

Travel Time Study

October 1997

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This report presents a summary of the Congestion Management System (CMS) Travel Time Study for the Knoxville Urban Area which includes Knoxville, Knox County, Farragut, Blount County, Maryville, and Alcoa.



Highlights of CMS Travel Time Study

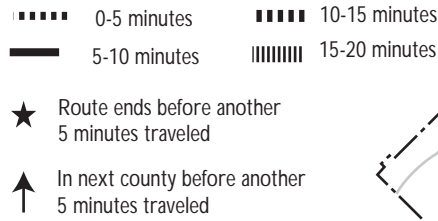
The travel time study area was divided into corridors which carry more than 10,000 vehicles per day. The 10,000 vehicles per day was chosen for several reasons. A two lane road can generally handle this volume without widening the roadway; and if a problem or problems were identified in a corridor, then the most drivers would be helped for the amount of money expended. The interstate system was divided into 8 corridors, Knox County was divided into 39 corridors and Blount County was divided into 9 corridors. Approximately 300 miles of corridors were defined and nearly 3,600 miles of roads traveled to obtain the travel time study data for Knox and Blount Counties.

- Travel time runs of the corridors were conducted between November 1995 and February 1997.
- The morning peak hour generally occurs between 7 and 9 a.m. and the afternoon peak hour between 4 and 6 p.m.
- For the purpose of this study, congestion is defined as serious when it takes twice as long to make a trip during the peak hour as opposed to the off peak hour. On the interstate system, serious congestion occurs on I-40/75 between the Airport/Smoky Mountains and I-640 interchanges, and on I-40 between the Henley Street and James White Parkway interchanges.
- "Sunshine slowdown" can cause a trip to take twice as long, e.g., on I-40/75 westbound between Alcoa Highway and Papermill Road.
- It is not unusual to see traffic backed onto I-40/75 at both the Campbell Station Road and Lovell Road westbound exit ramps in the afternoon peak hour.
- In the afternoon peak hour the I-640 eastbound right lane backs up about 1/4 mile because of the short weaving distance between the eastbound on ramp from Broadway and the eastbound exit ramp to Broadway.
- On average it takes 90 seconds to get from the Broadway eastbound exit ramp on to Broadway.

This report was prepared in cooperation with, and funded in part by, the U. S. Department of Transportation, Federal Highway Administration and the Federal Transit Administration and the Tennessee Department of Transportation.

