The New I-64 Economic and Regional Mobility Study
2009 Annual Report

Prepared for
Missouri Department of Transportation
Organizational Results

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January 2011

The opinions, findings, and conclusions expressed in this publication are those of the principal investigators. They are not necessarily those of the Missouri Department of Transportation, the U.S. Department of Transportation or the Federal Highway Administration. This report does not constitute a standard or regulation.
4. Title and Subtitle:
The New I-64 Economic and Regional Mobility Study - 2009 Annual Report

10. Sponsoring Agency Name and Address
Missouri Department of Transportation
Research, Development and Technology
P. O. Box 270-Jefferson City, MO    65102

18. Distribution Statement
No restrictions. This document is available to the public through National Technical Information Center, Springfield, Virginia   22161

19. Security Classification (of this report)
Unclassified

20. Security Classification (of this page)
Unclassified

12. Sponsoring Agency Name and Address
Missouri Department of Transportation
Research, Development and Technology
P. O. Box 270-Jefferson City, MO    65102


17. Key Words:
Communication, Public Opinions, Regional Mobility, Safety, Regional Economics, and Full-closure Construction
Executive Summary

The research team has found the following results on the four key study areas:

Communications
The Eastern closure in 2009 had a noticeable impact on respondent behavior and travel habits.
- A sizeable minority reported changes in their shopping and driving habits
- Many respondents reported slightly longer daily commutes compared to pre-construction period
- Majority of respondents are satisfied with how they are able to get around St. Louis (60 percent)
- Overwhelming majority of respondents are satisfied with MoDOT’s decision to close parts of I-64 for two years instead of taking 6-8 years with lane closures (83 percent in the lowest measurement, 96 percent in the highest both up when compared to 2008)
- Overall, the respondents have a high level of satisfaction with how the I-64 closure has been handled (78 percent)
- The overwhelming majority of responses received are very satisfied/satisfied when asked about the delivery of timely, accurate and understandable project information (86 percent)

Considering the reported changes in respondents’ behavior, these are extremely high levels of satisfaction and reflect the public consensus that this project was well planned and delivered within the “promised” 2 year period.

Mobility
The following our findings from the Eastern closure period in 2009:
- Traffic volumes (2009 compared to 2007) along I-70 decreased west of I-170, but increased east of I-170. Traffic volumes along I-270 south of I-64 increased by 30,000 to 40,000 vehicles per day. I-44 also experienced an increase in traffic volumes, ranging from an increase of 22,000 vehicles per day east of I-270 at Lindbergh Boulevard to an additional 7,000 vehicles per day near Jefferson Avenue. I-170 experienced increases between 7,000 and 15,000 vehicles per day. I-64 west of I-270 experienced increases ranging between 8,000 and 11,000 vehicles per day.
- Travel speeds (2009 compared to 2007) have remained about the same even with the increases in traffic volumes mentioned above. There were slight decreases in travel times along some of the region’s freeway network. Improvements in the operation of these adjacent roadways were the result of some of the pre-closure improvements and regional coordination across city/county/state agencies.
- Parallel arterial routes experienced increases in traffic volumes as well as travel time (2009 compared to 2007). East-west arterial corridors, such as Manchester Road, Forest Park Parkway and Olive Street, realized increases of between 10,000 and 20,000 vehicles per day. North-south arterial corridors such as Hanley Road and Lindbergh Boulevard experienced a slight increase in traffic volumes and travel times.
- The RideFinders Rideshare program experienced a significant increase through most of 2008 as it approached the 10,000 membership plateau in November. In 2009, rideshare
for both carpool and vanpool users dropped slightly or remained the same from the end of 2008. The increase in 2008 and stability in 2009 most likely means that the change in the Rideshare program could be a combination of gas prices, economic conditions and/or the I-64 project.

- Usage of commuter park-and-ride facilities in Missouri returned to similar levels experienced in 2007 demonstrating that park-n-ride facilities were most likely impacted in 2008 by higher gas prices and the economy, not significantly by the I-64 closure.

Based on the evaluation of regional mobility, the study team concluded the traffic volume increased on alternative routes that caused a slight increase travel times and decreased travel speeds. Regional planning and improvements to alternative routes significantly reduced and minimized travel impacts.

**Economics**
The Congressional Budget Office (CBO) is projecting the economic recovery will continue at a modest pace during the next few years, and projects that the economy will grow by two percent from the fourth quarter of 2010 through the fourth quarter of 2011.\(^1\) CBO anticipates national unemployment levels will not return to five percent until 2014. The St. Louis area appears to be following this national trend and forecast.

From the analysis of economic conditions, business surveys, and user transportation costs, the following represent the major results:

- The reconstruction of I-64 created more circuitous routes for commuters during closures thus reducing average speeds and increasing vehicle miles traveled;
- During reconstruction 98,000 to 120,000 vehicles were diverted daily and transportation user costs increased by $101.5 million during entire project. This represents less than 4.4 percent of the total transportation spending in St. Louis during the I-64 closure period (2008 through 2009);
- Alternatively, if I-64 had been reconstructed using a more conventional phased construction period of 6 to 8 years, user costs would have increased from additional traffic delays over the full-closure costs by $45.6 to $86.8 million;
- The project demonstrated a significant cost savings – between $92 and $187 million – from accelerating the reconstruction project schedule to two years versus a six or eight year staged construction schedule;
- Businesses expected the worst, but the conditions during the western and eastern closures were not as bad as they anticipated. Design-Build delivery and an aggressive project schedule were successful in minimizing the duration of impacts to the region;
- While the economic recession made the assessment difficult to determine the precise impact of the I-64 reconstruction, the analysis found the impacts to the corridor region were no different than economic conditions across Missouri and the nation;
- The evaluation of economic conditions, statistical analysis, business surveys, and transportation analysis of user costs has demonstrated that the impacts of the New I-64

\(^1\) [http://www.cbo.gov/doc.cfm?index=11705](http://www.cbo.gov/doc.cfm?index=11705)
Project on the regional economy were relatively minor compared to an alternative long-term project schedule;

- All three surveys reported high-levels of satisfaction (all above 86 percent) with the I-64 project. The final survey found that 93 percent of responding businesses were satisfied with the project as the sections of I-64 closest to downtown St. Louis were reopening;
- Throughout the project, approximately half of the businesses responding found no change in sales or customers.

Given that I-64 has only been reopened for a short period of time, and that the economy is still recovering from the recession, revisiting this study to evaluate the long-term impacts could provide an indication of future project benefits from this major transportation project.

**Crash Analysis**

The study team evaluated 6 years (2004-2009) of crash data that occurred on 17 different roadways in the vicinity of the I-64 closure. Using crash data, 2-year (2008 and 2009) closure crashes were compared to 4-year (2004-2007) pre-closure crashes in various ways. The major findings from the crash analysis are as follow:

- Comparing the average number of crashes for the pre-closure period (2004 through 2007) to the closure period (2008 and 2009) found the following results. The number of crashes increased on 5 roadways in 2008 and 4 roadways in 2009. Whereas the crash numbers decreased on 12 roadways in 2008 and 13 roadways in 2009.
- The 4-year average number of crashes across the pre-closure period was 16,595 compared to 15,111 crashes in 2008 (9 percent reduction) and to 14,155 crashes in 2009 (15 percent reduction).

Based on the evaluation of crash numbers and rates and their associated trends along the 17 major diversionary roadways, the study team concludes that there was no evidence that the closure contributed to any increases in crashes and crash rates.
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Introduction

On December 14, 2008, the eastern closure began with the closure of I-64 between I-170 and Kingshighway Boulevard. On December 15, 2008, the western closure of the New I-64 was opened to traffic. Partners again implemented their regional command center operations to ensure that any traffic conditions were addressed and responded to as the public adjusted to the change in closure along I-64.

This annual report for 2009 assesses the approximate twelve months that eastern I-64 section was closed and re-opened on December 7, 2009.

This report evaluates the four key areas of Communications (MoDOT’s provision of information to the public, and the public’s response to the project), Regional Mobility (the effects of the closure/project on travel behavior, choices, and flow), Regional Economics (the effects of the closure/project on businesses within the corridor as well as the economic health of the region) and Roadway Safety (the effects of the closure/project on the region’s roadway safety in regards to crash information).

This report is the culmination of monthly and quarterly reports produced in 2009 included in Appendix C. This 2009 report and a similar 2008 annual report along with the post-construction assessment report will be included in the final report in early 2011.

Objectives

Assess potential impacts in the following areas to provide information on how the I-64 full-closure construction influenced regional activities:

- Communications
- Regional Mobility
- Roadway Safety
- Regional Economics
Present Conditions

Full-closure is a roadway construction strategy that has been considered when regional conditions exist where alternative roadways are available. This strategy permits construction to be accelerated and normally at a reduced construction cost. The major concern in implementing this strategy is the public concerns on impacts to region mobility, economics and safety.

Results and Discussion (Evaluation)

Communications Discussion

<table>
<thead>
<tr>
<th>Major Goals – Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and implement survey instruments</td>
</tr>
<tr>
<td>Determine effectiveness of pre-closure notification</td>
</tr>
<tr>
<td>Measure participant satisfaction for key issues</td>
</tr>
<tr>
<td>Estimate changes in behavior</td>
</tr>
<tr>
<td>Hear everyone’s voice (obtain generalized sample)</td>
</tr>
</tbody>
</table>

Survey Methods and Characteristics

Response to surveys was 5,266 in 2009 measuring public opinions about the Eastern closure and how it may have changed behavior. Three survey methodologies were utilized in this study:

1. On-Line survey
2. Motorist Assist and I-64 Traffic Response surveys – two project related questions added
3. Second mail-out survey

These survey methodologies were consistent with those used in 2008.

On-Line Survey

Below are some statistics regarding the on-line survey on MoDOT’s the New I-64 website:

- 444 responses were generated during the Eastern closure with 38 percent in the first quarter within the first few months after the closure transition from opening the west end and closing the east end
- Satisfaction with the overall project management, distribution of project information and the support of the decision to close for two years versus construction under traffic for 6 to 8 years remained in the upper 70 percent to low 80 percent.
- On-line respondents tended to be Caucasian and affluent.

Mailed Survey

Ten thousand St. Louis residents were randomly selected and mailed surveys in January 2009 and again in January 2010. Since the list of 10,000 residents was randomly selected from multiple St. Louis area zip codes, this method provided the most representative sample of the area. The intent to increase minority participation to ensure a diverse study was accomplished with this mailed survey instrument. The January 2010 mailed survey report is included in the Appendix A of this report. January 2008 and 2009 mailed survey reports were included in the 2008 Annual Report. The following Table C-1 shows a comparison of general information on this survey method.

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailed Surveys</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Responses Received</td>
<td>776</td>
<td>1156</td>
<td>1559</td>
</tr>
<tr>
<td>Response Rate</td>
<td>7.8 percent</td>
<td>11.6 percent</td>
<td>15.6 percent</td>
</tr>
</tbody>
</table>
The responses received from African Americans rose from 16 percent in 2008 and 2009 to almost 20 percent in 2010. This method of survey helped ensure that a diverse opinion was heard on the I-64 evaluation.

Motorist Assist Surveys
Motorist Assist respondents tended to be less affluent than on-line respondents. People in the lower income bracket are less likely to respond to mail surveys and online surveys, so two key questions were added to the standard service survey already distributed by motorist assist operators to ensure that the most important questions regarding the I-64 study were asked of the lower income segment. These questions are as follows:

1. How satisfied are you with how well you are managing to move around the St. Louis area with the closure of I-64?
2. How satisfied are you with the decision to complete the work by closing I-64 for 2 years instead of taking 6-8 years to finish otherwise?

There were 3,666 responses in 2009 and their responses to two similar questions in both the on-line and motorist assist survey was generally higher in satisfaction in the mid to low 90 percent.

Survey Evaluation Methodology
The following seven (7) evaluation areas were developed to categorize the survey information gained and received from the various survey methods described above. The following defines the intent of the categorized evaluation area and the general overall results discovered:

- **“Awareness”** defines how informed transportation users are with regard to the closure and other project construction activities that impact their normal travel patterns and region’s economy. From the responses, it appears that MoDOT effectively communicated the closure to the affected population in 2007; pre-closure awareness was reported as very high. These responses have also reported that scheduled construction activities that impact travel have been effectively communicated.

- **“Satisfaction”** defines how satisfied transportation users are with regard to the management of the construction project and travel in and around the St. Louis region. Respondents are largely satisfied with their ability to travel around the region. They also are largely satisfied with project management that includes areas like the full closure approach, the level of information shared on project activities, and the project communication shared through various public information outlets.

- **“Information Sources”** defines the various outlet sources that project information is shared and what are the most effective sources to get information to the transportation user. TV News appears to be the best way to reach the majority of the respondents, with radio news, road signs and newspaper also being effective methods. For those who use the internet, online information sources are almost as effective as TV news. However, a large portion of the general population does not obtain their information via the internet and these other methods listed in this paragraph should continue to be used to reach them.
• “Alternative Routes” defines the designated and other alternate routes used by the transportation user to travel around the construction project. I-44 was the most recommended alternative route. Two nearby parallel arterials, Ladue Road and Clayton Road, received more negative responses when survey respondents were asked to make recommendations on preferred alternative routes.

