2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Prepared by
The American Transportation Research Institute

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INTRODUCTION

As part of the ongoing Freight Performance Measures (FPM) initiative, the American Transportation Research Institute (ATRI) and the Federal Highway Administration (FHWA) Office of Freight Management and Operations are monitoring freight significant highway locations. This research uses ATRI-developed analysis methods, customized software tools and terabytes of data from trucking operations to produce a congestion severity ranking for each of the 100 locations that are currently monitored. More specifically, this effort utilizes GPS technology and information to assess the level at which truck-based freight was affected by traffic congestion throughout 2009. A full description of the methodology used in this report is found in Chapter 3.

The majority of the locations that are currently monitored are urban interstate interchanges. On this type of highway segment, congestion is typically problematic during AM and PM rush hours. There are, however, several locations where congestion affects freight mobility during all hours of the day, and there are other locations where congestion is not a recurring issue.

To assess congestion levels at the monitored locations a congestion measure (the Congestion Index) is produced for each location; this measure is based on the severity of congestion during weekdays in 2009. Average speeds that are below free flow speeds (which is set at 55 mph) are considered to reflect congestion. The locations are listed by Congestion Index; Location 1 has the highest Congestion Index (and therefore has the highest level of congestion using this methodology). A detailed analysis of each location is available in Chapter 2.

This type of information is useful to both private and public sector freight stakeholders that wish to better understand the severity of congestion and mobility constraints experienced along the transportation system. For the public sector, the measurement of freight significant congestion can allow for better-informed identification of transportation system deficiencies. This identification, in turn, may lead to infrastructure, operations and ITS investment that may improve freight mobility. Additionally, the private sector can use this type of information to calibrate routing so as to avoid peak congestion.

The FPM bottleneck work will continue on an annual basis. ATRI and FHWA will be building upon this list for a 2010 analysis; if there are locations that you would like the program to monitor, please email your suggestion to ATRI@trucking.org.
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

30

Peak Average Speed

23

Nonpeak Average Speed

33

Nonpeak/Peak Speed Ratio

1.45

Congestion Index

3,794,139

Ranking (out of 100)

1

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
34

Peak Average Speed
23

Nonpeak Average Speed
39

Nonpeak/Peak Speed Ratio
1.72

Congestion Index
2,372,408

Ranking (out of 100)
2

Figure 1: Location Map

Average Speed by Time of Day
I-90 at I-94 (North)

Figure 2: Speed Profile
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

- **Average Speed**: 32 MPH
- **Peak Average Speed**: 25 MPH
- **Nonpeak Average Speed**: 36 MPH
- **Nonpeak/Peak Speed Ratio**: 1.44
- **Congestion Index**: 2,156,936
- **Ranking (out of 100)**: 3

![Figure 1: Location Map](image)

![Figure 2: Speed Profile](image)
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

*Average Speed*: 35

*Peak Average Speed*: 21

*Nonpeak Average Speed*: 44

*Nonpeak/Peak Speed Ratio*: 2.06

*Congestion Index*: 1,817,805

*Ranking (out of 100)*: 4

---

**Figure 1: Location Map**

**Figure 2: Speed Profile**
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Atlanta, GA: I-285 at I-85 (North)

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Speed Type</th>
<th>MPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>36</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.41</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>1,313,889</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile

Average Speed by Time of Day
I-285 at I-85 (North)

ATR
American Transportation Research Institute
### Bottleneck Summary

The bottleneck location is shown in **Figure 1**. The speed profile is shown in **Figure 2**.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>42</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>36</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>45</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.23</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>1,193,975</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>6</td>
</tr>
</tbody>
</table>

---

**Figure 1: Location Map**

**Figure 2: Speed Profile**
### Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
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<tbody>
<tr>
<td>Average Speed</td>
<td>48</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>41</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>50</td>
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<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.24</td>
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<tr>
<td>Congestion Index</td>
<td>1,098,436</td>
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<tr>
<td>Ranking (out of 100)</td>
<td>7</td>
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</tbody>
</table>

![Figure 1: Location Map](image1)

![Figure 2: Speed Profile](image2)
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>35</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>47</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.34</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>1,056,856</td>
</tr>
</tbody>
</table>

Ranking (out of 100)

8

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Chicago, IL: I-90 at I-94 (South)

