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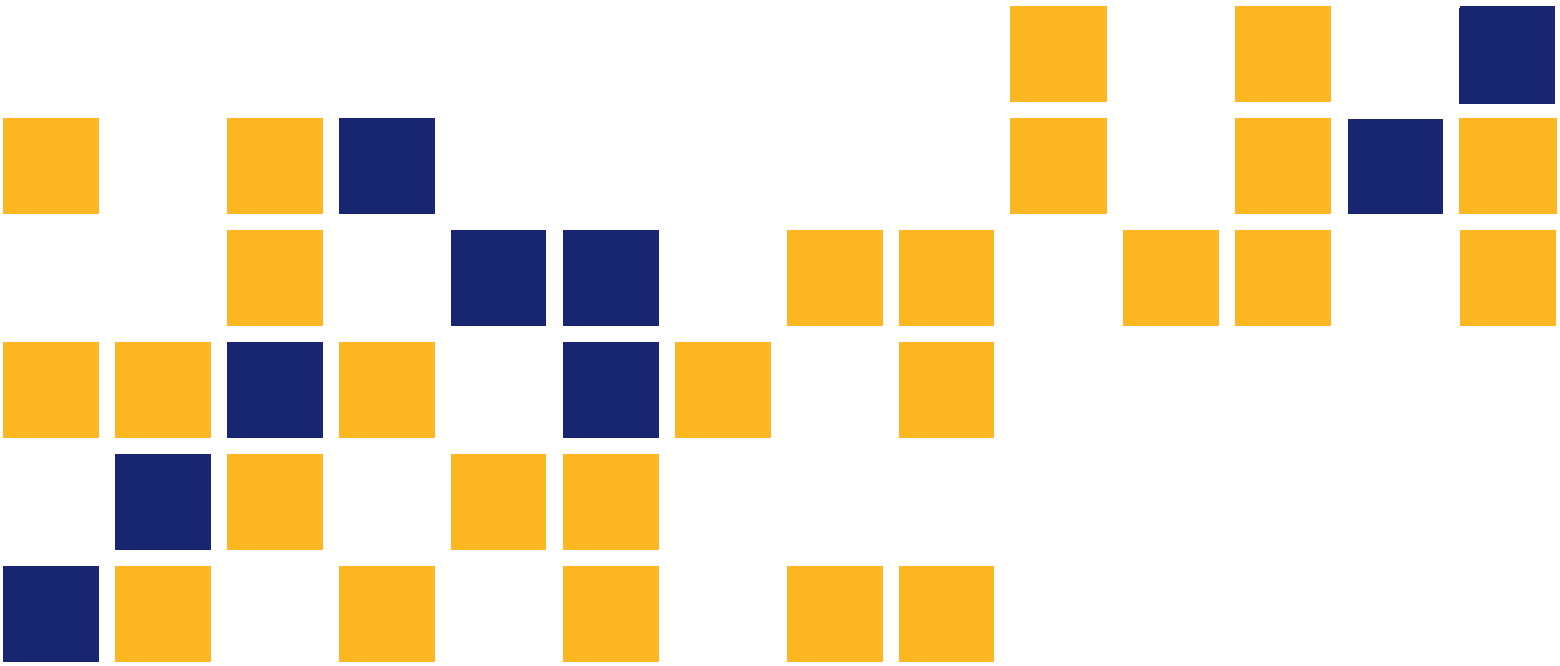
Guardrail and Bridge Rail Recommendations for Very Low-Volume Local Roads in Kansas

Ronald J. Seitz, P.E.
Tod Salfrank

Kansas Department of Transportation
Bureau of Local Projects



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Prepared by
Ronald J. Seitz, P.E.
Bureau Chief

and

Tod Salfrank
Associate Road Engineer

Kansas Department of Transportation
Bureau of Local Projects

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Abstract

The determination of warrants for bridge railing and approach guardrails is a fundamental roadside safety issue. These are specialized roadside safety barriers that are intended to capture and smoothly redirect errant vehicles that leave the roadway either on the bridge itself or on the approach to the bridge.

The Federal Highway Administration (FHWA) requires tested bridge rails and approach guardrails on all National Highway System (NHS) Roadways. However, states are given the discretion to develop their own policies for non-NHS roads. Currently in Kansas, all bridges constructed with federal funds are required to have one of the Kansas Department of Transportation's (KDOT) standard bridge rails (either corral rail or barrier curb) and approach guardrail (including transition and end treatment). These systems are expensive in terms of the initial cost of a bridge and they have additional safety and maintenance considerations that may outweigh the expected safety benefits on many low-volume applications.

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INTRODUCTION

The determination of warrants for bridge railing and approach guardrails is a fundamental roadside safety issue. These are specialized roadside safety barriers that are intended to capture and smoothly redirect errant vehicles that leave the roadway either on the bridge itself or on the approach to the bridge.

The FHWA requires tested bridge rails and approach guardrails on all National Highway System (NHS) roadways. However, states are given the discretion to develop their own policies for non-NHS roads. Currently in Kansas, all bridges constructed with federal funds are required to have one of KDOT's standard bridge rails (either corral rail or barrier curb) and approach guardrail (including transition and end treatment) all of which have met the crash test criteria of NCHRP Report 350 (1) or AASHTO's *Manual for Assessing Safety Hardware* (2), regardless of whether the structure is on the NHS and irrespective of the functional classification or ownership of the route. These systems are expensive in terms of the initial cost of a bridge (greater deck thickness, additional embankment, and additional right of way acquisition, to name a few), and they have additional safety and maintenance considerations that may outweigh the expected safety benefits on many low-volume applications.

In an effort to maximize the safety benefits of the limited available funding on a system-wide basis, the Kansas Department of Transportation (KDOT) undertook the effort outlined in this paper to establish practical risk-based guidelines and policies for bridge rails and guardrails on low-volume local roads. The primary tasks included:

- A review of the state of the practice, including current American Association of State Highway and Transportation Officials (AASHTO) policies and guidelines, to determine the amount of flexibility/discretion allowed.
- A review of research studies with similar objectives that have been performed elsewhere.
- A review of the policies of other state highway agencies.
- Analysis of bridge/approach guardrail crashes on low-volume local roads in Kansas.
- Benefit-cost analyses based on typical traffic and location features.

DESCRIPTION OF THE PROBLEM

Of the roughly 140,000 miles of public roads in the state of Kansas, only about 10,000 miles are under the state's jurisdiction. The remaining 130,000 miles are the responsibility of cities, counties or townships. Included on this local system are approximately 20,000 bridges.

The National Bridge Inspection Program data for local bridges in Kansas shows that many of these local bridges are older structures and in deteriorated condition. Over 3,600 of them are currently rated as either structurally deficient or functionally obsolete. About one-half of these deficient structures are less than 50 feet long and are located on roads with average daily traffic (ADT) lower than 50 vehicles per day. See Figures 1 and 2.

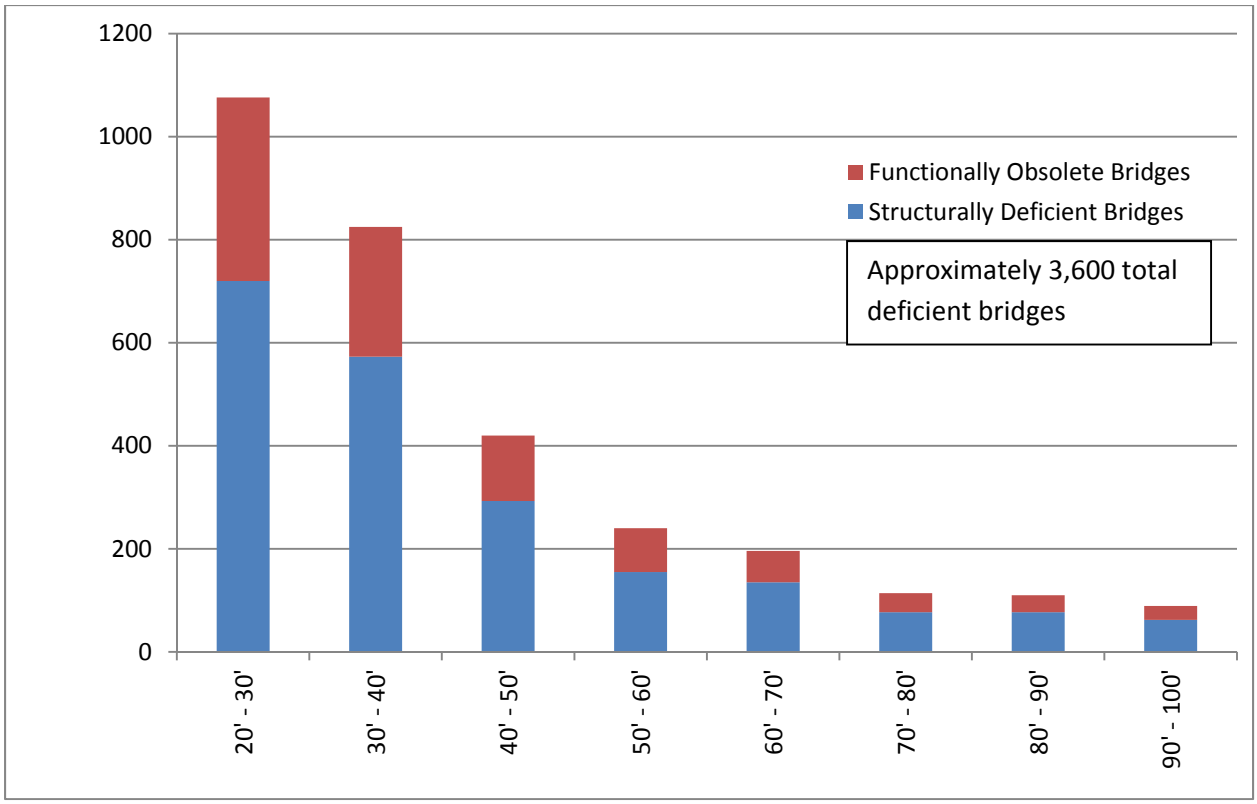

Figure 1. Deficient Local Bridges by Length. (Source: Kansas Local NBI Data)

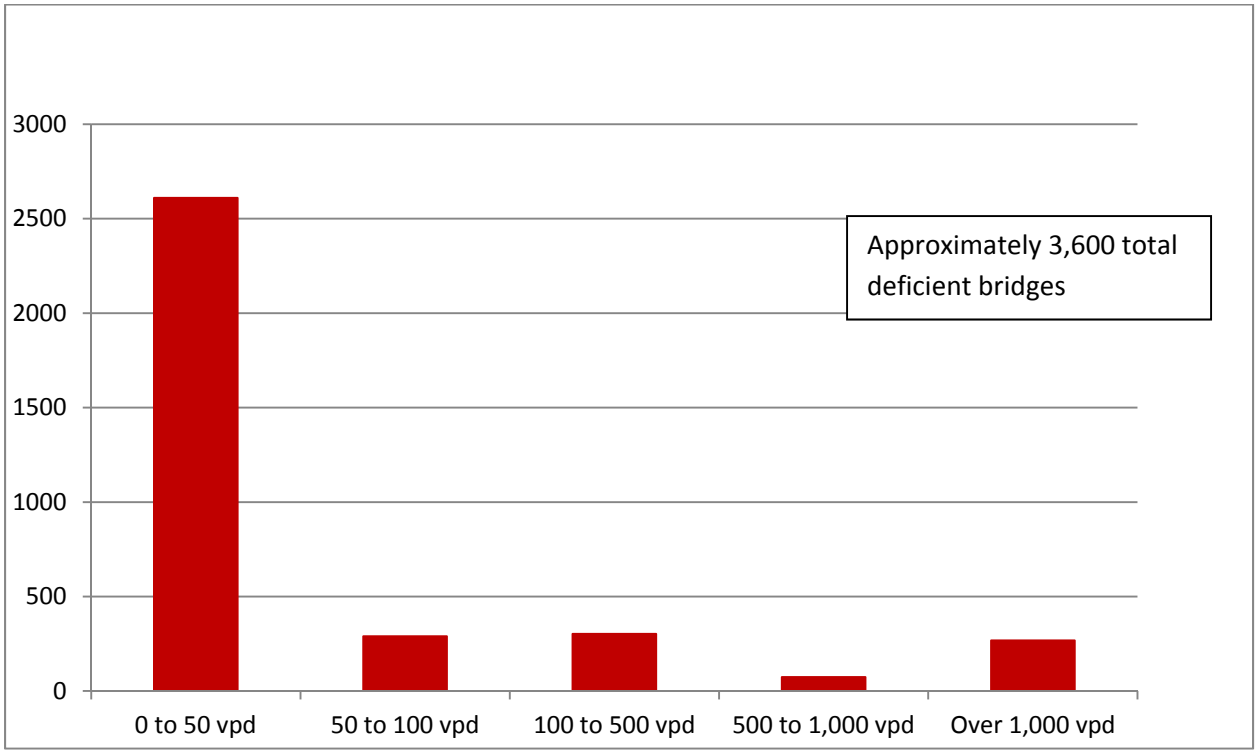

Figure 2. Deficient Local Bridges by Traffic Volume. (Source: Kansas Local NBI Data)

Compounding the problem is the age of the bridges on local roads. With nearly half of the local bridges exceeding 50 years age at this time, it is expected that there will be additional bridges added to the deficient list in coming years. See Figure 3.

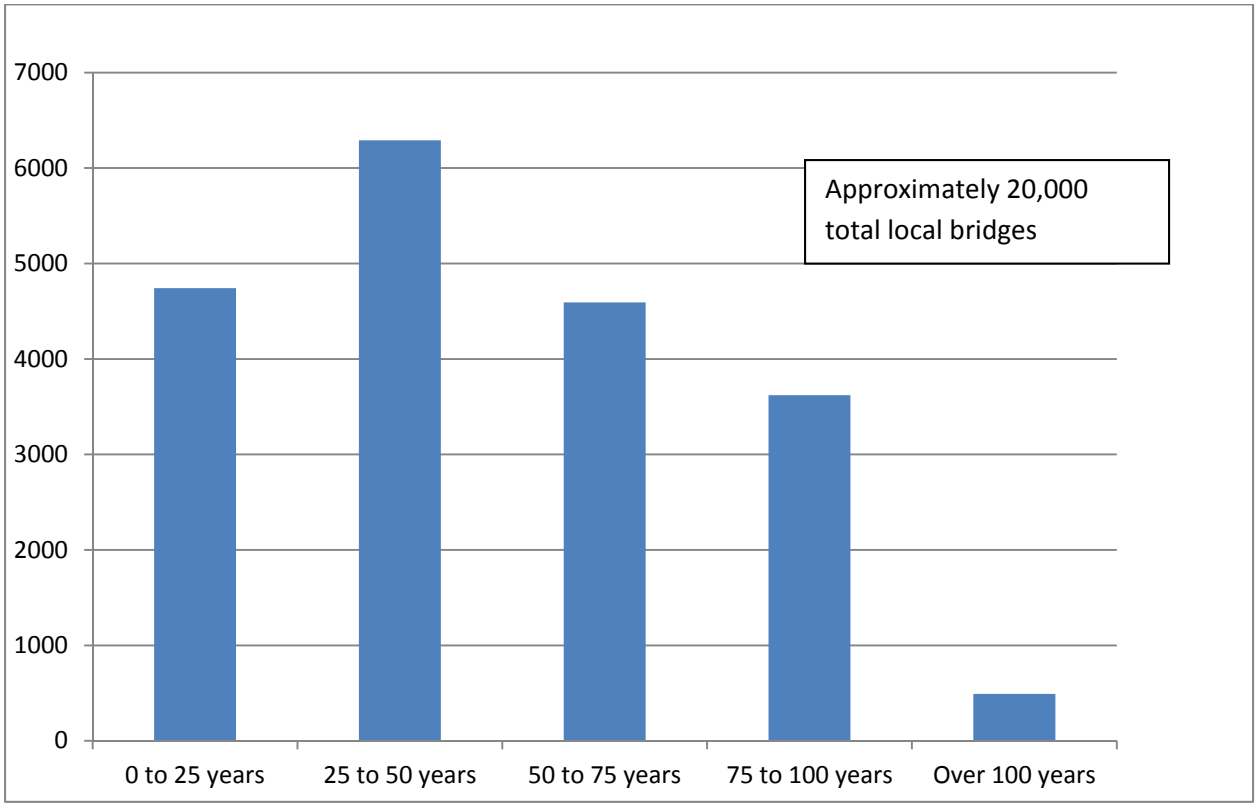

Figure 3. Numbers of Local Bridges by Age. (Source: Kansas Local NBI Data)

Some of the deficient bridges are replaced by counties using local revenues. The current federal-aid program for replacing local bridges uses Surface Transportation Program (STP) funds through the Off-System Bridge Program. This program is currently funded at approximately $8 million per year, which is sufficient to replace about 16 bridges per year using the current design standards and procedures for a federal-aid bridge project. The current replacement rate is not sufficient to significantly reduce the number of deficient bridges on the local system.

Although many of these deficient bridges are located on very low-volume roads, they are critical to Kansas' agriculture industry. There is usually significant political pressure from local residents to replace these deficient bridges rather than close them. A study performed by Mulinazzi, et al (3), investigated, for a variety of traffic volumes and detour lengths, the comparison of highway agency costs to replace and maintain a bridge versus the user costs to detour around a closed bridge. The goal was to provide a tool that local elected officials could use to justify to their constituents the closure of some bridges when they could no longer be maintained to safely carry traffic. Surprisingly, the study results indicate that, even at traffic volumes in the range of 10 vehicles per day, the user costs over the 75-year assumed life of a bridge are sufficient to justify repair or replacement of the structure. There are obviously other factors that need to be considered, particularly the agency's ability to pay on a system-wide basis, but it is not anticipated that local agencies will be closing enough bridges to provide much contribution to reducing the numbers of deficient bridges in the future.

In short, there appear to be only two ways to address the current and anticipated numbers of deficient bridges on the local system: 1) increase the amount of funding available for bridge replacements, and/or 2) allow more cost-effective or lower cost, design alternatives in appropriate locations utilizing federal-aid funds.

In an effort to address these needs, KDOT has recently implemented a new state-funded program for local agencies that will provide funding for replacement of some of their deficient bridges. The program targets bridges ranging from 20 to 50 feet in length on roads with traffic volumes of 100 vpd or less, which comprise approximately one-half of all deficient locally-owned bridges. Funding levels are based on low-cost bridge options with features that are considered appropriate for very low-volume, and therefore low-risk, applications. The dollars available for this program

are limited and subject to legislative and other actions that may limit KDOT's revenues. Although it will be helpful, the program in itself will not come close to solving the locally-owned deficient bridge problem.

Funding for local bridges may come from one or a combination of three sources: local revenues, state funds, and federal funds. In the current political climate at all levels of government, it is not anticipated that there will be a significant increase in the dollars made available to transportation from any of these sources in the foreseeable future. As a result, it is recommended that low-cost alternatives, such as those being used in the state-funded program, be explored that would reduce the cost of individual federal-aid bridge projects and allow replacement of a greater number of the deficient bridges with the limited amount of dollars available.

OPTIONAL BRIDGE DESIGNS

Typical bridges constructed under the Federal-Aid Off-System Bridge Program in Kansas are either reinforced concrete box culverts (RCB), rigid frame box culverts (RFB) or reinforced concrete haunched slab span bridges (RCSH). While these are all very good structures and have proven themselves over the years, the cost to construct them is difficult to justify on very low-volume rural roads. In addition the cost of the bridge for the roadway itself, these projects all provide for either approach guardrail work or involve extending the culverts to an appropriate clear zone. As a result, the typical investment of federal dollars in one of these structures is nearly $500,000. This does not include the matching cost to the local agency for construction and inspection or the total cost of design, right-of-way acquisition, and utility relocations.

There are a number of counties in Kansas and elsewhere in the region that replace bridges regularly using their own funds. There are a number of fabricators who serve this market by offering low-cost bridge designs that are structurally sound and adequately meet the needs of a location that is unlikely to see traffic volumes of more than a few dozen vehicles per day during its lifetime. Although these designs meet the applicable structural and geometric design criteria, the bridge railings are lightweight and untested. Typically the rail is simply a W-beam rail mounted on standard guardrail posts or other light structural steel shape attached to the bridge with brackets. The rail is terminated with a blunt end and there is no approach guardrail. Object markers are installed at each corner of the bridge to delineate the end of the rail.

These types of bridges are currently being constructed in a number of Kansas counties. When contractors are used for the construction, the prices range from less than $100,000 for a 20-foot long structure to around $140,000 for a 50-foot long bridge. (13) Since these are “modular” bridges produced by a number of manufacturers having their own specific design details, the up-front design effort is substantially less than a typical federal-aid bridge project.

Two representative examples of these low-cost bridges are shown in Figures 4 and 5. A sample set of plans is included in Appendix F.

Figure 4. Low-Cost Bridge Design for Very Low-Volume Local Roads. Steel Girder Bridge.

Figure 5. Low-Cost Bridge Design for Very Low-Volume Local Roads. Precast concrete bridge.

AASHTO CRITERIA

There is a substantial amount of recognition in AASHTO documents of the unique characteristics of low-volume local roads and the challenges of making the most effective decisions on how to expend the limited funds available for these roads. Following is a brief summary of the AASHTO guidance.

The AASHTO publication, *A Policy on Geometric Design of Highways and Streets* (Greenbook) (4), is the primary reference that provides guidelines and accepted engineering practices for

design of roads and streets. In addition to providing minimum values for the design of a variety of roadway features, the document also emphasizes a goal of cost-effective design by indicating that results "may need to be modified to meet the needs-versus-funds challenges that highway administrators face" (4, p. xlii). Based on this approach, dollars should be spent where they provide the greatest benefit to the system as a whole, rather than individual project sites.

AASHTO outlines a hierarchy of functional classification that essentially replicates the system adopted by the Federal Highway Administration (FHWA) and is based on a number of factors, including connectivity of urban areas, trip length, and travel densities, as well as others. The local road network is the lowest level in this hierarchy and consists of roads that serve the primary function of providing access to adjacent land. Trips on these roads are typically of shorter distance, and most of the drivers have driven the road before and are familiar with the features of a particular road. Because of this function, many of these roads also have very low traffic volumes.

Supplementing the Greenbook, AASHTO has also published the *Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT≤400)* (Low-Volume Guide) (5) to address criteria and considerations that are appropriate for the unique characteristics of these roads. The Low-Volume Guide recommends a rational approach to safety and discourages the expenditure of safety funds at sites where little safety benefit will be recognized (5, p. 2). The guidelines were based on a risk assessment approach that established criteria for very low-volume roads which, when applied system-wide, will provide safety similar to the guidelines in the Greenbook for higher-volume roads. The philosophy is based on safety concerns, but in recognition of the limited funds available for a very large local system, recommends that dollars only be used where there is likely to be an actual safety benefit in return. Based on the risk assessment

approach, AASHTO found that, even though there are clear safety benefits to providing an area free of obstacles on the roadside, it is generally not cost-effective to provide a clear zone on very low-volume local roads. Similarly, the use of guardrail or other barriers was also found to not be cost-effective. Determination of whether to provide a clear zone or install barriers on these very low-volume roads should be based on site-specific conditions and the engineering judgment of the designer.

AASHTO's *Roadside Design Guide* (6) has, since its original publication, recognized the need to allow flexibility in the application of roadside safety principles. It promotes economic evaluation of alternative measures so the projects that are built are the ones that best meet the public's need for safety and mobility. The Guide has previously provided the ROADSIDE analysis program and currently supports the Roadside Safety Analysis Program (RSAP) as methods to analyze features to determine the cost-effectiveness of improvements. Also included in the most recent version of the *Roadside Design Guide* is a chapter providing guidance on roadside safety recommendations for low-volume roads and streets. This chapter recognizes that it may not be practical to design low-volume roads to the same criteria as higher volume facilities. It recommends that it may be more effective to provide smaller improvements across the system rather than focus on bringing individual sites up to the highest possible level of safety. In regard to bridges, this recommendation means that "bridges in urban or low-volume roads that carry low traffic volumes, reduced speeds, or both may not need bridge railings designed to the same standard as bridge railings on high-speed, high-volume facilities" (2, p. 7-9). The guidelines also state that "under some circumstances (e.g., extremely low traffic volumes or approach speeds, good sight distance, and low probability of a severe crash), a decision to use no approach guardrail may be appropriate" (2, p 12-7).

REVIEW OF RELEVANT SAFETY RESEARCH

Although there appears to have been limited research efforts that are focused on the analysis and development of warrants/guidelines for bridge rail/approach guardrail on low-volume roads, a few studies have been done. Not insignificantly, one of these studies involved the review of sites in Kansas, while the other two are from Midwest states with locally-owned roads that have many similarities to those in Kansas.

In 2012, Schrum et al. (7) conducted a study for the Midwest States Pooled Fund Crash Test Program to determine cost-effective roadside safety treatments for low-volume roads. This study was focused on roadways with traffic volumes less than 500 vehicles per day and legal speed limits of 55 mph or greater. A benefit-cost analysis, utilizing the Roadside Safety Analysis Program (RSAP) was performed for a variety of roadside features and treatment options. Depending on the minimum benefit-to-cost ratio selected to establish a warrant (This is an administrative decision to be made by the highway agency. In Kansas the minimum B/C ratio to approve a countermeasure is usually in the range of 2 to 4, depending on the situation.), the study found little justification for replacement of existing untested bridge railings with approved bridge rails on roads with traffic volumes under 350 vpd.

Bigelow et al. (8) conducted a study in 2010 in the State of Iowa in which an analysis was performed regarding crashes on bridge rails and approach guardrails on low-volume road bridges in that state. The study involved statistical and benefit-cost analyses for the use of bridge rails and approach guardrails based on the bridge and crash features. Roadways included in the study

were those with traffic volumes less than or equal to 400 vpd and legal speed limit of 45 mph or higher. Benefit-to-cost analyses were done on a statewide basis, not for individual bridges, to compare the expected safety benefit of upgrading these systems to "current standards" versus the cost of making the improvement. This study found that, system-wide, the benefit-to-cost analyses resulted in very low B/C ratios, which would indicate that upgrading the bridge rails and approach guardrails to a current design is not cost-effective.

Gates and Noyce (9) studied bridge approach guardrails on low-volume roads in Minnesota. The target of this study was to determine the average daily traffic volume at which the benefit-to-cost ratio for installation of approach guardrail on county-state-aid bridges in Minnesota exceeds 1.0. Based on a statistical and benefit-to-cost approach, the study recommended that approach guardrails be used on bridges with ADT equal to or greater than 400 vpd; bridges with ADT between 150 and 400 vpd should be studied individually to determine the appropriate treatment; and on bridges with ADT under 150 vpd, it is not cost-effective to install approach guardrail.

POLICIES OF OTHER STATE TRANSPORTATION AGENCIES

Several other state agencies currently have policies that allow bridges with no approach guardrails to be constructed using federal or state dollars. Following is a summary of the policies of three states in the same geographic region as Kansas.

Iowa Department of Transportation in their Instructional Memorandum No. 3.213 (10) recommends that, in general, approach guardrails should be installed on all newly constructed bridges on the Farm-to-Market system and on federal-aid bridges where the speed limit exceeds

35 mph. However, several exceptions are provided where, if all are met, it is not required that an approach guardrail be installed. These exceptions are:

1. Current ADT is less than 400 vpd.
2. Structure is 24 feet or greater in width.
3. Structure is on tangent alignment.
4. Benefit/cost ratio is less than 0.80.
5. Bridge width is greater than the approach roadway width.

The Illinois Department of Transportation *Bureau of Local Roads and Streets Manual* (11) does not require a bridge approach roadside barrier on the traffic approach end of the bridge if at least one of the following conditions applies:

1. The posted speed limit is less than 25 mph on an uncurbed section.
2. The ADT is less than 150 vpd, the bridge is at least the same width as the approach roadway, and the bridge is on tangent alignment.
3. A township or road district bridge is wider than the approaching roadway and the bridge is on tangent alignment.

Approach barrier need on the downstream end (two-way traffic) is determined by whether the end of the bridge rail is within the appropriate clear zone.

The Missouri Department of Transportation *Engineering Policy Guide* (12) allows delineating the end of a bridge in lieu of shielding on roads functionally classified as either Local Roads or Collectors where the operating speed is less than 60 mph and the AADT is 400 vpd or less. Elimination of approach barriers is not recommended where there are geometric or sight distance concerns or where there is a history of crashes exceeding the statewide average for similar roads.

KANSAS BRIDGE CRASH DATA COLLECTION AND REVIEW

A review of crashes was performed for the 5-year period of 2008 through 2012. The total number of reported crashes of all types in Kansas during this period was 306,056. Of these, 10,276 resulted in a fatality or serious injury.

The Kansas crash database was queried to obtain data for crashes during this period that occurred on low volume roads and involved a bridge. In recognition of potential differences in terminology used by law enforcement officers in completing the reports, the database queries included a wide range of categories in an effort to capture all of the applicable data points. The query filters included the following:

- Functional class = Rural Minor Collector or Rural Local Road
- Surface type = Gravel or Dirt
- Crash type = Fixed Object
- Object type = Bridge Structure, Bridge Rail, Guard Rail, Culvert, Embankment, Curb, or Barricade

The resulting crash data set included, for the five-year period, a total of 1,433 crashes, 30 of which were fatal and 65 of which were serious injury.

All of the fatal and serious injury crash reports were reviewed. In addition, all of the crash reports for non-fatal/non-serious injury crashes were reviewed for crashes involving bridge structure (167 crashes), bridge rail (200 crashes), and guardrail (90 crashes). The remaining

categories of non-fatal/non-serious injury crashes were spot-reviewed since none of the fatal or serious injury crashes were in these categories and it would appear unlikely that a bridge crash would be miscoded to these categories. These included culvert (358 crashes, 74 reviewed), embankment (485 crashes, 48 reviewed), curb (31 crashes, 3 reviewed), and barricade (7 crashes, 1 reviewed).

The review focused on determining the applicability of each crash to the specific parameters of this study which are as follows: functional classification of rural local road, average daily traffic less than or equal to 50 vpd, and bridge length of 50 ft. or less. Google Maps were used to locate structures from the location information on the crash report and, if available, to get a "street view" look at the site; this location was then found on KDOT's K-GATE GIS system, which has a link to the Bridge Structure Inventory and Appraisal Sheet that was used to determine if the structure is in fact a bridge and if its geometry applicable.

The review yielded a total of 3 fatal crashes and 2 serious injury crashes in the five-year period on bridges meeting the parameters outlined previously. An additional 69 applicable crashes were identified that were coded as something other than fatal or serious injury. A complete breakdown of the crashes including the number of crashes that are applicable to the focus of this effort is shown in Table 1.

TABLE 1. SUMMARY OF CRASH REVIEW 2008 - 2012
LOW-VOLUME ROAD BRIDGE CRASHES

	Bridge Structure	Bridge Rail	Culvert	Curb	Embankment	Barricade	Guardrail	Total
Total Crashes								
Fatal	3	4	7	1	15	0	0	30
Serious Injury	11	7	12	0	32	1	0	63
non-Fatal/Non-Ser. Inj.	167	200	358	31	485	7	90	1338
Crashes Applicable to Study								
Fatal	2	1	N/A	N/A	N/A	N/A	N/A	3
Serious Injury	1	1	N/A	N/A	N/A	N/A	N/A	2
non-Fatal/Non-Ser. Inj.	17	36	N/A	N/A	N/A	N/A	16	69

A rigorous statistical analysis of the crash data was not performed due to staffing and resource constraints. However, some important observations can be made.

1. Of primary importance is that crashes involving shorter bridges on low-volume local roads are extremely rare events. There were a total of 74 reported crashes (all severity levels) of this type over the 5-year review period in comparison to a total of 306,056 crashes of all types across the state in the same period. These crashes represent only 0.02% of the total. Fatal and serious injury crashes of this type account for less than 0.05% (5 out of a total of 10,276) of all fatal and serious injury crashes and 0.0016% (5 out of 306,056) of all crashes.

2. The vast majority (93.2%) of crashes involving shorter bridges on low-volume local roads did not involve a fatality or serious injury. Factors that could contribute to the low rate of serious crashes include possible lower speeds due to the normally rougher surface on very low volume roads and/or geometric features that drivers recognize as requiring lower speed to safely travel. Additionally, driver familiarity with the road could be a

factor. Analysis of the factors that could influence the severity of crashes on low-volume local roads is beyond the scope of this current effort.

3. The percentage of fatal crashes relative to all crashes on shorter bridges on low-volume roads (3/74 or 4.05%) is higher than the percentage of all fatal crashes in relation to all crashes on Kansas roads during the review period (1,992/306,056 or 0.65%). The percentage of serious injury crashes relative to all serious injury crashes on shorter bridges on low-volume roads (2/74 or 2.7%) is the same as the percentage of all serious injury crashes relative to all crashes in Kansas during the review period (8,284/306.056 or 2.7%). It should be noted that, due to the very small number of crashes with low-volume bridges, the proportion of fatal crashes should be considered cautiously. Statistically, the confidence interval for this small group is very large, ranging from about 1.4% to 11.2% at the 95% confidence level. An increase or decrease of only one event can have a large effect on the rate, changing it by about 1.35%. As a result, one cannot interpret the data to indicate that a crash with a low-volume bridge is more likely to result in a fatality than any crash occurring in the State.

4. The bridge crashes identified as applicable to this study were primarily on tangent sections. However, there were a large number of crashes with non-bridge size structures and other features that occurred either on or immediately adjacent to a horizontal curve or intersection. Although the analysis of this factor is beyond the scope of this study, it does indicate that roadway alignment needs to be considered in developing the final recommendations.

5. All of the fatal crashes and one of the two serious injury crashes occurred on narrow bridges ranging in width from 15’ to 21’. Any new bridge constructed using state or federal funds will have a roadway width of at least 24’, which will make the bridge railings less likely to be impacted.

BENEFIT COST ANALYSES

The final task performed as part of this investigation involved performing benefit-to-cost analyses to determine the efficacy of the various alternatives for some generalized typical bridge sites. The analyses were conducted using the Roadside Safety Analysis Program (RSAP), a probability-based encroachment tool that predicts crash costs associated with roadside features.

Because the investigation is focused on bridges ranging from 20 to 50 feet in length, the analysis was performed on the two extremes with the assumption that if the recommended alternative is the same for both, then it could be applied to the entire range of lengths. Similarly, the high end of the traffic volume range (50 vpd) was evaluated with the assumption that it is a “worst case” scenario for this investigation.

For each scenario, three safety treatment options were identified as being practical for a low-volume road application. These are:

1. Bridge structure with no bridge rail.
2. Bridge structure with a w-beam rail (non-tested) and blunt end terminals.
3. Bridge structure with a w-beam rail (non-tested) and crashworthy end terminals.

Obviously there are other alternatives that could be considered, including the construction of crashworthy bridge railings along with approach guardrails with crashworthy end terminals and bridge-approach transitions. Because of the initial cost of this kind of improvement in comparison to a reasonably expected benefit on a road with 50 vpd, it was decided to evaluate this alternative only if the B/C of one of the w-beam bridge rail alternatives exceeds 1.0.

Several general assumptions were made in the development of the datasets and modeling of the site characteristics. These include:

1. The minimum width of a new bridge will be 24 feet, which is consistent with the recommendations for an agricultural access road in AASHTO's Low-Volume Guide(5).
2. The roadway being investigated is a two-wheel-path road 24-feet in width with traffic generally located in the center of the roadway. Assuming a width of traveled way equal to 10 feet, this would provide the equivalent of a 7-foot wide "shoulder" on each side.
3. Design speed is 55 mph. This is the statutory speed limit for roads in Kansas unless posted otherwise. This is considered to be a conservative assumption for roads of this type.
4. The construction costs used for all alternatives only included the cost of the w-beam and/or end terminals on both sides of the roadway. No grading, R/W, or utility adjustments costs were included. This was done to provide the most conservative b/c possible. If these alternates are not cost beneficial using the lower costs, then any additional cost would make them even less cost beneficial.
5. Height of the structure above the stream or ground underneath is 13 feet.

Initially, the analysis was done using RSAP Version 2.0.3, which is the version provided as part of the 2006 AASHTO Roadside Design Guide (14) and still in widespread use by the industry. Due to some shortcomings in this version of the program and the inability to specifically consider a bridge with no side rail, Alternative 1 (Base Alternate) was modeled as a road with a vertical slope. This is the condition that most closely resembles the bridge drop-off condition.