• “Travel Time” defines respondents’ perception on how their travel times were impacted by the construction project. The majority of respondents are indicating that that their travel time for basic trips have increased; although many have indicated no change or even a few reported an improvement in travel times.

• “Travel Mode” defines changes in transportation modes like use of transit or non-motorized transport (bike or walking) to accommodate their trips (commute, event/entertainment, shopping, etc.). Initial responses on how the closure has changed people’s mode of travel are somewhat inconclusive. It is clear that the dominant mode of travel by the respondents has been and continues to be by the automobile.

• “Personal Impact” defines how the construction project has impacted their trips in the region. The closure is affecting people’s trip choices. Survey respondents are indicating changes in basic trip destinations such as shopping and eating out. Overall, almost three quarters of respondents are indicating that their frequency of travel to certain areas has been affected by the closure. Most commuters have reported not shifting their normal commute time.

To date, the responses have been fairly consistent over the various survey methods. This general agreement across surveys is important because it appears to demonstrate that one can generalize from the surveys to the general population. Other than issues related to access to the online survey that is not available to all transportation users for various reasons, the web-based survey instrument may present skewed information.

The selection of a target area with the mailed survey to help ensure greater diverse survey participation and to counter potential web-based survey impacts was utilized. Also, the inclusion of two key questions on the Motorist Assist Survey increasing a more diverse participation in providing opinions on how the project potentially impacted a lower income population.

In order to facilitate better comparisons of changes across survey types and from time to time, the statistics used in the project assessment usually do not include the “not sure” or “no opinion” percentages. This eliminates a major source of random variability and allows a more accurate observation of change over time. In addition, this methodology is consistent with how MoDOT calculates similar Tracker performance measures.

Communications Results
Awareness
This question was very important during the initial western closure to determine the level of awareness of I-64 being closed. In mid-2008, this question was removed when revising the online survey to better reflect and assess the I-64 project. It was discovered in the first six months of 2008 that 98.1 percent of the on-line respondents were aware of the upcoming closure in 2007, and since 97.2 percent of the online respondents traveled on the affected section of I-64 at least once per week before the closure, it appears that the target population received the needed advance information and addressed the awareness issue.
Satisfaction
The Table C-2 below summarizes survey respondents’ opinions in the area of satisfaction. As the on-line survey display indicates when comparing 2009 to 2008, three indicators remained about the same (green shading) while two indicators (rose shading) showed a detectable difference. In 2009, we noticed that people expressed less satisfaction with their ability to move around the St. Louis area. In a potential opposite response, they expressed an increased satisfaction for the 2-year closure construction approach.

Table C-2 – On-line Survey Satisfaction Comparison

<table>
<thead>
<tr>
<th>Key Public Satisfaction Indicators – On-line Survey</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall level of satisfaction with how the I-64 closure has been handled</td>
<td>78%</td>
<td>77%</td>
</tr>
<tr>
<td>Satisfaction with how well the public kept informed about the new I-64 project</td>
<td>86%</td>
<td>89%</td>
</tr>
<tr>
<td>Satisfaction with how well managing to move around the St. Louis area w/ the closure</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>Satisfaction with timeliness of information being made available</td>
<td>86%</td>
<td>87%</td>
</tr>
<tr>
<td>Satisfaction with decision to complete the work by closing I-64 for 2 years instead of 6-8 years w/ lane closures</td>
<td>83%</td>
<td>76%</td>
</tr>
</tbody>
</table>

Table C-3 provides information on the two survey questions for the motorist assist and I-64 traffic response programs showed a higher satisfaction level for similar questions. This may indicate that those receiving service patrol assistance responded in a more positive manner of appreciation. This indication is another acknowledgement that these programs are well appreciated by transportation users. It could be another potential indicator that the I-64 traffic response program implemented for this project was well accepted.

Table C-3 – Motorist Assist Survey Questions Comparison

<table>
<thead>
<tr>
<th>Key Public Indicators - Motorist Assist Comparison of Both Closures</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with how well managing to move around the St. Louis area w/ the closure</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Satisfaction with decision to complete the work by closing I-64 for 2 years instead of 6-8 years w/ lane closures</td>
<td>96%</td>
<td>94%</td>
</tr>
</tbody>
</table>

One notable item is that survey respondents have expressed satisfaction regarding the regional collaboration on signal timing that has facilitated arterial flow during construction. The public has also expressed a desire to see these signal timing improvements continued after the project is complete along major arterial corridors.

Personal Impact of the Closure
The questions on how the I-64 construction and the full closure impacted regional travel will help in measuring and confirming potential travel and economic impacts. As the Figure C-1 below indicates, respondents much more often modified their frequency of travel to certain areas than the location of their basic trip destinations. The most affected destinations were attending events (42 percent), eat out (44 percent), shopping (47 percent) and the most impacted was travel to certain areas (75 percent). While personnel impacts to where someone lives, works or buys gas, were reported as showing lesser impacts in the surveys.
Most respondents indicated that they have continued to work the same hours in the same location. In the initial first few months of the 2008 closure, survey information showed a slight adjustment in commuter periods; however, most commuters soon return to more normal commute times and this trend continues in 2009.

Information Sources and Communication Methods
In 2009, TV News was considered to be the best method for MoDOT to deliver project information to the public by the respondents of the online survey. Again, based on this survey being an Internet-based survey, the percentage may have been higher when compared to other survey methods. The 2010 mail-out survey for example showed 39 percent of respondents selecting it as the best way to deliver information while the 2009 on-line showed Internet-based information delivery as 64 percent. Online respondents with access to the internet thought the internet was the second best way for MoDOT to provide information to them. Road signs, radio news and newspapers were also considered very good methods of communication.

Table C-4 – Communication Best Way Comparison

<table>
<thead>
<tr>
<th>Best Way for MoDOT to Get Information to You</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV News</td>
<td>62%</td>
<td>73%</td>
</tr>
<tr>
<td>Internet Site</td>
<td>60%</td>
<td>64%</td>
</tr>
<tr>
<td>Radio News</td>
<td>51%</td>
<td>56%</td>
</tr>
<tr>
<td>Road Signs</td>
<td>43%</td>
<td>56%</td>
</tr>
<tr>
<td>Newspaper</td>
<td>43%</td>
<td>43%</td>
</tr>
<tr>
<td>Project email from MoDOT or I-64 Team</td>
<td>24%</td>
<td>26%</td>
</tr>
<tr>
<td>Radio Talk Shows</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Receive Information in Mail</td>
<td>13%</td>
<td>15%</td>
</tr>
<tr>
<td>Project Display Boards at Public Events</td>
<td>11%</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
<td>3%</td>
</tr>
</tbody>
</table>
Alternative Routes
Respondents were initially (first six months of 2008) asked to provide input about eight alternative routes to gain a public perspective on what was considered the best alternative route. This information could then be used to correlate with information discovered in the mobility evaluation. I-44 was the most recommended route, with 41 percent of the respondents recommending it. Clayton Road and Ladue Road were the least recommended routes, in the sense that more respondents recommended against their usage than for them. From the mobility evaluation, the I-44 corridor continues to experience the greatest increase in traffic and correlates with information gained in the on-line survey in 2008.

Travel Time
The travel time evaluation has shifted to the mobility and economic evaluations. In 2008, information was gathered on potential increase or decrease in travel time to gain the public perception. The majority of on-line survey respondents (58 to 78 percent) indicated that various trips had gotten longer since the closure, with a total of 9 to 12 percent responding that their trips had increased by 30 minutes or more. Notably, when asked specifically about work trips, 14 percent of respondents indicated that their work trips were actually faster than before. The response on this question regarding a potential shift in their typical commute period continues to provide respondents’ perspectives that additional travel time was experienced. In 2009, it was observed that commute times shifted later in both the am and pm peak periods in Figure C-2.

Figure C-2 – Typical Commuter Period

<table>
<thead>
<tr>
<th>Typical Commuter Period</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 7 am</td>
<td>20</td>
</tr>
<tr>
<td>7 am to 9 am</td>
<td>41</td>
</tr>
<tr>
<td>9 am to noon</td>
<td>10</td>
</tr>
<tr>
<td>noon to 3 pm</td>
<td>10</td>
</tr>
<tr>
<td>3 pm to 6 pm</td>
<td>37</td>
</tr>
<tr>
<td>After 6 pm</td>
<td>12</td>
</tr>
</tbody>
</table>

In 2009, respondents were asked if they shifted their commute start times and Figure C-3 below shows the percentage based time and when from their response to this question “did you shift your commute start time by?”
No change and not applicable represented 49 percent while starting more than 10 minutes early was 28 percent that present a somewhat opposite opinion to the display above when respondent stated that they started later in 2009.

Travel Modes
The on-line survey for 2007 (before) and 2008 and 2009 (closure period) revealed only slight changes in reported travel mode over the evaluation period, as illustrated below. Single-occupant driving has apparently slightly decreased by 2 to 3 percent, and carpooling (driving with others) also appears to have decreased in 2008 and increased in 2009. For other modes, the fluctuations are not stark, but there appears to have been some increase in each for 2009.
Demographics
The Figures C-5 through C-8 below summarizes the responses to demographic questions from the respective surveys. One of the purposes of supplementing the Web survey with a mail survey was to reach populations without internet access, in order to ensure the research considered the input of as many groups as possible – a representative sample. By targeting the mail survey at many of the zip codes near the closure, the research team succeeded in its objective of reaching a more diverse population, especially in reaching more minorities and more females.

Figure C-5 – Survey Respondent’s Age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>2009</th>
<th>2008</th>
</tr>
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<tbody>
<tr>
<td>over 65 years old</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>41 to 65 years old</td>
<td>53</td>
<td>49</td>
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<td>35</td>
<td>38</td>
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<td>16 to 25 years old</td>
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Figure C-6 – Survey Respondent’s Gender

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<th>Year</th>
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<th>Male</th>
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<tbody>
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<td>42</td>
<td>58</td>
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<tr>
<td>2008</td>
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</table>
Major Goals – Mobility Assessment

Assess the shifts (temporal, spatial, and modal) in travel demand throughout the region
Assess congestion effects of the closure
Assess closure effects on transit, ridesharing, and park-and-ride demand.

Regional Mobility Discussion

This assessment uses a variety of tools to measure the region’s mobility before, during, and after the construction and closure period. The assessment examines traveler shifts and their effects, using a multitude of data sources of varying resolution. The complexity and sheer size of the data set requires examinations at several levels to gain the most relevant information. The graphic display to the right shows both closures that occurred in 2008 and 2009.

Based on monthly and quarterly reports and field traffic monitoring completed during 2008, it was determined that limited mobility impacts were experienced along secondary facilities. Major facilities within the area described as Interstate 70 on the north; Interstate 44 on the south; and Route 141 on the west appeared to be impacted with similar diversion trends as the western closure. For each of these facilities, relevant mobility data (traffic volumes, travel times, incidents) was gathered based on available information. It should be noted that data collection along the regions roadway network was significantly less during the eastern closure than during the western closure. Experience gained by motorists during the western closure led to minimizing impacts and reduced the required monitoring of these corridors.

Mobility data was obtained through numerous sources:

- MoDOT collected limited traffic volume data along key major expressway and arterial facilities. Travel time runs along these roadways were conducted during the early days of the closure to enhance and adjust the regional traffic plan to accommodate mobility shifts and reduce mobility impacts. These runs were eliminated after the first few weeks of the closure. MoDOT also maintains statistics for its park-and-ride facilities across the state, and provided quarterly count data for its facilities in the region.

- Traffic.com is a national commercial traveler information service provider that works with state and local highway agencies in major metropolitan areas across the U.S., by providing real-time traffic information. Their data is based primarily on sensors placed throughout the major urban area by Traffic.com or the DOT agencies. Traffic.com archives traffic volumes, travel speeds, and vehicle classification (limited to their sensors) and produces travel times. They have agreed to share this information with the research team based on their original data-sharing agreement with MoDOT. The research team used the customized software routines developed during the western closure to collect and process significant amounts of data for use in this report. This source of data has been valuable in this study.

- St. Louis County conducted and provided traffic counts and travel-time studies on various regional arterials periodically during the eastern closure.

- RideFinders, sponsored by Madison County Transit, is the St. Louis regional rideshare program. Rideshare data has been provided on a monthly basis.
• The research team has supplemented data collection where necessary, including travel-time runs, traffic counts, and field observations.

Regional Mobility Results
Pre-closure Capacity Improvements
It is important to note that regional mobility began to be affected by the new I-64 project even before the closure. Perhaps most notably, several highway/roadway capacity improvements were implemented by MoDOT and St. Louis County on parallel and complementary facilities, as listed at right.

In addition to capacity improvements, temporary access management measures were also taken to increase traffic flow at or near key signalized intersections. Cross access (including left turns to and from key arterials) was prohibited to improve traffic flow, especially during the peak hours.

