

## 7. TRAVEL TIME STUDIES

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In order to thoroughly evaluate the Dixie Highway Corridor, travel time studies for the AM and PM Peak Hours were conducted throughout the week, for the existing conditions. In addition, travel time studies were conducted for the Noon and Off Peak Hours on an average weekday.

Travel time studies are conducted to evaluate the quality of traffic movement along a route and to determine the locations, types, and extent of traffic delay by using a moving test vehicle. Often, travel time studies are performed before and after roadway, intersection, or traffic signal improvements are made.

While conducting a travel time study, the floating car technique was used. In the floating car technique, the test vehicle floats with traffic, passing as many vehicles as pass the test car. The idea is to be an average vehicle in the traffic stream.

The following table lists the dates of the travel time studies:

|           |      |                |
|-----------|------|----------------|
| Monday    | AM   | March 1, 2004  |
|           | PM   | March 1, 2004  |
| Tuesday   | AM   | March 2, 2004  |
|           | Off  | March 2, 2004  |
|           | Noon | March 2, 2004  |
| Wednesday | PM   | March 9, 2004  |
|           | AM   | March 3, 2004  |
| Thursday  | PM   | March 3, 2004  |
|           | AM   | March 4, 2004  |
| Friday    | PM   | March 11, 2004 |
|           | AM   | March 5, 2004  |
|           | PM   | March 12, 2004 |

The variance in dates is due to weather conditions. It is necessary that travel time studies be performed under standard conditions to ensure comparability. Conditions such as bad weather and accidents can produce falsely negative results which may not represent typical travel. The nature of the Dixie Highway Corridor, running parallel to Interstate 71/75 in Northern Kentucky, makes measuring travel time particularly challenging. Close attention was paid to conditions in the corridor, as well as the interstate, for any accidents or other incidents. Constant contact was maintained with ARTIMIS (Advanced Regional Traffic Interactive Management and Information System) during the completion of the travel time studies.

In order to accurately gauge the information presented in the travel time studies, each run was digitally recorded. These recordings helped to determine the cause of any delays and any deficiencies within the system. The travel time videos were included with the Field Inventory Report (October 25, 2004).

In the majority of the travel time studies, delay was caused by traffic signals. However, there were also instances of buses causing delay by blocking traffic and several instances of left turning vehicles blocking the left through lane.

The travel time studies revealed several areas of concern. For most of the travel time studies, regardless of time of day, the intersection of Dixie Highway and Kenton Lands presented a problem. During most of the runs, the vehicle was stopped and delayed at this intersection. This seems to be mainly a timing problem. The signal at this intersection does not seem to be coordinated with the remainder of the system.

In addition to the signal coordination problem at Kenton Lands Road, there are several driveways leading up to this intersection. A two-way left turn lane has been provided in this area, however, the vehicles turning into and out of these driveways presents a problem to the Dixie Highway traffic. The two-way left turn lane helps to move the left turning vehicles out of the through lanes, however, the large number of vehicles turning into and out of the driveways creates a large number of conflict points.

The intersection of Dixie Highway and Dudley Road / Summit Drive also proved to be a problem during the travel time studies. Again the vehicle was stopped routinely at this intersection. The signal at this intersection also did not seem to be in good coordination with the rest of the system. In addition, there seemed to be a high percentage of right-turning vehicles at this intersection, causing vehicles to stack in the right-most (curb) through lane.

Several detectors caused problems during the travel time studies. First, at the intersection of Dixie Highway and the I-71/75 SB Ramp, the NB left on Dixie Highway is monitored by a video detector. This detector often includes the left-most through lane, causing the NB left turn phase to be called. This causes undue delay to the SB movements. Secondly, the loop detector on St. Joseph's Lane is false calling the side street phase. Several times during the travel time study, the vehicle was stopped due to a false call at this intersection.

During the travel time studies, there were several instances where bus stops caused the right-most (curb) through lane to be blocked temporarily. This is a problem in most urban areas. The buses only stop for a few moments, however, during peak hours this is enough time to cause congestion on Dixie Highway. In addition, the sign inventory revealed that a number of bus stops have been added over the years. Moving or consolidating some bus stops would improve overall conditions.

A significant number of left turns are made during an average day. These left turning vehicles generally block the left lane and cause a backup until the turn can be completed. Because regular users of the corridor know this, there is a large amount of traffic using the right-most (curb) through lane exclusively. This uneven distribution of traffic often results in no vehicles using the left-most through lane and a backup in the right-most (curb) lane.

The results of the travel time studies were provided in the Field Inventory Report (October 25, 2004). Tables 2-5 show the average speeds per link for each day of the week, for the AM and

PM Peak Hours traveling northbound and southbound. These tables show the variation that exists based on the day of the week.

The travel time studies were conducted to test the adequacy of all traffic models developed for this study. The values determined from the travel time studies were compared to the output from the traffic models to determine their ability to correctly model existing conditions. The Capacity Analysis Section (Section 10) of this report provide the travel time study / model comparisons.

