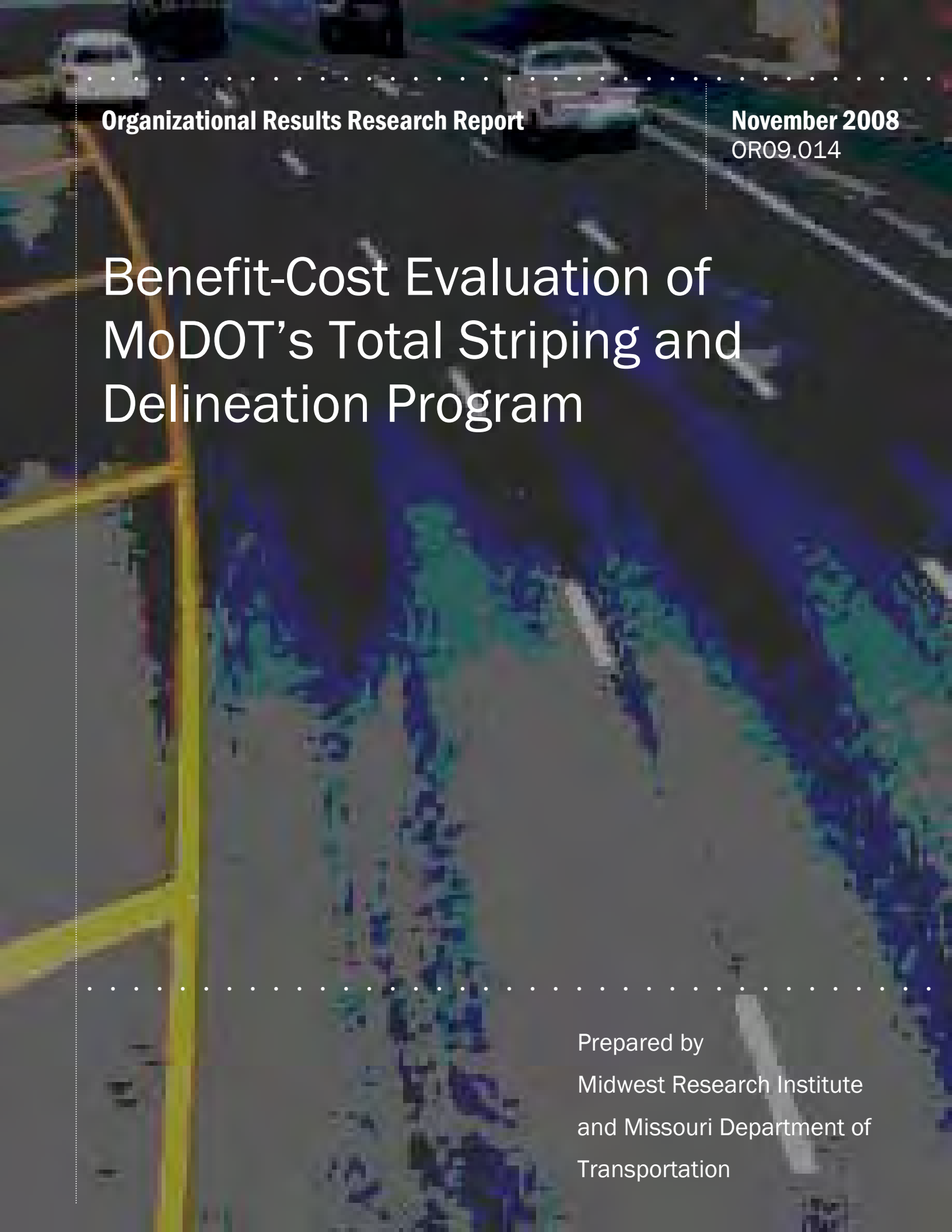

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Benefit-Cost Evaluation of MoDOT's Total Striping and Delineation Program

Prepared by
Midwest Research Institute
and Missouri Department of
Transportation

FINAL REPORT

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Benefit-Cost Evaluation of MoDOT's Total Striping and Delineation Program

Prepared for the
Missouri Department of Transportation
Organizational Results Division

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The opinions, findings and conclusions expressed in this report are those of the principal investigator and the Missouri Department of Transportation. They are not necessarily those of the U.S. Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification or regulation.

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16. Abstract

In 2005 and 2006, the Missouri Department of Transportation (MoDOT) undertook a major program, known as the Smooth Roads Initiative (SRI), to improve both the rideability and the visibility of over 2,300 mi of major roadways in Missouri. Midwest Research Institute (MRI) conducted research for MoDOT to:

- evaluate the safety effectiveness of SRI improvements
- use the safety evaluation results together with improvement cost data to perform a benefit-cost evaluation
- assess public perception or satisfaction with the improved striping and delineation.

The safety evaluation indicated that the striping and delineation program resulted in an overall reduction of 8 percent in fatal-and-disabling-injury crashes and 6 percent in fatal-and-all-injury crashes. The striping and delineation improvements appeared to be particularly effective in reducing multiple-vehicle crashes. Results of the benefit-cost evaluation suggested that the SRI projects had an overall benefit-cost ratio of 7.8. A survey of Missouri motorists indicated that 57 percent of survey respondents believe the striping and delineation improvements increase the general level of safety on Missouri roadways, and 79 percent believe the improvements have been a good investment of taxpayer dollars.

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Preface

This final report is submitted to the Missouri Department of Transportation (MoDOT) and the Missouri Transportation Institute (MTI) in accordance with the terms of the current research contract MRI is performing, entitled *Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation System*. This report was prepared by Ms. Ingrid B. Potts, Mr. Douglas W. Harwood, Ms. Courtney D. Bokenkroger, and Ms. Jessica M. Hutton of Midwest Research Institute.

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Executive Summary

In 2005 and 2006, the Missouri Department of Transportation (MoDOT) undertook a major program, known as the Smooth Roads Initiative (SRI), to improve both the rideability and the visibility of over 2,300 mi of major roadways in Missouri. The SRI program included most of the Interstate highway system in Missouri, as well as freeways and expressways; some multilane and two-lane undivided roads were included.

The striping and delineation improvements in the SRI program included:

- wider and higher-visibility lane lines
- wider edgelines with rumble stripes or shoulder rumble strips
- centerline rumble strips (on undivided highways only)
- roadside barrier (guardrail) improvements
- barrier-mounted delineators (on concrete barriers, guardrails, and cable barriers)
- emergency reference marker signs (on Interstate highways only)

The objectives of this research were to:

- evaluate the safety effectiveness of SRI improvements (including specific combinations of improvement types)
- use the safety evaluation results together with improvement cost data to perform a benefit-cost evaluation
- assess public perception or satisfaction with improved striping and delineation

A before/after evaluation was performed using the Empirical Bayes (EB) method to estimate the safety effectiveness of specific striping and delineation improvement packages used in the SRI program. The striping and delineation program resulted in an overall reduction of 8 percent in fatal-and-disabling-injury crashes and 6 percent in fatal-and-all-injury crashes. The evaluation results for total crashes (all crash severity levels combined) were not statistically significant. Lack of statistical significance is to be expected in some cases because only 1 year of data were available for the study period after implementation of the striping and delineation improvements.

Twenty-four specific combinations of roadway type and project type (i.e., striping and delineation packages) were evaluated and statistically significant results were found for 11 of those 24 combinations. The effectiveness of these striping and delineation packages in reducing injury crashes ranged from 11 to 86 percent. The striping and delineation improvements appear to be particularly effective in reducing multiple-vehicle crashes on the improved roadways. By contrast, single-vehicle crashes appear to have increased, but this is likely to have resulted from a statewide trend of increases in lane-departure crashes rather than from an effect of the striping and delineation improvements.

Over a period of 5 years from 2007 through 2011, the striping and delineation program is expected to reduce approximately 50 fatal crashes; 300 disabling injury

crashes; 1,100 nondisabling injury crashes; and 3,800 property-damage-only crashes. The overall results are important because they show that the SRI program was an excellent investment in safety improvement for MoDOT.

A benefit-cost evaluation was performed for each combination of roadway type and striping and delineation package for which there was sufficient data to obtain a reliable safety effectiveness estimate. These projects had an overall benefit-cost ratio of 9.7. In other words, the projects provided $9.70 in benefits for each dollar invested in improving striping and delineation. While all of the roadway type/project type combinations that could be assessed had benefit-cost ratios substantially greater than 1.0, five specific project types stand out as being particularly cost-effective. These are:

- Wider markings without resurfacing on urban freeways (benefit-cost ratio = 129)
- Wider markings with resurfacing on rural multilane undivided highways (benefit-cost ratio = 91)
- Wider markings without resurfacing on rural freeways (benefit-cost ratio = 64)
- Wider markings and both centerline and edgeline rumble strips with resurfacing on rural two-lane highways (benefit-cost ratio = 59)
- Wider markings and shoulder rumble strips with resurfacing on urban multilane divided highways (benefit-cost ratio = 27)

A survey of Missouri motorists was conducted to assess public perception and satisfaction with the striping and delineation treatments that are part of the SRI packages. The survey found that nearly 87 percent of respondents have noticed the new SRI improvements. The improvements most noticed by respondents are the rumble strips, followed by the improved visibility of the new lane markings. Fifty-three percent of survey respondents found the edgeline and lane line improvements to be helpful. Fifty-six percent of survey respondents indicated that shoulder and centerline rumble strips were helpful in preventing drivers from leaving their lane unintentionally. More than half of survey respondents (57 percent) believe the striping and delineation improvements increase the general level of safety on Missouri roadways. A substantial majority of respondents (79 percent) believe the improvements have been a good investment of taxpayer dollars and 80 percent of respondents would like to see these improvements implemented more widely in the future.

The research results suggest that MoDOT may proceed with future striping and delineation improvements with confidence that such improvements make a substantial contribution to safety improvements and that they are well received by the motoring public.

Since the availability of only 1 year of crash data for the period after SRI project implementation limits the ability to obtain statistically significant evaluation results, it is recommended that MoDOT consider repeating the safety evaluation in 2009 with 2 years

of after-period data and/or in 2010 with 3 years of after-period data. It is also recommended that MoDOT consider evaluating the safety effectiveness of the Better Roads, Brighter Future program, which is making similar improvements as in the SRI program, to an additional 3,300 mi of Missouri roads.

Section 1. Introduction

Midwest Research Institute (MRI) has conducted a research project for the Missouri Department of Transportation (MoDOT) to evaluate the safety effectiveness of the striping and delineation program implemented as part of MoDOT's Smooth Roads Initiative (SRI). This research was performed by MRI for MoDOT through a master agreement with the Missouri Transportation Institute (MTI), a consortium of Missouri universities and research organizations.

This document presents a final report documenting the results of the research. This introduction presents an overview of the SRI program, a summary of the research tasks performed as part of this project, and the organization of the remainder of the report.

1.1 Smooth Roads Initiative Overview

In 2005 and 2006, MoDOT undertook a major initiative to improve both the rideability and the visibility of over 2,300 mi of major roadways in Missouri. The SRI program was implemented with funding that came to MoDOT as a result of Amendment 3 and was announced with the slogan "Smoother, Safer, Sooner."

The SRI program included most of the Interstate highway system in Missouri, as well as other selected major highways. Most of the SRI network consisted of freeways and expressways, but some multilane and two-lane undivided roads were included. The key elements of the SRI program were:

- SMOOTHER—pavements were resurfaced, where needed
- SAFER—striping and delineation improvements were made at all sites in the program
- SOONER—the entire program for improving 2,300 mi of roadway was accomplished in only 2 years

The striping and delineation improvements in the SRI program included:

- wider and higher-visibility lane lines
- wider edgelines with rumble stripes or shoulder rumble strips
- centerline rumble strips (on undivided highways only)
- roadside barrier (guardrail) improvements
- barrier-mounted delineators (on concrete barriers, guardrails, and cable barriers)
- emergency reference marker signs (on Interstate highways only)

The specific combinations of striping and delineation and the pavement marking materials used varied from site to site. Some sites received a standard striping package of wider pavement markings. Other sites received an enhanced package that included both wider pavement markings and edgeline rumble stripes or shoulder rumble strips. Two-lane highway sites received wider edgelines and, at some locations, both edgeline rumble stripes and centerline rumble strips. Edgeline rumble stripes are a combination of a wider edgeline marking and a rumble strip that provides an audible warning to drivers who begin to leave their travel lane. For clarity, the term rumble strips is used throughout this report to refer to both edgeline rumble stripes and shoulder and centerline rumble strips. The term wider markings is used throughout this report to refer to markings that are wider than previous practice (6 in vs. 4 in) and more visible. For approximately 80 percent of the lane line markings in the SRI program, high-retroreflectivity tape was used as the marking material. All SRI projects included added delineators mounted on guardrail and roadside barriers. Guardrail was upgraded at locations where needed. Emergency reference marker signs were installed at 0.2-mi intervals on the entire Interstate highway system; in addition to assisting motorists in the reporting on crash and incident locations, these markers also provide delineation of the roadway ahead for drivers. Pavements at the SRI project sites were resurfaced, where needed, to improve ride quality for motorists and to preserve the structural integrity of the pavement.

1.2 Research Overview

The objectives of the research were to:

- evaluate the safety effectiveness of SRI improvements (including specific combinations of improvement types)
- use the safety evaluation results together with improvement cost data to perform a benefit-cost evaluation
- assess public perception or satisfaction with improved striping and delineation

The research was conducted in four tasks, as follows:

- Task A—Prepare a Detailed Work Plan for the Project
- Task B—Perform a Before/After Safety Effectiveness Evaluation
- Task C—Perform a Benefit-Cost Evaluation
- Task D—Assess Public Perception and Satisfaction

Each of these tasks is described below.

In **Task A**, the research team prepared a draft work plan for Tasks B, C, and D for review and approval by MoDOT and MTI. The draft work plan was discussed with MoDOT and was revised in response to MoDOT comments.

In **Task B**, MRI performed a before/after evaluation to document the safety effectiveness of specific SRI project *packages*, including striping and delineation only; striping and delineation in conjunction with resurfacing; and striping, delineation, and rumble strips in conjunction with resurfacing.

In **Task C**, MRI performed a benefit-cost evaluation for each of the SRI packages. The results of the benefit-cost evaluation is expressed as a benefit/cost ratio. The benefits are based on crash frequency before the improvement, expected crash reduction, and crash cost estimates. The costs are based on the installation cost of the SRI improvements.

An assessment of public perception and satisfaction with the striping and delineation treatments that are part of the SRI packages was performed in **Task D**. This task consisted of a web-based survey targeted to Missouri motorists who drive through the SRI sites.

1.3 Organization of This Draft Final Report

This report presents the results of the safety effectiveness evaluation, the benefit-cost evaluation, and the survey of public perception and satisfaction with SRI projects.

The remainder of the report is organized as follows. Section 2 presents the results of the safety effectiveness evaluation. Section 3 presents the results of the benefit-cost evaluation. The results of the assessment of public perception and satisfaction with the SRI improvements are summarized in Section 4. Section 5 presents the conclusions and recommendations of the research. Appendix A presents detailed results of the safety effectiveness evaluations discussed in Section 2 of the report. Appendix B presents a list of the SRI project locations included in the evaluation. Appendix C presents the safety performance functions for Missouri highways used in the evaluation. Appendix B presents the survey questions that were used in the assessment of public perception and satisfaction with SRI projects.

Section 2.
Safety Effectiveness of SRI Projects

A before/after evaluation was performed to document the safety effectiveness of the striping and delineation improvements made as part of the SRI program. The evaluation estimated the effect on crash frequencies of the specific striping and delineation packages used in the program. The following discussion presents the evaluation approach and the results.

2.1 Evaluation Approach

The before/after safety effectiveness evaluation was performed with the Empirical Bayes (EB) method, which compensates for the potential bias in the evaluation results resulting from regression to the mean. Regression to the mean is a key threat to the validity of observational before/after evaluations (*1, 2*). Simple before/after evaluations may result in safety effectiveness measures that are artificially high because, at sites with particularly high crash frequencies, crashes are likely to decrease whether an improvement project had been implemented or not. The EB method assures that this natural decrease in crashes following a period of high crash frequencies is not mistaken for an effect of the project.

2.2 Safety Effectiveness Measures for SRI Projects

Safety effectiveness measures used in evaluating the striping and delineation projects included:

- crash frequencies for all crashes by severity level
- crash frequencies for lane departure crashes by severity level

The crash severity levels that were available for analysis of all crashes and lane departure crashes included:

- fatal crashes
- disabling-injury crashes
- minor-injury crashes
- property-damage-only (PDO) crashes

The available crash data by severity level were used to define three safety measures for the before/after safety evaluation. Each of these safety measures combined two or more of the individual crash severity levels identified above. The safety measures evaluated in the study addressed the following crash severity levels:

- fatal and disabling injury crashes combined
- fatal and all injury crashes combined
- total crashes (fatal, injury, and PDO crashes combined)

The results for analysis of fatal-and-disabling-injury crashes are the most important for safety program management, because such crashes have the most severe consequences for road users. Fatal-and-disabling-injury crashes also constitute the most reliable dataset because they are the most completely reported crashes. Analysis results for fatal-and-all-injury crashes include crashes involving less severe injuries and may not be as fully reported as fatal-and-disabling-injury crashes. Analysis results for total crashes are generally the least reliable because they include PDO crashes, which are often not fully reported.

Lane departure crashes were classified into three categories as follows:

- lane departure crashes—on-roadway
- roadway departure crashes—run-off-road right
- roadway departure crashes—run-off-road left

Other crash type classifications that were considered include:

- light condition (daytime vs. nighttime)
- pavement surface condition (dry vs. wet vs. ice and snow)

Nighttime wet-pavement crashes are of particular interest, because these are expected to benefit substantially from the striping and delineation improvements. It should be noted that, in comparing crashes by pavement surface condition, it was beyond the scope of this study to conduct a detailed assessment of the rainfall and snowfall amounts and intensities in the periods before and after SRI project implementation, as well as their effects on exposure (veh-mi of travel). For this reason, there is some possibility that differences in weather in the periods before and after installation of the SRI improvements could affect the evaluation results.

For each striping and delineation package and for each safety effectiveness measure of interest, the objective of the evaluation was to:

- estimate the magnitude of the safety effectiveness (i.e., the percent change in crash frequency)
- assess whether the safety effectiveness measure is statistically significant

2.3 Striping and Delineation Packages Evaluated

The evaluation focused on determining the safety effectiveness of specific combinations or packages of SRI striping and delineation improvements. These packages were defined by MRI, in consultation with MoDOT, after reviewing the actual combinations of striping and delineation improvements implemented in the SRI program.

Five project types or striping and delineation packages were implemented as part of the SRI program. These are:

- Wider pavement markings with resurfacing
- Wider pavement markings and edgeline rumble strips with resurfacing
- Wider pavement markings and shoulder rumble strips with resurfacing
- Wider pavement markings and both centerline and edgeline rumble strips with resurfacing (two-lane highways only)
- Wider pavement marking without resurfacing

Each striping and delineation package also included roadside barrier (guardrail) improvements, where needed, and barrier-mounted delineators (on concrete barriers, guardrails, and cable barriers). Emergency reference marking signs (showing the route number, direction of travel, and milepost) were provided at 0.2-mi intervals on Interstate highways only.

For each striping and delineation package, separate evaluations were performed for:

- rural vs. urban areas
- specific roadway types:
  - Interstate highways and other freeways
  - multilane divided highways other than freeways (e.g., expressways)
  - multilane undivided highways
  - two-lane undivided highways

Some multilane and two-lane undivided highway sites included center two-way left-turn lanes (TWLTLs). The number of TWLTL sites was not sufficient for a separate analysis.

2.4 Safety Evaluation Methodology

The before/after safety evaluations were performed using the EB method to compensate for the bias due to regression to the mean. In the EB method, safety performance functions (SPFs) serve as “control sites” and are used to estimate how many

crashes would have occurred in the period after the improvement if no improvement had been made. SPFs for Missouri highways have been developed with crash data for MoDOT facilities. These SPFs were based on data for roadways that were not improved as part of SRI or on before-period data for roadways that were improved as part of SRI. The latter approach was used in many cases, particularly for freeways, because very few freeways in Missouri were not part of the SRI program and even those have received some recent striping and delineation improvements. The SPFs used in this evaluation are presented in Appendix C.

The EB method used in the study was that developed by MRI for the Federal Highway Administration (FHWA) *SafetyAnalyst* project (*3*). *SafetyAnalyst* is a set of software tools for safety management of specific highways sites being developed in a FHWA pooled-fund study in which MoDOT is participating. The *SafetyAnalyst* methodology was adapted from the EB approach recommended by Hauer (*1, 2*). The EB method developed for *SafetyAnalyst* was implemented in the SRI project evaluation in a statistical analysis package known as SAS (*4*). The EB method was applied in this research as follows:

1. Data were obtained for the observed crash frequency of each SRI project site during the before- and after-study periods.
2. SPFs were developed that model crash frequencies as a function of site parameters (e.g., traffic volumes and other site characteristics). These SPFs were developed by means of negative binomial regression analysis.
3. The predicted crash frequency at each SRI project site during the before-study period was estimated using the appropriate SPF for that type of site.
4. A weighted average of the predicted and observed crash frequencies at each SRI project site during the before-study period was computed. This crash frequency is referred to as the EB-adjusted expected crash frequency.
5. An estimate of the expected crash frequency at each SRI project site that would have occurred during the after-study period, had no project been implemented, was made using the EB-adjusted expected crash frequency for the before-study period. This step of the analysis accounts for changes in traffic volumes during the before- and after-study periods.
6. The observed crash frequencies for the after-study period at the SRI project sites were compared to the expected crash frequencies at those same sites for the after-study period had no project been implemented. The difference between these observed and expected crash frequencies is an estimate of the safety effectiveness of the SRI projects.

The statistical significance of the computed differences in crash frequency was determined for each set of SRI projects evaluated. A statistically significant difference in crash frequency is one that is too large to have occurred due to chance variation alone. Thus, statistically significant differences in crash frequency are presumed to occur as a result of the projects evaluated unless there is a logical alternative explanation for the

observed effect. All conclusions concerning statistical significance in this report are at the 90-percent confidence level unless otherwise stated; this means that there is 90-percent confidence that the observed difference did not occur due to chance alone. Observed differences in crash frequency that are not statistically significant may have resulted from an effect of the projects evaluated, but could also have resulted from chance variations. Thus, when an observed difference is not statistically significant, this does not mean that the projects evaluated are necessarily ineffective. A result that is not statistically significant may mean only that there is not sufficient data to demonstrate with confidence that the projects evaluated were effective.

2.5 Treatment of Potential Confounding Factors

Some potential confounding factors needed to be carefully considered in the conduct of the before/after evaluation. First, it should be recognized that the safety benefits could be determined for each striping and delineation package as a whole, but not of the individual treatments that make up the package. For example, where wider pavement markings and rumble strips were installed together, their combined effect on safety was determined, but not their individual effects.

Second, special attention was given to the safety effects of cable median barriers that were installed on many of the same roads as the SRI projects during the same general time period. Cable median barriers have been installed recently on nearly all existing freeways with 40-ft medians, but not on freeways with wider medians. The evaluation was structured as well as possible to avoid mistaking the effect on safety of the cable median barrier for an effect of the striping and delineation treatments. Cable median barriers have been found to decrease fatal and disabling injury crashes, but may increase less severe crashes. To investigate the potential confounding effect of cable median barrier installation, separate analyses were conducted for (1) lane departure crashes that involved on-roadway collisions, (2) crashes involving roadway departures on the right side of the road, and (3) crashes involving roadway departures of the left side of the road, with the assumption that only crashes involving roadway departures on the left side of the roadway are affected by the cable median barriers.

Third, consideration was given to the potential confounding effect of roadway lighting on urban sites. Decreases in nighttime crashes due to retro reflectivity improvements may be smaller at sites that are lighted. Separate analyses were conducted for daytime and nighttime crashes.

Fourth, the evaluation was structured to avoid bias due to seasonal effects. Specifically, in all cases the evaluation used before- and after-study periods that consisted of full-year periods (i.e., multiples of 12 months), rather than partial-year periods for which crashes might be influenced by seasonal variations in traffic volumes or roadway conditions.

Differences in traffic volumes between the before- and after-study periods have been accounted for in the evaluation. It is always a concern in before/after evaluation that changes to the roadway system other than implementation of the projects being evaluated may have taken place between the before- and after-study periods. Sites where other project activity was known were dropped from the evaluation, but it is not generally possible to know of all such activity. And, as noted earlier, there is no direct way to account for differences in weather (e.g., rainfall or snowfall) between the before- and after-study periods.

2.6 Durations of Before- and After-Study Periods

All of the SRI striping and delineation improvements evaluated in this research were implemented in 2005 and 2006. The preferred duration of the before-study period for an observational before/after study is 5 years, so the ideal before-study period would have been the 5-year period from 2000 to 2004, inclusive. However, there was a major change in MoDOT's crash data system between 2001 and 2002 and some of the data needed for the SRI project evaluation were not available for the period prior to 2002. Therefore, a decision was reached to use a 3-year before-study period from 2002 through 2004, inclusive.

Determination of an appropriate date for the beginning of the after-study period was a bit more challenging. One option would have been to have an after-study period beginning a few months after completion of each individual SRI project. For those projects implemented during early 2005, this would have allowed for 2 years of data (2006 and 2007) for the after-study period. However, the pavement resurfacing and the striping and delineation portions of the SRI projects were done under separate contracts that may have been completed at different times. Thus, some roadways may have been resurfaced and restriped in early 2005, but other SRI improvements at the same site may not have been completed until late 2006. Furthermore, MoDOT indicated that the dates of the individual improvements on any given roadway would be difficult to determine. Based on these considerations, the years 2005 and 2006 were treated as a during-construction period and crash data for these years were not used in the evaluation. Since the years 2005 and 2006 were excluded from the evaluation, only 1 complete year of crash data (2007) was available for the after-study period. An after-study period of only 1 year in duration limits the ability to obtain statistically significant evaluation results because the sample size of crash data is smaller than desirable. A more reliable evaluation could be performed with a longer after-study period with a larger sample of crashes; therefore, the research team recommends that MoDOT consider repeating the evaluation in 2009 with 2 years of after-period data (2007 and 2008) and/or in 2010 with 3 years of after-period data (2007 through 2009, inclusive).

2.7 Collection and Assembly of the Safety Evaluation Database

MRI obtained data on roadway characteristics, traffic volumes, and crashes during the before- and after-study periods directly from the crash files and the State of the System file in the MoDOT Transportation Management System (TMS). These data were downloaded from TMS and organized into an evaluation database. MoDOT provided data on the locations of the SRI projects and the specific striping and delineation package used for each project.

Table 1 summarizes the total lengths of SRI projects that were evaluated in the research by roadway type and project type. The project lengths shown in the table represent each direction of travel separately on divided highways and both directions of travel combined on undivided highways. Table 2 shows a comparable summary of the number of SRI project sites evaluated by roadway type and project type. The locations of the evaluation sites are listed in Appendix B.

Adjacent sites that consist of the same roadway type and project type, and are similar in other site characteristics, were combined so that each evaluation site would be as long as possible and have as high an expected crash frequency as possible. The evaluation dataset includes 500 divided highway sites with a total length of 2,105.6 mi and 145 undivided highway sites with a total length of 248.7 mi. The average length of the evaluation sites was 4.2 mi for divided highways and 1.7 mi for undivided highways. Rural sites were relatively long, averaging 6.1 mi in length, in comparison to urban sites which averaged 2.2 mi in length. SRI project sites where other work was performed during the evaluation period have been excluded from the evaluation. In addition, 11 of the 656 sites for which data were obtained were excluded from the evaluation because data anomalies were found.

Average daily traffic volumes (ADTs) for each SRI project evaluation site were obtained from MoDOT's TMS database for each year of the before- and after-study periods. Table 3 presents a summary of the average ADT for the SRI project sites for each roadway and project type. These data show, on average, relatively modest traffic growth of 0.4 percent per year for rural sites and 0.3 percent per year for urban sites over the 4-year interval between the middle year of the before-study period (2003) and the after-study period (2007).

Tables 4 through 6 summarize the crash frequency data for the SRI project sites for total, fatal-and-all-injury, and fatal-and-disabling-injury crashes, respectively. The evaluation dataset includes a total of 68,395 crashes—51,100 during the 3-year before-study period and 17,295 during the 1-year after-study period. There were 13,651 fatal-and-all-injury crashes during the before-study period and 4,330 during the after-study period, including 2,472 fatal-and-disabling-injury crashes during the before-study period and 711 during the after-study period.

Table 1. Total Length (mi) of SRI Projects Evaluated

Roadway type	With pavement resurfacing				Wider markings without pavement resurfacing	TOTAL
	Wider markings	Wider markings and edgeline rumble strips	Wider markings and shoulder strips	Wider markings with centerline and edgeline rumble strips		
Rural freeways	254.4	383.2	201.6	–	43.4	882.6
Rural multilane divided highways	136.8	319.1	31.1	–	40.8	527.8
Rural multilane undivided highways	11.2	–	–	–	–	11.2
Rural two-lane highways	11.8	–	4.7	21.6	–	38.1
All rural roads	414.2	702.3	237.4	21.6	84.2	1,459.7
Urban freeways	223.1	136.6	68.1	–	5.9	433.7
Urban multilane divided highways	167.1	79.0	14.5	–	0.9	261.5
Urban multilane undivided highways	160.2	–	0.5	–	–	160.7
Urban two-lane highways	35.5	–	–	3.2	–	38.7
All urban roads	585.9	215.6	83.1	3.2	6.8	894.6
TOTAL	1,001.1	917.6	320.5	24.8	91.0	2,354.3

Table 2. Number of SRI Project Sites Evaluated

Roadway type	With pavement resurfacing				Wider markings without pavement resurfacing	TOTAL
	Wider markings	Wider markings and edgeline rumble strips	Wider markings and shoulder strips	Wider markings with centerline and edgeline rumble strips		
Rural freeways	47	54	24	–	4	129
Rural multilane divided highways	41	43	8	–	3	95
Rural multilane undivided highways	4	–	–	–	–	4
Rural two-lane highways	7	–	1	3	–	11
All rural roads	99	97	33	3	7	239
Urban freeways	58	37	23	–	2	120
Urban multilane divided highways	115	35	4	–	2	120
Urban multilane undivided highways	100	–	1	–	–	101
Urban two-lane highways	26	–	–	2	–	29
All urban roads	299	72	28	3	4	406
TOTAL	398	169	61	6	11	645

Table 3. Summary of Average Daily Traffic Volumes (veh/day) for SRI Projects Evaluated

Roadway type	With pavement resurfacing									
	Wider markings		Wider markings and edgeline rumble strips		Wider markings and shoulder strips		Wider markings with centerline and edgeline rumble strips		Wider markings without pavement resurfacing	
	Before[a]	After[b]	Before	After	Before	After	Before	After	Before	After
Rural freeways[c]	13,586	13,930	11,723	12,247	9,961	10,130	–	–	14,613	17,131
Rural multilane divided highways[c]	9,134	8,860	9,917	9,361	7,748	7,445	–	–	7,544	8,498
Rural multilane undivided highways[d]	17,698	19,017	–	–	–	–	–	–	–	–
Rural two-lane highways[d]	14,909	13,694	–	–	6,731	6,258	13,017	13,380	–	–
Urban freeways[c]	36,324	37,157	32,210	32,928	21,541	24,242	–	–	15,780	18,469
Urban multilane divided highways[c]	13,079	12,635	15,045	14,491	6,698	6,367	–	–	9,566	10,632
Urban multilane undivided highways[d]	23,483	23,169	–	–	17,565	21,482	–	–	–	–
Urban two-lane highways[d]	18,134	16,499	–	–	–	–	13,170	13,009	–	–

[a] Before-study period, 2002-2004 (3 years).
[b] After-study period, 2007 (1 year).
[c] Divided highway traffic volumes are for one direction of travel only.
[d] Undivided highway traffic volumes are for both directions of travel combined.

Table 4. Summary of Total Crash Frequencies for SRI Projects Evaluated

Roadway type	With pavement resurfacing								Wider markings without pavement resurfacing		TOTAL	
	Wider markings		Wider markings and edgeline rumble strips		Wider markings and shoulder strips		Wider markings with centerline and edgeline rumble strips					
	Before[a]	After[b]	Before	After	Before	After	Before	After	Before	After	Before	After
Rural freeways	2,877	1,151	3,233	1,156	1,111	300	–	–	367	166	7,588	2,773
Rural multilane divided highways	1,052	282	2,480	704	201	45	–	–	229	84	3,962	1,115
Rural multilane undivided highways	712	222	–	–	–	–	–	–	–	–	712	222
Rural two-lane highways	266	74	–	–	48	20	201	36	–	–	515	130
All rural roads	4,907	1,729	5,713	1,860	1,360	365	201	36	596	250	12,777	4,240
Urban freeways	12,861	4,756	5,419	1,667	1,795	565	–	–	110	16	20,185	7,004
Urban multilane divided highways	3,875	1,477	1,802	628	119	23	–	–	13	7	5,809	2,135
Urban multilane undivided highways	10,874	3,507	–	–	26	8	–	–	–	–	10,900	3,515
Urban two-lane highways	1,382	377	–	–	–	–	47	24	–	–	1,429	401
All urban roads	28,992	10,117	7,221	2,295	1,940	596	47	24	123	23	38,323	13,055
TOTAL	33,899	11,846	12,934	4,155	3,300	961	248	60	719	273	51,100	17,295

[a] Before-study period, 2002-2004 (3 years).
[b] After-study period, 2007 (1 year).

Table 5. Summary of Fatal-and-All-Injury Crash Frequencies for SRI Projects Evaluated

Roadway type	With pavement resurfacing											
	Wider markings		Wider markings and edgeline rumble strips		Wider markings and shoulder strips		Wider markings with centerline and edgeline rumble strips		Wider markings without pavement resurfacing		TOTAL	
	Before[a]	After[b]	Before	After	Before	After	Before	After	Before	After	Before	After
Rural freeways	749	219	940	258	343	72	–	–	120	41	2,152	590
Rural multilane divided highways	325	94	754	186	46	13	–	–	76	28	1,201	321
Rural multilane undivided highways	186	52	–	–	–	–	–	–	–	–	186	52
Rural two-lane highways	68	21	–	–	17	6	82	13	–	–	167	40
All rural roads	1,328	386	1,694	444	406	91	82	13	196	69	3,706	1,003
Urban freeways	3,345	1,217	1,424	434	502	144	–	–	30	5	5,301	1,800
Urban multilane divided highways	1,044	391	476	145	45	4	–	–	4	2	1,569	542
Urban multilane undivided highways	2,707	862	–	–	3	2	–	–	–	–	355	121
Urban two-lane highways	351	113	–	–	–	–	14	8	–	–	365	121
All urban roads	7,447	2,583	1,900	579	550	150	14	8	34	7	9,945	3,327
TOTAL	8,775	2,969	3,594	1,023	956	241	96	21	230	76	13,651	4,330

[a] Before-study period, 2002-2004 (3 years).
[b] After-study period, 2007 (1 year).

Table 6. Summary of Fatal-and-Disabling-Injury Crash Frequencies for SRI Projects Evaluated

Roadway type	With pavement resurfacing											
	Wider markings		Wider markings and edgeline rumble strips		Wider markings and shoulder strips		Wider markings with centerline and edgeline rumble strips		Wider markings without pavement resurfacing		TOTAL	
	Before[a]	After[b]	Before	After	Before	After	Before	After	Before	After	Before	After
Rural freeways	258	64	298	79	117	23	–	–	29	5	702	171
Rural multilane divided highways	91	23	198	55	11	3	–	–	24	8	324	89
Rural multilane undivided highways	28	9	–	–	–	–	–	–	–	–	28	9
Rural two-lane highways	23	5	–	–	9	3	24	1	–	–	56	9
All rural roads	400	101	496	134	137	29	24	1	53	13	1,110	278
Urban freeways	444	144	206	73	98	32	–	–	9	1	757	250
Urban multilane divided highways	134	41	77	22	17	1	–	–	2	0	230	64
Urban multilane undivided highways	334	106	–	–	0	0	–	–	–	–	334	106
Urban two-lane highways	39	12	–	–	–	–	2	1	–	–	41	13
All urban roads	951	303	283	95	115	33	2	1	11	1	1,362	433
TOTAL	1,351	404	779	229	252	62	26	2	64	14	2,472	711

[a] Before-study period, 2002-2004 (3 years).
[b] After-study period, 2007 (1 year).

The evaluation results from analysis of these data are presented in the next section of this report.

2.8 Results of Safety Effectiveness Evaluation

The overall safety effectiveness evaluation results for the SRI program as a whole show a statistically significant 8-percent decrease in fatal-and-disabling-injury crashes and a statistically significant 6-percent decrease in fatal-and-all-injury crashes for the first year after program implementation (see Table A-4 in Appendix A). The evaluation results for total crashes (all crash severity levels combined) were not statistically significant. Lack of statistical significance is to be expected in some cases because only 1 year of data were available for the after-study period.

The overall results are important because they show that the SRI program was a good investment in safety improvement for MoDOT. The following discussion addresses the variation in evaluation results by roadway type, project type, and crash type. The results reported below focus on fatal-and-disabling-injury and fatal-and-all-injury crashes because these results are the most critical to safety improvement.

Detailed tables of the evaluation results for specific roadway and project types are presented in Appendix A.

Evaluation Results by Roadway Type

Table 7 summarizes the evaluation results by roadway type; the detailed results on which Table 7 is based are presented in Tables A-5 and A-6 in Appendix A. When the percentage change in crash frequency is statistically significant at the 90-percent level, the table also shows its standard error in parentheses. The standard error is a measure of precision of the estimated percent change. Smaller standard errors indicate better precision. In addition, smaller standard errors relative to the estimated percent change are more desirable.