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
\[
\begin{align*}
\text{Peak Average Speed} &\quad 38 \\
\text{Nonpeak Average Speed} &\quad 50 \\
\text{Nonpeak/Peak Speed Ratio} &\quad 1.30 \\
\text{Congestion Index} &\quad 1,027,566 \\
\text{Ranking (out of 100)} &\quad 9
\end{align*}
\]

Figure 1: Location Map

Average Speed by Time of Day
I-90 at I-94 (South)

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations


Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>31</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>37</td>
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<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.21</td>
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</table>

Congestion Index

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Congestion Index</td>
<td>946,575</td>
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<tr>
<td>Ranking (out of 100)</td>
<td>10</td>
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</table>

Figure 1: Location Map

Figure 2: Speed Profile

Average Speed by Time of Day
I-76 at US-30

Time of Day

Figure 2: Speed Profile

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2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Louisville, KY: I-65 at I-64/I-71

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>37</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
</tbody>
</table>

Nonpeak/Peak Speed Ratio

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.35</td>
</tr>
</tbody>
</table>

Congestion Index

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion Index</td>
<td>918,778</td>
</tr>
</tbody>
</table>

Ranking (out of 100)

<table>
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<tr>
<th>Description</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Ranking</td>
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</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile

Average Speed by Time of Day
I-65 at I-64/I-71

Time of Day

MPH
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Las Vegas, NV: I-15 at I-515

**Bottleneck Summary**
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
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<tbody>
<tr>
<td>Average Speed</td>
<td>38</td>
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<tr>
<td>Peak Average Speed</td>
<td>34</td>
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<tr>
<td>Nonpeak Average Speed</td>
<td>40</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.16</td>
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<td>Congestion Index</td>
<td>871,065</td>
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<tr>
<td>Ranking (out of 100)</td>
<td>12</td>
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</tbody>
</table>

![Figure 1: Location Map](image)

![Figure 2: Speed Profile](image)
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Average Speed</th>
<th>45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>44</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>46</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.05</td>
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<tr>
<td>Congestion Index</td>
<td>842,858</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>13</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed 42
Peak Average Speed 32
Nonpeak Average Speed 46
Nonpeak/Peak Speed Ratio 1.44
Congestion Index 807,974
Ranking (out of 100) 14

Figure 1: Location Map

Figure 2: Speed Profile
### Bottleneck Summary

The bottleneck location is shown in [Figure 1](#). The speed profile is shown in [Figure 2](#).

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>49 MPH</td>
<td></td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>40 MPH</td>
<td></td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>54 MPH</td>
<td></td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.33</td>
<td></td>
</tr>
<tr>
<td>Congestion Index</td>
<td>796,020</td>
<td></td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

![Figure 1: Location Map](image1)

![Figure 2: Speed Profile](image2)
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Baton Rouge, LA: I-10 at I-110

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
46

Peak Average Speed
38

Nonpeak Average Speed
49

Nonpeak/Peak Speed Ratio
1.29

Congestion Index
779,358

Ranking (out of 100)
16

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>35</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>44</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.27</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile

New Haven, CT: I-95 at I-91

Bottleneck Analysis of 100 Freight Significant Highway Locations
Bottleneck Summary
The bottleneck location is shown in Figure 1.
The speed profile is shown in Figure 2.

Average Speed

47

Peak Average Speed

38

Nonpeak Average Speed

51

Nonpeak/Peak Speed Ratio

1.36

Congestion Index

762,045

Ranking (out of 100)

18

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

37

Peak Average Speed

32

Nonpeak Average Speed

39

Nonpeak/Peak Speed Ratio

1.23

Congestion Index

761,237

Ranking (out of 100)

19

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Washington, DC: I-495 at I-66

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
44

Peak Average Speed
35

Nonpeak Average Speed
46

Nonpeak/Peak Speed Ratio
1.31

Congestion Index
700,166

Ranking (out of 100)
20

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Ft. Worth, TX: I-35W at I-30

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>41</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.23</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>680,002</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>21</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Atlanta, GA: I-20 at I-285 (West)

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
- 51

Peak Average Speed
- 45

Nonpeak Average Speed
- 52

Nonpeak/Peak Speed Ratio
- 1.16

Congestion Index
- 645,757

Ranking (out of 100)
- 22

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

San Bernardino, CA: I-10 at I-15

Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>50</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>44</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>52</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.16</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>583,389</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>23</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
**Bottleneck Summary**