Crash reconstruction sites were located and marked along interstate facilities to assist in traffic incident management activities. These sites provided a safe location for police to work non-injury crashes while maintaining freeway traffic-handling capacities. The research team discussed the utilization of these sites with MoDOT staff and found that their utilization was limited based on several factors like size of the site, location of the site, and education of the motorist and the responding emergency service providers.

Traffic Volumes
A key task included as part of this research project was the development of a series of systems to automate the collection, processing, and display of the enormous stream of available data. The graphics included in this section of the report were created using these systems. The research team developed a Macro using an Excel spreadsheet, and later using an SQL database application, to search the Traffic.Com traffic database for specific traffic-related data for each highway segment of interest.

Prior to the closure, in baseline 2006, I-64 carried approximately 170,000 vehicles per day (vpd) on a typical weekday in heaviest segment – this is Annual Average Daily Traffic, or AADT (excluding “outlier” days). In January-February of 2007, one year before the closure, the Eastern section of I-64 carried approximately 143,000 vpd on a typical weekday. This initial shift was potentially or partially caused by the anticipation of the construction along I-64. Travelers finding an early alternate route or beginning other travel demand opportunities (like reduction or combining trips, transit, etc.). One hundred (100) percent of this traffic was necessarily displaced (temporally and/or spatially) as a result of the closure.

### Key Improvements to Regional Highways/Roadways

<table>
<thead>
<tr>
<th>Improvement Type</th>
<th>Improvement Details</th>
</tr>
</thead>
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<tr>
<td><strong>I-70</strong> Restriped</td>
<td>From I-170 to I-270 (added lane in each direction)</td>
</tr>
<tr>
<td><strong>I-44</strong> Restriped</td>
<td>From I-270 to I-55/I-70 (added lane in each direction)</td>
</tr>
<tr>
<td><strong>I-270</strong> Restriped</td>
<td>From I-64 to Olive (added lane in each direction)</td>
</tr>
<tr>
<td><strong>I-270/I-64</strong> Restriped interchange</td>
<td>Ramps to improve traffic flow (revised during 2008)</td>
</tr>
<tr>
<td><strong>I-270/I-44</strong> Restriped interchange</td>
<td>Ramps to improve traffic flow</td>
</tr>
<tr>
<td><strong>Clayton Road</strong> Restriped from Mason</td>
<td>Road to Lindbergh Blvd; upgrade various traffic signals; new traffic signals at</td>
</tr>
<tr>
<td></td>
<td>Topping Road and Bopp Road</td>
</tr>
<tr>
<td><strong>Ladue Road</strong> Upgraded</td>
<td>Various traffic signals; various new left/right-turn lanes; new traffic signals at</td>
</tr>
<tr>
<td></td>
<td>Graeser Road/Warson Road</td>
</tr>
<tr>
<td><strong>Improved Signal Timing</strong></td>
<td>Along Page Avenue, Olive Boulevard, Manchester Road, Lindbergh Boulevard, Clayton</td>
</tr>
<tr>
<td></td>
<td>Road, Brentwood Boulevard, Hanley Road, Big Bend Boulevard, Kingshighway Boulevard,</td>
</tr>
<tr>
<td></td>
<td>Grand Boulevard, and Forest Park Parkway</td>
</tr>
</tbody>
</table>
One primary question of interest is, “where did all the traffic go?” Several sources have been used to determine the most appropriate answer to this question - including before/after volumes (from MoDOT, Traffic.com, and St. Louis County), responses to the various public surveys developed, and selected aggregated data reported by MoDOT in its frequent e-mail briefings. The project team summarized and analyzed roadway data based on the interstate, major expressway and major arterials approach. The following discussion highlights the trends in traffic volume, travel speeds, and travel time observed during the eastern closure.

The graphs on the following pages (Figures M1 through M6) include a detailed summary of several freeway and arterial roadways. It is important to note that this summary is based on average traffic conditions for Tuesdays, Wednesdays and Thursdays. This average traffic conditions excluded every holiday, weekend and “outlier” weekday (Mondays and Fridays) from the available data sets. These graphs compare 2009 to 2007 traffic data.

Based on these graphs, the following preliminary conclusions can be gleaned:

• Volumes along I-64 west of I-270 increased by approximately 8,000 to 11,000 vehicles per day vpd) beginning in March. West of I-270, traffic volumes ranged from 85,000 to 110,000 vpd also beginning after March. It appears that western pre-closure regional traffic patterns took a couple months to return after the opened western section of I-64 in early 2009.

• Based on the Traffic.com data, it appears that volumes along I-70 decreased west of I-170, but increased east of I-170 by 20,000 to 30,000 vpd. This shift in traffic would be expected based on the eastern closure of I-64.

• Traffic volumes along I-270 south of I-64 have increased by 30,000 to 40,000 vehicles per day. This trend also occurred during the western closure and demonstrates the use of the designate alternate routing of I-270 to I-44. Also, I-270 north of Page experienced an increase of 20,000 to 30,000 vpd. The only plausible explanation is the baseline 170,000 was low, based on the period after the opening of Page Extension in the mid-2000 when traffic moved to Page from I-70 going to and from St. Charles County. It appears that traffic patterns have adjusted back.

• I-44 became a key alternative east-west route with increases in traffic volumes ranging from 22,000 vehicles per day east of I-270 at Lindbergh Blvd to 7,000 vehicles per day near Jefferson Ave.

• I-170 became a key route that connected several of the arterial roadways throughout the region. South of Page Avenue, volume increases of 15,000 vehicles per day were observed. Just north of I-64, volume increases of around 7,000 vpd were observed.

• Travel speeds and travel times along the region’s freeway network have dropped slightly in conjunction with slight increases in traffic volumes.

• Parallel arterial routes also experienced significant increases in traffic volumes and travel times. East-west arterial corridors closely located along the I-64 corridor like Clayton Road and Ladue Road, maintained increases east of Hanley Road. Traffic volumes along these roadways, west of I-170, dropped to their pre-closure traffic volumes.
• East of Hanley Road, Forest Park Parkway experienced an increase of approximately 15,000 vpd. West of Big Bend, volumes dropped closer to those prior to the closure of the western segment.
Figure M1 – Summary of Traffic Flow – East-West Routes (Traffic volumes for shown segments in thousands vehicles per day)
Figure M2 – Summary of Traffic Flow - North-South Routes (Traffic volumes for shown segments in thousands vehicles per day)

Source: Traffic.Com

The New I-64 Economic and Regional Mobility Study
Annual Report – 2009
Figure M2 – Summary of Traffic Flow – North/South Routes
Figure M3 – Summary of Hourly Traffic Flow (in vehicles per hour)
Figure M4 – Summary of Hourly Traffic Flow (in vehicles per hour)
Figure M5 – Summary of Arterial Traffic Flow (in vehicles per day)
Source St. Louis County and MoDOT
Figure M6 – Summary of Arterial Traffic Flow (in vehicles per day)
Source St. Louis County and MoDOT
Average Speeds
Average speeds were obtained from freeway detection sites (source Traffic.com) based on a one-minute resolution level. Average speed is an indication of how well traffic is flowing and can be an indicator of traffic congestion or an incident/event occurrence. For purposes of this study, average speed is also used in the determination of travel time along the freeway network. Generally, travel time performance measurement is better understood by the general public, since it is how most travelers or commuters measure their trips.

Travel speed was measured using an average daily profile. Speed at low traffic volumes will be closer to the free-flow speed or speed limit of the highway segment (an upper horizontal straight line is the typical free flow speed). Profiles dipping below this line show traffic slowing due to traffic volume increases or incidents. Figures M7 and M8 on the following pages include a detailed summary of five spot locations along I-270, I-70, I-44 and I-170. It is important to note that this summary is based on average traffic conditions for Tuesdays, Wednesdays and Thursdays. These traffic conditions excluded every holiday, weekend and “outlier” weekday (Mondays and Fridays) from the available data sets. It should also be noted that baseline 2007 data was not available along all roadways. Based on these graphs, the following preliminary conclusions can be gleaned:

- In general, travel speeds for the eastern closure were similar to, or higher than, those observed during the western closure.
- Drivers along WB I-44 experienced an increase in travel speeds of between 10 and 13 mph. This is most likely due to the return of traffic from I-44 to I-64.
- Travel speeds along I-70 generally increased east of I-170.
- Travel speeds along I-170 south of Shaw Park increased to values higher than those observed during 2007. This is most likely related to the improved design of the I-64/I-170 interchange.

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Figure M7 – Summary of Hourly Travel Speeds (in miles per hour)
Figure M8 – Summary of Travel Speeds (in miles per hour)

Source: Traffic.com

The New I-64 Economic and Regional Mobility Study
Annual Report – 2008
Figure M8 – Summary of Hourly Travel Speeds
Travel Times

Travel times along the freeway interstate network were calculated using the average travel speeds that were obtained from Traffic.com. Travel time statistics, as mentioned above, are a more “traveler-friendly” performance measurement, since most travelers or commuters measure their trips based on the time it takes to get from one location to the next. Travel times related to the time it takes a driver to get from one point to another point (e.g., along I-270 from I-64 to I-44 was 5 minutes during the morning peak period). Comparison of pre-construction (known as baseline), construction and post-construction periods will provide a better insight into impacts related to traveling during construction, as well as the future value gained from the constructed improvements. Table M1 depicts a summary of twelve freeway segments within the St. Louis region. The pink shaded ratios indicate an increase in travel time, while the green shaded indicate a decrease in travel time. Travel Time Index is the ratio of 2009 Travel Time compared to 2007 Travel Time (baseline). In general, **interstate travel time values were less than the 2007 travel times with only 4 segment/periods out of 95 segment/periods showing an increase in travel time.**

Table M1 – Summary of Freeway Travel Time (Source Traffic.com)
Traffic.com provides a map display of traffic conditions including information such as congestion levels, speed and travel time for any specific segment. Additionally, drivers could sign up to receive email alerts of traffic conditions for specific roadway segments at predetermined time periods. For example “Eastbound Page between I-270 and I-170 at 7:00 AM” would be a user defined route during a specific period.

Travel times for key major arterials were also collected and summarized. Four segments within close proximity to the closure were chosen for studying the travel-time impacts of the I-64 eastern closure. Email alert travel time data was collected at specific times during both the AM peak (7:00 or 7:30 AM) and PM peak (5:00 PM) periods. These email alerts were collected for Monday through Friday for the first 6 months of 2009 and Tuesday through Thursday for the last six months of 2009. From travel times conducted by both agency staff and the research team before the closure, baseline travel times were developed for comparison. The segments are as follows:

- Lindbergh Boulevard: Between Route 100 and US 40/I- 64 (2.45 miles)
- MO 141: Between US 40/I-64 and I-44 (7.5 miles)
- Page Avenue: Between I-270 and I-170 (5.5 miles) & I-170 and Grand Avenue (7.55 miles)
- Manchester Road: Between Barrett Station Road and Hanley Road (7.95 miles)

To insure and validate the data being collected through the Traffic.com website was accurate, the team monitored Traffic.com data while project team members conducted actual travel time runs along the selected roadway segments in 2008. The observed differences were around 1 minute between the Traffic.com data sets and the observed field results, validating the Traffic.com data for use in this study.

Figure M9 depicts the average travel times during various months in 2008 and 2009.

In general, travel times increased, but not significantly. Travel times along Page Avenue actually dropped. This was most likely due to the additional through lane that was added prior to the closure and the signal timing improvements implemented.
Figure M9 – Travel Time along Selected Major Arterial Roadways (Source Traffic.com)
Based on the travel time data, the following preliminary conclusions can be gleaned:

- Average travel times along northbound Route 141 increased slightly. The maximum travel times, however, were significantly higher than the pre-closure travel times.

- Average travel times along westbound Manchester at the beginning of the PM peak hour increased rather significantly, but generally decreased during the five to six o’clock timeframe.

- Page Avenue experienced higher average travel times during the AM peak hour and similar travel times during the PM peak hour.

- Ladue Road and Clayton Road experienced higher average travel times when compared to the pre-closure. Since traffic on these roadways increased significantly, this was not a surprise to the project team.

In general, increases in post-closure travel time runs were observed along several of the corridors. This, most likely, could be due to a significant increase in traffic volumes using these facilities. These conditions could have been significantly worse, if not, for the planned and implemented improvements in the region’s signal timing and coordination efforts to address anticipated increases in traffic volumes. It should be noted that collaboration between local and state agencies was a critical factor in maintaining acceptable traffic flow. The public appeared to notice these improvements, based on survey responses received.

Park-and-Ride
Figure M20 below summarizes both baseline year 2007 and construction years of 2008 and 2009 based on quarterly usage counts at MoDOT’s Park-and-Ride lots in St. Louis County and neighboring counties. As the display below indicates, a downward and stabiling trend from mid-year 2008 were experienced in St. Louis, Jefferson and St. Charles Counties. This increase could be somewhat related to gas prices and/or the economic downturn in 2008. Franklin County was stable after a downward trend in early 2007.