The table shows that all of the rural roadway types experienced statistically significant decreases in fatal-and-all-injury crashes ranging from 4 to 30 percent. Only two rural roadway types experienced statistically significant reductions in fatal-and-disabling-injury crashes: a 22-percent crash reduction for SRI projects on urban freeways and a 41-percent crash reduction for SRI projects on rural two-lane highways. The overall evaluation results for projects on urban roads were generally not statistically significant. The only exception was a statistically significant 5-percent crash reduction for SRI projects on urban freeways. Table 7 combines results across all SRI project types. Results by project type and by roadway type and project type combined are presented below.

Table 7. Summary of Before/After Evaluation Results by Roadway Type

Roadway type	Percentage change in crash frequency (standard error) from before to after the SRI projects	
	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes
Rural freeways	–21.9 (6.0)	–16.9 (3.5)
Rural multilane divided highways	NS	–13.8 (4.9)
Rural multilane undivided highways	NS	–29.8 (10.2)
Rural two-lane highways	–40.9 (20.1)	–24.5 (12.4)
Urban freeways	NS	–4.7 (2.3)
Urban multilane divided highways	NS	NS
Urban multilane undivided highways	NS	NS
Urban two-lane highways	NS	NS
All roadway types combined	–8.0 (3.5)	–5.8 (1.5)

NS = Not statistically significant.

Evaluation Results by Project Type

Table 8 summarizes the evaluation results by project type; the detailed results on which Table 8 is based are presented in Tables A-8 and A-9 in Appendix A. The table shows that all project types involving rumble strips resulted in statistically significant reductions in the frequency of fatal-and-all-injury crashes ranging from 15 to 36 percent. For most of these project types, statistically significant reductions were also found for fatal-and-disabling-injury crashes. For SRI projects involving wide markings without rumble strips, a statistically significant reduction in fatal-and-disabling-injury crashes was found only for placement of durable markings without resurfacing (43 percent reduction in crash frequency). It may be possible to demonstrate statistical significance for these project types without rumble strips with more than 1 year of data for the after-study period. Table 8 combines results across all roadway types. Results by roadway type and project type are presented below.

Table 8. Summary of Before/After Evaluation Results by SRI Project Type

SRI project type	Percentage change in crash frequency (standard error) from before to after the SRI projects	
	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes
1–Wider markings with resurfacing	NS	NS
2–Wider markings and edgeline rumble strips with resurfacing	NS	–15.1 (2.7)
3–Wider markings and shoulder rumble strips with resurfacing	–17.9 (10.5)	–30.0 (4.6)
2 and 3–Wider markings and either edgeline or shoulder rumble strips with resurfacing	–9.7 (5.3)	–18.4 (2.3)
4–Wider markings and both centerline and edgeline rumble strips with resurfacing[a]	–74.5 (18.2)	–35.5 (14.5)
5–Wider markings without resurfacing	–43.3 (15.3)	NS
All project types combined	–8.0 (3.5)	–5.8 (1.5)

NS = Not statistically significant.
[a] Two-lane highways only.

Evaluation Results by Roadway Type and Project Type

Table 9 summarizes the overall evaluation results for specific SRI project types on freeways; the detailed evaluation results on which Table 9 is based are presented in Tables A-1 and A-2 in Appendix A. For fatal-and-all-injury crashes on rural freeways, there were statistically significant crash reductions, ranging from 11 to 38 percent, for all SRI project types except wider markings without resurfacing. SRI projects involving wider markings without resurfacing did experience a statistically significant reduction in fatal-and-disabling-injury crashes. Thus, the evaluation results show that all of the SRI project types were effective in reducing crashes on rural freeways.

For urban freeways, Table 9 shows statistically significant reductions in fatal-and-all-injury crashes, ranging from 16 to 56 percent, for all SRI project types except wider markings with resurfacing. However, none of the evaluation results for fatal-and-disabling-injury crashes were statistically significant.

Table 10 summarizes the overall evaluation results for multilane divided highways; the detailed results on which Table 10 is based are presented in Tables A-1 and A-2 in Appendix A. For rural multilane divided highways, there was a statistically significant 20-percent reduction in the frequency of fatal-and-all-injury crashes for SRI projects involving wider markings and edgeline rumble strips with resurfacing. SRI projects with wider markings and any type of rumble strip (edgeline or shoulder) experienced a statistically significant 21-percent reduction in crash frequency. All other results for rural multilane divided highways were not statistically significant.

For urban multilane divided highways, SRI projects involving durable markings and shoulder rumble strips with resurfacing had a statistically significant 75-percent decrease in fatal-and-all-injury crash frequency. For SRI projects on urban multilane divided highways involving wider markings, there was a statistically significant 14-percent increase in fatal-and-all-injury crash frequency. There is no obvious explanation for this observed increase in crash frequency.

Table 11 summarizes the evaluation results by SRI project type for multilane undivided highways; the detailed results on which Table 11 is based are presented in Tables A-1 and A-2 in Appendix A. There was only one statistically significant result, a 30-percent reduction in fatal-and-all-injury crash frequency for SRI projects involving wider markings (without rumble strips) with resurfacing for rural multilane undivided highways.

Table 12 summarizes the evaluation results by SRI project type for two-lane highways; the detailed results on which Table 12 is based are presented in Tables A-1 and A-2 in Appendix A. The only SRI project type to show statistically significant results for rural two-lane highways was placement of wider markings, centerline rumble strips, and edgeline rumble strips. This project type resulted in a statistically significant reduction of 53 percent in fatal-and-all-injury crashes and 86 percent in fatal-and-disabling-injury crashes. This was the highest effectiveness observed in the study for any

Table 9. Summary of Before/After Evaluation Results by SRI Project Type for Freeways

SRI project type	Percentage change in crash frequency (standard error) from before to after the SRI projects			
	Rural sites		Urban sites	
	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes
1–Wider markings with resurfacing	NS	–10.8 (6.1)	NS	NS
2–Wider markings and edgeline rumble strips with resurfacing	NS	–15.1 (5.3)	NS	–15.7 (4.2)
3–Wider markings and shoulder rumble strips with resurfacing	–36.9 (13.2)	–37.8 (7.4)	NS	–23.5 (6.6)
2 and 3–Wider markings and either edgeline or shoulder rumble strips with resurfacing	–21.1 (7.8)	–21.3 (4.4)	NS	–17.8 (3.5)
5–Wider markings without resurfacing	–62.0 (17.0)	NS	NS	–55.9 (20.1)
All project types combined	–21.9 (6.0)	–16.9 (3.5)	NS	–4.7 (2.3)

NS = Not statistically significant.

Table 10. Summary of Before/After Evaluation Results by SRI Project Type for Multilane Divided Highways

SRI project type	Percentage change in crash frequency (standard error) from before to after the SRI projects			
	Rural sites		Urban sites	
	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes
1–Wider markings with resurfacing	NS	NS	NS	+14.4[a] (6.1)
2–Wider markings and edgeline rumble strips with resurfacing	NS	–19.9 (6.0)	NS	NS
3–Wider markings and shoulder rumble strips with resurfacing	NS	NS	–65.4 (34.7)	–74.7 (12.8)
2 and 3–Wider markings and either edgeline or shoulder rumble strips with resurfacing	NS	–20.6 (5.7)	NS	–14.1 (7.3)
5–Wider markings without resurfacing	NS	NS	NS	NS
All project types combined	NS	NS	NS	NS

NS = Not statistically significant.
[a] Statistically significant increase in crash frequency.

Table 11. Summary of Before/After Evaluation Results by SRI Project Type for Multilane Undivided Highways

SRI project type	Percentage change in crash frequency (standard error) from before to after the SRI projects			
	Rural sites		Urban sites	
	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes
1–Wider markings with resurfacing	NS	–29.8 (10.2)	NS	NS
3–Wider markings and shoulder rumble strips with resurfacing	–	–	NS	NS
All project types combined	NS	NS	NS	NS

NS = Not statistically significant.

Table 12. Summary of Before/After Evaluation Results by SRI Project Type for Two-Lane Highways

SRI project type	Percentage change in crash frequency (standard error) from before to after the SRI projects			
	Rural sites		Urban sites	
	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes	Fatal-and-disabling-injury crashes	Fatal-and-all-injury crashes
1–Wider markings with resurfacing	NS	NS	NS	NS
3–Wider markings and shoulder rumble strips with resurfacing	NS	NS	–	–
4–Wider markings and both centerline and edgeline rumble strips with resurfacing	–85.9 (14.1)	–53.1 (13.3)	NS	NS
All project types combined	–40.9 (20.1)	–24.5 (12.4)	NS	NS

NS = Not statistically significant.

specific roadway and project type. None of the SRI project types for urban two-lane highways showed statistically significant results.

Evaluation by Crash Type

The overall evaluation results, as noted above, show a net reduction of 8 percent in fatal-and-disabling-injury crashes from before to after SRI project evaluation. This net reduction in severe crashes consists of a 33-percent reduction in multiple-vehicle crashes and a 45-percent increase in single-vehicle crashes. Lane-departure crashes, which include many single-vehicle crashes, increased by 39 percent from before to after the SRI projects. Similar trends were found for fatal-and-all-injury crashes. This result is surprising because SRI projects were expected to reduce single-vehicle crashes and, especially, lane departure crashes. However, data for 2007 show a statewide increase in lane-departure crashes, which may be weather related. Thus, it appears that lane-departure crashes are increasing for reasons not related to the SRI projects. Two findings are inherent in these results. First, the data show that the SRI projects were particularly effective in reducing multiple-vehicle crashes. This should be anticipated in future striping and delineation projects. Second, it is likely that, had there not been a statewide trend in increasing lane-departure crashes, the overall effectiveness of the SRI projects would have been even higher.

A key issue that was considered in the SRI project evaluation for freeways was the addition of cable barrier in the medians of many of the same sites as the SRI projects and during the same time period (2005 and 2006). MoDOT has found that cable median barriers have been 95 percent successful in preventing out-of-control vehicles from crossing the median and entering the opposing lanes of traffic. It is expected that the installation of cable barriers in the median at SRI project sites should reduce the frequency of these cross-median collisions (a very severe crash type) and will result in additional injury and PDO collisions with the cable barrier.

Table 13 summarizes the lengths of SRI projects on freeways with and without cable median barriers installed during the evaluation period. Overall, 43 percent of the evaluation sites on rural freeways had cable median barriers installed, while cable median barriers were installed for only 7 percent of the evaluation sites on urban freeways.

Because of the cable barrier issue, separate analyses were performed for run-off-road crashes involving the left and right sides of the roadway. However, in many cases because of small sample sizes, the evaluation results for lane-departure crashes (including run-off-road crashes) were not statistically significant.

In fact, for both rural and urban freeways, there were no statistically significant results at sites where cable median barriers were installed for lane-departure crashes involving run-off-road-left or other lane-departure crashes (see Tables A-1 and A-2). Thus, more data than are currently available would be needed to assess the potential effect of cable median barrier installation on the SRI project results.

Table 13. Summary of Lengths of SRI Projects Evaluated for Freeways With and Without Cable Median Barrier Installed During the Study Period

SRI project type	Rural freeways			Urban freeways		
	No cable barrier installed	Cable barrier installed	TOTAL	No cable barrier Installed	Cable barrier installed	TOTAL
1–Wider markings with resurfacing	90.0	164.4	254.4	210.5	12.6	223.1
2–Wider markings and edgeline rumble strips with resurfacing	180.5	202.7	383.2	123.1	13.5	136.6
3–Wider markings and shoulder rumble strips with resurfacing	187.5	14.1	201.6	60.7	7.4	68.1
5–Wider markings without resurfacing	43.4	0.0	43.4	5.9	0.0	5.9
All project types combined	501.4	381.2	882.6	400.2	33.5	433.7

The overall evaluation results for daytime and nighttime crashes are presented in Tables A-1 and A-2. The results for fatal-and-all-injury crashes are statistically significant for all rural roadway types, with crash reductions ranging from 12 to 34 percent. For fatal-and-disabling-injury crashes, only the results for rural freeways and rural two-lane highways are statistically significant. For daytime crashes on urban freeways, there was a statistically significant 9-percent reduction in fatal-and-all-injury crashes for urban freeways, but a statistically significant 12-percent increase in daytime crashes for urban multilane divided highways. There were no statistically significant results for daytime fatal-and-disabling-injury crashes on urban roadways.

For nighttime fatal-and-all-injury crashes, there were statistically significant crash reductions, ranging from 21 to 43 percent, for rural freeways, rural multilane divided highways, and rural multilane undivided highways. No other roadway types had evaluation results that were statistically significant.

For nighttime crashes, there were statistically significant reductions in fatal-and-disabling-injury crashes, ranging from 25 to 77 percent, for rural freeways, rural multilane divided highways, and rural two-lane highways. There was a statistically significant 34-percent increase in nighttime fatal-and-disabling-injury crashes on urban freeways. All other results for fatal-and-all-injury crashes were not statistically significant. There is no obvious explanation for the latter result, but the corresponding result for fatal-and-all-injury crashes is a crash reduction that is not statistically significant.

The overall evaluation results for both dry- and wet-pavement crashes are presented in Tables A-1 and A-2. For both dry- and wet-pavement crashes, all evaluation results for rural roadways that were statistically significant showed crash reductions. These crash reductions ranged from 12 to 33 percent for fatal-and-all-injury crashes and 14 to 51 percent for fatal-and-disabling-injury crashes. For fatal-and-disabling-injury crashes on urban freeways, there was a statistically significant 49-percent decrease in wet-pavement crashes on urban multilane divided highways. For fatal-and-all-injury crashes, there was a statistically significant crash reduction of 9 percent of dry-pavement crashes on urban freeways, but there were statistically significant increases of 10 and 12 percent for wet-pavement crashes on urban freeways and dry-pavement crashes on urban multilane divided highways, respectively.

No reliable conclusions should be drawn concerning crashes on ice-and-snow-covered pavements with only 1 year of after-period data because winter conditions vary widely and there is no documentation available on the relative severity of winter conditions in the before- and after-study periods.

SRI improvements should be particularly effective in addressing nighttime wet-pavement crashes, so a special analysis of this crash type was conducted. The only statistically significant results were for rural multilane divided highways where fatal-and-all-injury crashes were reduced by 44 percent and fatal-and-disabling-injury crashes were reduced by 57 percent.

Summary of Safety Effectiveness Measures for SRI Projects

Table 14 presents a summary of the safety effectiveness measures for SRI projects based on the results shown in Tables 9 through 12. The safety effectiveness estimates for fatal-and-disabling- injury crashes in Table 14 are taken directly from the results shown in Tables 9 through 12 where statistically significant results for fatal-and-disabling-injury crashes were available. Where statistically significant results for fatal-and-disabling-injury crashes were not available, but the results for fatal-and-all-injury crashes were statistically significant, the results for fatal-and-all-injury crashes were used as the best available estimate of the safety effectiveness for fatal-and-disabling-injury crashes.

The safety effectiveness estimate for nondisabling-injury crashes in Table 14 are based on the evaluation results for fatal-and-all-injury crashes in Tables 9 through 12, where these were statistically significant. Where statistically significant results were found in Tables 9 through 12 for both fatal-and-disabling-injury crashes and fatal-and-all-injury crashes, the safety effectiveness estimate for nondisabling-injury crashes in Table 14 is derived logically from both values.

If the evaluation results for both fatal-and-disabling-injury crashes and fatal-and-all-injury crashes were found to be not statistically significant in Tables 9 through 12, no safety effectiveness measure is shown in Table 14.

The safety effectiveness measures in Table 14 include reductions in crash frequency ranging from 11 to 86 percent. The highest safety effectiveness measure shown in the table, a statistically significant reduction in crash frequency of 86 percent, was found for installation of wide markings with both centerline and edgeline rumble strips on rural two-lane highways. The table shows that a broad range of additional SRI project types are effective in reducing crash frequency. However, for a number of roadway and project types, the available data, including an after-study period of only 1 year in duration, are not sufficient to obtain statistically significant results.

More data would be desirable to investigate the safety effectiveness of installing durable markings with resurfacing on urban freeways, for which the evaluation results were not statistically significant. There were a number of urban freeway projects in which crashes increased between the before- and after-study periods. This may be a short-term trend in crashes that affects the year 2007 only, but this cannot be determined without considering data for subsequent years.

The one statistically significant increase in crash frequency observed for a particular roadway type/project type combination—wider markings with resurfacing on urban multilane divided highways as shown in Table 10—has not been included in Table 14 because it may be related to factors other than the SRI projects. It would also be desirable to investigate this result with additional data.

Table 14. Summary of Safety Effectiveness Measures for SRI Projects

SRI project type	Roadway type	Percent reduction in crash frequency from before to after the SRI projects: Fatal-and-disabling-injury crashes	Minor-injury crashes
1–Wider markings with resurfacing	Rural freeways	11	11
	Rural multilane divided highways	–	–
	Rural multilane undivided highways	30	30
	Rural two-lane highways	–	–
	Urban freeways	–	–
	Urban multilane divided highways	–	–
	Urban multilane undivided highways	–	–
	Urban two-lane highways	–	–
2–Wider markings and edgeline rumble strips with resurfacing	Rural freeways	15	15
	Rural multilane divided highways	20	20
	Urban freeways	16	16
	Urban multilane divided highways	–	–
3–Wider markings and shoulder rumble strips with resurfacing	Rural freeways	37	38
	Rural multilane divided highways	–	–
	Rural two-lane highways	–	–
	Urban freeways	24	24
	Urban multilane divided highways	65	77
	Urban multilane undivided highways	–	–
4–Wider markings and both centerline and edgeline rumble strips with resurfacing	Rural two-lane highways	86	53
	Urban two-lane highways	–	–
5–Wider markings without resurfacing	Rural freeways	62	62
	Rural multilane divided highways	–	–
	Urban freeways	56	56
	Urban multilane divided highways	–	–

Section 3.
Benefit-Cost Evaluation of SRI Projects

A benefit-cost evaluation was performed for each combination of roadway type and striping and delineation package for which there was sufficient data to obtain a reliable safety effectiveness estimate. The following discussion presents the benefit-cost methodology that was used, reviews each aspect of that methodology, and presents the results of the benefit-cost evaluation.

The benefit-cost evaluation focused on the cost-effectiveness of the striping and delineation improvements and did not consider the costs or benefits of pavement resurfacing. This focus is reasonable because the pavements that were resurfaced needed resurfacing and would have been resurfaced even if no striping and delineation improvements had been made. Furthermore, a benefit-cost evaluation of resurfacing would need to consider benefits other than safety (e.g., improvement of ride quality and preservation of the structural integrity of the pavement).

3.1 Benefit-Cost Methodology

The results of the benefit-cost evaluation are presented in the form of benefit-cost ratios for specific striping and delineation packages on specific roadway types. A benefit-cost ratio of 1.0 or greater indicates that the improvement in question has benefits that equal or exceed its costs and that the improvement is, therefore, considered cost effective. A benefit-cost ratio less than 1.0 indicates that the benefits of the improvement are less than its costs and that the improvement is not considered cost effective.

The benefit-cost ratio is computed as:

$$B/C = \frac{\left(\sum_{j=1}^{n} N_{jk}\ T_k\ r_{jk}\ C_j\right)(P/A,\ i\%,\ n)}{CC_k} \qquad (1)$$

where:

B/C	=	benefit-cost ratio
N_{jk}	=	annual crash frequency per mile for severity level *j* on roadway type *k*
T_k	=	adjustment for traffic volume growth for roadway type *k*
r_{jk}	=	proportional reduction in crashes due to striping and delineation improvements for severity level *j* on roadway type *k*
C_j	=	average crash cost for severity level *j* on roadway type *k*

(P/A, i%, n)	=	uniform series present worth factor for an improvement service life of *n* years at a minimum attractive rate of return of *i%*
CC_k	=	installation cost per mile for a specific package of striping and delineation improvements on roadway type *k*

Each element of the benefit-cost methodology is discussed below.

Crash Frequency Per Mile (N_{jk})

The typical crash frequency per mile per year for specific crash severity levels and roadway types has been determined from the observed crash frequencies in the evaluation dataset for the before-study period (see Tables 4 through 6).

Adjustment for Traffic Volume Growth (T_k)

Traffic volume growth on the SRI project sites is likely to increase future crash frequencies. Thus, there will be more crashes in the future that the SRI projects will have an opportunity to reduce. Traffic volume growth was estimated as 0.4 percent per year for rural sites and 0.3 percent per year for urban sites based on the observed changes in traffic volume between the before- and after-study periods at the evaluation sites. These estimates were derived from the traffic volume data for the before- and after-study periods shown in Table 3.

The traffic volume adjustment factor includes allowances for:

- traffic volume growth between the before-study period and the beginning of the after-study period expected
- traffic volume growth during the service life of the SRI improvements (see below)

Reduction in Crashes Due to Striping and Delineation Improvements (r_{jk})

The reduction in crashes due to striping and delineation improvements represents the percentage reductions in crash frequency, based on the evaluation results presented in Table 14, expressed as a proportion. Since the effect of the SRI projects on PDO crashes was not formally evaluated, it is assumed to be equal to the effectiveness for minor-injury crashes shown in Table 14. Where no safety effectiveness measure is shown in Table 14, no benefit-cost evaluation was conducted.

Crash Costs (C_{jk})

The benefit-cost evaluation uses estimates of the average cost per crash for specific crash severity levels that have been provided by MoDOT. Specifically, MoDOT has provided estimates of the economic cost (in dollar terms) for the following injury severity levels:

- fatal crashes
- disabling-injury crashes
- minor-injury crashes
- property-damage-only (PDO) crashes

The cost for a fatal crash is based on the average number of fatalities, disabling injuries, and other injuries per fatal crash. The cost for a disabling injury crash is based on the average number of disabling injuries and other injuries per disabling-injury crash. The cost for any other injury crash is based on the average number of injuries per other-injury crash.

The crash costs were estimated to be:

- $4,417,000 for fatal crashes
- $277,000 for disabling-injury crashes
- $71,600 for minor-injury crashes
- $4,000 for PDO crashes

These crash cost estimates are based on MoDOT values for 2005, updated for inflation to represent 2007 values.

Uniform Series Present Worth Factor (P/A, i%, n)

The uniform series present worth factor is used to estimate the present value of a series of annual cash flows. The safety benefits of a striping and delineation project would be expected to be obtained annually over the entire service life of the project. The purpose of the benefit-cost evaluation is to compare the magnitude of these benefits to the improvement cost, which is a one-time cost incurred at the time the improvement is made. The uniform series present worth factor converts the annual benefits to a present value that can be compared to the improvement cost. The uniform series present worth factor is computed as:

$$(P/A, i\%, n) = \frac{(1+i)^n - 1}{i(1+i)^n} \qquad (2)$$

where:

i = minimum attractive rate of return (interest rate or discount rate), expressed as a proportion (i.e., i=0.04 corresponds to 4 percent minimum attractive rate of return)
n = service life of improvement (years)

Minimum Attractive Rate of Return (i)

The minimum attractive rate of return is the minimum return on investment that represents an attractive investment in highway safety. The minimum attractive rate of return is also known as the interest rate or discount rate. A minimum attractive rate of return of 4 percent, which represents a reasonable estimate of the real long-term cost of capital (not including inflation), has been used in the benefit-cost evaluation.

Service Life (n)

The service life of striping and delineation improvements is estimated to be 5 years. The pavement markings have a service life of 5 years or less. The rumble strips, delineators, and emergency reference markers have a service life of at least 5 years. Since the benefit-cost evaluation is focused on the striping and delineation improvements, the life of pavement resurfacing has not been considered in determining the project service life.

Installation Cost (CC_k)

Estimates of installation cost for specific striping and delineation packages on specific roadway types have been provided by MoDOT based on experience for actual SRI projects. Table 15 summarizes the installation cost per mile for various types of SRI improvements. The installation costs per mile in Table 15 are based on the following unit costs for specific SRI project components:

- 6-in white marking — $0.57 per ft
- 6-in yellow marking — $0.55 per ft
- 6-in tape marking — $4.00 per ft
- Edgeline or shoulder rumble strip — $38.33 per 100 ft
- Centerline rumble strip — $55.00 per 100 ft
- Reference markers (0.2-mi intervals) — $162.05 per marker
- Delineators — $83.00 per mi

The marking materials for 6-in white and 6-in yellow lines included both epoxy and polyurea; the unit costs shown above are a weighted average based on the relative lengths of these materials that were used. The 6-in tape markings were used for lane lines at

Table 15. Installation Cost for Various SRI Project Types

Roadway type	Number of lanes[a]	Tape lane line markings	Number included in installation cost estimate: White lane lines	White edgelines	Yellow edgelines	Yellow centerlines	Edge/shoulder rumble strips	Centerline rumble strips	Reference markers	Installation cost ($) per mi
PROJECT TYPE 1 or 5: Wider markings with or without resurfacing										
Freeway	2	N	1	1	1	0	0	0	5	9,816
	2	Y	1	1	1	0	0	0	5	27,927
	3	N	2	1	1	0	0	0	5	12,826
	3	Y	2	1	1	0	0	0	5	49,047
Freeway (non-Interstate)	2	N	1	1	1	0	0	0	0	9,006
	2	Y	1	1	1	0	0	0	0	27,117
	3	N	2	1	1	0	0	0	0	12,016
	3	Y	2	1	1	0	0	0	0	48,237
Multilane divided highway	2	N	1	1	1	0	0	0	0	9,006
	2	Y	1	1	1	0	0	0	0	27,117
	3	N	2	1	1	0	0	0	0	12,016
	3	Y	2	1	1	0	0	0	0	48,237
Multilane undivided highway	4	N	2	2	0	2	0	0	0	17,929
	4	Y	2	2	0	2	0	0	0	54,150
Two-lane highway	2	N	0	2	0	2	0	0	0	11,910
PROJECT TYPE 2 or 3: Wider markings and edgeline or shoulder rumble strip with resurfacing										
Freeway	2	N	1	1	1	0	2	0	5	13,864
	2	Y	1	1	1	0	2	0	5	31,974
	3	N	2	1	1	0	2	0	5	16,874
	3	Y	2	1	1	0	2	0	5	53,094
Freeway (non-Interstate)	2	N	1	1	1	0	2	0	0	13,054
	2	Y	1	1	1	0	2	0	0	31,164
	3	N	2	1	1	0	2	0	0	16,063
	3	Y	2	1	1	0	2	0	0	52,284
Multilane divided highway	2	N	1	1	1	0	2	0	0	13,054
	2	Y	1	1	1	0	2	0	0	31,164
	3	N	2	1	1	0	2	0	0	16,063
	3	Y	2	1	1	0	2	0	0	52,284
Multilane undivided highway	4	N	2	2	0	2	2	0	0	21,977
	4	Y	2	2	0	2	2	0	0	58,198
Two-lane highway	2	N	0	2	0	2	2	0	0	15,958
PROJECT TYPE 4: Wider markings and centerline and edgeline rumble strips with resurfacing										
Two-lane highway	2	N	0	2	0	2	2	1	0	18,862

[a] One direction of travel for divided highways and both directions of travel for undivided highways.

some sites, but not all sites. Where more than one line of Table 15 applies to a specific roadway type/project type combination, a weighted average based on the lengths of the evaluation segments has been used. The need for guardrail improvements as part of SRI projects was very site specific and overall costs specifically for the guardrail improvements at the project sites evaluated in this report (and these sites only) are not available. Therefore, guardrail improvement costs have not been included in the benefit-cost analysis. It is expected that guardrail improvement costs constitute a relatively small proportion of the overall SRI project costs. Installation cost serves as the denominator in computing the benefit-cost ratio with Equation (1).

3.2 Results of Benefit-Cost Evaluation

Table 16 summarizes the benefits, costs, and benefit-cost ratios determined for specific combinations of roadway type and project type. Computed benefit-cost ratios are presented only for those combinations for which a safety effectiveness estimate was available in Table 14. The results in Table 16 show that the SRI project types that could be assessed had benefit-cost ratios ranging from 5 to 129. The average benefit-cost ratio for the project types that could be evaluated was 9.7. This indicates that these improvements are expected to provide $9.70 in benefits over a 5 year service life for each dollar invested in striping and delineation improvements.

While all of the project types that could be assessed were found to have benefit-cost ratios substantially greater than 1.0, five project types stand out as being particularly cost-effective. These are:

- Wider markings without resurfacing on urban freeways (benefit-cost ratio = 129)
- Wider markings with resurfacing on rural multilane undivided highways (benefit-cost ratio = 91)
- Wider markings without resurfacing on rural freeways (benefit-cost ratio = 64)
- Wider markings and both centerline and edgeline rumble strips with resurfacing on rural two-lane highways (benefit-cost ratio = 59)
- Wider markings and shoulder rumble strips with resurfacing on urban multilane divided highways (benefit-cost ratio = 27)

It is not possible to evaluate the SRI program as a whole with the safety effectiveness measures in Table 14, because the evaluation results for several project types were not statistically significant. These project types that were not statistically significant clearly had lower effectiveness than the project types that were found to be statistically significant. Section 2.8 noted that the overall program effectiveness measures were an 8-percent reduction in fatal-and-disabling-injury crashes and a 6-percent reduction in fatal-and-all-injury crashes. If these overall effectiveness measures are applied to each roadway and project type, it is estimated that the SRI striping and delineation program, as

a whole, is expected to provide $374,000,000 in crash reduction benefits over a 5 year service life, at a cost of $68,000,000 for a benefit-cost ratio of 5.5. In other words, the SRI striping and delineation program as a whole should provide $5.50 in benefits for each dollar spent on striping and delineation improvements. It should, however, be recognized that this result includes some roadway type and project type combinations for which the available data were too variable to achieve statistically significant results.

Based on the 2007 results, it is estimated that, over a period of 5 years from 2007 through 2011, the striping and delineation program will reduce approximately 50 fatal crashes; 300 disabling-injury crashes; 1,100 minor-injury crashes; and 3,800 property-damage-only crashes.

Table 16. Summary of Benefit-Cost Ratios for SRI Projects

SRI project type	Roadway type	Benefit ($)	Installation cost ($)	Benefit-cost ratio
1–Wider markings with resurfacing	Rural freeways	35,126,000	6,607,000	5.3
	Rural multilane divided highways	–	–	–
	Rural multilane undivided highways	19,851,000	217,600	91.2
	Rural two-lane highways	–	–	–
	Urban freeways	–	–	–
	Urban multilane divided highways	–	–	–
	Urban multilane undivided highways	–	–	–
	Urban two-lane highways	–	–	–
2–Wider markings and edgeline rumble strips with resurfacing	Rural freeways	58,151,000	12,038,000	4.8
	Rural multilane divided highways	59,575,000	9,565,000	6.2
	Urban freeways	81,902,000	5,390,000	15.2
	Urban multilane divided highways	–	–	–
3–Wider markings and shoulder rumble strips with resurfacing	Rural freeways	54,717,000	6,446,000	8.5
	Rural multilane divided highways	–	–	–
	Rural two-lane highways	–	–	–
	Urban freeways	44,943,000	2,250,000	20.0
	Urban multilane divided highways	11,819,000	433,000	27.3
	Urban multilane undivided highways	–	–	–
4–Wider markings and both centerline and edgeline rumble strips with resurfacing	Rural two-lane highways	24,164,000	407,000	59.3
	Urban two-lane highways	–	–	–
5–Wider markings without resurfacing	Rural freeways	27,390,000	426,000	64.3
	Rural multilane divided highways	–	–	–
	Urban freeways	7,439,000	58,000	128.5
	Urban multilane divided highways	–	–	–

Section 4.
Assessment of Public Perception and Satisfaction with SRI Projects

MRI used an online survey to conduct an assessment of public perception and satisfaction with the striping and delineation treatments that are part of the SRI packages. A web-based survey software package, known as SurveyMonkey, was used to conduct an online survey of motorists who regularly drive through SRI sites. Several methods were used to provide the URL address to the survey, including posting it on MoDOT's website and advertising it through a press release. The specific questions included in the survey are presented in Appendix D.

The survey performed for this research was structured to obtain responses from a geographically diverse sample of Missouri motorists. Rather than preselecting a representative sample of motorists, which would have involved a substantial cost, motorists were invited through MoDOT's website and through media announcements to participate in the survey. Thus, the demographics of the survey respondents do not necessarily represent a statistical sample of the demographics of all Missouri drivers. Nevertheless, the survey results provide a strong indication that the motoring public is receptive to the SRI program. Furthermore, the survey results are consistent with comments received by MoDOT and newspaper editorials showing strong support for the SRI program.

4.1 Distribution of Survey and Response Rate

MoDOT posted a link to the electronic survey on the front page of their website; the link was available from the beginning of December 2007 through the first full week of January 2008. MoDOT also included information about the project with a link to the survey in their ExpressLane newsletter, which is emailed to subscribers around the state. MRI issued a press release in mid-December describing the project and providing the web address of the survey, and several newspapers, including the Southeast Missourian (Cape Girardeau) and the Springfield Newsleader, ran the release or a similar story.

A total of 356 surveys were completed by motorists. Approximately half of the survey respondents completed the survey through the link posted on MoDOT's website. Eighteen percent of respondents were made aware of the survey through the newspaper; four percent indicated that they were led to the survey by a family member or friend. The remainder indicated that they found out about the survey by "other" means.

4.2 Driver Characteristics

Nearly all (347) of the 356 respondents were Missouri residents; however, eight survey respondents were residents of Illinois, Kansas, or Nebraska, and one survey respondent entered an erroneous zip code. Figure 1 illustrates the number of responses that were received from residents in each of MoDOT's ten districts. Each of the ten districts was represented in the distribution of responses, and, in general, the districts with more SRI mileage generated more responses.

Survey respondents were asked, but not required, to provide information on their age and gender. Table 17 presents the age distribution of survey respondents and shows that all age groups were represented, but that the majority of respondents were between the ages of 26 and 75. Sixty-five percent of the respondents were male, and 35 percent were female.

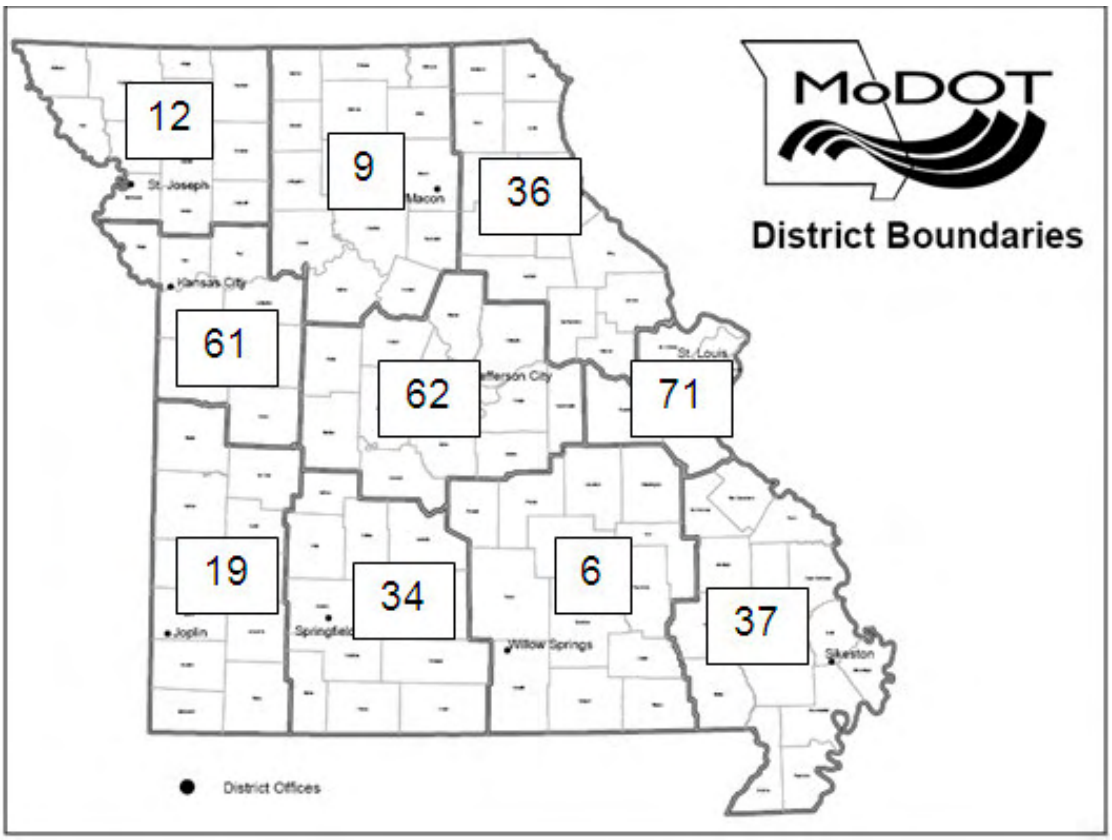

Figure 1. Location of survey respondents by MoDOT district

Table 17. Age Distribution of Survey Respondents

Age range	*Percent of responses*	*Number of responses*
16-20	1.4	5
21-25	4.8	17
26-35	14.9	53
36-45	21.1	75
46-55	27.2	97
56-65	18.5	66
66-75	11.0	39
> 75	1.1	4
	Total	**356**

4.3 Trip Characteristics

Survey respondents were provided a list of SRI routes and asked which of the routes they drive on at least twice a week. As expected, the interstate routes generally had the highest representation, followed by US routes and State routes. Approximately 8 percent of respondents indicated that they do not drive on any of the SRI routes as frequently as twice a week.

Survey respondents were asked how many trips they make, in an average week, during hours of *daylight* when driving the routes identified from Table 18. Table 19 summarizes the responses. Approximately half of the respondents make no more than five trips per week during daylight hours.

Survey respondents were asked how many trips they make, in an average week, during hours of *darkness* when driving the routes identified from Table 18. Table 20 summarizes the responses. Nearly 25 percent of respondents make more than five trips per week during hours of darkness.

Survey respondents were asked to identify the type of vehicle they normally drive when driving the routes identified from Table 18. Table 21 summarizes the responses. Nearly all respondents indicated that they drive a passenger vehicle; none of the respondents identified a motorcycle as the vehicle type they use.

Survey respondents were asked about their general impression of the new lane markings, new shoulder or centerline rumble strips, and new emergency reference mile markers. Table 22 summarizes the results. At least half of the respondents found the lane markings to be more visible (both during the day and at night); one third found them to be more visible in wet weather. Nearly half of the respondents indicated they had noticed the new reference mile marker signs and the majority of respondents noticed the shoulder or centerline rumble stripes. Only 13 percent of respondents had *not* noticed any improvements.