DIXIE HIGHWAY CORRIDOR STUDY  
 A PLAN FOR TRANSPORTATION & TRAFFIC OPTIMIZATION

TABLE 2 – TRAVEL TIME STUDY (BEFORE) AM PEAK HOUR NB

| Cross Street                                               | Class |         | Mon NB AM<br>Avg Speed<br>(mi/hr) | Tues NB AM<br>Avg Speed<br>(mi/hr) | Wed NB AM<br>Avg Speed<br>(mi/hr) | Thurs NB AM<br>Avg Speed<br>(mi/hr) | Fri NB AM<br>Avg Speed<br>(mi/hr) |
|------------------------------------------------------------|-------|---------|-----------------------------------|------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| Turway Road / Main Street / Rose Drive & Dixie Highway     | III   | NB<br>↓ | 19.6                              | 31.7                               | 15.2                              | 11.0                                | 18.9                              |
| Goodridge Drive / Bustetter Drive & Dixie Highway          | III   |         | 27.6                              | 29.9                               | 31.9                              | 27.1                                | 32.2                              |
| Eastern Avenue / Kentaboo Avenue & Dixie Highway           | III   |         | 29.1                              | 29.3                               | 36.9                              | 34.5                                | 30.2                              |
| Cave Run Drive & Dixie Highway                             | III   |         | 32.2                              | 33.4                               | 22.5                              | 24.8                                | 34.7                              |
| Sunset Avenue / Main Street & Dixie Highway                | III   |         | 30.7                              | 31.7                               | 36.1                              | 33.5                                | 24.0                              |
| McAlpin Avenue & Dixie Highway                             | III   |         | 30.4                              | 25.1                               | 19.5                              | 32.4                                | 23.7                              |
| May Street & Dixie Highway                                 | III   |         | 26.9                              | 32.6                               | 14.1                              | 32.0                                | 31.4                              |
| Bartlett Street & Dixie Highway                            | III   |         | 25.7                              | 30.4                               | 22.4                              | 31.4                                | 34.1                              |
| Commonwealth Avenue / Stevensen Road & Dixie Highway       | III   |         | 7.9                               | 30.9                               | 8.7                               | 9.0                                 | 13.7                              |
| Hallam Avenue & Dixie Highway                              | III   |         | 27.9                              | 15.8                               | 31.6                              | 28.6                                | 29.9                              |
| Silver Lakes Shopping Center / Post Office & Dixie Highway | III   |         | 26.4                              | 34.1                               | 38.7                              | 38.8                                | 38.6                              |
| Montgomery Avenue / Post Office & Dixie Highway            | III   |         | 8.1                               | 11.5                               | 34.6                              | 31.9                                | 19.3                              |
| Kenton Lands Road & Dixie Highway                          | III   |         | 31.1                              | 18.2                               | 23.6                              | 20.5                                | 16.6                              |
| Edgewood Road / Dixie High School & Dixie Highway          | III   |         | 20.0                              | 21.2                               | 31.7                              | 19.6                                | 17.4                              |
| Dudley Road / Summit Drive & Dixie Highway                 | III   |         | 18.3                              | 20.5                               | 12.1                              | 28.4                                | 11.1                              |
| Rosemount Drive / Crestview Hills Mall & Dixie Highway     | III   |         | 31.8                              | 27.8                               | 30.7                              | 37.7                                | 23.4                              |
| Winding Way / Dillard's Entrance & Dixie Highway           | III   |         | 29.2                              | 26.4                               | 37.2                              | 31.1                                | 22.2                              |
| EB I-275 Ramp & Dixie Highway                              | III   |         | 36.4                              | 30.3                               | 40.8                              | 35.2                                | 37.6                              |
| Lookout Farm & Dixie Highway                               | III   |         | 39.6                              | 40.7                               | 40.5                              | 33.2                                | 29.9                              |
| Carran Drive & Dixie Highway                               | III   |         | 37.2                              | 36.7                               | 33.8                              | 34.7                                | 33.8                              |
| Turkeyfoot Road / Hudson Avenue & Dixie Highway            | III   |         | 36.5                              | 32.0                               | 38.9                              | 22.2                                | 23.9                              |
| Arcadia Avenue & Dixie Highway                             | III   |         | 22.3                              | 21.7                               | 28.8                              | 20.1                                | 29.1                              |
| Buttermilk Pike / Huckelberry Lane & Dixie Highway         | III   |         | 19.5                              | 27.8                               | 13.9                              | 6.4                                 | 13.1                              |
| Orphanage Road & Dixie Highway                             | III   |         | 28.1                              | 27.1                               | 11.0                              | 9.8                                 | 11.8                              |
| Pleasant Ridge Avenue & Dixie Highway                      | III   |         | 24.2                              | 19.1                               | 30.0                              | 28.5                                | 28.3                              |
| Highland Avenue & Dixie Highway                            | III   |         | 25.3                              | 20.3                               | 34.1                              | 26.0                                | 34.6                              |
| Beechwood Road & Dixie Highway                             | III   |         | 16.7                              | 25.9                               | 21.6                              | 21.6                                | 37.5                              |
| Expressway Plaza & Dixie Highway                           | III   |         | 34.7                              | 33.8                               | 26.6                              | 35.4                                | 36.1                              |
| NB I-75 Ramp & Dixie Highway                               | III   |         | 38.5                              | 23.0                               | 24.4                              | 30.5                                | 38.3                              |
| SB I-75 Ramp & Dixie Highway                               | III   |         | 39.0                              | 37.7                               | 24.8                              | 28.6                                | 39.3                              |
| Orchard Avenue & Dixie Highway                             | III   |         | 33.8                              | 29.2                               | 30.2                              | 39.5                                | 38.7                              |
| St. John's Road / Ridge Road & Dixie Highway               | III   |         | 31.1                              | 36.6                               | 32.8                              | 32.5                                | 34.1                              |
| Fortside Drive & Dixie Highway                             | III   |         | 25.6                              | 39.9                               | 35.2                              | 33.6                                | 33.3                              |
| Ashwood Court & Dixie Highway                              | III   |         | 15.7                              | 29.3                               | 38.5                              | 32.1                                | 37.3                              |
| Kyles Lane & Dixie Highway                                 | III   | 12.2    | 41.9                              | 13.1                               | 7.5                               | 18.5                                |                                   |
| Sleepy Hollow Road & Dixie Highway                         | III   | 31.9    | 33.5                              | 28.6                               | 30.9                              | 31.5                                |                                   |
| St. James Avenue / Hilton Drive & Dixie Highway            | III   | 31.0    | 17.7                              | 32.0                               | 35.8                              | 34.1                                |                                   |
| Covington Catholic Entrance & Dixie Highway                | III   | 35.7    | 33.5                              | 39.7                               | 27.2                              | 21.9                                |                                   |
| St. Joseph Lane & Dixie Highway                            | III   | 35.4    | 32.2                              | 43.7                               | 39.0                              | 41.1                                |                                   |
| South Arlington Road & Dixie Highway                       | III   | 35.3    | 36.9                              | 38.2                               | 33.7                              | 41.3                                |                                   |
| North Arlington Road & Dixie Highway                       | III   | 37.4    | 37.6                              | 31.6                               | 37.3                              | 41.6                                |                                   |
| Montague Road / Western Avenue & Dixie Highway             | III   | 16.0    | 36.5                              | 23.9                               | 21.0                              | 34.3                                |                                   |
| SB I-75 Off Ramp / Bullock Street & Dixie Highway          | III   | 12.1    | 33.4                              | 12.7                               | 15.6                              | 18.4                                |                                   |
| NB I-75 On Ramp / Willow Street & Dixie Highway            | III   | 16.5    | 15.8                              | 20.0                               | 18.4                              | 11.0                                |                                   |
| NB AM Peak Hour Travel Time (s)                            |       |         | 1246.5                            | 1037.3                             | 1195.0                            | 1272.7                              | 1112.7                            |