The construction and closure along I-64 may have had a limited impact on park-and-ride usage, since the 1st quarter in 2008 actually showed a decrease when concerns of the closure’s impact were at their peak. The rise in mid-year 2008 was probably more caused by gas prices (near $4 per gallon) and the economy than the closure of I-64. In 2009, the park-n-ride usage returned to similar levels experienced before the closure of I-64 in 2007.
Figure M20 – Park-and-Ride Summary

Rideshare
RideFinders, sponsored by Madison County Transit, is the St. Louis regional rideshare program. The figures shown below labeled M21 and M22 were developed from historical ridership information from RideFinders. In general, the graphs indicate a general upward trend since the second half of 2007 through the latter part of 2008. As previously mentioned, these increases could be due in part to gas prices and the economic down-turn in addition to the New I-64 construction project.

Figure M21 Carpool Summary
On January 2, 2008, the Missouri Department of Transportation (MoDOT) closed I-64 for reconstruction purposes. During the planning stages of this reconstruction project, the plan for a total closure was met with concern, inciting questions from the general public like: Could closing the roadway possibly contribute to more (or less) crashes than before on adjacent roadways? And, if noticeable changes existed in the number and types of crashes, are the changes due to closing I-64 or other influencing factors?

This 2009 Annual Report and its companion 2008 Annual Report aims to answer these questions by examining crash data before and during the closure, and by providing objective explanations to the changes if any. This study retained the same analysis approach conducted in 2008 by conducting two separate analyses (Crash Analysis and Crash Rate Analysis). The following presents the main findings from the two analyses with the inclusion of 2009 crash information:

**Crash Analysis:**
The research team was provided 6 years (2004-2009) worth of crash data that included all crashes that had occurred on 17 area adjacent roadways including I-64. Using this crash data, the 2-year closure period crashes (2008 and 2009) were compared to the 4-year pre-closure period crashes (2004 through 2007). Figures S-1 through S-3 show the trend in total crashes for the various roadways identified as roadways that could be potentially impacted by the I-64 construction project.
Roadway Safety - Results
Comparisons were based on average crashes for the 4-year pre-closure period compared to the 2-year closure period:

Freeways:
- 2008 - Increase in crashes for I-44 (5 percent), I-55 (4 percent) and I-70 (8 percent)
- 2008 - Decrease in crashes for I-64 (52 percent), I-170 (6 percent) and I-270 (6 percent)
- 2009 – Increase in crashes for I-70 (16 percent) only
- 2009 – Decrease in crashes for I-44 (19 percent), I-55 (8 percent), I-64 (73 percent), I-170 (33 percent) and I-270 (19 percent)

Expressways:
- 2008 - Increase in crashes for Route D (2 percent) only
- 2008 - Decrease in crashes for US 40 (35 percent), US 61 (8 percent), US 67 (16 percent) and Route 141 (7 percent)
- 2009 – Increase in crashes for Route 141 (16 percent) only
- 2009 – Decrease in crashes for US 40 (11 percent), US 61 (5 percent), US 67 (4 percent) and Route D (32 percent)

Major Arterials:
- 2008 - Increase in crashes for Route 100 (5 percent) only
- 2008 - Decrease in crashes for Routes 30 (20 percent), 115 (6 percent), 180 (13 percent), 340 (3 percent) and 366 (15 percent)
- 2009 – Increase in crashes for Routes 100 (10 percent) and 115 (0.1 percent)
- 2009 – Decrease in crashes for Routes 30 (13 percent), 180 (19 percent), 340 (15 percent) and 366 (5 percent)

Figure S-1 – All Crashes for Freeway Roadways
Figure 2 – All Crashes for Expressway Roadways

Figure S-3 All Crashes for Major Arterial Roadways
Crash Rates Analysis:
The crash rate represents the exposure to crashes relative to total vehicle miles traveled. For example, if roadway A shows a higher crash rate than roadway B, it indicates that roadway A was more vulnerable to crashes than roadway B. Traffic volumes, roadway lengths and number of days are used in calculating crash rates, thus equalizing the comparison between roadways. Figures S-4 through S-6 present the crash rates for roadways investigated, the major findings from the crash rate analysis are as follows:

Roadway Safety – Results
Comparisons were based on average crash rates for the 4-year pre-closure period compared to the 2 year closure period

Freeways:
- 2008 - Increase in crash rates for I-70 (9 percent) and I-55 (0.1 percent)
- 2008 - Decrease in crash rates for I-44 (0.7 percent), I-64 (51 percent), I-170 (7 percent) and I-270 (7 percent)
- 2009 – Increase in crash rates for I-70 (12 percent) only
- 2009 – Decrease in crash rates for I-44 (25 percent), I-55 (5 percent), I-64 (72 percent), I-170 (31 percent) and I-270 (21 percent)

Expressways:
- 2008 - Increase in crashes for Route D (2 percent) only
- 2008 - Decrease in crashes for US 40 (35 percent), US 61 (8 percent), US 67 (16 percent) and Route 141 (7 percent)
- 2009 – Increase in crashes for Route 141 (16 percent) only
- 2009 – Decrease in crashes for US 40 (11 percent), US 61 (5 percent), US 67 (4 percent) and Route D (32 percent)

Major Arterials:
- 2008 - Increase in crashes for Route 100 (5 percent) only
- 2008 - Decrease in crashes for Routes 30 (20 percent), 115 (6 percent), 180 (13 percent), 340 (3 percent) and 366 (15 percent)
- 2009 – Increase in crashes for Routes 100 (10 percent) and 115 (0.1 percent)
- 2009 – Decrease in crashes for Routes 30 (13 percent), 180 (19 percent), 340 (15 percent) and 366 (5 percent)
Figure S-4 - All Crash Rates for Freeway Roadways

<table>
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<tr>
<th>Crash Rates</th>
<th>I-44</th>
<th>I-55</th>
<th>I-64</th>
<th>I-70</th>
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Figure S-5 – All Crash Rates for Expressway Roadways

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<th>Crash Rates</th>
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<th>MO 141</th>
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</table>
Regional Economics – Discussion

This Annual Report provides detail related to the economic analysis conducted by HDR Decision Economics to ascertain the impacts on the local and regional economies due to the New I-64 project and the associated road closures. The analysis tracks and focuses on the impacts before, during, and after the systematic closures of I-64 to determine how they affect the local economy, businesses, and traffic patterns. The overall objective of this analysis is to determine whether the closures disrupted local businesses due to increased congestion and possible barriers to accessing labor, customers, or shipments. Various methods are used to quantify and determine the magnitude of local and regional impacts.

For the analysis, data was collected quarterly from the initial construction closure in January 2008 through the reopening in December 2009 of the New I-64 project. It was used to assess the economic impacts to local businesses, the real estate market, commuters, and revenues due to the closure. In addition to the published data, three business surveys were developed and distributed in February 2008, November 2008, and January 2010 to track the effects of I-64’s closure on: (1) commuting; (2) transportation costs; and (3) sales, visitation, and economic activity.

The analysis covers the overall region which consists of St. Louis County and City of St. Louis. Since the impacted portions of I-64 overlap city/county borders, the impacted nine ZIP codes containing the closed sections of I-64 were aggregated into the corridor area, and the remaining ZIP codes of the City of St. Louis and St. Louis County compose the non-corridor area.
Published Economic Data

Published economic data were used to track economic indicators over the course of the I-64 reconstruction project. An economic baseline of current conditions was first developed based on the data sources used for the earlier 2006 Pre-Construction Analysis by Missouri Economic Research and Information Center (MERIC).\(^2\) Federal, Missouri, St. Louis County, City of St. Louis, and private-sector data supplemented the 2006 data to establish the baseline.

The core economic and demographic concepts utilized in the baseline included employment, labor force, population, commercial and retail real estate trends, taxable sales, and other related metrics. The decision to use these specific economic indicators was based on the frequency of data publication, time lag, availability, and level of detail. This same data was collected for the time period during the I-64 construction project, as well as the period after the project was completed.

The industrial and geographic detail was considered crucial because businesses will respond differently to changes in the road network based on their proximity to I-64 and the industry’s reliance on transportation. To gauge the impacts from I-64 reconstruction, comparisons focused on: a) time series trends (before, during, after); b) sub-county economic trends; and c) county and national-level macroeconomic conditions.

Business Surveys and Interviews

As part of the analysis, HDR developed three business surveys. The business surveys were conducted to specifically target the business climate and economic conditions of firms with various transportation needs throughout the region. With the help of local business associations, the surveys were distributed to businesses within St. Louis City and County. The three surveys were distributed on the following dates: February 2008, November 2008, and January 2010.

The surveys’ questions were directed at conditions just prior to the initial closure of I-64, the changes during the western and eastern closures, and conditions following the reopening of I-64. The surveys focused on three main impact areas: 1) transportation costs, 2) sales and visitation, and 3) commuting Impacts.

As a supplement to the business survey, HDR conducted follow-up, in-depth interviews with transportation-dependent businesses in and near the I-64 corridor. During the interview process, 12 separate businesses from varying industries were contacted via telephone. Representatives were interviewed from various industries to gauge how different industries are being impacted, which are more susceptible to the New I-64 project, and the steps businesses are taking to cope with the closure. The interviews focused on determining:

- How businesses prepared for the closure;
- The impact on commuters;
- Changes in transportation costs; and
- Whether outreach with employees, clients, and patients was successful.

\(^2\) MERIC, “Interstate 64 Business Climate Report Pre-Construction Analysis” St. Louis, MO: MERIC, April 2006
Economic Data Indicators
The economic data collected and reported through this study used many of the same data sources as the “Pre-Construction Analysis” report to remain consistent and enable tracking long-term economic trends.

Given the nature of the project and the level of detail required for the analysis, the research team employed a “bottom up” approach using detailed ZIP-code-level data for the I-64 corridor. The map below illustrates the ZIP code definitions for each region, including those comprising the I-64 corridor. The published economic data collected at the ZIP code level includes jobs, wages, number of establishments, and taxable sales by industry type. Real estate, household, and other demographic information were collected in addition to the industry-based data to capture the total impacts to the region.

Throughout this report, the terms “corridor” and “non-corridor” will be used to describe aggregations of the data. “Corridor” refers to the regions labeled “East” and “West” below in Figure E-1, while “non-corridor” refers to the balance of the map below, labeled “County” and “City.” The combined St. Louis County and St. Louis City represent the St. Louis metropolitan area.

Figure E-1 Zip Code Definitions for Study Regions

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3 MERIC, “Interstate 64 Business Climate Report Pre-Construction Analysis” St. Louis, MO: MERIC, April 2006
Data Concepts and Sources

Employment, Wages, and Establishment Statistics

The “Quarterly Census of Employment and Wages” (QCEW) dataset is compiled by Missouri Economic Research and Information Center (MERIC) and includes employment, wages, and the number of establishments by industry. It is publicly available at the county level. In an effort to track sub-county corridor-level conditions, the research team reached an agreement with MERIC to create custom tabulations of the QCEW at the zip-code level for the two-digit North American Industrial Classification System (NAICS). The standard QCEW has few data suppressions at both the city and county geographies, making the data ideal for this analysis. Although the economic data is published on a quarterly basis, there is a lag of at least three months from collection and processing to its official release. The most recent release for both St. Louis County and St. Louis City is the fourth quarter of 2009.

Unemployment Rate, Labor Force

MERIC’s Local Area Unemployment Statistics (LAUS) covers labor force and subsequent unemployment rates for each county, city, and MSA within the state. These estimates are derived from historical data, the Current Employment Statistics (CES) program, and the Unemployment Insurance (UI) system. The county and city data are reported monthly for all geographical areas but are not available until three months after being collected. ZIP-code level data is reported quarterly and available two to three months after collection. The last reported month was April 2010. The LAUS is reported by MERIC to the U.S. Bureau of Labor Statistics (BLS) for their unemployment estimates.

Population

The U.S. Census Bureau publishes demographic data for the nation, state, cities, and towns. Census population data and estimates are the most commonly cited and available demographic data for the U.S. Estimates for the total population are available for both the City of St. Louis and St. Louis County through 2009. Every ten years the U.S. Census Bureau collects new demographic data for the US. Between censuses, these data are updated every year on July 1. Population estimates for 2010 are unavailable as the decennial census is in progress.

Taxable Sales

Missouri Department of Revenue (MoDOR) reports Quarterly Taxable Sales by ZIP code, and this data is currently available up to and including the second quarter of 2010. Taxable sales are used to track consumer and retail spending and overall economic activity at a detailed geographic level. The Taxable Sales by City dataset also separates taxable sales for each individual industry via the Standard Industrial Codes (SIC) at the two-digit level. Since 1997, federal agencies adopted the North American Industrial Classification System (NAICS) for reporting business related economic data. This presented a minor challenge for the analysis since MoDOR’s data is still tabulated using the older SIC classifications. The taxable sales data by ZIP code provides sufficient geographic detail to allow an examination of the direct sales impacts on the I-64 Corridor.