While there appears to be variation in the degree to which drivers have noticed SRI improvements, drivers generally believe the improvements provide better guidance for them to stay in their lane.

Table 18. SRI Routes Driven at Least Twice per Week by Survey Respondents

SRI route	Percent of responses	Number of responses
Interstate Route 29 (Kansas City to St. Joseph)	6.7	24
Interstate Route 35 (Kansas City to Bethany)	7.6	27
Interstate Route 44	18.0	64
Interstate Route 55	14.6	52
Interstate Route 57	1.1	4
Interstate Route 64	10.1	36
Interstate Route 70	25.8	92
Interstate Route 170	8.1	29
Interstate Route 270	15.2	54
Interstate Route 435	9.6	34
Interstate Route 470	9.0	32
US Route 24 (in KC Metro)	3.1	11
US Route 50 (Kansas City through Warrensburg)	8.4	30
US Route 50 (near Jefferson City)	13.2	47
US Route 54 (Jefferson City to Camdenton)	12.4	44
US Route 60 (Aurora to Mansfield)	3.7	13
US Route 61 (St. Louis to Pike County Line)	6.7	24
US Route 61 (Jackson to Cape Girardeau)	6.5	23
US Route 63 (Columbia to Jefferson City)	9.3	33
US Route 65 (Springfield to Arkansas border)	7.0	25
US Route 67 (St. Louis to Farmington)	4.5	16
US Route 69 (KC to Excelsior Springs)	0.8	3
US Route 71 (Kansas City to Butler)	7.9	28
US Route 71 (Nevada to Neosho)	4.5	16
US Route 160 (In Springfield)	6.2	22
MO Route 1 (in Clay County)	1.1	4
MO Route 7 (Between I-70 and US 50)	2.5	9
MO Route 13 (Collins to Springfield)	4.2	15
MO Route 100 (St. Louis to Wildwood)	4.8	17
MO Route 141	7.9	28
MO Route 152	3.4	12
MO Route 169 (Kansas City to Smithville)	3.4	12
MO Route 180 (outside St. Louis City Limits)	0.8	3
MO Route 210 (in Clay County)	2.8	10
MO Route 291 (in Jackson County)	7.9	28
MO Route 340	1.7	6
MO Route 366	0.6	2
MO Route 370	3.9	14
Business Route 44 (in Springfield)	6.7	24
None	8.4	30
	Total	**356**

Table 19. Number of Trips on SRI Routes by Survey Respondents During Daylight Hours

Number of trips	Percent of responses	Number of responses
0 to 5	48.0	171
6 to 10	30.3	108
11 to 20	15.7	56
More than 20	5.9	21
	Total	**356**

Table 20. Number of Trips on SRI Routes by Survey Respondents During Hours of Darkness

Number of trips	Percent of responses	Number of responses
0 to 2	41.0	146
3 to 5	34.8	124
6 to 10	19.1	68
More than 10	5.1	18
	Total	**356**

Table 21. Type of Vehicle Used by Survey Respondents When Driving on SRI Routes

Vehicle type	Percent of responses	Number of responses
Passenger vehicle (car, pick-up, SUV)	97.1	340
Motorcycle	0.0	0
Commercial vehicle/heavy truck	2.9	10
	Total	**350**

NOTE: *Six respondents did not answer this question.*

Table 22. SRI Improvement Types Noticed by Drivers

SRI improvement type	Percent of responses	Number of responses
Lane markings are more visible during the day.	49.7	173
Lane markings are more visible at night.	54.3	189
Lane markings are more visible in wet weather.	33.0	115
Wider and brighter lane markings.	42.8	149
New emergency reference mile marker signs.	45.1	157
Shoulder or centerline rumble strips.	72.4	252
Improvements provide better guidance for drivers to stay in their lane.	31.3	109
I have not noticed any improvements.	13.2	46

NOTE: *Eight respondents did not answer this question.*

4.4 Results of the Assessment of Public Perception and Satisfaction

This section summarizes the survey results concerning striping and delineation improvements.

Edgeline and Lane Line Markings

In the survey, respondents were shown three photos to illustrate the edgeline and lane line marking improvements on SRI routes. Respondents were then asked to what extent they found these improvements to be helpful in making the path of the roadway ahead more visible. Table 23 summarizes the results. While several of the respondents (13 percent) indicated they have not noticed the new markings, nearly all of the respondents who noticed the new markings indicated they found them to be helpful.

Nearly half of the respondents indicated that they found the new markings to be most helpful during hours of darkness (see Table 24). When asked under which pavement condition they found the improvements to be most helpful (see Table 25), the responses were fairly well distributed between the three possible answers (dry, wet, both the same).

Respondents were asked whether the new markings are perceived to increase their personal level of safety when they drive (see Table 26). The majority of respondents indicated that they believe the markings do increase, either slightly or greatly, their personal level of safety. A small percentage (12 percent) said the markings had no effect on their personal level of safety.

Table 23. Extent to Which New Edgelines and Lane Lines Have Been Helpful at Making Roadway Path Ahead More Visible

Answer	Percent of responses	Number of responses
I have found these improvements to be very helpful.	53.0	187
I have found these improvements to be slightly helpful.	29.7	105
I have not found these improvements to be helpful at all.	4.5	16
I have not noticed these improvements on the roads I drive.	12.7	45
	Total	**353**

NOTE: *Three respondents did not answer this question.*

Table 24. Time of Day When New Edgelines and Lane Lines are Most Helpful

Time of day	Percent of responses	Number of responses
Hours of daylight	15.2	46
Hours of darkness	48.2	146
Both the same	36.6	111
	Total	**303**

NOTE: *Fifty-three respondents did not answer this question.*

Table 25. Pavement Condition for Which New Edgelines and Lane Lines are Most Helpful

Pavement condition	Percent of responses	Number of responses
Dry pavement	27.2	82
Wet pavement	37.1	112
Both the same	35.8	108
	Total	**302**

NOTE: *Fifty-four respondents did not answer this question.*

Table 26. Extent to Which New Edgelines and Lane Lines are Perceived by Drivers to Increase Their Personal Level of Safety

Answer	Percent of responses	Number of responses
Greatly increase my personal level of safety when I drive.	43.8	133
Slightly increase my personal level of safety when I drive.	44.4	135
Have no effect on my personal level of safety when I drive.	11.8	36
	Total	**304**

NOTE: *Fifty-two respondents did not answer this question.*

Shoulder or Centerline Rumble Strips

In the survey, respondents were shown two photos to illustrate the edgeline/shoulder and centerline rumble strip improvements on SRI routes. Respondents were then asked to what extent they found these improvements to be helpful in preventing them from accidentally traveling outside of their lane. Table 27 summarizes the results. Over 90 percent of respondents noticed the rumble strips on the routes they travel, and a majority of these found them to be helpful at preventing them from accidentally traveling outside of their lane.

Table 27. Extent to Which New Rumble Strips Have Been Helpful in Preventing Accidental Travel Outside of Lane

Answer	Percent of responses	Number of responses
I have found this improvement to be very helpful.	56.0	197
I have found this improvement to be slightly helpful.	25.0	88
I have not found this improvement to be helpful at all.	9.4	33
I have not noticed this improvement on the roads I drive.	9.7	34
	Total	**352**

NOTE: *Four respondents did not answer this question.*

Respondents were asked to what extent they found the rumble strips to be helpful in making the path of the roadway ahead more visible. Table 28 summarizes the results. While the majority of respondents indicated that the rumble strips were helpful in making the roadway path more visible, it appears that rumble strips may be slightly less helpful for this purpose than for preventing accidental travel outside of the lane. Approximately 23 percent of respondents indicated that rumble strips were *not* helpful at making the roadway path more visible.

While many survey respondents found rumble strips to be more helpful during hours of darkness than during daylight hours, the majority of survey respondents (64 percent) indicated that rumble strips were equally helpful during both time periods (see Table 29). When asked on which pavement condition they found rumble strips to be most helpful, the majority of respondents (69 percent) indicated that rumble strips were equally helpful under dry or wet pavement conditions (see Table 30). Even though respondents indicated that rumble strips were more helpful at keeping them in their lane than at making the road more visible, they still found them to be more beneficial in hours of darkness than in daylight. These may suggest that drivers are more likely to need help staying in their lane during hours of darkness because of fatigue, rather than because of poor lane visibility.

Respondents were asked to indicate the degree to which the rumble strips are perceived to increase their personal level of safety when they drive (see Table 31). The majority of respondents indicated that the rumble strips do increase, either slightly or greatly, their personal level of safety. A small percentage (9 percent) said the rumble strips have no effect on their personal level of safety.

Table 28. Extent to Which New Rumble Stripes Have Been Helpful in Making Roadway Path Ahead More Visible

Answer	Percent of responses	Number of responses
I have found this improvement to be very helpful.	38.2	120
I have found this improvement to be slightly helpful.	39.2	123
I have not found this improvement to be helpful at all.	22.6	71
	Total	**314**

NOTE: *Forty-two respondents did not answer this question.*

Table 29. Time of Day When New Rumble Strips are Most Helpful

Time of Day	Percent of responses	Number of responses
Hours of daylight	7.5	23
Hours of darkness	28.5	87
Both the same	63.9	195
	Total	**305**

NOTE: *Fifty-one respondents did not answer this question.*

Table 30. Pavement Condition for Which New Rumble Strips are Most Helpful

Pavement condition	Percent of responses	Number of responses
Dry pavement	11.9	36
Wet pavement	19.5	59
Both the same	68.6	208
	Total	**303**

NOTE: *Fifty-three respondents did not answer this question.*

Table 31. Extent to Which New Rumble Strips Are Perceived by Drivers to Increase Their Personal Level of Safety

Answer	Percent of responses	Number of responses
Greatly increases my personal level of safety when I drive.	53.8	170
Slightly increases my personal level of safety when I drive.	30.7	97
Has no affect on my personal level of safety when I drive.	8.9	28
Decreases my personal level of safety when I drive.	6.6	21
	Total	**316**

NOTE: *Forty respondents did not answer this question.*

Reflectors

In the survey, respondents were shown two photos to illustrate the new reflectors that have been installed on many of the SRI routes. Respondents were then asked to what extent they found these improvements to be helpful in making the path of the roadway ahead more visible. Table 32 summarizes the results. While 22 percent of the respondents indicated they had not noticed the new reflectors, the majority of those that *had* noticed them indicated they found them to be helpful at making the roadway path more visible.

Not surprisingly, the majority of respondents found the new reflectors to be most helpful during hours of darkness (see Table 33); however, 18 percent found them to be equally helpful in the daylight. When asked under which pavement condition they found the reflectors to be most helpful (see Table 34), the majority of respondents (66 percent) indicated that the reflectors were equally helpful under dry or wet pavement conditions; 30 percent found them to be more helpful in wet pavement conditions.

Respondents were asked to indicate the degree to which the reflectors are perceived to increase their personal level of safety when they drive (see Table 35). The majority of respondents indicated that the reflectors do increase, either slightly or greatly, their personal level of safety. A small percentage (10 percent) said the reflectors have no effect on their personal level of safety.

Table 32. Extent to Which New Reflectors Have Been Helpful in Making Roadway Path Ahead More Visible

Answer	Percent of responses	Number of responses
I have found these improvements to be very helpful.	47.4	165
I have found these improvements to be slightly helpful.	25.0	87
I have not found these improvements to be helpful at all.	5.5	19
I have not noticed these improvements on the roads I drive.	22.1	77
	Total	**348**

NOTE: *Eight respondents did not answer this question.*

Table 33. Time of Day When New Reflectors are Most Helpful

Time of day	Percent of responses	Number of responses
Hours of daylight	1.5	4
Hours of darkness	80.6	216
Both the same	17.9	48
	Total	**268**

NOTE: *Eighty-eight respondents did not answer this question.*

Table 34. Pavement Condition for Which New Reflectors are Most Helpful

Pavement condition	Percent of responses	Number of responses
Dry pavement	4.5	12
Wet pavement	29.6	79
Both the same	65.9	176
	Total	**267**

NOTE: *Eighty-nine respondents did not answer this question.*

Table 35. Extent to Which New Reflectors are Perceived by Drivers to Increase Their Personal Level of Safety

Answer	Percent of responses	Number of responses
Greatly increase my personal level of safety when I drive.	53.5	145
Slightly increase my personal level of safety when I drive.	36.9	100
Have no affect on my personal level of safety when I drive.	9.6	26
	Total	**271**

NOTE: *Eighty-five respondents did not answer this question.*

Emergency Reference Mile Markers

In the survey, respondents were shown a photo to illustrate the new emergency reference mile markers that have been installed on SRI Interstate routes. Respondents were then asked to what extent they found these improvements to be helpful in providing guidance and making the path of the roadway ahead more visible. Table 36 summarizes the results. Over 90 percent of respondents have noticed these improvements, and approximately two-thirds of respondents have found them to be helpful. One-fourth of respondents have not found them to be helpful

The majority of respondents indicated that the new emergency reference mile markers are equally helpful during day or night (see Table 37) and on dry or wet pavement conditions (see Table 38). The majority of respondents (72 percent) also indicated that the emergency reference mile markers would help them report their location to emergency personnel if their car broke down along the roadway (see Table 39). Only 6 percent of respondents indicated that they might not be helpful.

Respondents were asked to indicate the degree to which the emergency reference mile markers are perceived to increase their personal level of safety when they drive (see Table 40). The majority of respondents indicated that the markers do increase, either slightly or greatly, their personal level of safety. Approximately one-fourth of respondents indicated the markers had no effect on their personal level of safety.

Table 36. Extent to Which New Emergency Reference Mile Markers Have Been Helpful in Providing Guidance and Making Roadway Path More Visible

Answer	Percent of responses	Number of responses
I have found these improvements to be very helpful.	30.6	107
I have found these improvements to be slightly helpful.	36.0	126
I have not found these improvements to be helpful at all.	24.9	87
I have not noticed these improvements on the roads I drive.	8.6	30
	Total	**350**

NOTE: *Six respondents did not answer this question.*

Table 37. Time of Day When New Emergency Reference Mile Markers are Most Helpful

Time of Day	Percent of responses	Number of responses
Hours of daylight	7.4	22
Hours of darkness	5.1	15
Both the same	87.5	260
	Total	**297**

NOTE: *Fifty-nine respondents did not answer this question.*

Table 38. Pavement Conditions for Which New Emergency Reference Mile Markers are Most Helpful

Pavement condition	Percent of responses	Number of responses
Dry pavement	3.7	11
Wet pavement	2.0	6
Both the same	94.2	277
	Total	**294**

NOTE: *Sixty-two respondents did not answer this question.*

Table 39. Extent to Which New Emergency Reference Mile Markers May be Helpful When Driver's Car Breaks Down

Answer	Percent of responses	Number of responses
Very helpful	71.9	228
Slightly helpful	22.4	71
Not helpful	2.8	9
I don't know	2.8	9
	Total	**317**

NOTE: *Thirty-nine respondents did not answer this question.*

Table 40. Extent to Which New Emergency Reference Mile Markers are Perceived by Drivers to Increase Their Personal Level of Safety

Answer	Percent of responses	Number of responses
Greatly increase my personal level of safety when I drive.	39.6	125
Slightly increase my personal level of safety when I drive.	36.4	115
Have no effect on my personal level of safety when I drive.	24.1	76
	Total	**316**

NOTE: *Forty respondents did not answer this question.*

General Assessment

At the end of the survey, respondents were asked to provide their general assessment of the new pavement markings, rumble strips, and reflectors. The majority of respondents (91 percent) indicated that the SRI improvements were either slightly or very helpful at providing guidance and making driving easier on Missouri highways (see Table 41). The majority of respondents (90 percent) also indicated that the SRI improvements either slightly or greatly increase safety on Missouri highways (see Table 42). Seventy-nine percent of respondents believe the SRI improvements have been a good use of taxpayer dollars (see Table 43), and 80 percent of respondents would like MoDOT to use the treatments more widely on Missouri highways in the future (see Table 44).

Table 41. Overall Assessment of How Well SRI Improvements Provide Guidance and Make Driving Easier

Answer	Percent of responses	Number of responses
I have found these improvements to be very helpful.	56.2	200
I have found these improvements to be slightly helpful.	35.1	125
I have not found these improvements to be helpful at all.	3.4	12
I have not noticed these improvements on the roads I drive.	5.3	19
	Total	**356**

Table 42. Overall Assessment of Contribution of SRI Improvements to Safety

Answer	Percent of responses	Number of responses
I have found these improvements to greatly increase safety.	56.5	201
I have found these improvements to slightly increase safety.	33.1	118
I have not found these improvements to increase or decrease safety.	6.2	22
I have found these improvements to decrease safety.	4.2	15
	Total	**356**

Table 43. Assessment of Whether SRI Improvements Have Been a Good Investment

Answer	Percent of responses	Number of responses
Yes, they have been a good investment.	78.7	280
No, they have not been a good investment.	10.7	38
I don't know.	10.7	38
	Total	**356**

Table 44. Assessment of Whether MoDOT Should Use SRI Improvements More Widely

Answer	Percent of responses	Number of responses
Yes	80.1	285
No	10.7	38
I don't know	9.3	33
	Total	**356**

Summary of Survey Results

For each of the SRI improvements, the survey asked respondents a set of questions addressing the following issues:

- the extent to which the improvement made the path of the roadway ahead more visible
- the time of day when the improvement was most helpful
- the pavement condition for which the improvement was most helpful
- to what degree the improvement increased the driver's overall perceived level of safety

Table 45 compares the answers to these common questions between the four SRI improvement types (edgeline and lane line markings, rumble strips, reflectors, and emergency reference mile markers).

The following conclusions can be drawn from the survey results:

- More than half of the survey respondents make at least six trips per week on SRI routes; 52 percent make at least six trips per week during daylight hours and 59 percent make at least six trips during hours of darkness.
- Nearly 87 percent of respondents have noticed the new SRI improvements. The improvements most noticed by respondents are the rumble strips, followed by the improved visibility of lane markings. By contrast, of the various improvement types, the new roadside delineators have been noticed the least by respondents.
- Of the various improvement types, the new edgeline and lane line markings and the new reflectors have been most helpful at making the roadway path more visible on Missouri roadways. Fifty-three percent of survey respondents found the edgeline and lane line improvements to be very helpful and 47 percent of respondents found the reflectors to be very helpful.
- The shoulder and center line rumble strips have been helpful in preventing Missouri drivers from leaving their lane unintentionally (56 percent of respondents) than at making the roadway path ahead more visible (38 percent of respondents).
- With the exception of emergency reference mile markers, all SRI improvements have been more helpful to drivers at night than during the day, particularly the reflectors.
- SRI improvements generally have been as helpful during wet or dry pavement conditions, with the exception of reflectors which have been considerably more helpful during wet pavement conditions.

Table 45. Comparison of Survey Responses Between Improvement Types

	Percent of respondents			
	Edgeline and lane line improvements	Rumble strips	Reflectors	Emergency reference mile markers
Extent to Which Improvements Have Made the Roadway More Visible				
I have found these improvements to be very helpful.	53.0	38.2	47.4	30.6
I have found these improvements to be slightly helpful.	29.7	39.2	25.0	36.0
I have not found these improvements to be helpful at all.	4.5	28.6	5.5	24.9
I have not noticed these improvements on the roads I drive.	12.7	--	22.1	8.6
Time of Day When Improvements are Most Helpful				
Hours of daylight	15.2	7.5	1.5	7.4
Hours of darkness	48.2	28.5	80.6	5.1
Both the same	36.6	63.9	17.9	87.5
Pavement Condition for Which Improvements are Most Helpful				
Dry pavement	27.2	11.9	4.5	3.7
Wet pavement	37.1	19.5	29.6	2.0
Both the same	35.8	68.6	65.9	94.2
Extent to Which Improvements are Perceived by Drivers to Increase Their Personal Level of Safety				
Greatly increase my personal level of safety when I drive.	43.8	53.8	53.5	39.6
Slightly increase my personal level of safety when I drive.	44.4	30.7	36.9	36.4
Have no effect on my personal level of safety when I drive.	11.8	8.9	9.6	24.1
Decreases my personal level of safety when I drive.	n/a	6.6	n/a	n/a

- The majority of respondents (72 percent) believe that the new reference mile markers may be very helpful if a driver's vehicle were to break down.
- More than half of respondents (57 percent) believe the improvements increase the general level of safety on Missouri roadways.
- A substantial majority of respondents (79 percent) believe the improvements have been a good investment of taxpayer dollars.
- A substantial majority of respondents (80 percent) would like to see the improvements implemented more widely in the future.

Section 5.
Conclusions and Recommendations

This section of the report presents the conclusions and recommendations of the research.

5.1 Conclusions

The conclusions of the research are as follows:

1. MoDOT implemented an extensive program of striping and delineation improvements, often in conjunction with pavement resurfacing, in 2005 and 2006, known as the Smooth Roads Initiative (SRI). The SRI program included 2,354.3 mi of striping and delineation improvements at sites with sufficient data for evaluation, including 2,105.6 mi on divided highways and 248.7 mi on undivided highways.
2. The striping and delineation program resulted in an overall reduction of 8 percent in fatal-and-disabling-injury crashes and 6 percent in fatal-and-all-injury crashes. Over a period of 5 years from 2007 through 2011, the striping and delineation program is expected to reduce approximately 50 fatal crashes; 300 disabling-injury crashes; 1,100 minor-injury crashes; and 3,800 property-damage-only crashes. The best available estimate is that the overall striping and delineation program is expected to provide $374,000,000 in benefits over the 5-year period at a cost of $68,000,000, for an overall benefit-cost ratio of 5.5. This finding indicates that the program provides $5.50 in crash reduction benefits for each dollar invested in striping and delineation improvements.
3. Statistically significant estimates of the crash reduction effectiveness of the striping and delineation program, obtained using the Empirical Bayes (EB) method for before/after safety evaluations, were obtained for 11 of the 24 specific combinations of roadway type and project type evaluated. The 11 roadway type/project type combinations experienced reductions in injury crashes ranging from 11 to 86 percent (see Table 14), with an overall benefit-cost ratio of 9.7. This finding indicates that these projects provide $9.70 in crash reduction benefits for each dollar invested in striping and delineation improvements.
4. While all of the 11 roadway type/project type combinations that could be assessed had benefit-cost ratios substantially greater than 1.0, five specific project types stand out as being particularly cost-effective. These are:
   - Wider markings without resurfacing on urban freeways (benefit-cost ratio = 129)
   - Wider markings with resurfacing on rural multilane undivided highways (benefit-cost ratio = 91)

- Wider markings without resurfacing on rural freeways (benefit-cost ratio = 64)
- Wider markings and both centerline and edgeline rumble strips with resurfacing on rural two-lane highways (benefit-cost ratio = 59)
- Wider markings and shoulder rumble strips with resurfacing on urban multilane divided highways (benefit-cost ratio = 27)

5. The 13 roadway type/project type combinations for which no statistically significant evaluation results were obtained appear to have lower crash reduction effectiveness than the 11 roadway type/project type combinations for which statistically significant results were obtained. However, the safety effectiveness of these improvement types that were not statistically significant cannot be quantified with the available data.
6. The striping and delineation improvements appear to be particularly effective in reducing multiple-vehicle crashes on the improved roadways. By contrast, single-vehicle crashes appear to have increased, but this is likely to have resulted from a statewide trend of increases in lane-departure crashes, many of which involve a single vehicle and may be weather related, rather than from an effect of the striping and delineation improvements.
7. The striping and delineation improvements provided statistically significant reductions in daytime fatal-and-all-injury crashes for all roadway types, with crash reductions ranging from 12 to 34 percent.
8. The striping and delineation improvements provided statistically significant reductions in nighttime fatal-and-disabling-injury crashes, ranging from 25 to 77 percent, for rural freeways, rural multilane divided highways, and rural two-lane highways.
9. There were statistically significant reductions for both dry- and wet-pavement crashes on rural roadways. For urban roadways, there were mixed results with crash reductions for dry- and wet-pavement crashes observed for some roadway types and crash increases for others. For the most part, the evaluation results for nighttime wet-pavement crashes were not statistically significant, except that statistically significant crash reductions of 44 to 57 percent were found for nighttime wet-pavement crashes on rural multilane divided highways.
10. Missouri drivers were invited to participate in a survey regarding the new SRI improvements. Nearly 87 percent of survey respondents have noticed the new SRI improvements. The improvements most noticed by survey respondents are the rumble strips, followed by the improved visibility of the new lane markings.
11. Fifty-three percent of survey respondents found the edgeline and lane line improvements to be helpful. Fifty-six percent of survey respondents indicated that shoulder and centerline rumble strips were helpful in preventing drivers from leaving their lane unintentionally.
12. More than half of survey respondents (57 percent) believe the striping and delineation improvements increase the general level of safety on Missouri

roadways. A substantial majority of respondents (79 percent) believe the improvements have been a good investment of taxpayer dollars and 80 percent of respondents would like to see these improvements implemented more widely in the future.

5.2 Recommendations

The following recommendations have been developed from the research results:

1. MoDOT may proceed with future striping and delineation improvements with confidence that they make a substantial contribution to safety improvement and that they are well received by the motoring public.
2. Quantitative estimates of the crash reduction effectiveness of striping and delineation improvements have been obtained for about half of the situations (roadway type/project type combinations) in which they have been used in Missouri. In the remaining situations, no statistically significant evaluation results were obtained. MoDOT should consider continuing the evaluation effort to include more than 1 year of after-study period data. Additional years of crash data would make statistically significant results more likely.
3. Additional years of data for the after-study period should be obtained to investigate some of the anomalies observed in the study. Specifically, the reason for the observed increases in single-vehicle crashes should be further investigated to determine whether this is a 1-year phenomenon (possibly weather-related). Further investigations should be conducted for the limited situations (roadway type/project type combinations) for which crash increases were observed.
4. Additional years of data should also permit statistically significant findings to be developed for the effects of striping and delineation programs on some specific crash types, such as nighttime wet-pavement crashes, for which only limited results could be obtained with 1 year of after-period data.
5. MoDOT should consider evaluating the safety effectiveness of the Better Roads, Brighter Future program, which is making improvements similar to those in the SRI program, for an additional 3,300 mi of roadways in Missouri, once at least 2 years of data after project implementation are available.

Section 6. References

1. Hauer, E., *Observational Before-After Studies in Road Safety*, Pergamon Press, 1997.
2. Hauer, E., D. W. Harwood, F. M. Council, and M. S. Griffith, "Estimating Safety by the Empirical Bayes Method: A Tutorial," *Transportation Research Record 1784*, Transportation Research Board, 2002.
3. Federal Highway Administration, *SafetyAnalyst* web site, www.safetyanalyst.org.
4. SAS Institute, Inc., SAS statistical software package, Version 9.1.3.

Appendix A

Detailed Before/After Evaluation Results

This appendix includes tables presenting the detailed results of the before/after safety evaluation of striping and delineation improvements, expressed as percentage changes in crash frequency from before to after the SRI improvement projects. Negative changes in crash frequency represent crash reductions. Positive changes in crash frequency represent crash increases. Crash reductions that are statistically significant are shown in green. Crash increases that are statistically significant are shown in red. Percentage changes in crash frequency shown in black are not statistically significant and could have occurred due to chance variations alone. All assessments of statistical significance are at the 90-percent confidence level.

Tables A-1 through A-3 present the evaluation results by severity level for specific roadway and project types. The results at this level of detail are considered the primary results of the study, particularly for fatal-and-disabling injury crashes (Table A-1) and fatal-and-all-injury crashes (Table A-2). The results for total crashes (all crash severity levels combined) in Table A-3 are considered less reliable because they include property-damage-only crashes which are often not fully reported.

Table A-4 presents an overall summary of the before/after evaluation results by crash severity for all roadway and project types combined. The results in Table A-4 are useful as overall measures of the success of the striping and delineation program, but they may be less reliable than Tables A-1 through A-3 precisely because they represent average results combined across two factors—roadway type and project type—whose effects on safety have been shown to be important. Tables A-5 hrough A-7 present detailed evaluation results by roadway type (averaging across all project types) and Tables A-8 through A-10 present detailed evaluation results by project type (averaging across all roadway types).

Table A-1. Summary of Before/After Evaluation Results for Fatal-and-Disabling-Injury Crashes by Roadway and Project Type

Project type	Cable median barrier	No. of sites	Total length (mi)	Percentage change in crash frequency																			
							Lane departure						Pavement surface condition			Day				Night			
				All	MV	SV	All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
RURAL FREEWAYS																							
1	N	23	90.0	–4.1	–23.4	10.9	27.6	–26.9	49.2	8.7	84.4	–8.5	–6.2	–18.9	74.4	–9.7	–0.7	–40.0	3.9	14.8	–20.5	24.5	161.9
1	Y	24	164.4	**–21.1**	**–43.8**	–0.5	–1.0	–1.6	1.0	7.9	–2.9	2.2	–7.2	–34.3	**–63.9**	**–32.4**	–25.5	**–45.9**	–38.0	4.0	30.6	–9.7	–100.0
1	N+Y	47	254.4	–16.2	**–38.1**	2.7	7.2	–8.0	15.3	8.1	23.5	–0.7	–7.1	–29.9	–30.4	**–25.7**	–18.0	**–44.1**	–27.5	7.5	19.0	–0.1	–34.5
2	N	30	180.5	–2.6	–18.7	6.2	18.7	74.3	2.9	–11.2	19.8	20.3	1.0	–32.6	8.9	40.4	48.7	–30.1	71.1	**–67.0**	**–67.4**	–37.5	–100.0
2	Y	24	202.6	**–21.1**	**–42.0**	–4.0	9.5	–5.9	18.4	14.3	25.1	3.8	–22.8	10.7	**–55.6**	–16.8	–18.0	21.2	**–75.9**	–26.2	–29.7	–13.3	–22.9
2	N+Y	54	383.2	–15.0	**–35.0**	–0.3	12.6	16.8	12.8	4.7	23.3	9.3	–14.5	–1.1	–32.9	1.1	3.6	8.1	–23.0	**–41.5**	**–44.5**	–20.9	–49.3
3	N	22	187.5	**–37.7**	**–84.5**	–4.7	–27.2	**–57.1**	–16.8	–44.8	13.6	**–49.9**	–18.4	**–66.3**	**–80.3**	**–39.4**	–23.8	**–74.8**	–61.6	–33.6	–7.5	–49.2	–100.0
3	Y	2	14.1	–30.9	–10.5	–53.6	–26.1	–6.2	–40.0	–100.0	70.3	–53.6	14.8	–100.0	–100.0	–10.1	57.5	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0
3	N+Y	24	201.6	**–36.9**	**–73.4**	–10.1	–27.0	–46.8	–19.5	**–51.9**	16.9	**–50.1**	–14.8	**–71.9**	**–82.2**	**–34.8**	–13.3	**–79.6**	**–66.6**	**–39.5**	–16.3	–54.8	–100.0
2+3	N	52	368.1	**–20.5**	**–54.0**	0.7	–3.8	8.0	–6.8	–27.5	16.6	–14.2	–8.5	**–51.6**	–42.4	–0.7	12.8	**–55.8**	1.4	**–50.4**	**–40.6**	–43.7	–100.0
2+3	Y	26	216.7	**–21.7**	**–39.3**	–7.1	7.2	–5.5	14.8	5.8	25.9	–0.4	–20.7	0.9	**–58.7**	–16.1	–13.3	9.1	**–77.9**	–30.3	–33.5	–18.9	–26.9
2+3	N+Y	78	584.8	**–21.1**	**–46.1**	–3.1	1.9	0.2	4.0	–11.3	21.4	–7.0	–14.7	–22.5	**–49.8**	–9.0	–1.1	–18.6	–36.5	**–40.9**	**–37.2**	–31.0	**–69.2**
5	N	4	43.4	**–62.0**	**–74.6**	–44.8	–30.1	–29.7	–29.8	–38.7	–24.7	–33.1	**–51.9**	–100.0	–100.0	**–68.1**	**–59.7**	–100.0	–100.0	–46.9	–31.8	–100.0	–100.0
RURAL MULTILANE DIVIDED HIGHWAYS																							
1	N	41	136.8	–8.4	15.1	–24.2	–14.0	–35.6	–7.8	–27.2	13.0	–30.5	21.1	**–47.1**	–100.0	6.2	31.0	–25.8	–100.0	–36.1	2.8	–100.0	–100.0
2	N	43	319.1	–12.6	–14.6	–11.6	12.8	2.0	17.5	23.8	15.9	14.8	–13.1	–18.8	3.1	0.8	7.9	–5.7	–46.6	**–34.0**	**–47.7**	–43.4	91.8
3	N	8	31.1	–43.3	–100.0	–23.8	3.9	–100.0	26.3	–16.2	63.7	–41.4	–43.8	–35.5	–100.0	**–69.9**	–51.1	–100.0	–100.0	–8.8	–39.0	85.2	–100.0
2+3	N	51	350.3	–14.9	–19.8	–12.6	12.1	–4.4	18.2	20.6	20.2	10.7	–15.3	–20.4	–4.3	–4.7	3.8	–18.1	–51.1	**–31.7**	**–46.9**	–25.6	82.2
5	N	3	40.8	–10.6	43.1	–35.9	2.2	124.8	–21.6	–55.3	8.0	–1.0	26.2	–100.0	–100.0	–1.3	37.7	–100.0	–100.0	–23.4	17.6	–100.0	–100.0
RURAL MULTILANE UNDIVIDED HIGHWAYS																							
1	N	4	11.2	2.4	4.9	11.2	43.3	57.8	57.5	313.7	–100.0	104.1	–28.7	572.8	–100.0	–21.3	**–50.7**	467.5	–100.0	94.3	58.5	394.6	–100.0
RURAL TWO–LANE HIGHWAYS																							
1	N	7	11.8	–17.9	–52.1	120.7	113.7	–0.6	332.8	364.2	447.1	81.1	3.5	–100.0	–100.0	–2.9	16.7	–100.0	–100.0	–27.9	2.4	–100.0	–100.0
3	N	1	4.7	37.7	173.9	–100.0	24.9	64.4	46.1	–100.0	244.5	–6.9	–35.5	461.2	–100.0	197.4	65.2	751.7	.	–100.0	–100.0	–100.0	–100.0
4	N	3	21.6	**–85.9**	**–79.6**	–100.0	**–79.3**	–60.6	–100.0	–100.0	–100.0	–74.7	–100.0	–100.0	311.4	**–76.0**	–100.0	–100.0	502.7	–100.0	–100.0	–100.0	–100.0
URBAN FREEWAYS																							
1	N	50	210.5	1.6	–15.9	**46.5**	**42.2**	18.2	**81.0**	**81.6**	**89.7**	**34.8**	0.0	1.6	69.3	–3.5	–7.3	–21.3	139.3	25.1	26.4	43.7	–21.8
1	Y	8	12.6	5.1	–30.2	57.0	7.3	–100.0	93.4	226.8	9.8	8.1	17.2	–5.5	–100.0	**–66.8**	–55.6	–100.0	–100.0	130.9	159.4	157.7	–100.0
1	N+Y	58	223.1	1.7	**–16.3**	**47.1**	**40.8**	13.8	**82.5**	**88.3**	**84.9**	**33.8**	0.5	1.4	61.7	–5.5	–8.7	–24.4	131.4	29.7	31.9	48.6	–26.4
2	N	30	123.1	7.6	–21.4	**78.8**	**60.5**	14.1	**124.9**	**119.3**	**141.6**	42.9	10.4	1.3	2.4	–8.0	–14.0	12.2	4.5	**50.8**	**81.7**	–20.0	0.6
2	Y	7	13.5	–24.5	15.3	–54.6	37.5	164.7	–28.1	–100.0	61.6	32.3	–32.4	52.0	–100.0	–16.6	–47.8	160.3	–100.0	–33.2	–2.9	–100.0	–100.0
2	N+Y	37	136.6	5.8	–20.8	**69.5**	**60.3**	20.8	**114.9**	**102.0**	**139.4**	**43.0**	8.0	4.1	–3.8	–8.7	–16.0	19.5	–1.2	**46.1**	**77.3**	–24.9	–6.1
3	N	21	60.7	1.3	**–44.3**	**68.3**	20.7	–39.8	69.7	49.4	101.4	–5.7	2.2	–12.4	83.7	10.8	–4.5	7.2	201.9	–1.6	25.6	–42.7	–100.0
3	Y	2	7.4	89.1	102.3	124.8	177.7	278.6	173.3	357.4	69.5	275.2	167.4	–100.0	–100.0	49.9	109.9	–100.0	.	248.5	368.2	–100.0	–100.0
3	N+Y	23	68.1	11.1	–30.9	**75.3**	45.8	5.0	**85.4**	86.0	99.1	33.8	20.2	–22.3	79.0	15.2	7.2	–6.1	198.1	22.6	61.5	–47.8	–100.0
2+3	N	51	183.8	5.9	**–27.3**	**77.5**	**49.0**	0.2	**108.1**	**97.5**	**130.7**	29.4	8.1	–2.5	26.8	–3.0	–11.7	10.9	73.9	35.7	**65.6**	–26.7	–24.3
2+3	Y	9	20.9	26.4	55.7	13.9	105.8	216.6	59.7	71.0	61.1	144.6	54.6	–24.1	–100.0	13.8	20.2	18.0	–100.0	72.3	141.6	–100.0	–100.0
2+3	N+Y	60	204.7	7.4	**–23.8**	**73.7**	**56.5**	16.2	**107.0**	**98.4**	**127.8**	**40.5**	11.4	–3.7	20.1	–2.0	–9.9	12.1	66.2	**39.4**	**73.0**	–31.9	–29.0
5	N	2	5.9	–53.6	–9.8	–100.0	–29.9	92.2	–100.0	–100.0	–100.0	–13.0	–100.0	222.8	–100.0	–100.0	–100.0	–100.0	–100.0	63.3	–100.0	1521.7	.
URBAN MULTILANE DIVIDED HIGHWAYS																							
1	N	115	167.1	–1.9	–24.5	57.4	50.9	–10.9	**108.9**	**164.8**	58.9	52.9	22.8	**–64.5**	–100.0	–6.1	12.6	**–64.5**	–100.0	12.2	50.6	**–63.7**	–100.0
1	N	35	79.0	–2.8	–27.0	47.4	75.9	68.1	90.1	156.4	27.5	**105.0**	12.3	–18.6	–100.0	–21.9	–21.1	–12.9	–100.0	57.9	119.1	–31.7	–100.0
3	N	4	14.5	**–65.4**	7.6	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–50.6	–100.0	–100.0	–50.0	–33.7	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0
2+3	N	39	93.5	–9.8	–26.3	24.7	50.0	50.3	58.8	129.4	–0.7	83.1	5.5	–25.3	–100.0	–25.2	–22.4	–19.7	–100.0	41.6	97.5	–37.9	–100.0
5	N	2	0.9	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	.	–100.0	.	.	–100.0
URBAN MULTILANE UNDIVIDED HIGHWAY																							
1	N	100	160.2	–0.4	–14.7	**95.9**	9.1	1.4	59.3	–2.3	**264.7**	–7.1	5.1	–23.3	–43.6	–4.6	5.6	**–43.3**	–100.0	23.7	25.4	16.4	82.4
3	N	1	0.5	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	–100.0	.	–100.0	–100.0	–100.0	.	–100.0	–100.0	–100.0	.
URBAN TWO–LANE HIGHWAYS																							
1	N	26	35.5	–2.3	–11.8	95.3	–48.1	–100.0	133.5	48.2	564.4	**–72.3**	9.4	–50.7	–100.0	4.7	9.4	–33.2	–100.0	–6.0	30.5	–100.0	–100.0
4	N	2	3.2	21.8	100.1	–100.0	138.2	655.1	–100.0	–100.0	–100.0	248.3	–100.0	–100.0	2,962.3	–100.0	–100.0	.	–100.0	291.1	–100.0	–100.0	5,845.6

Project Code	Project Type
1	Wider markings with resurfacing.
2	Wider markings and edgeline rumble stripe with resurfacing.
3	Wider markings and shoulder rumble strip with resurfacing.
4	Wider markings and centerline and edgeline rumble strips with resurfacing.
5	Wider markings without resurfacing.

