U.S. HIGHWAY 60<br>CORRIDOR \& AT-GRADE RAILWAY CROSSING MASTER PLAN

# , CMT 

Crawford, Murphy \& Tilly

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## ACKNOWLEDGMENTS

The authors greatly acknowledge the friendship, support, and commitment of the Webster County Commission. We dedicate this plan to the citizens and stakeholders of southern Webster County. We would like to express special gratitude to all involved stakeholders for their dedicated leadership and commitment to the safety and success of this project.

## Webster County Commission

Presiding Commissioner - Mr. Paul Ipock
Northern Commissioner - Mr. Dale Fraker
Southern Commissioner - Mr. Randy Owens
County Clerk - Mr. Stanley Whitehurst

## Agency Stakeholders \& Funding Partners

Missouri Department of Transportation - SW District
Missouri Department of Transportation - Multi-Modal District
Southwest Missouri Council of Governments
BNSF Railway

## Local Municipalities

City of Rogersville
City of Fordland
Village of Diggins
City of Seymour

## Planning Team

Crawford, Murphy and Tilly, Inc.

## EXECUTIVE SUMMARY

U.S. 60 in Webster County, Missouri, serves as a major regional and national highway arterial and is heavily prioritized in terms of importance for the local communities. U.S. 60 has seen a continual increase in traffic over the past 20 years, resulting in significant traffic congestion, heightened safety risks, and loss of economic revenue. In addition, the BNSF Railway's Thayer-North line parallels U.S. 60 through much of Webster County, creating additional safety and connectivity concerns. As a result, Webster County Officials commissioned an independent study to analyze the U.S. 60 Highway and Rail Corridor through Webster County and to develop a Corridor Master Plan to improve safety and efficiency along the highway and rail corridor.
The U.S. 60 Corridor Master Plan is a long-term vision of the 22 -mile highway and rail corridor through southern Webster County, with the end goal of limited access freeway status for U.S. 60. The study took a holistic approach to developing a connected corridor that not only improves safety and efficiency along the highway and rail line, but also maintains local and regional connectivity that is vital to the local economies and rural residents. The study heavily relied on public involvement to determine the future of the U.S. 60 Corridor, and the resulting master plan identifies areas of improvement and prioritizes improvements based on quantitative analytics to justify the need for investment.

The existing corridor serves over 20,000 vehicles daily and has a considerable history of serious crashes. Since 2012, over 624 crashes have occurred on U.S. 60 and forty-four (44) train-vehicle crashes have occurred at the at-grade rail crossings since 1975 within the study limits. Local school buses travel on U.S. 60 approximately 80 times per day and cross the active railroad approximately 78 times per day. Additionally, U.S. 60 serves as the vital link for emergency responders to access and provide life-dependent services to local communities and surrounding rural areas, with over
 3,400 calls for assistance in 2018 along the corridor.

The importance of the BNSF Thayer-North line through Webster County is an essential link of the BNSF national rail network, as a major system component connecting Atlanta to Los Angeles. The increasing rail traffic has resulted in increased congestion at rail crossings and a heightened safety concern.

The U.S. 60 Corridor Master Plan recommends the consolidation of 49 at-grade highway access points to a limited access freeway with eight (8) full-access interchanges and one highway (1) overpass. Additionally, the plan recommends the closure of 21 at-grade rail crossings ( 16 public and five (5) private), two (2) at-grade rail crossing upgrades, one (1) rail overpass, and over 27 miles of outer roads.
The total cost for all improvements within the study is estimated at approximately 132.8 Million ( 2029 dollars), with a Benefit-Cost Ratio of 1.53 , resulting in a positive return on investment.

|  | U.S. 60 Corridor Summary |  |  |
| :---: | :---: | :---: | :---: |
| Corridor Section | Total Cost (2029) | Net Benefits | BCA Value |
| Section I - Rogersville | $\$ 17,229,833$ | $\$ 9,850,790$ | $\mathbf{0 . 5 7}$ |
| Section II - Fordland | $\$ 41,185,462$ | $\$ 41,400,981$ | $\mathbf{1 . 0 1}$ |
| Section III - Diggins | $\$ 31,223,880$ | $\$ 44,998,180$ | $\mathbf{1 . 4 4}$ |
| Section IV - Seymour | $\$ 43,152,223$ | $\$ 105,497,100$ | $\mathbf{2 . 4 4}$ |
| U.S. $\mathbf{6 0}$ Corridor | $\mathbf{\$ 1 3 2 , 7 9 1 , 3 9 8}$ | $\mathbf{\$ 2 0 3 , 3 2 9 , 0 5 0}$ | $\mathbf{1 . 5 3}$ |

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## Introduction \& Existing Conditions



## I - Introduction \& Existing Conditions

## Purpose \& Need

U.S. 60 serves as a major regional and national highway arterial and is heavily prioritized in terms of importance for the local communities of Webster County. U.S. 60 has seen a continual increase in traffic of $1.11 \%$ annually since 2002, resulting in significant traffic congestion, heightened safety risks, and loss of economic revenue. In addition, the BNSF Railway's Thayer-North line parallels U.S. 60 through much of Webster County, creating additional safety and connectivity concerns. As a result, in February 2019, Webster County Officials commissioned an independent study to analyze the U.S. 60 Highway and Rail Corridor through Webster County and to develop a Corridor Master Plan to improve safety and efficiency along the corridor.
The U.S. Highway 60 Corridor and At-Grade Rail Crossing Master Plan has been completed in order to prepare a longterm plan for the 22-mile highway/rail corridor in southern Webster County, Missouri, with the end goal of limited access freeway status for U.S. 60. The scope of this study examined the impacts of the proximity of U.S. 60 and the adjacent BNSF Railway Thayer-North line and resulting high impacts on safety, connectivity, and regional resilience.

The Southwest Missouri Council of Governments (SMCOG) expanded the study to include economic resiliency planning, natural-disaster mitigation planning, and recovery efforts along the corridor. Natural disaster and emergency-event risks were identified and assessed for the role the U.S. 60 highway and rail corridor plays in regional disaster recovery and relief efforts as a primary emergency relief route for Interstate 44 (I-44).

## Background

The section of U.S. 60 under review is located just east of Springfield, Missouri, and serves as a major transportation arterial running east-west across the entire state. Locally, U.S. 60 serves as the major commuter route for the communities of Rogersville, Fordland, Diggins, and Seymour (from west to east). U.S. 60 is currently a four-lane divided highway with 49 at-grade intersections within the study limits, of which 24 are full-access and 25 are partial access. The highest average daily traffic (ADT) for U.S. 60 is 23,225 near Rogersville. The 2017 populations of these communities were 3,649 in Rogersville, 837 in Fordland, 312 in Diggins, and 1,993 in Seymour.
The BNSF Thayer-North line is an essential segment of the eastwest rail network, generating major economic impacts related to the transportation of freight from Oakland/Los Angeles to St. Louis/ Memphis/Atlanta. The resulting heavy rail traffic impacts local communities on a daily basis, with 36 at-grade crossings within the study limits, 12 of which function as unsignalized private crossings.

The safety of the U.S. 60 corridor through Webster County is a major concern for area stakeholders, with 624 crashes occurring on U.S. 60 since 2012, including 21 fatalities. Forty-four (44) train-vehicle crashes have occurred at the at-grade rail crossings since 1975, with 15 resulting in fatalities.


## Existing Corridor Conditions

## U.S. HIGHWAY 60 EXISTING CONDITIONS

U.S. 60 is a major route for east-west travel in Missouri and nationally from the east coast in Virginia to its connection with Interstate 10 in western Arizona. As a result of its transcontinental connectivity, the 22-mile section through Webster County sees high volumes of passenger and freight traffic. With traffic projected to continue increasing, safety concerns have become a major priority for local officials and citizens.

Currently, there are 49 existing at-grade intersections, with 30 full-access and 19 partial access intersections, including two (2) signalized intersections within the 65 MPH corridor. Table 1 summarizes the existing intersections within the study limits.

The existing corridor has a considerable history of serious crashes attributed to the high-speed roadway and number of at-grade intersections, including two (2) signalized intersections on U.S. 60 in Seymour. Since 2012, over 624 crashes have occurred on U.S. 60 within the study limits. A full historical crash analysis was performed and can be seen in Section III - Corridor Traffic Analysis and Appendix B.

TABLE 1. U.S. 60 EXISTING INTERSECTIONS

| HIGHWAY | CROSS STREET | ACCESS TYPE | 2019 AVERAGE DAILY TRAFFIC (ADT) |
| :---: | :---: | :---: | :---: |
| US-60 | Industry Road | Full | 570 |
| US-60 | White Oak Road (Peck Hollow Rd) | Full | 1010 |
| US-60 | Center Road | Full | 1028 |
| US-60 | Power Line Road | Full | - |
| US-60 | Private (Driveway) | Median | - |
| US-60 | Porter Crossing Road | Full | 209 |
| US-60 | Porter Loop/Private (Farm Access) | Full | 40 |
| US-60 | Private (Farm Access) | North | - |
| US-60 | State Highway U | Full | 886 |
| US-60 | Private (Farm Access) | North | - |
| US-60 | Private (Church Access) | South | - |
| US-60 | Private (Driveway) | North | - |
| US-60 | Private (Driveway) | North | - |
| US-60 | Iron Mountain Road (Road 445) | Full | 970 |
| US-60 | Private (Driveway) | North | - |
| US-60 | State Highway FF (Burks Street) | Full | 2200 |
| US-60 | State Highway PP (E Main Street) | South | 320 |
| US-60 | State Highway Z | Full | 911 |
| US-60 | Windswept Drive | North | 20 |
| US-60 | Private (Farm Access) | North | - |
| US-60 | Bluebird Lane | South | 10 |
| US-60 | Hummingbird Lane | Full | 33 |
| US-60 | Honor Camp Lane | Full | 212 |
| US-60 | Green Brier Drive | South | - |
| US-60 | Private (Driveway) | South | - |
| US-60 | Private (Driveway) | South | - |
| US-60 | State Highway A | Full | 2590 |
| US-60 | State Highway NN (S Main Street) | Full | 836 |
| US-60 | State Highway O | Full | 970 |
| US-60 | Private (Driveway) | North | - |
| US-60 | White Rose Lane | North | 10 |
| US-60 | County Road 317 (Raspberry Road) | North | - |
| US-60 | County Road 320 (Box School Loop) | Full | 84 |
| US-60 | Berry Road | North | 70 |
| US-60 | Killdeer/Short Road | Full | 541 |


| HIGHWAY | CROSS STREET | ACCESS TYPE | 2019 AVERAGE DAILY |
| :---: | :--- | :--- | :---: |
| TRAFFIC (ADT) |  |  |  |

## BNSF Railway Existing Conditions

The BNSF Railway's Thayer-North line parallels much of U.S. 60 through Webster County, and varies in proximity from 65 feet at the closest at-grade crossing to over 750 feet at the farthest at-grade crossing. The close proximity in certain locations often results in vehicular traffic queuing onto U.S. 60 affer turning onto an adjacent crossroad during times of rail traffic, creating significant rear-end collision risks.

At the beginning of the study, a team consisting of representatives from CMT (consultant), MoDOT Multimodal, BNSF, and Webster County conducted detailed diagnostic reviews of every public rail crossing within the study limits to better understand the existing conditions, exposure, and interactions of the rail and highway traffic. Items under review included warning devices, signage, track and road conditions, road widths, drainage, and other necessary components.
The existing Thayer-North line has a timetable speed of 50 MPH and sees over 27 trains daily. Currently, there are 36 at-grade highway/rail crossings within the study limits, with 12 serving as private accesses and 24 public road crossings. Table 2 summarizes the rail crossings and existing warning devices within the study limits.

TABLE 2. EXISTING RAIL CONDITIONS

|  | Roadway | USDOT \# | M.P. | Warning Devices |
| :---: | :---: | :---: | :---: | :---: |
|  | Cherry Street | 667619N | 218.92 | Closed |
|  | Front Street | 667620 H | 219.05 | FL / Gates |
|  | Private Crossing | 667621P | 219.63 | Crossbucks |
|  | White Oak Road | 6679622W | 220.60 | FL / Gates |
|  | Porter Crossing Road | 667623D | 222.12 | Crossbucks |
|  | Private Crossing | 667624K | 222.51 | Stop Sign |
|  | Private Crossing | 667625S | 222.56 | Stop Sign |
|  | Private Crossing | 667626Y | 222.90 | Stop Sign |
|  | Dutch Hill Road | 667628M | 223.72 | FL / Gates |
|  | Red Oak Road (Ballpark) | 667629 U | 223.92 | FL |
|  | Private Crossing | 667632C | 225.00 | Stop Sign |
|  | Iron Mountain Road | 667633J | 225.41 | FL / Gates |
|  | Burks Street (Hwy FF) | 667634R | 226.30 | Grade-Separated |
|  | Center Street | 667635X | 226.50 | FL / Gates |
|  | Carpenter Sreet | 667638T | 227.24 | FL / Gates |
|  | Private Crossing | 667639A | 227.41 | Stop Sign |
|  | Highway Z | $667640 \cup$ | 227.66 | FL / Gates |
|  | Bluebird Lane | 667641B | 228.13 | Crossbucks |
|  | Hummingbird Lane | 667642 H | 228.64 | Crossbucks |
|  | Private Crossing | 667643P | 228.92 | Stop Sign |
|  | Tandy Road | 667644W | 229.17 | FL / Gates |
|  | Honor Camp Lane | 667645D | 229.73 | FL / Gates |


| $\begin{aligned} & \frac{\Delta}{Z} \\ & \underline{U} \\ & \frac{U}{\square} \end{aligned}$ | Private Crossing | 667646K | 230.32 | Stop Sign |
| :---: | :---: | :---: | :---: | :---: |
|  | Private Crossing | 667647S | 230.66 | Stop Sign |
|  | Private Crossing | 667648 Y | 230.89 | Stop Sign |
|  | Highway NN (S Diggins Main) | 667650A | 231.51 | FL / Gates |
|  | Raspberry Road | 667651G | 232.51 | Closed |
|  | W Box School Loop (Garden) | 667652N | 233.03 | Crossbucks |
| $\stackrel{\sim}{\sim}$ | Short Road | 667653 V | 233.75 | FL / Gates |
|  | Bison Road (E Box School Lp) | 667654C | 234.75 | Crossbucks |
|  | Private Crossing | 667655J | 235.50 | Stop Sign |
|  | Division Street | 667656R | 236.43 | Closed |
|  | Commercial Street | 667657X | 236.59 | FL / Gates |
|  | Main Street (Hwy K) | 667659L | 236.69 | FL / Gates |
|  | Charles Street | 667660F | 236.88 | FL / Gates |
|  | Oak Lawn Road | 667661M | 238.22 | Crossbucks |
|  | Private Crossing | 667662U | 238.75 | Stop Sign |
|  | Private Crossing | 667663B | 239.46 | Stop Sign |
|  | Peewee Crossing Road | 667664H | 239.95 | FL / Gates |
|  | Mineral Road | 667665P | 240.51 | Crossbucks |
|  | Dewberry Road | 667667D | 241.38 | Crossbucks |

The USDOT at-grade rail crossing crash-prediction model was utilized for the vehicle-train crashes along the corridor, and considered the historical crash data, as can be seen in Section III - Corridor Traffic Analysis.

## EMERGENCY RESPONDER ACCESS

Currently there are four (4) fire stations, three (3) police departments, and three (3) emergency medical service (EMS) facilities that serve Webster County and its communities. U.S. 60 serves as the vital link for emergency responders to access and provide life-dependent services to local communities and surrounding rural areas. Due to the location of the BNSF Thayer Rail, passenger, freight, and emergency vehicles must cross the railroad to access northern or southern parts of the rural communities. Traffic congestion, crashes and other highway delays, compounded with high rail traffic volume, often result in the delay of emergency responders providing life-supporting care and the accompanying potential for unfortunate loss of life.

Webster County 911 services report that the agencies they dispatch along U.S. 60 include the Seymour Police Department, Seymour Fire Department, Southern Webster County Fire Protection District, Fordland Police Department, Rogersville Police Department, and Webster County Sheriff's office. These six (6) agencies alone report over 3,400 calls in 2018 responding to emergency situations along the U.S. 60 Corridor, including 380 responses related to motor vehicle crashes, fires, or medical emergencies on U.S. 60. Additional agencies that respond to U.S. 60 Corridor emergencies and are dispatched through other county \& state call centers include the Logan-Rogersville Fire Protection District, Cox Ambulance, the Missouri State Highway Patrol, and the BNSF Railroad Police.
It is imperative that emergency responders always have efficient and adequate access to the rural communities of Webster County. In a collaborative effort with local emergency services stakeholders, the study sought ways to minimize the adverse impact of highway/rail intersection blockages in an effort to reduce emergency response times.

## SCHOOL SAFETY

Being mostly rural, Webster County is home to many school districts that span hundreds of square miles, resulting in school buses and students traveling on both major highways and rural county roads. The locations of school buildings often require buses loaded with students to cross the active rail tracks and make at-grade left turns onto U.S. 60. In many cases, the median openings are too narrow, resulting in the rear end of buses protruding into traffic or over rail crossings.

Currently, school buses from the Logan-Rogersville, Fordland, and Seymour School Districts travel on U.S. 60 approximately 80 times per day and cross the active railroad approximately 78 times per day. These crossings place students at a significantly heightened exposure to rail traffic and high-speed vehicular traffic. Table 3 below shows the current bus crossings along the U.S. 60 Corridor.

TABLE 3. 2019 SCHOOL BUS CROSSINGS


## Economic Transportation Trends

The U.S. 60 Corridor is a major route for freight shipments via both truck and rail. While heavily influenced by the economy, freight shipments have continually been on the rise, and as a result, the U.S. 60 Corridor has seen significant increases in both rail and truck freight traffic.

A 2015 USDOT Freight Analysis ${ }^{2}$ estimated that $\$ 53$ billion of goods are shipped daily throughout the country on all transportation modes. Trucks make up the largest freight-transport sector, moving approximately $63 \%$ of the tonnage and $68 \%$ of the value of all transported goods. The 2015 analysis predicts that total freight movement will increase by $49 \%$ by 2045, and truck transport is expected to increase by $45 \%$.

The BNSF Thayer-North line through Webster County is vital to the connectivity of the BNSF national rail network. This line is the primary route that carries coal and freight from the western U.S. to the southeast region, connecting the major hubs of Memphis, Birmingham, and Atlanta. The Federal Highway Administration recently forecasted that U.S. rail-freight shipments will increase by $35 \%$ to 24.1 billion tons by $2040^{3}$. Missouri alone reports shipping over 400 million tons of freight in 2017, generating approximately $\$ 220$ billion in annual economic activity, making the railroad essential to the national and state economies ${ }^{4}$. While the rail throughout Missouri is vital to local, state, and national economies, the Thayer-North line through Webster County plays a more specific and critical role in the movement of freight in these local economies along the railroad.

## U.S. 60 Corridor Safety Analysis

As traffic is continually increasing, and freight shipments via truck and rail are forecasted to increase, it is imperative that a plan be developed to improve the safety, connectivity, and resiliency of the U.S. 60 Corridor. The high number of serious crashes alone justify the need for safety improvements.

The highway/rail corridor was analyzed as a single, cohesive and interacting transportation network, and a holistic planning effort was performed to develop a plan to improve the U.S. 60 Corridor. Sessions were held with key stakeholders and the general public to develop a publicly supported and designed plan to create a safer, more connected network that fits the needs of the local communities. A corridor master plan was developed based on the concerns associated with the existing conditions, traffic volumes, public input, and safety analysis (see Section IV - Corridor Master Plan).

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## Public Involvement Process



## II - Public Involvement Process

## Public Engagement \& Planning Process

The study included a proactive public outreach effort to drive the vision and alternative analysis for the U.S. 60 Corridor Master Plan. Webster County leaders were fervent in obtaining the public's participation and feedback during the planning process. Meetings were held with the respective municipalities and jurisdictional authorities to seek their input and support in the consolidation of at-grade highway/rail crossings. This effort was performed in collaboration with local and regional transportation plans for each of the municipal and county governments.

A "listen first" approach was taken on the project within each community. Instead of developing concepts and alternatives with little local understanding and insight, the team engaged the public in a series of listening sessions in each community to understand key issues and challenges related to U.S. 60, the railroad, and safety within the study limits. Through this process, each community within the study limits was engaged and actively sought feedback and alternatives from local business owners, stakeholders, and citizens who would be impacted by the master plan recommendations.

The process utilized a menu of different tools and techniques to obtain feedback and information from the public during the process. The approach was designed to engage many different demographics and geographic participants. This collaborative and flexible approach to engaging the public was initiated throughout the process and has resulted in a plan that has the support of the public. The process is graphically depicted in Figure 2.


Figure 2. Public Involvement Process

This plan provides recommendations largely based on opinions and perceptions of those who know the community best: its residents, businesses, and property owners. Community leaders made an essential commitment to engage the public using multiple methods to ensure transparency and innovation in generating support and commitment towards the success of the project.

## ONE ON ONE STAKEHOLDER INTERVIEWS (05/05/19 \& 05/30/19)

Initial interviews were held at the Webster County Emergency Management Center on May 5, 2019 with stakeholders from Rogersville and Fordland and on May 30, 2019 with stakeholders from Diggins and Seymour. These stakeholder groups were comprised of local elected officials, public works personnel, emergency responders, emergency management personnel, and road maintenance personnel.

Stakeholders provided valuable insights to the challenges and issues occurring within each of their respective communities along U.S. 60 in regard to the traffic congestion, safety, railroad impacts, and flooding impacts to the local transportation network.

## ONE ON ONE STAKEHOLDER MEETINGS (10/08/19 \& 10/15/19)

A second round of meetings with local stakeholders and municipality leadership was held with Rogersville and Fordland on October 8, 2019 and with Diggins and Seymour on October 15, 2019. At the conclusion of these meetings, each community was requested to adopt a resolution of support acknowledging the transparent public outreach process and their support for the U.S. 60 Corridor Master Plan.

## Public Listening Sessions \& Opinion Survey

In addition to interviews with local stakeholders, public listening sessions were held in each community to obtain the feedback of citizens. The initial meeting in each community provided the public with details on scope of the study and provided the opportunity to receive their direct feedback in the forms of $Q \& A$ sessions, comment boards, and public opinion surveys. The meeting was designed to encourage the public to generate concepts of their long-term vision for the U.S. 60 Corridor.

In addition to interviews with stakeholders and public listening sessions, the project team administered a survey for a four (4) week period. The survey was provided in conjunction with the first public listening session and provided an opportunity for citizens and business owners to provide specific feedback to issues and concerns regarding various roadways, intersections, and rail crossings along the U.S. 60 Corridor. A community-specific survey was provided in person at the respective first public meeting as well as electronically on the Webster County Commission's webpage. Those completing the survey had the option to complete and return at the meeting in-person, by mail, online, or by email. A copy of each community survey and results summary is attached in Appendix A.
A summary of feedback received during the first public listening session and on the public opinion survey was presented to the public during the second listening session in each community. Conceptual Alternatives developed during the first meeting and by the project team were presented to the public at the second meeting and meeting participants were provided an opportunity to vote on their preferred option by ranking the alternatives using numbered dots ( $1=$ Most Preferred). A tally of the voting results shows which alternative had the strongest community support. A summary of each community's favored alternative is attached in Appendix A.
A third meeting was held in each community to inform the public of the plan for the U.S. 60 Corridor that was developed as a result of the study and previous public meetings. These meetings included a high-level overview of the project, proposed improvements, estimated costs, and benefit-cost analysis.
Overall, the public input received throughout the study ultimately lead the direction of the proposed improvements along the corridor. In total, there 12 meetings held, with over 300 rural participants. The proposed improvement plan was selected as the favored alternative by $72 \%$ of the community.


## initionif

## COMMUNITY FAVORED

$72 \%$ of the community selected this alternative as their preferred plan.

12 Total Public Meetings Held

300+ Rural Particiants


The following meetings were held in the respective communities:

"Porter Crossing has a steep incline from the Rail crossing to Hwy 60 and is very short. The length between the crossing and Hwy 60 is only about a bus length, causing concerns for traffic backups on Hwy 60."
"Trains will often block the White Oak crossing by approximately 4 rail cars for upwards of 20 minutes (mostly in the PM hours)."
"Most residents utilize the White Oak Crossing rather than Porter due to the profile issue and short distance between the Rail/Hwy 60, except in times of heavy rain, as White Oak has a tendency to flood in several low areas."
"The Dog Bone interchange works well. The community would be in favor of developing a similar interchange elsewhere."


## ROGERSVILLE LISTENING SESSION \#2

7.16.19 - Rogersville First Baptist Church
:ig: 16 Attendees
t Alternative \#1-Publicly Favored


## ROGERSVILLE INFORMATIONAL MEETING

## :9: 12 Attendees



FORDLAND LISTENING SESSION \#1
06.13.19 - Fordland City Hall

## : 22 Attendees

- 25 Surveys Completed


## $f 6$

Key Comments Received
"Eliminating at-grade crossings would be okay if a person doesn't have to detour around for miles (ex. Z Hwy)."
"I would like to see a quiet zone at Center St. and Carpenter."
"Hwy 60 badly needs on and off ramps entering and exiting. Hwy 60 is dangerous. Traffic increases are at least ten-fold in the past ten years. Our business, Chateau Charmant, is currently closed in part because Hwy 60 is unsafe due to semi-truck traffic which crosses center lines on sharp curves."
"The Hwy 60/FF (Burks) intersection has an extremely short crossover with bad sight distance."
"There is concern for younger aged drivers trying to enter/exit Hwy 60 with such high traffic volumes and speed."
"Concerns with citizens parking on RR right of way during baseball games. Also, there are concerns of people walking across the RR tracks at the ballpark."
"Many accidents happen at the Hwy 60 overpass (S-Curve) over the railroad, especially in icy conditions. Many locals go through town (under overpass) instead of taking 60 because the overpass is dangerous."


## FORDLAND LISTENING SESSION \#2

7.3.19 - Fordland City Hall

## : 17 Attendees

Alternative \#2A - Publicly Favored

:9: 34 Attendees


DIGGINS LISTENING SESSION \#1
6.18.19 - Diggins Community Center

## :9: 41 Attendees

- 30 Surveys Completed


## $f 6$ <br> Key Comments Received

"All crossings should have RR guard gates to safely be able to cross the tracks along Hwy 60."
"We need crossing over the railroad and Hwy 60 between Hwy A and Seymour."
"The intersection at Hwy A and Hwy 60 is very dangerous. Cannot see good pulling out of Hwy A to Hwy 60 because traffic is moving too fast with the curves. Cannot tell which lane cars are in on Hwy 60."
"There is a Quarry located approximately 1 mile down Hwy NN. Many heavy loaded trucks use the Hwy NN Rail Crossing \& Intersection. The Deceleration lane is too short, causing traffic to queue on US 60 during Rail Traffic."


DIGGINS LISTENING SESSION \#2
07.30.19 - Diggins Baptist Church
: 51 Attendees
t Alternative \#2 - Publicly Favored


DIGGINS INFORMATIONAL MEETING \#3
11.12.19-Diggins Baptist Church
:0: 31 Attendees


## SEYMOUR LISTENING SESSION \#1

6.25.19 - Seymour City Hall

## :9: 44 Attendees

- 23 Surveys Completed
ff
Key Comments Received
"The signalized intersections on Hwy 60 are the most dangerous areas."
"There is concern for impacts to businesses/sales tax if there isn't visible access to businesses if signalized intersections were to be removed. Others had concerns for safety if the stop lights were left in place."
"The Oak Lawn Rail Crossing has seen the highest incident rate and is the most dangerous rail crossing in town. It needs lights \& gates."
"The Mineral Road Rail crossing is not needed and should be removed. It has very little traffic on it."
"The Fire Department \& Police Department could be separated from US 60 and several schools in the event of a train blocking all crossings in town."
"The Advanced Signal Warning Signal sign is too small and is hidden as EB traffic comes around curve."



## SEYMOUR LISTENING SESSION \#2

8.8.19 - Seymour Senior Center
:3: 42 Attendees

* Alternative \#2B - Publicly Favored



## SEYMOUR INFORMATIONAL MEETING \#3

11.19.19 - Seymour Senior Center

## : 34 Attendees

## Proposed Alternative Development

From the start of the study, emphasis was placed on incorporating public input with the goal of creating a final master corridor plan that was ultimately developed and supported by each community.

Input received from the initial stakeholder meetings and public listening sessions was used to develop multiple conceptual alternatives for each study section. Alternatives ranging from a No-Build Scenario to a full corridor overhaul were presented at the second public listening sessions. Community members were provided the opportunity to rank the proposed improvement alternatives using numbered dots, with one (1) being the most favored. Additional public input was collected, and hybrids were developed at the meetings as needed.

The alternatives from each section are summarized below. Map exhibits for each alternative can be found in Appendix A. Generally, Alternative 1 was developed by the public during the first public listening sessions. In each section, the No-Build alternative was ranked last, indicating the public desires some type of improvements along the corridor.

## ROGERSVILLE

Four alternatives were developed in the Rogersville section. Table 4 below summarizes the alternatives presented and the public ranking. All 16 meeting attendees provided their vote, with Alternative 1 resulting as the preferred improvement plan, and was incorporated into the U.S. 60 Master Corridor Plan.

TABLE 4. ROGERSVILLE IMPROVEMENT ALTERNATIVES

| Rogersville Alternative Summary |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Alternative | \# of Proposed Interchanges | \# of At-Grade Hwy Intersection Closures | \# of At-Grade Rail Crossing Closures | \# of At-Grade Rail Crossing Upgrades | Public Ranking |
| Alternative 1 | 1 | 5 | - | 1 Public | 1 |
| Alternative 2A | - | 5 | - | 1 Public | 2 |
| Alternative 2B | - | 3 | - | 1 Public | 3 |
| Alternative 3 | - | - | - | 1 Public | 4 |

## ALTERNATIVE 1

The improvements proposed in this alternative would effectively transform the existing U.S. 60 into a limited-access freeway through Rogersville. Improvements are centered around an interchange at White Oak Road, with outer roads funneling traffic from the existing at-grade intersections to the new interchange. To improve safety, U.S. 60 Westbound lanes would be realigned to parallel the eastbound lanes. The existing westbound lanes would become an outer road, connecting Porter Crossing to Center Street, and removing the associated at-grade intersections.

Additional improvements include a new roadway connecting Peck Hollow Road to Farm Road 185, providing unimpeded connectivity to Highway W and Highway 125 on the south side of U.S. 60. It is expected that this improvement would alleviate any traffic congestion associated with the consolidation of at-grade intersections.
Rail Improvements include sidewalk upgrades at the Front Street crossing, lights and gates warning upgrades to Porter Crossing, and a roadway approach profile adjustment at the Porter Crossing Road at-grade rail crossing.

## ALTERNATIVE 2A

Traffic flows and outer road connectivity in this alternative are proposed similar to Alternative 1, however a J-Turn configuration is proposed at White Oak Road. These improvements would result in a reduction of five at-grade intersections, and traffic funneling to the White Oak Road intersection.

Rail Improvements include sidewalk upgrades at the Front Street crossing, lights and gates warning upgrades to Porter Crossing, and a roadway approach profile adjustment at the Porter Crossing Road at-grade rail crossing.

## ALTERNATIVE 2B

Similar to Alternative 2A, a J-turn configuration is proposed at the White Oak Road intersection, along with the closures of the Chicory Road and Center Road at-grade intersections. An outer road connecting these roads is proposed with a right-in, right-out configuration at White Oak/Peck Hollow.
Rail Improvements include lights and gates warning upgrades to Porter Crossing and a roadway approach profile adjustment at the Porter Crossing Road at-grade rail crossing.

## ALTERNATIVE 3

The improvements presented in this alternative were considered the No-Build alternative and include only an at-grade rail crossing upgrade to Porter Crossing Road and roadway approach profile adjustment. No other roadway or rail improvements were proposed under this alternative.

## FORDLAND

Five alternatives were developed in the Fordland section. Table 5 below summarizes the presented alternatives and the public ranking. Out of the 17 attendees, 16 community members voted. With an average ranking of $3.20 / 5$, Alternative 2 A was ranked as the preferred improvement plan. A hybrid of this plan, with only minor changes to improvements was included in the U.S. 60 Master Corridor Plan.

TABLE 5. FORDLAND IMPROVEMENT ALTERNATIVES

| Fordland Alternative Summary |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Alternative | \# of Proposed Interchanges | \# of At-Grade Hwy Intersection Closures | \# of At-Grade Rail Crossing Closures | \# of At-Grade Rail Crossing Upgrades | Public Ranking |
| Alternative 1 | 2 | 6 | 3 Public + 1 Private | 3 | 2 |
| Alternative 2A | 3 | 9 | $\begin{aligned} & 8 \text { Public }+2 \\ & \text { Private } \end{aligned}$ | 1 | 1 |
| Alternative 2B | 2 | 9 | $\begin{aligned} & 8 \text { Public }+2 \\ & \text { Private } \end{aligned}$ | 1 | 3 |
| Alternative 3 | - | 1 | 1 Public | 3 | 4 |
| Alternative 4 | - | - | 1 Public | 1 | 5 |

## ALTERNATIVE 1

Improvements proposed under this alternative include a partial freeway conversion in the Fordland section, with interchanges proposed at Highway FF (Burks Street) and Highway Z. The Highway Z interchange will span the highway and railroad. Outer roads are proposed to connect Front Street and Barton Drive to the Highway Z Interchange. Additionally, this alternative proposes closing and replacing the Bluebird Lane and Hummingbird Lane intersections with one intersection between the two existing locations. This improvement would eliminate one at-grade intersection and utilize the existing old Highway 60 road as a connection, allowing for better profile of the minor roads.
To reduce vehicle crashes on U.S. 60 during wet and icy conditions, a high friction surface treatment is recommended along the S-Curve between Burks Street and Highway PP.

Rail Improvements include the closure of the Dutch Hill Road. grade crossing with a roadway connector to Red Oak Road. Additional closures are proposed at Carpenter Street and Highway Z with the implementation of an interchange. Lights and gates upgrades are proposed at Red Oak Road, Bluebird Lane, and Hummingbird Lane. Security fencing and a pedestrian sidewalk crossing are proposed at the Center Street grade crossing.

## ALTERNATIVE 2A

Improvements proposed in this alternative include a full limited-access freeway conversion, with three proposed interchanges: Highway U, Burks Street (Hwy FF), and Highway Z. An outer road system is proposed along the corridor to reroute traffic from the existing at-grade intersections to the three proposed interchanges, allowing for the reduction of nine at-grade intersections and ten at-grade rail crossings. Outer roads will connect to the Rogersville section to the west and to Highway A (Diggins) to the east.

Additional security fencing and pedestrian sidewalk improvements are proposed at the Center Street crossing to improve safety and security in town.

## ALTERNATIVE 2B

Similar to Alternative 2A, this alternative proposes a full conversion to a limited-access freeway. Interchanges are proposed at Burks Street (Highway FF) and Highway Z, and a highway overpass is proposed at Highway U. An outer road system will reroute traffic to the key access points along the corridor, allowing for the removal of nine at-grade intersections and ten at-grade rail crossings. Outer roads are proposed to connect to the Rogersville section (west) and the Diggins section (east).

Additional security fencing and pedestrian sidewalk improvements are proposed at the Center Street crossing to improve safety and security in town.

## ALTERNATIVE 3

Improvements proposed in this alternative would reduce one at-grade rail crossing, one at-grade intersection, and three at-grade rail crossing upgrades.

Dutch Hill Road is proposed to be closed, with a new road connection to Red Oak Road. Security fencing and pedestrian sidewalk improvements are proposed at the Center Street crossing to improve safety and security in town. Intersection consolidation and improvements at Bluebird Lane and Hummingbird Lane would improve safety and reduce one at-grade intersection.
To reduce vehicle crashes on U.S. 60 during wet and icy conditions, a high friction surface treatment is recommended along the S-Curve between Burks Street and Highway PP.

## ALTERNATIVE 4

Considered the No-Build alternative, proposed improvements include the closure of the Dutch Hill Road at-grade rail crossing and a new roadway connection to Red Oak Road. Additionally, deceleration and acceleration lanes at the Hwy PP intersection are proposed to be extended to provide added safety for vehicles entering and existing U.S. 60. All other intersections and rail crossings would remain open.

## DIGGINS

Four alternatives were developed in the Fordland section. Table 6 below summarizes the presented alternatives and the public ranking. Out of the 51 attendees, 50 community members voted. With an average ranking of $2.87 / 4$, Alternative 2 was ranked as the preferred improvement plan. Ultimately, a hybrid of Alternative 1 and Alternative 2 was developed and incorporated into the U.S. 60 Corridor Master Plan.

TABLE 6. DIGGINS IMPROVEMENT ALTERNATIVES

| Diggins Alternative Summary |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Alternative | \# of Proposed Interchanges | \# of At-Grade Hwy Intersection Closures | \# of At-Grade Rail Crossing Closures | \# of At-Grade Rail Crossing Upgrades | Public Ranking |
| Alternative 1 | $1+1$ Overpass | 8 | 4 Public +3 Private | - | 2 |
| Alternative 2 | $1+1$ Overpass | 8 | 4 Public +3 Private | - | 1 |
| Alternative 3 | $1+1$ Overpass | 8 | $4 \text { Public + } 3$ <br> Private | - | 3 |
| Alternative 4 | - | - | - | 2 | 4 |
| Alternative 4 | - | - | 1 Public | 1 | 5 |

## ALTERNATIVE 1

Alternative 1 continues the outer road system from Fordland and connects to a new interchange at Highway A. This interchange would span the highway and rail, requiring a realignment of Highway A and Highway NN. Additionally, a new highway and rail overpass is proposed at Short Road.

The outer road system through Diggins would route traffic to the Highway A interchange, Short Road overpass, and W. Clinton Avenue (Seymour). Connecting the existing roadways allows for fluid connectivity from Diggins to Seymour, resulting in fewer vehicles with the need to utilize U.S. 60 for local travel.
Additionally, the improvements were designed to accommodate agricultural buggies, and sought to separate higher speed motor vehicles from the buggies. As such, shoulder pull-offs on Highway A, gravel shoulders, and wider bridge structures are proposed to accommodate these various modes of travel.

## ALTERNATIVE 2

Similar to Alternative 1, improvements proposed in Alternative 2 include an interchange and Highway A and an outer road system providing connectivity from Diggins to Seymour both north of U.S. 60 and south of the railroad. This alternative also proposes a highway/rail overpass, however located at Berry Road.
Additional improvements include a new connection from Highway $O$ to Highway A, including agricultural shoulder pull-offs and intersection improvements at Highway A/Diggins Rd.

## ALTERNATIVE 3

Improvements proposed in this alternative are quite similar to Alternative 1, with the exception of the south outer road from E Box School Loop. to Finley Falls Road in Seymour. Improvements include the Highway A interchange, Highway NN realignment, and the Short Road overpass. The outer road system would span from Short road west to Highway A and the Fordland section.

## ALTERNATIVE 4

Alternative 4 is proposed as the No-Build alternative and includes no associated roadway improvements. Rail improvements only include upgrading the W Box School Loop and E Box School Loop at-grade crossings to include an active lights and gates warning system.

## SEYMOUR

Four alternatives were developed in the Fordland section. Table 7 below summarizes the presented alternatives and the public ranking. Out of the 51 attendees, 50 community members voted. With an average ranking of $2.87 / 4$, Alternative 2 was ranked as the preferred improvement plan. Ultimately, a hybrid of Alternative 1 and Alternative 2 was developed and incorporated into the U.S. 60 Corridor Master Plan.

TABLE 7. SEYMOUR IMPROVEMENT ALTERNATIVES

| Seymour Alternative Summary |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Alternative | \# of Proposed Interchanges | \# of At-Grade Hwy Intersection Closures | \# of At-Grade Rail Crossing Closures | \# of At-Grade Rail Crossing Upgrades | Public Ranking |
| Alternative 1A | 2 | 4 | 1 Public +1 Private | 2 | 4 |
| Alternative 1B | 2 | 4 | 3 Public + 1 Private | 2 | 2 |
| Alternative 2A | 3 | 10 | 3 Public + 1 Private | 1 | 3 |
| Alternative 2B | 3 | 10 | 3 Public + 1 Private | 1 | 1 |
| Alternative 3 | 2 | 10 | 3 Public + 1 Private | 1 | 5 |
| Alternative 4 | - | - | 1 Public | 2 | 6 |

## ALTERNATIVE 1A

Alternative 1 A includes improvements that were developed by the public at the first listening session. This plan calls for two interchanges in Seymour: W Clinton Avenue and Highway C/Highway K. Both interchanges would result in the removal of the only at-grade signalized intersections along the corridor, significantly increasing safety.
The W Clinton Avenue interchange would span the highway and railroad and would connect the outer road system from Diggins to Seymour. Additionally, the Skyline Road intersection would be eliminated with a new outer road connecting to the new interchange, increasing safety and providing economic development opportunities. Outer roads on the south would connect to Finley Falls Road and Velma Drive, providing increased connectivity and vital emergency access.

The Highway C/Highway K interchange would tie into a new intersection at Highway K/E Clinton Avenue. An outer road along the north side of U.S. 60 would allow for the removal of the north side of the Oak Lawn Road intersection. Additionally, to improve connectivity and resiliency in the event a train blocks all crossings in town, a rail overpass is proposed to connect to Summit Avenue and the Highway K/E Clinton Avenue intersection.

Intersection improvements at Peewee Crossing and Mineral Road are proposed to improve sight distances for turning vehicles and accommodate the high truck volume leading to the logging mill to the south.
To improve pedestrian safety and security, security fencing is a proposed along the railroad from Main Street to just west of Charles Street. Pedestrian crossing improvements are proposed at Charles Street to accommodate pedestrians traveling to the YMCA or the local school.

At-grade rail crossing improvements include the upgrade of the Oak Lawn Road and Dewberry Road crossings to include an active lights and gates warning system and the closure of the Mineral Road crossing.

## ALTERNATIVE 1B

Roadway improvements proposed under this plan are similar to Alternative 1A, but the outer road connecting the W Clinton Avenue interchange to Skyline road is shifted north. Additionally, a new roadway paralleling the railroad on the south side would stretch from the W Clinton Avenue interchange to Main Street (Hwy K). This would result in the closures of the Commercial Street and Charles Street at-grade rail crossings. Traffic south of the railroad would have three routes to the north: the new road to the W Clinton Avenue interchange, the Summit Avenue overpass, or the Main Street at-grade rail crossing.

## ALTERNATIVE 2A

Improvements proposed under this plan include three interchanges: at W Clinton Avenue, Highway C/Highway K, and Peewee Crossing Road. The proposed outer road system and connectivity would be identical to Alternative 1B at the W Clinton Avenue interchange. The Highway C/Highway K interchange would also be similar, with connection to a new intersection at the Highway K/E Clinton Avenue intersection.
An outer road system east of Seymour is proposed, centered around limited access to the Highway C/Highway K and Peewee Crossing Road interchanges. The Peewee Crossing interchange would span the highway and railroad, with an outer road system stretching east to several private access intersections and west to the Webster/Wright County line, resulting in the reduction of four at-grade intersections and three at-grade rail crossings.

Additionally, a realignment to improve the eastbound U.S. 60 curve between Oak Lawn Road and Peewee Crossing allows for the existing lanes to become an outer road, connecting several private accesses to Oak Lawn Road. Improvements to the eastbound U.S. 60 lanes at the county line would improve geometrics and safety where there have historically been a higher number of crashes.

To improve pedestrian safety and security, security fencing is a proposed along the railroad from Main Street to just west of Charles Street. Pedestrian crossing improvements are proposed at Charles Street to accommodate pedestrians traveling to the YMCA or local school.

## ALTERNATIVE 2B

Improvements in this plan are identical to Alternative 2A, except for the addition of the Summit Avenue rail overpass. This alternative was used to gauge public interest in having a grade-separated crossing over the railroad. All other roadway and rail improvements remain the same to Alternative 2A.

## ALTERNATIVE 3

Improvements under this plan are centered around one interchange in Seymour located where original plans called for an interchange decades ago. This would align with Main Street, and all access into Seymour would be centered around this location. An outer road would extend Bison Road (Diggins) west to the new interchange, and Highway C would be realigned to the east to connect to the interchange. Main Street would be extended north to provide connectivity from town to the new interchange. Slip-on and slip-off ramps are proposed near the existing W Clinton Avenue and Highway $\mathrm{C} /$ Highway K intersections to maintain efficient travel and access to businesses. These improvements would result in the closure of all at-grade intersections in Seymour

Additionally, the southern outer road from Diggins would connect to Finley Falls Road and Velma Road for connectivity to the south. The Peewee Crossing interchange would be identical to Alternatives 2 A and 2 B with the same outer road system stretching east to the county line.

To improve pedestrian safety and security, security fencing is a proposed along the railroad from Main Street to just west of Charles Street. Pedestrian crossing improvements are proposed at Charles Street to accommodate pedestrians traveling to the YMCA or local school.

## ALTERNATIVE 4

This plan is considered the No-Build Alternative, and it includes offset left turn lanes and acceleration/deceleration lanes at Skyline Road, the upgrade of the Oak Lawn Road at-grade rail crossing to include an active lights and gates warning system, and the closure of the Mineral Road at-grade crossing.

## Media Coverage \& News Outlets

Partners of the local media were informed and utilized to advertise and inform the public on project meetings and milestone progress. Throughout the study, there has been significant media coverage and publications that are summarized below and attached as part of Appendix A.

- February 13, 2019
- June 05, 2019
- June 11, 2019
- June 19, 2019
- July 03, 2019
- October 22, 2019
- November 20, 2019
- November 27, 2019

The Marshfield Mail "County plans for highway's future"
The Marshfield Mail "County forming plans for future of U.S. 60"
KSPR "Webster County looks to improve the safety of Highway 60"
Webster County Citizen "U.S. 60 Meeting Tuesday"
Webster County Citizen "U.S. 60 Future Debated"
KY3 "Webster County finalizes plan to improve safety on U.S. 60"
The Marshfield Mail "U.S. 60 study recommends $\$ 714.3$ million in improvements"
Webster County Citizen "Three New Interchanges"


## U.S. 60 future debated

County-led study comes to Seymour with 58 in attendance By Dan Wehmer Webster County Citizen citizen@webstercountycitizen.com Jul 3, 2019


Consultant Steve Prange. left of Crawford, Murphy \& Tilly goes over U.S. 60 traffic issues with Cpl. Chase Davis of the Seymour Police Department, right, at last week's meeting.
CIIZEN PHOTO/Dan Wehmer
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Figure 4. Webster County Citizen "U.S. 60
Future Debated" (Left)

## Corridor Traffic Analysis

## III - Corridor Traffic Analysis

## Introduction

The existing U.S. 60 Corridor in Webster County is a 4 -lane divided highway with 49 at-grade intersections. A traffic analysis was performed to evaluate the potential effects of consolidating these at-grade crossings into eight (8) grade-separated interchanges and one (1) overpass, effectively making U.S. 60 a limited access freeway. Traffic models were utilized to predict vehicular highway crash rates and vehicle-train collisions using historical data and standard engineering best practices.

The consolidation and improvement of 36 at-grade railroad crossings in the study area were also evaluated, with the proposed plan recommending the closure of 21 at-grade rail crossings, two (2) at-grade crossing upgrades, one (1) rail overpass, and seven (7) highway interchanges that span the BNSF Railway.
A detailed description of each improvement can be found in Section IV - Corridor Master Plan.

## U.S. 60 Existing Traffic

## EXISTING TRAFFIC VOLUMES

Traffic counts were collected along U.S. 60 at 32 at-grade public intersections within the study area during the morning and afternoon peak hours in Spring 2019 (Appendix B). An annual growth factor of $1 \%$ was applied to the 2019 traffic counts to develop a 20 -year projected model (2039 traffic volumes), assuming no improvements are implemented (the no-build model). The 2039 traffic volumes can be found in Appendix B. The 2039 data was used to develop traffic models that reflect the proposed roadway and railroad crossing consolidations and improvements. The no-build and proposed 2039 traffic models were compared to assess the potential impacts of roadway improvements to the transportation network.

## EXISTING TRAFFIC DELAYS

For the purposes of this traffic study, delay is broken up into two components: control delay and travel delay. Control delay represents the increase in travel time that a vehicle experiences due to traffic control, such as stop signs or traffic signals. Control delay also provides a measure of additional fuel consumption due to time spent idling. Synchro, a macroscopic traffic modeling software, was utilized to determine the control delay for each intersection in both the existing and proposed scenarios.

Only two (2) of the 32 intersections within the study area are signalized, with the rest being two-way stop-controlled intersections, meaning that there is no traffic control on U.S. 60, while the minor intersecting road is controlled by stop signs. Since U.S. 60 is a major arterial with periods of heavy traffic and a speed limit of 65 MPH , there are times where vehicles on the minor approaches experience significant control delay as they wait for an opportunity to turn onto, cross, or turn left off of U.S. 60. These delays often result in the formation of vehicle queves, which ultimately increase the risk of crash occurrences.

Travel delay represents the difference in travel time, irrespective of control delay, between the existing and proposed route of a vehicle. If a vehicle would have to travel longer to get to the same destination once roadway improvements are constructed, then the extra travel time added by the roadway improvement is the travel delay. Travel delay can also be negative, meaning the implementation of an improvement may reduce the travel time of a vehicle. Travel times for the existing conditions were determined for the purposes of calculating travel delay, which will be discussed further in the proposed master plan traffic analysis.

## CRASH HISTORY

Safety along the U.S. 60 Corridor in Webster County is of major concern, especially given the high number of serious crashes reported in the area. Since 2012, there have been 624 crashes on U.S. 60, including 21 fatalities ${ }^{5}$. A breakdown of crash type can be seen in Table 4, and a map showing crash "hot spots" along the U.S. 60 Corridor can be seen in Figure 5. Detailed crash data is attached in Appendix B.

55 MoDOT Crash Database (June 2019)


Figure 5. Crash Density

TABLE 8. U.S. 60 WEBSTER COUNTY CRASH HISTORY, BY SECTION AND CRASH TYPE

| Section | Crash Occurrences Since 2012 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Property Damage Only | Minor Injury | Serious Injury | Fatal | Total |
| Rogersville | 106 | 42 | 7 | 6 | 161 |
| Fordland | 100 | 46 | 5 | 4 | 155 |
| Diggins | 70 | 31 | 12 | 3 | 116 |
| Seymour | 120 | 54 | 14 | 4 | 192 |
| Total | 396 | 173 | 38 | 17 | 624 |

Table 8 shows a breakdown of crash occurrences since 2012 by study section of U.S. 60 and by crash type. Seymour has historically experienced the highest rate of crashes within the study limits. This is due to the higher traffic volumes and more at-grade intersections in the Seymour area, including two (2) signals. The presence of more intersections and higher traffic volumes results in greater opportunities for vehicles to conflict with one another, thus resulting in higher crash rates. The rates of crashes in the other sections follow this same pattern, respective to the ADT and number of intersections.

When compared to the statewide crash rate for U.S. numbered routes of 112.6 total crashes per 100 million vehicle miles traveled, U.S. 60 in Webster County experiences a lower crash rate of 57.2 total crashes per 100 million vehicle miles traveled ${ }^{6}$. However, U.S. 60 in Webster County has had an abnormally high number of crashes that result in fatalities and disabling injuries in the past several years alone. Of the 624 recorded crashes, $2.7 \%$ resulted in at least one fatality, and $6.1 \%$ resulted in a disabling injury. The highest number of fatal and injury crashes have occurred at Highway K/ Highway C, West Clinton Avenue, and Highway A, respectively.
Many of these serious crashes were right angle crashes with "failed to yield to incoming traffic" listed as the primary factor". These types of crashes highlight the need for safety improvements along the corridor to reduce vehicle conflict points and minimize the severity of crashes.

## PROJECT FREEWAY CASE STUDY

With the recent completion of the Project Freeway project west of Rogersville (Greene County) in 2015, a case study was performed in conjunction with the U.S. 60 Corridor Study. The signalized at-grade Route B/W (Mill Street) intersection was replaced with a full-access interchange, greatly reducing the conflict points and severity of crashes that occur. Figures 6 and 7 show the before-and-after crash density in the Rogersville area. Prior to construction, 63 total crashes occurred at the intersection from 2012 to 2015, including 15 serious injuries. In the post-interchange condition, only 19 total crashes occurred over a three (3) year period from 2016-2019, and only included two (2) serious injuries. In the pre- and post-interchange analysis, it is understood that the higher crash rates move from the signalized intersection to other at-grade intersections further east along U.S. 60.


Figure 6. Mill St. Crash Density (Pre-Interchange)


Figure 7. Mill St. Crash Density (Post-Interchange)

A similar existing condition is present at the signalized intersections in Seymour at W Clinton Avenue and Highway K/ Highway C. This case study was utilized to justify to the public the importance of safety enhancements along the corridor. Overall, U.S. 60 in Webster County has seen a high number of fatal and disabling injury crashes in recent years, and the at-grade intersections along the corridor have been common locations for crashes to occur.

## U.S. 60 Proposed Master Plan Traffic Analysis

## FUTURE TRAFFIC VOLUMES

Future traffic models for the proposed U.S. 60 Corridor Master Plan were generated and used to develop traffic delay and crash prediction models. Existing turning movements at the at-grade intersections were redistributed to the eight (8) proposed interchanges, with assumptions made on the most likely new route a vehicle would take to reach its destination. In general, this was done by assigning each existing turning movement (left, through, and right) at each intersection a new route, if needed, to accomplish the respective movement under the proposed conditions.

## FUTURE DELAY

Control delay for the proposed scenario was determined using Synchro software. Each of the eight (8) proposed interchanges were modeled as a stop-controlled tight-diamond interchange, though further analysis should be performed in design to determine the most effective interchange geometry for each location.

In this general configuration, exit and entrance ramps allow U.S. 60 to operate as a controlled access freeway. Vehicles traveling at vastly different speeds no longer interact and control delay will be reduced significantly because turning movements will no longer be in direct conflict with traffic on U.S. 60. Vehicles crossing U.S. 60 will move freely on the overpasses with no control delay, vehicles entering U.S. 60 will use ramps and acceleration lanes to merge with no control delay, and traffic exiting U.S. 60 will experience minimal control delay at the ramp terminals. Additionally, the proposed removal of existing signals at W Clinton Avenue and Highway K (Seymour) would significantly reduce control delay along the corridor, as through traffic on U.S. 60 would no longer be required to stop in these locations.
Travel-delay time between the existing and proposed conditions was generally found to be a positive value for the entire corridor, resulting in vehicles traveling further in the proposed scenario. Though certain areas would result in a decreased travel time, the overall corridor and sections have an increase in travel time in the proposed conditions. While this is the case due to the consolidation of intersections and implementation of an extensive outer road network, safety was the focus of consolidation (see Future Crash Prediction below).

TABLE 9. COMPARISON OF 2039 NO-BUILD AND PROPOSED DELAY, BY SECTION

|  | Delay (Hours per Day) |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Section | Cont | Delay | Adver | Travel |  | Total Delay |  |
|  | No-Build | Proposed | No-Build | Proposed | No-Build | Proposed | Daily Reduction |
| Rogersville | 16.3 | 4.9 | 45.6 | 68.4 | 61.9 | 73.4 | +11.5 |
| Fordland | 22.9 | 12.4 | 85.0 | 127.6 | 107.9 | 140.0 | +32.1 |
| Diggins | 16.1 | 9.9 | 59.0 | 101.7 | 75.1 | 111.5 | +36.4 |
| Seymour | 154.9 | 26.7 | 126.4 | 236.3 | 281.3 | 263.0 | -18.3 |
| U.S. 60 Corridor Totals |  |  |  |  | 526.2 | 587.9 | +61.7 |

## FUTURE CRASH PREDICTION

Crash prediction models were generated and performed according to the Highway Safety Manual procedure for rural multilane highways ${ }^{7}$. The existing crash prediction models reported estimated annual frequencies of 91.0 Property Damage Only (PDO), 71.1 Injury, and 1.3 Fatal crashes within the 22 -mile study limits ${ }^{8}$. Because of the nature of traffic count collection, these estimates are considered conservative, resulting in the possible underestimation of future annual crash frequencies.

The proposed U.S. 60 Corridor Master Plan transforms the rural highway with at-grade intersections into a limited access freeway, and thus crash prediction for the proposed scenario was performed using the Highway Safety Manual's methodologies for freeways and interchanges. The proposed crash prediction model reports estimated annual frequencies of 68.6 property damage only, 33.5 injury, and 0.8 fatal crashes in the study area ${ }^{9}$.

[^1]While these models eliminate the inconsistencies of year-to-year crash prediction, they do not account for the presence of mixed vehicular and buggy traffic, as is present along this corridor near Diggins and Seymour. Nonetheless, the elimination of at-grade intersections and the implementation of interchanges, overpasses, and an outer road system would eliminate agricultural horses and buggies mixing with highspeed vehicular traffic on U.S. 60, thereby reducing overall traffic conflicts and increasing safety. Table 10 below shows a comparison of crash rates for the proposed and no-build scenarios in the design year of 2039.

TABLE 10. COMPARISON OF 2039 NO-BUILD AND PROPOSED SCENARIO CRASH RATES, BY SECTION

| Section | Crash Frequency (crashes/year) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Property Damage Only |  | Injury |  | Fatal |  | Total |  |  |
|  | No- <br> Build | Proposed | No-Build | Proposed | No-Build | Proposed | No-Build | Proposed | Annual Reduction |
| Rogersville | 18.4 | 16.2 | 13.8 | 7.6 | 0.3 | 0.2 | 32.5 | 24.0 | -8.5 |
| Fordland | 19.6 | 23.3 | 15.6 | 11.2 | 0.3 | 0.3 | 35.5 | 34.8 | -0.7 |
| Diggins | 17.0 | 12.5 | 14.2 | 6.3 | 0.3 | 0.2 | 31.5 | 19.0 | -12.5 |
| Seymour | 36.0 | 16.4 | 27.4 | 8.4 | 0.4 | 0.2 | 63.8 | 25.0 | -38.8 |
| U.S. 60 Corridor Crash Prediction |  |  |  |  |  |  | 163.3 | 102.8 | -60.5 |

## EMISSIONS REDUCTIONS

Emissions output by idling vehicles can be directly attributed to the intersection control delay, allowing for the value of emissions reductions to be generated as part of the Traffic Delay Model for passenger vehicles and commercial trucks. Because the overall control delay is reduced in the proposed scenario, it is estimated that emissions would be reduced and an annual societal savings of $\$ 7,440$ would result ${ }^{10}$.

TABLE 11. AT-GRADE RAIL CROSSING CRASH SUMMARY

| City | STREET | US DOT \# | RR M.P. | Crashes | INJURY STATUS | DATE |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Private Crossing | 667621P | 219.629 | 1 | Uninjured | 12/22/1994 |
|  | White Oak Road | 667622W | 220.600 | 4 | Killed | 7/23/2013 |
|  |  |  |  |  | Injured | 11/3/1983 |
|  |  |  |  |  | Killed | 4/21/1982 |
|  |  |  |  |  | Killed | 11/21/1976 |
|  | Porter Crossing | 667623D | 222.119 | 2 | Injured | 5/24/1985 |
|  |  |  |  |  | Killed | 11/20/1976 |
| $\begin{aligned} & \text { ㅇ } \\ & \frac{C}{10} \\ & \hline \overline{0} \\ & \hline \text { ㅇ } \end{aligned}$ | Ballpark Road | 667629 U | 223.919 | 1 | Injured | 2/28/1978 |
|  | S Iron Mountain Road | $667633 J$ | 225.410 | 3 | Injured | 3/23/2008 |
|  |  |  |  |  | Uninjured | 1/29/1991 |
|  |  |  |  |  | Killed | 1/31/1990 |
|  | Center Street | 667635X | 226.500 | 4 | Killed | 9/16/1990 |
|  |  |  |  |  | Injured | 10/18/1987 |
|  |  |  |  |  | Injured | 5/11/1985 |
|  |  |  |  |  | Uninjured | 2/3/1984 |
|  | Private Crossing | 667638 T | 227.240 | 1 | Injured | 7/9/2007 |
|  | Route 2 | $667640 \cup$ | 227.660 | 1 | Uninjured | 4/30/1998 |
|  | Tandy Road | 667644 W | 229.170 | 2 | Uninjured | 11/20/1993 |
|  |  |  |  |  | Injured | 9/22/1987 |


| City | STREET | US DOT \# | RR M.P. | Crashes | INJURY STATUS | DATE |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { n } \\ & \frac{5}{0} \\ & \frac{0}{0} \end{aligned}$ | Private Crossing | 667647 S | 230.660 | 2 | Uninjured | 12/6/2017 |
|  |  |  |  |  | Injured | 12/4/2009 |
|  |  |  |  |  | Killed | 12/4/2009 |
|  | Diggins Main Street | 667650A | 231.510 | 1 | Uninjured | 4/26/2010 |
|  | Box School Loop | 667652 N | 233.030 | 2 | Uninjured | 8/2/2014 |
|  |  |  |  |  | Killed | 12/14/1992 |
|  | Short Road | 667653 V | 233.749 | 5 | Uninjured | 7/20/2012 |
|  |  |  |  |  | Uninjured | 8/31/2003 |
|  |  |  |  |  | Uninjured | 7/10/2001 |
|  |  |  |  |  | Killed | 4/5/1999 |
|  |  |  |  |  | Killed | 8/21/1991 |
|  | Bison Road | 667654C | 234.750 | 1 | Injured | 10/13/1989 |
|  | Commercial Street | 667657X | 236.590 | 1 | Uninjured | 12/21/1990 |
|  | Main Street | 667659 L | 236.689 | 3 | Killed | 6/20/1983 |
|  |  |  |  |  | Killed | 1/30/1982 |
|  |  |  |  |  | Injured | 10/17/1976 |
|  | Oak Lawn Road | 667661M | 238.219 | 4 | Injured | 2/12/2019 |
|  |  |  |  |  | Killed | 12/5/2011 |
|  |  |  |  |  | Killed |  |
|  |  |  |  |  | Injured | 8/4/1990 |
|  |  |  |  |  | Uninjured | 5/20/1979 |
|  |  |  |  |  | Injured | 6/4/1978 |
|  | Private Crossing | 667662 U | 238.750 | 1 | Uninjured | 7/13/2011 |
|  | Pee Wee Crossing | 667664 H | 239.950 | 3 | Killed | 8/31/1991 |
|  |  |  |  |  | Uninjured | 6/19/1979 |
|  |  |  |  |  | Uninjured | 12/29/1978 |
|  | Dewberry Road | 667667D | 241.379 | 2 | Injured | 1/24/1990 |
|  |  |  |  |  | Uninjured | 1/30/1983 |

## Highway/Rail Interaction

Due to the proximity between U.S. 60 and the BNSF Railway Thayer-North line, there is high interaction between rail traffic and vehicles crossing the railroad while entering and exiting U.S. 60. It was determined early in the study that the highway and rail needed to be analyzed as one (1) corridor, as it would do injustice to the other if focus was only placed on one (1). As both the highway and rail continue to increase in traffic, safety becomes of greater concern.

An analysis showing the vehicle-train interactions at the at-grade highway/rail crossings was performed alongside the highway engineering models. The analysis included crash prediction, exposure index ratings, and near-miss data.

## RAIL CRASH HISTORY

Of the existing 36 at-grade highway/rail crossings, there have been 44 crash occurrences, including 13 injuries and 15 fatalities at 9 crossings along the corridor. Table 11 summarizes the at-grade crossing historical crash data, dating back 44 years to 1975.

Key observations in the data show that there have been 12 crashes in the past 15 years, including four (4) injuries and four (4) fatalities. These crashes hold greater weight, as any safety modifications to these crossings have generally occurred within the last 20 years. Of the total crashes that have occurred, $67 \%$ have occurred where crossing warning devices were only crossbucks (passive warning), while $33 \%$ have occurred at locations with lights and gates (active warning).

## EXISTING \& PROPOSED RAIL CRASH PREDICTION

Crash prediction models were generated for the at-grade highway/rail crossings along the corridor for the existing and proposed conditions. Crash prediction models utilized formulas derived in the USDOT Railroad-Highway Grade Crossing

Handbook ${ }^{11}$, and consider various factors such as ADT, speed, lighting, warning devices, and historical crash data. Four (4) separate formulas are utilized to create the Rail Crash Prediction models:

- USDOT General Basic Accident Prediction (Existing Conditions)
- Final Accident Prediction (General Formula + Crash Data)
- Fatal Accident Probability
- Injury Accident Probability

Through the combination of the above formulas, the engineering team derived crash rates for the 36 at-grade crossings along the corridor. Twenty-five (25) year models were generated for the no-build and proposed conditions, and provided data for total, fatal, injury, and PDO crash rates.
As a result of the proposed improvements, a reduction in 15.71 crashes annually is predicted, including the reduction of 5.07 annual fatal and injury crashes. Most notably, all vehicle-train crash potential will be eliminated in the Diggins sections with the removal of all at-grade crossings and implementation of a full-access interchange and highway overpass at Highway A and Short Road, respectively. The detailed Rail Crash Prediction Model results are attached in Appendix B.

## EXPOSURE INDEX RATINGS

The Exposure Index provides a numerical value of safety at each at-grade crossing. The State of Missouri has developed its own rating formula that considers ADT, speed, geometry, lighting, and many other factors that contribute to the safety of a crossing ${ }^{12}$. An adjusted exposure index rating (AEI) was used for analysis to account for the warning devices safety factor ${ }^{13}$. A higher exposure index rating represents a higher safety risk while a lower exposure index rating nets a safer crossing for vehicle-train interactions.

CMT evaluated the crossing Exposure Index ratings for each at-grade crossing within the study limits. The existing and proposed conditions were analyzed to determine locations for necessary safety improvements. As a result of the proposed U.S. 60 Corridor Master Plan, the closure of 20 at-grade crossings, upgrade of three (3) at-grade crossings, and implementation of one (1) rail overpass nets a projected adjusted Exposure Index rating reduction of 2028. Table 12 summarizes the Exposure Index model for each study section. The full Exposure Index model is attached in Appendix B.

TABLE 12. EXPOSURE INDEX SUMMARY

| Section | Existing Avg. AEI | Proposed Avg. AEI | AEl Change |
| :---: | :---: | :---: | :---: |
| Rogersville | 283.4 | 35.1 | -248.3 |
| Fordland | 314.3 | 2.6 | -90.6 |
| Diggins | 221.6 | 0.0 | -221.6 |
| Seymour | $1,499.2$ | 32.1 | -1467.02 |
| U.S. $\mathbf{6 0}$ Corridor | $\mathbf{2 , 0 9 7 . 4}$ | $\mathbf{6 9 . 8}$ | $\mathbf{- 2 , 0 2 7 . 5}$ |

## NEAR MISSES

Near misses are occurrences self-reported by the railroad in which a train engineer thought a crash with a vehicle almost occurred. Railroads are required to document and report these instances under the Federal Railroad Administration (FRA) regulations.
The BNSF Railway Thayer-North line through Webster County has reported over 21 near-miss occurrences since 2012 (7 years), most recently as of October 2018 at Highway NN (Diggins) ${ }^{14}$. While these are not actual crashes, they cause alarm for safety as they had the potential to result in a fatal or serious injury crash between a train and vehicle. Most notable is the Iron Mountain Road crossing where there have been five (5) reported near misses in the past four (4) years. This is concerning as the Fordland High School is located off this road, meaning these near misses potentially involve high school students. Table 13 summarizes the Near-Miss Data received from the BNSF Railway.

[^2]TABLE 13. NEAR-MISS SUMMARY

| Crossing | USDOT \# | RR M.P. | \# of Near Misses | Date |
| :---: | :---: | :---: | :---: | :---: |
| Front Street | 667620H | 219.05 | 1 | 10/31/2012 |
| White Oak Road | 667622W | 220.6 | 2 | 8/31/2016 |
|  |  |  |  | 4/30/2012 |
| Porter Crossing Road | 667623D | 222.12 | 1 | 6/30/2012 |
| Red Oak Road (Ballpark) | 667629 U | 223.92 | 1 | 4/30/2012 |
| Iron Mountain Road | 667633J | 225.41 | 5 | 6/27/2017 |
|  |  |  |  | 4/30/2015 |
|  |  |  |  | 3/31/2016 |
|  |  |  |  | 6/30/2015 |
|  |  |  |  | 5/31/2015 |
| Highway Z | $667640 \cup$ | 227.66 | 1 | 6/30/2014 |
| Hummingbird Lane | 667642H | 228.64 | 1 | 4/30/2012 |
| Honor Camp Lane | 667645D | 229.73 | 1 | 3/31/2015 |
| Highway NN (S Diggins Main) | 667650A | 231.51 | 3 | 8/31/2012 |
|  |  |  |  | 4/30/2011 |
|  |  |  |  | 10/4/2018 |
| W Box School (Garden) | 667652N | 233.03 | 1 | 2/28/2015 |
| Short Road | 667653 V | 233.75 | 2 | 9/23/2017 |
|  |  |  |  | 7/31/2013 |
| E Box School (Bison) | 667654C | 234.75 | 1 | 7/31/2013 |
| Oak Lawn Road | 667661M | 238.22 | 1 | 1/31/2013 |

## Conclusions

The existing conditions of U.S. 60 and the adjacent BSNF Railway pose significant safety concerns for both vehicles and trains. The existing crash prediction models and historical crash data support the need for safety improvements along this corridor. The proposed master plan would eliminate most vehicular conflict points on U.S. 60, vastly improving safety, efficiency, and connectivity in each of the rural communities.

The consolidation of existing at-grade intersections into interchanges with a limited access facility would alleviate congestion and provide increased capacity for present and future traffic volumes. In terms of delay, the result of implementing the proposed U.S. 60 Corridor Master Plan would be a decrease in intersection control delay, but an increase in travel delay due to the use of an outer road system to access interchanges from roads with closed at-grade crossings. However, this would reduce the amount of traffic accessing U.S. 60 for local commute, ultimately increasing safety.

The resulting traffic analysis performed for the U.S. 60 Corridor Study yields results that highly support the implementation of safety-vehicle improvements by shifting the corridor towards limited access freeway status. The reduced vehicle and vehi-cle-train conflict points along the corridor would greatly improve the safety of the traveling public, and significantly reduce the crash frequency and severity.

## U.S. 60 Corridor Master Plan



## IV - U.S. 60 Corridor Master Plan

## Introduction

Throughout the process of the study, U.S. 60 Corridor improvements were developed to increase safety, improve efficiency, and enhance resiliency along U.S. 60 and the adjacent BNSF Railway. Collaboration with all agency partners, municipalities, stakeholders and the public worked to refine these improvements to identify safety concerns, key access locations, and regional connectivity needs.

The public involvement process (Section II) sought public feedback that was centered around a publicly supported plan and backed by each of the local communities along the corridor. Many concerns and potential improvements were highlighted as a result of the public meetings, including locations of flooding, emergency response, high-traffic businesses, agricultural routes, and dangerous intersections and rail crossings.
A U.S. 60 Corridor Master Plan was developed for the portion of U.S. 60 and the BNSF Railway in southern Webster County. The result of the study provides a plan for a future limited access highway that consolidates at-grade intersections and rail crossings and maintains access via key grade-separated interchanges and overpasses. Selected at-grade rail crossings will remain open but will include safety upgrades. Master plan exhibits with detailed section views are attached in Appendix C.

## ROGERSVILLE

The Rogersville Corridor (Section I) extends from the western Webster County line to approximately 0.5 miles east of the Porter Loop Intersection. This section includes the consolidation of six (6) at-grade intersections into one (1) interchange at White Oak Road/Peck Hollow Road, three (3) miles of outer roads, and one (1) at-grade rail-crossing upgrade.

## RAIL IMPROVEMENTS

Improvements are recommended to upgrade the
 Porter Crossing Road at-grade rail crossing to include lights and gates. Roadway profile adjustments on Porter Crossing Road north of the tracks are recommended to improve sight distance at the crossing. Additionally, improvements are recommended at the Front Street at-grade crossing to include a pedestrian sidewalk crossing and security fencing along the BNSF Railway due to the many young children and students traveling to and from schools in the area.

## WHITE OAK/PECK HOLLOW INTERCHANGE

A proposed interchange at White Oak Road/Peck Hollow Road will continue the limited access freeway further east, connecting to the limited access of U.S. 60 constructed in 2015. The interchange is expected to reduce delay due to vehicle idling at at-grade intersections and improve safety by reducing the frequency and severity of crashes.

## U.S. 60 REALIGNMENT \& OUTER ROAD

Improvements are recommended to realign the westbound lanes of U.S. 60 to parallel the eastbound lanes from the existing Power Line Road intersection to approximately 0.25 miles east of the Porter Loop intersection. This realignment serves two purposes: reducing crash potential in the existing tight S-curve and allowing the existing lanes to serve as an outer road from Center Road (BUS 60) to Porter Crossing Road. The outer road will connect many private accesses, Porter Crossing Road, Center Road and the existing Copart business entrance, providing U.S. 60 highway access at the proposed interchange at White Oak Road.

## REGIONAL CONNECTIVITY

Following the implementation of an interchange at White Oak Road/Peck Hollow Road, improvements are proposed to extend Farm Road 186 to Peck Hollow Road to increase the redundancy of east-west routes that supplement U.S. 60.

## FORDLAND

The Fordland Corridor (Section II) extends from approximately 0.5 miles east of the Highway $U$ intersection to approximately 0.75 miles west of the Highway A intersection. This section includes the consolidation of eight (8) at-grade intersections into three (3) interchanges located at Highway U, Highway FF (Burks Street), and Highway Z. In addition to three (3) grade-separated interchanges and rail overpasses, this consolidation will require the construction of nine (9) miles of outer roads and proposes the closure of 11 at-grade rail crossings (nine (9) public and two (2) private).


## RAIL IMPROVEMENTS

Improvements are recommended along the rail corridor to greatly increase safety and improve the efficiency of the local transportation network. An at-grade rail-crossing upgrade is recommended at Red Oak Road (Ballpark Road) that upgrades warning devices to lights and gates. Additionally, the Front Street at-grade crossing is recommended to be upgraded to allow for the inclusion of a Quiet Zone through Fordland. Improvements for the Quiet Zone include security fencing, ADA sidewalk crossing, and median islands.

It is recommended to close nine (9) at-grade crossings in Fordland, including the following: Dutch Hill Road, Red Oak Road, Iron Mountain Road, Carpenter Street, Highway Z, Bluebird Lane, Hummingbird Lane, Tandy Road, and Honor Camp Lane. The closure of the above crossings will coincide with the roadway improvements (below) and will increase the safety for both train and vehicular traffic. The above closures and upgrades will result in a 311.2 reduction of the MoDOT Exposure Index rating. Private rail crossings will be maintained, except when the implementation of an outer road eliminates the need.

## HIGHWAY U INTERCHANGE \& OVERPASS

A proposed interchange at Highway U/Red Oak Road is recommended to provide grade-separated access regionally to the south into Christian County and over the BNSF Railway to the north, providing connectivity to Dutch Hill Road and Red Oak Road. Additionally, an outer road both north and south of U.S. 60 is proposed to maintain adequate access from Porter Loop (Rogersville) to Washboard Road and from S Iron Mountain to Red Oak Road. The outer road will maintain existing access for several businesses and residential highway accesses that will close. The proposed outer road would run adjacent to U.S. 60 and provide highway access at two (2) interchange locations: Highway U and Highway FF. Additionally, with the implementation of an interchange at this location, traffic patterns are expected to shift, with more vehicles utilizing Highway PP and Black Oak Road to access U.S. 60, resulting in the need to replace \& widen a local wet-weather bridge and pave the surface of Black Oak Road.

## HIGHWAY FF INTERCHANGE

An interchange at this location will provide grade-separated access to Highway FF (north) and Washboard Road (south). Highway FF is the main route into the City of Fordland. The removal of the existing at-grade intersection and implementation of an interchange is expected to prevent 1.66 crash occurrences annually. An interchange will also provide expedited access for emergency personnel, as the police and fire stations are located just north of U.S. 60 on Highway FF. Additionally, it is recommended to extend Brentlinger Drive to Iron Mountain Road with the construction of the Highway FF interchange to maintain business and residential access.

## HIGHWAY Z INTERCHANGE \& RAIL OVERPASS

Highway $Z$ was identified early in the project as a key connection to U.S. 60, serving significant regional traffic south into Christian County. The existing U.S. 60/Highway Z at-grade intersection is a high priority intersection, provided the high ADT, flooding issues, and U.S. 60 geometry at this location.

A full access interchange is recommended at this location to reduce the crash potential, enhance connectivity, and improve efficiency. Additionally, an interchange at this location will allow for the removal of the Highway PP/U.S. 60 intersection and re-aligning to connect to the Highway $Z$ interchange north of the BNSF Railway. To maintain unimpeded connectivity into
the heart of Fordland, Barton Drive is recommended to be extended to Highway Z (south of the BNSF Railway), simultaneously with the closure of the Carpenter Street rail crossing. It is also recommended to extend Barton Drive (north of U.S. 60) approximately one (1) mile east, providing access and connectivity at the Highway Z interchange.
An interchange at Highway $Z$ is expected to result in the reduction of 1.04 annual crash occurrences at U.S. 60/Highway Z in addition to the elimination of all vehicle-train exposure.

## OUTER ROAD SYSTEM

An extensive outer road system on the south side of the BNSF Railway is recommended to span from Highway Z to Highway A in Diggins. The numerous at-grade rail crossings and highway intersections pose a significant safety concern for both vehicular and train traffic. The construction of a 25 -mile outer road would eliminate 20 rail crossings ( 15 public and five (5) private) and 33 at-grade intersections. The outer road would service traffic for the local north-south roads and would provide highway access via grade separated interchanges at Highway $Z$ and Highway $A$.

## INCIDENTAL ROADWAY IMPROVEMENTS

Incidental Roadway Improvements are recommended along the Corridor to enhance safety and efficiency of the road system. A high friction pavement treatment is recommended on U.S. 60 along the super-elevated reverse S -curves. This area of U.S. 60 has seen a considerable amount of crashes related to wet and icy conditions, resulting in vehicles sliding and hydroplaning off the embankment. In addition to pavement surface treatment, guardrail extension is also recommended to reduce the frequency of vehicles traveling off the roadway.

## DIGGINS

The Diggins Corridor (Section III) extends from approximately 0.95 miles west of the existing Highway A intersection to approximately 0.5 miles west of the W Clinton Avenue Intersection in Seymour. This section includes the consolidation of eight (8) existing at-grade intersections into one (1) interchange located at Highway A and one (1) overpass located at Short Road/Killdeer Road. Additionally, all six (6) rail crossings will be eliminated, with the implementation and extension of an outer road system that provides full highway access at Highway A, overpass access at Short Road, and highway access connecting to the W Clinton Avenue Interchange in Seymour.


## RAIL IMPROVEMENTS

The U.S. 60 and Rail Corridor through Diggins is the longest stretch within the study limits that the BNSF Railway parallels U.S. 60 in such proximity, as close as 65 feet at Short Road. This proximity creates significant safety concerns for vehicles entering and exiting the highway in the event of rail traffic. As such, the recommended plan calls for the elimination of all six (6) rail crossings (four (4) public and two (2) private) and their respective roadway intersections in the Diggins section and proposes the implementation of an outer road that parallels the rail through much of the Diggins area. Access over the BNSF Railway will be provided at the Highway A Interchange and Short Road overpass.

## HIGHWAY A INTERCHANGE

A full-access interchange is recommended at Highway A to increase safety, provide connectivity over the rail, and improve the transportation network resiliency. The existing Highway A/U.S. 60 intersection has one of the highest crash rates on the corridor. Additionally, the vast diversity in vehicle use creates major safety issues in this area; this area of rural Webster County sees high traffic volumes of agricultural vehicles, including farm trucks, tractors, equipment, and horses and buggies.
The diverse traffic mix of vehicular traffic and slower-moving horses and buggies along the high-speed corridor has resulted in frequent and severe or fatal crashes. An interchange at this location would eliminate the need for slow-moving traffic to cross U.S. 60 or travel on the shoulder, improving traffic safety.
Additionally, Highway NN, south of U.S. 60, is recommended to be realigned to connect at the proposed Highway A inter-
change. This will provide direct access to U.S. 60 over the railroad to many agricultural vehicles, trucks, and residents. Hwy NN is a key route to a local rock quarry, and services hundreds of heavy-loaded trucks daily. This realignment will provide safer access from U.S. 60, and eliminate all risk associated with heavy trucks crossing an active rail line.
The Highway A Interchange is identified as a key improvement along the corridor, as Highway A serves as the Incident Relief Route from U.S. 60 to I-44 in Marshfield. In the event of a road closure on either highway, high traffic volumes are rerouted on this rural two-lane highway to maintain east-west travel. Such events result in high traffic congestion and safety concerns at the Highway A/U.S. 60 intersection. The recommended interchange will improve traffic flow, safety, and support a resilient transportation network with redundant routes.

## SHORT ROAD OVERPASS

An overpass over U.S. 60 and the BNSF Railway is recommended at Short Road to provide adequate north-south connectivity. The study determined a full-access interchange was not needed in this area, as highway access is located approximately 2.5 miles to the west and 1.5 miles to the east. However, north-south access across U.S. 60 and the rail is necessary for much of the area residents and agricultural community to access their properties, residences, and businesses. An outer road system will maintain east-west access along the corridor.

## OUTER ROAD SYSTEM

An extensive outer road system is recommended to maintain east-west connectivity, tying into the Fordland outer road system at Highway A and seamlessly connecting Diggins to Seymour at the W Clinton Avenue Interchange. An outer road is proposed north of U.S. 60 from Highway A, connecting to N Diggins Main Street, Highway O, Berry Road, and Short Road. The plan proposes tying into the existing Brumback Road alignment, providing access to Skyline Road in Seymour.
An outer road south of U.S. 60 and the BNSF railway will connect to the Fordland section at Highway NN, extend east to the existing Box School Loop, and connect into Seymour at the W Clinton Avenve Interchange and at Finley Falls Road.

## HIGHWAY A CONNECTIVITY \& SHOULDER IMPROVEMENTS

Due to the high volumes of slow-moving horses and buggies along Highway A, the plan recommends improvements for permanent shoulder pull-offs. Currently, the existing aggregate pull-offs frequently wash out and are difficult to use in such condition. Constructing paved shoulder pull-offs will enhance the safety of users, amplify traffic safety, and improve traffic flow along this stretch of Highway A.
Additionally, it is recommended to provide an improved connection to Highway O, as U.S. 60 access is centered at the Highway A interchange. Road and intersection improvements are recommended along Diggins Road to Highway $O$, to improve road conditions for an increase in traffic.

## SEYMOUR

The Seymour Corridor (Section IV) extends from approximately 0.5 miles west of the existing $W$ Clinton Avenue intersection to the eastern Webster County line. This section includes the consolidation of 10 existing at-grade intersections into three (3) full-access interchanges. Additionally, recommendations include the elimination off four (4) at-grade rail crossings, upgrade of one (1) at-grade rail crossing and one (1) railroad overpass, with the construction of an extensive outer road system east of the City of Seymour. An outer road system on the west side of Seymour would connect the Diggins area to Seymour and U.S. 60 via an interchange at W Clinton Avenue.

## RAIL IMPROVEMENTS

Improvements are recommended along the rail corridor to reduce vehicle-train exposure and increase safety of vehicles along the U.S. 60 and rail corridors. Improvements call for the upgrade of the Oak Lawn Road crossing to be widened and include lights and gates. Additionally, the implementation of an outer road system from Oak Lawn Road to Cedar Gap

Road allows for the closure of five (5) total crossings (three (3) public and two (2) private): Pewee Crossing Road, Mineral Road, and Dewberry Road. Traffic at these locations would be routed to a proposed interchange at Peewee Crossing Road.
Additionally, a railroad overpass is proposed to tie into Summit Avenue and the E Clinton Avenue/Highway K intersection (north). The unique positioning of the rail dividing the community in half creates the potential for emergency responders to be blocked from providing life-saving aid or prevents residents from accessing the FEMA Safe Room in the event of severe weather. An overpass at this location will improve the community's safety, resiliency, and provide additional connectivity for future growth.

Additional rail improvements are recommended at the Charles Street at-grade crossing to install security fencing and ADA sidewalk upgrades for safer access to the local elementary school and YMCA.

## WEST CLINTON AVENUE INTERCHANGE

A full-access interchange and rail overpass is recommended to replace the W Clinton Avenue signalized intersection. An interchange at this location (just west of existing) would reduce the frequency and severity of crashes that occur at the existing signalized intersection. It is recommended that this interchange structure also span the BNSF Railway, providing safe and continuous access across the rail. The interchange is proposed to connect to a new road that extends from Bison Road to Forrest Road north of U.S. 60. An interchange at this location is expected to result in a reduction of 9.47 annual crashes and 2,482 annual minutes of control delay.

## HIGHWAY K/HIGHWAY C INTERCHANGE

A full-access interchange is recommended to replace the existing at-grade signalized Highway K/Highway C intersection. These routes see high traffic volumes that serve local routes to eateries, schools, and gas stations as well as regional routes south to Ava (Douglas County) and north into rural Webster County. Additionally, intersection improvements are proposed at the Highway K/E Clinton Avenue intersection to improve safety and capacity at the interchange.

A new connector road is proposed to extend Steel Street to Highway K, providing adequate access and minimizing adverse travel for residential and heavy-industrial traffic with the closure of Skyline Road.

An interchange at this location would result in the highest safety benefit on the entire corridor, as the existing signalized intersection has seen the highest number of crashes, and is expected to reduce the frequency of crash occurrences by 6.98 crashes annually.

## PEWEE CROSSING ROAD INTERCHANGE

A full access interchange is proposed at Peewee Crossing Road to provide access over the BNSF Railway and safer access while entering and exiting U.S. 60. An outer road system is proposed with the implementation of this interchange, allowing for the consolidation of several at-grade rail crossings and highway intersections. Additionally, it is recommended to realign the U.S. 60 eastbound lanes west of Peewee Crossing Road to improve roadway geometry and allow for the existing lanes to be utilized as an outer road from Oak Lawn Road. Additionally, Crosstie Road is proposed to be extended approximately 1.5 miles east to Highway $O$ in Wright County, reducing the adverse travel required.

## U.S. 60 GEOMETRY IMPROVEMENTS

The U.S. 60 eastbound lanes are recommended to be realigned to provide a gentler alignment and to reduce the frequency of crashes occurring in this sharper, highspeed curve.

## Building a Connected Corridor

An immersive Public Involvement process was undertaken with this study to engage the public for concerns, design ideas, and community needs. While each section was developed individually and public meetings were held in respective communities, a comprehensive approach was taken in determining solutions for the U.S. 60 Corridor. Rural southern Webster County vitally depends on the transportation network for personal and business use and for the local economies to thrive. Consideration was taken to not leave properties landlocked due to a rail crossing closure or roadway intersection closure.

An extensive outer road system that effectively parallels U.S. 60 for much of the 22 -mile study length was conceptually designed to allow unimpeded traffic flow to maintain access, increase connectivity, and increase safety along the U.S. 60 Corridor.

## Opinion of Probable Costs

An Engineer's Opinion of Probable Costs ("cost estimate") was prepared for the improvements recommended in the U.S 60 Corridor Master Plan. Table 10 below shows a summary of the estimated probable costs for each section of the corridor study. The cost opinions in 2019 dollars were developed by quantifying the conceptual design's major construction items and conceptual Rights-of-Way acquisition areas, and then applying representative unit prices based on local and statewide MoDOT contracts. Estimated costs for utility adjustments, preliminary engineering, construction engineering, and contingencies were added based on historical percentages of construction costs in collaboration with MoDOT. The cost opinions for each corridor section are included in Appendix D.
Though the corridor improvements would be phased over time to match available funding, it was assumed that all the work would be let for construction in 10 years or 2029. This was considered a reasonable amount of time for processing of railroad, MoDOT, and local-agency agreements, procuring of funding, and acquisition of R/W. Thus, the 2019 cost opinions were inflated to 2029 dollars using an assumed annual inflation rate of $2 \%$ and $3 \%$ for 10 years. The 2029-dollar amounts provide stakeholders with a reasonable target for programming and securing the necessary funds to implement the master-plan improvements. However, the cost opinions will need to be updated annually to reflect more detailed design studies, availability of funding, phasing of improvements, and actual inflation.
Probable costs were determined based on quantity estimates for conceptual roadway improvements. Unit costs are determined from historical local and statewide MoDOT contracts.

TABLE 14. OPINION OF PROBABLE COST SUMMARY

| Corridor Section | Probable Cost (2029 Dollars) |
| :---: | :---: |
| Section I - Rogersville | $\$ 17,229,833$ |
| Section II - Fordland | $\$ 41,185,462$ |
| Section III - Diggins | $\$ 31,223,880$ |
| Section IV - Seymour | $\$ 43,152,223$ |
| U.S. 60 Corridor | $\$ 132,791,398$ |

## Investment Need Analysis

Each alternative was analyzed independently of public opinion to determine which would provide the largest safety benefit and maintain a positive benefit-cost ratio. Analysis was conducted through the following process to illustrate which improvements provide the greatest net safety benefit:

1. Data collection consisted of site visits, interviews with key stakeholders, and utilization of the MoDOT, Federal Rail Administration (FRA), and BNSF databases.
2. Using the Missouri Exposure Index formula ${ }^{15}$ and USDOT Basic Crash Prediction, proposed improvements were compared to existing conditions.
3. Using the USDOT Basic and General Crash Prediction formulas ${ }^{16}$ simultaneously, accident prediction was based upon both crossing characteristics and historic crash data.
4. The societal crash costs for fatal, injury, and property damage were combined with accident prediction to estimate a crash cost per crossing.
5. The number of prevented crashes were converted to a monetary value to analyze the benefit of crossing upgrades/ closures. The Benefit-Cost Analysis was used to ensure the financial investment generates sufficient safety benefits.

[^3]

A Benefit-Cost Analysis (BCA) was performed on the proposed improvements to the U.S. 60 Corridor to provide analytics for making an investment-based decision on effectiveness, practicality, and implementation of the recommended improvements. The BCA value provides insight on a dollar-for-dollar return on investment, with a BCA value greater than 1.0 resulting in a net positive investment. Table 15 summarizes the results of the U.S. 60 Corridor BCA. As a result, the overall corridor BCA value was determined to be 1.53 on the conceptual cost estimate of approximately $\$ 132.8$ Million. The full BCA analysis model is attached in Appendix D .

TABLE 15. BCA ANALYSIS

|  | U.S. 60 Corridor Summary |  |  |
| :---: | :---: | :---: | :---: |
| Corridor Section | Total Cost (2029) | Net Benefits | BCA Value |
| Section I - Rogersville | $\$ 17,229,833$ | $\$ 9,850,790$ | $\mathbf{0 . 5 7}$ |
| Section II - Fordland | $\$ 41,185,462$ | $\$ 41,400,981$ | $\mathbf{1 . 0 1}$ |
| Section III - Diggins | $\$ 31,223,880$ | $\$ 44,998,180$ | $\mathbf{1 . 4 4}$ |
| Section IV - Seymour | $\$ 43,152,223$ | $\$ 105,497,100$ | $\mathbf{2 . 4 4}$ |
| U.S. 60 Corridor | $\$ 132,791,398$ | $\mathbf{\$ 2 0 3 , 3 2 9 , 0 5 0}$ | $\mathbf{1 . 5 3}$ |

The BCA was split into two categories: roadway and railway. Net benefits of the proposed improvements were determined based on engineering best management practices, including formulas and assumptions provided by AASHTO, Highway Safety Manual (HSM), MoDOT, the USDOT, the FRA, and CMT.