4 QCEW data does not disclose county level data if there is fewer than three establishments in a given industry or if one firm constitutes more than 80 percent of area employment.
Real Estate
The “I-64 Business Climate Report: Pre-Construction Analysis” used a custom tabulation provided by the Torto Wheaton Research Group (TWR), now CB Richard Ellis (CBRE). The data included annual and quarterly estimates for industrial building gross rental asking price, availability, net absorption, and stock for the City of St. Louis, St. Louis County, and the I-64 Corridor. In addition to the CBRE data, supplemental data was obtained for the real estate analysis. On the residential side, the National Association of Homebuilders (NAHB) reports the volume of building permits for single and multi-family units both at the regional and national level. This information was also utilized in the analysis.

Economic Data Trend Analysis

Purpose
Large transportation projects often disrupt traffic patterns through lane closures, delays, and detours. These disruptions can impact businesses, commuters, and freight transport through traffic diversions or significant delays. Customers or clients can be inconvenienced enough that they avoid certain impacted areas, which can affect business districts. The Interstate 64 reconstruction project completely closed two separate sections of I-64 over a two-year project period. Because the closure could cause significant delays and diversions, businesses were concerned that they would be dramatically impacted.

The western closure of I-64 (west of I-170) occurred in January 2008, and this portion of the road remained closed until December 2008. The eastern closure of I-64 took place from December 2008 through December 2009, following the reopening of the western closure. As part of this study, an analysis was performed to determine if the economic conditions experienced in the corridor area during the western and eastern closures of I-64 were a direct result of the reconstruction and congestion, or the global recession. The economic concepts were collected and tracked from the “Pre-Construction” analysis through project completion.

Looming in this analysis of economic trends is the economic recession, which officially began in December 2007 according to the National Bureau of Economic Research. The impact of the recession became evident in the job market in the middle of 2008, as employment dropped below 2007 levels and continued to decline through 2009. Consumer activity showed similar trends as total taxable sales declined in 2008 by 3.3 percent and another 7.4 percent in 2009. The following sections will provide detailed information on the economic conditions before, during, and after I-64’s reconstruction.

Employment
The four largest industry sectors in terms of employees within the St. Louis metropolitan area are: education and health care; management and administration; arts, accommodation and recreation; and retail. Combined, these sectors account for 45 percent of total employment. Figure E-2 shows the breakdown of employment by industry for St. Louis City and St. Louis County.

Compared to the national average, the city/county area has a high concentration in finance and real estate, which demonstrated stable growth throughout 2007 until fourth quarter 2008, where
finance and real estate employment declined by two percent. By the fourth quarter of 2009, finance employment leveled off with 51,820 jobs for the region. In addition, the high percentage of health care facilities within the nine ZIP code corridor is unique as its services are generally critical for residents and have limited or no substitutes. The high concentration of hospitals and health care establishments in the corridor, and the unique nature of the health care services have maintained stable employment levels in health care, with a total of 164,760 jobs for the last quarter of 2009.

Figure E-2 - Employment Shares for St. Louis City and County

![Pie chart showing employment shares for St. Louis City and County. The largest share is for Education and Health Care at 23%. Other significant shares include Wholesale Trade at 11%, Retail Trade at 11%, Prof Tech Services at 7%, Mgmt & Admin at 11%, Transp Warehouse at 3%, Info at 2%, Finance, Ins, Real Estate at 7%, Construction at 5%, Manufacturing at 7%, Wholesale Trade at 5%, and Other Svs at 4%.]

Source: MERIC QCEW

As of fourth quarter 2009, the total employment for the study area was 773,184 of which 28 percent is concentrated in the corridor region and represents a 7.7 percent decline in total employment since the start of the recession in December of 2007. Traditionally, employment for the region follows a seasonal trend where employment increases from the first quarter to the second quarter of the year, followed by a small contraction in the third quarter, and a rebound in the fourth quarter coinciding with the holiday season. This trend was not maintained in 2009, when employment levels declined in every quarter except the fourth, consistent with national trends.

Industry employment trends for the county and city are summarized below.

- Management and administration jobs have continued to decline since its peak in third quarter 2008 (90,018 jobs). For the fourth quarter of 2009, there were 77,243 management and administration jobs.

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5 Business Surveys and Interviews confirmed that hospital patients and activities were unaffected by I-64
• Retail employment peaked in fourth quarter 2007 with 83,750 jobs, and has since declined with the exception of the fourth quarter of 2008, coinciding with the holiday shopping season. Despite the slight positive growth at the end of 2009, most retail growth during that year has been flat. Wholesale trade employment has declined throughout 2009, at an average rate of -1.6 percent.

• The decline in manufacturing jobs has continued through 2009, with 44,720 jobs at year end as compared to 52,770 jobs in 2008. From the beginning of 2009 through the end of the year, 5,324 manufacturing jobs have been lost. This represents a 10 percent decrease in manufacturing employment. As a percent of total employment, manufacturing in the corridor region dropped from four to three percent, and 9.3 percent to 7.6 percent for the non-corridor between 2007 and 2010.

• The construction industry has experienced a decline in jobs, coinciding with national trends. Comparisons between the fourth quarter of 2008 and 2009 show a decline of 15 percent, a loss of 6,167 jobs. Like manufacturing, the industry mix declined between 2007 and 2010, the corridor region dropping from 4.4 to 3.8 percent and the non-corridor region from 6.4 to 5.6 percent.

To determine whether employment deviated from the pre-project trend, an employment growth index was constructed based on 2007 data. Figure E-3 below shows this growth index for each region. The index shows that the corridor’s employment growth remains above all other comparison regions with the exception of the US in the second and third quarters of 2009, representing the point in time when eastern portion of I-64 was closed for reconstruction. Employment dropped 5.4 percent in 2009 for the corridor following stable job growth in 2007 and 2008.

Prior to the economic recession, the employment trends for the corridor and non-corridor region indicate that employment was growing from its 2007 levels. Following the start of the recession, job growth began to fluctuate for all regions, and in the second quarter of 2008 employment declined for the non-corridor area, state and nation. The corridor region’s employment growth remained relatively unchanged through 2008; however, this area represents only 28 percent of the total employment for the region. As a result, the effects of the non-corridor’s employment decline displace the marginal gains in the corridor region at the end of 2009. In general, however, all regions experienced similar trends in employment during the project period.

The flat employment trend in the corridor, during the start of the recessionary period and the start of the I-64 western closure, suggests that the construction and closure of I-64 did not significantly impact the corridor region. This major regional change to the transportation network that occurred with the western closure did not seemingly affect employment, implying that the employment trends were more influenced by the recession. The industry mix in the corridor was likely responsible for maintaining greater employment growth throughout and after the I-64 reconstruction. The corridor’s higher concentration of finance and insurance (two percentage points greater than the non-corridor) and health care employment (13 percentage points greater than the non-corridor) provided stable employment base during the project period and economic recession.
The economic recession, officially starting in December of 2007, began showing signs in St. Louis’ labor market in mid-2008, likely just before the decline in the housing market. By June 2008, the unemployment rate for St. Louis City reached 8.1 percent; St. Louis County wouldn’t reach the eight percent mark until January 2009. By the end of 2009, the unemployment rate for the city reached 11.5 percent, and 8.9 percent for the county. Figure E-4 shows the monthly unemployment trends for the St. Louis City, St. Louis County, Missouri, and the Nation for January 2007 through July of 2010. As the figure shows, St. Louis City’s unemployment rate has been higher than St. Louis County, State of Missouri, and nation from 2007 through July 2010. Unemployment rate trends remained flat during the start of the western closure, following national trends through the eastern closure and reopening of I-64.
Wages

Similar to employment, the MERIC QCEW wage data is provided at the ZIP code and industry level. At the geographic level, the nine ZIP code corridor region generates 27.6 percent of the total wages and 24.7 percent of total jobs of the entire city/county region with a total of $2.7 billion in the fourth quarter of 2009 (Figure E-5). Therefore the corridor wages per employee, on average, are greater than the non-corridor. However, the much larger non-corridor region still generated $7.1 billion in wages in the fourth quarter 2009, which represents 72 percent of the regional wages.

National economic pressures have placed more downward pressure on wages across both the corridor and non-corridor regions in 2008. This pressure intensified in 2009. The substantial increase in fourth quarter 2008 wages is attributable to additional compensation (year-end bonuses, profit-sharing and firm buyout payments) that represents a unique one-time payment and account for the large wage variation from the previous quarter. Net of these additional compensation payments, the non-corridor would have still demonstrated positive growth from third quarter 2008, albeit at a much smaller rate. As Figure E-5 shows, aggregate wages for 2009 declined for both regions, but the corridor’s share of total wages increased over 2009, suggesting that wage growth was greater in the corridor during the eastern closure relative to the non-corridor.
Service-based industries account for more than half of the wages distributed. Health care and education are the largest contributors to wages in the region, providing over 23 percent, as shown in Figure E-6. Wholesale trade contributes eight percent of the wages to the region, but has a smaller share of employment (five percent) indicating higher pay. Whereas retail trade contributes six percent of wages to the region, but represents 11 percent of total employment, indicating lower paying jobs. The same is true of the arts, recreation, entertainment, and food service industries, where the share of wages is five percentage points lower than the share of employment for that industry category.
Taxable Sales
Taxable sales are a dynamic measurement of business and consumer expenditures and economic performance, as taxable sales measure the amount of spending within the region. As economic conditions change, spending patterns are the first to respond as consumers and businesses will be more likely to hold onto cash and reduce unnecessary spending. Shifts in employment typically respond on more of a lagged basis, and these effects can be seen on the national scale as consumer spending has declined and savings has increased. The graph (Figure 6) below shows the total taxable sales for each quarter, from first quarter 2005 to fourth quarter 2009, in millions of dollars. As Figure E-7 indicates, the taxable sales for the non-corridor are almost four and a half times larger than the taxable sales for the corridor area.

The combined taxable sales for the city and county were $4.52 billion for the third quarter of 2009. Analysis of fourth quarter 2009 shows total taxable sales increased by 7.6 percent to a combined total of $4.86 billion. When compared on a year-by-year basis, the fourth quarter 2009 taxable sales revenues dropped $231 million dollars from the fourth quarter of 2008, which represents a decline in fourth quarter sales of 4.5 percent.

While fourth quarter 2009 taxable sales increased by 7.6 percent from the third quarter, as expected due to holiday sales, the increase in those sales was still below 2008 and 2007 levels.

Source: MERIC QCEW
Figure 6 shows the total taxable sales for each quarter, from first quarter 2005 to fourth quarter 2009, in millions of dollars. The Figure 6 shows that taxable sales for 2009 have dropped below 2005 levels, with the year end taxable sales totals for 2009 coming in $1.2 billion less than 2005.

Figure E-7 - Taxable Sales by Region (in millions of dollars)

Source: Missouri Department of Revenue

The seasonal taxable sales patterns are best reflected in the taxable sales growth index presented in Figure E-8. The index demonstrates quarterly taxable sales growth by region in the study area, county, city, non-corridor and corridor. Each year, sales follow a quarterly cycle similar to employment (a strong 4th quarter recovery). As the Figure E-8 shows, the corridor area’s taxable sales, while demonstrating similar trends as the other regions, has the most fluctuation. The total taxable sales in the corridor are the smallest by comparison, but the corridor exhibits the largest fourth quarter growth as seen in Figure 7.

The region’s growth followed the expected seasonal pattern, maintaining an overall level of positive growth until 2007, where the 2007 fourth quarter growth fell short of the previous years and was followed by a significant drop in taxable sales in first quarter 2008. Sales did recover during the course of 2008, but they remained below 2006 levels with one exception.
Although overall sales declined in 2008 and continued into 2009, individual industries were impacted differently. For example, the taxable sales for food stores remained steady from 2005 through 2009 for all regions. Taxable sales for hotels dropped significantly in 2009 within St. Louis County, while St. Louis City’s hotel taxable sales were almost double of those in 2005. Real estate sales in St. Louis began contracting in 2006 for both the city and county, consistent with national real estate and housing trends.

Since then, real estate sales in St. Louis City have remained at roughly half of their peak values in 2005, while St. Louis County has returned to positive growth in the second half of 2008 to then drop below 2005 levels throughout 2009. St. Louis City taxable sales decreased by 4.1 percent in the first half of 2010, while St. Louis County taxable sales decreased by one percent.

As FigureE-8 shows, the smaller corridor region’s taxable sales decreased immediately after the western portion of I-64 closed and the onset of the economic recession. The corridor region exhibited signs of recovery in the second and fourth quarters of 2008. However, the decline in taxable sales for the corridor following the reopening of I-64 suggests that sales were not significantly influenced by the closure of I-64.

Source: Missouri Department of Revenue
Real Estate

Despite the start of the recession in December 2007, office vacancy rates in the St. Louis metropolitan area remained steady for three quarters before increasing in late 2008, see Figure E-9. It was not until the fourth quarter of 2008 that vacancy rates began to tick upward (an increase in vacancy rates is a negative impact), and they continued to increase slightly through the third quarter of 2009. This trend indicates that the recession’s impact on the office market was lagged due to a shift in the demand for office space.