Numbers in **GREEN** represent a statistically significant decrease in crashes

Numbers in **RED** represent a statistically significant increase in crashes.

Numbers in **BLACK** are not statistically significant.

Table A-2. Summary of Before/After Evaluation Results for Fatal-and-All-Injury Crashes by Roadway and Project Type

Project type	Cable median barrier	No. of sites	Total length (mi)	Percentage change in crash frequency																			
							Lane departure						Pavement surface condition			Day				Night			
				All	MV	SV	All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
RURAL FREEWAYS																							
1	N	23	90.0	10.7	–6.9	27.1	20.6	–32.3	42.1	50.6	43.1	10.4	–13.5	69.9	95.2	13.8	–15.6	96.4	92.3	14.1	–2.4	14.9	100.3
1	Y	24	164.4	–19.9	–34.3	–8.7	–4.7	–22.9	4.5	–6.2	14.8	–15.1	–13.3	–25.9	–50.0	–23.2	–17.9	–26.9	–52.3	–15.1	–5.9	–23.8	–47.0
1	N+Y	47	254.4	–10.8	–26.6	2.2	2.8	–25.1	15.9	10.6	23.2	–7.7	–13.5	–0.3	–14.4	–11.9	–17.5	5.9	–18.1	–7.1	–4.3	–13.1	–9.6
2	N	30	180.5	–9.0	–12.7	–5.6	–2.9	9.4	–5.5	–25.8	20.2	–13.6	–16.1	4.6	27.7	14.7	6.3	30.5	47.5	–41.4	–46.0	–41.3	–7.3
2	Y	24	202.6	–18.2	–25.5	–11.2	8.8	–9.7	18.8	1.2	40.9	–5.0	–26.2	19.6	–18.5	–17.8	–28.7	33.2	–33.6	–15.3	–19.7	–11.1	6.5
2	N+Y	54	383.2	–15.1	–21.7	–9.2	5.0	–4.3	10.3	–8.8	34.0	–7.8	–22.6	15.6	–2.5	–7.7	–17.4	32.8	–4.8	–25.0	–30.0	–20.5	1.8
3	N	22	187.5	–39.3	–58.6	–25.2	–27.0	–46.1	–20.0	–56.6	19.6	–52.8	–22.9	–52.6	–87.6	–36.6	–25.4	–44.9	–75.9	–42.5	–17.0	–68.0	–100.0
3	Y	2	14.1	–26.1	–31.1	–25.2	–8.0	–13.2	–6.7	–42.6	55.8	–27.3	–25.6	–28.4	–39.1	–3.5	0.2	–11.3	–20.3	–100.0	–100.0	–100.0	–100.0
3	N+Y	24	201.6	–37.8	–54.3	–25.4	–24.6	–38.9	–18.9	–54.7	21.3	–48.5	–23.2	–47.5	–83.2	–31.7	–22.1	–36.5	–68.5	–47.7	–24.9	–71.7	–100.0
2+3	N	52	368.1	–24.2	–37.1	–15.2	–14.7	–18.5	–12.6	–40.5	19.7	–32.6	–19.4	–27.6	–38.6	–11.5	–9.3	–12.7	–17.3	–42.0	–33.3	–55.8	–66.6
2+3	Y	26	216.7	–18.7	–25.7	–12.1	7.8	–9.6	17.1	–1.8	40.5	–6.4	–26.3	15.9	–19.8	–16.6	–27.0	29.9	–32.1	–19.9	–23.9	–17.0	1.0
2+3	N+Y	78	584.8	–21.4	–31.0	–13.6	–2.9	–13.4	2.5	–21.5	30.5	–18.8	–22.9	–3.2	–29.9	–14.3	–18.8	12.0	–24.4	–31.4	–28.8	–35.8	–37.8
5	N	4	43.4	–9.0	–43.2	43.4	42.4	7.9	67.7	104.7	47.6	42.5	–25.3	46.6	30.6	–22.2	–31.6	–2.6	135.6	21.6	–6.4	195.8	–100.0
RURAL MULTILANE DIVIDED HIGHWAYS																							
1	N	41	136.8	0.7	22.6	–12.1	7.6	56.5	–3.8	–10.1	8.8	12.5	17.5	–36.6	28.9	3.2	19.5	–34.7	71.5	–1.8	20.6	–38.5	–20.9
2	N	43	319.1	–19.9	–16.1	–21.4	–7.0	–5.0	–6.4	–5.2	–1.5	–6.2	–22.2	–14.2	8.3	–10.9	–11.8	7.9	–19.3	–32.7	–39.6	–53.1	59.9
3	N	8	31.1	–29.4	–43.5	–27.6	–2.5	–47.1	5.3	13.6	–5.0	–2.6	–32.8	–47.6	33.5	–21.8	–11.5	–74.3	66.6	–48.1	–65.4	5.6	–100.0
2+3	N	51	350.3	–20.6	–17.7	–21.9	–6.7	–7.7	–5.4	–3.7	–1.7	–6.0	–22.9	–18.2	9.8	–11.7	–11.9	–2.9	–12.4	–34.0	–41.8	–45.1	52.1
5	N	3	40.8	–2.4	–13.3	–1.9	4.4	29.4	–4.9	–26.7	9.6	–6.3	–6.4	–18.7	–18.5	3.2	–15.2	–7.1	171.1	–26.1	–2.4	–55.8	–100.0
RURAL MULTILANE UNDIVIDED HIGHWAYS																							
1	N	4	11.2	–29.8	–30.5	–23.6	–37.1	–37.3	–31.0	–7.3	–100.0	–32.7	–33.8	3.0	30.6	–24.0	–27.2	12.5	–100.0	–42.6	–59.0	–16.5	196.9
RURAL TWO–LANE HIGHWAYS																							
1	N	7	11.8	4.3	–7.0	43.8	93.5	114.0	89.2	140.0	35.3	118.0	21.9	–73.2	–100.0	–12.4	4.8	–66.7	–100.0	45.6	88.9	–100.0	–100.0
3	N	1	4.7	12.6	–3.8	37.0	8.7	–43.1	62.6	–6.9	171.2	–32.5	–50.4	193.5	1517.8	58.4	6.3	204.3	.	–19.5	–100.0	145.0	1517.8
4	N	3	21.6	–53.1	–32.0	–81.8	–73.8	–47.7	–90.6	–84.0	–100.0	–66.0	–65.1	–58.7	69.4	–51.0	–56.2	–26.3	36.8	–75.9	–85.0	–100.0	147.5
URBAN FREEWAYS																							
1	N	50	210.5	3.0	11.0	–9.4	3.8	2.9	9.5	16.0	12.5	4.8	–0.9	15.6	29.4	6.4	4.0	10.3	32.7	–0.7	–10.1	25.0	23.7
1	Y	8	12.6	27.5	33.0	11.6	4.3	–21.4	20.9	42.5	7.9	0.2	49.1	–42.9	10.8	18.9	30.2	–37.4	172.8	34.2	74.5	–57.6	–100.0
1	N+Y	58	223.1	3.6	11.5	–8.8	3.8	2.2	9.9	16.9	11.9	4.7	0.3	13.8	28.8	6.7	4.5	8.7	36.2	0.4	–7.6	22.6	17.7
2	N	30	123.1	–15.0	–23.7	4.7	3.4	–23.7	35.4	24.0	57.0	–9.6	–21.4	11.7	–4.4	–10.9	–21.5	26.3	13.9	–20.2	–20.2	–16.5	–23.2
2	Y	7	13.5	–38.9	–37.1	–47.6	–21.1	12.1	–42.2	–73.5	–5.7	–29.0	–54.5	–34.6	46.5	–33.9	–54.3	5.5	82.4	–55.6	–60.3	–100.0	16.8
2	N+Y	37	136.6	–15.7	–24.2	2.5	2.7	–22.7	31.8	18.7	54.6	–10.2	–22.5	10.1	–1.9	–11.7	–22.6	25.5	16.2	–21.5	–21.7	–19.8	–20.7
3	N	21	60.7	–27.5	–37.9	–11.2	–23.0	–48.0	–5.5	6.0	–8.3	–26.1	–31.9	–3.3	–37.6	–30.7	–33.2	–19.1	–40.6	–17.1	–25.1	20.6	–33.9
3	Y	2	7.4	22.9	18.1	31.2	29.5	77.8	9.3	–20.7	41.4	35.6	29.6	–41.7	1261.4	–13.4	–10.5	–57.7	.	100.0	110.3	0.3	580.7
3	N+Y	23	68.1	–23.5	–34.3	–7.0	–16.9	–34.2	–3.6	3.6	–1.6	–19.6	–27.1	–6.9	–20.7	–29.3	–31.5	–23.0	–25.7	–7.5	–13.2	19.1	–14.2
2+3	N	51	183.8	–18.2	–27.0	0.4	–3.8	–29.4	22.8	19.1	35.8	–13.9	–24.1	7.9	–13.2	–15.9	–24.4	14.5	–2.7	–19.2	–21.4	–5.9	–25.8
2+3	Y	9	20.9	–9.5	–11.5	–12.2	4.6	44.4	–17.6	–51.8	17.4	2.0	–16.3	–39.3	200.4	–24.3	–35.0	–31.7	335.5	11.6	13.9	–56.3	122.9
2+3	N+Y	60	204.7	–17.8	–26.7	0.1	–2.9	–25.6	20.6	14.5	35.7	–12.7	–23.7	5.6	–6.8	–16.3	–24.9	12.2	3.8	–17.4	–19.1	–8.4	–19.5
5	N	2	5.9	–55.9	–47.9	–62.2	–48.7	–30.9	–55.0	–100.0	52.9	–67.3	–51.0	–48.3	–100.0	–73.6	–61.6	–100.0	–100.0	–4.7	–27.8	188.3	.
URBAN MULTILANE DIVIDED HIGHWAYS																							
1	N	115	167.1	14.4	27.9	–7.6	6.8	3.5	12.0	11.5	23.7	5.8	23.8	0.2	–38.4	23.2	30.6	10.0	–10.9	–2.6	11.2	–16.9	–69.8
1	N	35	79.0	–8.1	–11.0	–3.3	4.0	–6.8	9.3	10.5	13.1	2.6	–4.2	–12.4	–48.8	–23.1	–18.1	–38.1	–26.5	27.7	31.2	46.6	–77.4
3	N	4	14.5	–74.7	–82.2	–71.0	–70.6	–100.0	–61.7	39.4	–100.0	–32.0	–82.4	–60.2	–52.1	–73.1	–76.8	–100.0	–10.3	–79.4	–100.0	6.3	–100.0
2+3	N	39	93.5	–14.1	–16.0	–11.7	–4.9	–15.6	0.3	13.5	–8.9	–0.5	–11.4	–16.1	–48.0	–27.6	–23.7	–41.9	–22.0	17.6	19.8	42.8	–81.1
5	N	2	0.9	2.2	–100.0	53.3	42.9	–100.0	445.8	–100.0	647.3	–100.0	29.4	–100.0	–100.0	–100.0	–100.0	–100.0	.	327.7	.	.	–100.0
URBAN MULTILANE UNDIVIDED HIGHWAYS																							
1	N	100	160.2	–1.4	–5.3	24.2	–4.0	–12.1	13.5	14.5	15.9	–5.7	–1.7	–4.6	22.6	–1.8	1.2	–10.8	–47.7	–0.6	–10.1	8.5	173.3
3	N	1	0.5	43.5	103.0	–100.0	81.3	87.8	–100.0	–100.0	–100.0	83.9	72.5	–100.0	.	–27.9	73.9	–100.0	.	–100.0	–100.0	–100.0	.
URBAN TWO–LANE HIGHWAYS																							
1	N	26	35.5	9.0	1.8	47.0	0.9	–25.6	42.4	–1.1	184.3	–16.0	10.6	–3.8	–63.1	2.7	4.3	–24.0	–28.3	23.0	25.6	18.0	–100.0
4	N	2	3.2	61.4	22.0	100.4	36.5	8.9	32.6	232.5	–47.3	134.3	39.7	–100.0	298.8	34.6	34.8	.	–100.0	30.6	21.7	–100.0	485.4

Project Code	Project Type
1	Wider markings with resurfacing
2	Wider markings and edgeline rumble stripe with resurfacing
3	Wider markings and shoulder rumble strip with resurfacing
4	Wider markings and centerline and edgeline rumble strips with resurfacing
5	Wider markings without resurfacing

Numbers in **GREEN** represent a statistically significant decrease in crashes

Numbers in **RED** represent a statistically significant increase in crashes

Numbers in **BLACK** are not statistically significant.

Table A-3. Summary of Before/After Evaluation Results for Total Crashes (All Severity Levels Combined) by Roadway and Project Type

Project type	Cable median barrier	No. of sites	Total length (mi)	Percentage change in crash frequency																			
							Lane departure						Pavement surface condition			Day				Night			
				All	MV	SV	All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
RURAL FREEWAYS																							
1	N	23	90.0	17.3	9.7	30.3	32.6	20.0	41.7	15.4	65.0	15.2	–2.8	68.2	103.6	7.8	–15.6	80.7	93.3	52.8	44.6	57.9	122.1
1	Y	24	164.4	22.0	–10.0	48.6	45.2	–0.8	64.0	4.7	107.9	3.4	15.9	–1.0	111.0	14.6	14.0	–2.2	54.7	35.5	18.4	1.0	185.9
1	N+Y	47	254.4	20.5	–4.2	42.8	41.2	5.2	56.9	7.8	94.0	6.9	9.9	18.8	110.8	12.4	3.8	21.3	65.4	40.4	25.5	16.6	172.5
2	N	30	180.5	–3.9	–0.5	–3.4	2.9	30.7	–4.9	–8.5	–2.1	5.2	–24.1	25.6	97.2	6.2	–7.2	18.5	81.8	–17.2	–47.8	39.8	127.1
2	Y	24	202.6	5.6	–24.2	29.2	32.2	–10.5	50.8	–8.9	104.3	–9.7	–17.4	54.5	71.2	–3.1	–24.1	53.9	28.8	24.9	–2.8	55.6	140.6
2	N+Y	54	383.2	2.4	–17.4	18.0	22.5	0.7	31.4	–8.6	68.8	–4.8	–19.6	46.5	80.2	–0.4	–18.8	45.0	47.3	9.9	–19.8	50.9	136.2
3	N	22	187.5	–33.5	–30.7	–35.6	–31.6	6.7	–45.1	–51.5	–39.7	–28.4	–22.1	–41.6	–72.6	–27.5	–15.5	–38.5	–70.3	–44.5	–34.0	–47.5	–75.1
3	Y	2	14.1	39.3	–21.0	86.0	78.8	–8.5	119.7	–11.8	300.9	–3.1	4.8	97.1	–31.7	37.3	13.8	75.6	–55.7	20.5	–30.9	145.2	36.2
3	N+Y	24	201.6	–25.7	–29.3	–24.2	–18.8	4.7	–28.8	–46.7	–12.2	–24.9	–19.2	–18.2	–69.0	–19.3	–12.0	–14.8	–68.3	–39.2	–33.9	–26.4	–70.2
2+3	N	52	368.1	–18.4	–16.1	–19.0	–13.6	18.8	–24.1	–29.0	–20.3	–11.0	–23.3	–12.0	0.6	–10.6	–11.3	–13.7	2.3	–30.6	–41.8	–8.0	–1.2
2+3	Y	26	216.7	7.4	–23.9	31.9	34.8	–10.1	54.1	–9.0	111.0	–9.1	–16.4	58.9	64.6	–0.5	–22.0	57.3	22.5	24.5	–4.5	61.1	134.4
2+3	N+Y	78	584.8	–5.0	–20.6	6.8	11.8	1.5	15.6	–19.0	47.9	–10.1	–19.7	27.7	30.8	–5.4	–17.2	27.6	12.2	–3.6	–23.5	28.2	57.8
5	N	4	43.4	8.0	–43.4	77.7	67.7	–4.2	108.3	67.8	124.2	25.4	–30.2	101.6	261.4	2.4	–33.2	89.1	302.1	14.3	–28.0	133.3	210.2
RURAL MULTILANE DIVIDED HIGHWAYS																							
1	N	41	136.8	–10.7	–0.2	–17.4	–17.7	20.6	–27.8	–30.8	–26.8	–12.3	2.5	–39.5	10.2	–11.1	3.6	–37.4	–1.8	–8.8	3.8	–42.2	27.6
2	N	43	319.1	–10.4	–11.9	–7.6	–11.8	4.6	–17.1	–16.2	–21.1	–8.2	–15.7	–1.5	29.8	–10.7	–19.1	16.8	16.2	–6.8	–7.5	–32.4	55.4
3	N	8	31.1	–33.0	–28.7	–35.5	–29.7	–35.5	–29.3	–17.2	–47.0	–22.0	–30.0	–72.1	70.7	–36.4	–21.6	–83.1	0.0	–28.4	–41.1	–53.1	314.3
2+3	N	51	350.3	–12.2	–12.8	–10.4	–13.1	2.3	–18.1	–16.2	–23.3	–9.2	–16.7	–10.4	32.4	–12.6	–19.3	3.9	14.8	–8.7	–10.4	–34.7	66.0
5	N	3	40.8	–3.3	–22.4	3.0	–2.2	–0.2	–5.8	–23.4	2.2	–12.2	–16.1	8.1	11.5	–0.4	–28.0	23.2	107.9	–14.2	–7.7	–38.7	–41.0
RURAL MULTILANE UNDIVIDED HIGHWAYS																							
1	N	4	11.2	–24.1	–26.7	–9.3	–28.4	–37.5	11.8	15.7	11.4	–30.3	–25.7	–12.6	43.1	–20.5	–22.9	3.0	–1.9	–32.9	–35.4	–41.9	74.0
RURAL TWO–LANE HIGHWAYS																							
1	N	7	11.8	–3.5	–14.1	30.4	12.1	18.7	5.9	47.4	–58.5	30.0	–1.1	–19.6	–26.0	–12.1	–13.1	–4.6	–33.8	15.2	33.5	–67.1	–16.5
3	N	1	4.7	32.8	–9.5	88.9	45.2	–44.6	107.5	94.3	107.1	9.3	5.7	82.9	591.9	84.3	57.4	149.3	.	–14.0	–58.6	6.3	591.9
4	N	3	21.6	–48.3	–48.9	–47.8	–64.0	–54.4	–72.9	–81.5	–62.3	–65.0	–56.8	–38.4	4.8	–56.3	–62.1	–18.7	–25.9	–41.9	–46.1	–66.7	71.2
URBAN FREEWAYS																							
1	N	50	210.5	5.9	12.5	–11.1	5.5	5.3	4.9	1.9	5.0	4.9	4.1	10.6	34.5	8.2	7.6	9.9	23.7	1.6	–7.3	13.5	47.8
1	Y	8	12.6	30.4	18.5	49.1	23.5	–5.6	48.4	20.5	60.4	3.7	30.7	–14.7	182.2	27.9	33.2	–19.4	180.9	32.5	22.5	–7.4	180.7
1	N+Y	58	223.1	6.6	12.6	–8.8	6.2	5.0	7.2	2.6	9.3	4.9	4.9	9.8	40.3	8.7	8.2	9.0	27.8	2.7	–6.2	12.8	55.3
2	N	30	123.1	–14.3	–16.4	–9.8	–5.3	–16.8	8.9	2.1	10.7	–10.7	–18.6	–2.7	11.9	–15.0	–20.5	1.0	22.5	–11.6	–14.8	–13.4	–0.9
2	Y	7	13.5	26.0	–21.8	53.2	70.5	1.7	90.0	–31.0	199.4	–5.5	–13.8	89.7	80.6	25.2	–31.7	163.0	140.6	2.0	–1.5	–56.9	24.9
2	N+Y	37	136.6	–13.3	–16.6	–6.2	–2.6	–16.4	13.9	0.9	21.7	–10.4	–18.5	0.3	15.1	–14.0	–20.8	6.0	26.6	–10.9	–14.0	–15.0	1.1
3	N	21	60.7	–19.9	–23.1	–13.9	–15.8	–18.5	–13.8	–22.1	–9.2	–19.4	–27.8	–8.4	46.2	–20.1	–28.9	1.4	39.1	–18.0	–25.8	–25.3	51.6
3	Y	2	7.4	3.8	0.7	4.4	13.8	41.6	–9.1	–46.2	21.8	5.5	8.2	–23.2	393.4	–4.0	–6.1	–15.2	.	22.5	30.8	–46.0	229.0
3	N+Y	23	68.1	–18.2	–21.9	–11.9	–13.0	–13.6	–13.2	–24.4	–5.7	–17.2	–25.2	–9.7	50.5	–19.0	–27.4	–0.2	42.5	–14.5	–20.5	–26.8	57.6
2+3	N	51	183.8	–15.7	–18.1	–10.7	–8.1	–17.3	2.1	–4.9	4.8	–12.9	–20.9	–4.1	21.5	–16.3	–22.6	1.1	28.7	–13.2	–17.6	–16.5	10.5
2+3	Y	9	20.9	15.2	–11.4	29.2	40.4	20.2	39.3	–37.4	102.9	–0.2	–3.0	28.8	134.9	11.1	–19.5	61.4	237.4	11.8	13.9	–52.1	71.4
2+3	N+Y	60	204.7	–14.6	–18.0	–7.7	–5.4	–15.8	5.2	–6.8	12.9	–12.2	–20.2	–2.3	24.7	–15.3	–22.5	4.5	32.2	–11.8	–15.7	–18.2	13.2
5	N	2	5.9	–62.8	–61.8	–63.8	–49.2	–48.9	–50.1	–89.7	33.8	–68.9	–69.5	–19.4	–100.0	–67.6	–69.3	–49.8	–100.0	–47.3	–69.8	113.9	.
URBAN MULTILANE DIVIDED HIGHWAYS																							
1	N	115	167.1	14.8	21.9	–6.7	5.9	19.7	–11.0	–13.2	–15.0	9.9	18.6	–0.4	6.8	20.4	23.1	7.9	4.9	0.1	4.1	–21.1	4.7
1	N	35	79.0	2.9	5.5	–4.8	2.7	2.8	–0.8	–2.1	–7.4	3.5	6.0	–2.1	–20.1	–2.7	–1.1	–12.5	–12.9	17.0	21.7	14.3	–33.7
3	N	4	14.5	–48.6	–82.4	–35.0	–48.9	–86.7	–41.0	4.6	–72.9	–33.8	–57.7	–54.0	–32.1	–45.6	–58.7	–67.3	23.0	–63.1	–63.5	–40.9	–100.0
2+3	N	39	93.5	–0.6	1.7	–8.0	–2.4	–4.2	–5.3	–1.2	–17.9	0.5	1.5	–5.6	–20.1	–5.6	–5.0	–16.4	–4.6	10.2	14.1	9.9	–43.9
5	N	2	0.9	26.8	–68.4	108.7	83.5	–100.0	406.2	–100.0	746.4	–100.0	25.5	50.5	–100.0	–22.2	–37.2	50.5	.	254.8	.	.	–100.0
URBAN MULTILANE UNDIVIDED HIGHWAYS																							
1	N	100	160.2	–0.7	–1.9	9.5	1.7	2.9	–0.8	–4.1	7.6	1.3	–0.8	–5.5	48.3	–1.3	0.0	–9.3	28.6	0.8	–3.3	4.4	84.7
3	N	1	0.5	–25.4	–7.9	–100.0	–8.0	46.9	–100.0	–100.0	–100.0	13.2	–19.6	–100.0	.	–49.2	–26.3	–100.0	.	0.6	–7.7	–100.0	.
URBAN TWO–LANE HIGHWAYS																							
1	N	26	35.5	–5.3	–11.0	39.8	0.0	–23.6	65.6	64.5	36.2	–3.7	–4.4	–13.4	–5.1	–7.4	–5.0	–22.2	–13.2	0.1	–4.1	2.3	–9.8
4	N	2	3.2	51.1	46.4	51.0	36.1	–32.1	75.8	279.3	–33.0	77.1	23.7	203.1	114.0	34.3	39.5	.	–100.0	51.3	–4.3	203.1	248.9

Project Code	Project Type
1	Wider markings with resurfacing
2	Wider markings and edgeline rumble stripe with resurfacing
3	Wider markings and shoulder rumble strip with resurfacing
4	Wider markings and centerline and edgeline rumble strips with resurfacing
5	Wider markings without resurfacing

Numbers in **GREEN** represent a statistically significant decrease in crashes

Numbers in **RED** represent a statistically significant increase in crashes

Numbers in **BLACK** are not statistically significant.

Table A-4. Summary of Before/After Evaluation Results by Severity Level for All Roadway and Project Types Combined

No. of sites	Total length (mi)	All	MV	SV	Lane departure						Pavement surface condition			Day				Night			
					All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
FATAL-AND-DISABLING-INJURY CRASHES																					
645	2355.2	**–7.99**	**–32.8**	**45.12**	**38.85**	3.95	**74.51**	**61.51**	**94.86**	**23.78**	–4.22	**–19.5**	–2.05	**–11.73**	**–10.18**	**–25.19**	8.64	9.11	**18.18**	–8.93	–18.38
FATAL-AND-ALL-INJURY CRASHES																					
645	2355.2	**–5.78**	**–10.55**	**8.12**	**10.2**	**–7.45**	**28.41**	**19.58**	**43.98**	1.74	**–7.97**	0.57	10.15	**–5.11**	**–7.27**	–0.97	8.19	–4.56	**–7.92**	2.67	4.97
TOTAL CRASHES (ALL CRASH SEVERITY LEVEL COMBINED)																					
645	2355.2	–0.32	**–4.53**	**12.98**	**12.9**	–0.12	**29.94**	**9.12**	**53.99**	2.45	**–4.31**	**4.07**	**60.82**	–1.13	**–4.61**	**4.33**	**45.21**	**3.74**	**–3.53**	3.41	**76.3**

Numbers in **GREEN** represent a statistically significant decrease in crashes.
Numbers in **RED** represent a statistically significant increase in crashes.
Numbers in **BLACK** are not statistically significant.

Table A-5. Summary of Before/After Evaluation Results by Severity Level for Fatal-and-Disabling-Injury Crashes by Roadway Type

Roadway type	No. of sites	Total length (mi)	All	MV	SV	Lane departure						Pavement surface condition			Day				Night			
						All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
Rural freeways	129	882.494	**5.01**	**–16.35**	**22.53**	**25.38**	2.27	**34.61**	–6.83	**69.3**	–2.29	**–10**	**27.01**	**60.08**	1.57	**–10.81**	**27.97**	**33.54**	**12.54**	**–7.91**	**26.68**	**97.06**
Rural multilane divided highways	95	527.947	**–11.19**	**–9.98**	**–10.94**	**–13.45**	6.66	**–19.71**	**–20.48**	**–22.06**	**–10.18**	**–12.33**	**–20.7**	**26.67**	**–11.45**	**–14.31**	–12	18.54	**–9.1**	–7.13	**–37.91**	**37.94**
Rural multilane undivided highways	4	11.241	**–24.11**	**–26.72**	–9.32	**–28.44**	**–37.51**	11.84	15.67	11.43	**–30.27**	**–25.69**	–12.56	43.06	**–20.5**	**–22.88**	2.95	–1.89	**–32.86**	**–35.44**	–41.85	73.96
Rural two–lane highways	11	38.085	**–19.3**	**–27.25**	–2.33	**–21.87**	–24.44	–20.38	–15.08	–28.11	–20.12	**–25.4**	–7.52	20.67	**–23.83**	**–30.01**	11.69	–25.69	–14.24	–14.96	**–47.59**	95.74
Urban freeways	120	433.683	–1.57	1.26	**–8.76**	1.42	–2.82	**6.1**	–2.16	**11.51**	–2	**–4.87**	**5.4**	**33.3**	–0.55	**–3.54**	**6.93**	**29.28**	–2.97	**–10.21**	2.1	**36.25**
Urban multilane divided highways	156	261.448	**9.67**	**15.36**	–6.57	3.17	10.67	–6.88	–8.28	**–12.9**	5.78	**13.07**	–2.2	–5.22	**11.36**	**13.49**	–1.18	0.85	3.83	7.98	–10.26	–17.69
Urban multilane undivided highways	102	161.615	–0.28	–1.56	**10.06**	2.67	3.77	0.61	–5.04	14.74	1.74	–0.27	–5.82	**49.15**	–0.94	0.54	**–9.62**	27.46	1.12	–2.9	4.1	**89.62**
Urban two–lane highways	28	38.684	–3.09	**–9.34**	**41.6**	2.86	**–23.85**	**68.09**	**81.64**	11.37	0.37	–3.12	–10.31	5.7	–6.15	–3.55	**–22.49**	–19.66	4.62	–3.92	12.13	16.43
Rural and urban two–lane highways combined	39	76.769	**–7.61**	**–13.52**	**21.29**	–6.83	**–23.6**	20.34	**35.94**	–5.84	–6.72	**–9.43**	–9.73	15.04	**–10.66**	**–10.3**	–14.84	–17.83	–1.69	–7.35	–3.59	43.09

Numbers in **GREEN** represent a statistically significant decrease in crashes.
Numbers in **RED** represent a statistically significant increase in crashes.
Numbers in **BLACK** are not statistically significant.

Table A-6. Summary of Before/After Evaluation Results for Fatal-and-All-Injury Crashes by Roadway Type

Roadway type	No. of sites	Total length (mi)	All	MV	SV	Lane departure						Pavement surface condition			Day				Night			
						All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
Rural freeways	129	882.494	**–16.89**	**–30.33**	–5.77	1.21	**–16.46**	9.75	–6.52	**28.03**	**–11.84**	**–19.7**	0.04	**–24.27**	**–14**	**–19.12**	7.94	–19.84	**–20.6**	**–19.65**	–16.3	**–30.6**
Rural multilane divided highways	95	527.947	**–13.84**	–7.25	**–17.61**	–2.17	9.47	–5.05	–7.4	2.35	–1.56	**–12.44**	**–25.96**	11.24	–6.76	–4.63	–16.88	12.12	**–25.98**	**–26.16**	**–44.28**	8.32
Rural multilane undivided highways	4	11.241	**–29.8**	**–30.54**	–23.58	**–37.09**	–37.29	–31.02	–7.28	–100	–32.69	**–33.77**	2.96	30.55	**–23.99**	**–27.23**	12.46	–100	**–42.58**	**–59.04**	–16.52	196.86
Rural two–lane highways	11	38.085	**–24.48**	–18.44	–31.78	–21.61	–5.66	–25.82	–14.4	–28.6	–15.58	**–31.43**	–31.11	75.08	**–26.67**	–27.01	–22.47	1.86	–31.01	–39.21	–49.71	187.58
Urban freeways	120	433.683	**–4.7**	–2.99	–5.68	0.93	**–8.27**	**13.99**	**14.64**	**23.14**	–2.38	**–9**	**10.45**	12.71	–2.27	**–6.84**	9.06	21.52	–6.34	**–11.98**	11.87	0.69
Urban multilane divided highways	156	261.448	4.84	**13.78**	–8.59	2.68	–4.74	8.65	12.82	12.69	2.73	**12.32**	–5.98	**–42.95**	5.18	**11.92**	–10.36	–15.15	5.22	15.8	4.19	**–75.15**
Urban multilane undivided highways	102	161.615	–1.03	–4.72	**23.61**	–3.09	–10.91	13.84	12.71	20.98	–5.24	–0.75	–6.87	22.32	–1.56	2.07	–13.37	**–47.85**	–0.12	–9.23	7.58	**172.9**
Urban two–lane highways	28	38.684	11.51	2.62	55.63	5.61	–23.32	44.39	18.85	92.06	–7.47	12.15	–7.94	–30.69	3.94	5.73	–25.33	–33.68	24.5	26.35	7.2	–47.12
Rural and urban two–lane highways combined	39	76.769	–0.23	–3.35	16.5	–4.72	–14.01	12.81	10.88	27.83	–8.09	–2.05	–14.63	12.9	–5.71	–4.33	–25.13	–17.9	6.45	3.94	–4.61	16.89

Numbers in **GREEN** represent a statistically significant decrease in crashes.
Numbers in **RED** represent a statistically significant increase in crashes.
Numbers in **BLACK** are not statistically significant.

Table A-7. Summary of Before/After Evaluation Results for Total Crashes (All Crash Severity Levels Combined)

Roadway type	No. of sites	Total length (mi)	All	MV	SV	Lane departure						Pavement surface condition			Day				Night			
						All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
Rural freeways	129	882.494	**5.01**	**–16.35**	**22.53**	**25.38**	2.27	**34.61**	–6.83	**69.3**	–2.29	**–10**	**27.01**	**60.08**	1.57	**–10.81**	**27.97**	**33.54**	**12.54**	**–7.91**	**26.68**	**97.06**
Rural multilane divided highways	95	527.947	**–11.19**	**–9.98**	**–10.94**	**–13.45**	6.66	**–19.71**	**–20.48**	**–22.06**	**–10.18**	**–12.33**	**–20.7**	**26.67**	**–11.45**	**–14.31**	–12	18.54	**–9.1**	–7.13	**–37.91**	**37.94**
Rural multilane undivided highways	4	11.241	**–24.11**	**–26.72**	–9.32	**–28.44**	**–37.51**	11.84	15.67	11.43	**–30.27**	**–25.69**	–12.56	43.06	**–20.5**	**–22.88**	2.95	–1.89	**–32.86**	**–35.44**	–41.85	73.96
Rural two–lane highways	11	38.085	**–19.3**	**–27.25**	–2.33	**–21.87**	–24.44	–20.38	–15.08	–28.11	–20.12	**–25.4**	–7.52	20.67	**–23.83**	**–30.01**	11.69	–25.69	–14.24	–14.96	**–47.59**	95.74
Urban freeways	120	433.683	–1.57	1.26	**–8.76**	1.42	–2.82	**6.1**	–2.16	**11.51**	–2	**–4.87**	**5.4**	**33.3**	–0.55	**–3.54**	**6.93**	**29.28**	–2.97	**–10.21**	2.1	**36.25**
Urban multilane divided highways	156	261.448	**9.67**	**15.36**	–6.57	3.17	10.67	–6.88	–8.28	**–12.9**	5.78	**13.07**	–2.2	–5.22	**11.36**	**13.49**	–1.18	0.85	3.83	7.98	–10.26	–17.69
Urban multilane undivided highways	102	161.615	–0.28	–1.56	**10.06**	2.67	3.77	0.61	–5.04	14.74	1.74	–0.27	–5.82	**49.15**	–0.94	0.54	**–9.62**	27.46	1.12	–2.9	4.1	**89.62**
Urban two–lane highways	28	38.684	–3.09	**–9.34**	**41.6**	2.86	**–23.85**	**68.09**	**81.64**	11.37	0.37	–3.12	–10.31	5.7	–6.15	–3.55	**–22.49**	–19.66	4.62	–3.92	12.13	16.43

Numbers in **GREEN** represent a statistically significant decrease in crashes.
Numbers in **RED** represent a statistically significant increase in crashes.
Numbers in **BLACK** are not statistically significant.