The results of the analysis using RSAP Version 2.0.3 are shown in Tables 2 and 3.

TABLE 2. RSAP 2.0.3 B/C RESULTS FOR 20-FOOT LONG BRIDGE

Alternates	Description of Alternate	Incremental B/C
1	20 Ft. Bridge, No Rail	-
2	20 Ft. Bridge with W-beam rail, blunt end terminals	0.18
3	20 Ft. Bridge with W-beam rail, crashworthy end terminals	0.20

TABLE 3. RSAP 2.0.3 B/C RESULTS FOR A 50-FOOT LONG BRIDGE

Alternates	Description of Alternate	Incremental B/C
1	50 Ft. Bridge, No Rail	-
2	50 Ft. Bridge with W-beam rail, blunt end terminals	0.19
3	50 Ft. Bridge with W-beam rail, crashworthy end terminals	0.16

RSAP Version 3.0.1 has more recently become available. This version of the program was developed to address the shortcomings of Version 2.0.3 and to add a more user-friendly interface and more comprehensive model of roadway and roadside features. Although this version has not yet been adopted by KDOT, it was decided to repeat the analyses using this version because

these improvements allow for a more accurate modeling of the features being considered. The following parameter changes were made.

1. The roadway was analyzed as a one lane, one way roadway with 50 VPD all in the same direction. It should be noted that using a one way roadway with all traffic in the same direction will yield the same results as two-way traffic split 50/50 because the configuration would be identical regardless of direction.
2. Alternative 1 (Base Alternative) was modeled as a Bridge Edge, Medium Hazard. This hazard type more accurately reflects the condition being considered when compared to the hazard in the previous analysis.

The results of these analyses are shown in Tables 4 and 5.

TABLE 4. RSAP 3.0.1 B/C RESULTS FOR A 20-FOOT LONG BRIDGE

Alternates	**Description of Alternate**	**Incremental B/C**
1	20 Ft. Bridge, No Rail	-
2	20 Ft. Bridge with W-beam rail, blunt end terminals	0.14
3	20 Ft. Bridge with W-beam rail, crashworthy end terminals	0.00

TABLE 5. RSAP 3.0.1 B/C RESULTS FOR A 50-FOOT LONG BRIDGE

Alternates	**Description of Alternate**	**Incremental B/C**
1	50 Ft. Bridge, No Rail	-
2	50 Ft. Bridge with W-beam rail, blunt end terminals	0.17
3	50 Ft. Bridge with W-beam rail, crashworthy end terminals	0.00

As can be seen in the tables, the results from both versions are very similar. In all cases the B/C of adding a rail to the bridge is substantially lower than 1.0, which is generally considered the "break even" point for an investment. The generally accepted threshold for deciding to make a road or bridge improvement based on a B/C analysis is between 2.0 and 4.0. KDOT typically uses a B/C of 2.0 as the minimum to support that decision. Based on these thresholds, it is clear that the addition of a guardrail cannot be justified on a purely economic basis.

Regardless of the results of this analysis, engineering judgment would lead one to consider the installation of the w-beam guardrail. This railing will provide delineation of the edge of the bridge deck, helping to "funnel" the traffic across the bridge, and it provides some redirection capability for lower speed traffic that might drift toward the edge at a low angle. To determine if there would be support for installing a w-beam bridge rail, an analysis was performed using RSAP 3.0.1 using the feature, Bridge Edge, High Hazard. This hazard is of the most severe type and assumes there is a fatality each time a vehicle encroaches on it. Although this is for extreme conditions that don't exist in Kansas, it should be considered to establish an upper limit for decision-making.

The results of this analysis are shown in Tables 6 and 7.

TABLE 6. RSAP 3.0.1 B/C RESULTS FOR A 20-FOOT LONG HIGH-HAZARD BRIDGE EDGE

Alternates	Description of Alternate	Incremental B/C
1	20 Ft. Bridge, No Rail	-
2	20 Ft. Bridge with W-beam rail, blunt end terminals	1.18
3	20 Ft. Bridge with W-beam rail, crashworthy end terminals	0.02

TABLE 7. RSAP 3.0.1 B/C RESULTS FOR A 50-FOOT LONG HIGH-HAZARD BRIDGE EDGE

Alternates	Description of Alternate	Incremental B/C
1	50 Ft. Bridge, No Rail	-
2	50 Ft. Bridge with W-beam rail, blunt end terminals	1.22
3	50 Ft. Bridge with W-beam rail, crashworthy end terminals	0.02

As the tables indicate, even when a fatality is expected every time a vehicle departs the bridge, the B/C of installing a w-beam rail with blunt ends is just above the theoretical break-even point and substantially below the KDOT threshold. The B/C for installation of w-beam rail with crashworthy end terminals is well below the break-even point. As a result, neither installation is supported by the economic analysis.

Details of the input and output for the RSAP analyses are included in Appendices G and H.

CONCLUSIONS

The analyses show that the risk of fatal or serious injury crashes occurring at shorter low-volume bridges is very low. In addition, on a system-wide basis, the costs of including a crash-tested bridge rail and properly installed approach guardrail section cannot be justified because they exceed the anticipated reductions in crash costs.

In addition to the work completed in this study, there is ample support from AASHTO for using lower design criteria on very low-volume roads. Significant among AASHTO guidelines are the

AASHTO Low Volume Guide's allowance of no clear zone and its conclusion that barriers in general are not cost effective on very low-volume roads.

Any new bridge constructed under this guideline will be no less than 24 feet in width. AASHTO's *Roadside Design Guide* provides information regarding the application of roadside safety principles, including the clear zone concept and guidelines for installation of various kinds of safety hardware. The clear zone recommended by the Guide for roads with less than 700 vpd is generally 6' to 10'. For traffic volumes less than 50 vpd it would be appropriate to use the lower end values of this range. For two-wheel path roads (most rural local roads under 50 vpd are two-wheel path roads) the vehicles are driving in the center of the traveled way. Assuming a 12' driving lane in the center, a 6' clear zone would be provided on a bridge that is 24' wide. Therefore, the bridge rail is outside the clear zone and not likely to be struck.

Previous studies in several states in the Midwest region have reached similar conclusions that upgrading to current bridge rail designs and/or installing approach guardrail are not recommended for locations with very low traffic volumes.

RECOMMENDATIONS

Although the findings of this investigation would support a policy that does not require installation of bridge rails on structures between 20 ft. and 50 ft. on roads functionally classified as Local Roads with less than 50 vpd traffic, it is recognized that there are benefits of the rail that cannot be evaluated by this effort. That is, they provide delineation to all drivers by indicating where the edge of the structure is located; additionally even a lightweight, non-tested rail has the ability to redirect some low-angle and/or low speed impacts. As a result it is recommended that

bridge rails installed on new or rehabilitated bridges utilizing federal funds could be of a non-tested design if the structure meets the set of conditions outlined below. This non-tested design is constructed of a w-beam guardrail section mounted on standard guardrail posts that are fastened to the bridge structure either by welding or a bolted connection. In addition, no approach guardrail will be required on these bridges.

In order to use this design, the bridge would need to meet all of the following conditions:

1. The bridge is located on a road functionally classified as a Local Road.
2. Traffic volume is less than or equal to 50 vpd.
3. The approach roadway is a two-wheel path road.
4. Roadway surface on approaches is gravel, sand or dirt.
5. Maximum length of bridge is 50 feet.
6. The new structure shall be no less than 24 ft. wide
7. Bridge is not located on or adjacent to a curve or intersection.
8. A Type 3 object marker shall be installed at each end of the bridge rails.

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APPENDIX A
FATAL CRASHES

Bridge Structure

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
ELLIS	2011	20110090101	N	
NEMAHA	2008	20080090073	Y	BR # 00070985003443 ??
OTTAWA	2008	20080095160	Y	BR # 000720779704420

Bridge Rail

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
GREENWOOD	2009	20090095053	N	
MEADE	2011	20110095022	N	
JACKSON	2009	20090090016	N	
RENO	2008	20080095064	Y	BR # 000780775005600

Culvert

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
BOURBON	2009	20090095025	N	
RICE	2013	20130095010	N	
RICE	2010	20100095097	N	
OSAGE	2010	20100095051	N	
NEOSHO	2009	20090095019	N	
CLOUD	2008	20080095107	N	
SEWARD	2009	20090097145	N	

Curb

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
SEDGWICK	2011	20110095114	N	

Embankment

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
KINGMAN	2009	20090095030	N	
BARTON	2010	20100095050	N	
ELLSWORTH	2012	20120090076	N	
BARBER	2010	20100095147	N	
CLAY	2010	20100095004	N	
CLAY	2010	20100095144	N	
DONIPHAN	2010	20100095077	N	
DOUGLAS	2011	20110090087	N	
HARPER	2011	20110095046	N	
MIAMI	2013	20130090001	N	
ROOKS	2012	20120095143	N	
SMITH	2013	20130095019	N	
BROWN	2011	20110090057	N	
MARSHALL	2008	20080095065	N	
OSAGE	2009	20090090130	N	

APPENDIX B
SERIOUS INJURY CRASHES

Bridge Structure

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
LINCOLN	2013	20130122329	N	
BARTON	2012	20120111224	N	
DOUGLAS	2011	20110033964	N	
MIAMI	2011	20110024720	Y	BR # 000611073005190
OSAGE	2012	20120110726	N	
SALINE	2010	20100113251	N	
FRANKLIN	2008	20080031063	N	
MIAMI	2008	20080004030	N	
SEDGWICK	2008	20080024155	N	
WABAUNSEE	2008	20080025051	N	
FINNEY	2009	20090100868	N	

Bridge Rail

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
DECATUR	2013	20130114597	N	
LYON	2010	20100080767	N	
MCPHERSON	2013	20130101734	N	
NEMAHA	2012	20120025879	N	
SEDGWICK	2011	20110009927	N	
NEOSHO	2009	20090002091	N	
JOHNSON	2009	20090048846	Y	BR # 000461097804740

Culvert

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
ELLIS	2013	20130002232	N	
ELLSWORTH	2012	20120012176	N	
JACKSON	2013	20130031218	N	
MARION	2013	20130006555	N	
SALINE	2011	20110023643	N	
SEDGWICK	2010	20100101284	N	
BUTLER	2008	20080003050	N	
CHEROKEE	2009	20090012004	N	
CRAWFORD	2008	20080105427	N	
WABAUNSEE	2008	20080048606	N	
WABAUNSEE	2009	20090152844	N	
WOODSON	2008	20080052738	N	

Barricade

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
SEDGWICK	2013	20130103584	N	

Ditch				
COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
CHEYENNE	2012	20120102639	N	
WABAUNSEE	2010	20100012423	N	

Embankment				
COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
BROWN	2012	20120011636	N	
CLOUD	2010	20100013171	N	
COFFEY	2012	20120118166	N	
ELLIS	2011	20110106298	N	
HODGEMAN	2012	20120120830	N	
JACKSON	2012	20120020024	N	
MCPHERSON	2013	20130115323	N	
MORRIS	2012	20120118996	N	
OSAGE	2011	20110115362	N	
WASHINGTON	2012	20120000084	N	
MARION	2010	20100018500	N	
ANDERSON	2012	20120100755	N	
ATCHISON	2013	20130116303	N	
CLAY	2011	20110105121	N	
COWLEY	2009	20090061919	N	
CRAWFORD	2010	20100024818	N	
DICKINSON	2011	20110021763	N	
DOUGLAS	2010	20100022073	N	
FINNEY	2011	20110026710	N	
MIAMI	2011	20110019664	N	
MITCHELL	2012	20120007764	N	
NEMAHA	2011	20110032786	N	
SUMNER	2012	20120026276	N	
WYANDOTTE	2011	20110024365	N	
BUTLER	2011	20110019350	N	
JEFFERSON	2011	20110009869	N	
NEMAHA	2011	20110024501	N	
GRAHAM	2009	20090007071	N	
LEAVENWORTH	2008	20080012089	N	
MORRIS	2008	20080055540	N	
REPUBLIC	2009	20090156878	N	
SEDGWICK	2009	20090014127	N	

APPENDIX C
NON-FATAL OR SERIOUS INJURY CRASHES

Bridge Structure				
COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
ALLEN	2012	20120025119	N	
BOURBON	2012	20120030726	N	
CHAUTAUQUA	2011	20110029138	Y	BR #000100943006948
CHEROKEE	2013	20130007295	N	
GRAHAM	2013	20130000563	N	
KINGMAN	2010	20100112917	N	
MIAMI	2013	20130031156	N	
PAWNEE	2013	20130007474	N	
RICE	2012	20120122938	N	
ALLEN	2013	20130080478	N	
ATCHISON	2010	20100111065	Y	BR # 00031049603625
ATCHISON	2011	20110109146	N	
ATCHISON	2012	20120120279	N	
BOURBON	2011	20110013754	N	
BUTLER	2010	20100026290	N	
BUTLER	2010	20100017993	N	
BUTLER	2010	20100081290	N	
BUTLER	2011	20110116803	N	
BUTLER	2011	20110004874	N	
BUTLER	2011	20110004193	N	
BUTLER	2011	20110000010	N	
BUTLER	2013	20130030392	N	
BUTLER	2013	20130034378	Y	Br # 000080887905960
BUTLER	2013	20130005575	N	
CLAY	2010	20100115771	N	
CLOUD	2010	20100080333	Y	Br # 000150785803740
COFFEY	2010	20100107809	N	
COWLEY	2009	20090063294	N	
COWLEY	2010	20100023567	N	
COWLEY	2010	20100025126	N	
COWLEY	2010	20100026613	Y	BR # 000180865906660
COWLEY	2013	20130010650	N	
CRAWFORD	2011	20110008572	N	
CRAWFORD	2012	20120001444	N	
CRAWFORD	2012	20120021006	N	
CRAWFORD	2012	20120026815	N	
DICKINSON	2012	20120108559	N	
DICKINSON	2013	20130034894	N	
DONIPHAN	2010	20100014585	N	
ELLSWORTH	2013	20130030893	N	
FRANKLIN	2010	20100005236	N	
FRANKLIN	2013	20130038566	N	

GEARY	2010	20100017701	N	
GEARY	2011	20110005170	N	
GEARY	2013	20130105581	N	
GREENWOOD	2010	20100036932	N	
GREENWOOD	2011	20110008303	N	
HARPER	2012	20120103824		
JEFFERSON	2013	20130111855	N	
JOHNSON	2011	20110080035	N	
KINGMAN	2012	20120103606	Y	BR # 000480765006565
KINGMAN	2012	20120108747	N	
LABETTE	2010	20100018426	N	
LABETTE	2011	20110002264	N	
LABETTE	2013	20130002305	N	
LINCOLN	2011	20110033422	N	
LINCOLN	2013	20130109647	N	
LINN	2013	20130104524	N	
LYON	2010	20100116401	N	
MCPHERSON	2010	20100023493	Y	BR # 000590815305500
MCPHERSON	2013	20130116367	N	
MIAMI	2010	20100039484	N	
MIAMI	2010	20100039678	N	
MIAMI	2010	20100039360	N	
MIAMI	2012	20120027151	N	
MITCHELL	2011	20110005569	N	
MORRIS	2011	20110122407	N	
NEMAHA	2013	20130004041	Y	Bridge is removed
NEOSHO	2009	20090102439	N	
NEOSHO	2011	20110007074	Y	BR # 000671045606340
NESS	2011	20110081201	N	
OSAGE	2013	20130116542	N	
OTTAWA	2011	20110021555	N	
PAWNEE	2011	20110001905	N	
PAWNEE	2011	20110026421	N	
PAWNEE	2013	20130030145	Y	BR # 000730589005481
POTTAWATOMIE	2009	20090047493	N	
POTTAWATOMIE	2013	20130005622	N	
RICE	2011	20110111544	Y	BR # 000800749805320
RUSSELL	2009	20090058968	N	
SALINE	2010	20100012106	N	
SEDGWICK	2009	20090063126	N	
SEDGWICK	2010	20100008795	Y	Appears to be bridge. No bridge in inventory at this location.
SEDGWICK	2010	20100014925	N	
SHAWNEE	2010	20100009424	N	
WILSON	2012	20120021183	N	

WILSON	2012	20120080008	N	
WOODSON	2010	20100080407	N	
WOODSON	2012	20120105447	N	
WOODSON	2013	20130113920	N	
CLAY	2011	20110112340	N	
DONIPHAN	2013	20130037438	N	
JACKSON	2013	20130034361	N	
CHEROKEE	2010	20100036814	N	
OSAGE	2012	20120106361	N	
LABETTE	2012	20120002385	N	
BUTLER	2010	20100017141	N	
SUMNER	2011	20110013137	N	
ANDERSON	2011	20110081068	N	
SEDGWICK	2011	20110109595	N	
ATCHISON	2008	20080022530	N	
ATCHISON	2008	20080051003	Y	BR # 000031051903481
BARTON	2008	20080021511	N	
BARTON	2009	20090155350	N	
BOURBON	2008	20080042509	N	
Butler	2008	20080033081	N	
BUTLER	2008	20080022544	N	
BUTLER	2009	20090028538	N	
BUTLER	2009	20090010556	N	
BUTLER	2009	20090010555	N	
CHEROKEE	2008	20080026038	N	
CHEROKEE	2008	20080034015	Y	BR # 000111095006947
CHEROKEE	2008	20080015510	N	
CHEROKEE	2008	20080054009	N	
CLARK	2008	20080026044	N	
CLAY	2009	20090152279	N	
CLOUD	2009	20090019474	N	
COFFEY	2009	20090000534	N	
COWLEY	2008	20080022578	N	
CRAWFORD	2008	20080034539	N	
DICKINSON	2008	20080049071	N	
DOUGLAS	2008	20080051066	N	
DOUGLAS	2008	20080021551	N	
DOUGLAS	2008	20080046072	N	
ELK	2009	20090005005	N	
FRANKLIN	2008	20080021570	N	
GOVE	2009	20090021338	N	
GREENWOOD	2008	20080016584	N	
HARPER	2009	20090009052	N	
HARVEY	2008	20080023056	N	
KIOWA	2008	20080007513		
LABETTE	2008	20080018069	Y	BR # 000501023006900
LABETTE	2008	20080053530	N	

LABETTE	2008	20080053524	N	
LABETTE	2009	20090023832	N	
LABETTE	2009	20090029390	N	
LEAVENWORTH	2008	20080012064	N	
LINN	2009	20090029475		
MARION	2009	20090154773	N	
MCPHERSON	2008	20080001055	Y	BR # 000590801705340
MCPHERSON	2008	20080010574	N	
MEADE	2008	20080036548	N	
MIAMI	2008	20080011531	N	
MIAMI	2009	20090029547	N	
MIAMI	2009	20090014615	N	
MONTGOMERY	2008	20080036564	N	
MONTGOMERY	2009	20090029874	N	
MORRIS	2009	20090024310	N	
NEOSHO	2008	20080002017	N	
NEOSHO	2009	20090020018	N	
OSAGE	2009	20090026966	N	
OSAGE	2009	20090004020	N	
OSBORNE	2009	20090017175	N	
POTTAWATOMIE	2008	20080002023	N	
RENO	2008	20080109915	N	
RENO	2009	20090156633	N	
RICE	2009	20090022371	N	
SEDGWICK	2008	20080024116	N	
WILSON	2008	20080042091	N	
WOODSON	2009	20090019915	N	
CRAWFORD	2010	20100020211	N	
DOUGLAS	2010	20100010497	N	
PRATT	2011	20110033365	N	
SHAWNEE	2010	20100002271	Y	BR # 000891001004446
DOUGLAS	2010	20100029132	N	
KINGMAN	2010	20100100001	N	
LINN	2012	20120036054	N	

BridgeRail

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
ALLEN	2013	20130007759	Y	BR # 000011031005780
BUTLER	2011	20110026871	Y	BR # 000080857006189
BUTLER	2013	20130121737	N	
BUTLER	2013	20130085131	N	
CHASE	2012	20120036179	N	
COWLEY	2012	20120028437	N	
GRAY	2011	20110081508	N	
MARION	2012	20120018879	N	
MARSHALL	2012	20120002464	N	
NESS	2013	20130085588	N	

OSAGE	2010	20100106635	N	
OSAGE	2010	20100115021	N	
PHILLIPS	2012	20120121928	Y	BR # 000740615303180
POTTAWATOMIE	2013	20130031185	N	
SEDGWICK	2013	20130107436	N	
SHERIDAN	2011	20110030170		
WABAUNSEE	2012	20120002110	N	
WILSON	2010	20100026150	N	
BUTLER	2010	20100015000	N	
DOUGLAS	2013	20130005141	N	
EDWARDS	2011	20110017855	Y	BR # 000240577205860
NEOSHO	2010	20100015821	N	
RICE	2013	20130109356	Y	BR # 000800753805260
ANDERSON	2013	20130000842	N	
ATCHISON	2011	20110107617	N	
BARBER	2011	20110022267	N	
BARTON	2013	20130112443	N	
BOURBON	2010	20100011610	N	
BOURBON	2012	20120104575	N	
BOURBON	2013	20130003017	N	
BROWN	2011	20110024777	Y	BR # 000071007103380
BROWN	2012	20120029710	N	
BUTLER	2010	20100004082	N	
BUTLER	2011	20110080419	N	
BUTLER	2012	20120021228	N	
BUTLER	2013	20130034281	N	
BUTLER	2013	20130030746	Y	BR # 000080845306000
BUTLER	2013	20130008440	N	
BUTLER	2013	20130005583	Y	BR # 000080845306000
CHEYENNE	2011	20110116008	N	
CLOUD	2011	20110025162	N	
CLOUD	2011	20110012273	N	
COFFEY	2011	20110104780	Y	BR # 000161007905660
COMANCHE	2011	20110028464	N	
COWLEY	2011	20110121286	N	
COWLEY	2013	20130002247	N	
CRAWFORD	2009	20090063333	N	
CRAWFORD	2012	20120019546	Y	BR # 000191073906580
DICKINSON	2010	20100011922	N	
DOUGLAS	2011	20110000128	N	
DOUGLAS	2013	20130101874	N	
ELLIS	2010	20100011175	N	
ELLSWORTH	2011	20110022780	N	
FORD	2012	20120036157	N	
FORD	2012	20120029699	N	
FRANKLIN	2010	20100013706	N	
FRANKLIN	2010	20100023359	N	

FRANKLIN	2010	20100035358	N	
FRANKLIN	2011	20110014147	N	
FRANKLIN	2011	20110026568	N	
GEARY	2012	20120027569	N	
GRAHAM	2011	20110012961	N	
GREENWOOD	2010	20100016023	N	
HARPER	2011	20110121490	Y	BR # 000390735006948
HARPER	2013	20130101389	N	
JACKSON	2010	20100000664	N	
JACKSON	2010	20100024799	Y	BR # 000430989003646
JACKSON	2012	20120021796	N	
JACKSON	2013	20130036110	?	
JACKSON	2013	20130060193	N	
JEFFERSON	2011	20110023383	Y	BR # 000441035204061
JOHNSON	2009	20090055159	N	
KEARNY	2011	20110108650	N	
KINGMAN	2010	20100109855	N	
KINGMAN	2012	20120117893	N	
LABETTE	2013	20130030735	N	
LABETTE	2013	20130004505	N	
LYON	2010	20100010263	N	
MCPHERSON	2010	20100004606	N	
MCPHERSON	2010	20100023957	Y	BR # 000590791205460
MCPHERSON	2011	20110115029	N	
MCPHERSON	2012	20120102091	Y	BR # 000590785105020
MCPHERSON	2013	20130114033	Y	BR # 000590775005426
MEADE	2013	20130007537	N	
MIAMI	2010	20100039463	N	
MIAMI	2010	20100039594	N	
MIAMI	2011	20110004345	N	
MIAMI	2012	20120001536	N	
MIAMI	2013	20130035562	N	
MONTGOMERY	2010	20100120316	N	
MONTGOMERY	2012	20120105254	N	
MONTGOMERY	2012	20120103472	N	
MONTGOMERY	2013	20130100508	N	
MORRIS	2011	20110111119	N	
MORRIS	2012	20120104319	N	
NEMAHA	2013	20130004254	N	
NEMAHA	2013	20130030022	N	
NORTON	2009	20090101460	N	
OSAGE	2012	20120123156	N	
OTTAWA	2011	20110024124	N	
PAWNEE	2012	20120029182	Y	BR # 000730615405540
PHILLIPS	2011	20110115331	Y	BR # 000920639003300
PHILLIPS	2011	20110124253	N	
POTTAWATOMIE	2013	20130006855	N	

PRATT	2010	20100022632	N	
RENO	2011	20110006345	N	
REPUBLIC	2013	20130119649	Y	BR # 000790783103240
RICE	2011	20110118069	N	
ROOKS	2010	20100040128	N	
ROOKS	2010	20100040088	N	
SALINE	2009	20090062335	N	
SALINE	2009	20090058982	Y	BR # 000850775104820
SALINE	2011	20110023759	N	
SEDGWICK	2011	20110120654	N	
SEDGWICK	2011	20110003418	N	
SEDGWICK	2012	20120110984	N	
SEDGWICK	2012	20120108602	N	
SEDGWICK	2012	20120107687	Y	BR # 000870801006421
SEDGWICK	2013	20130112810	N	
SHAWNEE	2012	20120028911	Y	BR # 000890987004240
STAFFORD	2010	20100027482	Y	BR # 000930691005882
SUMNER	2009	20090065823	N	
SUMNER	2010	20100022551	Y	BR # 000000000960200
SUMNER	2010	20100019929	N	
THOMAS	2011	20110118168	Y	BR # 000970447004180
WASHINGTON	2010	20100017471	N	
WASHINGTON	2013	20130033147	N	
WILSON	2011	20110022978	Y	BR # 001030975406362
WILSON	2013	20130005533	N	
WOODSON	2011	20110119582	N	
CLAY	2009	20090064577	N	
CLAY	2013	20130113284	N	
DOUGLAS	2011	20110014743	N	
NEOSHO	2011	20110019734	N	
SEDGWICK	2011	20110000754	N	
SMITH	2010	20100110364	Y	BR # 000920645503260
SMITH	2013	20130101306	N	
BUTLER	2011	20110026869	N	
ALLEN	2009	20090018507	N	
ANDERSON	2008	20080013503	N	
ANDERSON	2009	20090010505	N	
BUTLER	2008	20080002512	N	
BUTLER	2009	20090015536	Y	BR # 000080879006128
CHAUTAUQUA	2008	20080034529	N	
CHEROKEE	2009	20090000090	N	
CLOUD	2009	20090154530	Y	BR # 000150805703600
DICKINSON	2008	20080042554	N	
DONIPHAN	2009	20090013082	N	
DOUGLAS	2008	20080034553	N	
FRANKLIN	2008	20080053517	N	
FRANKLIN	2008	20080014547	N	

FRANKLIN	2008	20080044060	N	
FRANKLIN	2008	20080002551	N	
FRANKLIN	2009	20090019500	N	
GRAHAM	2008	20080033039	N	
GRAHAM	2009	20090021344	N	
GREELEY	2008	20080020073	N	
GREENWOOD	2008	20080031567	N	
HARVEY	2009	20090029059	N	
JACKSON	2008	20080004504	N	
JEFFERSON	2008	20080050517	N	
JOHNSON	2008	20080032191	N	
KEARNY	2008	20080049544		
KEARNY	2008	20080045043		
KINGMAN	2008	20080046545	N	
LABETTE	2009	20090029410	N	
LINCOLN	2008	20080054570	N	
MARSHALL	2008	20080032035	Y	BR # 000580895403223
MCPHERSON	2009	20090002009	Y	BR # 000590801005187
MCPHERSON	2009	20090012510	N	
MIAMI	2008	20080010004	N	
MIAMI	2008	20080013041	N	
MIAMI	2008	20080010577	N	
MIAMI	2009	20090019654	N	
MITCHELL	2009	20090017096	N	
MONTGOMERY	2008	20080018512	N	
MORRIS	2008	20080017062	N	
MORRIS	2008	20080030575	N	
MORRIS	2008	20080055019	Y	BR # 000640877004944
MORRIS	2009	20090029879	N	
NEMAHA	2009	20090004014	N	
NEOSHO	2009	20090003095	N	
NEOSHO	2009	20090007590	N	
POTTAWATOMIE	2008	20080001504	N	
REPUBLIC	2008	20080108382	Y	BR # 000790767003246
REPUBLIC	2009	20090150881	N	
SEDGWICK	2008	20080038593	N	
SEDGWICK	2009	20090018094	N	
SEDGWICK	2009	20090010003	N	
SHAWNEE	2008	20080040061	N	
SHAWNEE	2008	20080040085	N	
SHERIDAN	2008	20080040618	N	
SUMNER	2008	20080042049	Y	BR # 000960819506980
WABAUNSEE	2008	20080010055	N	
WASHINGTON	2008	20080019045	Y	BR # 001010847103220
WASHINGTON	2009	20090019885	N	
WOODSON	2009	20090030380	N	
FRANKLIN	2013	20130000016	N	

MIAMI	2012	20120021524	Y	BR # 000611071204800
JACKSON	2013	20130006908	N	
GuardRail				
COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
ELLIS	2013	20130030740	Y	BR # 000830593004801
GREENWOOD	2012	20120021321	N	
JOHNSON	2009	20090101225	N	
LABETTE	2011	20110021769	N	
SEDGWICK	2011	20110033891	N	
WASHINGTON	2013	20130002930	N	
WILSON	2011	20110021948	N	
BARBER	2011	20110116650	N	
MIAMI	2011	20110081339	Y	BR # 000611073004841
ANDERSON	2013	20130101842	N	
BARTON	2010	20100108881	N	
BUTLER	2011	20110016845	N	
BUTLER	2012	20120017558	N	
BUTLER	2012	20120002754	N	
CHASE	2012	20120017808	N	
CHEROKEE	2011	20110009192	N	
CHEYENNE	2011	20110106608	N	
CRAWFORD	2013	20130037561	N	
DOUGLAS	2010	20100015204	N	
ELLIS	2013	20130003612	N	
FRANKLIN	2011	20110024241	N	
FRANKLIN	2012	20120013536	N	
GEARY	2009	20090059989	N	
HARVEY	2010	20100022082	Y	BR # 000400827005742
HARVEY	2010	20100022085	N	
HARVEY	2011	20110106410	N	
JACKSON	2010	20100005845	Y	BR # 000430995003886
JEFFERSON	2013	20130037088	N	
KEARNY	2012	20120117646	N	
LINN	2013	20130115790	N	
MARION	2012	20120002112	N	
MARSHALL	2010	20100004954	Y	BR # 000580885003108
MCPHERSON	2010	20100028059	N	
MEADE	2013	20130000101	Y	BR # 000600473906560
MIAMI	2010	20100039413	N	
MIAMI	2012	20120018594	N	
MONTGOMERY	2010	20100105498	Y	BR # 000630999506906
MONTGOMERY	2011	20110107549	N	
NEMAHA	2013	20130037393	N	
OSAGE	2010	20100107891	N	
OSAGE	2013	20130115476	N	
POTTAWATOMIE	2011	20110103022	N	

POTTAWATOMIE	2013	20130010094	N	
RILEY	2009	20090046110	N	
RUSSELL	2009	20090050136	N	
SALINE	2009	20090052028	N	
SEDGWICK	2010	20100017173	N	
SEDGWICK	2010	20100000825	Y	BR # 000870771406240
SHAWNEE	2011	20110080487	Y	BR # 000890975104480
SUMNER	2012	20120005259	N	
SUMNER	2013	20130107342	N	
WABAUNSEE	2013	20130003558	N	
NORTON	2011	20110022465	Y	BR # 000690553903208
OTTAWA	2012	20120000014	N	
DICKINSON	2012	20120060187	N	
SHAWNEE	2011	20110030304	N	
COFFEY	2011	20110112917	N	
NEMAHA	2011	20110115419	Y	BR # 000660983003149
SEWARD	2010	20100120971	N	
BARBER	2009	20090010531	Y	BR # 000040703406740
BARBER	2009	20090011505	Y	BR # 000040699906800
BROWN	2008	20080013546	N	
BUTLER	2008	20080013554	N	
BUTLER	2009	20090028484	N	
BUTLER	2009	20090019929	N	
BUTLER	2009	20090015546	N	
CRAWFORD	2008	20080014523	N	
CRAWFORD	2009	20090009032	N	
DOUGLAS	2008	20080034036	N	
ELLIS	2008	20080040515	N	
ELLSWORTH	2009	20090021326	N	
FRANKLIN	2008	20080021564	N	
HARVEY	2009	20090005047	Y	BR # 000400817005748
JEFFERSON	2008	20080023073	N	
JOHNSON	2008	20080044074	Y	BR # 000461083104680
JOHNSON	2008	20080035503	N	
JOHNSON	2009	20090007086	Y	BR #000461075104708
LYON	2009	20090009081	N	
MARSHALL	2008	20080002578	N	
MARSHALL	2009	20090003586	N	
MIAMI	2008	20080023561	N	
MIAMI	2008	20080017043	N	
MIAMI	2009	20090014027	N	
MIAMI	2009	20090019651	N	
MONTGOMERY	2008	20080001074	N	
OSAGE	2009	20090003113	N	
PRATT	2008	20080036598	N	
REPUBLIC	2008	20080103703	N	
SALINE	2008	20080052634	N	

SHAWNEE	2008	20080029548	N	
Culvert				
COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
ANDERSON	2010	20100109967	N	
BUTLER	2013	20130001334	N	
CHAUTAUQUA	2013	20130034411	N	
COWLEY	2011	20110034337	N	
COWLEY	2011	20110025817	N	
COWLEY	2013	20130010769	N	
CRAWFORD	2011	20110022399	N	
DICKINSON	2011	20110123490	N	
DOUGLAS	2013	20130005150	N	
FINNEY	2011	20110029980	N	
FRANKLIN	2011	20110005871	N	
FRANKLIN	2012	20120030924	N	
GREENWOOD	2010	20100038339	N	
GREENWOOD	2011	20110015420	N	
HARPER	2011	20110103113	N	
LABETTE	2012	20120013304	N	
LOGAN	2012	20120002425	N	
LYON	2012	20120025769	N	
NEOSHO	2013	20130009301	N	
PRATT	2011	20110022638	N	
RICE	2011	20110109303	N	
RUSSELL	2009	20090064116	N	
SALINE	2012	20120027735	N	
SALINE	2012	20120081087	N	
SEDGWICK	2009	20090056632	N	
SEDGWICK	2011	20110003963	N	
SHAWNEE	2013	20130035239	N	
WABAUNSEE	2011	20110002792	N	
WASHINGTON	2012	20120015931	N	
CLAY	2011	20110116708	N	
RENO	2012	20120020394	N	
BOURBON	2013	20130008529	N	
OTTAWA	2013	20130031774	N	
DICKINSON	2011	20110016599	N	
ELLIS	2010	20100121712	N	
DOUGLAS	2012	20120021940	N	
MCPHERSON	2012	20120111027	N	
MITCHELL	2010	20100002887	N	
SEDGWICK	2012	20120105498	N	
STAFFORD	2013	20130085444	N	
WOODSON	2012	20120117563	N	
ALLEN	2012	20120014879	N	
ANDERSON	2010	20100033598	N	

ANDERSON	2012	20120104153		
ANDERSON	2012	20120027837		
ANDERSON	2013	20130037097		
BARBER	2012	20120027903		
BARTON	2010	20100111289		
BARTON	2010	20100107505		
BARTON	2010	20100103688		
BARTON	2011	20110109909		
BARTON	2011	20110108178	N	
BARTON	2011	20110106040		
BARTON	2012	20120116523		
BOURBON	2012	20120006738		
BROWN	2011	20110033242		
BUTLER	2010	20100102894		
BUTLER	2010	20100035772		
BUTLER	2010	20100014186		
BUTLER	2010	20100025710		
BUTLER	2011	20110007287		
BUTLER	2011	20110030587	N	
BUTLER	2011	20110030588		
BUTLER	2011	20110029624		
BUTLER	2012	20120000064		
BUTLER	2012	20120012959		
BUTLER	2013	20130034818		
BUTLER	2013	20130037565		
BUTLER	2013	20130032346		
BUTLER	2013	20130008807		
BUTLER	2013	20130007275		
CHAUTAUQUA	2012	20120007046	N	
CHEROKEE	2010	20100027053		
CHEROKEE	2011	20110023457		
CHEROKEE	2012	20120018302		
CHEROKEE	2012	20120002567		
CHEROKEE	2013	20130104950		
CLARK	2012	20120018242		
CLAY	2012	20120111401		
CLOUD	2011	20110024101		
CLOUD	2012	20120026794		
CLOUD	2013	20130002898	N	
COFFEY	2011	20110113352		
COFFEY	2012	20120101994		
COFFEY	2012	20120124833		
COWLEY	2009	20090061921		
COWLEY	2009	20090057339		
COWLEY	2010	20100021402		
COWLEY	2011	20110107562		
COWLEY	2011	20110024158		