TABLE 3 – TRAVEL TIME STUDY (BEFORE) AM PEAK HOUR SB

| Cross Street                                               | Class | SB   | Mon SB AM<br>Avg Speed<br>(mi/hr) | Tues SB AM<br>Avg Speed<br>(mi/hr) | Wed SB AM<br>Avg Speed<br>(mi/hr) | Thurs SB AM<br>Avg Speed<br>(mi/hr) | Fri SB AM<br>Avg Speed<br>(mi/hr) |
|------------------------------------------------------------|-------|------|-----------------------------------|------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| NB I-75 On Ramp / Willow Street & Dixie Highway            | III   | ↓    | 22.4                              | 9.7                                | 28.5                              | 22.7                                | 20.6                              |
| SB I-75 Off Ramp / Bullock Street & Dixie Highway          | III   |      | 21.5                              | 28.1                               | 27.5                              | 13.7                                | 22.3                              |
| Montague Road / Western Avenue & Dixie Highway             | III   |      | 19.9                              | 9.0                                | 17.5                              | 10.6                                | 17.2                              |
| North Arlington Road & Dixie Highway                       | III   |      | 31.5                              | 33.5                               | 33.0                              | 31.8                                | 30.9                              |
| South Arlington Road & Dixie Highway                       | III   |      | 33.4                              | 33.4                               | 38.9                              | 36.1                                | 28.6                              |
| St. Joseph Lane & Dixie Highway                            | III   |      | 33.2                              | 25.6                               | 35.7                              | 20.7                                | 21.9                              |
| Covington Catholic Entrance & Dixie Highway                | III   |      | 39.3                              | 20.5                               | 34.8                              | 17.6                                | 20.8                              |
| St. James Avenue / Hilton Drive & Dixie Highway            | III   |      | 36.4                              | 24.9                               | 36.5                              | 12.0                                | 29.8                              |
| Sleepy Hollow Road & Dixie Highway                         | III   |      | 35.2                              | 27.6                               | 34.9                              | 30.3                                | 32.9                              |
| Kyles Lane & Dixie Highway                                 | III   |      | 32.3                              | 16.8                               | 24.7                              | 18.3                                | 19.8                              |
| Ashwood Court & Dixie Highway                              | III   |      | 32.1                              | 29.8                               | 33.6                              | 31.7                                | 33.3                              |
| Fortside Drive & Dixie Highway                             | III   |      | 36.7                              | 36.2                               | 33.0                              | 37.9                                | 36.3                              |
| St. John's Road / Ridge Road & Dixie Highway               | III   |      | 33.1                              | 36.5                               | 34.4                              | 34.7                                | 36.8                              |
| Orchard Avenue & Dixie Highway                             | III   |      | 28.6                              | 36.5                               | 36.2                              | 36.1                                | 37.3                              |
| SB I-75 Ramp & Dixie Highway                               | III   |      | 16.0                              | 28.2                               | 40.3                              | 38.8                                | 29.4                              |
| NB I-75 Ramp & Dixie Highway                               | III   |      | 28.8                              | 26.1                               | 35.9                              | 31.7                                | 33.9                              |
| Expressway Plaza & Dixie Highway                           | III   |      | 34.4                              | 24.5                               | 30.1                              | 38.4                                | 22.3                              |
| Beechwood Road & Dixie Highway                             | III   |      | 8.7                               | 33.4                               | 24.0                              | 32.5                                | 14.4                              |
| Highland Avenue & Dixie Highway                            | III   |      | 23.8                              | 26.4                               | 33.5                              | 25.1                                | 30.6                              |
| Pleasant Ridge Avenue & Dixie Highway                      | III   |      | 31.5                              | 26.8                               | 32.8                              | 29.1                                | 25.0                              |
| Orphanage Road & Dixie Highway                             | III   |      | 33.2                              | 18.0                               | 33.3                              | 34.4                                | 28.4                              |
| Buttermilk Pike / Huckelberry Lane & Dixie Highway         | III   |      | 6.5                               | 7.5                                | 8.5                               | 9.9                                 | 26.1                              |
| Arcadia Avenue & Dixie Highway                             | III   |      | 14.6                              | 26.0                               | 32.9                              | 18.9                                | 34.8                              |
| Turkeyfoot Road / Hudson Avenue & Dixie Highway            | III   |      | 28.5                              | 33.9                               | 39.5                              | 33.0                                | 36.6                              |
| Carran Drive & Dixie Highway                               | III   |      | 35.5                              | 39.7                               | 40.0                              | 33.7                                | 41.0                              |
| Lookout Farm & Dixie Highway                               | III   |      | 12.4                              | 13.8                               | 46.8                              | 27.2                                | 26.4                              |
| EB I-275 Ramp & Dixie Highway                              | III   |      | 22.0                              | 34.9                               | 40.1                              | 43.2                                | 27.8                              |
| Winding Way / Dillard's Entrance & Dixie Highway           | III   |      | 32.1                              | 40.5                               | 26.7                              | 43.9                                | 29.8                              |
| Rosemount Drive / Crestview Hills Mall & Dixie Highway     | III   |      | 36.6                              | 40.1                               | 36.2                              | 38.5                                | 35.2                              |
| Dudley Road / Summit Drive & Dixie Highway                 | III   |      | 11.9                              | 18.5                               | 7.8                               | 7.2                                 | 12.7                              |
| Edgewood Road / Dixie High School & Dixie Highway          | III   |      | 23.9                              | 29.4                               | 20.7                              | 15.8                                | 32.1                              |
| Kenton Lands Road & Dixie Highway                          | III   |      | 26.1                              | 33.9                               | 19.6                              | 34.2                                | 25.4                              |
| Montgomery Avenue / Post Office & Dixie Highway            | III   |      | 28.0                              | 42.4                               | 33.0                              | 29.6                                | 36.8                              |
| Silver Lakes Shopping Center / Post Office & Dixie Highway | III   |      | 27.8                              | 24.5                               | 37.5                              | 33.2                                | 36.6                              |
| Hallam Avenue & Dixie Highway                              | III   |      | 25.6                              | 37.3                               | 30.9                              | 29.3                                | 35.7                              |
| Commonwealth Avenue / Stevensen Road & Dixie Highway       | III   |      | 8.6                               | 15.3                               | 10.1                              | 10.8                                | 16.4                              |
| Bartlett Street & Dixie Highway                            | III   |      | 27.3                              | 30.6                               | 24.9                              | 16.5                                | 29.3                              |
| May Street & Dixie Highway                                 | III   |      | 22.2                              | 31.0                               | 29.4                              | 23.5                                | 28.9                              |
| McAlpin Avenue & Dixie Highway                             | III   |      | 27.3                              | 25.2                               | 23.3                              | 21.0                                | 24.1                              |
| Sunset Avenue / Main Street & Dixie Highway                | III   |      | 20.7                              | 22.3                               | 31.0                              | 34.1                                | 33.2                              |
| Cave Run Drive & Dixie Highway                             | III   | 28.8 | 30.8                              | 30.9                               | 33.6                              | 33.0                                |                                   |
| Eastern Avenue / Kentaboo Avenue & Dixie Highway           | III   | 25.1 | 18.5                              | 29.2                               | 30.1                              | 29.7                                |                                   |
| Goodridge Drive / Bustetter Drive & Dixie Highway          | III   | 32.7 | 36.0                              | 28.1                               | 26.8                              | 34.5                                |                                   |
| Turway Road / Main Street / Rose Drive & Dixie Highway     | III   | 36.1 | 27.0                              | 30.2                               | 6.8                               | 21.0                                |                                   |
| SB AM Peak Hour Travel Time (s)                            |       |      | 1234.0                            | 1178.0                             | 1070.0                            | 1254.5                              | 1068.7                            |