Figure E-9 - Regional Industrial Office Vacancy

Office vacancy rates for the fourth quarter of 2009 increased to 16 plus percent and remained at the same level through the first half of 2010. These trends follow the regional unemployment patterns closely, as the region’s unemployment rate declined in the last quarter of 2009 and increased in the first half of 2010. As of May 2010, St. Louis ranks 34th in terms of its office vacancy rate compared to the major metropolitan areas in the United States. The St. Louis rate is 0.8 percentage points greater than the national average.

CBRE created a custom real estate database for the corridor and non-corridor regions, as well as the St. Louis metropolitan area. The data, compiled at the ZIP code level, provides vacancy rates, net and gross asking rent prices, the number of buildings, total stock, completions, net absorption, and availability rates for industrial and office real estate. The analysis conducted for this annual report focuses on gross asking rates, as 95 percent of the vacant office space in the St. Louis metropolitan area is quoted in gross terms. Industrial space for St. Louis is quoted in both in gross (40 percent) and net terms (60 percent); the analysis will focus on the net industrial asking rates.

6 Red Capital Group, “Market Overview St. Louis, Missouri”
7 CB Richard Ellis
8 Concluding conveyance of property sales
The CBRE industrial data showed net asking rent prices per square foot have declined from peak prices in the second quarter of 2007. Since then, industrial rates have declined from almost $5.50 per square foot to less than $4.20 for both the corridor and non-corridor regions. Figure E-10 below shows the regional industrial vacancy rates, which have increased for the corridor by 84 percent and 93 percent for the non-corridor since the first quarter of 2007.

During this period, industrial space expanded by 1.5 percent for the corridor and 1.4 percent for the non-corridor area. The rise in industrial vacancy and slow growth in industrial space for the region indicates that the industrial market has been hit hard by the economic recession rather than the closures in I-64. Furthermore the highest industrial vacancy rates occurred in the first half of 2010, after the reopening of I-64. In terms of overall stock, the non-corridor region has the larger stock of industrial space. Therefore shifts in the most concentrated industrial market occurred following the reopening of I-64 and were not located along the impacted corridor region.

The increase in the industrial vacancy rates over the last three years corresponds to the decline in net asking industrial rent for both regions. Since the peak in second quarter 2007, asking lease rates for both regions have dropped 24 percent. The decline in asking rents is likely due to decreased industrial demand, high vacancy, and elevated levels of unemployment within the region. The average difference in industrial asking rent between the corridor and non-corridor areas has been around one percent for the last three years, and this spread has been maintained throughout the I-64 project.

**Figure E-10 Net Industrial Asking Rent per Square Foot**

![Figure E-10 Net Industrial Asking Rent per Square Foot](image)

*Source: CBRE*

While the non-corridor region has been established as the leading industrial real estate market, the corridor region’s office real estate market has greater access to downtown St. Louis and high concentrations or industry clusters including finance, professional services, and hospitals and
research. Although the non-corridor region has an additional 13 million square feet of total office space and three times the available office space, the corridor region has higher asking rents and lower vacancy rates. The gross asking price for office space per square foot for the corridor has increased through most of 2008, with a slight dip in the second quarter of 2009. The non-corridor office asking rent prices have remained relatively flat with limited variation in asking rents as illustrated in Figure E-11.

Figure E-11: Gross Office Asking Rent per Square Foot

![Figure E-11: Gross Office Asking Rent per Square Foot](image)

Source: CBRE

In terms of office vacancies, the lowest office vacancy rates for the non-corridor region occurred during the third quarter of 2008. The office vacancy rates rose through most of 2009, and continued to increase through the first half of 2010. The corridor region has followed a similar trend; however, vacancy rates have not increased beyond the 12 percent high in second quarter 2007. Since 2007, the corridor region’s vacancy rate has been on average 7.8 percentage-points lower than the non-corridor region, as seen in Figure E-12. Like industrial, office vacancies have increased in 2010 following the reopening of I-64.
As for residential housing, the number of building permits for single-family housing in the St. Louis metropolitan area has increased since the major declines in 2008 and the first half of 2009, consistent with national trends\(^9\) but to a lesser degree. Since July 2010, building permits for single and multifamily housing in the St. Louis metropolitan area increased by 21 percent, 11 percentage-points more than the national average. This suggests that construction activity in the region is improving at a faster rate than the nation, although recognizing that St. Louis lost more than one-fifth of its construction workforce since 2008. While housing permits are on the rise in St. Louis and the nation, these increases do not offset the major drop experienced by the national housing market. The national housing market is still fragile during the slow economic recovery, and may become more volatile now that the federal housing tax credit expired in April 2010. According to the Census Bureau’s new residential sales statistics, year-over-year sales for second quarter 2010 showed new home sales declined by seven percent nationally.

Population
St. Louis County’s 2009 population of 992,408 is more than double the City of St. Louis’ population of 356,587. Although the City and County are adjacent to each other, historic population trends have been different. The City of St. Louis has demonstrated a positive average annual growth of 0.3 percent from 2000 through 2009, while the county has seen a steady annual decline of -0.3 percent in overall population from its peak in 2000, as shown Figure E-13.

\(^9\) National Association of Homebuilders
Although the county’s historic population trend is negative, the decline is less than one-half of one percent per year and has not shown any significant fluctuation since the start of the I-64 project. In contrast, the population in the city has historically grown from year to year until 2009 when it declined slightly. This demographic response is likely related to economic conditions, however, and not the closure of I-64.

Figure E-13 - Population Growth for St. Louis City and St. Louis County

Source: Census Bureau

Statistical Analysis
As discussed earlier, the I-64 corridor and St. Louis metropolitan area exhibited similar employment and sales trends as the rest of Missouri and the Nation. These mirroring trends were evident prior to the start of the I-64 project and continued once the project was initiated, which was also the beginning of the economic recession. Based on data that were available for the project period, trends suggest that the St. Louis metropolitan area was more likely experiencing the impacts of the decline in the housing market and the subsequent recession than an economic impact due to I-64’s closure. The following statistical analyses will help determine whether this initial assessment is accurate.

The statistical analyses conducted for St. Louis utilized the following data: taxable sales, wages, employment, and unemployment rate. The quarterly data compiled were from 2000 through 2010 for Missouri, Nationally, City of St. Louis, and St. Louis County. The data for the corridor and
non-corridor areas were included in the analyses for the available years of 2007 through the end of 2009.

A first step in the analysis was the plotting of the data to visually assess whether there were any indications of relationships prior to or during the closures of I-64. The data plots from multiple regions confirmed that the overall trends between the corridor and other comparison regions followed similar trends before, during, and after the project period of December 2008 through December 2009.

Prior to the regression analyses, the average slope for the overall employment growth trend lines for each region was estimated. The slope represents the steepness of the trend line or the ratio of height change over the horizontal distance between two points on a line. As shown in Table E-1, all slopes are within the same relative magnitude, which implies that the corridor area employment trend is consistent with statewide and national trends throughout the project period.

Table E-1 - Slope of Employment Growth Index

<table>
<thead>
<tr>
<th>Region</th>
<th>Slope</th>
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<tbody>
<tr>
<td>Corridor</td>
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</tr>
<tr>
<td>Non-Corridor</td>
<td>0.007</td>
</tr>
<tr>
<td>Missouri</td>
<td>0.006</td>
</tr>
<tr>
<td>Nation</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Source: HDR calculations

The taxable sales, as discussed previously, follow similar trends across all regions. The change in taxable sales for the corridor follows the same direction as the non-corridor and Missouri; all regions experienced spikes in taxable sales and decreases during the same quarters. While the trends in taxable sales growth are similar across regions, the magnitude of the shifts for the corridor region were often more significant. These exaggerated shifts reflect the relatively smaller nine ZIP code area that composes the corridor and the seasonal spike in sales for the fourth-quarter of each year.

As these economic indicators have shown, conditions before and during the I-64 closures are similar across all comparison regions, and impacts to the corridor could be influenced by a number of factors. In an effort to isolate those factors, regression analyses were conducted using the data depicted in the previous sections.

The regression analysis was performed to determine if the change in economic conditions varied before and during the project period. The regression analyses focused on the impact taxable sales, region location, and seasonality had on the dependent variables of the unemployment rate and employment growth. These dependent variables were chosen as they measure economic activity across all regions. Both unemployment rates and employment growth regressions were run separately as unemployment data is an estimate by place of residence and employment is an estimate by place of work establishment. The research team ran multiple regressions using both variables to determine if the statistical relationships changed when looking at employment concepts by place of work versus employment by place of residence. Additionally, independent ‘dummy variables’ were created to identify the corridor region and to account for seasonal and
annual changes. Dummy variables within a regression indicate a categorical difference in the data that may influence the outcome. The dummy variables in these regressions isolated the potential impacts location (within the corridor or not) and seasonality had on the unemployment and employment growth rates for the corridor, non-corridor, and state of Missouri.

The regressions found many of the variables were not statistically significant including the regional dummy variable, which re-enforces that the I-64 closures did not have a significant impact on the local economy. As the regressions demonstrated, the reconstruction of I-64 likely impacted the local economy temporarily, but the impact is relatively minor and not statistically significant. The analysis of transportation user cost helps quantify the size of these minor impacts to the local economy.

**Business Surveys**

Three online business surveys were created to evaluate the impacts and conditions business were experiencing due to the western and eastern closure of I-64. The survey questions were specifically designed to track conditions over time and determine the variations between the two separate closures.

The first business survey was released on February 18, 2008, shortly after the western portion of I-64 was closed. On June 17, 2008, the results of this first survey were presented to local economic development leaders in St. Louis. The comments from the economic development leaders were consistent with the conclusions of the published economic data. Economic development leaders were concerned with current national economic conditions that were becoming evident in St. Louis and were expected to make it difficult to isolate the impacts of I-64. The major concerns included the decline in available credit for businesses, high fuel prices, fluctuations in the housing market, the exchange rate and exports, all of which are points for the economic decline. The meeting also provided some positive feedback, similar to the interviews.

The second business survey was released on November 5, 2008, just before the reopening of the western closure and the start of the eastern closure. The third and final business survey was released on January 25, 2010, about one month after the eastern closure reopened and the New I-64 Project was considered complete.

**Response**

As the survey was online and specifically targeted toward businesses, rather than the general public, arrangements were made with the following local business organizations to facilitate as many responses as possible:

- St. Louis Regional Chamber and Growth Association (RCGA);
- Regional Business Council (RBC);
- Downtown St. Louis Partnership;
- Civic Progress; and
- St. Louis County Economic Council (SLCEC).
The organizations’ combined distribution list included 6,000 contacts from 3,600 various businesses. The survey was advertised and distributed via e-mail and newsletters with reminder notices urging members to participate in the online business survey.

The first business survey received 369 separate and complete responses, the second received 84 responses, and the third survey had 111 responses. Although this response represents less than 10 percent of the total distribution list, there were obstacles that inhibited participation and completion of this web-based survey. First, some of the 6,000 contacts were duplicates or multiple contacts from the same business. Second, e-mail spelling may have been imprecise. Finally, some e-mails were filtered as spam or blocked by internet content blockers. Previous web-based surveys have reported failure rates for survey invitations ranging from a low of one to five percent in well-defined samples to as high as seven to 17 percent in less-than-well-defined samples.10 Because of these obstacles, the final number of people receiving the survey e-mail was likely less than 6,000.

As mentioned above, the response rate for the second and third surveys was much smaller, and therefore makes some of the more detailed comparisons between surveys difficult. The research team attributes this reduction in completed surveys to: a) business complacency and acceptance regarding I-64; and b) larger economic concerns regarding the recession.

Profile of Businesses Responding
On a percentage basis, the businesses responding were fairly uniform in terms of the industry type and the number of employees. As mentioned previously, the first business survey had a higher response rate than the second and third surveys. This could be attributed to the concern from businesses and residents prior to the initial closure, before the impact of the closure was apparent. The first survey had relatively high representation of corridor-based businesses; in all likelihood, their close proximity and relationship with the closed sections of I-64 prompted and motivated these businesses to complete a survey. As part of the survey, respondents were asked to indicate how close they were to the western closure in miles. For each survey, more than 80 percent of the total businesses that responded were within 10 miles of the western closure.

Results
The Table E-2 below summarizes some key statistics from each of the three surveys. Overall, 85 percent of respondents noted that they were “satisfied” with the execution of the New I-64 Project. Seventy percent of respondents contacted after the project was completed were “very satisfied” with MoDOT’s execution of the project. An additional 23 percent indicated they were “satisfied” with the project’s delivery.