Table A-8. Summary of Before/After Evaluation Results for Fatal-and-Disabling-Injury Crashes by SRI Project Type

SRI project type	Cable median barrier	No. of sites	Total length (mi)	All	MV	SV	Lane departure						Pavement surface condition			Day				Night			
							All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
1	N	366	823.238	–0.8	**–21.05**	**65.07**	**43.44**	4.17	**101**	**79.31**	**138.54**	**24.59**	3.02	–15.73	18.94	–5.42	–1.95	**–29.58**	30.52	**22.35**	**28.6**	10.61	0.31
1	Y	32	176.951	–18.93	**–43.87**	5.4	0.67	–13.22	9.16	23.19	0.02	3.16	–5.75	–31.52	**–64.54**	**–35.05**	**–29**	**–48.96**	–37.07	15.02	41.82	4.14	–100
1	N+Y	398	1000.189	–3.36	**–25.77**	**61.74**	**42.62**	2.8	**94.3**	**79.59**	**118.99**	**25.37**	0.89	–16.72	3.58	**–10.09**	–6.88	**–31.65**	22.14	**23.98**	**32.52**	12.24	–24.08
2	N	139	702.583	–2.04	**–27.26**	**34.85**	**44.82**	18.14	**65.62**	**68.02**	**70.52**	**38.94**	1.61	–17.55	5.23	–0.75	–0.19	–9.75	5.62	0.51	9.62	–33.65	4.55
2	Y	31	216.128	**–21.29**	**–38.38**	–6.91	10.93	4.45	16.17	8.12	26.55	5.48	**–23.35**	12.92	**–57.34**	–16.77	–19.91	27.36	**–76.56**	–26.67	–27.81	–19.33	–27.64
2	N+Y	170	918.711	–7.17	**–31.43**	**24.73**	**37.56**	14.86	**54.24**	**52.8**	**61.95**	**31.15**	–5.16	–8.22	–13.3	–5.16	–5.92	2.28	–20.65	–6.39	–0.05	–29.99	–3.3
3	N	57	299.138	**–22.15**	**–57.84**	14.96	–6.65	**–48.8**	17.33	–11.76	50.13	**–31.68**	–15.38	–28.96	–38.98	–18.32	–19.16	–26.23	9.04	–22.25	–3.44	–33.44	–100
3	Y	4	21.444	20.09	36.36	13.24	63.36	112.37	44.26	39.35	57.84	74.43	80.65	–100	–100	15.04	77.58	–100	–100	46.99	102.44	–100	–100
3	N+Y	61	320.582	**–17.94**	**–48.49**	14.86	2.21	–25.64	20.44	–5.57	50.97	–17.4	–6.26	**–37.39**	–42.95	–14.51	–9.64	–36.08	0.93	–16.82	5.7	–39.37	–100
2+3	N	196	1001.721	–7.52	**–35.11**	**29.84**	**30.32**	0.38	**51.96**	**45.22**	**65.96**	19.46	–3.06	–20.51	–8.15	–5.57	–5.37	–14.16	8.09	–5.65	6.16	–33.13	–29.54
2+3	Y	35	237.572	–17.05	**–29.54**	–5.15	16.4	18.86	18.61	11.07	28.99	13.49	–13.11	–1.45	**–59.6**	–13.3	–10.01	10.01	**–77.96**	–20.34	–16.24	–27.75	–30.74
2+3	N+Y	231	1239.293	**–9.68**	**–35.27**	**22.62**	**29.1**	5.52	**46.14**	**38.81**	**59.76**	**19.7**	–5.53	–15.24	–20.75	–7.37	–6.93	–6.86	–14.72	–8.76	1.33	**–32.14**	–29.03
4	N	5	24.729	**–74.53**	**–62.64**	–100	**–61.12**	–21.76	–100	–100	–100	–51.31	–100	–100	649.86	**–78.95**	–100	–100	465.43	–60.96	–100	–100	915.22
5	N	11	90.986	**–43.34**	**–41.18**	**–45.36**	–19.46	9.24	–30.81	**–55.6**	–7.84	–23.53	–30.84	**–78.05**	–100	**–50.48**	–35.58	–100	–100	–27.19	–16.42	–20.05	–100

Project Code	Project Type
1	Wider markings with resurfacing
2	Wider markings and edgeline rumble stripe with resurfacing
3	Wider markings and shoulder rumble strip with resurfacing
4	Wider markings and centerline and edgeline rumble strips with resurfacing
5	Wider markings without resurfacing

Numbers in **GREEN** represent a statistically significant decrease in crashes

Numbers in **RED** represent a statistically significant increase in crashes

Numbers in **BLACK** are not statistically significant.

Table A-9. Summary of Before/After Evaluation Results for Fatal-and-All-Injury Crashes by SRI Project Type

SRI project type	Cable median barrier	No. of sites	Total length (mi)	All	MV	SV	Lane departure						Pavement surface condition			Day				Night			
							All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
1	N	366	823.238	2.52	2.25	12.03	12.29	1.86	32.11	31.09	44.85	8.68	1.02	6.55	34.67	3.86	3.47	2.35	22.6	3.1	–2.55	14.68	40.9
1	Y	32	176.951	–13.17	–23.89	–4.66	–2.6	–23.58	8.37	0.4	15.7	–12.56	–4.31	–27.75	–43.58	–17.2	–11.35	–27.88	–36.83	–7.68	7.36	–28.39	–53.37
1	N+Y	398	1000.189	1.45	–0.16	13.01	13.62	0.21	33.96	30.42	46.75	8.24	0.29	4.34	24.74	2.21	1.87	0.42	15.49	3.1	–1.19	11.56	26.89
2	N	139	702.583	–14.03	–22.48	–0.71	3.7	–16.5	17.44	7.05	29.95	–5.98	–17.53	–2.58	0.22	–11.34	–16.79	3.65	4.53	–17.17	–19.39	–15.48	–8.54
2	Y	31	216.128	–19.71	–26.51	–13.84	6.79	–7.76	14.51	–4.83	37.33	–6.82	–28.69	15.45	–15.25	–18.91	–30.91	30.79	–30.19	–18.93	–23.5	–19.85	7.56
2	N+Y	170	918.711	–15.05	–24.05	–2.12	6.25	–14.75	19.39	5.54	34.69	–5.23	–19.66	1.1	–2.7	–12.77	–19.5	9.29	–3.73	–17.26	–20	–16.25	–4.62
3	N	57	299.138	–32.69	–45.9	–18.32	–23.24	–49.13	–9.84	–16.67	–0.82	–33.26	–32.45	–23.42	–56.39	–33.48	–32.53	–33.9	–46.85	–30.01	–30.42	–5.48	–70.63
3	Y	4	21.444	–0.43	–6.17	4.2	12.29	34.23	1.95	–30.98	42.86	4.84	3.86	–32.75	95.17	–6.24	–6.44	–27.7	87.64	14.58	26.31	–44.98	99.72
3	N+Y	61	320.582	–30.04	–42.75	–16.36	–19.31	–38.81	–8.57	–17.84	3.19	–28.83	–29.57	–24.09	–49.18	–31.05	–30.42	–32.7	–39.05	–26.78	–26.01	–8.65	–64.78
2+3	N	196	1001.721	–18.51	–27.68	–5.15	–3.18	–24.15	10.26	0.97	21.67	–12.74	–21.13	–7.62	–15.93	–16.55	–20.5	–5.47	–10.03	–20.3	–22.11	–12.62	–26.81
2+3	Y	35	237.572	–17.5	–23.78	–11.94	7.49	–0.95	13.2	–7.67	37.57	–5.24	–24.99	8.52	–8.84	–17.42	–28.1	22.05	–22.38	–15.37	–18.03	–22.88	11.3
2+3	N+Y	231	1239.293	–18.35	–27.88	–5.43	0.26	–20.02	12.67	0.1	27.08	–10.59	–21.85	–4.62	–14.06	–16.7	–21.85	–0.24	–12.23	–19.39	–21.35	–14.21	–19.86
4	N	5	24.729	–35.47	–22.55	–53.49	–58.83	–40.31	–68.77	–54.53	–82.07	–49.11	–48.36	–68.21	120.26	–38.67	–41.56	–29.39	14.39	–52.69	–63.72	–100	269.46
5	N	11	90.986	–12.41	–36.6	8.63	13.95	–0.2	20.29	0.21	39.23	0.05	–20.45	10.13	–19.97	–22.59	–31.66	–17.27	100.76	1.74	1.46	74.87	–100

Project Code	Project Type
1	Wider markings with resurfacing
2	Wider markings and edgeline rumble stripe with resurfacing
3	Wider markings and shoulder rumble strip with resurfacing
4	Wider markings and centerline and edgeline rumble strips with resurfacing
5	Wider markings without resurfacing

Numbers in **GREEN** represent a statistically significant decrease in crashes

Numbers in **RED** represent a statistically significant increase in crashes

Numbers in **BLACK** are not statistically significant.

Table A-10. Summary of Before/After Evaluation Results for Total Crashes (All Crash Severity Levels Combined) by SRI Project Type

SRI project type	Cable median barrier	No. of sites	Total length (mi)	All	MV	SV	Lane departure						Pavement surface condition			Day				Night			
							All	On road	ROR	ROR right	ROR left	All except ROR left	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow	All	Dry	Wet	Ice and snow
1	N	366	823.238	3.3	4.11	4.05	8.82	6.05	17.55	10.83	29.96	6.34	2.33	3.35	52.41	3.86	3.61	2.47	38.77	3.29	–1.68	6.91	72.26
1	Y	32	176.951	23.37	–5.39	50.8	42.93	–3.03	65.09	8.82	105.18	3.72	17.98	–2.33	123.06	16.81	16.86	–3.7	67.65	35.04	18.68	–0.14	187.18
1	N+Y	398	1000.189	4.69	3.03	14.42	15.87	5.86	35.41	15.62	64.32	7.55	3.04	3.66	74.41	4.5	3.81	2.74	50.58	7.22	0.67	7.34	105.72
2	N	139	702.583	–8.99	–13.33	–0.48	–0.69	–8.82	5.97	1.54	5.16	–4.11	–13.95	–1.79	31.47	–10.22	–16.12	–0.33	31.12	–3.96	–8.51	–7.17	25.14
2	Y	31	216.128	6.87	–24.08	30.8	34.6	–9.54	53.34	–10.26	109.79	–9.31	–17.28	57.1	71.61	–1.23	–24.68	60.95	32.09	23.01	–2.85	44.82	130.35
2	N+Y	170	918.711	–6.14	–15.66	9.49	9.37	–8.75	23.06	0.83	41.79	–4.26	–14.69	9.95	44.93	–8.72	–17.84	12.47	34.3	1.8	–7.1	2.05	51.37
3	N	57	299.138	–25.4	–28.91	–21.58	–21.12	–17.44	–24.22	–28.28	–24.04	–21.62	–27.61	–25.7	–9.43	–23.89	–26.67	–21.27	–10.87	–28.53	–31.16	–35	–15.28
3	Y	4	21.444	20.51	–9.7	39.7	44.12	15.14	52.36	–24.62	123.78	2.11	4.95	45.19	26.86	18.83	2.13	43.62	–20.42	17.81	1.35	33.68	105.56
3	N+Y	61	320.582	–21.96	–27.59	–16.18	–14.94	–13.9	–16.93	–27.76	–10.67	–19.2	–25.17	–18.22	–8.02	–20.56	–24.55	–13.07	–11.64	–25.04	–28.48	–29.7	–11.4
2+3	N	196	1001.721	–12.88	–16.84	–6.05	–5.83	–10.88	–2.32	–6.37	–2.99	–8.36	–17.15	–7.53	20.44	–13.41	–18.62	–5.2	19.54	–10.04	–14.07	–14.31	14.02
2+3	Y	35	237.572	8.28	–22.55	31.86	35.61	–6.44	53.48	–11.7	111.39	–8.12	–14.94	55.06	69.3	0.86	–21.83	58.02	28.7	22.64	–2.32	43.58	127.74
2+3	N+Y	231	1239.293	–9.55	–18.11	3.28	3.79	–9.87	13.21	–5.98	28.45	–7.57	–16.91	3.62	32.16	–11.24	–19.28	6.9	23.1	–4.27	–11.88	–5.52	36.05
4	N	5	24.729	–29.7	–30.41	–29.57	–47.17	–50.33	–46.19	–41.37	–54.34	–45.67	–40.5	–4.44	30.2	–41.34	–43.8	–19.41	–36.23	–18.87	–35.41	1.1	140.33
5	N	11	90.986	–5.47	–41.16	26.63	26.24	–14.67	42.14	–7.61	77.39	–8.42	–30.63	55.11	54.79	–9.29	–36.85	49.5	125.18	–3.55	–22.47	57.15	–2.13

Project Code	Project Type
1	Wider markings with resurfacing
2	Wider markings and edgeline rumble stripe with resurfacing
3	Wider markings and shoulder rumble strip with resurfacing
4	Wider markings and centerline and edgeline rumble strips with resurfacing
5	Wider markings without resurfacing

Numbers in **GREEN** represent a statistically significant decrease in crashes

Numbers in **RED** represent a statistically significant increase in crashes

Numbers in **BLACK** are not statistically significant.

Appendix B

List of Evaluation Sites

Table B-1 presents a list of all SRI project evaluation sites by roadway type and project type. The striping and delineation project at each of these sites was implemented during 2005 and/or 2006.

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
RURAL FREEWAYS—Wider markings with resurfacing									
23	IS	29	N	4	Platte	23.610	24.300	0.690	Y
223	IS	44	E	7	Jasper	27.982	29.933	1.951	Y
224	IS	44	E	7	Jasper	29.933	32.518	2.585	Y
225	IS	44	E	7	Lawrence	32.518	32.978	0.460	Y
227	IS	44	E	7	Lawrence	37.678	38.502	0.824	Y
228	IS	44	E	7	Lawrence	38.502	44.302	5.800	Y
229	IS	44	E	7	Lawrence	44.302	46.923	2.621	Y
230	IS	44	E	7	Lawrence	46.923	47.380	0.457	Y
245	IS	44	E	8	Greene	82.512	84.509	1.997	Y
246	IS	44	E	8	Greene	84.509	88.353	3.844	Y
251	IS	44	E	8	Webster	95.529	96.029	0.500	Y
252	IS	44	E	8	Webster	96.029	100.946	4.917	Y
253	IS	44	E	8	Webster	100.946	107.561	6.615	Y
254	IS	44	E	8	Webster	107.561	111.745	4.184	Y
255	IS	44	E	8	Laclede	111.745	113.236	1.491	Y
256	IS	44	E	8	Laclede	113.236	115.600	2.364	Y
266	IS	44	E	9	Pulaski	145.457	145.723	0.266	Y
267	IS	44	E	9	Pulaski	145.723	150.645	4.922	Y
268	IS	44	E	9	Pulaski	150.645	153.235	2.590	Y
270	IS	44	E	9	Pulaski	153.429	156.773	3.344	Y
271	IS	44	E	9	Pulaski	156.773	158.700	1.927	Y
272	IS	44	E	9	Pulaski	158.700	159.856	1.156	N
273	IS	44	E	9	Pulaski	159.856	160.358	0.502	N
274	IS	44	E	9	Pulaski	160.358	161.189	0.831	Y
275	IS	44	E	9	Pulaski	161.189	162.442	1.253	Y
282	IS	44	E	9	Phelps	176.554	179.470	2.916	Y
283	IS	44	E	9	Phelps	179.470	182.514	3.044	Y
305	IS	44	E	6	Franklin	225.860	226.074	0.214	N
306	IS	44	E	6	Franklin	226.074	230.269	4.195	N
307	IS	44	E	6	Franklin	230.269	238.847	8.578	N
308	IS	44	E	6	Franklin	238.847	240.340	1.493	N
309	IS	44	E	6	Franklin	240.340	242.221	1.881	N
310	IS	44	E	6	Franklin	242.221	247.117	4.896	N
311	IS	44	E	6	Franklin	247.117	247.684	0.567	N
312	IS	44	E	6	Franklin	247.684	252.043	4.359	N
313	IS	44	E	6	Franklin	252.043	253.321	1.278	N
314	IS	44	E	6	Franklin	253.321	255.490	2.169	N
414	IS	44	W	9	Phelps	117.672	119.450	1.778	N
415	IS	44	W	9	Phelps	119.450	121.290	1.840	Y
416	IS	44	W	9	Phelps	121.290	121.445	0.155	Y
417	IS	44	W	9	Pulaski	121.445	121.900	0.455	Y
421	IS	44	W	9	Pulaski	127.915	129.171	1.256	Y
422	IS	44	W	9	Pulaski	129.171	129.997	0.826	Y
423	IS	44	W	9	Pulaski	129.997	130.509	0.512	N
424	IS	44	W	9	Pulaski	130.509	131.822	1.313	N
425	IS	44	W	9	Pulaski	131.822	133.555	1.733	Y
426	IS	44	W	9	Pulaski	133.555	136.010	2.455	Y
429	IS	44	W	9	Pulaski	137.107	139.698	2.591	Y
430	IS	44	W	9	Pulaski	139.698	144.622	4.924	Y
431	IS	44	W	9	Pulaski	144.622	144.886	0.264	Y
432	IS	44	W	8	Laclede	144.886	147.425	2.539	Y
443	IS	44	W	8	Laclede	174.812	177.098	2.286	Y
444	IS	44	W	8	Laclede	177.098	178.617	1.519	Y
445	IS	44	W	8	Webster	178.617	182.796	4.179	Y
446	IS	44	W	8	Webster	182.796	188.128	5.332	Y
474	IS	44	W	7	Lawrence	257.303	257.763	0.460	Y