DIXIE HIGHWAY CORRIDOR STUDY  
A PLAN FOR TRANSPORTATION & TRAFFIC OPTIMIZATION

TABLE 4 – TRAVEL TIME STUDY (BEFORE) PM PEAK HOUR NB

| Cross Street                                               | Class | NB<br>↓ | Mon NB PM<br>Avg Speed<br>(mi/hr) | Tues NB PM<br>Avg Speed<br>(mi/hr) | Wed NB PM<br>Avg Speed<br>(mi/hr) | Thurs NB PM<br>Avg Speed<br>(mi/hr) | Fri NB PM<br>Avg Speed<br>(mi/hr) |
|------------------------------------------------------------|-------|---------|-----------------------------------|------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| Turfway Road / Main Street / Rose Drive & Dixie Highway    | III   |         |                                   | 20.3                               | 13.4                              | 13.5                                | 7.6                               |
| Goodridge Drive / Bustetter Drive & Dixie Highway          | III   |         | 19.7                              | 24.1                               | 27.0                              | 28.6                                | 26.7                              |
| Eastern Avenue / Kentaboo Avenue & Dixie Highway           | III   |         | 27.5                              | 31.7                               | 23.6                              | 25.8                                | 25.9                              |
| Cave Run Drive & Dixie Highway                             | III   |         | 23.9                              | 32.9                               | 31.4                              | 26.7                                | 25.9                              |
| Sunset Avenue / Main Street & Dixie Highway                | III   |         | 11.4                              | 27.7                               | 32.6                              | 21.0                                | 16.2                              |
| McAlpin Avenue & Dixie Highway                             | III   |         | 23.5                              | 26.1                               | 30.7                              | 23.5                                | 22.0                              |
| May Street & Dixie Highway                                 | III   |         | 14.2                              | 27.5                               | 30.2                              | 29.8                                | 24.9                              |
| Bartlett Street & Dixie Highway                            | III   |         | 21.0                              | 29.0                               | 29.8                              | 25.5                                | 27.1                              |
| Commonwealth Avenue / Stevensen Road & Dixie Highway       | III   |         | 25.9                              | 13.4                               | 6.8                               | 13.7                                | 18.7                              |
| Hallam Avenue & Dixie Highway                              | III   |         | 27.1                              | 27.4                               | 22.7                              | 26.3                                | 24.8                              |
| Silver Lakes Shopping Center / Post Office & Dixie Highway | III   |         | 29.3                              | 34.9                               | 33.7                              | 35.2                                | 33.7                              |
| Montgomery Avenue / Post Office & Dixie Highway            | III   |         | 33.1                              | 32.9                               | 34.1                              | 29.7                                | 24.4                              |
| Kenton Lands Road & Dixie Highway                          | III   |         | 29.9                              | 12.6                               | 8.4                               | 12.9                                | 11.3                              |
| Edgewood Road / Dixie High School & Dixie Highway          | III   |         | 16.2                              | 19.1                               | 16.8                              | 16.1                                | 21.8                              |
| Dudley Road / Summit Drive & Dixie Highway                 | III   |         | 24.6                              | 27.3                               | 31.4                              | 21.3                                | 31.7                              |
| Rosemount Drive / Crestview Hills Mall & Dixie Highway     | III   |         | 24.2                              | 39.0                               | 21.5                              | 38.9                                | 18.0                              |
| Winding Way / Dillard's Entrance & Dixie Highway           | III   |         | 39.2                              | 41.4                               | 22.0                              | 39.9                                | 32.5                              |
| EB I-275 Ramp & Dixie Highway                              | III   |         | 39.6                              | 31.4                               | 19.2                              | 42.5                                | 42.2                              |
| Lookout Farm & Dixie Highway                               | III   |         | 41.3                              | 37.5                               | 29.7                              | 40.2                                | 41.5                              |
| Carran Drive & Dixie Highway                               | III   |         | 14.5                              | 30.9                               | 34.3                              | 33.6                                | 36.9                              |
| Turkeyfoot Road / Hudson Avenue & Dixie Highway            | III   |         | 36.4                              | 35.3                               | 28.0                              | 34.1                                | 19.2                              |
| Arcadia Avenue & Dixie Highway                             | III   |         | 37.2                              | 33.9                               | 27.1                              | 31.9                                | 26.0                              |
| Buttermilk Pike / Huckelberry Lane & Dixie Highway         | III   |         | 33.9                              | 14.1                               | 13.0                              | 16.6                                | 10.1                              |
| Orphanage Road & Dixie Highway                             | III   |         | 16.4                              | 27.5                               | 27.0                              | 26.1                                | 24.2                              |
| Pleasant Ridge Avenue & Dixie Highway                      | III   |         | 33.5                              | 28.1                               | 32.1                              | 33.7                                | 30.9                              |
| Highland Avenue & Dixie Highway                            | III   |         | 37.8                              | 33.0                               | 32.3                              | 31.5                                | 30.7                              |
| Beechwood Road & Dixie Highway                             | III   |         | 35.8                              | 36.3                               | 37.2                              | 38.1                                | 36.9                              |
| Expressway Plaza & Dixie Highway                           | III   |         | 36.1                              | 28.3                               | 37.5                              | 39.4                                | 36.8                              |
| NB I-75 Ramp & Dixie Highway                               | III   |         | 38.4                              | 32.3                               | 33.6                              | 28.7                                | 26.7                              |
| SB I-75 Ramp & Dixie Highway                               | III   |         | 33.2                              | 30.9                               | 34.8                              | 14.1                                | 23.6                              |
| Orchard Avenue & Dixie Highway                             | III   |         | 26.4                              | 35.1                               | 35.5                              | 33.5                                | 36.2                              |
| St. John's Road / Ridge Road & Dixie Highway               | III   |         | 30.9                              | 22.9                               | 30.5                              | 34.5                                | 13.3                              |
| Fortside Drive & Dixie Highway                             | III   |         | 14.1                              | 23.2                               | 27.1                              | 33.7                                | 32.9                              |
| Ashwood Court & Dixie Highway                              | III   |         | 29.9                              | 31.0                               | 32.9                              | 32.8                                | 36.3                              |
| Kyles Lane & Dixie Highway                                 | III   |         | 31.3                              | 13.1                               | 20.3                              | 11.6                                | 8.1                               |
| Sleepy Hollow Road & Dixie Highway                         | III   |         | 12.7                              | 23.1                               | 20.0                              | 20.7                                | 14.9                              |
| St. James Avenue / Hilton Drive & Dixie Highway            | III   |         | 27.8                              | 31.2                               | 33.0                              | 31.4                                | 33.0                              |
| Covington Catholic Entrance & Dixie Highway                | III   |         | 31.7                              | 36.9                               | 34.9                              | 33.4                                | 36.5                              |
| St. Joseph Lane & Dixie Highway                            | III   |         | 28.6                              | 31.2                               | 39.0                              | 24.0                                | 38.1                              |
| South Arlington Road & Dixie Highway                       | III   |         | 36.8                              | 37.5                               | 38.8                              | 35.8                                | 37.2                              |
| North Arlington Road & Dixie Highway                       | III   |         | 41.9                              | 39.2                               | 40.4                              | 44.1                                | 37.6                              |
| Montague Road / Western Avenue & Dixie Highway             | III   |         | 35.9                              | 29.9                               | 26.1                              | 31.7                                | 33.0                              |
| SB I-75 Off Ramp / Bullock Street & Dixie Highway          | III   |         | 12.7                              | 11.9                               | 14.5                              | 15.8                                | 14.0                              |
| NB I-75 On Ramp / Willow Street & Dixie Highway            | III   |         | 24.3                              | 13.5                               | 19.5                              | 28.5                                | 23.0                              |
| NB PM Peak Hour Travel Time (s)                            |       |         | 1124.3                            | 1125.0                             | 1215.5                            | 1168.7                              | 1185.5                            |

DIXIE HIGHWAY CORRIDOR STUDY  
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TABLE 5 – TRAVEL TIME STUDY (BEFORE) PM PEAK HOUR SB