COWLEY	2011	20110009535		
CRAWFORD	2010	20100003559	N	
CRAWFORD	2012	20120012818		
DICKINSON	2011	20110013812		
DOUGLAS	2009	20090048821		
DOUGLAS	2010	20100036752		
DOUGLAS	2011	20110000433		
DOUGLAS	2012	20120010306		
DOUGLAS	2013	20130000099		
ELK	2011	20110031181		
ELLIS	2009	20090063542		
ELLIS	2011	20110031196	N	
ELLSWORTH	2012	20120018379		
FINNEY	2009	20090048824		
FINNEY	2012	20120019806		
FINNEY	2013	20130109387		
FORD	2010	20100039622		
FRANKLIN	2011	20110002801		
GRAY	2011	20110028156		
HARPER	2013	20130101390		
HARVEY	2010	20100000655		
HARVEY	2011	20110022324		
HARVEY	2011	20110034457	N	
HARVEY	2011	20110122807		
HARVEY	2012	20120023926		
HODGEMAN	2010	20100010807		
JEFFERSON	2010	20100113881		
JOHNSON	2010	20100020086		
JOHNSON	2010	20100022921		
JOHNSON	2011	20110014033		
JOHNSON	2011	20110027826		
KEARNY	2011	20110120033		
LABETTE	2010	20100033480	N	
LEAVENWORTH	2012	20120013721		
LYON	2012	20120020783		
LYON	2012	20120027450		
LYON	2013	20130009271		
MARION	2012	20120002415		
MARSHALL	2012	20120016053		
MCPHERSON	2010	20100015785		
MCPHERSON	2011	20110112010		
MCPHERSON	2011	20110119217		
MIAMI	2011	20110030418	N	
MIAMI	2011	20110011816		
MITCHELL	2012	20120013632		
MONTGOMERY	2011	20110103976		
MONTGOMERY	2012	20120107002		

MONTGOMERY	2013	20130100515		
MORRIS	2011	20110111464		
NEOSHO	2010	20100026009		
NEOSHO	2010	20100021484		
NEOSHO	2011	20110024301		
NEOSHO	2011	20110024302	N	
NEOSHO	2013	20130006783		
OSAGE	2011	20110105577		
PAWNEE	2010	20100110235		
POTTAWATOMIE	2010	20100000778		
POTTAWATOMIE	2011	20110023989		
POTTAWATOMIE	2012	20120022401		
POTTAWATOMIE	2012	20120010010		
RENO	2013	20130033563		
RENO	2013	20130008699		
RICE	2010	20100119659	N	
RICE	2012	20120116003		
ROOKS	2012	20120025215		
ROOKS	2012	20120081441		
RUSSELL	2009	20090058976		
RUSSELL	2010	20100015948		
RUSSELL	2010	20100027621		
SALINE	2009	20090058998		
SALINE	2009	20090045326		
SALINE	2011	20110030043		
SALINE	2013	20130030276	N	
SALINE	2013	20130002688		
SALINE	2013	20130036021		
SEDGWICK	2009	20090101227		
SEDGWICK	2010	20100015096		
SEDGWICK	2010	20100019876		
SEDGWICK	2010	20100023230		
SEDGWICK	2010	20100014250		
SEDGWICK	2011	20110024586		
SEDGWICK	2011	20110120551		
SEDGWICK	2012	20120121567	N	
SEDGWICK	2012	20120110259		
SEDGWICK	2012	20120101854		
SEDGWICK	2012	20120116879		
SEDGWICK	2013	20130123664		
SHAWNEE	2009	20090046249		
SHAWNEE	2010	20100026380		
SHAWNEE	2011	20110021501		
SHAWNEE	2011	20110033367		
SHAWNEE	2013	20130011725		
SUMNER	2010	20100012335	N	
SUMNER	2011	20110023739		

SUMNER	2011	20110023737		
THOMAS	2012	20120105460		
WABAUNSEE	2012	20120005499		
WABAUNSEE	2013	20130080363		
WILSON	2010	20100026151		
WILSON	2011	20110021683		
WOODSON	2010	20100008421		
WOODSON	2011	20110002095		
WOODSON	2013	20130100125	N	
HARVEY	2010	20100023757		
LOGAN	2012	20120005682		
NEMAHA	2010	20100015783		
RICE	2010	20100101330		
RUSH	2010	20100012431		
BOURBON	2012	20120004713		
COWLEY	2011	20110005316		
CRAWFORD	2011	20110014751		
GRANT	2009	20090065418		
HARVEY	2011	20110007757	N	
MARSHALL	2011	20110023543		
MCPHERSON	2012	20120116581		
NORTON	2013	20130032135		
OSAGE	2010	20100109504		
CHEYENNE	2010	20100107826		
JACKSON	2012	20120026434		
OSAGE	2010	20100121272		
WOODSON	2011	20110122014		
BUTLER	2011	20110016473		
BUTLER	2011	20110022308	N	
DOUGLAS	2013	20130112286		
RUSH	2013	20130031702		
WILSON	2010	20100038362		
WOODSON	2011	20110117061		
COFFEY	2011	20110112918		
ALLEN	2008	20080033004		
ALLEN	2008	20080031001		
ALLEN	2008	20080037501		
ALLEN	2008	20080042503		
ALLEN	2008	20080021505	N	
ANDERSON	2008	20080033006		
BARTON	2008	20080026014		
BOURBON	2009	20090004521		
BOURBON	2009	20090018516		
BROWN	2008	20080013541		
BROWN	2008	20080044015		
BUTLER	2008	20080034005		
BUTLER	2008	20080050031		

BUTLER	2009	20090007026		
BUTLER	2009	20090028514	N	
BUTLER	2009	20090028495		
BUTLER	2009	20090028491		
BUTLER	2009	20090014524		
BUTLER	2009	20090000060		
BUTLER	2009	20090027321		
BUTLER	2009	20090020804		
CHEROKEE	2008	20080044036		
CHEROKEE	2009	20090000503		
CHEROKEE	2009	20090004545		
CHEROKEE	2009	20090153957	N	
CLARK	2008	20080026042		
COFFEY	2009	20090000533		
COWLEY	2009	20090006927		
CRAWFORD	2008	20080021547		
CRAWFORD	2008	20080030521		
CRAWFORD	2009	20090028843		
DOUGLAS	2008	20080051071		
DOUGLAS	2009	20090016549		
DOUGLAS	2009	20090011004		
ELLSWORTH	2009	20090021317	N	
FINNEY	2008	20080015523		
FRANKLIN	2008	20080034571		
FRANKLIN	2008	20080030054		
HARPER	2008	20080024563		
HARPER	2009	20090019528		
HARPER	2009	20090011040		
HARPER	2009	20090019525		
HARVEY	2008	20080051531		
HARVEY	2008	20080024848		
HARVEY	2008	20080030544	N	
HARVEY	2009	20090019540		
HARVEY	2009	20090021362		
HARVEY	2009	20090021365		
HARVEY	2009	20090150961		
JACKSON	2009	20090009064		
JEFFERSON	2008	20080003585		
JEFFERSON	2009	20090005061		
KINGMAN	2008	20080018058		
LABETTE	2008	20080046562		
LABETTE	2009	20090029393	N	
LABETTE	2009	20090019579		
LEAVENWORTH	2008	20080032011		
LEAVENWORTH	2008	20080043063		
LEAVENWORTH	2008	20080045056		
LEAVENWORTH	2009	20090005505		

LINCOLN	2009	20090019988		
LINN	2008	20080106063		
LINN	2009	20090152540		
LYON	2008	20080050561		
MARION	2009	20090011104	N	
MCPHERSON	2008	20080020520		
MCPHERSON	2009	20090002014		
MCPHERSON	2009	20090023874		
MIAMI	2009	20090006044		
MONTGOMERY	2008	20080010162		
MONTGOMERY	2009	20090011147		
MONTGOMERY	2009	20090002058		
MORRIS	2008	20080008546		
MORRIS	2009	20090011153		
NEOSHO	2009	20090011165	N	
NEOSHO	2010	20100019141		
NEOSHO	2010	20100018055		
OSAGE	2009	20090004022		
PHILLIPS	2009	20090017196		
RENO	2008	20080102224		
RENO	2008	20080103891		
RENO	2009	20090156597		
REPUBLIC	2008	20080111493		
RICE	2008	20080048525		
RUSH	2009	20090017286	N	
SALINE	2008	20080102347		
SEDGWICK	2008	20080030386		
SEDGWICK	2008	20080018578		
SEDGWICK	2008	20080040022		
SEDGWICK	2008	20080020530		
SEDGWICK	2008	20080015578		
SEDGWICK	2008	20080017595		
SEDGWICK	2009	20090019800		
SEDGWICK	2009	20090022392		
SEWARD	2009	20090150066	N	
SMITH	2008	20080019574		
SUMNER	2008	20080008046		
SUMNER	2009	20090012259		
WASHINGTON	2009	20090019889		
WILSON	2008	20080052725		
WILSON	2008	20080048619		
WOODSON	2008	20080052737		
DONIPHAN	2010	20100036989		
MCPHERSON	2012	20120118784		
BUTLER	2010	20100004260	N	
BUTLER	2013	20130004557		
COWLEY	2013	20130000074		

CRAWFORD	2009	20090065757		
CRAWFORD	2012	20120022392		
DICKINSON	2010	20100021120		
DOUGLAS	2011	20110032984		
DOUGLAS	2012	20120103132		
HODGEMAN	2011	20110005520		
MARION	2013	20130032026		
MARSHALL	2012	20120026884	N	
MITCHELL	2010	20100029735		
OSAGE	2013	20130120198		
REPUBLIC	2010	20100103082		
SALINE	2013	20130035899		
SEDGWICK	2013	20130103445		
TREGO	2010	20100017130		
TREGO	2010	20100014005		
WASHINGTON	2012	20120080875		
DOUGLAS	2010	20100014684		
SEDGWICK	2012	20120123596	N	
SEDGWICK	2012	20120104119		
ATCHISON	2012	20120122747		
GEARY	2011	20110005171		
JACKSON	2013	20130009005		
LANE	2010	20100027936		
SEDGWICK	2011	20110116078		
MONTGOMERY	2011	20110123958		
SALINE	2011	20110033215		
BUTLER	2012	20120008110		
COFFEY	2012	20120122963	N	
FINNEY	2011	20110013185		
GEARY	2011	20110001995		
HARVEY	2012	20120012955		
NEMAHA	2013	20130031924		
SUMNER	2013	20130111429		

Curb

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
CHEYENNE	2010	20100113638		
SEDGWICK	2009	20090101617		
SEDGWICK	2012	20120124584		
SEDGWICK	2013	20130122640		
SALINE	2009	20090065577	N	
SEDGWICK	2012	20120100825		
SEDGWICK	2013	20130118237		
KINGMAN	2012	20120124234		
SEDGWICK	2010	20100114171		
SEDGWICK	2010	20100116744		
SEDGWICK	2012	20120106313		

JOHNSON	2012	20120030885		
RUSSELL	2010	20100119341		
JOHNSON	2012	20120003737		
LEAVENWORTH	2012	20120009680	N	
MIAMI	2011	20110016846		
POTTAWATOMIE	2012	20120006555		
RENO	2010	20100038158		
SEDGWICK	2010	20100118449		
SHAWNEE	2009	20090047940		
HASKELL	2008	20080049522		
JOHNSON	2008	20080011286		
MEADE	2009	20090003589		
REPUBLIC	2008	20080105838		
RILEY	2008	20080035090	N	
SEDGWICK	2008	20080000365		
SEDGWICK	2009	20090021789		
STAFFORD	2008	20080042023		
LABETTE	2010	20100037457		
SEDGWICK	2012	20120101080		
BARTON	2010	20100102795		

Barricade

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
EDWARDS	2011	20110080968		
COWLEY	2012	20120015723		
GRANT	2010	20100028276		
RICE	2012	20120100506	N	
SALINE	2011	20110007424		
ALLEN	2008	20080020598		
BUTLER	2008	20080011035		

Embankment

COUNTY_NAME	Year	ACCIDENT_KEY	MEET CRITERIA?	BRIDGE NUMBER
BARBER	2010	20100004967		
BARTON	2010	20100106785		
BOURBON	2010	20100036246		
CHAUTAUQUA	2010	20100114698		
CHAUTAUQUA	2011	20110022930		
CHEROKEE	2012	20120006024		
CHEROKEE	2012	20120081358	N	
CLOUD	2011	20110035035		
DOUGLAS	2010	20100021925		
ELLIS	2010	20100081414		
ELLIS	2010	20100006087		
GEARY	2011	20110025140		
GEARY	2012	20120029855		
GRANT	2010	20100022328		

GREELEY	2010	20100038717		
HARPER	2010	20100095169		
JEFFERSON	2011	20110013360	N	
JEFFERSON	2011	20110002540		
JEFFERSON	2011	20110005452		
LEAVENWORTH	2011	20110081902		
LEAVENWORTH	2012	20120001238		
LEAVENWORTH	2012	20120000382		
MIAMI	2012	20120002714		
MITCHELL	2012	20120013705		
MONTGOMERY	2012	20120110745		
NORTON	2010	20100005901		
OTTAWA	2012	20120116365	N	
PAWNEE	2010	20100028465		
RILEY	2012	20120010040		
RUSSELL	2010	20100019651		
SEDGWICK	2010	20100025213		
SUMNER	2013	20130113034		
THOMAS	2013	20130110016		
TREGO	2011	20110025318		
WABAUNSEE	2010	20100010832		
WASHINGTON	2010	20100026531		
ANDERSON	2012	20120014463	N	
BOURBON	2010	20100030765		
BUTLER	2010	20100012041		
BUTLER	2011	20110012311		
BUTLER	2012	20120007393		
BUTLER	2012	20120007390		
BUTLER	2012	20120005525		
BUTLER	2013	20130030376		
CHAUTAUQUA	2011	20110022929		
COWLEY	2012	20120005860		
COWLEY	2013	20130008573	N	
COWLEY	2013	20130012521		
DICKINSON	2009	20090047471		
DICKINSON	2010	20100025422		
DONIPHAN	2011	20110029155		
DOUGLAS	2011	20110027895		
DOUGLAS	2011	20110006924		
DOUGLAS	2011	20110006427		
DOUGLAS	2012	20120004858		
DOUGLAS	2013	20130080274		
EDWARDS	2012	20120081302	N	
ELLIS	2011	20110007316		
ELLIS	2011	20110007342		
ELLIS	2012	20120010004		
FINNEY	2010	20100025471		

FRANKLIN	2010	20100009144		
FRANKLIN	2013	20130006218		
GRAHAM	2011	20110029658		
GREENWOOD	2012	20120027728		
HARPER	2010	20100119567		
HARPER	2013	20130111476	N	
JACKSON	2010	20100036557		
JACKSON	2013	20130037163		
JOHNSON	2013	20130036468		
LABETTE	2013	20130030712		
LEAVENWORTH	2010	20100015985		
LEAVENWORTH	2012	20120009703		
LEAVENWORTH	2012	20120028999		
LEAVENWORTH	2012	20120007209		
LEAVENWORTH	2012	20120120749		
LEAVENWORTH	2013	20130031781	N	
LEAVENWORTH	2013	20130037809		
LYON	2012	20120026454		
NEMAHA	2010	20100006473		
NORTON	2013	20130036725		
POTTAWATOMIE	2010	20100112116		
POTTAWATOMIE	2010	20100111150		
POTTAWATOMIE	2011	20110031032		
POTTAWATOMIE	2012	20120010388		
POTTAWATOMIE	2012	20120007519		
RENO	2010	20100032269	N	
RENO	2013	20130038425		
RILEY	2012	20120002798		
SALINE	2013	20130034440		
SEDGWICK	2013	20130117784		
SHAWNEE	2011	20110032897		
SHERIDAN	2012	20120024953		
STEVENS	2012	20120029354		
TREGO	2013	20130009809		
WABAUNSEE	2013	20130006828		
WILSON	2012	20120025076	N	
BARTON	2011	20110108857		
MARION	2013	20130031703		
SEDGWICK	2011	20110012072		
CLAY	2010	20100116093		
ELLIS	2012	20120028021		
GREENWOOD	2009	20090045042		
JEFFERSON	2011	20110023382		
JOHNSON	2009	20090060526		
LABETTE	2010	20100081417		
LANE	2011	20110007970	N	
MARSHALL	2011	20110004814		

BUTLER	2013	20130006904		
CLAY	2012	20120114494		
FORD	2013	20130030675		
LABETTE	2012	20120029170		
LANE	2012	20120020562		
MONTGOMERY	2011	20110103970		
MONTGOMERY	2013	20130108078		
ROOKS	2011	20110034046		
BUTLER	2012	20120016768	N	
CLAY	2012	20120111237		
DOUGLAS	2012	20120015551		
JEWELL	2012	20120002129		
JOHNSON	2009	20090059389		
LABETTE	2012	20120006572		
MCPHERSON	2011	20110101218		
SEWARD	2010	20100021496		
SHAWNEE	2009	20090045361		
ANDERSON	2013	20130000103		
ATCHISON	2010	20100104943	N	
ATCHISON	2010	20100111067		
ATCHISON	2011	20110100774		
ATCHISON	2013	20130123055		
BARTON	2010	20100119382		
BARTON	2010	20100116318		
BARTON	2010	20100115303		
BARTON	2010	20100111004		
BARTON	2010	20100103422		
BARTON	2010	20100110891		
BARTON	2011	20110103244	N	
BARTON	2011	20110106258		
BARTON	2011	20110115134		
BARTON	2011	20110100793		
BARTON	2011	20110117801		
BARTON	2012	20120113288		
BARTON	2012	20120123173		
BARTON	2012	20120101029		
BARTON	2013	20130107092		
BARTON	2013	20130107103		
BROWN	2012	20120123775	N	
BUTLER	2010	20100023837		
BUTLER	2010	20100002142		
BUTLER	2010	20100009857		
BUTLER	2010	20100008317		
BUTLER	2010	20100010658		
BUTLER	2011	20110008071		
BUTLER	2013	20130010507		
BUTLER	2013	20130031832		

BUTLER	2013	20130037166		
BUTLER	2013	20130002274	N	
CHAUTAUQUA	2010	20100029369		
CHAUTAUQUA	2013	20130101196		
CHEYENNE	2010	20100101927		
CLAY	2013	20130113808		
CLOUD	2010	20100121085		
CLOUD	2011	20110022488		
CLOUD	2013	20130006054		
COMANCHE	2011	20110023465		
COWLEY	2009	20090064709		
COWLEY	2009	20090064697	N	
COWLEY	2009	20090059425		
COWLEY	2009	20090059908		
COWLEY	2012	20120025624		
COWLEY	2012	20120108339		
COWLEY	2012	20120027148		
CRAWFORD	2009	20090064410		
CRAWFORD	2011	20110000639		
CRAWFORD	2011	20110011311		
CRAWFORD	2011	20110027735		
DICKINSON	2009	20090045010	N	
DICKINSON	2009	20090048812		
DICKINSON	2010	20100036563		
DICKINSON	2011	20110006910		
DICKINSON	2012	20120114335		
DICKINSON	2013	20130033779		
DONIPHAN	2011	20110025588		
DONIPHAN	2012	20120120562		
DOUGLAS	2010	20100009921		
DOUGLAS	2010	20100037844		
DOUGLAS	2011	20110031206	N	
DOUGLAS	2011	20110007817		
DOUGLAS	2012	20120003913		
DOUGLAS	2012	20120007617		
DOUGLAS	2012	20120026499		
DOUGLAS	2012	20120120986		
DOUGLAS	2012	20120025599		
DOUGLAS	2013	20130119539		
DOUGLAS	2013	20130113233		
DOUGLAS	2013	20130108179		
DOUGLAS	2013	20130000096	N	
DOUGLAS	2013	20130106125		
ELLIS	2010	20100023503		
ELLIS	2010	20100003574		
ELLIS	2010	20100031439		
ELLIS	2012	20120017062		

ELLIS	2013	20130114612		
FINNEY	2010	20100009943		
FINNEY	2012	20120018599		
FORD	2011	20110013470		
FRANKLIN	2010	20100015945	N	
FRANKLIN	2012	20120016703		
GEARY	2011	20110007517		
GEARY	2011	20110032122		
GRAHAM	2010	20100011228		
GRAHAM	2011	20110007262		
GRAHAM	2012	20120008638		
GRAY	2012	20120008136		
GREENWOOD	2011	20110118311		
GREENWOOD	2012	20120005109		
HARPER	2009	20090101936	N	
HARPER	2013	20130112800		
HARVEY	2010	20100105351		
HARVEY	2012	20120022144		
JACKSON	2012	20120006541		
JEFFERSON	2010	20100027762		
JEFFERSON	2010	20100032844		
JEFFERSON	2010	20100037529		
JEFFERSON	2012	20120013317		
JEFFERSON	2012	20120101312		
JOHNSON	2009	20090047156	N	
JOHNSON	2010	20100001485		
JOHNSON	2012	20120028815		
KINGMAN	2010	20100111465		
KINGMAN	2010	20100110998		
KINGMAN	2011	20110106612		
KINGMAN	2012	20120108741		
KINGMAN	2013	20130113833		
KIOWA	2013	20130037120		
LEAVENWORTH	2010	20100010217		
LEAVENWORTH	2010	20100034221	N	
LEAVENWORTH	2010	20100032375		
LEAVENWORTH	2010	20100028609		
LEAVENWORTH	2010	20100017062		
LEAVENWORTH	2010	20100012054		
LEAVENWORTH	2013	20130036801		
MARION	2009	20090058913		
MARION	2011	20110001322		
MARSHALL	2010	20100027047		
MARSHALL	2011	20110021766		
MARSHALL	2011	20110023545	N	
MCPHERSON	2010	20100008979		
MCPHERSON	2011	20110110548		

MCPHERSON	2011	20110110775		
MCPHERSON	2011	20110106523		
MCPHERSON	2012	20120103713		
MIAMI	2011	20110004327		
MITCHELL	2010	20100038425		
MITCHELL	2011	20110028296		
MITCHELL	2011	20110028475		
MITCHELL	2012	20120013628	N	
MONTGOMERY	2010	20100001526		
MORRIS	2011	20110112190		
MORTON	2012	20120005097		
NEMAHA	2009	20090063896		
NEMAHA	2010	20100121613		
NEMAHA	2010	20100117993		
NEMAHA	2011	20110029991		
NEMAHA	2012	20120012530		
NEMAHA	2012	20120017987		
NEMAHA	2013	20130000849	N	
NEMAHA	2013	20130033950		
NORTON	2010	20100005880		
NORTON	2010	20100005902		
NORTON	2011	20110029179		
OSAGE	2012	20120102353		
OSAGE	2012	20120102910		
OSAGE	2013	20130121961		
PAWNEE	2012	20120103213		
POTTAWATOMIE	2010	20100009286		
POTTAWATOMIE	2010	20100022826	N	
POTTAWATOMIE	2010	20100022820		
POTTAWATOMIE	2011	20110005557		
POTTAWATOMIE	2011	20110011800		
RENO	2012	20120013894		
RICE	2011	20110118849		
RICE	2012	20120100413		
RICE	2012	20120119491		
RILEY	2011	20110000041		
RILEY	2011	20110015944		
RILEY	2012	20120025196	N	
RILEY	2012	20120018806		
ROOKS	2013	20130035621		
RUSSELL	2009	20090064119		
SALINE	2009	20090058997		
SALINE	2011	20110023642		
SALINE	2013	20130034111		
SCOTT	2012	20120007878		
SEDGWICK	2010	20100000823		
SEDGWICK	2010	20100016112		

SEDGWICK	2011	20110012075	N	
SEDGWICK	2012	20120107730		
SEDGWICK	2012	20120101526		
SHAWNEE	2009	20090060387		
SHAWNEE	2009	20090045606		
SHAWNEE	2011	20110034077		
SHAWNEE	2011	20110035045		
SHAWNEE	2011	20110015365		
SHAWNEE	2013	20130008384		
SHAWNEE	2013	20130012046		
SMITH	2012	20120110832	N	
SMITH	2012	20120108069		
SMITH	2012	20120117912		
SMITH	2013	20130100475		
SUMNER	2010	20100119505		
SUMNER	2011	20110004821		
SUMNER	2011	20110028970		
WABAUNSEE	2012	20120019168		
WABAUNSEE	2012	20120018675		
WASHINGTON	2012	20120000810		
WASHINGTON	2012	20120000814	N	
WASHINGTON	2012	20120029907		
WILSON	2012	20120036208		
WILSON	2012	20120022105		
WOODSON	2012	20120118782		
WYANDOTTE	2012	20120031299		
ANDERSON	2010	20100014318		
BARTON	2011	20110106931		
BUTLER	2011	20110013948		
CLOUD	2013	20130032428		
DOUGLAS	2010	20100036745	N	
DOUGLAS	2011	20110110976		
ELLIS	2010	20100011176		
HARPER	2012	20120109667		
BARTON	2011	20110107474		
BUTLER	2010	20100037273		
KINGMAN	2011	20110107868		
ATCHISON	2008	20080022514		
ATCHISON	2008	20080022529		
ATCHISON	2009	20090000040		
ATCHISON	2009	20090019439	N	
ATCHISON	2009	20090010514		
ATCHISON	2009	20090019427		
BARBER	2009	20090018008		
BARBER	2009	20090150833		
BARTON	2008	20080111174		
BARTON	2008	20080110628		

BARTON	2008	20080106251		
BARTON	2008	20080103363		
BARTON	2008	20080046023		
BARTON	2008	20080031009	N	
BARTON	2009	20090004520		
BARTON	2009	20090020782		
BARTON	2009	20090028450		
BARTON	2009	20090003505		
BARTON	2009	20090015517		
BARTON	2009	20090010532		
BROWN	2008	20080102052		
BUTLER	2008	20080015015		
BUTLER	2010	20100000518		
CHEROKEE	2008	20080110640	N	
CLAY	2009	20090150497		
CLOUD	2008	20080109799		
COWLEY	2008	20080054010		
COWLEY	2009	20090057476		
DICKINSON	2008	20080018025		
DONIPHAN	2008	20080005049		
DONIPHAN	2008	20080110164		
DONIPHAN	2009	20090000567		
DOUGLAS	2009	20090028871		
DOUGLAS	2009	20090013503	N	
DOUGLAS	2009	20090007054		
DOUGLAS	2009	20090000270		
DOUGLAS	2009	20090023345		
DOUGLAS	2009	20090015577		
DOUGLAS	2009	20090004588		
ELLIS	2008	20080033026		
ELLIS	2009	20090021300		
FINNEY	2008	20080030530		
FORD	2008	20080007807		
FRANKLIN	2008	20080050085	N	
FRANKLIN	2008	20080039073		
FRANKLIN	2009	20090028931		
GEARY	2008	20080101808		
GRAHAM	2009	20090016028		
GRANT	2010	20100035392		
GRAY	2008	20080027039		
HARPER	2008	20080010131		
HARPER	2009	20090150440		
HARVEY	2008	20080105989		
HASKELL	2008	20080045025	N	
HASKELL	2008	20080051534		
HODGEMAN	2009	20090029085		
JACKSON	2008	20080011082		

JEFFERSON	2008	20080022001		
JEFFERSON	2008	20080043016		
JEFFERSON	2008	20080054556		
JEFFERSON	2009	20090005062		
JEFFERSON	2009	20090019560		
JOHNSON	2008	20080011507		
JOHNSON	2008	20080000580	N	
JOHNSON	2008	20080017550		
JOHNSON	2008	20080050537		
JOHNSON	2008	20080050527		
JOHNSON	2009	20090001526		
KINGMAN	2008	20080017018		
KIOWA	2009	20090019965		
LABETTE	2008	20080018079		
LEAVENWORTH	2008	20080045064		
LEAVENWORTH	2008	20080046568		
LEAVENWORTH	2009	20090012063	N	
LEAVENWORTH	2009	20090029431		
LEAVENWORTH	2009	20090016078		
LEAVENWORTH	2009	20090013571		
LEAVENWORTH	2009	20090011081		
LEAVENWORTH	2009	20090005504		
LEAVENWORTH	2009	20090001562		
LINCOLN	2008	20080054571		
LYON	2008	20080009260		
LYON	2008	20080024580		
LYON	2009	20090001582	N	
MARION	2008	20080018091		
MARSHALL	2008	20080006067		
MARSHALL	2008	20080030567		
MCPHERSON	2008	20080028549		
MCPHERSON	2009	20090007518		
MCPHERSON	2009	20090007516		
MIAMI	2008	20080001064		
MITCHELL	2008	20080047012		
MONTGOMERY	2008	20080045510		
MONTGOMERY	2009	20090011141	N	
MONTGOMERY	2009	20090026926		
MORRIS	2009	20090017130		
NEMAHA	2008	20080032069		
NEMAHA	2008	20080049591		
NEMAHA	2008	20080028577		
NEMAHA	2008	20080002004		
NEMAHA	2008	20080024002		
NEOSHO	2008	20080048090		
NORTON	2008	20080024013		
OTTAWA	2009	20090017181	N	

PAWNEE	2009	20090003123		
PHILLIPS	2008	20080111293		
POTTAWATOMIE	2008	20080041544		
POTTAWATOMIE	2008	20080024039		
POTTAWATOMIE	2008	20080052586		
POTTAWATOMIE	2009	20090150209		
POTTAWATOMIE	2009	20090003135		
PRATT	2008	20080015560		
PRATT	2008	20080011556		
PRATT	2009	20090007552	N	
RENO	2009	20090156640		
REPUBLIC	2009	20090150889		
RICE	2009	20090004035		
SALINE	2009	20090151878		
SEDGWICK	2008	20080004544		
SEDGWICK	2008	20080038559		
SEDGWICK	2009	20090027802		
SEDGWICK	2009	20090018097		
SHAWNEE	2008	20080032555		
TREGO	2009	20090003094	N	
WABAUNSEE	2009	20090012665		
WASHINGTON	2008	20080019050		
WASHINGTON	2008	20080019580		
WASHINGTON	2009	20090004095		
WASHINGTON	2009	20090029602		
WILSON	2008	20080042086		
WOODSON	2009	20090030379		
BROWN	2012	20120000989		
BUTLER	2011	20110013750		
DOUGLAS	2012	20120013018	N	
LEAVENWORTH	2013	20130005252		
OTTAWA	2010	20100119717		
REPUBLIC	2011	20110101637		
WABAUNSEE	2013	20130009559		
WILSON	2012	20120018444		
SALINE	2012	20120005915		
JACKSON	2010	20100031283		
JEFFERSON	2012	20120009106		
ATCHISON	2011	20110111203		
CHEROKEE	2010	20100011604	N	
OSAGE	2010	20100101998		
ELLIS	2013	20130000371		
FRANKLIN	2012	20120003310		
GREENWOOD	2011	20110026314		
NORTON	2013	20130031761		
RILEY	2011	20110023527		
SEDGWICK	2010	20100008796		

SHERIDAN	2013	20130030689		

APPENDIX D

CRASH REPORTS

FATAL CRASHES AT SHORT BRIDGES

ON LOW-VOLUME LOCAL ROADS

☒ Fatal
☐ Injury
☒ PDO OVER $1000
☐ PDO UNDER $1000
☐ Private Property

0192

0090073

State of Kansas Motor Vehicle Accident Report
DOT form 850 Rev. 1-2005

RECEIVED 08-08-08

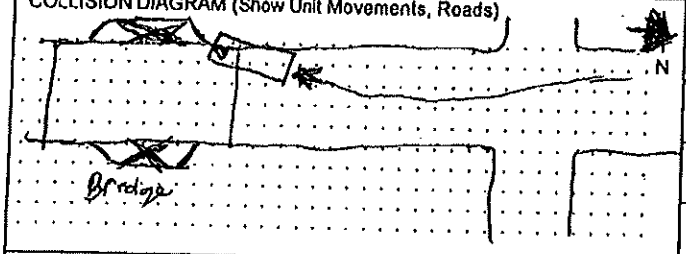
☐ Amended Report

☐ Hit & Run Accident
☐ KDOT Property Damage
☐ KDOT Construction Zone

Milepost	COUNTY	ON Road	Speed Limit CITY	Photos By	Local Case Number	Page of
	Nemaha	X road	55	DD	08-1118	1 / 4

Distance	F/M/I	Dir.	☒ FROM ☐ AT Road	Speed Limit	Investigating Dept.	Investigating OFFICER/BADGE Number	Reviewed By
165	Feet	S	84th road		Nemaha SO	Douglas Dalinghaus / 424	RRV

COLLISION DIAGRAM (Show Unit Movements, Roads)



Describe pre-crash movement or action and direction of vehicles and pedestrians by traffic unit number.

V1 hit a bridge railing went over the side and landed upside down in the creek with the passangers compartment under water.

DATE of ACCIDENT	
08/02/08	
TIME Occurred	DAY
02:30	Sat
TIME Notified	DAY
08:00	Sun
TIME Arrived	DAY
08:24	Sun

Object damaged and nature of damage (Show location in diagram)

Name and Address of object owner

ON Road	Cntl Sec	Sec. Milepost	AT Road	Distance	Unit	Dir.	Latitude	Longitude	
G/X			84TH	165.000	FEET	E			
County	City Code	Agency Code	Distance	Reference Road 1		Distance	Reference Road 2	Coder	Func. Class
D066		0000	N M		+	M		TH	3

State Use Only

Unit	☒ Driver	☐ Ped NAME (Last, First and Init	Phone ☐ Work ☐ Home	Color	YEAR	MAK	MODEL & BODY STYLE	MC CC
1		[redacted]		RED	1989	FORD	F250 PK - Pickup	

Driver/Ped ADDRESS (Number, Street, City, State, Zip Code)	STATE	LICENSE PLATE #	Exp Yr	Removed By:
[redacted]	[redacted]	[redacted]	08	McGuire

DRIVER'S LICENSE STATE and NUMBER	CDL?	DATE OF BIRTH	SEX	VEHICLE IDENTIFICATION NUMBER	Odometer
St. [redacted]		[redacted]	M	[redacted]	

Registered OWNER FULL NAME ("Same" if Driver)	Phone ☐ Work ☐ Home	TOTAL occupants in this vehicle	FIRE?	Insurance Company
[redacted]		1		[redacted]

OWNER Address ("Same" if Driver)	Special Data Area	Direction of Travel	Policy Number
[redacted]		S	[redacted]

Special Conditions for unit above: ☐ 01 Hit & Run ☐ 02 Non-Contact ☒ 03 Stolen ☒ 04 Legally Parked ☐ 05 Police Pursuit ☐ 06 Driverless ☐ 07 Towed Away

Unit	☐ Driver	☐ Ped NAME (Last, First and Init	Phone ☐ Work ☒ Home	Color	YEAR	MAK	MODEL & BODY STYLE	MC C

Driver/Ped ADDRESS (Number, Street, City, State, Zip Code)	STATE	LICENSE PLATE #	Exp Yr	Removed By:

DRIVER'S LICENSE STATE and NUMBER	CDL?	DATE OF BIRTH	SEX	VEHICLE IDENTIFICATION NUMBER	Odometer
St. No.					

Registered OWNER FULL NAME ("Same" if Driver)	Phone ☐ Work ☐ Home	TOTAL occupants in this vehicle	FIRE?	Insurance Company

OWNER Address ("Same" if Driver)	Special Data Area	Direction of Travel	Policy Number

Special Conditions for unit above: ☐ 01 Hit & Run ☐ 02 Non-Contact ☐ 03 Stolen ☐ 04 Legally Parked ☐ 05 Police Pursuit ☐ 06 Driverless ☐ 07 Towed Away

TRAF UNIT	SEAT TYPE	Last NAME	First Name	Initial	ADDRESS (Number, Street, City, State, Zip)	SEX	AGE	S.E. USE	EJECT TRAP	INJ SEV	EMS UNIT
1	01	[redacted]			[redacted]	M	19	N	N	F	

EMS Unit A	INJURED TAKEN	EMS Unit B	INJURED TAKEN	EMS Unit C	INJURED TAKEN
	INJURED TAKEN		INJURED TAKEN		INJURED TAKEN

Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.
Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.