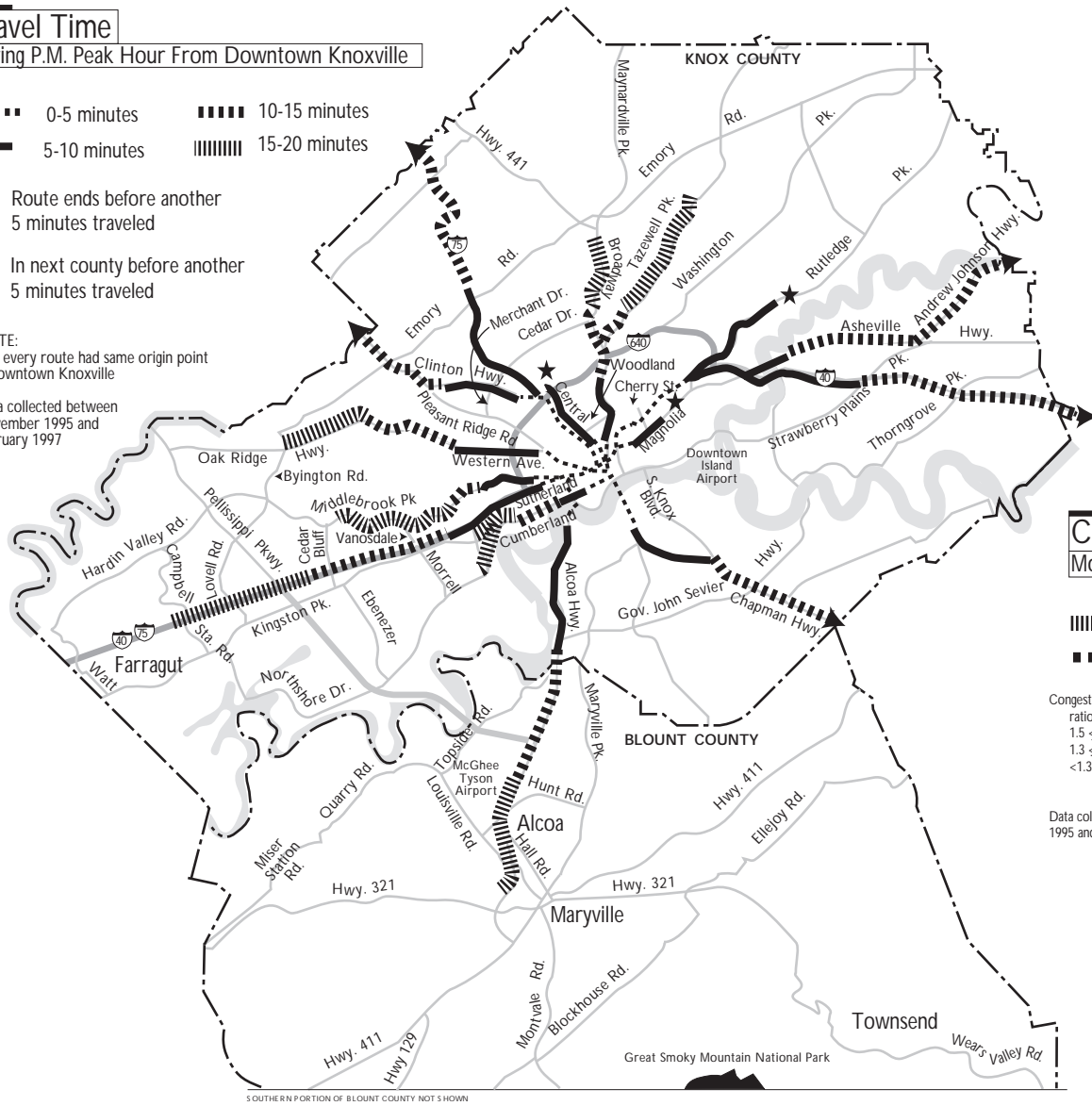
Travel Time

During P.M. Peak Hour From Downtown Knoxville

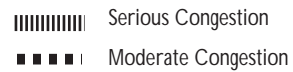


NOTE:
Not every route had same origin point in downtown Knoxville

Data collected between November 1995 and February 1997



Congested Roadways Morning Peak Hour



Congestion rating is based on ratio of peak hour travel time to free flow travel time.
 ≥ 2.0 indicates serious congestion
 $1.5 < \text{ratio} < 2.0$ indicates moderate congestion
 $1.3 < \text{ratio} < 1.5$ indicates marginal congestion
 < 1.3 indicates no congestion

Data collected between November 1995 and February 1997



Travel Time

Travel time is the total time it takes to get from point A to point B, i.e., it includes all the time spent stopped en route. Knox County has 3 corridors that experience serious congestion based on travel time for the corridor while Blount County has none.

1. Buckingham/Vanosdale is between Middlebrook Pike and Kingston Pike and is nearly a mile in length.
2. Peters/Ebenezer Road is between Northshore Drive and Kingston Pike and is more than 3.5 miles in length. (*under construction)
3. Lovell Road is approximately a mile from Kingston Pike to the I-40/75 westbound ramps.