| Cross Street                                               | Class |         | Mon SB PM<br>Avg Speed<br>(mi/hr) | Tues SB PM<br>Avg Speed<br>(mi/hr) | Wed SB PM<br>Avg Speed<br>(mi/hr) | Thurs SB PM<br>Avg Speed<br>(mi/hr) | Fri SB PM<br>Avg Speed<br>(mi/hr) |
|------------------------------------------------------------|-------|---------|-----------------------------------|------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| NB I-75 On Ramp / Willow Street & Dixie Highway            | III   | SB<br>↓ | 16.9                              | 17.8                               | 26.5                              | 23.4                                | 28.0                              |
| SB I-75 Off Ramp / Bullock Street & Dixie Highway          | III   |         | 12.1                              | 14.4                               | 14.1                              | 18.8                                | 27.5                              |
| Montague Road / Western Avenue & Dixie Highway             | III   |         | 14.3                              | 12.3                               | 10.6                              | 12.5                                | 11.4                              |
| North Arlington Road & Dixie Highway                       | III   |         | 32.7                              | 32.6                               | 32.7                              | 34.3                                | 34.5                              |
| South Arlington Road & Dixie Highway                       | III   |         | 35.1                              | 26.1                               | 37.6                              | 38.5                                | 37.5                              |
| St. Joseph Lane & Dixie Highway                            | III   |         | 36.8                              | 24.0                               | 22.4                              | 17.9                                | 26.1                              |
| Covington Catholic Entrance & Dixie Highway                | III   |         | 35.3                              | 33.8                               | 33.1                              | 29.2                                | 37.1                              |
| St. James Avenue / Hilton Drive & Dixie Highway            | III   |         | 39.2                              | 25.3                               | 30.3                              | 34.9                                | 20.9                              |
| Sleepy Hollow Road & Dixie Highway                         | III   |         | 33.6                              | 18.6                               | 21.6                              | 15.9                                | 24.3                              |
| Kyles Lane & Dixie Highway                                 | III   |         | 21.7                              | 14.6                               | 14.0                              | 13.5                                | 11.1                              |
| Ashwood Court & Dixie Highway                              | III   |         | 28.2                              | 24.6                               | 24.2                              | 32.7                                | 26.8                              |
| Fortside Drive & Dixie Highway                             | III   |         | 34.4                              | 35.9                               | 35.1                              | 37.3                                | 37.0                              |
| St. John's Road / Ridge Road & Dixie Highway               | III   |         | 31.1                              | 35.4                               | 30.3                              | 19.5                                | 24.6                              |
| Orchard Avenue & Dixie Highway                             | III   |         | 17.5                              | 21.4                               | 36.0                              | 28.9                                | 31.7                              |
| SB I-75 Ramp & Dixie Highway                               | III   |         | 25.8                              | 29.3                               | 28.4                              | 19.2                                | 28.2                              |
| NB I-75 Ramp & Dixie Highway                               | III   |         | 26.9                              | 25.8                               | 21.1                              | 21.1                                | 28.0                              |
| Expressway Plaza & Dixie Highway                           | III   |         | 37.9                              | 30.0                               | 12.0                              | 31.8                                | 34.0                              |
| Beechwood Road & Dixie Highway                             | III   |         | 35.2                              | 23.9                               | 31.3                              | 34.4                                | 35.6                              |
| Highland Avenue & Dixie Highway                            | III   |         | 22.7                              | 31.4                               | 32.7                              | 34.6                                | 32.0                              |
| Pleasant Ridge Avenue & Dixie Highway                      | III   |         | 21.3                              | 25.8                               | 22.8                              | 34.5                                | 29.7                              |
| Orphanage Road & Dixie Highway                             | III   |         | 27.7                              | 28.4                               | 27.0                              | 35.7                                | 32.3                              |
| Buttermilk Pike / Huckleberry Lane & Dixie Highway         | III   |         | 29.6                              | 28.1                               | 23.8                              | 35.6                                | 26.1                              |
| Arcadia Avenue & Dixie Highway                             | III   |         | 19.2                              | 35.9                               | 31.3                              | 37.7                                | 35.1                              |