## QUANTIFIABLE BENEFITS

The implementation of the project will generate the following benefits that are quantified in the BCA:

## 1. Safety Benefits

- Elimination of conflicts between trains and vehicles through at-grade rail crossing and highway intersection consolidation will result in cost savings to both highway agencies and the BNSF Railway (liability insurance, litigation, property damage, forensic investigations, etc.)
- Reduction in annual and lifetime crash frequency and severity, which will result in an annual societal cost savings

2. Travel Time Savings

- Reduction in travel-time delays, which will result in an annual societal cost savings

3. Emissions Reduction

- Reduction in annual emissions pollution due to idling vehicles at blocked rail crossings and intersection control delay, resulting in indirect cost savings

4. Operations \& Maintenance Benefits

- Reduction of annual highway and rail operations and maintenance costs, which will result in direct annual cost savings


## QUALITATIVE \& ECONOMIC BENEFITS

There are also numerous benefits to the project that are non-quantifiable given the lack of available data or which involve broader impacts to the regional and state economies. However, these benefits should also be considered, which further enhance the net positive impacts on the local, regional, and national economies.

An economic analysis (see Section V) was performed for the U.S. 60 Corridor in Webster County. Economic weighting factors were considered, including population growth, industry analysis, employment opportunities, retail gap analysis (supply vs. demand), and projected land use. As a result, a "soft" BCA value was determined based on a combined value of the quantifiable and qualitative benefits (see Section V).

## Recommended U.S. 60 Corridor Master Plan

The U.S. 60 Corridor Master Plan is a long-term vision of the highway and rail corridor through southern Webster County. The study took a holistic approach to developing a connected corridor that not only improves safety and efficiency along the highway and rail line, but also maintains the local and regional connectivity that is vital to the local economies and rural residents. The master plan set forth in this study identifies areas of potential improvement, and prioritizes improvements based on quantitative analytics to justify the need for investment.
Overall, the U.S. 60 Corridor Master Plan recommends the consolidation of 49 at-grade highway access points to a limited access freeway with eight (8) full-access interchanges and one highway (1) overpass. Additionally, the plan recommends the closure of 21 at-grade rail crossings (16 Public and five (5) Private), two (2) at-grade rail crossing upgrades, one (1) rail overpass, and over 25 miles of outer roads. As a result of the recommended improvements, the corridor is expected to operate more efficiently and safely (see Section III - Corridor Traffic Analysis).

The total cost for improvements within the study is estimated at approximately \$132.8 Million (2029 dollars), with a Benefit-Cost Ratio of 1.53 , resulting in a positive return on investment. Improvements are anticipated to be implemented in phases based on funding availability and are further detailed in Section VII.
Figure 8 below identifies the eight (8) proposed highway interchanges and rail overpasses along the corridor. A detailed exhibit showing all improvements along the U.S. 60 Corridor is attached in Appendix C.


Figure 8. U.S. 60 Corridor Key Improvements

## Economic Analysis \& Land Use Planning

## V - Economic Analysis \& Land Use Planning

## Introduction

The U.S. 60 Corridor Master Plan recommends the consolidation of at-grade intersections and the conversion of the existing highway to a limited access freeway with eight (8) full-access interchanges and one (1) highway overpass. To further understand the full impacts and opportunities associated with the recommended improvements, the study was expanded to include an economic analysis and land-use planning component to assess the potential opportunities for economic development as a result of the project. The U.S. 60 economic and land use planning analysis examined the demographic and economic performance of the communities along the U.S. 60 corridor in Webster County and assessed the projections of future retail growth. Additionally, the analysis developed land-use projections for residential, commercial, and industrial uses in each of the four communities along U.S. 60 in Webster County: Seymour, Diggins, Fordland, and Rogersville.
Webster County is located in southwest Missouri and is part of the Springfield, MO, metropolitan statistical area (MSA). There are four population centers located along U.S. 60 in Webster County (from west to east): Rogersville, Fordland, Diggins, and Seymour. In addition, the U.S. 60 corridor in Webster County crosses four zip codes: 65742, 65652, 65636, and 65746. This analysis utilized both zip code and community-level data to examine population, housing, and economic characteristics of each community.

Detailed analysis tables are attached in Appendix E. It should be noted that all economic analyses are performed based on existing infrastructure and the proposed recommendations in the U.S. 60 Corridor Study which are expected to generate and accelerate economic growth in the area.

## Population and Housing Assessment

In order to assess the economic development potential for the U.S. 60 corridor, it is necessary to assess the current and projected population growth in each of the four (4) communities along the corridor. Table 12 provides population and household growth estimates from 2010 to 2019 and projections to 2024.
From 2010 to 2019, Rogersville's population grew from just over 3,000 to 3,883 resulting in an annual growth rate of $2.63 \%$, the highest among the four (4) U.S. 60 communities in Webster County. The population in Rogersville is projected to grow by an average of $1.52 \%$ over the next five (5) years to 4,188 .
Fordland's population increased by an average of $0.83 \%$ annually from 800 in 2010 to almost 900 in 2019 . Over the next five years, Fordland is projected to grow by an average of $0.84 \%$ each year.

Diggins' population has grown from 299 in 2010 to 327 ( $1.0 \%$ annual growth). Over the next five (5) years, the Diggins community is projected grow to 342 with an annual growth rate of $0.90 \%$.

Between 2010 and 2019, Seymour's population increased $0.54 \%$ per year from 1,921 to 2,016, and is projected to increase to 2,070 by 2024, an average annual increase of $0.53 \%$. In comparing these four (4) communities to all of Webster County, only Rogersville has historical and future growth rates that exceed that of Webster County ${ }^{17}$.

TABLE 16. U.S. 60 POPULATION AND HOUSING PROJECTIONS

| Statistic | Rogersville | Fordland | Diggins | Seymour | Webster County |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Population |  |  |  |  |  |
| 2010 Census | 3,073 | 800 | 299 | 1,921 | 36,202 |
| 2019 Estimate | 3,883 | 862 | 327 | 2,016 | 39,607 |
| 2024 Projection | 4,188 | 899 | 342 | 2,070 | 41,474 |
| Annual Growth Rate 2010-2019 | 2.63\% | 0.83\% | 1.00\% | 0.54\% | 1.00\% |
| Annual Growth Rate 2019-2024 | 1.52\% | 0.84\% | 0.90\% | 0.53\% | 0.93\% |
| Households |  |  |  |  |  |
| 2010 Census | 1,138 | 312 | 118 | 746 | 13,062 |
| 2019 Estimate | 1,426 | 334 | 129 | 834 | 14,194 |
| 2024 Projection | 1,536 | 348 | 136 | 875 | 14,844 |
| Annual Growth Rate 2010-2019 | 2.54\% | 0.76\% | 1.00\% | 1.25\% | 0.93\% |
| Annual Growth Rate 2019-2024 | 1.50\% | 0.82\% | 1.06\% | 0.96\% | 0.90\% |

Figure 9 highlights the historical and future population growth in the zip codes that encompass the U.S. 60 Corridor. Between 2009 and 2019, the population has grown from 16,206 to 19,712. Over the next ten (10) years, the population is expected to grow to 20,754, representing a $28 \%$ increase from 2009 to $2029^{18}$.

Compared to the state (5\%) and national (11\%) growth rates, the U.S. 60 Corridor has significantly outpaced both and is one of the


Figure 9. U.S. 60 Population Growth (2009-2029) fastest growing areas in Missouri over the same time period. Additionally, when the populations are broken down into age generations, it was found that there is an increase in residents ages 19 and under, as well as those 55 to 85 . The only age groups projected to decline include those aged 45 to 54 years old.

Table 16 (above) also highlights the growth in households between 2010 and 2019 along with the projected growth over the next five (5) years in each community along the corridor. The number of households is expected to increase on average $1.50 \%, 0.82 \%, 1.06 \%$, and $0.96 \%$ annually for the Rogersville, Fordland, Diggins, and Seymour communities, respectively. Most notably, the U.S. 60 Corridor as a whole is projected to have an average annual household increase greater than Webster County as a whole.
Table 17 provides information on the availability and price of housing in each of the four (4) communities along with Webster County. It is important to note that each of the four (4) communities have total occupancy rates, owner-occupancy rates, and median home values below the average for Webster County, and higher renter-occupancy rates.
Rogersville has the highest occupancy rate (89.5\%), median home value ( $\$ 120,100$ ), and housing stock ( 1,411 ) among the four (4) U.S. 60 corridor communities. Diggins has the highest owner-occupancy rate at $72.5 \%$, while Fordland has the highest renter-occupancy rate at $46.3 \%{ }^{19}$.

TABLE 17. U.S. 60 HOUSING AVAILABILITY AND PRICE

|  | Diggins | Fordland | Rogersville | Seymour | Webster County |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Total Housing Units | 140 | 418 | 1,411 | 985 | 14,650 |
| Occupied Housing Units | 120 | 365 | 1,263 | 834 |  |
| Occupancy Rate | $85.7 \%$ | $87.3 \%$ | $89.5 \%$ | $84.7 \%$ | 9,311 |
| Median Home Value | $\$ 86,900$ | $\$ 81,300$ | $\$ 120,100$ | $\$ 76,500$ | $\$ 122,500$ |
| Owner-Occupied Rate | $72.5 \%(87)$ | $53.7 \%(196)$ | $63.9 \%(807)$ | $65.1 \%(543)$ | $72.8 \%(9,684)$ |
| Renter-occupied Rate | $27.5 \%(33)$ | $46.3 \%(169)$ | $36.1 \%(456)$ | $34.9 \%(291)$ | $27.2 \%(3,627)$ |

[^4]
## Economic Development and Job Growth Projections

The Webster County and U.S. 60 Corridor economies have seen steady improvement since the 2009 recession. The Webster County unemployment rate has fallen from the all-time high of $10.5 \%$ in 2010, to an all-time low of $3.9 \%$ in 2019 $\left(\right.$ Figure 10) ${ }^{20}$. The U.S. 60 Corridor has seen steady job growth since 2009 with the number of jobs increasing from 4,049 to 4,387 in 2019, with the projected


Figure 10. Webster County Unemployment growth resulting in 4,945 jobs by 2029 .
Table 18 highlights changes in the number of jobs in the four (4) communities in key industry sectors. The fastest growing industries along the corridor over the past ten (10) years were manufacturing ( 480 jobs, $158 \%$ increase) and health care and social assistance with $158 \%$ and $139 \%$ increases, respectively. Both government and retail trade have seen significant decreases in jobs since 2009 with a $12 \%$ \& $15 \%$ decrease, respectively. Over the next ten years, manufacturing, health care, and social assistance are projected to continue to grow, in addition to continued growth in the high earning sectors such as wholesale trade ( $9 \%$ growth) and transportation and warehousing ( $20 \%$ growth).

TABLE 18. U.S. 60 CORRIDOR JOB CHANGE BY INDUSTRY

| Industry | 2019 Jobs | 2009-2019 Change | 2019-2029 <br> Projected Change | Average Earnings <br> Per Job (2018) |
| :---: | :---: | :---: | :---: | :---: |
| Government | 799 | $-12 \%(-105)$ | $-2 \%(-15)$ | $\$(48,826$ |
| Manufacturing | 785 | $158 \%(481)$ | $36 \%(280)$ | $\$ 45,428$ |
| Construction | 688 | $16 \%(94)$ | $11 \%(78)$ | $\$ 35,198$ |
| Retail Trade | 436 | $-15 \%(-77)$ | $-4 \%(-16)$ | $\$ 29,981$ |
| Health Care and Social Assistance | 322 | $139 \%(187)$ | $38 \%(121)$ | $\$ 37,561$ |
| Accommodation and Food Services | 267 | $9 \%(22)$ | $15 \%(41)$ | $\$ 14,535$ |
| Transportation and Warehousing | 191 | $22 \%(35)$ | $20 \%(38)$ | $\$ 68,280$ |
| Wholesale Trade | 137 | $0 \%(0)$ | $9 \%(13)$ | $\$ 92,446$ |
| Finance and Insurance | 104 | $-22 \%(-29)$ | $-16 \%(-17)$ |  |
|  |  |  |  |  |

Industry specialization along the corridor is key for potential investors to be able to identify prime locations for future development and industry growth. Figure 11 visually depicts the level of specialization and projected growth of specialization over the next ten (10) years as a location quotient. A location quotient (LQ) is a measure of the level of specialization in a region of an industry, occupation, or other demographic measure compared to a larger geographic area, and it is calculated by dividing the specialization of a particular industry in one region by the national or state level special-


[^5]ization in the same industry. The resulting $L Q$ represents industry concentration in a specific region compared to the nation. $A L Q$ of 1.0 means that the region and the nation have the same relative specialization in an industry, while a $L Q$ below 1.0 means that the region is at a competitive disadvantage compared to the nation and a $L Q$ above 1.0 means the region has a competitive advantage in that industry. The LQ in Figure 11 also represents the current employment level by the scale of the ellipse.

The economic analytics resulted in high LQ values of Manufacturing (2.7), meaning this industry is expected to grow approximately $30 \%$ in the next ten (10) years and employment is expected to significantly increase. Overall, most industry sectors in the region will continue to grow in terms of specialization. The analysis suggests that communities along the U.S. 60 corridor should focus on enhancing and fostering their existing and projected advantage in manufacturing while attempting to grow complementary sectors such as transportation and warehousing.

In addition to industry sector growth, the analysis included the historical and projected growth by occupation. Overall, the top nine (9) occupation categories in the region are expected to add employment over the next ten (10) years. The top occupation, Construction and Extraction, has seen robust growth since 2009 of $12 \%$ and is expected to grow by another $10 \%$ in the next ten (10) years. This growth will enhance the region's specialization in this occupation, which has a LQ of 2.70 .

Additionally, production occupations that provide manufacturing support have seen incredible growth of $119 \%$ since 2009 and are projected to grow by an additional $30 \%$ over the next ten (10) years, significantly increasing the occupation's LQ of 2.05. Given the region's advantage in manufacturing, coupled with an LQ of 1.10, transportation and material-moving jobs is projected is have high regional growth, with an estimated $12 \%$ increase over the next ten (10) years.

## Retail Growth Projections

U.S. 60 is an essential and vital roadway for economic and retail activity in southern Webster County. A key component of the U.S 60 Corridor plan is to assess the potential for expanded retail activity in Rogersville, Fordland, Diggins, and Seymour. CMT relied on ESRI Retail Marketplace Data, which uses census, business-level, and geographic information to estimate retail expenditures and individual spending by those who reside in a specific area for 13 common retail sectors. This allowed for the calculation of the following for each community:

- Retail potential (Demand) - Spending individuals who live in an area
- Retail Sales (Supply) - Actual retail sales in an area
- Positive Retail Gap - Less supply of retail sales than demand (opportunity to build retail base)
- Negative Retail Gap - More supply of retail sales than demand (ability to attract out of area spending)

ERSI data available only provides estimates on business size and numbers within each community. While the data in this analysis provides an estimated number of businesses, it may not reflect the actual amount in each community. This data is designed to provide a generalized projection of the local economies, and further analysis should be performed to determine specific economic develop opportunities.

## ROGERSVILLE

Table 15 presents the retail gap analysis for Rogersville. The retail sectors of motor vehicle and parts dealers, furniture stores, health and personal care stories, and gasoline stations have a negative retail gap, thus Rogersville is attracting people from surrounding areas to spend their dollars in these areas. The retail sectors with greatest positive retail gap (more local demand than supply) include general merchandise and building materials, garden, and supply stores.
Overall, Rogersville has $\$ 5.6$ million more in demand than supply of retail. This analysis, coupled with the growing population, suggests there is an opportunity to build upon the 31 retail business establishments by attracting new retail opportunities that supply both the local demand and the attracted demand from outside the immediate community.

TABLE 19. ROGERSVILLE RETAIL GAP ANALYSIS

| Industry Group | Demand (Retail Potential) | Supply (Retail Sales) | Retail Gap | Number of Businesses |
| :---: | :---: | :---: | :---: | :---: |
| Motor Vehicle \& Parts Dealers | \$8,697,950 | \$10,717,411 | -\$2,019,461 | 8 |
| Furniture \& Home Furnishings Stores | \$1,289,487 | \$1,332,729 | -\$43,242 | 1 |
| Electronics \& Appliance Stores | \$1,183,922 | \$300,890 | \$883,032 | 1 |
| Building Materials, Garden, and Supply Stores | \$2,868,041 | \$1,005,704 | \$1,862,337 | 2 |
| Food \& Beverage Stores | \$6,433,666 | \$5,603,207 | \$830,459 | 1 |
| Health \& Personal Care Stores | \$2,280,256 | \$5,255,683 | -\$2,975,427 | 3 |
| Gasoline Stations | \$4,612,355 | \$8,556,232 | -\$3,943,877 | 2 |
| Clothing \& Clothing Accessories Stores | \$1,718,390 | \$460,906 | \$1,257,484 | 1 |
| Sporting Goods, Hobby, Book, \& Music Stores | \$1,155,317 | \$70,168 | \$1,085,149 | 1 |
| General Merchandise Stores | \$7,487,238 | \$914,179 | \$6,573,059 | 1 |
| Miscellaneous Store Retailers | \$1,613,317 | \$0 | \$1,613,317 | 0 |
| Nonstore Retailers | \$443,161 | \$0 | \$443,161 | 0 |
| Food Services \& Drinking Places | \$4,260,974 | \$4,174,635 | \$86,339 | 10 |
| Total | \$44,044,074 | \$38,391,744 | \$5,652,330 | 31 |

## FORDLAND

Table 20 presents the retail gap analysis for Fordland. There are only four (4) retail business establishments in Fordland and combine for $\$ 1.4$ million in annual sales. However, the residents of Fordland spend approximately $\$ 8.5$ million annually in retail establishments, resulting in a negative $\$ 7.1$ million retail gap, and opportunity to attract businesses in all of the 13 retail categories to increase economic development.

TABLE 20. FORDLAND RETAIL GAP ANALYSIS

| Industry Group | Demand (Retail Potential) | Supply (Retail Sales) | Retail Gap | Number of Businesses |
| :---: | :---: | :---: | :---: | :---: |
| Motor Vehicle \& Parts Dealers | \$1,786,050 | \$0 | \$1,786,050 | 0 |
| Furniture \& Home Furnishings Stores | \$231,478 | \$0 | \$231,478 | 0 |
| Electronics \& Appliance Stores | \$210,267 | \$0 | \$210,267 | 0 |
| Building Materials, Garden, and Supply Stores | \$591,486 | \$0 | \$591,486 | 0 |
| Food \& Beverage Stores | \$1,246,968 | \$788,121 | \$458,847 | 2 |
| Health \& Personal Care Stores | \$464,851 | \$0 | \$464,851 | 0 |
| Gasoline Stations | \$941,293 | \$0 | \$941,293 | 0 |
| Clothing \& Clothing Accessories Stores | \$307,505 | \$0 | \$307,505 | 0 |
| Sporting Goods, Hobby, Book, \& Music Stores | \$210,499 | \$0 | \$210,499 | 0 |
| General Merchandise Stores | \$1,411,184 | \$577,612 | \$833,572 | 1 |
| Miscellaneous Store Retailers | \$325,042 | \$0 | \$325,042 | 0 |
| Nonstore Retailers | \$89,892 | \$0 | \$89,892 | 0 |
| Food Services \& Drinking Places | \$767,767 | \$39,880 | \$727,887 | 1 |
| Total | \$8,584,282 | \$1,405,613 | \$7,178,669 | 4 |

## DIGGINS

The analysis shows that there is currently only one (1) retail business establishment in the village that produces $\$ 36,000$ in annual sales (Table 21). While there may be other small businesses within the community, there is only one (1) large enough to appear in the ESRI database. The residents of Diggins generate approximately $\$ 3.9$ million in retail demand each year, resulting in a $\$ 3.8$ million annual negative retail gap. Given the community's relatively small population base, it is unlikely to attract a retail establishment in each retail sector. The results suggest targeted attraction efforts in the areas of highest demand, such as motor vehicle parts, along with focus on retail establishments that improve quality of life such as restaurants, may prove to be an effective strategy.

TABLE 21. DIGGINS RETAIL GAP ANALYSIS

| Industry Group | Demand (Retail Potential) | Supply (Retail Sales) | Retail Gap | Number of Businesses |
| :---: | :---: | :---: | :---: | :---: |
| Motor Vehicle \& Parts Dealers | \$807,632 | \$0 | \$807,632 | 0 |
| Furniture \& Home Furnishings Stores | \$104,671 | \$0 | \$104,671 | 0 |
| Electronics \& Appliance Stores | \$95,080 | \$0 | \$95,080 | 0 |
| Building Materials, Garden, and Supply Stores | \$267,463 | \$36,119 | \$231,344 | 1 |
| Food \& Beverage Stores | \$563,866 | \$0 | \$563,866 | 0 |
| Health \& Personal Care Stores | \$210,201 | \$0 | \$210,201 | 0 |
| Gasoline Stations | \$425,642 | \$0 | \$425,642 | 0 |
| Clothing \& Clothing Accessories Stores | \$139,051 | \$0 | \$139,051 | 0 |
| Sporting Goods, Hobby, Book, \& Music Stores | \$95,184 | \$0 | \$95,184 | 0 |
| General Merchandise Stores | \$638,123 | \$0 | \$638,123 | 0 |
| Miscellaneous Store Retailers | \$146,982 | \$0 | \$146,982 | 0 |
| Nonstore Retailers | \$40,647 | \$0 | \$40,647 | 0 |
| Food Services \& Drinking Places | \$347,175 | \$0 | \$347,175 | 0 |
| Total | \$3,881,717 | \$36,119 | \$3,845,598 | 1 |

## SEYMOUR

There are an estimated 33 retail business establishments in Seymour that generate over $\$ 24$ million in annual retail sales (Table 22). This level of sales generates the local retail demand of $\$ 17$ million, resulting in a negative retail gap of over $\$ 7$ million. Much of this gap is centered on two key sectors: food-and-beverage stores and health-and-personal care stores, suggesting many residents from nearby towns and rural areas are driving to Seymour for food shopping and medical needs.

Despite the overall negative retail gap, there are several noticeable areas for retail expansion in Seymour. While Seymour does have some motor vehicle and parts sales, it is losing $\$ 1.4$ million annually to sales outside of the area, resulting in opportunity for increased industry and local sales within the City of Seymour.

TABLE 22. SEYMOUR RETAIL GAP ANALYSIS

| Industry Group | Demand (Retail <br> Potential) | Supply (Retail <br> Sales) | Retail Gap <br> Businesses |  |
| :---: | :---: | :---: | :---: | :---: |
| Motor Vehicle \& Parts Dealers | $\$ 3,665,398$ | $\$ 2,214,165$ | $\$ 1,451,233$ | 5 |
| Furniture \& Home Furnishings Stores | $\$ 440,001$ | $\$ 0$ | $\$ 440,001$ | 0 |
| Electronics \& Appliance Stores | $\$ 423,508$ | $\$ 343,874$ | $\$ 79,634$ | 1 |
| Building Materials, Garden, and Supply Stores | $\$ 1,165,399$ | $\$ 1,390,708$ | $-\$ 225,309$ | 3 |
| Food \& Beverage Stores | $\$ 2,596,783$ | $\$ 11,252,596$ | $-\$ 8,655,813$ | 7 |
| Health \& Personal Care Stores | $\$ 961,960$ | $\$ 5,209,099$ | $-\$ 4,247,139$ | 2 |
| Gasoline Stations | $\$ 1,937,026$ | $\$ 0$ | $\$ 1,937,026$ | 0 |
| Clothing \& Clothing Accessories Stores | $\$ 580,622$ | $\$ 84,652$ | $\$ 495,970$ |  |


| Industry Group | Demand (Retail <br> Potential) | Supply (Retail <br> Sales) | Retail Gap | Number of <br> Businesses |
| :---: | :---: | :---: | :---: | :---: |
| Sporting Goods, Hobby, Book, \& Music Stores | $\$ 421,068$ | $\$ 248,822$ | $\$ 172,246$ |  |
| General Merchandise Stores | $\$ 2,829,034$ | $\$ 2,281,869$ | $\$ 547,165$ | 2 |
| Miscellaneous Store Retailers | $\$ 694,160$ | $\$ 596,349$ | $\$ 97,811$ | 3 |
| Nonstore Retailers | $\$ 208,145$ | $\$ 0$ | $\$ 208,145$ | 4 |
| Food Services \& Drinking Places | $\$ 1,479,993$ | $\$ 1,058,329$ | $\$ 421,664$ | 0 |
| Total | $\$ 17,403,097$ | $\$ 24,680,463$ | $-\$ 7,277,366$ | 5 |

## U.S. 60 Corridor New Retail Demand Potential

Using the data in the preceding sections, projections of future retail demand over the next ten years were developed. Per Capita retail spending estimates were projected using population projections and existing retail spending for each community. Ten (10) year projections were generated by applying the population compounded annual growth rate (CAGR) to each population base, in conjunction with the projected new residents. A $\$ 300 /$ SF assumption was applied to estimate the potential net new retail square footage in the next ten (10) years. A future reduction in SF/Capita assumption was applied to account for online shopping utilizing previous Webster County studies, including the Marshfield Economic Development Plan.
Table 23 presents the results of the new retail potential analysis. Rogersville has the highest retail potential at over \$7 million in potential new spending, resulting in the potential for 19,000 square feet of new retail space over the next ten (10) years. New economic development is projected to be driven by the significant population growth and the high retail spending per capita. Seymour has the second highest retail potential with over \$940,000 in potential new retail spending, resulting in 2,500 square feet in new potential retail space over the next ten (10) years.

TABLE 23. U.S. 60 CORRIDOR NEW RETAIL DEMAND POTENTIAL

| Indicator | Rogersville | Fordland | Diggins | Seymour | Webster County |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Retail spending per capita | $\$ 11,343$ | $\$ 9,959$ | $\$ 11,871$ | $\$ 8,632$ | $\$ 10,428$ |
| Population CAGR (2019-2024) | $1.52 \%$ | $0.84 \%$ | $0.90 \%$ | $0.53 \%$ | $0.93 \%$ |
| Projected 10-Year Population Growth | 634 | 76 | 31 | 109 | 3,822 |
| Potential New Retail Spending | $\$ 7,190,844$ | $\$ 752,750$ | $\$ 364,289$ | $\$ 944,795$ | $\$ 39,855,077$ |
| Potential New Retail SF (\$300/sf) | 23,969 | 2,509 | 1,214 | 3,149 | 132,850 |
| Future Reduction in SF per capita (20\%) | 4,794 | 502 | 243 | 630 | 26,570 |
| Potential Net New Retail SF | 19,176 | 2,007 | 971 | 2,519 | 106,280 |

## Land Use Projections

The economic development analysis above was used to project land use demand within the study area along the U.S. 60 Corridor. Land uses were broken down into three different categories: residential, commercial (retail), and industrial (manufacturing and logistics).

For purposes of analysis, all growth was assumed to occur within the incorporated limits of Rogersville, Fordland, Diggins or Seymour and not in unincorporated Webster County. Actual land use is expected to occur both within and outside of these incorporated limits. These municipalities are best positioned to provide needed utility services, such as water, sewer, electricity, and telephone/cable for new land development, whereas private water wells and treatment plants would likely be needed outside of these areas. Finally, roadway pavement and capacity within the four (4) cities is assumed to be more capable to accommodate new development and higher traffic counts compared to roads in unincorporated areas.

## Residential Land Use

Residential land use projections were projected over the next ten (10) years and are based on three (3) factors: projected population growth, average household size, and expected new-dwelling unit density (Table 24).

TABLE 24. HOUSING NEEDS

| Municipality | Total Additional Residents in <br> $\mathbf{2 0 2 9}$ | Average Household Size | New Dwelling Units Needed for <br> Additional Residents |
| :---: | :---: | :---: | :---: |
| Rogersville | 634 | 2.70 | 231 |
| Fordland | 76 | 2.56 | 29 |
| Diggins | 31 | 2.53 | 14 |
| Seymour | 109 | 2.52 | 43 |

Dwelling-unit density is determined utilizing generalized current housing patterns for each community based upon available aerial photography and zoning maps. Compared to similar small Midwest community development patterns, the following estimates were made for the U.S. 60 Corridor and summarized in Table 25:

- 70\% of the existing housing supply is detached single-family residential
- $20 \%$ is two-family (duplex) housing
- 10\% is multi-family housing

TABLE 25. NEW DWELLING UNITS BY TYPE THROUGH 2029

| Municipality | Detached Single Family (70\% <br> of new dwelling units) | Two Family (20\% of new <br> dwelling units) | Multi-Family (10\% of new dwelling <br> units) |
| :---: | :---: | :---: | :---: |
| Rogersville | 162 | 46 | 23 |
| Fordland | 20 | 6 | 3 |
| Diggins | 10 | 3 | 1 |
| Seymour | 30 | 9 | 4 |

Table 26 summarizes the projected acreage required to accommodate the projected new housing in each community. The following standards were utilized for required residential land development:

- 4 dwelling units per acre ( $0.25 / \mathrm{Ac}$ ) for single-family detached development
- 6 dwelling units per acre ( $0.14 / \mathrm{Ac}$ ) for two-family (duplex) development
- 11 dwelling units per acre ( $0.09 / \mathrm{Ac}$ ) for multi-family development

Land requirements for the 317 total projected housing units along the U.S. 60 Corridor are estimated to require 67.6 acres, with 55.5 acres for new single-family development, 9.25 acres for duplex development, and 2.85 acres for multifamily development.

Land projections do not include the land necessary for community infrastructure, services, and amenities such as fire \& police, parks and recreation, public utilities, etc. Such infrastructure and amenities would increase the total acreage to support the residential demand by approximately 10-20\%, depending on land use efficiency.

TABLE 26. RESIDENTIAL LAND USE DEMAND FOR POPULATION GROWTH THROUGH 2029

|  | Residential Development Land Needs |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Municipality | Single Family <br> (4 units/Ac) | Two-Family <br> $(7$ units/Ac) | Multi-Family <br> (11 units/Ac) | TOTAL (Acres) |
| Rogersville | 40.5 | 6.5 | 2.10 | 49.10 |
| Fordland | 5.0 | 1.0 | 0.25 | 6.25 |
| Diggins | 2.5 | 0.5 | 0.10 | 3.10 |
| Seymour | 7.5 | 1.25 | 0.40 | 9.15 |
| TOTAL | $\mathbf{5 5 . 5}$ | $\mathbf{9 . 2 5}$ | $\mathbf{2 . 8 5}$ | $\mathbf{6 7 . 6}$ |

## Commercial and Industrial Land Use

In this analysis, Commercial and Industrial sectors determined by the North American Industry Classification System (NAICS) codes were split into three (3) categories: industrial, commercial, and office (Table 27). Assumptions were made for land-to-building ratios and the number of employees per acre by industry.

TABLE 27. INDUSTRY CLASSIFICATIONS

| NAICS | Description |
| :---: | :---: |
| 23 | - Construction/Extraction |
| 31 | - Manufacturing |
| 42 | - Wholesale Trade |
| 44 | - Retail Trade |
| 48 | - Transportation and Warehousing |
| 51 | - Information |
| 52 | - Finance and Insurance |
| 53 | - Real Estate and Rental and Leasing |
| 54 | - Professional, Scientific, and Technical Services |
| 55 | - Management of Companies and Enterprises |
| 56 | - Administrative and Support and Waste Management and Remediation Services |
| 61 | - Educational Services |
| 62 | - Health Care and Social Assistance |
| 71 | - Arts, Entertainment, and Recreation |
| 72 | - Accommodation and Food Services |
| 81 | - Other Services (except Public Administration) |
| 90 | - Government |
| - Industrial - Commercial Office |  |

Land-to-building ratios were assumed to be 3:1, based upon average commercial land use standards of 2.5:1 to 3.5:1 in the Midwest. Other components outside of the structure necessary include parking lots, stormwater detention areas, and building setbacks as required by zoning codes.
Assumptions for employee-to-land ratios vary based on whether the industry sector is more employee-intensive or vehicle/ equipment-intensive. The assumptions used are as follows:

- Office Use - 20 Employees/acre
- Commercial Use - 20 Employees/acre
- Industrial Use - 18 Employees/acre


## ROGERSVILLE

The Rogersville section is projected to generate 339 jobs over the next ten (10) years, with total annual earnings of approximately $\$ 14,189,000$ (see Appendix E). It is important to note that not all projected jobs will be "new" jobs, as many employees change industries in which they work as a result of factors including new job skills, changes in the economy, and lifestyle preferences (such as job commute times, work schedules, etc.).

Therefore, only 20-30\% of the 339 projected jobs are estimated to be those directly related to new job growth in Rogersville. If $20 \%$ of projected jobs are new to Rogersville ( 68 new jobs), the community can expect a $\$ 2,838,000$ total positive benefit from 2019 to 2029. If $30 \%$ of projected jobs are new to Rogersville ( 102 new jobs), a \$4,257,000 total positive benefit from 2019 to 2029 can be expected.

Rogersville is expected to need approximately 17 acres of developable land to accommodate job growth through 2029. The majority of this acreage ( $80 \%$ ) will be needed for industrial uses. Additionally, there is an estimated need of approximately 2.5 acres for office space and one (1) acre of commercial land space within the next ten (10) years.
TABLE 28. ROGERSVILLE LAND USE PROJECTIONS BY INDUSTRY CATEGORY (2019-2029)

| Land Use | Projected Jobs through <br> 2029 | Net Additional SF <br> Needed (through 2029) | Acres Needed* (3:1 land <br> to building ratio) | \% of Total |
| :---: | :---: | :---: | :---: | :---: |

*Projected Jobs by Employees per Acre (per Table 26)
Locational needs for industrial uses are generally tied to proximity and access to transportation systems. U.S. 60 will be critical for both short and long-haul vehicles. The proposed White Oak Road Interchange on the east side of the city offers access to U.S. 60, existing industrial zoning in the immediate vicinity, and available vacant land that could accommodate these uses. Additionally, Highway B leading north out of Rogersville offers access to I-44, 15 miles to the north via the Northview Interchange.

Since residents and commuters have needs that are met by commercial retail establishments such as food, clothing, home goods, etc., job growth and population growth positively impacts retail spending. New retail spending in Rogersville as a result of job and population growth from 2019-2029 is estimated to be \$7,191,000 (\$719,000 annually).

## FORDLAND

The Fordland section is expected to generate 104 jobs, with total annual average earnings of \$6,208,000 (see Appendix $\mathrm{E})$.

With an estimated 20-30\% of projected jobs expected to be directly related to new job growth, the following assumptions are expected:

- If $20 \%$ of projected jobs are new to Fordland ( 21 new jobs), the community can expect a $\$ 1,242,000$ total positive benefit from 2019 to 2029.
- If $30 \%$ of projected jobs are new to Fordland (31 new jobs), a \$1,863,000 total positive benefit from 2019 to 2029 can be expected.
TABLE 29. FORDLAND LAND USE PROJECTIONS BY INDUSTRY CATEGORY (2019-2029)

| Land Use | Projected Jobs through <br> 2029 | Net Additional SF <br> Needed (through 2029) | Acres Needed* (3:1 <br> land to building ratio) | \% of Total |
| :---: | :---: | :---: | :---: | :---: |
| Office | 47 | 23,532 | 1.62 acres | $\mathbf{3 5 . 0 \%}$ |
| Commercial | 9 | 6,534 | 0.45 acres | $\mathbf{9 . 7 \%}$ |
| Industrial | 46 | 37,107 | 2.56 acres | $\mathbf{5 5 . 2 \%}$ |
| TOTALS | 102 | $\mathbf{6 7 , 1 7 3}$ | $\mathbf{4 . 6 3}$ acres | $\mathbf{1 0 0 \%}$ |

*Projected New Jobs divided by Employees per Acre (per Table 22)
Fordland is expected to need approximately 4.63 acres of developable land to accommodate job growth through 2029. The majority of this acreage (55\%) will be needed for Industrial uses. Additionally, there is a need of 1.6 acres for office use and approximately 0.50 acres of commercial land use in the next ten (10) years. New retail spending in Fordland as a result of growth from 2019-2029 is estimated to be \$753,000 (\$75,300 annually).

As U.S. 60 is critical for the short and long-haul of goods along the corridor, the proposed Burks Street (Highway FF) interchange offers opportunities for office, commercial, and industrial uses with convenient access to U.S. 60 within city limits. Locating within existing city limits increases the availability of utility services as well as public safety needs, including fire and police.

While presently outside city limits, the Highway U Interchange west of Fordland and the Highway Z Interchange east of Fordland also offer north-south access to communities in those directions. These areas have the potential to be annexed in the future, making them prime locations for industrial uses in the long term.

## DIGGINS

Due to the lack of data on industry employment projections, the land-use projection method used for the other municipalities in this study has been modified for Diggins. The following two approaches were utilized:

## 1. "PRORATED JOB ALLOCATION" METHOD

The Prorated Job Allocation method utilizes the total projected additional jobs in Rogersville, Fordland and Seymour within seven industry areas and assigns jobs in these same industries based on the percent of population residing in Diggins compared to the urban population in the study area as a whole (see Appendix E).

The result assigns additional jobs by industry based on Diggins 2019 population as compared to the total 2019 population within all four cities. Note that 2019 population estimates in unincorporated Webster County are not utilized as employment growth is assumed to occur within the four cities in the study area and not the county due to the availability of utility services such as water and sanitary sewer.

Since Diggins has 5\% of the population within the incorporated areas, the Prorated Job Allocation method assumes Diggins is likely to receive a similar 5\% share of additional jobs (28 additional jobs) through 2029.

As only $20-30 \%$ of the 28 projected jobs are estimated to be those directly related to new job growth in Diggins, the following projections result:

- If $20 \%$ of projected jobs are new to Diggins (6 new jobs), the community can expect a $\$ 256,000$ total positive benefit from 2019 to 2029.
- If $30 \%$ of projected jobs are new to Diggins (8 new jobs), a \$383,000 total positive benefit from 2019 to 2029 can be expected.


## 2. "PERCENTAGE OF COMPARABLE PEER CITY" METHOD

The Percentage of Comparable Peer City method is similar to the Prorated Job Allocation method, except that job growth is based on the city most similar in size to Diggins in the study area: Fordland. With an estimated 2019 population of 327, (compared to Fordland's 862), Diggins' population is approximately 38\% that of Fordland. Thus, Diggins is expected to have 40 additional jobs.
At the 20-30\% new job growth, the following projections are made:

- If $20 \%$ of projected jobs are new to Diggins ( 8 new jobs), the community can expect a $\$ 484,000$ total positive benefit from 2019 to 2029.
- If $30 \%$ of projected jobs are new to Diggins ( 12 new jobs), a $\$ 726,000$ total positive benefit from 2019 to 2029 can be expected in Diggins.
While the absence of industry employment projection data makes these predictive models necessary, both methods are unable to account for unique elements of local conditions and should therefore be used with caution as they assume that the economic trends in other municipalities also will occur in Diggins. With these limitations in mind, Diggins is anticipated to see between 28-40 additional jobs in the industries listed in Appendix E, with 6-12 of these jobs being directly related to new job growth.

TABLE 30. DIGGINS LAND USE PROJECTIONS BY INDUSTRY CATEGORY (2019-2029)**

| Land Use | Projected Jobs through <br> $\mathbf{2 0 2 9}$ | Net SF Needed (through <br> 2029) | Acres Needed (at a 3:1 <br> land to building ratio)* | \% of Total |
| :---: | :---: | :---: | :---: | :---: | (2-19 | Office |
| :---: |

*Projected Jobs divided by Employees per Acre (per Table 22)
**Note: Table 25 provides a range of numbers based on results in Appendix E
As Table 26 illustrates, Diggins is expected to need between 1.25 and 2.0 acres of developable land to accommodate job growth through 2029. Most of this acreage will be needed for industrial uses.
Despite the challenges in estimating population, job growth and land use needs in Diggins, the city has sufficient developable land available for both commercial ( 6.5 acres) and industrial ( 4 acres) uses on both sides of U.S. 60. Additionally, Diggins offers Highway A, connecting the U.S. 60 Corridor directly to I-44 approximately 15 miles north in Marshfield. For south-bound traffic from Diggins, Highway NN connects to Highway Z. With U.S. 60 offering east and west connections, roadway accessibility in all four directions suggests that the growth estimates for Diggins through 2029 may be more positive than presented here.

## SEYMOUR

The Seymour section is expected to generate 160 additional jobs, with approximately $\$ 6,715,000$ in total annual earnings.

At the assumed 20-30\% jobs tied directly to new jobs; the following conclusions are drawn:

- If $20 \%$ of projected jobs are new to Seymour (32 new jobs), the community can expect a $\$ 1,343,000$ total positive benefit from 2019 to 2029.
- If 30\% of projected jobs are new to Seymour (48 new jobs), a \$2,015,000 total positive benefit from 2019 to 2029 can be expected.
Seymour is expected to need approximately seven (7) acres of land to accommodate new job growth in the next ten (10) years, with the majority (87\%) needed for industrial expansion. Job and population growth both positively impact retail spending. New retail spending in Seymour as a result of growth from 2019-2029 is estimated to be \$945,000 (\$94,500 annually).

TABLE 31. SEYMOUR LAND USE PROJECTIONS BY INDUSTRY CATEGORY (2019-2029)

| Land Use | Projected Jobs through $2029$ | Potential Net SF Needed (through 2029) | Acres Needed* (3:1 land to building ratio) | \% of Total |
| :---: | :---: | :---: | :---: | :---: |
| Office | 3 | 4,506 | 0.10 acres | 1.5\% |
| Commercial | 17 | 37,026 | 0.85 acres | 11.9\% |
| Industrial | 111 | 268,620 | 6.17 acres | 86.6\% |
| TOTALS | 131 | 310,153 | 7.12 acres | 100\% |

[^6]Transportation access to support economic development are abundantly present in Seymour. As with the other communities along the corridor, U.S. 60 is the major and critical route for short and long-haul vehicles in Seymour. Additionally, the proposed Highway K/Highway C interchange would offer available land with direct access to Highway C, Highway K, and Highway BB, the three (3) key north-south connections that increase marketability at this location. Although the proposed W Clinton Avenue Interchange in Seymour lacks access to north-south roads, nearby McDonalds and Subway restaurants may encourage development of additional commercial tracts in the vicinity. The interchange will also offer direct access to outer roads that connect to the proposed interchange. Both interchange locations are located within existing city limits and offer available land and accessible utilities for economic expansion, making these locations prime opportunities for future development.

## Added Investment Value

The population expansion, economic demand, and opportunity for market expansion attributed to the U.S. 60 Corridor Master Plan improvements are anticipated to increase the value of properties and result in these four (4) communities along the corridor becoming prime locations for business expansion and new job growth. Retail sales are expected to yield potentially over $\$ 9$ million in new spending over ten (10) years.
These opportunities for economic development should be included in the investment analysis of the improvements to fully appreciate how investments made by agencies, municipalities, and private parties will result in a net positive benefit for the U.S. 60 Corridor and residing communities.

TABLE 32. INVESTMENT SUMMARY

| Municipality | Acres Needed within <br> Growth Industries <br> (Acres) | Additional Jobs | New Jobs | Additional Annual <br> Retail Sales |
| :--- | :---: | :---: | :---: | :---: |
| Rogersville | 17.20 | 339 | $68-102$ | $\$ 719,000$ |
| Fordland | 4.60 | 104 | $21-31$ | $\$ 75,300$ |
| Diggins | 1.50 | $28-40$ | $6-12$ | $\$ 36,500$ |
| Seymour | 7.10 | 160 | $32-48$ | $127-193$ |
| TOTALS | 30.4 | 640 |  | $\$ 925,500$ |

In addition to the BCA for safety and operations of the proposed improvements, an economic Benefit-Cost Analysis (BCA) was also performed, allowing for a holistic look at infrastructure investments along the corridor. The economic benefits are directly tied to the results of implementing the eight (8) interchanges along U.S. 60 in Webster County.

| Municipality | Employment Benefits | New Retail/Sales <br> Revenue Benefits | Total Economic <br> Potential | Combined "Soft" BCA <br> Value |
| :--- | :---: | :---: | :---: | :---: |
| Rogersville | $\$ 8,514,000$ | $\$ 14,380,000$ | $\$ 22,894,000$ | 1.90 |
| Fordland | $\$ 3,726,000$ | $\$ 1,506,000$ | $\$ 5,232,000$ | 1.13 |
| Diggins | $*$ | $*$ | $*$ | $*$ |
| Seymour | $\$ 4,030,000$ | $\$ 1,890,000$ | $\$ 5,920,000$ | 2.58 |
| TOTALS | $\$ 16,270,000$ | $\$ 17,776,000$ | $\$ 34,046,000$ | 1.79 |

The benefits included in the analysis above include increased safety, travel time savings, emissions reductions, maintenance cost reduction, and economic development potential. The result is an increased overall "soft" BCA value of the U.S. 60 Corridor of 1.79. The addition of economic benefits resulted in the improved BCA value for the Rogersville, Fordland, and Seymour municipalities, with values of 1.90, 1.13, and 2.58, respectively.
It should be noted that this modified economic BCA is highly dependent on market trends, and the values resulting from this analysis are for the market trends in Fall 2019. Shifts in the market may result in greater or lesser returns on investment.

## U.S. 60 Corridor Resiliency Planning



## VI - U.S. 60 Corridor Resiliency Planning

As part of the U.S. 60 Corridor Study, the Southwest Missouri Council of Governments partnered with Webster County to assist in funding the study, utilizing a grant through the Missouri Association of Councils of Governments (MACOG). The grant assisted in funding, provided the study placed focus on resiliency. Specifically, increasing resiliency of the regional transportation network in the event of road closures and traffic rerouting due to natural disasters and emergency events.

To meet the required funding deadline set by MACOG, a standalone chapter of the U.S. 60 Corridor Master Report, titled Corridor Resiliency Planning was developed and submitted on September 30, 2019. The U.S. 60 Corridor Resiliency Planning summary serves as Appendix F of the U.S. 60 Corridor Master Plan report. A brief summary of the document can be found below. Additionally, a Regional Incident Detour Analysis was developed to determine the impacts of traffic being detoured onto US 60. This analysis can be found in Appendix F.

## Summary

With over 60,000 vehicles traveling east and west through Webster County daily, it is imperative to consider the traffic operations and safety impacts associated with a major closure or delay on one of these roadways. Major closures and delays have historically occurred during times of flooding, road construction, or major vehicle collisions, resulting in significant traffic diversion to alternate roadways. Traffic diversion on adjacent infrastructure often leads to overloading roadway capacities, resulting in significant traffic delays, heightened safety risks, and significant economic losses.

Due to the necessity of the railroad in this area to both the national and state economies, an emergency incident due to train derailment, vehicle-train collision, hazardous material spill, or flooding event occurring on the BNSF Thayer-North line would be detrimental to the movement of freight across the country. It is critical to the regional and nation rail network to maintain a resilient corridor along the Thayer-North line in Webster County, supporting the safe and efficient delivery of high-dollar freight across the country.
To maintain resiliency along the U.S. Corridor in the event of a major closure or delay, the following improvements have been suggested:

## IMPROVEMENTS AT HIGHWAY A

The construction of an interchange, outer road system, and shoulder pull-offs for horse and buggy use at Highway A in Diggins would reduce traffic congestion and potential safety conflicts for both the agricultural communities and motor vehicle traffic.

## U.S. 60 PROFILE ADJUSTMENT

Raising the roadway profile and improving the drainage system of U.S. 60 in the area just east of Farm Road 213 (Greene County) would significantly reduce the potential for flooding and to help maintain efficient traffic flow in periods of record flooding. While this improvement would be made to the Greene County section of U.S. 60, the corridor throughout Webster County would significantly benefit.

## INTERCHANGE AT HIGHWAY Z

The construction of an interchange, railroad overpass, and outer road system at Highway Z in Fordland would allow for the removal of six (6) at-grade roadway intersections and at-grade highway/rail crossings. This improvement would eliminate the safety risk associated with these at-grade intersections and rail crossings and create a single efficient access point to U.S. 60. The construction of an overpass would also eliminate the safety concern attributed to intersection flooding at Highway Z.

## SEYMOUR RAILROAD OVERPASS

As the City of Seymour is currently divided by the BNSF Railway, the construction of a railroad overpass at Summit Avenue and Highway K would maintain local connectivity and provide necessary access in the event of all at-grade crossings being simultaneously closed by stalled rail traffic. This improvement would also present the opportunity for residential and commercial growth south of the railroad.

## Implementation Strategies

## VII - Implementation Strategies

The U.S. 60 Corridor Master Plan sets the long-term vision for the future of the highway/rail corridor and the southern Webster County communities of Rogersville, Fordland, Diggins, and Seymour. While the master plan identifies key improvements needed to improve safety, efficiency, and resiliency along the corridor, it is not practical to consider all improvements to be implemented as one (1) project due to the magnitude of their total cost.
The timing of available funds will limit the implementation of improvements while always maintaining public safety and connectivity throughout the corridor. The prioritization of improvements is determined based on several key factors, including safety, BCA, infrastructure and natural disaster resiliency, and connectivity.

## Corridor Improvements Prioritization

A generalized plan for the prioritization and implementation is defined below. Improvements are first prioritized by safety impacts, BCA, regional resiliency and connectivity, and locally prioritized improvements. In many instances certain roadway improvements or extensions are required to effectively implement other improvements. As such, projects should be considered on a holistic approach as funding mechanisms are leveraged in the design phases.

Prioritized Improvements below identify general areas of improvements for each study section. Specific Improvements may also require other improvements to be implemented for full safety and efficiency benefits to be effective. See Section VI Corridor Resiliency Planning for improvement prioritization based solely on strategic, resilient improvements.

TABLE 33. ROGERSVILLE IMPLEMENTATION SUMMARY

| Section I - Rogersville |  |  |
| :---: | :---: | :---: |
| Priority | Key Improvement | Benefits |
| 1 | White Oak Interchange | Interchange will provide grade-separated access to U.S. 60. |
| 2 | US 60 Westbound Realignment | Realignment of U.S. 60 WB lanes will reduce vehicle crashes due to hydroplaning \& will allow for implementation of an outer road system from Porter Crossing to Center St. |

TABLE 34. FORDLAND IMPLEMENTATION SUMMARY

| Section II - Fordland |  |  |
| :---: | :--- | :--- |
| Priority | Key Improvement | Benefits |
| $\mathbf{7}$ | Highway Z Interchange | Interchange \& outer road system will eliminate need for <br> 7 at-grade intersections \& rail crossings \& provide grade- <br> separated access to US 60 \& over the BNSF Railway. |
| 2 | Highway FF (Burks St.) Interchange | Interchange will provide grade-separated access to U.S. 60 <br> at the center of town. |
| 3 | Highway U Interchange \& Rail Overpass | Interchange \& Rail Overpass will provide grade-separated <br> access to US 6O \& over the BNSF Railway, eliminate 2 at- <br> grade rail crossings, and increase connectivity north of U.S. <br> 60. |

## TABLE 35. DIGGINS IMPLEMENTATION SUMMARY

| Section III - Diggins | Benefits |  |
| :---: | :--- | :--- |
| Priority | Key Improvement | Interchange will eliminate a heavily used at-grade <br> intersection \& provide a much safer grade-separated <br> access to U.S. 60 \& over the BNSF Railway. The Hwy A <br> interchange will alleviate heavy traffic traveling to/from <br> I-44 \& provide improved traffic capacity during Incident <br> Relief Events. |
| $\mathbf{7}$ | Highway A Interchange | Overpass will provide vehicular \& agricultural buggy <br> access across U.S. 6O \& the BNSF Railway. |
| Short Road Overpass |  |  |

TABLE 36. SEYMOUR IMPLEMENTATION SUMMARY

| Section IV - Seymour |  |  |
| :---: | :---: | :---: |
| Priority | Key Improvement | Benefits |
| 1 | W Clinton Ave. Interchange | Interchange will eliminate at-grade signalized intersection \& provide grade-separated access to US 60 \& over the BNSF Railway. This interchange will tie the Seymour \& Diggins communities together \& expand economic development opportunities. |
| 2 | Highway K/Highway C Interchange | Interchange will address the highest safety priority in the corridor by eliminating the signalized intersection and providing grade-separated access to U.S. 60. Additional intersection improvements will occur at Highway K/E Clinton. |
| 3 | Pewee Crossing Interchange \& Highway Realignment | Interchange \& Rail Overpass will result in elimination of 5 at-grade rail crossings \& 3 at-grade intersections. A highway realignment \& outer road system will maintain connectivity. |
| 4 | Summit Ave. Railroad Overpass | The Summit Ave. Overpass will provide safe access over the BNSF Railway during times of rail traffic \& provide opportunities for economic \& residential growth. |

## Temporary Detour Plan

During the construction of improvements, traffic pattern disruptions are expected. Efforts during the design phases should be made to minimize the impacts to traffic and to maintain local access. The greatest impacts are expected to occur during the construction of interchanges on U.S. 60. In such cases, traffic detours will be planned, and existing at-grade intersections and rail crossings will not be closed until traffic patterns can safely be routed onto the constructed improvements. Utility Impacts are expected at several locations along the corridor. In several locations, overhead electric utilities cross the highway and railroad. Summit Natural Gas owns and maintains an $8^{\prime \prime}$ gas main within the U.S. Highway 60 Right-of-Way. Utility impacts should be considered during the engineering phase to plan for timely relocations that do not interfere with roadway construction.
Regional traffic shifts may occur at several project locations, including Highway Z in Fordland, Highway A in Diggins and Highway K in Seymour. As such, traffic detours for these routes should be able to accommodate additional traffic loads due to regional disaster relief routes. Specifically, Highway A is the main incident relief route from 1-44, and adequate access and connectivity to U.S. 60 should be maintained in the event of a roadway closure.

## Funding Mechanisms

At the time of the U.S. 60 Corridor Study, there is no funding mechanism or agency identified to fund the proposed improvements. The study was designed as a plan to move the U.S. 60 Corridor forward and increase the prioritization for improvements on various agency lists, including MoDOT and SMCOG. The study resulted in a list of key improvements to the corridor that sets the path forward for advancing the safety, efficiency, and resiliency of the highway/rail corridor, and justifies the positive return on investment for implementing the improvements.
The study process was designed to align with and meet the requirements of applications for future funding through various local, state, and federal agencies. The U.S. 60 Corridor through Webster County has the opportunity to be a highly competitive candidate for funding, as the study and improvements encompass many key elements and priorities agencies seek when providing funding opportunities. The corridor is eligible for various funding opportunities, including highway safety, environmental impacts (emissions reduction and minimized flooding impacts), emergency response initiatives, infrastructure resiliency, rail safety, economic development, and many more. The state of Missouri grade-crossing program could also provide a mechanism for BNSF participation in the cost of highway/rail grade separations and crossing closures.

Annually, many local, state, and federal agencies provide hundreds of Notices of Funding Opportunities (NOFO) and other funding programs for which the U.S. 60 Corridor would be eligible, including MoDOT, USDOT, FRA, FEMA, Missouri DEC, and many more.

## Strategic Implementation

Ideally, the entire U.S. 60 Corridor through Webster County would be funded entirely at once, and all improvements could be implemented simultaneously. However, full funding for a single-phase project is likely unrealistic. Thus, strategic implementation along the corridor would be necessary to maintain connectivity, while providing the greatest safety benefits to the most needed locations.

As such, Table 37 summarizes a corridor-wide implementation plan for the proposed improvements (eight (8) interchanges and one (1) overpass) on U.S. 60 that is prioritized based on safety, BCA, resiliency, and regional connectivity. Implementation of these individual improvements would require additional improvements to be made in the form of intersection and at-grade rail closures, outer road systems, or road extensions. This implementation strategy is subject to refinement based upon feedback and further evaluation of all involved stakeholders.

TABLE 37. U.S. 60 STRATEGIC IMPLEMENTATION SUMMARY

| Corridor-wide Strategic Implementation Plan |  |  |
| :---: | :---: | :---: |
| Priority | Key Improvement | Benefits |
| 1 | W Clinton Ave. Interchange (Seymour) | Interchange will eliminate at-grade signalized intersection \& provide grade-separated access to US 60 \& over the BNSF Railway. This interchange will tie the Seymour \& Diggins communities together \& expand economic development opportunities. |
| 2 | Highway K/Highway C Interchange (Seymour) | Interchange will eliminate the most historically dangerous signalized intersection in the corridor \& provide grade-separated access to U.S. 60. Additional intersection improvements will occur at Highway K/E Clinton. |
| 3 | Highway A Interchange (Diggins) | Interchange will eliminate a dangerous at-grade intersection \& provide grade-separated access to U.S. 60 \& over the BNSF Railway. The Hwy A interchange will alleviate heavy traffic traveling to/from I-44 \& provide improved traffic capacity during Incident Relief Events. |
| 4 | Short Road Overpass | Overpass will provide vehicular \& agricultural buggy access across U.S. 60 \& the BNSF Railway. |
| 5 | Highway Z Interchange | Interchange \& outer road system will eliminate need for 7 at-grade intersections \& rail crossings \& provide grade-separated access to US 60 \& over the BNSF Railway. |
| 6 | Highway FF (Burks St.) Interchange | Interchange will provide grade-separated access to U.S. 60 at the center of town. |


| Priority | Key Improvement | Benefits |
| :---: | :--- | :--- |
| 7 | White Oak Interchange | Interchange will provide grade-separated access to U.S. 60. |
| $\mathbf{8}$ | Highway U Interchange \& Rail Overpass | Interchange \& Rail Overpass will provide grade-separated access to US <br> 60 \& over the BNSF Railway \& eliminate 1 at-grade rail crossing. |
| $\mathbf{9}$ | Pewee Crossing Interchange \& Highway <br> Realignment | Interchange \& Rail Overpass will result in elimination of 5 at-grade rail <br> crossings \& 3 at-grade intersections. A highway realignment \& outer <br> road system will maintain connectivity. |

## IN-PROGRESS SAFETY IMPROVEMENTS

In the interim, MoDOT has identified and planned safety improvements along the corridor to address intersections that have a high frequency and severity of crashes. While these improvements do not address the long-term plans of freeway status for the corridor, they do provide needed safety improvements at these locations. Currently, MoDOT has the following projects identified for the U.S. 60 Corridor:

- Rogersville - J-Turn Intersections at Industry Rd. / White Oak Rd. / Center Rd.
- Diggins - Offset Left Turn (Eastbound) and Offset Right Turn (Westbound) at Highway A
- Seymour - Offset Left Turns and Offset Right Turn (Westbound) at Skyline Rd.


## INTERIM PROJECT IMPLEMENTATION

While Table 33 highlights the nine largest improvements along the corridor, allocating funding for these projects will take considerable resources, and may need to be realized over a period of several years. However, there are several improvements that can be made in the short-term that require significantly less funding resources, yet drastically increase safety. Significant safety improvements can be made with the implementation of outer road systems, which reduce the number of at-grade intersections on U.S. 60 and at-grade railroad crossings.
Outer roads and other smaller-scale improvements can be built as funding becomes available and each section built strategically, with logical termini. As such, each improvement will result in safety benefits, while also accomplishing a piece of the U.S. 60 Corridor Master Plan. Some projects may not provide as significant safety improvements, though require significantly less funding resources and still align with the Master Plan. Such projects, and their associated benefits have been identified below in Table 38. These projects are subject to change due to funding availability or agency prioritization. Prior to the construction of outer road systems, further engineering studies should be performed to determine traffic impacts the routes and highway intersections that the outer roads intersect.

TABLE 38. INTERIM PROJECT IMPLEMENTATION SUMMARY

| Section | Key Improvement | Segment Length (Miles) | Number of Reduced Highway Intersections | Number of At-Grade Railroad Crossings | Probable <br> Cost Level |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Rogersville | FR 186 Extension to Peck Hollow | 1.5 | - | - | 1 |
| Fordland | Pave Black Oak Road from Hwy PP to Red Oak Rd | 1.0 | - | - | 1 |
|  | Dutch Hill Rd. connection to Red Oak Rd. | 0.3 | - | 1 | 1 |
|  | Extend Brentlinger Dr. to Iron Mountain Road | 0.3 | 1 (North Side) | 1 | 1 |
|  | Center St. At-Grade Railroad Crossing Quiet Zone Upgrade | - | - | - | 1 |
|  | High Friction Surface Treatments | 1.2 | - | - | 1 |
|  | Extend Barton Dr. to Crestview Ln. | 1.4 | 3 (North Side) | - | 1 |
|  | South Outer Rd. (Front St. to Hwy Z) | 0.8 | - | 2 | 1 |
|  | South Outer Rd. (Hwy Z to Honor Camp Ln.) | 2.1 | 3 (South Side) | 4 | 2 |


| Section | Key Improvement | Segment <br> Length <br> (Miles) | Number of Reduced Highway Intersections | Number of At-Grade Railroad Crossings | Probable Cost Level |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Diggins | Hwy A Agricultural Shoulder Pullovers | - | - | - | 1 |
|  | South Outer Rd. (Honor Camp Ln. to Private Dr.) | 1.2 | 1 (North Side) | - | 1 |
|  | Connect Forest View to Normandy Rd. | 0.9 | 1 (North Side) | - | 1 |
|  | Extend Ragsdale St. to Box School Lp. | 1.5 | - | - | 1 |
|  | Extend Springfield Ave. to Hwy A and Killdeer Rd. | 2.6 | 5 (North Side) | - | 3 |
| Seymour | Connect W. Box School Lp. to Finley Falls Rd. | 1.1 | - | 1 | 2 |
|  | E Clinton Ave / Hwy K Intersection Improvements | - | - | - | 2 |
|  | EB US 60 Curve Realignment \& Outer Road from Oak Lawn to Pewee Crossing | 2.2 | 2 | 2 | 1 |
|  | Outer Road from Dewberry Rd. to Hwy O (Cedar Gap) | 1.6 | - | - | 2 |

- $1=<\$ 3$ Million
- $2=\$ 3$ - 5 Million
- 3 = \$5+ Million

APPENDIX A

## Public Involvement

## ROGERSVILLE <br> US HIGHWAY 60 CORRIDOR RALLWAY SAFETY STUDY QUESTIONNAIRE

$\square$ BUSINESS OPERATOR

DATE RECEIVED
RECEIVED BY

BEST WAY TO KEEP YOU INFORMED:
$\square$ Phone: $\qquad$
Name: $\qquad$
Business Name: $\qquad$
Address: $\qquad$
How long have you lived or worked in the area? $\qquad$
 $<20$ $\qquad$ $\square$ 20-40 -40 $\square$ 40-60 $\qquad$ $>60$

## RAILROAD GENERAL QUESTIONS

How often do you cross the tracks? $\qquad$ $\square$ per day $\qquad$ per week How often do you wait at crossings for rail traffic? $\qquad$ $\square$ per day $\square$ per week When stopped for rail traffic, how long is your wait? $\qquad$ min.
Do you think the community needs more railroad crossing safety and education programs? $\square$ yes $\square$ no
What is your preferred route to your business or home?

What type of vehicles / equipment do you drive across the tracks? $\qquad$
Are there any conditions or physical restrictions at a crossing that have resulted in you using a different crossing?

## RAILROAD SPECIFIC QUESTIONS

## EXISTING AT-GRADE CROSSINGS

Please rank the existing at-grade crossings on how important they are to you and your business:
( 1 = least important, $10=$ most important)

| Front Street |  |
| :--- | :--- |
| White Oak Road |  |
| Porter Crossing |  |

## EXISTING AT-GRADE CROSSING SAFTEY

Please rank the existing at-grade crossings on how safe you think they are:
( 1 = Least safe, $10=$ most safe)

| Front Street |  |
| :--- | :--- |
| White Oak Road |  |
| Porter Crossing |  |

## ROADWAY GENERAL QUESTIONS

How often do you travel on US Highway 60? $\qquad$ $\square$ per day $\square$ per week
When you travel on US Highway 60 , what is your primary means?
$\square$ Business
$\square$ Recreation
When traveling on US Highway 60, approximately how long do you travel for? $\square 1-5$ Miles $\square 5$-10 Miles $\square 10-20$ Miles $\square 20+$ Miles What is your preferred route to your business or home?

Which intersections along US 60 do you experience the most traffic delays?

## ROADWAY SPECIFIC QUESTIONS

## EXISTING AT-GRADE INTERSECTIONS

Please rank the existing at-grade intersections on how important they are to you and your business:
( $1=$ least important, $10=$ most important)

| Industry Road |  |
| :--- | :--- |
| White Oak Road |  |
| Center Road |  |
| Power Line Road |  |
| Porter Crossing Road |  |

What type of vehicles / equipment do you drive on US Highway 60?

Are there any conditions or physical restrictions at an intersection that have resulted in you using a different intersection?

## ROGERSVILLE US HIGHWAY 60 CORRIDOR ROADWAY SAFETY STUDY QUESTIONNAIRE

## OPINION

| What is the RR's contribution to vehicular traffic congestion? | ${ }_{\text {impact }}^{\text {high }} \mathrm{O}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }_{\text {impact }}^{\text {no }}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| What is your opinion of the existing at-grade crossing conditions? | $\underset{\substack{\text { excellent } \\ \text { condition }}}{\text { enter }}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc \bigcirc_{\substack{\text { pery } \\ \text { por }}}^{\text {per }}$ |
| How important is a potential quiet zone through the city limits? | importary | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ Oimp ${ }_{\text {important }}^{\text {not }}$ |
| How safe do you think the existing at-grade crossings are in town? | very P | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }^{\text {not }}$ sate |
| How does rail traffic and crossings contribute to emergency response? | ${ }_{\text {impact }}^{\text {high }} \mathrm{O}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }_{\text {impact }}^{\text {nom }}$ |
| When stopped for rail traffic how would you characterize your wait? | ${ }_{\text {irritating }}^{\text {very }} \bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ ¢ ${ }_{\text {bothered }}^{\text {not }}$ |
| Would you be in favor of eliminating at-grade crossings if access to | yes $\bigcirc$ | Ono |  |  |  | businesses \& residences were maintained?

ADDITIONAL COMMENTS

## DIGGINS

## US HIGHWAY 60 CORRIDOR SAFETY STUDY QUESTIONNAIRE

$\square$ BUSINESS OPERATOR
$\square$ LOCAL RESIDENT

## CONTACT INFORMATION

Name: $\qquad$
Business Name: $\qquad$
Address:
How long have you lived or worked in the area?

DATE RECEIVED
RECEIVED BY $\qquad$
BEST WAY TO KEEP YOU INFORMED:
$\square$ Phone: $\qquad$
$\square$ EMail:
$\qquad$

Age Range: $\square<20 \quad \square$ 20-40 $\square$ 40-60 $\quad \square>60$

## RAILROAD GENERAL QUESTIONS

How often do you cross the tracks? $\qquad$ $\square$ per day $\square$ perweek How often do you wait at crossings for rail traffic? $\qquad$ $\square$ per day $\square$ per week When stopped for rail traffic, how long is your wait? $\qquad$ min.
Do you think the community needs more railroad crossing safety and education programs? $\square$ yes $\square$ no
What is your preferred route to your business or home?

What type of vehicles / equipment do you drive across the tracks? $\qquad$
Are there any conditions or physical restrictions at a crossing that have resulted in you using a different crossing?

## RAILROAD SPECIFIC QUESTIONS

EXISTING AT-GRADE CROSSINGS
Please rank the existing at-grade crossings on how important they are to you and your business:
( 1 = least important, 4 = most important)

| S Diggins Main Street (Route NN) |  |
| :--- | :--- |
| West Box School Loop |  |
| Short Road |  |
| East Box School Loop (Bison) |  |

## EXISTING AT-GRADE CROSSING SAFTEY

Please rank the existing at-grade crossings on how safe you think they are:
( 1 = Least safe, 4 = most safe)

| S Diggins Main Street (Route NN) |  |
| :--- | :--- |
| West Box School Loop |  |
| Short Road |  |
| East Box School Loop (Bison) |  |

## ROADWAY GENERAL QUESTIONS

How often do you travel on US Highway 60 ? _ $\square$ per day $\square$ per week When you travel on US Highway 60, what is your primary means? When traveling on US Highway 60, approximately how long do you travel for? $\square 1$-5 Miles $\square 5$-10 Miles $\square 10-20$ Miles $\square 20+$ Miles What is your preferred route to your business or home? $\qquad$
Which intersections along US 60 do you experience the most traffic delays?

## ROADWAY SPECIFIC QUESTIONS

## EXISTING AT-GRADE INTERSECTIONS

Please rank the existing at-grade intersections on how important they are to you and your business:
( $1=$ least important, $10=$ most important)

| Green Brier Drive |  | Raspberry Lane |  |
| :--- | :--- | :--- | :--- |
| State Highway A |  | W Box School Loop |  |
| S Main Street (Hwy NN) |  | Berry Road |  |
| State Highway O |  | Killdeer/Short Road |  |
| White Rose Lane |  | E Box School Loop (Bison) |  |

What type of vehicles / equipment do you drive on US Highway 60?

Are there any conditions or physical restrictions at an intersection that have resulted in you using a different intersection?

## DIGGINS US HIGHWAY 60 CORRIDOR SAFETY STUDY QUESTIONNAIRE

## OPINION

| What is the RR's contribution to vehicular traffic congestion? | impact ${ }_{\text {high }}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }^{\text {nompact }}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| What is your opinion of the existing at-grade crossing conditions? | ${ }_{\substack{\text { excellent } \\ \text { condition }}}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }_{\text {pory }}^{\text {poory }}$ |
| How important is a potential quiet zone through the city limits? | importary ${ }_{\text {der }}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }^{\text {impt }}$ important |
| How safe do you think the existing at-grade crossings are in town? | ${ }_{\text {very }}^{\text {safe }} \mathrm{O}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }_{\text {sate }}^{\text {not }}$ |
| How does rail traffic and crossings contribute to emergency response? | ${ }_{\text {impact }}$ high O | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }_{\text {impact }}^{\text {nom }}$ |
| When stopped for rail traffic how would you characterize your wait? | irritating $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ Oith |
| Would you be in favor of eliminating at-grade crossings if access to | yes $\bigcirc$ | Ono |  |  |  | businesses \& residences were maintained?

## ADDITIONAL COMMENTS

## $\square$ BUSINESS OPERATOR

$\square$ LOCAL RESIDENT

## CONTACT INFORMATION

Name: $\qquad$
Business Name: $\qquad$
Address: $\qquad$
How long have you lived or worked in the area?

RECEIVED BY $\qquad$

BEST WAY TO KEEP YOU INFORMED:Phone: $\qquad$
$\square$ EMail:
$\qquad$

Age Range: $\square<20 \quad \square$ 20-40 $\square$ 40-60 $\square>60$

## RAILROAD GENERAL QUESTIONS

How often do you cross the tracks? $\qquad$ $\square$ per day $\square$ per week How often do you wait at crossings for rail traffic? $\qquad$ $\square$ per day $\square$ per week When stopped for rail traffic, how long is your wait? $\qquad$ min.
Do you think the community needs more railroad crossing safety and education programs? $\qquad$ yes $\square$
What is your preferred route to your business or home?

What type of vehicles / equipment do you drive across the tracks? $\qquad$
Are there any conditions or physical restrictions at a crossing that have resulted in you using a different crossing?

## RAILROAD SPECIFIC QUESTIONS

## EXISTING AT-GRADE CROSSINGS

Please rank the existing at-grade crossings on how important they are to you and your business:
( 1 = least important, 10 = most important)

| Dutch Hill Road |  |
| :--- | :--- |
| Red Oak Road (Ballpark Rd) |  |
| Iron Mountain Road |  |
| Center Street |  |
| Carpenter Street |  |
| Highway Z |  |
| Bluebird Lane |  |
| Hummingbird Lane |  |
| Tandy Road |  |
| Honor Camp Lane |  |

## EXISTING AT-GRADE CROSSING SAFTEY

Please rank the existing at-grade crossings on how safe you think they are:
( 1 = Least safe, $10=$ most safe)

| Dutch Hill Road |  |
| :--- | :--- |
| Red Oak Road (Ballpark Rd) |  |
| Iron Mountain Road |  |
| Center Street |  |
| Carpenter Street |  |
| Highway Z |  |
| Bluebird Lane |  |
| Hummingbird Lane |  |
| Tandy Road |  |
| Honor Camp Lane |  |

## ROADWAY GENERAL QUESTIONS

How often do you travel on US Highway 60? $\qquad$ $\square$ per day $\square$ per week When you travel on US Highway 60, what is your primary means?

## $\square$ Business

$\square$ Recreation
When traveling on US Highway 60, approximately how long do you travel for? $\square 1$-5 Miles $\square 5$-10 Miles $\square 10-20$ Miles $\square 20+$ Miles What is your preferred route to your business or home?

Which intersections along US 60 do you experience the most traffic delays?

What type of vehicles / equipment do you drive on US Highway 60?

Are there any conditions or physical restrictions at an intersection that have resulted in you using a different intersection?

## ROADWAY SPECIFIC QUESTIONS

## EXISTING AT-GRADE INTERSECTIONS

Please rank the existing at-grade intersections on how important they are to you and your business:
( 1 = least important, $10=$ most important)

| State Highway U |  | Windswept Drive |  |
| :--- | :--- | :--- | :--- |
| Iron Mountain Rd. |  | Bluebird Lane |  |
| Burks St. (Hwy FF) |  | Hummingbird Lane |  |
| Main St. (Hwy PP) |  | Tandy Road |  |
| State Highway Z |  | Honor Camp Lane |  |

## EXISTING AT-GRADE INTERSECTION SAFTEY

Please rank the existing at-grade intersections on how safe you think they are:
( 1 = Least safe, $10=$ most safe)

| State Highway U |  | Windswept Drive |  |
| :--- | :--- | :--- | :--- |
| Iron Mountain Rd. |  | Bluebird Lane |  |
| Burks St. (Hwy FF) |  | Hummingbird Lane |  |
| Main St. (Hwy PP) |  | Tandy Road |  |
| State Highway Z |  | Honor Camp Lane |  |

## FORDLAND US HIGHWAY 60 CORRIDOR SAFETY STUDY QUESTIONNAIRE

## OPINION

| What is the RR's contribution to vehicular traffic congestion? | ${ }_{\text {impact }}^{\text {high }} \mathrm{O}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }^{\text {mon }}$ imact |
| :---: | :---: | :---: | :---: | :---: | :---: |
| What is your opinion of the existing at-grade crossing conditions? | $\underset{\substack{\text { excellent } \\ \text { condition }}}{ }$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ ¢ ${ }_{\text {pory }}$ |
| How important is a potential quiet zone through the city limits? | importary ${ }_{\text {ver }}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }_{\text {O }}^{\text {important }}$ |
| How safe do you think the existing at-grade crossings are in town? | ${ }_{\text {very }}^{\text {sate }} \mathrm{O}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }_{\text {sate }}^{\text {not }}$ |
| How does rail traffic and crossings contribute to emergency response? | impact ${ }_{\text {high }}$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc{ }_{\text {impact }}$ |
| When stopped for rail traffic how would you characterize your wait? | irritating v | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |  |
| Would you be in favor of eliminating at-grade crossings if access to | yes $\bigcirc$ | $\bigcirc$ по |  |  |  |

## ADDITIONAL COMMENTS

## SEYMOUR

 US HIGHWAY 60 CORRIDOR SAFETY STUDY QUESTIONNAIRE$\square$ BUSINESS OPERATOR
$\square$ LOCAL RESIDENT

## CONTACT INFORMATION

Name: $\qquad$
Business Name: $\qquad$
Address: $\qquad$
How long have you lived or worked in the area? $\qquad$

DATE RECEIVED
RECEIVED BY $\qquad$
BEST WAY TO KEEP YOU INFORMED:
$\square$ Phone: $\qquad$
$\square$ EMail:
$\qquad$

Age Range: $\square<20 \quad \square$ 20-40 $\square$ 40-60 $\quad \square>60$

## RAILROAD GENERAL QUESTIONS

How often do you cross the tracks? $\qquad$ $\square$ per day $\square$ per week How often do you wait at crossings for rail traffic? $\qquad$ $\square$ per day $\square$ per week When stopped for rail traffic, how long is your wait? $\qquad$ min.
Do you think the community needs more railroad crossing safety and education programs? $\qquad$ $\square$ no
What is your preferred route to your business or home?
What type of vehicles / equipment do you drive across the tracks? $\qquad$
Are there any conditions or physical restrictions at a crossing that have resulted in you using a different crossing?

## RAILROAD SPECIFIC QUESTIONS

## EXISTING AT-GRADE CROSSINGS

Please rank the existing at-grade crossings on how
important they are to you and your business:
( 1 = least important, 7 = most important)


## EXISTING AT-GRADE CROSSING SAFTEY

Please rank the existing at-grade crossings on how safe you think they are:
( 1 = Least safe, $7=$ most safe)

| Commercial Street |  |
| :--- | :--- |
| Main Street |  |
| Charles Street |  |
| Oak Lawn Road |  |
| Peewee Crossing |  |
| Mineral Road |  |
| Dewberry Road |  |

## ROADWAY GENERAL QUESTIONS

How often do you travel on US Highway 60? _ _ $\square$ per day $\square$ per week When you travel on US Highway 60, what is your primary means?
$\square$ Business
$\square$ Recreation
When traveling on US Highway 60, approximately how long do you travel for? $\square$ 1-5 Miles $\square$ 5-10 Miles $\square 10-20$ Miles $\square 20+$ Miles What is your preferred route to your business or home? $\qquad$
Which intersections along US 60 do you experience the most traffic delays?

What type of vehicles / equipment do you drive on US Highway 60?

Are there any conditions or physical restrictions at an intersection that have resulted in you using a different intersection?

## ROADWAY SPECIFIC QUESTIONS

## EXISTING AT-GRADE INTERSECTIONS

Please rank the existing at-grade intersections on how important they are to you and your business:
( 1 = least important, 9 = most important)

| West Clinton Avenue |  | Oak Lawn Road |  |
| :--- | :--- | :--- | :--- |
| Skyline Road |  | Peewee Crossing Road |  |
| Lynch Drive |  | Mineral Road |  |
| State Highway C |  | Dewberry Road |  |
| State Highway K |  |  |  |

## EXISTING AT-GRADE INTERSECTION SAFTEY

Please rank the existing at-grade intersections on how safe you think they are:
( 1 = Least safe, $9=$ most safe)

| West Clinton Avenue |  | Oak Lawn Road |  |
| :--- | :--- | :--- | :--- |
| Skyline Road |  | Peewee Crossing Road |  |
| Lynch Drive |  | Mineral Road |  |
| State Highway C |  | Dewberry Road |  |
| State Highway K |  |  |  |

SEYMOUR
US HIGHWAY 60 CORRIDOR SAFETY STUDY QUESTIONNAIRE

OPINION
What is the RR's contribution to vehicular traffic congestion?
What is your opinion of the existing at-grade crossing conditions?
How important is a potential quiet zone through the city limits?

How does rail traffic and crossings contribute to emergency response?
When stopped for rail traffic how would you characterize your wait?
Would you be in favor of eliminating at-grade crossings if access to
yesno

ADDITIONAL COMMENTS

## Public Opinion Survey \& Voting Results

## Section 1 - Rogersville

The Rogersville Public Opinion Survey had a total of 4 responses, with 2 received by mail, 1 in-person, and 1 online. The results are presented below, however, they were not heavily weighted in the decision-making process due to the limited sample size.

## Opinion Question 1

Participants were asked how often they cross the railroad tracks on a weekly basis.
$50 \%$ of participants stated they utilize the at-grade crossings approximately eight (8) to 14 times per week. This indicates that onaverage, people cross the railroad tracks one (1) to two (2) times per day.


## Opinion Question 2

Participants were asked how often they travel on U.S. 60 each week.
75\% of participants stated they travel on U.S. 60 approximately eight
(8) to 14 times per week. This indicates that on-average, people utilize U.S. 60 one (1) to two (2) times per day to travel to/from their destinations.

## Opinion Question 3

Participants were asked if they would be in favor of implementing Railroad Safety \& Education Programs (Yes / No)

The question netted a $75 \%$ (3 of 4) response in favor of implementing a program. This indicates that the community is supports the implementation of additional Railroad Safety \& Education Programs.



## Opinion Question 4

Participants were asked to rank the importance of each existing at-grade rail crossings to better understand which crossings have a significant impact on businesses \& everyday use. (1=Least Important, 10=Most Important) Participants were encouraged to think beyond their personal needs and rank according to the importance to the community.
Of the three (3) crossings included in the study limits, Porter Crossing Road showed to be the most important to the rural Rogersville community.

## Opinion Question 5

Participants were asked to rate a series of seven (7) statements on the impacts the railroad has on the community. Questions gauged the community's perception of the railroad and the impacts it has on the daily quality of life.

The responses received from the Rogersville community show the community accepts the impacts the rail line has to the community. Many of Rogersville's crossings, except for Porter Crossing, have been upgraded within the last 10

| Q1: RR's Contribution to Vehicular Traffic Congestion |  |
| :---: | :---: |
| Q2: Curent At-Grade Crossing Condilion |  |
| Q3: Importance of Quiet Zone |  |
| Q4: Current At-Grade Crossing Safety | 3.75 newtse. Sver mete) |
| Q5: Rail Traffic Impact on Emergency Response | 2.75 n=wimpeat smontmpeet |
| Q6: Characterize Your Wait When Stopped For Rail Traffic |  |
| Q7: In Favor of Eliminating RR Crossings | 75\% Yes \| $25 \%$ No | years in order to implement a Quiet Zone Policy in town. Survey results show that the crossing safety is generally perceived as safe and in fair condition, which is in line with the recent improvements made.

The last question in this series is arguably the most important reinforcement of the public's potential to support a corridor consolidation project. The Rogersville community supports the elimination of railroad crossings, provided adequate access was maintained, with $75 \%$ of participants (3 of 4 ) in support of eliminating crossings.

## Meeting \#2 - Public Voting Results

Four (4) alternatives were presented to the public (see Corridor Master Plan). Alternatives included concept ideas received by the public, those considering proposed short-term improvements by MoDOT, and others developed by the project team. Attendees were provided four (4) dots to rank each alternative presented. Of the 16 people in attendance, all 16 voted, with 14 correctly ranking all alternatives. The results and input received show that Alternate 1 garners the greatest public support, with an average ranking of 3.29 out of 4 . This option provides the greatest safety benefit and aligns with the long-term vision of a limited-access freeway, with a new interchange at White Oak Rd./Peck Hollow Rd., new outer road to Porter Crossing Road, and new U.S. Westbound Iane alignment.


## Section 2 - Fordland

After a one (1) month period following the first meeting, 25 surveys responses were collected, with 15 Mail-In, 8 In-person, and 2 via email. Valuable information regarding the common commuting routes, flooding issues, and safety concerns, were received and documented at the meeting and from the public opinion survey.

## Opinion Question 1

Participants were asked how often they cross the railroad tracks on a weekly basis.

54\% of participants stated they utilize the at-grade crossings more than 15 times per week. This indicates that on-average, people cross the railroad tracks more than twice per day.



## Opinion Question 2

Participants were asked how often they travel on U.S. 60 each week.
80\% of participants stated they travel on U.S. 60 approximately eight (8) to 14 times per week. This indicates that on-average, people utilize U.S. 60 one (1) to two (2) times per day to travel to/from their destinations.

## Opinion Question 3

Participants were asked if they would be in favor of implementing Railroad Safety \& Education Programs (Yes / No)
The question netted a $58 \%$ response in favor of implementing a program. This indicates that the community is relatively split as to whether they would like to see the implementation of additional Railroad Safety \& Education Programs.



## Opinion Question 4

Participants were asked to rank the importance of each existing at-grade rail crossings to better understand which crossings have a significant impact on businesses \& everyday use. (1=Least Important, 10=Most Important) Participants were encouraged to think beyond their personal needs and rank according to the importance to the community.

Of the 10 crossings included in the study limits, Highway $Z$ is perceived to be the most important to the rural Fordland community.

## Opinion Question 5

Participants were asked to rate a series of seven (7) statements on the impacts the railroad has on the community. Questions gauged the community's perception of the railroad and the impacts it has on the daily quality of life.

The responses received from the Fordland community show the community perceives the impacts of the railroad on vehicular traffic congestion to be minimal. This question did show the community is interested in implementing a
 Quiet Zone.

The last question in this series is arguably the most important reinforcement of the public's potential to support a corridor consolidation project. The Fordland community is split on the elimination of railroad crossings, with only $45 \%$ of participants in support of eliminating crossings.

## Meeting \#2 - Public Voting Results

Five (5) alternatives were presented to the public (see Corridor Master Plan). Alternatives included concepts developed by the public and local stakeholders at previous meetings and those developed by the project team. Of the 17 attendees, 16 participated in the voting process, with 15 correctly placing all dots to rank their preferred alternatives. Alternate 2A was determined to be the most community-backed option, with a ranking of 3.20 out of 5 . This option aligns with the vision of a limited-access freeway, and centers access around 3 interchanges at Highway U, Highway FF (Burks St.), and Highway Z.


## Section 3 - Diggins

Attendees provided valuable insight into the safety risks they encounter on a daily basis, with the Highway A intersection being the most notable concern. After the one (1) month period following the meeting, 30 total surveys were collected, with 11 returned In-person, 4 by mail, and 2 online.

## Opinion Question 1

Participants were asked how often they cross the railroad tracks on a weekly basis.
$41 \%$ of participants stated they utilize the at-grade crossings at least one (1) to seven (7) times per week. This indicates that on-average, people cross the railroad tracks approximately once per day.


## Opinion Question 2

Participants were asked how often they travel on U.S. 60 each week. 56\% of participants stated they travel on U.S. 60 approximately one (1) to seven (7) times per week. This indicates that on-average, people utilize U.S. 60 one (1) to two (2) times per day to travel to/from their destinations.

## Opinion Question 3

Participants were asked if they would be in favor of implementing Railroad Safety \& Education Programs (Yes / No)

The question netted a 68\% response in favor of implementing a program. This indicates that the community is relatively split as to whether they would like to see the implementation of additional Railroad Safety \& Education Programs.



## Opinion Question 4

Participants were asked to rank the importance of each existing at-grade rail crossings to better understand which crossings have a significant impact on businesses \& everyday use. (1=Least Important, 4=Most Important) Participants were encouraged to think beyond their personal needs and rank according to the importance to the community.

Of the 10 crossings included in the study limits, Highway NN (S Diggins Main St.) is perceived to be the most important to the rural Diggins community.

## Opinion Question 5

Participants were asked to rate a series of seven (7) statements on the impacts the railroad has on the community. Questions gauged the community's perception of the railroad and the impacts it has on the daily quality of life.

The responses received from the Diggins community show the community perceives the impacts of the railroad on vehicular traffic congestion to be moderate. Additionally, this question shows the community is in agreeance that there are safety concerns at many of the at-grade crossings as well as the rail having high impacts on emergency response.

The last question in this series is arguably the most important reinforcement of the public's potential to support a corridor consolidation project. The Diggins community supports the elimination of railroad crossings, provided adequate access was maintained, with $77 \%$ of participants in support of eliminating crossings.

## Meeting \#2 - Public Voting Results

Four (4) alternatives were presented to the public (see Corridor Master Plan). Alternatives included concepts developed by the public and local stakeholders at previous meetings and those developed by the project team. Of the 14 attendees at the meeting and 37 members of the agricultural community participating, 50 participated in the voting process, with 46 correctly placing all dots to rank their preferred alternatives. Alternate 2 was determined to be the most community-backed option, with a ranking of 2.87 out of 4 . This option aligns with the vision of a limited-access freeway, and centers access around an interchange at Highway A, with outer roads adjacent to U.S. 60 and an overpass near Short Road or Berry Road.

Publicly Favored Alternate Diggins Section


## Section 4 - Seymour

## Seymour Public Listening Session \#1 (06/25/19)

A total of eight (8) surveys were collected from the initial meeting in Seymour. Attendees at the second meeting were provided an option to fill out the survey in person and return the same day. An additional 15 surveys were collected, for a total of 23 participants, with 22 responding in-person and 1 by mail.

## Opinion Question 1

Participants were asked how often they cross the railroad tracks on a weekly basis.

52\% of participants stated they utilize the at-grade crossings more than 15 times per week. This indicates that on-average, people cross the railroad tracks approximately more than twice per day.


## Opinion Question 2

Participants were asked how often they travel on U.S. 60 each week.
64\% of participants stated they travel on U.S. 60 approximately eight (8) to 14 times per week. This indicates that on-average, people utilize U.S. 60 one (1) to two (2) times per day to travel to/from their destinations.

## Opinion Question 3




## Opinion Question 4

Participants were asked to rank the importance of each existing at-grade rail crossings to better understand which crossings have a significant impact on businesses \& everyday use. (1=Least Important, $7=$ Most Important) Participants were encouraged to think beyond their personal needs and rank according to the importance to the community.

Of the seven (7) crossings included in the study limits, the Main Street (Highway K) crossing is perceived to be the most important to the City of Seymour.

## Opinion Question 5

Participants were asked to rate a series of seven (7) statements on the impacts the railroad has on the community. Questions gauged the community's perception of the railroad and the impacts it has on the daily quality of life.

The responses received from the Seymour community show the community perceives the impacts of the railroad on vehicular traffic congestion to be moderate. Additionally, this question shows the community is in agreeance that

| Q1: RR's Contribution to Vehicular rrafic Congestion |  |
| :---: | :---: |
| Q2: Curent At-Grade Crossing Condilion |  |
| Q3: Importance of Quiet Zone |  |
| Q4: Current At-Grade Crossing Safety | 2.71 (10wemet, sver mea) |
| Q5: Rail Traffic Impact on Emergency Response |  |
| Q6: Characterize Your Wait When Stopped For Rail Traffic |  |
| Q7: In Favor of Eliminating RR Crossings | 86\% Yes \| $14 \%$ No | there are safety concerns at many of the at-grade crossings, as well as the rail having high impacts on emergency response.

The last question in this series is arguably the most important reinforcement of the public's potential to support a corridor consolidation project. The Seymour community supports the elimination of railroad crossings, provided adequate access was maintained, with $86 \%$ of participants in support of eliminating crossings.

## Meeting \#2 - Public Voting Results

The second Diggins Public Listening Session was held on August 8 ${ }^{\text {th }}, 2019$ at the Seymour Senior Center. There were approximately 42 attendees, including local officials, business owners, and private citizens.

Six (6) alternatives were presented to the public (see Corridor Master Plan). Alternatives included concepts developed by the public and local stakeholders at previous meetings and those developed by the project team. Of the 42 attendees, 31 participated in the voting process, with 28 correctly placing all dots to rank their preferred alternatives. Alternate 2B was determined to be the most community-backed option, with a ranking of 2.33 out of 6 . This option aligns with the vision of a limited-access freeway, removal of at-
 grade signalized intersections, and implementation of a railroad overpass to maintain connectivity.

# County plans for highway's future 

## By Karen Craigo

karenc@marshfieldmail.com

The southern part of Webster County is the fastest-growing area, according to Paul Ipock, president of the Webster County Commission. That is why the county leaders must plan for growth in the U.S. Highway 60 corridor.

In their Jan. 29 meeting, commissioners voted to enter into contract negotiations with Crawford, Murphy and Tilley (CMT) to handle transportation planning.
"The south side of the county is growing. The south rail has many, many trains through it - at one time 60 trains a day were going through Seymour," Ipock said. He said that the railroad is always on the county to close crossings, but before that is done, the commissioners need to see a plan.

County Clerk Stan Whitehurst explained that railroad crossings need to line up with highway infrastructure. "We can't independently close rail crossings without knowing where future interchanges are going to be," he said, adding that commissioners need to take care not to leave any roads to nowhere.

Ipock said that the commissioners are teaming up with the Missouri Department of Transportation and the Burlington Northern Santa Fe Railway to seek a possible plan.
"What we're most concerned with is how we're going to move people along," Ipock explained. "Twenty years ago, MoDOT said 60 would have freeway status from Willow Springs to Springfield." With planning, he added, the county can be ready for whatever materializes with the throughway.

# County forming plans for future of U.S. 60 

## By Karen Craigo

carencemarshifelamailicom
Growth appears to be inevitable in Webster County, and now is the time to plan for it, according to the Board of Commissioners.

That is why the county has contracted with Crawford, Murphy \& Tilly (CMT), an infrastructure consultancy firm that readers may recognize from its work with the City of Marshfield on planning for the new Interstate 44 interchange and Route 66 roadside park.

For Webster County, CMT will be spearheading a different project: a long-range study of the 22 -mile-long U.S. 60 corridor within the county's borders.