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
475	IS	44	W	7	Jasper	257.763	260.348	2.585	Y
476	IS	44	W	7	Jasper	260.348	262.294	1.946	Y
497	IS	55	N	10	Pemiscot	19.088	27.625	8.537	N
642	IS	55	S	10	Pemiscot	179.972	182.332	2.360	N
643	IS	55	S	10	Pemiscot	182.332	190.577	8.245	N
647	IS	55	S	10	Pemiscot	193.183	195.463	2.280	N
648	IS	55	S	10	Pemiscot	195.463	201.960	6.497	N
649	IS	55	S	10	Pemiscot	201.960	205.449	3.489	N
650	IS	55	S	10	Pemiscot	205.449	208.210	2.761	N
736	IS	70	E	4	Jackson	23.125	24.552	1.427	Y
737	IS	70	E	4	Jackson	24.552	28.156	3.604	Y
738	IS	70	E	4	Jackson	28.156	29.150	0.994	Y
739	IS	70	E	4	Jackson	29.150	29.157	0.007	Y
740	IS	70	E	4	Lafayette	29.157	31.535	2.378	Y
741	IS	70	E	4	Lafayette	31.535	36.975	5.440	Y
742	IS	70	E	4	Lafayette	36.975	38.665	1.690	Y
756	IS	70	E	5	Cooper	86.709	89.909	3.200	Y
757	IS	70	E	5	Cooper	89.909	93.900	3.991	Y
766	IS	70	E	5	Boone	114.712	115.495	0.783	Y
767	IS	70	E	5	Boone	115.495	117.698	2.203	Y
768	IS	70	E	5	Boone	117.698	121.548	3.850	Y
769	IS	70	E	5	Boone	121.548	122.764	1.216	Y
784	IS	70	E	5	Callaway	154.534	155.424	0.890	Y
785	IS	70	E	5	Callaway	155.424	161.316	5.892	Y
786	IS	70	E	5	Callaway	161.316	161.531	0.215	Y
799	IS	70	E	6	St. Charles	203.350	203.764	0.414	Y
800	IS	70	E	6	St. Charles	203.764	207.754	3.990	Y
912	IS	70	W	6	St. Charles	43.753	47.763	4.010	Y
913	IS	70	W	6	St. Charles	47.763	48.183	0.420	Y
945	IS	70	W	5	Cooper	145.139	147.590	2.451	Y
966	IS	70	W	4	Lafayette	212.843	214.532	1.689	Y
967	IS	70	W	4	Lafayette	214.532	220.021	5.489	Y
968	IS	70	W	4	Lafayette	220.021	222.407	2.386	Y
969	IS	70	W	4	Jackson	222.407	222.415	0.008	Y
970	IS	70	W	4	Jackson	222.415	223.400	0.985	Y
971	IS	70	W	4	Jackson	223.400	227.164	3.764	Y
972	IS	70	W	4	Jackson	227.164	228.409	1.245	Y
1037	IS	229	N	1	Buchanan	0.402	0.758	0.356	N
1038	IS	229	N	1	Buchanan	0.758	1.742	0.984	N
1068	IS	229	S	1	Buchanan	13.373	14.361	0.988	N
1069	IS	229	S	1	Buchanan	14.361	14.630	0.269	N
11543	US	60	E	8	Greene	77.509	77.665	0.156	N
11544	US	60	E	8	Greene	77.665	79.675	2.010	N
11545	US	60	E	8	Greene	79.675	79.703	0.028	N
11761	US	60	W	8	Greene	261.079	261.372	0.293	N
12286	US	65	N	8	Taney	10.847	11.444	0.597	N
12287	US	65	N	8	Taney	11.444	12.402	0.958	N
12288	US	65	N	8	Taney	12.402	12.702	0.300	N
12313	US	65	N	8	Greene	54.171	54.801	0.630	N
12460	US	65	S	8	Greene	258.231	258.890	0.659	N
12486	US	65	S	8	Taney	300.656	301.595	0.939	N
12487	US	65	S	8	Taney	301.595	302.198	0.603	N
12643	US	71	N	7	Jasper	50.591	53.353	2.762	N
12646	US	71	N	7	Jasper	54.348	55.862	1.514	N
12772	US	71	S	7	Vernon	215.757	216.693	0.936	N
12795	US	71	S	7	Jasper	260.966	262.477	1.511	N
12798	US	71	S	7	Jasper	263.497	263.947	0.450	N
12800	US	71	S	7	Jasper	264.535	266.482	1.947	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
10135	MO	13	N	8	Polk	83.693	83.886	0.193	N
10136	MO	13	N	8	Polk	83.886	85.366	1.480	N
10137	MO	13	N	8	Polk	85.366	85.739	0.373	N
RURAL FREEWAYS—Wider markings and edgeline rumble stripe with resurfacing									
25	IS	29	N	4	Platte	24.916	25.915	0.999	Y
28	IS	29	N	4	Platte	27.346	27.626	0.280	Y
29	IS	29	N	4	Platte	27.626	32.151	4.525	Y
30	IS	29	N	4	Platte	32.151	36.693	4.542	Y
45	IS	29	N	1	Andrew	60.399	60.703	0.304	N
46	IS	29	N	1	Andrew	60.703	63.696	2.993	N
47	IS	29	N	1	Andrew	63.696	67.017	3.321	N
48	IS	29	N	1	Andrew	67.017	71.964	4.947	N
49	IS	29	N	1	Andrew	71.964	72.224	0.260	N
50	IS	29	N	1	Andrew	72.224	73.235	1.011	N
51	IS	29	N	1	Holt	73.235	74.043	0.808	N
71	IS	29	S	1	Holt	56.673	57.608	0.935	N
72	IS	29	S	1	Andrew	57.608	58.796	1.188	N
73	IS	29	S	1	Andrew	58.796	63.976	5.180	N
74	IS	29	S	1	Andrew	63.976	67.182	3.206	N
75	IS	29	S	1	Andrew	67.182	70.401	3.219	N
89	IS	29	S	1	Buchanan	93.065	93.076	0.011	Y
90	IS	29	S	4	Platte	93.076	94.134	1.058	Y
91	IS	29	S	4	Platte	94.134	98.651	4.517	Y
92	IS	29	S	4	Platte	98.651	103.178	4.527	Y
93	IS	29	S	4	Platte	103.178	104.721	1.543	Y
94	IS	29	S	4	Platte	104.721	105.884	1.163	Y
96	IS	29	S	4	Platte	106.497	107.250	0.753	Y
135	IS	35	N	4	Clay	20.900	24.516	3.616	N
136	IS	35	N	4	Clay	24.516	26.299	1.783	N
137	IS	35	N	4	Clay	26.299	27.320	1.021	N
138	IS	35	N	4	Clay	27.320	32.887	5.567	N
146	IS	35	N	1	DeKalb	54.876	56.832	1.956	N
147	IS	35	N	1	Caldwell	56.832	56.910	0.078	N
148	IS	35	N	1	Daviess	56.910	61.610	4.700	N
149	IS	35	N	1	Daviess	61.610	65.076	3.466	N
150	IS	35	N	1	Daviess	65.076	68.727	3.651	N
153	IS	35	N	1	Daviess	77.752	78.153	0.401	N
154	IS	35	N	1	Daviess	78.153	80.504	2.351	N
155	IS	35	N	1	Daviess	80.504	82.858	2.354	N
156	IS	35	N	1	Harrison	82.858	84.469	1.611	N
157	IS	35	N	1	Harrison	84.469	88.520	4.051	N
158	IS	35	N	1	Harrison	88.520	92.332	3.812	N
167	IS	35	S	1	Harrison	21.953	25.756	3.803	N
168	IS	35	S	1	Harrison	25.756	29.805	4.049	N
169	IS	35	S	1	Harrison	29.805	31.425	1.620	N
170	IS	35	S	1	Daviess	31.425	33.777	2.352	N
171	IS	35	S	1	Daviess	33.777	36.129	2.352	N
172	IS	35	S	1	Daviess	36.129	36.354	0.225	N
175	IS	35	S	1	Daviess	45.529	49.204	3.675	N
176	IS	35	S	1	Daviess	49.204	52.668	3.464	N
177	IS	35	S	1	Daviess	52.668	57.372	4.704	N
178	IS	35	S	1	Caldwell	57.372	57.394	0.022	N
179	IS	35	S	1	DeKalb	57.394	59.407	2.013	N
183	IS	35	S	1	Clinton	61.299	65.444	4.145	N
186	IS	35	S	1	Clinton	73.099	73.902	0.803	N
187	IS	35	S	1	Clinton	73.902	80.842	6.940	N
188	IS	35	S	1	Clinton	80.842	81.393	0.551	N
189	IS	35	S	4	Clay	81.393	86.796	5.403	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
190	IS	35	S	4	Clay	86.796	87.980	1.184	N
191	IS	35	S	4	Clay	87.980	93.377	5.397	N
192	IS	35	S	4	Clay	93.377	93.725	0.348	N
210	IS	44	E	7	Newton	0.000	0.351	0.351	Y
211	IS	44	E	7	Newton	0.351	2.841	2.490	Y
231	IS	44	E	7	Lawrence	47.380	49.724	2.344	Y
232	IS	44	E	7	Lawrence	49.724	58.350	8.626	Y
233	IS	44	E	7	Lawrence	58.350	58.802	0.452	Y
234	IS	44	E	7	Lawrence	58.802	59.884	1.082	Y
276	IS	44	E	9	Pulaski	162.442	163.851	1.409	Y
277	IS	44	E	9	Pulaski	163.851	168.915	5.064	Y
278	IS	44	E	9	Phelps	168.915	169.110	0.195	Y
279	IS	44	E	9	Phelps	169.110	170.910	1.800	Y
280	IS	44	E	9	Phelps	170.910	172.592	1.682	N
281	IS	44	E	9	Phelps	172.592	176.554	3.962	Y
291	IS	44	E	9	Phelps	189.977	190.530	0.553	N
292	IS	44	E	9	Phelps	190.530	195.633	5.103	Y
293	IS	44	E	9	Phelps	195.633	201.160	5.527	Y
295	IS	44	E	9	Crawford	203.414	208.308	4.894	Y
296	IS	44	E	9	Crawford	208.308	210.808	2.500	Y
297	IS	44	E	9	Crawford	210.808	214.276	3.468	Y
300	IS	44	E	9	Crawford	218.976	223.156	4.180	Y
397	IS	44	W	9	Crawford	76.676	79.460	2.784	Y
398	IS	44	W	9	Crawford	79.460	81.959	2.499	Y
399	IS	44	W	9	Crawford	81.959	86.853	4.894	Y
400	IS	44	W	9	Crawford	86.853	88.116	1.263	Y
402	IS	44	W	9	Phelps	89.097	94.632	5.535	Y
403	IS	44	W	9	Phelps	94.632	100.289	5.657	Y
413	IS	44	W	9	Phelps	116.439	117.672	1.233	Y
418	IS	44	W	9	Pulaski	121.900	126.197	4.297	Y
433	IS	44	W	8	Laclede	147.425	150.332	2.907	Y
434	IS	44	W	8	Laclede	150.332	155.105	4.773	Y
435	IS	44	W	8	Laclede	155.105	158.954	3.849	Y
465	IS	44	W	7	Lawrence	230.399	231.486	1.087	Y
466	IS	44	W	7	Lawrence	231.486	232.008	0.522	Y
467	IS	44	W	7	Lawrence	232.008	240.577	8.569	Y
468	IS	44	W	7	Lawrence	240.577	242.941	2.364	Y
487	IS	44	W	7	Newton	287.417	289.943	2.526	Y
488	IS	44	W	7	Newton	289.943	290.284	0.341	Y
494	IS	55	N	10	Pemiscot	15.022	17.669	2.647	N
495	IS	55	N	10	Pemiscot	17.669	18.720	1.051	N
501	IS	55	N	10	New Madrid	41.000	44.926	3.926	N
502	IS	55	N	10	New Madrid	44.926	49.654	4.728	N
618	IS	55	S	10	Cape Girardeau	104.171	109.705	5.534	N
636	IS	55	S	10	New Madrid	160.284	165.034	4.750	N
637	IS	55	S	10	New Madrid	165.034	168.959	3.925	N
638	IS	55	S	10	New Madrid	168.959	169.139	0.180	N
660	IS	57	N	10	Mississippi	10.245	10.599	0.354	N
749	IS	70	E	2	Saline	62.561	66.878	4.317	Y
750	IS	70	E	2	Saline	66.878	71.370	4.492	Y
751	IS	70	E	2	Saline	71.370	74.594	3.224	Y
752	IS	70	E	2	Saline	74.594	77.026	2.432	Y
758	IS	70	E	5	Cooper	93.900	97.993	4.093	Y
759	IS	70	E	5	Cooper	97.993	101.119	3.126	Y
763	IS	70	E	5	Cooper	103.895	106.376	2.481	Y
764	IS	70	E	5	Cooper	106.376	111.452	5.076	Y
765	IS	70	E	5	Cooper	111.452	114.712	3.260	Y
788	IS	70	E	3	Montgomery	164.747	165.629	0.882	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
789	IS	70	E	3	Montgomery	165.629	169.101	3.472	N
943	IS	70	W	5	Cooper	136.808	140.066	3.258	Y
944	IS	70	W	5	Cooper	140.066	145.139	5.073	Y
949	IS	70	W	5	Cooper	149.943	153.512	3.569	Y
950	IS	70	W	5	Cooper	153.512	161.140	7.628	Y
951	IS	70	W	5	Cooper	161.140	161.596	0.456	Y
952	IS	70	W	5	Cooper	161.596	164.804	3.208	Y
956	IS	70	W	2	Saline	174.464	176.919	2.455	Y
957	IS	70	W	2	Saline	176.919	180.142	3.223	Y
958	IS	70	W	2	Saline	180.142	184.635	4.493	Y
959	IS	70	W	2	Saline	184.635	188.952	4.317	Y
12101	US	63	N	5	Boone	213.418	214.218	0.800	N
12642	US	71	N	7	Jasper	49.942	50.591	0.649	N
12674	US	71	N	7	Vernon	107.987	110.370	2.383	N
12681	US	71	N	7	Bates	134.040	135.261	1.221	N
12682	US	71	N	7	Bates	135.261	139.946	4.685	N
12753	US	71	S	7	Bates	176.857	181.553	4.696	N
12754	US	71	S	7	Bates	181.553	182.793	1.240	N
12764	US	71	S	7	Vernon	206.456	208.759	2.303	N
12769	US	71	S	7	Vernon	212.326	212.467	0.141	N
12770	US	71	S	7	Vernon	212.467	213.606	1.139	N
12784	US	71	S	7	Barton	243.030	245.790	2.760	N
12799	US	71	S	7	Jasper	263.947	264.535	0.588	N
12801	US	71	S	7	Jasper	266.482	266.877	0.395	N
10134	MO	13	N	8	Polk	82.272	83.693	1.421	N
10172	MO	13	S	8	Polk	208.892	210.454	1.562	N
RURAL FREEWAYS—Wider markings and shoulder rumble strip with resurfacing									
76	IS	29	S	1	Andrew	70.401	73.018	2.617	N
77	IS	29	S	1	Andrew	73.018	73.024	0.006	N
78	IS	29	S	1	Buchanan	73.024	73.476	0.452	N
79	IS	29	S	1	Buchanan	73.476	74.054	0.578	N
85	IS	29	S	1	Buchanan	80.197	81.041	0.844	N
86	IS	29	S	1	Buchanan	81.041	84.183	3.142	N
452	IS	44	W	8	Greene	201.355	205.768	4.413	Y
469	IS	44	W	7	Lawrence	242.941	243.378	0.437	Y
470	IS	44	W	7	Lawrence	243.378	245.966	2.588	Y
471	IS	44	W	7	Lawrence	245.966	251.779	5.813	Y
472	IS	44	W	7	Lawrence	251.779	252.580	0.801	Y
489	IS	55	N	10	Pemiscot	0.000	1.131	1.131	N
490	IS	55	N	10	Pemiscot	1.131	4.482	3.351	N
491	IS	55	N	10	Pemiscot	4.482	7.978	3.496	N
492	IS	55	N	10	Pemiscot	7.978	14.485	6.507	N
493	IS	55	N	10	Pemiscot	14.485	15.022	0.537	N
496	IS	55	N	10	Pemiscot	18.720	19.088	0.368	N
503	IS	55	N	10	New Madrid	49.654	52.191	2.537	N
504	IS	55	N	10	New Madrid	52.191	58.246	6.055	N
505	IS	55	N	10	New Madrid	58.246	65.408	7.162	N
510	IS	55	N	10	Scott	69.593	80.983	11.390	N
511	IS	55	N	10	Scott	80.983	89.750	8.767	N
512	IS	55	N	10	Scott	89.750	90.210	0.460	N
522	IS	55	N	10	Cape Girardeau	105.790	118.082	12.292	N
523	IS	55	N	10	Cape Girardeau	118.082	119.316	1.234	N
524	IS	55	N	10	Perry	119.316	124.075	4.759	N
525	IS	55	N	10	Perry	124.075	129.514	5.439	N
528	IS	55	N	10	Perry	130.017	135.627	5.610	N
529	IS	55	N	10	Perry	135.627	139.971	4.344	N
610	IS	55	S	10	Perry	69.997	74.332	4.335	N
611	IS	55	S	10	Perry	74.332	79.961	5.629	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
614	IS	55	S	10	Perry	80.449	85.892	5.443	N
615	IS	55	S	10	Perry	85.892	90.636	4.744	N
616	IS	55	S	10	Cape Girardeau	90.636	91.882	1.246	N
617	IS	55	S	10	Cape Girardeau	91.882	104.171	12.289	N
626	IS	55	S	10	Scott	119.737	120.200	0.463	N
627	IS	55	S	10	Scott	120.200	128.951	8.751	N
628	IS	55	S	10	Scott	128.951	140.363	11.412	N
633	IS	55	S	10	New Madrid	144.519	151.695	7.176	N
634	IS	55	S	10	New Madrid	151.695	157.771	6.076	N
635	IS	55	S	10	New Madrid	157.771	160.284	2.513	N
644	IS	55	S	10	Pemiscot	190.577	190.858	0.281	N
645	IS	55	S	10	Pemiscot	190.858	192.258	1.400	N
646	IS	55	S	10	Pemiscot	192.258	193.183	0.925	N
651	IS	55	S	10	Pemiscot	208.210	208.813	0.603	N
652	IS	55	S	10	Pemiscot	208.813	209.944	1.131	N
655	IS	57	N	10	Scott	0.573	1.725	1.152	N
668	IS	57	S	10	Mississippi	0.278	8.677	8.399	N
671	IS	57	S	10	Mississippi	10.003	10.477	0.474	N
674	IS	57	S	10	Mississippi	11.757	17.392	5.635	N
675	IS	57	S	10	Mississippi	17.392	20.157	2.765	N
676	IS	57	S	10	Scott	20.157	20.181	0.024	N
677	IS	57	S	10	Scott	20.181	21.782	1.601	N
RURAL FREEWAYS—Wider markings without resurfacing									
219	IS	44	E	7	Jasper	11.863	15.278	3.415	N
220	IS	44	E	7	Jasper	15.278	18.479	3.201	N
221	IS	44	E	7	Jasper	18.479	26.511	8.032	N
222	IS	44	E	7	Jasper	26.511	27.982	1.471	N
477	IS	44	W	7	Jasper	262.294	263.771	1.477	N
478	IS	44	W	7	Jasper	263.771	271.805	8.034	N
479	IS	44	W	7	Jasper	271.805	275.030	3.225	N
480	IS	44	W	7	Jasper	275.030	278.419	3.389	N
625	IS	55	S	10	Scott	119.435	119.737	0.302	N
639	IS	55	S	10	New Madrid	169.139	177.034	7.895	N
640	IS	55	S	10	New Madrid	177.034	178.059	1.025	N
641	IS	55	S	10	Pemiscot	178.059	179.972	1.913	N
RURAL MULTILANE DIVIDED HIGHWAYS—Wider markings with resurfacing									
11047	US	36	E	1	DeKalb	31.856	32.890	1.034	N
11048	US	36	E	1	DeKalb	32.890	33.509	0.619	N
11052	US	36	E	1	DeKalb	35.363	35.366	0.003	N
11053	US	36	E	1	Caldwell	35.366	36.134	0.768	N
11070	US	36	W	1	Caldwell	157.221	157.353	0.132	N
11071	US	36	W	1	DeKalb	157.353	157.358	0.005	N
11075	US	36	W	1	DeKalb	159.227	159.834	0.607	N
11076	US	36	W	1	DeKalb	159.834	160.843	1.009	N
11185	US	50	E	5	Pettis	74.455	75.051	0.596	N
11186	US	50	E	5	Pettis	75.051	76.384	1.333	N
11241	US	50	E	5	Cole	147.237	149.047	1.810	N
11242	US	50	E	5	Cole	149.047	149.680	0.633	N
11273	US	50	W	5	Cole	110.765	113.549	2.784	N
11274	US	50	W	5	Cole	113.549	115.370	1.821	N
11359	US	54	E	5	Camden	118.817	118.836	0.019	N
11361	US	54	E	5	Camden	121.528	122.040	0.512	N
11407	US	54	E	5	Callaway	198.220	198.570	0.350	N
11408	US	54	E	5	Callaway	198.570	198.780	0.210	N
11441	US	54	W	5	Callaway	73.422	73.640	0.218	N
11442	US	54	W	5	Callaway	73.640	73.993	0.353	N
11470	US	54	W	5	Miller	123.300	123.667	0.367	N
11471	US	54	W	5	Miller	123.667	126.592	2.925	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
11472	US	54	W	5	Miller	126.592	129.752	3.160	N
11473	US	54	W	5	Miller	129.752	131.107	1.355	N
11474	US	54	W	5	Miller	131.107	131.597	0.490	N
11554	US	60	E	8	Greene	88.465	90.249	1.784	N
11555	US	60	E	8	Greene	90.249	94.185	3.936	N
11556	US	60	E	8	Greene	94.185	96.183	1.998	N
11557	US	60	E	8	Greene	96.183	97.280	1.097	N
11558	US	60	E	8	Webster	97.280	97.725	0.445	N
11559	US	60	E	8	Webster	97.725	99.642	1.917	N
11560	US	60	E	8	Webster	99.642	102.630	2.988	N
11561	US	60	E	8	Webster	102.630	104.880	2.250	N
11562	US	60	E	8	Webster	104.880	106.349	1.469	N
11563	US	60	E	8	Webster	106.349	106.562	0.213	N
11568	US	60	E	8	Webster	114.087	116.347	2.260	N
11569	US	60	E	8	Webster	116.347	118.292	1.945	N
11731	US	60	W	8	Wright	215.938	219.248	3.310	N
11732	US	60	W	8	Wright	219.248	219.797	0.549	N
11733	US	60	W	8	Webster	219.797	224.602	4.805	N
11734	US	60	W	8	Webster	224.602	230.200	5.598	N
11735	US	60	W	8	Webster	230.200	230.668	0.468	N
11736	US	60	W	8	Webster	230.668	231.236	0.568	N
11737	US	60	W	8	Webster	231.236	234.471	3.235	N
11738	US	60	W	8	Webster	234.471	234.685	0.214	N
11739	US	60	W	8	Webster	234.685	236.164	1.479	N
11740	US	60	W	8	Webster	236.164	236.697	0.533	N
11743	US	60	W	8	Webster	239.028	239.427	0.399	N
11745	US	60	W	8	Webster	240.843	241.393	0.550	N
11746	US	60	W	8	Webster	241.393	243.307	1.914	N
11747	US	60	W	8	Webster	243.307	243.752	0.445	N
11748	US	60	W	8	Greene	243.752	244.846	1.094	N
11749	US	60	W	8	Greene	244.846	246.848	2.002	N
11750	US	60	W	8	Greene	246.848	250.773	3.925	N
11751	US	60	W	8	Greene	250.773	252.216	1.443	N
11762	US	60	W	8	Greene	261.372	263.288	1.916	N
12109	US	63	N	5	Boone	222.082	223.341	1.259	N
12110	US	63	N	5	Boone	223.341	225.404	2.063	N
12193	US	63	S	2	Macon	65.286	65.318	0.032	N
12215	US	63	S	5	Boone	111.881	113.793	1.912	N
12216	US	63	S	5	Boone	113.793	115.194	1.401	N
12542	US	67	N	6	St. Charles	194.102	194.646	0.544	N
12547	US	67	S	6	St. Charles	3.508	4.142	0.634	N
12757	US	71	S	7	Bates	185.034	187.450	2.416	N
12869	US	160	E	8	Greene	102.455	102.712	0.257	N
12870	US	160	E	8	Christian	102.712	102.965	0.253	N
12871	US	160	E	8	Christian	102.965	103.031	0.066	N
12885	US	160	W	8	Christian	220.042	220.700	0.658	N
12886	US	160	W	8	Christian	220.700	220.710	0.010	N
12887	US	160	W	8	Greene	220.710	221.707	0.997	N
12970	US	169	S	4	Clay	107.800	110.040	2.240	N
10033	MO	7	N	4	Cass	138.536	141.335	2.799	N
10034	MO	7	N	4	Cass	141.335	144.761	3.426	N
10035	MO	7	N	4	Cass	144.761	146.836	2.075	N
10064	MO	7	S	4	Cass	40.326	42.865	2.539	N
10065	MO	7	S	4	Cass	42.865	46.009	3.144	N
10066	MO	7	S	4	Cass	46.009	48.740	2.731	N
10126	MO	13	N	8	Greene	67.284	70.836	3.552	N
10127	MO	13	N	8	Greene	70.836	72.231	1.395	N
10129	MO	13	N	8	Polk	73.170	74.935	1.765	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
10130	MO	13	N	8	Polk	74.935	75.871	0.936	N
10131	MO	13	N	8	Polk	75.871	78.569	2.698	N
10132	MO	13	N	8	Polk	78.569	81.043	2.474	N
10142	MO	13	N	8	Polk	88.049	88.822	0.773	N
10281	MO	30	E	6	Jefferson	20.749	21.781	1.032	N
10282	MO	30	E	6	Jefferson	21.781	23.860	2.079	N
10284	MO	30	E	6	Jefferson	24.981	26.365	1.384	N
10314	MO	30	W	6	Jefferson	25.370	26.220	0.850	N
10316	MO	30	W	6	Jefferson	27.000	27.960	0.960	N
10318	MO	30	W	6	Jefferson	28.560	30.888	2.328	N
10319	MO	30	W	6	Jefferson	30.888	31.906	1.018	N
10570	MO	100	E	6	St. Louis	93.620	95.070	1.450	N
15001	BU	60	E	10	Butler	0.000	0.191	0.191	N
15002	BU	60	E	10	Butler	0.191	0.306	0.115	N
15078	LP	29	N	1	Andrew	11.594	12.125	0.531	N
RURAL MULTILANE DIVIDED HIGHWAYS—Wider markings and edgeline rumble stripe with resurfacing									
11164	US	50	E	4	Johnson	28.456	29.994	1.538	N
11165	US	50	E	4	Johnson	29.994	31.538	1.544	N
11166	US	50	E	4	Johnson	31.538	35.645	4.107	N
11167	US	50	E	4	Johnson	35.645	40.793	5.148	N
11168	US	50	E	4	Johnson	40.793	45.943	5.150	N
11169	US	50	E	4	Johnson	45.943	49.966	4.023	N
11174	US	50	E	4	Johnson	53.476	54.008	0.532	N
11304	US	50	W	4	Johnson	208.605	209.260	0.655	N
11309	US	50	W	4	Johnson	212.772	216.682	3.910	N
11310	US	50	W	4	Johnson	216.682	221.711	5.029	N
11311	US	50	W	4	Johnson	221.711	226.872	5.161	N
11312	US	50	W	4	Johnson	226.872	230.992	4.120	N
11313	US	50	W	4	Johnson	230.992	232.536	1.544	N
11314	US	50	W	4	Johnson	232.536	234.076	1.540	N
11380	US	54	E	5	Cole	155.998	156.189	0.191	N
11381	US	54	E	5	Cole	156.189	158.186	1.997	N
11382	US	54	E	5	Cole	158.186	163.467	5.281	N
11466	US	54	W	5	Cole	108.781	114.013	5.232	N
11467	US	54	W	5	Cole	114.013	116.011	1.998	N
11784	US	61	N	6	St. Charles	258.341	260.464	2.123	N
11785	US	61	N	6	St. Charles	260.464	263.172	2.708	N
11786	US	61	N	6	St. Charles	263.172	263.830	0.658	N
11788	US	61	N	6	St. Charles	264.062	264.200	0.138	N
11789	US	61	N	3	Lincoln	264.200	265.818	1.618	N
11790	US	61	N	3	Lincoln	265.818	269.678	3.860	N
11791	US	61	N	3	Lincoln	269.678	271.858	2.180	N
11792	US	61	N	3	Lincoln	271.858	274.086	2.228	N
11800	US	61	N	3	Lincoln	288.175	289.204	1.029	N
11801	US	61	N	3	Pike	289.204	289.709	0.505	N
11802	US	61	N	3	Pike	289.709	291.278	1.569	N
11824	US	61	N	3	Ralls	324.949	325.150	0.201	N
11825	US	61	N	3	Ralls	325.150	327.172	2.022	N
11826	US	61	N	3	Ralls	327.172	329.149	1.977	N
11827	US	61	N	3	Ralls	329.149	329.440	0.291	N
11905	US	61	S	3	Pike	101.709	101.890	0.181	N
11906	US	61	S	3	Pike	101.890	103.710	1.820	N
11907	US	61	S	3	Pike	103.710	104.240	0.530	N
11908	US	61	S	3	Lincoln	104.240	106.764	2.524	N
11909	US	61	S	3	Lincoln	106.764	107.105	0.341	N
11910	US	61	S	3	Lincoln	107.105	111.411	4.306	N
11913	US	61	S	3	Lincoln	119.044	119.157	0.113	N
11914	US	61	S	3	Lincoln	119.157	121.584	2.427	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
11915	US	61	S	3	Lincoln	121.584	123.257	1.673	N
11917	US	61	S	3	Lincoln	123.305	123.754	0.449	N
11918	US	61	S	3	Lincoln	123.754	127.617	3.863	N
11919	US	61	S	3	Lincoln	127.617	129.237	1.620	N
11920	US	61	S	6	St. Charles	129.237	130.285	1.048	N
11921	US	61	S	6	St. Charles	130.285	132.985	2.700	N
11922	US	61	S	6	St. Charles	132.985	135.110	2.125	N
12094	US	63	N	5	Callaway	190.361	195.035	4.674	N
12095	US	63	N	5	Boone	195.035	200.937	5.902	N
12096	US	63	N	5	Boone	200.937	203.943	3.006	N
12097	US	63	N	5	Boone	203.943	207.946	4.003	N
12098	US	63	N	5	Boone	207.946	209.991	2.045	N
12099	US	63	N	5	Boone	209.991	210.480	0.489	N
12100	US	63	N	5	Boone	210.480	213.418	2.938	N
12224	US	63	S	5	Boone	123.595	126.507	2.912	N
12230	US	63	S	5	Boone	136.155	136.486	0.331	N
12231	US	63	S	5	Boone	136.486	142.258	5.772	N
12232	US	63	S	5	Callaway	142.258	144.585	2.327	N
12507	US	67	N	10	St. Francois	102.574	106.282	3.708	N
12508	US	67	N	10	St. Francois	106.282	108.111	1.829	N
12510	US	67	N	10	St. Francois	108.547	109.669	1.122	N
12511	US	67	N	10	St. Francois	109.669	110.275	0.606	N
12512	US	67	N	10	St. Francois	110.275	113.241	2.966	N
12513	US	67	N	10	St. Francois	113.241	121.091	7.850	N
12514	US	67	N	10	St. Francois	121.091	121.587	0.496	N
12515	US	67	N	10	St. Francois	121.587	122.256	0.669	N
12516	US	67	N	6	Jefferson	122.256	123.392	1.136	N
12517	US	67	N	6	Jefferson	123.392	126.928	3.536	N
12518	US	67	N	6	Jefferson	126.928	130.135	3.207	N
12519	US	67	N	6	Jefferson	130.135	135.460	5.325	N
12520	US	67	N	6	Jefferson	135.460	136.075	0.615	N
12573	US	67	S	6	Jefferson	62.038	62.645	0.607	N
12574	US	67	S	6	Jefferson	62.645	67.996	5.351	N
12575	US	67	S	6	Jefferson	67.996	71.201	3.205	N
12576	US	67	S	6	Jefferson	71.201	74.740	3.539	N
12577	US	67	S	6	Jefferson	74.740	75.873	1.133	N
12578	US	67	S	10	St. Francois	75.873	75.957	0.084	N
12579	US	67	S	10	St. Francois	75.957	76.543	0.586	N
12580	US	67	S	10	St. Francois	76.543	77.026	0.483	N
12581	US	67	S	10	St. Francois	77.026	84.892	7.866	N
12582	US	67	S	10	St. Francois	84.892	87.851	2.959	N
12583	US	67	S	10	St. Francois	87.851	88.456	0.605	N
12584	US	67	S	10	St. Francois	88.456	89.585	1.129	N
12586	US	67	S	10	St. Francois	90.027	91.934	1.907	N
12587	US	67	S	10	St. Francois	91.934	94.473	2.539	N
12588	US	67	S	10	St. Francois	94.473	95.441	0.968	N
12661	US	71	N	7	Barton	89.047	89.761	0.714	N
12675	US	71	N	7	Vernon	110.370	113.701	3.331	N
12676	US	71	N	7	Vernon	113.701	120.676	6.975	N
12677	US	71	N	7	Vernon	120.676	121.080	0.404	N
12678	US	71	N	7	Bates	121.080	124.343	3.263	N
12679	US	71	N	7	Bates	124.343	132.647	8.304	N
12680	US	71	N	7	Bates	132.647	134.040	1.393	N
12683	US	71	N	7	Bates	139.946	145.004	5.058	N
12684	US	71	N	7	Bates	145.004	147.526	2.522	N
12685	US	71	N	7	Bates	147.526	150.389	2.863	N
12686	US	71	N	4	Cass	150.389	151.066	0.677	N
12687	US	71	N	4	Cass	151.066	159.815	8.749	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
12748	US	71	S	4	Cass	156.974	165.929	8.955	N
12749	US	71	S	4	Cass	165.929	166.420	0.491	N
12750	US	71	S	7	Bates	166.420	169.285	2.865	N
12751	US	71	S	7	Bates	169.285	171.809	2.524	N
12752	US	71	S	7	Bates	171.809	176.857	5.048	N
12755	US	71	S	7	Bates	182.793	184.166	1.373	N
12756	US	71	S	7	Bates	184.166	185.034	0.868	N
12759	US	71	S	7	Bates	191.690	192.731	1.041	N
12760	US	71	S	7	Bates	192.731	195.733	3.002	N
12761	US	71	S	7	Vernon	195.733	196.122	0.389	N
12762	US	71	S	7	Vernon	196.122	203.112	6.990	N
12763	US	71	S	7	Vernon	203.112	206.456	3.344	N
12783	US	71	S	7	Barton	240.285	243.030	2.745	N
10128	MO	13	N	8	Polk	72.231	73.170	0.939	N
10133	MO	13	N	8	Polk	81.043	82.272	1.229	N
10173	MO	13	S	8	Polk	210.454	213.794	3.340	N
10174	MO	13	S	8	Polk	213.794	216.419	2.625	N
10175	MO	13	S	8	Polk	216.419	217.314	0.895	N
10176	MO	13	S	8	Polk	217.314	219.981	2.667	N
10177	MO	13	S	8	Greene	219.981	221.339	1.358	N
10178	MO	13	S	8	Greene	221.339	226.245	4.906	N
10179	MO	13	S	8	Greene	226.245	227.745	1.500	N
10180	MO	13	S	8	Greene	227.745	231.830	4.085	N
10283	MO	30	E	6	Jefferson	23.860	24.981	1.121	N
10285	MO	30	E	6	Jefferson	26.365	27.395	1.030	N
10313	MO	30	W	6	Jefferson	25.256	25.370	0.114	N
10315	MO	30	W	6	Jefferson	26.220	27.000	0.780	N
10317	MO	30	W	6	Jefferson	27.960	28.560	0.600	N
10473	MO	79	N	6	St. Charles	1.070	1.167	0.097	N
RURAL MULTILANE DIVIDED HIGHWAYS—Wider markings and shoulder rumble strip with resurfacing									
11033	US	36	E	1	Buchanan	5.627	5.911	0.284	N
11090	US	36	W	1	Buchanan	186.838	187.132	0.294	N
11793	US	61	N	3	Lincoln	274.086	274.289	0.203	N
11794	US	61	N	3	Lincoln	274.289	278.385	4.096	N
11911	US	61	S	3	Lincoln	111.411	114.604	3.193	N
11912	US	61	S	3	Lincoln	114.604	119.044	4.440	N
12225	US	63	S	5	Boone	126.507	126.951	0.444	N
12226	US	63	S	5	Boone	126.951	127.481	0.530	N
12227	US	63	S	5	Boone	127.481	129.483	2.002	N
12228	US	63	S	5	Boone	129.483	133.525	4.042	N
12229	US	63	S	5	Boone	133.525	136.155	2.630	N
12758	US	71	S	7	Bates	187.450	191.690	4.240	N
10213	MO	21	N	6	Jefferson	175.900	178.179	2.279	N
10230	MO	21	S	6	Jefferson	16.443	18.900	2.457	N
RURAL MULTILANE DIVIDED HIGHWAYS—Wider markings without resurfacing									
11175	US	50	E	4	Johnson	54.008	54.080	0.072	N
11176	US	50	E	4	Johnson	54.080	57.792	3.712	N
11177	US	50	E	4	Johnson	57.792	60.849	3.057	N
11178	US	50	E	4	Johnson	60.849	61.366	0.517	N
11179	US	50	E	4	Johnson	61.366	62.599	1.233	N
11180	US	50	E	4	Johnson	62.599	64.292	1.693	N
12634	US	71	N	7	Newton	27.148	27.405	0.257	N
12635	US	71	N	7	Newton	27.405	30.421	3.016	N
12636	US	71	N	7	Newton	30.421	36.423	6.002	N
12637	US	71	N	7	Newton	36.423	38.445	2.022	N
12638	US	71	N	7	Newton	38.445	42.449	4.004	N
12805	US	71	S	7	Newton	274.395	278.422	4.027	N
12806	US	71	S	7	Newton	278.422	280.439	2.017	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
12807	US	71	S	7	Newton	280.439	286.446	6.007	N
12808	US	71	S	7	Newton	286.446	289.462	3.016	N
12809	US	71	S	7	Newton	289.462	289.648	0.186	N
RURAL MULTILANE UNDIVIDED HIGHWAYS—Wider markings with resurfacing									
11360	US	54	E	5	Camden	118.836	121.528	2.692	N
11362	US	54	E	5	Camden	122.040	124.526	2.486	N
11363	US	54	E	5	Miller	124.526	124.661	0.135	N
11364	US	54	E	5	Camden	124.661	125.588	0.927	N
11953	US	61	S	6	Jefferson	193.512	193.596	0.084	N
11954	US	61	S	6	Jefferson	193.596	196.327	2.731	N
11955	US	61	S	6	Jefferson	196.327	196.983	0.656	N
12191	US	63	S	2	Macon	63.756	64.765	1.009	N
12192	US	63	S	2	Macon	64.765	65.286	0.521	N
11187	US	50	E	5	Pettis	76.384	77.077	0.693	N
11535	US	60	E	8	Greene	70.630	70.729	0.099	N
12488	US	65	S	8	Taney	302.198	303.285	1.087	N
10271	MO	30	E	6	Franklin	0.882	1.720	0.838	N
10272	MO	30	E	6	Franklin	1.720	1.841	0.121	N
10397	MO	47	S	6	Franklin	66.230	68.424	2.194	N
10398	MO	47	S	6	Franklin	68.424	70.642	2.218	N
15029	BU	67	S	10	Butler	5.302	6.554	1.252	N
15030	BU	67	S	10	Butler	6.554	7.588	1.034	N
15160	RT	K	E	10	Scott	0.170	2.109	1.939	N
15161	RT	K	E	10	Scott	2.109	2.429	0.320	N
RURAL MULTILANE UNDIVIDED HIGHWAYS—Wider markings and shoulder rumble strip with resurfacing									
10273	MO	30	E	6	Franklin	1.841	6.572	4.731	N
RURAL TWO–LANE HIGHWAYS—Wider markings, centerline rumble strip, and edgeline rumble stripe with resurfacing									
11520	US	60	E	7	Lawrence	54.592	56.360	1.768	N
11521	US	60	E	7	Lawrence	56.360	57.389	1.029	N
11522	US	60	E	7	Lawrence	57.389	57.672	0.283	N
11523	US	60	E	7	Lawrence	57.672	59.036	1.364	N
11524	US	60	E	7	Lawrence	59.036	60.108	1.072	N
11525	US	60	E	7	Lawrence	60.108	60.182	0.074	N
11526	US	60	E	7	Lawrence	60.182	60.462	0.280	N
11527	US	60	E	7	Lawrence	60.462	62.075	1.613	N
11528	US	60	E	8	Christian	62.075	65.198	3.123	N
11529	US	60	E	8	Christian	65.198	66.159	0.961	N
11530	US	60	E	8	Christian	66.159	66.353	0.194	N
11533	US	60	E	8	Christian	67.210	69.880	2.670	N
11534	US	60	E	8	Greene	69.880	70.630	0.750	N
10485	MO	79	S	6	St. Charles	77.528	81.559	4.031	N
10486	MO	79	S	6	St. Charles	81.559	83.667	2.108	N
10487	MO	79	S	6	St. Charles	83.667	83.906	0.239	N
URBAN FREEWAYS—Wider markings with resurfacing									
22	IS	29	N	4	Platte	21.255	23.610	2.355	Y
243	IS	44	E	8	Greene	80.383	82.473	2.090	Y
244	IS	44	E	8	Greene	82.473	82.512	0.039	Y
302	IS	44	E	6	Franklin	223.978	223.987	0.009	N
303	IS	44	E	6	Franklin	223.987	224.591	0.604	N
304	IS	44	E	6	Franklin	224.591	225.860	1.269	N
319	IS	44	E	6	St. Louis	260.311	261.558	1.247	N
320	IS	44	E	6	St. Louis	261.558	264.254	2.696	N
321	IS	44	E	6	St. Louis	264.254	265.670	1.416	N
322	IS	44	E	6	St. Louis	265.670	266.640	0.970	N
323	IS	44	E	6	St. Louis	266.640	268.846	2.206	N
324	IS	44	E	6	St. Louis	268.846	270.184	1.338	N
325	IS	44	E	6	St. Louis	270.184	271.250	1.066	N
326	IS	44	E	6	St. Louis	271.250	272.424	1.174	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
327	IS	44	E	6	St. Louis	272.424	273.886	1.462	N
328	IS	44	E	6	St. Louis	273.886	275.815	1.929	N
336	IS	44	E	6	St. Louis	282.428	282.900	0.472	N
337	IS	44	E	6	St. Louis	282.900	283.361	0.461	N
338	IS	44	E	6	St. Louis City	283.361	283.402	0.041	N
339	IS	44	E	6	St. Louis City	283.402	284.224	0.822	N
340	IS	44	E	6	St. Louis City	284.224	284.843	0.619	N
341	IS	44	E	6	St. Louis City	284.843	285.680	0.837	N
352	IS	44	W	6	St. Louis City	4.556	5.387	0.831	N
353	IS	44	W	6	St. Louis City	5.387	5.990	0.603	N
354	IS	44	W	6	St. Louis City	5.990	6.796	0.806	N
355	IS	44	W	6	St. Louis City	6.796	6.843	0.047	N
356	IS	44	W	6	St. Louis	6.843	7.332	0.489	N
357	IS	44	W	6	St. Louis	7.332	7.790	0.458	N
364	IS	44	W	6	St. Louis	14.126	14.393	0.267	N
365	IS	44	W	6	St. Louis	14.393	16.330	1.937	N
366	IS	44	W	6	St. Louis	16.330	16.950	0.620	N
367	IS	44	W	6	St. Louis	16.950	17.794	0.844	N
368	IS	44	W	6	St. Louis	17.794	18.960	1.166	N
369	IS	44	W	6	St. Louis	18.960	20.040	1.080	N
370	IS	44	W	6	St. Louis	20.040	21.391	1.351	N
371	IS	44	W	6	St. Louis	21.391	23.594	2.203	N
372	IS	44	W	6	St. Louis	23.594	24.520	0.926	N
373	IS	44	W	6	St. Louis	24.520	24.951	0.431	N
554	IS	55	N	6	St. Louis	197.971	199.796	1.825	N
555	IS	55	N	6	St. Louis	199.796	200.517	0.721	N
556	IS	55	N	6	St. Louis	200.517	201.334	0.817	N
557	IS	55	N	6	St. Louis	201.334	201.973	0.639	N
577	IS	55	S	6	St. Louis City	4.629	4.920	0.291	N
578	IS	55	S	6	St. Louis City	4.920	5.892	0.972	N
579	IS	55	S	6	St. Louis City	5.892	6.836	0.944	N
580	IS	55	S	6	St. Louis City	6.836	7.507	0.671	N
581	IS	55	S	6	St. Louis City	7.507	7.805	0.298	N
583	IS	55	S	6	St. Louis	8.062	8.653	0.591	N
584	IS	55	S	6	St. Louis	8.653	9.495	0.842	N
585	IS	55	S	6	St. Louis	9.495	10.240	0.745	N
586	IS	55	S	6	St. Louis	10.240	12.333	2.093	N
725	IS	70	E	4	Jackson	7.666	8.315	0.649	N
726	IS	70	E	4	Jackson	8.315	9.324	1.009	N
727	IS	70	E	4	Jackson	9.324	11.108	1.784	N
728	IS	70	E	4	Jackson	11.108	12.583	1.475	N
729	IS	70	E	4	Jackson	12.583	14.080	1.497	N
730	IS	70	E	4	Jackson	14.080	15.445	1.365	N
734	IS	70	E	4	Jackson	20.379	21.612	1.233	Y
735	IS	70	E	4	Jackson	21.612	23.125	1.513	Y
770	IS	70	E	5	Boone	122.764	124.396	1.632	Y
801	IS	70	E	6	St. Charles	207.754	208.234	0.480	Y
808	IS	70	E	6	St. Charles	213.950	215.568	1.618	N
809	IS	70	E	6	St. Charles	215.568	217.321	1.753	N
810	IS	70	E	6	St. Charles	217.321	219.877	2.556	N
811	IS	70	E	6	St. Charles	219.877	221.705	1.828	N
812	IS	70	E	6	St. Charles	221.705	222.972	1.267	N
813	IS	70	E	6	St. Charles	222.972	224.692	1.720	N
814	IS	70	E	6	St. Charles	224.692	226.467	1.775	N
815	IS	70	E	6	St. Charles	226.467	227.855	1.388	N
816	IS	70	E	6	St. Charles	227.855	228.271	0.416	N
823	IS	70	E	6	St. Louis	232.657	234.194	1.537	N
824	IS	70	E	6	St. Louis	234.194	234.760	0.566	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
830	IS	70	E	6	St. Louis	238.392	238.783	0.391	N
831	IS	70	E	6	St. Louis	238.783	239.054	0.271	N
833	IS	70	E	6	St. Louis	239.288	239.815	0.527	N
834	IS	70	E	6	St. Louis	239.815	240.425	0.610	N
835	IS	70	E	6	St. Louis	240.425	240.944	0.519	N
836	IS	70	E	6	St. Louis	240.944	241.710	0.766	N
837	IS	70	E	6	St. Louis	241.710	242.766	1.056	N
838	IS	70	E	6	St. Louis	242.766	243.022	0.256	N
839	IS	70	E	6	St. Louis City	243.022	243.034	0.012	N
840	IS	70	E	6	St. Louis City	243.034	243.121	0.087	N
841	IS	70	E	6	St. Louis City	243.121	243.399	0.278	N
842	IS	70	E	6	St. Louis City	243.399	244.610	1.211	N
843	IS	70	E	6	St. Louis City	244.610	245.038	0.428	N
844	IS	70	E	6	St. Louis City	245.038	245.701	0.663	N
845	IS	70	E	6	St. Louis City	245.701	246.156	0.455	N
846	IS	70	E	6	St. Louis City	246.156	246.652	0.496	N
847	IS	70	E	6	St. Louis City	246.652	247.265	0.613	N
848	IS	70	E	6	St. Louis City	247.265	248.155	0.890	N
849	IS	70	E	6	St. Louis City	248.155	248.540	0.385	N
852	IS	70	E	6	St. Louis City	249.724	250.154	0.430	N
853	IS	70	E	6	St. Louis City	250.154	250.666	0.512	N
854	IS	70	E	6	St. Louis City	250.666	250.842	0.176	N
855	IS	70	E	6	St. Louis City	250.842	251.152	0.310	N
873	IS	70	W	6	St. Louis	8.511	8.720	0.209	N
874	IS	70	W	6	St. Louis	8.720	9.801	1.081	N
875	IS	70	W	6	St. Louis	9.801	10.570	0.769	N
876	IS	70	W	6	St. Louis	10.570	11.090	0.520	N
877	IS	70	W	6	St. Louis	11.090	11.702	0.612	N
878	IS	70	W	6	St. Louis	11.702	12.225	0.523	N
880	IS	70	W	6	St. Louis	12.532	12.721	0.189	N
881	IS	70	W	6	St. Louis	12.721	13.182	0.461	N
887	IS	70	W	6	St. Louis	16.646	17.328	0.682	N
888	IS	70	W	6	St. Louis	17.328	18.836	1.508	N
893	IS	70	W	6	St. Charles	21.602	21.938	0.336	N
896	IS	70	W	6	St. Charles	23.233	23.628	0.395	N
897	IS	70	W	6	St. Charles	23.628	25.074	1.446	N
898	IS	70	W	6	St. Charles	25.074	26.860	1.786	N
899	IS	70	W	6	St. Charles	26.860	28.581	1.721	N
900	IS	70	W	6	St. Charles	28.581	29.828	1.247	N
901	IS	70	W	6	St. Charles	29.828	31.533	1.705	N
902	IS	70	W	6	St. Charles	31.533	34.226	2.693	N
903	IS	70	W	6	St. Charles	34.226	35.933	1.707	N
904	IS	70	W	6	St. Charles	35.933	37.566	1.633	N
911	IS	70	W	6	St. Charles	43.287	43.753	0.466	Y
973	IS	70	W	4	Jackson	228.409	229.945	1.536	Y
974	IS	70	W	4	Jackson	229.945	231.183	1.238	Y
978	IS	70	W	4	Jackson	235.946	236.118	0.172	N
979	IS	70	W	4	Jackson	236.118	237.492	1.374	N
980	IS	70	W	4	Jackson	237.492	238.981	1.489	N
981	IS	70	W	4	Jackson	238.981	240.474	1.493	N
982	IS	70	W	4	Jackson	240.474	242.233	1.759	N
983	IS	70	W	4	Jackson	242.233	243.181	0.948	N
984	IS	70	W	4	Jackson	243.181	243.897	0.716	N
1012	IS	170	E	6	St. Louis	6.820	6.849	0.029	N
1013	IS	170	E	6	St. Louis	6.849	7.843	0.994	N
1014	IS	170	E	6	St. Louis	7.843	8.799	0.956	N
1015	IS	170	E	6	St. Louis	8.799	9.352	0.553	N
1016	IS	170	E	6	St. Louis	9.352	9.898	0.546	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
1017	IS	170	E	6	St. Louis	9.898	10.378	0.480	N
1021	IS	170	W	6	St. Louis	0.452	0.816	0.364	N
1022	IS	170	W	6	St. Louis	0.816	1.204	0.388	N
1023	IS	170	W	6	St. Louis	1.204	1.829	0.625	N
1024	IS	170	W	6	St. Louis	1.829	2.381	0.552	N
1025	IS	170	W	6	St. Louis	2.381	3.335	0.954	N
1026	IS	170	W	6	St. Louis	3.335	4.415	1.080	N
1039	IS	229	N	1	Buchanan	1.742	2.129	0.387	N
1040	IS	229	N	1	Buchanan	2.129	2.950	0.821	N
1043	IS	229	N	1	Buchanan	4.779	5.184	0.405	N
1044	IS	229	N	1	Buchanan	5.184	5.595	0.411	N
1045	IS	229	N	1	Buchanan	5.595	6.110	0.515	N
1046	IS	229	N	1	Buchanan	6.110	6.783	0.673	N
1047	IS	229	N	1	Buchanan	6.783	7.671	0.888	N
1058	IS	229	S	1	Buchanan	7.436	8.329	0.893	N
1062	IS	229	S	1	Buchanan	9.710	9.917	0.207	N
1063	IS	229	S	1	Buchanan	9.917	10.316	0.399	N
1066	IS	229	S	1	Buchanan	12.182	12.976	0.794	N
1067	IS	229	S	1	Buchanan	12.976	13.373	0.397	N
1083	IS	270	E	6	St. Louis	0.545	2.145	1.600	N
1084	IS	270	E	6	St. Louis	2.145	3.915	1.770	N
1085	IS	270	E	6	St. Louis	3.915	6.128	2.213	N
1086	IS	270	E	6	St. Louis	6.128	7.634	1.506	N
1087	IS	270	E	6	St. Louis	7.634	8.734	1.100	N
1088	IS	270	E	6	St. Louis	8.734	10.234	1.500	N
1089	IS	270	E	6	St. Louis	10.234	12.660	2.426	N
1090	IS	270	E	6	St. Louis	12.660	13.847	1.187	N
1091	IS	270	E	6	St. Louis	13.847	15.000	1.153	N
1092	IS	270	E	6	St. Louis	15.000	16.803	1.803	N
1093	IS	270	E	6	St. Louis	16.803	17.937	1.134	N
1094	IS	270	E	6	St. Louis	17.937	20.317	2.380	N
1100	IS	270	E	6	St. Louis	26.361	26.883	0.522	N
1125	IS	270	W	6	St. Louis	8.680	8.877	0.197	N
1126	IS	270	W	6	St. Louis	8.877	9.295	0.418	N
1127	IS	270	W	6	St. Louis	9.295	9.480	0.185	N
1133	IS	270	W	6	St. Louis	15.633	18.019	2.386	N
1134	IS	270	W	6	St. Louis	18.019	19.154	1.135	N
1135	IS	270	W	6	St. Louis	19.154	20.949	1.795	N
1136	IS	270	W	6	St. Louis	20.949	22.108	1.159	N
1137	IS	270	W	6	St. Louis	22.108	23.279	1.171	N
1138	IS	270	W	6	St. Louis	23.279	25.723	2.444	N
1139	IS	270	W	6	St. Louis	25.723	27.229	1.506	N
1140	IS	270	W	6	St. Louis	27.229	28.351	1.122	N
1141	IS	270	W	6	St. Louis	28.351	29.870	1.519	N
1142	IS	270	W	6	St. Louis	29.870	32.071	2.201	N
1143	IS	270	W	6	St. Louis	32.071	33.834	1.763	N
1144	IS	270	W	6	St. Louis	33.834	35.440	1.606	N
1145	IS	435	N	4	Jackson	0.000	0.661	0.661	N
1146	IS	435	N	4	Jackson	0.661	1.416	0.755	N
1147	IS	435	N	4	Jackson	1.416	2.608	1.192	N
1148	IS	435	N	4	Jackson	2.608	3.952	1.344	N
1207	IS	435	S	4	Jackson	51.208	52.552	1.344	N
1208	IS	435	S	4	Jackson	52.552	53.745	1.193	N
1209	IS	435	S	4	Jackson	53.745	54.500	0.755	N
1210	IS	435	S	4	Jackson	54.500	55.160	0.660	N
11118	US	40	E	6	St. Charles	208.441	209.316	0.875	N
11119	US	40	E	6	St. Charles	209.316	211.011	1.695	N
11387	US	54	E	5	Cole	167.336	167.527	0.191	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
11388	US	54	E	5	Cole	167.527	167.659	0.132	N
11389	US	54	E	5	Cole	167.659	168.735	1.076	N
11390	US	54	E	5	Cole	168.735	169.022	0.287	N
11459	US	54	W	5	Cole	103.173	103.459	0.286	N
11460	US	54	W	5	Cole	103.459	104.538	1.079	N
11461	US	54	W	5	Cole	104.538	104.660	0.122	N
11755	US	60	W	8	Greene	253.181	254.161	0.980	N
11760	US	60	W	8	Greene	258.647	261.079	2.432	N
12105	US	63	N	5	Boone	216.537	217.335	0.798	N
12106	US	63	N	5	Boone	217.335	218.214	0.879	N
12107	US	63	N	5	Boone	218.214	219.764	1.550	N
12218	US	63	S	5	Boone	117.474	119.048	1.574	N
12219	US	63	S	5	Boone	119.048	119.954	0.906	N
12220	US	63	S	5	Boone	119.954	120.753	0.799	N
12304	US	65	N	8	Greene	45.561	47.707	2.146	N
12305	US	65	N	8	Greene	47.707	48.723	1.016	N
12308	US	65	N	8	Greene	49.689	51.293	1.604	N
12309	US	65	N	8	Greene	51.293	52.281	0.988	N
12310	US	65	N	8	Greene	52.281	53.289	1.008	N
12311	US	65	N	8	Greene	53.289	54.073	0.784	N
12312	US	65	N	8	Greene	54.073	54.171	0.098	N
12461	US	65	S	8	Greene	258.890	258.970	0.080	N
12462	US	65	S	8	Greene	258.970	259.754	0.784	N
12463	US	65	S	8	Greene	259.754	260.763	1.009	N
12464	US	65	S	8	Greene	260.763	261.771	1.008	N
12465	US	65	S	8	Greene	261.771	263.337	1.566	N
12468	US	65	S	8	Greene	264.327	265.335	1.008	N
12469	US	65	S	8	Greene	265.335	267.474	2.139	N
12644	US	71	N	7	Jasper	53.353	54.052	0.699	N
12645	US	71	N	7	Jasper	54.052	54.348	0.296	N
12647	US	71	N	7	Jasper	55.862	56.881	1.019	N
12794	US	71	S	7	Jasper	259.946	260.966	1.020	N
12796	US	71	S	7	Jasper	262.477	262.776	0.299	N
12797	US	71	S	7	Jasper	262.776	263.497	0.721	N
10140	MO	13	N	8	Polk	86.472	87.703	1.231	N
10141	MO	13	N	8	Polk	87.703	88.049	0.346	N
URBAN FREEWAYS—Wider markings and edgeline rumble stripe with resurfacing									
97	IS	29	S	4	Platte	107.250	109.852	2.602	Y
144	IS	35	N	1	DeKalb	53.834	54.347	0.513	N
145	IS	35	N	1	DeKalb	54.347	54.876	0.529	N
180	IS	35	S	1	DeKalb	59.407	59.933	0.526	N
181	IS	35	S	1	DeKalb	59.933	60.447	0.514	N
182	IS	35	S	1	Clinton	60.447	61.299	0.852	N
196	IS	35	S	4	Clay	94.769	96.335	1.566	N
197	IS	35	S	4	Clay	96.335	97.841	1.506	N
198	IS	35	S	4	Clay	97.841	100.053	2.212	N
212	IS	44	E	7	Newton	2.841	3.990	1.149	Y
213	IS	44	E	7	Newton	3.990	4.478	0.488	Y
290	IS	44	E	9	Phelps	187.265	189.977	2.712	N
301	IS	44	E	9	Crawford	223.156	223.978	0.822	Y
404	IS	44	W	9	Phelps	100.289	100.494	0.205	Y
485	IS	44	W	7	Newton	284.330	286.278	1.948	Y
486	IS	44	W	7	Newton	286.278	287.417	1.139	Y
619	IS	55	S	10	Cape Girardeau	109.705	110.072	0.367	N
620	IS	55	S	10	Cape Girardeau	110.072	113.451	3.379	N
621	IS	55	S	10	Cape Girardeau	113.451	114.685	1.234	N
622	IS	55	S	10	Cape Girardeau	114.685	116.512	1.827	N
623	IS	55	S	10	Cape Girardeau	116.512	117.888	1.376	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
624	IS	55	S	10	Scott	117.888	119.435	1.547	N
694	IS	64	E	6	St. Louis City	11.500	12.318	0.818	N
695	IS	64	E	6	St. Louis City	12.318	13.286	0.968	N
696	IS	64	E	6	St. Louis City	13.286	13.600	0.314	N
703	IS	64	W	6	St. Louis City	1.710	2.020	0.310	N
704	IS	64	W	6	St. Louis City	2.020	2.993	0.973	N
705	IS	64	W	6	St. Louis City	2.993	3.750	0.757	N
760	IS	70	E	5	Cooper	101.119	101.774	0.655	Y
761	IS	70	E	5	Cooper	101.774	103.545	1.771	Y
762	IS	70	E	5	Cooper	103.545	103.895	0.350	Y
817	IS	70	E	6	St. Charles	228.271	228.984	0.713	N
818	IS	70	E	6	St. Charles	228.984	229.624	0.640	N
821	IS	70	E	6	St. Louis	231.221	231.515	0.294	N
822	IS	70	E	6	St. Louis	231.515	232.657	1.142	N
889	IS	70	W	6	St. Louis	18.836	19.999	1.163	N
890	IS	70	W	6	St. Louis	19.999	21.127	1.128	N
891	IS	70	W	6	St. Louis	21.127	21.410	0.283	N
892	IS	70	W	6	St. Charles	21.410	21.602	0.192	N
946	IS	70	W	5	Cooper	147.590	147.970	0.380	Y
947	IS	70	W	5	Cooper	147.970	149.729	1.759	Y
948	IS	70	W	5	Cooper	149.729	149.943	0.214	Y
1095	IS	270	E	6	St. Louis	20.317	21.072	0.755	N
1096	IS	270	E	6	St. Louis	21.072	23.134	2.062	N
1097	IS	270	E	6	St. Louis	23.134	23.828	0.694	N
1098	IS	270	E	6	St. Louis	23.828	25.513	1.685	N
1099	IS	270	E	6	St. Louis	25.513	26.361	0.848	N
1101	IS	270	E	6	St. Louis	26.883	27.853	0.970	N
1102	IS	270	E	6	St. Louis	27.853	28.368	0.515	N
1103	IS	270	E	6	St. Louis	28.368	29.867	1.499	N
1104	IS	270	E	6	St. Louis	29.867	30.571	0.704	N
1105	IS	270	E	6	St. Louis	30.571	30.913	0.342	N
1106	IS	270	E	6	St. Louis	30.913	32.086	1.173	N
1107	IS	270	E	6	St. Louis	32.086	33.066	0.980	N
1108	IS	270	E	6	St. Louis	33.066	34.057	0.991	N
1109	IS	270	E	6	St. Louis	34.057	35.017	0.960	N
1110	IS	270	E	6	St. Louis	35.017	35.043	0.026	N
1111	IS	270	E	6	St. Louis City	35.043	35.170	0.127	N
1112	IS	270	E	6	St. Louis City	35.170	35.752	0.582	N
1113	IS	270	W	6	St. Louis City	0.000	0.583	0.583	N
1114	IS	270	W	6	St. Louis City	0.583	0.714	0.131	N
1115	IS	270	W	6	St. Louis	0.714	0.737	0.023	N
1116	IS	270	W	6	St. Louis	0.737	1.704	0.967	N
1117	IS	270	W	6	St. Louis	1.704	2.693	0.989	N
1118	IS	270	W	6	St. Louis	2.693	3.673	0.980	N
1119	IS	270	W	6	St. Louis	3.673	4.848	1.175	N
1120	IS	270	W	6	St. Louis	4.848	5.196	0.348	N
1121	IS	270	W	6	St. Louis	5.196	5.909	0.713	N
1122	IS	270	W	6	St. Louis	5.909	7.400	1.491	N
1123	IS	270	W	6	St. Louis	7.400	7.912	0.512	N
1124	IS	270	W	6	St. Louis	7.912	8.680	0.768	N
1128	IS	270	W	6	St. Louis	9.480	10.406	0.926	N
1129	IS	270	W	6	St. Louis	10.406	12.101	1.695	N
1130	IS	270	W	6	St. Louis	12.101	12.800	0.699	N
1131	IS	270	W	6	St. Louis	12.800	14.869	2.069	N
1132	IS	270	W	6	St. Louis	14.869	15.633	0.764	N
1213	IS	470	E	4	Jackson	3.732	4.077	0.345	N
1214	IS	470	E	4	Jackson	4.077	7.383	3.306	N
1215	IS	470	E	4	Jackson	7.383	10.321	2.938	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
1216	IS	470	E	4	Jackson	10.321	12.647	2.326	N
1217	IS	470	E	4	Jackson	12.647	14.168	1.521	N
1222	IS	470	W	4	Jackson	2.463	4.443	1.980	N
1223	IS	470	W	4	Jackson	4.443	6.624	2.181	N
1224	IS	470	W	4	Jackson	6.624	9.264	2.640	N
1225	IS	470	W	4	Jackson	9.264	12.968	3.704	N
1226	IS	470	W	4	Jackson	12.968	13.317	0.349	N
1232	IS	635	S	4	Platte	0.000	1.473	1.473	N
1233	IS	635	S	4	Platte	1.473	2.016	0.543	N
1234	IS	635	S	4	Platte	2.016	3.716	1.700	N
11128	US	40	E	6	St. Louis	228.051	230.760	2.709	N
11129	US	40	E	6	St. Louis	230.760	232.396	1.636	N
11130	US	40	E	6	St. Louis	232.396	233.726	1.330	N
11131	US	40	W	6	St. Louis	15.247	16.638	1.391	N
11132	US	40	W	6	St. Louis	16.638	18.271	1.633	N
11133	US	40	W	6	St. Louis	18.271	20.978	2.707	N
11385	US	54	E	5	Cole	166.516	167.299	0.783	N
11463	US	54	W	5	Cole	104.937	105.722	0.785	N
12102	US	63	N	5	Boone	214.218	215.560	1.342	N
12103	US	63	N	5	Boone	215.560	216.514	0.954	N
12221	US	63	S	5	Boone	120.753	121.739	0.986	N
12222	US	63	S	5	Boone	121.739	123.094	1.355	N
12223	US	63	S	5	Boone	123.094	123.595	0.501	N
12672	US	71	N	7	Vernon	106.239	106.676	0.437	N
12673	US	71	N	7	Vernon	106.676	107.987	1.311	N
12765	US	71	S	7	Vernon	208.759	210.149	1.390	N
12766	US	71	S	7	Vernon	210.149	210.703	0.554	N
12767	US	71	S	7	Vernon	210.703	211.237	0.534	N
12768	US	71	S	7	Vernon	211.237	212.326	1.089	N
10911	MO	370	E	6	St. Charles	5.605	7.885	2.280	N
10912	MO	370	E	6	St. Charles	7.885	8.457	0.572	N
10913	MO	370	E	6	St. Louis	8.457	9.430	0.973	N
10914	MO	370	E	6	St. Louis	9.430	11.636	2.206	N
10915	MO	370	E	6	St. Louis	11.636	12.966	1.330	N
10916	MO	370	W	6	St. Louis	0.000	1.140	1.140	N
10917	MO	370	W	6	St. Louis	1.140	3.411	2.271	N
10918	MO	370	W	6	St. Louis	3.411	4.342	0.931	N
10919	MO	370	W	6	St. Charles	4.342	4.918	0.576	N
10920	MO	370	W	6	St. Charles	4.918	7.191	2.273	N
URBAN FREEWAYS—Wider markings and shoulder rumble strip with resurfacing									
80	IS	29	S	1	Buchanan	74.054	75.104	1.050	N
81	IS	29	S	1	Buchanan	75.104	76.147	1.043	N
82	IS	29	S	1	Buchanan	76.147	78.059	1.912	N
83	IS	29	S	1	Buchanan	78.059	79.803	1.744	N
84	IS	29	S	1	Buchanan	79.803	80.197	0.394	N
125	IS	35	N	4	Clay	8.182	8.859	0.677	N
126	IS	35	N	4	Clay	8.859	9.513	0.654	N
127	IS	35	N	4	Clay	9.513	11.029	1.516	N
128	IS	35	N	4	Clay	11.029	12.912	1.883	N
129	IS	35	N	4	Clay	12.912	14.112	1.200	N
199	IS	35	S	4	Clay	100.053	101.173	1.120	N
200	IS	35	S	4	Clay	101.173	103.076	1.903	N
201	IS	35	S	4	Clay	103.076	104.569	1.493	N
202	IS	35	S	4	Clay	104.569	105.222	0.653	N
203	IS	35	S	4	Clay	105.222	105.980	0.758	N
214	IS	44	E	7	Newton	4.478	6.602	2.124	Y
215	IS	44	E	7	Newton	6.602	8.816	2.214	Y
216	IS	44	E	7	Newton	8.816	9.006	0.190	Y