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Average Speed</th>
<th>49</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>39</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>53</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.35</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>575,290</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>24</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

**Figure 2: Speed Profile**
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations


Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
- 46

Peak Average Speed
- 39

Nonpeak Average Speed
- 48

Nonpeak/Peak Speed Ratio
- 1.23

Congestion Index
- 557,858

Ranking (out of 100)
- 25

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Oakland, CA: I-880 at I-238

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>40</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>47</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.19</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>551,256</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>26</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
- 49

Peak Average Speed
- 38

Nonpeak Average Speed
- 53

Nonpeak/Peak Speed Ratio
- 1.38

Congestion Index
- 496,757

Ranking (out of 100)
- 27

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Analysis of 100 Freight Significant Highway Locations

Milwaukee, WI: I-94 at I-894

**Bottleneck Summary**
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>50</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>42</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>53</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.27</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>478,413</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>28</td>
</tr>
</tbody>
</table>

*Figure 1: Location Map*

*Figure 2: Speed Profile*
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Bottleneck Summary</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>48</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>40</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.29</td>
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<tr>
<td>Congestion Index</td>
<td>447,702</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>29</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>40</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>35</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>43</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.23</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>442,396</td>
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<tr>
<td>Ranking (out of 100)</td>
<td>30</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
37

Peak Average Speed
29

Nonpeak Average Speed
42

Nonpeak/Peak Speed Ratio
1.46

Congestion Index
441,361

Ranking (out of 100)
31

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Houston, TX: I-45 at I-610 (South)

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
49
Peak Average Speed
42
Nonpeak Average Speed
53
Nonpeak/Peak Speed Ratio
1.24
Congestion Index
440,806
Ranking (out of 100)
32

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>42</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.20</td>
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<tr>
<td>Congestion Index</td>
<td>434,827</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>33</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Los Angeles, CA: I-710 at I-105

Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

47

Peak Average Speed

39

Nonpeak Average Speed

51

Nonpeak/Peak Speed Ratio

1.29

Congestion Index

429,511

Ranking (out of 100)

34

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>46</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>31</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
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<tr>
<td>Nonpeak/Peak Speed Ratio</td>
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<tr>
<td>Congestion Index</td>
<td>426,297</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>35</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Phoenix, AZ: I-17 at I-10

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
</tr>
</tbody>
</table>

Peak Average Speed

<table>
<thead>
<tr>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
</tr>
</tbody>
</table>

Nonpeak Average Speed

<table>
<thead>
<tr>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
</tr>
</tbody>
</table>

Nonpeak/Peak Speed Ratio

<table>
<thead>
<tr>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.20</td>
</tr>
</tbody>
</table>

Congestion Index

<table>
<thead>
<tr>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>415,050</td>
</tr>
</tbody>
</table>

Ranking (out of 100)

<table>
<thead>
<tr>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Atlanta, GA: I-20 at I-285 (East)

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>45</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.20</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>413,149</td>
</tr>
</tbody>
</table>

Ranking (out of 100)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking</td>
<td>37</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Speed Type</th>
<th>MPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>41</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>35</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>44</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.25</td>
</tr>
</tbody>
</table>

Congestion Index

407,504

Ranking (out of 100)

38

Figure 1: Location Map

Average Speed by Time of Day

I-5 at I-90

Figure 2: Speed Profile

Seattle, WA: I-5 at I-90
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>40</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>49</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.24</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>390,015</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>39</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

New Castle, DE: I-95 at US-301

**Bottleneck Summary**
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>50</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>49</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>50</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.01</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>340,212</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>40</td>
</tr>
</tbody>
</table>

![Figure 1: Location Map](image1)

**Average Speed by Time of Day**

![Figure 2: Speed Profile](image2)
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>44</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>53</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.21</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>309,257</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>41</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed | 50
---|---
Peak Average Speed | 46
Nonpeak Average Speed | 52
Nonpeak/Peak Speed Ratio | 1.13
Congestion Index | 294,193
Ranking (out of 100) | 42

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Stamford, CT: I-95

**Bottleneck Summary**

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

**Average Speed**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>41</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.25</td>
</tr>
</tbody>
</table>