The county is planning four separate sets of three listening sessions in communities across the expanse of the highway. The first meeting will be held in Rogersville from 6:30 to 8 p.m. on Tuesday, June 11, at the First Baptist Church gym, 101 W. Mill St., Rogersville, and this session is intended for Rogersville-area input only. Another meeting will be held in Fordland from 6 to 7:30 p.m. on June 13 in the Fordland City Hall, 296 Burks St., Fordland, to hear Fordlandarea concerns. Other sessions will be held in Diggins on June 18 and Seymour on June 25 at times and places to be announced. Each of these four municipalities will have a set of three input sessions over the course of the study.

At these meetings, the public will be invited to weigh in with thoughts about the future of U.S. 60 with consideration of the county's growth projections.

The county's effort is happening with the cooperation of the Missouri Department of Transportation, Burlington Northern Railroad and the Southwest Missouri Council of Governments.
"The main thing is that we get out ahead of the change that's coming," explained Stan Whitehurst, the Webster County Clerk. "We recognize that we need some long-range planning."

Commission President Paul Ipock noted that the western end of U.S. 60 in Webster County, the Rogersville area, is growing very rapidly already. The area also has high agricultural usage, and the county has some 40 railroad crossings alongside the route.
"The question is how can we all work together to make it a safer place?" he asked.

Commissioner Randy Owens said that it is also prudent to have a plan in case grant money comes available in the future, because without a plan, "You're dead in the water," he said.

Ipock said that the commissioners want a plan for the future. The 2018 population ofWebster County was 39,109 , he said, but by 2030 , the population is projected to be 53,282 . By contrast, when he and Whitehurst took office in 1999, the population was less than 30,000 .

These days U.S. 60 has more traf-
fic volume and larger trucks on it than when the route was established (around the late 1960s, by Ipock's recollection).

Steve Prange of CMT emphasized that there is no money for improvements at present, but that money is available for highway and railroad safety improvements, especially at the federal level. Having a plan puts the county in line for future funding.
"For years there has been no master plan for the U.S. Highway 60 corridor from Rogersville to the east," he said. "They haven't had a plan to convert that to a freeway or to make intersection improvements or anything. They've just been doing things as money was available or as safety concerns dictated."

Added Prange, "We want to have a plan in place so that we can compete for money to do safety and capacity improvements along 60 . It starts with a plan, so they've hired me to do a plan for them."

Planning for the future of the route will help to make the road safer while encouraging economic development, Commissioner Ipock said. For those unable to attend the listening sessions, a survey will be available at city hall and online at www.webstercountymo. gov after the meeting. Those interested in the topic are encouraged to take the survey that is included on the webpage by June 28.

For more information on recent actions of the Webster County Board of Commissioners, see the "For the Record" public information section inside on pages $15-17 \mathrm{~A}$.

## Webster County looks to improve the safety of Highway 60



By Frances Watson | Posted: Tue 10:52 PM, Jun 11, 2019 | Updated: Tue 10:56 PM, Jun 11, 2019
WEBSTER COUNTY, Mo. Webster County is looking at ways to make your drive along Highway 60 safer and is asking for your help in doing so.


The county held the first of several meetings here at First Baptist Church in Rogersville. They're geared toward creating plans for future improvements of this area, including major intersections and rail road crossings.
"I've already asked MoDOT, when are they going to make the 60 an interstate from here to the Mississippi River," said Don Carrigan.

That may likely not happen anytime soon but he says he's eager to see major improvements along the highway in Webster County.
"Planning is a very important step. They're starting out on the right foot," he said.
Presiding commissioner, Paul Ipock said, "The Highway 60 corridor is probably growing faster than anything."
County commissioners have been trying to get a 22 mile stretch of the highway examined for years.
"For sometime now we've asked Burlington Northern to do such a study. We've asked MoDOT to do a study. They didn't really want to.
But then we had a meeting in Springfield in the MoDOT office and said, hey, we're going to do it. Will you buy in? They said yes, we will," explained Ipock.

They hired a private firm to monitor the area. Representatives counted cars that drove through intersections onto the highway and at railroad crossings. They also measured distances between country roads and the highway. All this data was used to calculate what would help improve the safety of the area.
"There will be a federal grant that will be available and if we've got a plan we have a greater chance at getting the grant. The early bird gets the worm. That's what we're hoping for," said lpock.

Officials are asking the public to weigh in by taking a survey and brainstorming ideas about areas that need improvement.
"You've got to change if you want to progress," said Carrigan.
http://www.webstercountycitizen.com/community/meetings/article_c0b846b4-8c96-11e9-a7cf9778dddebcd5.html

BREAKING TOP STORY

## U.S. 60 meeting Tuesday

Highway input sought from Seymour residents in meeting at city hall By Dan Wehmer Webster County Citizen citizen@webstercountycitizen.com 5 hrs ago


## MEETING TIME

The final public meeting set to gather input about the U.S. 60 corridor in southern Webster County will be held early next week in Seymour.

It arrives next Tuesday in council chambers at Seymour City Hall.

The meeting starts at 6 p.m. It has been scheduled to last $1-1 / 2$ hours.

The public is invited and encouraged to attend.

Previous meetings have been held in Diggins, Fordland and Rogersville.

The meetings are being organized by the Webster County Commission.

Elected representatives from each of the three communities will be present at the respective meetings.

County Clerk Stan Whitehurst said the purpose of the meetings is to gather ideas about possible improvements along U.S. 60, which travels for 30 miles on the south side of Webster County, beginning in the west at Rogersville and ending in the east at Cedar Gap.

Southern District Commissioner Randy Owens said the county commission has been encouraged in the project by assistance from the Burlington Northern Santa Fe (BNSF) railroad. He said BNSF officials have shown a great interest in finding solutions to present and future traffic issues on fourlane U.S. 60.
"This is very encouraging for us as BNSF hasn't been involved in these types of discussions in the past," Owens said. "When we had a stakeholder meeting earlier this month in Marshfield, we had a lot of representatives there from the cities along U.S. 60 and the (Seymour) Special Road District, which also was very encouraging."

Among the issues to be discussed will be possible overpasses in Seymour, making U.S. 60 a true "limited-access" highway, safety of Amish horse-drawn buggies on the four-lane highway and many other topics.s

When meetings are held in Diggins, Fordland and Seymour, respectively, Whitehurst said it is important that local residents attend and share their ideas, thoughts and visions.
"These meetings don't work nearly as well without that local participation," he said. "That's why we encourage the public to come out and attend, to share their viewpoints, to be a big part of the process."

Doors at city hall will open at 5:30 p.m. Tuesday.
http://www.webstercountycitizen.com/news/article_89336e3e-9e5d-11e9-834d-f7f2955b58eb.html

## U.S. 60 future debated

County-led study comes to Seymour with 58 in attendance
By Dan Wehmer Webster County Citizen citizen@webstercountycitizen.com Jul 3, 2019 Updated Jul 9, 2019


Consultant Steve Prange, left, of Crawford, Murphy \& Tilly goes over U.S. 60 traffic issues with Cpl. Chase Davis of the Seymour Police Department, right, at last week's meeting.
CITIZEN PHOTO/Dan Wehmer

There are 22 miles of four-lane U.S. 60 in southern Webster County.

Along that corridor are 49 intersections - 25 of them partial access, 24 that are full access.

The Webster County Commission wants to create a plan for the future of the federal highway that currently carries 23,000 vehicles a day through Seymour.

Commissioners also want to develop a plan for the corridor's railroads as 50 to 60 Burlington Northern Santa Fe trains travel through tracks adjacent to the highway each day.

Discussion of that plan came to Seymour City Hall last Tuesday, June 25, as Steve Prange, regional office manager for Crawford, Murphy \& Tilly of Springfield, a consulting and engineering company hired by the county to complete a study of the corridor, led a public meeting that drew 58 guests and many questions over 1-1/2 hours.

Present were all three commissioners - Presiding Commissioner Paul lpock, Randy Owens from the Southern District and Dale Fraker from the Northern District - two members of the Seymour Special Road District, Assistant District Engineer Andy Mueller from the Missouri Department of Transportation (MoDOT), State Rep. Hannah Kelly and officials from the Southwest Missouri Council of Gov ernments.

After an introduction from lpock, Prange began his presentation, laying out the statistics for Section 4 of the corridor, which goes from Seymour to the Wright County line at Cedar Gap. Section 1 is Rogersville, Section 2 is Fordland, while Section 3 is Diggins.

Prange noted along the U.S. 60 corridor, there are 36 different rail crossings -24 of them public and 12 of them private.

At those crossings over the past 25 years, there have been 44 different "incidents," resulting in 15 fatalities, 14 injuries and 15 non-injury incidents.

He also shared highway statistics in Section 4, noting that since 2012, there have been 192 automobile accidents at U.S. 60 crossings, resulting in 68 injuries and four fatalities.
"Five people have been killed at the railroad crossings in the Seymour area since 1990," Prange added.

Statistics compiled this spring showed the traffic counts at all highway and rail crossings in Section 4.

The busiest crossing?

It's at Highway $K$ going south off U.S. 60 , which has an average of 3,570 crossings a day.

Next is Highway C going north off U.S. 60 at 2,570.

The busiest rail crossing in Seymour?

It may surprise most.

It's not the crossing on Main Street (Highway K). That crossing averages 830 cars a day.

But the crossing on Commercial Street has more than three times as many daily crossings at 2,631 .

The rail crossing on Charles Street has a daily average of 1,006 per day.

Prange's statistics showed that the crossing on U.S. 60 at Skyline Road averages 1,510 vehicles a day, while the joint highway and rail crossing at Oak Lawn Road at Seymour's east edge averages 1,048 .

The least-used crossing?

It's at Lynch Drive off U.S. 60.

The daily average is 25 vehicles.

However, that number likely will increase significantly this year after Abby and Jacque Grabher opened their new business along the street.

Most questions from the crowd concerned the building of an overpass or overpasses in Seymour.

Prange wouldn't speculate on whether any new overpasses would be built in Seymour in the near future.

However, he said the city's future likely includes an overpass or overpasses.
"The ultimate goal is to have a limited-access highway (on U.S. 60)," Prange said. "That can't happen without an overpass in Seymour.
"For MoDOT, I think the goal is to have a corridor like you now see on the James River Freeway in Springfield.

That's ultimately what southern Webster County on U.S. 60 very well may look like."

Prange was asked how long Seymour will wait for an overpass.
"It could take a very long time," he said. "It may not occur until I'm retired, and I'm not retiring any time soon."

Cpl. Chase Davis of the Seymour Police Department said the city's two stoplights are dangerous.
"If we have to wait 20 more years, how many people are going to die at these two crossings?" he asked.
"I understand your frustration," Prange responded. "The purpose of this study is to get input like yours ... to compile all of the statistics from all sides, then to take that information and create a plan for the county."

Mueller said that MoDOT has plans to build an overpass at the U.S. 60 intersection at Highway 125 west of Rogersville in 2022.
"Are there considerations for our Amish neighbors who use the corridor on U.S. 60 between Highway A at Diggins and Seymour?" Seymour resident Bob Crump asked.
"It's a factor," Prange said. "It most certainly is a factor.

In (Section 4), many of the residents are Amish. It's a safety factor for the Amish and for motorists."

Prange added that once U.S. 60 becomes a full limitedaccess highway, Amish horse-drawn buggies wouldn't be allowed on the shoulders.
"This is something that's been delayed for so long that few people can even remember it," Seymour business owner Jerry Kleier said. "MoDOT bought that property here in Seymour in the early 1970s for the overpass, as well as the right of ways, then absolutely nothing was done.
"Every city between Springfield and way east on U.S. 60 got an overpass. But not Seymour."
"And that's what we are studying," Prange said. "We are looking at a long-term plan and solutions."

Prange concluded the meeting by noting that the purpose of the meeting was to gather information. Handed out to all who attended was a questionnaire soliciting input and opinions from residents who live in Section 4 of the study. Those handouts are available at Seymour City Hall and at the Webster County Citizen office.

A second listening session arrives in early August.

It will be held at the Seymour Senior Citizens' Center on the west side of the city square.

## Webster County finalizes plan to improve safety on U.S. 60

By Christine Morton | Posted: Tue 9:52 PM, Oct 22, 2019

ROGERSVILLE, Mo.-- Webster County's study of the 22-mile stretch along U.S. 60 is now complete. The master plan includes areas such as Rogersville, Fordland, Diggins, and Seymour.

Engineer Steve Prange says their goal in the future would be a limited-access freeway similar to James River, which would include interchanges. He says it would enhance safety and travel times.

Prange says the entire project will cost more than $\$ 110$ million, however, at the moment there is no funding to complete the project, but MoDOT plan to look into federal grants.

Superintendent Shawn Randle for the Rogersville School District says this project would help keep students safe on the bus when traveling on U.S. 60.

The next meeting will happen on Tuesday, October 29, at Fordland City Hall.

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https://marshfieldmail.com/news/u-s-study-recommends-million-in-improvements/article_9b3c79d2-0bc1-11ea-8d3a-dbabcb4c396c.html

## U.S. 60 study recommends $\$ 114.3$ million in improvements

By: Karen Craigo, Editor KarenC@MarshfieldMail.com Nov 21, 2019


Steve Prange of CMT Construction shares the results of the U.S. Highway 60 corridor study with residents of Diggins on Nov. 12.
Mail photo by Karen Craigo

A series of three meetings in each of four towns along the U.S. Highway 60 corridor wrapped up Tuesday in Seymour.

Participating communities represented the whole stretch of U.S. 60 , from the western to the eastern boundaries of Webster County. They included Rogersville (mile markers 218 to 223), Fordland (223-229), Diggins (229-235) and Seymour (235-242).

The purpose of the meeting was to draft plans for improvements to the U.S. 60 corridor in order to improve safety and commerce.


Since 2012, the stretch has seen 624 accidents, ranging from 17 crashes with 21 fatalities, to 211 injury accidents, to 396 accidents resulting in property damage only. Rail crossing incidents were also tallied, and they included 11 total incidents with two injuries and four fatalities.

Some 253 attendees came to meetings to consider a $\$ 114.3$ million project that would include eight interchanges, two overpasses, 25 miles of outer roads, three railroad crossing upgrades, 20 railroad crossing closures and 21 roadway intersection closures.

The study indicates that the proposed changes will reduce fatal and injury crashes by 38, property damage crashes by 22.6 and total crashes by 60.6 .

The benefit-cost analysis for the entire project comes in at 1.76, which means that for every dollar spent, $\$ 1.76$ of benefit will accrue. Steve Prange, regional office manager for CMT Construction, who conducted the study, reported at the final listening session in Diggins Nov. 12 that this was a phenomenally good figure. He said that he had just been part of a successful project in Springfield with a 1.15 benefit-cost figure, but that a 1.76 figure is practically unheard of.

It should be noted that the project is not in the works; the study merely lays the groundwork to obtain funding sources for future work. Prange cannot imagine a project taking off until, at minimum, five years from now. Having the cooperation of so many people along the corridor will help future efforts, as will a completed study with an excellent benefit-cost figure. The fact that the Burlington Northern Santa Fe Railway company and the Missouri Department of Transportation have been involved also positions the project very nicely for future implementation.


The U.S. 60 corridor population projections predict a $28 \%$ increase from 2009 to 2029, according to CMT. Missouri itself is predicted to have only a $5 \%$ increase in that period. The number of jobs in the corridor is project to increase from 4,387 today to 4,945 in 2029.
"The Route 60 plan was designed to be the first step," Prange explained.

He added that the route touches so many population centers and communities. "It is a priority - a need for the region," he said.

Prange compared the U.S. Highway 60 planning, now in its initial stages, to the plans for Marshfield's second interchange off of Interstate 44, for which ground was broken this week. He noted that it was the level of planning and cooperation that brought the l-44 plan to fruition, and the same could be true for Highway 60.
(1)

Karen Craigo
Editor

http://www.webstercountycitizen.com/news/article_84ccff62-109b-11ea-a6c6-df038f57f55c.html

BREAKING

## - Three new interchanges

U.S. 60 study: Seymour needs $\$ 37.2$ million in highway help

By Dan Wehmer Webster County Citizen citizen@webstercountycitizen.com Nov 27, 2019
1 of 2


According the U.S. 60 Corridor Study, the stoplights at the intersection of Highway C and Highway K should be removed a replaced with an interchange. The same is true at the city's west exit.

CITIZEN PHOTO/Anna Sturdefant

When doing highway-improvement math, there are three key letters.

BCA.

BCA is an acronym for Benefi t Cost Analysis.

A simple explanation for BCA is that for every dollar spent, it is hoped that one is saved. Projects that do just that have a 1-to-1 net BCA.

When Steve Prange of Crawford Murphy Tilly (CMT), a consulting and engineering fi rm from Springfield tasked with completing the official U.S. 60 Corridor Study for the Webster County Commission, recently went to work on a highway project just west of Springfield, the BCA was 1:15-to-1.
"In essence, the estimated return of investment was $\$ 1.15$ for every dollar spent," Prange explained to a crowd of 37 gathered last Tuesday, Nov. 19, at the Seymour Senior Citizens' Center on the west side of the city square.
"That was a net BCA that the Missouri Department of Transportation (MoDOT) was pleased to hear, and MoDOT funded the project."

Prange and his team from CMT compiled the same BCA numbers for the U.S. 60 Corridor in Webster County, which begins in the east at Cedar Gap and ends in the west at Rogersville.

The BCA for the entire 28-mile corridor?
1.76-to-1.

Better yet, the BCA for Seymour's section of the project? 2.75-to-1.
"The good news for Seymour is that you're the No. 1 safety priority for the project," Prange said.

And the bad news?

There is no funding for the work, which is estimated (in 2029 dollars) at $\$ 37,163,939$ for Seymour and at just over \$114 million for the entire corridor.

Three interchanges in Seymour

For more than an hour on Nov. 19, Prange described the proposed project in great detail to nearly 40 people who were present, noting that under CMT's plan, Seymour would get three new interchanges along U.S. 60.

The first would be on the city's west side near the current McDonald's.

The second would be at the intersection of Highway C and Highway K.

The third would be at PeeWee Crossing Road, roughly three miles east of Seymour's city limits.
"You guys (in Seymour) are getting the lion's share of the infrastructure improvements for the entire project," Prange noted. "The biggest improvements or most significant are the three new interchanges."

Currently, he said the annual average number of automobile accidents along U.S. 60 in Webster County is 163.
"With the proposed improvements, that number would be reduced by almost half," Prange said.
"Travel times also would improve ... this will become a limited-access highway if implemented."

In Seymour, the two highest-accident crossings on U.S. 60 can be found at the two aforementioned intersections on the east and west sides of town.
"Both are stoplights," Prange said. "Over the past seven years, there have been 624 accidents or crashes along U.S. 60 in Webster County. Of those, 192 of them have occurred in Seymour. That's a very-high proportion."

If the new interchanges are constructed, Prange said a system of outer roads must be built on the north and south sides of the four-lane highway.

And at each interchange, the CMT plan calls for an over-pass to be built, crossing the railroad tracks.
"This is a bridge over the railroad," he explained.
"One of the goals of this study, with safety first in mind, is to eliminate dangerous railroad crossings and stoplights. That's the purpose of the rail overpasses and outer roads."

Prange noted that "nothing is set in stone" until the project's design phase is completed; however, he added that he didn't see the plan presented in Seymour last week changing much, if at all.
"Seymour has been very good at coming out and providing us with input," he said. "At the first meeting at city hall, we had 44 present. The second meeting here at the senior center had 42 come out. And tonight's crowd looks very similar to the previous crowds we've had."

Seymour's attendance even was bolstered by a few Amish residents.
"We had a great turnout at our recent Diggins meeting by the Amish," Webster County Presiding Commissioner Paul lpock, R-Diggins, said. "The Amish community has been very helpful during this study, and we appreciate it."

The U.S. 60 Corridor Study has four sections, including:

- Rogersville, which has a 0.64-to-1 net BCA.
- Fordland, which has a 1.26-to-1 net BCA.
- Diggins, which has a 1.55-to-1 net BCA.
- Seymour, which has a 2.75-to-1 net BCA.

Heavy growth expected here Prange said that in the 2010 census, the population along the corridor was roughly 16,000 .

Today, that estimate is 19,712 .
"We realize that growth isn't going to stop," he said.
"We also believe that with highway improvements, that growth could really take off."

In CMT's overall plan, the U.S. 60 corridor in Webster County would get eight new interchanges between Cedar Gap and Rogersville.
"The economic potential in southern Webster County on this corridor is huge," Prange said.
"With this data, I suppose that what I'm saying is that if you build it, they will come."

Partners with the county in the U.S. 60 Corridor Study include Burlington Northern Santa Fe railroad, MoDOT and the Southwest Missour Council of Governments (SMCOG).

The project's price tag was more than \$200,000.

By the end of the year, CMT will post its final report on the project.

Then the company will go to work looking for grants and any type of funding.
"We don't have any money for this now, but I plan to make our case to every agency, federal and state, that will listen to me," Prange concluded

APPENDIX B

## Traffic Models \& Safety Analysis




| US 60 ROADWAY CRASHES - WEBSTER COUNTY (JAN 2012 - JUNE 2019) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SECTION | Log mile | DIRECTION | CRASH CLASS | factors | Intersection | Date | SEVERITY RATING |
| ROGERSVILLE | 97.418 | EB | OUT OF CONTROL | TRAILER ATTACHED TO TRUCK BEGAN TO FISHTALL DURING A LANE CHANGE |  | 43241 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 97.529 | EB | SIDESWIPE | HYDROPLANING |  | 43319 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 97.562 | EB | Rear end | ASLEEP | MILL | 42843 | disabling InJury |
| ROGERSVILLE | 97.566 | EB | OUT OF CONTROL | DIDN'T SEE THE MEDIAN BETWEEN THE ROADWAY AND OFF RAMP, HIT A SIGN | MILL | 42441 | PROPERTY DAMAGE ONL |
| ROGERSVILLE | 97.68 | EB | REAR END | HYDROPLANING |  | 41207 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 97.709 | WB | REAR END | HOPPED UP ON METHAMPHEDAMINES | MILL | 42027 | DISABLING INJURY |
| ROGERSVILLE | 97.709 | EB | REAR END | ALCOHOL | MILL | 43588 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 97.718 | EB | OUT OF CONTROL | ALCOHOL | MILL | 41994 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 97.718 | EB | OUT OF CONTROL | ICY ROADWAY | MILL | 42015 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 97.718 | EB | RIGHT ANGLE | SLIPPED ON WET PAVEMENT IN CONSTRUCTION ZONE | MILL | 42268 | MINOR INJURY |
| ROGERSVILLE | 97.718 | EB | OTHER | TRAILER DETACHED FROM TRUCK AND STRUCK ANOTHER VEHICLE IN THE ROADWAY | MILL | 43499 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 98.366 | EB | HEAD ON | ALCOHOL |  | 41572 | FATAL |
| ROGERSVILLE | 98.419 | EB | OUT OF CONTROL | IMPROPER PASSING, FORCED OFF THE ROADWAY AND STRUCK A ROADWAY SIGN |  | 42588 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 98.666 | EB | PASSING | IMPROPER LANE CHANGE |  | 42654 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 98.766 | EB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when Crossing the roadway | INDUSTRY | 42003 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 98.766 | EB | RIGHT ANGLE | FAILED TO YilL TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | INDUSTRY | 42125 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 98.766 | EB | RIGHT ANGLE | FAILED TO Yilld to incoming traffic when Crossing the roadway | INDUSTRY | 42198 | MINOR INJURY |
| ROGERSVILLE | 98.766 | EB | RIGHT ANGLE | FAILED TO YiELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | Industry | 42364 | MINOR INJURY |
| ROGERSVILLE | 98.766 | EB | RIGHT ANGLE | FAILED TO Yied to incoming traffic when Crossing the roadway | INDUSTRY | 42383 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 98.766 | EB | RIGHT ANGLE | FAILED TO Yilld to incoming traffic when Crossing the roadway | INDUSTRY | 42435 | MINOR INJURY |
| ROGERSVILLE | 98.788 | EB | OTHER | OBJECT IN ROADWAY |  | 41903 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 99.288 | EB | BACKING | SUICIDE ATTEMPT | WHITE OAK | 42017 | MINOR INJURY |
| ROGERSVILLE | 99.288 | EB | SIDESWIPE | SUICIDE ATTEMPT | WHITE OAK | 42017 | MINOR INJURY |
| ROGERSVILLE | 99.288 | EB | OTHER | OBJECT IN ROADWAY |  | 43008 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 99.288 | EB | OUT OF CONTROL | FAILED TO YIELD CROSSING TRAFFIC | WHITE OAK | 41056 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 99.288 | EB | RIGHT ANGLE | FAILED TO Yilld to incoming traffic when Crossing the roadway | WHITE OAK | 41501 | MINOR INJURY |
| ROGERSVILLE | 99.288 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHILE MAKING A RIGHT TURN | WHITE OAK | 41303 | MINOR INJURY |
| ROGERSVILLE | 99.288 | EB | PASSING | IMPROPER PASSING, ADJACENT VEHICLE WAS IN THE BLIND SPOT OF A SEMI CHANGING LANES |  | 42496 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 99.288 | EB | RIGHT ANGLE | FAILED TO Yilld to incoming traffic when Crossing the roadway | WHITE OAK | 42727 | MINOR INJURY |
| ROGERSVILLE | 99.288 | EB | RIGHT ANGLE | FAILED TO Yied To incoming traffic when Crossing the roadway | WHITE OAK | 43105 | MINOR INJURY |
| ROGERSVILLE | 99.571 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | CENTER | 41265 | MINOR INJURY |
| ROGERSVILLE | 99.598 | EB | REAR END | TOOK A RIGHT TURN ONTO US6O: EITHER FAILED TO YIELD OR INCOMING VEHICLE WAS INATTENTIVE | CENTER | 41020 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 99.635 | EB | LEFT TURN | FAILED TO Yield to incoming traffic when Crossing the roadway | CENTER | 41438 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 99.635 | EB | OUT OF CONTROL | ASLEEP | CENTER | 42448 | MINOR INJURY |
| ROGERSVILLE | 99.635 | EB | REAR END | SEMI ATTEMPTED A RIGHT TURN TO ENTER EB US60 And HIT AN ADJACENT VEHICLE | CENTER | 42682 | disabling InJury |
| ROGERSVILLE | 99.635 | EB | OTHER | FAILED TO Yield to incoming traffic when crossing the roadway | CENTER | 43332 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 99.641 | EB | REAR END | FAILED TO Yilld to incoming traffic when Crossing the roadway | CENTER | 43092 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 100.16 | EB | REAR END | INATTENTVE TO SLOWED TRAFFIC MAKING A RIGHT TURN AHEAD | POWERLINE | 43331 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 100.166 | EB | OTHER | MEDICAL ISSUES |  | 41506 | MINOR INJURY |
| ROGERSVILLE | 100.166 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | POWERLINE | 42448 | MINOR INJURY |
| ROGERSVILLE | 100.166 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | POWERLINE | 43162 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 100.32 | EB | PASSING | ANIMAL IN ROADWAY |  | 41212 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 100.355 | wB | AVoiding | ATTEMPTED A LANE CHANGE NOT KNOWING ANOTHER VEHICLE WAS THERE, OVERCORRECTED AND RAN OFF THE RIGHT SIDE OF ROADWAY |  | 41523 | MINOR INJURY |
| ROGERSVILLE | 100.466 | EB | REAR END | InATTENTVE TO SLOWED TRAFFIC AHEAD |  | 43205 | MINOR INJURY |
| ROGERSVILLE | 100.466 | EB | PASSING | IMPROPER LANE CHANGE |  | 41570 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 100.849 | EB | OTHER | OBJECT IN ROADWAY |  | 42249 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 100.849 | EB | RIGHT ANGLE | FAILED TO YilLD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | PORTER LOOP | 43296 | FATAL |
| Rogersville | 101.149 | EB | OUT OF CONTROL | ASLEEP |  | 42604 | FATAL |
| Rogersville | 101.264 | EB | ОTHER | OBJECT IN ROADWAY |  | 43345 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 101.498 | EB | DEER | ANIMAL IN ROADWAY |  | 43279 | MINOR INJURY |
| Rogersville | 101.657 | EB | REAR END | IMPROPER LANE CHANGE/FOLLOWING TOO CLOSE |  | 43471 | PROPERTY DAMAGE ONLY |
| Rogersville | 101.922 | EB | Rear end | ICY ROADWAY |  | 41354 | PROPERTY DAMAGE ONLY |
| Rogersville | 238.6 | WB | JACKKNIFE | ANIMAL IN ROADWAY |  | 43335 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 238.606 | EB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 43379 | DISABLING INJURY |
| RoGERSVILLE | 238.619 | wB | OUT OF CONTROL | ANIMAL IN ROADWAY |  | 42308 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 238.624 | WB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 43427 | PROPERTY DAMAGE ONLY |
| Rogersville | 238.656 | wB | OUT OF CONTROL | Ran off the road on the left side, overcorrected and ran off the road on the right side |  | 43057 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 238.699 | wB | AVOIDING | ANIMAL IN ROADWAY |  | 42955 | MINOR INJURY |
| Rogersville | 238.951 | EB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when crossing the roadway | PORTER LOOP | 43066 | PROPERTY DAMAGE ONLY |
| Rogersville | 239.247 | WB | CROSS MEDIAN | RAN OFF THE ROAD, NO ADIITIONAL INFORMATION |  | 43559 | PROPERTY DAMAGE ONLY |
| Rogersville | 239.456 | wB | OUT OF CONTROL | HYDROPLANING THROUGH THE ROGERSVILLE S-CURVE |  | 41257 | PROPERTY DAMAGE ONLY |
| Rogersville | 239.552 | WB | REAR END | IMPROPER LANE CHANGE |  | 41668 | MINOR INJURY |
| ROGERSVILLE | 239.552 | wB | OUT OF CONTROL | ASLEEP |  | 42818 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 239.676 | wB | OUT OF CONTROL | ASLEEP |  | 41528 | PROPERTY DAMAGE ONLY |
| Rogersville | 239.719 | wB | OUT OF CONTROL | ASLEEP |  | 41202 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 239.752 | WB | RIGHT ANGLE | FAILED TO Yilld TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | PORTER CROSSING | 42047 | MINOR INJURY |
| RoGERSVILLE | 239.754 | wB | PASSING | SIDESWIPE, NO ADDITIONAL INFORMATION |  | 41623 | PROPERTY DAMAGE ONLY |
| Rogersville | 239.952 | wB | PASSING | ANIMAL IN ROADWAY |  | 41439 | PROPERTY DAMAGE ONLY |
| Rogersville | 239.956 | wB | AVOIDING | INATTENTIVE TO TRAFFIC WHILL CHANGING LANES |  | 41476 | PROPERTY DAMAGE ONLY |
| Rogersville | 240.226 | EB | OUT OF CONTROL | BENT Down to Retrieve cigarette |  | 43338 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 240.252 | wB | OUT OF CONTROL | HYDROPLANING THROUGH THE ROGERSVILLE S-CURVE |  | 41258 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 240.286 | wB | OUT OF CONTROL | VEHICLE DEFECTS |  | 43396 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 240.356 | wB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 41430 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 240.399 | WB | OUT OF CONTROL | HYDROPLANING THROUGH THE ROGERSVILLE S SUURVE |  | 41258 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 240.475 | WB | PASSING | IMPROPER LANE CHANGE |  | 42696 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 240.56 | EB | OUT OF CONTROL | DRIVER WAS ARGUING WITH HIS PASSENGER AND THE PASSENGER GRABBED THE STEERING WHEEL AND SWERVED OFF THE ROAD TO THE RIGHT |  | 42521 | PROPERTY DAMAGE ONLY |
| Rogersville | 240.993 | WB | DEER | ANIMAL IN ROADWAY |  | 41943 | PROPERTY DAMAGE ONLY |
| Rogersville | 240.993 | WB | TURN RIGHT ANGLE COLL | ICY ROADWAY | CENTER | 42740 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 240.993 | wB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | CENTER | 41110 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 240.993 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | CENTER | 41960 | MINOR INJURY |
| ROGERSVILLE | 241.002 | wB | REAR END | FAILED TO YIELD TO INCOMING TRAFFIC WHILE MAKING A RIGHT TURN | CENTER | 42237 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 241.023 | wB | DEER | ANIMAL IN ROADWAY |  | 41930 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 241.057 | WB | OUT OF CONTROL | STRUCK ROADWAY SIGN WHILE ATTEMPTING A LEFT TURN | CENTER | 41274 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 241.297 | EB | PASSING | SWERVED INTO ANOTHER VEHICLE DUE TO A VEHICLE BRAKING WITH NON FUNCTIONING LIGHTS |  | 41194 | PROPERTY DAMAGE ONLY |
| Rogersille | 241.336 | WB | RIGHT ANGLE | FAILED TO YilLD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | WHITE OAK | 41801 | MINOR INJURY |
| Rogersville | 241.336 | WB | RIGHT ANGLE | FAILED TO YilLD TO INCOMING TRAFFIC WHEN MAKING A LEFT TURN | WHITE OAK | 43037 | MINOR INJURY |
| RoGERSVILLE | 241.336 | wB | PASSING | ASLEEP |  | 43134 | PROPERTY DAMAGE ONLY |
| Rogersville | 241.336 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | WHITE OAK | 43430 | FATAL |
| Rogersville | 241.336 | WB | RIGHT ANGLE | FAILED TO YilLD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | WHITE OAK | 42272 | FATAL |
| ROGERSVILLE | 241.854 | wB | REAR END | ICY ROADWAY |  | 43476 | PROPERTY DAMAGE ONLY |
| RoGERSVILLE | 241.859 | WB | REAR END | ICY ROADWAY |  | 41344 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 241.859 | WB | OUT OF CONTROL | HYDROPLANING |  | 41350 | PROPERTY DAMAGE ONLY |
| Rogersville | 241.859 | EB | TURN RIGHT ANGLE COLL | FAILED TO YIELD TO INCOMING TRAFFIC WHILE MAKING A LEFT TURN | INDUSTRY | 40911 | MINOR INJURY |
| ROGERSVILLE | 241.859 | wB | OUT OF CONTROL | INATTENTIVE TO STOPPED TRAFFIC AT SIGNAL AHEAD, CHAIN REACTION REAR END CRASHES |  | 41100 | MINOR INJURY |


| US 60 ROADWAY CRASHES - WEBSTER COUNTY (JAN 2012 - JUNE 2019) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SECTION | LOG MILE | DIRECTION | CRASH CLASS | FACTORS | INTERSECTION | Date | SEVERITY RATING |
| Rogersvilue | 241.859 | WB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when Crossing the roadway | INDUSTRY | 41982 | MINOR INJURY |
| ROGERSVILLE | 241.859 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | INDUSTRY | 42109 | PROPERTY DAMAGE ONLY |
| ROGERSVILE | 241.859 | wB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when Crossing the roadway | INDUSTRY | 42286 | MINOR INJURY |
| ROGERSVILE | 241.859 | WB | turn right Angle colu | FAILED TO YIELD TO INCOMING TRAFFIC WHILE MAKING A LEFT TURN | INDUSTRY | 42315 | PROPERTY DAMAGE ON |
| ROGERSVILE | 241.859 | WB | TURN RIGHT ANGLE COLL | FAILED TO YIELD TO INCOMING TRAFFIC WHILE MAKING A LEFT TURN | INDUSTRY | 42332 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 241.859 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | INDUSTRY | 42342 | MINOR INJURY |
| ROGERSVILLE | 241.859 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | INDUSTRY | 42377 | MINOR INJURY |
| ROGERSVILLE | 241.859 | EB | OUT OF CONTROL | ASLEEP |  | 42680 | PROPERTY DAMAGE ONLY |
| ROGERSVILE | 241.859 | wB | OUT OF CONTROL | FAILED TO YIELD TO INCOMING TRAFFIC WHEN MAKING A LEFT TURN | INDUSTRY | 42927 | fatal |
| Rogersvilu | 241.859 | WB | RIGHT ANGLE | FAILED TO Yilld to incoming traffic when Crossing the roadway | INDUSTRY | 43118 | PROPERTY DAMAGE ONLY |
| RoGERSVILE | 241.859 | WB | OUT OF CONTROL | FAILED TO Yield to incoming traffic when crossing the roadway | INDUSTRY | 43251 | MINOR INJURY |
| ROGERSVILE | 241.859 | WB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when crossing the roadway | INDUSTRY | 43430 | PROPERTY DAMAGE ONLY |
| ROGERSVILE | 241.859 | wB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when crossing the roadway | INDUSTRY | 43596 | MINOR INJURY |
| ROGERSVILE | 241.949 | WB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 41126 | MINOR INJURY |
| ROGERSVILE | 242.708 | EB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 41422 | PROPERTY DAMAGE ONLY |
| Rogersvilue | 242.744 | WB | AVoiding | OBJECT IN ROADWAY |  | 43264 | PROPERTY DAMAGE ONLY |
| ROGERSVILLE | 242.808 | WB | DEER | ANIMAL IN ROADWAY |  | 41413 | PROPERTY DAMAGE ONLY |
| Rogersvilu | 242.851 | WB | OTHER | OBJECT IN ROADWAY |  | 42526 | PROPERTY DAMAGE ONLY |
| RoGERSVILE | 242.897 | WB | OUT OF CONTROL | VEHICLE DEFECTS | MILL | 42439 | PROPERTY DAMAGE ONLY |
| ROGERSVILE | 242.909 | WB | FIXED OBJECT | SEVERE THUNDERSTORM BLEW OVER SEMI |  | 42800 | disabling InJury |
| ROGERSVILLE | 243.307 | wB | OUT OF CONTROL | ALCOHOL |  | 41850 | PROPERTY DAMAGE ONLY |
| FORDLAND | 102.122 | EB | PASSING | ALCOHOL |  | 41708 | PROPERTY DAMAGE ONLY |
| FORDLAND | 102.122 | EB | PASSING | IMPROPER LANE CHANGE |  | 42053 | PROPERTY DAMAGE ONLY |
| FORDLAND | 102.597 | EB | L NOT DEER/DOG/FARM A | ANIMAL IN ROADWAY |  | 43014 | PROPERTY DAMAGE ONLY |
| FORDLAND | 102.622 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY | 43508 | PROPERTY DAMAGE ONLY |
| FORDLAND | 102.658 | EB | OTHER | OBJECT IN ROADWAY |  | 42886 | PROPERTY DAMAGE ONLY |
| FordLand | 102.709 | EB | CHANGING LANE | IMPROPER LANE CHANGE |  | 43609 | PROPERTY DAMAGE ONLY |
| FORDLAND | 102.922 | EB | REAR END | DISTRACTED BY ERADIC DRIVER IN ROADWAY, CHAIN REACTION OF REAR END CRASHES |  | 41165 | MINOR INJURY |
| FORDLAND | 103.022 | EB | REAR END | FOLLOWING TOO CLOSE |  | 40992 | MINOR INJURY |
| FORDLAND | 103.986 | EB | PASSING | INATTENTIVE TO TRAFFIC WHILE CHANGING LANES |  | 41214 | PROPERTY DAMAGE ONLY |
| FORDLAND | 104.005 | EB | REAR END | DISTRACTED BY CELL PHONE |  | 41597 | PROPERTY DAMAGE ONLY |
| FORDLAND | 104.028 | EB | OTHER | OBJECT IN ROADWAY | MOCKINGBIRD | 41213 | PROPERTY DAMAGE ONLY |
| FORDLAND | 104.146 | EB | HEAD ON | WRONG WAY CRASH, NO ADDITIONAL INFORMATION |  | 43061 | FATAL |
| FORDLAND | 104.547 | EB | OUT OF CONTROL | ASLEEP |  | 43532 | disabling injury |
| FORDLAND | 104.572 | EB | SIDESWIPE | WRONG WAY CRASH, VEHICLE HAD TO DO IIMMEDIATE LANE CHANGE TO AVOID HEAD ON COLLISION |  | 41507 | MINOR INJURY |
| FORDLAND | 104.872 | EB | RIGHT ANGLE | ICY ROADWAY | BURKS | 43511 | FATAL |
| FORDLAND | 104.872 | EB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when Crossing the roadway | BURKS | 42114 | PROPERTY DAMAGE ONLY |
| FORDLAND | 104.872 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | BURKS | 41696 | DISABLING INJURY |
| FORDLAND | 105.072 | EB | OUT OF CONTROL | MEDICAL ISSUES |  | 42523 | MINOR INJURY |
| FORDLAND | 105.072 | EB | OTHER | ASLEEP |  | 41446 | MINOR INJURY |
| FORDLAND | 105.112 | WB | PASSING | ALCOHOL |  | 41874 | PROPERTY DAMAGE ONLY |
| FORDLAND | 105.169 | EB | OUT OF CONTROL | UNKNOWN CAUSES |  | 42365 | PROPERTY DAMAGE ONLY |
| FordLand | 105.372 | EB | JACKKNIFE | ICY ROADWAY |  | 42388 | PROPERTY DAMAGE ONLY |
| FORDLAND | 105.483 | EB | OUT OF CONTROL | DISTRACTED BY CELL PHONE |  | 42799 | MINOR INJURY |
| FORDLAND | 105.609 | EB | OTHER | OBJECT IN ROADWAY |  | 43481 | PROPERTY DAMAGE ONLY |
| FORDLAND | 105.637 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41344 | PROPERTY DAMAGE ONLY |
| FORDLAND | 105.637 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41344 | PROPERTY DAMAGE ONLY |
| FORDLAND | 105.637 | EB | OUT OF CONTROL | ICY RoADWAY |  | 41344 | PROPERTY DAMAGE ONLY |
| FORDLAND | 105.637 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41344 | PROPERTY DAMAGE ONLY |
| FORDLAND | 105.683 | EB | OTHER | RaN OFF THE ROADWA ON THE LEFT SIDE WHILE ATTEMPTING TO MERGE ONTO US60 | HWY PP | 41486 | MINOR INJURY |
| Fordiand | 105.699 | EB | REAR END | FOLLOWING TOO CLOSE |  | 43496 | PROPERTY DAMAGE ONLY |
| FORDLAND | 105.726 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41331 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.329 | wB | OUT OF CONTROL | ALCOHOL |  | 42610 | MINOR INJURY |
| FORDLAND | 106.329 | WB | RIGHT ANGLE | VEHICLE WAS STOPPED IN ROADWAY |  | 42610 | MINOR INJURY |
| FORDLAND | 106.329 | WB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 42335 | MINOR INJURY |
| FORDLAND | 106.45 | EB | PASSING | IMPROPER LANE CHANGE AT FAULT OF BOTH VEHICLES |  | 41263 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.522 | EB | OUT OF CONTROL | VEHICLE DEFECTS | HWY Z | 42773 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.531 | EB | OUT OF CONTROL | HYDROPLANED |  | 42818 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.544 | EB | OUT OF CONTROL | RAN OFF THE ROAD ON THE RIGHT SIDE, NO ADIITIONAL INFORMATION | HWY Z | 41956 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.545 | EB | OUT OF CONTROL | SWERVED TO AVOID UNSTABLE VEHICLE ON THE WET ROADWAY AHEAD |  | 43476 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.546 | EB | LEFT TURN | FAILED TO Yield to incoming traffic whle making a left turn | HWY Z | 41168 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.55 | EB | OUT OF CONTROL | ICY ROADWAY | HWY | 41675 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.55 | EB | ОTHER | ICY ROADWAY |  | 42067 | MINOR INJURY |
| FORDLAND | 106.55 | EB | OTHER | OBJECT IN ROADWAY |  | 41556 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.55 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE Roadway | HWY | 41592 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.55 | EB | RIGHT ANGLE | FAILED TO YiELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY | 41995 | MINOR INJURY |
| FORDLAND | 106.552 | EB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when Crossing the roadway | HWY | 42592 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.558 | EB | OUT OF CONTROL | drugs |  | 43335 | MINOR INJURY |
| FORDLAND | 106.572 | EB | DEER | ANIMAL IN ROADWAY |  | 43402 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.574 | EB | DEBRIS | OBJECT IN ROADWAY |  | 43238 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.756 | WB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 41801 | PROPERTY DAMAGE ONLY |
| FORDLAND | 106.756 | wB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 41801 | PROPERTY DAMAGE ONLY |
| FORDLAND | 107.085 | EB | FIXED OBJECT | ICY ROADWAY |  | 41674 | PROPERTY DAMAGE ONLY |
| FORDLAND | 107.436 | EB | REAR END | VISION WAS OBSTRUCTED BY LARGE VEHICLE AHEAD SUDDENLY CHANGING LANES TO REVEAL A SLOWLY MOVING VEHICLE |  | 43170 | PROPERTY DAMAGE ONLY |
| FordLand | 107.45 | WB | OTHER | OBJECT IN RoADWAY |  | 41242 | PROPERTY DAMAGE ONLY |
| FORDLAND | 107.525 | EB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when crossing the roadway | HUMMINGBIRD | 42756 | MINOR INJURY |
| FORDLAND | 107.625 | EB | PASSING | IMPROPER LANE CHANGE |  | 42840 | PROPERTY DAMAGE ONLY |
| FORDLAND | 107.871 | EB | REAR END | DISTRACTED DRIVER WAS LOOKING AT PHONE AND DIDN' NOTICE THE VEHICLE SLOWING AHEAD |  | 40970 | MINOR INJURY |
| FORDLAND | 107.925 | EB | OTHER | OBJECT IN ROADWAY |  | 41887 | PROPERTY DAMAGE ONLY |
| FORDLAND | 108.313 | EB | REAR END | ICY ROADWAY |  | 43494 | PROPERTY DAMAGE ONLY |
| FORDLAND | 108.365 | EB | OUT OF CONTROL | ICY ROADWAY |  | 42068 | PROPERTY DAMAGE ONLY |
| FORDLAND | 232.649 | WB | OUT OF CONTROL | ICY ROADWAY |  | 41675 | PROPERTY DAMAGE ONLY |
| FORDLAND | 232.714 | wB | OUT OF CONTROL | ICY ROADWAY |  | 43135 | MINOR INJURY |
| FORDLAND | 232.787 | wB | OUT OF CONTROL | MEDICAL ISSUES |  | 42428 | MINOR INJURY |
| FORDLAND | 233.329 | wB | OUT OF CONTROL | CHILD UNBUCKLED SEAT BELT IN BACKSEAT, DRIVER TURNED TO ASSIST AND RAN OFF THE ROADWAY ON LEFT |  | 41422 | MINOR INJURY |
| FORDLAND | 233.562 | wB | OUT OF CONTROL | DISTRACTED BY DOG HAVING A TANTRUM IN THE BACKSEAT - ALSO MAYBE DRUGS? |  | 42334 | PROPERTY DAMAGE ONLY |
| FORDLAND | 233.726 | wB | DEER | ANIMAL IN ROADWAY |  | 42297 | MINOR INJURY |
| FORDLAND | 233.862 | WB | REAR END | FAILED TO YIELD TO INCOMING TRAFFIC WHEN MAKING A RIGHT TURN ONTO US60 | WINDSWEPT | 42683 | PROPERTY DAMAGE ONLY |
| FORDLAND | 233.881 | wB | PASSING | DISTRACTED BY VEHICLE PARKED IN THE RIGHT SHOULDER RESULTING IN SIDESWIPE |  | 41508 | MINORINJURY |
| FORDLAND | 234.04 | wB | OTHER | OBJECT IN ROADWAY |  | 42444 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.05 | wB | OUT OF CONTROL | ASLEEP |  | 42905 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.062 | WB | PASSING | NO INFORMATION |  | 42208 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.062 | WB | TURN RIGHT ANGLE COLL | FAILED TO YIELD TO INCOMING TRAFFIC WHEN MAKING A LEFFT TURN ONTO US60 | HWYZ | 43517 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.063 | EB | FIXED OBJECT | DRIVER WAS NOT WATCHING WHERE HE WAS DRIVING | HWY | 41481 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.065 | WB | TURN RIGHT ANGLE COLL | FAILED TO YIELD TO INCOMING TRAFFIC WHEN MAKING A LEFT TURN ONTO US60 | HWY | 43024 | MINOR INJURY |


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| SECTIoN | Log MILE | DIRECTION | CRASH CLASS | factors | Intersection | Date | SEVERITY RATING |
| FORDLAND | 234.112 | wB | DEER | ANIMAL IN ROADWAY | hwy | 41223 | PROPERTY DAMAGE ONLY |
| Fordiand | 234.176 | wB | OUT OF CONTROL | ASLEEP |  | 41237 | MINOR INJURY |
| FORDLAND | 234.222 | WB | FIXED OBJECT | ASLEEP |  | 43274 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.231 | EB | REAR END | ALCOHOL |  | 42453 | fatal |
| FORDLAND | 234.27 | WB | OUT OF CONTROL | HYDROPLANING |  | 41167 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.324 | wB | AVOIDING | IMPROPER LANE CHANGE |  | 42674 | disabling injury |
| FORDLAND | 234.535 | WB | REAR END | INATTENTIVE TO SLOWED TRAFFIC AHEAD PREPARING TO TAKE A RIGHT TURN | HWYZ | 41540 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.931 | WB | OUT OF CONTROL | ICY ROADWAY |  | 43092 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.931 | WB | OUT OF CONTROL | ICY ROADWAY |  | 43429 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.94 | WB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 42077 | MINOR INJURY |
| FORDLAND | 234.941 | WB | OUT OF CONTROL | HYDROPLANING |  | 41252 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.946 | wB | PASSING | ICY ROADWAY |  | 41344 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.946 | wB | OUT OF CONTROL | ICY ROADWAY |  | 41344 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.96 | wB | OUT OF CONTROL | ICY ROADWAY |  | 41397 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.962 | WB | OTHER | OBJECT IN ROADWAY |  | 41242 | PROPERTY DAMAGE ONLY |
| FORDLAND | 234.965 | WB | OUT OF CONTROL | ICY Roadway |  | 41344 | MINOR INJURY |
| FORDLAND | 234.988 | WB | OUT OF CONTROL | ICY ROADWAY |  | 43477 | MINOR INJURY |
| FORDLAND | 234.994 | wB | OUT OF CONTROL | ICY Roadway |  | 42709 | MINOR INJURY |
| FORDLAND | 234.998 | WB | OUT OF CONTROL | ICY ROADWAY |  | 42807 | MINOR INJURY |
| FORDLAND | 235.003 | WB | OUT OF CONTROL | ICY ROADWAY |  | 41344 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.02 | WB | PASSING | ICY ROADWAY |  | 43477 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.028 | WB | OUT OF CONTROL | ICY ROADWAY |  | 41331 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.032 | wB | OUT OF CONTROL | ICY ROADWAY |  | 43153 | MINOR INJURY |
| FORDLAND | 235.032 | wB | PASSING | IMPROPER LANE CHANGE |  | 42818 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.04 | WB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 42077 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.04 | wB | OUT OF CONTROL | ICY ROADWAY |  | 42366 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.04 | wB | OUT OF CONTROL | ICY ROADWAY |  | 43092 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.219 | wB | FIXED OBJECT | HYDROPLANING |  | 41350 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.24 | wB | OUT OF CONTROL | NeGOTIATED A CURVE TOO FAST |  | 42709 | MINOR INJURY |
| FORDLAND | 235.44 | wB | DEER | ANIMAL IN ROADWAY |  | 42535 | disabling INJURY |
| FORDLAND | 235.49 | EB | OTHER | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 41481 | MINOR INJURY |
| FORDLAND | 235.54 | WB | OUT OF CONTROL | ICY ROADWAY |  | 40952 | MINOR INJURY |
| FORDLAND | 235.579 | WB | PASSING | IMPROPER LANE CHANGE |  | 43407 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.74 | wB | OUT OF CONTROL | HYDROPLANING |  | 42181 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.74 | WB | OUT OF CONTROL | ASLEEP |  | 41719 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.74 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | BURKS | 43221 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.748 | WB | REAR END | INATTENTIVE TO STOPPED TRAFFIC AHEAD AT RIGHT TURN BAY ENTERING US60 | BURKS | 43556 | PROPERTY DAMAGE ONLY |
| FORDLAND | 235.755 | wB | REAR END | REAR END CRASH, NO ADIITIONAL INFORMATION GIVEN | INDUSTRY | 43104 | MINOR INJURY |
| FORDLAND | 235.84 | WB | REAR END | FOLLOWING TOO CLOSE |  | 41485 | MINOR INJURY |
| FORDLAND | 235.929 | WB | OTHER | OBJECT IN ROADWAY |  | 41222 | PROPERTY DAMAGE ONLY |
| FORDLAND | 236.023 | wB | OUT OF CONTROL | AsLEEP |  | 42575 | DISABLING INJURY |
| FORDLAND | 236.04 | WB | OUT OF CONTROL | ICY ROADWAY |  | 42051 | PROPERTY DAMAGE ONLY |
| FORDLAND | 236.081 | wB | OUT OF CONTROL | RAN OFF THE ROADWAY ON THE RIGHT SIDE IN AN ATTEMPT TO AVOID A PARKED POLICE CAR ON THE RIGHT SHOULDER |  | 41493 | PROPERTY DAMAGE ONLY |
| FORDLAND | 236.397 | wB | DEER | ANIMAL IN ROADWAY |  | 41793 | PROPERTY DAMAGE ONLY |
| FORDLAND | 236.449 | WB | OTHER | OBJECT IN ROADWAY |  | 42379 | PROPERTY DAMAGE ONLY |
| FORDLAND | 236.467 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | MOCKINGBIRD | 42266 | PROPERTY DAMAGE ONLY |
| FORDLAND | 236.498 | wB | OUT OF CONTROL | MEDICAL ISSUES |  | 41169 | FATAL |
| FORDLAND | 236.577 | WB | FIXED OBJECT | ASLEEP |  | 42323 | MINOR INJURY |
| FORDLAND | 236.586 | WB | REAR END | INATTENTVE TO SLOWED TRAFFIC AHEAD | IRON MOUNTAIN | 42379 | MINOR INJURY |
| FORDLAND | 236.609 | wB | OUT OF CONTROL | SLIPPED ON WET PAVEMENT WHILE CHANGING LANES |  | 42304 | PROPERTY DAMAGE ONLY |
| FORDLAND | 236.697 | wB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 43426 | PROPERTY DAMAGE ONLY |
| FORDLAND | 236.75 | wB | REAR END | IMPROPER LANE CHANGE |  | 43001 | MINOR INJURY |
| FORDLAND | 236.986 | WB | OUT OF CONTROL | ASLEEP |  | 42863 | MINOR INJURY |
| FordLand | 237.052 | WB | OTHER | OBJECT IN ROADWAY |  | 41361 | PROPERTY DAMAGE ONLY |
| FORDLAND | 237.081 | wB | OUT OF CONTROL | POLICE VEHICLE DAMAGED UNDERCARRIAGE ATTEMPTING TO DRIVE INTO MEDIAN TO INVESTIGATE INCIDENT |  | 43125 | PROPERTY DAMAGE ONLY |
| FordLand | 237.086 | WB | OUT OF CONTROL | VEHICLE DEFECTS |  | 40985 | PROPERTY DAMAGE ONLY |
| FORDLAND | 237.086 | wB | CHANGING LANE | POLICE OFFICER PULLED VEHICLE OVER IN THE LEFT SHOULDER THEN TOLD THE DRIVER TO RELOCATE TO THE RIGHT SHOULDER RESULTING IN AN INCIDENT |  | 41598 | PROPERTY DAMAGE ONLY |
| FordLand | 237.086 | WB | OUT OF CONTROL | SWERVED TO AVOID COLISIION DUE TO IMPROPER LANE CHANGE |  | 43360 | PROPERTY DAMAGE ONLY |
| FORDLAND | 237.255 | WB | REAR END | INATTENTVE TO SLOWED TRAFFIC AHEAD (VEHICLE DEFECTS RESUULTED IN SLOW TRAVEL SPEED) |  | 42114 | MINOR INJURY |
| FORDLAND | 237.599 | wB | DOG | ANIMAL IN ROADWAY |  | 42697 | PROPERTY DAMAGE ONLY |
| FordLand | 237.827 | WB | REAR END | DRIVING TOO FAST AND REAR ENDED A VEHICLE AHEAD |  | 43121 | MINOR INJURY |
| FordLand | 237.876 | wB | OUT OF CONTROL | VEHICLE DEFECTS |  | 41236 | PROPERTY DAMAGE ONLY |
| FORDLAND | 237.916 | wB | PASSING | IMPROPER LANE CHANGE |  | 43019 | PROPERTY DAMAGE ONLY |
| FORDLAND | 237.986 | wB | REAR END | INATtENTIVE TO SLOWED TRAFFIC AHEAD PREPARING TO TAKE A RIGHT TURN | RED OAK | 43338 | MINOR INJURY |
| FORDLAND | 237.999 | wB | OUT OF CONTROL | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY | 42110 | MINOR INJURY |
| FORDLAND | 237.999 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY |  | 42061 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.01 | wB | OTHER | OBJECT IN ROADWAY |  | 42978 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.032 | wB | REAR END | DISTRACTED BY CELL PHONE |  | 43027 | MINOR INJURY |
| FORDLAND | 238.036 | WB | OTHER | OBJECT IN ROADWAY |  | 43329 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.098 | WB | OUT OF CONTROL | HYDROPLANING |  | 43193 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.199 | WB | PASSING | IMPROPER LANE CHANGE |  | 42461 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.399 | WB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 41258 | MINORINJURY |
| FORDLAND | 238.399 | wB | OUT OF CONTROL | NEGOTIATED A CURVE TOO FAST |  | 42611 | MINOR INJURY |
| FORDLAND | 238.469 | wB | OUT OF CONTROL | TOOK A CURVE AND LANE CHANGE TOO FAST AND RAN OFF THE ROADWAY ON THE LEFT SIDE |  | 43337 | MINOR INJURY |
| FORDLAND | 238.499 | wB | OUT OF CONTROL | HYDROPLANING |  | 41491 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.499 | wB | OUT OF CONTROL | FORCED ONTO SHOULDER BY A VEHICLE IMPROPERLY PASSING, STRUCK A ditch |  | 40980 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.499 | wB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 42324 | MINOR INJURY |
| FORDLAND | 238.546 | wB | OUT OF CONTROL | SWERVED TO AVOID COLIISION DUE TO IMPROPER LANE CHANGE |  | 43341 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.591 | wB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 43073 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.595 | WB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 43054 | PROPERTY DAMAGE ONLY |
| FORDLAND | 238.599 | WB | OUT OF CONTROL | ICY ROADWAY |  | 41613 | PROPERTY DAMAGE ONLY |
| DIGGINS | 108.411 | EB | OTHER | OBJECT IN Roadway |  | 42595 | PROPERTY DAMAGE ONLY |
| DIGGINS | 108.465 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41675 | MINOR INJURY |
| DIGGINS | 108.465 | EB | OUT OF CONTROL | ASLEEP |  | 42280 | MINOR INJURY |
| DIGGINS | 108.49 | EB | OTHER | OBJECT IN ROADWAY |  | 43093 | PROPERTY DAMAGE ONLY |
| DIGGINS | 108.564 | EB | RIGHT TURN | HEAVY FOG OBSTRUCTED VISION OF ALL DRIVERS | HONOR CAMP | 43109 | MINOR INJURY |
| DIGGINS | 108.565 | EB | RIGHT ANGLE | HEAVY FOG OBSTRUCTED VISION OF ALL DRIVERS | HONOR CAMP | 41978 | DISABLING INJURY |
| DIGGINS | 108.565 | EB | OUT OF CONTROL | ALCOHOL |  | 42973 | PROPERTY DAMAGE ONLY |
| DIGGINS | 108.565 | EB | CHANGING LANE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN MAKING A LEFT TURN ONTO US60 | HONOR CAMP | 42981 | PROPERTY DAMAGE ONLY |
| DIGGINS | 108.567 | EB | REAR END | IMPROPER LANE CHANGE |  | 41964 | MINOR INJURY |
| DIGGINS | 108.579 | EB | DOG | ANIMAL IN ROADWAY |  | 42650 | PROPERTY DAMAGE ONLY |
| DIGGINS | 108.605 | EB | OTHER | OBJECT IN ROADWAY |  | 43060 | PROPERTY DAMAGE ONLY |
| DIGGINS | 108.631 | EB | REAR END | CRASHED INTO VEHICLES STOPPED FOR A PREVIIOUS ACCIDENT AT THIS LOCATION |  | 41964 | PROPERTY DAMAGE ONLY |
| DIGGINS | 109.097 | EB | OUT OF CONTROL | RAN OF THE ROAD ON THE RIGHT SIDE DUE TO TAKING A CURVE TOO FAST |  | 42310 | MINOR INJURY |


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| SECTION | LOG MILE | DIRECTION | CRASH CLASS | factors | Intersection | Date | SEVERITY RATING |
| DIGGINS | 109.249 | EB | OUT OF CONTROL | ICY ROADWAY |  | 42721 | MINOR INJURY |
| DIGGINS | 109.397 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41330 | PROPERTY DAMAGE ONLY |
| DIGGINS | 109.497 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41648 | MINOR INJURY |
| DIGGINS | 109.552 | EB | OUT OF CONTROL | ALCOHOL |  | 42913 | MINOR INJURY |
| DIGGINS | 109.597 | EB | PASSING | HYDROPLANING |  | 41441 | PROPERTY DAMAGE ONLY |
| DIGGINS | 109.597 | EB | OUT OF CONTROL | POTENTIAL SEXUAL TOUCHING IN THE VEHICLE RESULTED IN IT RUNNING OFF THE ROADWAY ON THE RIGHT SIDE AND OVERTURNING PAST THE RR TRACKS |  | 42308 | DISABLING INJURY |
| DIGGINS | 109.597 | EB | OUT OF CONTROL | MEDICAL ISSUES |  | 42563 | disabling InJury |
| DIGGINS | 109.802 | EB | OUT OF CONTROL | RAN OF THE LEFT SIDE OF THE ROADWAY WHEN TAKING A CURVE TOO FAST |  | 41968 | MINOR INJURY |
| DIGGINS | 109.803 | EB | OUT OF CONTROL | AsLEEP |  | 42612 | MINOR INJURY |
| DIGGINS | 109.805 | EB | PASSING | FAILED TO YIELD TO INCOMING TRAFFIC WHEN MAKING A LEFT TURN ONTO US60 | HWY A | 42832 | PROPERTY DAMAGE ONLY |
| DIGGINS | 109.835 | EB | OUT OF CONTROL | SWERVED TO AVOID COLIISION DUE TO IMPROPER LANE CHANGE |  | 42102 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.01 | EB | PARKING OR PARKED CARI | INATTENTVE TO THE VEHICLE PARKED ON THE RIGHT SHOULDER AND CLIPPED IT |  | 43310 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.097 | EB | REAR END | ICY ROADWAY |  | 42721 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.2 | WB | DEER | ANIMAL IN ROADWAY |  | 41950 | MINOR INJURY |
| DIGGINS | 110.211 | EB | PASSING | IMPROPER LANE CHANGE |  | 43250 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.226 | EB | CHANGING LANE | HYDROPLANING |  | 41403 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.226 | EB | OUT OF CONTROL | AsLEEP |  | 42217 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.226 | EB | OUT OF CONTROL | ASLEEP |  | 42613 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.226 | EB | OUT OF CONTROL | NEGOTATED A CURVE TOO FAST |  | 42767 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.303 | EB | PASSING | ROAD RAGE INCIDENT |  | 42543 | PROPERTY DAMAGE ONLY |
| digGins | 110.326 | ев | DRAWN VEH OR RIDDEN | AN UNOCCUPIED HORSE AND BUGGY RAN INTO THE ROADWAY AND WAS STRUCK BY ANOTHER VEHICLE | HWY NN | 41257 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.326 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY NN | 41281 | MINOR INJURY |
| DIGGINS | 110.326 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY NN | 41609 | disabling InJury |
| DIGGINS | 110.326 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY NN | 42072 | MINOR INJURY |
| DIGGINS | 110.331 | EB | OUT OF CONTROL | DRIVING TOO FAST DURING A RAIN EVENT AND HYDROPLANED |  | 43186 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.426 | EB | PASSING | IMPROPER LANE CHANGE |  | 43223 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.526 | EB | OUT OF CONTROL | INATTENTIVE TO SLOWED TRAFFIC AHEAD AND SWERVED TO MISS IT, RUNNING OFF THE ROAD ON THE RIGHT SIDE THEN THE LEFT SIDE |  | 43063 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.679 | EB | OUT OF CONTROL | ICY ROADWAY |  | 42388 | MINOR INJURY |
| DIGGINS | 110.717 | EB | OUT OF CONTROL | DISTRACTED BY TRAIN BESIDE ROADWAY |  | 43163 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.779 | EB | OUT OF CONTROL | AsLEEP |  | 41585 | PROPERTY DAMAGE ONLY |
| DIGGINS | 110.798 | EB | PASSING | FAILED TO YilLD TO INCOMING TRAFFIC WHEN MAKING A LEFT TURN ONTO US60 | HwY | 42704 | PROPERTY DAMAGE ONLY |
| DIGGINS | 111.179 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41648 | PROPERTY DAMAGE ONLY |
| DIGGINS | 111.422 | EB | OUT OF CONTROL | HYDROPLANING |  | 41767 | FATAL |
| DIGGINS | 111.549 | EB | OTHER | RAN OFF THE ROAD ON THE RIGHT SIIE, NO ADDITIONAL INFORMATION | RAIL | 42508 | DISABLING INJURY |
| DIGGINS | 112.237 | EB | OUT OF CONTROL | STRANDED MOTORIST WAS IN ROADWAY |  | 41648 | PROPERTY DAMAGE ONLY |
| DIGGINS | 112.389 | EB | DEER | ANIMAL IN ROADWAY |  | 41178 | MINOR INJURY |
| DIGGINS | 112.557 | EB | OUT OF CONTROL | OBJECT IN ROADWAY |  | 42214 | MINOR INJURY |
| DIGGINS | 112.57 | EB | OTHER | ALCOHOL |  | 43317 | PROPERTY DAMAGE ONLY |
| DIGGINS | 112.833 | EB | OUT OF CONTROL | AsLEEP |  | 42562 | PROPERTY DAMAGE ONLY |
| DIGGINS | 113.13 | EB | OUT OF CONTROL | ASLEEP |  | 41350 | PROPERTY DAMAGE ONLY |
| DIGGINS | 113.187 | EB | OUT OF CONTROL | MEDICAL ISSUES |  | 41166 | PROPERTY DAMAGE ONLY |
| DIGGINS | 113.258 | EB | OTHER | VEHICLE DEFECTS |  | 42569 | PROPERTY DAMAGE ONLY |
| DIGGINS | 113.506 | EB | REAR END | ICY ROADWAY |  | 41647 | PROPERTY DAMAGE ONLY |
| DIGGINS | 113.613 | EB | TURN RIGHT ANGLE COLL | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | BOX SCHOOL LOOP | 43188 | PROPERTY DAMAGE ONLY |
| DIGGINS | 113.645 | EB | REAR END | AsLEEP |  | 41848 | PROPERTY DAMAGE ONLY |
| DIGGINS | 113.751 | EB | OTHER | OBJECT IN ROADWAY |  | 41223 | PROPERTY DAMAGE ONLY |
| DIGGINS | 226.887 | WB | OUT OF CONTROL | ALCOHOL |  | 43497 | PROPERTY DAMAGE ONLY |
| DIGGINS | 227.1 | WB | REAR END | IMPROPER LANE CHANGE |  | 43233 | PROPERTY DAMAGE ONLY |
| DIGGINS | 227.239 | wB | OTHER | OBJECT IN Roadway |  | 41661 | PROPERTY DAMAGE ONLY |
| DIGGINS | 227.257 | wB | REAR END | RAN OFF THE ROAD ON THE RIGHT SIDE, OVERCORRECTED, RE-ENTERED THE ROADWAY AND STRUCK ANOTHER VEHICLE |  | 43009 | disabling injury |
| DIGGINS | 227.764 | wB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 41424 | PROPERTY DAMAGE ONLY |
| DIGGINS | 227.969 | EB | PASSING | IMPROPER LANE CHANGE |  | 42221 | PROPERTY DAMAGE ONLY |
| DIGGINS | 228.003 | WB | REAR END | FOLLOWING TOO CLOSE TO VEHICLE SLOWING FOR ANOTHER VEHICLE THAT HAD JUST ENTERED THE ROADWAY | SHORT | 43231 | PROPERTY DAMAGE ONLY |
| DIGGINS | 228.074 | WB | PASSING | IMPROPER LANE CHANGE |  | 43228 | PROPERTY DAMAGE ONLY |
| DIGGINS | 228.114 | WB | PASSING | AsLEEP |  | 42549 | MINOR INJURY |
| DIGGINS | 228.3 | WB | RIGHT TURN | INATTENTIVE TO SLOWED TRAFFIC AHEAD PREPARING TO TAKE A RIGHT TURN | BERRY | 42095 | PROPERTY DAMAGE ONLY |
| DIGGINS | 228.349 | WB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 42863 | PROPERTY DAMAGE ONLY |
| DIGGINS | 228.363 | WB | OUT OF CONTROL | VEHICLE DEFECTS |  | 41853 | PROPERTY DAMAGE ONLY |
| DIGGINS | 228.396 | WB | dRawn Veh or rideen | DRIVER OF HORSE AND BUGGY IMPROPERLY CHANGED LANES AND WAS STRUCK BY ANOTHER VEHICLE |  | 41404 | MINOR INJURY |
| DIGGINS | 228.563 | WB | REAR END | AsLEEP |  | 41581 | PROPERTY DAMAGE ONLY |
| DIGGINS | 228.682 | WB | OUT OF CONTROL | AsLEEP | BOX SCHOOL LOOP | 42661 | PROPERTY DAMAGE ONLY |
| DIGGINS | 228.863 | WB | OTHER | OBJECT IN ROADWAY |  | 42903 | PROPERTY DAMAGE ONLY |
| DIGGINS | 229.115 | WB | OUT OF CONTROL | RAN OfF THE ROAD, NO Aditional information |  | 43567 | DISABLING INJURY |
| DIGGINS | 229.305 | WB | RIGHT TURN | IMPROPER PASSING ON THE RIGHT SHOULDER FOR A VEHICLE MAKING A RIGHT TURN | HWY O | 42587 | DISABLING INJURY |
| DIGGINS | 229.792 | WB | REAR END | INATTENTIVE TO SLOWED TRAFFIC AHEAD PREPARING TO TAKE A RIGHT TURN | HWY O | 41684 | PROPERTY DAMAGE ONLY |
| DIGGINS | 229.793 | WB | REAR END | INATTENTIVE TO SLOWED TRAFFIC AHEAD PREPARING TO TAKE A RIGHT TURN | HWY O | 42223 | MINOR INJURY |
| DIGGINS | 229.805 | wB | OUT OF CONTROL | HYDROPLANED |  | 42152 | PROPERTY DAMAGE ONLY |
| DIGGINS | 229.805 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY O | 42475 | MINOR INJURY |
| DIGGINS | 230.159 | wB | AVoiding | OBJECT IN Roadway |  | 41470 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.159 | wB | DRAWN VEH OR RIDDEN. | DISTRACTED BY CELL PHONE |  | 43029 | MINOR INJURY |
| DIGGINS | 230.284 | WB | HEAD ON | MEDICAL ISSUES |  | 42805 | DISABLING INJURY |
| DIGGINS | 230.292 | WB | OUT OF CONTROL | DRIVER INTENTIONALLY DROVE INTO THE MEDIAN, NOT EXPECTING TO OVERTURN FUTHER DOWN |  | 43295 | MINOR INJURY |
| DIGGINS | 230.696 | wB | OUT OF CONTROL | AsLEEP |  | 43050 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.79 | WB | OUT OF CONTROL | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY A | 43128 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.819 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWYA | 43021 | MINOR INJURY |
| DIGGINS | 230.822 | wB | OTHER | OBJECT IN ROADWAY |  | 41498 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.822 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY A | 41417 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when crossing the roadway | HWY A | 41454 | MINOR INJURY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWYA | 41530 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | DISTRACTED BY HORSE AND BUGGY WHLLE CROSSING ROADWAY | HWY A | 41814 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWYA | 42085 | disabling InJury |
| DIGGINS | 230.822 | WB | DRawn veh or ridoen | Horse and bugay falled to Yield to incoming traffic when crossing the roadway | HWY | 42146 | fatal |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWYA | 42243 | MINOR INJURY |
| DIGGINS | 230.822 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY A | 42418 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWYA | 42431 | DISABLING INJURY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY A | 42687 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWYA | 42718 | MINOR INJURY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWYA | 43003 | MINOR INJURY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWYA | 43057 | MINOR INJURY |
| DIGGINS | 230.822 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | HWY A | 43060 | MINOR INJURY |
| DIGGINS | 230.822 | wB | RIGHT ANGLE | IMPATIENT DRIVER PASSED THE VEHICLE AHEAD WAITING IN THE MEDIAN CROSSOVER AND FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING ROADWAY | hWYa | 43108 | disabling injury |


| US 60 ROADWAY CRASHES - WEBSTER COUNTY (JAN 2012 - JUNE 2019) |  |  |  |  |  |  |  |
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| section | Log mile | DIRECTION | CRASH CLASS | factors | Intersection | Date | SEVERITY Rating |
| DIGGINS | 230.824 | WB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when Crossing the roadway | HWY | 42076 | fatal |
| DIGGINS | 230.875 | wB | OTHER | OBJECT IN ROADWAY |  | 42645 | PROPERTY DAMAGE ONLY |
| DIGGINS | 230.891 | wB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 43404 | PROPERTY DAMAGE ONLY |
| DIGGINS | 231.022 | WB | CHANGING LANE | HYDROPLANING |  | 41894 | PROPERTY DAMAGE ONLY |
| DIGGINS | 231.322 | WB | OTHER | OBJECT IN Roadway |  | 41758 | PROPERTY DAMAGE ONLY |
| DIGGINS | 231.597 | WB | OUT OF CONTROL | MEDICAL ISSUES |  | 43461 | PROPERTY DAMAGE ONLY |
| DIGGINS | 231.758 | EB | OTHER | OBJECT IN ROADWAY | HONOR CAMP | 42566 | PROPERTY DAMAGE ONLY |
| DIGGINS | 231.816 | WB | JACKKNIFE | VEHICLE DEFECTS |  | 43271 | PROPERTY DAMAGE ONLY |
| DIGGINS | 232.052 | wB | REAR END | ICY ROADWAY | HONOR CAMP | 43115 | MINORINJURY |
| DIGGINS | 232.456 | WB | OUT OF CONTROL | ASLEEP |  | 43462 | MINOR INJURY |
| SEYMOUR | 114.303 | EB | REAR END | ATTEMPTED A LEFT TURN FROM THE PASSING LANE AT SIGNAL AND NOT THE LLEFT TURN LANE | CLINTON | 41311 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.326 | EB | REAR END | FOOT SLIPPED ON BRAKE PEDAL FROM WET SHOES AFTER ALL VEHICLES WERE SAFELY STOPPED AT THE SIGNALIZED INTERSECTION | CLINTON | 42995 | MINOR INJURY |
| SEYMOUR | 114.327 | EB | OUT OF CONTROL | HEAVY FOG OBSTRUCTED VIIION | CLINTON | 43153 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.327 | EB | U- TURN | FAlLED To YIELD AT SIGNALZED INTERSECTION WHILE MAKING LLEFT TURN | CLINTON | 41108 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.331 | EB | OTHER | VEHICLE DEFECTS | CLINTON | 41502 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.337 | EB | PASSING | HYDROPLANED APPROACHING RED LIGHT AT SIGNALIZED INTERSECTION | CLINTON | 42076 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.338 | EB | REAR END | VEHICLE DEFECTS | CLINTON | 42483 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.341 | EB | RIGHT ANGLE | FALLED TO YIELD To Incoming traffic at red light | CLINTON | 42568 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.343 | EB | PASSING | MEDICAL ISSUES | CLINTON | 41249 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.344 | EB | LEFT TURN | RAN A RED LIGHT AT SIGNALIZED INTERSECTION | CLINTON | 41226 | MINOR INJURY |
| SEYMOUR | 114.345 | EB | RIGHT ANGLE | DRIVER DID NOT HEAR OR SEE EMERGENCY LIGHTS AND HIT THE EMERGENCY RESPONSE VEHICLE IN A | CLINTON | 42122 | MINOR INJURY |
| SEYMOUR | 114.345 | EB | REAR END | MEDICAL ISSUES | CLINTON | 42415 | DISABLING INJURY |
| SEYMOUR | 114.345 | EB | RIGHT ANGLE | DISTRACTED BY RADIO | CLINTON | 43631 | DISABLING INJURY |
| SEYMOUR | 114.345 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC AT SIGNAL AHEAD | CLINTON | 43365 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.345 | EB | OUT OF CONTROL | FALLED TO YIELD TO INCOMING TRAFFIC AT RED LIGHT | CLINTON | 43584 | MINOR INJURY |
| SEYMOUR | 114.345 | EB | RIGHT ANGLE | FAILED TO YiELD To Incoming traffic at Signal ahead | CLINTON | 43301 | DISABLING INJURY |
| SEYMOUR | 114.347 | EB | RIGHT ANGLE | FAlLED TO YieLd to incoming traffic at red light | CLINTON | 42320 | DISABLING INJURY |
| SEYMOUR | 114.352 | EB | TURN RIGIT ANGLE COLL | ALCOHOL | CLINTON | 41755 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.353 | EB | TURN RIGHT ANGLE COLL | DISTRACTED BY CELL PHONE | CLINTON | 42405 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.353 | wB | REAR END | INATTENTVE TO STOPPED TRAFFIC AT SIGNAL AHEAD | CLINTON | 41936 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 114.358 | EB | REAR END | FAILED TO YIELD TO INCOMING TRAFFIC WHEN MAKING A RIGHT TURN ONTO US60 | CLINTON | 42922 | MINOR INJURY |
| SEYMOUR | 115.1 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | SKYLINE | 42135 | MINOR INJURY |
| SEYMOUR | 115.103 | EB | CROSS MEDIAN | LIMITED VIIIBLITY - SUN WAS SHINING DIRECTLY INTO EYES | SKYLINE | 43425 | MINOR INJURY |
| SEYMOUR | 115.103 | EB | RIGHT ANGLE | FAILED TO YilLD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | SKYLINE | 40921 | DISABLING INJURY |
| SEYMOUR | 115.103 | EB | RIGHT ANGLE | FAILED TO Yilld to incoming traffic when Crossing the roadway | SKYLINE | 41033 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 115.103 | EB | SIDESWIPE | TOOK A U-TURN TOO TIGHT AND HIT ANOTHER VEHICLE IN THE MEDIAN CROSSOVER | SKYLINE | 41530 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 115.103 | EB | RIGHT ANGLE | FAILED TO Yield to incoming traffic when crossing the roadway | SKYLINE | 42561 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 115.236 | EB | REAR END | INATTENTIVE TO SLOWED TRAFFIC THAT HAD JUST ENTERED THE ROADWAY | SKYLINE | 43064 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 115.273 | EB | OUT OF CONTROL | VEHICLE WAS STOPPED IN ROADWAY |  | 41657 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 115.305 | EB | HEAD ON | ALCOHOL |  | 42378 | MINOR INJURY |
| SEYMOUR | 115.505 | EB | JACKKNIFE | ICY ROADWAY | CLINTON | 41334 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.236 | EB | dRawn veh or ridden | AN UNOCCUPIED HORSE AND BUGGY RAN INTO THE ROADWAY AND WAS STRUCK BY Another vehicle | HWY C/Kk | 42975 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.304 | EB | REAR END | HYDROPLANING | HWY C/Kk | 41920 | MINOR INJURY |
| SEYMOUR | 116.304 | wB | PASSING | TWO VEHICLES ENTERED THE INTERSECTIONS FROM DIFFERENT DIRECTIONS AT THE SAME TIME AND COLIDED |  | 42325 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.311 | WB | PASSING | IMPROPER LANE CHANGE |  | 42099 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.313 | EB | REAR END | Following too close at red light | HWY C/KK | 42461 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.317 | EB | REAR END | InATtentive to slowed traffic Ahead at signal | нWY C/Kk | 41612 | DISABLING INJURY |
| SEYMOUR | 116.321 | EB | REAR END | DISTRACTED BY CELL PHONE | HWY C/KK | 43007 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.323 | EB | OUT OF CONTROL | InATtentive to slowed traffic Ahead at signal | HWY C/KK | 42339 | DISABLING INJURY |
| SEYMOUR | 116.324 | EB | REAR END | VEHICLE DEFECTS | HWY C/KK | 42544 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.332 | EB | REAR END | INATTENTVE TO STOPPED TRAFFIC AHEAD AT SIGNAL | HWY C/KK | 42761 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.333 | wB | RIGHT ANGLE | FAlLED TO YIELD To Incoming traffic at red light | HWY C/KK | 42076 | DISABLING INJURY |
| SEYMOUR | 116.334 | EB | TURN RIGHT ANGLE COLL | FAILED TO YIELD To Incoming traffic when making a Left turn at Signal | HWY C/KK | 42070 | DISABLING INJURY |
| SEYMOUR | 116.336 | EB | REAR END | FOLLOWING TOO CLOSE ENTERING US60- REAR END CRASH IN RIGHT TURN BAY | SKYLINE | 41123 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.336 | EB | PASSING | IMPROPER LANE CHANGE |  | 42723 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.336 | EB | LEFT TURN | FAILED TO YIELD To Incoming traffic at Signal ahead | HWY C/KK | 43304 | MINOR INJURY |
| SEYMOUR | 116.337 | EB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC AT RED LIGHT | HWY C/Kk | 42116 | MINOR INJURY |
| SEYMOUR | 116.337 | EB | REAR END | INATTENTVE TO SLOWED TRAFFIC AHEAD AT SIGNAL | HWY C/KK | 42333 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.338 | WB | RIGHT ANGLE | FAILED TO YieLd to incoming traffic at red light | HWY C/Kk | 42467 | MINOR INJURY |
| SEYMOUR | 116.345 | WB | REAR END | INATTENTIVE TO STOPPED TRAFFIC AHEAD AT SIGNAL | HWY C/KK | 42569 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.455 | EB | AVOIDING | FOLLOWING TOO CLOSE |  | 41238 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.455 | EB | PASSING | IMPROPER LANE CHANGE |  | 41841 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.561 | WB | REAR END | Following too close at red light | HWY C/KK | 42652 | MINOR INJURY |
| SEYMOUR | 116.823 | WB | CROSS MEDIAN | ICY ROADWAY |  | 42388 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.836 | EB | AVOIDING | HYDROLANED |  | 42629 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 116.936 | EB | OUT OF CONTROL | HYDROPLANED |  | 42794 | MINOR INJURY |
| SEYMOUR | 117.205 | EB | OTHER | OBJECT IN ROADWAY |  | 43055 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 117.376 | EB | REAR END | INATTENTIVE TO SLOWED TRAFFIC THAT HAD JUST ENTERED THE ROADWAY | OAK LAWN | 42814 | MINOR INJURY |
| SEYMOUR | 117.78 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41714 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 118.091 | EB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 41382 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 118.494 | EB | OUT OF CONTROL | HYDROPLANING |  | 41013 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 118.494 | EB | LEFT TURN | IMPROPER LANE CHANGE |  | 41480 | MINOR INJURY |
| SEYMOUR | 118.574 | EB | PASSING | IMPROPER LANE CHANGE |  | 42119 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 118.624 | EB | OUT OF CONTROL | ICY ROADWAY |  | 43138 | MINOR INJURY |
| SEYMOUR | 118.794 | EB | OUT OF CONTROL | HYDROPLANED |  | 42866 | MINOR INJURY |
| SEYMOUR | 118.937 | EB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 42874 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 119.055 | EB | CHANGING LANE | HIT RUMBLE STRIPS AND OVERCORRECTED |  | 42029 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 119.527 | EB | OUT OF CONTROL | VEHICLE DEFECTS |  | 41436 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 119.994 | EB | OTHER | VEHICLE DEFECTS |  | 42868 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.124 | EB | OUT OF CONTROL | DISTRACTED DRIVER WATCHING APPROACHING VEHICLES AND NOT THE ROAD AHEAD |  | 42905 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.297 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41715 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.324 | EB | OUT OF CONTROL | ALCOHOL |  | 42774 | disabling InJury |
| SEYMOUR | 120.408 | EB | REAR END | DISTRACTED DRIVER WAS LOOKING AT PHONE AND DIDN'T NOTICE THE MOTORCYCLE SLOWING TO MAKE A RIGHT TURN AHEAD | DEWBERRY | 40999 | FATAL |
| SEYMOUR | 120.44 | EB | OUT OF CONTROL | DRIVER WAS NOT WATCHING WHERE HE WAS DRIVING |  | 42121 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.442 | EB | OUT OF CONTROL | ICY ROADWAY |  | 43512 | MINOR INJURY |
| SEYMOUR | 120.624 | EB | PASSING | DISTRACTED BY CELL PHONE |  | 42641 | MINOR INJURY |
| SEYMOUR | 120.724 | EB | PARKING OR PARKED CAR | ICY ROADWAY |  | 41649 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.724 | EB | PASSING | ICY ROADWAY |  | 41649 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.724 | EB | OUT OF CONTROL | ICY ROADWAY |  | 42050 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.724 | EB | OUT OF CONTROL | ICY ROADWAY |  | 42388 | MINOR INJURY |
| SEYMOUR | 120.724 | EB | OUT OF CONTROL | ICY ROADWAY |  | 42720 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.724 | EB | OUT OF CONTROL | SEMI FAILED TO NEGOTAATE CURVE AND RAN OFF THE ROADWAY ON THE RIGHT SIDE |  | 42143 | MINOR INJURY |
| SEYMOUR | 120.724 | EB | OUT OF CONTROL | ASLEEP |  | 42271 | MINOR INJURY |


| US 60 ROADWAY CRASHES - WEBSTER COUNTY (JAN 2012 - JUNE 2019) |  |  |  |  |  |  |  |
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| SECTION | Log MILE | DIRECTION | CRASH CLASS | factors | Intersection | Date | SEVERITY RATING |
| SEYMOUR | 120.724 | EB | OUT OF CONTROL | SEMI FAILED TO NEGOTAATE CURVE AND RAN OFF THE ROADWAY ON THE RIGHT SIIE |  | 42521 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.724 | EB | OUT OF CONTROL | HYDROPLANED WHEN TAKING CURVE TOO FAST |  | 42692 | MINOR INJURY |
| SEYMOUR | 120.724 | EB | OUT OF CONTROL | NEGOTAATED A CURVE TOO FAST |  | 42728 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.755 | EB | OUT OF CONTROL | SEMI FAILED TO NEGOTIATE CURVE AND RAN OFF THE ROADWAY ON THE RIGHT SIDE |  | 42533 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.759 | EB | OUT OF CONTROL | ICY ROADWAY |  | 43107 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.765 | EB | OUT OF CONTROL | ICY ROADWAY |  | 43107 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.779 | EB | OUT OF CONTROL | RAN OFF THE ROAD ON THE RIGHT SIDE, NOT SPEED RELATED |  | 42493 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.824 | EB | AVOIDING | TRAILER DETACHED FROM TRUCK AND STRUCK ANOTHER VEHICLE IN THE ROADWAY |  | 41206 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.824 | EB | PARKING OR PARKED CAR | ICY ROADWAY |  | 41603 | MINOR INJURY |
| SEYMOUR | 120.824 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41603 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 120.824 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41621 | MINOR INJURY |
| SEYMOUR | 120.861 | EB | OTHER | MEDICAL ISSUES |  | 43354 | DISABLING INJURY |
| SEYMOUR | 120.924 | EB | OUT OF CONTROL | UNABLE TO SEE ROADWAY STRIPIING DUE TO HEAVY RAIN |  | 41491 | MINOR INJURY |
| SEYMOUR | 121.124 | EB | OUT OF CONTROL | RAN OFF THE ROAD ON THE RIGHT SIIE, NO ADDITIONAL INFORMATION |  | 41604 | fatal |
| SEYMOUR | 219.63 | wB | OUT OF CONTROL | ASLEEP |  | 41928 | MINOR INJURY |
| SEYMOUR | 219.812 | WB | DEBRIS | OBJECT IN ROADWAY |  | 43297 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 220.08 | wB | OTHER | OBJECT IN ROADWAY |  | 42922 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 220.155 | WB | DOG | ANIMAL IN ROADWAY |  | 43050 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 220.613 | WB | PASSING | IMPROPER LANE CHANGE |  | 42644 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 220.815 | WB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 41321 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 220.83 | wB | OUT OF CONTROL | ICY ROADWAY |  | 41974 | MINOR INJURY |
| SEYMOUR | 220.93 | wB | REAR END | HEAVY FOG OBSTRUCTED VISION OF ALL DRIVERS |  | 41148 | disabling injury |
| SEYMOUR | 221.209 | wB | OUT OF CONTROL | ICY ROADWAY |  | 42389 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 221.338 | wB | OUT OF CONTROL | ICY ROADWAY |  | 43506 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 221.43 | WB | OUT OF CONTROL | MEDICAL ISSUES |  | 41089 | MINOR INJURY |
| SEYMOUR | 221.43 | wB | OUT OF CONTROL | ICY ROADWAY |  | 41355 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 221.574 | WB | OTHER | OBJECT IN ROADWAY |  | 40936 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 221.605 | WB | OUT OF CONTROL | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | PEEWEE CROSSING | 42709 | FATAL |
| SEYMOUR | 221.63 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSIING THE ROADWAY | PEEWEE CROSSING | 40935 | MINOR INJURY |
| SEYMOUR | 221.634 | wB | RIGHT ANGLE | OBJECT IN ROADWAY |  | 42709 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 221.7 | wB | FARM ANIMAL | ANIMAL IN ROADWAY |  | 43314 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 221.767 | WB | OUT OF CONTROL | ASLEEP |  | 42156 | MINOR INJURY |
| SEYMOUR | 222.097 | WB | OUT OF CONTROL | VEHICLE DEFECTS |  | 43004 | MINOR INJURY |
| SEYMOUR | 222.234 | WB | OTHER | OBJECT IN Roadway |  | 42832 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 222.33 | wB | REAR END | HEAVY FOG OBSTRUCTED VISION OF ALL DRIVERS |  | 42962 | MINOR INJURY |
| SEYMOUR | 222.608 | WB | DEER | ANIMAL IN ROADWAY |  | 43412 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 223.234 | WB | DEER | ANIMAL IN ROADWAY |  | 43226 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 223.234 | WB | PASSING | AsLEEP |  | 41279 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 223.934 | WB | OTHER | ANIMAL IN ROADWAY |  | 41242 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 223.944 | WB | DOG | ANIMAL IN ROADWAY |  | 41740 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.022 | WB | OUT OF CONTROL | AsLEEP |  | 43354 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.098 | EB | REAR END | DISTRACTED DRIVER WAS MESSIING WITH THE SODA IN HIS CUP HOLDER | HWY C/Kk | 42411 | MINOR INJURY |
| SEYMOUR | 224.127 | WB | REAR END | DISTRACTED BY COFFEE | HWY C/Kk | 43502 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.134 | WB | REAR END | HYDROPLANED - FOLLOWING TOO CLOSE |  | 42337 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.154 | EB | REAR END | IMPROPER LANE CHANGE |  | 42078 | MINOR INJURY |
| SEYMOUR | 224.177 | WB | REAR END | AsLEEP |  | 42918 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.181 | WB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | HWY C/KK | 42913 | MINOR INJURY |
| SEYMOUR | 224.186 | wB | REAR END | INATTENTIVE TO SLOWED TRAFFIC AHEAD APPROACHING SIGNALIZED INTERSECTION | HWY C/Kk | 43434 | MINOR INJURY |
| SEYMOUR | 224.199 | EB | REAR END | INATTENTVE TO STOPPED TRAFFIC AHEAD AT SIGNALZED INTERSECTION | HWY C/Kk | 42228 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.218 | WB | REAR END | INATTENTIVE TO SLOWED TRAFFIC AHEAD AT SIGNAL | HWY C/Kk | 43460 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.221 | WB | rear end | SLID ON WET ROADWAY FROM FOLLOWING TOO CLOSE AND PUSHED THE VEHICLE AHEAD INTO THE SIGNALIZED INTERSECTION TO STRIKE ANOTHER VEHICLE | HWY C/KK | 43382 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.222 | WB | ReAR End | THOUGHT TRAFFIC WAS MOVING AT SIGNAL WHEN IT WASN'T | HWY C/KK | 41771 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.223 | WB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | HWY C/KK | 40979 | MINOR INJURY |
| SEYMOUR | 224.224 | WB | REAR END | ALCOHOL | HWY C/Kk | 41542 | MINOR INJURY |
| SEYMOUR | 224.228 | WB | REAR END | INATTENTIVE TO STOPPED TRAFFIC AHEAD AT SIGNAL | HWY C/Kk | 40930 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.228 | wB | REAR END | INATTENTVE TO STOPPED TRAFFIC AHEAD AT SIGNAL | HWY C/KK | 40930 | MINOR INJURY |
| SEYMOUR | 224.228 | WB | REAR END | SWERVING AFTER BEING UNABLE TO STOP AT RED LIGHT | HWY C/Kk | 40930 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.228 | WB | REAR END | THOUGHT TRAFFIC WAS MOVING AT SIGNAL WHEN IT WASN'T | HWY C/Kk | 43388 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.228 | WB | PASSING | SWERVED TO AVOID REAR END CRASH RESULTING IN SIDESWIPE AT THE SIGNAL | HWY C/Kk | 43502 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.231 | EB | REAR END | DISTRACTED BY CELL PHONE | HWY C/Kk | 43331 | MINOR INJURY |
| SEYMOUR | 224.232 | WB | REAR END | HYDROPLANING, CHAIN REACTION REAR END CRASHES AT SIGNAL | HWY C/Kk | 42066 | MINOR INJURY |
| SEYMOUR | 224.232 | WB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | HWY C/Kk | 41262 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.234 | wB | TURN RIGHT ANGLE COLL | FAILED TO YIELD TO INCOMING TRAFFIC AT SIGNAL AHEAD | HWY C/KK | 42844 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.234 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC AT RED LIGHT | HWY C/Kk | 43109 | MINOR INJURY |
| SEYMOUR | 224.234 | WB | RIGHT ANGLE | FALLED TO YIELD TO INCOMING TRAFFIC AT RED LIGHT | HWY C/Kk | 41284 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.234 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC AT RED LIGHT | HWY C/Kk | 41727 | disabling injury |
| SEYMOUR | 224.234 | wB | U-TURN | IMPROPER U-TURN, COLLIDED WITH ANOTHER VEHILLE UPON RE-ENTERING THE ROADWAY | HWY C/Kk | 42854 | MINOR INJURY |
| SEYMOUR | 224.234 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC AT SIGNAL AHEAD | HWY C/Kk | 43192 | MINOR INJURY |
| SEYMOUR | 224.243 | WB | RIGHT ANGLE | FAlLed to Yield to incoming traffic At red light | HWY C/KK | 42066 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.266 | WB | OTHER | OBJECT IN ROADWAY |  | 41097 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.333 | EB | OUT OF CONTROL | MESSING WITH THE VEHICLE FLOORBOARDS AND RAN OFF THE ROAD ON THE RIGHT SIDE, OVERCORRECTED AND OVERTURNED UPON RETURNING TO ROADWAY |  | 42191 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.346 | EB | Rear end | drugs | HWY C/Kk | 42319 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.349 | WB | REAR END | INATTENTIVE TO SLOWED TRAFFIC AHEAD THAT HAD RECENTLY ENTERED THE ROADWAY | HWY C/Kk | 41587 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.516 | EB | PASSING | IMPROPER LANE CHANGE |  | 42132 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.564 | EB | PASSING | IMPROPER LANE CHANGE |  | 42483 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.778 | WB | OUT OF CONTROL | HYDROPLANED |  | 42195 | MINOR INJURY |
| SEYMOUR | 224.931 | wB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | CLINTON | 42629 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.94 | wB | REAR END | ANIMAL IN ROADWAY | CLINTON | 42156 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 224.987 | wB | CHANGING LANE | VEHICLE DEFECTS |  | 43513 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 225.381 | EB | REAR END | drugs |  | 42997 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 225.467 | EB | OUT OF CONTROL | ICY ROADWAY |  | 41974 | MINOR INJURY |
| SEYMOUR | 225.481 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | SKYLINE | 43305 | MINOR INJURY |
| SEYMOUR | 225.481 | wB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | SKYLINE | 43000 | MINOR INJURY |
| SEYMOUR | 225.481 | WB | RIGHT ANGLE | FAILED TO YIELD TO INCOMING TRAFFIC WHEN CROSSING THE ROADWAY | SKYLINE | 43010 | DISABLING INJURY |
| SEYMOUR | 225.487 | WB | TURN RIGHT ANGLE COLL | FAILED TO YIELD TO INCOMING TRAFFIC WHEN MAKING A LEFT TURN ONTO US60 | SKYLINE | 41865 | FATAL |
| SEYMOUR | 225.573 | wB | PEDESTRIAN | PEDESTRIAN WAS CROSSING THE ROADWAY AND WAS STRUCK BY AN INCOMING VEHICLE | SKYLINE | 41496 | MINOR INJURY |
| SEYMOUR | 226.039 | WB | OUT OF CONTROL | HYOROPLANED |  | 42195 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.058 | WB | OUT OF CONTROL | VEHICLE DEFECTS |  | 42657 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.139 | wB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | CLINTON | 42669 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.144 | WB | PASSING | ROAD RAGE INCIDENT |  | 43075 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.176 | wB | REAR END | REAR END CRASH, NO ADDITIONAL INFORMATION GIVEN | CLINTON | 42333 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.182 | wB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | CLINTON | 42871 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.193 | wB | REAR END | HYDROPLANED ATTEMPTING TO STOP AFTER FOLLOWING TOO CLOSE AT RED LIGHT | CLINTON | 43089 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.223 | wB | REAR END | REAR END CRASH, NO ADDITIONAL INFORMATION GIVEN | CLINTON | 42466 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.225 | WB | REAR END | ICY ROADWAY | CLINTON | 43114 | MINOR INJURY |