Table One

| Corridor | Time (minutes) | | |
|----------------------|-------------------|----------|---------------------|
| | Morning Peak Hour | Off Peak | Afternoon Peak Hour |
| Buckingham/Vanosdale | 6.7 | 2.3 | 5.0 |
| Peters/Ebenezer Rd | 11.4 | 5.4 | * |
| Lovell Rd | 5.5 | 2.7 | * |

* Does not meet definition of serious congestion

SOUTHERN PORTION OF BLOUNT COUNTY NOT SHOWN

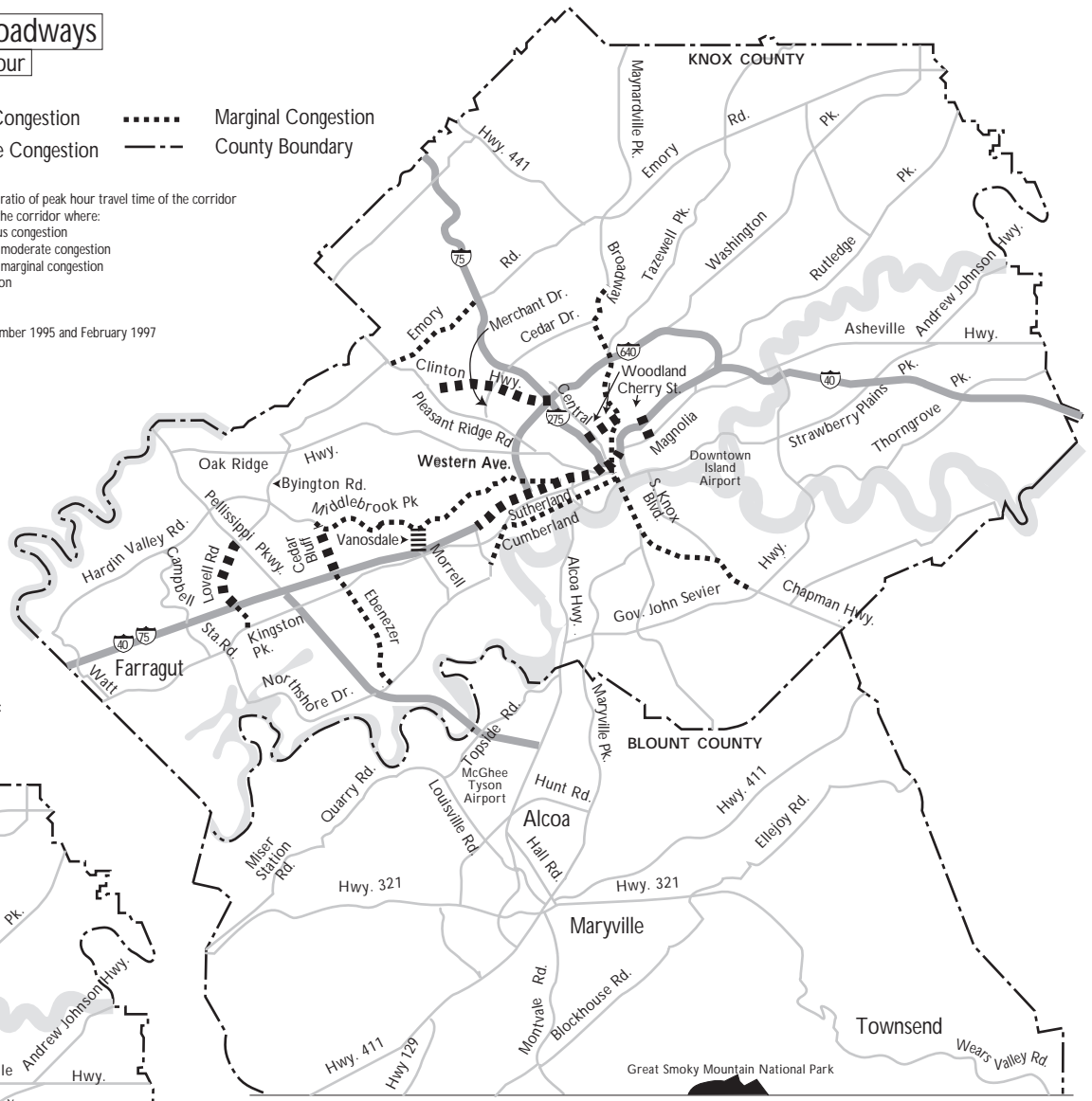
Congested Roadways

Afternoon Peak Hour

- |||||| Serious Congestion
- Moderate Congestion
- Marginal Congestion
- County Boundary