| Turkeyfoot Road / Hudson Avenue & Dixie Highway            | III   |         | 29.8                              | 32.5                               | 32.8                              | 38.0                                | 36.8                              |
| Carran Drive & Dixie Highway                               | III   |         | 37.7                              | 39.4                               | 35.7                              | 40.2                                | 40.0                              |
| Lookout Farm & Dixie Highway                               | III   |         | 37.2                              | 40.7                               | 39.4                              | 39.5                                | 38.8                              |
| EB I-275 Ramp & Dixie Highway                              | III   |         | 40.0                              | 36.7                               | 41.7                              | 42.1                                | 34.2                              |
| Winding Way / Dillard's Entrance & Dixie Highway           | III   |         | 21.2                              | 22.9                               | 38.3                              | 40.8                                | 38.4                              |
| Rosemount Drive / Crestview Hills Mall & Dixie Highway     | III   |         | 23.9                              | 18.5                               | 17.6                              | 20.3                                | 29.2                              |
| Dudley Road / Summit Drive & Dixie Highway                 | III   |         | 15.8                              | 11.2                               | 8.1                               | 7.6                                 | 8.3                               |
| Edgewood Road / Dixie High School & Dixie Highway          | III   |         | 7.5                               | 16.0                               | 20.0                              | 29.9                                | 29.7                              |
| Kenton Lands Road & Dixie Highway                          | III   |         | 28.3                              | 11.4                               | 7.3                               | 12.9                                | 13.2                              |
| Montgomery Avenue / Post Office & Dixie Highway            | III   |         | 17.6                              | 20.7                               | 19.4                              | 24.7                                | 31.5                              |
| Silver Lakes Shopping Center / Post Office & Dixie Highway | III   |         | 31.4                              | 28.1                               | 9.2                               | 33.4                                | 11.1                              |
| Hallam Avenue & Dixie Highway                              | III   | 23.1    | 34.1                              | 33.2                               | 36.7                              | 35.8                                |                                   |
| Commonwealth Avenue / Stevensen Road & Dixie Highway       | III   | 31.6    | 15.8                              | 12.8                               | 13.0                              | 17.9                                |                                   |
| Bartlett Street & Dixie Highway                            | III   | 15.9    | 24.8                              | 29.1                               | 21.8                              | 20.4                                |                                   |
| May Street & Dixie Highway                                 | III   | 27.6    | 11.4                              | 26.6                               | 29.1                              | 29.5                                |                                   |
| McAlpin Avenue & Dixie Highway                             | III   | 15.0    | 9.8                               | 10.1                               | 11.0                              | 10.4                                |                                   |
| Sunset Avenue / Main Street & Dixie Highway                | III   | 15.4    | 22.1                              | 24.9                               | 32.7                              | 19.5                                |                                   |
| Cave Run Drive & Dixie Highway                             | III   | 33.7    | 17.2                              | 29.5                               | 35.4                              | 25.0                                |                                   |
| Eastern Avenue / Kentaboo Avenue & Dixie Highway           | III   | 12.5    | 23.8                              | 31.7                               | 33.9                              | 27.8                                |                                   |
| Goodridge Drive / Bustetter Drive & Dixie Highway          | III   | 22.5    | 32.3                              | 24.5                               | 20.6                              | 21.9                                |                                   |
| Turway Road / Main Street / Rose Drive & Dixie Highway     | III   | 31.8    | 6.6                               | 11.3                               | 8.9                               | 10.9                                |                                   |
| SB PM Peak Hour Travel Time (s)                            |       |         | 1255.7                            | 1314.2                             | 1364.7                            | 1238.0                              | 1228.0                            |

After problems identified in the traffic signal inventory were addressed by KYTC, the signal timing was revised. Following the implementation of the adjusted signal timing, several travel time studies were conducted to determine the level of improvement achieved. The choice of timing for these repeat travel time studies was based on the previous travel time studies. Based on the travel time studies, the worst travel day of the week proved to be Wednesday.

The second travel time studies were performed for the AM and PM Peaks on Wednesday, December 8, 2004. Again, these were digitally recorded to help determine the cause of any delays and any deficiencies within the system.