| US 60 ROADWAY CRASHES - WEBSTER COUNTY (JAN 2012 - JUNE 2019) |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SECTION | Log mile | DIRECTION | CRASH CLASS | FACTORS | INTERSECTION | Date | SEVERITY RATING |
| SEYMOUR | 226.225 | WB | PASSING | INATTENTIVE TO STOPPED TRAFFIC AT SIGNAL AHEAD | CLINTON | 41942 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.228 | WB | REAR END | DISTRACTED DRIVER WAS FIGHTING WITH PASSENGER AND STRUCK ANOTHER VEHICLE | CLINTON | 42216 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.23 | WB | REAR END | ICY ROADWAY | CLINTON | 41715 | MINOR INJURY |
| SEYMOUR | 226.233 | WB | OUT OF CONTROL | ICY ROADWAY | CLINTON | 41330 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.235 | WB | PASSING | FOLLOWING TOO CLOSE AT RED LIGHT | CLINTON | 40959 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.239 | WB | OUT OF CONTROL | ICY ROADWAY |  | 43506 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.239 | WB | PASSING | ROAD RAGE INCIDENT |  | 41561 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.245 | WB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | CLINTON | 41229 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.267 | WB | REAR END | IMPROPERLY PASSING TO ALLOW MORE ROOM FOR HORSE AND BUGGY ON SHOULDER |  | 43106 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.289 | WB | REAR END | FOLLOWING TOO CLOSE AT RED LIGHT | CLINTON | 40958 | MINOR INJURY |
| SEYMOUR | 226.32 | WB | PASSING | SIDESWIPED IN AN ATTEMPT TO MOVE ASIDE AND GIVE A HORSE AND BUGGY ON THE SHOULDER SOME SAFETY SPACE APPROACHING INTERSECTION | CLINTON | 42362 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.511 | WB | REAR END | ALCOHOL | CLINTON | 41069 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.552 | WB | CHANGING LANE | ALCOHOL |  | 41634 | PROPERTY DAMAGE ONLY |
| SEYMOUR | 226.557 | WB | OUT OF CONTROL | ICY ROADWAY |  | 42053 | PROPERTY DAMAGE ONLY |
| *SEVERAL ROADWAY CRASHES WERE REMOVED DUE TO DUPLICATION OR OCCURRENCE PRIOR TO INTERSECTION SAFETY IMPROVEMENT. |  |  |  |  |  |  |  |


| 2019 US 60 TRAFFIC COUNTS - WEBSTER COUNTY |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| INTERSECTION | PEAK HOUR | DIRECTION |  |  |  |  |  |  |  |  |  |  |  |
|  |  | EASTBOUND |  |  | WESTBOUND |  |  | NORTHBOUND |  |  | SOUTHBOUND |  |  |
|  |  | L | T | R | L | T | R | L | T | R | L | T | R |
| INDUSTRY ROAD | AM | 11 | 497 | 5 | 11 | 1002 | 5 | 23 | 1 | 35 | 0 | 4 | 3 |
|  | PM | 17 | 1096 | 18 | 2 | 807 | 4 | 7 | 8 | 21 | 2 | 1 | 12 |
| WHITE OAK ROAD | AM | 14 | 471 | 19 | 2 | 962 | 0 | 26 | 3 | 2 | 3 | 1 | 36 |
|  | PM | 25 | 1076 | 17 | 1 | 782 | 0 | 18 | 3 | 9 | 1 | 3 | 18 |
| CENTER ROAD | AM | 2 | 481 | 2 | 20 | 949 | 18 | 13 | 2 | 9 | 11 | 3 | 0 |
|  | PM | 3 | 1040 | 5 | 9 | 765 | 27 | 14 | 2 | 22 | 22 | 3 | 0 |
| POWER LINE ROAD | AM | 0 | 0 | 0 | 1 | 949 | 0 | 51 | 10 | 0 | 0 | 0 | 0 |
|  | PM | 0 | 0 | 0 | 3 | 777 | 1 | 25 | 4 | 0 | 0 | 2 | 9 |
| PORTER CROSSING ROAD | AM | 0 | 0 | 0 | 0 | 940 | 1 | 5 | 0 | 0 | 0 | 2 | 7 |
|  | PM | 0 | 0 | 0 | 0 | 766 | 0 | 2 | 3 | 0 | 0 | 2 | 2 |
| PORTER LOOP | AM | 0 | 458 | 1 | 0 | 932 | 1 | 2 | 0 | 1 | 1 | 0 | 0 |
|  | PM | 0 | 1047 | 4 | 1 | 758 | 0 | 1 | 1 | 2 | 0 | 0 | 0 |
| STATE HIGHWAY U | AM | 6 | 430 | 14 | 7 | 844 | 1 | 71 | 0 | 37 | 2 | 0 | 18 |
|  | PM | 9 | 941 | 62 | 18 | 654 | 5 | 18 | 0 | 21 | 1 | 1 | 2 |
| ROAD 445 | AM | 29 | 453 | 2 | 1 | 817 | 0 | 3 | 1 | 4 | 2 | 0 | 41 |
|  | PM | 42 | 945 | 2 | 4 | 695 | 3 | 4 | 0 | 4 | 0 | 0 | 38 |
| BURKS STREET | AM | 44 | 492 | 4 | 2 | 547 | 4 | 2 | 2 | 0 | 7 | 0 | 51 |
|  | PM | 92 | 841 | 1 | 3 | 638 | 11 | 1 | 4 | 2 | 10 | 5 | 77 |
| EAST MAIN STREET | AM | 0 | 56 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 85 |
|  | PM | 0 | 82 | 0 | 0 | 12 | 0 | 0 | 82 | 0 | 0 | 0 | 32 |
| STATE HIGHWAY Z | AM | 2 | 434 | 18 | 3 | 729 | 0 | 82 | 0 | 8 | 0 | 0 | 0 |
|  | PM | 1 | 879 | 50 | 10 | 668 | 1 | 32 | 0 | 7 | 1 | 0 | 1 |
| WINDSWEPT DRIVE | AM | 0 | 433 | 0 | 0 | 711 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | PM | 0 | 880 | 0 | 0 | 681 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| BLUEBIRD LANE | AM | 0 | 444 | 0 | 0 | 718 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
|  | PM | 0 | 896 | 3 | 0 | 644 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| HUMMINGBIRD LANE | AM | 0 | 442 | 4 | 0 | 707 | 0 | 19 | 0 | 1 | - | 0 | 0 |
|  | PM | 2 | 869 | 15 | 0 | 685 | 0 | 7 | 0 | 0 | 0 | 0 | 0 |
| HONOR CAMP LANE | AM | 2 | 372 | 30 | 25 | 668 | 1 | 10 | 0 | 7 | 3 | 0 | 4 |
|  | PM | 2 | 860 | 5 | 5 | 587 | 3 | 36 | 0 | 31 | 2 | 0 | 0 |
| GREEN BRIER DRIVE | AM | 0 | 361 | 0 | 0 | 702 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
|  | PM | 0 | 897 | 0 | 0 | 569 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| STATE HIGHWAY A | AM | 36 | 325 | 0 | 1 | 625 | 82 | 0 | 0 | 0 | 68 | 0 | 75 |
|  | PM | 68 | 841 | 0 | 0 | 548 | 75 | 0 | 0 | 0 | 73 | 0 | 41 |
| SOUTH MAIN STREET | AM | 0 | 376 | 14 | 6 | 662 | 6 | 40 | 4 | 15 | 3 | 2 | 11 |
|  | PM | 8 | 834 | 39 | 15 | 623 | 5 | 18 | 2 | 20 | 3 | 1 | 2 |
| STATE HIGHWAY O | AM | 14 | 395 | 0 | 1 | 630 | 7 | 0 | 0 | 0 | 31 |  | 29 |
|  | PM | 30 | 828 | 0 | 1 | 617 | 23 | 0 | 0 | 0 | 19 | 0 | 25 |
| COUNTY ROAD 320 | AM | 1 | 423 | 0 | 1 | 635 | 4 | 4 | 6 | 1 | 0 | 1 | 7 |
|  | PM | 1 | 850 | 5 | 2 | 635 | 1 | 2 | 0 | 4 | 1 | 1 | 3 |
| BERRY ROAD | AM | 0 | 0 | 0 | 0 | 638 | 8 | 0 | 0 | 0 | 0 | 0 | 9 |
|  | PM | 0 | 0 | 0 | 0 | 628 | 9 | 0 | 0 | 0 | 0 | 0 | 7 |
| KILLDEER/SORT ROAD | AM | 5 | 422 | 2 | 4 | 645 | 3 | 0 | 0 | 2 | 2 | 3 | 8 |
|  | PM | 11 | 858 | 2 | 5 | 611 | 12 | 1 | 1 | 4 | 11 | 2 | 10 |
| COUNTY ROAD 320B | AM | 0 | 423 | 0 | 0 | 612 | 13 | 0 | 0 | 2 | 5 | 0 | 3 |
|  | PM | 1 | 791 | 0 | 3 | 622 | 11 | 2 | 1 | 5 | 9 | 0 | 4 |
| WEST CLINTON AVENUE | AM | 8 | 354 | 120 | 14 | 469 | 10 | 112 | 7 | 32 | 7 | 10 | 6 |
|  | PM | 12 | 588 | 239 | 14 | 509 | 11 | 113 | 4 | 26 | 10 | 17 | 6 |
| SKYLINE ROAD | AM | 17 | 352 | 9 | 18 | 497 | 0 | 17 | 18 | 18 | 4 | 21 | 18 |
|  | PM | 41 | 589 | 11 | 21 | 485 | 1 | 29 | 58 | 58 | 2 | 27 | 22 |
| LYNCH DRIVE | AM | 0 | 373 | 0 | 0 | 519 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
|  | PM | 1 | 656 | 0 | 0 | 511 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| STATE HIGHWAY K | AM | 28 | 302 | 35 | 28 | 400 | 22 | 34 | 62 | 41 | 14 | 51 | 33 |
|  | PM | 32 | 529 | 65 | 49 | 414 | 28 | 39 | 68 | 56 | 28 | 66 | 32 |
| OAK LAWN ROAD | AM | 0 | 352 | 2 | 36 | 492 | 0 | 2 | 0 | 12 | 0 | 2 | 0 |
|  | PM | 1 | 612 | 0 | 54 | 487 | 0 | 2 | 0 | 29 | 0 | 0 | 0 |
| PEWEE CROSSING ROAD | AM | 8 | 384 | 4 | 2 | 497 | 7 | 5 | 1 | 2 | 7 | 1 | 14 |
|  | PM | 8 | 642 | 8 | 2 | 534 | 6 | 8 | 1 | 1 | 2 | 1 | 17 |
| MINERAL ROAD | AM | 0 | 355 | 2 | 0 | 355 | 2 | 1 | 0 | 0 | 1 | 0 | 0 |
|  | PM | 0 | 614 | 1 | 0 | 529 | 1 | 1 | 0 | 0 | 0 | 0 | 3 |
| ROAD 218/DEWBERRY ROAD | AM | 0 | 384 | 3 | 2 | 498 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
|  | PM | 0 | 625 | 3 | 1 | 535 | 0 | 3 | 0 | 1 | 0 | 0 | 0 |
| PRIVATE DRIVEWAY/CHURCH | AM | 0 | 382 | 0 | 0 | 493 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | PM | 0 | 629 | 0 | 0 | 522 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |


| 2039 PROJECTED US 60 TRAFFIC VOLUMES - WEBSTER COUNTY (NO-BUILD) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| INTERSECTION | PEAK HOUR | DIRECTION |  |  |  |  |  |  |  |  |  |  |  |
|  |  | EASTBOUND |  |  | WESTBOUND |  |  | NORTHBOUND |  |  | SOUTHBOUND |  |  |
|  |  | L | T | R | L | T | R | L | T | R | L | T | R |
| Industry road | AM | 13 | 606 | 6 | 13 | 1248 | 6 | 28 | 1 | 43 | 0 | 5 | 4 |
|  | PM | 21 | 1337 | 22 | 2 | 998 | 5 | 9 | 10 | 26 | 2 | 1 | 15 |
| WHITE OAK ROAD | AM | 17 | 609 | 23 | 2 | 1192 | 0 | 32 | 4 | 2 | 4 | 1 | 44 |
|  | PM | 31 | 1313 | 21 | 1 | 962 | 0 | 22 | 4 | 11 | 1 | 4 | 22 |
| CENTER ROAD | AM | 2 | 610 | 2 | 24 | 1179 | 22 | 16 | 2 | 11 | 13 | 4 | 0 |
|  | PM | 4 | 1315 | 6 | 11 | 946 | 33 | 17 | 2 | 27 | 27 | 4 | 0 |
| POWER LINE ROAD | AM | 12 | 610 | 12 | 1 | 1163 | 0 | 62 | 12 | 0 | 0 | 0 | 0 |
|  | PM | 12 | 1345 | 12 | 4 | 948 | 1 | 31 | 5 | 0 | 0 | 2 | 11 |
| PORTER CROSSING ROAD | AM | 0 | 604 | 6 | 0 | 1149 | 1 | 6 | 0 | 0 | 0 | 2 | 9 |
|  | PM | 12 | 1326 | 6 | 0 | 935 | 0 | 2 | 4 | 0 | 0 | 2 | 2 |
| PORTER LOOP | AM | 0 | 603 | 1 | 0 | 1148 | 1 | 2 | 0 | 1 | 1 | 0 | 0 |
|  | PM | 0 | 1321 | 5 | 1 | 925 | 0 | 1 | 1 | 2 | 0 | 0 | 0 |
| STATE HIGHWAY U | AM | 7 | 581 | 17 | 9 | 1041 | 1 | 87 | 0 | 45 | 2 | 0 | 22 |
|  | PM | 11 | 1241 | 76 | 22 | 888 | 6 | 22 | 0 | 26 | 1 | 1 | 2 |
| ROAD 445 | AM | 35 | 591 | 2 | 1 | 997 | 0 | 4 | 1 | 5 | 2 | 0 | 50 |
|  | PM | 51 | 1214 | 2 | 5 | 865 | 4 | 5 | 0 | 5 | 0 | 0 | 46 |
| BURKS STREET | AM | 49 | 544 | 5 | 2 | 933 | 5 | 2 | 2 | 0 | 9 | 0 | 62 |
|  | PM | 118 | 1099 | 1 | 4 | 797 | 13 | 1 | 5 | 2 | 12 | 6 | 94 |
| EAST MAIN STREET | AM | 0 | 512 | 12 | 0 | 941 | 104 | 0 | 0 | 68 | 0 | 0 | 0 |
|  | PM | 0 | 1062 | 24 | 0 | 826 | 39 | 0 | 0 | 100 | 0 | 0 | 0 |
| STATE HIGHWAY Z | AM | 2 | 530 | 22 | 4 | 916 | 0 | 100 | 0 | 10 | 0 | 0 | 0 |
|  | PM | 1 | 1073 | 61 | 12 | 831 | 1 | 39 | 0 | 9 | 1 | 0 | 1 |
| WINDSWEPT DRIVE | AM | 0 | 539 | 0 | 0 | 893 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | PM | 0 | 1082 | 0 | 0 | 842 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| BLUEBIRD LANE | AM | 0 | 542 | 0 | 0 | 893 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
|  | PM | 0 | 1079 | 4 | 0 | 844 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| HUMMINGBIRD LANE | AM | 0 | 539 | 5 | 0 | 870 | 0 | 23 | 0 | 1 | 0 | 0 | 0 |
|  | PM | 2 | 1060 | 18 | 0 | 836 | 0 | 9 | 0 | 0 | 0 | 0 | 0 |
| HONOR CAMP LANE | AM | 2 | 498 | 40 | 35 | 853 | 1 | 12 | 0 | 9 | 4 | 0 | 5 |
|  | PM | 2 | 1052 | 6 | 6 | 731 | 4 | 44 | 0 | 38 | 2 | 0 | 0 |
| GREEN BRIER DRIVE | AM | 0 | 510 | 0 | 0 | 890 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
|  | PM | 0 | 1092 | 0 | 0 | 741 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| STATE HIGHWAY A | AM | 49 | 462 | 0 | 1 | 794 | 100 | 0 | 0 | 0 | 83 | 0 | 95 |
|  | PM | 83 | 1026 | 0 | 0 | 691 | 94 | 0 | 0 | 0 | 89 | 0 | 50 |
| SOUTH MAIN STREET | AM | 0 | 526 | 20 | 7 | 833 | 7 | 49 | 5 | 18 | 4 | 2 | 13 |
|  | PM | 10 | 1058 | 48 | 18 | 760 | 6 | 22 | 2 | 24 | 4 | 1 | 2 |
| STATE HIGHWAY O | AM | 17 | 531 | 0 | 1 | 813 | 9 | 0 | 0 | 0 | 38 | 0 | 35 |
|  | PM | 37 | 1049 | 0 | 1 | 753 | 28 | 0 | 0 | 0 | 23 | 0 | 31 |
| COUNTY ROAD 320 | AM | 1 | 567 | 0 | 1 | 809 | 5 | 5 | 7 | 1 | 0 | 1 | 9 |
|  | PM | 1 | 1065 | 6 | 2 | 775 | 1 | 2 | 0 | 5 | 1 | 1 | 4 |
| BERRY ROAD | AM | 0 | 569 | 0 | 0 | 778 | 10 | 0 | 0 | 0 | 0 | 0 | 11 |
|  | PM | 0 | 1071 | 0 | 0 | 766 | 11 | 0 | 0 | 0 | 0 | 0 | 9 |
| KILLDEER/SORT ROAD | AM | 6 | 560 | 2 | 5 | 787 | 4 | 0 | 0 | 2 | 2 | 4 | 10 |
|  | PM | 13 | 1055 | 2 | 6 | 746 | 15 | 1 | 1 | 5 | 13 | 2 | 12 |
| COUNTY ROAD 320B | AM | 0 | 565 | 0 | 0 | 793 | 16 | 0 | 0 | 2 | 6 | 0 | 4 |
|  | PM | 1 | 1073 | 0 | 4 | 759 | 13 | 2 | 1 | 6 | 11 | 0 | 5 |
| WEST CLINTON AVENUE | AM | 10 | 422 | 142 | 17 | 620 | 12 | 182 | 9 | 39 | 9 | 12 | 7 |
|  | PM | 15 | 764 | 311 | 17 | 630 | 13 | 138 | 5 | 32 | 12 | 21 | 7 |
| SKYLINE ROAD | AM | 21 | 438 | 11 | 22 | 606 | 0 | 21 | 22 | 22 | 5 | 26 | 22 |
|  | PM | 50 | 744 | 13 | 26 | 598 | 1 | 35 | 71 | 71 | 2 | 33 | 27 |
| LYNCH DRIVE | AM | 0 | 465 | 0 | 0 | 633 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
|  | PM | 1 | 816 | 0 | 0 | 624 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| STATE HIGHWAY K | AM | 34 | 389 | 43 | 34 | 542 | 27 | 41 | 76 | 50 | 17 | 62 | 40 |
|  | PM | 41 | 689 | 85 | 63 | 517 | 35 | 48 | 83 | 68 | 34 | 81 | 39 |
| OAK LAWN ROAD | AM | 0 | 454 | 2 | 44 | 600 | 0 | 2 | 0 | 15 | 0 | 2 | 0 |
|  | PM | 1 | 791 | 0 | 68 | 614 | 0 | 2 | 0 | 35 | 0 | 0 | 0 |
| PEWEE CROSSING ROAD | AM | 10 | 469 | 5 | 2 | 606 | 9 | 6 | 1 | 2 | 9 | 1 | 17 |
|  | PM | 10 | 807 | 10 | 2 | 652 | 7 | 10 | 1 | 1 | 2 | 1 | 21 |
| MINERAL ROAD | AM | 0 | 477 | 2 | 0 | 608 | 2 | 1 | 0 | 0 | 1 | 0 | 0 |
|  | PM | 0 | 809 | 1 | 0 | 655 | 1 | 1 | 0 | 0 | 0 | 0 | 4 |
| ROAD 218/DEWBERRY ROAD | AM | 0 | 475 | 4 | 2 | 608 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
|  | PM | 0 | 805 | 4 | 1 | 653 | 0 | 4 | 0 | 1 | 0 | 0 | 0 |
| PRIVATE DRIVEWAY/CHURCH | AM | 0 | 476 | 0 | 0 | 602 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | PM | 0 | 807 | 0 | 0 | 637 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |


| 2039 PROPOSED US 60 TRAFFIC VOLUMES - WEBSTER COUNTY (PROPOSED) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| INTERCHANGE | PEAK HOUR | DIRECTION |  |  |  |  |  |  |  |  |  |  |  |
|  |  | EASTBOUND |  |  | WESTBOUND |  |  | NORTHBOUND |  |  | SOUTHBOUND |  |  |
|  |  | L | T | R | L | T | R | L | T | R | L | T | R |
| WHITE OAK ROAD | AM | 45 | 537 | 38 | 41 | 1143 | 29 | 110 | 20 | 56 | 17 | 12 | 56 |
|  | PM | 79 | 1242 | 39 | 18 | 894 | 39 | 70 | 21 | 63 | 31 | 13 | 50 |
| STATE HIGHWAY U | AM | 7 | 576 | 27 | 9 | 1093 | 2 | 99 | 0 | 46 | 4 | 0 | 22 |
|  | PM | 11 | 1236 | 89 | 23 | 918 | 6 | 31 | 5 | 28 | 1 | 1 | 2 |
| BURKS STREET | AM | 84 | 537 | 5 | 4 | 989 | 5 | 2 | 4 | 5 | 11 | 0 | 112 |
|  | PM | 170 | 1095 | 1 | 9 | 806 | 17 | 1 | 5 | 7 | 12 | 6 | 140 |
| STATE HIGHWAY Z | AM | 2 | 471 | 79 | 4 | 857 | 104 | 135 | 0 | 11 | 68 | 0 | 5 |
|  | PM | 4 | 997 | 113 | 12 | 737 | 43 | 92 | 0 | 11 | 101 | 0 | 4 |
| STATE HIGHWAY A | AM | 70 | 462 | 20 | 45 | 737 | 117 | 54 | 5 | 29 | 128 | 2 | 173 |
|  | PM | 133 | 923 | 54 | 26 | 659 | 132 | 26 | 2 | 66 | 118 | 1 | 107 |
| KILLDEER/SORT ROAD | AM | 0 | 619 | 0 | 0 | 899 | 0 | 0 | 7 | 0 | 0 | 5 | 0 |
|  | PM | 0 | 1107 | 0 | 0 | 817 | 0 | 0 | 1 | 0 | 0 | 4 | 0 |
| WEST CLINTON AVENUE | AM | 37 | 428 | 155 | 23 | 662 | 46 | 203 | 24 | 45 | 17 | 30 | 34 |
|  | PM | 81 | 700 | 327 | 29 | 601 | 54 | 176 | 56 | 48 | 38 | 44 | 40 |
| STATE HIGHWAY K | AM | 34 | 411 | 45 | 100 | 647 | 28 | 44 | 82 | 87 | 23 | 72 | 40 |
|  | PM | 43 | 657 | 85 | 157 | 595 | 38 | 50 | 104 | 174 | 37 | 88 | 39 |
| PEWEE CROSSING ROAD | AM | 10 | 500 | 11 | 5 | 751 | 11 | 7 | 1 | 4 | 10 | 1 | 17 |
|  | PM | 10 | 844 | 15 | 4 | 750 | 9 | 15 | 1 | 2 | 2 | 1 | 26 |


| MoDOT - BNSF RAILROAD (THAYER LINE FROM M.P. 218 TO M.P. 242) WEBSTER COUNTY, MO AT-GRADE CROSSING EXPOSURE INDEX SUMMARY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| StREET |  | US DOT \# | RR M.P. | \# DAILY TRAIN MOVEMENTS (T) | MAX TRAIN SPEED (Ts) | ADT (v) | VEHICLE SPEED (Vs) | TRAFFIC INDEX (TI) | TOTAL \% OBSTRUCTION (PO) | SIGHT DIST. FACTOR | EXPOSURE INDEX (EI) | Protection Factor (PF) | Existing Adjusted Exposure Index (AEI) | Proposed Improvement <br> N/A | Proposed AEI | AEI Change |
|  | CHERRY Street | 667619N | 218.92 | closed |  |  |  |  |  |  |  |  |  |  | N/A | 248.3 |
|  | FRont street (RTE B) | 667620H | 219.05 | 27 | 50 | 2319 | 30 | 9391.95 | 0.0 | 0.00 | 9391.95 | 0.01 | 93.92 |  | 93.92 |  |
|  | white oak road | 6679622W | 220.6 | 27 | 50 | 90 | 45 | 546.75 | 0.0 | 0.00 | 546.75 | 0.01 | $5.47{ }^{283.44}$ | - | 5.47 |  |
|  | Porter crossing road | 667623D | 222.12 | 27 | 50 | 89 | 50 | 600.75 | 0.0 | 0.00 | 600.75 | 1.25 | 750.94 | Lights \& Gates | 6.01 |  |
| $\begin{aligned} & \text { ㄹ } \\ & \frac{5}{5} \\ & \text { 흔 } \end{aligned}$ | DUTCH HILL Road | 667628M | 223.72 | 27 | 50 | 52 | 50 | 351 | 0.0 | 0.00 | 351 | 0.01 | 3.51 | Closure | 0 | -90.6 |
|  | BALLPARK ROAD (RED OAK) | 6676290 | 223.92 | 27 | 50 | 279 | 50 | 1883.25 | 0.0 | 0.00 | 1883 | 0.25 | 470.81 | Closure | 0 |  |
|  | IRON MOUNTAIN RoAd | ${ }^{667633 J}$ | 225.41 | 27 | 50 | 830 | 50 | 5602.5 | 0.0 | 0.00 | 5603 | 0.01 | 56.03 | Closure | 0 |  |
|  | Center street | 667635x | 226.5 | 27 | 50 | 384 | 50 | 2592 | 0.0 | 0.00 | 2592 | 0.01 | 25.92 | . | 25.92 |  |
|  | CARPENTER STREET (FR 345B) | ${ }^{6676387}$ | 227.24 | 27 | 50 | 86 | 50 | 580.5 | 0.0 | 0.00 | 581 | 0.01 | 5.81 | Closure | 0 |  |
|  | HIGHWAYZ | $667640 \cup$ | 227.66 | 27 | 50 | 911 | 55 | 6764.175 | 0.0 | 0.00 | 6764 | 0.01 | $6^{67.64} 93.14$ | Closure | 2.6 |  |
|  | blue bird lane | 667641B | 228.13 | 27 | 50 | 10 | 50 | 67.5 | 0.0 | 0.00 | 68 | 1.25 | 84.38 | Closure | 0 |  |
|  | hummingbird lane | ${ }^{667642 H}$ | 228.64 | 27 | 50 | 33 | 50 | 222.75 | 0.0 | 0.00 | 223 | 1.25 | 278.44 | Closure | 0 |  |
|  | tand r Road | 667644w | 229.17 | 27 | 50 | 263 | 50 | 1775.25 | 0.0 | 0.00 | 1775 | 0.01 | 17.75 | Closure | 0 |  |
|  | HONOR CAMP LANE (FOREST GROVE DR) | 667645D | 229.73 | 27 | 50 | 212 | 50 | 1431 | 0.0 | 0.00 | 1431 | 0.01 | 14.31 | Closure | 0 |  |
|  | digains main strett (RTE NN) | 667650A | 231.51 | 27 | 50 | 626 | 55 | 4648.05 | 0.0 | 0.00 | 4648 | 0.01 | 46.48 | Closure | 0 | 221.6 |
|  | RASPBERRY ROAD | ${ }^{667651 G}$ | 232.51 | closed |  |  |  |  |  |  |  |  |  | N/A | N/A |  |
|  | Box SCHOOL LOOP | 667652N | 233.03 | 27 | 50 | 72 | 50 | 486 | 0.0 | 0.00 | 486 | 1.25 | 607.50 | Closure | 0.0 |  |
|  | SHort road | 667653 V | 233.75 | 27 | 50 | 71 | 50 | 479.25 | 0.0 | 0.00 | 479 | 0.01 | 4.79 | Closure | 0 |  |
|  | BISON ROAD (BOX SCHOOL LP) | 667654 C | 234.75 | 27 | 50 | 27 | 50 | 182.25 | 0.0 | 0.00 | 182 | 1.25 | 227.81 | Closure | 0 |  |
|  | DIVISION STREET | 667656R | 236.43 | CLOSED |  |  |  |  |  |  |  |  |  | N/A | N/A | 1467.0 |
|  | COMMERCIAL STREET | $667657 \times$ | 236.59 | 27 | 50 | 2631 | 25 | 8879.625 | 0.0 | 0.00 | 8880 | 0.01 | 88.80 | - | 88.80 |  |
|  | MAIN STREET | 667659 L | 236.69 | 27 | 50 | 930 | 25 | 3138.75 | 0.0 | 0.00 | 3139 | 0.01 | 31.39 | - | 31.39 |  |
|  | Charles street | $667660 \%$ | 236.88 | 27 | 50 | 1006 | 25 | 3395.25 | 0.0 | 0.00 | 3395 | 0.01 | 33.95 | - | 33.95 |  |
|  | oak lawn road | 667661M | 238.22 | 27 | 50 | 1048 | 50 | 7074 | 0.0 | 0.00 | 7074 | 1.25 | $8842.50{ }^{1499.15}$ | Lights \& Gates | 70.74 |  |
|  | Peewee crossing road | ${ }^{667664 H}$ | 239.95 | 27 | 50 | 152 | 50 | 1026 | 0.2 | 212.59 | 1239 | 0.01 | 12.39 | Closure | 0 |  |
|  | MINERAL RoAD | 667665P | 240.51 | 27 | 50 | 40 | 50 | 270 | 0.0 | 0.00 | 270 | 1.25 | 337.50 | Closure | 0 |  |
|  | dewberry road | 667667 D | ${ }^{241.38}$ | 27 | 50 | 136 | 50 | 918 | 0.0 | 0.00 | 918 | 1.25 | 1147.50 | Closure | 0 |  |
| AVERAGE AEI |  |  |  |  |  |  |  |  |  |  |  |  | 2097.4 | 69.8 |  | 2027.5 |

Traffic Index Factor Formula (TI) = (T)(Ts)(V)V(V)/(0.00001)
Total Percent Sight Distance obstructions Formula (PO) $=$ (Sight Distance Obstructions/Required Sight Distance)
Sight Distance Factor Formula = Total Percent Sight Distance Obstructions (PO) * Traffic Index Factor (Ti)
Exposure Index Formula (EI) = Traffic Index Factor (TT) * Sight Distance Factor
Adjusted Exposure Index Formula ( $A E I)=$ Exposure Index * Protection Factor
Protection Factor $=$ Type of Protection (Passive Warning Devices $=1.25$, Railroad Flashing Lights $=0.25$, and Gates with Railroad Flashing Lights $=0.01$ ) ***Protection Factors are derived from Connecticut's Hazard Rating Formula
*Note: All Roadways considered to be at a North/ South Orientation

| US 60 CORRIDOR STUDY - BNSF THAYER-NORTH LINE (M.P. 219.00-M.P. 242.00) WEBSTER COUNTY, MO BUILD CONDITION CRASH REDUCTION NUMBERS |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | STREET | US DOT \# | RR M.P. | EXISTING CRASH PREDICTION | ESTIMATED CRASHES OVER 25 YEAR PERIOD | $\begin{aligned} & \text { PROPOSED } \\ & \text { CRASH } \\ & \text { PREDICTION } \end{aligned}$ | ESTIMATED CRASHES OVER 25 YEAR PERIOD (BUILD CONDITION) | TOTAL CRASH REDUCTION | FATAL CRASH REDUCTION | INJURY CRASH REDUCTION | $\begin{aligned} & \text { NON - INJURY } \\ & \text { CRASH } \\ & \text { REDUCTION } \\ & \hline \end{aligned}$ |
| 岂 | FRONT STREET (RTE B) | 667620H | 219.05 | 0.0121 | 0.30 | 0.012 | 0.303 | - | - | - | - |
| 号 | WHITE OAK ROAD | 6679622W | 220.6 | 0.0842 | 2.11 | 0.084 | 2.106 | - | - | - | - |
| $0$ | PORTER CROSSING ROAD | 667623D | 222.12 | 0.0568 | 1.42 | 0.009 | 0.233 | 1.1887 | 0.0012 | 0.4052 | 0.7823 |
| $\begin{aligned} & 0 \\ & 2 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & \hline 0 \end{aligned}$ | DUTCH HILL ROAD | 667628M | 223.72 | 0.0059 | 0.15 | 0.0 | 0.0 | 0.1475 | 0.0002 | 0.0503 | 0.097 |
|  | BALLPARK ROAD (RED OAK) | 667629 U | 223.92 | 0.0349 | 0.87 | 0.0 | 0.0 | 0.8714 | 0.0013 | 0.2744 | 0.5958 |
|  | IRON MOUNTAIN ROAD | 667633J | 225.41 | 0.0669 | 1.67 | 0.0 | 0.0 | 1.6716 | 0.0024 | 0.5263 | 1.1429 |
|  | CENTER STREET | 667635X | 226.5 | 0.0827 | 2.07 | 0.083 | 2.068 | - | - | - | - |
|  | CARPENTER STREET (FR 345B) | 667638 T | 227.24 | 0.0066 | 0.17 | 0.0 | 0.0 | 0.1653 | 0.0002 | 0.0497 | 0.1154 |
|  | HIGHWAY Z | $667640 \cup$ | 227.66 | 0.0208 | 0.52 | 0.0 | 0.0 | 0.52 | 0.0006 | 0.1564 | 0.363 |
|  | BLUE BIRD LANE | 667641B | 228.13 | 0.0093 | 0.23 | 0.0 | 0.0 | 0.2325 | 0.0002 | 0.0793 | 0.153 |
|  | HUMMINGBIRD LANE | 667642H | 228.64 | 0.0115 | 0.29 | 0.0 | 0.0 | 0.2884 | 0.0003 | 0.0983 | 0.1898 |
|  | TANDY ROAD | 667644W | 229.17 | 0.0448 | 1.12 | 0.0 | 0.0 | 1.1206 | 0.0016 | 0.3818 | 0.7371 |
|  | HONOR CAMP LANE (FOREST GROVE DR) | 667645D | 229.73 | 0.0080 | 0.20 | 0.0 | 0.0 | 0.2 | 0.0003 | 0.0682 | 0.1316 |
| $\begin{aligned} & \text { n } \\ & \frac{1}{5} \\ & \text { U } \end{aligned}$ | DIGGINS MAIN STREET (RTE NN) | 667650A | 231.51 | 0.0285 | 0.71 | 0.0 | 0.0 | 0.713 | 0.001 | 0.2245 | 0.4875 |
|  | BOX SCHOOL LOOP | 667652N | 233.03 | 0.0563 | 1.41 | 0.0 | 0.0 | 1.4072 | 0.0014 | 0.4433 | 0.9625 |
|  | SHORT ROAD | 667653 V | 233.75 | 0.0944 | 2.36 | 0.0 | 0.0 | 2.3589 | 0.0034 | 0.7758 | 1.5798 |
|  | BISON ROAD (BOX SCHOOL LP) | 667654C | 234.75 | 0.0336 | 0.84 | 0.0 | 0.0 | 0.8402 | 0.0008 | 0.2643 | 0.5751 |
|  | COMMERCIAL STREET | 667657X | 236.59 | 0.0318 | 0.80 | 0.032 | 0.796 | - | - | - | - |
|  | MAIN STREET | 667659L | 236.69 | 0.0669 | 1.67 | 0.067 | 1.672 | - | - | - | - |
|  | Charles street | 667660F | 236.88 | 0.0107 | 0.27 | 0.011 | 0.266 | - | - | - | - |
|  | OAK LAWN ROAD | 667661M | 238.22 | 0.1053 | 2.63 | 0.076 | 1.903 | 0.7302 | 0.0007 | 0.2229 | 0.5066 |
|  | PEEWEE CROSSING ROAD | 667664H | 239.95 | 0.0641 | 1.60 | 0.006 | 0.153 | 1.4509 | 0.0021 | 0.4428 | 1.0061 |
|  | MINERAL ROAD | 667665P | 240.51 | 0.0144 | 0.36 | 0.0 | 0.0 | 0.3601 | 0.0004 | 0.1099 | 0.2498 |
|  | DEWBERRY ROAD | 667667D | 241.38 | 0.0579 | 1.45 | 0.0 | 0.0 | 1.4482 | 0.0014 | 0.4765 | 0.9703 |
| TOTAL |  |  |  |  |  |  |  | 15.71 | 0.02 | 5.05 | 10.65 |

APPENDIXC

## Corridor Improvement Maps

Tin en
4173

$1-\sqrt{60}$







## Proposed Cost Summary \& <br> Benefit-Cost Analysis



## NOTES:

1. The Opinion of Probable Cost Assumes a Reasonable Schedule for Construction with No Additional Contingencies Estimated for Acceleration.
2. The Opinion of Probable Cost Does not Include any Additional Contingencies for Escalation of Steel and Fuel Costs.


## NOTES

1. The Opinion of Probable Cost Assumes a Reasonable Schedule for Construction with No Additional Contingencies Estimated for Acceleration.
2. The Opinion of Probable Cost Does not Include any Additional Contingencies for Escalation of Steel and Fuel Costs.

| WEBSTER COUNTY, MO <br> US 60 CORRIDOR STUDY <br> March 2, 2020 <br> Diggins - Cost Alternate \#1A |  |  |
| :---: | :---: | :---: |
|  | TOTAL |  |
| DEMOLITION | \$ | 263,230 |
| Existing Pavement Removal | \$ | 263,230 |
| STRUCTURAL | \$ | 3,965,000 |
| Structure | \$ | 3,965,000 |
| ROADWAY | \$ | 13,422,723 |
| Excavation | \$ | 1,388,000 |
| Embankment | \$ | 1,830,000 |
| Aggregate Base (4") | \$ | 1,310,303 |
| Full Depth Pavement (8") | \$ | 7,027,150 |
| Drainage Pipe | \$ | 55,250 |
| Guardrail, Type A | \$ | 29,400 |
| Pavement Marking | \$ | 23,400 |
| Seeding \& Landscaping | \$ | 26,750 |
| Erosion Control | \$ | 26,000 |
| Signing | \$ | 48,250 |
| New Drive | \$ | 84,555 |
| Gravel Road Surface | \$ | 1,573,665 |
| ENVIRONMENTAL MITIGATION | \$ | - |
| Hazardous Waste Disposal |  | N/A |
| RAILROAD CROSSINGS | \$ | 150,000 |
| BNSF Track Removal | \$ | 150,000 |
| BNSF Track Construction |  | N/A |
| Aggregate Ballast |  | N/A |
| BNSF RR Flaggers |  | N/A |
| BNSF RR Insurance |  | N/A |
| BNSF RR At-Grade Signal Equipment |  | N/A |
| BNSF RR Communication Equipment |  | N/A |
| BNSF RR At-Grade Removal |  | N/A |
| MOBILIZATION | \$ | 344,899 |
| Assume 4\% for Mobilization | \$ | 344,899 |
| MAINTENANCE OF TRAFFIC | \$ | 50,000 |
| Assume Staged Constuction | \$ | 50,000 |
| TOTAL CONSTRUCTION OPINION OF PROBABLE COST (2019 DOLLARS) | \$ | 18,195,851 |
| PRELIMINARY DESIGN LEVEL CONTINGENCY (20\%) | \$ | 3,639,170 |
| SUB-TOTAL | \$ | 21,835,021 |
| INFLATION (3\% PER YEAR) ASSUMING CONSTRUCTION IN 2029 | \$ | 6,550,506 |
| TOTAL CONSTRUCTION OPINION OF PROBABLE COST (2029 DOLLARS) | \$ | 28,385,528 |
| UTILITIES | \$ | 350,000 |
| Utilitiy Relocation | \$ | 350,000 |
| LAND ACQUISITION | \$ | 304,850 |
| ROW | \$ | 304,850 |
| ENGINEERING | \$ | 2,183,502 |
| Phase 2 Design Phase Engineering | \$ | 2,183,502 |
| SUB-TOTAL TOTAL PROGRAM BUDGET (2029 DOLLARS) | \$ | $\begin{array}{r} 2,838,352 \\ 31,223,880 \\ \hline \end{array}$ |

## NOTES:

1. The Opinion of Probable Cost Assumes a Reasonable Schedule for Construction with No Additional Contingencies Estimated for Acceleration.
2. The Opinion of Probable Cost Does not Include any Additional Contingencies for Escalation of Steel and Fuel Costs.


# US Highway 60 Corridor Study Webster County, MO 

## Benefit-Cost Analysis



COUNCIL OF GOVERNMENTS


March 2, 2020

| US 60 Corridor (Combined) |  |  |  |
| :---: | :---: | :---: | :---: |
| Benefit |  | BCA Value |  |
| Railroad Benefits |  |  |  |
| At-Grade Crossing Safety |  | \$ | 52,595,000 |
| Rail Crossing Travel Time Savings |  | \$ | 2,622,000 |
| At-Grade Crossing Emissions Reduction |  | \$ | 18,000 |
| At-Grade Crossing Operations \& Maintenance Savings |  | \$ | 1,556,000 |
| Roadway Benefits |  |  |  |
| Roadway Safety |  | \$ | 151,536,000 |
| Roadway Travel-Time Savings |  | \$ | $(717,390)$ |
| Roadway Emissions Reduction |  | \$ | 7,440 |
| Roadway Operations \& Maintenance Savings |  | \$ | (4,288,000) |
| Project Cost |  |  |  |
| US 60 Corridor (Combined) |  | \$ | 132,791,398 |
|  | US 60 Corridor Net BCA Value |  | 1.53 |
| ${ }^{1}$ Assumes Benefits Realized in Year 3 after Construction |  |  |  |
| ${ }^{2}$ Assumed 20 Year Lifespan (7\% Present Value) |  |  |  |
| Rogersville |  |  |  |
| Benefit |  |  | Value |
| Railroad Benefits |  |  |  |
| At-Grade Crossing Safety |  | \$ | 2,964,000 |
| Rail Crossing Travel Time Savings |  | \$ | 64,000 |
| At-Grade Crossing Emissions Reduction |  | \$ | - |
| At-Grade Crossing Operations \& Maintenance Savings |  | \$ | - |
| Roadway Benefits |  |  |  |
| Roadway Safety |  | \$ | 7,470,000 |
| Roadway Travel-Time Savings |  | \$ | $(132,750)$ |
| Roadway Emissions Reduction |  | \$ | 540 |
| Roadway Operations \& Maintenance Savings |  | \$ | $(515,000)$ |
| Project Cost |  |  |  |
| Section I-Rogersville |  | \$ | 17,229,833 |
| Rogersville Net BCA Value 0.57 |  |  |  |
| Fordland |  |  |  |
| Benefit |  |  | BCA Value |
| Railroad Benefits |  |  |  |
| At-Grade Crossing Safety |  | \$ | 25,483,000 |
| Rail Crossing Travel Time Savings |  | \$ | 1,745,000 |
| At-Grade Crossing Emissions Reduction |  | \$ | 14,000 |
| At-Grade Crossing Operations \& Maintenance Savings |  | \$ | 996,000 |
| Roadway Benefits |  |  |  |
| Roadway Safety |  | \$ | 15,404,000 |
| Roadway Travel-Time Savings |  | \$ | $(373,520)$ |
| Roadway Emissions Reduction |  | \$ | 500 |
| Roadway Operations \& Maintenance Savings |  | \$ | (1,868,000) |
| Project Cost |  |  |  |
| Section II - Fordland |  | \$ | 41,185,462 |
| Fordland Net BCA Value 1.01 |  |  |  |

BENEFIT-COST MODEL (cont.)
US 60 CORRIDOR STUDY - WEBSTER COUNTY, MO

| Diggins |  |  |  |
| :---: | :---: | :---: | :---: |
| Benefit |  | BCA Value |  |
| Railroad Benefits |  |  |  |
| At-Grade Crossing Safety |  | \$ | 11,767,000 |
| Rail Crossing Travel Time Savings |  | \$ | 576,000 |
| At-Grade Crossing Emissions Reduction |  | \$ | 3,000 |
| At-Grade Crossing Operations \& Maintenance Savings |  | \$ | 443,000 |
| Roadway Benefits |  |  |  |
| Roadway Safety |  | \$ | 34,077,000 |
| Roadway Travel-Time Savings |  | \$ | $(423,110)$ |
| Roadway Emissions Reduction |  | \$ | 290 |
| Roadway Operations \& Maintenance Savings |  | \$ | $(1,445,000)$ |
| Project Cost |  |  |  |
| Section III - Diggins |  | \$ | 31,223,880 |
|  | Diggins Net BCA Value |  | 1.44 |
| Seymour |  |  |  |
| Benefit |  |  | A Value |
| Railroad Benefits |  |  |  |
| At-Grade Crossing Safety |  | \$ | 12,381,000 |
| Rail Crossing Travel Time Savings |  | \$ | 237,000 |
| At-Grade Crossing Emissions Reduction |  | \$ | 1,000 |
| At-Grade Crossing Operations \& Maintenance Savings |  | \$ | 117,000 |
| Roadway Benefits |  |  |  |
| Roadway Safety |  | \$ | 94,585,000 |
| Roadway Travel-Time Savings |  | \$ | 211,990 |
| Roadway Emissions Reduction |  | \$ | 6,110 |
| Roadway Operations \& Maintenance Savings |  | \$ | (2,042,000) |
| Project Cost |  |  |  |
| Section IV - Seymour |  | \$ | 43,152,223 |
|  | Seymour Net BCA Value |  | 2.44 |

BENEFIT-COST MODEL - ECONOMIC BENEFITS
US 60 CORRIDOR STUDY - WEBSTER COUNTY, MO

|  |  | Employment Benefits |
| :--- | :---: | ---: | :---: | :---: | :---: | :---: | | New Retail/Sales |
| :---: |
| Revenue Benefits |$\quad$| Total Economic |
| :---: |
| Potential |$\quad$| Combined "Soft" |
| :---: |
| BCA Value |

${ }^{1}$ BCA Values include Safety + Current 2019 Market Trend Predictions

## Roadway Benefit-Cost Tables

| ROADWAY BENEFITS |  |  |
| :---: | :---: | :---: |
| ROADWAY SAFETY BENEFITS |  |  |
| 1. Reduced Crash Prediction Benefits (BCA Value) | \$ | 151,536,000 |
| TRAVEL TIME SAVINGS |  |  |
| 1. Reduced in Vehicular/Truck Traffic Delays | \$ | $(717,390)$ |
| EMISSIONS REDUCTION BENEFITS |  |  |
| 2. Reduction in Emissions from Idling Vehicles | \$ | 7,440 |
| OTHER BENEFITS |  |  |
| 3. Reduction in Operations and Maintenance Expenses | \$ | (4,288,000) |
| TOTAL BENEFITS | \$ | 146,538,050 |
| TOTAL COSTS* | \$ | 132,791,398 |
| COMBINED ROADWAY BCA RATIO |  | 1.10 |

Benefit-Cost Analysis Inputs and Assumptions

| Maintenance Assumptions |  |  |  |
| :---: | :---: | :---: | :---: |
| Average Annual At-Grade Stop-Controlled Intersection Maintenance |  | 7,500 | MoDOT |
| Average Annual At-Grade Signalized Intersection Maintenance | \$ | 15,000 |  |
| Average Annual Grade-Separated Structure Maintenace | \$ | 100,000 |  |
| Project Costs |  |  |  |
| Rogersville Section Costs |  | 17,229,833 |  |
| Fordland Section Costs |  | 41,185,462 | CMT Estimates |
| Diggins Section Costs |  | 31,223,880 |  |
| Seymour Section Costs | \$ | 43,152,223 |  |
| Vehicular Traffic Assumptions |  |  |  |
| Average Daily Crossings Vehicular Traffic (ADT) |  | 2,835 |  |
| Proportion of Daytime Crossings (6am to 6pm) |  | 80\% |  |
| Proportion of Average Evening Crossings (6pm to 6am) |  | 20\% | MoDOT \& CMT Traffic Counts, 2019 |
| Percent Trucks |  | 10\% |  |
| Percent Passenger Vehicles |  | 90\% |  |
| Average Annual Regional Vehicular Count Increase |  | 1.35\% | Assumption based on projected population growth |
| Average Passengers per Private Vehicle |  | 1.68 | Benefit-Cost Analysis Guidance for TIGER and INFRA |
| Average Passengers per Truck |  | 1.00 | Applications, December 2018 |
| Crash Assumptions |  |  |  |
| Annual Crash Prediction | See Appendix |  | U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of Crossing Safety and Operation |
| Fatal Accident Probability | See Appendix |  |  |
| Injury Accident Probability | See Appendix |  |  |
| Property Damage Only Probability | See Appendix |  |  |
| Value of Travel Time Savings, per hour |  |  |  |
| 2019 dollars |  |  |  |
| Private Vehicle Travel |  |  |  |
| Personal | \$ | 15.48 |  |
| Business | \$ | 27.72 |  |
| All Purposes | \$ | 16.84 | Programs, December 2018 |
| Commercial Vehicle Operators |  |  |  |
| Truck Drivers | \$ | 29.92 |  |
| Bus Drivers | \$ | 31.38 |  |
| Transit Rail Operators | \$ | 51.15 |  |
| Locomotive Engineers | \$ | 46.97 |  |
| Value of Injuries |  |  |  |
| 2019 dollars |  |  |  |
| Minor Injury |  | 150,300 | MoDOT |
| Serious Injury | \$ | 577,700 | MoDOT |
| Fatal Accident Probability |  | 9,962,900 |  |
| Property Damage | \$ | 10,500 |  |
| Average Idle Emission Rates (g/hr) |  |  |  |
| Light Duty Gasoline Fueled Vehicles |  |  |  |
| Volatile Organic Compounds (VOC) |  | 2.683 |  |
| Nitrogen Oxide (NOx) |  | 3.515 |  |
| Particulate Matter ( $\mathrm{PM}_{2.5}$ ) |  | N/A |  |
| Sulfur Dioxide ( $\mathrm{SO}_{2}$ ) |  | N/A |  |
| Heavy Duty Diesel Vehicle |  |  | Trucks, and Heavy-Duty Trucks, EPA, October 2008 |
| Volatile Organic Compounds (VOC) |  | 3.455 |  |
| Nitrogen Oxide (NOx) |  | 33.763 |  |
| Particulate Matter ( $\mathrm{PM}_{2.5}$ ) |  | 1.100 |  |
| Sulfur Dioxide ( $\mathrm{SO}_{2}$ ) |  | N/A |  |
| Value of Emissions (2017 dollars) |  | Short Ton |  |
| Carbone Dioxide ( $\mathrm{CO}_{2}$ ) |  | Varies |  |
| Volatile Organic Compounds (VOC) | \$ | 2,092 | Benefit-Cost Analysis Guidance for Discretionary Grant |
| Nitrogen Oxide (NOx) | \$ | 8,682 | Programs, December 2018 |
| Particulate Matter ( $\mathrm{PM}_{2.5}$ ) | \$ | 395,179 |  |
| Sulfur Dioxide ( $\mathrm{SO}_{2}$ ) | \$ | 51,149 |  |

Roadway Table 1. Value of Travel Time Savings

| Interchange | No Build Average Daily Delay (min) | Proposed Average Daily Delay (min) | Average Daily Time Savings (min) | Annual Passenger Vehicle Value of Time Delay |  | al Truck Value of Delay |  | al Value of Savings ${ }^{1}$ |  | et Present <br> Emissions uction scount) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| White Oak | 3716 | 4402 | -686 | \$ $(106,259)$ | \$ | $(12,486)$ | \$ | $(118,746)$ | \$ | $(132,750)$ |
| Highway U | 723 | 1025 | -303 | \$ (46,895) | \$ | $(5,511)$ | \$ | $(52,406)$ | \$ | $(58,580)$ |
| Highway FF (Burks St.) | 1723 | 2821 | -1098 | \$ $(170,080)$ | \$ | $(19,986)$ | \$ | $(190,066)$ | \$ | $(212,470)$ |
| Highway Z | 4026 | 4556 | -530 | \$ $(82,025)$ | \$ | $(9,639)$ | \$ | $(91,664)$ | \$ | $(102,470)$ |
| Highway A | 4506 | 6693 | -2187 | \$ $(338,689)$ | \$ | $(39,799)$ | \$ | $(378,488)$ | \$ | $(423,110)$ |
| W Clinton Ave. | 8504 | 8380 | 124 | \$ 19,191 | \$ | 2,255 | \$ | 21,446 | \$ | 23,970 |
| Highway K/Highway C | 8094 | 7069 | 1025 | \$ 158,774 | \$ | 18,657 | \$ | 177,431 | \$ | 198,350 |
| Peewee Crossing | 279 | 333 | -53 | \$ $(8,267)$ | \$ | (971) | \$ | $(9,238)$ | \$ | $(10,330)$ |
| Total Annual Travel Time Savings |  |  |  |  |  |  |  |  | $\$ \quad(717,390)$ |  |

${ }^{1}$ Traffic Patterns are assumed the same as Existing. It is expected for Traffic Patterns to Shift in the Proposed Scenario
${ }^{2}$ Assume Benefits Realized in Year 3 after Construction

Roadway Table 2a. Value of Reduced Crashes in Rogersville

|  |  | Calendar Year |  |
| :---: | :---: | :---: | ---: |
| Year |  | Total Annual Value of Reduced <br> Crashes |  |
| 0 | 2019 | $\$$ | - |
| 1 | 2020 | $\$$ | - |
| 2 | 2021 | $\$$ | 849,816 |
| 3 | 2022 | $\$$ | 858,314 |
| 4 | 2023 | $\$$ | 866,897 |
| 5 | 2024 | $\$$ | 875,566 |
| 6 | 2025 | $\$$ | 884,322 |
| 7 | 2026 | $\$$ | 893,165 |
| 8 | 2027 | $\$$ | 902,097 |
| 9 | 2028 | $\$$ | 911,118 |
| 10 | 2029 | $\$$ | 920,229 |
| 11 | 2030 | $\$$ | 929,431 |
| 12 | 2031 | $\$$ | 938,725 |
| 13 | 2032 | $\$$ | 948,113 |
| 14 | 2033 | $\$$ | 957,594 |
| 15 | 2034 | $\$$ | 967,170 |
| 16 | 2035 | $\$$ | 976,841 |
| 17 | 2036 | $\$$ | 986,610 |
| 18 | 2037 | $\$$ | 996,476 |
| 19 | 2038 | $\$$ | $1,006,441$ |
| 20 | 2039 | $\$$ | $11,564,000$ |
|  |  |  |  |

Roadway Table 2b. Value of Reduced Crashes in Fordland

| Year | Calendar Year | Total Annual Value of Reduced <br> Crashes |  |
| :---: | :---: | :---: | :---: |
| 0 | 2019 | $\$$ | - |
| 1 | 2020 | $\$$ | - |
| 2 | 2021 | $\$$ | $1,752,355$ |
| 3 | 2022 | $\$$ | $1,769,878$ |
| 4 | 2023 | $\$$ | $1,787,577$ |
| 5 | 2024 | $\$$ | $1,805,453$ |
| 6 | 2025 | $\$$ | $1,823,508$ |
| 7 | 2026 | $\$$ | $1,841,743$ |
| 8 | 2027 | $\$$ | $1,860,160$ |
| 9 | 2028 | $\$$ | $1,878,762$ |
| 10 | 2029 | $\$$ | $1,897,549$ |
| 11 | 2030 | $\$$ | $1,916,525$ |
| 12 | 2031 | $\$$ | $1,935,690$ |
| 13 | 2032 | $\$$ | $1,955,047$ |
| 14 | 2033 | $\$$ | $1,974,597$ |
| 15 | 2034 | $\$$ | $1,994,343$ |
| 16 | 2035 | $\$$ | $2,014,287$ |
| 17 | 2036 | $\$$ | $2,034,430$ |
| 18 | 2037 | $\$$ | $2,054,774$ |
| 19 | 2038 | 2039 | $\$$ |
| 20 | Net Present Value (3\%) | $\$$ | $2,075,322$ |
| 1 Assumes no savings until Year 3 after Contstruction | $15,404,000$ |  |  |

[^7]Roadway Table 2c. Value of Reduced Crashes in Diggins

| Year | Calendar Year | Total Annual Value of Reduced Crashes |
| :---: | :---: | :---: |
| 0 | 2019 | \$ |
| 1 | 2020 | \$ |
| 2 | 2021 | \$ |
| 3 | 2022 | \$ 3,876,667 |
| 4 | 2023 | \$ 3,915,434 |
| 5 | 2024 | \$ 3,954,588 |
| 6 | 2025 | \$ 3,994,134 |
| 7 | 2026 | \$ 4,034,075 |
| 8 | 2027 | \$ 4,074,416 |
| 9 | 2028 | \$ 4,115,160 |
| 10 | 2029 | \$ 4,156,312 |
| 11 | 2030 | \$ 4,197,875 |
| 12 | 2031 | \$ 4,239,853 |
| 13 | 2032 | \$ 4,282,252 |
| 14 | 2033 | \$ 4,325,075 |
| 15 | 2034 | \$ 4,368,325 |
| 16 | 2035 | \$ 4,412,009 |
| 17 | 2036 | \$ 4,456,129 |
| 18 | 2037 | \$ 4,500,690 |
| 19 | 2038 | \$ 4,545,697 |
| 20 | 2039 | \$ 4,591,154 |
| Net Present Value (3\%) |  | \$ 52,752,000 |
| Net Present Value (7\%) |  | \$ 34,077,000 |

Roadway Table 2d. Value of Reduced Crashes in Seymour

| Year | Calendar Year | Total Annual Value of Reduced <br> Crashes |  |
| :---: | :---: | :---: | :---: |
| 0 | 2019 | $\$$ | - |
| 1 | 2020 | $\$$ | - |
| 2 | 2021 | $\$$ | $9,509,308$ |
| 3 | 2022 | $\$$ | $9,604,401$ |
| 4 | 2023 | $\$$ | $10,189,309$ |
| 5 | 2024 | $\$$ | $10,494,988$ |
| 6 | 2025 | $\$$ | $10,809,838$ |
| 7 | 2026 | $\$$ | $11,134,133$ |
| 8 | 2027 | $\$$ | $11,468,157$ |
| 9 | 2028 | $\$$ | $11,812,202$ |
| 10 | 2029 | $\$$ | $12,166,568$ |
| 11 | 2030 | $\$$ | $12,531,565$ |
| 12 | 2031 | $\$$ | $12,907,512$ |
| 13 | 2032 | $\$$ | $13,294,737$ |
| 14 | 2033 | $\$$ | $13,693,579$ |
| 15 | 2034 | $\$$ | $14,104,387$ |
| 16 | 2035 | $\$$ | $14,527,518$ |
| 17 | 2036 | $\$$ | $14,963,344$ |
| 18 | 2037 | $\$$ | $15,412,244$ |
| 19 | 2038 | $\$$ | $149,291,000$ |
| 20 | 2039 | $\$$ | $94,585,000$ |
| 1 Assumes no savings until Year 3 after Contstruction |  |  |  |

[^8]Roadway Table 3. Value of Emissions Reduction for Idling Vehicles

| Interchange | No Build Average Daily Control Delay (min) | ProposedAverage DailyControl Delay(min) | Time Savings (min) | Cost of Emissions for Passenger Vehicles |  |  |  |  | Cost of Emissions for Trucks |  |  |  |  |  | Total Annual <br> Value of Emissions Reduction |  | 20 Year Net Present Worth of Emissions Reduction (7\% Discount) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | VOC |  | Nox | $\mathrm{PM}_{2.5}$ | VOC |  | Nox |  | $\mathrm{PM}_{2.5}$ |  |  |  |  |  |
| White Oak | 978 | 295 | 682 | \$ | 23 | \$ | 126 | N/A | \$ | 3 | \$ | 134 | \$ | 199 | \$ | 485 | \$ | 540 |
| Highway U | 451 | 164 | 288 | \$ | 10 | \$ | 53 | N/A | \$ | 1 | \$ | 57 | \$ | 84 | \$ | 205 | \$ | 230 |
| Highway FF (Burks St.) | 587 | 231 | 355 | \$ | 12 | \$ | 65 | N/A | \$ | 2 | \$ | 70 | \$ | 104 | \$ | 253 | \$ | 280 |
| Highway Z | 336 | 351 | -15 | \$ | (0) | \$ | (3) | N/A | \$ | (0) | \$ | (3) | \$ | (4) | \$ | (10) | \$ | (10) |
| Highway A | 964 | 594 | 370 | \$ | 13 | \$ | 68 | N/A | \$ | 2 | \$ | 73 | \$ | 108 | \$ | 263 | \$ | 290 |
| W Clinton Ave. | 4230 | 965 | 3265 | \$ | 111 | \$ | 601 | N/A | \$ | 16 | \$ | 642 | \$ | 952 | \$ | 2,321 | \$ | 2,600 |
| Highway K/Highway C | 4969 | 588 | 4382 | \$ | 148 | \$ | 807 | N/A | \$ | 21 | \$ | 861 | \$ | 1,277 | \$ | 3,115 | \$ | 3,480 |
| Peewee Crossing | 92 | 51 | 41 | \$ | 1 | \$ | 8 | N/A | \$ | 0 | \$ | 8 | \$ | 12 | \$ | 29 | \$ | 30 |
| Total Value Annual Emissions Reduction |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \$7,440 |

${ }^{1}$ Traffic Patterns are assumed the same as Existing. It is expected for Traffic Patterns to Shift in the Proposed Scenario
${ }^{2}$ Assume Benefits Realized in Year 3 after Construction

US 60 CORRIDOR
Roadway Table 4a. Value of Reduced Operations and Maintenance Expenses

|  |  | No Build Scenario |  |  |  | Build Scenario |  |  |  |  |  | Total O\&M Savings |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calendar Year | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection Maintenance (MoDOT) |  | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection Maintenance (MoDOT) |  | Grade-Separated Structure Maintenance (MoDOT) |  |  |  |
| 0 | 2019 | \$ | 232,500 | \$ | 30,000 | \$ | 232,500 | \$ | 30,000 | \$ | - | \$ | - |
| 1 | 2020 | \$ | 239,475 | \$ | 30,900 | \$ | 239,475 | \$ | 30,900 | \$ | - | \$ | - |
| 2 | 2021 | \$ | 246,659 | \$ | 31,827 | \$ | 246,659 | \$ | 31,827 | \$ | - | \$ | 493,319 |
| $4 \mathrm{E}+07$ | 2022 | \$ | 254,059 | \$ | 32,782 | \$ | - | \$ | - | \$ | 800,000 | \$ | $(513,159)$ |
| 4 | 2023 | \$ | 261,681 | \$ | 33,765 | \$ | - | \$ | - | \$ | 824,000 | \$ | $(528,554)$ |
| 5 | 2024 | \$ | 269,531 | \$ | 34,778 | \$ | - | \$ | - | \$ | 848,720 | \$ | $(544,411)$ |
| 6 | 2025 | \$ | 277,617 | \$ | 35,822 | \$ | - | \$ | - | \$ | 874,182 | \$ | $(560,743)$ |
| 7 | 2026 | \$ | 285,946 | \$ | 36,896 | \$ | - | \$ | - | \$ | 900,407 | \$ | $(577,565)$ |
| 8 | 2027 | \$ | 294,524 | \$ | 38,003 | \$ | - | \$ | - | \$ | 927,419 | \$ | $(594,892)$ |
| 9 | 2028 | \$ | 303,360 | \$ | 39,143 | \$ | - | \$ | - | \$ | 955,242 | \$ | $(612,739)$ |
| 10 | 2029 | \$ | 312,461 | \$ | 40,317 | \$ | - | \$ | - | \$ | 983,899 | \$ | $(631,121)$ |
| 11 | 2030 | \$ | 321,834 | \$ | 41,527 | \$ | - | \$ | - | \$ | 1,013,416 | \$ | $(650,055)$ |
| 12 | 2031 | \$ | 331,489 | \$ | 42,773 | \$ | - | \$ | - | \$ | 1,043,819 | \$ | $(669,556)$ |
| 13 | 2032 | \$ | 341,434 | \$ | 44,056 | \$ | - | \$ | - | \$ | 1,075,133 | \$ | $(689,643)$ |
| 14 | 2033 | \$ | 351,677 | \$ | 45,378 | \$ | - | \$ | - | \$ | 1,107,387 | \$ | $(710,332)$ |
| 15 | 2034 | \$ | 362,227 | \$ | 46,739 | \$ | - | \$ | - | \$ | 1,140,609 | \$ | $(731,642)$ |
| 16 | 2035 | \$ | 373,094 | \$ | 48,141 | \$ | - | \$ | - | \$ | 1,174,827 | \$ | $(753,592)$ |
| 17 | 2036 | \$ | 384,287 | \$ | 49,585 | \$ | - | \$ | - | \$ | 1,210,072 | \$ | $(776,199)$ |
| 18 | 2037 | \$ | 395,816 | \$ | 51,073 | \$ | - | \$ | - | \$ | 1,246,374 | \$ | $(799,485)$ |
| 19 | 2038 | \$ | 407,690 | + | 52,605 | \$ | - | \$ | - | \$ | 1,283,765 | \$ | $(823,470)$ |
| 20 | 2039 | \$ | 419,921 | \$ | 54,183 | \$ | - | \$ | - | \$ | 1,322,278 | \$ | $(848,174)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (3\%) | \$ | $(7,755,000)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (7\%) | \$ | $(4,795,000)$ |

${ }^{1}$ Assumes no operations and maintenance savings until Year 3 in Build Scenario

ROGERSVILLE
Roadway Table 4b. Value of Reduced Operations and Maintenance Expenses

|  |  | No Build Scenario |  |  |  | Build Scenario |  |  |  |  |  | Total O\&M Savings |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calendar Year | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection Maintenance (MoDOT) |  | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection Maintenance (MoDOT) |  | Grade-Separated Structure Maintenance (MoDOT) |  |  |  |
| 0 | 2019 | \$ | 45,000 | \$ | - | \$ | 45,000 | \$ | - | \$ | - | \$ | - |
| 1 | 2020 | \$ | 46,350 | \$ | - | \$ | 46,350 | \$ | - | \$ | - | \$ | - |
| 2 | 2021 | \$ | 47,741 | \$ | - | \$ | 47,741 | \$ | - | \$ | - | \$ | - |
| 3 | 2022 | \$ | 49,173 | \$ | - | \$ | - | \$ | - | \$ | 100,000 | \$ | $(50,827)$ |
| 4 | 2023 | \$ | 50,648 | \$ | - | \$ | - | \$ | - | \$ | 103,000 | \$ | $(52,352)$ |
| 5 | 2024 | \$ | 52,167 | \$ | - | \$ | - | \$ | - | \$ | 106,090 | \$ | $(53,923)$ |
| 6 | 2025 | \$ | 53,732 | \$ | - | \$ | - | \$ | - | \$ | 109,273 | \$ | $(55,540)$ |
| 7 | 2026 | \$ | 55,344 | \$ | - | \$ | - | \$ | - | \$ | 112,551 | \$ | $(57,207)$ |
| 8 | 2027 | \$ | 57,005 | \$ | - | \$ | - | \$ | - | \$ | 115,927 | \$ | $(58,923)$ |
| 9 | 2028 | \$ | 58,715 | \$ | - | \$ | - | \$ | - | \$ | 119,405 | \$ | $(60,690)$ |
| 10 | 2029 | \$ | 60,476 | \$ | - | \$ | - | \$ | - | \$ | 122,987 | \$ | $(62,511)$ |
| 11 | 2030 | \$ | 62,291 | \$ | - | \$ | - | \$ | - | \$ | 126,677 | \$ | $(64,386)$ |
| 12 | 2031 | \$ | 64,159 | \$ | - | \$ | - | \$ | - | \$ | 130,477 | \$ | $(66,318)$ |
| 13 | 2032 | \$ | 66,084 | \$ | - | \$ | - | \$ | - | \$ | 134,392 | \$ | $(68,308)$ |
| 14 | 2033 | \$ | 68,067 | \$ | - | \$ | - | \$ | - | \$ | 138,423 | \$ | $(70,357)$ |
| 15 | 2034 | \$ | 70,109 | \$ | - | \$ | - | \$ | - | \$ | 142,576 | \$ | $(72,468)$ |
| 16 | 2035 | \$ | 72,212 | \$ | - | \$ | - | \$ | - | \$ | 146,853 | \$ | $(74,642)$ |
| 17 | 2036 | \$ | 74,378 | \$ | - | \$ | - | \$ | - | \$ | 151,259 | \$ | $(76,881)$ |
| 18 | 2037 | \$ | 76,609 | \$ | - | \$ | - | \$ | - | \$ | 155,797 | \$ | $(79,187)$ |
| 19 | 2038 | \$ | 78,908 | \$ | - | \$ | - | \$ | - | \$ | 160,471 | \$ | $(81,563)$ |
| 20 | 2039 | \$ | 81,275 | \$ | - | \$ | - | \$ | - | \$ | 165,285 | \$ | $(84,010)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (3\%) | \$ | $(813,000)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (7\%) | \$ | $(515,000)$ |

[^9]ORDLAND
Roadway Table 4c. Value of Reduced Operations and Maintenance Expenses

|  |  | No Build Scenario |  |  |  | Build Scenario |  |  |  |  |  | Total O\&M Savings |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calendar Year | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection Maintenance (MoDOT) |  | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection <br> Maintenance (MoDOT) |  | Grade-Separated Structure Maintenance (MoDOT) |  |  |  |
| 0 | 2019 | \$ | 60,000 | \$ | - | \$ | 60,000 | \$ | - | \$ | - | \$ | - |
| 1 | 2020 | \$ | 61,800 | \$ | - | \$ | 61,800 | \$ | - | \$ | - | \$ | - |
| 2 | 2021 | \$ | 63,654 | \$ | - | \$ | 63,654 | \$ | - | \$ | - | \$ | - |
| 3 | 2022 | \$ | 65,564 | \$ | - | \$ | - | \$ | - | \$ | 250,000 | \$ | $(184,436)$ |
| 4 | 2023 | \$ | 67,531 | \$ | - | \$ | - | \$ | - | \$ | 257,500 | \$ | $(189,969)$ |
| 5 | 2024 | \$ | 69,556 | \$ | - | \$ | - | \$ | - | \$ | 265,225 | \$ | $(195,669)$ |
| 6 | 2025 | \$ | 71,643 | \$ | - | \$ | - | \$ | - | \$ | 273,182 | \$ | $(201,539)$ |
| 7 | 2026 | \$ | 73,792 | \$ | - | \$ | - | \$ | - | \$ | 281,377 | \$ | $(207,585)$ |
| 8 | 2027 | \$ | 76,006 | \$ | - | \$ | - | \$ | - | \$ | 289,819 | \$ | $(213,812)$ |
| 9 | 2028 | \$ | 78,286 | \$ | - | \$ | - | \$ | - | \$ | 298,513 | \$ | $(220,227)$ |
| 10 | 2029 | \$ | 80,635 | \$ | - | \$ |  | \$ | - | \$ | 307,468 | \$ | $(226,833)$ |
| 11 | 2030 | \$ | 83,054 | \$ | - | \$ | - | \$ | - | \$ | 316,693 | \$ | $(233,638)$ |
| 12 | 2031 | \$ | 85,546 | \$ | - | \$ | - | \$ | - | \$ | 326,193 | \$ | $(240,648)$ |
| 13 | 2032 | \$ | 88,112 | \$ | - | \$ | - | \$ | - | \$ | 335,979 | \$ | $(247,867)$ |
| 14 | 2033 | \$ | 90,755 | \$ | - | \$ | - | \$ | - | \$ | 346,058 | \$ | $(255,303)$ |
| 15 | 2034 | \$ | 93,478 | \$ | - | \$ | - | \$ | - | \$ | 356,440 | \$ | $(262,962)$ |
| 16 | 2035 | \$ | 96,282 | \$ | - | \$ | - | \$ | - | \$ | 367,133 | \$ | $(270,851)$ |
| 17 | 2036 | \$ | 99,171 | \$ | - | \$ | - | \$ | - | \$ | 378,147 | \$ | $(278,977)$ |
| 18 | 2037 | \$ | 102,146 | \$ | - | \$ | - | \$ | - | \$ | 389,492 | \$ | $(287,346)$ |
| 19 | 2038 | \$ | 105,210 | \$ | - | \$ | - | \$ | - | \$ | 401,177 | \$ | $(295,966)$ |
| 20 | 2039 | \$ | 108,367 | \$ | - | \$ | - | \$ | - | \$ | 413,212 | \$ | $(304,845)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (3\%) | \$ | $(2,950,000)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (7\%) | \$ | $(1,868,000)$ |

${ }^{1}$ Assumes no operations and maintenance savings until Year 3 in Build Scenario
DIGGINS
Roadway Table 4d. Value of Reduced Operations and Maintenance Expenses

|  |  | No Build Scenario |  |  |  | Build Scenario |  |  |  |  |  | Total O\&M Savings |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calendar Year | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection <br> Maintenance (MoDOT) |  | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection Maintenance (MoDOT) |  | Grade-Separated Structure Maintenance (MoDOT) |  |  |  |
| 0 | 2019 | \$ | 52,500 | \$ | - | \$ | 52,500 | \$ | - | \$ | - | \$ |  |
| 1 | 2020 | \$ | 54,075 | \$ | - | \$ | 54,075 | \$ | - | \$ | - | \$ | - |
| 2 | 2021 | \$ | 55,697 | \$ | - | \$ | 55,697 | \$ | - | \$ | - | \$ | - |
| 3 | 2022 | \$ | 57,368 | \$ | - | \$ | - | \$ | - | \$ | 200,000 | \$ | $(142,632)$ |
| 4 | 2023 | \$ | 59,089 | \$ | - | \$ | - | \$ | - | \$ | 206,000 | \$ | $(146,911)$ |
| 5 | 2024 | \$ | 60,862 | \$ | - | \$ | - | \$ | - | \$ | 212,180 | \$ | $(151,318)$ |
| 6 | 2025 | \$ | 62,688 | \$ | - | \$ | - | \$ | - | \$ | 218,545 | \$ | $(155,858)$ |
| 7 | 2026 | \$ | 64,568 | \$ | - | \$ | - | \$ | - | \$ | 225,102 | \$ | $(160,533)$ |
| 8 | 2027 | \$ | 66,505 | \$ | - | \$ | - | \$ | - | \$ | 231,855 | \$ | $(165,349)$ |
| 9 | 2028 | \$ | 68,501 | \$ | - | \$ | - | \$ | - | \$ | 238,810 | \$ | $(170,310)$ |
| 10 | 2029 | \$ | 70,556 | \$ | - | \$ | - | \$ | - | \$ | 245,975 | \$ | $(175,419)$ |
| 11 | 2030 | \$ | 72,672 | \$ | - | \$ | - | \$ | - | \$ | 253,354 | \$ | $(180,682)$ |
| 12 | 2031 | \$ | 74,852 | \$ | - | \$ | - | \$ | - | \$ | 260,955 | \$ | $(186,102)$ |
| 13 | 2032 | \$ | 77,098 | \$ | - | \$ | - | \$ | - | \$ | 268,783 | \$ | $(191,685)$ |
| 14 | 2033 | \$ | 79,411 | \$ | - | \$ | - | \$ | - | \$ | 276,847 | \$ | $(197,436)$ |
| 15 | 2034 | \$ | 81,793 | \$ | - | \$ | - | \$ | - | \$ | 285,152 | \$ | $(203,359)$ |
| 16 | 2035 | \$ | 84,247 | \$ | - | \$ | - | \$ | - | \$ | 293,707 | \$ | $(209,460)$ |
| 17 | 2036 | \$ | 86,775 | \$ | - | \$ | - | \$ | - | \$ | 302,518 | \$ | $(215,743)$ |
| 18 | 2037 | \$ | 89,378 | \$ | - | \$ | - | \$ | - | \$ | 311,593 | \$ | $(222,216)$ |
| 19 | 2038 | \$ | 92,059 | \$ | - | \$ | - | \$ | - | \$ | 320,941 | \$ | $(228,882)$ |
| 20 | 2039 | \$ | 94,821 | \$ | - | \$ | - | \$ | - | \$ | 330,570 | \$ | $(235,749)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (3\%) | \$ | $(2,281,000)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (7\%) | \$ | $(1,445,000)$ |

[^10]SEYMOUR
Roadway Table 4e. Value of Reduced Operations and Maintenance Expenses

|  |  | No Build Scenario |  |  |  | Build Scenario |  |  |  |  |  | Total O\&M Savings |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calendar Year | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection Maintenance (MoDOT) |  | At-Grade StopControlled Intersection Maintenance (MoDOT) |  | At-Grade Signalized Intersection Maintenance (MoDOT) |  | Grade-Separated Structure Maintenance (MoDOT) |  |  |  |
| 0 | 2019 | \$ | 60,000 | \$ | 30,000 | \$ | 60,000 | \$ | 30,000 | \$ | - | \$ | - |
| 1 | 2020 | \$ | 61,800 | \$ | 30,900 | \$ | 61,800 | \$ | 30,900 | \$ | - | \$ | - |
| 2 | 2021 | \$ | 63,654 | \$ | 31,827 | \$ | 63,654 | \$ | 31,827 | \$ | - | \$ | - |
| 3 | 2022 | \$ | 65,564 | \$ | 32,782 | \$ | - | \$ | - | \$ | 300,000 | \$ | $(201,655)$ |
| 4 | 2023 | \$ | 67,531 | \$ | 33,765 | \$ | - | \$ | - | \$ | 309,000 | \$ | $(207,704)$ |
| 5 | 2024 | \$ | 69,556 | \$ | 34,778 | \$ | - | \$ | - | \$ | 318,270 | \$ | $(213,935)$ |
| 6 | 2025 | \$ | 71,643 | \$ | 35,822 | \$ | - | \$ | - | \$ | 327,818 | \$ | $(220,353)$ |
| 7 | 2026 | \$ | 73,792 | \$ | 36,896 | \$ | - | \$ | - | \$ | 337,653 | \$ | $(226,964)$ |
| 8 | 2027 | \$ | 76,006 | \$ | 38,003 | \$ | - | \$ | - | \$ | 347,782 | \$ | $(233,773)$ |
| 9 | 2028 | \$ | 78,286 | \$ | 39,143 | \$ | - | \$ | - | \$ | 358,216 | \$ | $(240,786)$ |
| 10 | 2029 | \$ | 80,635 | \$ | 40,317 | \$ | - | \$ | - | \$ | 368,962 | \$ | $(248,010)$ |
| 11 | 2030 | \$ | 83,054 | \$ | 41,527 | \$ | - | \$ | - | \$ | 380,031 | \$ | $(255,450)$ |
| 12 | 2031 | \$ | 85,546 | \$ | 42,773 | \$ | - | \$ | - | \$ | 391,432 | \$ | $(263,113)$ |
| 13 | 2032 | \$ | 88,112 | \$ | 44,056 | \$ | - | \$ | - | \$ | 403,175 | \$ | $(271,007)$ |
| 14 | 2033 | \$ | 90,755 | \$ | 45,378 | \$ | - | \$ | - | \$ | 415,270 | \$ | $(279,137)$ |
| 15 | 2034 | \$ | 93,478 | \$ | 46,739 | \$ | - | \$ | - | \$ | 427,728 | \$ | $(287,511)$ |
| 16 | 2035 | \$ | 96,282 | \$ | 48,141 | \$ | - | \$ | - | \$ | 440,560 | \$ | $(296,137)$ |
| 17 | 2036 | \$ | 99,171 | \$ | 49,585 | \$ | - | \$ | - | \$ | 453,777 | \$ | $(305,021)$ |
| 18 | 2037 | \$ | 102,146 | \$ | 51,073 | \$ | - | \$ | - | \$ | 467,390 | \$ | $(314,171)$ |
| 19 | 2038 | \$ | 105,210 | \$ | 52,605 | \$ | - | \$ | - | \$ | 481,412 | \$ | $(323,596)$ |
| 20 | 2039 | \$ | 108,367 | \$ | 54,183 | \$ | - | \$ | - | \$ | 495,854 | \$ | $(333,304)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (3\%) | \$ | $(3,225,000)$ |
|  |  |  |  |  |  |  |  |  |  | Net | Value (7\%) | \$ | $(2,042,000)$ |

[^11]
## Railroad Benefit-Cost Tables

| BENEFITS |  |  |
| :---: | :---: | :---: |
| RAIL SAFETY BENEFITS |  |  |
| 1. Reduced Crash Prediction Benefits (BCA Value) | \$ | 52,595,000.00 |
| TRAVEL TIME SAVINGS |  |  |
| 2. Reduced in Vehicular/Truck Traffic Delays | \$ | 2,622,000 |
| EMISSIONS REDUCTION BENEFITS |  |  |
| 3. Reduction in Emissions from Idling Vehicles | \$ | 18,000 |
| OTHER BENEFITS |  |  |
| 4. Reduction in Operations and Maintenance Expenses | \$ | 1,556,000 |
| TOTAL BENEFITS | \$ | 56,791,000 |
| TOTAL COSTS* | \$ | 132,791,398 |
| COMBINED RAIL BCA RATIO |  | 0.43 |

Benefit-Cost Analysis Inputs and Assumptions

| Description | Value | Source |
| :---: | :---: | :---: |
| General Assumptions |  |  |
| Discount Rate @ 3\% | 3\% |  |
| Discount Rate @ 7\% | 7\% | 3537 |
| Webster County 2019 Population | 39,607 |  |
| Webster County Projected 2029 Population | 50,697 |  |
| Total Projected Population Change | 28.0\% | ESRI 2019, EMSI 2019, Census, CMT Estima |
| Annual Average Projected Population Change | 1.92\% |  |
| Annual Increase in Maintenance Costs | 3.00\% | Assumption |
| Conversion of 2017 to 2019 dollars | 1.046 | Bureau of Labor Statistics (BLS) |
| Miles to foot ratio | 0.000189 |  |
| Grams per Short Ton | 907,185 |  |
| Project Costs |  |  |
| Rogersville Section Costs | \$ 17,229,833 |  |
| Fordland Section Costs | \$ 41,185,462 | CMT Estimates |
| Diggins Section Costs | 31,223,880 |  |
| Seymour Section Costs | 43,152,223 |  |
| Train Crossing Assumptions |  |  |
| Baseline |  |  |
| Average Daily Train Movements | 27 |  |
| Average Train Length in Feet (Min) | 6,000 |  |
| Average Train Length in Feet (Max) | 7,300 |  |
| Average Train Length in Feet (Avg) | 6,650 |  |
| Average crossing speed (MPH) | 30 |  |
| Current Average Train Crossing Time (min) | 2.519 |  |
| Average Crossing Closure (add 1 min ) | 3.519 | BNSF Railway Company |
| Average Idle time per vehicle (add 1 min ) | 4.519 |  |
| Proportion of Daytime Crossings (6am to 6pm) | 50\% |  |
| Proportion of Average Evening Crossings (6pm to 6am) | 50\% |  |
| Projected |  |  |
| Projected Average Train Length in Feet (Min) | 8,800 |  |
| Projected Average Train Length in Feet (Max) | 10,000 |  |
| Projected Average Train Length (Avg) | 9,400 |  |
| Average Annual Train Length Increase | 1.40\% | BNSF Railway Company |
| Average Annual Increase in Crossings | 1.50\% | National Freight Strategic Plan, DOT (October 2015) |
| Vehicular Traffic Assumptions |  |  |
| Average Daily Crossings Vehicular Traffic (ADT) | 2,835 |  |
| Proportion of Daytime Crossings (6am to 6pm) | 80\% |  |
| Proportion of Average Evening Crossings (6pm to 6am) | 20\% | MoDOT \& CMT Traffic Counts, 2019 |
| Percent Trucks | 10\% |  |
| Percent Passenger Vehicles | 90\% |  |
| Average Annual Regional Vehicular Count Increase | 1.92\% | Assumption based on projected population growth |
| Average Passengers per Private Vehicle | 1.68 | Benefit-Cost Analysis Guidance for TIGER and INFRA Applications, |
| Average Passengers per Truck | 1.00 | December 2018 |
| Crash Assumptions |  |  |
| Annual Crash Prediction | See Appendix |  |
| Fatal Accident Probability | See Appendix |  |
| Injury Accident Probability | See Appendix | Railroad-Highway Guide Crossing Handbook-Section 3 Assessment <br> of Crossing Safety and Operation |
| Property Damage Only Probability | See Appendix |  |
| Value of Travel Time Savings, per hour |  |  |
| 2019 dollars |  |  |
| Private Vehicle Travel |  |  |
| Personal | \$ 15.48 |  |
| Business | 27.72 |  |
| All Purposes | 16.84 | December 2018 |
| Commercial Vehicle Operators |  |  |
| Truck Drivers | 29.92 |  |
| Bus Drivers | 31.38 |  |
| Transit Rail Operators | 51.15 |  |
| Locomotive Engineers | 46.97 |  |
| Value of Injuries |  |  |
| 2019 dollars |  |  |
| MAIS 1 (Minor) | \$ 30,100 |  |
| MAIS 2 (Moderate) | 472,000 |  |
| MAIS 3 (Serious) | \$ 1,054,000 | Benefit-Cost Analysis Guidance for Discretionary Grant Programs, |
| MAIS 4 (Severe) | \$ 2,671,000 |  |
| MAIS 5 (Critical) | \$ 5,955,000 |  |
| MAIS 6 (Not survivable) | \$ 10,042,000 |  |
| Property Damage | 4,500 |  |
| Average Idle Emission Rates (g/hr) |  |  |
| Light Duty Gasoline Fueled Vehicles |  |  |
| Volatile Organic Compounds (VOC) | 2.683 |  |
| Nitrogen Oxide ( NOX ) | 3.515 |  |
| Particulate Matter ( $\mathrm{PM}_{2.5}$ ) | N/A |  |
| Sulfur Dioxide ( $\mathrm{SO}_{2}$ ) | N/A |  |
| Heavy Duty Diesel Vehicle |  | Heavy-Duty Trucks, EPA, October 2008 |
| Volatile Organic Compounds (VOC) | 3.455 |  |
| Nitrogen Oxide ( NOX ) | 33.763 |  |
| Particulate Matter ( $\mathrm{PM}_{2.5}$ ) | 1.100 |  |
| Sulfur Dioxide ( $\mathrm{SO}_{2}$ ) | N/A |  |
| Value of Emissions (2017 dollars) | \$/ Short Ton |  |
| Carbone Dioxide ( $\mathrm{CO}_{2}$ ) | Varies |  |
| Volatile Organic Compounds (VOC) | 2,092 | Benefit-Cost Analysis Guidance for Discretionary Grant Programs, |
| Nitrogen Oxide ( NOX ) | 8,682 | December 2018 |
| Particulate Matter ( $\mathrm{PM}_{2.5}$ ) | \$ 395,179 |  |
| Sulfur Dioxide $\left(\mathrm{SO}_{2}\right)$ | 51,149 |  |