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
483	IS	44	W	7	Newton	281.466	283.693	2.227	Y
484	IS	44	W	7	Newton	283.693	284.330	0.637	Y
506	IS	55	N	10	New Madrid	65.408	65.922	0.514	N
507	IS	55	N	10	Scott	65.922	66.207	0.285	N
508	IS	55	N	10	Scott	66.207	67.513	1.306	N
509	IS	55	N	10	Scott	67.513	69.593	2.080	N
526	IS	55	N	10	Perry	129.514	129.898	0.384	N
527	IS	55	N	10	Perry	129.898	130.017	0.119	N
612	IS	55	S	10	Perry	79.961	80.074	0.113	N
613	IS	55	S	10	Perry	80.074	80.449	0.375	N
629	IS	55	S	10	Scott	140.363	142.435	2.072	N
630	IS	55	S	10	Scott	142.435	143.743	1.308	N
631	IS	55	S	10	Scott	143.743	144.019	0.276	N
632	IS	55	S	10	New Madrid	144.019	144.519	0.500	N
654	IS	57	N	10	Scott	0.247	0.573	0.326	N
669	IS	57	S	10	Mississippi	8.677	9.308	0.631	N
670	IS	57	S	10	Mississippi	9.308	10.003	0.695	N
672	IS	57	S	10	Mississippi	10.477	11.551	1.074	N
673	IS	57	S	10	Mississippi	11.551	11.757	0.206	N
678	IS	57	S	10	Scott	21.782	22.068	0.286	N
1004	IS	170	E	6	St. Louis	0.000	1.066	1.066	N
1005	IS	170	E	6	St. Louis	1.066	1.165	0.099	N
1006	IS	170	E	6	St. Louis	1.165	1.983	0.818	N
1007	IS	170	E	6	St. Louis	1.983	2.572	0.589	N
1008	IS	170	E	6	St. Louis	2.572	3.416	0.844	N
1009	IS	170	E	6	St. Louis	3.416	4.069	0.653	N
1010	IS	170	E	6	St. Louis	4.069	5.304	1.235	N
1011	IS	170	E	6	St. Louis	5.304	6.820	1.516	N
1027	IS	170	W	6	St. Louis	4.415	5.986	1.571	N
1028	IS	170	W	6	St. Louis	5.986	7.047	1.061	N
1029	IS	170	W	6	St. Louis	7.047	7.662	0.615	N
1030	IS	170	W	6	St. Louis	7.662	8.578	0.916	N
1031	IS	170	W	6	St. Louis	8.578	9.156	0.578	N
1032	IS	170	W	6	St. Louis	9.156	9.989	0.833	N
1033	IS	170	W	6	St. Louis	9.989	10.065	0.076	N
1034	IS	170	W	6	St. Louis	10.065	11.040	0.975	N
1072	IS	255	N	6	St. Louis	0.283	0.567	0.284	N
1073	IS	255	N	6	St. Louis	0.567	1.589	1.022	N
1074	IS	255	N	6	St. Louis	1.589	3.253	1.664	N
1075	IS	255	N	6	St. Louis	3.253	3.709	0.456	N
1078	IS	255	S	6	St. Louis	0.286	0.733	0.447	N
1079	IS	255	S	6	St. Louis	0.733	2.399	1.666	N
1080	IS	255	S	6	St. Louis	2.399	3.437	1.038	N
1081	IS	255	S	6	St. Louis	3.437	3.666	0.229	N
11024	US	36	E	1	Buchanan	0.000	0.202	0.202	N
11025	US	36	E	1	Buchanan	0.202	0.311	0.109	N
11026	US	36	E	1	Buchanan	0.311	0.675	0.364	N
11027	US	36	E	1	Buchanan	0.675	1.440	0.765	N
11028	US	36	E	1	Buchanan	1.440	1.960	0.520	N
11029	US	36	E	1	Buchanan	1.960	3.159	1.199	N
11030	US	36	E	1	Buchanan	3.159	3.871	0.712	N
11031	US	36	E	1	Buchanan	3.871	5.063	1.192	N
11092	US	36	W	1	Buchanan	187.611	188.836	1.225	N
11093	US	36	W	1	Buchanan	188.836	189.447	0.611	N
11094	US	36	W	1	Buchanan	189.447	190.728	1.281	N
11095	US	36	W	1	Buchanan	190.728	191.258	0.530	N
11096	US	36	W	1	Buchanan	191.258	192.026	0.768	N
11097	US	36	W	1	Buchanan	192.026	192.402	0.376	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
11098	US	36	W	1	Buchanan	192.402	192.473	0.071	N
URBAN FREEWAYS—Wider markings without resurfacing									
217	IS	44	E	7	Newton	9.006	10.699	1.693	N
218	IS	44	E	7	Jasper	10.699	11.863	1.164	N
481	IS	44	W	7	Jasper	278.419	279.630	1.211	N
482	IS	44	W	7	Newton	279.630	281.466	1.836	N
URBAN MULTILANE DIVIDED HIGHWAYS—Wider markings with resurfacing									
10975	US	24	E	4	Jackson	6.420	6.562	0.142	N
10976	US	24	E	4	Jackson	6.562	6.724	0.162	N
10978	US	24	E	4	Jackson	7.607	7.736	0.129	N
10980	US	24	E	4	Jackson	8.335	8.591	0.256	N
11049	US	36	E	1	DeKalb	33.509	33.845	0.336	N
11050	US	36	E	1	DeKalb	33.845	34.607	0.762	N
11051	US	36	E	1	DeKalb	34.607	35.363	0.756	N
11072	US	36	W	1	DeKalb	157.358	158.111	0.753	N
11073	US	36	W	1	DeKalb	158.111	158.880	0.769	N
11074	US	36	W	1	DeKalb	158.880	159.227	0.347	N
11109	US	40	E	4	Jackson	9.398	12.612	3.214	N
11110	US	40	E	4	Jackson	12.612	13.103	0.491	N
11111	US	40	E	4	Jackson	13.103	14.644	1.541	N
11145	US	40	W	4	Jackson	234.395	234.431	0.036	N
11146	US	40	W	4	Jackson	234.431	234.519	0.088	N
11147	US	40	W	4	Jackson	234.519	236.050	1.531	N
11148	US	40	W	4	Jackson	236.050	236.539	0.489	N
11149	US	40	W	4	Jackson	236.539	239.662	3.123	N
11150	US	40	W	4	Jackson	239.662	239.853	0.191	N
11229	US	50	E	5	Cole	138.739	139.114	0.375	N
11230	US	50	E	5	Cole	139.114	140.324	1.210	N
11231	US	50	E	5	Cole	140.324	140.862	0.538	N
11232	US	50	E	5	Cole	140.862	140.957	0.095	N
11233	US	50	E	5	Cole	140.957	141.052	0.095	N
11234	US	50	E	5	Cole	141.052	141.921	0.869	N
11235	US	50	E	5	Cole	141.921	142.530	0.609	N
11240	US	50	E	5	Cole	146.265	147.237	0.972	N
11275	US	50	W	5	Cole	115.370	116.317	0.947	N
11280	US	50	W	5	Cole	119.872	120.676	0.804	N
11281	US	50	W	5	Cole	120.676	121.546	0.870	N
11282	US	50	W	5	Cole	121.546	121.641	0.095	N
11283	US	50	W	5	Cole	121.641	121.735	0.094	N
11284	US	50	W	5	Cole	121.735	122.279	0.544	N
11285	US	50	W	5	Cole	122.279	123.487	1.208	N
11286	US	50	W	5	Cole	123.487	123.606	0.119	N
11391	US	54	E	5	Cole	169.022	169.235	0.213	N
11392	US	54	E	5	Callaway	169.235	169.867	0.632	N
11393	US	54	E	5	Callaway	169.867	170.330	0.463	N
11394	US	54	E	5	Callaway	170.330	170.955	0.625	N
11395	US	54	E	5	Callaway	170.955	171.315	0.360	N
11396	US	54	E	5	Callaway	171.315	175.532	4.217	N
11456	US	54	W	5	Callaway	101.872	102.326	0.454	N
11457	US	54	W	5	Callaway	102.326	102.961	0.635	N
11458	US	54	W	5	Cole	102.961	103.173	0.212	N
11546	US	60	E	8	Greene	79.703	82.381	2.678	N
11547	US	60	E	8	Greene	82.381	82.594	0.213	N
11552	US	60	E	8	Greene	86.650	87.848	1.198	N
11553	US	60	E	8	Greene	87.848	88.465	0.617	N
11754	US	60	W	8	Greene	252.872	253.181	0.309	N
11770	US	61	N	10	Cape Girardeau	106.892	108.220	1.328	N
11771	US	61	N	10	Cape Girardeau	108.220	108.260	0.040	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
11772	US	61	N	10	Cape Girardeau	108.260	108.643	0.383	N
11776	US	61	N	6	St. Louis	226.081	226.483	0.402	N
11777	US	61	N	6	St. Louis	226.483	226.524	0.041	N
11778	US	61	N	6	St. Louis	226.524	228.304	1.780	N
11779	US	61	N	6	St. Louis	228.304	228.690	0.386	N
11831	US	61	N	3	Marion	331.486	331.827	0.341	N
11833	US	61	N	3	Marion	333.462	333.621	0.159	N
11871	US	61	S	3	Marion	59.645	59.853	0.208	N
11872	US	61	S	3	Marion	59.853	59.976	0.123	N
11877	US	61	S	3	Marion	61.484	62.029	0.545	N
11927	US	61	S	6	St. Louis	164.556	164.774	0.218	N
11928	US	61	S	6	St. Louis	164.774	165.348	0.574	N
11929	US	61	S	6	St. Louis	165.348	167.112	1.764	N
11930	US	61	S	6	St. Louis	167.112	167.172	0.060	N
11946	US	61	S	6	Jefferson	183.189	183.654	0.465	N
11957	US	61	S	6	Jefferson	198.591	199.160	0.569	N
12012	US	61	S	10	Cape Girardeau	284.686	285.068	0.382	N
12013	US	61	S	10	Cape Girardeau	285.068	285.146	0.078	N
12014	US	61	S	10	Cape Girardeau	285.146	286.324	1.178	N
12015	US	61	S	10	Cape Girardeau	286.324	286.431	0.107	N
12025	US	61	S	10	Cape Girardeau	290.513	290.870	0.357	N
12026	US	61	S	10	Cape Girardeau	290.870	292.193	1.323	N
12108	US	63	N	5	Boone	219.764	222.082	2.318	N
12169	US	63	S	2	Adair	30.082	30.297	0.215	N
12170	US	63	S	2	Adair	30.297	30.691	0.394	N
12217	US	63	S	5	Boone	115.194	117.474	2.280	N
12235	US	63	S	5	Callaway	146.940	147.575	0.635	N
12363	US	65	S	2	Livingston	57.396	57.679	0.283	N
12366	US	65	S	2	Livingston	59.018	59.725	0.707	N
12367	US	65	S	2	Livingston	59.725	59.850	0.125	N
12524	US	67	N	6	St. Louis	173.845	175.107	1.262	N
12525	US	67	N	6	St. Louis	175.107	176.780	1.673	N
12526	US	67	N	6	St. Louis	176.780	179.117	2.337	N
12529	US	67	N	6	St. Louis	179.360	179.763	0.403	N
12530	US	67	N	6	St. Louis	179.763	180.130	0.367	N
12535	US	67	N	6	St. Louis	182.350	182.969	0.619	N
12536	US	67	N	6	St. Louis	182.969	183.920	0.951	N
12541	US	67	N	6	St. Louis	194.019	194.102	0.083	N
12549	US	67	S	6	St. Louis	4.403	5.838	1.435	N
12557	US	67	S	6	St. Louis	14.140	15.167	1.027	N
12558	US	67	S	6	St. Louis	15.167	15.700	0.533	N
12562	US	67	S	6	St. Louis	17.750	17.908	0.158	N
12563	US	67	S	6	St. Louis	17.908	18.370	0.462	N
12564	US	67	S	6	St. Louis	18.370	18.868	0.498	N
12566	US	67	S	6	St. Louis	18.936	21.357	2.421	N
12567	US	67	S	6	St. Louis	21.357	23.031	1.674	N
12568	US	67	S	6	St. Louis	23.031	24.280	1.249	N
12569	US	67	S	6	St. Louis	24.280	25.706	1.426	N
12860	US	160	E	8	Greene	88.989	89.256	0.267	N
12888	US	160	W	8	Greene	221.707	223.013	1.306	N
12893	US	160	W	8	Greene	234.235	234.508	0.273	N
12894	US	160	W	8	Greene	234.508	234.555	0.047	N
12898	US	169	N	4	Clay	0.432	0.700	0.268	N
12899	US	169	N	4	Clay	0.700	3.854	3.154	N
12900	US	169	N	4	Clay	3.854	5.260	1.406	N
12907	US	169	N	4	Clay	10.529	12.881	2.352	N
12908	US	169	N	4	Clay	12.881	13.201	0.320	N
12971	US	169	S	4	Clay	110.040	110.500	0.460	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
12974	US	169	S	4	Clay	110.798	111.621	0.823	N
12975	US	169	S	4	Clay	111.621	113.006	1.385	N
12976	US	169	S	4	Clay	113.006	115.053	2.047	N
12977	US	169	S	4	Clay	115.053	115.700	0.647	N
12982	US	169	S	4	Clay	120.100	120.389	0.289	N
12983	US	169	S	4	Clay	120.389	120.511	0.122	N
12984	US	169	S	4	Clay	120.511	122.190	1.679	N
12985	US	169	S	4	Clay	122.190	124.800	2.610	N
12988	US	63C	N	5	Boone	0.000	0.355	0.355	N
12989	US	63C	N	5	Boone	0.956	1.252	0.296	N
12990	US	63C	S	5	Boone	0.000	0.468	0.468	N
12994	US	63C	S	5	Boone	1.069	1.206	0.137	N
10036	MO	7	N	4	Cass	146.836	147.205	0.369	N
10090	MO	9	N	4	Clay	4.082	4.819	0.737	N
10105	MO	9	S	4	Clay	9.408	10.277	0.869	N
10185	MO	13	S	8	Greene	232.861	232.943	0.082	N
10186	MO	13	S	8	Greene	232.943	233.954	1.011	N
10189	MO	13	S	8	Greene	234.780	235.470	0.690	N
10190	MO	13	S	8	Greene	235.470	236.025	0.555	N
10191	MO	13	S	8	Greene	236.025	236.897	0.872	N
10194	MO	13	S	8	Greene	237.103	238.425	1.322	N
10287	MO	30	E	6	Jefferson	27.550	31.363	3.813	N
10296	MO	30	E	6	St. Louis	41.134	41.725	0.591	N
10310	MO	30	W	6	Jefferson	21.278	21.360	0.082	N
10311	MO	30	W	6	Jefferson	21.360	25.020	3.660	N
10457	MO	78	E	4	Jackson	0.395	1.609	1.214	N
10515	MO	94	E	6	St. Charles	110.601	110.734	0.133	N
10516	MO	94	E	6	St. Charles	110.734	110.911	0.177	N
10517	MO	94	E	6	St. Charles	110.911	111.141	0.230	N
10571	MO	100	E	6	St. Louis	95.070	95.861	0.791	N
10572	MO	100	E	6	St. Louis	95.861	97.374	1.513	N
10573	MO	100	E	6	St. Louis	97.374	98.370	0.996	N
10585	MO	100	E	6	St. Louis	106.988	107.017	0.029	N
10586	MO	100	E	6	St. Louis	107.017	107.134	0.117	N
10612	MO	115	N	6	St. Louis	8.866	9.743	0.877	N
10613	MO	115	N	6	St. Louis	9.743	9.963	0.220	N
10614	MO	115	N	6	St. Louis	9.963	10.249	0.286	N
10615	MO	115	S	6	St. Louis	0.000	0.253	0.253	N
10616	MO	115	S	6	St. Louis	0.253	0.506	0.253	N
10617	MO	115	S	6	St. Louis	0.506	1.408	0.902	N
10639	MO	141	N	6	St. Louis	11.075	11.151	0.076	N
10640	MO	141	N	6	St. Louis	11.151	11.827	0.676	N
10641	MO	141	N	6	St. Louis	11.827	11.961	0.134	N
10642	MO	141	N	6	St. Louis	11.961	12.045	0.084	N
10648	MO	141	N	6	St. Louis	16.800	17.482	0.682	N
10649	MO	141	N	6	St. Louis	17.482	17.970	0.488	N
10656	MO	141	S	6	St. Louis	3.381	3.884	0.503	N
10657	MO	141	S	6	St. Louis	3.884	4.760	0.876	N
10663	MO	141	S	6	St. Louis	9.313	9.396	0.083	N
10664	MO	141	S	6	St. Louis	9.396	9.531	0.135	N
10665	MO	141	S	6	St. Louis	9.531	10.210	0.679	N
10666	MO	141	S	6	St. Louis	10.210	10.283	0.073	N
10688	MO	152	E	4	Clay	13.567	14.043	0.476	N
10689	MO	152	E	4	Clay	14.043	16.051	2.008	N
10694	MO	152	W	4	Clay	0.845	2.815	1.970	N
10695	MO	152	W	4	Clay	2.815	3.314	0.499	N
10706	MO	163	N	5	Boone	6.606	7.461	0.855	N
10707	MO	163	N	5	Boone	7.461	7.881	0.420	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
10708	MO	163	N	5	Boone	7.881	9.441	1.560	N
10716	MO	163	S	5	Boone	2.263	3.818	1.555	N
10717	MO	163	S	5	Boone	3.818	4.250	0.432	N
10718	MO	163	S	5	Boone	4.250	5.105	0.855	N
10731	MO	180	E	6	St. Louis	6.360	6.432	0.072	N
10732	MO	180	E	6	St. Louis	6.432	6.529	0.097	N
10733	MO	180	E	6	St. Louis	6.529	8.310	1.781	N
10746	MO	210	E	4	Clay	0.444	1.601	1.157	N
10747	MO	210	E	4	Clay	1.601	3.791	2.190	N
10766	MO	210	W	4	Clay	29.807	29.827	0.020	N
10767	MO	210	W	4	Clay	29.827	32.020	2.193	N
10768	MO	210	W	4	Clay	32.020	32.902	0.882	N
10779	MO	269	S	4	Clay	1.552	1.674	0.122	N
10790	MO	291	N	4	Jackson	27.725	27.872	0.147	N
10791	MO	291	N	4	Jackson	27.872	30.148	2.276	N
10792	MO	291	N	4	Jackson	30.148	31.094	0.946	N
10793	MO	291	N	4	Jackson	31.094	32.910	1.816	N
10794	MO	291	N	4	Jackson	32.910	33.009	0.099	N
10808	MO	291	S	4	Clay	7.858	8.079	0.221	N
10816	MO	291	S	4	Jackson	16.381	16.481	0.100	N
10817	MO	291	S	4	Jackson	16.481	18.278	1.797	N
10818	MO	291	S	4	Jackson	18.278	19.222	0.944	N
10819	MO	291	S	4	Jackson	19.222	21.494	2.272	N
10820	MO	291	S	4	Jackson	21.494	21.636	0.142	N
10838	MO	340	E	6	St. Louis	3.592	4.596	1.004	N
10839	MO	340	E	6	St. Louis	4.596	5.011	0.415	N
10850	MO	340	E	6	St. Louis	11.840	13.973	2.133	N
10858	MO	340	E	6	St. Louis	19.129	19.268	0.139	N
10892	MO	366	E	6	St. Louis	3.541	3.662	0.121	N
10943	MO	740	E	5	Boone	5.321	6.279	0.958	N
15003	BU	60	E	10	Butler	0.306	0.476	0.170	N
15026	BU	67	S	10	Butler	4.532	4.587	0.055	N
15027	BU	67	S	10	Butler	4.587	5.133	0.546	N
15039	BU	65	N	8	Greene	7.014	8.775	1.761	N
15053	BU	65	S	8	Greene	5.548	5.938	0.390	N
15054	BU	65	S	8	Greene	5.938	7.233	1.295	N
15071	BU	63	S	2	Randolph	2.453	2.672	0.219	N
15077	LP	29	N	1	Andrew	11.390	11.594	0.204	N
15098	LP	44	E	8	Greene	4.332	6.931	2.599	N
15118	RT	AC	E	5	Boone	2.037	2.197	0.160	N
15143	RT	H	N	8	Greene	0.000	0.225	0.225	N
15158	RT	Y	E	5	Pettis	28.712	29.123	0.411	N
15198	RT	H	S	6	St. Louis City	0.219	0.250	0.031	N
15200	RT	H	S	6	St. Louis City	3.629	4.407	0.778	N
URBAN MULTILANE DIVIDED HIGHWAYS—Wider markings and edgeline rumble stripe with resurfacing									
11153	US	50	E	4	Jackson	10.999	11.999	1.000	N
11154	US	50	E	4	Jackson	11.999	12.346	0.347	N
11170	US	50	E	4	Johnson	49.966	50.282	0.316	N
11171	US	50	E	4	Johnson	50.282	51.485	1.203	N
11172	US	50	E	4	Johnson	51.485	52.760	1.275	N
11173	US	50	E	4	Johnson	52.760	53.476	0.716	N
11227	US	50	E	5	Cole	137.468	137.508	0.040	N
11228	US	50	E	5	Cole	137.508	138.739	1.231	N
11236	US	50	E	5	Cole	142.530	143.075	0.545	N
11237	US	50	E	5	Cole	143.075	143.854	0.779	N
11238	US	50	E	5	Cole	143.854	145.222	1.368	N
11239	US	50	E	5	Cole	145.222	146.265	1.043	N
11276	US	50	W	5	Cole	116.317	117.442	1.125	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
11277	US	50	W	5	Cole	117.442	118.755	1.313	N
11278	US	50	W	5	Cole	118.755	119.522	0.767	N
11279	US	50	W	5	Cole	119.522	119.872	0.350	N
11287	US	50	W	5	Cole	123.606	125.094	1.488	N
11305	US	50	W	4	Johnson	209.260	209.844	0.584	N
11306	US	50	W	4	Johnson	209.844	211.141	1.297	N
11307	US	50	W	4	Johnson	211.141	212.316	1.175	N
11308	US	50	W	4	Johnson	212.316	212.772	0.456	N
11323	US	50	W	4	Jackson	249.641	250.108	0.467	N
11324	US	50	W	4	Jackson	250.108	250.468	0.360	N
11325	US	50	W	4	Jackson	250.468	251.482	1.014	N
11383	US	54	E	5	Cole	163.467	165.339	1.872	N
11384	US	54	E	5	Cole	165.339	166.516	1.177	N
11464	US	54	W	5	Cole	105.722	106.811	1.089	N
11465	US	54	W	5	Cole	106.811	108.781	1.970	N
11781	US	61	N	6	St. Charles	256.940	257.032	0.092	N
11782	US	61	N	6	St. Charles	257.032	258.140	1.108	N
11783	US	61	N	6	St. Charles	258.140	258.341	0.201	N
11828	US	61	N	3	Ralls	329.440	330.322	0.882	N
11829	US	61	N	3	Marion	330.322	330.738	0.416	N
11830	US	61	N	3	Marion	330.738	331.486	0.748	N
11834	US	61	N	3	Marion	333.621	333.769	0.148	N
11835	US	61	N	3	Marion	333.769	334.019	0.250	N
11870	US	61	S	3	Marion	59.271	59.645	0.374	N
11878	US	61	S	3	Marion	62.029	62.680	0.651	N
11923	US	61	S	6	St. Charles	135.110	135.317	0.207	N
11924	US	61	S	6	St. Charles	135.317	136.580	1.263	N
11925	US	61	S	6	St. Charles	136.580	136.599	0.019	N
12093	US	63	N	5	Callaway	189.478	190.361	0.883	N
12505	US	67	N	10	St. Francois	100.705	101.159	0.454	N
12506	US	67	N	10	St. Francois	101.159	102.574	1.415	N
12509	US	67	N	10	St. Francois	108.111	108.547	0.436	N
12521	US	67	N	6	Jefferson	136.075	136.383	0.308	N
12522	US	67	N	6	Jefferson	136.383	136.731	0.348	N
12571	US	67	S	6	Jefferson	61.612	61.700	0.088	N
12572	US	67	S	6	Jefferson	61.700	62.038	0.338	N
12585	US	67	S	10	St. Francois	89.585	90.027	0.442	N
10181	MO	13	S	8	Greene	231.830	231.989	0.159	N
10286	MO	30	E	6	Jefferson	27.395	27.550	0.155	N
10288	MO	30	E	6	Jefferson	31.363	36.709	5.346	N
10289	MO	30	E	6	Jefferson	36.709	36.936	0.227	N
10290	MO	30	E	6	St. Louis	36.936	37.155	0.219	N
10291	MO	30	E	6	St. Louis	37.155	38.062	0.907	N
10292	MO	30	E	6	St. Louis	38.062	40.686	2.624	N
10293	MO	30	E	6	St. Louis	40.686	40.736	0.050	N
10304	MO	30	W	6	St. Louis	11.891	11.963	0.072	N
10305	MO	30	W	6	St. Louis	11.963	14.593	2.630	N
10306	MO	30	W	6	St. Louis	14.593	15.505	0.912	N
10307	MO	30	W	6	St. Louis	15.505	15.739	0.234	N
10308	MO	30	W	6	Jefferson	15.739	15.958	0.219	N
10309	MO	30	W	6	Jefferson	15.958	21.278	5.320	N
10312	MO	30	W	6	Jefferson	25.020	25.256	0.236	N
10472	MO	79	N	6	St. Charles	0.547	1.070	0.523	N
10489	MO	79	S	6	St. Charles	86.452	86.992	0.540	N
10490	MO	79	S	6	St. Charles	86.992	87.495	0.503	N
10508	MO	94	E	6	St. Charles	103.421	104.673	1.252	N
10509	MO	94	E	6	St. Charles	104.673	105.023	0.350	N
10510	MO	94	E	6	St. Charles	105.023	105.671	0.648	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
10539	MO	94	W	6	St. Charles	30.850	31.582	0.732	N
10540	MO	94	W	6	St. Charles	31.582	31.930	0.348	N
10541	MO	94	W	6	St. Charles	31.930	33.100	1.170	N
10630	MO	141	N	6	Jefferson	0.604	1.771	1.167	N
10631	MO	141	N	6	Jefferson	1.771	3.592	1.821	N
10632	MO	141	N	6	Jefferson	3.592	6.593	3.001	N
10633	MO	141	N	6	Jefferson	6.593	6.688	0.095	N
10634	MO	141	N	6	St. Louis	6.688	7.165	0.477	N
10671	MO	141	S	6	St. Louis	14.191	14.664	0.473	N
10672	MO	141	S	6	Jefferson	14.664	14.748	0.084	N
10673	MO	141	S	6	Jefferson	14.748	17.756	3.008	N
10674	MO	141	S	6	Jefferson	17.756	19.608	1.852	N
10675	MO	141	S	6	Jefferson	19.608	20.774	1.166	N
10874	MO	350	E	4	Jackson	7.007	7.846	0.839	N
10875	MO	350	E	4	Jackson	7.846	8.532	0.686	N
10877	MO	350	W	4	Jackson	0.085	0.732	0.647	N
10878	MO	350	W	4	Jackson	0.732	1.560	0.828	N
URBAN MULTILANE DIVIDED HIGHWAYS—Wider markings and shoulder rumble strip with resurfacing									
11032	US	36	E	1	Buchanan	5.063	5.627	0.564	N
11091	US	36	W	1	Buchanan	187.132	187.611	0.479	N
10214	MO	21	N	6	Jefferson	178.179	180.780	2.601	N
10215	MO	21	N	6	Jefferson	180.780	184.907	4.127	N
10228	MO	21	S	6	Jefferson	9.683	13.763	4.080	N
10229	MO	21	S	6	Jefferson	13.763	16.443	2.680	N
URBAN MULTILANE DIVIDED HIGHWAYS—Wider markings without resurfacing									
12639	US	71	N	7	Jasper	42.449	42.454	0.005	N
12640	US	71	N	7	Jasper	42.454	43.161	0.707	N
12804	US	71	S	7	Jasper	274.242	274.395	0.153	N
URBAN MULTILANE UNDIVIDED HIGHWAYS—Wider markings with resurfacing									
10974	US	24	E	4	Jackson	5.653	6.420	0.767	N
10977	US	24	E	4	Jackson	6.724	7.607	0.883	N
10979	US	24	E	4	Jackson	7.736	8.335	0.599	N
10981	US	24	E	4	Jackson	8.591	10.743	2.152	N
10982	US	24	E	4	Jackson	10.743	12.660	1.917	N
11874	US	61	S	3	Marion	60.015	60.688	0.673	N
11875	US	61	S	3	Marion	60.688	61.332	0.644	N
11876	US	61	S	3	Marion	61.332	61.484	0.152	N
11931	US	61	S	6	St. Louis	167.172	167.261	0.089	N
11932	US	61	S	6	St. Louis	167.261	167.592	0.331	N
11933	US	61	S	6	St. Louis	167.592	167.877	0.285	N
11936	US	61	S	6	St. Louis	169.363	169.421	0.058	N
11937	US	61	S	6	St. Louis	169.421	169.968	0.547	N
11941	US	61	S	6	St. Louis	177.990	179.802	1.812	N
11942	US	61	S	6	St. Louis	179.802	180.399	0.597	N
11943	US	61	S	6	Jefferson	180.399	181.582	1.183	N
11944	US	61	S	6	Jefferson	181.582	182.250	0.668	N
11945	US	61	S	6	Jefferson	182.250	183.189	0.939	N
11947	US	61	S	6	Jefferson	183.654	184.705	1.051	N
11948	US	61	S	6	Jefferson	184.705	187.512	2.807	N
11949	US	61	S	6	Jefferson	187.512	188.894	1.382	N
11956	US	61	S	6	Jefferson	196.983	198.591	1.608	N
11958	US	61	S	6	Jefferson	199.160	199.625	0.465	N
12009	US	61	S	10	Cape Girardeau	281.022	283.339	2.317	N
12010	US	61	S	10	Cape Girardeau	283.339	284.560	1.221	N
12011	US	61	S	10	Cape Girardeau	284.560	284.686	0.126	N
12016	US	61	S	10	Cape Girardeau	286.431	287.164	0.733	N
12017	US	61	S	10	Cape Girardeau	287.164	288.039	0.875	N
12018	US	61	S	10	Cape Girardeau	288.039	288.363	0.324	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
12019	US	61	S	10	Cape Girardeau	288.363	288.700	0.337	N
12020	US	61	S	10	Cape Girardeau	288.700	288.912	0.212	N
12021	US	61	S	10	Cape Girardeau	288.912	289.350	0.438	N
12022	US	61	S	10	Cape Girardeau	289.350	289.595	0.245	N
12023	US	61	S	10	Cape Girardeau	289.595	289.943	0.348	N
12024	US	61	S	10	Cape Girardeau	289.943	290.513	0.570	N
12062	US	62	E	10	Scott	59.474	59.803	0.329	N
12063	US	62	E	10	Scott	59.803	60.764	0.961	N
12064	US	62	E	10	Scott	60.764	61.253	0.489	N
12065	US	62	E	10	Scott	61.253	61.943	0.690	N
12158	US	63	S	2	Adair	26.718	26.985	0.267	N
12159	US	63	S	2	Adair	26.985	27.258	0.273	N
12187	US	63	S	2	Macon	61.084	61.173	0.089	N
12267	US	63	S	9	Howell	308.823	309.477	0.654	N
12362	US	65	S	2	Livingston	56.692	57.396	0.704	N
12364	US	65	S	2	Livingston	57.679	58.332	0.653	N
12365	US	65	S	2	Livingston	58.332	59.018	0.686	N
12411	US	65	S	5	Pettis	149.557	149.769	0.212	N
12412	US	65	S	5	Pettis	149.769	150.225	0.456	N
12413	US	65	S	5	Pettis	150.225	151.231	1.006	N
12414	US	65	S	5	Pettis	151.231	151.388	0.157	N
12551	US	67	S	6	St. Louis	5.928	9.861	3.933	N
12944	US	169	S	1	Buchanan	73.753	73.797	0.044	N
12945	US	169	S	1	Buchanan	73.797	74.370	0.573	N
12946	US	169	S	1	Buchanan	74.370	74.802	0.432	N
12947	US	169	S	1	Buchanan	74.802	75.268	0.466	N
12992	US	63C	S	5	Boone	0.765	0.886	0.121	N
12993	US	63C	S	5	Boone	0.886	1.069	0.183	N
10001	MO	6	E	1	Buchanan	0.000	0.501	0.501	N
10041	MO	7	S	4	Jackson	7.709	7.818	0.109	N
10042	MO	7	S	4	Jackson	7.818	9.268	1.450	N
10063	MO	7	S	4	Cass	39.957	40.326	0.369	N
10183	MO	13	S	8	Greene	232.112	232.279	0.167	N
10184	MO	13	S	8	Greene	232.279	232.861	0.582	N
10187	MO	13	S	8	Greene	233.954	234.459	0.505	N
10188	MO	13	S	8	Greene	234.459	234.780	0.321	N
10218	MO	21	S	6	St. Louis	0.000	2.408	2.408	N
10219	MO	21	S	6	St. Louis	2.408	3.071	0.663	N
10220	MO	21	S	6	St. Louis	3.071	3.605	0.534	N
10221	MO	21	S	6	St. Louis	3.605	3.865	0.260	N
10222	MO	21	S	6	St. Louis	3.865	5.378	1.513	N
10297	MO	30	E	6	St. Louis	41.725	44.832	3.107	N
10298	MO	30	E	6	St. Louis	44.832	45.379	0.547	N
10299	MO	30	E	6	St. Louis	45.379	46.957	1.578	N
10300	MO	30	E	6	St. Louis City	46.957	47.106	0.149	N
10301	MO	30	E	6	St. Louis City	47.106	50.601	3.495	N
10331	MO	43	S	7	Jasper	53.092	55.094	2.002	N
10332	MO	43	S	7	Newton	55.094	56.477	1.383	N
10369	MO	45	S	4	Platte	36.512	36.808	0.296	N
10370	MO	45	S	4	Platte	36.808	36.965	0.157	N
10412	MO	58	E	4	Cass	3.299	4.473	1.174	N
10413	MO	58	E	4	Cass	4.473	5.016	0.543	N
10439	MO	66	E	7	Jasper	3.837	3.959	0.122	N
10440	MO	66	E	7	Jasper	3.959	4.286	0.327	N
10441	MO	66	E	7	Jasper	4.286	4.949	0.663	N
10442	MO	66	E	7	Jasper	4.949	5.290	0.341	N
10443	MO	66	E	7	Jasper	5.290	5.924	0.634	N
10444	MO	66	E	7	Jasper	5.924	6.341	0.417	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
10445	MO	66	E	7	Jasper	6.341	6.946	0.605	N
10446	MO	66	E	7	Jasper	6.946	7.929	0.983	N
10447	MO	66	E	7	Jasper	7.929	8.930	1.001	N
10458	MO	78	E	4	Jackson	1.609	2.783	1.174	N
10459	MO	78	E	4	Jackson	2.783	3.517	0.734	N
10460	MO	78	E	4	Jackson	3.517	4.517	1.000	N
10461	MO	78	E	4	Jackson	4.517	6.441	1.924	N
10579	MO	100	E	6	St. Louis	102.851	103.284	0.433	N
10580	MO	100	E	6	St. Louis	103.284	104.888	1.604	N
10587	MO	100	E	6	St. Louis	107.134	108.596	1.462	N
10588	MO	100	E	6	St. Louis	108.596	109.050	0.454	N
10589	MO	100	E	6	St. Louis	109.050	109.119	0.069	N
10590	MO	100	E	6	St. Louis	109.119	109.175	0.056	N
10591	MO	100	E	6	St. Louis	109.175	111.552	2.377	N
10592	MO	100	E	6	St. Louis	111.552	113.829	2.277	N
10597	MO	100	E	6	St. Louis City	118.098	120.654	2.556	N
10652	MO	141	S	6	St. Louis	0.000	1.352	1.352	N
10653	MO	141	S	6	St. Louis	1.352	1.681	0.329	N
10710	MO	163	S	5	Boone	0.024	0.335	0.311	N
10711	MO	163	S	5	Boone	0.335	0.836	0.501	N
10712	MO	163	S	5	Boone	0.836	1.235	0.399	N
10713	MO	163	S	5	Boone	1.235	1.878	0.643	N
10714	MO	163	S	5	Boone	1.878	2.195	0.317	N
10715	MO	163	S	5	Boone	2.195	2.263	0.068	N
10719	MO	163	S	5	Boone	5.105	5.489	0.384	N
10729	MO	180	E	6	St. Louis	2.505	5.044	2.539	N
10730	MO	180	E	6	St. Louis	5.044	6.360	1.316	N
10734	MO	180	E	6	St. Louis	8.310	8.787	0.477	N
10807	MO	291	S	4	Clay	6.332	7.858	1.526	N
10836	MO	340	E	6	St. Louis	0.000	0.843	0.843	N
10837	MO	340	E	6	St. Louis	0.843	3.592	2.749	N
10840	MO	340	E	6	St. Louis	5.011	5.643	0.632	N
10843	MO	340	E	6	St. Louis	8.287	8.613	0.326	N
10844	MO	340	E	6	St. Louis	8.613	10.374	1.761	N
10855	MO	340	E	6	St. Louis	16.355	16.595	0.240	N
10856	MO	340	E	6	St. Louis	16.595	18.925	2.330	N
10857	MO	340	E	6	St. Louis	18.925	19.129	0.204	N
10893	MO	366	E	6	St. Louis	3.662	5.116	1.454	N
10894	MO	366	E	6	St. Louis	5.116	6.750	1.634	N
10895	MO	366	E	6	St. Louis	6.750	6.874	0.124	N
10896	MO	366	E	6	St. Louis	6.874	6.884	0.010	N
10930	MO	413	S	8	Greene	0.152	0.801	0.649	N
10936	MO	740	E	5	Boone	0.099	0.529	0.430	N
10937	MO	740	E	5	Boone	0.529	1.026	0.497	N
10938	MO	740	E	5	Boone	1.026	2.654	1.628	N
10939	MO	740	E	5	Boone	2.654	2.966	0.312	N
10940	MO	740	E	5	Boone	2.966	3.990	1.024	N
10941	MO	740	E	5	Boone	3.990	4.669	0.679	N
10942	MO	740	E	5	Boone	4.669	5.321	0.652	N
10951	MO	744	E	8	Greene	6.660	7.030	0.370	N
10952	MO	744	E	8	Greene	7.030	8.522	1.492	N
10963	MO	763	S	5	Boone	3.440	3.866	0.426	N
10966	MO	763	S	5	Boone	4.134	4.352	0.218	N
10968	MO	763	S	5	Boone	4.543	5.076	0.533	N
10969	MO	763	S	5	Boone	5.076	5.412	0.336	N
10970	MO	763	S	5	Boone	5.412	6.272	0.860	N
15004	BU	60	E	10	Butler	0.476	0.692	0.216	N
15005	BU	60	E	10	Butler	0.692	1.097	0.405	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
15006	BU	60	E	10	Butler	1.097	2.452	1.355	N
15007	BU	60	E	10	Butler	2.452	2.814	0.362	N
15008	BU	60	E	10	Butler	2.814	3.190	0.376	N
15025	BU	67	S	10	Butler	3.546	4.532	0.986	N
15033	BU	50	E	5	Cole	0.493	1.247	0.754	N
15034	BU	50	E	5	Cole	1.247	1.646	0.399	N
15035	BU	50	E	5	Cole	1.646	2.945	1.299	N
15043	BU	65	S	8	Greene	2.293	2.966	0.673	N
15045	BU	65	S	8	Greene	3.088	3.390	0.302	N
15046	BU	65	S	8	Greene	3.390	3.742	0.352	N
15049	BU	65	S	8	Greene	4.407	4.858	0.451	N
15052	BU	65	S	8	Greene	5.336	5.548	0.212	N
15056	BU	71	S	7	Jasper	8.803	9.132	0.329	N
15057	BU	71	S	7	Jasper	9.132	10.021	0.889	N
15058	BU	71	S	7	Jasper	10.021	10.759	0.738	N
15059	BU	71	S	7	Jasper	10.759	11.753	0.994	N
15060	BU	71	S	7	Jasper	11.753	12.717	0.964	N
15061	BU	71	S	7	Jasper	12.717	13.152	0.435	N
15062	BU	71	S	7	Jasper	13.152	13.728	0.576	N
15063	BU	71	S	7	Jasper	13.728	14.736	1.008	N
15069	BU	63	S	2	Randolph	1.097	1.264	0.167	N
15070	BU	63	S	2	Randolph	1.264	2.453	1.189	N
15072	BU	63	S	2	Randolph	2.672	3.046	0.374	N
15073	BU	63	S	2	Randolph	3.046	4.308	1.262	N
15074	BU	63	S	2	Randolph	4.308	4.411	0.103	N
15075	BU	63	S	2	Randolph	4.411	4.851	0.440	N
15084	LP	70	E	5	Boone	0.071	0.427	0.356	N
15085	LP	70	E	5	Boone	0.427	0.733	0.306	N
15086	LP	70	E	5	Boone	0.733	1.009	0.276	N
15087	LP	70	E	5	Boone	1.009	1.503	0.494	N
15088	LP	70	E	5	Boone	1.694	2.347	0.653	N
15089	LP	70	E	5	Boone	2.347	2.782	0.435	N
15095	LP	44	E	8	Greene	3.123	3.501	0.378	N
15096	LP	44	E	8	Greene	3.501	4.258	0.757	N
15097	LP	44	E	8	Greene	4.258	4.332	0.074	N
15101	LP	44	E	8	Greene	7.195	7.806	0.611	N
15102	LP	44	E	8	Greene	7.806	8.128	0.322	N
15103	LP	44	E	8	Greene	8.128	8.253	0.125	N
15105	LP	44	E	8	Greene	8.310	8.693	0.383	N
15108	LP	44	E	8	Greene	8.943	9.180	0.237	N
15110	LP	44	E	8	Greene	9.204	9.251	0.047	N
15125	RT	B	S	5	Boone	7.737	8.154	0.417	N
15126	RT	B	S	5	Boone	8.154	9.959	1.805	N
15129	RT	B	S	5	Boone	11.352	12.923	1.571	N
15136	RT	D	E	8	Greene	0.093	0.851	0.758	N
15137	RT	D	E	8	Greene	0.851	2.090	1.239	N
15155	RT	Y	E	5	Pettis	27.923	28.352	0.429	N
15156	RT	Y	E	5	Pettis	28.352	28.703	0.351	N
15157	RT	Y	E	5	Pettis	28.703	28.712	0.009	N
15177	RT	N	S	6	St. Louis	0.030	1.883	1.853	N
15178	RT	N	S	6	St. Louis	1.883	2.022	0.139	N
15179	RT	N	S	6	St. Louis	2.022	2.721	0.699	N
15180	RT	N	S	6	St. Louis	2.721	3.894	1.173	N
15181	RT	N	S	6	St. Louis	3.894	5.247	1.353	N
15182	RT	P	S	6	St. Louis	0.000	2.144	2.144	N
15197	RT	H	S	6	St. Louis City	0.031	0.219	0.188	N
15201	RT	H	S	6	St. Louis City	4.407	7.119	2.712	N
URBAN MULTILANE UNDIVIDED HIGHWAYS—Wider markings and edgeline rumble stripe with resurfacing									