The signal timing changes for the Dixie 2 system, however were inadvertently not implemented at the time of the AM Peak Hour travel time study and therefore are not presented. The travel time study results are presented in the following tables. Table 6 includes the southbound travel time study results and Table 7 includes the northbound Travel time study results.

TABLE 6 – SHORT TERM SIGNAL TIMING RECOMMENDATIONS TRAVEL TIME STUDY (SB)



| Approach to Cross Street                                   | Link Distance (feet) |                                                                                     | SB PM Peak Avg Speed (mi/hr) |
|------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------------------------|
| NB I-75 On Ramp / Willow Street & Dixie Highway            | 440                  |  | 28.8                         |
| SB I-75 Off Ramp / Bullock Street & Dixie Highway          | 275                  |                                                                                     | 16.6                         |
| Montague Road / Western Avenue & Dixie Highway             | 1055                 |                                                                                     | 13.9                         |
| North Arlington Road & Dixie Highway                       | 4355                 |                                                                                     | 30.6                         |
| South Arlington Road & Dixie Highway                       | 120                  |                                                                                     | 28.9                         |
| St. Joseph Lane & Dixie Highway                            | 880                  |                                                                                     | 34.0                         |
| Covington Catholic Entrance & Dixie Highway                | 890                  |                                                                                     | 32.7                         |
| St. James Avenue / Hilton Drive & Dixie Highway            | 625                  |                                                                                     | 32.9                         |
| Sleepy Hollow Road & Dixie Highway                         | 1035                 |                                                                                     | 26.0                         |
| Kyles Lane & Dixie Highway                                 | 750                  |                                                                                     | 11.1                         |
| Ashwood Court & Dixie Highway                              | 550                  |                                                                                     | 22.9                         |
| Fortside Drive & Dixie Highway                             | 1980                 |                                                                                     | 36.7                         |
| St. John's Road / Ridge Road & Dixie Highway               | 760                  |                                                                                     | 37.6                         |
| Orchard Avenue & Dixie Highway                             | 350                  |                                                                                     | 37.4                         |
| SB I-75 Ramp & Dixie Highway                               | 1265                 |                                                                                     | 37.8                         |
| NB I-75 Ramp & Dixie Highway                               | 700                  |                                                                                     | 36.1                         |
| Expressway Plaza & Dixie Highway                           | 970                  |                                                                                     | 24.9                         |
| Beechwood Road & Dixie Highway                             | 630                  |                                                                                     | 34.7                         |
| Highland Avenue & Dixie Highway                            | 1810                 |                                                                                     | 30.7                         |
| Pleasant Ridge Avenue & Dixie Highway                      | 880                  |                                                                                     | 24.5                         |
| Orphanage Road & Dixie Highway                             | 1300                 |                                                                                     | 23.5                         |
| Buttermilk Pike / Huckelberry Lane & Dixie Highway         | 500                  |                                                                                     | 25.9                         |
| Arcadia Avenue & Dixie Highway                             | 565                  |                                                                                     | 29.2                         |
| Turkeyfoot Road / Hudson Avenue & Dixie Highway            | 1400                 |                                                                                     | 25.6                         |
| Carran Drive & Dixie Highway                               | 1595                 |                                                                                     | 40.3                         |
| Lookout Farm & Dixie Highway                               | 460                  |                                                                                     | 38.0                         |
| EB I-275 Ramp & Dixie Highway                              | 1645                 |                                                                                     | 40.4                         |
| Winding Way / Dillard's Entrance & Dixie Highway           | 720                  |                                                                                     | 39.9                         |
| Rosemount Drive / Crestview Hills Mall & Dixie Highway     | 735                  |                                                                                     | 33.3                         |
| Dudley Road / Summit Drive & Dixie Highway                 | 620                  |                                                                                     | 18.6                         |
| Edgewood Road / Dixie High School & Dixie Highway          | 660                  |                                                                                     | 27.3                         |
| Kenton Lands Road & Dixie Highway                          | 1060                 |                                                                                     | 10.5                         |
| Montgomery Avenue / Post Office & Dixie Highway            | 635                  |                                                                                     | 16.7                         |
| Silver Lakes Shopping Center / Post Office & Dixie Highway | 430                  | 11.7                                                                                |                              |
| Hallam Avenue & Dixie Highway                              | 1560                 | 34.2                                                                                |                              |
| Commonwealth Avenue / Stevensen Road & Dixie Highway       | 1015                 | 11.1                                                                                |                              |
| Bartlett Street & Dixie Highway                            | 745                  | 15.3                                                                                |                              |
| May Street & Dixie Highway                                 | 150                  | 18.7                                                                                |                              |
| McAlpin Avenue & Dixie Highway                             | 785                  | 4.7                                                                                 |                              |
| Sunset Avenue / Main Street & Dixie Highway                | 1715                 | 20.8                                                                                |                              |
| Cave Run Drive & Dixie Highway                             | 795                  | 19.9                                                                                |                              |
| Eastern Avenue / Kentaboo Avenue & Dixie Highway           | 1170                 | 18.8                                                                                |                              |
| Goodridge Drive / Bustetter Drive & Dixie Highway          | 1455                 | 26.6                                                                                |                              |
| Turfway Road / Main Street / Rose Drive & Dixie Highway    | 800                  | 7.4                                                                                 |                              |
|                                                            |                      |                                                                                     |                              |
| SB Peak Hour Travel Time (s)                               |                      |                                                                                     | 1364.7                       |
| SB Peak Hour Avg Arterial Speed (mi/hr)                    |                      |                                                                                     | 21.8                         |