**Congestion Index**

292,454

**Ranking (out of 100)**

43

Figure 1: Location Map

Figure 2: Speed Profile
### Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>44</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>53</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.21</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>290,491</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>44</td>
</tr>
</tbody>
</table>

#### Figure 1: Location Map

Denver, CO: I-25 at I-76

#### Figure 2: Speed Profile

Average Speed by Time of Day
I-25 at I-76
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>42</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>49</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.18</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>285,457</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>45</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Speed Type</th>
<th>Average Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>44</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>53</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Congestion Index

| Congestion Index   | 282,266 |

Ranking (out of 100)

| Ranking   | 46 |

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Corona, CA: I-15 at SR-91

**Bottleneck Summary**
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>48</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>41</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.24</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>279,774</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>47</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Norwalk, CT: I-95

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

48

Peak Average Speed

43

Nonpeak Average Speed

50

Nonpeak/Peak Speed Ratio

1.16

Congestion Index

278,888

Ranking (out of 100)

48

Figure 1: Location Map

Average Speed by Time of Day
I-95

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

45

Peak Average Speed

36

Nonpeak Average Speed

50

Nonpeak/Peak Speed Ratio

1.37

Congestion Index

260,041

Ranking (out of 100)

49
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

48

Peak Average Speed

40

Nonpeak Average Speed

51

Nonpeak/Peak Speed Ratio

1.26

Congestion Index

257,806

Ranking (out of 100)

50

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
48
Peak Average Speed
41
Nonpeak Average Speed
52
Nonpeak/Peak Speed Ratio
1.24
Congestion Index
256,813
Ranking (out of 100)
51

Figure 1: Location Map

Figure 2: Speed Profile
### Bottleneck Summary

The bottleneck location is shown in **Figure 1**. The speed profile is shown in **Figure 2**.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>46 MPH</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>41 MPH</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>48 MPH</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.17</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>254,853</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>52</td>
</tr>
</tbody>
</table>

**Figure 1: Location Map**

**Figure 2: Speed Profile**
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Providence, RI: I-95 at I-195

Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

- Peak Average Speed: 39
- Nonpeak Average Speed: 48
- Nonpeak/Peak Speed Ratio: 1.23
- Congestion Index: 236,857
- Ranking (out of 100): 53

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Memphis, TN: I-40 at I-240 (East)

**Bottleneck Summary**

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>52</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>46</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.19</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>226,090</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>54</td>
</tr>
</tbody>
</table>

**Figure 1: Location Map**

**Figure 2: Speed Profile**
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Baltimore, MD: I-95 at I-395

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
51

Peak Average Speed
49

Nonpeak Average Speed
52

Nonpeak/Peak Speed Ratio
1.06

Congestion Index
223,163

Ranking (out of 100)
55

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Seattle, WA: I-90 at I-405

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>46</td>
</tr>
</tbody>
</table>

Peak Average Speed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak</td>
<td>39</td>
</tr>
</tbody>
</table>

Nonpeak Average Speed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonpeak</td>
<td>50</td>
</tr>
</tbody>
</table>

Nonpeak/Peak Speed Ratio

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonpeak/Peak</td>
<td>1.27</td>
</tr>
</tbody>
</table>

Congestion Index

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>222,359</td>
</tr>
</tbody>
</table>

Ranking (out of 100)

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Speed</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>40</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
</tbody>
</table>

Nonpeak/Peak Speed Ratio

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.27</td>
</tr>
</tbody>
</table>

Congestion Index

<table>
<thead>
<tr>
<th>Index</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion Index</td>
<td>221,906</td>
</tr>
</tbody>
</table>

Ranking (out of 100)

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking (out of 100)</td>
<td>57</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Montgomery, AL: I-85 at I-65

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>50</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>52</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.02</td>
</tr>
</tbody>
</table>

Congestion Index

<table>
<thead>
<tr>
<th>Ranking (out of 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>58</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
### Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>49</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>44</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.18</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>199,044</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>59</td>
</tr>
</tbody>
</table>

**Figure 1: Location Map**

**Figure 2: Speed Profile**
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

**Average Speed**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>49</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.11</td>
</tr>
</tbody>
</table>

**Congestion Index**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion Index</td>
<td>190,334</td>
</tr>
</tbody>
</table>