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10 Manfreda, Katja Lozar & Vehovar, Vasja “Survey Design Features Influencing Response Rates in Web Surveys” University of Ljubljana
Table E-2 - Business Survey – Selected Results

<table>
<thead>
<tr>
<th>Total Distributed</th>
<th>1st Survey (Feb 2008)</th>
<th>2nd Survey (Nov 2008)</th>
<th>3rd Survey (Jan 2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,000+</td>
<td>6,000+</td>
<td>6,000+</td>
</tr>
<tr>
<td>Total Responses</td>
<td>369</td>
<td>84</td>
<td>111</td>
</tr>
</tbody>
</table>

**Respondent location (based on zip code)**

| Immediate I-64 region | 23% | 40% | 40% |

**Satisfaction w/ MoDOT execution of project**

| Very satisfied | 46% | 56% | 70% |
| Satisfied      | 40% | 40% | 23% |
| No Opinion     | 10% | 0%  | 2%  |
| Dissatisfied   | 3%  | 4%  | 3%  |
| Very dissatisfied | 1% | 0%  | 2%  |

*Source: HDR Business Surveys*

In addition to satisfaction with overall execution, all three surveys returned positive feedback (over 90 percent) on the performance of alternative routes. While less than half of the businesses surveyed were located in the nine ZIP code corridor region, 86 percent of businesses in the first survey were located within 10 miles of the New I-64 Project. Eighty-eight percent of businesses in the second survey and 81 percent in the third survey were located within that same distance. These results indicate that a large portion of the businesses that responded to the survey were located in an area that was potentially impacted by the I-64 project through either providing access to commuters, shippers, or customers.

**Summary of survey results from key areas**

**Commuting Impacts**

- The third survey found the majority (51 percent) of businesses are experiencing limited effects on employee commuting behavior due to the closure, which is consistent with previous survey results.
- At the start of the western closure 41 percent of the respondents indicated noticeably earlier or noticeably later commute times, while at the end of the western closure (second survey) respondents reported a 32 percent earlier or later commute. During the eastern closure 23 percent of respondents noticed a later commute time while 29 percent reported earlier commute times.
- During the western closure, 27 percent of respondents found a significant increase in commuter time or cost, followed by 14 percent during the first portion of the eastern closure. During the eastern closure of I-64, 69 percent of respondents reported a minor (46 percent) or significant (23 percent) increase in commute times or cost, with 30 percent seeing no change.
- After the reopening of I-64, 62 percent of respondents confirmed that commute times have been noticeably reduced.
• Of the businesses surveyed 85 percent implemented new commuter benefit programs. The large number of businesses who have implemented new commuter benefit programs may be correlated to “self-selection” as the businesses who are the most actively engaged in this type of activity may also be the ones most likely to respond to a survey on I-64. The two largest commuter benefit categories reported were telecommuting and flextime.

**Transportation Costs**

• During the western closure, 52 percent of respondents indicated transportation costs were not rising, and 94 percent attributed any rise in transportation costs were related to travel time delays.
• During the eastern closure, 19 percent of respondents reported an increase in freight shipping costs, while 77 percent reported an increase in travel time and delay.
• Following the reopening of I-64, nine percent of respondents reported a minor decrease in freight shipping costs, and 47 percent reported a minor or significant decrease in travel time and delay.
• Despite almost half of the businesses reporting an increase in transportation costs, less than 10 percent of respondents from all three surveys claimed to participate in the MoDOT outreach grant program.

**Sales, Visitation and Economic Activity**

• During the western and eastern closures, respondents reported a decline in sales and business activity. However, following the reopening of I-64 respondents noted that there was either no change in sales and business activity or the change in sales was not relevant.
• The first survey found nine percent of all businesses cited a lower volume of weekly sales. This percentage jumped to 17 percent by the second survey, and dropped to four percent in the third survey.

**Commute**

During the western and eastern closures, respondents were asked exactly how employee commute behavior changed during each closure of I-64. Both surveys found corridor and non-corridor businesses were not experiencing major changes. The most frequently noted change was employees shifting their commute times to either earlier or later in the day. Following the reopening of I-64, 62 percent said that commute times were noticeably reduced with another 31% citing no change.

Flextime and telecommuting were the two major benefits offered by businesses during the construction of I-64. A larger portion of businesses reported more telecommuting options during the western closure than during the eastern closure. This shift away from telecommuting could be influenced by the notion that the impacts on traffic may have been less than originally anticipated.

**Transportation Costs**

Although the measurable commuter impacts to business respondents were relatively minor, respondents consistently noticed an increase in transportation costs and delay. Not surprisingly, all three surveys’ respondents noted a rise in fuel costs, but this can be only indirectly related to
I-64. While the rise in fuel costs per unit is apparent, the actual impacts related to I-64 are a result of longer distances traveled through detours around the closure or by an increase in stop-and-go traffic conditions. Eighty-one percent of respondents reported no change in freight shipping costs during the eastern closure and 85 percent following the reopening of I-64.

**Satisfaction**
Following the closure, the level of satisfaction with the performance of I-64’s closure and alternative routes were very high, especially when considering the number of businesses experiencing at least a minor rise in transportation costs. The response was similar across all three surveys and time periods, with each survey finding over 86 percent of respondents either satisfied or very satisfied. The results show that despite the rise in cost attributable to an increase in travel time, businesses coped with the closure and to a large extent were satisfied with the project delivery. Although there have been proactive steps made by MoDOT and many of the local businesses, the sentiment still seems the same: travel delays and costs were higher during the closures but were not significant enough to drastically change behavior.

**Sales and Visitors**
All three surveys found that over 78 percent of businesses reported the change in customers, visitors, and patients were either not relevant or not noticeable. Only four percent of respondents noted a lower volume of customers, which is down from 21 percent from the second survey as seen in Table E-3. The majority of respondents noted no change in visitors and sales and high levels of project satisfaction despite increases in travel time and transportation costs.

<table>
<thead>
<tr>
<th>Table E-3 - Change in Weekly Sales and Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Survey</strong> (Feb 2008)</td>
</tr>
<tr>
<td>Sales</td>
</tr>
<tr>
<td>Lower Volume</td>
</tr>
<tr>
<td>Higher Volume</td>
</tr>
<tr>
<td>No Change</td>
</tr>
<tr>
<td>Not Relevant</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

*Source: HDR Business Surveys*

**Interviews**
During the New I-64 Project, interviews were held with transportation-dependent businesses in and near the I-64 corridor. Interviews with these stakeholders were completed by HDR and summaries of the findings were included in the 2009 Annual Report. The following section includes those interviews; no subsequent interviews have been conducted.

During the initial phases of the New I-64 Project, HDR conducted in-depth interviews with transportation-dependent businesses in and near the I-64 corridor. Different industry groups were targeted, with significant help from the St. Louis Regional Chamber and Growth Association (RCGA), to provide a detailed and in-depth range of private sector businesses that are being impacted by the I-64 closure. The interview questions also attempted to gauge the steps that
businesses took to cope with the closure. At least one representative from the following local businesses and organizations was interviewed, as shown in Table E-4.

Table E-4 - Industries Interviewed

<table>
<thead>
<tr>
<th>Industry</th>
<th>Transportation Needs</th>
<th>Employees</th>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities</td>
<td>On-site technicians</td>
<td>1,000+</td>
<td>Multiple</td>
</tr>
<tr>
<td>Network Hospital</td>
<td>Patient access</td>
<td>1,000+</td>
<td>Multiple</td>
</tr>
<tr>
<td>Distributors</td>
<td>Freight shipments</td>
<td>&lt;1,000</td>
<td>Multiple</td>
</tr>
<tr>
<td>Parcel Shippers</td>
<td>Freight shipments</td>
<td>1,000+</td>
<td>Multiple</td>
</tr>
<tr>
<td>Rental Car Agency</td>
<td>Customer access</td>
<td>&lt;1,000</td>
<td>Multiple</td>
</tr>
<tr>
<td>Catering</td>
<td>Delivery</td>
<td>&lt;50</td>
<td>Multiple</td>
</tr>
<tr>
<td>Research laboratories</td>
<td>Commuter access</td>
<td>1,000+</td>
<td>Multiple</td>
</tr>
<tr>
<td>Convention Center</td>
<td>Visitor access</td>
<td>&lt;1,000</td>
<td>Single</td>
</tr>
<tr>
<td>Museum</td>
<td>Visitor access</td>
<td>&lt;100</td>
<td>Single</td>
</tr>
<tr>
<td>Accommodation</td>
<td>Visitor access</td>
<td>&lt;100</td>
<td>Single</td>
</tr>
</tbody>
</table>

The interviews found businesses expected the worst prior to the closure, but the conditions for the first quarter were not nearly as bad as they anticipated. To cope with the closures many of the businesses with a large commuting labor force offered flex-time hours or telecommuting options, encouraged carpooling or public transit, and, in some cases, provided public transit passes. Businesses reported that impacts to peak commute times were largely negligible.

In terms of operations, businesses with delivery schedules had planned for additional travel time per delivery into the impacted areas, but they found that the additional delivery time was unnecessary. Onsite service industries, such as utilities, track emergency response time statistics and these statistics showed emergency response times were not impacted by the western closure.

Those interviewed were asked if they were satisfied with MoDOT’s delivery of the I-64 project and how it has impacted sales, visitation, and operations. The interviews found that many businesses were pleased with the delivery of the project and support activities including: MoDOT’s outreach and planning, the timing of traffic signals to improve traffic flow, and the amount of information available to the public.

Transportation Analysis - User Costs

Background
The New I-64 project required the complete closure of two separate approximately 5-mile spans of roadway that are essential connectors to downtown St. Louis. In 2007, the year before the closures, average weekday traffic was slightly less than 130,000 vehicles on the section of highway that would become the western closure and nearly 139,000 on the eastern closure portion. In typical single-lane closure projects, there will be some diversion due to reduced road capacity; however in this case, all vehicles were diverted away from each closed segment. This diversion had the potential to cause significant impacts, through longer detour routes as well as the additional travel time associated with the detours. This analysis of transportation related user

11 Please note commuter access was sited as a transportation need by all industries
12 Employee ranges are for non-disclosure purposes
costs was performed to quantify the impacts of the full closures, and determine whether the closures placed significant downward pressure on the economic conditions in the corridor.

**Methodology**

Minute-by-minute traffic counts were provided for all of the major interstates and some arterials for 2007, 2008, and 2009 from MoDOT and traffic.com. Traffic count data for the arterials was not as comprehensive as the interstate data and therefore not all arterials could be considered in the analysis. Traffic data was aggregated and the average weekday traffic was calculated for 2007, 2008 and 2009. Overall, it was assumed that 10 percent of traffic that would have traveled on I-64 was lost to other modes, such as transit, or the trips were no longer taken.

The traffic count data available was for singular points along each roadway, the project team created the most likely diversion routes in order to determine change in distance traveled. These diversion routes were developed using knowledge of the area and by examining the changes in traffic counts during the closures to determine the traffic patterns. Roadways with no traffic counts, either prior to the closure or during the closures, were omitted from the analysis, potentially underestimating the impacts.

The transportation analysis for both closures measured the change in vehicle miles traveled (VMT) and additional travel time due to the closure, measured in vehicle hours traveled (VHT). The VMT based impacts include emissions, pavement maintenance, and vehicle operating costs. Crash related costs are typically considered, but it was found that there was actually a reduction in crashes during the closure period, so they were not considered for this analysis.

Emissions costs are those related to exhaust from automobiles and trucks. The emissions considered are carbon monoxide, volatile organic compounds, nitrogen oxides, particulate matter, sulfur dioxide, and carbon dioxide. Emissions rates are calculated using the EPAs Mobile6 tool to determine rates specific to the climate conditions in the area. Rates vary for automobiles and trucks, and the costs are measured in dollars per ton of emission. According to MoDOT figures, approximately 13 percent of the traffic on I-64 prior to the closure was truck traffic. For purposes of this analysis, it was assumed that truck diversion only occurred on the Interstates and not the arterials.

Pavement maintenance costs are those costs incurred to maintain the road surface, calculated on a per mile basis. The wear-and-tear on pavement from trucks is more substantial than from automobiles, and thus the cost of maintenance per truck-mile is significantly greater than the cost per automobile-mile, $0.12 and $0.001 respectively. These maintenance costs per vehicle mile were obtained from the Addendum to the Federal Cost Allocation Study and adjusted to 2010 dollars using the BLS Consumer Price Index (CPI). Vehicle operating costs are incurred to the user; these costs include fuel, oil, maintenance and repair, depreciation, and tires. Again, these costs vary between truck and auto.

Travel time costs represent the costs incurred for time spent traveling that could be otherwise spent, and is based on VHT. The trip purpose is divided between personal and business, and the

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value of time is calculated accordingly. For business purposes, travel time is valued at the regional average hourly wage rate. For personal trips, travel time is valued at half of the prevailing wage rate. For the closure periods, the wage rate was provided by MERIC’s custom data tabulation of the QCEW. For the western closure the average wage in 2008 was $22.21 in 2010 dollars, and for the eastern closure it was $21.90.

**Issues and Constraints**

One of the major limitations of this transportation analysis is the change in the overall economy. Due to the recession, the overall level of traffic decreased during the study period. Despite the decrease in overall traffic, several of the alternate routes during the closure still experienced higher traffic levels.

While it would have been ideal to conduct a detailed assessment of the travel time impacts, accounting for additional congestion on the impacted roads, this was not possible due to the constraints posed by the traffic data. Because of this, a simple analysis of the additional time necessary to travel the diversion routes was only considered.

**Results**

All impacts are incremental, meaning that they are over and above what was occurring before the closures. For example, if a commuter previously travelled on the closed portions of I-64, only the distance this commuter was diverted is considered in the analysis.