TABLE 7 – SHORT TERM SIGNAL TIMING RECOMMENDATIONS TRAVEL TIME STUDY (NB)

| Approach to Cross Street                                   | Link Distance (feet) | NB                                                                                  | NB PM Peak Avg Speed (mi/hr) |
|------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|------------------------------|
| Turfway Road / Main Street / Rose Drive & Dixie Highway    | 955                  |                                                                                     |                              |
| Goodridge Drive / Bustetter Drive & Dixie Highway          | 820                  |  | 29.9                         |
| Eastern Avenue / Kentaboo Avenue & Dixie Highway           | 1480                 |                                                                                     | 31.0                         |
| Cave Run Drive & Dixie Highway                             | 1160                 |                                                                                     | 32.0                         |
| Sunset Avenue / Main Street & Dixie Highway                | 815                  |                                                                                     | 16.4                         |
| McAlpin Avenue & Dixie Highway                             | 1615                 |                                                                                     | 11.0                         |
| May Street & Dixie Highway                                 | 855                  |                                                                                     | 25.5                         |
| Bartlett Street & Dixie Highway                            | 145                  |                                                                                     | 28.8                         |
| Commonwealth Avenue / Stevensen Road & Dixie Highway       | 820                  |                                                                                     | 11.0                         |
| Hallam Avenue & Dixie Highway                              | 945                  |                                                                                     | 30.4                         |
| Silver Lakes Shopping Center / Post Office & Dixie Highway | 1605                 |                                                                                     | 32.1                         |
| Montgomery Avenue / Post Office & Dixie Highway            | 370                  |                                                                                     | 28.7                         |
| Kenton Lands Road & Dixie Highway                          | 665                  |                                                                                     | 28.6                         |
| Edgewood Road / Dixie High School & Dixie Highway          | 1075                 |                                                                                     | 27.3                         |
| Dudley Road / Summit Drive & Dixie Highway                 | 715                  |                                                                                     | 8.4                          |
| Rosemount Drive / Crestview Hills Mall & Dixie Highway     | 600                  |                                                                                     | 30.5                         |
| Winding Way / Dillard's Entrance & Dixie Highway           | 750                  |                                                                                     | 33.3                         |
| EB I-275 Ramp & Dixie Highway                              | 670                  |                                                                                     | 16.9                         |
| Lookout Farm & Dixie Highway                               | 1715                 |                                                                                     | 30.9                         |
| Carran Drive & Dixie Highway                               | 395                  |                                                                                     | 35.0                         |
| Turkeyfoot Road / Hudson Avenue & Dixie Highway            | 1660                 |                                                                                     | 35.6                         |
| Arcadia Avenue & Dixie Highway                             | 1335                 |                                                                                     | 32.0                         |
| Buttermilk Pike / Huckelberry Lane & Dixie Highway         | 600                  |                                                                                     | 32.0                         |
| Orphanage Road & Dixie Highway                             | 480                  |                                                                                     | 30.7                         |
| Pleasant Ridge Avenue & Dixie Highway                      | 1230                 |                                                                                     | 31.3                         |
| Highland Avenue & Dixie Highway                            | 960                  |                                                                                     | 36.5                         |
| Beechwood Road & Dixie Highway                             | 1740                 |                                                                                     | 37.6                         |
| Expressway Plaza & Dixie Highway                           | 755                  |                                                                                     | 39.9                         |
| NB I-75 Ramp & Dixie Highway                               | 965                  |                                                                                     | 17.7                         |
| SB I-75 Ramp & Dixie Highway                               | 690                  |                                                                                     | 33.4                         |
| Orchard Avenue & Dixie Highway                             | 1190                 |                                                                                     | 41.3                         |
| St. John's Road / Ridge Road & Dixie Highway               | 370                  |                                                                                     | 11.4                         |
| Fortside Drive & Dixie Highway                             | 705                  |                                                                                     | 34.2                         |
| Ashwood Court & Dixie Highway                              | 2095                 |                                                                                     | 33.0                         |
| Kyles Lane & Dixie Highway                                 | 455                  | 12.5                                                                                |                              |
| Sleepy Hollow Road & Dixie Highway                         | 845                  | 18.4                                                                                |                              |
| St. James Avenue / Hilton Drive & Dixie Highway            | 940                  | 33.0                                                                                |                              |
| Covington Catholic Entrance & Dixie Highway                | 640                  | 24.3                                                                                |                              |
| St. Joseph Lane & Dixie Highway                            | 840                  | 24.0                                                                                |                              |
| South Arlington Road & Dixie Highway                       | 920                  | 34.5                                                                                |                              |
| North Arlington Road & Dixie Highway                       | 90                   | 32.1                                                                                |                              |
| Montague Road / Western Avenue & Dixie Highway             | 4355                 | 31.4                                                                                |                              |
| SB I-75 Off Ramp / Bullock Street & Dixie Highway          | 1135                 | 24.3                                                                                |                              |
| NB I-75 On Ramp / Willow Street & Dixie Highway            | 255                  | 28.0                                                                                |                              |
| NB Peak Hour Travel Time (s)                               |                      |                                                                                     | 1169.5                       |
| NB Peak Hour Avg Arterial Speed (mi/hr)                    |                      |                                                                                     | 25.5                         |

In reviewing the travel time studies, a detector failure was noticed at the intersection of Dixie Highway and Garvey Avenue/McAlpin Avenue. This was evident in the travel time study, as well as in the corresponding video. During every run through the system, the test vehicle experienced delay at this intersection. In addition, several comments have been received from the web site concerning the same issue (please see the *Dixie Highway Corridor Study: Public Involvement & Modeling Documentation* for Project Correspondence). The detector failure was corrected on December 16, 2004.

Other intersections revealed improvements following the short term traffic signal recommendations. The following is a list of areas of notable decreases in the overall travel time study from one intersection to the next in the northbound travel time during the PM Peak Hour:

- approximately Parkside Drive to Turfway Road (61%)
- Bartlett Road to Commonwealth Avenue (37.5%)
- Montgomery Drive to Kenton Lands Road (71.1%)
- Arcadia Avenue to Buttermilk Pike (58.1%)
- Arlington Road to Montague Avenue (17.2%)
- Expressway Plaza to I-75 SB Ramp (40.5%)

The following is a list of areas of notable decreases in the southbound travel time during the PM Peak Hour:

- I-75 SB Off Ramp (Covington) to Montague Avenue (23.8%)
- I-75 SB On/Off Ramp (Fort Mitchell) to Expressway Plaza (51.3%)
- Rosemont Drive to Dudley Road (58.0%)
- Edgewood Road to Kenton Lands Road (31.2%)

With this level of improvement at several intersections, it would be reasonable to expect an overall decrease in travel time of approximately 10%. The only major increase in travel time was noticed at the intersection of Dixie Highway and Garvey Avenue/McAlpin Avenue. This issue should be solved by replacing the loop detector.