OFFICER'S OPINIONS OF APPARENT CONTRIBUTING CIRCUMSTANCES (Factor Type-Unit Number / Specific Factor) Enter in order all codes that apply.

LIGHT (9|9)
01 Daylight
02 Dawn
03 Dusk
04 Dark: street lights on
05 Dark: no street lights

WEATHER (0|0)
00 No adverse conditions
01 Rain, Mist, Drizzle
02 Sleet
03 Snow
04 Fog
05 Smoke
06 Strong winds
07 Blowing dust, sand, etc.
08 Freezing rain
14 Rain or fog
16 Rain or wind
24 Sleet & fog
36 Snow & winds
88 Other

SURFACE TYPE ON (0|4) AT
01 Concrete
02 Blacktop
03 Gravel
04 Dirt
05 Brick
88 Other

SURFACE CONDITION ON (0|1) AT
01 Dry
02 Wet
03 Snow or slush
04 Ice or snowpacked
05 Mud, dirt or sand
06 Debris (Oil, etc.)
88 Other

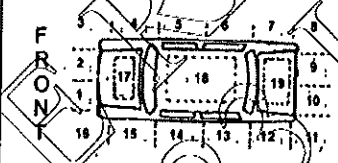
VEHICLE MANEUVER BEFORE CRASH (1: 0|1, 2)
01 Straight/following road
02 Left turn
03 Right turn
04 U turn
05 Overtaking (passing)
06 Changing lanes
07 Avoiding maneuver
08 Merging
09 Parking
10 Backing
11 Stopped awaiting turn
12 Stopped in traffic
13 Illegally parked
14 Disabled in roadway
15 Slowing or stopping
88 Other

VEHICLE DAMAGE (1: 0|4, 2)
00 None
01 Damage (minor)
02 Functional
03 Disabling
04 Destroyed
88 Other

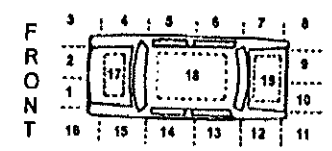
TRAFFIC CONTROLS
O/A (On/At Road) Type Present | OK/NF (OK/Non-functional)
O | 0|0
00 None
01 Officer flagger
02 Traffic signal
03 Stop sign
04 Flasher
05 Yield sign
06 RR gates or signal
07 RR crossing signs
08 No passing zone
09 Center/edge lines
88 Other

ROAD CHARACTER ON (0|1) AT
01 Straight and level
02 Straight on grade
03 Straight on hillcrest
04 Curved on level
05 Curved on grade
06 Curved on hillcrest
88 Other

CONST./MAINT. ZONE ON (0|0) AT
00 None apply
01 Construction zone
02 Maintenance zone
03 Utility zone

DAMAGE LOCATION AREA--Vehicle 1


☒ Top ☒ Winshield ☒ Windows
☒ Under ☒ Overturn
Trailer? ☐ Present ☐ Damaged

DAMAGE LOCATION AREA--Vehicle 2


☐ Top ☐ Winshield ☐ Windows
☐ Under ☐ Overturn
Trailer? ☐ Present ☐ Damaged

ACCIDENT CLASS (0|8)
00 Other non-collision
01 Overturned
COLLISION WITH:
02 Pedestrian
03 Other motor vehicle*
04 Parked motor vehicle
05 Railway train
06 Pedalcycle
07 Animal (specify)
08 Fixed object**
09 Other object

ACCIDENT LOCATION (1|1)
ON ROADWAY:
11 Non-intersection
12 Intersection
13 Intersection-related
14 Parking lot or driveway access
15 Interchange area
16 On crossover
OFF ROADWAY:
21 Roadside (including shoulder)
22 Median
23 Parking lot, rest area trafficway
88 Other

ROAD SPECIAL FEATURES (0|1, 2)
Identify up to three
00 None
01 Bridge
02 Bridge overhead
03 Railroad bridge
04 Railroad crossing
05 Interchange
06 Ramp
88 Other

Enter any visable identifier: refer by code — Code — Ident:

VEHICLE BODY TYPE (1: 0|5, 2)
01 Automobile
02 Motorcycle
03 Motorscooter or moped
04 Van
05 Pickup truck
06 Sport Utility Veh.
07 Camper or RV
08 Farm equipment
09 All terrain vehicle (ATV)

Heavy/Large Vehicles — Bus Capacity (1, 2)
10 Single large Truck
11 Truck and trailer(s)
12 Tractor-trailer(s)
13 Cross country bus
14 School bus
15 Transit bus
25 Train
77 Emergency Vehicles
88 Other

PEDESTRIAN LOCATION BEFORE IMPACT-- IN INTERSECTION: (1, 2)
01 In crosswalk or bikeway
02 Not in crosswalk or bikeway
03 In intersection without crosswalk or bikeway

NOT IN INTERSECTION
11 In available crosswalk or bikeway
12 Not in available crosswalk or bikeway
13 In area without crosswalk or bikeway
25 NOT IN ROADWAY

PEDESTRIAN ACTION (1, 2)
01 Entering or crossing road
02 Walking or riding on road
03 Approaching, leaving, or working on vehicle
04 Working (not on vehicle)
05 Playing or standing
06 Approaching or leaving bus
07 In parked vehicle
88 Other

PED OBEDIENCE TO TRAF SIG (1, 2)
00 No pedestrian signal
01 Obeyed pedestrian signal
02 Disobeyed ped signal
03 Ped signal malfunction
04 Not applicable

*** COLLISION WITH OTHER MOTOR VEH.**
01 Head on
02 Rear end
03 Angle-side impact
04 Sidswipe:opposite direction
05 Sidswipe:same direction
06 Backed into
88 Other

**** FIXED OBJECT TYPE** (0|1)
01 Bridge structure
02 Bridge rail
03 Crash cushion (Barrels)
04 Divider, median barrier
05 Overhead sign support
06 Utility devices: pole, meter, etc.
07 Other post or pole
08 Building
09 Guardrail
10 Sign post
11 Culvert
12 Curb
13 Fence/Gate
14 Hydrant
15 Barricade
16 Mailbox
17 Ditch
18 Embankment
19 Wall
20 Tree
21 RR crossing fixtures
88 Other

DR. LIC. COMPLY (1: 0|1, 2) (Code each driver)
00 Not licensed
01 Valid license
02 Invalid license

RESTRICT. COMPLY (1: 0|1, 2) (Code each driver)
00 No restrictions
01 complied with
02 Did not comply

SUBSTANCE USE (1: A|P, 2)
AP - Alcohol Present
AC - Alcohol Contributed
DP - Illegal Drug Present
DC - Illegal Drug Contributed
MP - Medication Present
MC - Medication Contributed

DRIVER/PED IMPAIRMENT TEST (1, 2)
TR Alcohol or drug Test Refused
PT Positive preliminary Test
RT Test given, Results Pending

← B.A.C. →

INVESTIGATIVE - FATALITY REPORT

COUNTY	ON ROAD	CITY	DATE of ACCIDENT	☒ Fatal, narrative & diagram on fatal accident (required by state) ☐ Investigative report	Page of
Nemaha	X road		08/02/08		3 / 4

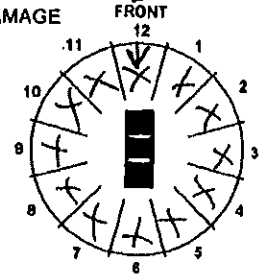
STATE USE ONLY	INVESTIGATIVE DEPT.	TIME Occurred	Day	Invest. OFFICER/BADGE No.	Local Case Number
	Nemaha SO	02:30	Sat	Douglas Dalinghaus / 424	08-1118

On 08/03/2008 at 08:00 hrs I was dispatched to a vehicle wrecked in a creek bed just south of 84th road on X road. I arrived at 08:24 hrs and found a 1989 Ford pickup with Kansas plate [redacted] upside down in the creek and most of the cab area was submerged under water. I had Mcquire towing come to the scene and when the vehicle was turned upright we could see there was an occupant inside. I called for the Sabetha Fire Departments rescue truck, the Coroner (Gregg Wenger) and Popkes Mortuary to come to the scene. The driver was pronounced dead at the scene, extracted from the vehicle and identified as [redacted]. The body was put in a body bag, sealed with tag # 03800 and taken by Popkes Mortuary to Shawnee County Coroners Office for an obtopsy.The accident scene showed that [redacted] was southbound on X road which is gravel, went across 84th road which is gravel and continued south on X road which turned to dirt . The road drops in elevation about 2 feet and there was 2 ruts in the roadway that had some water in them. Due to some traffic on the roadway it was hard to tell exactly what path the truck took, but it appeared from the tracks that he veered left around the rut then veered back right and ran into the bridge rail which was located 182' 5" from the intersection. It is possable that the truck hit the water ruts causing it to loose control and hit the railing, there was water and mud on the railing that would also suggest this. There was about 4 feet of skid on the bridge prior to impact with the railing. The railing was a metal railing that started at bridge level and angled up to about 5 feet in elevation then it went level across the bridge until it tapered back down on the other side. The vehicle hit the railing about center of the front bumper, riding it approximately 5 feet in elevation to the top of the rail and went over the west side, fell approximately 20-25 feet, landing in the water upside down, crushed the cab trapping the driver inside. The cause of death was determined to be drowning.I talked to a [redacted] on the phone and was told that [redacted] had left his place about 10 or 11pm the night before and [redacted] had been drinking and had about half a 30 pack of beer left and wanted to go on a "Booze cruise" [redacted] said he wouldnt go unless he could drive and [redacted] refused and left without him.I talked to [redacted], who lives about 2 miles north of the accident scene and first was told he never knew [redacted] the next day I found out [redacted] knew [redacted] and I went back and talked to [redacted], [redacted] admitted that he knew [redacted] and had been at his residence the night before the wreck and [redacted] had left about 2-2:30 a.m. He aslo said [redacted] was at his residence when he arrived home around 10:30pm and [redacted] had been drinking in the yard. He said there were several other friends at the residence that night and they all stayed outside partying till about 2-2:30 am then he went to bed about 3am. He said he didnt think [redacted] was drunk. but admitted he had been drinking beer that he had brought with him.

FATALITY DATA

TIME EMS NOTIFIED	EXTRICATION WAS REQUIRED FOR THE	SPECIAL JURISDICTION
TIME EMS ARRIVED		00 Not Special 01 National Park Service 02 Military 03 Indian Reservation 04 College/University Campus 05 Other Federal properties 88 Other_____ 99 Unknown
TIME EMS ARRIVED AT HOSPITAL		

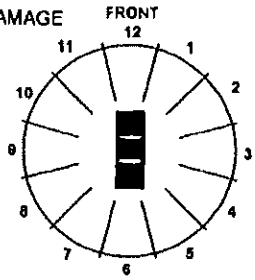
VEHICLE 1 DAMAGE



☒ Undercarriage ☐ No Damage

N/A Estimated Speed, MPH

VEHICLE 2 DAMAGE



☐ Undercarriage ☐ No Damage

Estimated Speed, MPH

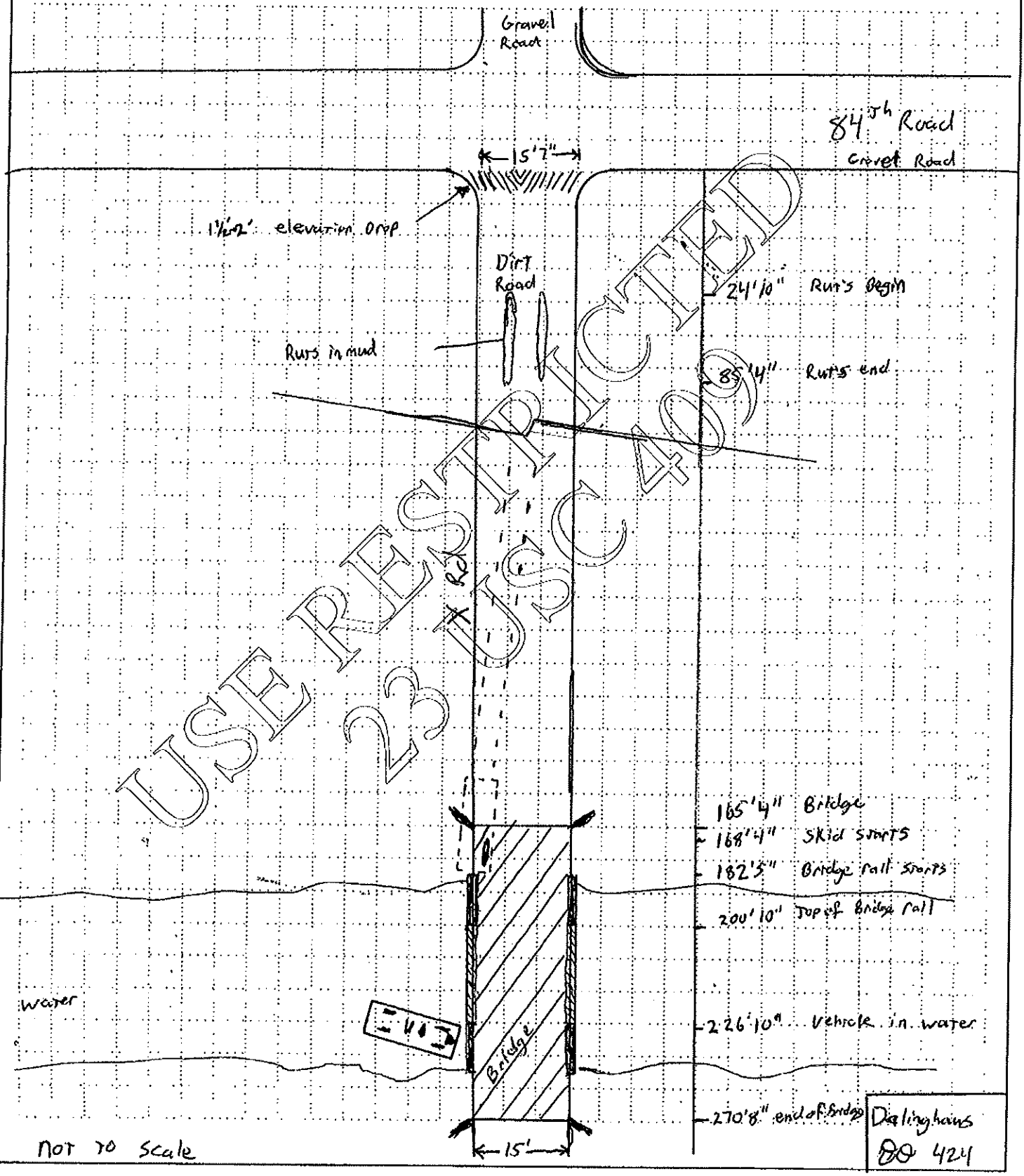
IMPACT POINTS: Show initial impact point by arrow and label "I". Show principal impact point by arrow and label "P".

COLLISION DIAGRAM | Draw scene as observed. Refer to vehicles, drivers, and pedestrians by numbers assigned in this report.

SHOW (1) Outline of street and access points and identify specifically by number.
(2) Paths of units prior to and after impact, skidmarks, and point of impact (POI).
(3) Location of signs, traffic controls, and reference points.
(4) Location of other property hit or damaged (trees, signs, etc.)
(5) Specific features at location (bridge, overpass, culvert, railroad crossing, etc.)
(6) Location of temporary highway conditions.
(7) All measurements to locate the accident relative to specific, fixed, and identifiable points.

Case # 08-1118

NORTH



Dalinghaus
08 424

RECEIVED 12-18-08

☒ FATAL
☐ INJURY
☐ PDO over $1000
☐ PDO under $1000
☐ PRIVATE PROPERTY

20080095160

STATE OF KANSAS
MOTOR VEHICLE ACCIDENT REPORT

DOT FORM NO. 850
Rev. 1-2005

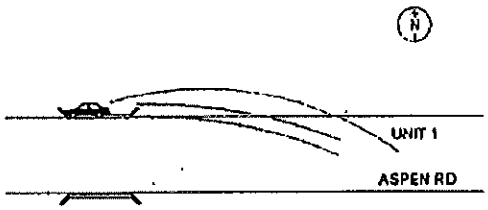
0322

☐ Amended Report
☐ Hit & Run Accident
☐ KDOT Property Damage
☐ KDOT Construction Zone

Milepost	COUNTY	On Road	Speed Limit	CITY	Photos By	Local Case Number	Page of
	OT	ASPEN ROAD	55		KHP	2008014135	1 / 2

Distance	Ft/Mi	Dir.	☒ FROM ☐ AT Road	Speed Limit	Investigating Dept.	Investigating Officer /Badge Number	Reviewed By
0.200	M	EE	115th ROAD		Kansas Highway Patrol	D.RUBLE 160	RWB 233

COLLISION DIAGRAM (Show Unit Movements, Roads)



Describe pre-crash movement or action and direction of vehicles and pedestrians by traffic unit number.

Unit 1 was westbound on Aspen Road. For unknown reasons, swerved to the right and struck a bridge structure and came to rest on the passenger side, beside the bridge.

Date of Accident: 11/23/2008

TIME Occurred	DAY
13:30	SU
TIME Notified	DAY
13:48	SU
TIME Arrived	DAY
14:04	SU

Object Damaged and nature of damage (Show location in diagram)

Name and Address of object owner

ON Road	Crit Sec	Sec Milepost	AT Road	Distance	Unit	Dir	Latitude	Longitude	STATE USE ONLY
ASPEN			115TH	000 200	M	E			

County	City Code	Agency Code	Distance	Reference Road 1	Distance	Reference Road 2	Coder	Func. Class
OT62		HP00	N M		E M		TH	12

Unit	☒ Driver ☐ Ped	NAME (Last, First and Initial)	Phone ☐ Work ☐ Home	Color	YEAR	MAKE	MODEL & BODY STYLE	MC CCs
01	[redacted]	[redacted]	[redacted]	MAR	2008	PONT	GRA 4D	

Driver/Ped ADDRESS (Number, Street, City, State, Zip Code)	STATE	LICENSE PLATE #	Exp. Yr	Removed By:
[redacted]	[redacted]	[redacted]	2009	BACKUS TOWING

DRIVER'S LICENSE STATE and NUMBER	CDL?	DATE OF BIRTH	SEX	VEHICLE IDENTIFICATION NUMBER	Odometer
St. [redacted] No. [redacted]		[redacted]	M	[redacted]	

Registered OWNER FULL NAME ("Same" if Driver)	Phone ☒ Work ☐ Home	TOTAL occupants in this vehicle	Fire?	Insurance Company
[redacted]	[redacted]	1	N	[redacted]

OWNER Address ("Same" if Driver)	Special Data Area	Direction of Travel	Policy Number
[redacted]		WW	[redacted]

Special Conditions for unit above: ☐ 1 Hit & Run ☐ 2 Non-Contact ☐ 3 Stolen ☐ 4 Legally parked ☐ 5 Police pursuit ☐ 6 Driverless ☒ 7 Towed away

Unit	☐ Driver ☐ Ped	NAME (Last, First and Initial)	Phone ☐ Work ☐ Home	Color	YEAR	MAKE	MODEL & BODY STYLE	MC CCs

Driver/Ped ADDRESS (Number, Street, City, State, Zip Code)	STATE	LICENSE PLATE #	Exp. Yr	Removed By:

DRIVER'S LICENSE STATE and NUMBER	CDL?	DATE OF BIRTH	SEX	VEHICLE IDENTIFICATION NUMBER	Odometer
St. No.					

Registered OWNER FULL NAME ("Same" if Driver)	Phone ☐ Work ☐ Home	TOTAL occupants in this vehicle	Fire?	Insurance Company

OWNER Address ("Same" if Driver)	Special Data Area	Direction of Travel	Policy Number

Special Conditions for unit above: ☐ 1 Hit & Run ☐ 2 Non-Contact ☐ 3 Stolen ☐ 4 Legally parked ☐ 5 Police pursuit ☐ 6 Driverless ☐ 7 Towed away

TRAF UNIT	SEAT TYPE	Last NAME	First Name	Initial	ADDRESS (Number, Street, City, State, Zip)	SEX	AGE	S.B. USED	EJECT TRAP	INJ SEV	EMS UNIT
01	01	[redacted]	[redacted]		[redacted]	M	52	N	N	F	A

EMS Unit A	INJURED TAKEN By: WILSON/SHIELDS FNRL	INJURED TAKEN To: WILSON/FIELDS FNRL
EMS Unit B	INJURED TAKEN By:	INJURED TAKEN To:
EMS Unit C	INJURED TAKEN By:	INJURED TAKEN To:

Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.
Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.

OFFICER'S OPINIONS OF APPARENT CONTRIBUTING CIRCUMSTANCES (Factor Type-Unit Number/Specific Factor) Enter in order all codes that apply.

01 LIGHT
01 Daylight
02 Dawn
03 Dusk
04 Dark: street lights on
05 Dark: no street lights

00 WEATHER
00 No adverse conditions
01 Rain, mist, or drizzle
02 Sleet
03 Snow
04 Fog
05 Smoke
06 Strong winds
07 Blowing dust, sand, etc.
08 Freezing rain
14 Rain & fog
18 Rain & wind
24 Sleet & fog
38 Snow & winds
88 Other

ON / 03 / AT — SURFACE TYPE
01 Concrete
02 Blacktop
03 Gravel
04 Dirt
05 Brick
88 Other

ON / 01 — SURFACE CONDITION
01 Dry
02 Wet
03 Snow or slush
04 Ice or snowpacked
05 Mud, dirt or sand
06 Debris (Oil, etc.)
88 Other

01 — VEHICLE MANEUVER BEFORE CRASH
01 Straight/following road
02 Left turn
03 Right turn
04 U-turn
05 Overtaking (passing)
06 Changing lanes
07 Avoiding maneuver
08 Merging
09 Parking
10 Backing
11 Stopped awaiting turn
12 Stopped in traffic
13 Illegally parked
14 Disabled in roadway
15 Slowing or stopping
88 Other

04 — VEHICLE DAMAGE
00 None
01 Damage (minor)
02 Functional
03 Disabling
04 Destroyed
88 Other

TRAFFIC CONTROLS
O/A (On/At Road) — Type Present — OK/NF(OK/Non-functional)

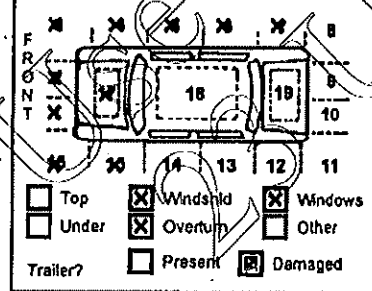
1	O	00
2	2	
3	3	
4	4	
5	5	

00 None
01 Officer, flagger
02 Traffic signal
03 Stop sign
04 Flasher
05 Yield sign
06 RR gates or signal
07 RR crossing signal
08 No passing zone
09 Center/edge lines
88 Other

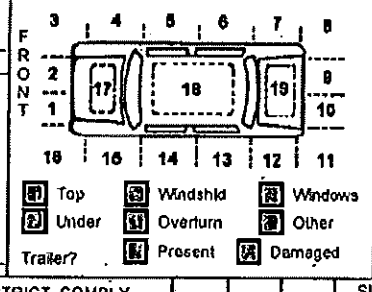
ROAD CHARACTER
ON / 01 / AT
01 Straight and level
02 Straight on grade
03 Straight at hillcrest
04 Curved and level
05 Curved on grade
06 Curved at hillcrest
88 Other

ON / 00 / AT — CONST./MAINT. ZONE
00 None apply
01 Construction zone
02 Maintenance zone
03 Utility zone

DAMAGE LOCATION AREA - Vehicle 01



DAMAGE LOCATION AREA - Vehicle



08 ACCIDENT CLASS
00 Other non-collision
01 Overturned
COLLISION WITH:
02 Pedestrian
03 Other motor vehicle *
04 Parked motor vehicle
05 Railway train
06 Pedalcycle
07 Animal (specify)
08 Fixed object **
09 Other object

11 ACCIDENT LOCATION
ON ROADWAY:
11 Non-intersection
12 Intersection
13 Intersection-related
14 Parking lot or driveway access
15 Interchange area
16 On crossover
OFF ROADWAY:
21 Roadside (including shoulder)
22 Median
23 Parking lot, rest area trafficway
88 Other

01 ROAD SPECIAL FEATURES — Identify up to three
00 None
01 Bridge
02 Bridge overhead
03 Railroad bridge
04 Railroad crossing
05 Interchange
06 Ramp
88 Other
Enter any visible identifier; refer by code — Code / Ident:

01 VEHICLE BODY TYPE
01 Automobile
02 Motorcycle
03 Motorscooter or Moped
04 Van
05 Pickup truck
06 Sport Utility Veh.
07 Camper or RV
08 Farm equipment
09 All terrain vehicle (ATV)

Heavy / Large Vehicles
10 Single large Truck
11 Truck and trailer(s)
12 Tractor-trailer(s)
13 Cross country bus
14 School bus
15 Transit bus
25 Train
77 Emergency Vehicles
88 Other

Bus Capacity

PEDESTRIAN LOCATION BEFORE IMPACT- IN INTERSECTION:
01 In crosswalk or bikeway
02 Not in crosswalk or bikeway
03 In intersection without crosswalk or bikeway

NOT IN INTERSECTION
11 In available crosswalk or bikeway
12 Not in available crosswalk or bikeway
13 In area without crosswalk or bikeway
25 NOT IN ROADWAY

PEDESTRIAN ACTION
01 Entering or crossing road
02 Walking or riding on road
03 Approaching, leaving, or working on vehicle
04 Working (not on vehicle)
05 Playing or standing
06 Approaching or leaving bus
07 In parked vehicle
88 Other

PED OBEDIENCE TO TRAF SIG
00 No pedestrian signal
01 Obeyed pedestrian signal
02 Disobeyed ped signal
03 Ped signal malfunction
04 Not applicable

*** COLLISION WITH OTHER MOTOR VEH.**
01 Head on
02 Rear end
03 Angle - side impact
04 Sideswipe: opposite direction
05 Sideswipe: same direction
06 Backed into
88 Other

01 — ** FIXED OBJECT TYPE
01 Bridge structure
02 Bridge rail
03 Crash cushion (barrels)
04 Divider, median barrier
05 Overhead sign support
06 Utility devices: pole, meter, etc.
07 Other post or pole
08 Building
09 Guardrail
10 Sign post
11 Culvert
12 Curb
13 Fence / Gate
14 Hydrant
15 Barricade
16 Mailbox
17 Ditch
18 Embankment
19 Wall
20 Tree
21 RR crossing fixtures
88 Other

01 — DR. LIC. COMPLY (Code each driver)
00 Not licensed
01 Valid license
02 Invalid license

01 — RESTRICT. COMPLY (Code each driver)
00 No restrictions
01 Complied with
02 Do not comply

SUBSTANCE USE
AP - Alcohol Present
AC - Alcohol Contributed
DP - Illegal Drug Present
DC - Illegal Drug Contributed
MP - Medication Present
MC - Medication Contributed

RP — DRIVER/PED IMPAIRMENT TEST
TR - Alcohol or drug Test Refused
PT - Positive preliminary Test
RP - Test given, Results Pending
← B.A.C. →

USE CODE "99" FOR UNKNOWN

INVESTIGATIVE - FATALITY REPORT

COUNTY	ON Road	CITY	DATE of Accident	☒ Fatal, narrative & diagram on fatal accident (required by State) ☐ Investigative Report	Page of
OT	ASPEN ROAD		11/23/2008		1 / 2

STATE USE ONLY	INVESTIGATIVE DEPT.	TIME Occurred	Day	Invest. OFFICER	BADGE No.	Local Case Number
	Kansas Highway Patrol	13:30	SU	D.RUBLE	160	2008014135

On this date, I responded to a report of a one vehicle roll-over crash located about 1.5 miles east of Culver, Kansas on Aspen Road. When I arrived, Ottawa County Fire and Sheriffs Department were on scene. Ottawa County Deputy Coleman met with me and told me that the driver of the car was deceased.

Evidence at the scene indicates that unit 1 was westbound on Aspen Road and for unknown reasons, swerved to the right and struck a bridge structure. The vehicle came to rest on its passenger side on the north side of the bridge.

Dr. Yoxall (Ottawa County Coroner) arrived and pronounced the driver deceased at the scene. The driver was transported to Wilson/Shields Funeral Home in Minneapolis, Kansas by Wilson/Shields.

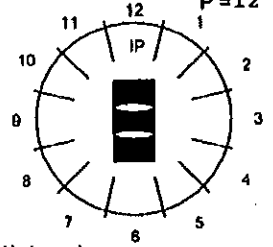
The vehicle was towed by Backus towing service to their tow lot.

FATALITY DATA

TIME EMS NOTIFIED	EXTRICATION WAS REQUIRED FOR THE FOLLOWING PERSONS	00 SPECIAL JURISOICTION
13:35		00 Not Special
TIME EMS ARRIVED 13:53		01 National Park Service
		02 Military
		03 Indian Reservation
TIME EMS ARRIVED AT HOSPITAL 15:13		04 College/University Campus
		05 Other Federal properties
		88 Other
		99 Unknown

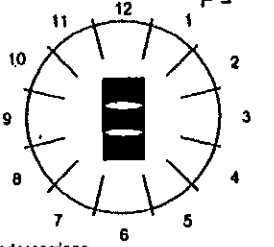
IMPACT POINTS: Show initial impact point by arrow and label "I". Show principal impact point by arrow and label "P".

VEHICLE 01 DAMAGE — I = 12, P = 12



☒ Undercarriage ☐ No Damage ☐ Estimated Speed,MPH

VEHICLE DAMAGE — I = , P =

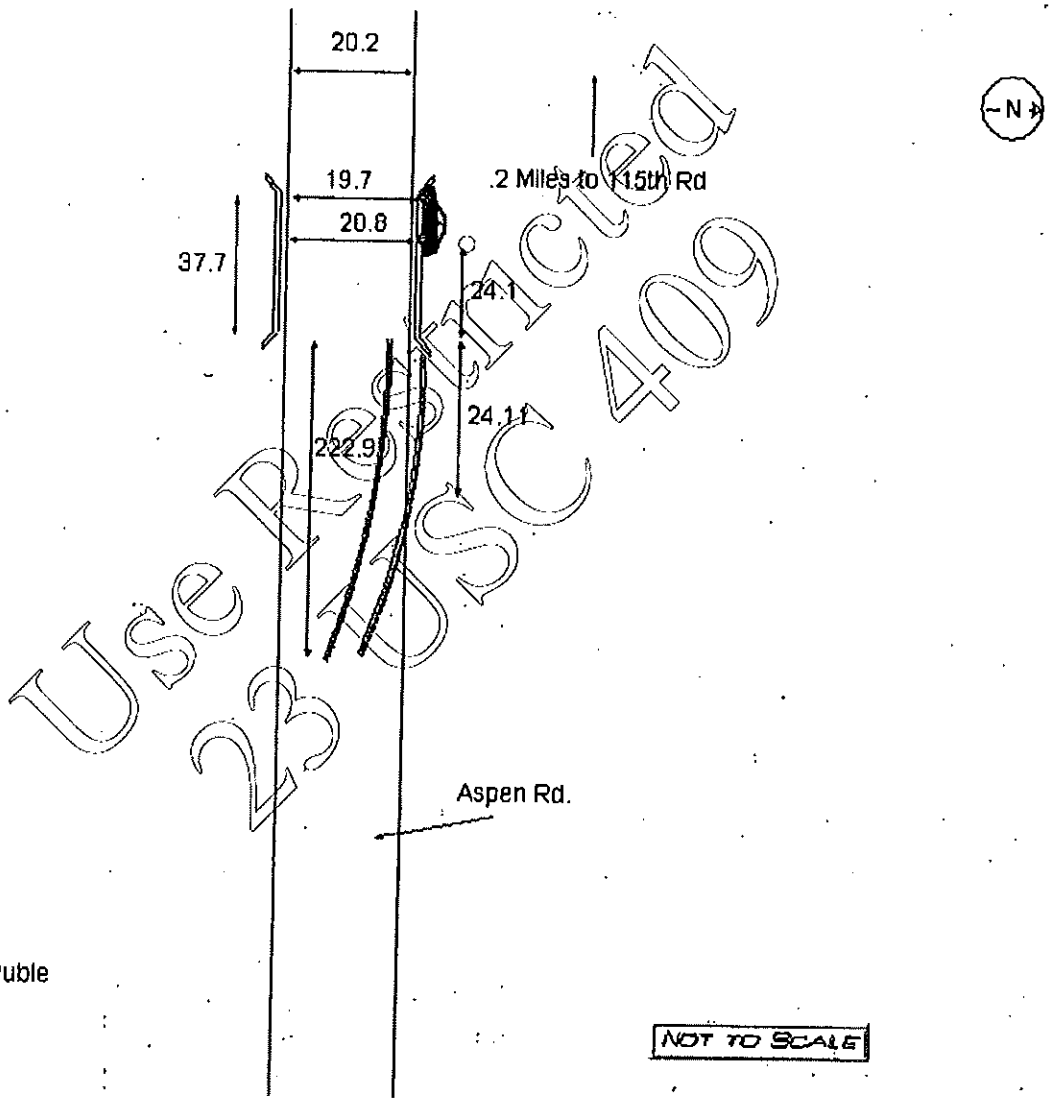


☐ Undercarriage ☐ No Damage ☐ Estimated Speed,MPH

COLLISION DIAGRAM

Draw scene as observed. Refer to vehicles, drivers, and pedestrians by numbers assigned in this report.

SHOW
(1) Outline of street and access points and identify specifically by number.
(2) Paths of units prior to and after impact, skidmarks, and point of impact (POI).
(3) Location of signs, traffic controls, and reference points.
(4) Location of other property hit or damaged (trees, signs, etc.).
(5) Specific features at location (bridge, overpass, culvert, railroad crossing, etc.).
(6) Location of temporary highway conditions.
(7) All measurements to locate the accident relative to specific, fixed, and identifiable points.



MasterTrooper D. Ruble

NOT TO SCALE

RECEIVED 12.01.08

☒ FATAL
☐ INJURY
☐ PDO over $1000
☐ PDO under $1000
☐ PRIVATE PROPERTY

20080095064

STATE OF KANSAS
MOTOR VEHICLE ACCIDENT REPORT

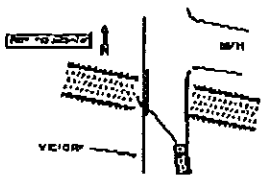
DOT FORM NO. 850
Rev. 1-2005

☐ Amended Report
☐ Hit & Run Accident
☐ KDOT Property Damage
☐ KDOT Construction Zone

Milepost	COUNTY	On Road	Speed Limit	CITY	Photos By	Local Case Number	Page of
	RN	VICTORY	55		Josh L. White	200805165	1 / 2

Distance	F/M/I	Dir.	☒ FROM ☐ AT Road	Speed Limit	Investigating Dept.	Investigating Officer /Badge Number	Reviewed By
127.000	F	SS	56TH		RENO CO SHERIFF	Josh L. White 429	JSO440

COLLISION DIAGRAM (Show Unit Movements, Roads)



Describe pre-crash movement or action and direction of vehicles and pedestrians by traffic unit number.

VEHICLE WAS NORTHBOUND ON VICTORY WHEN IT LOST CONTROL AND TURNED TOWARD THE WEST SIDE OF BRIDGE. VEHICLE WENT OVER BRIDGE, LANDING UPSIDE DOWN IN WATER. DRIVER WAS TRAPPED IN VEHICLE & PRONOUNCED DEAD AT SCENE.