The western closure impacted 129,000 vehicles daily, 116,000 of which were not lost to other circumstances and were thus diverted to other roads. With the available interstate and arterial information, 99,000 of these vehicles were accounted for. The unaccounted vehicles are likely on arterials that did not have traffic counts, and thus are not included in this analysis. From the given information, the primary impacted roadways that were accounted for are: Clayton, Ladue, I-270, I-170, I-44 and I-70. While there are certainly other roads that were impacted, the lack of information does not allow for any calculations to be completed related to these roads. Due to Clayton’s proximity to I-64, there were no additional miles incurred to travel on this road, so the impacts are not counted in this incremental analysis.

The results of the western closure analysis indicate that the vehicle operating costs associated with the 248 weekday closure were $16 million for autos and $12 million for trucks. Pavement maintenance costs incurred an additional $43,000 for autos and $1.3 million for trucks, and emissions generated $2.3 million in costs from autos and $4.9 million from trucks. The additional travel time resulted in delay costs of $15 million for the closure, not including congestion costs. Thus, the total impact of the western closure was $51.9 million for the year.

The eastern closure began immediately upon the western closure’s reopening and lasted for 255 weekdays. Prior to the closure, there were approximately 138,000 daily vehicles, of which approximately 125,000 were diverted during the closure period. The available data for the eastern closure accounted for approximately 120,000 of these, indicating that most of the impacted roads were accounted for. The primary roads seeing additional vehicles were Clayton, Delmar, Big Bend, Forest Park, I-170, I-270, I-44 and I-70.
The results of the eastern closure analysis indicate that the vehicle operating costs associated with the closure were approximately $17.5 million for auto and $9.5 million for truck. Pavement maintenance cost were approximately $47,000 for autos and $1.2 million for trucks while emissions costs totaled $2.4 million for autos and $3.4 million for truck. Total travel time related costs were $15.7 million. In total, the eastern closure cost $49.6 million for the year, as Table E-5 shows.

Table E-5: Transportation Impacts (in millions of dollars)

<table>
<thead>
<tr>
<th></th>
<th>Western Closure</th>
<th>Eastern Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC</td>
<td>$28.24</td>
<td>$26.98</td>
</tr>
<tr>
<td>Pavement Maintenance</td>
<td>$1.35</td>
<td>$1.07</td>
</tr>
<tr>
<td>Emissions</td>
<td>$7.20</td>
<td>$5.82</td>
</tr>
<tr>
<td>Total VMT Related</td>
<td>$36.79</td>
<td>$33.86</td>
</tr>
<tr>
<td>VHT Costs</td>
<td>$15.09</td>
<td>$15.73</td>
</tr>
<tr>
<td>Total</td>
<td>$51.89</td>
<td>$49.59</td>
</tr>
</tbody>
</table>

Source: HDR Calculations

Overall, the highway and road network in St. Louis was very conducive to a project such as this, as there were many available alternate routes that could handle the additional volume that would be diverted due to complete closure of one of the major routes. While the impacts, $101.5 million over two years, may seem high, the costs of maintaining traffic along I-64 through single or two-lane closures would likely be even greater, as the travel time would increase greatly, and the emissions and operations costs would vary due to the slower speeds as well. The following alternative construction scenario analysis estimates the impact of reconstructing I-64 using a more conventional construction schedule.

**Alternative Construction Scenario Analysis**

Since the actual New I-64 project followed an innovative accelerated construction schedule, a set of alternative construction schedules was developed to determine the potential cost savings of the accelerated construction schedule. This analysis of alternative construction schedules compares user costs of partial long-term lane closures to the actual full closure of I-64. Alternative construction schedules were developed for a six and eight year construction period. For each alternative scenario there would be staged lane closures for sections of I-64 with traffic continuing to use two lanes in each direction at reduced speeds. The estimated user costs, in present value, for the actual design-build project and the two alternative project construction schedules are shown in Table E-6.
The actual reconstruction project fully closed sections of I-64, diverting all traffic, thereby increasing VMT. This resulted in higher per-year VMT related costs than the alternative construction options. Under the alternative construction schedules, users would still be able to travel on the sections of I-64 during reconstruction, albeit at a reduced speed and highway capacity, which reduces the amount traffic diversion that occurred under the actual full closure. The reduced speeds and increased congestion due to lower capacity along I-64 under the alternative scenarios represent the largest category of user costs. By extending the I-64 project schedule to 6 years, total user costs increase by $45.6 million or as much as $86.8 million if the project schedule were extended to 8 years.

The final construction cost of the actual full closure of I-64 was approximately $427.5 million. For comparison, the construction cost schedules were estimated from the project scoping cost estimates in the I-64 Environmental Impact Statement (EIS) of $670.4 million and placed into present value. The estimated costs in Present Value (PV) are $520 and $614 million for the 6 and 8 year construction alternatives respectively.

The potential construction costs savings from initiating a full closure of I-64 versus a six or eight year staged reconstruction is $93 to $187 million, assuming construction material costs were to remain consistent with inflation. If construction material costs were to return to levels of high cost escalation experienced from 2003 to 2008, the alternative construction (6 and 8 years) cost schedules could see a dramatic increase in cost. The results show that the actual I-64 reconstruction project benefited from an accelerated project schedule, as the alternative scenarios have greater construction costs, cost escalation risk, and user costs due to the longer construction schedule.

Conclusions

Communications

The Eastern closure in 2009 had a noticeable impact on respondent behavior and travel habits.
- A sizeable minority reported changes in their shopping and driving habits
- Many respondents reported slightly longer daily commutes compared to pre-construction period
- Majority of respondents are satisfied with how they are able to get around St. Louis (60 percent)
• Overwhelming majority of respondents are satisfied with MoDOT’s decision to close parts of I-64 for two years instead of taking 6-8 years with lane closures (83 percent in the lowest measurement, 96 percent in the highest both up when compared to 2008)
• Overall, the respondents have a high level of satisfaction with how the I-64 closure has been handled (78 percent)
• The overwhelming majority of responses received are very satisfied/satisfied when asked about the delivery of timely, accurate and understandable project information (86 percent)

Considering the reported changes in respondents’ behavior, these are extremely high levels of satisfaction and reflect the public consensus that this project was well planned and delivered within the “promised” 2 year period.

Mobility

The following are findings from the Eastern closure period in 2009:

• Traffic volumes (2009 compared to 2007) along I-70 decreased west of I-170, but increased east of I-170. Traffic volumes along I-270 south of I-64 increased by 30,000 to 40,000 vehicles per day. I-44 also experienced an increase in traffic volumes, ranging from an increase of 22,000 vehicles per day east of I-270 at Lindbergh Boulevard to an additional 7,000 vehicles per day near Jefferson Avenue. I-170 experienced increases between 7,000 and 15,000 vehicles per day. I-64 west of I-270 experienced increases ranging between 8,000 and 11,000 vehicles per day.

• Travel speeds (2009 compared to 2007) have remained about the same even with the increases in traffic volumes mentioned above. There were slight decreases in travel times along some of the region’s freeway network. Improvements in the operation of these adjacent roadways were the result of some of the pre-closure improvements and regional coordination across city/county/state agencies.

• Parallel arterial routes experienced increases in traffic volumes as well as travel time (2009 compared to 2007). East-west arterial corridors, such as Manchester Road, Forest Park Parkway and Olive Street, realized increases of between 10,000 and 20,000 vehicles per day. North-south arterial corridors such as Hanley Road and Lindbergh Boulevard experienced a slight increase in traffic volumes and travel times.

• The RideFinders Rideshare program experienced a significant increase through most of 2008 as it approached the 10,000 membership plateau in November. In 2009, rideshare for both carpool and vanpool users dropped slightly or remained the same from the end of 2008. The increase in 2008 and stability in 2009 most likely means that the change in the Rideshare program could be a combination of gas prices, economic conditions and/or the I-64 project.

• Usage of commuter park-and-ride facilities in Missouri returned to similar levels experienced in 2007 demonstrating that park-n-ride facilities were most likely impacted in 2008 by higher gas prices and the economy, not significantly by the I-64 closure.

Based on the evaluation of regional mobility, the study team concluded the traffic volume increased on alternative routes that caused a slight increase travel times and decreased travel
speeds. Regional planning and improvements to alternative routes significantly reduced and minimized travel impacts.

**Crash Analysis**

The major conclusions from the crash analysis and crash rate analysis are as follow:

- Comparing the average number of crashes for the pre-closure period (2004 through 2007) to the closure period (2008 and 2009) found the following results. The number of crashes increased (ranging from 2 to 8 percent) on five (5) roadways (I-44, I-55, I-70, MO D and MO 100) in 2008 and increased (ranging from 0.1 to 16 percent) on four (4) roadways (I-70, MO 100, MO 155 and MO 141) in 2009. Whereas the crash numbers decreased (3 to 52 percent) for the remaining twelve (12) roadways in 2008 and decreased (4 to 73 percent) for the remaining thirteen (13) roadways in 2009.

- Comparing the average crash rates for the pre-closure period (2004 through 2007) to the closure period (2008 and 2009) found the following results. The crash rates increased (2 to 9 percent) for four (4) roadways (I-55, I-70, MO D and MO 100) in 2008 and increased (0.1 to 16 percent) for five (5) roadways (I-70, MO 100, MO 115 and MO 141) in 2009. Whereas the crash numbers decreased (0.7 percent to 50.5 percent) for the remaining thirteen (13) roadways in 2008 and decreased (23 to 72 percent) for the remaining twelve (12) roadways in 2009.

- With regards to I-70 and MO 100, the increasing trend started before the I-64 closure (i.e., before 2008). Based on these pre-closure trends, it was difficult to imply that the I-64 closure caused an increase in crashes and crash rates for these roadways.

- Although each route shows its own trend, the overall crashes on all three types of roadways (i.e. freeways, expressways and major arterials) have decreased in both 2008 and 2009.

- The significant crash reduction along I-64 segments (50 to 70 percent) that were not closed could be a good indicator on the region’s awareness of the project and their willingness in using designated alternative roadways.

- Crash data evaluation for Routes D and 340, found noticeable safety improvements in 2009 that could have been caused partially by the increase arterial management implemented along these corridors.

- In general, rear-end type crashes (the most recorded crash type) decreased noticeably from 7,757 in 2007 to 6,728 in 2009.

- The average number of crashes per year across the 4-year pre-closure period was 16,595 compared to 15,111 in 2008 (9 percent below average) and to 14,155 in 2009 (15 percent).

- Based on the evaluation of crash numbers and rates and their associated trends along the 17 major diversionary roadways, the study team concludes that there was no evidence that the closure contributed to any increases in crashes and crash rates.
Economics
The Congressional Budget Office (CBO) is projecting the economic recovery will continue at a modest pace during the next few years, and projects that the economy will grow by two percent from the fourth quarter of 2010 through the fourth quarter of 2011.14 CBO anticipates national unemployment levels will not return to five percent until 2014. The St. Louis area appears to be following this national trend and forecast.

From the analysis of economic conditions, business surveys, and user transportation costs, the following represent the major results:

- The reconstruction of I-64 created more circuitous routes for commuters during closures thus reducing average speeds and increasing vehicle miles traveled;
- During reconstruction 98,000 to 120,000 vehicles were diverted daily and transportation user costs increased by $101.5 million during entire project. This represents less than 4.4 percent of the total transportation spending in St. Louis during the I-64 closure period (2008 through 2009);
- Alternatively, if I-64 had been reconstructed using a more conventional phased construction period of 6 to 8 years, user costs would have increased from additional traffic delays over the full-closure costs by $45.6 to $86.8 million;
- The project demonstrated a significant cost savings – between $92 and $187 million – from accelerating the reconstruction project schedule to two years versus a six or eight year staged construction schedule;
- Businesses expected the worst, but the conditions during the western and eastern closures were not as bad as they anticipated. Design-Build delivery and an aggressive project schedule were successful in minimizing the duration of impacts to the region;
- While the economic recession made the assessment difficult to determine the precise impact of the I-64 reconstruction, the analysis found the impacts to the corridor region were no different than economic conditions across Missouri and the nation;
- The evaluation of economic conditions, statistical analysis, business surveys, and transportation analysis of user costs has demonstrated that the impacts of the New I-64 Project on the regional economy were relatively minor compared to an alternative long-term project schedule;
- All three surveys reported high-levels of satisfaction (all above 86 percent) with the I-64 project. The final survey found that 93 percent of responding businesses were satisfied with the project as the sections of I-64 closest to downtown St. Louis were reopening;
- Throughout the project, approximately half of the businesses responding found no change in sales or customers.

Given that I-64 has only been reopened for a short period of time, and that the economy is still recovering from the recession, revisiting this study to evaluate the long-term impacts could provide an indication of future project benefits from this major transportation project.

1http://www.cbo.gov/doc.cfm?index=11705
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Daniel Hodge, Investigator, Economics
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8. CB Richard Ellis – “completions” concluded conveyance of property sales
9. National Association of Homebuilders was the source for national trends
11. Business Interviews – Commuter access was mentioned as a “Transportation Need” by all industries surveyed
12. Business Interviews – Employee ranges are for non-disclosure purposes