ROGERSVILLE
Rail Table 1a-2.. Value of Travel Time Savings: Estimated Delay of Passenger Vehicles and Trucks in No Build Scenario

| Year | Calendar Year | Average Daily Traffic | Daytime Crossings (6am to 6pm) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Estimated Passenger Vehicles | Estimated Trucks | Estimated <br> Passenger <br> Vehicles <br> Affected | Estimated <br> Trucks Affected | Assumed Average Daily Train Crossings | Average Crossing Delay per Vehicle (min) | Total Average Daily Delay (min) | Total Average Daytime Passenger Vehicle Delay (min) | Total Average Daytime Truck Vehicle Delay (min) |
| 0 | 2019 | 89 | 64 | 7 | 4 | 1 | 13.50 | 4.52 | 61.0 | 16 | 6 |
| 1 | 2020 | 91 | 65 | 7 | 4 | 1 | 13.70 | 4.58 | 62.8 | 17 | 6 |
| 2 | 2021 | 92 | 67 | 7 | 4 | 1 | 13.91 | 4.65 | 64.6 | 18 | 6 |
| 3 | 2022 | 94 | 68 | 8 | 4 | 1 | 14.12 | 4.71 | 66.5 | 19 | 6 |
| 4 | 2023 | 96 | 69 | 8 | 4 | 1 | 14.33 | 4.78 | 68.5 | 20 | 7 |
| 5 | 2024 | 98 | 70 | 8 | 4 | 1 | 14.54 | 4.84 | 70.5 | 21 | 7 |
| 6 | 2025 | 100 | 72 | 8 | 4 | 1 | 14.76 | 4.91 | 72.5 | 22 | 7 |
| 7 | 2026 | 102 | 73 | 8 | 5 | 2 | 14.98 | 4.98 | 74.6 | 23 | 8 |
| 8 | 2027 | 104 | 75 | 8 | 5 | 2 | 15.21 | 5.05 | 76.8 | 24 | 8 |
| 9 | 2028 | 106 | 76 | 8 | 5 | 2 | 15.44 | 5.12 | 79.1 | 25 | 8 |
| 10 | 2029 | 108 | 77 | 9 | 5 | 2 | 15.67 | 5.19 | 81.4 | 27 | 9 |
| 11 | 2030 | 110 | 79 | 9 | 5 | 2 | 15.90 | 5.27 | 83.7 | 28 | 9 |
| 12 | 2031 | 112 | 80 | 9 | 5 | 2 | 16.14 | 5.34 | 86.2 | 29 | 10 |
| 13 | 2032 | 114 | 82 | 9 | 6 | 2 | 16.38 | 5.41 | 88.7 | 31 | 10 |
| 14 | 2033 | 116 | 84 | 9 | 6 | 2 | 16.63 | 5.49 | 91.3 | 32 | 11 |
| 15 | 2034 | 118 | 85 | 9 | 6 | 2 | 16.88 | 5.57 | 94.0 | 34 | 11 |
| 16 | 2035 | 121 | 87 | 10 | 6 | 2 | 17.13 | 5.64 | 96.7 | 35 | 12 |
| 17 | 2036 | 123 | 88 | 10 | 6 | 2 | 17.39 | 5.72 | 99.5 | 37 | 12 |
| 18 | 2037 | 125 | 90 | 10 | 7 | 2 | 17.65 | 5.80 | 102.4 | 39 | 13 |
| 19 | 2038 | 128 | 92 | 10 | 7 | 2 | 17.91 | 5.89 | 105.4 | 41 | 13 |
| 20 | 2039 | 130 | 94 | 10 | 7 | 2 | 18.18 | 5.97 | 108.5 | 43 | 14 |
|  |  |  | Evening Crossings (6pm to 6am) |  |  |  |  |  |  |  |  |
| Year | Calendar Year | Average Daily Traffic | Estimated Passenger Vehicles | Estimated <br> Trucks | Estimated <br> Passenger Vehicles Affected | Estimated <br> Trucks <br> Affected | Assumed Evening Train Crossings | Average Evening Vehicle Delay (min) | Total Average Daily Delay (min) | Total Average Evening Passenger Vehicle Delay (min) | Total Average Evening Truck Vehicle Delay (min) |
| 0 | 2019 | 89 | 16 | 2 | 1 | 0 | 13.50 | 4.52 | 61.0 | 4 | 1 |
| 1 | 2020 | 91 | 16 | 2 | 1 | 0 | 13.70 | 4.58 | 62.8 | 4 | 1 |
| 2 | 2021 | 92 | 17 | 2 | 1 | 0 | 13.91 | 4.65 | 64.6 | 5 | 2 |
| 3 | 2022 | 94 | 17 | 2 | 1 | 0 | 14.12 | 4.71 | 66.5 | 5 | 2 |
| 4 | 2023 | 96 | 17 | 2 | 1 | 0 | 14.33 | 4.78 | 68.5 | 5 | 2 |
| 5 | 2024 | 98 | 18 | 2 | 1 | 0 | 14.54 | 4.84 | 70.5 | 5 | 2 |
| 6 | 2025 | 100 | 18 | 2 | 1 | 0 | 14.76 | 4.91 | 72.5 | 5 | 2 |
| 7 | 2026 | 102 | 18 | 2 | 1 | 0 | 14.98 | 4.98 | 74.6 | 6 | 2 |
| 8 | 2027 | 104 | 19 | 2 | 1 | 0 | 15.21 | 5.05 | 76.8 | 6 | 2 |
| 9 | 2028 | 106 | 19 | 2 | 1 | 0 | 15.44 | 5.12 | 79.1 | 6 | 2 |
| 10 | 2029 | 108 | 19 | 2 | 1 | 0 | 15.67 | 5.19 | 81.4 | 7 | 2 |
| 11 | 2030 | 110 | 20 | 2 | 1 | 0 | 15.90 | 5.27 | 83.7 | 7 | 2 |
| 12 | 2031 | 112 | 20 | 2 | 1 | 0 | 16.14 | 5.34 | 86.2 | 7 | 2 |
| 13 | 2032 | 114 | 21 | 2 | 1 | 0 | 16.38 | 5.41 | 88.7 | 8 | 3 |
| 14 | 2033 | 116 | 21 | 2 | 1 | 0 | 16.63 | 5.49 | 91.3 | 8 | 3 |
| 15 | 2034 | 118 | 21 | 2 | 2 | 0 | 16.88 | 5.57 | 94.0 | 8 | 3 |
| 16 | 2035 | 121 | 22 | 2 | 2 | 1 | 17.13 | 5.64 | 96.7 | 9 | 3 |
| 17 | 2036 | 123 | 22 | 2 | 2 | 1 | 17.39 | 5.72 | 99.5 | 9 | 3 |
| 18 | 2037 | 125 | 23 | 3 | 2 | 1 | 17.65 | 5.80 | 102.4 | 10 | 3 |
| 19 | 2038 | 128 | 23 | 3 | 2 | 1 | 17.91 | 5.89 | 105.4 | 10 | 3 |
| 20 | 2039 | 130 | 23 | 3 | 2 | 1 | 18.18 | 5.97 | 108.5 | 11 | 4 |

FORDLAND
Rail Table 1a-3.. Value of Travel Time Savings: Estimated Delay of Passenger Vehicles and Trucks in No Build Scenario

| Year | Calendar Year | Average Daily Traffic | Daytime Crossings (6am to 6pm) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Estimated <br> Passenger Vehicles | Estimated Trucks | Estimated <br> Passenger <br> Vehicles <br> Affected | Estimated <br> Trucks <br> Affected | Assumed Average Daily Train Crossings | Average Crossing Delay per Vehicle (min) | Total Average Daily Delay (min) | Total Average Daytime Passenger Vehicle Delay (min) | Total Average Daytime Truck Vehicle Delay (min) |
| 0 | 2019 | 2,413 | 1,737 | 193 | 99 | 33 | 13.50 | 4.52 | 61.0 | 447 | 149 |
| 1 | 2020 | 2,459 | 1,771 | 197 | 102 | 34 | 13.70 | 4.58 | 62.8 | 468 | 157 |
| 2 | 2021 | 2,506 | 1,805 | 201 | 106 | 35 | 13.91 | 4.65 | 64.6 | 491 | 164 |
| 3 | 2022 | 2,554 | 1,839 | 204 | 109 | 37 | 14.12 | 4.71 | 66.5 | 515 | 172 |
| 4 | 2023 | 2,603 | 1,874 | 208 | 113 | 38 | 14.33 | 4.78 | 68.5 | 541 | 180 |
| 5 | 2024 | 2,653 | 1,910 | 212 | 117 | 39 | 14.54 | 4.84 | 70.5 | 567 | 189 |
| 6 | 2025 | 2,704 | 1,947 | 216 | 121 | 40 | 14.76 | 4.91 | 72.5 | 595 | 198 |
| 7 | 2026 | 2,756 | 1,984 | 220 | 125 | 42 | 14.98 | 4.98 | 74.6 | 624 | 207 |
| 8 | 2027 | 2,809 | 2,022 | 225 | 130 | 43 | 15.21 | 5.05 | 76.8 | 654 | 217 |
| 9 | 2028 | 2,863 | 2,061 | 229 | 134 | 44 | 15.44 | 5.12 | 79.1 | 687 | 228 |
| 10 | 2029 | 2,918 | 2,101 | 233 | 139 | 46 | 15.67 | 5.19 | 81.4 | 720 | 239 |
| 11 | 2030 | 2,974 | 2,141 | 238 | 143 | 47 | 15.90 | 5.27 | 83.7 | 755 | 250 |
| 12 | 2031 | 3,031 | 2,182 | 242 | 148 | 49 | 16.14 | 5.34 | 86.2 | 792 | 262 |
| 13 | 2032 | 3,089 | 2,224 | 247 | 154 | 51 | 16.38 | 5.41 | 88.7 | 831 | 275 |
| 14 | 2033 | 3,148 | 2,266 | 252 | 159 | 52 | 16.63 | 5.49 | 91.3 | 872 | 288 |
| 15 | 2034 | 3,208 | 2,310 | 257 | 164 | 54 | 16.88 | 5.57 | 94.0 | 914 | 302 |
| 16 | 2035 | 3,270 | 2,354 | 262 | 170 | 56 | 17.13 | 5.64 | 96.7 | 959 | 316 |
| 17 | 2036 | 3,332 | 2,399 | 267 | 176 | 58 | 17.39 | 5.72 | 99.5 | 1,006 | 331 |
| 18 | 2037 | 3,396 | 2,445 | 272 | 182 | 60 | 17.65 | 5.80 | 102.4 | 1,055 | 347 |
| 19 | 2038 | 3,461 | 2,492 | 277 | 188 | 62 | 17.91 | 5.89 | 105.4 | 1,107 | 364 |
| 20 | 2039 | 3,528 | 2,540 | 282 | 195 | 64 | 18.18 | 5.97 | 108.5 | 1,161 | 381 |
|  |  |  | Evening Crossings (6pm to 6am) |  |  |  |  |  |  |  |  |
| Year | Calendar Year | Average Daily Traffic | Estimated Passenger Vehicles | Estimated Trucks | Estimated <br> Passenger <br> Vehicles <br> Affected | Estimated <br> Trucks <br> Affected | Assumed <br> Evening Train Crossings | Average Evening Vehicle Delay (min) | Total Average Daily Delay (min) | Total Average Evening Passenger Vehicle Delay (min) | Total Average Evening Truck Vehicle Delay (min) |
| 0 | 2019 | 2,413 | 434 | 48 | 25 | 8 | 13.50 | 4.52 | 61.0 | 112 | 37 |
| 1 | 2020 | 2,459 | 443 | 49 | 26 | 9 | 13.70 | 4.58 | 62.8 | 117 | 39 |
| 2 | 2021 | 2,506 | 451 | 50 | 26 | 9 | 13.91 | 4.65 | 64.6 | 123 | 41 |
| 3 | 2022 | 2,554 | 460 | 51 | 27 | 9 | 14.12 | 4.71 | 66.5 | 129 | 43 |
| 4 | 2023 | 2,603 | 469 | 52 | 28 | 9 | 14.33 | 4.78 | 68.5 | 135 | 45 |
| 5 | 2024 | 2,653 | 478 | 53 | 29 | 10 | 14.54 | 4.84 | 70.5 | 142 | 47 |
| 6 | 2025 | 2,704 | 487 | 54 | 30 | 10 | 14.76 | 4.91 | 72.5 | 149 | 49 |
| 7 | 2026 | 2,756 | 496 | 55 | 31 | 10 | 14.98 | 4.98 | 74.6 | 156 | 52 |
| 8 | 2027 | 2,809 | 506 | 56 | 32 | 11 | 15.21 | 5.05 | 76.8 | 164 | 54 |
| 9 | 2028 | 2,863 | 515 | 57 | 34 | 11 | 15.44 | 5.12 | 79.1 | 172 | 57 |
| 10 | 2029 | 2,918 | 525 | 58 | 35 | 11 | 15.67 | 5.19 | 81.4 | 180 | 60 |
| 11 | 2030 | 2,974 | 535 | 59 | 36 | 12 | 15.90 | 5.27 | 83.7 | 189 | 63 |
| 12 | 2031 | 3,031 | 545 | 61 | 37 | 12 | 16.14 | 5.34 | 86.2 | 198 | 66 |
| 13 | 2032 | 3,089 | 556 | 62 | 38 | 13 | 16.38 | 5.41 | 88.7 | 208 | 69 |
| 14 | 2033 | 3,148 | 567 | 63 | 40 | 13 | 16.63 | 5.49 | 91.3 | 218 | 72 |
| 15 | 2034 | 3,208 | 577 | 64 | 41 | 14 | 16.88 | 5.57 | 94.0 | 229 | 75 |
| 16 | 2035 | 3,270 | 589 | 65 | 42 | 14 | 17.13 | 5.64 | 96.7 | 240 | 79 |
| 17 | 2036 | 3,332 | 600 | 67 | 44 | 14 | 17.39 | 5.72 | 99.5 | 252 | 83 |
| 18 | 2037 | 3,396 | 611 | 68 | 45 | 15 | 17.65 | 5.80 | 102.4 | 264 | 87 |
| 19 | 2038 | 3,461 | 623 | 69 | 47 | 15 | 17.91 | 5.89 | 105.4 | 277 | 91 |
| 20 | 2039 | 3,528 | 635 | 71 | 49 | 16 | 18.18 | 5.97 | 108.5 | 290 | 95 |

DIGGINS
Rail Table 1a-4. Value of Travel Time Savings: Estimated Delay of Passenger Vehicles and Trucks in No Build Scenario

| Year | Calendar Year | Average <br> Daily <br> Traffic | Daytime Crossings (6am to 6pm) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Estimated Passenger Vehicles | Estimated Trucks | Estimated Passenger Vehicles Affected | Estimated <br> Trucks <br> Affected | Assumed Average Daily Train Crossings | Average Crossing Delay per Vehicle (min) | Total Average Daily Delay (min) | Total Average Daytime Passenger Vehicle Delay (min) | Total Average Daytime Truck Vehicle Delay (min) |
| 0 | 2019 | 796 | 573 | 64 | 33 | 11 | 13.50 | 4.52 | 61.0 | 147 | 49 |
| 1 | 2020 | 811 | 584 | 65 | 34 | 11 | 13.70 | 4.58 | 62.8 | 155 | 52 |
| 2 | 2021 | 827 | 595 | 66 | 35 | 12 | 13.91 | 4.65 | 64.6 | 162 | 54 |
| 3 | 2022 | 843 | 607 | 67 | 36 | 12 | 14.12 | 4.71 | 66.5 | 170 | 57 |
| 4 | 2023 | 859 | 618 | 69 | 37 | 12 | 14.33 | 4.78 | 68.5 | 178 | 59 |
| 5 | 2024 | 875 | 630 | 70 | 39 | 13 | 14.54 | 4.84 | 70.5 | 187 | 62 |
| 6 | 2025 | 892 | 642 | 71 | 40 | 13 | 14.76 | 4.91 | 72.5 | 196 | 65 |
| 7 | 2026 | 909 | 655 | 73 | 41 | 14 | 14.98 | 4.98 | 74.6 | 206 | 68 |
| 8 | 2027 | 927 | 667 | 74 | 43 | 14 | 15.21 | 5.05 | 76.8 | 216 | 72 |
| 9 | 2028 | 944 | 680 | 76 | 44 | 15 | 15.44 | 5.12 | 79.1 | 226 | 75 |
| 10 | 2029 | 962 | 693 | 77 | 46 | 15 | 15.67 | 5.19 | 81.4 | 238 | 79 |
| 11 | 2030 | 981 | 706 | 78 | 47 | 16 | 15.90 | 5.27 | 83.7 | 249 | 83 |
| 12 | 2031 | 1,000 | 720 | 80 | 49 | 16 | 16.14 | 5.34 | 86.2 | 261 | 86 |
| 13 | 2032 | 1,019 | 734 | 82 | 51 | 17 | 16.38 | 5.41 | 88.7 | 274 | 91 |
| 14 | 2033 | 1,038 | 748 | 83 | 52 | 17 | 16.63 | 5.49 | 91.3 | 288 | 95 |
| 15 | 2034 | 1,058 | 762 | 85 | 54 | 18 | 16.88 | 5.57 | 94.0 | 302 | 99 |
| 16 | 2035 | 1,079 | 777 | 86 | 56 | 18 | 17.13 | 5.64 | 96.7 | 316 | 104 |
| 17 | 2036 | 1,099 | 791 | 88 | 58 | 19 | 17.39 | 5.72 | 99.5 | 332 | 109 |
| 18 | 2037 | 1,120 | 807 | 90 | 60 | 20 | 17.65 | 5.80 | 102.4 | 348 | 114 |
| 19 | 2038 | 1,142 | 822 | 91 | 62 | 20 | 17.91 | 5.89 | 105.4 | 365 | 120 |
| 20 | 2039 | 1,164 | 838 | 93 | 64 | 21 | 18.18 | 5.97 | 108.5 | 383 | 126 |
|  |  |  | Evening Crossings (6pm to 6am) |  |  |  |  |  |  |  |  |
| Year | Calendar Year | Average Daily Traffic | Estimated Passenger Vehicles | Estimated Trucks | Estimated Passenger Vehicles Affected | Estimated <br> Trucks <br> Affected | Assumed Evening Train Crossings | Average Evening Vehicle Delay (min) | Total Average Daily Delay (min) | Total Average Evening Passenger Vehicle Delay (min) | Total Average <br> Evening Truck Vehicle Delay (min) |
| 0 | 2019 | 796 | 143 | 16 | 8 | 3 | 13.50 | 4.52 | 61.0 | 37 | 12 |
| 1 | 2020 | 811 | 146 | 16 | 8 | 3 | 13.70 | 4.58 | 62.8 | 39 | 13 |
| 2 | 2021 | 827 | 149 | 17 | 9 | 3 | 13.91 | 4.65 | 64.6 | 41 | 14 |
| 3 | 2022 | 843 | 152 | 17 | 9 | 3 | 14.12 | 4.71 | 66.5 | 43 | 14 |
| 4 | 2023 | 859 | 155 | 17 | 9 | 3 | 14.33 | 4.78 | 68.5 | 45 | 15 |
| 5 | 2024 | 875 | 158 | 18 | 10 | 3 | 14.54 | 4.84 | 70.5 | 47 | 16 |
| 6 | 2025 | 892 | 161 | 18 | 10 | 3 | 14.76 | 4.91 | 72.5 | 49 | 16 |
| 7 | 2026 | 909 | 164 | 18 | 10 | 3 | 14.98 | 4.98 | 74.6 | 51 | 17 |
| 8 | 2027 | 927 | 167 | 19 | 11 | 4 | 15.21 | 5.05 | 76.8 | 54 | 18 |
| 9 | 2028 | 944 | 170 | 19 | 11 | 4 | 15.44 | 5.12 | 79.1 | 57 | 19 |
| 10 | 2029 | 962 | 173 | 19 | 11 | 4 | 15.67 | 5.19 | 81.4 | 59 | 20 |
| 11 | 2030 | 981 | 177 | 20 | 12 | 4 | 15.90 | 5.27 | 83.7 | 62 | 21 |
| 12 | 2031 | 1,000 | 180 | 20 | 12 | 4 | 16.14 | 5.34 | 86.2 | 65 | 22 |
| 13 | 2032 | 1,019 | 183 | 20 | 13 | 4 | 16.38 | 5.41 | 88.7 | 69 | 23 |
| 14 | 2033 | 1,038 | 187 | 21 | 13 | 4 | 16.63 | 5.49 | 91.3 | 72 | 24 |
| 15 | 2034 | 1,058 | 190 | 21 | 14 | 4 | 16.88 | 5.57 | 94.0 | 75 | 25 |
| 16 | 2035 | 1,079 | 194 | 22 | 14 | 5 | 17.13 | 5.64 | 96.7 | 79 | 26 |
| 17 | 2036 | 1,099 | 198 | 22 | 14 | 5 | 17.39 | 5.72 | 99.5 | 83 | 27 |
| 18 | 2037 | 1,120 | 202 | 22 | 15 | 5 | 17.65 | 5.80 | 102.4 | 87 | 29 |
| 19 | 2038 | 1,142 | 206 | 23 | 16 | 5 | 17.91 | 5.89 | 105.4 | 91 | 30 |
| 20 | 2039 | 1,164 | 209 | 23 | 16 | 5 | 18.18 | 5.97 | 108.5 | 96 | 31 |

SEYMOUR
Rail Table 1a-5. Value of Travel Time Savings: Estimated Delay of Passenger Vehicles and Trucks in No Build Scenario

| Year | Calendar Year | Average <br> Daily <br> Traffic | Daytime Crossings (6am to 6pm) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Estimated Passenger Vehicles | Estimated Trucks | Estimated Passenger Vehicles Affected | Estimated <br> Trucks <br> Affected | Assumed Average Daily Train Crossings | Average Crossing Delay per Vehicle (min) | Total Average Daily Delay (min) | Total Average Daytime Passenger Vehicle Delay (min) | Total Average Daytime Truck Vehicle Delay (min) |
| 0 | 2019 | 328 | 236 | 26 | 13 | 4 | 13.50 | 4.52 | 61.0 | 61 | 20 |
| 1 | 2020 | 334 | 241 | 27 | 14 | 5 | 13.70 | 4.58 | 62.8 | 64 | 21 |
| 2 | 2021 | 341 | 245 | 27 | 14 | 5 | 13.91 | 4.65 | 64.6 | 67 | 22 |
| 3 | 2022 | 347 | 250 | 28 | 15 | 5 | 14.12 | 4.71 | 66.5 | 70 | 23 |
| 4 | 2023 | 354 | 255 | 28 | 15 | 5 | 14.33 | 4.78 | 68.5 | 73 | 25 |
| 5 | 2024 | 361 | 260 | 29 | 16 | 5 | 14.54 | 4.84 | 70.5 | 77 | 26 |
| 6 | 2025 | 368 | 265 | 29 | 16 | 5 | 14.76 | 4.91 | 72.5 | 81 | 27 |
| 7 | 2026 | 375 | 270 | 30 | 17 | 6 | 14.98 | 4.98 | 74.6 | 85 | 28 |
| 8 | 2027 | 382 | 275 | 31 | 18 | 6 | 15.21 | 5.05 | 76.8 | 89 | 30 |
| 9 | 2028 | 389 | 280 | 31 | 18 | 6 | 15.44 | 5.12 | 79.1 | 93 | 31 |
| 10 | 2029 | 397 | 286 | 32 | 19 | 6 | 15.67 | 5.19 | 81.4 | 98 | 32 |
| 11 | 2030 | 404 | 291 | 32 | 19 | 6 | 15.90 | 5.27 | 83.7 | 103 | 34 |
| 12 | 2031 | 412 | 297 | 33 | 20 | 7 | 16.14 | 5.34 | 86.2 | 108 | 36 |
| 13 | 2032 | 420 | 302 | 34 | 21 | 7 | 16.38 | 5.41 | 88.7 | 113 | 37 |
| 14 | 2033 | 428 | 308 | 34 | 22 | 7 | 16.63 | 5.49 | 91.3 | 119 | 39 |
| 15 | 2034 | 436 | 314 | 35 | 22 | 7 | 16.88 | 5.57 | 94.0 | 124 | 41 |
| 16 | 2035 | 444 | 320 | 36 | 23 | 8 | 17.13 | 5.64 | 96.7 | 130 | 43 |
| 17 | 2036 | 453 | 326 | 36 | 24 | 8 | 17.39 | 5.72 | 99.5 | 137 | 45 |
| 18 | 2037 | 462 | 332 | 37 | 25 | 8 | 17.65 | 5.80 | 102.4 | 143 | 47 |
| 19 | 2038 | 471 | 339 | 38 | 26 | 8 | 17.91 | 5.89 | 105.4 | 150 | 49 |
| 20 | 2039 | 480 | 345 | 38 | 26 | 9 | 18.18 | 5.97 | 108.5 | 158 | 52 |
|  |  |  | Evening Crossings (6pm to 6am) |  |  |  |  |  |  |  |  |
| Year | Calendar Year | Average Daily Traffic | Estimated Passenger Vehicles | Estimated Trucks | Estimated Passenger Vehicles Affected | Estimated <br> Trucks <br> Affected | Assumed Evening Train Crossings | Average Evening Vehicle Delay (min) | Total Average Daily Delay (min) | Total Average Evening Passenger Vehicle Delay (min) | Total Average <br> Evening Truck Vehicle Delay (min) |
| 0 | 2019 | 328 | 59 | 7 | 3 | 1 | 13.50 | 4.52 | 61.0 | 15 | 5 |
| 1 | 2020 | 334 | 60 | 7 | 3 | 1 | 13.70 | 4.58 | 62.8 | 16 | 5 |
| 2 | 2021 | 341 | 61 | 7 | 4 | 1 | 13.91 | 4.65 | 64.6 | 17 | 6 |
| 3 | 2022 | 347 | 63 | 7 | 4 | 1 | 14.12 | 4.71 | 66.5 | 18 | 6 |
| 4 | 2023 | 354 | 64 | 7 | 4 | 1 | 14.33 | 4.78 | 68.5 | 18 | 6 |
| 5 | 2024 | 361 | 65 | 7 | 4 | 1 | 14.54 | 4.84 | 70.5 | 19 | 6 |
| 6 | 2025 | 368 | 66 | 7 | 4 | 1 | 14.76 | 4.91 | 72.5 | 20 | 7 |
| 7 | 2026 | 375 | 67 | 7 | 4 | 1 | 14.98 | 4.98 | 74.6 | 21 | 7 |
| 8 | 2027 | 382 | 69 | 8 | 4 | 1 | 15.21 | 5.05 | 76.8 | 22 | 7 |
| 9 | 2028 | 389 | 70 | 8 | 5 | 2 | 15.44 | 5.12 | 79.1 | 23 | 8 |
| 10 | 2029 | 397 | 71 | 8 | 5 | 2 | 15.67 | 5.19 | 81.4 | 24 | 8 |
| 11 | 2030 | 404 | 73 | 8 | 5 | 2 | 15.90 | 5.27 | 83.7 | 26 | 8 |
| 12 | 2031 | 412 | 74 | 8 | 5 | 2 | 16.14 | 5.34 | 86.2 | 27 | 9 |
| 13 | 2032 | 420 | 76 | 8 | 5 | 2 | 16.38 | 5.41 | 88.7 | 28 | 9 |
| 14 | 2033 | 428 | 77 | 9 | 5 | 2 | 16.63 | 5.49 | 91.3 | 30 | 10 |
| 15 | 2034 | 436 | 78 | 9 | 6 | 2 | 16.88 | 5.57 | 94.0 | 31 | 10 |
| 16 | 2035 | 444 | 80 | 9 | 6 | 2 | 17.13 | 5.64 | 96.7 | 33 | 11 |
| 17 | 2036 | 453 | 82 | 9 | 6 | 2 | 17.39 | 5.72 | 99.5 | 34 | 11 |
| 18 | 2037 | 462 | 83 | 9 | 6 | 2 | 17.65 | 5.80 | 102.4 | 36 | 12 |
| 19 | 2038 | 471 | 85 | 9 | 6 | 2 | 17.91 | 5.89 | 105.4 | 38 | 12 |
| 20 | 2039 | 480 | 86 | 10 | 7 | 2 | 18.18 | 5.97 | 108.5 | 39 | 13 |

ROGERSVILLE
Rail Table 1b-2. Value of Travel Time Savings in Build Scenario
$\left.\begin{array}{cccc|cc:c}\hline \hline & \begin{array}{c}\text { Total Average } \\ \text { Daily Passenger } \\ \text { Vehicle Delay }\end{array} & \begin{array}{c}\text { Total } \\ \text { Average } \\ \text { Daily Truck }\end{array} & \begin{array}{c}\text { Annual } \\ \text { Passenger }\end{array} & \begin{array}{c}\text { Annual Truck } \\ \text { Vehicle Value of } \\ \text { Time Delay }\end{array} & \begin{array}{c}\text { Driver Value of } \\ \text { Time Delay }\end{array} & \begin{array}{c}\text { Total Annual Value } \\ \text { of Travel Time }\end{array} \\ \text { Year } & \text { Calendar Year } & 2019 & 21 & 7 & \$ & - \\ \text { Sangs }^{1}\end{array}\right]$
${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed
FORDLAND
Rail Table 1b-3. Value of Travel Time Savings in Build Scenario

| Year | Calendar Year | Total Average Daily Passenger Vehicle Delay (min) | Total <br> Average <br> Daily Truck <br> Delay (min) |  | Annual Passenger ehicle Value of Time Delay |  | Truck value of Delay |  | ual Value ITime gs ${ }^{1}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 558 | 187 | \$ | - | \$ | - | \$ | - |
| 1 | 2020 | 586 | 196 | \$ | - | \$ | - | \$ | - |
| 2 | 2021 | 614 | 205 | \$ | - | \$ | - | \$ | - |
| 3 | 2022 | 644 | 215 | \$ | 110,883 | \$ | 39,130 | \$ | 150,013 |
| 4 | 2023 | 676 | 225 | \$ | 116,309 | \$ | 41,005 | \$ | 157,314 |
| 5 | 2024 | 709 | 236 | \$ | 122,002 | \$ | 42,969 | \$ | 164,971 |
| 6 | 2025 | 744 | 247 | \$ | 127,972 | \$ | 45,028 | \$ | 173,000 |
| 7 | 2026 | 780 | 259 | \$ | 134,236 | \$ | 47,185 | \$ | 181,421 |
| 8 | 2027 | 818 | 272 | \$ | 140,805 | \$ | 49,446 | \$ | 190,251 |
| 9 | 2028 | 858 | 285 | \$ | 147,696 | \$ | 51,814 | \$ | 199,511 |
| 10 | 2029 | 900 | 298 | \$ | 154,925 | \$ | 54,297 | \$ | 209,221 |
| 11 | 2030 | 944 | 313 | \$ | 162,507 | \$ | 56,898 | \$ | 219,405 |
| 12 | 2031 | 990 | 328 | \$ | 170,460 | \$ | 59,624 | \$ | 230,084 |
| 13 | 2032 | 1,039 | 343 | \$ | 178,802 | \$ | 62,480 | \$ | 241,282 |
| 14 | 2033 | 1,090 | 360 | \$ | 187,553 | \$ | 65,473 | \$ | 253,026 |
| 15 | 2034 | 1,143 | 377 | \$ | 196,732 | \$ | 68,610 | \$ | 265,342 |
| 16 | 2035 | 1,199 | 395 | \$ | 206,360 | \$ | 71,897 | \$ | 278,257 |
| 17 | 2036 | 1,258 | 414 | \$ | 216,460 | \$ | 75,341 | \$ | 291,801 |
| 18 | 2037 | 1,319 | 434 | \$ | 227,053 | \$ | 78,951 | \$ | 306,004 |
| 19 | 2038 | 1,384 | 455 | \$ | 238,166 | \$ | 82,733 | \$ | 320,899 |
| 20 | 2039 | 1,452 | 476 | \$ | 249,822 | \$ | 86,697 | \$ | 336,518 |
| Net Present Value (3\%) |  |  |  |  |  |  |  |  |  |
| Net Present Value (7\%) |  |  |  |  |  |  |  | \$1,745,000 |  |

${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

DIGGINS
Rail Table 1b-4. Value of Travel Time Savings in Build Scenario

|  | Total Average <br> Daily Passenger <br> Vehicle Delay | Total <br> Average <br> (maily <br> Delay (min) | Annual <br> Passenger <br> Venicle Value of <br> Time Delay | Annual Truck <br> Driver Value of <br> Time Delay | Total Annual Value <br> of Travel Time <br> Savings ${ }^{1}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calendar Year | 2019 | 184 | 62 | $\$$ | - |

${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed
SEYMOUR
Rail Table 1b-5. Value of Travel Time Savings in Build Scenario

|  | Total Average <br> Daily Passenger <br> Vehicle Delay | Total <br> Average <br> Daily Truck <br> Delay (min) | Annual <br> Passenger <br> Vehicle Value of <br> Time Delay | Annual Truck <br> Driver Value of <br> Time Delay | Total Annual Value <br> of Travel Time <br> Savings ${ }^{1}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calendar Year | 2019 | 76 | 25 | $\$$ | - |

${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

FORDLAND
Rail Table 1b-3. Value of Travel Time Savings in Build Scenario

${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

DIGGINS
Rail Table 1b-4. Value of Travel Time Savings in Build Scenario
\(\left.$$
\begin{array}{cccc|cc:c}\hline & & \begin{array}{c}\text { Total Average } \\
\text { Daily Passenger } \\
\text { Vehicle Delay }\end{array} & \begin{array}{c}\text { Total } \\
\text { Average } \\
\text { Daily Truck } \\
\text { Delay (min) }\end{array} & \begin{array}{c}\text { Annual } \\
\text { Passenger } \\
\text { Vehicle Value of } \\
\text { Time Delay }\end{array} & \begin{array}{c}\text { Annual Truck } \\
\text { Driver Value of } \\
\text { Time Delay }\end{array} & \begin{array}{c}\text { Total Annual Value } \\
\text { of Travel Time }\end{array}
$$ <br>
Year \& Calendar Year \& 2019 \& 189 \& 63 \& \$ \& - <br>

Savings^{1}\end{array}\right]\)| $\$$ |
| :--- |
| 0 |

[^12]SEYMOUR
Rail Table 1b-5. Value of Travel Time Savings in Build Scenario

|  |  | Total Average <br> Daily Passenger <br> Vehicle Delay | Total <br> Average <br> Daily Truck <br> Delay (min) | Annual <br> Passenger <br> Vehicle Value of <br> Time Delay | Annual Truck <br> Driver Value of <br> Time Delay | Total Annual Value <br> of Travel Time |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calendar Year | 2019 | 78 | 26 | $\$$ | - | $\$$ |
| Savings ${ }^{1}$ |  |  |  |  |  |  |  |

[^13]Rail Table 2a. Value of Safety Benefits for Porter Crossing Road At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash <br> Probability ${ }^{1}$ | Fatal Accident <br> Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property <br> Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0568 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0570 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 3537.0000 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0514 | 0.0875 | 0.3113 | 0.6011 | \$ | 376,047 |
| 4 | 2023 | 0.0681 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,754 |
| 5 | 2024 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,769 |
| 6 | 2025 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,774 |
| 7 | 2026 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,776 |
| 8 | 2027 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,778 |
| 9 | 2028 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,779 |
| 10 | 2029 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,779 |
| 11 | 2030 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,429 |
| 12 | 2031 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,517 |
| 13 | 2032 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,605 |
| 14 | 2033 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,693 |
| 15 | 2034 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,780 |
| 16 | 2035 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,866 |
| 17 | 2036 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,953 |
| 18 | 2037 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 321,039 |
| 19 | 2038 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 321,124 |
| 20 | 2039 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 321,209 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,474,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,964,000 |
| See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{\text {< See Appendix }} 3$ for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |

Rail Table 2b. Value of Safety Benefits for Dutch Hill Road At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash <br> Probability ${ }^{1}$ | Fatal Accident <br> Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property <br> Damage <br> Probability |  | Reduction in Injuries, and lities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0055 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0055 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0056 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0056 | 0.0875 | 0.3113 | 0.6011 | \$ | 335,775 |
| 4 | 2023 | 0.0056 | 0.0875 | 0.3113 | 0.6011 | \$ | 335,815 |
| 5 | 2024 | 0.0057 | 0.0875 | 0.3113 | 0.6011 | \$ | 335,854 |
| 6 | 2025 | 0.0057 | 0.0875 | 0.3113 | 0.6011 | \$ | 335,894 |
| 7 | 2026 | 0.0058 | 0.0875 | 0.3113 | 0.6011 | \$ | 335,934 |
| 8 | 2027 | 0.0058 | 0.0875 | 0.3113 | 0.6011 | \$ | 335,974 |
| 9 | 2028 | 0.0059 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,014 |
| 10 | 2029 | 0.0059 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,055 |
| 11 | 2030 | 0.0060 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,095 |
| 12 | 2031 | 0.0060 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,136 |
| 13 | 2032 | 0.0061 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,177 |
| 14 | 2033 | 0.0061 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,219 |
| 15 | 2034 | 0.0061 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,260 |
| 16 | 2035 | 0.0062 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,302 |
| 17 | 2036 | 0.0062 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,344 |
| 18 | 2037 | 0.0063 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,386 |
| 19 | 2038 | 0.0063 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,428 |
| 20 | 2039 | 0.0064 | 0.0875 | 0.3113 | 0.6011 | \$ | 336,471 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,230,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,759,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |


| Year | Calendar Year | Crash <br> Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0568 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0570 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 3537.0000 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0514 | 0.0875 | 0.3113 | 0.6011 | \$ | 376,047 |
| 4 | 2023 | 0.0681 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,754 |
| 5 | 2024 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,769 |
| 6 | 2025 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,774 |
| 7 | 2026 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,776 |
| 8 | 2027 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,778 |
| 9 | 2028 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,779 |
| 10 | 2029 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,779 |
| 11 | 2030 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,429 |
| 12 | 2031 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,517 |
| 13 | 2032 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,605 |
| 14 | 2033 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,693 |
| 15 | 2034 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,780 |
| 16 | 2035 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,866 |
| 17 | 2036 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 320,953 |
| 18 | 2037 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 321,039 |
| 19 | 2038 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 321,124 |
| 20 | 2039 | 0.0682 | 0.0875 | 0.3113 | 0.6011 | \$ | 321,209 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,474,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,964,000 |

2 See Appendix 3 for Fatal Accident Probability calculation
See Appendix 4 for Injury Accident Probability calculations
It is assumed that benefits will be realized starting Year 3 when construction is completed
Rail Table 2b. Value of Safety Benefits for Dutch Hill Road At-Grade Crossing in Build Scenario


Rail Table 2c. Value of Safety Benefits for Red Oak Road At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0349 | 0.0875 | 0.3113 | 0.6011 | \$ |  |
| 1 | 2020 (Construction) | 0.0349 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0350 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0362 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,687 |
| 4 | 2023 | 0.0363 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,750 |
| 5 | 2024 | 0.0364 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,813 |
| 6 | 2025 | 0.0364 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,875 |
| 7 | 2026 | 0.0365 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,937 |
| 8 | 2027 | 0.0366 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,999 |
| 9 | 2028 | 0.0366 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,061 |
| 10 | 2029 | 0.0367 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,122 |
| 11 | 2030 | 0.0368 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,183 |
| 12 | 2031 | 0.0368 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,244 |
| 13 | 2032 | 0.0369 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,304 |
| 14 | 2033 | 0.0370 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,364 |
| 15 | 2034 | 0.0371 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,424 |
| 16 | 2035 | 0.0371 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,484 |
| 17 | 2036 | 0.0372 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,543 |
| 18 | 2037 | 0.0373 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,602 |
| 19 | 2038 | 0.0373 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,660 |
| 20 | 2039 | 0.0374 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,719 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,571,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,982,000 |

${ }^{1}$ See Appendix 2 for Crash Probability calculations
${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations
${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations
It is assumed that benefits will be realized starting Year 3 when construction is completed

| Year | Calendar Year | Crash <br> Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0669 | 0.0875 | 0.3113 | 0.6011 | \$ |  |
| 1 | 2020 (Construction) | 0.0670 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0671 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0672 | 0.0875 | 0.3113 | 0.6011 | \$ | 389,930 |
| 4 | 2023 | 0.0673 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,031 |
| 5 | 2024 | 0.0674 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,133 |
| 6 | 2025 | 0.0676 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,235 |
| 7 | 2026 | 0.0677 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,336 |
| 8 | 2027 | 0.0678 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,438 |
| 9 | 2028 | 0.0679 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,540 |
| 10 | 2029 | 0.0680 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,642 |
| 11 | 2030 | 0.0670 | 0.0875 | 0.3113 | 0.6011 | \$ | 389,760 |
| 12 | 2031 | 0.0671 | 0.0875 | 0.3113 | 0.6011 | \$ | 389,861 |
| 13 | 2032 | 0.0672 | 0.0875 | 0.3113 | 0.6011 | \$ | 389,963 |
| 14 | 2033 | 0.0674 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,064 |
| 15 | 2034 | 0.0675 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,166 |
| 16 | 2035 | 0.0676 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,268 |
| 17 | 2036 | 0.0677 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,370 |
| 18 | 2037 | 0.0678 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,471 |
| 19 | 2038 | 0.0679 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,573 |
| 20 | 2039 | 0.0681 | 0.0875 | 0.3113 | 0.6011 | \$ | 390,675 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,912,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 3,204,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |

Rail Table 2e. Value of Safety Benefits for Carpenter Street At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0066 | 0.0736 | 0.2790 | 0.6474 | \$ |  |
| 1 | 2020 (Construction) | 0.0066 | 0.0736 | 0.2790 | 0.6474 | \$ | - |
| 2 | 2021 (Construction) | 0.0067 | 0.0736 | 0.2790 | 0.6474 | \$ | $\cdot$ |
| 3 | 2022 | 0.0067 | 0.0736 | 0.2790 | 0.6474 | \$ | 301,890 |
| 4 | 2023 | 0.0067 | 0.0736 | 0.2790 | 0.6474 | \$ | 301,913 |
| 5 | 2024 | 0.0068 | 0.0736 | 0.2790 | 0.6474 | \$ | 301,936 |
| 6 | 2025 | 0.0124 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,072 |
| 7 | 2026 | 0.0124 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,099 |
| 8 | 2027 | 0.0124 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,126 |
| 9 | 2028 | 0.0125 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,153 |
| 10 | 2029 | 0.0125 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,181 |
| 11 | 2030 | 0.0125 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,208 |
| 12 | 2031 | 0.0126 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,235 |
| 13 | 2032 | 0.0126 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,262 |
| 14 | 2033 | 0.0127 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,289 |
| 15 | 2034 | 0.0127 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,316 |
| 16 | 2035 | 0.0127 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,344 |
| 17 | 2036 | 0.0128 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,371 |
| 18 | 2037 | 0.0128 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,398 |
| 19 | 2038 | 0.0128 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,425 |
| 20 | 2039 | 0.0129 | 0.0736 | 0.2790 | 0.6474 | \$ | 306,452 |
| Net Present Value (3\%) |  |  |  |  |  |  | 3,843,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,505,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |


| Rail Table 2f. Value of Safety | Benefits for | Highway Z At-Grade Crossing in Build Scenario |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |

See Appendix 2 for Crash Probability calculations
${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations
See Appendix 4 for Injury Accident Probability calculation
It is assumed that benefits will be realized starting Year 3 when construction is complete

| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0093 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0093 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0094 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0094 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,159 |
| 4 | 2023 | 0.0095 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,202 |
| 5 | 2024 | 0.0095 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,246 |
| 6 | 2025 | 0.0096 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,289 |
| 7 | 2026 | 0.0096 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,333 |
| 8 | 2027 | 0.0097 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,377 |
| 9 | 2028 | 0.0097 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,421 |
| 10 | 2029 | 0.0098 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,464 |
| 11 | 2030 | 0.0098 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,508 |
| 12 | 2031 | 0.0099 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,552 |
| 13 | 2032 | 0.0099 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,596 |
| 14 | 2033 | 0.0100 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,641 |
| 15 | 2034 | 0.0100 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,685 |
| 16 | 2035 | 0.0101 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,729 |
| 17 | 2036 | 0.0101 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,773 |
| 18 | 2037 | 0.0102 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,817 |
| 19 | 2038 | 0.0102 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,862 |
| 20 | 2039 | 0.0103 | 0.0875 | 0.3113 | 0.6011 | \$ | 339,906 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,273,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,787,000 |
| See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |

Rail Table 2h. Value of Safety Benefits for Hummingbird Lane At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash <br> Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0115 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0116 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0116 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0117 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,129 |
| 4 | 2023 | 0.0117 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,174 |
| 5 | 2024 | 0.0118 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,219 |
| 6 | 2025 | 0.0118 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,263 |
| 7 | 2026 | 0.0119 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,308 |
| 8 | 2027 | 0.0119 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,353 |
| 9 | 2028 | 0.0120 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,397 |
| 10 | 2029 | 0.0120 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,442 |
| 11 | 2030 | 0.0121 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,487 |
| 12 | 2031 | 0.0121 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,531 |
| 13 | 2032 | 0.0122 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,576 |
| 14 | 2033 | 0.0122 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,620 |
| 15 | 2034 | 0.0123 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,665 |
| 16 | 2035 | 0.0123 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,709 |
| 17 | 2036 | 0.0124 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,754 |
| 18 | 2037 | 0.0125 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,798 |
| 19 | 2038 | 0.0125 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,843 |
| 20 | 2039 | 0.0126 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,887 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,298,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,804,000 |

${ }^{2}$ See Appendix 2 for Crash Probability calculations
${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations
${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations
${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed
Rail Table 2i. Value of Safety Benefits for Tandy Lane At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0448 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0449 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0449 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0450 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,401 |
| 4 | 2023 | 0.0450 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,451 |
| 5 | 2024 | 0.0451 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,501 |
| 6 | 2025 | 0.0452 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,550 |
| 7 | 2026 | 0.0452 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,600 |
| 8 | 2027 | 0.0453 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,650 |
| 9 | 2028 | 0.0453 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,700 |
| 10 | 2029 | 0.0454 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,750 |
| 11 | 2030 | 0.0454 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,801 |
| 12 | 2031 | 0.0455 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,851 |
| 13 | 2032 | 0.0456 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,901 |
| 14 | 2033 | 0.0456 | 0.0875 | 0.3113 | 0.6011 | \$ | 370,952 |
| 15 | 2034 | 0.0457 | 0.0875 | 0.3113 | 0.6011 | \$ | 371,002 |
| 16 | 2035 | 0.0457 | 0.0875 | 0.3113 | 0.6011 | \$ | 371,053 |
| 17 | 2036 | 0.0458 | 0.0875 | 0.3113 | 0.6011 | \$ | 371,103 |
| 18 | 2037 | 0.0458 | 0.0875 | 0.3113 | 0.6011 | \$ | 371,154 |
| 19 | 2038 | 0.0459 | 0.0875 | 0.3113 | 0.6011 | \$ | 371,205 |
| 20 | 2039 | 0.0460 | 0.0875 | 0.3113 | 0.6011 | \$ | 371,256 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,667,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 3,044,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |


| Year | Calendar Year | $\begin{gathered} \text { Crash } \\ \text { Probability }^{1} \end{gathered}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0084 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0084 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0084 | 0.0875 | 0.3113 | 0.6011 | \$ | $\checkmark$ |
| 3 | 2022 | 0.0085 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,288 |
| 4 | 2023 | 0.0085 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,319 |
| 5 | 2024 | 0.0085 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,349 |
| 6 | 2025 | 0.0086 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,380 |
| 7 | 2026 | 0.0086 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,411 |
| 8 | 2027 | 0.0086 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,441 |
| 9 | 2028 | 0.0087 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,472 |
| 10 | 2029 | 0.0087 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,503 |
| 11 | 2030 | 0.0087 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,534 |
| 12 | 2031 | 0.0088 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,565 |
| 13 | 2032 | 0.0088 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,596 |
| 14 | 2033 | 0.0088 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,627 |
| 15 | 2034 | 0.0089 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,658 |
| 16 | 2035 | 0.0089 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,689 |
| 17 | 2036 | 0.0089 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,720 |
| 18 | 2037 | 0.0090 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,752 |
| 19 | 2038 | 0.0090 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,783 |
| 20 | 2039 | 0.0091 | 0.0875 | 0.3113 | 0.6011 | \$ | 338,814 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,261,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,779,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is is asumed that benefits will be realized starting Year 3 w |  |  |  |  |  |  |  |

Rail Table 2k. Value of Safety Benefits for Highway NN At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0285 | 0.0875 | 0.2877 | 0.6247 | \$ | - |
| 1 | 2020 (Construction) | 0.0286 | 0.0875 | 0.2877 | 0.6247 | \$ | - |
| 2 | 2021 (Construction) | 0.0286 | 0.0875 | 0.2877 | 0.6247 | \$ | - |
| 3 | 2022 | 0.0287 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,290 |
| 4 | 2023 | 0.0287 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,332 |
| 5 | 2024 | 0.0288 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,375 |
| 6 | 2025 | 0.0288 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,417 |
| 7 | 2026 | 0.0289 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,459 |
| 8 | 2027 | 0.0289 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,502 |
| 9 | 2028 | 0.0290 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,544 |
| 10 | 2029 | 0.0290 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,586 |
| 11 | 2030 | 0.0290 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,629 |
| 12 | 2031 | 0.0291 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,671 |
| 13 | 2032 | 0.0291 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,714 |
| 14 | 2033 | 0.0292 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,756 |
| 15 | 2034 | 0.0292 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,799 |
| 16 | 2035 | 0.0293 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,841 |
| 17 | 2036 | 0.0293 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,884 |
| 18 | 2037 | 0.0294 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,926 |
| 19 | 2038 | 0.0294 | 0.0875 | 0.2877 | 0.6247 | \$ | 331,969 |
| 20 | 2039 | 0.0295 | 0.0875 | 0.2877 | 0.6247 | \$ | 332,012 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,174,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,723,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |

Rail Table 21. Value of Safety Benefits for W Box School Loop At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash <br> Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property <br> Damage <br> Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0524 | 0.0875 | 0.2877 | 0.6247 | \$ |  |
| 1 | 2020 (Construction) | 0.0525 | 0.0875 | 0.2877 | 0.6247 | \$ | - |
| 2 | 2021 (Construction) | 0.0525 | 0.0875 | 0.2877 | 0.6247 | \$ | - |
| 3 | 2022 | 0.0526 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,349 |
| 4 | 2023 | 0.0527 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,420 |
| 5 | 2024 | 0.0528 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,491 |
| 6 | 2025 | 0.0529 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,561 |
| 7 | 2026 | 0.0529 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,632 |
| 8 | 2027 | 0.0530 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,702 |
| 9 | 2028 | 0.0531 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,773 |
| 10 | 2029 | 0.0532 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,843 |
| 11 | 2030 | 0.0533 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,913 |
| 12 | 2031 | 0.0533 | 0.0875 | 0.2877 | 0.6247 | \$ | 352,983 |
| 13 | 2032 | 0.0534 | 0.0875 | 0.2877 | 0.6247 | \$ | 353,053 |
| 14 | 2033 | 0.0535 | 0.0875 | 0.2877 | 0.6247 | \$ | 353,123 |
| 15 | 2034 | 0.0536 | 0.0875 | 0.2877 | 0.6247 | \$ | 353,193 |
| 16 | 2035 | 0.0537 | 0.0875 | 0.2877 | 0.6247 | \$ | 353,262 |
| 17 | 2036 | 0.0537 | 0.0875 | 0.2877 | 0.6247 | \$ | 353,332 |
| 18 | 2037 | 0.0538 | 0.0875 | 0.2877 | 0.6247 | \$ | 353,401 |
| 19 | 2038 | 0.0539 | 0.0875 | 0.2877 | 0.6247 | \$ | 353,470 |
| 20 | 2039 | 0.0540 | 0.0875 | 0.3153 | 0.5971 | \$ | 382,507 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,457,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,904,000 |

See Appendix 2 for Crash Probability calculations
${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations
${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations
It is assumed that benefits will be realized starting Year 3 when construction is complete

Rail Table 2m. Value of Safety Benefits for Short Road At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0944 | 0.0875 | 0.2877 | 0.6247 | \$ | - |
| 1 | 2020 (Construction) | 0.0944 | 0.0875 | 0.2877 | 0.6247 | \$ | - |
| 2 | 2021 (Construction) | 0.0945 | 0.0875 | 0.2877 | 0.6247 | \$ | - |
| 3 | 2022 | 0.0946 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,235 |
| 4 | 2023 | 0.0947 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,303 |
| 5 | 2024 | 0.0947 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,371 |
| 6 | 2025 | 0.0948 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,439 |
| 7 | 2026 | 0.0949 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,508 |
| 8 | 2027 | 0.0950 | 0.0875 | 0.2877 | 0.6247 | S | 389,577 |
| 9 | 2028 | 0.0951 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,645 |
| 10 | 2029 | 0.0951 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,715 |
| 11 | 2030 | 0.0952 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,784 |
| 12 | 2031 | 0.0953 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,853 |
| 13 | 2032 | 0.0954 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,923 |
| 14 | 2033 | 0.0955 | 0.0875 | 0.2877 | 0.6247 | \$ | 389,993 |
| 15 | 2034 | 0.0955 | 0.0875 | 0.2877 | 0.6247 | \$ | 390,063 |
| 16 | 2035 | 0.0956 | 0.0875 | 0.2877 | 0.6247 | \$ | 390,133 |
| 17 | 2036 | 0.0957 | 0.0875 | 0.2877 | 0.6247 | \$ | 390,204 |
| 18 | 2037 | 0.0958 | 0.0875 | 0.2877 | 0.6247 | \$ | 390,274 |
| 19 | 2038 | 0.0959 | 0.0875 | 0.2877 | 0.6247 | \$ | 390,345 |
| 20 | 2039 | 0.0959 | 0.0875 | 0.2877 | 0.6247 |  | 390,416 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,906,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 3,200,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |

Rail Table 2n. Value of Safety Benefits for E Box School Loop At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0303 | 0.0875 | 0.3113 | 0.6011 | \$ |  |
| 1 | 2020 (Construction) | 0.0303 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0304 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0305 | 0.0875 | 0.3113 | 0.6011 | \$ | 357,635 |
| 4 | 2023 | 0.0305 | 0.0875 | 0.3113 | 0.6011 | \$ | 357,694 |
| 5 | 2024 | 0.0306 | 0.0875 | 0.3113 | 0.6011 | \$ | 357,753 |
| 6 | 2025 | 0.0307 | 0.0875 | 0.3113 | 0.6011 | \$ | 357,812 |
| 7 | 2026 | 0.0307 | 0.0875 | 0.3113 | 0.6011 | \$ | 357,870 |
| 8 | 2027 | 0.0308 | 0.0875 | 0.3113 | 0.6011 | \$ | 357,929 |
| 9 | 2028 | 0.0309 | 0.0875 | 0.3113 | 0.6011 | \$ | 357,988 |
| 10 | 2029 | 0.0309 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,047 |
| 11 | 2030 | 0.0310 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,105 |
| 12 | 2031 | 0.0311 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,164 |
| 13 | 2032 | 0.0311 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,223 |
| 14 | 2033 | 0.0312 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,281 |
| 15 | 2034 | 0.0313 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,340 |
| 16 | 2035 | 0.0313 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,399 |
| 17 | 2036 | 0.0314 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,457 |
| 18 | 2037 | 0.0315 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,516 |
| 19 | 2038 | 0.0315 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,574 |
| 20 | 2039 | 0.0316 | 0.0875 | 0.3113 | 0.6011 | \$ | 358,633 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,507,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,940,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |

Rail Table 20. Value of Safety Benefits for Oak Lawn Road At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0349 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0349 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0350 | 0.0875 | 0.3113 | 0.6011 | \$ | 361,621 |
| 3 | 2022 | 0.0362 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,687 |
| 4 | 2023 | 0.0363 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,750 |
| 5 | 2024 | 0.0364 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,813 |
| 6 | 2025 | 0.0364 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,875 |
| 7 | 2026 | 0.0365 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,937 |
| 8 | 2027 | 0.0366 | 0.0875 | 0.3113 | 0.6011 | \$ | 362,999 |
| 9 | 2028 | 0.0366 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,061 |
| 10 | 2029 | 0.0367 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,122 |
| 11 | 2030 | 0.0368 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,183 |
| 12 | 2031 | 0.0368 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,244 |
| 13 | 2032 | 0.0369 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,304 |
| 14 | 2033 | 0.0370 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,364 |
| 15 | 2034 | 0.0371 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,424 |
| 16 | 2035 | 0.0371 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,484 |
| 17 | 2036 | 0.0372 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,543 |
| 18 | 2037 | 0.0373 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,602 |
| 19 | 2038 | 0.0373 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,660 |
| 20 | 2039 | 0.0374 | 0.0875 | 0.3113 | 0.6011 | \$ | 363,719 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,902,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 3,277,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |


| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability | Value of Reduction in Crashes, Injuries, and Fatalities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0641 | 0.0875 | 0.3113 | 0.6011 | \$ |
| 1 | 2020 (Construction) | 0.0642 | 0.0875 | 0.3113 | 0.6011 | \$ . |
| 2 | 2021 (Construction) | 0.0643 | 0.0875 | 0.3113 | 0.6011 | \$ |
| 3 | 2022 | 0.0643 | 0.0875 | 0.3113 | 0.6011 | \$ 387,408 |
| 4 | 2023 | 0.0644 | 0.0875 | 0.3113 | 0.6011 | \$ 387,469 |
| 5 | 2024 | 0.0645 | 0.0875 | 0.3113 | 0.6011 | \$ 387,530 |
| 6 | 2025 | 0.0645 | 0.0875 | 0.3113 | 0.6011 | \$ 387,590 |
| 7 | 2026 | 0.0646 | 0.0875 | 0.3113 | 0.6011 | \$ 387,651 |
| 8 | 2027 | 0.0647 | 0.0875 | 0.3113 | 0.6011 | \$ 387,712 |
| 9 | 2028 | 0.0648 | 0.0875 | 0.3113 | 0.6011 | \$ 387,773 |
| 10 | 2029 | 0.0648 | 0.0875 | 0.3113 | 0.6011 | \$ 387,834 |
| 11 | 2030 | 0.0649 | 0.0875 | 0.3113 | 0.6011 | \$ 387,895 |
| 12 | 2031 | 0.0650 | 0.0875 | 0.3113 | 0.6011 | \$ 387,957 |
| 13 | 2032 | 0.0650 | 0.0875 | 0.3113 | 0.6011 | \$ 388,018 |
| 14 | 2033 | 0.0651 | 0.0875 | 0.3113 | 0.6011 | \$ 388,079 |
| 15 | 2034 | 0.0652 | 0.0875 | 0.3113 | 0.6011 | \$ 388,141 |
| 16 | 2035 | 0.0652 | 0.0875 | 0.3113 | 0.6011 | \$ 388,202 |
| 17 | 2036 | 0.0653 | 0.0875 | 0.3113 | 0.6011 | \$ 388,264 |
| 18 | 2037 | 0.0654 | 0.0875 | 0.3113 | 0.6011 | \$ 388,326 |
| 19 | 2038 | 0.0655 | 0.0875 | 0.3113 | 0.6011 | \$ 388,387 |
| 20 | 2039 | 0.0655 | 0.0875 | 0.3113 | 0.6011 | \$ 388,449 |
| Net Present Value (3\%) |  |  |  |  |  | \$ 4,882,000 |
|  |  |  |  | Net Pr | ent Value (7\%) | \$ 3,184,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |

Rail Table 2q. Value of Safety Benefits for Mineral Road At-Grade Crossing in Build Scenario

| Year | Calendar Year | Crash <br> Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property <br> Damage <br> Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0119 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 1 | 2020 (Construction) | 0.0120 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0120 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0121 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,449 |
| 4 | 2023 | 0.0121 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,493 |
| 5 | 2024 | 0.0122 | 0.0875 | 0.3113 | 0.6011 |  | 341,538 |
| 6 | 2025 | 0.0122 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,583 |
| 7 | 2026 | 0.0123 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,627 |
| 8 | 2027 | 0.0123 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,672 |
| 9 | 2028 | 0.0124 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,716 |
| 10 | 2029 | 0.0124 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,760 |
| 11 | 2030 | 0.0125 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,805 |
| 12 | 2031 | 0.0125 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,849 |
| 13 | 2032 | 0.0126 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,893 |
| 14 | 2033 | 0.0126 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,938 |
| 15 | 2034 | 0.0127 | 0.0875 | 0.3113 | 0.6011 | \$ | 341,982 |
| 16 | 2035 | 0.0127 | 0.0875 | 0.3113 | 0.6011 | \$ | 342,026 |
| 17 | 2036 | 0.0128 | 0.0875 | 0.3113 | 0.6011 | \$ | 342,070 |
| 18 | 2037 | 0.0128 | 0.0875 | 0.3113 | 0.6011 | \$ | 342,114 |
| 19 | 2038 | 0.0129 | 0.0875 | 0.3113 | 0.6011 | \$ | 342,158 |
| 20 | 2039 | 0.0129 | 0.0875 | 0.3113 | 0.6011 | \$ | 342,202 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,302,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 2,806,000 |
| ${ }^{1}$ See Appendix 2 for Crash Probability calculations |  |  |  |  |  |  |  |
| ${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{3}$ See Appendix 4 for Injury Accident Probability calculations |  |  |  |  |  |  |  |
| ${ }^{4}$ It is assumed that benefits will be realized starting Year 3 when construction is completed |  |  |  |  |  |  |  |


| Year | Calendar Year | Crash Probability ${ }^{1}$ | Fatal Accident Probability ${ }^{2}$ | Injury Accident Probability ${ }^{3}$ | Property Damage Probability |  | Reduction in Injuries, and alities ${ }^{4}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 0.0543 | 0.0875 | 0.3113 | 0.6011 | \$ |  |
| 1 | 2020 (Construction) | 0.0543 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 2 | 2021 (Construction) | 0.0544 | 0.0875 | 0.3113 | 0.6011 | \$ | - |
| 3 | 2022 | 0.0545 | 0.0875 | 0.3113 | 0.6011 | \$ | 378,752 |
| 4 | 2023 | 0.0546 | 0.0875 | 0.3113 | 0.6011 | \$ | 378,819 |
| 5 | 2024 | 0.0546 | 0.0875 | 0.3113 | 0.6011 | \$ | 378,887 |
| 6 | 2025 | 0.0547 | 0.0875 | 0.3113 | 0.6011 | \$ | 378,955 |
| 7 | 2026 | 0.0548 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,022 |
| 8 | 2027 | 0.0549 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,089 |
| 9 | 2028 | 0.0550 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,156 |
| 10 | 2029 | 0.0550 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,223 |
| 11 | 2030 | 0.0551 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,290 |
| 12 | 2031 | 0.0552 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,356 |
| 13 | 2032 | 0.0553 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,422 |
| 14 | 2033 | 0.0553 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,489 |
| 15 | 2034 | 0.0554 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,555 |
| 16 | 2035 | 0.0555 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,620 |
| 17 | 2036 | 0.0556 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,686 |
| 18 | 2037 | 0.0556 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,751 |
| 19 | 2038 | 0.0557 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,817 |
| 20 | 2039 | 0.0558 | 0.0875 | 0.3113 | 0.6011 | \$ | 379,882 |
| Net Present Value (3\%) |  |  |  |  |  | \$ | 4,774,000 |
| Net Present Value (7\%) |  |  |  |  |  | \$ | 3,114,000 |

See Appendix 2 for Crash Probability calculations
${ }^{2}$ See Appendix 3 for Fatal Accident Probability calculations
See Appendix 4 for Injury Accident Probability calculation
It is assumed that benefits will be realized starting Year 3 when constrution is complete

ROGERSVILLE
Rail Table 3b. Value of Emissions Reduction for Idling Vehicles in Build Scenario

| Period | Year | Total Average Daily Passenger Vehicular Traffic Delay (min) | Total <br> Average Daily Truck Traffic Delay (min) | VOC | Vehicles NOX | PM ${ }_{2.5}$ | Cost of <br> VOC | ssions for <br> NOX | rucks $P M_{2.5}$ | Total Value of Emissions Reduction ${ }^{1}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 21 | 7 | \$1 | \$4 | N/A | \$0 | \$14 | \$20 | \$0 |
| 1 | 2020 | 22 | 7 | \$1 | \$4 | N/A | \$0 | \$14 | \$21 | \$0 |
| 2 | 2021 | 23 | 8 | \$1 | \$5 | N/A | \$0 | \$15 | \$22 | \$0 |
| 3 | 2022 | 24 | 8 | \$1 | \$5 | N/A | \$0 | \$16 | \$23 | \$0 |
| 4 | 2023 | 25 | 8 | \$1 | \$5 | N/A | \$0 | \$16 | \$24 | \$0 |
| 5 | 2024 | 26 | 9 | \$1 | \$5 | N/A | \$0 | \$17 | \$25 | \$0 |
| 6 | 2025 | 27 | 9 | \$1 | \$6 | N/A | \$0 | \$18 | \$27 | \$0 |
| 7 | 2026 | 29 | 10 | \$1 | \$6 | N/A | \$0 | \$19 | \$28 | \$0 |
| 8 | 2027 | 30 | 10 | \$1 | \$6 | N/A | \$0 | \$20 | \$29 | \$0 |
| 9 | 2028 | 32 | 11 | \$1 | \$6 | N/A | \$1 | \$21 | \$31 | \$0 |
| 10 | 2029 | 33 | 11 | \$1 | \$7 | N/A | \$1 | \$22 | \$32 | \$0 |
| 11 | 2030 | 35 | 12 | \$1 | \$7 | N/A | \$1 | \$23 | \$34 | \$0 |
| 12 | 2031 | 37 | 12 | \$1 | \$7 | N/A | \$1 | \$24 | \$35 | \$0 |
| 13 | 2032 | 38 | 13 | \$1 | \$8 | N/A | \$1 | \$25 | \$37 | \$0 |
| 14 | 2033 | 40 | 13 | \$2 | \$8 | N/A | \$1 | \$26 | \$39 | \$0 |
| 15 | 2034 | 42 | 14 | \$2 | \$9 | N/A | \$1 | \$27 | \$41 | \$0 |
| 16 | 2035 | 44 | 15 | \$2 | \$9 | N/A | \$1 | \$29 | \$42 | \$0 |
| 17 | 2036 | 46 | 15 | \$2 | \$9 | N/A | \$1 | \$30 | \$45 | \$0 |
| 18 | 2037 | 49 | 16 | \$2 | \$10 | N/A | \$1 | \$31 | \$47 | \$0 |
| 19 | 2038 | 51 | 17 | \$2 | \$10 | N/A | \$1 | \$33 | \$49 | \$0 |
| 20 | 2039 | 54 | 18 | \$2 | \$11 | N/A | \$1 | \$35 | \$51 | \$0 |
| Net Present Value (3\%) |  |  |  |  |  |  |  |  |  |  |
| Net Present Value (7\%) |  |  |  |  |  |  |  |  |  | \$0 |

${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

FORDLAND
Rail Table 3c. Value of Emissions Reduction for Idling Vehicles in Build Scenario

| Period | Year | Total Average <br> Daily Passenger Vehicular Traffic Delay (min) | Total <br> Average Daily Truck Traffic Delay (min) | Cost of Em VOC | ions for ehicles <br> NOx | senger $P M_{2.5}$ | Cost of voc | sions for NOX | rucks PM ${ }_{2.5}$ | Total Value of Emissions Reduction ${ }^{1}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 558 | 187 | \$21 | \$114 | N/A | \$9 | \$367 | \$545 | \$0 |
| 1 | 2020 | 586 | 196 | \$22 | \$120 | N/A | \$9 | \$385 | \$571 | \$0 |
| 2 | 2021 | 614 | 205 | \$23 | \$126 | N/A | \$10 | \$403 | \$598 | \$0 |
| 3 | 2022 | 644 | 215 | \$24 | \$132 | N/A | \$10 | \$423 | \$627 | \$1,216 |
| 4 | 2023 | 676 | 225 | \$25 | \$138 | N/A | \$11 | \$443 | \$657 | \$1,274 |
| 5 | 2024 | 709 | 236 | \$27 | \$145 | N/A | \$11 | \$464 | \$688 | \$1,336 |
| 6 | 2025 | 744 | 247 | \$28 | \$152 | N/A | \$12 | \$486 | \$721 | \$1,400 |
| 7 | 2026 | 780 | 259 | \$29 | \$160 | N/A | \$13 | \$510 | \$756 | \$1,467 |
| 8 | 2027 | 818 | 272 | \$31 | \$167 | N/A | \$13 | \$534 | \$792 | \$1,537 |
| 9 | 2028 | 858 | 285 | \$32 | \$176 | N/A | \$14 | \$560 | \$830 | \$1,611 |
| 10 | 2029 | 900 | 298 | \$34 | \$184 | N/A | \$14 | \$586 | \$870 | \$1,689 |
| 11 | 2030 | 944 | 313 | \$36 | \$193 | N/A | \$15 | \$615 | \$911 | \$1,770 |
| 12 | 2031 | 990 | 328 | \$37 | \$203 | N/A | \$16 | \$644 | \$955 | \$1,855 |
| 13 | 2032 | 1,039 | 343 | \$39 | \$213 | N/A | \$17 | \$675 | \$1,001 | \$1,944 |
| 14 | 2033 | 1,090 | 360 | \$41 | \$223 | N/A | \$17 | \$707 | \$1,049 | \$2,037 |
| 15 | 2034 | 1,143 | 377 | \$43 | \$234 | N/A | \$18 | \$741 | \$1,099 | \$2,135 |
| 16 | 2035 | 1,199 | 395 | \$45 | \$245 | N/A | \$19 | \$777 | \$1,152 | \$2,238 |
| 17 | 2036 | 1,258 | 414 | \$47 | \$257 | N/A | \$20 | \$814 | \$1,207 | \$2,345 |
| 18 | 2037 | 1,319 | 434 | \$50 | \$270 | N/A | \$21 | \$853 | \$1,265 | \$2,458 |
| 19 | 2038 | 1,384 | 455 | \$52 | \$283 | N/A | \$22 | \$894 | \$1,325 | \$2,576 |
| 20 | 2039 | 1,452 | 476 | \$55 | \$297 | N/A | \$23 | \$936 | \$1,389 | \$2,700 |
| Net Present Value (3\%) |  |  |  |  |  |  |  |  |  | \$23,000 |
| Net Present Value (7\%) |  |  |  |  |  |  |  |  |  | \$14,000 |

[^14]DIGGINS
Rail Table 3d. Value of Emissions Reduction for Idling Vehicles in Build Scenario

| Period | Year | Total Average Daily Passenger Vehicular Traffic Delay (min) | Total <br> Average Daily Truck Traffic Delay (min) | Cost of Emissions for Passenger Vehicles |  |  | Cost of Emissions for Trucks |  |  | Total Value of Emissions Reduction ${ }^{1}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | VOC | NOx | $P M_{2.5}$ | VOC | NOx | PM 2.5 |  |
| 0 | 2019 | 184 | 62 | \$7 | \$38 | N/A | \$3 | \$121 | \$180 | \$0 |
| 1 | 2020 | 193 | 65 | \$7 | \$40 | N/A | \$3 | \$127 | \$188 | \$0 |
| 2 | 2021 | 203 | 68 | \$8 | \$41 | N/A | \$3 | \$133 | \$197 | \$0 |
| 3 | 2022 | 213 | 71 | \$8 | \$43 | N/A | \$3 | \$139 | \$207 | \$0 |
| 4 | 2023 | 223 | 74 | \$8 | \$46 | N/A | \$4 | \$146 | \$217 | \$0 |
| 5 | 2024 | 234 | 78 | \$9 | \$48 | N/A | \$4 | \$153 | \$227 | \$0 |
| 6 | 2025 | 245 | 82 | \$9 | \$50 | N/A | \$4 | \$160 | \$238 | \$0 |
| 7 | 2026 | 257 | 86 | \$10 | \$53 | N/A | \$4 | \$168 | \$249 | \$0 |
| 8 | 2027 | 270 | 90 | \$10 | \$55 | N/A | \$4 | \$176 | \$261 | \$0 |
| 9 | 2028 | 283 | 94 | \$11 | \$58 | N/A | \$5 | \$185 | \$274 | \$0 |
| 10 | 2029 | 297 | 98 | \$11 | \$61 | N/A | \$5 | \$193 | \$287 | \$557 |
| 11 | 2030 | 311 | 103 | \$12 | \$64 | N/A | \$5 | \$203 | \$301 | \$584 |
| 12 | 2031 | 327 | 108 | \$12 | \$67 | N/A | \$5 | \$212 | \$315 | \$612 |
| 13 | 2032 | 343 | 113 | \$13 | \$70 | N/A | \$5 | \$223 | \$330 | \$641 |
| 14 | 2033 | 359 | 119 | \$14 | \$74 | N/A | \$6 | \$233 | \$346 | \$672 |
| 15 | 2034 | 377 | 124 | \$14 | \$77 | N/A | \$6 | \$244 | \$363 | \$704 |
| 16 | 2035 | 396 | 130 | \$15 | \$81 | N/A | \$6 | \$256 | \$380 | \$738 |
| 17 | 2036 | 415 | 137 | \$16 | \$85 | N/A | \$7 | \$268 | \$398 | \$774 |
| 18 | 2037 | 435 | 143 | \$16 | \$89 | N/A | \$7 | \$281 | \$417 | \$811 |
| 19 | 2038 | 456 | 150 | \$17 | \$93 | N/A | \$7 | \$295 | \$437 | \$850 |
| 20 | 2039 | 479 | 157 | \$18 | \$98 | N/A | \$8 | \$309 | \$458 | \$891 |
| Net Present Value (3\%)Net Present Value (7\%) |  |  |  |  |  |  |  |  |  | \$5,000 |
|  |  |  |  |  |  |  |  |  |  | \$3,000 |

${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

SEYMOUR
Rail Table 3e. Value of Emissions Reduction for Idling Vehicles in Build Scenario

| Period | Year | Total Average Daily Passenger Vehicular Traffic Delay (min) | Total <br> Average Daily Truck Traffic Delay (min) | Cost of Emissions for Passenger Vehicles |  |  | Cost of Emissions for Trucks |  |  | Total Value of Emissions Reduction ${ }^{1}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | VOC | NOx | PM ${ }_{2.5}$ | VOC | NOx | PM ${ }_{2.5}$ |  |
| 0 | 2019 | 76 | 25 | \$3 | \$16 | N/A | \$1 | \$50 | \$74 | \$0 |
| 1 | 2020 | 80 | 27 | \$3 | \$16 | N/A | \$1 | \$52 | \$78 | \$0 |
| 2 | 2021 | 83 | 28 | \$3 | \$17 | N/A | \$1 | \$55 | \$81 | \$0 |
| 3 | 2022 | 88 | 29 | \$3 | \$18 | N/A | \$1 | \$57 | \$85 | \$0 |
| 4 | 2023 | 92 | 31 | \$3 | \$19 | N/A | \$1 | \$60 | \$89 | \$0 |
| 5 | 2024 | 96 | 32 | \$4 | \$20 | N/A | \$2 | \$63 | \$94 | \$0 |
| 6 | 2025 | 101 | 34 | \$4 | \$21 | N/A | \$2 | \$66 | \$98 | \$0 |
| 7 | 2026 | 106 | 35 | \$4 | \$22 | N/A | \$2 | \$69 | \$103 | \$0 |
| 8 | 2027 | 111 | 37 | \$4 | \$23 | N/A | \$2 | \$73 | \$108 | \$0 |
| 9 | 2028 | 117 | 39 | \$4 | \$24 | N/A | \$2 | \$76 | \$113 | \$0 |
| 10 | 2029 | 122 | 41 | \$5 | \$25 | N/A | \$2 | \$80 | \$118 | \$230 |
| 11 | 2030 | 128 | 42 | \$5 | \$26 | N/A | \$2 | \$84 | \$124 | \$241 |
| 12 | 2031 | 135 | 45 | \$5 | \$28 | N/A | \$2 | \$88 | \$130 | \$252 |
| 13 | 2032 | 141 | 47 | \$5 | \$29 | N/A | \$2 | \$92 | \$136 | \$264 |
| 14 | 2033 | 148 | 49 | \$6 | \$30 | N/A | \$2 | \$96 | \$143 | \$277 |
| 15 | 2034 | 155 | 51 | \$6 | \$32 | N/A | \$2 | \$101 | \$149 | \$290 |
| 16 | 2035 | 163 | 54 | \$6 | \$33 | N/A | \$3 | \$106 | \$157 | \$304 |
| 17 | 2036 | 171 | 56 | \$6 | \$35 | N/A | \$3 | \$111 | \$164 | \$319 |
| 18 | 2037 | 179 | 59 | \$7 | \$37 | N/A | \$3 | \$116 | \$172 | \$334 |
| 19 | 2038 | 188 | 62 | \$7 | \$38 | N/A | \$3 | \$121 | \$180 | \$350 |
| 20 | 2039 | 197 | 65 | \$7 | \$40 | N/A | \$3 | \$127 | \$189 | \$367 |
| Net Present Value (3\%) |  |  |  |  |  |  |  |  |  | \$2,000 |
| Net Present Value (7\%) |  |  |  |  |  |  |  |  |  | \$1,000 |

[^15]ROGERSVILLE
Rail Table 4b. Value of Reduced Operations and Maintenance Expenses

| Year | Calendar Year | No Build Scenario <br> At-Grade Crossing Maintenance (BNSF) | Build Scenario <br> At-Grade <br> Crossing <br> Maintenance <br> (BNSF) | Total O\&M Savings |
| :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | \$10,000 | \$10,000 | \$0 |
| 1 | 2020 | \$10,300 | \$10,300 | \$0 |
| 2 | 2021 | \$10,609 | \$10,609 | \$0 |
| 3 | 2022 | \$10,927 | \$10,927 | \$0 |
| 4 | 2023 | \$11,255 | \$11,255 | \$0 |
| 5 | 2024 | \$11,593 | \$11,593 | \$0 |
| 6 | 2025 | \$11,941 | \$11,941 | \$0 |
| 7 | 2026 | \$12,299 | \$12,299 | \$0 |
| 8 | 2027 | \$12,668 | \$12,668 | \$0 |
| 9 | 2028 | \$13,048 | \$13,048 | \$0 |
| 10 | 2029 | \$13,439 | \$13,439 | \$0 |
| 11 | 2030 | \$13,842 | \$13,842 | \$0 |
| 12 | 2031 | \$14,258 | \$14,258 | \$0 |
| 13 | 2032 | \$14,685 | \$14,685 | \$0 |
| 14 | 2033 | \$15,126 | \$15,126 | \$0 |
| 15 | 2034 | \$15,580 | \$15,580 | \$0 |
| 16 | 2035 | \$16,047 | \$16,047 | \$0 |
| 17 | 2036 | \$16,528 | \$16,528 | \$0 |
| 18 | 2037 | \$17,024 | \$17,024 | \$0 |
| 19 | 2038 | \$17,535 | \$17,535 | \$0 |
| 20 | 2039 | \$18,061 | \$18,061 | \$0 |
| Net Present Value (3\%) \$ |  |  |  |  |
| Net Present Value (7\%) \$0 |  |  |  |  |

${ }^{1}$ Assumes no operations and maintenance costs until Year 3 in Build Scenario

FORDLAND
Rail Table 4c. Value of Reduced Operations and Maintenance Expenses

| Year | Calendar Year | No Build Scenario <br> At-Grade Crossing Maintenance (BNSF) | Build Scenario <br> At-Grade <br> Crossing <br> Maintenance <br> (BNSF) | Total O\&M Savings |
| :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | \$90,000 | \$90,000 | \$0 |
| 1 | 2020 | \$92,700 | \$92,700 | \$0 |
| 2 | 2021 | \$95,481 | \$95,481 | \$0 |
| 3 | 2022 | \$98,345 | \$0 | \$98,345 |
| 4 | 2023 | \$101,296 | \$0 | \$101,296 |
| 5 | 2024 | \$104,335 | \$0 | \$104,335 |
| 6 | 2025 | \$107,465 | \$0 | \$107,465 |
| 7 | 2026 | \$110,689 | \$0 | \$110,689 |
| 8 | 2027 | \$114,009 | \$0 | \$114,009 |
| 9 | 2028 | \$117,430 | \$0 | \$117,430 |
| 10 | 2029 | \$120,952 | \$0 | \$120,952 |
| 11 | 2030 | \$124,581 | \$0 | \$124,581 |
| 12 | 2031 | \$128,318 | \$0 | \$128,318 |
| 13 | 2032 | \$132,168 | \$0 | \$132,168 |
| 14 | 2033 | \$136,133 | \$0 | \$136,133 |
| 15 | 2034 | \$140,217 | \$0 | \$140,217 |
| 16 | 2035 | \$144,424 | \$0 | \$144,424 |
| 17 | 2036 | \$148,756 | \$0 | \$148,756 |
| 18 | 2037 | \$153,219 | \$0 | \$153,219 |
| 19 | 2038 | \$157,816 | \$0 | \$157,816 |
| 20 | 2039 | \$162,550 | \$0 | \$162,550 |
| Net Present Value (3\%) |  |  |  | \$1,573,000 |
| Net Present Value (7\%) |  |  |  | \$996,000 |

[^16]DIGGINS
Rail Table 4d. Value of Reduced Operations and Maintenance Expenses

| Year | Calendar Year | No Build Scenario <br> At-Grade Crossing Maintenance (BNSF) | Build Scenario <br> At-Grade <br> Crossing <br> Maintenance <br> (BNSF) | Total O\&M Savings |
| :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | \$40,000 | \$40,000 | \$0 |
| 1 | 2020 | \$41,200 | \$41,200 | \$0 |
| 2 | 2021 | \$42,436 | \$42,436 | \$0 |
| 3 | 2022 | \$43,709 | \$0 | \$43,709 |
| 4 | 2023 | \$45,020 | \$0 | \$45,020 |
| 5 | 2024 | \$46,371 | \$0 | \$46,371 |
| 6 | 2025 | \$47,762 | \$0 | \$47,762 |
| 7 | 2026 | \$49,195 | \$0 | \$49,195 |
| 8 | 2027 | \$50,671 | \$0 | \$50,671 |
| 9 | 2028 | \$52,191 | \$0 | \$52,191 |
| 10 | 2029 | \$53,757 | \$0 | \$53,757 |
| 11 | 2030 | \$55,369 | \$0 | \$55,369 |
| 12 | 2031 | \$57,030 | \$0 | \$57,030 |
| 13 | 2032 | \$58,741 | \$0 | \$58,741 |
| 14 | 2033 | \$60,504 | \$0 | \$60,504 |
| 15 | 2034 | \$62,319 | \$0 | \$62,319 |
| 16 | 2035 | \$64,188 | \$0 | \$64,188 |
| 17 | 2413 | \$66,114 | \$0 | \$66,114 |
| 18 | 2037 | \$68,097 | \$0 | \$68,097 |
| 19 | 2038 | \$70,140 | \$0 | \$70,140 |
| 20 | 2039 | \$72,244 | \$0 | \$72,244 |
| Net Present Value (3\%) |  |  |  | \$699,000 |
| Net Present Value (7\%) |  |  |  | \$443,000 |

${ }^{1}$ Assumes no operations and maintenance costs until Year 3 in Build Scenario

SEYMOUR
Rail Table 4e. Value of Reduced Operations and Maintenance Expenses

| Year | Calendar Year | No Build Scenario <br> At-Grade Crossing Maintenance (BNSF) | Build Scenario <br> At-Grade <br> Crossing <br> Maintenance <br> (BNSF) | Total O\&M Savings |
| :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | \$30,000 | \$30,000 | \$0 |
| 1 | 2020 | \$30,900 | \$30,900 | \$0 |
| 2 | 2021 | \$31,827 | \$31,827 | \$0 |
| 3 | 2022 | \$32,782 | \$32,782 | \$0 |
| 4 | 2023 | \$33,765 | \$33,765 | \$0 |
| 5 | 2024 | \$34,778 | \$34,778 | \$0 |
| 6 | 2025 | \$35,822 | \$35,822 | \$0 |
| 7 | 2026 | \$36,896 | \$36,896 | \$0 |
| 8 | 2027 | \$38,003 | \$38,003 | \$0 |
| 9 | 2028 | \$39,143 | \$39,143 | \$0 |
| 10 | 2029 | \$40,317 | \$13,439 | \$26,878 |
| 11 | 2030 | \$41,527 | \$13,842 | \$27,685 |
| 12 | 2031 | \$42,773 | \$14,257 | \$28,515 |
| 13 | 2032 | \$44,056 | \$14,685 | \$29,371 |
| 14 | 2033 | \$45,378 | \$15,126 | \$30,252 |
| 15 | 2034 | \$46,739 | \$15,579 | \$31,160 |
| 16 | 2035 | \$48,141 | \$16,047 | \$32,094 |
| 17 | 2036 | \$49,585 | \$16,528 | \$33,057 |
| 18 | 2037 | \$51,073 | \$17,024 | \$34,049 |
| 19 | 2038 | \$52,605 | \$17,535 | \$35,070 |
| 20 | 2039 | \$54,183 | \$18,061 | \$36,122 |
| Net Present Value (3\%) |  |  |  | \$214,000 |
| Net Present Value (7\%) |  |  |  | \$117,000 |

[^17]| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day Through Trains Factor (DT) | Max Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 367 | 27 | 0.001088 | 29.0379 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0469 |
| 1 | 2020 | 369 | 27 | 0.001088 | 29.2284 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0472 |
| 2 | 2021 | 372 | 28 | 0.001088 | 29.4202 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0475 |
| 3 | 2022 | 374 | 28 | 0.001088 | 29.6133 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0478 |
| 4 | 2023 | 376 | 29 | 0.001088 | 29.8076 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0481 |
| 5 | 2024 | 378 | 29 | 0.001088 | 30.0032 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0484 |
| 6 | 2025 | 381 | 30 | 0.001088 | 30.2001 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0488 |
| 7 | 2026 | 383 | 30 | 0.001088 | 30.3983 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0491 |
| 8 | 2027 | 385 | 30 | 0.001088 | 30.5977 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0494 |
| 9 | 2028 | 388 | 31 | 0.001088 | 30.7985 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0497 |
| 10 | 2029 | 390 | 31 | 0.001088 | 31.0006 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0501 |
| 11 | 2030 | 392 | 32 | 0.001088 | 31.2041 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0504 |
| 12 | 2031 | 395 | 32 | 0.001088 | 31.4088 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0507 |
| 13 | 2032 | 397 | 33 | 0.001088 | 31.6149 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0510 |
| 14 | 2033 | 400 | 33 | 0.001088 | 31.8224 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0514 |
| 15 | 2034 | 402 | 34 | 0.001088 | 32.0312 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0517 |
| 16 | 2035 | 405 | 34 | 0.001088 | 32.2414 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0521 |
| 17 | 2036 | 407 | 35 | 0.001088 | 32.4530 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0524 |
| 18 | 2037 | 410 | 35 | 0.001088 | 32.6659 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0527 |
| 19 | 2038 | 412 | 36 | 0.001088 | 32.8803 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0531 |
| 20 | 2039 | 415 | 36 | 0.001088 | 33.0961 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0534 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of
USDOT Basic Accident Prediction Model for Mineral Road At-Grade Crossing

| Year | Calendar Year | ADT | $\begin{aligned} & \text { Daily } \\ & \text { Crossings } \end{aligned}$ | Formula <br> Constant (K) | Exposure <br> Factor (EI) | Day Through Trains Factor (DT) | Max Tiemtable Speed Factor (MS) | $\begin{gathered} \text { Main } \\ \text { Tracks } \\ \text { Factor }(M T) \end{gathered}$ | Highway Paved Factor (HP) | Highway Type Factor (HT) | $\qquad$ Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 40 | 27 | 0.002268 | 17.5552 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0799 |
| 1 | 2020 | 40 | 27 | 0.002268 | 17.6785 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0807 |
| 2 | 2021 | 40 | 28 | 0.002268 | 17.8026 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0814 |
| 3 | 2022 | 41 | 28 | 0.002268 | 17.9276 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0821 |
| 4 | 2023 | 41 | 29 | 0.002268 | 18.0535 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0829 |
| 5 | 2024 | 41 | 29 | 0.002268 | 18.1803 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0836 |
| 6 | 2025 | 41 | 30 | 0.002268 | 18.3080 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0844 |
| 7 | 2026 | 42 | 30 | 0.002268 | 18.4365 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0851 |
| 8 | 2027 | 42 | 30 | 0.002268 | 18.5660 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0859 |
| 9 | 2028 | 42 | 31 | 0.002268 | 18.6963 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0867 |
| 10 | 2029 | 43 | 31 | 0.002268 | 18.8276 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0874 |
| 11 | 2030 | 43 | 32 | 0.002268 | 18.9598 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0882 |
| 12 | 2031 | 43 | 32 | 0.002268 | 19.0930 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0890 |
| 13 | 2032 | 43 | 33 | 0.002268 | 19.2270 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0898 |
| 14 | 2033 | 44 | 33 | 0.002268 | 19.3620 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0906 |
| 15 | 2034 | 44 | 34 | 0.002268 | 19.4980 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0915 |
| 16 | 2035 | 44 | 34 | 0.002268 | 19.6349 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0923 |
| 17 | 2036 | 44 | 35 | 0.002268 | 19.7728 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0931 |
| 18 | 2037 | 45 | 35 | 0.002268 | 19.9116 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0939 |
| 19 | 2038 | 45 | 36 | 0.002268 | 20.0515 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0948 |
| 20 | 2039 | 45 | 36 | 0.002268 | 20.1923 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0956 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of