**Ranking (out of 100)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking</td>
<td>60</td>
</tr>
</tbody>
</table>

**Figure 1: Location Map**

**Figure 2: Speed Profile**
**Bottleneck Summary**

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

**Average Speed**

- 52

**Peak Average Speed**

- 47

**Nonpeak Average Speed**

- 54

**Nonpeak/Peak Speed Ratio**

- 1.16

**Congestion Index**

- 178,116

**Ranking (out of 100)**

- 61

---

**Figure 1: Location Map**

**Figure 2: Speed Profile**

---

ATR
American Transportation Research Institute
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>38</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.35</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>176,022</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>62</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Detroit, MI: I-75 at I-696

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>48</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.14</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>174,026</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>63</td>
</tr>
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</table>

Figure 1: Location Map

Figure 2: Speed Profile

Average Speed by Time of Day
I-75 at I-696
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Los Angeles, CA: I-110 at I-105

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>38</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>50</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.29</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>167,882</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>64</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Parsippany, NJ: I-80 at I-287

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
53

Peak Average Speed
49

Nonpeak Average Speed
55

Nonpeak/Peak Speed Ratio
1.11

Congestion Index
156,611

Ranking (out of 100)
65

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Atlanta, GA: I-75 at I-675

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
53

Peak Average Speed
48

Nonpeak Average Speed
55

Nonpeak/Peak Speed Ratio
1.15

Congestion Index
150,189

Ranking (out of 100)
66

Figure 1: Location Map

Figure 2: Speed Profile
Chicago, IL: I-290 at I-355

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>52</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.06</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>124,423</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>67</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile

Average Speed by Time of Day
I-290 at I-355

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>48</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>52</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.09</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>123,491</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>68</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
### Bottleneck Summary

The bottleneck location is shown in **Figure 1**. The speed profile is shown in **Figure 2**.

**Average Speed**

- 54 MPH

**Peak Average Speed**

- 52 MPH

**Nonpeak Average Speed**

- 55 MPH

**Nonpeak/Peak Speed Ratio**

- 1.06

**Congestion Index**

- 109,256

**Ranking (out of 100)**

- 69
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Morristown, NJ: I-287 at SR-24

**Bottleneck Summary**

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

**Average Speed**

<table>
<thead>
<tr>
<th>Speed Profile</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>50</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.10</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>99,907</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>70</td>
</tr>
</tbody>
</table>

---

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Los Angeles, CA: SR-91 at SR-55

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
50

Peak Average Speed
45

Nonpeak Average Speed
52

Nonpeak/Peak Speed Ratio
1.16

Congestion Index
99,665

Ranking (out of 100)
71

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Chattanooga, TN: I-75 at I-24

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

54

Peak Average Speed

52

Nonpeak Average Speed

55

Nonpeak/Peak Speed Ratio

1.06

Congestion Index

94,789

Ranking (out of 100)

72

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
53

Peak Average Speed
49

Nonpeak Average Speed
55

Nonpeak/Peak Speed Ratio
1.13

Congestion Index
90,009

Ranking (out of 100)
73

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

- Peak Average Speed: 50
- Nonpeak Average Speed: 55
- Nonpeak/Peak Speed Ratio: 1.10
- Congestion Index: 77,440
- Ranking (out of 100): 74

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

New Orleans, LA: I-10 at I-610 (West)

**Bottleneck Summary**

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

**Average Speed**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>46</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.17</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>77,227</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>75</td>
</tr>
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</table>

**Figure 1: Location Map**

**Figure 2: Speed Profile**
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Rye, NY: I-95 at I-287

**Bottleneck Summary**
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>53</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>52</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.04</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>75,219</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>76</td>
</tr>
</tbody>
</table>

**Figure 1: Location Map**

**Figure 2: Speed Profile**

Average Speed by Time of Day
I-95 at I-287
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
53

Peak Average Speed
49

Nonpeak Average Speed
55

Nonpeak/Peak Speed Ratio
1.13

Congestion Index
53,866

Ranking (out of 100)
77

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Tucson, AZ: I-10 at I-19

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
- 54

Peak Average Speed
- 52

Nonpeak Average Speed
- 55

Nonpeak/Peak Speed Ratio
- 1.05

Congestion Index
- 43,547

Ranking (out of 100)
- 78

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>52</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.05</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>43,389</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>79</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Analysis of 100 Freight Significant Highway Locations