Date of Accident	
05/29/2008	
TIME Occurred	DAY
02:47	TH
TIME Notified	DAY
02:49	TH
TIME Arrived	DAY
02:59	TH

Object Damaged and nature of damage (Show location in diagram)

Name and Address of object owner

ON Road	Ctrl Sec	Sec Milepost	AT Road	Distance	Unit	Dir	Latitude	Longitude	STATE USE ONLY
VICTORY			56TH	127.000	F	SS			

County	City Code	Acctg Code	Distance	Reference Road 1	Distance	Reference Road 2	Code	Func. Class
RN	[redacted]	N	M		E	M	TH	2

Unit	☒ Driver ☐ Ped NAME (Last, First and Initial)	Phone ☐ Work ☐ Home	Color	YEAR	MAKE	MODEL & BODY STYLE	MC CCs
01	[redacted]	[redacted]	RED	2006	FORD	ECP UT	

Driver's Address (Number, Street, City, State, Zip Code)			STATE	LICENSE PLATE #	Exp. Yr	Removed By:
[redacted]			[redacted]	[redacted]	2009	AUTOHOUSE

DRIVER'S LICENSE STATE and NUMBER	COL?	DATE OF BIRTH	SEX	VEHICLE IDENTIFICATION NUMBER	Odometer
St. [redacted] No. [redacted]	N	[redacted]	M	[redacted]	

Registered OWNER FULL NAME ("Same" if Driver)	Phone ☐ Work ☐ Home	TOTAL occupants in this vehicle	Fire?	Insurance Company
[redacted]		1	N	[redacted]

OWNER Address ("Same" if Driver)	Special Data Area	Direction of Travel	Policy Number
[redacted]		NN	[redacted]

Special Conditions for unit above: ☐ 1 Hit & Run ☐ 2 Non-Contact ☐ 3 Stolen ☒ 4 Legally parked ☐ 5 Police pursuit ☒ 6 Driverless ☒ 7 Towed away

Unit	☐ Driver ☐ Ped NAME (Last, First and Initial)	Phone ☐ Work ☐ Home	Color	YEAR	MAKE	MODEL & BODY STYLE	MC CCs

Driver/Ped ADDRESS (Number, Street, City, State, Zip Code)	STATE	LICENSE PLATE #	Exp. Yr	Removed By:

DRIVER'S LICENSE STATE and NUMBER	COL?	DATE OF BIRTH	SEX	VEHICLE IDENTIFICATION NUMBER	Odometer
St. No.					

Registered OWNER FULL NAME ("Same" if Driver)	Phone ☐ Work ☐ Home	TOTAL occupants in this vehicle	Fire?	Insurance Company

OWNER Address ("Same" if Driver)	Special Data Area	Direction of Travel	Policy Number

Special Conditions for unit above: ☐ 1 Hit & Run ☐ 2 Non-Contact ☐ 3 Stolen ☐ 4 Legally parked ☐ 5 Police pursuit ☐ 6 Driverless ☐ 7 Towed away

TRAF UNIT	SEAT TYPE	Last NAME	First Name	Initial	ADDRESS (Number, Street, City, State, Zip)	SEX	AGE	S.E. USED	EJECT TRAP	INJ SEV	EMS UNIT
01	01	[redacted]	[redacted]	[redacted]	[redacted]	M	20	N	N	F	A

E M S Unit	INJURED TAKEN By:	INJURED TAKEN To:
A	BUHLER EMS1	NOT TRANSPORTED
B		
C		

Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.
Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.	Dr/Pd	Violation Charged	Citation No.

OFFICER'S OPINIONS OF APPARENT CONTRIBUTING CIRCUMSTANCES (Factor Type-Unit Number/Specific Factor) Enter in order all codes that apply.

D1 | 02 | D1 | 18

05 LIGHT
01 Daylight
02 Dawn
03 Dusk
04 Dark: street lights on
05 Dark: no street lights

01 WEATHER
00 No adverse conditions
01 Rain, mist, or drizzle
02 Sleet — 08 Freezing rain
03 Snow — 14 Rain & fog
04 Fog — 16 Rain & wind
05 Smoke — 24 Sleet & fog
06 Strong winds — 38 Snow & winds
07 Blowing dust, sand, etc.
88 Other

ON 04 AT SURFACE TYPE
01 Concrete
02 Blacktop
03 Gravel
04 Dirt
05 Brick
88 Other

ON 02 AT SURFACE CONDITION
01 Dry
02 Wet
03 Snow or slush
04 Ice or snowpacked
05 Mud, dirt or sand
06 Debris (Oil, etc.)
88 Other

88 VEHICLE MANEUVER BEFORE CRASH
01 Straight/following road
02 Left turn
03 Right turn
04 U-turn
05 Overtaking (passing)
06 Changing lanes
07 Avoiding maneuver
08 Merging
09 Parking
10 Backing
11 Stopped awaiting turn
12 Stopped in traffic
13 Illegally parked
14 Disabled in roadway
15 Slowing or stopping
88 Other DRIFTING

04 VEHICLE DAMAGE
00 None
01 Damage (minor)
02 Functional
03 Disabling
04 Destroyed
88 Other

TRAFFIC CONTROLS
O/A (On/At Road) — Type Present — OK/NF(OK/Non-functional)

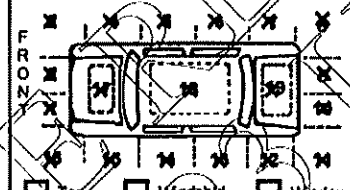
	O/A	Type	OK/NF
1	O	00	OK
2			
3			
4			
5			

00 None
01 Officer, flagger
02 Traffic signal
03 Stop sign
04 Flasher
05 Yield sign
06 RR gates or signal
07 RR crossing signal
08 No passing zone
09 Center/edge lines
88 Other

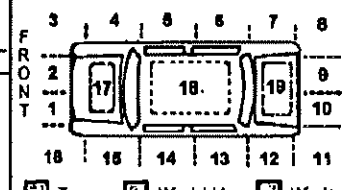
ON 01 AT ROAD CHARACTER
01 Straight and level
02 Straight on grade
03 Straight at hillcrest
04 Curved and level
05 Curved on grade
06 Curved at hillcrest
88 Other

ON 00 AT CONST./MAINT. ZONE
00 None apply
01 Construction zone
02 Maintenance zone
03 Utility zone

DAMAGE LOCATION AREA - Vehicle 1



DAMAGE LOCATION AREA - Vehicle



08 ACCIDENT CLASS
00 Other non-collision
01 Overturned
COLLISION WITH:
02 Pedestrian
03 Other motor vehicle *
04 Parked motor vehicle
05 Railway train
06 Pedalcycle
07 Animal (specify)
08 Fixed object **
09 Other object

11 ACCIDENT LOCATION
ON ROADWAY:
11 Non-intersection
12 Intersection
13 Intersection-related
14 Parking lot or driveway access
15 Interchange area
16 On crossover
OFF ROADWAY:
21 Roadside (including shoulder)
22 Median
23 Parking lot, rest area trafficway
88 Other

01 ROAD SPECIAL FEATURES (Identify up to three)
00 None
01 Bridge
02 Bridge overhead
03 Railroad bridge
04 Railroad crossing
05 Interchange
06 Ramp
88 Other

Enter any visible identifier, refer by code — Code — Ident:

06 VEHICLE BODY TYPE
01 Automobile
02 Motorcycle
03 Motorscooter or Moped
04 Van
05 Pickup truck
06 Sport Utility Veh.
07 Camper or RV
08 Farm equipment
09 All terrain vehicle (ATV)

Heavy / Large Vehicles — Bus Capacity
10 Single large Truck
11 Truck and trailer(s)
12 Tractor-trailer(s)
13 Cross country bus
14 School bus
15 Transit bus
25 Train
77 Emergency Vehicles
88 Other

PEDESTRIAN LOCATION BEFORE IMPACT - IN INTERSECTION:
01 In crosswalk or bikeway
02 Not in crosswalk or bikeway
03 In intersection without crosswalk or bikeway

NOT IN INTERSECTION
11 In available crosswalk or bikeway
12 Not in available crosswalk or bikeway
13 In area without crosswalk or bikeway
25 NOT IN ROADWAY

PEDESTRIAN ACTION
01 Entering or crossing road
02 Walking or riding on road
03 Approaching, leaving, or working on vehicle
04 Working (not on vehicle)
05 Playing or standing
06 Approaching or leaving bus
07 In parked vehicle
88 Other

PED OBEDIENCE TO TRAF SIG
00 No pedestrian signal
01 Obeyed pedestrian signal
02 Disobeyed ped signal
03 Ped signal malfunction
04 Not applicable

*** COLLISION WITH OTHER MOTOR VEH.**
01 Head on
02 Rear end
03 Angle - side impact
04 Sideswipe: opposite direction
05 Sideswipe: same direction
06 Backed into
88 Other

02 ** FIXED OBJECT TYPE
01 Bridge structure
02 Bridge rail
03 Crash cushion (barrels)
04 Divider, median barrier
05 Overhead sign support
06 Utility devices: pole, meter, etc.
07 Other post or pole
08 Building
09 Guardrail — 16 Mailbox
10 Sign post — 17 Ditch
11 Culvert — 18 Embankment
12 Curb — 19 Wall
13 Fence / Gate — 20 Tree
14 Hydrant — 21 RR crossing fixtures
15 Barricade
88 Other

01 DR. LIC. COMPLY (Code each driver)
00 Not licensed
01 Valid license
02 Invalid license

00 RESTRICT. COMPLY (Code each driver)
00 No restrictions
01 Complied with
02 Do not comply

SUBSTANCE USE
AP - Alcohol Present
AC - Alcohol Contributed
DP - Illegal Drug Present
DC - Illegal Drug Contributed
MP - Medication Present
MC - Medication Contributed

DRIVER/PED IMPAIRMENT TEST
TR - Alcohol or drug Test Refused
PT - Positive preliminary Test
RP - Test given, Results Pending
← B.A.C. →

USE CODE "99" FOR UNKNOWN

INVESTIGATIVE - FATALITY REPORT

COUNTY	ON Road	CITY	DATE of Accident	☒ Fatal, narrative & diagram on fatal accident (required by State) ☐ Investigative Report	Page of
RN	VICTORY		05/29/2008		1 / 2

STATE USE ONLY	INVESTIGATIVE DEPT.	TIME Occurred	Day	Invest. OFFICER	BADGE No.	Local Case Number
	RENO CO SHERIFF	02:47	TH	Josh L. White	429	200805165

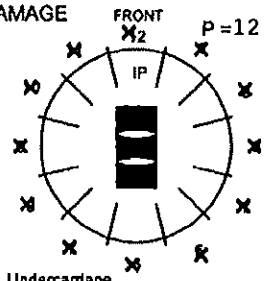
ON MAY 29TH, 2008 AT APPROXIMATELY 2:50am, I RECEIVED A CALL FROM DISPATCH ADVISING THAT THERE WAS AN INJURY ACCIDENT AT 56TH AND VICTORY ROAD. THEY ADVISED A CAR HAD WENT OVER THE BRIDGE AT THAT LOCATION AND WAS OVERTURNED WITH THE DRIVER STILL IN THE VEHICLE. THE REPORTING PARTY WAS ON SCENE AND ADVISED THAT HE HAD NOT SEEN THE DRIVER EXIT THE VEHICLE. I ARRIVED ON SCENE AT 2:59. I MADE CONTACT WITH THE REPORTING PARTY WHO WAS [redacted] HE WAS STANDING JUST SOUTH OF THE BRIDGE BY HIS JEEP. HE SHOWED ME WHERE THE VEHICLE WAS. I WENT TO THE BRIDGE AND LOOKED OVER THE WEST SIDE AND SAW THE BOTTOM SIDE OF A VEHICLE, SUBMERGED WITH ONLY THE REAR WHEELS AND THE BUMPER VISIBLE. [redacted] SAID THE DRIVER'S NAME WAS [redacted] AND THAT HE WAS VERY INTOXICATED. BY THIS TIME, BUHLER FIRE ENGINE 581 WAS ON SCENE. THEY ASSUMED THE RESCUE MISSION. OTHER EMS, FIRE & RESCUE AND LAW ENFORCEMENT UNITS ARRIVED AS WELL. AS I SPOKE WITH [redacted], HE ADVISED THAT [redacted] HAD CALLED HIM TO COME PULL HIM OUT OF THE DITCH BECAUSE HE WAS STUCK IN THE MUD. [redacted] SAID THAT WHEN HE ARRIVED, HE COULD IMMEDIATELY TELL THAT [redacted] WAS INTOXICATED BECAUSE OF HIS SLURRED SPEECH AND THE WAY HE WAS COMMUNICATING AND ACTING. HE ALSO SAID THAT HE SAW BEER IN THE VEHICLE. [redacted] TOLD ME THAT [redacted] WAS TAKING THE BACK ROADS HOME TO BUHLER BECAUSE HE DID NOT WANT TO GET PULLED OVER BY LAW ENFORCEMENT AND GET A DUI. [redacted] PULLED [redacted] OUT OF THE DITCH AND TOLD HIM THAT HE WOULD TAKE HIM HOME BECAUSE [redacted] WAS TOO DRUNK TO DRIVE. [redacted] REFUSED AND DEMANDED THAT HE DRIVE. [redacted] SAID HE KEPT TRYING TO CONVINCE [redacted] NOT TO DRIVE. HE SAID THIS DID NOT WORK. [redacted] THEN SAID THAT [redacted] GOT STUCK AGAIN JUST AFTER HE FINISHED PULLING HIM OUT. [redacted] PULLED HIM OUT AGAIN AND BEFORE HE COULD UNHOOK THE CHAIN, [redacted] BEGAN TO DRIVE AWAY, PULLING [redacted] JEEP SIDEWAYS ON THE ROAD. [redacted] GOT HIM TO STOP AND UNHOOKED THE CHAIN. [redacted] THEN BEGAN TO DRIVE NORTH. AT THIS TIME, THEY WERE SOUTH OF 56TH ON VICTORY ROAD APPROXIMATELY 1/2-3/4 OF A MILE. [redacted] WENT TO PUT HIS CHAIN BACK IN HIS JEEP AND WHEN HE LOOKED NORTH, HE COULD NOT SEE [redacted] TAIL LIGHTS. HE GOT IN HIS JEEP AND WHEN HE REACHED THE BRIDGE NOTICED PART OF THE BRIDGE RAIL WAS MISSING AND THAT THERE WERE TIRE TRACKS LEADING OFF THE WEST SIDE OF THE BRIDGE. HE GRABBED HIS SPOT LIGHT AND BEGAN LOOKING IN THE WATER. HE FIRST CHECKED THE SOUTH SIDE OF THE BRIDGE ON BOTH SIDES AND COULDN'T SEE ANYTHING. HE THEN WENT TO THE NORTH SIDE AND WHEN HE SHINED HIS LIGHT BACK SOUTH, HE SAW THE REAR TIRES OF THE VEHICLE STICKING OUT ABOVE THE WATER. HE MADE THE CALL TO 911. RESCUE UNITS FROM BUHLER AND HUTCHINSON FIRE DEPARTMENTS ENTERED THE WATER BUT WITH THE FLOW AND DEPTH OF THE FLOOD WATERS, ALONG WITH THE FLOATING DEBRIS THAT WAS LODGED WITH THE VEHICLE AT THE BRIGDE PILLAR, THEY WERE UNABLE TO GAIN ACCESS INTO THE VEHICLE. A SCUBA DIVER FROM THE HUTCHINSON POLICE DEPARTMENT ALSO ATTEMPTED TO GAIN ACCESS INTO THE VEHICE BUT WAS UNSUCCESSFUL. A WRECKER ATTEMPTED TO PULL THE VEHICLE OUT OF THE RIVER. THE VEHICLE WAS A DIRECTLY UNDER THE BRIDGE AND THE WRECKER WAS ABLE TO PULL IT AROUND TO THE BANK BUT NOT OUT OF THE WATER DUE TO IS WINCH CABLE BREAKING. THE VEHICLE SHIFTED FROM BEING UPSIDE DOWN, TO SITTING ON ITS DRIVER'S SIDE. THE ONLY VISIBLE AREA WAS THE PASSENGER SIDE OF THE VEHICLE. A PERSON WAS SEEN IN THE VEHICLE AT THIS TIME, BUT THERE WERE NO MOVEMENTS. FIRE RESCUE ENTERED THE WATER AGAIN AND WERE ABLE TO EXTRACT THE PERSON FROM THE VEHICLE AND WAS HE IDENTIFIED AS [redacted] RENO COUNTY DEATH IN INVESTIGATOR JOHN TRACY PRONOUNCED [redacted] DECEASED AT THIS TIME.

FATALITY DATA

TIME EMS NOTIFIED	EXTRICATION WAS REQUIRED FOR THE FOLLOWING PERSONS	SPECIAL JURISDICTION
02:51		00
TIME EMS ARRIVED: 03:01	[redacted]	00 Not Special 01 National Park Service 02 Military 03 Indian Reservation 04 College/University Campus 05 Other Federal properties 88 Other 99 Unknown
TIME EMS ARRIVED AT HOSPITAL: 99:99		

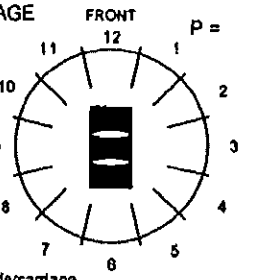
IMPACT POINTS: Show initial impact point by arrow and label "I". Show principal impact point by arrow and label "P".

VEHICLE DAMAGE 01 — I = 12, P = 12



☐ Undercarriage ☐ No Damage ☐ Estimated Speed,MPH

VEHICLE DAMAGE — I = , P =

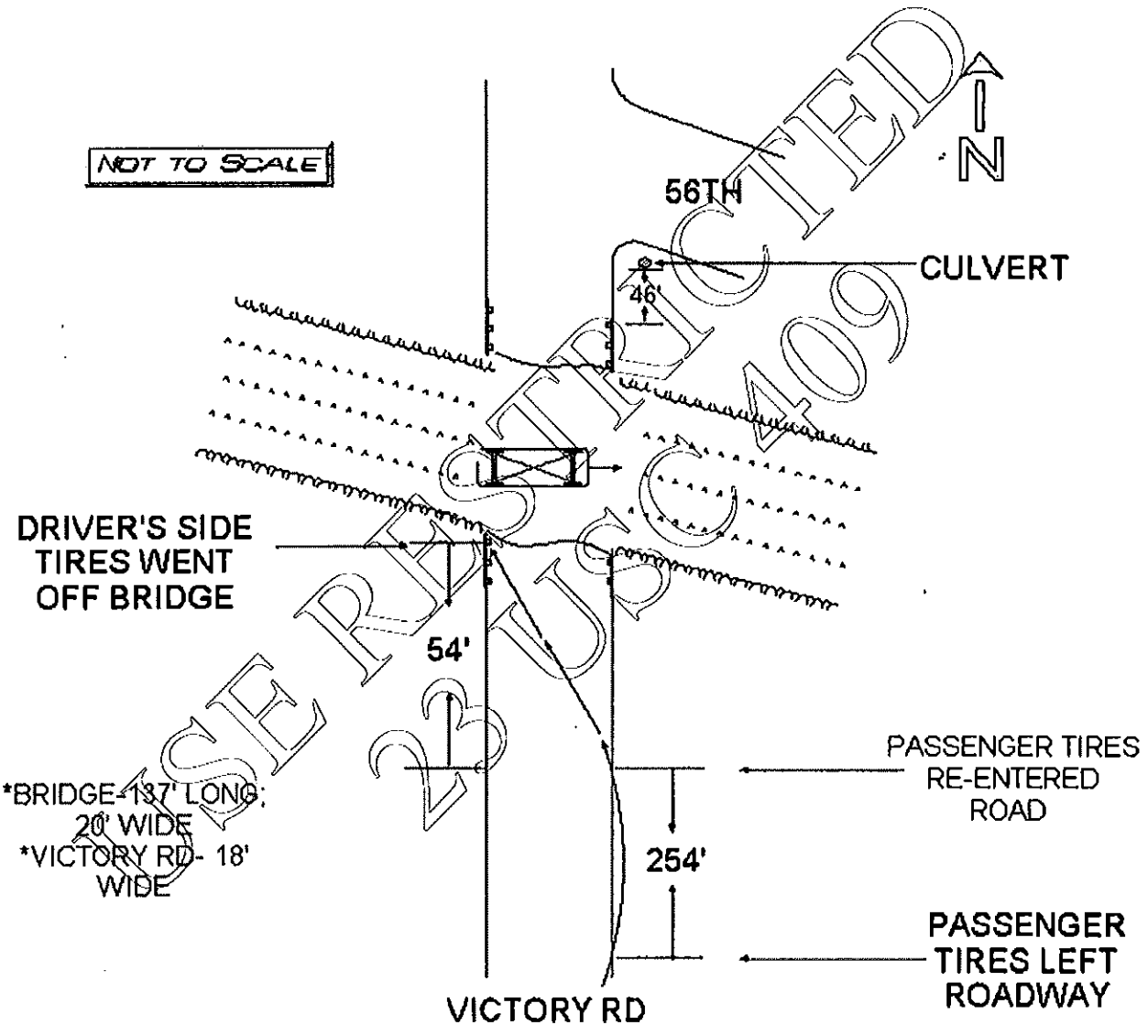


☐ Undercarriage ☐ No Damage ☐ Estimated Speed,MPH

D.O.T FORM NO. 851

COLLISION DIAGRAM — Draw scene as observed. Refer to vehicles, drivers, and pedestrians by numbers assigned in this report.

SHOW
(1) Outline of street and access points and identify specifically by number.
(2) Paths of units prior to and after impact, skidmarks, and point of impact (POI).
(3) Location of signs, traffic controls, and reference points.
(4) Location of other property hit or damaged (trees, signs, etc.).
(5) Specific features at location (bridge, overpass, culvert, railroad crossing, etc.).
(6) Location of temporary highway conditions.
(7) All measurements to locate the accident relative to specific, fixed, and identifiable points.



APPENDIX E

CRASH REPORTS

SERIOUS INJURY CRASHES AT SHORT BRIDGES

ON LOW-VOLUME LOCAL ROADS

Kansas Motor Vehicle Accident Report

KDOT Form 850A Rev 1-2009

KDOT: 201100247720

Investigating Department	Reviewed by	Local Case No.	Page of	
MISO	JAMIE SCHULTE	2011-2603	1 / 5	☐ Amended Report ☐ DUI ☐ Hit & Run

Investigating Officer Name	Badge Number	County	City Name
MICHAEL EARLY	903	MI	OSAWATOMIE

Accident Severity: 1 — Fatal / Injury / PDO >= $1,000 / PDO < $1,000

☐ Private Property

Milepost	Block No	Dir Pfx	On Road Name	Road Type	Dir Sfx	SpdLmt	Date of Accident (mm/dd/yyyy)	Time Occur.	Day
		S	BETHEL CHURCH	RD		55	10/18/2011	13:50	Tue

From Dist	Ft/Mi	From Dir	FROM / AT	Dir Pfx	Reference or At Road Name	Road Type	Dir Sfx	SpdLmt	Date Notified (mm/dd/yyyy)	Time Notif.	Day
307	Ft	N	● FROM ○ AT	W	399TH	ST		55	10/18/2011	13:58	Tue

Narrative: Describe each traffic unit's pre-crash movement and direction of travel

Driver #1 was southbound on Bethel Church Road when he fell asleep and struck a bridge.

Date Arrived (mm/dd/yyyy)	Time Arriv.	Day
10/18/2011	14:10	Tue

Latitude (AOI):

Longitude (AOI):

Photos by: SGT. EARLY

KDOT? ☐ Object 1 Damaged & Nature of Damage (show in diagram) — Owner Street Address — Personal Phone
Owner Last Name — First Name — Middle Name — City — State — Zip — Work Phone

KDOT? ☐ Object 2 Damaged & Nature of Damage (show in diagram) — Owner Street Address — Personal Phone
Owner Last Name — First Name — Middle Name — City — State — Zip — Work Phone

WORK ZONE TYPE — ON: 00 — AT:
- 00 None Apply
- 01 Construction Zone - (KDOT? ☐)
- 02 Maintenance Zone -
- 03 Utility Zone -
- 99 Unknown

LOCATION IN WORK ZONE (AOI)
- 01 Before first warning sign
- 02 Advance warning area
- 03 Transition area
- 04 Activity area
- 05 Termination area
- 99 Unknown

ONLY CHECK ONE BOX PER CATEGORY UNLESS SPECIFIED OTHERWISE

LIGHT CONDITIONS: 01
- 01 Daylight
- 02 Dawn
- 03 Dusk
- 04 Dark: street lights on
- 05 Dark: no street lights
- 99 Unknown

ADVERSE WEATHER CONDITIONS: 00
- 00 No adverse conditions
- 01 Rain, mist, drizzle
- 02 Sleet, hail
- 03 Snow
- 04 Fog
- 05 Smoke
- 06 Strong wind
- 07 Blowing dust, sand, etc.
- 08 Freezing rain, mist, drizzle
- 14 Rain & fog
- 16 Rain & wind
- 24 Sleet & fog
- 36 Snow & wind
- 88 Other:
- 99 Unknown

SURFACE TYPE — ON: 03 — AT:
- 01 Concrete
- 02 Blacktop (Asphalt)
- 03 Gravel
- 04 Dirt
- 05 Brick
- 88 Other:
- 99 Unknown

SURFACE CONDITIONS — ON: 01 — AT:
- 01 Dry
- 02 Wet
- 03 Snow
- 04 Ice
- 05 Mud/dirt/sand
- 06 Debris (oil, etc.)
- 07 Standing/ moving water
- 08 Slush
- 88 Other:
- 99 Unknown

ACC. LOCATION (of 1st Harmful Event): 11

ON ROADWAY: (within travel lanes)
- 11 Non-intersection
- 12 Intersection +
- 13 Intersection-related +
- 14 Access to Parking lot/Drvwy
- 15 Interchange Area +
- 16 On Crossover
- 17 Toll Plaza

OFF ROADWAY:
- 20 Shoulder
- 21 Roadside (not shoulder)
- 22 Median
- 23 Parking lot or Rest area
- 88 Other:
- 99 Unknown

+INTERSECTION TYPE:
- 01 Four-way intersection
- 02 Five-way or more
- 03 T - intersection
- 04 Y - intersection
- 05 L - intersection
- 06 Roundabout (See Manual for Definitions)
- 07 Traffic Circle
- 08 Part of an interchange
- 99 Unknown

ROAD SPECIAL FEATURES (up to 3): 1: 01 — 2: — 3:
- 00 None
- 01 Bridge
- 02 Bridge Overhead
- 03 Railroad Bridge
- 04 RRXING
- 05 Interchange
- 06 Ramp
- 99 Unknown

ACCIDENT CLASS (mark 1 box per side) — 1st Harmful Event: 08 — Most Harmful Event: 08
- 00 Other non-collision
- 01 Overturned/Rollover

COLLISION WITH:
- 02 Pedestrian
- 03 Motor vehicle in-transport*
- 04 Legally Parked Vehicle
- 05 Railway train
- 06 Pedalcyclist
- 07 Animal Type:
- 08 Fixed object**
- 09 Other object:
- 99 Unknown

****FIXED OBJECT TYPE** (mark 1 box per side if applicable) — 1st Harmful Event: 01 — Most Harmful Event:
- 01 Bridge structure
- 02 Bridge rail
- 03 Crash cush./impact attenuator
- 04 Divider, median barrier
- 05 Overhead sign support
- 06 Utility devices: pole,meter,etc
- 07 Other post or pole
- 08 Building
- 09 Guardrail
- 10 Sign post
- 11 Culvert
- 12 Curb
- 13 Fence/Gate
- 14 Hydrant
- 15 Barricade
- 16 Mailbox
- 17 Ditch
- 18 Embankment
- 19 Wall
- 20 Tree
- 21 RRXING fixtures
- 88 Other:
- 99 Unknown

WORK ZONE CATEGORY:
- 01 Lane closure
- 02 Lane shift / crossover
- 03 Work on shoulder / median
- 04 Intermittent or moving vehicle
- 88 Other:
- 99 Unknown

***COLLISION WITH VEHICLE** (mark 1 box per side if applicable) — 1st Harmful Event: — Most Harmful Event:
- 01 Head on
- 02 Rear end
- 03 Angle - side impact
- 04 Sideswipe: opposite direction
- 05 Sideswipe: Same direction
- 06 Backed into
- 88 Other:
- 99 Unknown

TRAFFIC CONTROLS (On / At Road: O/A)

	O/A	Type	Present OK/NF
1	O	00	OK
2			
3			
4			
5			

- 00 None
- 01 Officer, flagger
- 02 Traffic signal
- 03 Stop sign
- 04 Flasher
- 05 Yield sign
- 06 RR gates / signal
- 07 RR crossing signs
- 08 No passing zone
- 09 Center/Edge lines
- 10 Warning signs
- 11 School zone signs
- 12 Parking lines
- 88 Other:
- 99 Unknown

Accident Diagram 850A continued	SPECIAL EVENT	SPECIAL DATA	Local Case No. 2011-2603	Page of 2 / 5

01 ROADWAY NUMBER OF LANES — ON / AT

01 One
02 Two
03 Three
04 Four to Six
05 Seven or more
88 Other: _____
99 Unknown

01 ROAD CHARACTER — ON / AT

01 Straight & Level
02 Straight on grade/slope
03 Straight on hillcrest
04 Curved & level
05 Curved on grade/slope
06 Curved on hillcrest
88 Other: _____
99 Unknown

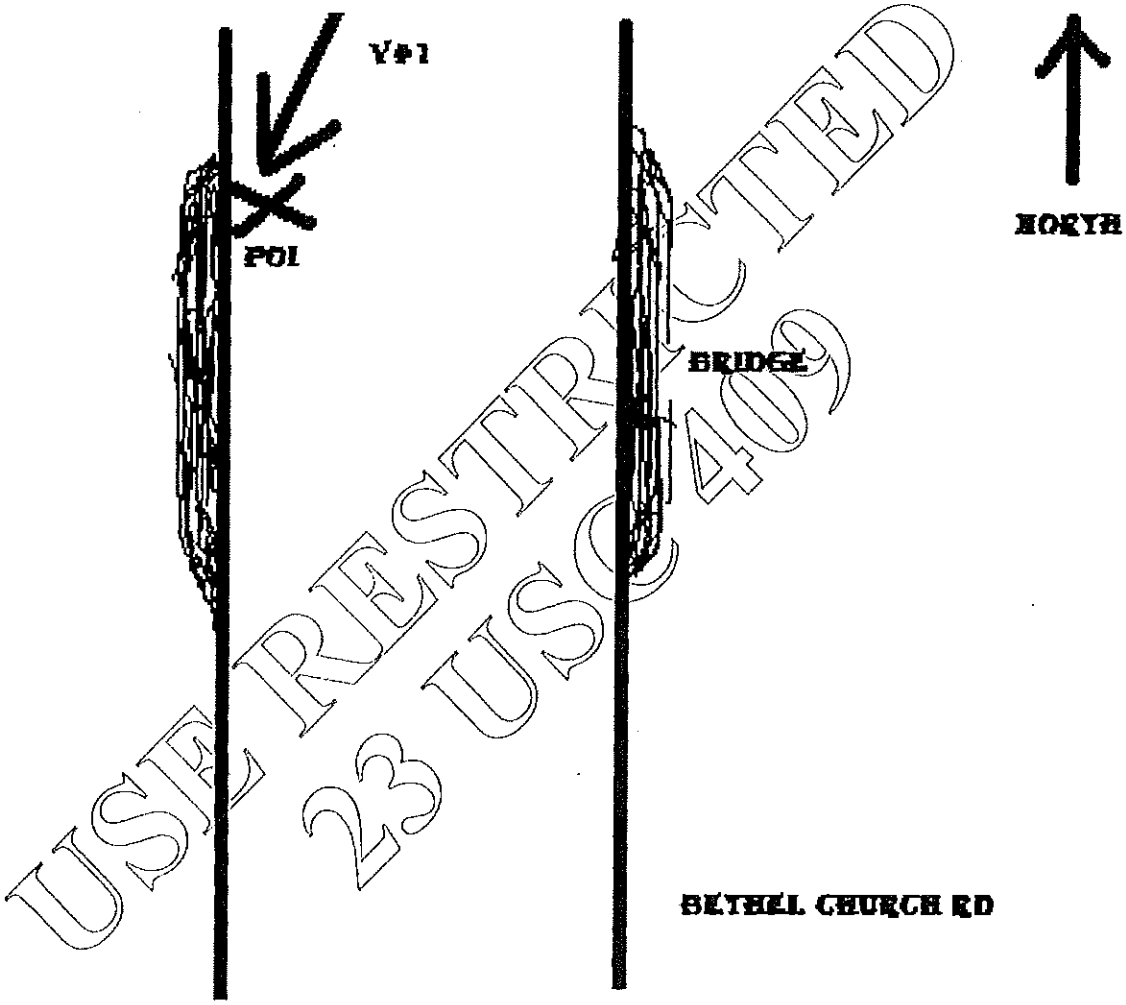
00 SPECIAL JURISDICTION

00 Normal Jurisdiction (Not Special)
01 National Park Service
02 Military
03 Indian Reservation
04 College / University Campus
05 Other Federal property
88 Other: _____
99 Unknown

A basic diagram is required for all state reportable accidents showing movements, direction, and positions of all traffic units in relationship to the trafficway. Identify (label) the street(s) and traffic unit(s) along with the area of impact (AOI) where possible. Refer to vehicles and pedestrians by unique numbers assigned in this report.

Indicate North Direction

Draw scene as observed or recreate per statements and evidence available



Note: The above line scale is 1"=20'; 5 feet squares. If another scale is used, please specify.

Occupants & Vehicles
KDOT Form 850B Rev. 1-2009

DRIVER & PASSENGER INFORMATION
(record pedestrians on supplemental form 854)

Investigating Officer / Badge No.: MICHAEL EARLY 903

Local Case No.: 2011-2603

Page of: 3 / 5

TU#	VIOLATIONS CHARGED	CITATION#	TU#	VIOLATIONS CHARGED (More violations in narrative ☐)	CITATION#

OFFICER'S OPINION OF APPARENT CONTRIBUTING CIRCUMSTANCES - ENTER AS MANY AS APPLY TO THIS ACCIDENT (FACTOR TYPE, TU#, CC CODE)

D1 | 05

Unit # / Seat Type	DRIVER Last Name / First Name	Middle Name / Date of Birth	DRIVER ADDRESS (Number, Street, Suffix, etc.) / City / State / Zip	Personal Phone Number / Work Phone Number	Gender / Age	SE Used / Eject/Trap	Inj Severity / Eject Path	Transpt Unit / Extrication?
TU 1	[redacted]	MN [redacted]	[redacted] New address? ☐	Personal	M	S	D	
ST 01	[redacted]	DOB [redacted]	[redacted]	Work	34	T		☒
TU		MN	New address? ☐	Personal				
ST		DOB		Work				☐

TRAFFIC UNIT# 1 (01, 03, N3, X3, etc)

DL State	Driver's License Number	DL Class	Driving for Employer?	CDL?
PA	29693283	A	☐	☒

01 DR LICENSE COMPLY
- 00 Not licensed
- 01 Valid License
- 02 Suspended
- 03 Revoked
- 04 Expired
- 05 Cancld or Denied
- 06 Disqualified
- 07 Restricted
- 99 Unknown

RESTRICT COMPLY

Restrictions? N

Driver's Lic Restrictions	Complied? Y	N
1		
2		
3		
4		

COMMERCIAL ENDORSEMENTS

[1] U [2] [3] [4]

- Z - None
- T - Double/Triple Trailer
- P - Passenger Vehicle
- N - Tank Vehicle
- H - Placarded Haz. Material
- X - Combination Tank/HazMat
- S - School Bus
- U - Unknown

SUBSTANCE USE (mark all that apply)
- ☐ AP - Alcohol ingested
- ☐ AC - Alcohol contributed
- ☐ DP - Illegal drugs ingested
- ☐ DC - Illegal drugs contributed
- ☐ MP - Medication ingested
- ☐ MC - Medication contributed

METHOD OF DETERMINATION (mark all that apply)

ALCOHOL	DRUGS
☒ 00 No evidence of impairment	☒
☐ 01 Evidential Test (Breath,Blood,etc)	☐
☐ 02 Preliminary Breath Test PBT	
☐ 03 Behavioral Tests: HGN, walk-and-turn, one leg stand, etc.	☐
☐ 04 Passive Alcohol Sensor (detects alcohol from driver's mouth)	
☐ 05 Observed (Odor, staggering, slurred speech, etc)	☐
☐ 06 Other (e.g. saliva test)	☐

IMPAIRMENT TEST (mark all that apply)
- ☒ NG - No Test given
- ☐ TR - Test Refused (Alcohol/Drug)
- ☐ PT - Prelim Positive Test (PBT)
- ☐ TG - Evidentiary Test given
- ☐ RP - Results pending

ALCOHOL: ☐ Evidentiary Breath 0. ☐ Eye Fluid 0. ☐ Blood (BAC) 0. ☐ Other 0.