USDOT Basic Accident Prediction Model for Dewberry Road At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day Through Trains Factor (DT) | Max Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 136 | 27 | 0.002268 | 26.3987 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1202 |
| 1 | 2020 | 137 | 27 | 0.002268 | 26.5841 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1213 |
| 2 | 2021 | 138 | 28 | 0.002268 | 26.7708 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1224 |
| 3 | 2022 | 139 | 28 | 0.002268 | 26.9588 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1235 |
| 4 | 2023 | 139 | 29 | 0.002268 | 27.1481 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1246 |
| 5 | 2024 | 140 | 29 | 0.002268 | 27.3388 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1257 |
| 6 | 2025 | 141 | 30 | 0.002268 | 27.5308 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1269 |
| 7 | 2026 | 142 | 30 | 0.002268 | 27.7241 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1280 |
| 8 | 2027 | 143 | 30 | 0.002268 | 27.9188 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1292 |
| 9 | 2028 | 144 | 31 | 0.002268 | 28.1149 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1303 |
| 10 | 2029 | 145 | 31 | 0.002268 | 28.3123 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1315 |
| 11 | 2030 | 145 | 32 | 0.002268 | 28.5111 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1327 |
| 12 | 2031 | 146 | 32 | 0.002268 | 28.7114 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1339 |
| 13 | 2032 | 147 | 33 | 0.002268 | 28.9130 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1351 |
| 14 | 2033 | 148 | 33 | 0.002268 | 29.1160 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1363 |
| 15 | 2034 | 149 | 34 | 0.002268 | 29.3205 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1375 |
| 16 | 2035 | 150 | 34 | 0.002268 | 29.5264 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1388 |
| 17 | 2036 | 151 | 35 | 0.002268 | 29.7338 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1400 |
| 18 | 2037 | 152 | 35 | 0.002268 | 29.9426 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1413 |
| 19 | 2038 | 153 | 36 | 0.002268 | 30.1528 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1425 |
| 20 | 2039 | 154 | 36 | 0.002268 | 30.3646 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1438 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day Through Trains Factor (DT) | Max <br> Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 71 | 27 | 0.001088 | 17.4052 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0281 |
| 1 | 2020 | 71 | 27 | 0.001088 | 17.5194 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0283 |
| 2 | 2021 | 72 | 28 | 0.001088 | 17.6343 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0285 |
| 3 | 2022 | 72 | 28 | 0.001088 | 17.7500 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0287 |
| 4 | 2023 | 73 | 29 | 0.001088 | 17.8665 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0288 |
| 5 | 2024 | 73 | 29 | 0.001088 | 17.9837 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0290 |
| 6 | 2025 | 74 | 30 | 0.001088 | 18.1017 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0292 |
| 7 | 2026 | 74 | 30 | 0.001088 | 18.2205 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0294 |
| 8 | 2027 | 75 | 30 | 0.001088 | 18.3401 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0296 |
| 9 | 2028 | 75 | 31 | 0.001088 | 18.4604 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0298 |
| 10 | 2029 | 75 | 31 | 0.001088 | 18.5815 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0300 |
| 11 | 2030 | 76 | 32 | 0.001088 | 18.7035 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0302 |
| 12 | 2031 | 76 | 32 | 0.001088 | 18.8262 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0304 |
| 13 | 2032 | 77 | 33 | 0.001088 | 18.9497 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0306 |
| 14 | 2033 | 77 | 33 | 0.001088 | 19.0741 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0308 |
| 15 | 2034 | 78 | 34 | 0.001088 | 19.1992 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0310 |
| 16 | 2035 | 78 | 34 | 0.001088 | 19.3252 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0312 |
| 17 | 2036 | 79 | 35 | 0.001088 | 19.4520 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0314 |
| 18 | 2037 | 79 | 35 | 0.001088 | 19.5797 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0316 |
| 19 | 2038 | 80 | 36 | 0.001088 | 19.7081 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0318 |
| 20 | 2039 | 80 | 36 | 0.001088 | 19.8375 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0320 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of
USDOT Basic Accident Prediction Model for E Box School Loop At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max <br> Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 27 | 0.002268 | 15.3996 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0701 |
| 1 | 2020 | 27 | 27 | 0.002268 | 15.5077 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0708 |
| 2 | 2021 | 27 | 28 | 0.002268 | 15.6166 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0714 |
| 3 | 2022 | 27 | 28 | 0.002268 | 15.7263 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0720 |
| 4 | 2023 | 28 | 29 | 0.002268 | 15.8367 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0727 |
| 5 | 2024 | 28 | 29 | 0.002268 | 15.9479 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0733 |
| 6 | 2025 | 28 | 30 | 0.002268 | 16.0598 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0740 |
| 7 | 2026 | 28 | 30 | 0.002268 | 16.1726 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0747 |
| 8 | 2027 | 28 | 30 | 0.002268 | 16.2862 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0753 |
| 9 | 2028 | 29 | 31 | 0.002268 | 16.4005 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0760 |
| 10 | 2029 | 29 | 31 | 0.002268 | 16.5157 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0767 |
| 11 | 2030 | 29 | 32 | 0.002268 | 16.6316 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0774 |
| 12 | 2031 | 29 | 32 | 0.002268 | 16.7484 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0781 |
| 13 | 2032 | 29 | 33 | 0.002268 | 16.8660 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0788 |
| 14 | 2033 | 29 | 33 | 0.002268 | 16.9844 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0795 |
| 15 | 2034 | 30 | 34 | 0.002268 | 17.1037 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0802 |
| 16 | 2035 | 30 | 34 | 0.002268 | 17.2238 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0809 |
| 17 | 2036 | 30 | 35 | 0.002268 | 17.3447 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0817 |
| 18 | 2037 | 30 | 35 | 0.002268 | 17.4665 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0824 |
| 19 | 2038 | 30 | 36 | 0.002268 | 17.5891 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0832 |
| 20 | 2039 | 31 | 36 | 0.002268 | 17.7126 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0839 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of
USDOT Basic Accident Prediction Model for Oak Lawn Road At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains Factor (DT) | Max <br> Tiemtable <br> Speed <br> Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway <br> Paved <br> Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 1,048 | 27 | 0.002268 | 52.1486 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.2375 |
| 1 | 2020 | 1,054 | 27 | 0.002268 | 52.5148 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.2396 |
| 2 | 2021 | 1,061 | 28 | 0.002268 | 52.8837 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.2418 |
| 3 | 2022 | 1,067 | 28 | 0.001088 | 41.0657 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 0.0556 |
| 4 | 2023 | 1,074 | 29 | 1.001088 | 41.3352 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 51.5216 |
| 5 | 2024 | 1,080 | 29 | 2.001088 | 41.6064 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 103.6631 |
| 6 | 2025 | 1,087 | 30 | 3.001088 | 41.8795 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 156.4866 |
| 7 | 2026 | 1,094 | 30 | 4.001088 | 42.1543 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 209.9990 |
| 8 | 2027 | 1,100 | 30 | 5.001088 | 42.4309 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 264.2070 |
| 9 | 2028 | 1,107 | 31 | 6.001088 | 42.7094 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 319.1173 |
| 10 | 2029 | 1,114 | 31 | 7.001088 | 42.9896 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 374.7370 |
| 11 | 2030 | 1,121 | 32 | 8.001088 | 43.2717 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 431.0728 |
| 12 | 2031 | 1,128 | 32 | 9.001088 | 43.5557 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 488.1319 |
| 13 | 2032 | 1,135 | 33 | 10.001088 | 43.8415 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 545.9214 |
| 14 | 2033 | 1,141 | 33 | 11.001088 | 44.1292 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 604.4482 |
| 15 | 2034 | 1,148 | 34 | 12.001088 | 44.4188 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 663.7197 |
| 16 | 2035 | 1,155 | 34 | 13.001088 | 44.7103 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 723.7430 |
| 17 | 2036 | 1,163 | 35 | 14.001088 | 45.0037 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 784.5255 |
| 18 | 2037 | 1,170 | 35 | 15.001088 | 45.2990 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 846.0746 |
| 19 | 2038 | 1,177 | 36 | 16.001088 | 45.5963 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 908.3977 |
| 20 | 2039 | 1,184 | 36 | 17.001088 | 45.8955 | 1.00 | 1.00 | 1.25 | 1.00 | 1.00 | 1.00 | 971.5024 |

[^18]| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day Through Trains Factor (DT) | Max Tiemtable Speed Factor (MS) | $\begin{gathered} \text { Main } \\ \text { Tracks } \\ \text { Factor (MT) } \end{gathered}$ | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 263 | 27 | 0.001088 | 26.1742 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0423 |
| 1 | 2020 | 265 | 27 | 0.001088 | 26.3460 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0425 |
| 2 | 2021 | 266 | 28 | 0.001088 | 26.5189 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0428 |
| 3 | 2022 | 268 | 28 | 0.001088 | 26.6929 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0431 |
| 4 | 2023 | 269 | 29 | 0.001088 | 26.8681 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0434 |
| 5 | 2024 | 271 | 29 | 0.001088 | 27.0444 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0437 |
| 6 | 2025 | 273 | 30 | 0.001088 | 27.2218 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0440 |
| 7 | 2026 | 274 | 30 | 0.001088 | 27.4005 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0442 |
| 8 | 2027 | 276 | 30 | 0.001088 | 27.5803 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0445 |
| 9 | 2028 | 278 | 31 | 0.001088 | 27.7613 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0448 |
| 10 | 2029 | 280 | 31 | 0.001088 | 27.9434 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0451 |
| 11 | 2030 | 281 | 32 | 0.001088 | 28.1268 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0454 |
| 12 | 2031 | 283 | 32 | 0.001088 | 28.3114 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0457 |
| 13 | 2032 | 285 | 33 | 0.001088 | 28.4971 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0460 |
| 14 | 2033 | 286 | 33 | 0.001088 | 28.6841 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0463 |
| 15 | 2034 | 288 | 34 | 0.001088 | 28.8724 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0466 |
| 16 | 2035 | 290 | 34 | 0.001088 | 29.0618 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0469 |
| 17 | 2036 | 292 | 35 | 0.001088 | 29.2525 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0472 |
| 18 | 2037 | 294 | 35 | 0.001088 | 29.4445 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0475 |
| 19 | 2038 | 295 | 36 | 0.001088 | 29.6377 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0479 |
| 20 | 2039 | 297 | 36 | 0.001088 | 29.8322 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0482 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of
USDOT Basic Accident Prediction Model for Highway NN At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max <br> Tiemtable <br> Speed <br> Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor <br> (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 626 | 27 | 0.001088 | 34.2946 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0554 |
| 1 | 2020 | 630 | 27 | 0.001088 | 34.5197 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0557 |
| 2 | 2021 | 634 | 28 | 0.001088 | 34.7462 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0561 |
| 3 | 2022 | 638 | 28 | 0.001088 | 34.9742 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0565 |
| 4 | 2023 | 641 | 29 | 0.001088 | 35.2037 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0568 |
| 5 | 2024 | 645 | 29 | 0.001088 | 35.4347 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0572 |
| 6 | 2025 | 649 | 30 | 0.001088 | 35.6673 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0576 |
| 7 | 2026 | 653 | 30 | 0.001088 | 35.9013 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0580 |
| 8 | 2027 | 657 | 30 | 0.001088 | 36.1369 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0583 |
| 9 | 2028 | 661 | 31 | 0.001088 | 36.3740 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0587 |
| 10 | 2029 | 665 | 31 | 0.001088 | 36.6127 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0591 |
| 11 | 2030 | 669 | 32 | 0.001088 | 36.8530 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0595 |
| 12 | 2031 | 674 | 32 | 0.001088 | 37.0948 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0599 |
| 13 | 2032 | 678 | 33 | 0.001088 | 37.3383 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0603 |
| 14 | 2033 | 682 | 33 | 0.001088 | 37.5833 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0607 |
| 15 | 2034 | 686 | 34 | 0.001088 | 37.8299 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0611 |
| 16 | 2035 | 690 | 34 | 0.001088 | 38.0781 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0615 |
| 17 | 2036 | 694 | 35 | 0.001088 | 38.3280 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0619 |
| 18 | 2037 | 699 | 35 | 0.001088 | 38.5795 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0623 |
| 19 | 2038 | 703 | 36 | 0.001088 | 38.8327 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0627 |
| 20 | 2039 | 707 | 36 | 0.001088 | 39.0875 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0631 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of
USDOT Basic Accident Prediction Model for W Box School Loop At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day Through Trains Factor (DT) | Max Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 72 | 27 | 0.002268 | 21.3552 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0972 |
| 1 | 2020 | 72 | 27 | 0.002268 | 21.5051 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0981 |
| 2 | 2021 | 73 | 28 | 0.002268 | 21.6561 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0990 |
| 3 | 2022 | 73 | 28 | 0.002268 | 21.8082 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0999 |
| 4 | 2023 | 74 | 29 | 0.002268 | 21.9614 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1008 |
| 5 | 2024 | 74 | 29 | 0.002268 | 22.1156 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1017 |
| 6 | 2025 | 75 | 30 | 0.002268 | 22.2709 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1026 |
| 7 | 2026 | 75 | 30 | 0.002268 | 22.4273 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1035 |
| 8 | 2027 | 76 | 30 | 0.002268 | 22.5848 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1045 |
| 9 | 2028 | 76 | 31 | 0.002268 | 22.7434 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1054 |
| 10 | 2029 | 77 | 31 | 0.002268 | 22.9031 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1064 |
| 11 | 2030 | 77 | 32 | 0.002268 | 23.0639 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1073 |
| 12 | 2031 | 77 | 32 | 0.002268 | 23.2259 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1083 |
| 13 | 2032 | 78 | 33 | 0.002268 | 23.3890 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1093 |
| 14 | 2033 | 78 | 33 | 0.002268 | 23.5532 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1103 |
| 15 | 2034 | 79 | 34 | 0.002268 | 23.7186 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1112 |
| 16 | 2035 | 79 | 34 | 0.002268 | 23.8852 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1122 |
| 17 | 2036 | 80 | 35 | 0.002268 | 24.0529 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1133 |
| 18 | 2037 | 80 | 35 | 0.002268 | 24.2218 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1143 |
| 19 | 2038 | 81 | 36 | 0.002268 | 24.3919 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1153 |
| 20 | 2039 | 81 | 36 | 0.002268 | 24.5632 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.1163 |

[^19]| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max <br> Tiemtable Speed Factor (MS) | Main <br> Tracks Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 10 | 27 | 0.002268 | 11.0601 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0504 |
| 1 | 2020 | 10 | 27 | 0.002268 | 11.1378 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0508 |
| 2 | 2021 | 10 | 28 | 0.002268 | 11.2159 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0513 |
| 3 | 2022 | 10 | 28 | 0.002268 | 11.2946 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0517 |
| 4 | 2023 | 10 | 29 | 0.002268 | 11.3739 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0522 |
| 5 | 2024 | 10 | 29 | 0.002268 | 11.4537 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0527 |
| 6 | 2025 | 10 | 30 | 0.002268 | 11.5341 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0531 |
| 7 | 2026 | 10 | 30 | 0.002268 | 11.6151 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0536 |
| 8 | 2027 | 11 | 30 | 0.002268 | 11.6966 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0541 |
| 9 | 2028 | 11 | 31 | 0.002268 | 11.7787 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0546 |
| 10 | 2029 | 11 | 31 | 0.002268 | 11.8613 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0551 |
| 11 | 2030 | 11 | 32 | 0.002268 | 11.9446 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0556 |
| 12 | 2031 | 11 | 32 | 0.002268 | 12.0284 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0561 |
| 13 | 2032 | 11 | 33 | 0.002268 | 12.1129 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0566 |
| 14 | 2033 | 11 | 33 | 0.002268 | 12.1979 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0571 |
| 15 | 2034 | 11 | 34 | 0.002268 | 12.2835 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0576 |
| 16 | 2035 | 11 | 34 | 0.002268 | 12.3697 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0581 |
| 17 | 2036 | 11 | 35 | 0.002268 | 12.4565 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0587 |
| 18 | 2037 | 11 | 35 | 0.002268 | 12.5440 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0592 |
| 19 | 2038 | 11 | 36 | 0.002268 | 12.6320 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0597 |
| 20 | 2039 | 11 | 36 | 0.002268 | 12.7207 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0603 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of
USDOT Basic Accident Prediction Model for Hummingbird Lane At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 33 | 27 | 0.002268 | 16.4649 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0750 |
| 1 | 2020 | 33 | 27 | 0.002268 | 16.5805 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0757 |
| 2 | 2021 | 33 | 28 | 0.002268 | 16.6969 | 1.83 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0763 |
| 3 | 2022 | 34 | 28 | 0.002268 | 16.8141 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0770 |
| 4 | 2023 | 34 | 29 | 0.002268 | 16.9322 | 1.84 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0777 |
| 5 | 2024 | 34 | 29 | 0.002268 | 17.0511 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0784 |
| 6 | 2025 | 34 | 30 | 0.002268 | 17.1708 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0791 |
| 7 | 2026 | 34 | 30 | 0.002268 | 17.2914 | 1.85 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0798 |
| 8 | 2027 | 35 | 30 | 0.002268 | 17.4128 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0806 |
| 9 | 2028 | 35 | 31 | 0.002268 | 17.5350 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0813 |
| 10 | 2029 | 35 | 31 | 0.002268 | 17.6582 | 1.86 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0820 |
| 11 | 2030 | 35 | 32 | 0.002268 | 17.7822 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0827 |
| 12 | 2031 | 36 | 32 | 0.002268 | 17.9070 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0835 |
| 13 | 2032 | 36 | 33 | 0.002268 | 18.0328 | 1.87 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0842 |
| 14 | 2033 | 36 | 33 | 0.002268 | 18.1594 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0850 |
| 15 | 2034 | 36 | 34 | 0.002268 | 18.2869 | 1.88 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0858 |
| 16 | 2035 | 36 | 34 | 0.002268 | 18.4153 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0865 |
| 17 | 2036 | 37 | 35 | 0.002268 | 18.5446 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0873 |
| 18 | 2037 | 37 | 35 | 0.002268 | 18.6748 | 1.89 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0881 |
| 19 | 2038 | 37 | 36 | 0.002268 | 18.8060 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0889 |
| 20 | 2039 | 37 | 36 | 0.002268 | 18.9380 | 1.90 | 1.47 | 1.23 | 1.00 | 0.61 | 1.00 | 0.0897 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of

USDOT Basic Accident Prediction Model for Tandy At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway <br> Paved <br> Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 263 | 27 | 0.001088 | 26.1742 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0423 |
| 1 | 2020 | 265 | 27 | 0.001088 | 26.3460 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0425 |
| 2 | 2021 | 266 | 28 | 0.001088 | 26.5189 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0428 |
| 3 | 2022 | 268 | 28 | 0.001088 | 26.6929 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0431 |
| 4 | 2023 | 269 | 29 | 0.001088 | 26.8681 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0434 |
| 5 | 2024 | 271 | 29 | 0.001088 | 27.0444 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0437 |
| 6 | 2025 | 273 | 30 | 0.001088 | 27.2218 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0440 |
| 7 | 2026 | 274 | 30 | 0.001088 | 27.4005 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0442 |
| 8 | 2027 | 276 | 30 | 0.001088 | 27.5803 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0445 |
| 9 | 2028 | 278 | 31 | 0.001088 | 27.7613 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0448 |
| 10 | 2029 | 280 | 31 | 0.001088 | 27.9434 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0451 |
| 11 | 2030 | 281 | 32 | 0.001088 | 28.1268 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0454 |
| 12 | 2031 | 283 | 32 | 0.001088 | 28.3114 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0457 |
| 13 | 2032 | 285 | 33 | 0.001088 | 28.4971 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0460 |
| 14 | 2033 | 286 | 33 | 0.001088 | 28.6841 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0463 |
| 15 | 2034 | 288 | 34 | 0.001088 | 28.8724 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0466 |
| 16 | 2035 | 290 | 34 | 0.001088 | 29.0618 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0469 |
| 17 | 2036 | 292 | 35 | 0.001088 | 29.2525 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0472 |
| 18 | 2037 | 294 | 35 | 0.001088 | 29.4445 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0475 |
| 19 | 2038 | 295 | 36 | 0.001088 | 29.6377 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0479 |
| 20 | 2039 | 297 | 36 | 0.001088 | 29.8322 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0482 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 830 | 27 | 0.001088 | 37.4454 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0605 |
| 1 | 2020 | 846 | 27 | 0.001088 | 37.8427 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0611 |
| 2 | 2021 | 862 | 28 | 0.001088 | 38.2443 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0618 |
| 3 | 2022 | 879 | 28 | 0.001088 | 38.6502 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0624 |
| 4 | 2023 | 896 | 29 | 0.001088 | 39.0603 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0631 |
| 5 | 2024 | 913 | 29 | 0.001088 | 39.4749 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0637 |
| 6 | 2025 | 930 | 30 | 0.001088 | 39.8938 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0644 |
| 7 | 2026 | 948 | 30 | 0.001088 | 40.3171 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0651 |
| 8 | 2027 | 966 | 30 | 0.001088 | 40.7450 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0658 |
| 9 | 2028 | 985 | 31 | 0.001088 | 41.1774 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0665 |
| 10 | 2029 | 1,004 | 31 | 0.001088 | 41.6144 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0672 |
| 11 | 2030 | 1,023 | 32 | 0.001088 | 42.0560 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0613 |
| 12 | 2031 | 1,042 | 32 | 0.001088 | 42.5023 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0620 |
| 13 | 2032 | 1,062 | 33 | 0.001088 | 42.9533 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0626 |
| 14 | 2033 | 1,083 | 33 | 0.001088 | 43.4092 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0633 |
| 15 | 2034 | 1,104 | 34 | 0.001088 | 43.8698 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0640 |
| 16 | 2035 | 1,125 | 34 | 0.001088 | 44.3354 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0646 |
| 17 | 2036 | 1,146 | 35 | 0.001088 | 44.8059 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0653 |
| 18 | 2037 | 1,168 | 35 | 0.001088 | 45.2814 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0660 |
| 19 | 2038 | 1,191 | 36 | 0.001088 | 45.7619 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0667 |
| 20 | 2039 | 1,213 | 36 | 0.001088 | 46.2475 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0674 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of
USDOT Basic Accident Prediction Model for Carpenter St At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor <br> (HT) | Highway Lane Factor <br> (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 86 | 27 | 0.001088 | 18.4762 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0298 |
| 1 | 2020 | 87 | 27 | 0.001088 | 18.5975 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0300 |
| 2 | 2021 | 87 | 28 | 0.001088 | 18.7195 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0302 |
| 3 | 2022 | 88 | 28 | 0.001088 | 18.8423 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0304 |
| 4 | 2023 | 88 | 29 | 0.001088 | 18.9660 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0306 |
| 5 | 2024 | 89 | 29 | 0.001088 | 19.0904 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0308 |
| 6 | 2025 | 2,413 | 30 | 0.001088 | 53.6916 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0867 |
| 7 | 2026 | 2,428 | 30 | 0.001088 | 54.0439 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0873 |
| 8 | 2027 | 2,443 | 30 | 0.001088 | 54.3986 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0878 |
| 9 | 2028 | 2,458 | 31 | 0.001088 | 54.7555 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0884 |
| 10 | 2029 | 2,473 | 31 | 0.001088 | 55.1149 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0890 |
| 11 | 2030 | 2,488 | 32 | 0.001088 | 55.4765 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0896 |
| 12 | 2031 | 2,503 | 32 | 0.001088 | 55.8406 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0902 |
| 13 | 2032 | 2,518 | 33 | 0.001088 | 56.2070 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0908 |
| 14 | 2033 | 2,534 | 33 | 0.001088 | 56.5759 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0914 |
| 15 | 2034 | 2,549 | 34 | 0.001088 | 56.9471 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0920 |
| 16 | 2035 | 2,565 | 34 | 0.001088 | 57.3208 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0926 |
| 17 | 2036 | 2,581 | 35 | 0.001088 | 57.6970 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0932 |
| 18 | 2037 | 2,596 | 35 | 0.001088 | 58.0756 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0938 |
| 19 | 2038 | 2,612 | 36 | 0.001088 | 58.4567 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0944 |
| 20 | 2039 | 2,628 | 36 | 0.001088 | 58.8403 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0950 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of

USDOT Basic Accident Prediction Model for Highway Z At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway <br> Paved <br> Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 911 | 27 | 0.001088 | 38.5477 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0622 |
| 1 | 2020 | 917 | 27 | 0.001088 | 38.8007 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0627 |
| 2 | 2021 | 922 | 28 | 0.001088 | 39.0553 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0631 |
| 3 | 2022 | 928 | 28 | 0.001088 | 39.3116 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0635 |
| 4 | 2023 | 934 | 29 | 0.001088 | 39.5696 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0639 |
| 5 | 2024 | 939 | 29 | 0.001088 | 39.8292 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0643 |
| 6 | 2025 | 945 | 30 | 0.001088 | 40.0906 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0647 |
| 7 | 2026 | 951 | 30 | 0.001088 | 40.3537 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0652 |
| 8 | 2027 | 957 | 30 | 0.001088 | 40.6185 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0656 |
| 9 | 2028 | 962 | 31 | 0.001088 | 40.8850 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0660 |
| 10 | 2029 | 968 | 31 | 0.001088 | 41.1533 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0664 |
| 11 | 2030 | 974 | 32 | 0.001088 | 41.4234 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0669 |
| 12 | 2031 | 980 | 32 | 0.001088 | 41.6952 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0673 |
| 13 | 2032 | 986 | 33 | 0.001088 | 41.9688 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0678 |
| 14 | 2033 | 992 | 33 | 0.001088 | 42.2442 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0682 |
| 15 | 2034 | 998 | 34 | 0.001088 | 42.5215 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0687 |
| 16 | 2035 | 1,004 | 34 | 0.001088 | 42.8005 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0691 |
| 17 | 2036 | 1,011 | 35 | 0.001088 | 43.0814 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0696 |
| 18 | 2037 | 1,017 | 35 | 0.001088 | 43.3641 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0700 |
| 19 | 2038 | 1,023 | 36 | 0.001088 | 43.6486 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0705 |
| 20 | 2039 | 1,029 | 36 | 0.001088 | 43.9351 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.11 | 0.0709 |

[^20]| Year | Calendar Year | ADT | $\begin{gathered} \text { Daily } \\ \text { Crossings } \end{gathered}$ | Formula Constant (K) | Exposure <br> Factor (EI) | Day Through Trains Factor (DT) | Max <br> Tiemtable <br> Speed <br> Factor (MS) | $\begin{gathered} \text { Main } \\ \text { Tracks } \\ \text { Factor (MT) } \end{gathered}$ | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 89 | 27 | 0.002268 | 22.9188 | 1.93 | 1.47 | 1.23 | 1.00 | 0.90 | 1.00 | 0.1643 |
| 1 | 2020 | 91 | 27 | 0.002268 | 23.1791 | 1.93 | 1.47 | 1.23 | 1.00 | 0.90 | 1.00 | 0.1665 |
| 2 | 2021 | 3,537 | 28 | 0.002268 | 79.0096 | 1.94 | 1.47 | 1.23 | 1.00 | 0.90 | 1.00 | 0.5686 |
| 3 | 2022 | 3,605 | 28 | 0.001088 | 60.0041 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0875 |
| 4 | 2023 | 3,674 | 29 | 1.001088 | 60.6409 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 81.3472 |
| 5 | 2024 | 3,744 | 29 | 2.001088 | 61.2844 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 164.3317 |
| 6 | 2025 | 3,816 | 30 | 3.001088 | 61.9348 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 249.0682 |
| 7 | 2026 | 3,889 | 30 | 4.001088 | 62.5921 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 335.5848 |
| 8 | 2027 | 3,964 | 30 | 5.001088 | 63.2563 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 423.9096 |
| 9 | 2028 | 4,040 | 31 | 6.001088 | 63.9276 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 514.0712 |
| 10 | 2029 | 4,117 | 31 | 7.001088 | 64.6060 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 606.0988 |
| 11 | 2030 | 4,196 | 32 | 8.001088 | 65.2916 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 700.0217 |
| 12 | 2031 | 4,277 | 32 | 9.001088 | 65.9845 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 795.8698 |
| 13 | 2032 | 4,359 | 33 | 10.001088 | 66.6848 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 893.6733 |
| 14 | 2033 | 4,442 | 33 | 11.001088 | 67.3925 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 993.4631 |
| 15 | 2034 | 4,527 | 34 | 12.001088 | 68.1076 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 1095.2703 |
| 16 | 2035 | 4,614 | 34 | 13.001088 | 68.8304 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 1199.1263 |
| 17 | 2036 | 4,703 | 35 | 14.001088 | 69.5609 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 1305.0633 |
| 18 | 2037 | 4,793 | 35 | 15.001088 | 70.2991 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 1413.1137 |
| 19 | 2038 | 4,885 | 36 | 16.001088 | 71.0451 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 1523.3105 |
| 20 | 2039 | 4,978 | 36 | 17.001088 | 71.7990 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 1635.6870 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of Crossing Safety and Operation

USDOT Basic Accident Prediction Model for Dutch Hill Road At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains Factor (DT) | Max <br> Tiemtable Speed Factor (MS) | Main <br> Tracks Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 52 | 27 | 0.001088 | 15.7957 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0230 |
| 1 | 2020 | 53 | 27 | 0.001088 | 15.9633 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0233 |
| 2 | 2021 | 54 | 28 | 0.001088 | 16.1327 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0235 |
| 3 | 2022 | 55 | 28 | 0.001088 | 16.3038 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0238 |
| 4 | 2023 | 56 | 29 | 0.001088 | 16.4768 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0240 |
| 5 | 2024 | 57 | 29 | 0.001088 | 16.6517 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0243 |
| 6 | 2025 | 58 | 30 | 0.001088 | 16.8284 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0245 |
| 7 | 2026 | 59 | 30 | 0.001088 | 17.0069 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0248 |
| 8 | 2027 | 61 | 30 | 0.001088 | 17.1874 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0251 |
| 9 | 2028 | 62 | 31 | 0.001088 | 17.3698 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0253 |
| 10 | 2029 | 63 | 31 | 0.001088 | 17.5541 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0256 |
| 11 | 2030 | 64 | 32 | 0.001088 | 17.7403 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0259 |
| 12 | 2031 | 65 | 32 | 0.001088 | 17.9286 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0261 |
| 13 | 2032 | 67 | 33 | 0.001088 | 18.1188 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0264 |
| 14 | 2033 | 68 | 33 | 0.001088 | 18.3111 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0267 |
| 15 | 2034 | 69 | 34 | 0.001088 | 18.5054 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0270 |
| 16 | 2035 | 70 | 34 | 0.001088 | 18.7018 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0273 |
| 17 | 2036 | 72 | 35 | 0.001088 | 18.9002 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0276 |
| 18 | 2037 | 73 | 35 | 0.001088 | 19.1008 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0278 |
| 19 | 2038 | 75 | 36 | 0.001088 | 19.3035 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0281 |
| 20 | 2039 | 76 | 36 | 0.001088 | 19.5083 | 1.00 | 1.00 | 1.34 | 1.00 | 1.00 | 1.00 | 0.0284 |

Crossing Safety and Operation

USDOT Basic Accident Prediction Model for Red Oak Road At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Formula Constant (K) | Exposure <br> Factor (EI) | Day <br> Through <br> Trains <br> Factor (DT) | Max <br> Tiemtable Speed Factor (MS) | Main <br> Tracks <br> Factor (MT) | Highway Paved Factor (HP) | Highway Type Factor (HT) | Highway Lane Factor (HL) | Unnormalized Crash Prediction |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 279 | 27 | 0.003646 | 22.4532 | 1.26 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1320 |
| 1 | 2020 | 284 | 27 | 0.003646 | 22.6789 | 1.26 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1334 |
| 2 | 2021 | 290 | 28 | 0.003646 | 22.9069 | 1.26 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1348 |
| 3 | 2022 | 295 | 28 | 0.003646 | 27.5181 | 1.26 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1621 |
| 4 | 2023 | 301 | 29 | 0.003646 | 27.8102 | 1.26 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1639 |
| 5 | 2024 | 307 | 29 | 0.003646 | 28.1053 | 1.26 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1658 |
| 6 | 2025 | 313 | 30 | 0.003646 | 28.4035 | 1.26 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1677 |
| 7 | 2026 | 319 | 30 | 0.003646 | 28.7050 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1696 |
| 8 | 2027 | 325 | 30 | 0.003646 | 29.0096 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1715 |
| 9 | 2028 | 331 | 31 | 0.003646 | 29.3174 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1734 |
| 10 | 2029 | 337 | 31 | 0.003646 | 29.6286 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1754 |
| 11 | 2030 | 344 | 32 | 0.003646 | 29.9430 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1774 |
| 12 | 2031 | 350 | 32 | 0.003646 | 30.2607 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1794 |
| 13 | 2032 | 357 | 33 | 0.003646 | 30.5819 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1814 |
| 14 | 2033 | 364 | 33 | 0.003646 | 30.9064 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1835 |
| 15 | 2034 | 371 | 34 | 0.003646 | 31.2344 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1855 |
| 16 | 2035 | 378 | 34 | 0.003646 | 31.5658 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1876 |
| 17 | 2036 | 385 | 35 | 0.003646 | 31.9008 | 1.27 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1898 |
| 18 | 2037 | 393 | 35 | 0.003646 | 32.2394 | 1.28 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1919 |
| 19 | 2038 | 400 | 36 | 0.003646 | 32.5815 | 1.28 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1941 |
| 20 | 2039 | 408 | 36 | 0.003646 | 32.9272 | 1.28 | 1.00 | 1.11 | 1.00 | 1.00 | 1.15 | 0.1963 |

${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of
USDOT General Accident Prediction Model for Peewee Road At-Grade Crossing

|  | Calendar |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | ADT | Daily |  |  |  |  |  |  |
| Crossings | Un-normalized <br> Crash <br> Prediction ${ }^{1}$ | Recorded <br> Incidents in T <br> Years ( ( $)$ | \# Years of <br> Crash <br> Data (T) | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |  |  |  |
| 0 | 2019 | 367 | 27 | 0.0469 | 3 | 44 | 10.3213 | 0.0641 |
| 1 | 2020 | 369 | 27 | 0.0472 | 3 | 44 | 10.2886 | 0.0642 |
| 2 | 2021 | 372 | 28 | 0.0475 | 3 | 44 | 10.2559 | 0.0643 |
| 3 | 2022 | 374 | 28 | 0.0478 | 3 | 44 | 10.2233 | 0.0643 |
| 4 | 2023 | 376 | 29 | 0.0481 | 3 | 44 | 10.1906 | 0.0644 |
| 5 | 2024 | 378 | 29 | 0.0484 | 3 | 44 | 10.1579 | 0.0645 |
| 6 | 2025 | 381 | 30 | 0.0488 | 3 | 44 | 10.1252 | 0.0645 |
| 7 | 2026 | 383 | 30 | 0.0491 | 3 | 44 | 10.0925 | 0.0646 |
| 8 | 2027 | 385 | 30 | 0.0494 | 3 | 44 | 10.0598 | 0.0647 |
| 9 | 2028 | 388 | 31 | 0.0497 | 3 | 44 | 10.0271 | 0.0648 |
| 10 | 2029 | 390 | 31 | 0.0501 | 3 | 44 | 9.9944 | 0.0648 |
| 11 | 2030 | 392 | 32 | 0.0504 | 3 | 44 | 9.9617 | 0.0649 |
| 12 | 2031 | 395 | 32 | 0.0507 | 3 | 44 | 9.9290 | 0.0650 |
| 13 | 2032 | 397 | 33 | 0.0510 | 3 | 44 | 9.8963 | 0.0650 |
| 14 | 2033 | 400 | 33 | 0.0514 | 3 | 44 | 9.8636 | 0.0651 |
| 15 | 2034 | 402 | 34 | 0.0517 | 3 | 44 | 9.8309 | 0.0652 |
| 16 | 2035 | 405 | 34 | 0.0521 | 3 | 44 | 9.7982 | 0.0652 |
| 17 | 2036 | 407 | 35 | 0.0524 | 3 | 44 | 9.7655 | 0.0653 |
| 18 | 2037 | 410 | 35 | 0.0527 | 3 | 44 | 9.7328 | 0.0654 |
| 19 | 2038 | 412 | 36 | 0.0531 | 3 | 44 | 9.7001 | 0.0655 |
| 20 | 2039 | 415 | 36 | 0.0534 | 3 | 44 | 9.6675 | 0.0655 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  |  |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for Mineral Road At-Grade Crossing

|  | Calendar |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | ADT | Daily <br> Crossings | Un-normalized <br> Crash | Recorded <br> Incidents in T <br> Prediction ${ }^{1}$ | \# Years of <br> Crash <br> Cears | Formula <br> Weighting | Crash <br> Factor (To) | Probability (B) |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for Dewberry Road At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Un-normalized Crash Prediction ${ }^{1}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{gathered} \text { \# Years of } \\ \text { Crash } \\ \text { Data }(T) \end{gathered}$ | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 136 | 27 | 0.1202 | 2 | 44 | 5.8750 | 0.0543 |
| 1 | 2020 | 137 | 27 | 0.1213 | 2 | 44 | 5.8379 | 0.0543 |
| 2 | 2021 | 138 | 28 | 0.1224 | 2 | 44 | 5.8009 | 0.0544 |
| 3 | 2022 | 139 | 28 | 0.1235 | 2 | 44 | 5.7640 | 0.0545 |
| 4 | 2023 | 139 | 29 | 0.1246 | 2 | 44 | 5.7273 | 0.0546 |
| 5 | 2024 | 140 | 29 | 0.1257 | 2 | 44 | 5.6907 | 0.0546 |
| 6 | 2025 | 141 | 30 | 0.1269 | 2 | 44 | 5.6543 | 0.0547 |
| 7 | 2026 | 142 | 30 | 0.1280 | 2 | 44 | 5.6180 | 0.0548 |
| 8 | 2027 | 143 | 30 | 0.1292 | 2 | 44 | 5.5818 | 0.0549 |
| 9 | 2028 | 144 | 31 | 0.1303 | 2 | 44 | 5.5458 | 0.0550 |
| 10 | 2029 | 145 | 31 | 0.1315 | 2 | 44 | 5.5099 | 0.0550 |
| 11 | 2030 | 145 | 32 | 0.1327 | 2 | 44 | 5.4742 | 0.0551 |
| 12 | 2031 | 146 | 32 | 0.1339 | 2 | 44 | 5.4386 | 0.0552 |
| 13 | 2032 | 147 | 33 | 0.1351 | 2 | 44 | 5.4032 | 0.0553 |
| 14 | 2033 | 148 | 33 | 0.1363 | 2 | 44 | 5.3679 | 0.0553 |
| 15 | 2034 | 149 | 34 | 0.1375 | 2 | 44 | 5.3327 | 0.0554 |
| 16 | 2035 | 150 | 34 | 0.1388 | 2 | 44 | 5.2977 | 0.0555 |
| 17 | 2036 | 151 | 35 | 0.1400 | 2 | 44 | 5.2629 | 0.0556 |
| 18 | 2037 | 152 | 35 | 0.1413 | 2 | 44 | 5.2281 | 0.0556 |
| 19 | 2038 | 153 | 36 | 0.1425 | 2 | 44 | 5.1936 | 0.0557 |
| 20 | 2039 | 154 | 36 | 0.1438 | 2 | 44 | 5.1592 | 0.0558 |

${ }^{1}$ Derived from Appendix Table 1b

| Year | Calendar Year | ADT | $\begin{gathered} \text { Daily } \\ \text { Crossings } \end{gathered}$ | Un-normalized Crash Prediction ${ }^{1}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{aligned} & \text { \# Years of } \\ & \text { Crash } \\ & \text { Data }(T) \end{aligned}$ | Formula Weighting Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 71 | 27 | 0.0281 | 5 | 44 | 12.8035 | 0.0944 |
| 1 | 2020 | 71 | 27 | 0.0283 | 5 | 44 | 12.7733 | 0.0944 |
| 2 | 2021 | 72 | 28 | 0.0285 | 5 | 44 | 12.7431 | 0.0945 |
| 3 | 2022 | 72 | 28 | 0.0287 | 5 | 44 | 12.7128 | 0.0946 |
| 4 | 2023 | 73 | 29 | 0.0288 | 5 | 44 | 12.6825 | 0.0947 |
| 5 | 2024 | 73 | 29 | 0.0290 | 5 | 44 | 12.6521 | 0.0947 |
| 6 | 2025 | 74 | 30 | 0.0292 | 5 | 44 | 12.6217 | 0.0948 |
| 7 | 2026 | 74 | 30 | 0.0294 | 5 | 44 | 12.5912 | 0.0949 |
| 8 | 2027 | 75 | 30 | 0.0296 | 5 | 44 | 12.5607 | 0.0950 |
| 9 | 2028 | 75 | 31 | 0.0298 | 5 | 44 | 12.5301 | 0.0951 |
| 10 | 2029 | 75 | 31 | 0.0300 | 5 | 44 | 12.4995 | 0.0951 |
| 11 | 2030 | 76 | 32 | 0.0302 | 5 | 44 | 12.4688 | 0.0952 |
| 12 | 2031 | 76 | 32 | 0.0304 | 5 | 44 | 12.4381 | 0.0953 |
| 13 | 2032 | 77 | 33 | 0.0306 | 5 | 44 | 12.4073 | 0.0954 |
| 14 | 2033 | 77 | 33 | 0.0308 | 5 | 44 | 12.3764 | 0.0955 |
| 15 | 2034 | 78 | 34 | 0.0310 | 5 | 44 | 12.3456 | 0.0955 |
| 16 | 2035 | 78 | 34 | 0.0312 | 5 | 44 | 12.3146 | 0.0956 |
| 17 | 2036 | 79 | 35 | 0.0314 | 5 | 44 | 12.2837 | 0.0957 |
| 18 | 2037 | 79 | 35 | 0.0316 | 5 | 44 | 12.2526 | 0.0958 |
| 19 | 2038 | 80 | 36 | 0.0318 | 5 | 44 | 12.2216 | 0.0959 |
| 20 | 2039 | 80 | 36 | 0.0320 | 5 | 44 | 12.1905 | 0.0959 |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for E Box School Loop At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Un-normalized Crash Prediction ${ }^{1}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{gathered} \text { \# Years of } \\ \text { Crash } \\ \text { Data (T) } \end{gathered}$ | Formula <br> Weighting <br> Factor (To) | Crash Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 27 | 0.0701 | 1 | 44 | 8.3246 | 0.0303 |
| 1 | 2020 | 27 | 27 | 0.0708 | 1 | 44 | 8.2811 | 0.0303 |
| 2 | 2021 | 27 | 28 | 0.0714 | 1 | 44 | 8.2376 | 0.0304 |
| 3 | 2022 | 27 | 28 | 0.0720 | 1 | 44 | 8.1942 | 0.0305 |
| 4 | 2023 | 28 | 29 | 0.0727 | 1 | 44 | 8.1509 | 0.0305 |
| 5 | 2024 | 28 | 29 | 0.0733 | 1 | 44 | 8.1076 | 0.0306 |
| 6 | 2025 | 28 | 30 | 0.0740 | 1 | 44 | 8.0644 | 0.0307 |
| 7 | 2026 | 28 | 30 | 0.0747 | 1 | 44 | 8.0213 | 0.0307 |
| 8 | 2027 | 28 | 30 | 0.0753 | 1 | 44 | 7.9783 | 0.0308 |
| 9 | 2028 | 29 | 31 | 0.0760 | 1 | 44 | 7.9353 | 0.0309 |
| 10 | 2029 | 29 | 31 | 0.0767 | 1 | 44 | 7.8924 | 0.0309 |
| 11 | 2030 | 29 | 32 | 0.0774 | 1 | 44 | 7.8496 | 0.0310 |
| 12 | 2031 | 29 | 32 | 0.0781 | 1 | 44 | 7.8069 | 0.0311 |
| 13 | 2032 | 29 | 33 | 0.0788 | 1 | 44 | 7.7643 | 0.0311 |
| 14 | 2033 | 29 | 33 | 0.0795 | 1 | 44 | 7.7217 | 0.0312 |
| 15 | 2034 | 30 | 34 | 0.0802 | 1 | 44 | 7.6793 | 0.0313 |
| 16 | 2035 | 30 | 34 | 0.0809 | 1 | 44 | 7.6369 | 0.0313 |
| 17 | 2036 | 30 | 35 | 0.0817 | 1 | 44 | 7.5946 | 0.0314 |
| 18 | 2037 | 30 | 35 | 0.0824 | 1 | 44 | 7.5524 | 0.0315 |
| 19 | 2038 | 30 | 36 | 0.0832 | 1 | 44 | 7.5103 | 0.0315 |
| 20 | 2039 | 31 | 36 | 0.0839 | 1 | 44 | 7.4682 | 0.0316 |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for Oak Lawn At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Un-normalized Crash Prediction ${ }^{1}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{aligned} & \text { \# Years of } \\ & \text { Crash } \\ & \text { Data }(T) \end{aligned}$ | Formula Weighting Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 1,048 | 27 | 0.2375 | 4 | 44 | 3.4786 | 0.1016 |
| 1 | 2020 | 1,054 | 27 | 0.2396 | 4 | 44 | 3.4529 | 0.1017 |
| 2 | 2021 | 1,061 | 28 | 0.2418 | 4 | 44 | 3.4274 | 0.1018 |
| 3 | 2022 | 1,067 | 28 | 0.0556 | 4 | 44 | 9.4670 | 0.0847 |
| 4 | 2023 | 1,074 | 29 | 51.5216 | 4 | 44 | 0.0194 | 0.1136 |
| 5 | 2024 | 1,080 | 29 | 103.6631 | 4 | 44 | 0.0096 | 0.1136 |
| 6 | 2025 | 1,087 | 30 | 156.4866 | 4 | 44 | 0.0064 | 0.1136 |
| 7 | 2026 | 1,094 | 30 | 209.9990 | 4 | 44 | 0.0048 | 0.1136 |
| 8 | 2027 | 1,100 | 30 | 264.2070 | 4 | 44 | 0.0038 | 0.1136 |
| 9 | 2028 | 1,107 | 31 | 319.1173 | 4 | 44 | 0.0031 | 0.1136 |
| 10 | 2029 | 1,114 | 31 | 374.7370 | 4 | 44 | 0.0027 | 0.1136 |
| 11 | 2030 | 1,121 | 32 | 431.0728 | 4 | 44 | 0.0023 | 0.1136 |
| 12 | 2031 | 1,128 | 32 | 488.1319 | 4 | 44 | 0.0020 | 0.1136 |
| 13 | 2032 | 1,135 | 33 | 545.9214 | 4 | 44 | 0.0018 | 0.1136 |
| 14 | 2033 | 1,141 | 33 | 604.4482 | 4 | 44 | 0.0017 | 0.1136 |
| 15 | 2034 | 1,148 | 34 | 663.7197 | 4 | 44 | 0.0015 | 0.1136 |
| 16 | 2035 | 1,155 | 34 | 723.7430 | 4 | 44 | 0.0014 | 0.1136 |
| 17 | 2036 | 1,163 | 35 | 784.5255 | 4 | 44 | 0.0013 | 0.1136 |
| 18 | 2037 | 1,170 | 35 | 846.0746 | 4 | 44 | 0.0012 | 0.1136 |
| 19 | 2038 | 1,177 | 36 | 908.3977 | 4 | 44 | 0.0011 | 0.1136 |
| 20 | 2039 | 1,184 | 36 | 971.5024 | 4 | 44 | 0.0010 | 0.1136 |
| Source: Crash Prediction based on ${ }^{1}$ Derived from Appendix Table 1b |  |  |  |  |  |  |  |  |


|  | Calendar |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | ADT | Daily <br> Crossings | Un-normalized <br> Crash | Recorded <br> Incidents in $T$ <br> Prediction | \# Years of <br> Crash <br> Years $(N)$ | Formula <br> Weighting | Crash | Factor (To) |$:$| Probability (B) |
| :---: |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for Highway NN At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | $\begin{aligned} & \text { Un-normalized } \\ & \text { Crash } \\ & \text { Prediction }^{1} \end{aligned}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{aligned} & \text { \# Years of } \\ & \text { Crash } \\ & \text { Data }(T) \end{aligned}$ | Formula Weighting Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 626 | 27 | 0.0554 | 1 | 44 | 9.4899 | 0.0285 |
| 1 | 2020 | 630 | 27 | 0.0557 | 1 | 44 | 9.4573 | 0.0286 |
| 2 | 2021 | 634 | 28 | 0.0561 | 1 | 44 | 9.4247 | 0.0286 |
| 3 | 2022 | 638 | 28 | 0.0565 | 1 | 44 | 9.3921 | 0.0287 |
| 4 | 2023 | 641 | 29 | 0.0568 | 1 | 44 | 9.3595 | 0.0287 |
| 5 | 2024 | 645 | 29 | 0.0572 | 1 | 44 | 9.3270 | 0.0288 |
| 6 | 2025 | 649 | 30 | 0.0576 | 1 | 44 | 9.2944 | 0.0288 |
| 7 | 2026 | 653 | 30 | 0.0580 | 1 | 44 | 9.2619 | 0.0289 |
| 8 | 2027 | 657 | 30 | 0.0583 | 1 | 44 | 9.2294 | 0.0289 |
| 9 | 2028 | 661 | 31 | 0.0587 | 1 | 44 | 9.1969 | 0.0290 |
| 10 | 2029 | 665 | 31 | 0.0591 | 1 | 44 | 9.1644 | 0.0290 |
| 11 | 2030 | 669 | 32 | 0.0595 | 1 | 44 | 9.1319 | 0.0290 |
| 12 | 2031 | 674 | 32 | 0.0599 | 1 | 44 | 9.0995 | 0.0291 |
| 13 | 2032 | 678 | 33 | 0.0603 | 1 | 44 | 9.0670 | 0.0291 |
| 14 | 2033 | 682 | 33 | 0.0607 | 1 | 44 | 9.0346 | 0.0292 |
| 15 | 2034 | 686 | 34 | 0.0611 | 1 | 44 | 9.0022 | 0.0292 |
| 16 | 2035 | 690 | 34 | 0.0615 | 1 | 44 | 8.9699 | 0.0293 |
| 17 | 2036 | 694 | 35 | 0.0619 | 1 | 44 | 8.9375 | 0.0293 |
| 18 | 2037 | 699 | 35 | 0.0623 | 1 | 44 | 8.9052 | 0.0294 |
| 19 | 2038 | 703 | 36 | 0.0627 | 1 | 44 | 8.8729 | 0.0294 |
| 20 | 2039 | 707 | 36 | 0.0631 | 1 | 44 | 8.8406 | 0.0295 |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for W Box School Loop At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | Un-normalized Crash Prediction ${ }^{1}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{aligned} & \text { \# Years of } \\ & \text { Crash } \\ & \text { Data (T) } \end{aligned}$ | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 72 | 27 | 0.0972 | 2 | 44 | 6.7914 | 0.0524 |
| 1 | 2020 | 72 | 27 | 0.0981 | 2 | 44 | 6.7512 | 0.0525 |
| 2 | 2021 | 73 | 28 | 0.0990 | 2 | 44 | 6.7112 | 0.0525 |
| 3 | 2022 | 73 | 28 | 0.0999 | 2 | 44 | 6.6713 | 0.0526 |
| 4 | 2023 | 74 | 29 | 0.1008 | 2 | 44 | 6.6314 | 0.0527 |
| 5 | 2024 | 74 | 29 | 0.1017 | 2 | 44 | 6.5918 | 0.0528 |
| 6 | 2025 | 75 | 30 | 0.1026 | 2 | 44 | 6.5522 | 0.0529 |
| 7 | 2026 | 75 | 30 | 0.1035 | 2 | 44 | 6.5128 | 0.0529 |
| 8 | 2027 | 76 | 30 | 0.1045 | 2 | 44 | 6.4734 | 0.0530 |
| 9 | 2028 | 76 | 31 | 0.1054 | 2 | 44 | 6.4342 | 0.0531 |
| 10 | 2029 | 77 | 31 | 0.1064 | 2 | 44 | 6.3952 | 0.0532 |
| 11 | 2030 | 77 | 32 | 0.1073 | 2 | 44 | 6.3562 | 0.0533 |
| 12 | 2031 | 77 | 32 | 0.1083 | 2 | 44 | 6.3174 | 0.0533 |
| 13 | 2032 | 78 | 33 | 0.1093 | 2 | 44 | 6.2787 | 0.0534 |
| 14 | 2033 | 78 | 33 | 0.1103 | 2 | 44 | 6.2401 | 0.0535 |
| 15 | 2034 | 79 | 34 | 0.1112 | 2 | 44 | 6.2017 | 0.0536 |
| 16 | 2035 | 79 | 34 | 0.1122 | 2 | 44 | 6.1634 | 0.0537 |
| 17 | 2036 | 80 | 35 | 0.1133 | 2 | 44 | 6.1252 | 0.0537 |
| 18 | 2037 | 80 | 35 | 0.1143 | 2 | 44 | 6.0871 | 0.0538 |
| 19 | 2038 | 81 | 36 | 0.1153 | 2 | 44 | 6.0492 | 0.0539 |
| 20 | 2039 | 81 | 36 | 0.1163 | 2 | 44 | 6.0114 | 0.0540 |

${ }^{1}$ Derived from Appendix Table 1b

|  | Calendar |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | ADT | Daily | Crossings | Un-normalized |  |  |  |  |
| Crash |  |  |  |  |  |  |  |  |
| Prediction ${ }^{1}$ | Recorded <br> Incidents in T <br> Years (N) | \# Years of <br> Crash <br> Data (T) | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |  |  |  |  |
| 0 | 2019 | 10 | 27 | 0.0504 | 0 | 44 | 9.9636 | 0.0093 |
| 1 | 2020 | 10 | 27 | 0.0508 | 0 | 44 | 9.9188 | 0.0093 |
| 2 | 2021 | 10 | 28 | 0.0513 | 0 | 44 | 9.8740 | 0.0094 |
| 3 | 2022 | 10 | 28 | 0.0517 | 0 | 44 | 9.8292 | 0.0094 |
| 4 | 2023 | 10 | 29 | 0.0522 | 0 | 44 | 9.7844 | 0.0095 |
| 5 | 2024 | 10 | 29 | 0.0527 | 0 | 44 | 9.7397 | 0.0095 |
| 6 | 2025 | 10 | 30 | 0.0531 | 0 | 44 | 9.6949 | 0.0096 |
| 7 | 2026 | 10 | 30 | 0.0536 | 0 | 44 | 9.6501 | 0.0096 |
| 8 | 2027 | 11 | 30 | 0.0541 | 0 | 44 | 9.6054 | 0.0097 |
| 9 | 2028 | 11 | 31 | 0.0546 | 0 | 44 | 9.5606 | 0.0097 |
| 10 | 2029 | 11 | 31 | 0.0551 | 0 | 44 | 9.5159 | 0.0098 |
| 11 | 2030 | 11 | 32 | 0.0556 | 0 | 44 | 9.4712 | 0.0098 |
| 12 | 2031 | 11 | 32 | 0.0561 | 0 | 44 | 9.4265 | 0.0099 |
| 13 | 2032 | 11 | 33 | 0.0566 | 0 | 44 | 9.3818 | 0.0099 |
| 14 | 2033 | 11 | 33 | 0.0571 | 0 | 44 | 9.3372 | 0.0100 |
| 15 | 2034 | 11 | 34 | 0.0576 | 0 | 44 | 9.2926 | 0.0100 |
| 16 | 2035 | 11 | 34 | 0.0581 | 0 | 44 | 9.2480 | 0.0101 |
| 17 | 2036 | 11 | 35 | 0.0587 | 0 | 44 | 9.2034 | 0.0101 |
| 18 | 2037 | 11 | 35 | 0.0592 | 0 | 44 | 9.1589 | 0.0102 |
| 19 | 2038 | 11 | 36 | 0.0597 | 0 | 44 | 9.1144 | 0.0102 |
| 20 | 2039 | 11 | 36 | 0.0603 | 0 | 44 | 9.0699 | 0.0103 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  |  |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for Hummingbird Lane At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | $\begin{aligned} & \text { Un-normalized } \\ & \text { Crash } \\ & \text { Prediction }{ }^{1} \end{aligned}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{gathered} \text { \# Years of } \\ \text { Crash } \\ \text { Data (T) } \end{gathered}$ | Formula <br> Weighting <br> Factor (To) | $\begin{gathered} \text { Crash } \\ \text { Probability (B) } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 33 | 27 | 0.0750 | 0 | 44 | 8.0015 | 0.0115 |
| 1 | 2020 | 33 | 27 | 0.0757 | 0 | 44 | 7.9585 | 0.0116 |
| 2 | 2021 | 33 | 28 | 0.0763 | 0 | 44 | 7.9156 | 0.0116 |
| 3 | 2022 | 34 | 28 | 0.0770 | 0 | 44 | 7.8727 | 0.0117 |
| 4 | 2023 | 34 | 29 | 0.0777 | 0 | 44 | 7.8300 | 0.0117 |
| 5 | 2024 | 34 | 29 | 0.0784 | 0 | 44 | 7.7873 | 0.0118 |
| 6 | 2025 | 34 | 30 | 0.0791 | 0 | 44 | 7.7447 | 0.0118 |
| 7 | 2026 | 34 | 30 | 0.0798 | 0 | 44 | 7.7022 | 0.0119 |
| 8 | 2027 | 35 | 30 | 0.0806 | 0 | 44 | 7.6598 | 0.0119 |
| 9 | 2028 | 35 | 31 | 0.0813 | 0 | 44 | 7.6175 | 0.0120 |
| 10 | 2029 | 35 | 31 | 0.0820 | 0 | 44 | 7.5752 | 0.0120 |
| 11 | 2030 | 35 | 32 | 0.0827 | 0 | 44 | 7.5331 | 0.0121 |
| 12 | 2031 | 36 | 32 | 0.0835 | 0 | 44 | 7.4910 | 0.0121 |
| 13 | 2032 | 36 | 33 | 0.0842 | 0 | 44 | 7.4490 | 0.0122 |
| 14 | 2033 | 36 | 33 | 0.0850 | 0 | 44 | 7.4071 | 0.0122 |
| 15 | 2034 | 36 | 34 | 0.0858 | 0 | 44 | 7.3654 | 0.0123 |
| 16 | 2035 | 36 | 34 | 0.0865 | 0 | 44 | 7.3237 | 0.0123 |
| 17 | 2036 | 37 | 35 | 0.0873 | 0 | 44 | 7.2821 | 0.0124 |
| 18 | 2037 | 37 | 35 | 0.0881 | 0 | 44 | 7.2406 | 0.0125 |
| 19 | 2038 | 37 | 36 | 0.0889 | 0 | 44 | 7.1992 | 0.0125 |
| 20 | 2039 | 37 | 36 | 0.0897 | 0 | 44 | 7.1580 | 0.0126 |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for Tandy Lane At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | $\begin{aligned} & \text { Un-normalized } \\ & \text { Crash }^{\text {Prediction }}{ }^{1} \end{aligned}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{aligned} & \text { \# Years of } \\ & \text { Crash } \\ & \text { Data (T) } \end{aligned}$ | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 263 | 27 | 0.0423 | 2 | 44 | 10.8386 | 0.0448 |
| 1 | 2020 | 265 | 27 | 0.0425 | 2 | 44 | 10.8061 | 0.0449 |
| 2 | 2021 | 266 | 28 | 0.0428 | 2 | 44 | 10.7736 | 0.0449 |
| 3 | 2022 | 268 | 28 | 0.0431 | 2 | 44 | 10.7411 | 0.0450 |
| 4 | 2023 | 269 | 29 | 0.0434 | 2 | 44 | 10.7085 | 0.0450 |
| 5 | 2024 | 271 | 29 | 0.0437 | 2 | 44 | 10.6760 | 0.0451 |
| 6 | 2025 | 273 | 30 | 0.0440 | 2 | 44 | 10.6434 | 0.0452 |
| 7 | 2026 | 274 | 30 | 0.0442 | 2 | 44 | 10.6108 | 0.0452 |
| 8 | 2027 | 276 | 30 | 0.0445 | 2 | 44 | 10.5783 | 0.0453 |
| 9 | 2028 | 278 | 31 | 0.0448 | 2 | 44 | 10.5457 | 0.0453 |
| 10 | 2029 | 280 | 31 | 0.0451 | 2 | 44 | 10.5130 | 0.0454 |
| 11 | 2030 | 281 | 32 | 0.0454 | 2 | 44 | 10.4804 | 0.0454 |
| 12 | 2031 | 283 | 32 | 0.0457 | 2 | 44 | 10.4478 | 0.0455 |
| 13 | 2032 | 285 | 33 | 0.0460 | 2 | 44 | 10.4152 | 0.0456 |
| 14 | 2033 | 286 | 33 | 0.0463 | 2 | 44 | 10.3825 | 0.0456 |
| 15 | 2034 | 288 | 34 | 0.0466 | 2 | 44 | 10.3498 | 0.0457 |
| 16 | 2035 | 290 | 34 | 0.0469 | 2 | 44 | 10.3172 | 0.0457 |
| 17 | 2036 | 292 | 35 | 0.0472 | 2 | 44 | 10.2845 | 0.0458 |
| 18 | 2037 | 294 | 35 | 0.0475 | 2 | 44 | 10.2518 | 0.0458 |
| 19 | 2038 | 295 | 36 | 0.0479 | 2 | 44 | 10.2191 | 0.0459 |
| 20 | 2039 | 297 | 36 | 0.0482 | 2 | 44 | 10.1864 | 0.0460 |

[^21]| Year | Calendar Year | ADT | Daily Crossings | Un-normalized Crash Prediction ${ }^{1}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{gathered} \text { \# Years of } \\ \text { Crash } \\ \text { Data }(T) \end{gathered}$ | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 830 | 27 | 0.0605 | 3 | 44 | 9.0528 | 0.0669 |
| 1 | 2020 | 846 | 27 | 0.0611 | 3 | 44 | 9.0006 | 0.0670 |
| 2 | 2021 | 862 | 28 | 0.0618 | 3 | 44 | 8.9483 | 0.0671 |
| 3 | 2022 | 879 | 28 | 0.0624 | 3 | 44 | 8.8962 | 0.0672 |
| 4 | 2023 | 896 | 29 | 0.0631 | 3 | 44 | 8.8441 | 0.0673 |
| 5 | 2024 | 913 | 29 | 0.0637 | 3 | 44 | 8.7920 | 0.0674 |
| 6 | 2025 | 930 | 30 | 0.0644 | 3 | 44 | 8.7400 | 0.0676 |
| 7 | 2026 | 948 | 30 | 0.0651 | 3 | 44 | 8.6881 | 0.0677 |
| 8 | 2027 | 966 | 30 | 0.0658 | 3 | 44 | 8.6363 | 0.0678 |
| 9 | 2028 | 985 | 31 | 0.0665 | 3 | 44 | 8.5845 | 0.0679 |
| 10 | 2029 | 1,004 | 31 | 0.0672 | 3 | 44 | 8.5328 | 0.0680 |
| 11 | 2030 | 1,023 | 32 | 0.0613 | 3 | 44 | 8.9836 | 0.0670 |
| 12 | 2031 | 1,042 | 32 | 0.0620 | 3 | 44 | 8.9314 | 0.0671 |
| 13 | 2032 | 1,062 | 33 | 0.0626 | 3 | 44 | 8.8792 | 0.0672 |
| 14 | 2033 | 1,083 | 33 | 0.0633 | 3 | 44 | 8.8271 | 0.0674 |
| 15 | 2034 | 1,104 | 34 | 0.0640 | 3 | 44 | 8.7751 | 0.0675 |
| 16 | 2035 | 1,125 | 34 | 0.0646 | 3 | 44 | 8.7232 | 0.0676 |
| 17 | 2036 | 1,146 | 35 | 0.0653 | 3 | 44 | 8.6713 | 0.0677 |
| 18 | 2037 | 1,168 | 35 | 0.0660 | 3 | 44 | 8.6195 | 0.0678 |
| 19 | 2038 | 1,191 | 36 | 0.0667 | 3 | 44 | 8.5677 | 0.0679 |
| 20 | 2039 | 1,213 | 36 | 0.0674 | 3 | 44 | 8.5161 | 0.0681 |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for Carpenter Street At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | $\begin{aligned} & \text { Un-normalized } \\ & \text { Crash } \\ & \text { Prediction }{ }^{1} \end{aligned}$ | Recorded Incidents in $T$ Years ( $N$ ) | \# Years of Crash Data (T) | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 86 | 27 | 0.0298 | 0 | 44 | 12.5261 | 0.0066 |
| 1 | 2020 | 87 | 27 | 0.0300 | 0 | 44 | 12.4955 | 0.0066 |
| 2 | 2021 | 2,413 | 28 | 0.0302 | 0 | 44 | 12.4648 | 0.0067 |
| 3 | 2022 | 88 | 28 | 0.0304 | 0 | 44 | 12.4340 | 0.0067 |
| 4 | 2023 | 88 | 29 | 0.0306 | 0 | 44 | 12.4032 | 0.0067 |
| 5 | 2024 | 89 | 29 | 0.0308 | 0 | 44 | 12.3724 | 0.0068 |
| 6 | 2025 | 2,413 | 30 | 0.0867 | 0 | 44 | 7.3156 | 0.0124 |
| 7 | 2026 | 2,428 | 30 | 0.0873 | 0 | 44 | 7.2852 | 0.0124 |
| 8 | 2027 | 2,443 | 30 | 0.0878 | 0 | 44 | 7.2550 | 0.0124 |
| 9 | 2028 | 2,458 | 31 | 0.0884 | 0 | 44 | 7.2248 | 0.0125 |
| 10 | 2029 | 2,473 | 31 | 0.0890 | 0 | 44 | 7.1946 | 0.0125 |
| 11 | 2030 | 2,488 | 32 | 0.0896 | 0 | 44 | 7.1645 | 0.0125 |
| 12 | 2031 | 2,503 | 32 | 0.0902 | 0 | 44 | 7.1344 | 0.0126 |
| 13 | 2032 | 2,518 | 33 | 0.0908 | 0 | 44 | 7.1045 | 0.0126 |
| 14 | 2033 | 2,534 | 33 | 0.0914 | 0 | 44 | 7.0745 | 0.0127 |
| 15 | 2034 | 2,549 | 34 | 0.0920 | 0 | 44 | 7.0446 | 0.0127 |
| 16 | 2035 | 2,565 | 34 | 0.0926 | 0 | 44 | 7.0148 | 0.0127 |
| 17 | 2036 | 2,581 | 35 | 0.0932 | 0 | 44 | 6.9851 | 0.0128 |
| 18 | 2037 | 2,596 | 35 | 0.0938 | 0 | 44 | 6.9554 | 0.0128 |
| 19 | 2038 | 2,612 | 36 | 0.0944 | 0 | 44 | 6.9257 | 0.0128 |
| 20 | 2039 | 2,628 | 36 | 0.0950 | 0 | 44 | 6.8961 | 0.0129 |

${ }^{1}$ Derived from Appendix Table 1b

USDOT General Accident Prediction Model for Highway Z At-Grade Crossing

| Year | Calendar Year | ADT | Daily Crossings | $\begin{aligned} & \text { Un-normalized } \\ & \text { Crash }^{\text {Prediction }}{ }^{1} \end{aligned}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{aligned} & \text { \# Years of } \\ & \text { Crash } \\ & \text { Data }(T) \end{aligned}$ | Formula Weighting Factor (To) | Crash Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 911 | 27 | 0.0622 | 1 | 44 | 8.9093 | 0.0294 |
| 1 | 2020 | 917 | 27 | 0.0627 | 1 | 44 | 8.8770 | 0.0294 |
| 2 | 2021 | 922 | 28 | 0.0631 | 1 | 44 | 8.8447 | 0.0295 |
| 3 | 2022 | 928 | 28 | 0.0635 | 1 | 44 | 8.8124 | 0.0295 |
| 4 | 2023 | 934 | 29 | 0.0639 | 1 | 44 | 8.7802 | 0.0296 |
| 5 | 2024 | 939 | 29 | 0.0643 | 1 | 44 | 8.7480 | 0.0296 |
| 6 | 2025 | 945 | 30 | 0.0647 | 1 | 44 | 8.7158 | 0.0297 |
| 7 | 2026 | 951 | 30 | 0.0652 | 1 | 44 | 8.6837 | 0.0297 |
| 8 | 2027 | 957 | 30 | 0.0656 | 1 | 44 | 8.6516 | 0.0298 |
| 9 | 2028 | 962 | 31 | 0.0660 | 1 | 44 | 8.6195 | 0.0298 |
| 10 | 2029 | 968 | 31 | 0.0664 | 1 | 44 | 8.5874 | 0.0299 |
| 11 | 2030 | 974 | 32 | 0.0669 | 1 | 44 | 8.5554 | 0.0299 |
| 12 | 2031 | 980 | 32 | 0.0673 | 1 | 44 | 8.5234 | 0.0300 |
| 13 | 2032 | 986 | 33 | 0.0678 | 1 | 44 | 8.4914 | 0.0300 |
| 14 | 2033 | 992 | 33 | 0.0682 | 1 | 44 | 8.4594 | 0.0301 |
| 15 | 2034 | 998 | 34 | 0.0687 | 1 | 44 | 8.4275 | 0.0301 |
| 16 | 2035 | 1,004 | 34 | 0.0691 | 1 | 44 | 8.3956 | 0.0302 |
| 17 | 2036 | 1,011 | 35 | 0.0696 | 1 | 44 | 8.3638 | 0.0302 |
| 18 | 2037 | 1,017 | 35 | 0.0700 | 1 | 44 | 8.3320 | 0.0303 |
| 19 | 2038 | 1,023 | 36 | 0.0705 | 1 | 44 | 8.3002 | 0.0303 |
| 20 | 2039 | 1,029 | 36 | 0.0709 | 1 | 44 | 8.2685 | 0.0304 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  |  |

[^22]| Year | Calendar Year | ADT | Daily Crossings | Un-normalized Crash Prediction ${ }^{1}$ | Recorded Incidents in T Years ( $N$ ) | $\begin{aligned} & \text { \# Years of } \\ & \text { Crash } \\ & \text { Data }(T) \end{aligned}$ | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 89 | 27 | 0.1643 | 2 | 44 | 4.6667 | 0.0568 |
| 1 | 2020 | 91 | 27 | 0.1665 | 2 | 44 | 4.6194 | 0.0570 |
| 2 | 2021 | 3,537 | 28 | 0.5686 | 2 | 44 | 1.6166 | 0.0640 |
| 3 | 2022 | 3,605 | 28 | 0.0875 | 2 | 44 | 7.2737 | 0.0514 |
| 4 | 2023 | 3,674 | 29 | 81.3472 | 2 | 44 | 0.0123 | 0.0681 |
| 5 | 2024 | 3,744 | 29 | 164.3317 | 2 | 44 | 0.0061 | 0.0682 |
| 6 | 2025 | 3,816 | 30 | 249.0682 | 2 | 44 | 0.0040 | 0.0682 |
| 7 | 2026 | 3,889 | 30 | 335.5848 | 2 | 44 | 0.0030 | 0.0682 |
| 8 | 2027 | 3,964 | 30 | 423.9096 | 2 | 44 | 0.0024 | 0.0682 |
| 9 | 2028 | 4,040 | 31 | 514.0712 | 2 | 44 | 0.0019 | 0.0682 |
| 10 | 2029 | 4,117 | 31 | 606.0988 | 2 | 44 | 0.0016 | 0.0682 |
| 11 | 2030 | 4,196 | 32 | 700.0217 | 2 | 44 | 0.0014 | 0.0682 |
| 12 | 2031 | 4,277 | 32 | 795.8698 | 2 | 44 | 0.0013 | 0.0682 |
| 13 | 2032 | 4,359 | 33 | 893.6733 | 2 | 44 | 0.0011 | 0.0682 |
| 14 | 2033 | 4,442 | 33 | 993.4631 | 2 | 44 | 0.0010 | 0.0682 |
| 15 | 2034 | 4,527 | 34 | 1095.2703 | 2 | 44 | 0.0009 | 0.0682 |
| 16 | 2035 | 4,614 | 34 | 1199.1263 | 2 | 44 | 0.0008 | 0.0682 |
| 17 | 2036 | 4,703 | 35 | 1305.0633 | 2 | 44 | 0.0008 | 0.0682 |
| 18 | 2037 | 4,793 | 35 | 1413.1137 | 2 | 44 | 0.0007 | 0.0682 |
| 19 | 2038 | 4,885 | 36 | 1523.3105 | 2 | 44 | 0.0007 | 0.0682 |
| 20 | 2039 | 4,978 | 36 | 1635.6870 | 2 | 44 | 0.0006 | 0.0682 |

Guide Crossing Handbook-Section 3 Assessment of Crossing Safety and Operation
${ }^{1}$ Derived from Appendix Table 1a

| Year | Calendar Year | ADT | $\begin{aligned} & \text { Daily } \\ & \text { Crossings } \end{aligned}$ | Un-normalized Crash Prediction ${ }^{1}$ | Recorded Incidents in $T$ Years ( $N$ ) | \# Years of <br> Crash <br> Data (T) | Formula <br> Weighting <br> Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 52 | 27 | 0.0230 | 0 | 44 | 13.6932 | 0.0055 |
| 1 | 2020 | 53 | 27 | 0.0233 | 0 | 44 | 13.6476 | 0.0055 |
| 2 | 2021 | 54 | 28 | 0.0235 | 0 | 44 | 13.6017 | 0.0056 |
| 3 | 2022 | 55 | 28 | 0.0238 | 0 | 44 | 13.5557 | 0.0056 |
| 4 | 2023 | 56 | 29 | 0.0240 | 0 | 44 | 13.5095 | 0.0056 |
| 5 | 2024 | 57 | 29 | 0.0243 | 0 | 44 | 13.4632 | 0.0057 |
| 6 | 2025 | 58 | 30 | 0.0245 | 0 | 44 | 13.4166 | 0.0057 |
| 7 | 2026 | 59 | 30 | 0.0248 | 0 | 44 | 13.3699 | 0.0058 |
| 8 | 2027 | 61 | 30 | 0.0251 | 0 | 44 | 13.3231 | 0.0058 |
| 9 | 2028 | 62 | 31 | 0.0253 | 0 | 44 | 13.2760 | 0.0059 |
| 10 | 2029 | 63 | 31 | 0.0256 | 0 | 44 | 13.2288 | 0.0059 |
| 11 | 2030 | 64 | 32 | 0.0259 | 0 | 44 | 13.1815 | 0.0060 |
| 12 | 2031 | 65 | 32 | 0.0261 | 0 | 44 | 13.1340 | 0.0060 |
| 13 | 2032 | 67 | 33 | 0.0264 | 0 | 44 | 13.0863 | 0.0061 |
| 14 | 2033 | 68 | 33 | 0.0267 | 0 | 44 | 13.0385 | 0.0061 |
| 15 | 2034 | 69 | 34 | 0.0270 | 0 | 44 | 12.9905 | 0.0061 |
| 16 | 2035 | 70 | 34 | 0.0273 | 0 | 44 | 12.9424 | 0.0062 |
| 17 | 2036 | 72 | 35 | 0.0276 | 0 | 44 | 12.8941 | 0.0062 |
| 18 | 2037 | 73 | 35 | 0.0278 | 0 | 44 | 12.8456 | 0.0063 |
| 19 | 2038 | 75 | 36 | 0.0281 | 0 | 44 | 12.7971 | 0.0063 |
| 20 | 2039 | 76 | 36 | 0.0284 | 0 | 44 | 12.7483 | 0.0064 |

Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of Crossing Safety and Operation
${ }^{1}$ Derived from Appendix Table 1b
USDOT General Accident Prediction Model for Red Oak Road At-Grade Crossing

| Year | Calendar Year | ADT | $\begin{gathered} \text { Daily } \\ \text { Crossings } \end{gathered}$ | $\begin{aligned} & \text { Un-normalized } \\ & \text { Crash } \\ & \text { Prediction }{ }^{1} \end{aligned}$ | Recorded Incidents in $T$ Years ( $N$ ) | $\begin{aligned} & \text { \# Years of } \\ & \text { Crash } \\ & \text { Data }(T) \end{aligned}$ | Formula Weighting Factor (To) | Crash <br> Probability (B) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 279 | 27 | 0.1320 | 1 | 44 | 5.4947 | 0.0349 |
| 1 | 2020 | 284 | 27 | 0.1334 | 1 | 44 | 5.4521 | 0.0349 |
| 2 | 2021 | 290 | 28 | 0.1348 | 1 | 44 | 5.4098 | 0.0350 |
| 3 | 2022 | 295 | 28 | 0.1621 | 1 | 44 | 4.7146 | 0.0362 |
| 4 | 2023 | 301 | 29 | 0.1639 | 1 | 44 | 4.6742 | 0.0363 |
| 5 | 2024 | 307 | 29 | 0.1658 | 1 | 44 | 4.6340 | 0.0364 |
| 6 | 2025 | 313 | 30 | 0.1677 | 1 | 44 | 4.5941 | 0.0364 |
| 7 | 2026 | 319 | 30 | 0.1696 | 1 | 44 | 4.5544 | 0.0365 |
| 8 | 2027 | 325 | 30 | 0.1715 | 1 | 44 | 4.5149 | 0.0366 |
| 9 | 2028 | 331 | 31 | 0.1734 | 1 | 44 | 4.4757 | 0.0366 |
| 10 | 2029 | 337 | 31 | 0.1754 | 1 | 44 | 4.4367 | 0.0367 |
| 11 | 2030 | 344 | 32 | 0.1774 | 1 | 44 | 4.3980 | 0.0368 |
| 12 | 2031 | 350 | 32 | 0.1794 | 1 | 44 | 4.3595 | 0.0368 |
| 13 | 2032 | 357 | 33 | 0.1814 | 1 | 44 | 4.3213 | 0.0369 |
| 14 | 2033 | 364 | 33 | 0.1835 | 1 | 44 | 4.2833 | 0.0370 |
| 15 | 2034 | 371 | 34 | 0.1855 | 1 | 44 | 4.2456 | 0.0371 |
| 16 | 2035 | 378 | 34 | 0.1876 | 1 | 44 | 4.2080 | 0.0371 |
| 17 | 2036 | 385 | 35 | 0.1898 | 1 | 44 | 4.1708 | 0.0372 |
| 18 | 2037 | 393 | 35 | 0.1919 | 1 | 44 | 4.1338 | 0.0373 |
| 19 | 2038 | 400 | 36 | 0.1941 | 1 | 44 | 4.0970 | 0.0373 |
| 20 | 2039 | 408 | 36 | 0.1963 | 1 | 44 | 4.0605 | 0.0374 |

[^23]|  | Calendar |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Daily <br> Crossings | Formula <br> Constant (CF) | Max <br> Timetable <br> Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural | Factor (UR) | Fatal Accident |
| Probability |  |  |  |  |  |  |  |  |

Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway

Fatal Accident Probability for Mineral Road At-Grade Crossing

|  | Calendar | Daily <br> Crossings | Formula <br> Constant (CF) | Max <br> Timetable <br> Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Factor (UR) | Fatal Accident |  |  |  |  |  |  |
| Probability |  |  |  |  |  |  |  |

Fatal Accident Probability for Dewberry Road At-Grade Crossing

|  | Calendar |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Dear | Crossings | Formula <br> Constant (CF) | Max <br> Timetable <br> Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural <br> Factor (UR) | Fatal Accident |
| Probability |  |  |  |  |  |  |  |  |


| Fatal Accident Probability for Short Road At-Grade Crossing |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Calendar | Daily | Formula | Max <br> Timetable | \# of Thru <br> Trains per | \# of Switch <br> Trains Per | Urban Rural | Fatal Accident |
| Year | Year | Crossings | Constant (CF) | Speed (MS) | Day (TT) | Day (TS) | Factor (UR) | Probability |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |

Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway

Fatal Accident Probability for E Box School Loop At-Grade Crossing
$\left.\begin{array}{ccc:ccccc:c}\hline & \text { Calendar } & \begin{array}{c}\text { Daily } \\ \text { Crossings }\end{array} & \begin{array}{c}\text { Formula } \\ \text { Constant (CF) }\end{array} & \begin{array}{c}\text { Mimetable } \\ \text { Speed (MS) }\end{array} & \begin{array}{c}\text { \# of Thru } \\ \text { Trains per } \\ \text { Day (TT) }\end{array} & \begin{array}{c}\text { \# of Switch } \\ \text { Trains Per } \\ \text { Day (TS) }\end{array} & \text { Urban Rural } & \text { Factor (UR) }\end{array}: \begin{array}{c}\text { Fatal Accident } \\ \text { Pearability }\end{array}\right]$

Fatal Accident Probability for Oak Lawn At-Grade Crossing

| Year | Calendar Year | Daily Crossings | Formula <br> Constant (CF) | Max Timetable Speed (MS) | $\begin{aligned} & \text { \# of Thru } \\ & \text { Trains per } \\ & \text { Day (TT) } \end{aligned}$ | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural <br> Factor (UR) | Fatal Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |


| Year | Calendar Year | Daily Crossings | Formula Constant (CF) | Max <br> Timetable Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural Factor (UR) | Fatal Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |

Fatal Accident Probability for Highway NN At-Grade Crossin

| Year | Calendar Year | Daily Crossings | Formula <br> Constant (CF) | Max <br> Timetable Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural Factor (UR) | Fatal Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |

Fatal Accident Probability for W Box School Loop At-Grade Crossing

|  | Calendar | Daily | Formula | Max <br> Timetable <br> Crossings | \# of Thru <br> Trains per | \# of Switch <br> Constant (CF) | Speed (MS) | Day (TT) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | Day (TS) $^{\text {Coar }}$| Urban Rural |
| :---: |
| Factor (UR) |$:$| Fatal Accident |
| :---: |
| Probability |


|  | Calendar | Daily | Formula | Max <br> Timetable | \# of Thru <br> Trains per | \# of Switch <br> Trains Per | Urban Rural | Fatal Accident |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Year | Crossings | Constant (CF) | Speed (MS) | Day (TT) | Day (TS) | Factor (UR) | Probability |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |

Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway

Fatal Accident Probability for Hummingbird Lane At-Grade Crossing

|  | Calendar |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Mear | Daily <br> Crossings | Formula <br> Constant (CF) | Max <br> Timetable <br> Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural |  |
| Factor (UR) | Fatal Accident |  |  |  |  |  |  |  |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |
| Source: Crash Prediction | based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  |

Fatal Accident Probability for Tandy Road At-Grade Crossing

| Year | Calendar Year | Daily Crossings | Formula Constant (CF) | Max <br> Timetable Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural Factor (UR) | Fatal Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |


|  | Calendar | Daily | Formula | Max <br> Timetable | \# of Thru <br> Trains per | \# of Switch <br> Trains Per | Urban Rural | Fatal Accident |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Year | Crossings | Constant (CF) | Speed (MS) | Day (TT) | Day (TS) | Factor (UR) | Probability |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |

Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Fatal Accident Probability for Carpenter Street At-Grade Crossing

|  | Calendar | Daily <br> Crossings | Formula <br> Constant (CF) | Max <br> Timetable <br> Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural | Factor (UR) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | Fatal Accident

Fatal Accident Probability for Highway Z At-Grade Crossing

| Year | Calendar Year Year | Daily Crossings | Formula <br> Constant (CF) | Max <br> Timetable Speed (MS) | $\begin{aligned} & \text { \# of Thru } \\ & \text { Trains per } \\ & \text { Day (TT) } \\ & \hline \end{aligned}$ | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural Factor (UR) | Fatal Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.2 | 0.0736 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.2 | 0.0736 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.2 | 0.0736 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.2 | 0.0736 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.2 | 0.0736 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.2 | 0.0736 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.2 | 0.0736 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.2 | 0.0736 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.2 | 0.0736 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.2 | 0.0736 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.2 | 0.0736 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.2 | 0.0736 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.2 | 0.0736 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.2 | 0.0736 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.2 | 0.0736 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.2 | 0.0736 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.2 | 0.0736 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.2 | 0.0736 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.2 | 0.0736 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.2 | 0.0736 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.2 | 0.0736 |


| Year | Calendar Year | Daily Crossings | Formula <br> Constant (CF) | Max <br> Timetable Speed (MS) | \# of Thru Trains per Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural <br> Factor (UR) | Fatal Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 3537 | 695 | 0.015 | 0.4328 | 2.311 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of Crossing Safety and Operation |  |  |  |  |  |  |  |  |
| Fatal Accident Probability for Dutch Hill Road At-Grade Crossing |  |  |  |  |  |  |  |  |
| Year | Calendar Year | Daily Crossings | Formula Constant (CF) | Max <br> Timetable Speed (MS) | $\begin{aligned} & \text { \# of Thru } \\ & \text { Trains per } \\ & \text { Day (TT) } \end{aligned}$ | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural Factor (UR) | Fatal Accident Probability |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.015 | 0.6900 | 1.449 | 1.0 | 0.0875 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of Crossing Safety and Operation |  |  |  |  |  |  |  |  |
| Fatal Accident Probability for Red Oak Road At-Grade Crossing |  |  |  |  |  |  |  |  |
| Year | Calendar Year | Daily Crossings | Formula Constant (CF) | Max <br> Timetable <br> Speed (MS) | \# of Thru <br> Trains per <br> Day (TT) | \# of Switch <br> Trains Per <br> Day (TS) | Urban Rural <br> Factor (UR) | Fatal Accident Probability |
| 0 | 2019 | 27 | 695 | 0.015 | 0.7107 | 1.407 | 1.0 | 0.0875 |
| 1 | 2020 | 27 | 695 | 0.015 | 0.7096 | 1.409 | 1.0 | 0.0875 |
| 2 | 2021 | 28 | 695 | 0.015 | 0.7086 | 1.411 | 1.0 | 0.0875 |
| 3 | 2022 | 28 | 695 | 0.015 | 0.7075 | 1.413 | 1.0 | 0.0875 |
| 4 | 2023 | 29 | 695 | 0.015 | 0.7065 | 1.415 | 1.0 | 0.0875 |
| 5 | 2024 | 29 | 695 | 0.015 | 0.7055 | 1.418 | 1.0 | 0.0875 |
| 6 | 2025 | 30 | 695 | 0.015 | 0.7044 | 1.420 | 1.0 | 0.0875 |
| 7 | 2026 | 30 | 695 | 0.015 | 0.7034 | 1.422 | 1.0 | 0.0875 |
| 8 | 2027 | 30 | 695 | 0.015 | 0.7023 | 1.424 | 1.0 | 0.0875 |
| 9 | 2028 | 31 | 695 | 0.015 | 0.7013 | 1.426 | 1.0 | 0.0875 |
| 10 | 2029 | 31 | 695 | 0.015 | 0.7003 | 1.428 | 1.0 | 0.0875 |
| 11 | 2030 | 32 | 695 | 0.015 | 0.6992 | 1.430 | 1.0 | 0.0875 |
| 12 | 2031 | 32 | 695 | 0.015 | 0.6982 | 1.432 | 1.0 | 0.0875 |
| 13 | 2032 | 33 | 695 | 0.015 | 0.6972 | 1.434 | 1.0 | 0.0875 |
| 14 | 2033 | 33 | 695 | 0.015 | 0.6961 | 1.437 | 1.0 | 0.0875 |
| 15 | 2034 | 34 | 695 | 0.015 | 0.6951 | 1.439 | 1.0 | 0.0875 |
| 16 | 2035 | 34 | 695 | 0.015 | 0.6941 | 1.441 | 1.0 | 0.0875 |
| 17 | 2036 | 35 | 695 | 0.015 | 0.6930 | 1.443 | 1.0 | 0.0875 |
| 18 | 2037 | 35 | 695 | 0.015 | 0.6920 | 1.445 | 1.0 | 0.0875 |
| 19 | 2038 | 36 | 695 | 0.015 | 0.6910 | 1.447 | 1.0 | 0.0875 |
| 20 | 2039 | 36 | 695 | 0.0 | 0.6900 | 1.449 | 1.0 | 0.0875 |


| Year | Calenda $r$ Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |

Source: Crash Prediction
${ }^{1}$ Derived in Appendix 3

Injury Accident Probability for Mineral Road At-Grade Crossing

|  |  |  |  |  | Max |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year | Calenda $r$ Year | Daily Crossings | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor (TK) | Urban-Rural Factor (UR) | Injury Accident Probability |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  |  |
| ${ }^{1}$ Derived in Appendix 3 |  |  |  |  |  |  |  |  |

Injury Accident Probability for Dewberry Road At-Grade Crossing

| Year | Calenda r Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural <br> Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  | oad-Highway |


| Year | Calenda r Year | Daily Crossings | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Max Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |

${ }^{1}$ Derived in Appendix 3
Injury Accident Probability for E Box School Loop At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
|  | ash Predi <br> Append | tion based | .S. Departmen | f Transpo | ion Accident | Prediction M | odel from Rail | ad-Highway |

Injury Accident Probability for Oak Lawn At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Max Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway${ }^{1}$ Derived in Appendix 3 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |


| Year | Calenda $r$ Year | DailyCrossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |

${ }^{1}$ Derived in Appendix 3
Injury Accident Probability for Highway NN At-Grade Crossing


Injury Accident Probability for W Box School Loop At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 1 | 2020 | 28 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 3 | 2022 | 29 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 5 | 2024 | 30 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 8 | 2027 | 31 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 10 | 2029 | 32 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 12 | 2031 | 33 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 14 | 2033 | 34 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 16 | 2035 | 35 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 18 | 2037 | 36 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.265 | 1.0 | 0.2877 |
| 20 | 2039 | 0 | 0.0000 | 4.28 | 0.401 | 1.265 | 1.0 | 0.3153 |

Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway
${ }^{1}$ Derived in Appendix 3

| Year | Calenda rYear | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |

${ }^{1}$ Derived in Appendix 3
Injury Accident Probability for Hummingbird At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Max <br> Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| ource: <br> Derive | in Appendi | tion based | U.S. Departmen | of Transpor | tion Acciden | Prediction M | odel from Railr | oad-Highway |

Injury Accident Probability for Tandy Road At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.0 | 0.3113 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  |  |
| ${ }^{1}$ Derived in Appendix 3 |  |  |  |  |  |  |  |  |


| Year | Calenda $r$ Year | DailyCrossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |

${ }^{1}$ Derived in Appendix 3
Injury Accident Probability for Carpenter Street At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable <br> Speed <br> (MS) | \# of Tracks for Factor (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 1 | 2020 | 27 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 2 | 2021 | 2413 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 3 | 2022 | 28 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 4 | 2023 | 29 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 5 | 2024 | 29 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 6 | 2025 | 2413 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 7 | 2026 | 30 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 8 | 2027 | 30 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 9 | 2028 | 31 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 10 | 2029 | 31 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 11 | 2030 | 32 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 12 | 2031 | 32 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 13 | 2032 | 33 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 14 | 2033 | 33 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 15 | 2034 | 34 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 16 | 2035 | 34 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 17 | 2036 | 35 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 18 | 2037 | 35 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 19 | 2038 | 36 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 20 | 2039 | 36 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| ource: <br> Derive | in Appendi | tion based | U.S. Departmen | of Transpor | tion Acciden | Prediction M | odel from Railr | oad-Highway |

Injury Accident Probability for Highway Z At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 1 | 2020 | 27 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 2 | 2021 | 28 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 3 | 2022 | 28 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 4 | 2023 | 29 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 5 | 2024 | 29 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 6 | 2025 | 30 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 7 | 2026 | 30 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 8 | 2027 | 30 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 9 | 2028 | 31 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 10 | 2029 | 31 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 11 | 2030 | 32 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 12 | 2031 | 32 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 13 | 2032 | 33 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 14 | 2033 | 33 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 15 | 2034 | 34 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 16 | 2035 | 34 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 17 | 2036 | 35 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 18 | 2037 | 35 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 19 | 2038 | 36 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| 20 | 2039 | 36 | 0.0736 | 4.28 | 0.401 | 1.125 | 1.202 | 0.2790 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highw |  |  |  |  |  |  |  |  |


| Year | Calenda $r$ Year | Daily Crossings | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 2 | 2021 | 3537 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |

Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway
Guide Crossing Handbook-Section 3 Assessment of Crossing Safety and Operation
${ }^{1}$ Derived in Appendix 3
Injury Accident Probability for Dutch Hill Road At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor <br> (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  |  |

Injury Accident Probability for Red Oak Road At-Grade Crossing

| Year | Calenda $r$ Year | Daily Crossings | Max |  |  |  |  | Injury Accident Probability |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Fatal Accident Probability ${ }^{1}$ | Formula Constant | Timetable Speed (MS) | \# of Tracks for Factor (TK) | Urban-Rural Factor (UR) |  |
| 0 | 2019 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 1 | 2020 | 27 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 2 | 2021 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 3 | 2022 | 28 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 4 | 2023 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 5 | 2024 | 29 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 6 | 2025 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 7 | 2026 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 8 | 2027 | 30 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 9 | 2028 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 10 | 2029 | 31 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 11 | 2030 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 12 | 2031 | 32 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 13 | 2032 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 14 | 2033 | 33 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 15 | 2034 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 16 | 2035 | 34 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 17 | 2036 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 18 | 2037 | 35 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 19 | 2038 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| 20 | 2039 | 36 | 0.0875 | 4.28 | 0.401 | 1.125 | 1.000 | 0.3113 |
| Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway |  |  |  |  |  |  |  |  |

APPENDIX E
Economic Analysis Tables
nul

## Economic Analysis \& Land Use Appendix

## Section 1 - Rogersville

Table34 provides a projection for projected job growth and annual earnings average specifically for Rogersville. Note that some industry areas in Rogersville during this period may experience no change or negative change in job growth. As the intent of this section of the study is to determine future land use needs, only industries with positive job growth through 2029 are used.

| Table 34 - Rogersville <br> Projected Jobs by Industry (2019 - 2029) |  |  |  |
| :--- | :---: | :---: | :---: |
| Industry | 2019-2029 Projected <br> Job Change | Average Earnings per <br> Job (2018) | Projected Job Change x <br> Average Earnings |
| Manufacturing | +174 | $\$ 45,428$ | $\$ 7,904,000$ |
| Construction | +61 | $\$ 35,198$ | $\$ 2,147,000$ |
| Health Care and Social <br> Assistance | +58 | $\$ 37,561$ | $\$ 2,179,000$ |
| Accommodation and <br> Food Services | +22 | $\$ 14,535$ | $\$ 320,000$ |
| Transportation and <br> Warehousing | +24 | $\$ 68.280$ | $\$ 1,639,000$ |
| TOTAL | 339 |  |  |

## Section 2 - Fordland

Table 35 provides a projection specifically for Fordland. Note that some industries in Fordland during this period may experience no change or negative change in job growth. As the intent of this section of the study is to determine future land use needs, only industries with positive job growth through 2029 are used.

| Table 35 - Fordland <br> Projected Jobs by Industry (2019-2029) |  |  |  |
| :--- | :---: | :---: | :---: |
| Industry | 2019-2029 Projected <br> Job Change | Average Earnings per <br> Job (2018) | Projected Job Change x <br> Average Earnings |
| Wholesale Trade | +41 | $\$ 92,446$ | $\$ 3,790,000$ |
| Construction | +1 | $\$ 35,198$ | $\$ 35,000$ |
| Health Care and <br> Social Assistance | +49 | $\$ 37,561$ | $\$ 1,840,000$ |
| Retail Trade | +9 | $\$ 29,981$ | $\$ 270,000$ |
| Transportation and <br> Warehousing | 104 | $\$ 68.280$ | $\$ 273,000$ |
| TOTAL | +4 |  | $\$ 6,208,000$ |

Section 3 - Diggins

| Table 36 <br> Projected Additional Jobs by Industry (2019 - 2029) |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Rogersville | Fordland | Seymour | TOTAL |
| Manufacturing | 174 | - | 105 | 279 |
| Wholesale Trade | - | 41 | - | 41 |
| Construction | 58 | 1 | 15 | 74 |
| Health Care and Social <br> Assistance | 22 | 49 | 13 | 84 |
| Retail Trade | - | 9 | - | 37 |
| Accommodation and Food <br> Services | 22 | - | 10 | 39 |
|  <br> Warehousing | 24 | 4 | 160 | 564 |
| Total | 300 | 104 |  | 38 |

Table 37
Estimated 2019 Population \& Percent of Total Population by City

| Municipality | Estimated 2019 Population | \% of Population |
| :--- | :---: | :---: |
| Rogersville | 3,883 | $55 \%$ |
| Fordland | 862 | $12 \%$ |
| Diggins | 327 | $5 \%$ |
| Seymour | 2,016 | $28 \%$ |
| TOTAL | 7,088 | $100 \%$ |


| Table 38 <br> Diggins Job Growth (5\%) |  |  |
| :--- | :---: | :---: |
| Industry Sector | Total Employment Growth Outside <br> of Diggins (Table 21) | Job Growth in Diggins (at 5\% of <br> population in the study corridor) |
| Manufacturing | 279 | 14 |
| Wholesale Trade | 41 | 2 |
| Construction | 74 | 4 |
| Health Care and Social <br> Assistance | 84 | 4 |
| Retail Trade | 9 | 0 |
| Accommodation and Food <br> Services | 39 | 2 |
|  <br> Warehousing | 564 | 2 |
| Total |  | 28 |


| Fordland \& Diggins Projected Jobs by Industry (2019-2029) |  |  |  |
| :--- | :---: | :---: | :---: |
| Industry Sector | Employment Growth by <br> Industry in Fordland | Employment Growth by Industry in Diggins <br> (38\% of Fordland's population) |  |
| Manufacturing | 0 | 0 |  |
| Wholesale Trade | 41 | 16 |  |
| Construction | 1 | 0 |  |
| Health Care and Social <br> Assistance | 49 | 19 |  |
| Retail Trade | 9 | 3 |  |
| Accommodation and Food <br> Services | 0 | 0 |  |
|  <br> Warehousing | 4 | 2 |  |
| Total | 104 | 40 |  |

## Section 4 - Seymour

Table 40 provides a projection specifically for Fordland. Note that some industries in Fordland during this period may experience no change or negative change in job growth. As the intent of this section of the study is to determine future land use needs, only industries with positive job growth through 2029 are used.

| Table 40 - Seymour <br> Land Use Projections by Industry (2019-2029) |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
| Industry Sector | 2019-2029 Projected <br> Job Change | Average Earnings per <br> Job (2018) | Projected Job Change $x$ <br> Average Earnings |  |
| Manufacturing | +105 | $\$ 45,428$ | $\$ 4,770,000$ |  |
| Construction | +15 | $\$ 35,198$ | $\$ 528,000$ |  |
| Health Care and Social <br> Assistance | +13 | $\$ 37,561$ | $\$ 488,000$ |  |
| Acommodation and <br> Food Services | +17 | $\$ 14,535$ | $\$ 247,000$ |  |
| Transportation and <br> Warehousing | +10 | $\$ 68.280$ | $\$ 682,000$ |  |
| TOTAL | 160 |  | $\$ 6,715,000$ |  |

APPENDIX F

## U.S. 60 Corridor Resiliency Planning

## Webster County, MO

## U.S. HIGHWAY 60 <br> CORRIDOR \& AT-GRADE RAILWAY CROSSING MASTER PLAN

September 30, 2019



## SECTION V - CORRIDOR RESILIENCY PLANNING

IN PARTNERSHIP WITH:
City of Rogersville, MO
City of Fordland, MO
Village of Diggins, MO
City of Seymour, MO
Seymour Special Road District

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## I - Introduction

## Purpose

The U.S. Highway 60 Corridor and At-Grade Rail Crossing Master Plan has been completed in order to prepare a longterm plan for a 22 -mile highway/rail corridor in southern Webster County, Missouri, with the end goal of limited access freeway status for U.S. 60. The scope of this study examined the impacts of the proximity of U.S. 60 and the BNSF Railway Thayer-North line. The BNSF Railway runs adjacent to U.S. 60 throughout much of Webster County resulting in high impacts on safety, connectivity, and regional resilience.
The Southwest Missouri Council of Governments (SMCOG) expanded the study to include economic resiliency planning, natural-disaster mitigation planning, and recovery efforts along the corridor. Natural disaster and emergency-event risks will be identified and assessed for the role the U.S. 60 and rail corridor plays in regional disaster recovery and relief efforts, primarily as an emergency relief route for Interstate 44.