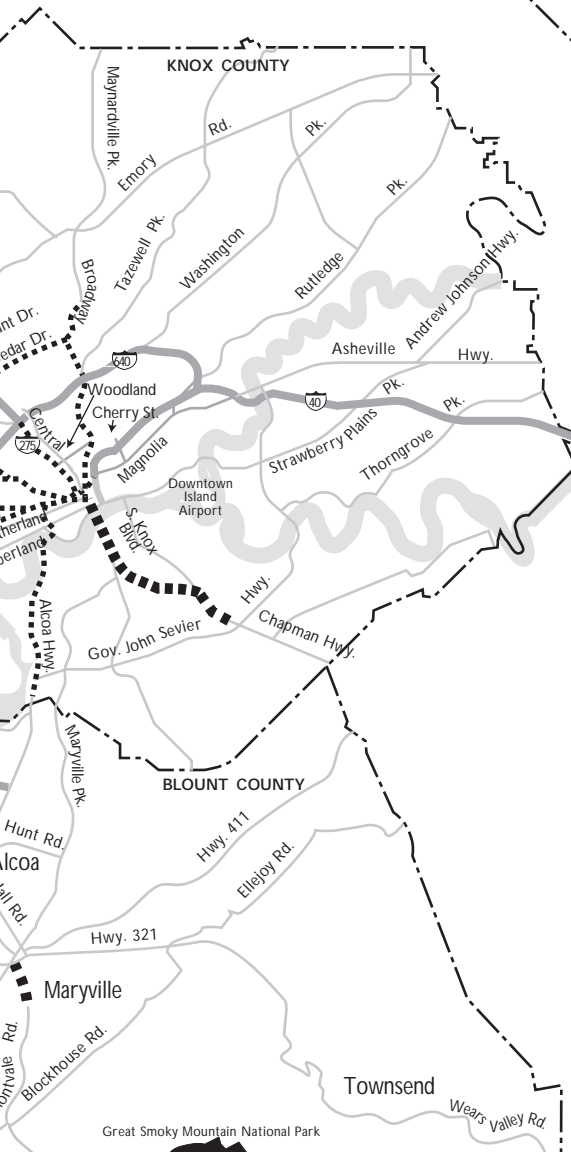
Congestion rating is based on ratio of peak hour travel time of the corridor to the off peak travel time of the corridor where:
 ratio ≥ 2.0 indicates serious congestion
 $1.5 \leq$ ratio < 2.0 indicates moderate congestion
 $1.3 \leq$ ratio < 1.5 indicates marginal congestion
 < 1.3 indicates no congestion

Data collected between November 1995 and February 1997



- Marginal Congestion
- County Boundary

ratio of the corridor to the off peak travel time of the corridor where:



Running Time

Running time is the time the vehicle is in motion, i.e., running time does not include stopped delay. The Buckingham/Vanosdale corridor is used as an example in Table Two.

Table Two

| Buckingham/ Vanosdale | Time (minutes) | | |
|--------------------------|-------------------|----------|---------------------|
| | Morning Peak Hour | Off Peak | Afternoon Peak Hour |
| Running Time | 2.4 | 2.0 | 2.0 |
| Fixed Delay Time | 4.3 | 0.3 | 3.0 |

Knox County has 12 corridors which experience serious congestion along sections of the corridor based on the running time. Blount County does not exhibit serious congestion for this performance measure. The Knox County corridors are: Broadway; Campbell Station Rd/Concord Rd; Chapman Hwy; Cherry St; Clinton Hwy; James White Pkwy; Lovell Rd; Maynardville Hwy; Merchant Dr; and Peters/Ebenezer Rd; Kingston Pk*. The * indicates that 2 of the 3 corridors that Kingston Pike was divided into for this study exhibit serious congestion.