Drug screen result ☐

TRAFFIC UNIT# (02, 04, N2, X4, etc)

DL State	Driver's License Number	DL Class	Driving for Employer?	CDL?
			☐	☐

DR LICENSE COMPLY
- 00 Not licensed
- 01 Valid License
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- 03 Revoked
- 04 Expired
- 05 Cancld or Denied
- 06 Disqualified
- 07 Restricted
- 99 Unknown

RESTRICT COMPLY

Restrictions? ☐

Driver's Lic Restrictions	Complied? Y	N
1		
2		
3		
4		

COMMERCIAL ENDORSEMENTS

[1] [2] [3] [4]

- Z - None
- T - Double/Triple Trailer
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- N - Tank Vehicle
- H - Placarded Haz. Material
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ALCOHOL: ☐ Evidentiary Breath 0. ☐ Eye Fluid 0. ☐ Blood (BAC) 0. ☐ Other 0.

Drug screen result ☐

Unit # / Seat Type	PASSENGER Last Name / First Name	Middle Name / Date of Birth	PASSENGER ADDRESS (Number, Street, Sfx, etc.) / City / State / Zip	Personal Phone Number / Work Phone Number	Gender / Age	SE Used / Eject/Trap	Inj Severity / Eject Path	Transpt Unit / Extrication?
TU		MN	New address? ☐	Personal				
ST		DOB		Work				☐
TU		MN	New address? ☐	Personal				
ST		DOB		Work				☐
TU		MN	New address? ☐	Personal				
ST		DOB		Work				☐
TU		MN	New address? ☐	Personal				
ST		DOB		Work				☐

Transport Unit	EMS Time Notified	Injured taken by:	Transport Unit	EMS Time Notified	Injured taken by:
EMS Arrived	EMS Time@Hosp	Injured taken to:	EMS Arrived	EMS Time@Hosp	Injured taken to:

Occupants & Vehicles
850B Continued

VEHICLE# 1 (01, 03, N3, X3, etc) | SPECIAL DATA | VEHICLE# (02, 04, N2, X4, etc) | SPECIAL DATA | Local Case No: 2011-2603 | Page of 4 / 5

OWNER Last Name ("Same" if Driver)	OWNER First Name	Middle Name
[redacted]		

OWNER ADDRESS (Number, Street) | New address? ☐ | Personal Phone

CITY [redacted] | ST | ZIP | Work Phone

COLOR	YEAR	MAKE	MODEL	BODY STYLE	ST
SIL	2011	CHEV	CRUZE	4D	KS

LICENSE PLATE #	County	Exp YR	Removed by:	MC CCs
[redacted]		2011	TOMMY	

VEHICLE IDENTIFICATION NUMBER [redacted] | Dir of Travel | Oc[redacted] | SS | 1

Insurance Company [redacted] | Policy Number [redacted]

SPECIAL CONDITIONS FOR TRAFFIC UNITS | 1 | 2 | 3 | 4 | 5 | Odometer: UNKN | Fire? ☐

1 Hit & Run | 2 Non-Contact | 3 Stolen | 7 Towed away due to damage
4 Legally Parked | 5 Pursued by LE | 6 Driverless

01 VEHICLE BODY TYPE

01 Automobile
02 Motorcycle
03 Motor scooter or Moped
04 Van
05 Pickup truck <10,001 lbs
06 Sport utility veh - SUV
07 Camper or RV
08 Farm machinery
09 All-terrain vehicle - ATV

LARGE / HEAVY VEHICLE (GCVWR over 10,000lbs)
10 Single heavy truck >10,000 lbs
11 Truck & trailer(s)
12 Tractor-trailer(s)
13 Cross country bus
14 School bus
15 Transit (city) bus
16 Other bus
25 Train
88 Other: _____
99 Unknown

Calculated speed at impact
Bus Seat Capacity ____
Power Source F

01 VEHICLE USE

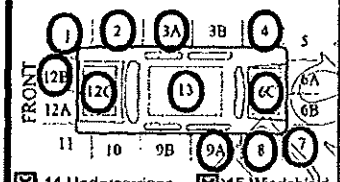
01 No special use
02 Taxi / Limo
03 School bus
04 Other bus
05 Military
06 Police
07 Ambulance
08 Fire
09 Mail/Parcel
99 Unknown

04 VEHICLE DAMAGE

00 None
01 Damage (minor)
02 Functional
03 Disabling
04 Destroyed
88 Other: _____
99 Unknown

DAMAGE LOCATION AREA

First Impact 1 Major Impact 1



☒ 14 Undercarriage ☒ 15 Windshield
☒ 16 Other windows ☐ 99 Unknown
☐ 17 Entire vehicle damaged
☐ 88 Other: _____

Trailer: Present / Damaged

01 VEH. MANU. BEFORE UNSTAB. SIT.

01 Straight/ following road
02 Left Turn
03 Right Turn
04 U Turn
05 Passing
06 Changing lanes
07 Avoidance man.
08 Merging
09 Parking
10 Backing
11 Stopped awaiting turn
12 Stopped in traf
13 Illegally parked
14 Disabled in roadway
15 Slowing or stopping
16 Negotiating a curve
88 Other: _____
99 Unknown

VEHICLE SEQUENCE OF EVENTS (List up to 4 per unit in the order of occurence)

1 27 | 2 | 3 | 4 | ☐ The exact sequence is unknown

NON-COLLISION

01 Ran off road right
02 Ran off road left
03 Crossed centerline
04 Overturn/Rollover
05 Crossed median
06 Fell/Jumped from veh
07 Thrown or falling object
08 Cargo loss or shift
09 Equipment failure (tire, brakes, etc.)
10 Downhill runaway
11 Trailer swing
12 Seperation of units
13 Jackknife
14 Fire
15 Explosion
16 Immersion in water
88 Other event: _____
98 Unknown non-coll.

COLLISION WITH

21 Pedestrian
22 Motor veh in-transport
23 Legally Parked Vehicle
24 Train
25 Pedal cycle (bike, etc)
26 Animal
27 Fixed Object
28 Other moveable object
99 Unknown object

VEHICLE# (02, 04, N2, X4, etc) | SPECIAL DATA

OWNER Last Name ("Same" if Driver) | OWNER First Name | Middle Name

OWNER ADDRESS (Number, Street) | New address? ☐ | Personal Phone

CITY | ST | ZIP | Work Phone

COLOR	YEAR	MAKE	MODEL	BODY STYLE	ST

LICENSE PLATE # | County | Exp YR | [redacted] | MC CCs

VEHICLE IDENTIFICATION NUMBER [redacted] | Dir of [redacted]

Insurance Company | Policy Number

SPECIAL CONDITIONS FOR TRAFFIC UNITS | 1 | 2 | 3 | 4 | 5 | Odometer | Fire? ☐

1 Hit & Run | 2 Non-Contact | 3 Stolen | 7 Towed away due to damage
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VEHICLE BODY TYPE

01 Automobile
02 Motorcycle
03 Motor scooter or Moped
04 Van
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07 Camper or RV
08 Farm machinery
09 All-terrain vehicle - ATV

LARGE / HEAVY VEHICLE (GCVWR over 10,000lbs)
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11 Truck & trailer(s)
12 Tractor-trailer(s)
13 Cross country bus
14 School bus
15 Transit (city) bus
16 Other bus
25 Train
88 Other: _____
99 Unknown

Calculated speed at impact
Bus Seat Capacity ____
Power Source ____

VEHICLE USE

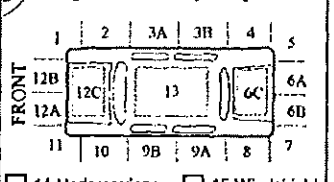
01 No special use
02 Taxi / Limo
03 School bus
04 Other bus
05 Military
06 Police
07 Ambulance
08 Fire
09 Mail/Parcel
99 Unknown

VEHICLE DAMAGE

00 None
01 Damage (minor)
02 Functional
03 Disabling
04 Destroyed
88 Other: _____
99 Unknown

DAMAGE LOCATION AREA

First Impact ____ Major Impact ____



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09 Parking
10 Backing
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15 Explosion
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COLLISION WITH

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22 Motor veh in-transport
23 Legally Parked Vehicle
24 Train
25 Pedal cycle (bike, etc)
26 Animal
27 Fixed Object
28 Other moveable object
99 Unknown object

Accident Narrative KDOT Form 851 Rev. 1-2009	Officer Observations Witness Statements Description of Events Additional Information	Investigating Officer / Badge No. MICHAEL EARLY 903	Local Case No. 2011-2603	Page of 5 / 5

MAIN NARRATIVE

On Tuesday October 18, 2011 at 1350 hours, I was dispatched to the area of Bethel Church Road south of W. 391st Street in reference to a one vehicle injury crash. Upon arrival, I located the crash just north of W. 399th Street on Bethel Church Road. I observed a silver 4 door Chevy Cruze bearing [redacted] laying on it's roof in the middle of the roadway. It appeared that the vehicle had struck the bridge on the west side of the road and then rolled on to it's roof. An off duty Osawatomie Police Officer Harold Whitley, was on scene and said that the driver and only occupant was trapped in the vehicle. I spoke to the subject who was identified as [redacted]. I asked [redacted] what happened and he said he was southbound on Bethel Church Road when he fell asleep and struck the bridge. Osawatomie Fire was able to ge[redacted]om the vehicle and he was transported to the Overland Park Regional Hospital with unknown injuries. I spoke with [redacted] mother at the scene who said that her son had been working two jobs. The vehicle was towed by Tommy Brewer Tow.

Kansas Motor Vehicle Accident Report

KDOT: 20090048846

KDOT Form 850A Rev 1-2009

Investigating Department	Reviewed By	Local Case No.	Page of
Johnson County Sheriff's Office	30359	09002135	1 / 6

Investigating Officer Name	Badge Number	County	City Name
C. HARGRAVE	31275	JO C	BUCYRUS

☐ Amended Report ☐ DUI ☐ Hit & Run

Milepost	Block No	Dir Pfx	On Road Name	Road Type	Dir Sfx	SpdLmt	Date of Accident (mm/dd/yyyy)	Time Occur	Day
		W	215TH	ST		35	05/06/2009	11:26	WE

From Dist	Ft/Mi	From Dir	☑ FROM ○ AT	Dir Pfx	Reference or At Road Name	Road Type	Dir Sfx	SpdLmt	Date Notified (mm/dd/yyyy)	Time Notif.	Day
1038	F	W	○ AT	S	PFLUMM	RD			05/06/2009	11:30	WE

Date Arrived (mm/dd/yyyy)	Time Arriv.	Day
05/06/2009	11:40	WE

○ Fatal ☑ Injury ○ PDO >= $1000 ○ PDO < $1000 ☐ Private Property

Narrative: Describe each traffic unit's pre-crash movement and direction of travel

V1 was traveling westbound on 215th Street, when it left the north side of the roadway and struck a concrete bridge railing. V1 then completed one quarter of a rotation and landed in the roadway on its left side.

Latitude (AOI):

Longitude (AOI):

Photos By: C. HARGRAVE

00 WORK ZONE TYPE ON / AT

00 None Apply
01 Construction Zone - (KDOT? ☐)
02 Maintenance Zone - (KDOT? ☐)
03 Utility Zone -
99 Unknown

- LOCATION IN WORK ZONE (AOI)

01 Before first warning sign
02 Advance warning area
03 Transition area
04 Activity area
05 Termination area ○ 99 Unknown

- WORK ZONE CATEGORY

01 Lane closure
02 Lane shift / crossover
03 Work on shoulder / median
04 Intermittent or moving vehicle
88 Other:
99 Unknown

KDOT?	Object 1 Damaged & Nature of Damage (show in diagram)	Owner Street Address	Personal Phone
☐	CONCRETE BRIDGE GAURD RAIL	1800 E OLD 56	(913) 782-2640

Owner Last Name	First Name	Middle Name	City	State	Zip	Work Phone
ROAD AND BRIDGE						

KDOT?	Object 2 Damaged & Nature of Damage (show in diagram)	Owner Street Address	Personal Phone
☐			

Owner Last Name	First Name	Middle Name	City	State	Zip	Work Phone

ONLY CHOOSE ONE CODE PER CATEGORY UNLESS SPECIFIED OTHERWISE

01 LIGHT CONDITIONS

01 Daylight
02 Dawn
03 Dusk
04 Dark: street lights on
05 Dark: no street lights
99 Unknown

00 ADVERSE WEATHER CONDITIONS

00 No adverse conditions
01 Rain, mist, drizzle
02 Sleet, hail
03 Snow
04 Fog
05 Smoke
06 Strong wind
07 Blowing dust, sand, etc.
08 Freezing rain, mist, drizzle
14 Rain & fog
16 Rain & wind
24 Sleet & fog
36 Snow & wind
88 Other:
99 Unknown

03 SURFACE TYPE ON / AT

01 Concrete
02 Blacktop (Asphalt)
03 Gravel
04 Dirt
05 Brick
88 Other:
99 Unknown

01 SURFACE CONDITIONS ON / AT

01 Dry
02 Wet
03 Snow
04 Ice
05 Mud/dirt/sand
06 Debris (oil, etc.)
07 Standing / moving water
08 Slush
88 Other:
99 Unknown

20 ACC. LOCATION (of 1st Harmful Event)

ON ROADWAY: (within travel lanes)
11 Non-intersection
12 Intersection +
13 Intersection-related +
14 Access to Parking lot/Drwy
15 Interchange Area +
16 On Crossover
17 Toll Plaza
OFF ROADWAY:
20 Shoulder
21 Roadside (not shoulder)
22 Median
23 Parking lot or Rest area
88 Other:
99 Unknown

+INTERSECTION TYPE

01 Four-way intersection
02 Five-way or more
03 T - intersection
04 Y - intersection
05 L - intersection
06 Roundabout (See Manual for Definitions)
07 Traffic Circle
08 Part of an interchange
99 Unknown

ROAD SPECIAL FEATURES (up to 3): 1: 01 2: 3:

00 None
01 Bridge
02 Bridge Overhead
03 Railroad Bridge
04 RRXING
05 Interchange
06 Ramp
99 Unknown

08 ACCIDENT CLASS (mark 1 box per side) 08

1st Harmful Event	Most Harmful Event
00 Other non-collision	
01 Overturned/Rollover	
COLLISION WITH:	
02 Pedestrian	
03 Motor vehicle in-transport*	
04 Legally Parked Vehicle	
05 Railway train	
06 Pedal cyclist	
07 Animal-Type:	
08 Fixed object**	
09 Other object:	
99 Unknown	

10 **FIXED OBJECT TYPE (mark 1 box per side if applicable) 02

1st Harmful Event	Most Harmful Event
01 Bridge structure	
02 Bridge rail	
03 Crash cush./impact attenuator	
04 Divider, median barrier	
05 Overhead sign support	
06 Utility devices: pole, meter, etc	
07 Other post or pole	
08 Building	
09 Guardrail	
10 Sign post	
11 Culvert	
12 Curb	
13 Fence/Gate	
14 Hydrant	
15 Barricade	
16 Mailbox	
17 Ditch	
18 Embankment	
19 Wall	
20 Tree	
21 RRXING fixtures	
88 Other:	
99 Unknown	

***COLLISION WITH VEHICLE** (mark 1 box per side if applicable)

1st Harmful Event	Most Harmful Event
01 Head on	
02 Rear end	
03 Angle - side impact	
04 Side swipe: opposite direction	
05 Sideswipe: Same direction	
06 Backed into	
88 Other:	
99 Unknown	

TRAFFIC CONTROLS

(On / At Road) O / A — Type Present — OK/NI

	1	2	3
00 None			
01 Officer, flagger			
02 Traffic signal			
03 Stop sign			
04 Flasher			
05 Yield sign			

06 RR gates / signal
07 RR crossing signs
08 No passing zone
09 Center/Edge lines
10 Warning signs
11 School zone signs
12 Parking lines
88 Other:
99 Unknown

KDOT Public Work 1504 05-08-09

Accident Diagram 850A continued	SPECIAL EVENT	SPECIAL DATA	Local Case No. 09002135	Page of 2 / 6

02 ROADWAY NUMBER OF LANES (ON / AT)

01 One
02 Two
03 Three
04 Four to Six
05 Seven or more
88 Other: _____
99 Unknown

02 ROAD CHARACTER (ON / AT)

01 Straight & Level
02 Straight on grade/slope
03 Straight on hillcrest
04 Curved & level
05 Curved on grade/slope
06 Curved on hillcrest
88 Other: _____
99 Unknown

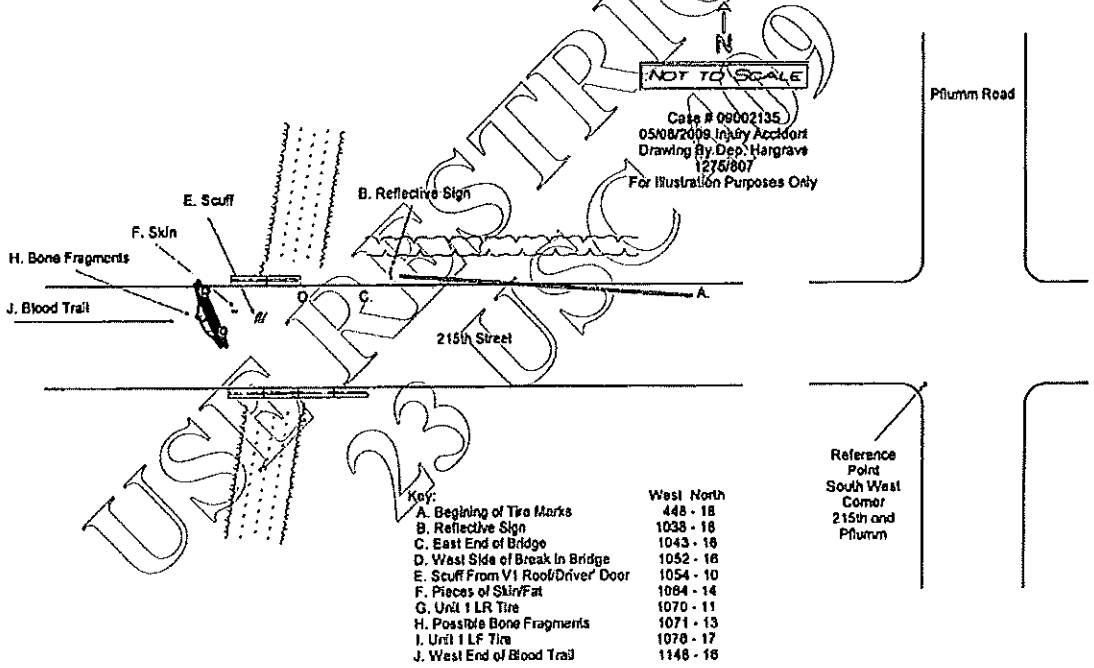
00 SPECIAL JURISDICTION

00 Normal Jurisdiction (Not Special)
01 National Park Service
02 Military
03 Indian Reservation
04 College / University Campus
05 Other Federal property
88 Other: _____
99 Unknown

A basic diagram is required for all state reportable accidents showing movements, direction, and positions of all traffic units in relationship to the trafficway. Identify (label) the street(s) and traffic unit(s) along with the area of impact (AOI) where possible. Refer to vehicles and pedestrians by unique numbers assigned in this report.

Indicate North Direction

Draw scene as observed or recreate per statements and evidence available



Key:	West	North
A. Begining of Tire Marks	448	18
B. Reflective Sign	1038	18
C. East End of Bridge	1043	18
D. West Side of Break in Bridge	1052	18
E. Scuff From Vt Roof/Driver' Door	1054	10
F. Pieces of Skin/Fat	1064	14
G. Unit 1 LR Tire	1070	11
H. Possible Bone Fragments	1071	13
I. Unit 1 LF Tire	1078	17
J. West End of Blood Trail	1146	18

K.D.O.T.

Occupants & Vehicles KDOT Form 850B Rev. 1-2009	DRIVER & PASSENGER INFORMATION (record pedestrians on supplemental form 854)	Investigating Officer / Badge No. C. HARGRAVE / 31275	Local Case No. 09002135	Page of 3 / 6

TU#	VIOLATIONS CHARGED	CITATION#	TU#	VIOLATIONS CHARGED More violations in narrative ☐	CITATION#

OFFICER'S OPINION OF APPARENT CONTRIBUTING CIRCUMSTANCES - ENTER AS MANY AS APPLY TO THIS ACCIDENT (FACTOR TYPE, TU#, CC CODE)

D1 | 22 | P1 | 17

Unit # / Seat Type	DRIVER Last Name / First Name	Middle Name / Date of Birth	DRIVER ADDRESS (Number, Street, Suffix, etc.) / City / State / Zip / New address?	Personal Phone Number / Work Phone Number	Gender / Age	SE Used / Eject/Trap	Inj Severity / Eject Path	Transpt Unit / Extrication?
TU 01	[redacted]	MN [redacted]	[redacted] ☐	Personal [redacted]	F	N	D	A
ST 01	[redacted]	[redacted]	[redacted] ☐	[redacted]	34	N		☐
TU		MN	☐	Personal				
ST		DOB		Work				☐

TRAFFIC UNIT # 01 (01, 03, N3, X3, etc) — **TRAFFIC UNIT #** (02, 04, N2, X4, etc)

DL State	Driver's License Number	DL Class	Driving for Employer?	CDL?
[redacted]	[redacted]	C	☐	☐

01 DR LICENSE COMPLY
00 Not licensed
01 Valid License
02 Suspended
03 Revoked
04 Expired
05 Cancld or Denied
06 Disqualified
07 Restricted
99 Unknown

RESTRICT COMPLY
Restrictions? N
Driver's Lic Restrictions — Complied? Y N
1 ☐ ☐
2 ☐ ☐
3 ☐ ☐
4 ☐ ☐

COMMERCIAL ENDORSEMENTS
☐ ☐ ☐ ☐
Z - None
T - Double/Triple Trailer
P - Passenger Vehicle
N - Tank Vehicle
H - Placarded Haz. Material
X - Combination Tank/HazMat
S - School Bus
U - Unknown

SUBSTANCE USE (mark all that apply)
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☐ AC - Alcohol contributed
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METHOD OF DETERMINATION (mark all that apply)

ALCOHOL	DRUGS
☐ 00 No evidence of impairment	☐
☐ 01 Evidential Test (Breath, Blood, etc)	☒
☐ 02 Preliminary Breath Test PBT	☐
☐ 03 Behavioral Tests: HGN, walk-and-turn, one leg stand, etc.	☐
☐ 04 Passive Alcohol Sensor (detects alcohol from driver's mouth)	☐
☐ 05 Observed (Odor, staggering, slurred speech, etc)	☐
☐ 06 Other (e.g. saliva test)	☒

IMPAIRMENT TEST (mark all that apply)
☐ NG - No Test given
☐ TR - Test Refused (Alcohol/Drug)
☐ PT - Prelim Positive Test (PBT)
☒ TG - Evidentiary Test given
☒ RP - Results Pending
ALCOHOL: ☒ Evidentiary Breath 0. ☐ Eye Fluid 0. ☐ Blood (BAC) 0. ☐ Other 0.
Drug screen result ☐

01 DR LICENSE COMPLY
00 Not licensed
01 Valid License
02 Suspended
03 Revoked
04 Expired
05 Cancld or Denied
06 Disqualified
07 Restricted
99 Unknown

RESTRICT COMPLY
Restrictions? ☐
Driver's Lic Restrictions — Complied? Y N
1 ☐ ☐
2 ☐ ☐
3 ☐ ☐
4 ☐ ☐

COMMERCIAL ENDORSEMENTS
☐ ☐ ☐ ☐
Z - None
T - Double/Triple Trailer
P - Passenger Vehicle
N - Tank Vehicle
H - Placarded Haz. Material
X - Combination Tank/HazMat
S - School Bus
U - Unknown

SUBSTANCE USE (mark all that apply)
☐ AP - Alcohol Ingested
☐ AC - Alcohol contributed
☐ DP - Illegal drugs Ingested
☐ DC - Illegal drugs contributed
☐ MP - Medication Ingested
☐ MC - Medication contributed

METHOD OF DETERMINATION (mark all that apply)

ALCOHOL	DRUGS
☐ 00 No evidence of impairment	☐
☒ 01 Evidential Test (Breath, Blood, etc)	☐
☐ 02 Preliminary Breath Test PBT	☐
☒ 03 Behavioral Tests: HGN, walk-and-turn, one leg stand, etc.	☐
☐ 04 Passive Alcohol Sensor (detects alcohol from driver's mouth)	☐
☐ 05 Observed (Odor, staggering, slurred speech, etc)	☐
☐ 06 Other (e.g. saliva test)	☐

IMPAIRMENT TEST (mark all that apply)
☐ NG - No Test given
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☐ PT - Prelim Positive Test (PBT)
☐ TG - Evidentiary Test given
☐ RP - Results Pending
ALCOHOL: ☐ Evidentiary Breath 0. ☐ Eye Fluid 0. ☐ Blood (BAC) 0. ☐ Other 0.
Drug screen result ☐

Unit # / Seat Type	PASSENGER Last Name / First Name	Middle Name / Date of Birth	PASSENGER ADDRESS (Number, Street, Sfx, etc.) / City / State / Zip / New address?	Personal Phone Number / Work Phone Number	Gender / Age	SE Used / Eject/Trap	Inj Severity / Eject Path	Transpt Unit / Extrication?
TU		MN	☐	Personal				
ST		DOB		Work				☐
TU		MN	☐	Personal				
ST		DOB		Work				☐
TU		MN	☐	Personal				
ST		DOB		Work				☐
TU		MN	☐	Personal				
ST		DOB		Work				☐

Transport Unit	EMS Time Notified	Injured taken by:	Transport Unit	EMS Time Notified	Injured taken by:
A	1126	JOHNSON COUNTY MED-ACT			
EMS Arrived	**EMS Time@Hosp**	**Injured taken to:**	**EMS Arrived**	**EMS Time@Hosp**	**Injured taken to:**
1130	1215	OVERLAND PARK REGIONAL			

K.D.O.T.

Transport Units: A, B, C, ..., N

Occupants & Vehicles
850B Continued

VEHICLE # 01 (01, 03, N3, X3, etc) | SPECIAL DATA

Local Case No. 09002135 | Page 4 / 6

VEHICLE 01

OWNER Last Name ("Same" if Driver): [redacted] | OWNER First Name | Middle Name

OWNER ADDRESS (Number, Street) | New address? ☐ | Personal Phone

CITY | ST | ZIP | Work Phone

COLOR	YEAR	MAKE	MODEL	BODY STYLE	ST
GRY	1991	NISS	SENTRA	2D	KS

LICENSE PLATE # [redacted] | County | Exp YR | Removed By: SANTA FE TOW | MC CCs

VEHICLE IDENTIFICATION NUMBER [redacted] | Dir of Travel: W | # Occupants: 1

Insurance Company | Policy Number [redacted]

SPECIAL CONDITIONS FOR TRAFFIC UNITS: 1 2 3 4 5 | Odometer: 217,091 | Fire? ☐

1 Hit & Run | 2 Non-Contact | 3 Stolen | 4 Legally Parked | 5 Pursued by LE | 6 Driverless | 7 Towed away due to damage

01 VEHICLE BODY TYPE

01 Automobile | 02 Motorcycle | 03 Motorscooter or Moped | 04 Van | 05 Pickup truck < 10,001 lbs | 06 Sport utility veh - SUV | 07 Camper or RV | 08 Farm machinery | 09 All-terrain vehicle - ATV

HEAVY / LARGE VEHICLE (GCVWR over 10,000lbs)

10 Single heavy truck > 10,000 lbs | 11 Truck and trailer(s) | 12 Tractor-trailer(s) | 13 Cross country bus | 14 School bus | 15 Transit (city) bus | 16 Other bus | 25 Train | 88 Other | 99 Unknown

Calculated speed at impact: 0 | Bus Seat Capacity | Power Source: F

01 VEHICLE USE

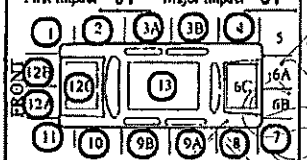
01 No special use | 02 Taxi / Limo | 03 School bus | 04 Other bus | 05 Military | 06 Police | 07 Ambulance | 08 Fire | 09 Mail/Parcel | 99 Unknown

04 VEHICLE DAMAGE

00 None | 01 Damage (minor) | 02 Functional | 03 Disabling | 04 Destroyed | 88 Other: | 99 Unknown

DAMAGE LOCATION AREA

First Impact 01 | Major Impact 01



☒ 14 Undercarriage | ☒ 15 Windshield | ☒ 16 Other windows | ☐ 99 Unknown | ☒ 17 Entire vehicle damaged | ☐ 88 Other:

Trailer: Present / Damaged

01 VEH. MANU. BEFORE UNSTAB. SIT

01 Straight/ following road | 02 Left turn | 03 Right turn | 04 U turn | 05 Passing | 06 Changing lanes | 07 Avoidance man. | 08 Merging | 09 Parking | 10 Backing | 11 Stopped awaiting turn | 12 Stopped in traf | 13 Illegally parked | 14 Disabled in roadway | 15 Slowing or stopping | 16 Negotiating a curve | 88 Other: | 99 Unknown

VEHICLE SEQUENCE OF EVENTS (List up to 4 per unit in the order of occurrence)

1: 01 | 2: 27 | 3: 27 | 4: 04 | ☐ The exact sequence is unknown

NON-COLLISION

01 Ran off road right | 02 Ran off road left | 03 Crossed centerline | 04 Overturn/Rollover | 05 Crossed median | 06 Fell/Jumped from veh | 07 Thrown or falling object | 08 Cargo loss or shift | 09 Equipment failure (tire, brakes, etc.) | 10 Downhill runaway | 11 Trailer swing | 12 Separation of units | 13 Jackknife | 14 Fire | 15 Explosion | 16 Immersion in water | 88 Other event: | 98 Unknown non-coll.

COLLISION WITH:

21 Pedestrian | 22 Motor veh in-transport | 23 Legally Parked Vehicle | 24 Train | 25 Pedal cycle (bike, etc) | 26 Animal | 27 Fixed object | 28 Other moveable object | 99 Unknown object

VEHICLE

SPECIAL DATA | (01, 03, N3, X3, etc)

OWNER Last Name ("Same" if Driver) | OWNER First Name | Middle Name

OWNER ADDRESS (Number, Street) | New address? ☐ | Personal Phone

CITY | ST | ZIP | Work Phone

COLOR	YEAR	MAKE	MODEL	BODY STYLE	ST

LICENSE PLATE # | County | Exp YR | Removed By: | MC CCs

VEHICLE IDENTIFICATION NUMBER | Dir of Travel | # Occupants

Insurance Company | Policy Number

SPECIAL CONDITIONS FOR TRAFFIC UNITS: 1 2 3 4 5 | Odometer | Fire? ☐

1 Hit & Run | 2 Non-Contact | 3 Stolen | 4 Legally Parked | 5 Pursued by LE | 6 Driverless | 7 Towed away due to damage

VEHICLE BODY TYPE

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Calculated speed at impact | Bus Seat Capacity | Power Source

VEHICLE USE

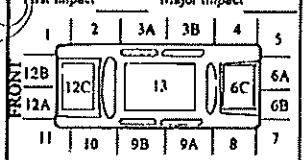
01 No special use | 02 Taxi / Limo | 03 School bus | 04 Other bus | 05 Military | 06 Police | 07 Ambulance | 08 Fire | 09 Mail/Parcel | 99 Unknown

VEHICLE DAMAGE

00 None | 01 Damage (minor) | 02 Functional | 03 Disabling | 04 Destroyed | 88 Other: | 99 Unknown

DAMAGE LOCATION AREA

First Impact | Major Impact



☐ 14 Undercarriage | ☐ 15 Windshield | ☐ 16 Other windows | ☐ 99 Unknown | ☐ 17 Entire vehicle damaged | ☐ 88 Other:

Trailer: Present / Damaged

VEH. MANU. BEFORE UNSTAB. SIT

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VEHICLE SEQUENCE OF EVENTS (List up to 4 per unit in the order of occurrence)

1 | 2 | 3 | 4 | ☐ The exact sequence is unknown

NON-COLLISION

01 Ran off road right | 02 Ran off road left | 03 Crossed centerline | 04 Overturn/Rollover | 05 Crossed median | 06 Fell/Jumped from veh | 07 Thrown or falling object | 08 Cargo loss or shift | 09 Equipment failure (tire, brakes, etc.) | 10 Downhill runaway | 11 Trailer swing | 12 Separation of units | 13 Jackknife | 14 Fire | 15 Explosion | 16 Immersion in water | 88 Other event: | 98 Unknown non-coll.

COLLISION WITH:

21 Pedestrian | 22 Motor veh in-transport | 23 Legally Parked Vehicle | 24 Train | 25 Pedal cycle (bike, etc) | 26 Animal | 27 Fixed object | 28 Other moveable object | 99 Unknown object

K.D.O.T.

Accident Narrative KDOT Form 851 Rev. 1-2009	Officer Observations Description of Events	Witness Statements Additional Information	Investigating Officer / Badge No. C. HARGRAVE / 31275	Local Case No. 09002135	Page of 5 / 6

Assisting Officers:
(30691) REDDIN, THOMAS C
(30821) CHAULK, THERON J
(30590) COLLINS, BRANDON S
#09002135
Injury Accident

D1 was transported to Overland Park Regional Medical Center, where she was interviewed by Deputy Collins. For information regarding her statement please refer to his supplement.

Upon arrival, I observed V1 sitting stationary on its left side, just west of a concrete bridge over a small creek; the front of the vehicle was facing north west. There was damage to the entire vehicle with the possible exception of the trunk and the rear bumper. There was a large amount of blood under the left front window and in the area of the rear of the vehicle. There was a trail of blood drops that led around the rear of V1 and approached the north side of the bridge. There was also a blood trail the led from V1 to a point approximately 75 feet west on 215th Street. There was a dark colored scuff mark on the bridge that appeared to match with the top of the driver's side door and roof. Additionally, I observed that there was a substance that appeared to be fat and skin also on the bridge.

I also observed that the concrete guardrail on the north side of the bridge had been struck and the eastern half of the guardrail was broken off. The piece of the guardrail that was broken off had fallen into the creek. There was also a reflective sign that had been hit and broken off just east of the guardrail. Furthermore, I observed a tire mark that started on 215th Street east of the bridge that gradually left roadway and appeared to lead to the sign and guardrail.

After the vehicle was removed, I located what appeared to be two pieces of bone fragments. The possible bone fragments were located underneath V1.

Based on my investigation it appears that V1 was traveling westbound on 215th Street when the vehicle gradually drifted to the right. The vehicle impacted the reflective sign and then impacted the guardrail that is located on the north side of the bridge. After impacting on the guardrail the vehicle rolled onto the left side and began sliding west. When the vehicle rolled D1's right arm came out of the window and became pinned between the top of the driver's side door and the roadway.

Based on the investigation, it is my opinion the primary contributing factor to the accident was D1 failed to give full time and attention to driving which caused her to steer her vehicle off of the roadway. Furthermore, I have cause to believe that D1 may have been distracted by an item inside her vehicle.

A scene diagram was completed and is included in this report. I took photographs of V1 and will attach a CD containing a copy of the pictures will be attached to this report, and stored in the Johnson County Sheriff's Office Record Division.

V1 was removed from the scene by Santa Fe Tow.