## Background

The section of U.S. 60 under review is located just east of Springfield, Missouri, and serves as a major transportation arterial running east-west across the entire state. Locally, U.S. 60 serves as the major commuter route for the communities of Rogersville, Fordland, Diggins, and Seymour (from west to east). U.S. 60 is currently a four-lane divided highway with 49 at-grade intersections within the study limits, of which 24 are full-access and $\mathbf{2 5}$ are partial access. The highest average daily traffic (ADT) for U.S. 60 is $\mathbf{2 3 , 2 2 5}$ near Rogersville. The estimated populations of these communities are 3,649 in Rogersville, 837 in Fordland, 312 in Diggins, and 1,993 in Seymour' .
The BNSF Thayer-North line is an essential segment of the east-west rail network, generating major economic impacts related to the transportation of freight from Oakland/Los Angeles to St. Lovis/ Memphis/Atlanta. The resulting high rail traffic impacts local communities on a daily basis, with 36 at-grade crossings within the study limits, 12 of which function as unsignalized private crossings.
The safety of the U.S. 60 corridor through Webster County is a major concern for area stakeholders, with $\mathbf{6 2 4}$ crashes occurring on U.S. 60 since 2012, including 21 fatalities. Forty-four (44) train-vehicle crashes have occurred at the at-grade rail crossings since 1975, with 15 resulting in fatalities.



Figure 1 - Webster County Regional Location Map

[^24]
## II - Regional Resiliency Planning

## Highway Operations

Missouri's top three (3) major routes for east-west travel across the state are: Interstate $70(1-70)$ in the North-central from St. Louis to Kansas City, Interstate 44 (I-44) from St. Louis to Joplin, and U.S. 60 from Sikeston to Seneca. Nationally, U.S. 60 is part of the major east-west transcontinental highway spanning over 2,600 miles from southwestern Arizona to the Atlantic Coast². Locally, U.S. 60 is the lifeline for southern-Missouri communities to maintain vital connectivity and it fuels much of the local communities' economic base.

In the Missouri South-Central and Southwest Regions, I-44 and U.S. 60 are vital components of transportation infrastructure. I- 44 services approximately 40,000 vehicles daily, with freight trucks making up almost 30\% or 12,000 of the Average Daily Traffic (ADT). U.S. 60 services approximately 23,000 vehicles daily, with nearly 1,900(8\%) trucks ${ }^{3}$.
With over $\mathbf{6 0 , 0 0 0}$ vehicles traveling east or west through Webster County daily, it is imperative to consider the traffic operations and safety impacts associated with a major closure or delay on one of these roadways. Major closures and delays have historically occurred during times of flooding, road construction, or major vehicle collisions, resulting in significant traffic diversion to alternate roadways. In such cases, I-44 traffic is diverted to U.S. 60 and vice versa using several north-south highways and local roadways, including U.S. 65, U.S. 63, Route B, Route A, and many other local collectors. Traffic diversion on adjacent infrastructure often leads to overloading roadway capacities, resulting in significant traffic delays, heightened safety risks, and significant economic losses.

## Rail Operations

The BNSF Railway's Thayer-North line through Webster County is vital to the connectivity of the BNSF national rail network. The Thayer-North line is the primary route that carries coal and freight from the western U.S. to the southeast region, connecting the major hubs of Memphis, Birmingham, and Atlanta. The rail line through Webster County is a component of one of only seven Class I railroads in the U.S., that combined, generated $\$ 490$ million of revenue in 2018. The Federal Highway Administration recently forecasted that U.S. rail-freight shipments will increase $\mathbf{3 5 \%}$ to 24.1 billion tons, from 2017 to 2040. Missouri alone reports shipping approximately 409.8 million tons of freight in $\mathbf{2 0 1 7}$, and generated nearly $\mathbf{\$ 2 1 9 . 5}$ billion in annual economic activity, making the railroad essential to both the national and state economies ${ }^{4}$.

An emergency incident due to train derailment, vehicle-train collision, hazardous material spill, or flooding event occurring on the Thayer-North line would be determinantal to the movement of freight across the country. It is critical to the regional and nation rail network to maintain a resilient corridor along the Thayer-North line in Webster County, supporting the safe and efficient delivery of high-dollar freight across the country.
The impacts of train rerouting due to an incident would result in loss of significant time, resources, and revenue. While the rail throughout Missouri is vital to the local, regional, and national economies, the Thayer-North line through Webster County plays a more specific and critical role in these economies along the railroad.


[^25]
## Military Operations

The U.S. Army's Fort Leonard Wood military base is located along I-44 in Pulaski County, approximately 70 miles east of Webster County near St. Robert, MO. The Army utilizes this location for many military operations training and strategic military planning. In the event of a military mobilization from Fort Leonard Wood, I-44 is the primary access route, making it essential for all military transport to both the east and west. Any incident that results in the temporary closure of I-44 would require the diversion of essential military personnel and equipment and potentially result in a high-cost delay, given the variety of circumstances that require military mobilizations.

## Natural Disaster Planning \& Mitigation

Webster County is located in an area prone to many different natural disasters, including flooding, tornados, earthquakes, and winter storms. The climate and weather variations present the need for municipalities and agencies to be prepared for all types of disasters that may occur in surrounding communities.
In the event of a natural disaster or other emergency events, I-44 and U.S. 60 become the primary routes for resources to reach the affected areas. Detouring from I-44 to U.S. 60 puts a significant strain on the surrounding roadway networks. Several roadways along the U.S. 60 corridor contribute to the connectivity of the region, the most notable of which are Highway B and Highway A.
Highway B in Rogersville connects traffic from the western end of the county, encompassing 15 miles of roadway to l-44 in Northview, Missouri. Highway A spans the 13.5-mile distance between to join Marshfield and Diggins, providing efficient connection from I-44.
Thus, mitigation measures are needed to prevent, or at least reduce, the adverse operational and economic impacts during l-44 diversions.

## III - Local Resiliency Planning

U.S. 60 is an essential and vital roadway for both regional and local connectivity in Southern Webster County. Each local community within the study limits heavily relies on U.S. 60 as the primary access in and out of each community and its conveyance of high traffic volumes to support the economic base. It is crucial to the survival and growth of each community that U.S. 60 maintains the capacity and efficient traffic flow for daily function of businesses. As improvements are developed to create a safer and more resilient corridor, several factors should be considered to minimize the adverse impacts to the local communities of Rogersville, Fordland, Diggins, and Seymour.


## Highway Operations

In addition to transcontinental, east-west travel in southern Missouri, U.S. 60 serves as the primary route for commuters, local truck transporters, and recreational travelers. As proposed improvements were developed, careful consideration was taken to avoid land locking parcels and to minimize the impacts of adverse travel for local residents. With the long-term corridor vision of a limited access freeway status, considerable focus was placed on maintaining access to local businesses and residential areas, by strategically locating outer access roads along U.S. 60.

As recommended in this plan, the ultimate goal in obtaining a limited access freeway will result in the elimination of all 49 at-grade road crossings, and all access would be consolidated around eight (8) interchanges or overpasses along the 22-mile stretch of the U.S. 60 corridor. Outer access roads between several of the interchanges are proposed, providing connection from local roadways to U.S. 60.

The proposed outer road system increases safety through the elimination of numerous at-grade highway-rail crossings. While the elimination of at-grade highway-rail crossings slightly increases some travel times, the resulting safety increases and potential highway-rail crashes are reduced. These improvements and resulting consolidation would also be supported by a majority of the local communities throughout the corridor ${ }^{5}$.
Many local roadways and minor arterials provide regional connection to adjacent counties and communities. These roadways are essential to the daily traffic flow of these communities and should maintain access to U.S. 60. Though these local routes are often redundant, they contribute to a resilient transportation network by allowing for multiple access routes and minimizing the required adverse travel resulting from a closure on I-44 or U.S. 60.

## HIGHWAY B - ROGERSVILLE

Highway B is a two-lane major collector that connects I-44 in Northview to U.S. 60 in Rogersville and connects many parts of rural Webster County to these major routes. Additionally, Highway B serves as an additional Incident Relief Route for U.S. 60 and I-44. Highway B near Rogersville currently services over 2,300 vehicles daily.

## HIGHWAY Z - FORDLAND

Highway $Z$ is a two-lane highway that connects directly to U.S. 60 in Fordland and serves north-south traffic to various residential and agricultural areas. Highway $Z$ is also a direct route south to Highway 14, an east-west route in Christian County that extends east to Ava (Douglas County) or west to Highway 65 in Ozark. Currently, Highway Z services approximately 1,000 vehicles daily. Highway $Z$ crosses several low-water streams that often flood during periods of heavy rain, forcing traffic to go north to U.S. 60 to travel east-west. Additionally, the intersection at U.S. 60 and Highway Z holds water in the driving lanes during high rainfall events, causing significant concern for vehicle hydroplaning ${ }^{6}$.

## HIGHWAY A - DIGGINS

Highway A is a two-lane major collector that extends from U.S. 60 in Diggins north to Marshfield, eventually connecting to I-44. Highway A is a major north-south route for Webster County and is experiencing daily traffic increases as vehicle navigation systems direct motorists to the U.S. 60-to-l-44 connection, resulting in an increase in heavy truck traffic. This creates significant concern for both capacity and safety as traffic density continues to increase. Traffic flow on Highway A is also a route heavily utilized by agricultural buggies traveling from farms and homesteads to various businesses in Diggins and Seymour. Proposed improvements call for shoulder pull-offs for slow moving buggies to pull out of the way of vehicular traffic, reducing delays and traffic congestion along the heavily traveled roadway. Highway A currently services approximately 2,600 vehicles daily.

## HIGHWAY K - SEYMOUR

Highway K is a two-lane major collector in Seymour that extends south from U.S. 60 to Ava in Douglas County. Highway K is a secondary route to U.S. 60 , with Highway 5 to Mansfield as the primary route, and is heavily utilized as a rural truck traffic route for logging and quarry trucks. Highway K services approximately 900 vehicles daily.

## Proximity of U.S. 60 \& BNSF Rail Line

The BNSF Thayer-North line varies in proximity to U.S. 60 from approximately 65 feet at the closest at-grade crossing to over 750 feet at the farthest at-grade crossings. At the closer distances, vehicular traffic offen queues onto U.S. 60 after turning onto an adjacent roadway during times of rail traffic, creating significant rear-end collision risk. As traffic volumes on the railroad and highway continue to increase, there is heightened concern for safety along the corridor.


Figure 4 - The BNSF Railway varies in proximity to U.S. 60, as close as 65' at some locations.
5. United States Geological Service
6. Webster Co. U.S. 60 Corridor Study, Public Meetings \#2

The proximity of the BNSF Railway to U.S. 60 currently involves maintaining local connectivity and access at 36 highway-rail at-grade crossing. The recommended improvements propose U.S. 60 interchanges and railroad overpasses as grade-separated crossings and highway access points, minimizing the travel-time delay and reduce vehicle traffic through at-grade crossings. Additionally, the implementation of the proposed improvements and outer access roads reduces the need for these crossings, resulting in a more efficient rail line, provide an increased safety benefit, and a redundant and parallel route to U.S. 60 for incident relief.
In addition to connectivity, the proximity of the BNSF Railway to U.S. 60 reduces access to vital community resources. In times of severe weather, a Federal Emergency Management Agency's (FEMA) Safe Room is open to the public in the City of Seymour. In the spring of 2014, Seymour citizens report a stalled train during a tornado warning which resulted in several vehicles trapped on the south side of the tracks, unable to access the FEMA Safe Room, and threatened the safety of many citizens ${ }^{\top}$.

## Emergency Response \& Relief

U.S. 60 is essential for emergency-response situations in each of the four (4) local communities and parts of rural Webster County. The nearest hospital is in Springfield, nearly 13 miles away from the western Webster county line. For emergency vehicles to respond to calls efficiently within Webster County, they most often utilize U.S. 60. Webster County has several emergency response services, including Webster County Sheriff, Fordland Police, Rogersville Police, Seymour Police, Seymour Fire, and Southern Webster County Fire District. Emergency Medical Services are managed by the Cox Ambulance District.
Many calls requesting emergency response in southern Webster County are related to motor vehicles on U.S. 60. In 2018, Webster County emergency services reported over 3,200 occurrences where emergency personnel responded to U.S. 60 for various needs, including routine traffic stops, wrong way drivers, motor vehicle accidents, vehicle pursuits, or criminally suspicious persons. In total, Webster County Police and Fire services responded to approximately 150 calls in 2018 for motor vehicle accidents, fires, or medical assistance ${ }^{8}$. This only includes services dispatched by Webster County 911 and does not include the many additional responses by the Logan-Rogersville Fire Protection District, Cox Health Ambulance District, or Missouri State Highway Patrol.

## EMERGENCY ACCESS POINTS

In planning for future improvements, emergency personnel have requested that aggregate turnarounds be implemented alongside the limited access freeway conversion, in effort to maintain adequate emergency access and reduce response time delays. The Fordland Police Department reports using Highway Z as a turnaround location on U.S. 60 when patrolling the area and responding to calls. Southern Webster County Fire Protection District vehicles travel along U.S. 60 to use Highway $Z$ in order to access the south side of the county. Highway $Z$ is considered a dangerous intersection, significantly increasing the traffic safety risk to first responders who utilize this location to turn around.
The proximity of the BNSF Railway to U.S. 60 creates several conflicts for emergency response access. When rail traffic is present during emergency response calls, it often slows emergency response, forcing responders to search for a different route, or wait until trains pass, resulting in the lifesaving aid being delayed. This risk is heightened in Seymour, where the town is divided by the rail. Both the Seymour Fire Department and Southern Webster County Fire Stations are located south of the tracks, potentially blocking vital fire and medical response services from accessing calls originating north of the tracks. Additionally, the Webster County Fire District is a volunteer department, meaning call response could also be impacted in the delay for volunteers to reach the fire station.
Emergency response services are a vital component of resilient communities, making it imperative that delays to emergency requests are minimized, and efficient routes of travel are maintained. The proposed grade-separations would provide unimpeded access across the railroad for emergency vehicles.

[^26]
## Agricultural Communities

Southern Webster County is home to many different economic bases and communities, including industrial, commercial, and agricultural. The rural areas of Webster County are home to many crop and livestock farms, which are an essential way of life for much of the county.
With a significant portion of the population agriculturally based, it is vital to consider the importance of the roadway transportation network to the efficient travel of farm equipment. Many local and rural roadways service many vehicle types including passenger cars, freight trucks, logging trucks, farm tractors and equipment, and agricultural horse and buggies.


Figure 5 - Agricultural Horse \& Buggy shown driving on shoulder of U.S. 60 near Seymour

Approximately 900 agricultural families that utilize buggies as a mode of travel reside in southern Webster County ${ }^{9}$ in the Diggins and Seymour areas. This mode of travel creates a heightened safety risk along local roadways and places significant strain on roadway pavement surfaces causing increased deterioration. The mix of slow-moving vehicles, heavy farm equipment, and buggies integrated with common traffic increases the crash potential and reduces the safety of all travelers on the roadways.

Additionally, agricultural horses and buggies traveling on paved asphalt roadways increase deterioration rates, resulting in pavement repairs and costs to occur more frequently. The steel horseshoes used to protect the horse's hooves create ruts (troughs) in the pavement due to repeated exposure, resulting in water collecting on the pavement surfaces. During colder months, freezing occurs and causes water to expand in the pavement and results in longitudinal cracking, significantly decreasing pavement lifespan.
The proposed improvements would reduce the safety risks associated with agricultural vehicles and equipment traveling on the existing roadway network. The implementation of an interchange at Highway A and overpass at Short Road would eliminate these slow-moving vehicles on U.S. 60, and would divert this traffic to a new outer road system on either side of U.S. 60. Outer roads would be constructed with aggregate shoulders to create separation for regular vehicular traffic and slow-moving agricultural horses and buggies. The overpass at Short Road would provide adequate distance between interchange access points on U.S. 60 at Highway A and West Clinton Avenue in Seymour.

## Geological Features

Southwest Missouri is known for its highly karst topography formed from the underlying limestone bedrock formations below the surface. As limestone is worn away by water, underground crevices form and eventually lead to the land surface collapsing due to insufficient structural support, resulting in what is known as a sinkhole ${ }^{10}$. Sinkholes can be as little as a small depression in the ground to a large open crater (collapsed) in the surface and are often termination points for surface drainage.
Sinkholes are often slow to drain, especially when the groundwater table is high or during periods of heavy rainfall. This causes the surrounding land and drainage channels to flood and hold water for a longer period of time than surrounding drainage termini.

Webster County currently has 59 known sinkholes in the county, with many along I-44 and the U.S. 60 corridor. With sinkholes being prominent in the area, it is often difficult to predict the recession of floodwaters and sometimes results in flooding of non-flood-prone areas. There is concern when sinkholes occur near major roadways, and as to how drainage will be mitigated so that there are minimal impacts to traffic.


Figure 6 - Known Sinkholes in Webster County

[^27]
## IV - Scenario Based Planning

As traffic continues to increase, it is essential to identify and address the impacts and learn from incidents that have occurred in the past in order to develop a resilient infrastructure in the event of future incidents. The following major historical incidents have had a significant impact on traffic flow in Webster County on I-44 and U.S. 60:

## I-44 FLOODING

In April of 2017, approximately 50 miles of I-44 were closed due to flooding. Just northeast of Webster County, the Gasconade River reached a record setting 39.74 feet ${ }^{11}$, resulting in both directions of I-44 being shut down ${ }^{12}$ and destroyed pavement. This is the third time in the past six years that the Gasconade River has reached Major Flood Stage, with the previous occurrences being in 2013 \& 2015.
In response to the closures, drivers were advised to use I-70 from Kansas City to St. Lovis. However, I-44 traffic had to be diverted to Route 63, U.S. 60 , and Route 360 , creating a significant capacity strain and heightened safety risk on these roadways.


## U.S. 60 FLOODING NEAR ROGERSVILLE

The same rainfall event that closed I-44 in April of 2017, also closed the westbound lanes of U.S. 60 just west of Rogersville for more than a week. The flooding occurred in Greene County near the Webster Country line. Pairing the reduced capacity from diverted I-44 traffic and U.S. 60 from a four-lane highway to a two-lane highway, caused significant traffic delays for miles.
There are two major contributing factors to flooding at this location. The first is the grade differential between the eastbound and westbound lanes. The eastbound lanes are well above the elevation of the westbound lanes, creating a natural ponding area. The second is a slow-draining sinkhole just north of U.S. 60 that exacerbates the already natural ponding area.


## I-44 WINTER STORM VEHICLE PILEUP

In February of 2018, an ice storm caused a massive pileup of vehicles to block all eastbound lanes of traffic on I-44 near Conway, Missouri. The blockage produced several hours of delays, multiple injuries, and one fatality. Over one hundred vehicles were involved.
In response to the heavy traffic detainment, vehicles were rerouted south along Highway A in Marshfield and Highway B in Northview, to U.S. 60, allowing drivers to continue traveling east. U.S. 60 was strained to accommodate the significantly larger traffic volumes, while maintaining efficient local connectivity in the region.

## ECONOMIC/INDUSTRY TRENDS



Figure 7-1-44 at Gasconade River in Laclede County, MO in Spring 2017. Photo by KSPR News.


Figure 8 - U.S. 60 Flooding near Rogersville in Spring 2017. Photo by KSPR News.


Figure 9 - Aerial view of the 1-44 winter storm pileup near Conway, MO on February 5, 2018. Photo by Conway Volunteer Fire Department.

> According to the latest projections from the USDOT, the total volume of U.S. rail freight is expected to increase by $\mathbf{3 5 \%}$ from 2017 to $2040^{13}$, and the total highway freight volume is expected to increase by $\mathbf{4 9 \%}$ by $2045^{14}$. Additionally, the population growth of Webster County has an average annual value of $1.35 \%$ since $2011^{15}$. These forecasts emphasize the need to reduce the exposure risk at highway-rail crossings and highway intersections and increase the safety, capacity, and efficiency of the transportation network.

[^28]The construction of interchanges, highway-rail grade separations, and outer road networks throughout the corridor would greatly enhance the connectivity of the region, provide essential access for emergency response vehicles, and minimize delays and roadway hazards on U.S. 60 in Webster County, thereby enhancing the resiliency of U.S. 60 in accommodating natural-disaster and emergency events.

## V - Recommended Improvements

## Strategic U.S. 60 Improvements

The U.S. 60 Corridor Study resulted in the conceptual development of strategic improvements to attain a limited-access freeway. Throughout the study, each improvement was evaluated based on certain criteria, including roadway and railway safety enhancements, economic development, life-cycle costs and maintenance, regional and local connectivity, community and stakeholder support, and community resiliency.
Recommended improvements were determined based on traffic capacity, safety priorities, and leveraging funding mechanisms. The proposed long-term solution envisions phased implementation of the entire corridor to freeway status in 30 to 40 years. Specific Improvements are recommended based on targeted impacts towards improving resiliency and enhancing the transportation systems to better accommodate emergency. The key areas within the study limits have been identified as having the most significant benefits towards maintaining a safe and efficient transportation network during emergency and disaster events. A complete list of improvements for the Corridor Master Plan is listed in previous chapters (Corridor Master Plan).


Figure 10 - Strategic Improvements to the U.S. 60 Corridor to Improve Regional Resiliency

IMPROVEMENTS AT HIGHWAY A
With an ADT of 2,590, the intersection of U.S. 60 and Highway A in Diggins has the highest traffic volumes of any roadway intersection throughout the corridor. An interchange at this location, paired with the construction of an outer road system connecting to the rest of the corridor, would allow vehicles to access U.S. 60 more safely and efficiently.
The proposed outer road system would reduce the need for agricultural horses and buggies to travel on the shoulders of U.S. 60, reducing safety hazards, damage to roadways, and traffic delays. Additionally, an overpass near Short Road in Diggins would provide grade-separated north-south access across U.S. 60.

An interchange at this location would also provide a positive economic benefit as a result of the increased safety and reduced travel-time delay. As traffic increases and navigational systems route traffic from U.S. 60 along Highway A to I-44 in Marshfield, these improvements would likely generate further economic opportunities around the interchange location. In the event of future detours from I-44 as an Incident Relief Route, an interchange would greatly reduce the safety risk and travel-time delay associated with the high traffic loading.
In addition to the construction of an interchange, implementing shoulder pull-offs along Highway A throughout the agricultural community provides an opportunity for slow-moving horses and buggies to move out of the way of motor vehicle traffic and reduce traffic congestion and potential safety conflicts.

## U.S. 60 PROFILE ADJUSTMENT

PRIORITY
\#2
The U.S. 60 flooding that occurred in 2017 (Scenario Based Planning) resulted in the closure of the westbound lanes and traffic being diverted to a single lane, head-on to traffic in the eastbound lanes. Raising the roadway profile and improving the drainage system of U.S. 60 in this area just east of Farm Road 213 (Greene County) would significantly reduce the flooding potential. These improvements would help maintain efficient traffic flow in periods of record flooding, reducing the travel-time delay and safety risk associated with potential flooded roadways and temporary lane configurations to accommodate detoured traffic. While these improvements would be made to the Greene County section of U.S. 60, the corridor throughout Webster County would significantly benefit.

## INTERCHANGE AT HIGHWAY Z

The construction and implementation of an interchange, railroad overpass, and outer road system at Highway $Z$ in Fordland would allow for the removal of six (6) at-grade roadway intersections and at-grade highway-rail crossings. There have been 21 recorded vehicle crashes since 2012 and three (3) recorded train-vehicle accidents since 1990.

An interchange at Highway $Z$ would eliminate the safety risk associated with these at-grade intersections and rail crossings and create a single efficient access point to U.S. 60. The construction of an overpass would also eliminate the safety concern attributed to intersection flooding at Highway Z.

Additionally, high-friction pavement treatment is recommended in Fordland along the S-curves of the U.S. 60 railroad overpass between Highway FF (Burks St.) and Highway Z to reduce vehicle hydroplaning in this area.

## SEYMOUR RAILROAD OVERPASS

PRIORITY
$\# 4$
As the City of Seymour is currently divided by the BNSF Railway, the construction and implementation of a railroad overpass would maintain local connectivity and provide necessary access in the event of all at-grade crossings being simultaneously closed. Additionally, the implementation of an overpass at Summit Avenue and Highway K would present the opportunity for residential and commercial growth south of the railroad, providing an additional access point and reduced travel time delay to the heart of the city and U.S. 60.
An overpass at this location would address the concerns brought forth in the Public Involvement phase regarding the access to the FEMA Safe Room by providing a route over the railroad in the event of a stalled train during severe weather events.

## Rail Crossing Safety Improvements

The proposed improvements along the 22 -mile stretch of the U.S. 60 corridor would result in the closure of 14 at-grade highway-rail crossings and safety improvements to four (4) crossings. The construction of an outer road system adjacent to U.S. 60 and the BNSF Railway would allow for traffic to reach grade-separated access points on U.S. 60 .

The elimination of at-grade crossings provides a positive safety benefit to the U.S. 60 corridor and BNSF Thayer-North line. The proposed improvements are expected to provide increased efficiency and safety of the rail line and eliminate travil-time delays for motor vehicles waiting during rail traffic at highway-rail crossings.

## VI - Implementing a Resilient Corridor

As funding becomes available, the recommended improvements should be strategically implemented in prioritized phases in order to maintain a resilient network, utilize U.S. 60 as the primary Incident Relief Route, and prepare the transportation network for impacts to the surrounding area in the event of emergency or natural-disaster scenarios.
The Highway A interchange is essential to improve safety at the U.S. 60/Highway A intersection, increase intersection capacity, and maintain efficient access to I-44. Profile adjustments on westbound U.S. 60 in Greene County would reduce future flooding risk and major traffic congestion. Following the implementation of these improvements, the interchange and outer road system at Highway Z would increase safety and capacity for U.S. 60. Following these major high-priarity improvements, safety and capacity improvements should be implemented throughout the corridor, including high-friction pavement treatment, acceleration and deceleration lanes, and intersection improvements. Following the safety and capacity improvements on U.S. 60, rail improvements would be feasible.

At the final implementation of all improvements, the transportation network would be better suited to serve the local communities and the region in times of disaster recovery and relief.

| Resilient Corridor Improvements Summary |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Ranking | Roadway | Location | Resilient <br> Enhancement | Benefits | Probable Cost 2019 Dollars |
| PRIORITY <br> \#1 | Highway A | Diggins | U.S. 60 Interchange \& Safety Improvements of Regional I-44 Connection | - Increased Capacity <br> - Upgrade of I-44 Incident Relief Route <br> - Removal \& Upgrade of dangerous At-Grade Intersection | \$5,433,332 |
|  | U.S. 60 <br> Profile <br> Adjustment | Greene County | Profile Adjustment \& Drainage Improvements to reduce Flooding Risk \& Highway Closures | - Reduced Flooding Risk <br> - Improvements to I-44 Incident Relief Route <br> - Decreased Traffic Congestion in Webster County during periods of high water <br> - Reduction in Vehicle Hydroplaning | \$1,324,609 |


| $\substack{\text { PRIORITY } \\ \# 3}$ | Highway Z |
| :--- | :--- |

- Maintain local connectivity at times of Rail Traffic
- Reduction in Vehicle Hydroplaning \$4,787,980
- Removal \& Upgrade of dangerous At-Grade Intersection

| PRIORITY <br> \#4 | BNSF <br> Railroad Overpass | Seymour | Implement 7 Gradeseparated Crossings with 14 At-Grade Crossing Closures \& 4 At-grade Crossing Improvements |  | Maintains connectivity during Rail Traffic <br> Full access for Emergency Responders Maintains access to FEMA Shelter | \$1,796,967 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |

## US Highway 60 Corridor Study <br> Webster County, MO

## Regional Incident Detour Analysis



April 13, 2020

## Introduction \& Background

As part of the US 60 Corridor Study, the US Hwy 60 Corridor was identified as a major regional relief route for Interstate 44 (l-44) in the event of a closure due to traffic incidents or natural disasters. With any detour that adds time and mileage to a trip, there is a resulting societal impact. This analysis details the various impacts, and their corresponding economic repercussions. For this section of I-44, there are two (2) main detour routes available that have been historically used, depending on the location of the closure:

## Scenario 1

The first routes traffic from Springfield to Marshfield, MO, and vice versa, via routes US 65, US 60, and MO Hwy A, providing a detour around a closure that occurs between Springfield and Marshfield (Mile Marker 82.4 to 101.0).

## Scenario 2

The second routes traffic from Springfield to Rolla, MO, and vice versa, via routes US 65, US 60, and US 63, providing a regional detour around a closure that occurs between Marshfield and Rolla
 (Mile Marker 101.0 to 186.6).

Four (4) general societal impacts were evaluated as part of this analysis, as follows:
Travel Time Impact - The economic impact of the added time for traffic detouring for drivers and passengers of general passenger vehicles and commercial vehicles.
Safety Impact - The resulting increased crash risk and associated economic impact due to higher traffic volumes and longer distances that result in reduced capacity and operations.
Vehicle Operating Costs Impact - The economic impact of the increase in mileage traveled by general passenger vehicles and commercial trucks. These costs are defined by the USDOT as fuel, maintenance, insurance, lease \& purchase payments, tires, and depreciation.

Emissions Output Impact - The environmental impact attributed to the additional Carbon Dioxide and other exhaust emissions due to increased travel distance, expressed as the associated economic impact.

## Methods \& Assumptions

As described above, the Detour Analysis was analyzed for two possible scenarios. Historically, data has shown that these scenarios occur most commonly on l-44 due to traffic incident closures or natural disasters such as flooding. Flooding in this region most commonly occurs during 500 -year flood events where l-44 crosses the Gasconade River at Hazelgreen and at Jerome, between Lebanon and Rolla.

The two (2) scenarios were developed after better understanding the most common locations of traffic incidents that result in roadway closures, and the associated traffic detour, as produced through Google Maps. Scenario 1 is the common route that Google Maps routes traffic for I-44 detours and Scenario 2 is MoDOT's official Incident Relief Route.

Added travel times and additional mileage for detours were calculated based on the Google Maps recommended detour route compared to the original, most efficient route via l-44. Travel Times are based on free-flow conditions; thus it would be expected that greater travel time delays would occur with higher traffic density.

A regional traffic growth of 2.62\% was applied, in addition to traffic volumes on l-44 and US 60 as determined by the US Highway 60 Corridor Study Master Plan. The 2020 two-directional Average Daily Traffic (ADT) on I-44 and US 60 was estimated at 39,900 and 19,420, respectively.
Additionally, the detour routes MO Hwy A and US 63 have estimated 2020 ADT of 2,590 and 3,469, respectively. All ADT inputs were assumed that all l-44 traffic is detoured, either for a one-directional or two-directional closure.

Crash Prediction models were developed using the Highway Safety Manual (HSM), with the detour corridors assumed to be one (1) segment, and a generalized intersection applied for each intersection along the detour route. Additionally, crash prediction rates were assumed to grow proportionately, and were back calculated using 2020 and 2040 traffic volumes, resulting in a yearly growth rate of $2.19 \%$. For routes that had over the maximum ADT input allowed under detour conditions, a percent difference ratio was applied to each crash type in the HSM models to obtain more accurate crash predictions.

The values of societal impact costs are derived from the USDOT and EPA guidance on Benefit-Cost Analysis and are listed on the Assumptions table of the attached Detour Analysis. ${ }^{1}$

## Detour Analysis Results

## Scenario 1 Results

The impact of a total roadway closure that reroutes l-44 via US 65 - US 60 - MO Hwy A would add an additional 32 minutes of travel time and 26 miles. The resulting economic impact is approximately $\$ 1,080,724$ per day, or approximately $\$ 45,030$ every hour ( 2020 dollars). In 20 years (2040), assuming no capacity or safety improvements are made to the transportation system, the resulting impact is estimated to be \$1,738,362 per day, or \$72,432 every hour.

## Scenario 2 Results

The impact of a total roadway closure that regionally reroutes I-44 via US 65 - US 60 - US 63 would add an additional 53 minutes of travel time and 39 miles. The resulting economic impact is approximately $\$ 1,716,931$ per day, or approximately $\$ 71,539$ every hour ( 2020 dollars). In 20 years (2040), assuming no capacity or safety improvements are made, the resulting impact is estimated to be $\$ 3,995,227$ per day, or $\$ 166,468$ every hour.

While these values express the economic toll that an Interstate closure and detour make on travel time, vehicle operating costs, safety, and emissions, these values do not include the value of the freight moved along these corridors. With limited information available on the type, value, and amounts of freight moved along the l-44 corridor regionally, it can be assumed that the economic toll is significantly greater.

[^29]| Scenario 1     <br> (Via US 65 - US 60 - Hwy A)     <br> One-Directional Closure     <br>      <br> Current Societal Impact (2020)    20 Year Societal Impact (2040) <br> Daily     Hourly |  |  |  |
| :---: | :---: | :---: | :---: |
| $\$ 540,781$ | $\$ 22,536$ | Daily | Hourly |
| Two-Directional Closure |  |  |  |
| Current Societal Impact (2020) | 20 Year Societal Impact (2040) |  |  |
| Daily | Hourly | Daily | Hourly |
| $\$ 1,080,724$ | $\$ 45,030$ | $\$ 1,738,362$ | $\$ 72,432$ |


| Scenario 2 <br> (Via US 65 - US 60 - US 63) <br> One-Directional Closure |  |  |  |
| :---: | :---: | :---: | :---: |
| Current Societal Impact (2020) |  |  |  |
| Daily | Hourly | 20 Year Societal Impact (2040) |  |
| $\$ 859,642$ | $\$ 35,818$ | Daily | Hourly |
| Two-Directional Closure |  |  |  |
| Current Societal Impact (2020) | 20 Year Societal Impact (2040) |  |  |
| Daily | Hourly | Daily | Hourly |
| $\$ 1,716,931$ | $\$ 71,539$ | $\$ 3,995,227$ | $\$ 166,468$ |

## Historical Impacts \& Analysis

MoDOT has documented and provided the data that resulted in a roadway closure on I-44 due to natural disasters, traffic incidents, or police emergencies from 2017 to 2019.

## Traffic Accidents

In the past three (3) years, from 2017-2019, l-44 has had a one-directional closure four (4) times, for a total of 13 hours and no major two-directional closures. The average closure due to a traffic incident was 3.3 hours. Traffic was able to detour via Scenario 1 (US 65 - US 60 - MO Hwy A) one (1) time and via Scenario 2 (US 65 - US 60 - US 63) three (3) times. Based on the economic data developed in this analysis, the combined closures have resulted in an estimated economic toll of \$265,206.

## Natural Disasters

Additionally, natural disasters have occurred several times in the past decade, and specifically in the last three (3) years, from 2017-2019, resulting in l-44 being completely shut down for multiple days at a time.

In 2018, a multi-vehicle pileup of over 100 vehicles near Conway, MO occurred during a winter snowstorm on February 4, 2018 and closed the l-44 eastbound lanes for 15 hours. The resulting economic toll is estimated to be $\$ 537,270$.

Flooding at the Gasconade River at Hazelgreen and Jerome resulted in l-44 being shut down for multiple days in both directions, forcing traffic to detour from Springfield to Rolla via US 65 - US 60 - US 63 (Scenario 2). l-44 was shut down in multiple locations from April 30 to May 3, 2017, for a total of 62 hours. The estimated economic toll from this event is estimated to be $\$ 4,435,418$.

Additionally, flooding in 2015 (not included in MoDOT data) resulted in l-44 being shut down at Hazelgreen for approximately 50 hours, resulting in an estimated economic toll of \$3,576,950 due to traffic detouring.

## Police Emergencies

In the past (3) years, from 2017-2019, l-44 had two (2) one-directional closures totaling two (2) hours, due to police activity. The average closure was 1.0 hours. Traffic was able to detour via Scenario 2 (US 65 - US 60 - US 63) both times. Based on the economic data developed in this analysis, the combined closures have resulted in an estimated economic toll of \$143,078.

## Conclusions

The Regional Traffic Detour Analysis details the negative economic impact that detouring l-44 traffic has on society. These results highlight the vital importance of an efficient transportation network in the essential movement of people and freight, regionally in Missouri and across the nation.

While this analysis accounts for the societal impact of travel time, safety, operating costs, and emissions, it does not account for the impact of idle or delayed freight nor the impact of additional traffic to the adjacent routes and towns along the detour routes Thus, the economic impact values obtained in this analysis are conservative to the actual realized societal impacts of a regional detour.

Furthermore, it is vitally important to maintain these routes to allow for capacity increases and associated safety enhancements. Additionally, it is also vitally important to maintain the dedicated detour routes in preparation of the circumstances that result in a closure to a regional arterial, such as Interstate 44. Such redundancy in transportation networks results could result in safer and more efficient movement of goods and people.

## Regional Incident Detour Analysis Analysis Tables \& Data

Detour Analysis Inputs and Assumptions

| Description | Value | Source |
| :---: | :---: | :---: |
| General Assumptions <br> Discount Rate @ 3\% <br> Discount Rate @ 7\% <br> Grams per Short Ton |  |  |
| 1-44 Eastbound Average Daily Traffic (ADT) Impacted I-44 Westbound Average Daily Traffic (ADT) Impacted Percent Trucks <br> Percent Passenger Vehicles <br> Average Annual Regional Vehicular Count Increase | $\begin{array}{r} 19,950 \\ 19,950 \\ 7 \% \\ 93 \% \\ 2.62 \% \end{array}$ | MoDOT \& CMT Traffic Counts, 2019 |
| Average Passengers per Private Vehicle Average Passengers per Truck | $\begin{aligned} & 1.67 \\ & 1.00 \end{aligned}$ | USDOT Benefit-Cost Analysis Guidance, January 2020 |
| Crash Assumptions Annual Crash Prediction Fatal Accident Probability Injury Accident Probability Property Damage Only Probability | See Appendix <br> See Appendix <br> See Appendix <br> See Appendix | U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of Crossing Safety and Operation |
| Value of Travel Time Savings, per hour 2019 dollars <br> Private Vehicle Travel <br> Personal <br> Business <br> All Purposes <br> Commercial Vehicle Operators <br> Truck Drivers <br> Bus Drivers <br> Transit Rail Operators <br> Locomotive Engineers | $\$$ 15.20 <br> $\$$ 27.10 <br> $\$$ 16.60 <br>   <br> $\$$ 29.50 <br> $\$$ 31.00 <br> $\$$ 50.20 <br> $\$$ 45.70 | USDOT Benefit-Cost Analysis Guidance, January 2020 |
| Value of Vehicle Operating Costs, per mile Light Duty Vehicles <br> Commerical Trucks | $\begin{array}{ll} \$ & 0.41 \\ \$ & 0.96 \end{array}$ | USDOT Benefit-Cost Analysis Guidance, January 2020 |
| Value of Injuries <br> Minor Injury <br> Serious Injury <br> Fatality <br> Property Damage Only Probability | $\$$ 150,300 <br> $\$$ 577,700 <br> $\$$ $9,962,900$ <br> $\$$ 10,500 | MoDOT |
| Average Emission Rates (g/mi) Light Duty Gasoline Fueled Vehicles Volatile Organic Compounds (VOC) Carbon Monoxide (CO) Nitrogen Oxide (NOx) <br> Particulate Matter ( $\mathrm{PM}_{2.5}$ ) Heavy Duty Diesel Vehicle Volatile Organic Compounds (VOC) Carbon Monoxide (CO) Nitrogen Oxide (NOx) Particulate Matter ( $\mathrm{PM}_{2.5}$ ) | $\begin{aligned} & 0.350 \\ & 3.941 \\ & 0.289 \\ & 0.012 \\ & \\ & 0.645 \\ & 1.994 \\ & 5.971 \\ & 0.230 \end{aligned}$ | EPA, Average U.S. Vehicle Emissions by Vehicle Type, April 2018 |
| Value of Emissions <br> Carbon Monoxide (CO) <br> Volatile Organic Compounds (VOC) <br> Nitrogen Oxide (NOx) <br> Particulate Matter ( $\mathrm{PM}_{2.5}$ ) <br> Sulfur Dioxide $\left(\mathrm{SO}_{2}\right)$ | \$/ Short Ton  <br> $\$$ 1 <br> $\$$ 2,100 <br> $\$$ 8,600 <br> $\$$ 387,300 <br> $\$$ 50,100 | USDOT Benefit-Cost Analysis Guidance, January 2020 |


| Scenario 1-Traffic Detour via US 65-US 60-Hwy A ${ }^{1}$ |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 32 Min. Added Time |  |  |  |  | 26 Added Miles |  |  |  |
| One-Directional Closure |  |  |  |  |  |  |  |  |
|  | Current Societal Impact |  |  |  | 20 Year Societal Impact |  |  |  |
|  | Daily |  | Hourly |  | Daily |  | Hourly |  |
| Travel Time Impact | \$ | 296,286 | \$ | 12,345 | \$ | 833,666 | \$ | 34,736 |
| Decreased Safety Impact | \$ | 2,087 | \$ | 87 | \$ | 3,218 | \$ | 134 |
| Operating Cost Impact | \$ | 232,637 | \$ | 9,693 | \$ | 390,228 | \$ | 16,260 |
| Emissions Output Impact | \$ | 9,861 | \$ | 411 | \$ | 16,540 | \$ | 689 |
| Total Impact | \$ | 540,871 | \$ | 22,536 | \$ | 1,243,653 | \$ | 51,819 |
| Two-Directional Closure |  |  |  |  |  |  |  |  |
|  | Current Societal Impact |  |  |  | 20 Year Societal Impact |  |  |  |
|  | Daily |  | Hourly |  | Daily |  | Hourly |  |
| Travel Time Impact | \$ | 592,573 | \$ | 24,691 | \$ | 1,667,332 | \$ | 69,472 |
| Decreased Safety Impact | \$ | 3,156 | \$ | 132 | \$ | 4,868 | \$ | 203 |
| Operating Cost Impact | \$ | 465,274 | \$ | 19,386 | \$ | 33,081 | \$ | 1,378 |
| Emissions Output Impact | \$ | 19,721 | \$ | 822 | \$ | 33,081 | \$ | 1,378 |
| Total Impact | \$ | 1,080,724 | \$ | 45,030 | \$ | 1,738,362 | \$ | 72,432 |

${ }^{1}$ See Tables 1-4

Scenario 2 - Traffic Detour via US 65 - US 60 - US $63^{2}$

| 53 Min. Added Time |  |  |  |  | 39 Added Miles |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| One-Directional Closure |  |  |  |  |  |  |  |  |
|  | Current Societal Impact |  |  |  | 20 Year Societal Impact |  |  |  |
|  | Daily |  | Hourly |  | Daily |  | Hourly |  |
| Travel Time Impact | \$ | 490,724 | \$ | 20,447 | \$ | 1,380,759 | \$ | 57,532 |
| Decreased Safety Impact | \$ | 5,172 | \$ | 215 | \$ | 8,675 | \$ | 361 |
| Operating Cost Impact | \$ | 348,955 | \$ | 14,540 | \$ | 585,343 | \$ | 24,389 |
| Emissions Output Impact | \$ | 14,791 | \$ | 616 | \$ | 24,811 | \$ | 1,034 |
| Total Impact | \$ | 859,642 | \$ | 35,818 | \$ | 1,999,588 | \$ | 83,316 |
| Two-Directional Closure |  |  |  |  |  |  |  |  |
|  | Current Societal Impact |  |  |  | 20 Year Societal Impact |  |  |  |
|  | Daily |  | Hourly |  | Daily |  | Hourly |  |
| Travel Time Impact | \$ | 981,448 | \$ | 40,894 | \$ | 2,761,518 | \$ | 115,063 |
| Decreased Safety Impact | \$ | 7,989 | \$ | 333 | \$ | 13,402 | \$ | 558 |
| Operating Cost Impact | \$ | 697,911 | \$ | 29,080 | \$ | 1,170,685 | \$ | 48,779 |
| Emissions Output Impact | \$ | 29,582 | \$ | 1,233 | \$ | 49,621 | \$ | 2,068 |
| Total Impact | \$ | 1,716,931 | \$ | 71,539 | \$ | 3,995,227 | \$ | 166,468 |

[^30]
## Scenario 1 -

## Traffic Detour via US 65 - US 60 - Hwy A

Table 1a. Value of Travel Time Delay - One-Directional Closure

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger <br> Vehicles | Estimated Trucks | Assumed Average Reroute Delay per Vehicle (min) | Total Average <br> Passenger Vehicle Delay (min) | Total <br> AverageTruck Vehicle Delay (min) | Daily Passenger Vehicle Value of Time Delay |  | Daily Annual Truck Value of Time Delay |  | Total Daily Value of Travel Time Impact |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | 19,950 | 18,554 | 1,397 | 32.0 | 593,712 | 44,688 | \$ | 274,315 | \$ | 21,972 | \$ | 296,286 |
| 1 | 2021 | 20,473 | 19,040 | 1,433 | 32.8 | 625,230 | 47,060 | \$ | 288,877 | \$ | 23,138 | \$ | 312,015 |
| 2 | 2022 | 21,009 | 19,538 | 1,471 | 33.7 | 658,421 | 49,559 | \$ | 304,213 | \$ | 24,366 | \$ | 328,579 |
| 3 | 2023 | 21,560 | 20,050 | 1,509 | 34.6 | 693,375 | 52,189 | \$ | 320,362 | \$ | 25,660 | \$ | 346,022 |
| 4 | 2024 | 22,124 | 20,576 | 1,549 | 35.5 | 730,183 | 54,960 | \$ | 337,369 | \$ | 27,022 | \$ | 364,391 |
| 5 | 2025 | 22,704 | 21,115 | 1,589 | 36.4 | 768,946 | 57,878 | \$ | 355,279 | \$ | 28,457 | \$ | 383,735 |
| 6 | 2026 | 23,299 | 21,668 | 1,631 | 37.4 | 809,767 | 60,950 | \$ | 374,139 | \$ | 29,967 | \$ | 404,106 |
| 7 | 2027 | 23,909 | 22,236 | 1,674 | 38.4 | 852,754 | 64,186 | \$ | 394,001 | \$ | 31,558 | \$ | 425,559 |
| 8 | 2028 | 24,536 | 22,818 | 1,718 | 39.4 | 898,024 | 67,593 | \$ | 414,917 | \$ | 33,233 | \$ | 448,150 |
| 9 | 2029 | 25,179 | 23,416 | 1,762 | 40.4 | 945,697 | 71,181 | \$ | 436,944 | \$ | 34,998 | \$ | 471,941 |
| 10 | 2030 | 25,838 | 24,030 | 1,809 | 41.4 | 995,901 | 74,960 | \$ | 460,139 | \$ | 36,855 | \$ | 496,995 |
| 11 | 2031 | 26,515 | 24,659 | 1,856 | 42.5 | 1,048,770 | 78,940 | \$ | 484,566 | \$ | 38,812 | \$ | 523,378 |
| 12 | 2032 | 27,210 | 25,305 | 1,905 | 43.6 | 1,104,445 | 83,130 | \$ | 510,290 | \$ | 40,872 | \$ | 551,163 |
| 13 | 2033 | 27,923 | 25,968 | 1,955 | 44.8 | 1,163,076 | 87,543 | \$ | 537,380 | \$ | 43,042 | \$ | 580,422 |
| 14 | 2034 | 28,654 | 26,649 | 2,006 | 46.0 | 1,224,820 | 92,191 | \$ | 565,907 | \$ | 45,327 | \$ | 611,235 |
| 15 | 2035 | 29,405 | 27,347 | 2,058 | 47.2 | 1,289,841 | 97,085 | \$ | 595,949 | \$ | 47,733 | \$ | 643,683 |
| 16 | 2036 | 30,176 | 28,063 | 2,112 | 48.4 | 1,358,314 | 102,239 | \$ | 627,586 | \$ | 50,267 | \$ | 677,854 |
| 17 | 2037 | 30,966 | 28,799 | 2,168 | 49.7 | 1,430,422 | 107,666 | \$ | 660,903 | \$ | 52,936 | \$ | 713,839 |
| 18 | 2038 | 31,777 | 29,553 | 2,224 | 51.0 | 1,506,358 | 113,382 | \$ | 695,988 | \$ | 55,746 | \$ | 751,734 |
| 19 | 2039 | 32,610 | 30,327 | 2,283 | 52.3 | 1,586,325 | 119,401 | \$ | 732,935 | \$ | 58,705 | \$ | 791,641 |
| 20 | 2040 | 33,464 | 31,122 | 2,343 | 53.7 | 1,670,538 | 125,739 | \$ | 771,844 | \$ | 61,822 | \$ | 833,666 |

${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps. Travel Delays assumed to increase linearly with ADT
${ }^{2}$ Traffic Routing assumed if $50 \%$ ADT was rerouted for 24 Hours
${ }^{3}$ Average Reroute Delay per Vehicle assumed to annually increase linearly with ADT

Table 1b. Value of Travel Time Delay - Two-Directional Closure

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger Vehicles | Estimated Trucks | Assumed Average Reroute Delay per Vehicle (min) | Total Average <br> Passenger <br> Vehicle Delay <br> (min) |  | Daily Passenger Vehicle Value of Time Delay |  | Daily Annual Truck Value of Time Delay |  | Total Daily Value of Travel Time Impact |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | 39,900 | 37,107 | 2,793 | 32.0 | 1,187,424 | 89,376 | \$ | 548,629 | \$ | 43,943 | \$ | 592,573 |
| 1 | 2021 | 40,945 | 38,079 | 2,866 | 32.8 | 1,250,460 | 94,121 | \$ | 577,754 | \$ | 46,276 | \$ | 624,030 |
| 2 | 2022 | 42,018 | 39,077 | 2,941 | 33.7 | 1,316,843 | 99,117 | \$ | 608,425 | \$ | 48,733 | \$ | 657,158 |
| 3 | 2023 | 43,119 | 40,101 | 3,018 | 34.6 | 1,386,749 | 104,379 | \$ | 640,724 | \$ | 51,320 | \$ | 692,044 |
| 4 | 2024 | 44,249 | 41,151 | 3,097 | 35.5 | 1,460,367 | 109,920 | \$ | 674,738 | \$ | 54,044 | \$ | 728,782 |
| 5 | 2025 | 45,408 | 42,229 | 3,179 | 36.4 | 1,537,892 | 115,755 | \$ | 710,558 | \$ | 56,913 | \$ | 767,471 |
| 6 | 2026 | 46,598 | 43,336 | 3,262 | 37.4 | 1,619,534 | 121,900 | \$ | 748,278 | \$ | 59,934 | \$ | 808,213 |
| 7 | 2027 | 47,819 | 44,471 | 3,347 | 38.4 | 1,705,509 | 128,372 | \$ | 788,002 | \$ | 63,116 | \$ | 851,118 |
| 8 | 2028 | 49,071 | 45,636 | 3,435 | 39.4 | 1,796,048 | 135,186 | \$ | 829,834 | \$ | 66,467 | \$ | 896,301 |
| 9 | 2029 | 50,357 | 46,832 | 3,525 | 40.4 | 1,891,394 | 142,363 | \$ | 873,887 | \$ | 69,995 | \$ | 943,882 |
| 10 | 2030 | 51,676 | 48,059 | 3,617 | 41.4 | 1,991,801 | 149,921 | \$ | 920,279 | \$ | 73,711 | \$ | 993,990 |
| 11 | 2031 | 53,030 | 49,318 | 3,712 | 42.5 | 2,097,539 | 157,879 | \$ | 969,133 | \$ | 77,624 | \$ | 1,046,757 |
| 12 | 2032 | 54,420 | 50,610 | 3,809 | 43.6 | 2,208,890 | 166,261 | \$ | 1,020,581 | \$ | 81,745 | \$ | 1,102,326 |
| 13 | 2033 | 55,846 | 51,936 | 3,909 | 44.8 | 2,326,152 | 175,087 | \$ | 1,074,760 | \$ | 86,084 | \$ | 1,160,844 |
| 14 | 2034 | 57,309 | 53,297 | 4,012 | 46.0 | 2,449,639 | 184,381 | \$ | 1,131,815 | \$ | 90,654 | \$ | 1,222,469 |
| 15 | 2035 | 58,810 | 54,694 | 4,117 | 47.2 | 2,579,682 | 194,170 | \$ | 1,191,899 | \$ | 95,467 | \$ | 1,287,366 |
| 16 | 2036 | 60,351 | 56,127 | 4,225 | 48.4 | 2,716,628 | 204,477 | \$ | 1,255,173 | \$ | 100,535 | \$ | 1,355,707 |
| 17 | 2037 | 61,932 | 57,597 | 4,335 | 49.7 | 2,860,844 | 215,332 | \$ | 1,321,805 | \$ | 105,872 | \$ | 1,427,677 |
| 18 | 2038 | 63,555 | 59,106 | 4,449 | 51.0 | 3,012,716 | 226,764 | \$ | 1,391,975 | \$ | 111,492 | \$ | 1,503,467 |
| 19 | 2039 | 65,220 | 60,655 | 4,565 | 52.3 | 3,172,650 | 238,802 | \$ | 1,465,870 | \$ | 117,411 | \$ | 1,583,281 |
| 20 | 2040 | 66,929 | 62,244 | 4,685 | 53.7 | 3,341,075 | 251,479 | \$ | 1,543,688 | \$ | 123,644 | \$ | 1,667,332 |

${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps. Travel Delays assumed to increase linearly with ADT
${ }^{2}$ Traffic Routing assumed if $100 \%$ ADT was rerouted for 24 Hours
${ }^{3}$ Average Reroute Delay per Vehicle assumed to annually increase linearly with ADT

Table 2a. Value of Decreased Safety - One-Directional Closure

| Year | Calendar <br> Year | Increased <br> Total Crash Probability | Increased Fatal \& Injury Crash Probability | Increased Property Damage Only Crash Probability |  | Value <br> Time <br> t |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | . 482 | . 213 | . 255 | \$ | 2,087 |
| 1 | 2021 | . 492 | . 218 | . 261 | \$ | 2,132 |
| 2 | 2022 | . 503 | . 222 | . 266 | \$ | 2,179 |
| 3 | 2023 | . 514 | . 227 | . 272 | \$ | 2,227 |
| 4 | 2024 | . 525 | . 232 | . 278 | \$ | 2,275 |
| 5 | 2025 | . 537 | . 237 | . 284 | \$ | 2,325 |
| 6 | 2026 | . 549 | . 243 | . 291 | \$ | 2,376 |
| 7 | 2027 | . 561 | . 248 | . 297 | \$ | 2,428 |
| 8 | 2028 | . 573 | . 253 | . 303 | \$ | 2,481 |
| 9 | 2029 | . 586 | . 259 | . 310 | \$ | 2,536 |
| 10 | 2030 | . 598 | . 264 | . 317 | \$ | 2,591 |
| 11 | 2031 | . 611 | . 270 | . 324 | \$ | 2,648 |
| 12 | 2032 | . 625 | . 276 | . 331 | \$ | 2,706 |
| 13 | 2033 | . 639 | . 282 | . 338 | \$ | 2,765 |
| 14 | 2034 | . 652 | . 288 | . 346 | \$ | 2,826 |
| 15 | 2035 | . 667 | . 295 | . 353 | \$ | 2,888 |
| 16 | 2036 | . 681 | . 301 | . 361 | \$ | 2,951 |
| 17 | 2037 | . 696 | . 308 | . 369 | \$ | 3,016 |
| 18 | 2038 | . 712 | . 315 | . 377 | \$ | 3,082 |
| 19 | 2039 | . 727 | . 321 | . 385 | \$ | 3,149 |
| 20 | 2040 | . 743 | . 328 | . 393 | \$ | 3,218 |
| ${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps. |  |  |  |  |  |  |
| ${ }^{2}$ Traffic Routing assumed if 50\% ADT was rerouted for 24 Hours |  |  |  |  |  |  |
| ${ }^{3}$ Crash Prediction Derived from HSM Models with assumed values |  |  |  |  |  |  |

Table 2b. Value of Decreased Safety - Two-Directional Closure

| Year | Calendar Year | Increased <br> Total Crash <br> Probability | Increased Fatal \& Injury Crash Probability | Increased Property Damage Only Crash Probability | Total Daily Value of Travel Time Impact |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | . 657 | . 322 | . 335 | \$ | 3,156 |
| 1 | 2021 | . 671 | . 329 | . 342 | \$ | 3,225 |
| 2 | 2022 | . 686 | . 337 | . 349 | \$ | 3,296 |
| 3 | 2023 | . 701 | . 344 | . 357 | \$ | 3,368 |
| 4 | 2024 | . 716 | . 351 | . 365 | \$ | 3,442 |
| 5 | 2025 | . 732 | . 359 | . 373 | \$ | 3,517 |
| 6 | 2026 | . 748 | . 367 | . 381 | \$ | 3,594 |
| 7 | 2027 | . 764 | . 375 | . 389 | \$ | 3,673 |
| 8 | 2028 | . 781 | . 383 | . 398 | \$ | 3,754 |
| 9 | 2029 | . 798 | . 392 | . 407 | \$ | 3,836 |
| 10 | 2030 | . 816 | . 400 | . 416 | \$ | 3,920 |
| 11 | 2031 | . 834 | . 409 | . 425 | \$ | 4,006 |
| 12 | 2032 | . 852 | . 418 | . 434 | \$ | 4,093 |
| 13 | 2033 | . 870 | . 427 | . 443 | \$ | 4,183 |
| 14 | 2034 | . 890 | . 436 | . 453 | \$ | 4,275 |
| 15 | 2035 | . 909 | . 446 | . 463 | \$ | 4,368 |
| 16 | 2036 | . 929 | . 456 | . 473 | \$ | 4,464 |
| 17 | 2037 | . 949 | . 466 | . 484 | \$ | 4,562 |
| 18 | 2038 | . 970 | . 476 | . 494 | \$ | 4,662 |
| 19 | 2039 | . 991 | . 486 | . 505 | \$ | 4,764 |
| 20 | 2040 | 1.013 | . 497 | . 516 | \$ | 4,868 |

${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps.
${ }^{2}$ Traffic Routing assumed if $50 \%$ ADT was rerouted for 24 Hours
${ }^{3}$ Crash Prediction Derived from HSM Models with assumed values

Table 3a. Value of Transportation Operating Cost - One-Directional Closure

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger Vehicles | Estimated Trucks | Assumed Added Reroute Distance per Vehicle (mile) | Total Added Passenger Vehicle Reroute (mile) | Total Added Truck Vehicle Reroute (mile) | Daily Passenger Vehicle Value of Time Delay |  | Daily Annual Truck Value of Time Delay |  | Total Daily Operations Value of Added Reroute Distance |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | 19,950 | 18,554 | 1,397 | 26 | 482,391 | 36,309 | \$ | 197,780 | \$ | 34,857 | \$ | 232,637 |
| 1 | 2021 | 20,473 | 19,040 | 1,433 | 26 | 495,030 | 37,260 | \$ | 202,962 | \$ | 35,770 | \$ | 238,732 |
| 2 | 2022 | 21,009 | 19,538 | 1,471 | 26 | 507,999 | 38,237 | \$ | 208,280 | \$ | 36,707 | \$ | 244,987 |
| 3 | 2023 | 21,560 | 20,050 | 1,509 | 26 | 521,309 | 39,238 | \$ | 213,737 | \$ | 37,669 | \$ | 251,405 |
| 4 | 2024 | 22,124 | 20,576 | 1,549 | 26 | 534,967 | 40,266 | \$ | 219,337 | \$ | 38,656 | \$ | 257,992 |
| 5 | 2025 | 22,704 | 21,115 | 1,589 | 26 | 548,983 | 41,321 | \$ | 225,083 | \$ | 39,668 | \$ | 264,752 |
| 6 | 2026 | 23,299 | 21,668 | 1,631 | 26 | 563,367 | 42,404 | \$ | 230,980 | \$ | 40,708 | \$ | 271,688 |
| 7 | 2027 | 23,909 | 22,236 | 1,674 | 26 | 578,127 | 43,515 | \$ | 237,032 | \$ | 41,774 | \$ | 278,806 |
| 8 | 2028 | 24,536 | 22,818 | 1,718 | 26 | 593,274 | 44,655 | \$ | 243,242 | \$ | 42,869 | \$ | 286,111 |
| 9 | 2029 | 25,179 | 23,416 | 1,762 | 26 | 608,818 | 45,825 | \$ | 249,615 | \$ | 43,992 | \$ | 293,607 |
| 10 | 2030 | 25,838 | 24,030 | 1,809 | 26 | 624,769 | 47,026 | \$ | 256,155 | \$ | 45,145 | \$ | 301,300 |
| 11 | 2031 | 26,515 | 24,659 | 1,856 | 26 | 641,138 | 48,258 | \$ | 262,866 | \$ | 46,327 | \$ | 309,194 |
| 12 | 2032 | 27,210 | 25,305 | 1,905 | 26 | 657,936 | 49,522 | \$ | 269,754 | \$ | 47,541 | \$ | 317,295 |
| 13 | 2033 | 27,923 | 25,968 | 1,955 | 26 | 675,173 | 50,820 | \$ | 276,821 | \$ | 48,787 | \$ | 325,608 |
| 14 | 2034 | 28,654 | 26,649 | 2,006 | 26 | 692,863 | 52,151 | \$ | 284,074 | \$ | 50,065 | \$ | 334,139 |
| 15 | 2035 | 29,405 | 27,347 | 2,058 | 26 | 711,016 | 53,517 | \$ | 291,517 | \$ | 51,377 | \$ | 342,893 |
| 16 | 2036 | 30,176 | 28,063 | 2,112 | 26 | 729,645 | 54,919 | \$ | 299,154 | \$ | 52,723 | \$ | 351,877 |
| 17 | 2037 | 30,966 | 28,799 | 2,168 | 26 | 748,761 | 56,358 | \$ | 306,992 | \$ | 54,104 | \$ | 361,096 |
| 18 | 2038 | 31,777 | 29,553 | 2,224 | 26 | 768,379 | 57,835 | \$ | 315,035 | \$ | 55,522 | \$ | 370,557 |
| 19 | 2039 | 32,610 | 30,327 | 2,283 | 26 | 788,510 | 59,350 | \$ | 323,289 | \$ | 56,976 | \$ | 380,265 |
| 20 | 2040 | 33,464 | 31,122 | 2,343 | 26 | 809,169 | 60,905 | \$ | 331,759 | \$ | 58,469 | \$ | 390,228 |

${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps.
${ }^{2}$ Traffic Routing assumed if 50\% ADT was rerouted for 24 Hours

Table 3b. Value of Transportation Operating Cost - Two-Directional Closure

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger Vehicles | Estimated <br> Trucks | Assumed Added Reroute Distance per Vehicle (mile) | Total Added Passenger Vehicle Reroute (mile) | Total Added Truck Vehicle Reroute (mile) | Daily Passenger Vehicle Value of Time Delay |  | Daily Annual <br> Truck Value of Time Delay |  | Total Daily Operations Value of Added Reroute Distance |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | 39,900 | 37,107 | 2,793 | 26 | 964,782 | 72,618 | \$ | 395,561 | \$ | 69,713 | \$ | 465,274 |
| 1 | 2021 | 40,945 | 38,079 | 2,866 | 26 | 990,059 | 74,521 | \$ | 405,924 | \$ | 71,540 | \$ | 477,464 |
| 2 | 2022 | 42,018 | 39,077 | 2,941 | 26 | 1,015,999 | 76,473 | \$ | 416,560 | \$ | 73,414 | \$ | 489,974 |
| 3 | 2023 | 43,119 | 40,101 | 3,018 | 26 | 1,042,618 | 78,477 | \$ | 427,473 | \$ | 75,338 | \$ | 502,811 |
| 4 | 2024 | 44,249 | 41,151 | 3,097 | 26 | 1,069,935 | 80,533 | \$ | 438,673 | \$ | 77,311 | \$ | 515,985 |
| 5 | 2025 | 45,408 | 42,229 | 3,179 | 26 | 1,097,967 | 82,643 | \$ | 450,166 | \$ | 79,337 | \$ | 529,503 |
| 6 | 2026 | 46,598 | 43,336 | 3,262 | 26 | 1,126,734 | 84,808 | \$ | 461,961 | \$ | 81,416 | \$ | 543,376 |
| 7 | 2027 | 47,819 | 44,471 | 3,347 | 26 | 1,156,254 | 87,030 | \$ | 474,064 | \$ | 83,549 | \$ | 557,613 |
| 8 | 2028 | 49,071 | 45,636 | 3,435 | 26 | 1,186,548 | 89,310 | \$ | 486,485 | \$ | 85,738 | \$ | 572,222 |
| 9 | 2029 | 50,357 | 46,832 | 3,525 | 26 | 1,217,635 | 91,650 | \$ | 499,231 | \$ | 87,984 | \$ | 587,215 |
| 10 | 2030 | 51,676 | 48,059 | 3,617 | 26 | 1,249,538 | 94,051 | \$ | 512,310 | \$ | 90,289 | \$ | 602,600 |
| 11 | 2031 | 53,030 | 49,318 | 3,712 | 26 | 1,282,275 | 96,515 | \$ | 525,733 | \$ | 92,655 | \$ | 618,388 |
| 12 | 2032 | 54,420 | 50,610 | 3,809 | 26 | 1,315,871 | 99,044 | \$ | 539,507 | \$ | 95,082 | \$ | 634,589 |
| 13 | 2033 | 55,846 | 51,936 | 3,909 | 26 | 1,350,347 | 101,639 | \$ | 553,642 | \$ | 97,573 | \$ | 651,216 |
| 14 | 2034 | 57,309 | 53,297 | 4,012 | 26 | 1,385,726 | 104,302 | \$ | 568,148 | \$ | 100,130 | \$ | 668,277 |
| 15 | 2035 | 58,810 | 54,694 | 4,117 | 26 | 1,422,032 | 107,035 | \$ | 583,033 | \$ | 102,753 | \$ | 685,786 |
| 16 | 2036 | 60,351 | 56,127 | 4,225 | 26 | 1,459,289 | 109,839 | \$ | 598,309 | \$ | 105,445 | \$ | 703,754 |
| 17 | 2037 | 61,932 | 57,597 | 4,335 | 26 | 1,497,523 | 112,717 | \$ | 613,984 | \$ | 108,208 | \$ | 722,192 |
| 18 | 2038 | 63,555 | 59,106 | 4,449 | 26 | 1,536,758 | 115,670 | \$ | 630,071 | \$ | 111,043 | \$ | 741,114 |
| 19 | 2039 | 65,220 | 60,655 | 4,565 | 26 | 1,577,021 | 118,700 | \$ | 646,578 | \$ | 113,952 | \$ | 760,531 |
| 20 | 2040 | 66,929 | 62,244 | 4,685 | 26 | 1,618,339 | 121,810 | \$ | 663,519 | \$ | 116,938 | \$ | 780,457 |

[^31]| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger <br> Vehicles | Estimated <br> Trucks | Assumed Added Reroute Distance per Vehicle (mile) | Total Added Passenger Vehicle Reroute (mile) | Total Added <br> Truck Vehicle <br> Reroute (mile) | Cost of Emissions for Passenger Vehicles |  |  |  |  |  |  | Cost of Emissions for Trucks |  |  |  |  |  |  |  | Total Daily Value of Added Emissions |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  | CO |  | VOC |  | $\mathrm{No}_{\mathrm{x}}$ |  | PM 2.5 | CO |  | VOC |  |  | $\mathrm{No}_{\mathrm{x}}$ | $\mathrm{PM}_{2.5}$ |  |  |  |
| 0 | 2020 | 19,950 | 18,554 | 1,397 | 26 | 482,391 | 36,309 | \$ | 2 | \$ | 391 | \$ | 1,322 | \$ 2,471 | \$ | 54 | \$ | 0 | \$ | 2,055 | \$ | 3,565 | \$ | 9,861 |
| 1 | 2021 | 20,473 | 19,040 | 1,433 | 26 | 495,030 | 37,260 | \$ | 2 | \$ | 401 | \$ | 1,356 | \$ 2,536 | \$ | 56 | \$ | 0 | \$ | 2,109 | \$ | 3,659 | \$ | 10,119 |
| 2 | 2022 | 21,009 | 19,538 | 1,471 | 26 | 507,999 | 38,237 | \$ | 2 | \$ | 412 | \$ | 1,392 | \$ 2,603 | \$ | 57 | \$ | 0 | \$ | 2,164 | \$ | 3,755 | \$ | 10,384 |
| 3 | 2023 | 21,560 | 20,050 | 1,509 | 26 | 521,309 | 39,238 | \$ | 2 | \$ | 422 | \$ | 1,428 | \$ 2,671 | \$ | 59 | \$ | 0 | \$ | 2,221 | \$ | 3,853 | \$ | 10,656 |
| 4 | 2024 | 22,124 | 20,576 | 1,549 | 26 | 534,967 | 40,266 | \$ | 2 | \$ | 433 | \$ | 1,466 | \$ 2,741 | \$ | 60 | \$ | 0 | \$ | 2,279 | \$ | 3,954 | \$ | 10,935 |
| 5 | 2025 | 22,704 | 21,115 | 1,589 | 26 | 548,983 | 41,321 | \$ | 2 | \$ | 445 | \$ | 1,504 | \$ 2,812 | \$ | 62 | \$ | 0 | \$ | 2,339 | \$ | 4,057 | \$ | 11,222 |
| 6 | 2026 | 23,299 | 21,668 | 1,631 | 26 | 563,367 | 42,404 | \$ | 2 | \$ | 456 | \$ | 1,543 | \$ 2,886 | \$ | 63 | \$ | 0 | \$ | 2,400 | \$ | 4,164 | \$ | 11,516 |
| 7 | 2027 | 23,909 | 22,236 | 1,674 | 26 | 578,127 | 43,515 | \$ | 3 | \$ | 468 | \$ | 1,584 | \$ 2,962 | \$ | 65 | \$ | 0 | \$ | 2,463 | \$ | 4,273 | \$ | 11,818 |
| 8 | 2028 | 24,536 | 22,818 | 1,718 | 26 | 593,274 | 44,655 | \$ | 3 | \$ | 481 | \$ | 1,625 | \$ 3,039 | \$ | 67 | \$ | 0 | \$ | 2,528 | \$ | 4,385 | \$ | 12,127 |
| 9 | 2029 | 25,179 | 23,416 | 1,762 | 26 | 608,818 | 45,825 | \$ | 3 | \$ | 493 | \$ | 1,668 | \$ 3,119 | \$ | 68 | \$ | 0 | \$ | 2,594 | \$ | 4,500 | \$ | 12,445 |
| 10 | 2030 | 25,838 | 24,030 | 1,809 | 26 | 624,769 | 47,026 | \$ | 3 | \$ | 506 | \$ | 1,712 | \$ 3,201 | \$ | 70 | \$ | 0 | \$ | 2,662 | \$ | 4,618 | \$ | 12,771 |
| 11 | 2031 | 26,515 | 24,659 | 1,856 | 26 | 641,138 | 48,258 | \$ | 3 | \$ | 519 | \$ | 1,757 | \$ 3,285 | \$ | 72 | \$ | 0 | \$ | 2,732 | \$ | 4,739 | \$ | 13,106 |
| 12 | 2032 | 27,210 | 25,305 | 1,905 | 26 | 657,936 | 49,522 | \$ | 3 | \$ | 533 | \$ | 1,803 | \$ 3,371 | \$ | 74 | \$ | 0 | \$ | 2,803 | \$ | 4,863 | \$ | 13,449 |
| 13 | 2033 | 27,923 | 25,968 | 1,955 | 26 | 675,173 | 50,820 | \$ | 3 | \$ | 547 | \$ | 1,850 | \$ 3,459 | \$ | 76 | \$ | 0 | \$ | 2,877 | \$ | 4,990 | \$ | 13,801 |
| 14 | 2034 | 28,654 | 26,649 | 2,006 | 26 | 692,863 | 52,151 | \$ | 3 | \$ | 561 | \$ | 1,898 | \$ 3,550 | \$ | 78 | \$ | 0 | \$ | 2,952 | \$ | 5,121 | \$ | 14,163 |
| 15 | 2035 | 29,405 | 27,347 | 2,058 | 26 | 711,016 | 53,517 | \$ | 3 | \$ | 576 | \$ | 1,948 | \$ 3,643 | \$ | 80 | \$ | 0 | \$ | 3,029 | \$ | 5,255 | \$ | 14,534 |
| 16 | 2036 | 30,176 | 28,063 | 2,112 | 26 | 729,645 | 54,919 | \$ | 3 | \$ | 591 | \$ | 1,999 | \$ 3,738 | \$ | 82 | \$ | 0 | \$ | 3,109 | \$ | 5,393 | \$ | 14,915 |
| 17 | 2037 | 30,966 | 28,799 | 2,168 | 26 | 748,761 | 56,358 | \$ | 3 | \$ | 607 | \$ | 2,051 | \$ 3,836 | \$ | 84 | \$ | 0 | \$ | 3,190 | \$ | 5,534 | \$ | 15,306 |
| 18 | 2038 | 31,777 | 29,553 | 2,224 | 26 | 768,379 | 57,835 | \$ | 3 | \$ | 623 | \$ | 2,105 | \$ 3,936 | \$ | 86 | \$ | 0 | \$ | 3,274 | \$ | 5,679 | \$ | 15,707 |
| 19 | 2039 | 32,610 | 30,327 | 2,283 | 26 | 788,510 | 59,350 | \$ | 3 | \$ | 639 | \$ | 2,160 | \$ 4,040 | \$ | 89 | \$ | 0 | \$ | 3,359 | \$ | 5,828 | \$ | 16,118 |
| 20 | 2040 | 33,464 | 31,122 | 2,343 | 26 | 809,169 | 60,905 | \$ | 4 | \$ | 656 | \$ | 2,217 | \$ 4,145 | \$ | 91 | \$ | 0 | \$ | 3,447 | \$ | 5,980 | \$ | 16,540 |

1 Traffic Routing Times \& Distances retrieved from Google Maps.
${ }^{2}$ Traffic Routing assumed if $50 \%$ ADT was rerouted for 24 Hours

Table 4b. Value of Added Emissions - Two-Directional Closure

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger <br> Vehicles | Estimated Trucks | Assumed Added Reroute Distance per Vehicle (mile) | Total Added Passenger Vehicle Reroute (mile) | Total Added Truck Vehicle Reroute (mile) | Cost of Emissions for Passenger Vehicles |  |  |  |  |  |  | Cost of Emissions for Trucks |  |  |  |  |  |  |  | Total Daily Value of Added Emissions |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  | CO |  | VOC |  | $\mathrm{No}_{\text {x }}$ |  | $\mathrm{PM}_{2.5}$ | CO |  | VOC |  |  | $\mathrm{No}_{\mathrm{x}} \quad \mathrm{PM}_{2.5}$ |  |  |  |  |
| 0 | 2020 | 39,900 | 37,107 | 2,793 | 26 | 964,782 | 72,618 | \$ | 4 | \$ | 782 | \$ | 2,643 | \$ 4,943 | \$ | 108 | \$ | 0 | \$ | 4,110 | \$ | 7,131 | \$ | 19,721 |
| 1 | 2021 | 40,945 | 38,079 | 2,866 | 26 | 990,059 | 74,521 | \$ | 4 | \$ | 802 | \$ | 2,712 | \$ 5,072 | \$ | 111 | \$ | 0 | \$ | 4,218 | \$ | 7,317 | \$ | 20,238 |
| 2 | 2022 | 42,018 | 39,077 | 2,941 | 26 | 1,015,999 | 76,473 | \$ | 4 | \$ | 823 | \$ | 2,784 | \$ 5,205 | \$ | 114 | \$ | 0 | \$ | 4,329 | \$ | 7,509 | \$ | 20,768 |
| 3 | 2023 | 43,119 | 40,101 | 3,018 | 26 | 1,042,618 | 78,477 | \$ | 5 | \$ | 845 | \$ | 2,856 | \$ 5,341 | \$ | 117 | \$ | 0 | \$ | 4,442 | \$ | 7,706 | \$ | 21,312 |
| 4 | 2024 | 44,249 | 41,151 | 3,097 | 26 | 1,069,935 | 80,533 | \$ | 5 | \$ | 867 | \$ | 2,931 | \$ 5,481 | \$ | 120 | \$ | 0 | \$ | 4,559 | \$ | 7,908 | \$ | 21,871 |
| 5 | 2025 | 45,408 | 42,229 | 3,179 | 26 | 1,097,967 | 82,643 | \$ | 5 | \$ | 890 | \$ | 3,008 | \$ 5,625 | \$ | 123 | \$ | 0 | \$ | 4,678 | \$ | 8,115 | \$ | 22,444 |
| 6 | 2026 | 46,598 | 43,336 | 3,262 | 26 | 1,126,734 | 84,808 | \$ | 5 | \$ | 913 | \$ | 3,087 | \$ 5,772 | \$ | 127 | \$ | 0 | \$ | 4,800 | \$ | 8,328 | \$ | 23,032 |
| 7 | 2027 | 47,819 | 44,471 | 3,347 | 26 | 1,156,254 | 87,030 | \$ | 5 | \$ | 937 | \$ | 3,168 | \$ 5,924 | \$ | 130 | \$ | 0 | \$ | 4,926 | \$ | 8,546 | \$ | 23,635 |
| 8 | 2028 | 49,071 | 45,636 | 3,435 | 26 | 1,186,548 | 89,310 | \$ | 5 | \$ | 961 | \$ | 3,251 | \$ 6,079 | \$ | 133 | \$ | 0 | \$ | 5,055 | \$ | 8,770 | \$ | 24,255 |
| 9 | 2029 | 50,357 | 46,832 | 3,525 | 26 | 1,217,635 | 91,650 | \$ | 5 | \$ | 987 | \$ | 3,336 | \$ 6,238 | \$ | 137 | \$ | 0 | \$ | 5,188 | \$ | 8,999 | \$ | 24,890 |
| 10 | 2030 | 51,676 | 48,059 | 3,617 | 26 | 1,249,538 | 94,051 | \$ | 5 | \$ | 1,012 | \$ | 3,423 | \$ 6,402 | \$ | 140 | \$ | 0 | \$ | 5,324 | \$ | 9,235 | \$ | 25,542 |
| 11 | 2031 | 53,030 | 49,318 | 3,712 | 26 | 1,282,275 | 96,515 | \$ | 6 | \$ | 1,039 | \$ | 3,513 | \$ 6,569 | \$ | 144 | \$ | 0 | \$ | 5,463 | \$ | 9,477 | \$ | 26,211 |
| 12 | 2032 | 54,420 | 50,610 | 3,809 | 26 | 1,315,871 | 99,044 | \$ | 6 | \$ | 1,066 | \$ | 3,605 | \$ 6,741 | \$ | 148 | \$ | 0 | \$ | 5,606 | \$ | 9,725 | \$ | 26,898 |
| 13 | 2033 | 55,846 | 51,936 | 3,909 | 26 | 1,350,347 | 101,639 | \$ | 6 | \$ | 1,094 | \$ | 3,700 | \$ 6,918 | \$ | 152 | \$ | 0 | \$ | 5,753 | \$ | 9,980 | \$ | 27,603 |
| 14 | 2034 | 57,309 | 53,297 | 4,012 | 26 | 1,385,726 | 104,302 | \$ | 6 | \$ | 1,123 | \$ | 3,796 | \$ 7,099 | \$ | 156 | \$ | 0 | \$ | 5,904 |  | 10,242 | \$ | 28,326 |
| 15 | 2035 | 58,810 | 54,694 | 4,117 | 26 | 1,422,032 | 107,035 | \$ | 6 | \$ | 1,152 | \$ | 3,896 | \$ 7,285 | \$ | 160 | \$ | 0 | \$ | 6,059 |  | 10,510 | \$ | 29,068 |
| 16 | 2036 | 60,351 | 56,127 | 4,225 | 26 | 1,459,289 | 109,839 | \$ | 6 | \$ | 1,182 | \$ | 3,998 | \$ 7,476 | \$ | 164 | \$ | 0 | \$ | 6,217 | \$ | 10,785 | \$ | 29,830 |
| 17 | 2037 | 61,932 | 57,597 | 4,335 | 26 | 1,497,523 | 112,717 | \$ | 7 | \$ | 1,213 | \$ | 4,103 | \$ 7,672 | \$ | 168 | \$ | 0 | \$ | 6,380 |  | 11,068 | \$ | 30,611 |
| 18 | 2038 | 63,555 | 59,106 | 4,449 | 26 | 1,536,758 | 115,670 | \$ | 7 | \$ | 1,245 | \$ | 4,210 | \$ 7,873 | \$ | 173 | \$ | 0 | \$ | 6,547 |  | 11,358 | \$ | 31,413 |
| 19 | 2039 | 65,220 | 60,655 | 4,565 | 26 | 1,577,021 | 118,700 | \$ | 7 | \$ | 1,278 | \$ | 4,321 | \$ 8,079 | \$ | 177 | \$ | 0 | \$ | 6,719 |  | 11,656 | \$ | 32,236 |
| 20 | 2040 | 66,929 | 62,244 | 4,685 | 26 | 1,618,339 | 121,810 | \$ | 7 | \$ | 1,311 | \$ | 4,434 | \$ 8,291 | \$ | 182 | \$ | 0 | \$ | 6,895 | \$ | 11,961 | \$ | 33,081 |

${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps.
${ }^{2}$ Traffic Routing assumed if $100 \%$ ADT was rerouted for 24 Hours

Scenario 2 -

## Traffic Detour via US 65 - US 60 - US 63

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger Vehicles | Estimated Trucks | Assumed Average Reroute Delay per Vehicle (min) | Total Average <br> Passenger Vehicle Delay (min) | Total <br> AverageTruck Vehicle Delay (min) | Daily Passenger Vehicle Value of Time Delay |  | Daily Annual Truck Value of Time Delay |  | Total Daily Value of Travel Time Impact |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | 19,950 | 18,554 | 1,397 | 53.0 | 983,336 | 74,015 | \$ | 454,334 | \$ | 36,390 | \$ | 490,724 |
| 1 | 2021 | 20,473 | 19,040 | 1,433 | 54.4 | 1,035,537 | 77,944 | \$ | 478,453 | \$ | 38,322 | \$ | 516,775 |
| 2 | 2022 | 21,009 | 19,538 | 1,471 | 55.8 | 1,090,510 | 82,081 | \$ | 503,852 | \$ | 40,357 | \$ | 544,209 |
| 3 | 2023 | 21,560 | 20,050 | 1,509 | 57.3 | 1,148,402 | 86,439 | \$ | 530,600 | \$ | 42,499 | \$ | 573,099 |
| 4 | 2024 | 22,124 | 20,576 | 1,549 | 58.8 | 1,209,366 | 91,028 | \$ | 558,767 | \$ | 44,755 | \$ | 603,523 |
| 5 | 2025 | 22,704 | 21,115 | 1,589 | 60.3 | 1,273,567 | 95,860 | \$ | 588,430 | \$ | 47,131 | \$ | 635,562 |
| 6 | 2026 | 23,299 | 21,668 | 1,631 | 61.9 | 1,341,176 | 100,949 | \$ | 619,668 | \$ | 49,633 | \$ | 669,301 |
| 7 | 2027 | 23,909 | 22,236 | 1,674 | 63.5 | 1,412,374 | 106,308 | \$ | 652,564 | \$ | 52,268 | \$ | 704,832 |
| 8 | 2028 | 24,536 | 22,818 | 1,718 | 65.2 | 1,487,352 | 111,951 | \$ | 687,206 | \$ | 55,043 | \$ | 742,249 |
| 9 | 2029 | 25,179 | 23,416 | 1,762 | 66.9 | 1,566,311 | 117,894 | \$ | 723,688 | \$ | 57,965 | \$ | 781,652 |
| 10 | 2030 | 25,838 | 24,030 | 1,809 | 68.6 | 1,649,461 | 124,153 | \$ | 762,106 | \$ | 61,042 | \$ | 823,148 |
| 11 | 2031 | 26,515 | 24,659 | 1,856 | 70.4 | 1,737,025 | 130,744 | \$ | 802,563 | \$ | 64,282 | \$ | 866,846 |
| 12 | 2032 | 27,210 | 25,305 | 1,905 | 72.3 | 1,829,237 | 137,685 | \$ | 845,168 | \$ | 67,695 | \$ | 912,863 |
| 13 | 2033 | 27,923 | 25,968 | 1,955 | 74.2 | 1,926,345 | 144,994 | \$ | 890,035 | \$ | 71,289 | \$ | 961,324 |
| 14 | 2034 | 28,654 | 26,649 | 2,006 | 76.1 | 2,028,607 | 152,691 | \$ | 937,284 | \$ | 75,073 | \$ | 1,012,357 |
| 15 | 2035 | 29,405 | 27,347 | 2,058 | 78.1 | 2,136,299 | 160,797 | \$ | 987,041 | \$ | 79,058 | \$ | 1,066,100 |
| 16 | 2036 | 30,176 | 28,063 | 2,112 | 80.2 | 2,249,707 | 169,333 | \$ | 1,039,440 | \$ | 83,255 | \$ | 1,122,695 |
| 17 | 2037 | 30,966 | 28,799 | 2,168 | 82.3 | 2,369,136 | 178,322 | \$ | 1,094,620 | \$ | 87,675 | \$ | 1,182,295 |
| 18 | 2038 | 31,777 | 29,553 | 2,224 | 84.4 | 2,494,905 | 187,789 | \$ | 1,152,729 | \$ | 92,329 | \$ | 1,245,059 |
| 19 | 2039 | 32,610 | 30,327 | 2,283 | 86.6 | 2,627,351 | 197,758 | \$ | 1,213,924 | \$ | 97,231 | \$ | 1,311,155 |
| 20 | 2040 | 33,464 | 31,122 | 2,343 | 88.9 | 2,766,828 | 208,256 | \$ | 1,278,367 | \$ | 102,392 | \$ | 1,380,759 |

${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps. Travel Delays assumed to increase linearly with ADT
${ }^{2}$ Traffic Routing assumed if $50 \%$ ADT was rerouted for 24 Hours
${ }^{3}$ Average Reroute Delay per Vehicle assumed to annually increase linearly with ADT