Los Angeles, CA: I-405 at I-605

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>46</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.17</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>36,913</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>80</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
- 54

Peak Average Speed
- 53

Nonpeak Average Speed
- 55

Nonpeak/Peak Speed Ratio
- 1.03

Congestion Index
- 35,133

Ranking (out of 100)
- 81

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

53

Peak Average Speed

50

Nonpeak Average Speed

55

Nonpeak/Peak Speed Ratio

1.10

Congestion Index

30,260

Ranking (out of 100)

82

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Little Rock, AR: I-40 at I-30

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

54

Peak Average Speed

53

Nonpeak Average Speed

55

Nonpeak/Peak Speed Ratio

1.04

Congestion Index

28,974

Ranking (out of 100)

83

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>47</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.09</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>28,010</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>84</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
**Bottleneck Summary**

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

- **Average Speed**: 55
- **Peak Average Speed**: 55
- **Nonpeak Average Speed**: 55
- **Nonpeak/Peak Speed Ratio**: 1.01
- **Congestion Index**: 27,900
- **Ranking (out of 100)**: 85

---

**Figure 1: Location Map**

Chicago, IL: I-80 at I-94

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

**Figure 2: Speed Profile**

Average Speed by Time of Day
I-80 at I-94

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>MPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AM-1AM</td>
<td>55</td>
</tr>
<tr>
<td>1AM-2AM</td>
<td>55</td>
</tr>
<tr>
<td>2AM-3AM</td>
<td>55</td>
</tr>
<tr>
<td>3AM-4AM</td>
<td>55</td>
</tr>
<tr>
<td>4AM-5AM</td>
<td>55</td>
</tr>
<tr>
<td>5AM-6AM</td>
<td>55</td>
</tr>
<tr>
<td>6AM-7AM</td>
<td>55</td>
</tr>
<tr>
<td>7AM-8AM</td>
<td>55</td>
</tr>
<tr>
<td>8AM-9AM</td>
<td>55</td>
</tr>
<tr>
<td>9AM-10AM</td>
<td>55</td>
</tr>
<tr>
<td>10AM-11AM</td>
<td>55</td>
</tr>
<tr>
<td>11AM-12PM</td>
<td>55</td>
</tr>
<tr>
<td>12PM-1PM</td>
<td>55</td>
</tr>
<tr>
<td>1PM-2PM</td>
<td>55</td>
</tr>
<tr>
<td>2PM-3PM</td>
<td>55</td>
</tr>
<tr>
<td>3PM-4PM</td>
<td>55</td>
</tr>
<tr>
<td>4PM-5PM</td>
<td>55</td>
</tr>
<tr>
<td>5PM-6PM</td>
<td>55</td>
</tr>
<tr>
<td>6PM-7PM</td>
<td>55</td>
</tr>
<tr>
<td>7PM-8PM</td>
<td>55</td>
</tr>
<tr>
<td>8PM-9PM</td>
<td>55</td>
</tr>
<tr>
<td>9PM-10PM</td>
<td>55</td>
</tr>
<tr>
<td>10PM-11PM</td>
<td>55</td>
</tr>
</tbody>
</table>
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Phoenix, AZ: I-10 at SR-51/SR-202

**Bottleneck Summary**
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

- Average Speed: 53
- Peak Average Speed: 50
- Nonpeak Average Speed: 54
- Nonpeak/Peak Speed Ratio: 1.09
- Congestion Index: 25,995
- Ranking (out of 100): 86

![Figure 1: Location Map](image1)

![Figure 2: Speed Profile](image2)
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

54

Peak Average Speed

53

Nonpeak Average Speed

55

Nonpeak/Peak Speed Ratio

1.04

Congestion Index

23,371

Ranking (out of 100)

87

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

San Antonio, TX: I-10 at I-410 (North)

**Bottleneck Summary**
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>54 MPH</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>52 MPH</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55 MPH</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.05</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>20,876</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>88</td>
</tr>
</tbody>
</table>

**Figure 1: Location Map**

**Average Speed by Time of Day**
I-10 at I-410 (North)

**Figure 2: Speed Profile**
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Los Angeles, CA: SR-134 at SR-2

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Average Speed</th>
<th>54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>51</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.07</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>20,457</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>89</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile

Average Speed by Time of Day
SR-134 at SR-2

MPH

Time of Day

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

Peak Average Speed

Nonpeak Average Speed

Nonpeak/Peak Speed Ratio

Congestion Index

Ranking (out of 100)

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Seattle, WA: I-90 (Floating Bridge)

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

- Average Speed: 51 MPH
- Peak Average Speed: 46 MPH
- Nonpeak Average Speed: 53 MPH
- Nonpeak/Peak Speed Ratio: 1.16
- Congestion Index: 19,052
- Ranking (out of 100): 91

Figure 1: Location Map
Figure 2: Speed Profile
Knoxville, TN: I-40 at I-275

Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>54</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.03</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>18,539</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>92</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak</td>
<td>49</td>
</tr>
<tr>
<td>Nonpeak</td>
<td>52</td>
</tr>
</tbody>
</table>

Nonpeak/Peak Speed Ratio

|          | 1.06   |

Congestion Index

|          | 13,845 |

Ranking (out of 100)

|          | 93     |

Figure 1: Location Map

Average Speed by Time of Day
I-5 at SR-163

Figure 2: Speed Profile
Colorado Springs, CO: I-25 at W. Bijou Street

**Bottleneck Summary**
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

**Average Speed**
- 55

**Peak Average Speed**
- 55

**Nonpeak Average Speed**
- 55

**Nonpeak/Peak Speed Ratio**
- 1.00

**Congestion Index**
- 1,231

**Ranking (out of 100)**
- 94

---

**Figure 1: Location Map**

**Figure 2: Speed Profile**
Salt Lake City, UT: I-15 at I-215 (North)

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Peak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.00</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>1,112</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>95</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Average Speed by Time of Day
I-15 at I-215 (North)

Figure 2: Speed Profile
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

- 55

Peak Average Speed

- 55

Nonpeak Average Speed

- 55

Nonpeak/Peak Speed Ratio

- 1.00

Congestion Index

- 0

Ranking (out of 100)

- 96

Figure 1: Location Map

Figure 2: Speed Profile
2009 Bottleneck Analysis of 100 Freight Significant Highway Locations

Mobile, AL: I-10 (George Wallace Tunnel)

Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
55

Peak Average Speed
55

Nonpeak Average Speed
55

Nonpeak/Peak Speed Ratio
1.00

Congestion Index
0

Ranking (out of 100)
97
Bottleneck Summary

The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak Average Speed</td>
<td>55</td>
</tr>
<tr>
<td>Nonpeak/Peak Speed Ratio</td>
<td>1.00</td>
</tr>
<tr>
<td>Congestion Index</td>
<td>0</td>
</tr>
<tr>
<td>Ranking (out of 100)</td>
<td>98</td>
</tr>
</tbody>
</table>

Figure 1: Location Map

Figure 2: Speed Profile
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed

55

Peak Average Speed

55

Nonpeak Average Speed

55

Nonpeak/Peak Speed Ratio

1.00

Congestion Index

0

Ranking (out of 100)

99

Figure 2: Speed Profile

Figure 1: Location Map
Bottleneck Summary
The bottleneck location is shown in Figure 1. The speed profile is shown in Figure 2.

Average Speed
55

Peak Average Speed
55

Nonpeak Average Speed
55

Nonpeak/Peak Speed Ratio
1.00

Congestion Index
0

Ranking (out of 100)
100

Figure 1: Location Map

Figure 2: Speed Profile
RESEARCH METHODOLOGY

ATRI conducted an in-depth analysis of each of 100 freight significant highway interchanges using truck position and speed data that were derived from wireless onboard communications systems used by the trucking industry. The four basic steps in this analysis are as follows:

1. Identification of Study Population: This step consisted of extraction of data for commercial vehicles during all of 2009 at 100 specific location from a large, anonymous database;
2. Application of Data Quality Tools and Techniques;
3. Application of a Four-Step Analysis Process that Utilizes Vehicle Time, Date and Speed information; and
4. Final Production of Total Freight Congestion Values and Ranking.

The final result of this analysis is a ranking of the 100 bottlenecks.

