 11. Unless additional capacity is provided, the average daily speed on this LATTS corridor will be reduced by more than 6 MPH.

The impact of the "additional" LATTS traffic on average daily truck travel speed appears minimal in Arkansas at less than 1 MPH.

The expected traffic growth in Arkansas' LATTS corridors will affect "peak hour" speeds more significantly, up to 21 MPH for Corridor 11 (I-40 from North Texas to Wilmington, NC) and Corridor 7 (I-55 from New Orleans, LA to St. Louis, MO) as illustrated in Exhibit E-14.

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



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

CONCLUSIONS FOR LATTS MAINLINE HIGHWAYS

(1) LATTS truck traffic in Arkansas is expected to grow at a much higher rate than the rest of the traffic in the state. From 1997 to 2020, LATTS truck traffic will increase by 365 percent while all other traffic is expected to increase by 100 percent.

(2) About 75 percent of the LATTS Strategic Highway Network in Arkansas will require additional capacity by 2020 at a cost of $ 3.4 billion. The majority of these needs are due to expected growth in total traffic and not to LATTS trucks only.

(3) If these investment needs are not met, Arkansas' portion of the LATTS Strategic Highway Network will experience some deterioration in operating speeds, especially during "peak hour."

(4) LATTS truck traffic will have a minimal impact on the state highway investment needs for the Strategic Highway Network. By 2020, LATTS "additional" truck traffic will have resulted in:

- 1.5% more highway miles needing capacity improvements.
- 2.4% additional costs to address these capacity needs.
- 0.5% increase in annual pavement resurfacing costs.

(5) Construction of I-69 can be expected to reduce or delay some of the needs on existing facilities, e.g., I-30 and I-40.

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, Arkansas has nine LATTS connectors (6.0 miles) serving three intermodal facilities for which information was available in the *NHS Connector Inventory Database*. All are under local jurisdiction.

Information for the connector to the Northwest Arkansas Regional Airport was not contained in the NHS Inventory database. Information for connectors to the Ebony and Harvard intermodal yards also was not in the database.

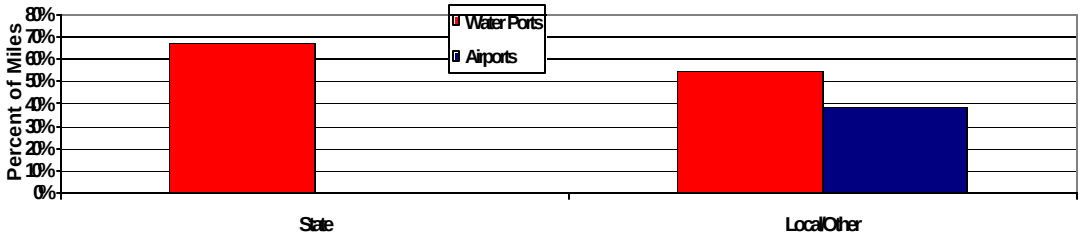
Pavement Problems

As illustrated in Exhibit E-16, more than two-thirds of Arkansas' waterport connector miles were reported to have poor to very poor pavement conditions, which is slightly higher than the average of Alliance waterport connectors under local other jurisdiction. The three airport connectors in the survey were reported to have no pavement deficiencies.

Exhibit E-15
LATTS INTERMODAL CONNECTORS

Facility Id	Facility Name	Link Miles	Rural/Urban Designation	Ownership	Agency
AR10P	Little Rock Port Complex	0.9	Urbanized (>200k)	Municipal Highway	Metropolitan Little Rock
AR10P	Little Rock Port Complex	0.2	Urbanized (>200k)	Municipal Highway	Metropolitan Little Rock
AR15P	Port of Pine Bluff	0.25	Urbanized (50k to 200k)	Municipal Highway	Southeast Ark. Regional Planning Commission
AR15P	Port of Pine Bluff	2.1	Urbanized (50k to 200k)	Municipal Highway	Southeast Ark. Regional Planning Commission
AR15P	Port of Pine Bluff	0.9	Urbanized (50k to 200k)	Municipal Highway	Southeast Ark. Regional Planning Commission
AR15P	Port of Pine Bluff	0.3	Urbanized (50k to 200k)	Municipal Highway	Southeast Ark. Regional Planning Commission
AR9A	Little Rock National Airport	0.2	Urbanized (>200k)	Municipal Highway	Metropolitan Little Rock
AR9A	Little Rock National Airport	0.8	Urbanized (>200k)	Municipal Highway	Metropolitan Little Rock
AR9A	Little Rock National Airport	0.3	Urbanized (>200k)	Municipal Highway	Metropolitan Little Rock

Exhibit E-16
CONNECTORS WITH PAVEMENT Problems
Arkansas vs. Alliance Local/Other



Geometric/Physical Problems

Connectors AR15P and AR9A both were reported to have shoulder problems and inadequate travel way width. This is consistent with the leading reported deficiencies in this category throughout the Alliance Region. Drainage was reported to be a problem on AR10P and one of the AR9A connectors.

At-Grade Railroad Crossing Problems

Of the nine connectors, three have at-grade railroad crossings and two of those were reported to have rough at-grade rail crossings. Arkansas connectors have fewer deficiencies than the rest of the Alliance Region in this category.

Traffic Operations and Safety Problems

AR15P was reported to have problems with truck turning movements and peak flow queues. There were no other significant deficiencies reported in this category.

State Summary

Based upon the available information, Arkansas' LATTS connectors generally fared better than the Alliance Region in the number of deficiencies reported. Pavement conditions were a concern at the waterports.

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.

Arkansas ITS/CVO Plan

As of the time of this review, Arkansas did not have an ITS/CVO Business Plan. The State was in the process of completing a statewide ITS program that will include a CVO component. This report should be completed within the next one to two years.

During the later part of 1998, Arkansas put into service a PrePass system along I-40, I-55 and recently I-30. There are a total of seven existing locations, all along these three corridors and all equipped with PrePass. PrePass is a system that allows motor carriers who are properly credentialed to bypass weigh stations and ports of entry. Those drivers that are in compliance do not have to stop. They continue without being delayed. Ultimately this project will allow commercial vehicles to operate more efficiently and safely due to a reduction in the number of vehicles that stop at weigh stations.