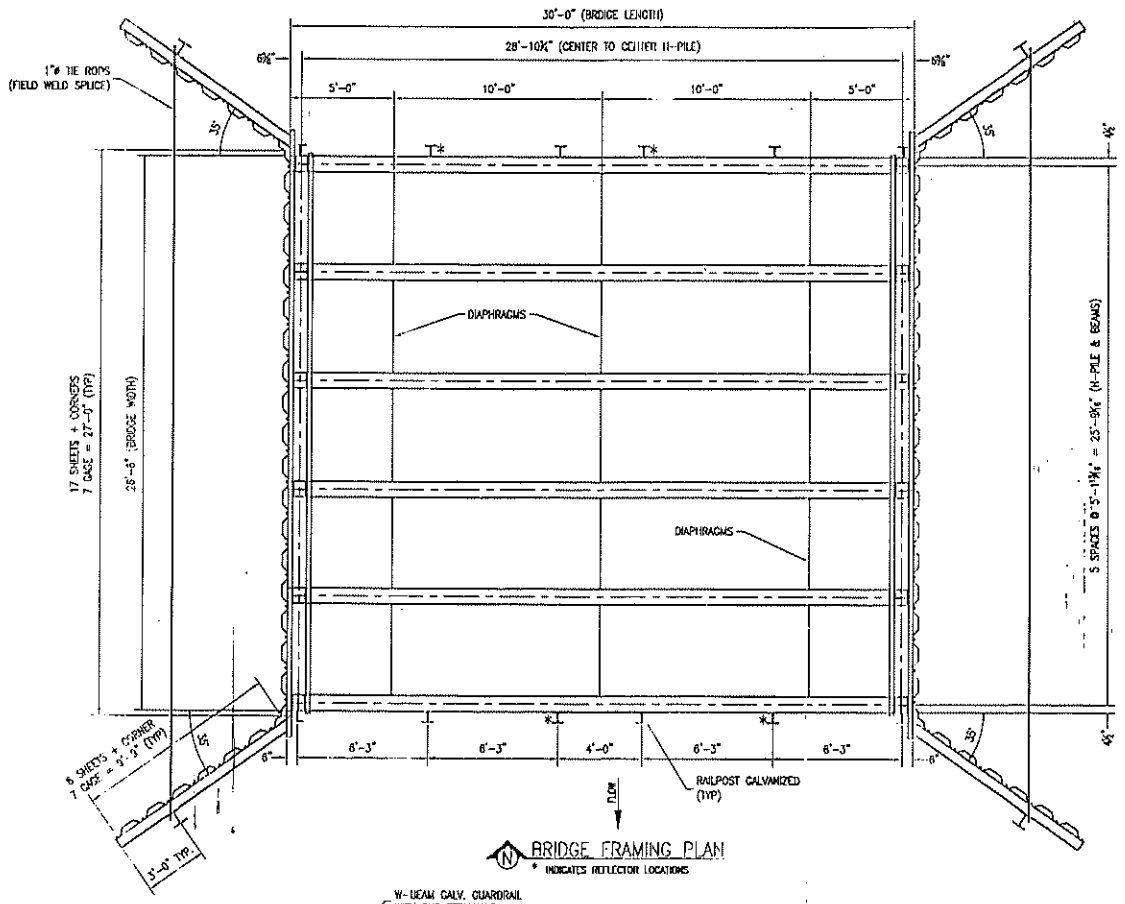
I also requested Dispatch notify Road and Bridge regarding the damaged bridge rail.

Respectfully Submitted, K.D.O.T.

APPENDIX F

SAMPLE PLAN SET

SHOWING ONE OPTIONAL LOW-COST BRIDGE DESIGN

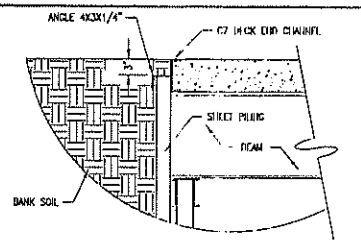


NOTES:

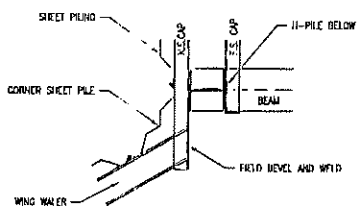
1. STEEL GIRDERS W24x68, DIAPHRAGMS AND DIAPHRAGM CLIPS SHALL CONFORM TO ASTM A588.
2. ALL STEEL SHALL CONFORM TO ASTM A36, U.N.O.
3. LOADING FOR DRIVING H-PILE SHALL BE 25 TONS PER PILE AT ABUTMENTS.
4. ALL SHOP AND FIELD WELDS SHALL BE 1/4" FILLETS U.N.O.
5. ALL GUARDRAIL AND GUARDRAIL HARDWARE SHALL BE GALVANIZED.
6. STEEL SHEET PILING SHALL BE 7 GAGE CONFORMING TO ASTM A-857/A570 GR.50.
7. BRIDGE LOAD RATING = HL-93.

HUSKER STEEL
P.O. BOX 96 (402) 564-3271 FAX (402) 564-6437
COLUMBUS, NEBRASKA

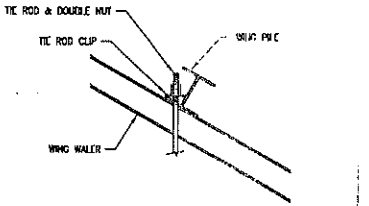
DATE 5-22-12	28'-6" X 30'-0" STEEL BEAM BRIDGE	DRAWN BY DSS
ISSUED FOR APPROVAL		CHECKED BY MRJ
PLANS APPROVED	ENGINEER H.S.	SHOP
IN SHOP	CONSTRUCTION REECE CONSTRUCTION	SHOP
FOR JOB USE	SHIP TO JOBSITE	PART
REMARKS	LOCATION BRIDGE SITE #31, SW OBERLIN, KS	SHEET NO. 1 OF 3
	ROUTING BY TRUCK TO DECATUR COUNTY, KS	JOB NO. C-12778



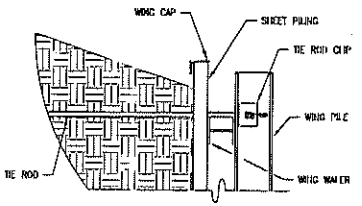
END OF SLAB DETAIL



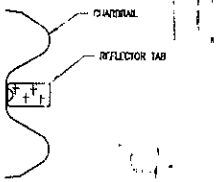
CORNER DETAIL



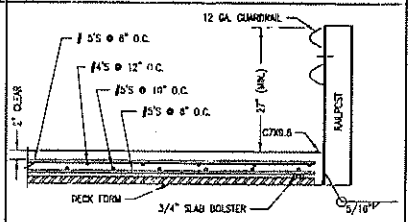
DETAIL AT TIE-ROD ENDS



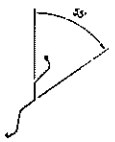
SECTION THROUGH WING



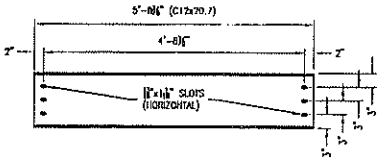
REFLECTOR PLACEMENT



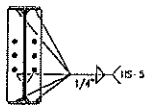
EDGE OF SLAB DETAIL



REQ'D. 4 CORNERS
MK. 55° TYPE F
SHEET PILE CORNER DETAIL



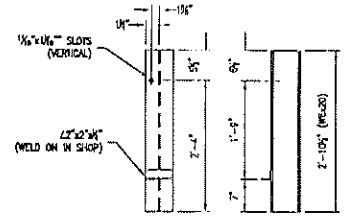
15 REQ'D. DIAPHRAGMS



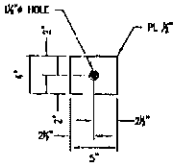
TYP. BEAM SECTION

BILL OF MATERIALS

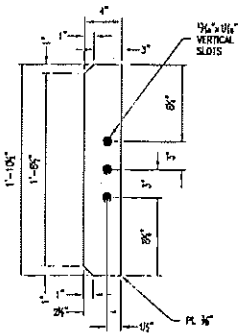
QTY.	DESCRIPTION	PIECE MARK	LENGTH FT.	LENGTH IN.	WEIGHT LB/FT	WEIGHT TOTAL	REMARKS	STEEL GRADE
1	HP 8	ABUT. PILE	60	0	36	1680	TEST	A36
11	HP 8	ABUT. PILE	56	0	36	19008		A36
4	HP 8	WING PILE	38	0	36	4320		A36
2	C 10	ABUT. FB	28	8	15.3	819		A36
2	C 10	ABUT. NB	28	0	15.3	857		A36
2	C 10	ABUTMENT WALERS	28	0	15.3	857		A36
8	W 6	WING WALERS	10	3	15	1230		A36
34	7 GAGE	SHEET PILE-ABUTMENT	16	0	14.4	7834		A570
24	7 GAGE	SHEET PILE-WINGS	16	0	14.4	5530		A570
4	7 GAGE	SHEET PILE CORNERS @ 55	16	0	14.4	922	TYPE F	A570
4	1" DIA. ROD	TIE ROD	20	0	2.67	214	Thread w/ wire guard	A36
4	PL 1/2"x8"	TIE ROD CLIP	1	4	6.81	11		A36
8	1" DIA. NUTS	TIE ROD NUTS						
4	PL 3/8"x12"	BEAM BRG. PLATE	13	4 1/2	15.3	818		A36
4	W 24	BEAMS	30	0	68	13240		A588
16	C 12	DIAPHRAGM	6	3/8	20.7	1862		A588
30	PL 3/8"x4"	DIAPHRAGM CLIP	1	10 1/2	6.1	287		A588
(H)	3/4" DIA. BOLT	DIAPHRAGM BOLT	0	3			TYPE 3	A325
2	C 7	DECK END	28	0	9.8	515		A36
2	C 7	DECK EDGE	30	0	9.8	588		A36
98	3/8"x1 1/2"	DECK EDGE ANCHOR BAR	1	6	1.91	143		A36
2	L 4x3x1/4"	ABUT. CAPS	28	0	8.5	334		A36
4	L 4x3x1/4"	WING CAPS	10	3	8.5	720		A36
12	1.50	DECK FORM	12	3	6	735		
12	1.50	DECK FORM	16	3	6	1020		
24	3/4"	SLAB BOLSTER	8	0	0.99	63		
126	#4 REBAR		28	2	1.044	3278		GR. 60
38	#5 REBAR		28	0	1.044	991		GR. 60
27	#4 REBAR		30	0	0.668	538		GR. 60
10	#3 REBAR	SPACERS	20	0	0.376	75	6'-0" C-C	
12	W 6	RAIL POST	7	10 1/2	20	850	GALV.	A36
12	L 2x2x1/4"	POST CLIPS	0	8	3.2	19		A36
8	W BEAM	GUARDRAIL	12	6	7	630	GALV.	
4	W BEAM	END TERMINALS			20	80	GALV.	
(H)	5/8" DIA. BOLT	GUARDRAIL BOLT	0	1 1/4			RAIL SPLICE	A307
(H)	5/8" DIA. BOLT	GUARDRAIL BOLT	0	2			POST TO RAIL	A307
(H)	5/8" DIA. NUT							A307
6	REFLECTORS							
						TOTAL WEIGHT=	68868	



12 REQ'D. RAIL POST
GALV.



4 REQ'D.
TIE ROD CLIPS



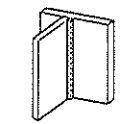
30 REQ'D.
DIAPHRAGMS CLIPS

IIS-5 PREQUALIFIED JOINT WELDING PROCEDURE

PROCEDURE SPECIFICATIONS	
MATERIAL SPECIFICATION	SEE NOTES
WELDING PROCESS	FCAW FLUX CORED ARC WELDING
SIGNAL OR REACTION	SEMI-AUTOMATIC
POSITION OF WELDING	2F
FILLER METAL CLASSIFICATION	E-71T-1
FILLER METAL SPECIFICATION	A5.20
FLUX	N/A
FLOW RATE	40
SHIELDING GAS	CO2
GAUGE ON MULTIPLE PASS	SINGLE
GAUGE ON MULTIPLE ARC	SINGLE
WELDING CURRENT	DIRECT CURRENT
POLARITY	REVERSE
WELDING PROGRESSION	N/A
ROOT TREATMENT	NONE
PRELIMINARY REINFORCE MAT	0-3/4" INT 13/16"-1 1/2" INT
POSTHEAT TREATMENT	NONE

WELDING PROCEDURE				
PASS NO.	ELECTRODE SIZE	WELDING AMPERES	CURRENT VOLTS	TRAVEL SPEED
1	1/16	200-310	28-34	15
FOR	06-01			

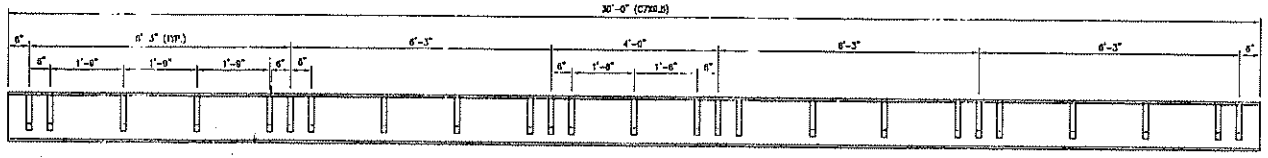
JOINT DETAIL
1/4 FILLET, INTERNAL (H)



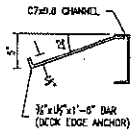
THIS PROCEDURE MAY HAVE DUE TO FABRICATION ECONOMICS, NF-NP, PASS SIZE, ETC. WITH IN THE LIMITATIONS OF VARIABLES GIVEN BY AWS OF AWS D1.5, STRUCTURAL WELDING CODE.

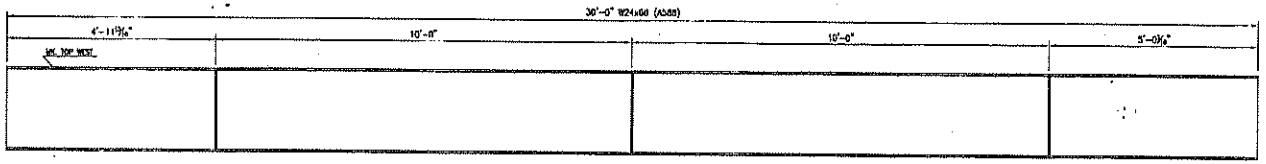
HUSKER STEEL
P.O. BOX 36 (402) 564-3271 FAX (402) 564-6437
COLUMBUS, NEBRASKA

DATE 5-22-12	26'-6" X 30'-0" STEEL BEAM BRIDGE	DRAWN BY DSS
SHOP DRAWING		CHECKED BY MRJ
REVIS. APPROVED	OWNER H.S.	FIELD
AS BUILT	CONTRACTOR REECE CONSTRUCTION	BOLTS
FOR JOB USE	SHIP TO JOBSITE	PAINT
REVISIONS	LOCATION BRIDGE SITE #31, SW OBERLIN, KS.	SHEET NO. 2 OF 3
	ROUTE BY TRUCK TO DECATUR COUNTY, KS	JOB NO. C-12278

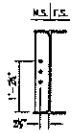


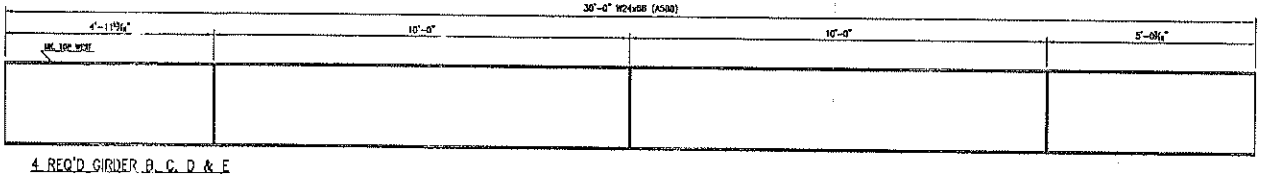
2 REQ'D. EDGE CHANNEL



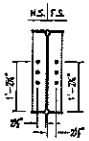


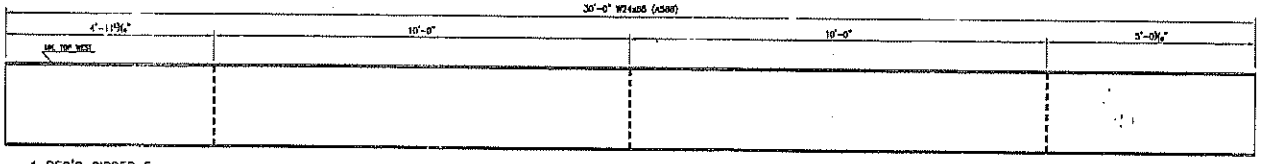
1 REQ'D GIRDER A





4 REQ'D GIRDER B, C, D & E





1 REQ'D GIRDER F

HUSKER STEEL		
P.O. BOX 36 (402) 564-3271 FAX (402) 564-6437 COLUMBUS, NEBRASKA		
DATE 5-22-12	26'-6" X 30'-0" STEEL BEAM BRIDGE	DRAWN BY DSS
NOT FOR ERECTION		CHECKED BY MRJ
DETAIL APPROVED	DRAWER H.S.	NOTES
AS BUILT	CONTRACTOR REECE CONSTRUCTION	BOOK
FOR JOB USE	SHIP TO JOBSITE	PAGE
REVISION	LOCATION BRIDGE SITE #31, SW OBERLIN, KS	SHEET NO. 3 OF 3
	HAULED BY TRUCK TO DECATUR COUNTY, KS	JOB NO. C-12276

APPENDIX G

BENEFIT/COST ANALYSES USING

RSAP VERSION 2.03

Date: June 05, 2014 **Time:** 13:03:51PM

Benefit/Cost Ratio Report

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative	Description
1	20 ft bridge no rail
2	20 ft bridge with rail no terms
3	20 ft bridge with rail with terms

	Alternative		
Alternative	**1**	**2**	**3**
1	0.00	0.18	0.19
2	0.00	0.00	0.20
3	0.00	0.00	0.00

Date: June 05, 2014 **Time:** 13:03:51PM

Alternative Cost Report

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative	Description
1	20 ft bridge no rail
2	20 ft bridge with rail no terms
3	20 ft bridge with rail with terms

Alternative	Expected Crash Frequency (Acc/Yr)	Annual Crash Cost ($)	Annual Installation Cost ($)	Annual Maintenance Cost ($)	Annual Repair Cost ($)
1	0.002222	319.24	0.00	0.00	0.00
2	0.001878	300.64	102.42	0.00	0.05
3	0.001555	269.17	262.45	0.00	0.24

Date: June 05, 2014

Time: 13:03:51PM

Feature Cost Report

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative: **1**
Description: **20 ft bridge no rail**

Feature	Distance From Beginning Of First Segment	Expected Crash Freq (Acc/Year)	Average Severity	Annual Crash Cost ($)	Category	Type
1.1	0.0	0.001213	5.64	133.50	Foreslopes	2:1, H = 2.0 m (7 ft)
2.1	155.7	0.000211	6.61	44.58	Foreslopes	Vertical, H = 4.0 m (13 ft)
3.1	175.7	0.000798	5.65	141.16	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014 **Time:** 13:03:51PM

Feature Cost Report

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative: **2**
Description: **20 ft bridge with rail no terms**

Feature	Distance From Beginning Of First Segment	Expected Crash Freq (Acc/Year)	Average Severity	Annual Crash Cost ($)	Category	Type
1.1	0.0	0.000953	5.61	105.79	Foreslopes	2:1, H = 2.0 m (7 ft)
2.1	155.7	0.000036	6.16	39.13	Terminals and Crash Cushions	Blunt End
3.1	155.8	0.000103	2.52	12.18	Longitudinal Barriers	TL-2 Guardrail
4.1	175.8	0.000786	5.61	143.54	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Time: 13:03:51PM

Feature Cost Report

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative: **3**
Description: **20 ft bridge with rail with terms**

Feature	Distance From Beginning Of First Segment	Expected Crash Freq (Acc/Year)	Average Severity	Annual Crash Cost ($)	Category	Type
1.1	0.0	0.000700	5.61	119.73	Foreslopes	2:1, H = 2.0 m (7 ft)
2.1	118.5	0.000001	3.76	0.00	Terminals and Crash Cushions	TL-3 Guardrail Terminal
3.1	155.7	0.000115	2.50	14.80	Longitudinal Barriers	TL-2 Guardrail
4.1	175.7	0.000117	3.77	4.37	Terminals and Crash Cushions	TL-3 Guardrail Terminal
5.1	213.2	0.000622	5.62	130.27	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014 **Time:** 13:03:51PM

Input Data Report

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternavtive 1[Baseline(Existing)Condition]

Description	20 ft bridge no rail
Life(years)	25
Total Installation Cost ($)	0.00
Annual Maintenance Cost ($)	0.00
Discount Rate	4.00
Area Type	Rural
Functional Class	Local
Highway Type	Two-Way, Undivided
Number of Lanes	2
Lane Width(ft)	10.0
Shoulder Width(ft)	7.0
Speed Limit(mph)	55.0
Nominal Percent Truck(%)	10.0
ADT	100
Traffic Growth Factor(%)	0.0
Encroachment Rate Adjustment Factor	1
Random Seed Number	1111 (User Specified)

Segment	Length(ft)	Median Width(ft)	Percent Grade(%)	Curvature Direction	Curvature Radius(ft)
1	331.4	0.0	0.0	None	

Date: June 05, 2014

Input Data Report

Time: 13:03:51PM

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative **1 [Baseline(Existing) Conditions]**

Feature	Category	Type
1	Foreslopes	2:1, H = 2.0 m (7 ft)
2	Foreslopes	Vertical, H = 4.0 m (13 ft)
3	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Input Data Report

Time: 13:03:51PM

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative 1 [Baseline(Existing) Conditions]

Feature	Length(ft)	Width(ft)	Flare Rate	Location	Offset(ft)	Distance(ft)	Repetitions	Spacing(ft)
1	155.7	13.0	0.000	Right	7.0	0.0		
2	20.0	0.5	0.000	Right	7.0	155.7		
3	155.7	13.0	0.000	Right	7.0	175.7		

Date: June 05, 2014 **Time:** 13:03:51PM

Input Data Report

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternavtive 2

Description	20 ft bridge with rail no terms
Life(years)	25
Total Installation Cost ($)	1600.00
Annual Maintenance Cost ($)	0.00
Discount Rate	4.00
Area Type	Rural
Functional Class	Local
Highway Type	Two-Way, Undivided
Number of Lanes	2
Lane Width(ft)	10.0
Shoulder Width(ft)	7.0
Speed Limit(mph)	55.0
Nominal Percent Truck(%)	10.0
ADT	100
Traffic Growth Factor(%)	0.0
Encroachment Rate Adjustment Factor	1
Random Seed Number	1111 (User Specified)

Segment	Length(ft)	Median Width(ft)	Percent Grade(%)	Curvature Direction	Curvature Radius(ft)
1	331.4	0.0	0.0	None	

Date: June 05, 2014

Input Data Report

Time: 13:03:51PM

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative **2**

Feature	Category	Type
1	Foreslopes	2:1, H = 2.0 m (7 ft)
2	Terminals and Crash Cushions	Blunt End
3	Longitudinal Barriers	TL-2 Guardrail
4	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Input Data Report

Time: 13:03:51PM

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative 2

Feature	Length(ft)	Width(ft)	Flare Rate	Location	Offset(ft)	Distance(ft)	Repetitions	Spacing(ft)
1	155.7	13.0	0.000	Right	7.0	0.0		
2	0.1	0.5	0.000	Right	7.0	155.7		
3	20.0	1.0	0.000	Right	7.0	155.8		
4	155.6	13.0	0.000	Right	7.0	175.8		

Date: June 05, 2014 **Time:** 13:03:51PM

Input Data Report

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternavtive 3

Description	20 ft bridge with rail with terms
Life(years)	25
Total Installation Cost ($)	4100.00
Annual Maintenance Cost ($)	0.00
Discount Rate	4.00
Area Type	Rural
Functional Class	Local
Highway Type	Two-Way, Undivided
Number of Lanes	2
Lane Width(ft)	10.0
Shoulder Width(ft)	7.0
Speed Limit(mph)	55.0
Nominal Percent Truck(%)	10.0
ADT	100
Traffic Growth Factor(%)	0.0
Encroachment Rate Adjustment Factor	1
Random Seed Number	1111 (User Specified)

Segment	Length(ft)	Median Width(ft)	Percent Grade(%)	Curvature Direction	Curvature Radius(ft)
1	331.4	0.0	0.0	None	

Date: June 05, 2014

Input Data Report

Time: 13:03:51PM

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative **3**

Feature	Category	Type
1	Foreslopes	2:1, H = 2.0 m (7 ft)
2	Terminals and Crash Cushions	TL-3 Guardrail Terminal
3	Longitudinal Barriers	TL-2 Guardrail
4	Terminals and Crash Cushions	TL-3 Guardrail Terminal
5	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Input Data Report

Time: 13:03:51PM

File Name: 20 ft 50 vpd.rpd
Project Description: 20 ft bridge

Alternative 3

Feature	Length(ft)	Width(ft)	Flare Rate	Location	Offset(ft)	Distance(ft)	Repetitions	Spacing(ft)
1	118.2	13.0	0.000	Right	7.0	0.0		
2	0.1	0.5	0.100	Right	11.0	118.5		
3	20.0	1.0	0.000	Right	7.0	155.7		
4	37.5	0.5	0.100	Right	7.0	175.7		
5	118.2	13.0	0.000	Right	7.0	213.2		

Date: June 05, 2014 **Time:** 13:05:39PM

Benefit/Cost Ratio Report

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative	Description
1	50 ft bridge no rail
2	50 ft bridge with rail no terms
3	50 ft bridge with rail with terms

	Alternative		
Alternative	**1**	**2**	**3**
1	0.00	0.19	0.17
2	0.00	0.00	0.16
3	0.00	0.00	0.00

Date: June 05, 2014 **Time:** 13:05:39PM

Alternative Cost Report

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative	Description
1	50 ft bridge no rail
2	50 ft bridge with rail no terms
3	50 ft bridge with rail with terms

Alternative	Expected Crash Frequency (Acc/Yr)	Annual Crash Cost ($)	Annual Installation Cost ($)	Annual Maintenance Cost ($)	Annual Repair Cost ($)
1	0.002412	379.84	0.00	0.00	0.00
2	0.001938	332.40	256.05	0.00	0.08
3	0.001700	307.30	416.08	0.00	0.30

Date: June 05, 2014

Time: 13:05:39PM

Feature Cost Report

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative: **1**
Description: **50 ft bridge no rail**

Feature	Distance From Beginning Of First Segment	Expected Crash Freq (Acc/Year)	Average Severity	Annual Crash Cost ($)	Category	Type
1.1	0.0	0.001213	5.65	152.22	Foreslopes	2:1, H = 2.0 m (7 ft)
2.1	155.7	0.000390	6.61	72.90	Foreslopes	Vertical, H = 4.0 m (13 ft)
3.1	205.7	0.000809	5.64	154.72	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Time: 13:05:39PM

Feature Cost Report

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative: **2**
Description: **50 ft bridge with rail no terms**

Feature	Distance From Beginning Of First Segment	Expected Crash Freq (Acc/Year)	Average Severity	Annual Crash Cost ($)	Category	Type
1.1	0.0	0.000923	5.62	119.03	Foreslopes	2:1, H = 2.0 m (7 ft)
2.1	155.7	0.000034	6.20	43.59	Terminals and Crash Cushions	Blunt End
3.1	155.8	0.000255	2.65	26.12	Longitudinal Barriers	TL-2 Guardrail
4.1	205.8	0.000726	5.59	143.66	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Time: 13:05:39PM

Feature Cost Report

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative: **3**
Description: **50 ft bridge with rail with terms**

Feature	Distance From Beginning Of First Segment	Expected Crash Freq (Acc/Year)	Average Severity	Annual Crash Cost ($)	Category	Type
1.1	0.0	0.000687	5.61	131.81	Foreslopes	2:1, H = 2.0 m (7 ft)
2.1	118.5	0.000001	3.82	0.00	Terminals and Crash Cushions	TL-3 Guardrail Terminal
3.1	155.7	0.000281	2.63	28.29	Longitudinal Barriers	TL-2 Guardrail
4.1	205.7	0.000124	3.78	6.33	Terminals and Crash Cushions	TL-3 Guardrail Terminal
5.1	243.2	0.000607	5.61	140.86	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014 **Time:** 13:05:39PM

Input Data Report

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternavtive 1[Baseline(Existing)Condition]

Description	50 ft bridge no rail
Life(years)	25
Total Installation Cost ($)	0.00
Annual Maintenance Cost ($)	0.00
Discount Rate	4.00
Area Type	Rural
Functional Class	Local
Highway Type	Two-Way, Undivided
Number of Lanes	2
Lane Width(ft)	10.0
Shoulder Width(ft)	7.0
Speed Limit(mph)	55.0
Nominal Percent Truck(%)	10.0
ADT	100
Traffic Growth Factor(%)	0.0
Encroachment Rate Adjustment Factor	1
Random Seed Number	1111 (User Specified)

Segment	Length(ft)	Median Width(ft)	Percent Grade(%)	Curvature Direction	Curvature Radius(ft)
1	361.4	0.0	0.0	None	

Date: June 05, 2014

Input Data Report

Time: 13:05:39PM

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative **1 [Baseline(Existing) Conditions]**

Feature	Category	Type
1	Foreslopes	2:1, H = 2.0 m (7 ft)
2	Foreslopes	Vertical, H = 4.0 m (13 ft)
3	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Input Data Report

Time: 13:05:39PM

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative 1 [Baseline(Existing) Conditions]

Feature	Length(ft)	Width(ft)	Flare Rate	Location	Offset(ft)	Distance(ft)	Repetitions	Spacing(ft)
1	155.7	13.0	0.000	Right	7.0	0.0		
2	50.0	0.5	0.000	Right	7.0	155.7		
3	155.7	13.0	0.000	Right	7.0	205.7		

Date: June 05, 2014 **Time:** 13:05:39PM

Input Data Report

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternavtive 2

Description	50 ft bridge with rail no terms
Life(years)	25
Total Installation Cost ($)	4000.00
Annual Maintenance Cost ($)	0.00
Discount Rate	4.00
Area Type	Rural
Functional Class	Local
Highway Type	Two-Way, Undivided
Number of Lanes	2
Lane Width(ft)	10.0
Shoulder Width(ft)	7.0
Speed Limit(mph)	55.0
Nominal Percent Truck(%)	10.0
ADT	100
Traffic Growth Factor(%)	0.0
Encroachment Rate Adjustment Factor	1
Random Seed Number	1111 (User Specified)

Segment	Length(ft)	Median Width(ft)	Percent Grade(%)	Curvature Direction	Curvature Radius(ft)
1	361.4	0.0	0.0	None	

Date: June 05, 2014

Input Data Report

Time: 13:05:39PM

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative **2**

Feature	Category	Type
1	Foreslopes	2:1, H = 2.0 m (7 ft)
2	Terminals and Crash Cushions	Blunt End
3	Longitudinal Barriers	TL-2 Guardrail
4	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Input Data Report

Time: 13:05:39PM

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative 2

Feature	Length(ft)	Width(ft)	Flare Rate	Location	Offset(ft)	Distance(ft)	Repetitions	Spacing(ft)
1	155.7	13.0	0.000	Right	7.0	0.0		
2	0.1	0.5	0.000	Right	7.0	155.7		
3	50.0	1.0	0.000	Right	7.0	155.8		
4	155.6	13.0	0.000	Right	7.0	205.8		

Date: June 05, 2014 **Time:** 13:05:39PM

Input Data Report

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternavtive 3

Description	50 ft bridge with rail with terms
Life(years)	25
Total Installation Cost ($)	6500.00
Annual Maintenance Cost ($)	0.00
Discount Rate	4.00
Area Type	Rural
Functional Class	Local
Highway Type	Two-Way, Undivided
Number of Lanes	2
Lane Width(ft)	10.0
Shoulder Width(ft)	7.0
Speed Limit(mph)	55.0
Nominal Percent Truck(%)	10.0
ADT	100
Traffic Growth Factor(%)	0.0
Encroachment Rate Adjustment Factor	1
Random Seed Number	1111 (User Specified)

Segment	Length(ft)	Median Width(ft)	Percent Grade(%)	Curvature Direction	Curvature Radius(ft)
1	361.4	0.0	0.0	None	

Date: June 05, 2014

Input Data Report

Time: 13:05:39PM

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative **3**

Feature	Category	Type
1	Foreslopes	2:1, H = 2.0 m (7 ft)
2	Terminals and Crash Cushions	TL-3 Guardrail Terminal
3	Longitudinal Barriers	TL-2 Guardrail
4	Terminals and Crash Cushions	TL-3 Guardrail Terminal
5	Foreslopes	2:1, H = 2.0 m (7 ft)

Date: June 05, 2014

Input Data Report

Time: 13:05:39PM

File Name: 50 ft 50 vpd.rpd
Project Description: 50 ft bridge

Alternative 3

Feature	Length(ft)	Width(ft)	Flare Rate	Location	Offset(ft)	Distance(ft)	Repetitions	Spacing(ft)
1	118.2	13.0	0.000	Right	7.0	0.0		
2	0.1	0.5	0.100	Right	11.0	118.5		
3	50.0	1.0	0.000	Right	7.0	155.7		
4	37.5	0.5	0.100	Right	7.0	205.7		
5	118.2	13.0	0.000	Right	7.0	243.2		

APPENDIX H

BENEFIT/COST ANALYSES USING

RSAP VERSION 3.01

EQUIVALENT ANNUAL INCREMENTAL BENEFIT-COST

20 ft bridge 50 vpd

Based on Analysis Run on 6/6/2014 9:19:40 AM

RSAP 3.0.1 (release 140130XL12) running in Excel Version 14.0 on Windows (32-bit) NT 6.01

			Decision Point Benefit-Cost Ratio:				1
			Alternative Choice				
			1	2	3		
With Respect to Alternative	Alternative No.	ALTERNATIVE NAMES	20 ft Br no rail	20 ft br guard rail only	20 ft Br guard rail with terms		
	1	20 ft Br no rail	1.00	0.14	0.05		
	2	20 ft br guard rail only		0.00	0.00		
	3	20 ft Br guard rail with terms			0.00		

Best Benefit-Cost Choice is: **20 ft Br no rail**

RSAP PROJECT INFORMATION

BASIC INFORMATION

Today's date (i.e., run date)	6/6/2014	
Title	20 ft bridge 50 vpd	
Units	USCU	(only USCU units at this time)
Design Life	25	YRS
Construction Year	2014	
Rate of Return	4	%

CRASH COSTS

Use GDP values during life?	N	
Expand to current year by GDP?	Y	http://www.gpoaccess.gov/usbudget/fy09/hist.html
GDP Deflator to construction year	1.07	

Crash Cost Timeline

Base year for crash cost data	2012	2014	2026.5	2039	Cost Used
Value of Statistical Life	$ 9,100,000	$ 9,295,782	$ 9,295,782	$ 9,295,782	$9,295,782
Reference for VSL	Guidance on Treatment of the Economic Value of a Statistical Life, US Department of Transportation, Washington, D.C., October 4, 2013.				

http://www.dot.gov/office-policy/transportation-policy/guidance-treatment-econo

RSAP Root Directory: C:\Program Files\RSAPv3

Notes:

20 ft bridge 50 vpd

TRAFFIC INFORMATION

CONSTRUCTION YEAR ADT:	50	vehicles/day
TRAFFIC GROWTH	0.0	% growth/yr
WHICH ADT TO USE?	Construction	
MID-LIFE ADT:	50	vehicles/day
END OF LIFE ADT:	50	vehicles/day
ADT USED BY RSAP	50	vehicles/day
PERCENT TRUCKS	12	%

VEHICLE MIX

RSAP VEHICLES	FHWA CLASS	PERCENT	RSAP TYPE	TYPICAL CHARACTERISTICS					Crash Cost Adj.	Trajectory Information		
				WEIGHT	LENGTH	WIDTH	C.G. Long.	C.G. Hgt		Trajectory Grid Name	Redirection Grid Name	Encr Multiplier
		%		lbs	ft	ft	ft	ft				
Motorcycles	1	0.0	M	600	7.00	1.50	3.00	2.60	0.S6	TrajectoryGrid1	RedirectionCars	1
Passenger Cars	2	60.0	C	3,300	15.00	5.40	6.00	2.00	1	TrajectoryGrid2	RedirectionCars	1
PickupTruck	3	20.0	PU	5,000	19.75	6.50	8.50	2.30	1	TrajectoryGrid2	RedirectionCars	1
Light Tractor Trailer	8-9	0.0	LTT	16,000	48.00	8.50	12.00	4.8	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Average Tractor Trailer	8-13	6.0	ATT	22,250	48.00	8.50	20.00	4.8	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Heavy Tractor Trailer	8-13	0.0	HTT	37,500	48.00	8.50	20.00	6	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Light Single Unit Truck	5	0.0	LSUT	6,800	35.00	7.77	12.50	3.4	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Average Single Unit Truck	6	4.0	ASUT	12,000	35.00	7.77	12.50	3.4	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Heavy Single Unit Truck	7	0.0	HSUT	22,000	35.00	7.77	12.50	4.2	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Total		90.00										

Click here for the on-line link to the FHWA classification system.