Each bottleneck was given a “total freight congestion value” using a calculation that factors in the impact of congestion on average commercial vehicle speeds in each study area, includes analysis for 24 one-hour blocks of time, and addresses freight demand for road segments that are located within the study area during each hour-long block of time. The “total freight congestion value” does not represent hours lost, or financial costs due to this delay, but is simply a means by which the researchers could compare the level of severity of each individual bottleneck.

Table 1 displays the calculations used to produce a “total freight congestion value” for an individual bottleneck; the methods are also described below.

The first step in the process is to set a free flow speed. In this research, 55 mph is used for free flow on all 100 bottlenecks.

The second step is a calculation of the miles per hour below free flow; this number is then multiplied on an hour-by-hour basis by the number of commercial vehicles that were part of the corresponding hour block. Thus, commercial vehicles that are not affected by delay produce a delay value of 0. Essentially, for each of the 24 one-hour blocks of time, “vehicle population by hour” is multiplied by “(Free Flow – Average MPH)” to produce an “hourly freight congestion value.”

Finally, the sum of 24 hourly freight congestion values is calculated to produce the “total freight congestion value,” which is the number used to rank the severity of the 100 bottlenecks.

As a final note, the study period (i.e. the timeframe from which data was extracted) included one year of weekday truck position data during all of 2009. During those time periods (and for specific bottlenecks) certain external factors may have played a role in the final total freight congestion value. This is especially true for those areas that were influenced by ongoing, long-term construction projects.
<table>
<thead>
<tr>
<th>Hour of Day</th>
<th>Vehicle Population by Hour</th>
<th>Average MPH by Hour</th>
<th>MPH Below Free Flow 55 MPH</th>
<th>Hourly Freight Congestion Value = (MPH Below Free Flow) * (Vehicle Population by Hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:00-01:00</td>
<td>687</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>01:00-02:00</td>
<td>711</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>02:00-03:00</td>
<td>744</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>03:00-04:00</td>
<td>700</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>04:00-05:00</td>
<td>784</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>05:00-06:00</td>
<td>979</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>06:00-07:00</td>
<td>1015</td>
<td>53.98</td>
<td>1.02</td>
<td>1,032</td>
</tr>
<tr>
<td>07:00-08:00</td>
<td>1473</td>
<td>38.48</td>
<td>16.52</td>
<td>24,333</td>
</tr>
<tr>
<td>08:00-09:00</td>
<td>1536</td>
<td>38.59</td>
<td>16.41</td>
<td>25,203</td>
</tr>
<tr>
<td>09:00-10:00</td>
<td>1585</td>
<td>49.06</td>
<td>5.94</td>
<td>9,418</td>
</tr>
<tr>
<td>10:00-11:00</td>
<td>1456</td>
<td>54.27</td>
<td>0.73</td>
<td>1,070</td>
</tr>
<tr>
<td>11:00-12:00</td>
<td>1537</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>12:00-13:00</td>
<td>1358</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>13:00-14:00</td>
<td>1420</td>
<td>53.44</td>
<td>1.56</td>
<td>2,209</td>
</tr>
<tr>
<td>14:00-15:00</td>
<td>1521</td>
<td>46.80</td>
<td>8.20</td>
<td>12,467</td>
</tr>
<tr>
<td>15:00-16:00</td>
<td>1654</td>
<td>39.85</td>
<td>15.15</td>
<td>25,057</td>
</tr>
<tr>
<td>16:00-17:00</td>
<td>1465</td>
<td>39.68</td>
<td>15.32</td>
<td>22,446</td>
</tr>
<tr>
<td>17:00-18:00</td>
<td>1609</td>
<td>39.36</td>
<td>15.64</td>
<td>25,164</td>
</tr>
<tr>
<td>18:00-19:00</td>
<td>1186</td>
<td>47.76</td>
<td>7.24</td>
<td>8,588</td>
</tr>
<tr>
<td>19:00-20:00</td>
<td>998</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>20:00-21:00</td>
<td>835</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>21:00-22:00</td>
<td>862</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>22:00-23:00</td>
<td>753</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>23:00-00:00</td>
<td>751</td>
<td>55.00</td>
<td>0.00</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Freight Congestion Value = 156,987
(Sum of Hourly Freight Congestion Values)

Table 1: Example of Total Freight Congestion Value Calculation for a Single Freight Bottleneck