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
10845	MO	340	E	6	St. Louis	10.374	10.785	0.411	N
10846	MO	340	E	6	St. Louis	10.785	11.280	0.495	N
URBAN MULTILANE UNDIVIDED HIGHWAYS—Wider markings and shoulder rumble strip with resurfacing									
15128	RT	B	S	5	Boone	10.881	11.352	0.471	N
URBAN TWO–LANE HIGHWAYS—Wider markings with resurfacing									
11188	US	50	E	5	Pettis	77.077	78.251	1.174	N
11189	US	50	E	5	Pettis	78.251	78.494	0.243	N
11190	US	50	E	5	Pettis	78.494	78.861	0.367	N
11191	US	50	E	5	Pettis	78.861	79.083	0.222	N
11192	US	50	E	5	Pettis	79.083	79.583	0.500	N
11193	US	50	E	5	Pettis	79.583	79.835	0.252	N
11194	US	50	E	5	Pettis	79.835	80.273	0.438	N
11195	US	50	E	5	Pettis	80.273	80.397	0.124	N
11196	US	50	E	5	Pettis	80.397	80.585	0.188	N
11197	US	50	E	5	Pettis	80.585	81.429	0.844	N
11198	US	50	E	5	Pettis	81.429	82.433	1.004	N
11256	US	50	E	6	St. Louis	253.189	253.404	0.215	N
11257	US	50	E	6	St. Louis	253.404	255.514	2.110	N
11258	US	50	E	6	St. Louis	255.514	257.263	1.749	N
11259	US	50	E	6	St. Louis	257.263	257.735	0.472	N
11536	US	60	E	8	Greene	70.729	71.326	0.597	N
12007	US	61	S	10	Cape Girardeau	280.410	280.531	0.121	N
12008	US	61	S	10	Cape Girardeau	280.531	281.022	0.491	N
12045	US	61	S	10	Scott	322.294	322.315	0.021	N
12066	US	62	E	10	Scott	61.943	62.225	0.282	N
12160	US	63	S	2	Adair	27.258	27.570	0.312	N
12161	US	63	S	2	Adair	27.570	28.137	0.567	N
12162	US	63	S	2	Adair	28.137	28.301	0.164	N
12163	US	63	S	2	Adair	28.301	28.576	0.275	N
12164	US	63	S	2	Adair	28.576	28.802	0.226	N
12165	US	63	S	2	Adair	28.802	29.055	0.253	N
12166	US	63	S	2	Adair	29.055	29.303	0.248	N
12167	US	63	S	2	Adair	29.303	29.553	0.250	N
12168	US	63	S	2	Adair	29.553	30.082	0.529	N
12188	US	63	S	2	Macon	61.173	61.539	0.366	N
12189	US	63	S	2	Macon	61.539	63.258	1.719	N
12190	US	63	S	2	Macon	63.258	63.756	0.498	N
12266	US	63	S	9	Howell	308.368	308.823	0.455	N
12268	US	63	S	9	Howell	309.477	310.708	1.231	N
12269	US	63	S	9	Howell	310.708	311.636	0.928	N
12270	US	63	S	9	Howell	311.636	311.722	0.086	N
12861	US	160	E	8	Greene	89.256	89.327	0.071	N
12991	US	63C	S	5	Boone	0.468	0.765	0.297	N
10002	MO	6	E	1	Buchanan	0.501	0.604	0.103	N
10043	MO	7	S	4	Jackson	9.268	9.355	0.087	N
10044	MO	7	S	4	Jackson	9.355	10.769	1.414	N
10395	MO	47	S	6	Franklin	64.897	65.377	0.480	N
10396	MO	47	S	6	Franklin	65.377	66.230	0.853	N
10448	MO	66	E	7	Jasper	8.930	9.111	0.181	N
10777	MO	269	S	4	Clay	0.536	0.694	0.158	N
10778	MO	269	S	4	Clay	0.694	1.552	0.858	N
10962	MO	763	S	5	Boone	3.349	3.440	0.091	N
15028	BU	67	S	10	Butler	5.133	5.302	0.169	N
15064	BU	36	E	2	Macon	0.000	0.339	0.339	N
15068	BU	63	S	2	Randolph	0.000	1.097	1.097	N
15138	RT	D	E	8	Greene	2.090	2.254	0.164	N
15170	RT	N	E	6	St. Charles	14.201	15.841	1.640	N
15171	RT	N	E	6	St. Charles	15.841	19.335	3.494	N

Table B-1. List of SRI Project Evaluation Sites by Roadway Type and Project Type (Continued)

Site Number	Route type	Route Number	Direction of Travel*	District	County	Continuous Log Beginning	Continuous Log End	Length (mi)	Cable Barrier**
15185	RT	AC	S	6	St. Louis	2.636	3.869	1.233	N
15189	RT	AC	S	6	St. Louis	5.609	5.884	0.275	N
15190	RT	AC	S	6	St. Louis	5.884	6.539	0.655	N
15191	RT	AC	S	6	St. Louis	6.539	7.809	1.270	N
15192	RT	AC	S	6	St. Louis	7.809	8.581	0.772	N
15193	RT	AC	S	6	St. Louis	8.581	8.873	0.292	N
URBAN TWO–LANE HIGHWAYS—Wider markings, centerline rumble strip, and edgeline rumble stripe with resurfacing									
11518	US	60	E	7	Lawrence	53.968	54.126	0.158	N
11519	US	60	E	7	Lawrence	54.126	54.592	0.466	N
10488	MO	79	S	6	St. Charles	83.906	86.452	2.546	N

* Direction of travel for continuous log beginning and end points is shown. Sites on divided highways include one direction of travel only. Sites on undivided highways include both directions of travel.

** Cable barrier codes:
Y = Cable barrier added in median during 2005 or 2006
N = No change in cable barrier during 2005 or 2006

Appendix C

Safety Performance Functions Used in the Before/After Evaluation

The safety performance functions (SPFs) used in the EB analysis are of the form:

$$N_{iy} = e^{a} ADT_{iy}^{b} \qquad (2)$$

where:

N_{iy}	=	expected crash frequency for site i in year y
ADT_{iy}	=	average daily traffic volume for site i in year y
a, b	=	estimated model parameters

Table C-1 presents the estimated values of the model parameters a and b, standard error for the AADT term, significance level (p-value) for the AADT term, the value of the overdisperson parameter for the model, and a goodness-of-fit measure (R_{LR}^2) for the model. The overdispersion parameter is used in determining the weights for combining predicted and observed crash frequencies as a weighted average in the EB method. The SPFs were developed using crash and traffic volume data from MoDOT's Transportation Management System.

The divided highway models predict crashes for one-direction of travel only. The undivided highway models predict crashes for both directions of travel combined.

The four-lane divided expressway (4DE) and six-lane divided expressway (6DE) models were used for all four- and six-lane nonfreeways. No models were available for six-lane undivided highways, so the models for four-lane undivided highways (4U) were used.

Table C-1. Safety Performance Functions for Missouri Highways

Area type	Roadway type	Number of observations used in model development	Model parameter estimates			ADT term significance level	Overdispersion parameter (k)	R^2_{LR}
			Intercept (a)	ADT (b)	ADT term standard error			
MODELS FOR TOTAL CRASHES								
Rural	2U	6272	–7.167	0.952	0.026	< 0.001	3.990	15.9%
Urban	2U	632	–9.615	1.300	0.130	< 0.001	4.069	12.7%
Rural	2SP	635	–6.755	0.851	0.116	< 0.001	4.143	7.2%
Urban	2SP	187	–9.303	1.259	0.229	< 0.001	4.286	13.5%
Rural	3T	49	–20.429	2.518	0.814	0.002	6.856	14.3%
Urban	3T	52	–9.554	1.276	0.815	0.117	4.619	4.0%
Rural	4DE	784	–7.957	0.961	0.049	< 0.001	0.313	31.8%
Urban	4DE	589	–8.311	1.091	0.057	< 0.001	0.532	39.8%
Rural	4DF	486	–12.354	1.419	0.047	< 0.001	0.173	66.6%
Urban	4DF	330	–9.606	1.180	0.059	< 0.001	0.440	54.9%
Rural	4U	54	–3.464	0.476	0.404	0.239	2.616	2.4%
Urban	4U	255	–6.985	1.016	0.289	< 0.001	5.236	4.2%
Rural	5T	28	–15.871	1.949	0.879	0.027	7.302	11.3%
Urban	5T	259	–6.643	0.991	0.343	0.004	5.339	3.0%
Urban	6DE	86	–1.816	0.444	0.184	0.016	0.425	6.3%
Urban	6DF	432	–10.643	1.251	0.066	< 0.001	0.239	43.9%
MODELS FOR FATAL-AND-ALL-INJURY CRASHES								
Rural	2U	6272	–6.922	0.771	0.026	< 0.001	3.127	11.7%
Urban	2U	632	–11.332	1.330	0.127	< 0.001	2.909	14.5%
Rural	2SP	635	–6.836	0.727	0.104	< 0.001	3.055	6.7%
Urban	2SP	187	–9.495	1.112	0.206	< 0.001	3.138	13.2%
Rural	3T	49	–24.370	2.790	0.879	0.002	4.227	21.4%
Urban	3T	52	–11.103	1.292	0.705	0.067	2.949	5.7%
Rural	4DE	784	–9.770	1.027	0.060	< 0.001	0.301	27.5%
Urban	4DE	589	–9.982	1.114	0.064	< 0.001	0.457	35.1%
Rural	4DF	486	–12.760	1.323	0.054	< 0.001	0.133	58.1%

Table C-1. Safety Performance Functions for Missouri Highways (Continued)

Area type	Roadway type	Number of observations used in model development	Model parameter estimates			ADT term significance level	Overdispersion parameter (k)	R^2_{LR}
			Intercept (a)	ADT (b)	ADT term standard error			
Urban	4DF	330	–10.703	1.151	0.071	< 0.001	0.412	45.8%
Rural	4U	54	–4.201	0.434	0.375	0.247	1.900	2.4%
Urban	4U	255	–8.334	1.012	0.275	< 0.001	4.241	4.6%
Rural	5T	28	–16.036	1.822	0.734	0.013	4.992	14.1%
Urban	5T	259	–8.533	1.042	0.315	< 0.001	4.043	4.0%
Urban	6DE	86	–4.862	0.600	0.199	0.003	0.401	9.5%
Urban	6DF	432	–13.223	1.367	0.070	< 0.001	0.215	46.0%
MODELS FOR FATAL-AND-DISABLING-INJURY CRASHES								
Rural	2U	6272	–7.039	0.616	0.029	< 0.001	2.550	6.6%
Urban	2U	632	–9.361	0.882	0.158	< 0.001	2.320	4.9%
Rural	2SP	635	–6.851	0.576	0.105	< 0.001	2.132	4.4%
Urban	2SP	187	–7.438	0.629	0.242	0.009	2.421	3.5%
Rural	3T	49	–20.868	2.137	0.827	0.010	1.818	18.2%
Urban	3T	52	–2.252	0.015	0.974	0.988	2.268	0.0%
Rural	4DE	784	–9.587	0.869	0.083	< 0.001	0.341	12.6%
Urban	4DE	589	–9.539	0.855	0.090	< 0.001	0.360	13.8%
Rural	4DF	486	–13.439	1.271	0.078	< 0.001	0.165	37.8%
Urban	4DF	330	–7.836	0.683	0.010	< 0.001	0.287	13.5%
Rural	4U	54	–6.147	0.498	0.364	0.171	0.937	3.3%
Urban	4U	255	–7.378	0.686	0.263	0.009	2.501	2.6%
Rural	5T	28	–9.623	0.916	0.868	0.291	5.139	3.4%
Urban	5T	259	–8.529	0.815	0.299	0.007	2.650	2.8%
Urban	6DE	86	–6.540	0.533	0.275	0.053	0.152	4.0%
Urban	6DF	432	–10.272	0.903	0.086	< 0.001	0.117	21.0%
MODELS FOR PROPERTY-DAMAGE-ONLY CRASHES								
Rural	2U	6272	–8.459	1.068	0.0267	< 0.001	3.637	19.3%
Urban	2U	632	–9.857	1.297	0.1289	< 0.001	4.011	12.7%
Rural	2SP	635	–7.821	0.931	0.116	< 0.001	3.791	8.6%

Table C-1. Safety Performance Functions for Missouri Highways (Continued)

Area type	Roadway type	Number of observations used in model development	Model parameter estimates			ADT term significance level	Overdispersion parameter (k)	R^2_{LR}
			Intercept (a)	ADT (b)	ADT term standard error			
Urban	2SP	187	–10.099	1.319	0.230	< 0.001	4.160	14.6%
Rural	3T	49	–19.378	2.371	0.779	0.002	6.512	13.7%
Urban	3T	52	–10.334	1.332	0.824	0.106	4.196	4.3%
Rural	4DE	784	–8.542	0.986	0.052	< 0.001	0.325	30.3%
Urban	4DE	589	–8.703	1.103	0.060	< 0.001	0.570	37.8%
Rural	4DF	486	–13.386	1.494	0.052	< 0.001	0.194	65.2%
Urban	4DF	330	–10.269	1.216	0.062	< 0.001	0.459	54.4%
Rural	4U	54	–4.139	0.505	0.385	0.189	2.232	3.0%
Urban	4U	255	–7.212	1.009	0.280	< 0.001	5.019	4.4%
Rural	5T	28	–16.175	1.949	0.843	0.021	6.769	12.1%
Urban	5T	259	–6.775	0.976	0.331	0.003	5.057	3.1%
Urban	6DE	86	–1.849	0.421	0.191	0.028	0.443	5.4%
Urban	6DF	432	–10.471	1.206	0.068	< 0.001	0.259	40.3%

Roadway Type Codes:

- 2U:Two-lane undivided highway
- 2SP:Two-lane undivided highway (super two)
- 3T:Three-lane undivided highway including center two-way left-turn lane
- 4DE:Four-lane divided highway (expressway)
- 4DF:Four-lane divided freeway
- 4U:Four-lane undivided highway
- 5T:Five-lane undivided highway including center two-way left-turn lane
- 6DE:Six-lane divided highway (expressway)
- 6DF:Six-lane divided freeway

Appendix D

Questions Included in Motorist Survey

MoDOT SRI Striping and Delineation Survey

Introduction

Thank you for choosing to take this survey! This survey is designed to assess your satisfaction with the striping and delineation on Missouri's major highways. To exit the survey and return to where you left off at any time, please use the **Exit this survey** link in the upper right corner of the screen. This survey will take about 10 minutes. Your identity will remain completely confidential. **We greatly appreciate your participation.**

Driver Characteristics

Q1. How did you learn about this survey?
- MoDOT website
- Newspaper
- Local civic organization
- Friend, family member or co-worker
- Other

Q2. In which zip code do you currently reside?
- Enter zip code

Q3. What age group do you fall in? (drop down menu)
- 16-20
- 21-25
- 26-35
- 36-45
- 46-55
- 56-65
- 66-75
- 75+

Q4. Are you:
- Male
- Female

Trip Characteristics

Q5. Which of the following routes in Missouri do you drive on at least twice a week? (Mark all that apply.)

Interstate Route 29 (Kansas City to St. Joseph)
Interstate Route 35 (Kansas City to Bethany)
Interstate Route 44
Interstate Route 55
Interstate Route 57
Interstate Route 64
Interstate Route 70
Interstate Route 170
Interstate Route 270
Interstate Route 435
Interstate Route 470
US Route 24 (In KC Metro)
US Route 50 (Kansas City through Warrensburg)
US Route 50 (near Jefferson City)
US Route 54 (Jefferson City to Camdenton)
US Route 60 (Aurora to Mansfield)
US Route 61 (St. Louis to Pike County Line)
US Route 61 (Jackson to Cape Girardeau)
US Route 63 (Columbia to Jefferson City)
US Route 65 (Springfield to Arkansas border)
US Route 67 (St. Louis to Farmington)
US Route 69 (KC to Excelsior Springs)
US Route 71 (Kansas City to Butler)
US Route 71 (Nevada to Neosho)
US Route 160 (In Springfield)
MO Route 1 (in Clay County)
MO Route 7 (Between I-70 and US 50)
MO Route 13 (Collins to Springfield)
MO Route 100 (St. Louis to Wildwood)
MO Route 141
MO Route 152
MO Route 169 (Kansas City to Smithville)
MO Route 180 (outside St. Louis City Limits)
MO Route 210 (in Clay County)
MO Route 291 (in Jackson County)
MO Route 340
MO Route 366
MO Route 370
Business Route 44 (in Springfield)
None

Q6. When driving the routes you identified previously in this survey, in an average week, about how many trips do you make during hours of daylight?

0-5
6-10
10-20
More than 20

Q7. When driving the routes you identified previously in this survey, in an average week, about how many trips do you make during hours of darkness?

0-2
3-5
6-10
More than 10

Q8. When driving the routes you identified previously in this survey, which of the following vehicle types do you normally drive?

Passenger vehicle (car, pick-up, SUV)
Motorcycle
Commercial vehicle/heavy truck

Q9. What improvements have you noticed on one or more of the routes you selected previously in this survey since 2005? (Choose all that apply) Please **click here** for descriptions of terms used.

Lane markings are more visible during the day
Lane markings are more visible at night
Lane markings are more visible in wet weather
Wider and brighter lane markings
New emergency reference mile marker signs
Shoulder or centerline rumble stripes
Improvements provide better guidance for drivers to stay in their lane
I have not noticed any improvements

Instructions

MoDOT has recently completed the first phase of the Smooth Roads Initiative (SRI). Each of the next few pages of this survey will ask you a few questions about how effective you have found specific SRI treatments to be. Photographs and descriptions of the treatments will be provided to help you recognize the treatments being discussed. This survey is designed to measure ***your perception*** of these treatments on the routes ***you frequently drive***, so please answer from your own experience. At the end of the survey, we will ask some general questions about the SRI program as a whole and invite you to share your comments.

Edgeline and Lane Line Markings

New lane-line and edgeline markings on a rural divided highway.

Close-up view of a new lane line.

New highway markings, including edgelines,
lane lines, and shoulder area hash marks,
are shown here on an urban interstate.

The photos shown above illustrate the new edgeline and lane line markings that are now being used on major highways in Missouri. Please use the photos to help you answer the following questions. The questions apply to your personal driving experience on the routes you identified at the beginning of the survey.

Q10. How helpful did you find these improvements in making the path of the roadway ahead more visible?
- I have found these improvements to be very helpful.
- I have found these improvements to be slightly helpful.
- I have not found these improvements to be helpful at all.
- I have not noticed these improvements on the roads I drive.

Q11. What time of day do you find these improvements to be the most helpful?
- Hours of daylight
- Hours of darkness
- Both the same

Q12. During which pavement condition do you find these improvements the most helpful?
- Dry pavement
- Wet pavement
- Both the same

Q13. These improvements:
- Greatly increase my personal level of safety when I drive.
- Slightly increase my personal level of safety when I drive.
- Have no effect on my personal level of safety when I drive.

Rumble Stripes

Centerline rumble stripes—regularly spaced grooves cut into the pavement along the centerline. Centerline marking is painted over the grooves.

Edgeline rumble stripes—regularly spaced grooves
cut into the pavement along the edgeline.
Edgeline marking is painted over the grooves.

The photos shown above illustrate the new centerline and edgeline rumble stripes that are now being used on major highways in Missouri. They produce noise and vibration to alert drowsy or distracted drivers who are drifting out of their lane. Please use the photos to help you answer the following questions. The questions apply to your personal driving experience on the routes you identified at the beginning of the survey.

Q14. How helpful did you find this improvement in helping you from accidentally traveling outside of your lane?
- I have found this improvement to be very helpful.
- I have found this improvement to be slightly helpful.
- I have not found this improvement to be helpful at all.
- I have not noticed this improvement on the roads I drive.

Q15. How helpful did you find this improvement in making the path of the roadway ahead more visible?
- I have found this improvement to be very helpful.
- I have found this improvement to be slightly helpful.
- I have not found this improvement to be helpful at all.

Q16. What time of day do you find this improvement to be the most helpful?
- Hours of daylight
- Hours of darkness
- Both the same

Q17. During which pavement condition do you find this improvement the most helpful?
- Dry pavement
- Wet pavement
- Both the same

Q18. This improvement:
- Greatly increases my personal level of safety when I drive.
- Slightly increases my personal level of safety when I drive.
- Has no affect on my personal level of safety when I drive.
- Decreases my personal level of safety when I drive.

Reflectors

Guiderail reflectors shown at night—reflective markers placed regularly along the guiderail that reflect headlights and illuminate the road alignment.

Delineator—post with reflective marker placed at regular intervals along the roadway that reflects headlights and illuminate the road alignment.

The photos shown above illustrate reflectors, known as delineators, that are now being mounted on guardrails and barriers on major highways in Missouri. Please use the photos to help you answer the following questions. The questions apply to your personal driving experience on the routes you identified at the beginning of the survey.

Q19. How helpful did you find these improvements in making the path of the roadway ahead more visible?

I have found these improvements to be very helpful.
I have found these improvements to be slightly helpful.
I have not found these improvements to be helpful at all.
I have not noticed these improvements on the roads I drive.

Q20. What time of day do you find these improvements to be the most helpful?
Hours of daylight
Hours of darkness
Both the same

Q21. During which pavement condition do you find these improvements the most helpful?
Dry pavement
Wet pavement
Both the same

Q22. These improvements:
Greatly increase my personal level of safety when I drive.
Slightly increase my personal level of safety when I drive.
Have no affect on my personal level of safety when I drive.

Emergency Reference Mile Markers

Emergency mile marker—Placed every two tenths of a mile along interstates to help drivers identify and report their location to emergency responders.

The photo shown above illustrates emergency reference marker signs that have been installed every 0.2 miles on Interstate freeways in Missouri, and give the route name and mileage at that location. Please use the photos to help you answer the following questions. The questions apply to your personal driving experience on the routes you identified at the beginning of the survey.

Q23. How helpful did you find these improvements in providing guidance and making the path of the roadway ahead more visible?
I have found these improvements to be very helpful.
I have found these improvements to be slightly helpful.
I have not found these improvements to be helpful at all.
I have not noticed these improvements on the roads I drive.

Q24. What time of day do you find these improvements to be the most helpful?
Hours of daylight
Hours of darkness
Both the same

Q25. During which pavement condition do you find these improvements the most helpful?
Dry pavement
Wet pavement
Both the same

Q26. To what extent do you think these signs would help you report your location to emergency personnel if your car broke down along the roadway?
Very helpful
Slightly helpful
Not helpful
I don't know

Q27. These improvements:
Greatly increase my personal level of safety when I drive.
Slightly increase my personal level of safety when I drive.
Have no effect on my personal level of safety when I drive.

Overall Assessment

Q28. What is your overall assessment of how well the new pavement markings, rumble strips, and reflectors illustrated in previous questions provide guidance and make driving easier on Missouri highways?
I have found these improvements to be very helpful.
I have found these improvements to be slightly helpful.
I have not found these improvements to be helpful at all.
I have not noticed these improvements on the roads I drive.

Q29. What is your overall assessment of the contribution of pavement markings, rumble strips, and reflectors illustrated in previous questions to safety on Missouri highways?
I have found these improvements to greatly increase safety.
I have found these improvements to slightly increase safety.
I have not found these improvements to increase or decrease safety.
I have found these improvements to decrease safety.

Q30. Do you believe that these improvements have been a good use of taxpayer dollars by MoDOT?
Yes, they have been a good investment.
No, they have not been a good investment.
I don't know.

Q31. Would you like MoDOT to use these safety treatments more widely on Missouri highways in the future?

Yes
No
I don't know

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