Fixed Delay

Fixed delay is the time spent stopped at traffic control devices, e.g., traffic signals and stop signs. Serious congestion at an intersection with a traffic control device is defined as a vehicle that is stopped for more than 60 seconds. Knox County has 24 intersections and Blount County has 1 intersection which exhibit serious congestion.

The congested intersections are ranked in descending order of delay by the hour period which experiences the most delay. The table provides the seconds of delay experienced in the morning peak hour, the off peak hour and the afternoon peak hour. The xx.x indicates that the delay was less than or equal to 25.0 seconds for that time period and, therefore, delay is not a problem for that time period.

Table Three

| Corridor | Intersection | Seconds of Delay am/off/pm |
|----------------------|-----------------------------|-------------------------------|
| Buckingham/Vanosdale | Sheffield Dr | 225.5/xx.x/69.5 |
| Lovell Rd | I-40 eastbound ramps | 155.0/47.0/xx.x |
| Northshore Dr | Morrell Rd/Wrights Ferry Rd | 157.3/xx.x/30.8 |
| Cedar Ln | Central Ave Pk | 144.3/36.3/xx.x |
| Clinton Hwy | Merchant Dr | 35.8/xx.x/143.0 |
| Oak Ridge Hwy | Beaver Ridge/Byington | 76.5/xx.x/94.5 |
| Middlebrook Pk | Liberty St | 134.5/xx.x/34.8 |
| Kingston Pk | Forest Glen Dr/Scenic Dr | 58.8/36.3/68.5 |
| Merchant Dr | Clinton Hwy | 60.3/44.8/58.0 |
| Northshore Dr | Kingston Pk | 69.3/xx.x/77.3 |
| Cedar Bluff Rd | North Peters Rd | 28.5/32.0/85.0 |
| Montvale St | Boardman St | 92.5/xx.x/52.8 |
| Buckingham/Vanosdale | Kingston Pk | 32.0/xx.x/112.8 |
| Woodland Ave | Broadway | 35.0/xx.x/107.5 |
| Cedar Bluff Rd | Middlebrook Pk | xx.x/xx.x/141.5 |
| Peters/Ebenezer Rd | Old Ebenezer Rd | 38.3/xx.x/96.8 |
| Sutherland Ave | Concord St | 62.3/27.0/34.8 |
| Asheville Hwy | Gov John Sevier Hwy | 31.3/25.3/61.0 |
| Emory Rd | Heiskell Rd/Central Ave Pk | xx.x/xx.x/117.5 |
| Lovell Rd | I-40 eastbound ramps | xx.x/xx.x/113.5 |
| Emory Rd | Heiskell Rd/Central Ave Pk | 100.3/xx.x/xx.x |
| Campbell Sta/Concord | Old Colony Pkwy | 78.5/xx.x/xx.x |
| Lovell Rd | Kingston Pk | xx.x/xx.x/77.5 |
| Broadway | Hotel Ave | 76.5/xx.x/xx.x |
| Peters/Ebenezer Rd | Westland Dr (west) | 65.0/xx.x/xx.x |

Note: Serious congestion defined as >60.0 sec of stopped delay

Several of the corridors and intersections that have been identified in this study are either under construction or in a pre-construction phase. Peters/Ebenezer Rd was under construction when travel times were conducted. The grade separated railroad crossing has recently opened for traffic, but the project is not quite completed. Lovell Rd south of I-40/75 is currently in design phase.

What the travel time data will be used for:

- To confirm what is already known and/or to provide information about existence of previously unknown problems.
- To prioritize corridors which need turning movement counts done so that traffic signals can be retimed. The turning movement count program is underway for 57 intersections in the City of Knoxville.
- To provide input to the Metropolitan Planning Organization's (MPO) early deployment planning study for intelligent transportation systems.
- To compare actual congested speeds to those produced by the MPO's traffic model.
- To identify projects for capital improvements programs of the local agencies.
- To provide another data point for determining the MPO's priority projects list which is sent to TDOT annually.
- To pinpoint where further analysis is needed.