20 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+31.40 ft
Max Offset	200.00 ft

ROAD SEGMENT DATA				EXPECTED EQUIVALENT PASSENGER VEHICLE ENCROACHMENTS					
				TOTAL		PRIMARY DIRECTION		OPPOSING DIRECTION	
SEG	START STA	END STA	SEGMENT LENGTH	BASE ENCR RATE	MODIFIED ENCR RATE	PRIMARY RIGHT ENCR	PRIMARY LEFT ENCR	OPPOSING RIGHT ENCR	OPPOSING LEFT ENCR
			ft	encr/yr	encr/yr	0.5000	0.5000	0.0000	0.0000
1	0+00.	3+31.4	331.40	0.0013	0.0010	0.0010	0.0000	0.0000	0.0000

20 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+31.40 ft
Max Offset	200.00 ft

ROAD CHARACTERISTICS TABLE

NUMBER OF ROAD SEGMENTS:		1	ROAD CHARACTERISTICS BY SEGMENT												
		WHOLE ROAD CHARACTERISTICS					PRIMARY DIRECTION			MEDIAN		NON-DIRECTIONAL CHARACTERISTICS			
SEG	STATIONS		ADT	SPEED LIMIT	TERRAIN	TOTAL NUMBER OF LANES	PRIM DIR GRADE	PRIM DIR CURVE RADIUS	LNS IN PRIM DIR	MEDIAN WIDTH	MEDIAN SHLDR WIDTH	LANE WIDTH	ACCESS DENSITY	RUMBLE STRIPS	SHLDR WIDTH
			RSAP DEFAULTS												
			50	55	F	1	0	T	1	0	0	12	0	FALSE	6
	START	END	veh / day	mi / hr	F / M / R		%	ft		ft	ft	ft	points/mi	TRUE/FALSE	ft
1	0+00.	3+31.4	50	55	F	1	0	T	1	0	7	10	0	FALSE	7

20 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+31.40 ft
Max Offset	200.00 ft

ENCROACHMENT ADJUSTMENTS

SEG	PRIM DIR ADJ			OPPOSING DIR ADJ			NON-DIRECTIONAL ADJUSTMENTS					
	GRADE	HORIZ'L CURVE RADIUS	NUMBER OF LANES	GRADE	HORIZ'L CURVE RADIUS	NUMBER OF LANES	SPEED LIMIT	LANE WIDTH	ACCESS DENSITY	RUMBLE STRIPS	TERRAIN	USER
1	1.00	1.00	1.00	0.00	0.00	0.00	1.18	1.30	1.00	1.00	1.00	1.00

20 ft bridge 50 vpd

TOTAL ALTERNATIVES DEFINED 3

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER: 1

ALTERNATIVE NAME		20 ft Br no rail					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST		$ -			ANNUAL MAINTENANCE COST		$ -		
GENERAL HAZARD TYPE	**SPECIFIC HAZARD TYPE**	**START STATION**	**START SIDE**	**START OFFSET**	**END STATION**	**END SIDE**	**END OFFSET**	**PARAMETER**	**VALUE**
		STATIONS		ft	STATIONS		ft		
SpecialEdge	BridgeEdge_MedHaz	1+55.70	R	17	1+75.70	R	17		
SpecialEdge	BridgeEdge_MedHaz	1+55.70	L	5	1+75.70	L	5		

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER:										2
ALTERNATIVE NAME		20 ft br guard rail only					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST		$3,200			ANNUAL MAINTENANCE COST			$0	
GENERAL HAZARD TYPE	SPECIFIC HAZARD TYPE	START STATION	START SIDE	START OFFSET	END STATION	END SIDE	END OFFSET	PARAMETER	VALUE
		STATIONS		ft	STATIONS		ft		
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	R	17	1+75.70	R	17	Width (in.)	12
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	L	7	1+75.70	L	7	Width (in.)	12
PoleTreeSign	Generic Fixed Obj	1+55.70	R	17	NA	NA	NA	Dia. (in.)	4
PoleTreeSign	Generic Fixed Obj	1+55.70	L	7	NA	NA	NA	Dia. (in.)	4

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER: 3

ALTERNATIVE NAME		20 ft Br guard rail with terms					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST		$8,200			ANNUAL MAINTENANCE COST			$0	
GENERAL HAZARD TYPE	**SPECIFIC HAZARD TYPE**	**START STATION**	**START SIDE**	**START OFFSET**	**END STATION**	**END SIDE**	**END OFFSET**	**PARAMETER**	**VALUE**
		STATIONS		ft	STATIONS		ft		
TerminalEnds	GenericEnd	1+55.70	R	17	NA	NA	NA		24
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	R	17	1+75.70	R	17	Width (in.)	12
TerminalEnds	GenericEnd	1+75.70	R	17	NA	NA	NA		24
TerminalEnds	GenericEnd	1+55.70	L	5	NA	NA	NA		24
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	L	5	1+75.70	L	5	Width (in.)	12
TerminalEnds	GenericEnd	1+75.70	L	5	NA	NA	NA		24

SEGMENT AND ALTERNATIVE COST SUMMARY

20 ft bridge 50 vpd

Based on Analysis Run on 6/6/2014 9:19:40 AM

RSAP 3.0.1 (release 140130XL12) running in Excel Version 14.0 on Windows (32-bit) NT 6.01

							Rate of Return	4	%	
							Design Life	25	yrs	
ANNUAL SEGMENT SUMMARY							A/P	0.0640		
Segment	Crashes	Crash Costs	Maintenance Cost	Repair Costs	Crash Rate (crashes/MVMT)	Alternative	Annualized Construction Cost	Expected Annual Maintenance Cost	Expected Annual Repair Cost	Expected Annual Crash Cost
		Alternative # 1				1	$ 0	$ 0	$ 0	$ 49
1	0.00	$ 49		$ 0	0	2	$ 205	$ 0	$	$ 21
		Alternative # 2				3	$ 525	$ 0	$	$ 20
1	0.00	$ 21		$	0					
		Alternative # 3								
1	0.00	$ 20		$	0					

EQUIVALENT ANNUAL INCREMENTAL BENEFIT-COST

50 ft bridge 50 vpd

Based on Analysis Run on 6/6/2014 9:02:24 AM

RSAP 3.0.1 (release 140130XL12) running in Excel Version 14.0 on Windows (32-bit) NT 6.01

			Decision Point Benefit-Cost Ratio:			
			Alternative Choice			
			1	2	3	
With Respect to Alternative	Alternative No.	ALTERNATIVE NAMES	50 ft Br no rail	50 ft br guard rail only	50 ft Br guard rail with terms	
	1	50 ft Br no rail	1.00	0.17	0.11	
	2	50 ft br guard rail only		0.00	0.00	
	3	50 ft Br guard rail with terms			0.00	

Best Benefit-Cost Choice is: **50 ft Br no rail**

RSAP PROJECT INFORMATION

BASIC INFORMATION

Today's date (i.e., run date)	6/6/2014	
Title	50 ft bridge 50 vpd	
Units	USCU	(only USCU units at this time)
Design Life	25	YRS
Construction Year	2014	
Rate of Return	4	%

CRASH COSTS

Use GDP values during life?	N	
Expand to current year by GDP?	Y	http://www.gpoaccess.gov/usbudget/fy09/hist.html
GDP Deflator to construction year	1.07	

Crash Cost Timeline

	2012	2014	2026.5	2039	Cost Used
Base year for crash cost data					
Value of Statistical Life	$ 9,100,000	$ 9,295,782	$ 9,295,782	$ 9,295,782	$9,295,782

Reference for VSL: Guidance on Treatment of the Economic Value of a Statistical Life, US Department of Transportation, Washington, D.C., October 4, 2013.

http://www.dot.gov/office-policy/transportation-policy/guidance-treatment-econo

RSAP Root Directory: C:\Program Files\RSAPv3

Notes:

50 ft bridge 50 vpd

TRAFFIC INFORMATION

CONSTRUCTION YEAR ADT:	50	vehicles/day
TRAFFIC GROWTH	0.0	% growth/yr
WHICH ADT TO USE?	Construction	
MID-LIFE ADT:	50	vehicles/day
END OF LIFE ADT:	50	vehicles/day
ADT USED BY RSAP	50	vehicles/day
PERCENT TRUCKS	12	%

VEHICLE MIX

				TYPICAL CHARACTERISTICS						Trajectory Information		
RSAP VEHICLES	FHWA CLASS	PERCENT	RSAP TYPE	WEIGHT	LENGTH	WIDTH	C.G. Long.	C.G. Hgt	Crash Cost Adj.	Trajectory Grid Name	Redirection Grid Name	Encr Multiplier
		%		lbs	ft	ft	ft	ft				
Motorcycles	1	0.0	M	600	7.00	1.50	3.00	2.60	0.56	TrajectoryGrid1	RedirectionCars	1
Passenger Cars	2	60.0	C	3,300	15.00	5.40	6.00	2.00	1	TrajectoryGrid2	RedirectionCars	1
PickupTruck	3	20.0	PU	5,000	19.75	6.50	8.50	2.30	1	TrajectoryGrid2	RedirectionCars	1
Light Tractor Trailer	8-9	0.0	LTT	16,000	48.00	8.50	12.00	4.8	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Average Tractor Trailer	8-13	6.0	ATT	22,250	48.00	8.50	20.00	4.8	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Heavy Tractor Trailer	8-13	0.0	HTT	37,500	48.00	8.50	20.00	6	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Light Single Unit Truck	5	0.0	LSUT	6,800	35.00	7.77	12.50	3.4	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Average Single Unit Truck	6	4.0	ASUT	12,000	35.00	7.77	12.50	3.4	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Heavy Single Unit Truck	7	0.0	HSUT	22,000	35.00	7.77	12.50	4.2	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Total		90.00										

Click here for the on-line link to the FHWA classification system.

50 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	0	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+61.40 ft
Max Offset	200.00 ft

EXPECTED EQUIVALENT PASSENGER VEHICLE ENCROACHMENTS

ROAD SEGMENT DATA				TOTAL		PRIMARY DIRECTION		OPPOSING DIRECTION	
SEG	START STA	END STA	SEGMENT LENGTH	BASE ENCR RATE	MODIFIED ENCR RATE	PRIMARY RIGHT ENCR	PRIMARY LEFT ENCR	OPPOSING RIGHT ENCR	OPPOSING LEFT ENCR
			ft	encr/yr	encr/yr	0.5000	0.5000	0.0000	0.0000
1	0+00.	3+61.4	361.40	0.0014	0.0011	0.0011	0.0000	0.0000	0.0000

50 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	0	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+61.40 ft
Max Offset	200.00 ft

ROAD CHARACTERISTICS TABLE

NUMBER OF ROAD SEGMENTS:		1	ROAD CHARACTERISTICS BY SEGMENT												
WHOLE ROAD CHARACTERISTICS							PRIMARY DIRECTION			MEDIAN		NON-DIRECTIONAL CHARACTERISTICS			
SEG	STATIONS		ADT	SPEED LIMIT	TERRAIN	TOTAL NUMBER OF LANES	PRIM DIR GRADE	PRIM DIR CURVE RADIUS	LNS IN PRIM DIR	MEDIAN WIDTH	MEDIAN SHLDR WIDTH	LANE WIDTH	ACCESS DENSITY	RUMBLE STRIPS	SHLDR WIDTH
			RSAP DEFAULTS												
			50	55	F	1	0	T	1	0	0	12	0	FALSE	6
	START	END	veh / day	mi / hr	F / M / R		%	ft		ft	ft	ft	points/mi	TRUE/FALSE	ft
1	0+00.	3+61.4	50	55	F	1	0	T	1	0	7	10	0	FALSE	7

50 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	0	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+61.40 ft
Max Offset	200.00 ft

ENCROACHMENT ADJUSTMENTS

SEG	PRIM DIR ADJ			OPPOSING DIR ADJ			NON-DIRECTIONAL ADJUSTMENTS					
	GRADE	HORIZ'L CURVE RADIUS	NUMBER OF LANES	GRADE	HORIZ'L CURVE RADIUS	NUMBER OF LANES	SPEED LIMIT	LANE WIDTH	ACCESS DENSITY	RUMBLE STRIPS	TERRAIN	USER
1	1.00	1.00	1.00	0.00	0.00	0.00	1.18	1.30	1.00	1.00	1.00	1.00

50 ft bridge 50 vpd

TOTAL ALTERNATIVES DEFINED 3

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER: 1

ALTERNATIVE NAME		50 ft Br no rail					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST		$ -			ANNUAL MAINTENANCE COST		$ -		
GENERAL HAZARD TYPE	**SPECIFIC HAZARD TYPE**	**START STATION**	**START SIDE**	**START OFFSET**	**END STATION**	**END SIDE**	**END OFFSET**	**PARAMETER**	**VALUE**
		STATIONS		ft	STATIONS		ft		
SpecialEdge	BridgeEdge_MedHaz	1+55.70	R	17	2+05.70	R	17		
SpecialEdge	BridgeEdge_MedHaz	1+55.70	L	5	2+05.70	L	5		

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER:										2
ALTERNATIVE NAME		50 ft br guard rail only					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST		$8,000			ANNUAL MAINTENANCE COST		$0		
GENERAL HAZARD TYPE	SPECIFIC HAZARD TYPE	START STATION	START SIDE	START OFFSET	END STATION	END SIDE	END OFFSET	PARAMETER	VALUE
		STATIONS		ft	STATIONS		ft		
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	R	17	2+05.70	R	17	Width (in.)	12
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	L	7	2+05.70	L	7	Width (in.)	12
PoleTreeSign	Generic Fixed Obj	1+55.70	R	17	NA	NA	NA	Dia. (in.)	4
PoleTreeSign	Generic Fixed Obj	1+55.70	L	7	NA	NA	NA	Dia. (in.)	4

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER:										3
ALTERNATIVE NAME		50 ft Br guard rail with terms					DEFAULT X-SECTION			All 2:1
CONSTRUCTION COST		$13,000			ANNUAL MAINTENANCE COST			$0		
GENERAL HAZARD TYPE	SPECIFIC HAZARD TYPE	START STATION	START SIDE	START OFFSET	END STATION	END SIDE	END OFFSET	PARAMETER	VALUE	
		STATIONS		ft	STATIONS		ft			
TerminalEnds	GenericEnd	1+55.70	R	17	NA	NA	NA		24	
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	R	17	2+05.70	R	17	Width (in.)	12	
TerminalEnds	GenericEnd	2+05.70	R	17	NA	NA	NA		24	
TerminalEnds	GenericEnd	1+55.70	L	5	NA	NA	NA		24	
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	L	5	2+05.70	L	5	Width (in.)	12	
TerminalEnds	GenericEnd	2+05.70	L	5	NA	NA	NA		24	

SEGMENT AND ALTERNATIVE COST SUMMARY

50 ft bridge 50 vpd

Based on Analysis Run on 6/6/2014 9:02:24 AM

RSAP 3.0.1 (release 140130XL12) running in Excel Version 14.0 on Windows (32-bit) NT 6.01

							Rate of Return	4	%	
							Design Life	25	yrs	
ANNUAL SEGMENT SUMMARY							A/P	0.0640		
Segment	Crashes	Crash Costs	Maintenance Cost	Repair Costs	Crash Rate (crashes/MVMT)	Alternative	Annualized Construction Cost	Expected Annual Maintenance Cost	Expected Annual Repair Cost	Expected Annual Crash Cost
		Alternative # 1				1	$ 0	$ 0	$ 0	$ 110
1	0.00	$ 110		$ 0	0	2	$ 512	$ 0	$	$ 23
		Alternative # 2				3	$ 832	$ 0	$	$ 23
1	0.00	$ 23		$	0					
		Alternative # 3								
1	0.00	$ 23		$	0					

EQUIVALENT ANNUAL INCREMENTAL BENEFIT-COST

20 ft bridge 50 vpd

Based on Analysis Run on 6/6/2014 12:50:32 PM

RSAP 3.0.1 (release 140130XL12) running in Excel Version 14.0 on Windows (32-bit) NT 6.01

			Decision Point Benefit-Cost Ratio:			
			Alternative Choice			
			1	2	3	
With Respect to Alternative	Alternative No.	ALTERNATIVE NAMES	20 ft Br no rail	20 ft br guard rail only	20 ft Br guard rail with terms	
	1	20 ft Br no rail	1.00	**1.18**	0.47	
	2	20 ft br guard rail only		0.00	0.02	
	3	20 ft Br guard rail with terms			0.00	

Best Benefit-Cost Choice is: **20 ft br guard rail only**

RSAP PROJECT INFORMATION

BASIC INFORMATION

Today's date (i.e., run date)	6/30/2014	
Title	20 ft bridge 50 vpd	
Units	USCU	(only USCU units at this time)
Design Life	25	YRS
Construction Year	2014	
Rate of Return	4	%

CRASH COSTS

Use GDP values during life?	N	
Expand to current year by GDP?	Y	http://www.gpoaccess.gov/usbudget/fy09/hist.html
GDP Deflator to construction year	1.07	**Crash Cost Timeline**

Base year for crash cost data	2012	2014	2026.5	2039	Cost Used
Value of Statistical Life	$ 9,100,000	$ 9,295,782	$ 9,295,782	$ 9,295,782	$9,295,782

Reference for VSL: Guidance on Treatment of the Economic Value of a Statistical Life, US Department of Transportation, Washington, D.C., October 4, 2013.

http://www.dot.gov/office-policy/transportation-policy/guidance-treatment-econo

RSAP Root Directory: C:\Program Files\RSAPv3

Notes:

20 ft bridge 50 vpd

TRAFFIC INFORMATION

CONSTRUCTION YEAR ADT:	50	vehicles/day
TRAFFIC GROWTH	0.0	% growth/yr
WHICH ADT TO USE?	Construction	
MID-LIFE ADT:	50	vehicles/day
END OF LIFE ADT:	50	vehicles/day
ADT USED BY RSAP	50	vehicles/day
PERCENT TRUCKS	12	%

VEHICLE MIX

RSAP VEHICLES	FHWA CLASS	PERCENT	RSAP TYPE	TYPICAL CHARACTERISTICS					Crash Cost Adj.	Trajectory Information		Encr Multiplier
				WEIGHT	LENGTH	WIDTH	C.G. Long.	C.G. Hgt		Trajectory Grid Name	Redirection Grid Name	
		%		lbs	ft	ft	ft	ft				
Motorcycles	1	0.0	M	600	7.00	1.50	3.00	2.60	0.56	TrajectoryGrid1	RedirectionCars	1
Passenger Cars	2	60.0	C	3,300	15.00	5.40	6.00	2.00	1	TrajectoryGrid2	RedirectionCars	1
PickupTruck	3	20.0	PU	5,000	19.75	6.50	8.50	2.30	1	TrajectoryGrid2	RedirectionCars	1
Light Tractor Trailer	8-9	0.0	LTT	16,000	48.00	8.50	12.00	4.8	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Average Tractor Trailer	8-13	6.0	ATT	22,250	48.00	8.50	20.00	4.8	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Heavy Tractor Trailer	8-13	0.0	HTT	37,500	48.00	8.50	20.00	6	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Light Single Unit Truck	5	0.0	LSUT	6,800	35.00	7.77	12.50	3.4	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Average Single Unit Truck	6	4.0	ASUT	12,000	35.00	7.77	12.50	3.4	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Heavy Single Unit Truck	7	0.0	HSUT	22,000	35.00	7.77	12.50	4.2	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Total		90.00										

Click **here** for the on-line link to the FHWA classification system.

20 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+31.40 ft
Max Offset	200.00 ft

				EXPECTED EQUIVALENT PASSENGER VEHICLE ENCROACHMENTS					
ROAD SEGMENT DATA				TOTAL		PRIMARY DIRECTION		OPPOSING DIRECTION	
SEG	START STA	END STA	SEGMENT LENGTH	BASE ENCR RATE	MODIFIED ENCR RATE	PRIMARY RIGHT ENCR	PRIMARY LEFT ENCR	OPPOSING RIGHT ENCR	OPPOSING LEFT ENCR
			ft	encr/yr	encr/yr	0.5000	0.5000	0.0000	0.0000
1	0+00.	3+31.4	331.40	0.0013	0.0010	0.0010	0.0000	0.0000	0.0000

20 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+31.40 ft
Max Offset	200.00 ft

ROAD CHARACTERISTICS TABLE

NUMBER OF ROAD SEGMENTS:		1	ROAD CHARACTERISTICS BY SEGMENT												
		WHOLE ROAD CHARACTERISTICS					PRIMARY DIRECTION			MEDIAN		NON-DIRECTIONAL CHARACTERISTICS			
SEG	STATIONS		ADT	SPEED LIMIT	TERRAIN	TOTAL NUMBER OF LANES	PRIM DIR GRADE	PRIM DIR CURVE RADIUS	LNS IN PRIM DIR	MEDIAN WIDTH	MEDIAN SHLDR WIDTH	LANE WIDTH	ACCESS DENSITY	RUMBLE STRIPS	SHLDR WIDTH
			RSAP DEFAULTS												
			50	55	F	1	0	T	1	0	0	12	0	FALSE	6
	START	END	veh / day	mi / hr	F / M / R		%	ft		ft	ft	ft	points/mi	TRUE/FALSE	ft
1	0+00.	3+31.4	50	55	F	1	0	T	1	0	7	10	0	FALSE	7

20 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+31.40 ft
Max Offset	200.00 ft

ENCROACHMENT ADJUSTMENTS

SEG	PRIM DIR ADJ			OPPOSING DIR ADJ			NON-DIRECTIONAL ADJUSTMENTS					
	GRADE	HORIZ'L CURVE RADIUS	NUMBER OF LANES	GRADE	HORIZ'L CURVE RADIUS	NUMBER OF LANES	SPEED LIMIT	LANE WIDTH	ACCESS DENSITY	RUMBLE STRIPS	TERRAIN	USER
1	1.00	1.00	1.00	0.00	0.00	0.00	1.18	1.30	1.00	1.00	1.00	1.00

20 ft bridge 50 vpd

TOTAL ALTERNATIVES DEFINED 3

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER: 1

ALTERNATIVE NAME		20 ft Br no rail					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST		$ -			ANNUAL MAINTENANCE COST		$ -		
GENERAL HAZARD TYPE	**SPECIFIC HAZARD TYPE**	**START STATION**	**START SIDE**	**START OFFSET**	**END STATION**	**END SIDE**	**END OFFSET**	**PARAMETER**	**VALUE**
		STATIONS		ft	STATIONS		ft		
SpecialEdge	BridgeEdge_HighHaz	1+55.70	R	17	1+75.70	R	17		
SpecialEdge	BridgeEdge_HighHaz	1+55.70	L	5	1+75.70	L	5		

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER:										2
ALTERNATIVE NAME		20 ft br guard rail only					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST		$3,200			ANNUAL MAINTENANCE COST			$0	
GENERAL HAZARD TYPE	SPECIFIC HAZARD TYPE	START STATION	START SIDE	START OFFSET	END STATION	END SIDE	END OFFSET	PARAMETER	VALUE
		STATIONS		ft	STATIONS		ft		
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	R	17	1+75.70	R	17	Width (in.)	12
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	L	7	1+75.70	L	7	Width (in.)	12
PoleTreeSign	Generic Fixed Obj	1+55.70	R	17	NA	NA	NA	Dia. (in.)	4
PoleTreeSign	Generic Fixed Obj	1+55.70	L	7	NA	NA	NA	Dia. (in.)	4
PoleTreeSign	Generic Fixed Obj	1+75.70	R	17	NA	NA	NA	Dia. (in.)	4
PoleTreeSign	Generic Fixed Obj	1+75.70	L	7	NA	NA	NA	Dia. (in.)	4

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER:										3
ALTERNATIVE NAME		20 ft Br guard rail with terms					DEFAULT X-SECTION			All 2:1
CONSTRUCTION COST		$8,200			ANNUAL MAINTENANCE COST			$0		
GENERAL HAZARD TYPE	SPECIFIC HAZARD TYPE	START STATION	START SIDE	START OFFSET	END STATION	END SIDE	END OFFSET	PARAMETER	VALUE	
		STATIONS		ft	STATIONS		ft			
TerminalEnds	GenericEnd	1+55.70	R	17	NA	NA	NA		24	
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	R	17	1+75.70	R	17	Width (in.)	12	
TerminalEnds	GenericEnd	1+75.70	R	17	NA	NA	NA		24	
TerminalEnds	GenericEnd	1+55.70	L	5	NA	NA	NA		24	
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	L	5	1+75.70	L	5	Width (in.)	12	
TerminalEnds	GenericEnd	1+75.70	L	5	NA	NA	NA		24	

SEGMENT AND ALTERNATIVE COST SUMMARY

20 ft bridge 50 vpd

Based on Analysis Run on 6/6/2014 12:50:32 PM

RSAP 3.0.1 (release 140130XL12) running in Excel Version 14.0 on Windows (32-bit) NT 6.01

							Rate of Return	4	%	
							Design Life	25	yrs	
ANNUAL SEGMENT SUMMARY							A/P	0.0640		
Segment	Crashes	Crash Costs	Maintenance Cost	Repair Costs	Crash Rate (crashes/MVMT)	Alternative	Annualized Construction Cost	Expected Annual Maintenance Cost	Expected Annual Repair Cost	Expected Annual Crash Cost
		Alternative # 1				1	$ 0	$ 0	$ 0	$ 261
1	0.00	$ 261		$ 0	0	2	$ 205	$ 0	$	$ 20
		Alternative # 2				3	$ 525	$ 0	$	$ 14
1	0.00	$ 20		$	0					
		Alternative # 3								
1	0.00	$ 14		$	0					

EQUIVALENT ANNUAL INCREMENTAL BENEFIT-COST

50 ft bridge 50 vpd

Based on Analysis Run on 6/6/2014 1:43:00 PM

RSAP 3.0.1 (release 140130XL12) running in Excel Version 14.0 on Windows (32-bit) NT 6.01

			Decision Point Benefit-Cost Ratio: Alternative Choice			
			1	2	3	
With Respect to Alternative	Alternative No.	ALTERNATIVE NAMES	50 ft Br no rail	50 ft br guard rail only	50 ft Br guard rail with terms	
	1	50 ft Br no rail	1.00	1.22	0.76	
	2	50 ft br guard rail only		0.00	0.02	
	3	50 ft Br guard rail with terms			0.00	

Best Benefit-Cost Choice is: **50 ft br guard rail only**

RSAP PROJECT INFORMATION

BASIC INFORMATION

Today's date (i.e., run date)	6/30/2014	
Title	50 ft bridge 50 vpd	
Units	USCU	(only USCU units at this time)
Design Life	25	YRS
Construction Year	2014	
Rate of Return	4	%

CRASH COSTS

Use GDP values during life?	N	
Expand to current year by GDP?	Y	http://www.gpoaccess.gov/usbudget/fy09/hist.html
GDP Deflator to construction year	1.07	**Crash Cost Timeline**

Base year for crash cost data	2012	2014	2026.5	2039	Cost Used
Value of Statistical Life	$ 9,100,000	$ 9,295,782	$ 9,295,782	$ 9,295,782	$9,295,782

Reference for VSL: Guidance on Treatment of the Economic Value of a Statistical Life, US Department of Transportation, Washington, D.C., October 4, 2013.

http://www.dot.gov/office-policy/transportation-policy/guidance-treatment-econo

RSAP Root Directory: C:\Program Files\RSAPv3

Notes:

50 ft bridge 50 vpd

TRAFFIC INFORMATION

CONSTRUCTION YEAR ADT:	50	vehicles/day
TRAFFIC GROWTH	0.0	% growth/yr
WHICH ADT TO USE?	Construction	
MID-LIFE ADT:	50	vehicles/day
END OF LIFE ADT:	50	vehicles/day
ADT USED BY RSAP	50	vehicles/day
PERCENT TRUCKS	10	%

VEHICLE MIX

RSAP VEHICLES	FHWA CLASS	PERCENT	RSAP TYPE	TYPICAL CHARACTERISTICS					Crash Cost Adj.	Trajectory Information		Encr Multiplier
				WEIGHT	LENGTH	WIDTH	C.G. Long.	C.G. Hgt		Trajectory Grid Name	Redirection Grid Name	
		%		lbs	ft	ft	ft	ft				
Motorcycles	1	0	M	600	7.00	1.50	3.00	2.60	0.56	TrajectoryGrid1	RedirectionCars	1
Passenger Cars	2	60	C	3,300	15.00	5.40	6.00	2.00	1	TrajectoryGrid2	RedirectionCars	1
PickupTruck	3	20	PU	5,000	19.75	6.50	8.50	2.30	1	TrajectoryGrid2	RedirectionCars	1
Light Tractor Trailer	8-9	0	LTT	16,000	48.00	8.50	12.00	4.8	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Average Tractor Trailer	8-13	6	ATT	22,250	48.00	8.50	20.00	4.8	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Heavy Tractor Trailer	8-13	0	HTT	37,500	48.00	8.50	20.00	6	3.52	TrajectoryGrid3	RedirectionTrucks	0.3
Light Single Unit Truck	5	0	LSUT	6,800	35.00	7.77	12.50	3.4	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Average Single Unit Truck	6	4	ASUT	12,000	35.00	7.77	12.50	3.4	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Heavy Single Unit Truck	7	0	HSUT	22,000	35.00	7.77	12.50	4.2	3.52	TrajectoryGrid4	RedirectionTrucks	0.3
Total		90.00										

Click **here** for the on-line link to the FHWA classification system.

50 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+61.40 ft
Max Offset	200.00 ft

				EXPECTED EQUIVALENT PASSENGER VEHICLE ENCROACHMENTS					
ROAD SEGMENT DATA				TOTAL		PRIMARY DIRECTION		OPPOSING DIRECTION	
SEG	START STA	END STA	SEGMENT LENGTH	BASE ENCR RATE	MODIFIED ENCR RATE	PRIMARY RIGHT ENCR	PRIMARY LEFT ENCR	OPPOSING RIGHT ENCR	OPPOSING LEFT ENCR
			ft	encr/yr	encr/yr	0.5000	0.5000	0.0000	0.0000
1	0+00.	3+61.4	361.40	0.0014	0.0011	0.0011	0.0000	0.0000	0.0000

50 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+61.40 ft
Max Offset	200.00 ft

ROAD CHARACTERISTICS TABLE

NUMBER OF ROAD SEGMENTS:		1	ROAD CHARACTERISTICS BY SEGMENT												
		WHOLE ROAD CHARACTERISTICS					PRIMARY DIRECTION			MEDIAN		NON-DIRECTIONAL CHARACTERISTICS			
SEG	STATIONS		ADT	SPEED LIMIT	TERRAIN	TOTAL NUMBER OF LANES	PRIM DIR GRADE	PRIM DIR CURVE RADIUS	LNS IN PRIM DIR	MEDIAN WIDTH	MEDIAN SHLDR WIDTH	LANE WIDTH	ACCESS DENSITY	RUMBLE STRIPS	SHLDR WIDTH
			RSAP DEFAULTS												
			50	55	F	1	0	T	1	0	0	12	0	FALSE	6
	START	END	veh / day	mi / hr	F / M / R		%	ft		ft	ft	ft	points/mi	TRUE/FALSE	ft
1	0+00.	3+61.4	50	55	F	1	0	T	1	0	7	10	0	FALSE	7

50 ft bridge 50 vpd

WHOLE ROADWAY CHARACTERISTICS

PERCENT OF TRAFFIC IN PRIMARY DIRECTION:	100	%
PERCENT OF TRAFFIC ENCROACHING RIGHT:	50	%
HIGHWAY TYPE:	O	
TERRAIN:	F	
POSTED SPEED LIMIT:	55	mi/hr
USER ENROACHMENT ADJUSTMENT:	1	

PROJECT LIMITS	
Min Sta	0+00. ft
Max Sta	3+61.40 ft
Max Offset	200.00 ft

ENCROACHMENT ADJUSTMENTS

SEG	PRIM DIR ADJ			OPPOSING DIR ADJ			NON-DIRECTIONAL ADJUSTMENTS					
	GRADE	HORIZ'L CURVE RADIUS	NUMBER OF LANES	GRADE	HORIZ'L CURVE RADIUS	NUMBER OF LANES	SPEED LIMIT	LANE WIDTH	ACCESS DENSITY	RUMBLE STRIPS	TERRAIN	USER
1	1.00	1.00	1.00	0.00	0.00	0.00	1.18	1.30	1.00	1.00	1.00	1.00

50 ft bridge 50 vpd

TOTAL ALTERNATIVES DEFINED 3

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER: 1

ALTERNATIVE NAME	50 ft Br no rail					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST	$ -			ANNUAL MAINTENANCE COST		$ -		
GENERAL HAZARD TYPE	**SPECIFIC HAZARD TYPE**	**START STATION**	**START SIDE**	**START OFFSET**	**END STATION**	**END SIDE**	**END OFFSET**	**PARAMETER**	**VALUE**
		STATIONS		ft	STATIONS		ft		
SpecialEdge	BridgeEdge_HighHaz	1+55.70	R	17	2+05.70	R	17		
SpecialEdge	BridgeEdge_HighHaz	1+55.70	L	5	2+05.70	L	5		

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER:										2
ALTERNATIVE NAME		50 ft br guard rail only					DEFAULT X-SECTION		All 2:1
CONSTRUCTION COST		$8,000			ANNUAL MAINTENANCE COST			$0	
GENERAL HAZARD TYPE	SPECIFIC HAZARD TYPE	START STATION	START SIDE	START OFFSET	END STATION	END SIDE	END OFFSET	PARAMETER	VALUE
		STATIONS		ft	STATIONS		ft		
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	R	17	2+05.70	R	17	Width (in.)	12
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	L	7	2+05.70	L	7	Width (in.)	12
PoleTreeSign	Generic Fixed Obj	1+55.70	R	17	NA	NA	NA	Dia. (in.)	4
PoleTreeSign	Generic Fixed Obj	1+55.70	L	7	NA	NA	NA	Dia. (in.)	4
PoleTreeSign	Generic Fixed Obj	2+05.70	R	17	NA	NA	NA	Dia. (in.)	4
PoleTreeSign	Generic Fixed Obj	2+05.70	L	7	NA	NA	NA	Dia. (in.)	4

ROADSIDE FEATURES FOR ALTERNATIVE NUMBER:										3
ALTERNATIVE NAME		50 ft Br guard rail with terms					DEFAULT X-SECTION			All 2:1
CONSTRUCTION COST		$13,000			ANNUAL MAINTENANCE COST			$0		
GENERAL HAZARD TYPE	SPECIFIC HAZARD TYPE	START STATION	START SIDE	START OFFSET	END STATION	END SIDE	END OFFSET	PARAMETER	VALUE	
		STATIONS		ft	STATIONS		ft			
TerminalEnds	GenericEnd	1+55.70	R	17	NA	NA	NA		24	
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	R	17	2+05.70	R	17	Width (in.)	12	
TerminalEnds	GenericEnd	2+05.70	R	17	NA	NA	NA		24	
TerminalEnds	GenericEnd	1+55.70	L	5	NA	NA	NA		24	
Guardrails_SemiRigid	TL3WbeamGR	1+55.70	L	5	2+05.70	L	5	Width (in.)	12	
TerminalEnds	GenericEnd	2+05.70	L	5	NA	NA	NA		24	

SEGMENT AND ALTERNATIVE COST SUMMARY

50 ft bridge 50 vpd

Based on Analysis Run on 6/6/2014 1:43:00 PM

RSAP 3.0.1 (release 140130XL12) running in Excel Version 14.0 on Windows (32-bit) NT 6.01

							Rate of Return	4	%	
							Design Life	25	yrs	
ANNUAL SEGMENT SUMMARY							A/P	0.0640		
Segment	Crashes	Crash Costs	Maintenance Cost	Repair Costs	Crash Rate (crashes/MVMT)	Alternative	Annualized Construction Cost	Expected Annual Maintenance Cost	Expected Annual Repair Cost	Expected Annual Crash Cost
		Alternative # 1				1	$ 0	$ 0	$ 0	$ 650
1	0.00	$ 650		$ 0	0	2	$ 512	$ 0	$	$ 23
		Alternative # 2				3	$ 832	$ 0	$	$ 16
1	0.00	$ 23		$	0					
		Alternative # 3								
1	0.00	$ 16		$	0					

AD ASTRA PER ASPERA

Kansas

Department of Transportation