Table 5b. Value of Travel Time Delay - Two-Directional Closure

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger Vehicles | Estimated Trucks | Assumed Average Reroute Delay per Vehicle (min) | Total Average Passenger Vehicle Delay (min) | Total AverageTruck Vehicle Delay (min) | Daily Passenger Vehicle Value of Time Delay |  | Daily Annual Truck Value of Time Delay |  | Total Daily Value of Travel Time Impact |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | 39,900 | 37,107 | 2,793 | 53.0 | 1,966,671 | 148,029 | \$ | 908,668 | \$ | 72,781 | \$ | 981,448 |
| 1 | 2021 | 40,945 | 38,079 | 2,866 | 54.4 | 2,071,075 | 155,887 | \$ | 956,905 | \$ | 76,645 | \$ | 1,033,550 |
| 2 | 2022 | 42,018 | 39,077 | 2,941 | 55.8 | 2,181,021 | 164,163 | \$ | 1,007,704 | \$ | 80,713 | \$ | 1,088,418 |
| 3 | 2023 | 43,119 | 40,101 | 3,018 | 57.3 | 2,296,803 | 172,878 | \$ | 1,061,200 | \$ | 84,998 | \$ | 1,146,198 |
| 4 | 2024 | 44,249 | 41,151 | 3,097 | 58.8 | 2,418,732 | 182,055 | \$ | 1,117,535 | \$ | 89,510 | \$ | 1,207,045 |
| 5 | 2025 | 45,408 | 42,229 | 3,179 | 60.3 | 2,547,134 | 191,720 | \$ | 1,176,861 | \$ | 94,262 | \$ | 1,271,123 |
| 6 | 2026 | 46,598 | 43,336 | 3,262 | 61.9 | 2,682,352 | 201,897 | \$ | 1,239,336 | \$ | 99,266 | \$ | 1,338,603 |
| 7 | 2027 | 47,819 | 44,471 | 3,347 | 63.5 | 2,824,749 | 212,616 | \$ | 1,305,128 | \$ | 104,536 | \$ | 1,409,664 |
| 8 | 2028 | 49,071 | 45,636 | 3,435 | 65.2 | 2,974,705 | 223,903 | \$ | 1,374,413 | \$ | 110,085 | \$ | 1,484,498 |
| 9 | 2029 | 50,357 | 46,832 | 3,525 | 66.9 | 3,132,621 | 235,789 | \$ | 1,447,375 | \$ | 115,929 | \$ | 1,563,305 |
| 10 | 2030 | 51,676 | 48,059 | 3,617 | 68.6 | 3,298,921 | 248,306 | \$ | 1,524,211 | \$ | 122,084 | \$ | 1,646,295 |
| 11 | 2031 | 53,030 | 49,318 | 3,712 | 70.4 | 3,474,049 | 261,488 | \$ | 1,605,126 | \$ | 128,565 | \$ | 1,733,691 |
| 12 | 2032 | 54,420 | 50,610 | 3,809 | 72.3 | 3,658,474 | 275,369 | \$ | 1,690,337 | \$ | 135,390 | \$ | 1,825,727 |
| 13 | 2033 | 55,846 | 51,936 | 3,909 | 74.2 | 3,852,689 | 289,987 | \$ | 1,780,071 | \$ | 142,577 | \$ | 1,922,648 |
| 14 | 2034 | 57,309 | 53,297 | 4,012 | 76.1 | 4,057,215 | 305,382 | \$ | 1,874,568 | \$ | 150,146 | \$ | 2,024,715 |
| 15 | 2035 | 58,810 | 54,694 | 4,117 | 78.1 | 4,272,598 | 321,593 | \$ | 1,974,083 | \$ | 158,117 | \$ | 2,132,199 |
| 16 | 2036 | 60,351 | 56,127 | 4,225 | 80.2 | 4,499,415 | 338,666 | \$ | 2,078,880 | \$ | 166,511 | \$ | 2,245,390 |
| 17 | 2037 | 61,932 | 57,597 | 4,335 | 82.3 | 4,738,273 | 356,644 | \$ | 2,189,240 | \$ | 175,350 | \$ | 2,364,590 |
| 18 | 2038 | 63,555 | 59,106 | 4,449 | 84.4 | 4,989,811 | 375,577 | \$ | 2,305,459 | \$ | 184,659 | \$ | 2,490,118 |
| 19 | 2039 | 65,220 | 60,655 | 4,565 | 86.6 | 5,254,702 | 395,515 | \$ | 2,427,848 | \$ | 194,462 | \$ | 2,622,309 |
| 20 | 2040 | 66,929 | 62,244 | 4,685 | 88.9 | 5,533,656 | 416,512 | \$ | 2,556,733 | \$ | 204,785 | \$ | 2,761,518 |

[^32]Table 6a. Value of Decreased Safety - One-Directional Closure

| Year | Calendar Year | Increased <br> Total Crash <br> Probability | Increased Fatal \& Injury Crash Probability | Increased Property Damage Only Crash Probability | Total Daily Value of Travel Time Impact |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | . 988 | . 528 | . 462 | \$ | 5,172 |
| 1 | 2021 | 1.014 | . 542 | . 474 | \$ | 5,307 |
| 2 | 2022 | 1.040 | . 556 | . 487 | \$ | 5,446 |
| 3 | 2023 | 1.067 | . 571 | . 499 | \$ | 5,589 |
| 4 | 2024 | 1.095 | . 586 | . 512 | \$ | 5,735 |
| 5 | 2025 | 1.124 | . 601 | . 526 | \$ | 5,886 |
| 6 | 2026 | 1.154 | . 617 | . 540 | \$ | 6,040 |
| 7 | 2027 | 1.184 | . 633 | . 554 | \$ | 6,198 |
| 8 | 2028 | 1.215 | . 650 | . 568 | \$ | 6,361 |
| 9 | 2029 | 1.247 | . 667 | . 583 | \$ | 6,527 |
| 10 | 2030 | 1.279 | . 684 | . 598 | \$ | 6,698 |
| 11 | 2031 | 1.313 | . 702 | . 614 | \$ | 6,874 |
| 12 | 2032 | 1.347 | . 721 | . 630 | \$ | 7,054 |
| 13 | 2033 | 1.382 | . 740 | . 647 | \$ | 7,239 |
| 14 | 2034 | 1.419 | . 759 | . 664 | \$ | 7,428 |
| 15 | 2035 | 1.456 | . 779 | . 681 | \$ | 7,623 |
| 16 | 2036 | 1.494 | . 799 | . 699 | \$ | 7,823 |
| 17 | 2037 | 1.533 | . 820 | . 717 | \$ | 8,028 |
| 18 | 2038 | 1.573 | . 842 | . 736 | \$ | 8,238 |
| 19 | 2039 | 1.614 | . 864 | . 755 | \$ | 8,454 |
| 20 | 2040 | 1.657 | . 886 | . 775 | \$ | 8,675 |

${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps.
${ }^{2}$ Traffic Routing assumed if $50 \%$ ADT was rerouted for 24 Hours
${ }^{3}$ Crash Prediction Derived from HSM Models with assumed values

Table 6b. Value of Decreased Safety - Two-Directional Closure

| Year | Calendar Year | Increased Increased |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Increased <br> Total Crash Probability | Fatal \& Injury Crash Probability | Property Damage <br> Only Crash <br> Probability | Total Daily Value of Travel Time Impact |  |
| 0 | 2020 | 1.474 | . 816 | . 660 | \$ | 7,989 |
| 1 | 2021 | 1.512 | . 838 | . 678 | \$ | 8,199 |
| 2 | 2022 | 1.552 | . 860 | . 695 | \$ | 8,414 |
| 3 | 2023 | 1.593 | . 882 | . 713 | \$ | 8,634 |
| 4 | 2024 | 1.634 | . 905 | . 732 | \$ | 8,860 |
| 5 | 2025 | 1.677 | . 929 | . 751 | \$ | 9,092 |
| 6 | 2026 | 1.721 | . 953 | . 771 | \$ | 9,331 |
| 7 | 2027 | 1.766 | . 978 | . 791 | \$ | 9,575 |
| 8 | 2028 | 1.813 | 1.004 | . 812 | \$ | 9,826 |
| 9 | 2029 | 1.860 | 1.030 | . 833 | \$ | 10,083 |
| 10 | 2030 | 1.909 | 1.057 | . 855 | \$ | 10,348 |
| 11 | 2031 | 1.959 | 1.085 | . 877 | \$ | 10,619 |
| 12 | 2032 | 2.010 | 1.113 | . 900 | \$ | 10,897 |
| 13 | 2033 | 2.063 | 1.143 | . 924 | \$ | 11,182 |
| 14 | 2034 | 2.117 | 1.173 | . 948 | \$ | 11,475 |
| 15 | 2035 | 2.172 | 1.203 | . 973 | \$ | 11,776 |
| 16 | 2036 | 2.229 | 1.235 | . 999 | \$ | 12,085 |
| 17 | 2037 | 2.288 | 1.267 | 1.025 | \$ | 12,401 |
| 18 | 2038 | 2.347 | 1.300 | 1.052 | \$ | 12,726 |
| 19 | 2039 | 2.409 | 1.334 | 1.079 | \$ | 13,059 |
| 20 | 2040 | 2.472 | 1.369 | 1.107 | \$ | 13,402 |

${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps.
${ }^{2}$ Traffic Routing assumed if 50\% ADT was rerouted for 24 Hours
${ }^{3}$ Crash Prediction Derived from HSM Models with assumed values

Table 7a. Value of Transportation Operating Cost - One-Directional Closure

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger Vehicles | Estimated Trucks | Assumed Added Reroute Distance per Vehicle (mile) | Total Added Passenger Vehicle Reroute (mile) | Total Added Truck Vehicle Reroute (mile) |  | Daily Passenger Vehicle Value of Time Delay |  | Daily Annual Truck Value of Time Delay |  | Daily ons Value d Reroute tance |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | 19,950 | 18,554 | 1,397 | 39 | 723,587 | 54,464 | \$ | 296,670 | \$ | 52,285 | \$ | 348,955 |
| 1 | 2021 | 20,473 | 19,040 | 1,433 | 39 | 742,544 | 55,890 | \$ | 304,443 | \$ | 53,655 | \$ | 358,098 |
| 2 | 2022 | 21,009 | 19,538 | 1,471 | 39 | 761,999 | 57,355 | \$ | 312,420 | \$ | 55,061 | \$ | 367,480 |
| 3 | 2023 | 21,560 | 20,050 | 1,509 | 39 | 781,964 | 58,857 | \$ | 320,605 | \$ | 56,503 | \$ | 377,108 |
| 4 | 2024 | 22,124 | 20,576 | 1,549 | 39 | 802,451 | 60,400 | \$ | 329,005 | \$ | 57,984 | \$ | 386,988 |
| 5 | 2025 | 22,704 | 21,115 | 1,589 | 39 | 823,475 | 61,982 | \$ | 337,625 | \$ | 59,503 | \$ | 397,128 |
| 6 | 2026 | 23,299 | 21,668 | 1,631 | 39 | 845,050 | 63,606 | \$ | 346,471 | \$ | 61,062 | \$ | 407,532 |
| 7 | 2027 | 23,909 | 22,236 | 1,674 | 39 | 867,191 | 65,272 | \$ | 355,548 | \$ | 62,662 | \$ | 418,210 |
| 8 | 2028 | 24,536 | 22,818 | 1,718 | 39 | 889,911 | 66,983 | \$ | 364,863 | \$ | 64,303 | \$ | 429,167 |
| 9 | 2029 | 25,179 | 23,416 | 1,762 | 39 | 913,227 | 68,737 | \$ | 374,423 | \$ | 65,988 | \$ | 440,411 |
| 10 | 2030 | 25,838 | 24,030 | 1,809 | 39 | 937,153 | 70,538 | \$ | 384,233 | \$ | 67,717 | \$ | 451,950 |
| 11 | 2031 | 26,515 | 24,659 | 1,856 | 39 | 961,707 | 72,387 | \$ | 394,300 | \$ | 69,491 | \$ | 463,791 |
| 12 | 2032 | 27,210 | 25,305 | 1,905 | 39 | 986,903 | 74,283 | \$ | 404,630 | \$ | 71,312 | \$ | 475,942 |
| 13 | 2033 | 27,923 | 25,968 | 1,955 | 39 | 1,012,760 | 76,229 | \$ | 415,232 | \$ | 73,180 | \$ | 488,412 |
| 14 | 2034 | 28,654 | 26,649 | 2,006 | 39 | 1,039,294 | 78,226 | \$ | 426,111 | \$ | 75,097 | \$ | 501,208 |
| 15 | 2035 | 29,405 | 27,347 | 2,058 | 39 | 1,066,524 | 80,276 | \$ | 437,275 | \$ | 77,065 | \$ | 514,340 |
| 16 | 2036 | 30,176 | 28,063 | 2,112 | 39 | 1,094,467 | 82,379 | \$ | 448,731 | \$ | 79,084 | \$ | 527,815 |
| 17 | 2037 | 30,966 | 28,799 | 2,168 | 39 | 1,123,142 | 84,538 | \$ | 460,488 | \$ | 81,156 | \$ | 541,644 |
| 18 | 2038 | 31,777 | 29,553 | 2,224 | 39 | 1,152,568 | 86,752 | \$ | 472,553 | \$ | 83,282 | \$ | 555,835 |
| 19 | 2039 | 32,610 | 30,327 | 2,283 | 39 | 1,182,766 | 89,025 | \$ | 484,934 | \$ | 85,464 | \$ | 570,398 |
| 20 | 2040 | 33,464 | 31,122 | 2,343 | 39 | 1,213,754 | 91,358 | \$ | 497,639 | \$ | 87,704 | \$ | 585,343 |

Table 7b. Value of Transportation Operating Cost - Two-Directional Closure

| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger Vehicles | Estimated Trucks | Assumed Added Reroute Distance per Vehicle (mile) | Total Added Passenger Vehicle Reroute (mile) | Total Added Truck Vehicle Reroute (mile) | Daily Passenger Vehicle Value of Time Delay |  | Daily Annual <br> Truck Value of Time Delay |  | Total Daily Operations Value of Added Reroute Distance |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0 | 2020 | 39,900 | 37,107 | 2,793 | 39 | 1,447,173 | 108,927 | \$ | 593,341 | \$ | 104,570 | \$ | 697,911 |
| 1 | 2021 | 40,945 | 38,079 | 2,866 | 39 | 1,485,089 | 111,781 | \$ | 608,886 | \$ | 107,310 | \$ | 716,196 |
| 2 | 2022 | 42,018 | 39,077 | 2,941 | 39 | 1,523,998 | 114,710 | \$ | 624,839 | \$ | 110,121 | \$ | 734,960 |
| 3 | 2023 | 43,119 | 40,101 | 3,018 | 39 | 1,563,927 | 117,715 | \$ | 641,210 | \$ | 113,006 | \$ | 754,216 |
| 4 | 2024 | 44,249 | 41,151 | 3,097 | 39 | 1,604,902 | 120,799 | \$ | 658,010 | \$ | 115,967 | \$ | 773,977 |
| 5 | 2025 | 45,408 | 42,229 | 3,179 | 39 | 1,646,950 | 123,964 | \$ | 675,250 | \$ | 119,005 | \$ | 794,255 |
| 6 | 2026 | 46,598 | 43,336 | 3,262 | 39 | 1,690,100 | 127,212 | \$ | 692,941 | \$ | 122,123 | \$ | 815,065 |
| 7 | 2027 | 47,819 | 44,471 | 3,347 | 39 | 1,734,381 | 130,545 | \$ | 711,096 | \$ | 125,323 | \$ | 836,419 |
| 8 | 2028 | 49,071 | 45,636 | 3,435 | 39 | 1,779,822 | 133,965 | \$ | 729,727 | \$ | 128,606 | \$ | 858,333 |
| 9 | 2029 | 50,357 | 46,832 | 3,525 | 39 | 1,826,453 | 137,475 | \$ | 748,846 | \$ | 131,976 | \$ | 880,822 |
| 10 | 2030 | 51,676 | 48,059 | 3,617 | 39 | 1,874,306 | 141,077 | \$ | 768,466 | \$ | 135,434 | \$ | 903,899 |
| 11 | 2031 | 53,030 | 49,318 | 3,712 | 39 | 1,923,413 | 144,773 | \$ | 788,599 | \$ | 138,982 | \$ | 927,581 |
| 12 | 2032 | 54,420 | 50,610 | 3,809 | 39 | 1,973,807 | 148,566 | \$ | 809,261 | \$ | 142,623 | \$ | 951,884 |
| 13 | 2033 | 55,846 | 51,936 | 3,909 | 39 | 2,025,520 | 152,459 | \$ | 830,463 | \$ | 146,360 | \$ | 976,823 |
| 14 | 2034 | 57,309 | 53,297 | 4,012 | 39 | 2,078,589 | 156,453 | \$ | 852,221 | \$ | 150,195 | \$ | 1,002,416 |
| 15 | 2035 | 58,810 | 54,694 | 4,117 | 39 | 2,133,048 | 160,552 | \$ | 874,550 | \$ | 154,130 | \$ | 1,028,680 |
| 16 | 2036 | 60,351 | 56,127 | 4,225 | 39 | 2,188,934 | 164,758 | \$ | 897,463 | \$ | 158,168 | \$ | 1,055,631 |
| 17 | 2037 | 61,932 | 57,597 | 4,335 | 39 | 2,246,284 | 169,075 | \$ | 920,976 | \$ | 162,312 | \$ | 1,083,288 |
| 18 | 2038 | 63,555 | 59,106 | 4,449 | 39 | 2,305,136 | 173,505 | \$ | 945,106 | \$ | 166,565 | \$ | 1,111,671 |
| 19 | 2039 | 65,220 | 60,655 | 4,565 | 39 | 2,365,531 | 178,051 | \$ | 969,868 | \$ | 170,929 | \$ | 1,140,796 |
| 20 | 2040 | 66,929 | 62,244 | 4,685 | 39 | 2,427,508 | 182,716 | \$ | 995,278 | \$ | 175,407 | \$ | 1,170,685 |


| Year | Calendar Year | Average Daily Traffic | Estimated <br> Passenger Vehicles | Estimated Trucks | Assumed Added Reroute Distance per Vehicle (mile) | Total Added Passenger Vehicle Reroute (mile) | Total Added Truck Vehicle Reroute (mile) | Cost of Emissions for Passenger Vehicles |  |  |  |  |  |  |  | Cost of Emissions for Trucks |  |  |  |  |  |  |  | Total Daily Value of Added Emissions |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  | CO |  | Voc |  | $\mathrm{No}_{\mathrm{x}}$ |  | $\mathrm{PM}_{2.5}$ |  | CO |  | VOC |  | $\mathrm{No}_{\mathrm{x}}$ |  | $\mathrm{PM}_{2.5}$ |  |  |  |
| 0 | 2020 | 19,950 | 18,554 | 1,397 | 39 | 723,587 | 54,464 | \$ | 3 | \$ | 586 | \$ | 1,982 | \$ | 3,707 | \$ | 81 | \$ | 0 | \$ | 3,083 | \$ | 5,348 | \$ | 14,791 |
| 1 | 2021 | 20,473 | 19,040 | 1,433 | 39 | 742,544 | 55,890 | \$ | 3 | \$ | 602 | \$ | 2,034 | \$ | 3,804 | \$ | 83 | \$ | 0 | \$ | 3,164 | + | 5,488 | \$ | 15,179 |
| 2 | 2022 | 21,009 | 19,538 | 1,471 | 39 | 761,999 | 57,355 | \$ | 3 | \$ | 617 | \$ | 2,088 | \$ | 3,904 | \$ | 86 | \$ | 0 | \$ | 3,247 | \$ | 5,632 | \$ | 15,576 |
| 3 | 2023 | 21,560 | 20,050 | 1,509 | 39 | 781,964 | 58,857 | \$ | 3 | \$ | 634 | \$ | 2,142 | \$ | 4,006 | \$ | 88 | \$ | 0 | \$ | 3,332 | \$ | 5,779 | \$ | 15,984 |
| 4 | 2024 | 22,124 | 20,576 | 1,549 | 39 | 802,451 | 60,400 | \$ | 3 | \$ | 650 | \$ | 2,198 | \$ | 4,111 | \$ | 90 | \$ | 0 | \$ | 3,419 | \$ | 5,931 | \$ | 16,403 |
| 5 | 2025 | 22,704 | 21,115 | 1,589 | 39 | 823,475 | 61,982 | \$ | 4 | \$ | 667 | \$ | 2,256 | \$ | 4,219 | \$ | 93 | \$ | 0 | \$ | 3,508 | \$ | 6,086 | \$ | 16,833 |
| 6 | 2026 | 23,299 | 21,668 | 1,631 | 39 | 845,050 | 63,606 | \$ | 4 | \$ | 685 | \$ | 2,315 | \$ | 4,329 | \$ | 95 | \$ | 0 | \$ | 3,600 | \$ | 6,246 | \$ | 17,274 |
| 7 | 2027 | 23,909 | 22,236 | 1,674 | 39 | 867,191 | 65,272 | \$ | 4 | \$ | 703 | \$ | 2,376 | \$ | 4,443 | \$ | 97 | \$ | 0 | \$ | 3,695 | \$ | 6,409 | \$ | 17,726 |
| 8 | 2028 | 24,536 | 22,818 | 1,718 | 39 | 889,911 | 66,983 | \$ | 4 | \$ | 721 | \$ | 2,438 | \$ | 4,559 | \$ | 100 | \$ | 0 | \$ | 3,792 | \$ | 6,577 | \$ | 18,191 |
| 9 | 2029 | 25,179 | 23,416 | 1,762 | 39 | 913,227 | 68,737 | \$ | 4 | \$ | 740 | \$ | 2,502 | \$ | 4,679 | \$ | 103 | \$ | 0 | \$ | 3,891 | \$ | 6,750 | \$ | 18,668 |
| 10 | 2030 | 25,838 | 24,030 | 1,809 | 39 | 937,153 | 70,538 | \$ | 4 | \$ | 759 | \$ | 2,568 | \$ | 4,801 | \$ | 105 | \$ | 0 | \$ | 3,993 | \$ | 6,926 | \$ | 19,157 |
| 11 | 2031 | 26,515 | 24,659 | 1,856 | 39 | 961,707 | 72,387 | \$ | 4 | \$ | 779 | \$ | 2,635 | \$ | 4,927 | \$ | 108 | \$ | 0 | \$ | 4,097 | \$ | 7,108 | \$ | 19,659 |
| 12 | 2032 | 27,210 | 25,305 | 1,905 | 39 | 986,903 | 74,283 | \$ | 4 | \$ | 800 | \$ | 2,704 | \$ | 5,056 | \$ | 111 | \$ | 0 | \$ | 4,205 | \$ | 7,294 | \$ | 20,174 |
| 13 | 2033 | 27,923 | 25,968 | 1,955 | 39 | 1,012,760 | 76,229 | \$ | 4 | \$ | 821 | \$ | 2,775 | \$ | 5,188 | \$ | 114 | \$ | 0 | \$ | 4,315 | \$ | 7,485 | \$ | 20,702 |
| 14 | 2034 | 28,654 | 26,649 | 2,006 | 39 | 1,039,294 | 78,226 | \$ | 5 | \$ | 842 | \$ | 2,847 | \$ | 5,324 | \$ | 117 | \$ | 0 | \$ | 4,428 | \$ | 7,681 | \$ | 21,244 |
| 15 | 2035 | 29,405 | 27,347 | 2,058 | 39 | 1,066,524 | 80,276 | \$ | 5 | \$ | 864 | \$ | 2,922 | \$ | 5,464 | \$ | 120 | \$ | 0 | \$ | 4,544 | \$ | 7,883 | \$ | 21,801 |
| 16 | 2036 | 30,176 | 28,063 | 2,112 | 39 | 1,094,467 | 82,379 | \$ | 5 | \$ | 887 | \$ | 2,998 | \$ | 5,607 | \$ | 123 | \$ | 0 | \$ | 4,663 | \$ | 8,089 | \$ | 22,372 |
| 17 | 2037 | 30,966 | 28,799 | 2,168 | 39 | 1,123,142 | 84,538 | \$ | 5 | \$ | 910 | \$ | 3,077 | \$ | 5,754 | \$ | 126 | \$ | 0 | \$ | 4,785 | \$ | 8,301 | \$ | 22,958 |
| 18 | 2038 | 31,777 | 29,553 | 2,224 | 39 | 1,152,568 | 86,752 | \$ | 5 | \$ | 934 | \$ | 3,158 | \$ | 5,905 | \$ | 130 | \$ | 0 | \$ | 4,911 | \$ | 8,518 | \$ | 23,560 |
| 19 | 2039 | 32,610 | 30,327 | 2,283 | 39 | 1,182,766 | 89,025 | \$ | 5 | \$ | 958 | \$ | 3,240 | \$ | 6,059 | \$ | 133 | \$ | 0 | \$ | 5,039 | \$ | 8,742 | \$ | 24,177 |
| 20 | 2040 | 33,464 | 31,122 | 2,343 | 39 | 1,213,754 | 91,358 | \$ | 5 | \$ | 983 | \$ | 3,325 | \$ | 6,218 | \$ | 136 | \$ | 0 | \$ | 5,171 | \$ | 8,971 | \$ | 24,811 |


| Year | Calendar Year | Average Daily Traffic | Estimated Passenger Vehicles | Estimated Trucks | Assumed Added Reroute Distance per Vehicle (mile) | Total Added <br> Passenger Vehicle Reroute (mile) | Total Added Truck Vehicle Reroute (mile) | Cost of Emissions for Passenger Vehicles |  |  |  |  |  |  | Cost of Emissions for Trucks |  |  |  |  |  |  | Total Daily Value of Added Emissions |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  | CO |  | VOC |  | $\mathrm{No}_{\text {x }}$ |  | $\mathrm{PM}_{2.5}$ | CO |  | VOC |  | $\mathrm{No}_{\mathrm{x}}$ |  | $\mathrm{PM}_{2.5}$ |  |  |
| 0 | 2020 | 39,900 | 37,107 | 2,793 | 39 | 1,447,173 | 108,927 | \$ | 6 | \$ | 1,172 | \$ | 3,965 | \$ 7,414 | \$ | 163 | \$ | 0 | \$ | 6,166 | \$ 10,696 | \$ | 29,582 |
| 1 | 2021 | 40,945 | 38,079 | 2,866 | 39 | 1,485,089 | 111,781 | \$ | 6 | \$ | 1,203 | \$ | 4,069 | \$ 7,608 | \$ | 167 | \$ | 0 | \$ | 6,327 | \$ 10,976 | \$ | 30,357 |
| 2 | 2022 | 42,018 | 39,077 | 2,941 | 39 | 1,523,998 | 114,710 | \$ | 7 | \$ | 1,235 | \$ | 4,175 | \$ 7,808 | \$ | 171 | \$ | 0 | \$ | 6,493 | \$ 11,264 | \$ | 31,152 |
| 3 | 2023 | 43,119 | 40,101 | 3,018 | 39 | 1,563,927 | 117,715 | \$ | 7 | \$ | 1,267 | \$ | 4,285 | \$ 8,012 | \$ | 176 | \$ | 0 | \$ | 6,663 | \$ 11,559 | \$ | 31,969 |
| 4 | 2024 | 44,249 | 41,151 | 3,097 | 39 | 1,604,902 | 120,799 | \$ | 7 | \$ | 1,300 | \$ | 4,397 | \$ 8,222 | \$ | 180 | \$ | 0 | \$ | 6,838 | \$ 11,862 | \$ | 32,806 |
| 5 | 2025 | 45,408 | 42,229 | 3,179 | 39 | 1,646,950 | 123,964 | \$ | 7 | \$ | 1,334 | \$ | 4,512 | \$ 8,437 | \$ | 185 | \$ | 0 | \$ | 7,017 | \$ 12,172 | \$ | 33,666 |
| 6 | 2026 | 46,598 | 43,336 | 3,262 | 39 | 1,690,100 | 127,212 | \$ | 7 | + | 1,369 | \$ | 4,630 | \$ 8,659 | \$ | 190 | \$ | 0 | \$ | 7,201 | \$ 12,491 | \$ | 34,548 |
| 7 | 2027 | 47,819 | 44,471 | 3,347 | 39 | 1,734,381 | 130,545 | \$ | 8 |  | 1,405 | \$ | 4,752 | \$ 8,885 | \$ | 195 | \$ | 0 | \$ | 7,389 | \$ 12,819 | \$ | 35,453 |
| 8 | 2028 | 49,071 | 45,636 | 3,435 | 39 | 1,779,822 | 133,965 | \$ | 8 | \$ | 1,442 | \$ | 4,876 | \$ 9,118 | \$ | 200 | \$ | 0 | \$ | 7,583 | \$ 13,154 | \$ | 36,382 |
| 9 | 2029 | 50,357 | 46,832 | 3,525 | 39 | 1,826,453 | 137,475 | \$ | 8 | \$ | 1,480 | \$ | 5,004 | \$ 9,357 | \$ | 205 | \$ | 0 | \$ | 7,782 | \$ 13,499 | \$ | 37,335 |
| 10 | 2030 | 51,676 | 48,059 | 3,617 | 39 | 1,874,306 | 141,077 | \$ | 8 | \$ | 1,519 | \$ | 5,135 | \$ 9,602 | \$ | 211 | \$ | 0 | \$ | 7,986 | \$ 13,853 | \$ | 38,313 |
| 11 | 2031 | 53,030 | 49,318 | 3,712 | 39 | 1,923,413 | 144,773 | \$ | 8 | + | 1,558 | \$ | 5,270 | \$ 9,854 | \$ | 216 | \$ | 0 | \$ | 8,195 | \$ 14,216 | \$ | 39,317 |
| 12 | 2032 | 54,420 | 50,610 | 3,809 | 39 | 1,973,807 | 148,566 | \$ | 9 | \$ | 1,599 | \$ | 5,408 | \$ 10,112 | \$ | 222 | \$ | 0 | \$ | 8,409 | \$ 14,588 | \$ | 40,347 |
| 13 | 2033 | 55,846 | 51,936 | 3,909 | 39 | 2,025,520 | 152,459 | \$ | 9 | \$ | 1,641 | \$ | 5,549 | \$ 10,377 | \$ | 228 | \$ | 0 | \$ | 8,630 | \$ 14,970 | \$ | 41,404 |
| 14 | 2034 | 57,309 | 53,297 | 4,012 | 39 | 2,078,589 | 156,453 | \$ | 9 | \$ | 1,684 | \$ | 5,695 | \$ 10,649 | \$ | 234 | \$ | 0 | \$ | 8,856 | \$ 15,363 | \$ | 42,489 |
| 15 | 2035 | 58,810 | 54,694 | 4,117 | 39 | 2,133,048 | 160,552 | \$ | 9 | \$ | 1,728 | \$ | 5,844 | \$ 10,928 | \$ | 240 | \$ | 0 | \$ | 9,088 | \$ 15,765 | \$ | 43,602 |
| 16 | 2036 | 60,351 | 56,127 | 4,225 | 39 | 2,188,934 | 164,758 | \$ | 10 | \$ | 1,773 | \$ | 5,997 | \$ 11,214 | \$ | 246 | \$ | 0 | \$ | 9,326 | \$ 16,178 | \$ | 44,745 |
| 17 | 2037 | 61,932 | 57,597 | 4,335 | 39 | 2,246,284 | 169,075 | \$ | 10 | \$ | 1,820 | \$ | 6,154 | \$ 11,508 | \$ | 252 | \$ | 0 | \$ | 9,570 | \$ 16,602 | \$ | 45,917 |
| 18 | 2038 | 63,555 | 59,106 | 4,449 | 39 | 2,305,136 | 173,505 | \$ | 10 | \$ | 1,868 | \$ | 6,315 | \$ 11,809 | \$ | 259 | \$ | 0 | \$ | 9,821 | \$ 17,037 | \$ | 47,120 |
| 19 | 2039 | 65,220 | 60,655 | 4,565 | 39 | 2,365,531 | 178,051 | \$ | 10 | \$ | 1,917 | \$ | 6,481 | \$ 12,119 | \$ | 266 | \$ | 0 |  | 10,078 | \$ 17,483 | \$ | 48,354 |
| 20 | 2040 | 66,929 | 62,244 | 4,685 | 39 | 2,427,508 | 182,716 | \$ | 11 | \$ | 1,967 | \$ | 6,651 | \$ 12,436 | \$ | 273 | \$ | 0 |  | 10,342 | \$ 17,941 | \$ | 49,621 |

## Appendix 1

Appendix Table 1. Regional Traffic Detour Loadings (ADT)

| One-Directional Closure |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | I-44 | US 65 | US 60 | Hwy A | US 63 |
| Base Condition | 39,900 | 68,293 | 19,420 | 2,590 | 3,469 |
| Detour Condition | 19,950 | 88,243 | 39,370 | 22,540 | 23,419 |
| Two-Directional Closure |  |  |  |  |  |
| Base Condition | 39,900 | 68,293 | 19,420 | 2,590 | 3,469 |
| Detour Condition | 0 | 108,193 | 53,320 | 42,490 | 43,369 |

Appendix Table 2. Traffic Safety Analysis - Detour via US 65-US 60-Hwy A


Appendix Table 3. Traffic Safety Analysis - Detour via US 65-US 60-US 63

| One-Directional Closure |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Base Condition (crashes/yr) |  |  | Detoured Condition (crashes/yr) |  |  | Increased Safety Risk (crashes/yr) |  |  |
|  | Total | Fatal \& Injury | Property Damage Only | Total | Fatal \& Injury | Property Damage Only | Total | Fatal \& Injury | Property Damage Only |
| 1-44 | 941.5 | 260.2 | 681.3 | 399.8 | 111.2 | 288.6 | -541.7 | -149 | -392.7 |
| US 65 | 142.4 | 38.7 | 103.8 | 146.672 | 39.861 | 106.914 | 4.272 | 1.161 | 3.114 |
| US 60 | 354.632 | 171.91 | 182.726 | 712.089 | 333.13 | 378.959 | 357.457 | 161.224 | 196.233 |
| US 63 | 104.845 | 34.893 | 68.952 | 645.329 | 214.356 | 430.973 | 540.484 | 179.463 | 362.021 |
| Total Increased Crash Prediction (crashes/yr) |  |  |  |  |  |  | 360.513 | 192.848 | 168.668 |
| Two-Directional Closure |  |  |  |  |  |  |  |  |  |
|  | Base Condition (crashes/yr) |  |  | Detoured Condition (crashes/yr) |  |  | Increased Safety Risk (crashes/yr) |  |  |
|  | Total | Fatal \& Injury | Property <br> Damage Only | Total | Fatal \& Injury | Property Damage Only | Total | Fatal \& Injury | Property Damage Only |
| I-44 | 941.5 | 260.2 | 681.3 | 0 | 0 | 0 | -941.5 | -260.2 | -681.3 |
| US 65 | 142.4 | 38.7 | 103.8 | 183.411 | 49.8456 | 133.6944 | 41.0112 | 11.1456 | 29.8944 |
| US 60 | 354.632 | 171.91 | 182.726 | 961.7 | 442.586 | 519.114 | 607.068 | 270.68 | 336.388 |
| US 63 | 104.845 | 34.893 | 68.952 | 936.189 | 311.24 | 624.949 | 831.344 | 276.347 | 555.997 |
| Total Increased Crash Prediction (crashes/yr) |  |  |  |  |  |  | 537.9232 | 297.9726 | 240.9794 |

## Appendix 2




| (1) | (2) |  | (3) | (4) | Proportion of Total Crashes | (6) | (7) | (8) | (9) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  | Overdispersion |  |  | Adjusted | Combined | Calibration Factor, Cr | Predicted |
|  |  |  | Parameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {bmv }}$ |  | $\mathrm{N}_{\text {brmv }}$ | CMFs |  | $\mathrm{N}_{\text {brmv }}$ |
|  | from Table 12-3 |  | from Table 12-3 | from Equation 12-10 |  | (4)total ${ }^{*}$ (5) | (6) from Worksheet 1 B |  | $(6)^{*}(7)^{*}(8)$ |
| Total | -12.34 | 1.36 | 1.32 | 150.274 | 1.000 | 150.274 | 1.00 | 1.00 | 150.274 |
| Fatal and Injury (FI) | -12.76 | 1.28 | 1.31 | 42.306 | $\frac{(4)_{\mathrm{F} 1} /\left((4)_{\mathrm{F} 1}+(4)_{\mathrm{PDO}}\right)}{0.267}$ | 40.137 | 1.00 | 1.00 | 40.137 |
| Property Damage Only (PDO) | -12.81 | 1.38 | 1.34 | 116.087 | $\frac{(5)_{\text {TOTAL }}-(5)_{\mathrm{FI}}}{0.733}$ | 110.136 | 1.00 | 1.00 | 110.136 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(f) | Predicted $\mathbf{N}_{\text {brmv (FI) }}$ (crashes/year) | Proportion of Collision Type (PDO) | $\begin{aligned} & \text { Predicted } \mathbf{N}_{\text {brmv (PDO) }} \\ & \text { (crashes/year) } \end{aligned}$ | Predicted $\mathrm{N}_{\text {brmv (total) }}$ (crashes/year) |
|  | from Table 12-4 | (9)Ff from Worksheet 1 C | from Table 12-4 | (9)poo from Worksheet 1 C | (9)total from Worksheet 1C |
| Total | 1.000 | 40.137 | 1.000 | 110.136 | 150.274 |
|  |  | (2)** ${ }_{\text {F }}$ F |  | (4)**(5) ${ }_{\text {poo }}$ | (3)+(5) |
| Rear-end collision | 0.832 | 33.394 | 0.662 | 72.910 | 106.304 |
| Head-on collision | 0.020 | 0.803 | 0.007 | 0.771 | 1.574 |
| Angle collision | 0.040 | 1.605 | 0.036 | 3.965 | 5.570 |
| Sideswipe, same direction | 0.050 | 2.007 | 0.223 | 24.560 | 26.567 |
| Sideswipe, opposite direction | 0.010 | 0.401 | 0.001 | 0.110 | 0.512 |
| Other multiple-vehicle collision | 0.048 | 1.927 | 0.071 | 7.820 | 9.746 |


| (1) |  |  | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  | Overdispersion |  | Proportion of TotalCrashes Crashes | Adjusted | Combined | Calibration Factor, Cr | Predicted |
|  |  |  | Parameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {brsv }}$ |  | $\mathrm{N}_{\text {brsv }}$ |  |  | $\mathrm{N}_{\text {brsv }}$ |
|  | from Table 12-5 |  | from Table 12-5 | from Equation 12-13 |  | (4) Total $^{*}$ (5) | (6) from Worksheet 1B |  | $(6)^{*}(7)^{*}(8)$ |
| Total | -5.05 | 0.47 | 0.86 | 17.702 | 1.000 | 17.702 | 1.00 | 1.00 | 17.702 |
| Fatal and Injury (FI) | -8.71 | 0.66 | 0.28 | 3.410 | $\left.(4)_{F /} /(4)_{F_{1}+}+(4)_{\text {Poo }}\right)$ | 3.376 | 1.00 | 1.00 | 3.376 |
|  |  |  |  |  | 0.191 |  |  |  |  |
| Property Damage Only (PDO) | -5.04 | 0.45 | 1.06 | 14.466 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.809}$ | 14.326 | 1.00 | 1.00 | 14.326 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(fI) | Predicted $\mathbf{N}_{\text {brsv (FI) }}$ (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brsv (PDO) (crashes/year) | Predicted $\mathrm{N}_{\text {bisv (total) }}$ (crashes/year) |
|  | from Table 12-6 | (9)ff from Worksheet 1E | from Table 12-6 | (9)poo from Worksheet | (9)Total from Worksheet 1E |
| Total | 1.000 | 3.376 | 1.000 | 14.326 | 17.702 |
|  |  | (2)** 3 F ${ }_{\text {F1 }}$ |  | (4)**5) ${ }_{\text {poo }}$ | (3)+(5) |
| Collision with animal | 0.001 | 0.003 | 0.063 | 0.903 | 0.906 |
| Collision with fixed object | 0.500 | 1.688 | 0.813 | 11.647 | 13.335 |
| Collision with other object | 0.028 | 0.095 | 0.016 | 0.229 | 0.324 |
| Other single-vehicle collision | 0.471 | 1.590 | 0.108 | 1.547 | 3.137 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Number of driveways, | Crashes per driveway per year, $\mathrm{N}_{\mathrm{j}}$ | Coefficient for traffic adjustment, t | Initial $\mathrm{N}_{\text {brdwy }}$ | Overdispersion parameter, $\mathbf{k}$ |
| Driveway Type |  | from Table 12-7 | from Table 12-7 | $\frac{\text { Equation } 12-16}{n_{j}{ }^{*} N_{j}{ }^{*}(\text { AADT } / 15,000)^{1}}$ | from Table 12-7 |
| Major commercial | 0 | 0.033 | 1.106 | 0.000 |  |
| Minor commercial | 0 | 0.011 | 1.106 | 0.000 |  |
| Major industrial/institutional | 0 | 0.036 | 1.106 | 0.000 |  |
| Minor industrial/institutional | 0 | 0.005 | 1.106 | 0.000 | -- |
| Major residential | 0 | 0.018 | 1.106 | 0.000 |  |
| Minor residential | 0 | 0.003 | 1.106 | 0.000 |  |
| Other | 0 | 0.005 | 1.106 | 0.000 |  |
| Total | -- | -- | -- | 0.000 | 1.39 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | Initial $\mathrm{N}_{\text {brdwy }}$ | $\begin{aligned} & \text { Proportion of total } \\ & \text { crashes }\left(\mathrm{f}_{\mathrm{dwy}}\right) \\ & \hline \end{aligned}$ | $\begin{gathered} \hline \text { Adjusted } \\ \mathbf{N}_{\text {brdwy }} \\ \hline \end{gathered}$ | Combined CMFs | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ |
|  | $\overline{(5)_{\text {TOTAL }}}$ from Worksheet 1 G | from Table 12-7 | (2) TOTAL $^{*}$ * (3) | (6) from Worksheet 1B |  | $(4)^{\star}(5)^{*}(6)$ |
| Total | 0.000 | 1.000 | 0.000 | 1.00 | 1.00 | 0.000 |
| Fatal and injury (FI) | -- | 0.284 | 0.000 | 1.00 | 1.00 | 0.000 |
| Property damage only (PDO) | -- | 0.716 | 0.000 | 1.00 | 1.00 | 0.000 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | dicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | dicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\text {br }}$ | $\mathrm{f}_{\mathrm{p}}$ |  | Predicted $\mathrm{N}_{\text {pedr }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3)+(4) | $\begin{gathered} \text { from Table } \\ 12-8 \end{gathered}$ | factor, $\mathrm{C}_{\mathrm{r}}$ | $(5)^{*}(6)^{*}(7)$ |
| Total | 150.274 | 17.702 | 0.000 | 167.976 | 0.019 | 1.00 | 3.192 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 3.192 |


| Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{Nbr}_{\text {br }}$ | $\mathrm{f}_{\text {biker }}$ | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {biker }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2) $+(3)+(4)$ | $\begin{gathered} \hline \text { from Table } \\ 12-9 \\ \hline \end{gathered}$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 150.274 | 17.702 | 0.000 | 167.976 | 0.005 | 1.00 | 0.840 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 0.840 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
|  | Fatal and injury (FI) | Property damage only (PDO) | Total |
| Collision type | (3) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J | (5) from Worksheet 1D and 1F; and <br> (7) from Worksheet 1H | (6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J |
| MULTIPLE-VEHICLE |  |  |  |
| Rear-end collisions (from Worksheet 1D) | 33.394 | 72.910 | 106.304 |
| Head-on collisions (from Worksheet 1D) | 0.803 | 0.771 | 1.574 |
| Angle collisions (from Worksheet 1D) | 1.605 | 3.965 | 5.570 |
| Sideswipe, same direction (from Worksheet 1D) | 2.007 | 24.560 | 26.567 |
| Sideswipe, opposite direction (from Worksheet 1D) | 0.401 | 0.110 | 0.512 |
| Driveway-related collisions (from Worksheet 1H) | 0.000 | 0.000 | 0.000 |
| Other multiple-vehicle collision (from Worksheet 1D) | 1.927 | 7.820 | 9.746 |
| Subtotal | 40.137 | 110.136 | 150.274 |
| SINGLE-VEHICLE |  |  |  |
| Collision with animal (from Worksheet 1F) | 0.003 | 0.903 | 0.906 |
| Collision with fixed object (from Worksheet 1F) | 1.688 | 11.647 | 13.335 |
| Collision with other object (from Worksheet 1F) | 0.095 | 0.229 | 0.324 |
| Other single-vehicle collision (from Worksheet 1F) | 1.590 | 1.547 | 3.137 |
| Collision with pedestrian (from Worksheet 11) | 3.192 | 0.000 | 3.192 |
| Collision with bicycle (from Worksheet 1J) | 0.840 | 0.000 | 0.840 |
| Subtotal | 7.408 | 14.326 | 21.733 |
| Total | 47.545 | 124.462 | 172.007 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
| Crash Severity Level | Predicted average crash frequency, $\mathbf{N}_{\text {predicted is }}$ (crashes/year) | Roadway segment length, L (mi) | Crash rate (crashes/mi/year) |
|  | (Total) from Worksheet 1K |  | (2)/(3) |
| Total | 172.0 | 19.00 | 9.1 |
| Fatal and injury (FI) | 47.5 | 19.00 | 2.5 |
| Property damage only (PDO) | 124.5 | 19.00 | 6.6 |




|  | (2) |  | (3) <br> 3) Overdispersion Parameter, $\mathbf{k}$ from Table 12-3 | (4)Initial $\mathrm{N}_{\text {bmv }}$from Equation 12-10 | (5) | $(6)$ <br> Adjusted <br> $\mathbf{N}_{\text {brmv }}$ <br> $(4)_{\text {Total }}{ }^{*}(5)$ | (7) <br> Combined <br> CMFs <br> (6) from <br> Worksheet 1B | Calibration Factor, Cr |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients from Table 12-3 |  |  |  | Proportion of Total Crashes |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Total | -12.34 | 1.36 | 1.32 | 58.544 | 1.000 | 58.544 | 1.00 | 1.00 | 58.544 |
| Fatal and Injury (FI) | -12.76 | 1.28 | 1.31 | 17.421 | $\frac{(4)_{F /} /\left((4)_{F+}+(4)_{\mathrm{PDO}}\right)}{0.281}$ | 16.444 | 1.00 | 1.00 | 16.444 |
| Property Damage Only (PDO) | -12.81 | 1.38 | 1.34 | 44.603 | $\begin{gathered} (5)_{\text {TOTAL }}-(5)_{\text {FII }} \\ 0.719 \end{gathered}$ | 42.100 | 1.00 | 1.00 | 42.100 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(f) | Predicted $\mathbf{N}_{\text {brmv (FI) }}$ (crashes/year) | Proportion of Collision Type (PDO) | $\begin{aligned} & \text { Predicted } \mathbf{N}_{\text {brmv (PDO) }} \\ & \text { (crashes/year) } \end{aligned}$ | Predicted $\mathrm{N}_{\text {brmv (total) }}$ (crashes/year) |
|  | from Table 12-4 | (9)FIf from Worksheet 1 C | from Table 12-4 | (9)poo from Worksheet | (9)total from Worksheet 1 C |
| Total | 1.000 | 16.444 | 1.000 | 42.100 | 58.544 |
|  |  | (2)** ${ }_{\text {F }}$ F। |  | (4)*(5) ${ }_{\text {Poo }}$ | (3)+(5) |
| Rear-end collision | 0.832 | 13.681 | 0.662 | 27.870 | 41.552 |
| Head-on collision | 0.020 | 0.329 | 0.007 | 0.295 | 0.624 |
| Angle collision | 0.040 | 0.658 | 0.036 | 1.516 | 2.173 |
| Sideswipe, same direction | 0.050 | 0.822 | 0.223 | 9.388 | 10.211 |
| Sideswipe, opposite direction | 0.010 | 0.164 | 0.001 | 0.042 | 0.207 |
| Other multiple-vehicle collision | 0.048 | 0.789 | 0.071 | 2.989 | 3.778 |


|  |  | Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | SPF Coefficients |  |  |  | Proportion of Total Crashes | Adjusted |  | Calibration Factor, Cr | Predicted |
| Crash Severity Level |  |  | Parameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {brsv }}$ |  | ${ }^{\text {N }}$ | Combines CMFs |  | $\mathrm{N}_{\text {brsv }}$ |
| Crash Severity Level | from Table 12-5 |  | from Table 12-5 | from Equation 12-13 |  | (4) ${ }_{\text {total }}{ }^{*}$ (5) | (6) from Worksheet 1B |  | ${ }_{(6))^{*}(7)^{*}(8)}^{\text {drem }}$ |
| Total | -5.05 | 0.47 | 0.86 | 12.780 | 1.000 | 12.780 | 1.00 | 1.00 | 12.780 |
| Fatal and Injury (FI) | -8.71 | 0.66 | 0.28 | 2.158 | $\left.(4)_{F=1} /(4)_{F_{1}+}+(4)_{P D o}\right)$ | 2.163 | 1.00 | 1.00 | 2.163 |
| Property Damage Only (PDO) | -5.04 | 0.45 | 1.06 | 10.590 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.831}$ | 10.617 | 1.00 | 1.00 | 10.617 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(fI) | Predicted $\mathbf{N}_{\text {brsv (FI) }}$ (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brsv (PDO) (crashes/year) | Predicted $\mathrm{N}_{\text {bisv (total) }}$ (crashes/year) |
|  | from Table 12-6 | (9)ff from Worksheet 1E | from Table 12-6 | (9)poo from Worksheet | (9)Total from Worksheet 1E |
| Total | 1.000 | 2.163 | 1.000 | 10.617 | 12.780 |
|  |  | (2)*(3) ${ }_{\text {F1 }}$ |  | (4)**(5) ${ }_{\text {PDo }}$ | (3)+(5) |
| Collision with animal | 0.001 | 0.002 | 0.063 | 0.669 | 0.671 |
| Collision with fixed object | 0.500 | 1.082 | 0.813 | 8.632 | 9.713 |
| Collision with other object | 0.028 | 0.061 | 0.016 | 0.170 | 0.230 |
| Other single-vehicle collision | 0.471 | 1.019 | 0.108 | 1.147 | 2.166 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Number of driveways, | Crashes per driveway per year, $\mathrm{N}_{\mathrm{j}}$ | Coefficient for traffic adjustment, t | Initial $\mathrm{N}_{\text {brdwy }}$ | Overdispersion parameter, $\mathbf{k}$ |
| Driveway Type |  | from Table 12-7 | from Table 12-7 | $\frac{\text { Equation } 12-16}{n_{j}{ }^{*} N_{j}{ }^{*}(\text { AADT } / 15,000)^{1}}$ | from Table 12-7 |
| Major commercial | 0 | 0.033 | 1.106 | 0.000 |  |
| Minor commercial | 0 | 0.011 | 1.106 | 0.000 |  |
| Major industrial/institutional | 0 | 0.036 | 1.106 | 0.000 |  |
| Minor industrial/institutional | 0 | 0.005 | 1.106 | 0.000 | -- |
| Major residential | 0 | 0.018 | 1.106 | 0.000 |  |
| Minor residential | 0 | 0.003 | 1.106 | 0.000 |  |
| Other | 0 | 0.005 | 1.106 | 0.000 |  |
| Total | -- | -- | -- | 0.000 | 1.39 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | Initial $\mathrm{N}_{\text {brdwy }}$ | $\begin{aligned} & \text { Proportion of total } \\ & \text { crashes }\left(\mathrm{f}_{\mathrm{dwy}}\right) \\ & \hline \end{aligned}$ | $\begin{gathered} \hline \text { Adjusted } \\ \mathbf{N}_{\text {brdwy }} \\ \hline \end{gathered}$ | Combined CMFs | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ |
|  | $\overline{(5)_{\text {TOTAL }}}$ from Worksheet 1 G | from Table 12-7 | (2) TOTAL $^{*}$ * (3) | (6) from Worksheet 1B |  | $(4)^{\star}(5)^{*}(6)$ |
| Total | 0.000 | 1.000 | 0.000 | 1.00 | 1.00 | 0.000 |
| Fatal and injury (FI) | -- | 0.284 | 0.000 | 1.00 | 1.00 | 0.000 |
| Property damage only (PDO) | -- | 0.716 | 0.000 | 1.00 | 1.00 | 0.000 |


|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\mathrm{br}}$ | $\mathrm{f}_{\text {pedr }}$ |  | Predicted $\mathrm{N}_{\text {pedr }}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3) $+(4)$ | $\begin{gathered} \text { from Table } \\ 12-8 \end{gathered}$ | factor, $\mathrm{C}_{\mathrm{r}}$ | $(5)^{*}(6)^{*}(7)$ |
| Total | 58.544 | 12.780 | 0.000 | 71.324 | 0.019 | 1.00 | 1.355 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 1.355 |


| Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{Nbr}_{\text {br }}$ | $\mathrm{f}_{\text {biker }}$ | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {biker }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2) $+(3)+(4)$ | $\begin{gathered} \hline \text { from Table } \\ 12-9 \\ \hline \end{gathered}$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 58.544 | 12.780 | 0.000 | 71.324 | 0.005 | 1.00 | 0.357 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 0.357 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
|  | Fatal and injury (FI) | Property damage only (PDO) | Total |
| Collision type | (3) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J | (5) from Worksheet 1D and 1F; and <br> (7) from Worksheet 1H | (6) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J |
| MULTIPLE-VEHICLE |  |  |  |
| Rear-end collisions (from Worksheet 1D) | 13.681 | 27.870 | 41.552 |
| Head-on collisions (from Worksheet 1D) | 0.329 | 0.295 | 0.624 |
| Angle collisions (from Worksheet 1D) | 0.658 | 1.516 | 2.173 |
| Sideswipe, same direction (from Worksheet 1D) | 0.822 | 9.388 | 10.211 |
| Sideswipe, opposite direction (from Worksheet 1D) | 0.164 | 0.042 | 0.207 |
| Driveway-related collisions (from Worksheet 1H) | 0.000 | 0.000 | 0.000 |
| Other multiple-vehicle collision (from Worksheet 1D) | 0.789 | 2.989 | 3.778 |
| Subtotal | 16.444 | 42.100 | 58.544 |
| SINGLE-VEHICLE |  |  |  |
| Collision with animal (from Worksheet 1F) | 0.002 | 0.669 | 0.671 |
| Collision with fixed object (from Worksheet 1F) | 1.082 | 8.632 | 9.713 |
| Collision with other object (from Worksheet 1F) | 0.061 | 0.170 | 0.230 |
| Other single-vehicle collision (from Worksheet 1F) | 1.019 | 1.147 | 2.166 |
| Collision with pedestrian (from Worksheet 11) | 1.355 | 0.000 | 1.355 |
| Collision with bicycle (from Worksheet 1J) | 0.357 | 0.000 | 0.357 |
| Subtotal | 3.875 | 10.617 | 14.492 |
| Total | 20.319 | 52.717 | 73.036 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
| Crash Severity Level | Predicted average crash frequency, $\mathbf{N}_{\text {predicted is }}$ (crashes/year) | Roadway segment length, L (mi) | Crash rate (crashes/mi/year) |
|  | (Total) from Worksheet 1K |  | (2)/(3) |
| Total | 73.0 | 19.00 | 3.8 |
| Fatal and injury (FI) | 20.3 | 19.00 | 1.1 |
| Property damage only (PDO) | 52.7 | 19.00 | 2.8 |




| (1) | (2) |  | (3) | (4) | (5) | (6) | (7) | CalibrationFactor, Cr | (9) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  | OverdispersionParameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {bmv }}$ | Proportion of Total Crashes | $\begin{gathered} \text { Adjusted } \\ \mathbf{N}_{\text {brmv }} \end{gathered}$ | Combined CMFs |  | Predicted |
|  | from Table 12-3 |  |  |  |  |  | (6) from |  |  |
|  | a | b |  |  |  | (4)ィ¢ | Worksheet 1B |  | (6)(7)(8) |
| Total | -12.34 | 1.36 | 1.32 | 129.372 | 1.000 | 129.372 | 1.00 | 1.00 | 129.372 |
| Fatal and Injury (FI) | -12.76 | 1.28 | 1.31 | 34.984 | $\frac{(4)_{F} /\left((4)_{\mathrm{F}}+(4)_{\mathrm{PDO}}\right)}{0.257}$ | 33.295 | 1.00 | 1.00 | 33.295 |
| Property Damage Only (PDO) | -12.81 | 1.38 | 1.34 | 100.951 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.743}$ | 96.077 | 1.00 | 1.00 | 96.077 |


| $\frac{(1)}{\text { Collision Type }}$ | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Proportion of Collision Type(FI) | Predicted $\mathbf{N}$ brmv (FI) (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brmv (PDO) (crashes/year) | Predicted $\mathbf{N}_{\text {brmv (total) }}$ (crashes/year) |
|  | from Table 12-4 | (9)FIf from Worksheet 1C | from Table 12-4 | (9)poo from Worksheet 1C | (9)total from Worksheet 1C |
| Total | 1.000 | 33.295 | 1.000 | 96.077 | 129.372 |
|  |  | (2)* 3$)_{\text {FI }}$ |  | (4)*(5) ${ }_{\text {PDO }}$ | (3)+(5) |
| Rear-end collision | 0.832 | 27.701 | 0.662 | 63.603 | 91.304 |
| Head-on collision | 0.020 | 0.666 | 0.007 | 0.673 | 1.338 |
| Angle collision | 0.040 | 1.332 | 0.036 | 3.459 | 4.791 |
| Sideswipe, same direction | 0.050 | 1.665 | 0.223 | 21.425 | 23.090 |
| Sideswipe, opposite direction | 0.010 | 0.333 | 0.001 | 0.096 | 0.429 |
| Other multiple-vehicle collision | 0.048 | 1.598 | 0.071 | 6.821 | 8.420 |


| Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) |  |  | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Crash Severity Level | SPF Coefficients |  | Overdispersion Parameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {brsv }}$ | Proportion of Total Crashes | Adjusted $\mathrm{N}_{\text {brsv }}$ | Combined CMFs | Calibration Factor, Cr | Predicted $\mathrm{N}_{\text {brsv }}$ |
| Crash Severity Level | from Table 12-5 |  | from Table 12-5 | from Equation 12-13 |  | (4) Total ${ }^{*}$ (5) | (6) from Worksheet 1B |  | $(6)^{*}(7)^{*}(8)$ |
| Total | -5.05 | 0.47 | 0.86 | 9.738 | 1.000 | 9.738 | 1.00 | 1.00 | 9.738 |
| Fatal and Injury (FI) | -8.71 | 0.66 | 0.28 | 2.064 | $\frac{(4)_{\mathrm{F}} /\left((4)_{\mathrm{F}}+(4)_{\mathrm{PDO}}\right)}{0.208}$ | 2.021 | 1.00 | 1.00 | 2.021 |
| Property Damage Only (PDO) | -5.04 | 0.45 | 1.06 | 7.878 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.792}$ | 7.716 | 1.00 | 1.00 | 7.716 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(FI) | Predicted $\mathbf{N}$ brsv (FI) (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brsv (PDO) (crashes/year) | Predicted $\mathbf{N}_{\text {brsv (TOTAL) }}$ (crashes/year) |
|  | from Table 12-6 | (9)FI from Worksheet 1E | from Table 12-6 | (9)poo from Worksheet 1E | (9)total from Worksheet 1E |
| Total | 1.000 | 2.021 | 1.000 | 7.716 | 9.738 |
|  |  | (2)* $\left.{ }^{*}\right)_{\text {Fl }}$ |  | (4)* $\left.{ }^{*}\right)_{\text {PDO }}$ | (3)+(5) |
| Collision with animal | 0.001 | 0.002 | 0.063 | 0.486 | 0.488 |
| Collision with fixed object | 0.500 | 1.011 | 0.813 | 6.273 | 7.284 |
| Collision with other object | 0.028 | 0.057 | 0.016 | 0.123 | 0.180 |
| Other single-vehicle collision | 0.471 | 0.952 | 0.108 | 0.833 | 1.785 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Driveway Type | Number of driveways, $\mathrm{n}_{\mathrm{j}}$ | Crashes per driveway per year, $\mathrm{N}_{\mathrm{j}}$ | Coefficient for traffic adjustment, t | Initial $\mathrm{N}_{\text {brdwy }}$ | Overdispersion parameter, $\mathbf{k}$ |
|  |  | from Table 12-7 | from Table 12-7 | $\frac{\text { Equation 12-16 }}{n_{j}{ }^{*} N_{i}{ }^{*}(\text { AADT } / 15,000)^{1}}$ | from Table 12-7 |
| Major commercial | 0 | 0.033 | 1.106 | 0.000 | -- |
| Minor commercial | 0 | 0.011 | 1.106 | 0.000 |  |
| Major industrial/institutional | 0 | 0.036 | 1.106 | 0.000 |  |
| Minor industrial/institutional | 0 | 0.005 | 1.106 | 0.000 |  |
| Major residential | 0 | 0.018 | 1.106 | 0.000 |  |
| Minor residential | 0 | 0.003 | 1.106 | 0.000 |  |
| Other | 0 | 0.005 | 1.106 | 0.000 |  |
| Total | -- | -- | -- | 0.000 | 1.39 |


| (1) | (2) | (3) | (4) | (5) | (6) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level |  |  |  |  | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ |  |
|  | Initial $\mathrm{N}_{\text {brdwy }}$ | $\text { crashes ( } \mathrm{f}_{\mathrm{dwy}} \text { ) }$ | $\mathbf{N}_{\text {brdwy }}$ | Combined CMFs |  | Predicted $\mathrm{N}_{\text {brdwy }}$ |
|  | (5) TOTAL from Worksheet 1G | from Table 12-7 | (2) TOTAL ${ }^{\text {* }}$ (3) | (6) from Worksheet 1B |  | $(4)^{*}(5)^{*}(6)$ |
| Total | 0.000 | 1.000 | 0.000 | 1.00 | 1.00 | 0.000 |
| Fatal and injury (FI) | -- | 0.284 | 0.000 | 1.00 | 1.00 | 0.000 |
| Property damage only (PDO) | -- | 0.716 | 0.000 | 1.00 | 1.00 | 0.000 |


| Worksheet 11-- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Crash Severity Level | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\mathrm{br}}$ | $\mathrm{f}_{\text {pedr }}$ | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {pedr }}$ |
|  | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3) $+(4)$ | $\begin{gathered} \hline \text { from Table } \\ 12-8 \end{gathered}$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 129.372 | 9.738 | 0.000 | 139.109 | 0.019 | 1.00 | 2.643 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 2.643 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\mathrm{br}}$ | $\mathrm{f}_{\text {biker }}$ | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {biker }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3) $+(4)$ | $\begin{gathered} \text { from Table } \\ 12-9 \\ \hline \end{gathered}$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 129.372 | 9.738 | 0.000 | 139.109 | 0.005 | 1.00 | 0.696 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 0.696 |


| Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments |  |  |  |
| :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) |
|  | Fatal and injury (FI) | Property damage only (PDO) | Total |
| Collision type | (3) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 11 and 1 J | (5) from Worksheet 1D and 1F; and (7) from Worksheet 1 H | (6) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J |
| MULTIPLE-VEHICLE |  |  |  |
| Rear-end collisions (from Worksheet 1D) | 27.701 | 63.603 | 91.304 |
| Head-on collisions (from Worksheet 1D) | 0.666 | 0.673 | 1.338 |
| Angle collisions (from Worksheet 1D) | 1.332 | 3.459 | 4.791 |
| Sideswipe, same direction (from Worksheet 1D) | 1.665 | 21.425 | 23.090 |
| Sideswipe, opposite direction (from Worksheet 1D) | 0.333 | 0.096 | 0.429 |
| Driveway-related collisions (from Worksheet 1H) | 0.000 | 0.000 | 0.000 |
| Other multiple-vehicle collision (from Worksheet 1D) | 1.598 | 6.821 | 8.420 |
| Subtotal | 33.295 | 96.077 | 129.372 |
| SINGLE-VEHICLE |  |  |  |
| Collision with animal (from Worksheet 1F) | 0.002 | 0.486 | 0.488 |
| Collision with fixed object (from Worksheet 1F) | 1.011 | 6.273 | 7.284 |
| Collision with other object (from Worksheet 1F) | 0.057 | 0.123 | 0.180 |
| Other single-vehicle collision (from Worksheet 1F) | 0.952 | 0.833 | 1.785 |
| Collision with pedestrian (from Worksheet 11) | 2.643 | 0.000 | 2.643 |
| Collision with bicycle (from Worksheet 1J) | 0.696 | 0.000 | 0.696 |
| Subtotal | 5.360 | 7.716 | 13.076 |
| Total | 38.655 | 103.793 | 142.448 |


| Crash Severity Level | Predicted average crash frequency, $\mathbf{N}_{\text {predicted rs }}$ (crashes/year) | Roadway segment length, L (mi) | Crash rate (crashes/mi/year) |
| :---: | :---: | :---: | :---: |
|  | (Total) from Worksheet 1K |  | (2)/(3) |
| Total | 142.4 | 8.25 | 17.3 |
| Fatal and injury (FI) | 38.7 | 8.25 | 4.7 |
| Property damage only (PDO) | 103.8 | 8.25 | 12.6 |




| Crash Severity Level | (2) |  | (3) <br> 3) Overdispersion Parameter, $\mathbf{k}$ from Table 12-3 | (4)Initial $\mathrm{N}_{\text {bmv }}$from Equation 12-10 | (5) | $(6)$ <br> Adjusted <br> $\mathbf{N}_{\text {brmv }}$ <br> $(4)_{\text {Total }}{ }^{*}(5)$ | (7) <br> Combined <br> CMFs <br> (6) from <br> Worksheet 1B |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | SPF Coefficients from Table 12-3 |  |  |  | Proportion of Total Crashes |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Total | -12.34 | 1.36 | 1.32 | 129.372 | 1.000 | 129.372 | 1.00 | 1.00 | 129.372 |
| Fatal and Injury (FI) | -12.76 | 1.28 | 1.31 | 34.984 | $\frac{(4)_{\mathrm{Fl}} /\left((4)_{\mathrm{F}+}+(4)_{\mathrm{PDO}}\right)}{0.257}$ | 33.295 | 1.00 | 1.00 | 33.295 |
| Property Damage Only (PDO) | -12.81 | 1.38 | 1.34 | 100.951 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.743}$ | 96.077 | 1.00 | 1.00 | 96.077 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(f) | Predicted $\mathbf{N}_{\text {brmv (FI) }}$ (crashes/year) | Proportion of Collision Type (PDO) | $\begin{aligned} & \text { Predicted } \mathbf{N}_{\text {brmv (PDO) }} \\ & \text { (crashes/year) } \end{aligned}$ | Predicted $\mathrm{N}_{\text {brmv (total) }}$ (crashes/year) |
|  | from Table 12-4 | (9)Ff from Worksheet 1 C | from Table 12-4 | (9)poo from Worksheet 1 C | (9)total from Worksheet 1C |
| Total | 1.000 | 33.295 | 1.000 | 96.077 | 129.372 |
|  |  | (2)** $)_{\text {F1 }}$ |  | (4)**(5) ${ }_{\text {poo }}$ | (3)+(5) |
| Rear-end collision | 0.832 | 27.701 | 0.662 | 63.603 | 91.304 |
| Head-on collision | 0.020 | 0.666 | 0.007 | 0.673 | 1.338 |
| Angle collision | 0.040 | 1.332 | 0.036 | 3.459 | 4.791 |
| Sideswipe, same direction | 0.050 | 1.665 | 0.223 | 21.425 | 23.090 |
| Sideswipe, opposite direction | 0.010 | 0.333 | 0.001 | 0.096 | 0.429 |
| Other multiple-vehicle collision | 0.048 | 1.598 | 0.071 | 6.821 | 8.420 |


| (1) |  |  | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  | Overdispersion |  | Proportion of TotalCrashes Crashes | Adjusted | Combined | Calibration Factor, $\mathbf{C r}$ | Predicted |
|  |  |  | Parameter, $\mathbf{k}$ |  |  | $\mathrm{N}_{\text {brsv }}$ |  |  | $\mathrm{N}_{\text {brsv }}$ |
|  | from Table 12-5 |  | from Table 12-5 | from Equation 12-13 |  | (4) ${ }_{\text {total }}{ }^{*}$ (5) | (6) from Worksheet 1B |  | (6)**(7)* $(8)$ |
| Total | -5.05 | 0.47 | 0.86 | 9.738 | 1.000 | 9.738 | 1.00 | 1.00 | 9.738 |
| Fatal and Injury (FI) | -8.71 | 0.66 | 0.28 | 2.064 |  | 2.021 | 1.00 | 1.00 | 2.021 |
|  |  |  |  |  | 0.208 |  |  |  |  |
| Property Damage Only (PDO) | -5.04 | 0.45 | 1.06 | 7.878 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.792}$ | 7.716 | 1.00 | 1.00 | 7.716 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(fI) | Predicted $\mathbf{N}_{\text {brsv (FI) }}$ (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brsv (PDO) (crashes/year) | Predicted $\mathrm{N}_{\text {bisv (total) }}$ (crashes/year) |
|  | from Table 12-6 | (9)ff from Worksheet 1E | from Table 12-6 | (9)poo from Worksheet | (9)Total from Worksheet 1E |
| Total | 1.000 | 2.021 | 1.000 | 7.716 | 9.738 |
|  |  | (2)*(3) ${ }_{\text {F1 }}$ |  | (4)**5) ${ }_{\text {PDo }}$ | (3)+(5) |
| Collision with animal | 0.001 | 0.002 | 0.063 | 0.486 | 0.488 |
| Collision with fixed object | 0.500 | 1.011 | 0.813 | 6.273 | 7.284 |
| Collision with other object | 0.028 | 0.057 | 0.016 | 0.123 | 0.180 |
| Other single-vehicle collision | 0.471 | 0.952 | 0.108 | 0.833 | 1.785 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Number of driveways, | Crashes per driveway per year, $\mathrm{N}_{\mathrm{j}}$ | Coefficient for traffic adjustment, t | Initial $\mathrm{N}_{\text {brdwy }}$ | Overdispersion parameter, $\mathbf{k}$ |
| Driveway Type |  | from Table 12-7 | from Table 12-7 | $\frac{\text { Equation } 12-16}{n_{j}{ }^{*} N_{j}{ }^{*}(\text { AADT } / 15,000)^{1}}$ | from Table 12-7 |
| Major commercial | 0 | 0.033 | 1.106 | 0.000 |  |
| Minor commercial | 0 | 0.011 | 1.106 | 0.000 |  |
| Major industrial/institutional | 0 | 0.036 | 1.106 | 0.000 |  |
| Minor industrial/institutional | 0 | 0.005 | 1.106 | 0.000 | -- |
| Major residential | 0 | 0.018 | 1.106 | 0.000 |  |
| Minor residential | 0 | 0.003 | 1.106 | 0.000 |  |
| Other | 0 | 0.005 | 1.106 | 0.000 |  |
| Total | -- | -- | -- | 0.000 | 1.39 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | Initial $\mathrm{N}_{\text {brdwy }}$ | $\begin{aligned} & \text { Proportion of total } \\ & \text { crashes }\left(\mathrm{f}_{\mathrm{dwy}}\right) \\ & \hline \end{aligned}$ | $\begin{gathered} \hline \text { Adjusted } \\ \mathbf{N}_{\text {brdwy }} \\ \hline \end{gathered}$ | Combined CMFs | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ |
|  | $\overline{(5)_{\text {TOTAL }}}$ from Worksheet 1 G | from Table 12-7 | (2) TOTAL $^{*}$ * (3) | (6) from Worksheet 1B |  | $(4)^{\star}(5)^{*}(6)$ |
| Total | 0.000 | 1.000 | 0.000 | 1.00 | 1.00 | 0.000 |
| Fatal and injury (FI) | -- | 0.284 | 0.000 | 1.00 | 1.00 | 0.000 |
| Property damage only (PDO) | -- | 0.716 | 0.000 | 1.00 | 1.00 | 0.000 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | dicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | dicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\text {br }}$ | $\mathrm{f}_{\mathrm{p}}$ |  | Predicted $\mathrm{N}_{\text {pedr }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3)+(4) | $\begin{gathered} \text { from Table } \\ 12-8 \end{gathered}$ | factor, $\mathrm{C}_{\mathrm{r}}$ | $(5)^{*}(6)^{*}(7)$ |
| Total | 129.372 | 9.738 | 0.000 | 139.109 | 0.019 | 1.00 | 2.643 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 2.643 |


|  | Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\mathrm{br}}$ | $\mathrm{f}_{\text {biker }}$ | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {biker }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2) $+(3)+(4)$ | $\begin{gathered} \hline \text { from Table } \\ 12-9 \\ \hline \end{gathered}$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 129.372 | 9.738 | 0.000 | 139.109 | 0.005 | 1.00 | 0.696 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 0.696 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
|  | Fatal and injury (FI) | Property damage only (PDO) | Total |
| Collision type | (3) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J | (5) from Worksheet 1D and 1F; and <br> (7) from Worksheet 1H | (6) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J |
| MULTIPLE-VEHICLE |  |  |  |
| Rear-end collisions (from Worksheet 1D) | 27.701 | 63.603 | 91.304 |
| Head-on collisions (from Worksheet 1D) | 0.666 | 0.673 | 1.338 |
| Angle collisions (from Worksheet 1D) | 1.332 | 3.459 | 4.791 |
| Sideswipe, same direction (from Worksheet 1D) | 1.665 | 21.425 | 23.090 |
| Sideswipe, opposite direction (from Worksheet 1D) | 0.333 | 0.096 | 0.429 |
| Driveway-related collisions (from Worksheet 1H) | 0.000 | 0.000 | 0.000 |
| Other multiple-vehicle collision (from Worksheet 1D) | 1.598 | 6.821 | 8.420 |
| Subtotal | 33.295 | 96.077 | 129.372 |
| SINGLE-VEHICLE |  |  |  |
| Collision with animal (from Worksheet 1F) | 0.002 | 0.486 | 0.488 |
| Collision with fixed object (from Worksheet 1F) | 1.011 | 6.273 | 7.284 |
| Collision with other object (from Worksheet 1F) | 0.057 | 0.123 | 0.180 |
| Other single-vehicle collision (from Worksheet 1F) | 0.952 | 0.833 | 1.785 |
| Collision with pedestrian (from Worksheet 11) | 2.643 | 0.000 | 2.643 |
| Collision with bicycle (from Worksheet 1J) | 0.696 | 0.000 | 0.696 |
| Subtotal | 5.360 | 7.716 | 13.076 |
| Total | 38.655 | 103.793 | 142.448 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
| Crash Severity Level | Predicted average crash frequency, $\mathbf{N}_{\text {predicted is }}$ (crashes/year) | Roadway segment length, L (mi) | Crash rate (crashes/mi/year) |
|  | (Total) from Worksheet 1K |  | (2)/(3) |
| Total | 142.4 | 8.25 | 17.3 |
| Fatal and injury (FI) | 38.7 | 8.25 | 4.7 |
| Property damage only (PDO) | 103.8 | 8.25 | 12.6 |




| (1) | (2) |  | (3) | (4) | (5) | (6) | (7) | CalibrationFactor, Cr | (9) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  | OverdispersionParameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {bmv }}$ | Proportion of Total Crashes | $\begin{gathered} \text { Adjusted } \\ \mathbf{N}_{\text {brmv }} \end{gathered}$ | Combined CMFs |  | Predicted |
|  | from Table 12-3 |  |  |  |  |  | (6) from |  |  |
|  | a | b |  |  |  | (4)ィ¢ | Worksheet 1B |  | (6)(7)(8) |
| Total | -12.34 | 1.36 | 1.32 | 129.372 | 1.000 | 129.372 | 1.00 | 1.00 | 129.372 |
| Fatal and Injury (FI) | -12.76 | 1.28 | 1.31 | 34.984 | $\frac{(4)_{F} /\left((4)_{\mathrm{F}}+(4)_{\mathrm{PDO}}\right)}{0.257}$ | 33.295 | 1.00 | 1.00 | 33.295 |
| Property Damage Only (PDO) | -12.81 | 1.38 | 1.34 | 100.951 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.743}$ | 96.077 | 1.00 | 1.00 | 96.077 |


| $\frac{(1)}{\text { Collision Type }}$ | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Proportion of Collision Type(FI) | Predicted $\mathbf{N}$ brmv (FI) (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brmv (PDO) (crashes/year) | Predicted $\mathbf{N}_{\text {brmv (total) }}$ (crashes/year) |
|  | from Table 12-4 | (9)FIf from Worksheet 1C | from Table 12-4 | (9)poo from Worksheet 1C | (9)total from Worksheet 1C |
| Total | 1.000 | 33.295 | 1.000 | 96.077 | 129.372 |
|  |  | (2)* 3$)_{\text {FI }}$ |  | (4)*(5) ${ }_{\text {PDO }}$ | (3)+(5) |
| Rear-end collision | 0.832 | 27.701 | 0.662 | 63.603 | 91.304 |
| Head-on collision | 0.020 | 0.666 | 0.007 | 0.673 | 1.338 |
| Angle collision | 0.040 | 1.332 | 0.036 | 3.459 | 4.791 |
| Sideswipe, same direction | 0.050 | 1.665 | 0.223 | 21.425 | 23.090 |
| Sideswipe, opposite direction | 0.010 | 0.333 | 0.001 | 0.096 | 0.429 |
| Other multiple-vehicle collision | 0.048 | 1.598 | 0.071 | 6.821 | 8.420 |


| Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) |  |  | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Crash Severity Level | SPF Coefficients |  | Overdispersion Parameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {brsv }}$ | Proportion of Total Crashes | Adjusted $\mathrm{N}_{\text {brsv }}$ | Combined CMFs | Calibration Factor, Cr | Predicted $\mathrm{N}_{\text {brsv }}$ |
| Crash Severity Level | from Table 12-5 |  | from Table 12-5 | from Equation 12-13 |  | (4) Total ${ }^{*}$ (5) | (6) from Worksheet 1B |  | $(6)^{*}(7)^{*}(8)$ |
| Total | -5.05 | 0.47 | 0.86 | 9.738 | 1.000 | 9.738 | 1.00 | 1.00 | 9.738 |
| Fatal and Injury (FI) | -8.71 | 0.66 | 0.28 | 2.064 | $\frac{(4)_{\mathrm{F}} /\left((4)_{\mathrm{F}}+(4)_{\mathrm{PDO}}\right)}{0.208}$ | 2.021 | 1.00 | 1.00 | 2.021 |
| Property Damage Only (PDO) | -5.04 | 0.45 | 1.06 | 7.878 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.792}$ | 7.716 | 1.00 | 1.00 | 7.716 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(FI) | Predicted $\mathbf{N}$ brsv (FI) (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brsv (PDO) (crashes/year) | Predicted $\mathbf{N}_{\text {brsv (TOTAL) }}$ (crashes/year) |
|  | from Table 12-6 | (9)FI from Worksheet 1E | from Table 12-6 | (9)poo from Worksheet 1E | (9)total from Worksheet 1E |
| Total | 1.000 | 2.021 | 1.000 | 7.716 | 9.738 |
|  |  | (2)* $\left.{ }^{*}\right)_{\text {Fl }}$ |  | (4)* $\left.{ }^{*}\right)_{\text {PDO }}$ | (3)+(5) |
| Collision with animal | 0.001 | 0.002 | 0.063 | 0.486 | 0.488 |
| Collision with fixed object | 0.500 | 1.011 | 0.813 | 6.273 | 7.284 |
| Collision with other object | 0.028 | 0.057 | 0.016 | 0.123 | 0.180 |
| Other single-vehicle collision | 0.471 | 0.952 | 0.108 | 0.833 | 1.785 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Driveway Type | Number of driveways, $\mathrm{n}_{\mathrm{j}}$ | Crashes per driveway per year, $\mathrm{N}_{\mathrm{j}}$ | Coefficient for traffic adjustment, t | Initial $\mathrm{N}_{\text {brdwy }}$ | Overdispersion parameter, $\mathbf{k}$ |
|  |  | from Table 12-7 | from Table 12-7 | $\frac{\text { Equation 12-16 }}{n_{j}{ }^{*} N_{i}{ }^{*}(\text { AADT } / 15,000)^{1}}$ | from Table 12-7 |
| Major commercial | 0 | 0.033 | 1.106 | 0.000 | -- |
| Minor commercial | 0 | 0.011 | 1.106 | 0.000 |  |
| Major industrial/institutional | 0 | 0.036 | 1.106 | 0.000 |  |
| Minor industrial/institutional | 0 | 0.005 | 1.106 | 0.000 |  |
| Major residential | 0 | 0.018 | 1.106 | 0.000 |  |
| Minor residential | 0 | 0.003 | 1.106 | 0.000 |  |
| Other | 0 | 0.005 | 1.106 | 0.000 |  |
| Total | -- | -- | -- | 0.000 | 1.39 |


| (1) | (2) | (3) | (4) | (5) | (6) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level |  |  |  |  | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ |  |
|  | Initial $\mathrm{N}_{\text {brdwy }}$ | $\text { crashes ( } \mathrm{f}_{\mathrm{dwy}} \text { ) }$ | $\mathbf{N}_{\text {brdwy }}$ | Combined CMFs |  | Predicted $\mathrm{N}_{\text {brdwy }}$ |
|  | (5) TOTAL from Worksheet 1G | from Table 12-7 | (2) TOTAL ${ }^{\text {* }}$ (3) | (6) from Worksheet 1B |  | $(4)^{*}(5)^{*}(6)$ |
| Total | 0.000 | 1.000 | 0.000 | 1.00 | 1.00 | 0.000 |
| Fatal and injury (FI) | -- | 0.284 | 0.000 | 1.00 | 1.00 | 0.000 |
| Property damage only (PDO) | -- | 0.716 | 0.000 | 1.00 | 1.00 | 0.000 |


| Worksheet 11-- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Crash Severity Level | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\mathrm{br}}$ | $\mathrm{f}_{\text {pedr }}$ | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {pedr }}$ |
|  | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3) $+(4)$ | $\begin{gathered} \hline \text { from Table } \\ 12-8 \end{gathered}$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 129.372 | 9.738 | 0.000 | 139.109 | 0.019 | 1.00 | 2.643 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 2.643 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\mathrm{br}}$ | $\mathrm{f}_{\text {biker }}$ | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {biker }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3) $+(4)$ | $\begin{gathered} \text { from Table } \\ 12-9 \\ \hline \end{gathered}$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 129.372 | 9.738 | 0.000 | 139.109 | 0.005 | 1.00 | 0.696 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 0.696 |


| Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments |  |  |  |
| :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) |
|  | Fatal and injury (FI) | Property damage only (PDO) | Total |
| Collision type | (3) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 11 and 1 J | (5) from Worksheet 1D and 1F; and (7) from Worksheet 1 H | (6) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J |
| MULTIPLE-VEHICLE |  |  |  |
| Rear-end collisions (from Worksheet 1D) | 27.701 | 63.603 | 91.304 |
| Head-on collisions (from Worksheet 1D) | 0.666 | 0.673 | 1.338 |
| Angle collisions (from Worksheet 1D) | 1.332 | 3.459 | 4.791 |
| Sideswipe, same direction (from Worksheet 1D) | 1.665 | 21.425 | 23.090 |
| Sideswipe, opposite direction (from Worksheet 1D) | 0.333 | 0.096 | 0.429 |
| Driveway-related collisions (from Worksheet 1H) | 0.000 | 0.000 | 0.000 |
| Other multiple-vehicle collision (from Worksheet 1D) | 1.598 | 6.821 | 8.420 |
| Subtotal | 33.295 | 96.077 | 129.372 |
| SINGLE-VEHICLE |  |  |  |
| Collision with animal (from Worksheet 1F) | 0.002 | 0.486 | 0.488 |
| Collision with fixed object (from Worksheet 1F) | 1.011 | 6.273 | 7.284 |
| Collision with other object (from Worksheet 1F) | 0.057 | 0.123 | 0.180 |
| Other single-vehicle collision (from Worksheet 1F) | 0.952 | 0.833 | 1.785 |
| Collision with pedestrian (from Worksheet 11) | 2.643 | 0.000 | 2.643 |
| Collision with bicycle (from Worksheet 1J) | 0.696 | 0.000 | 0.696 |
| Subtotal | 5.360 | 7.716 | 13.076 |
| Total | 38.655 | 103.793 | 142.448 |


| Crash Severity Level | Predicted average crash frequency, $\mathbf{N}_{\text {predicted rs }}$ (crashes/year) | Roadway segment length, L (mi) | Crash rate (crashes/mi/year) |
| :---: | :---: | :---: | :---: |
|  | (Total) from Worksheet 1K |  | (2)/(3) |
| Total | 142.4 | 8.25 | 17.3 |
| Fatal and injury (FI) | 38.7 | 8.25 | 4.7 |
| Property damage only (PDO) | 103.8 | 8.25 | 12.6 |



| Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) |  | (2) |  | (3) | (4) | (5) | (6) | (7) |
| Crash Severity Level | SPF Coefficients |  |  | N spf rd | Overdispersion Parameter, k | Combined CMFs | Calibration <br> Factor, Cr | Predicted average crash |
|  |  | Table |  |  |  | (6) from Worksheet 1B (a) |  | frequency, $\mathrm{N}_{\text {predicted } \mathrm{rs} \text { (d) }}$ |
|  | a | b | c | from Equation 11-9 | from Equation 11-10 |  |  | (3)** 5$)^{*}$ (6) |
| Total | -9.025 | 1.049 | 1.549 | 83.424 | 0.010 | 0.94 | 1.00 | 78.418 |
| Fatal and Injury (FI) | -8.837 | 0.958 | 1.687 | 40.993 | 0.008 | 0.94 | 1.00 | 38.533 |
| Fatal and Injury ${ }^{\text {a }}$ ( $\mathrm{F}^{\text {a }}$ ) | -8.505 | 0.874 | 1.740 | 24.927 | 0.008 | 0.94 | 1.00 | 23.432 |
| Property Damage Only (PDO) | -- | -- | -- | -- | -- | -- | -- | $\frac{(7)_{\text {TOTAL }}-(7)_{\text {FI }}}{39.885}$ |

$\overline{\text { NOTE: }}$ a Using the KABCO scale, these include only $K A B$ crashes. Crashes with severity level C (possible injury) are not included.

| Worksheet 1D (a) -- Crashes by Severity Level and Collision Type for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Collision Type | Proportion of Collision Tуре(тотаL) | $\mathbf{N}_{\text {predicted rs(d) (TOTAL) }}$ (crashes/year) | Proportion of Collision Type(FI) | $\mathbf{N}_{\text {predicted }} \mathrm{rs}(\mathrm{d})$ (FI) (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\mathrm{a}}$ ) | N predicted $\mathrm{rs}\left(\mathrm{Fl}^{\mathrm{a}}\right)$ (crashes/year) | Proportion of Collision Type (PDO) | $\mathrm{N}_{\text {predicted rs(d) (PDO) }}$ (crashes/year) |
|  | $\begin{array}{\|c} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | (7)total from Worksheet 1C <br> (a) | $\begin{array}{\|c} \hline \text { from Table 11- } \\ 6 \\ \hline \end{array}$ | (7)f from Worksheet $1 \mathrm{C}(\mathrm{a})$ | $\begin{array}{\|c\|} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | $\begin{gathered} \text { (7) } \mathrm{Fl}^{\mathrm{a}} \text { from Worksheet } \\ 1 \mathrm{C} \text { (a) } \end{gathered}$ | $\begin{gathered} \hline \text { from Table } \\ 11-6 \\ \hline \end{gathered}$ | (7)poo from Worksheet 1C <br> (a) |
| Total | 1.000 | 78.418 | 1.000 | 38.533 | 1.000 | 23.432 | 1.000 | 39.885 |
|  |  | (2)* $\left.{ }^{*}\right)_{\text {Total }}$ |  | $(4) \times(5)$ F1 |  | (6)* ${ }^{*}()_{\text {F1 }}{ }^{\text {a }}$ |  | (8)** 9$)_{\text {PDO }}$ |
| Head-on collision | 0.006 | 0.471 | 0.013 | 0.501 | 0.018 | 0.422 | 0.002 | 0.080 |
| Sideswipe collision | 0.043 | 3.372 | 0.027 | 1.040 | 0.022 | 0.515 | 0.053 | 2.114 |
| Rear-end collision | 0.116 | 9.096 | 0.163 | 6.281 | 0.114 | 2.671 | 0.088 | 3.510 |
| Angle collision | 0.043 | 3.372 | 0.048 | 1.850 | 0.045 | 1.054 | 0.041 | 1.635 |
| Single-vehicle collision | 0.768 | 60.225 | 0.727 | 28.013 | 0.778 | 18.230 | 0.792 | 31.589 |
| Other collision | 0.024 | 1.882 | 0.022 | 0.848 | 0.023 | 0.539 | 0.024 | 0.957 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

|  | Worksheet 1E -- Summary Results for Rural Multilane Roadway Segments |  |  |
| :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) |
| Crash severity level | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes/mi/year) |
| Crash severity level | (7) from Worksheet 1C (a) or (b) | Roadway segment length (mi) | (2)/(3) |
| Total | 78.4 | 22.0 | 3.6 |
| Fatal and Injury (FI) | 38.5 | 22.0 | 1.8 |
| Fatal and Injury ${ }^{\text {a }}\left(\mathrm{Fl}^{\text {a }}\right.$ ) | 23.4 | 22.0 | 1.1 |
| Property Damage Only (PDO) | 39.9 | 22.0 | 1.8 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.



|  | (2) | (3) |  | (5) | (6) | (7) | (8) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type |  |  |  |  |  |  |  | $\mathrm{N}_{\text {predicted int (PDO) }}$ (crashes/year) |
|  | Proportion of Collision Type(total) | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | Proportion of Collision Type(FI) | $\mathrm{N}_{\text {predicted int ( }}$ (F) ( ${ }^{\text {(crashes/year) }}$ | Proportion of Collision Type ( $\mathrm{Fl}^{\text {a }}$ ) | N predicted int ( $\mathrm{Fl}^{1}$ ) <br> (crashes/vear) | Proportion of Collision Type (PDO) |  |
|  | from Table 11-9 | (7)total from Worksheet 2C | $\begin{gathered} \text { from Table } \\ 11-9 \\ \hline \end{gathered}$ | (7) = f from Worksheet 2C | from Table 11-9 | (7) $\mathrm{FI}^{a}$ from Worksheet 2C | from Table 11-9 | (7)poo from Worksheet 2C |
| Total | 1.000 | 2.574 | 1.000 | 1.212 | 1.000 | 0.715 | 1.000 | 1.361 |
|  |  | (2)* 3 ( Total |  | (4) $\times(5)_{\text {F1 }}$ |  | (6)* ${ }^{*}(7)_{\text {F1 }}{ }^{\text {a }}$ |  | $(8)^{*}(9)_{\text {PDO }}$ |
| Head-on collision | 0.016 | 0.041 | 0.018 | 0.022 | 0.023 | 0.016 | 0.015 | 0.020 |
| Sideswipe collision | 0.107 | 0.275 | 0.042 | 0.051 | 0.040 | 0.029 | 0.156 | 0.212 |
| Rear-end collision | 0.228 | 0.587 | 0.213 | 0.258 | 0.108 | 0.077 | 0.240 | 0.327 |
| Angle collision | 0.395 | 1.017 | 0.534 | 0.647 | 0.571 | 0.408 | 0.292 | 0.397 |
| Single-vehicle collision | 0.202 | 0.520 | 0.148 | 0.179 | 0.199 | 0.142 | 0.243 | 0.331 |
| Other collision | 0.052 | 0.134 | 0.045 | 0.055 | 0.059 | 0.042 | 0.054 | 0.074 |



| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Site type | Predicted average crash frequency (crashes/year) |  |  | Observedcrashes,$N_{\text {observed }}$(crashes/year) | Overdispersion Parameter, k | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\mathrm{p} / \text { comb }}$ |
|  | $\mathrm{N}_{\text {predicted }}$ (TOTAL) | $\mathrm{N}_{\text {predicted }}$ (FI) | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & (\mathrm{PDO}) \end{aligned}$ |  |  | $\begin{gathered} \text { Equation A-8 } \\ (6)^{*}(2)^{2} \end{gathered}$ | $\begin{aligned} & \text { Equation A-9 } \\ & \text { sgrt((6)*(2)) } \end{aligned}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-10 \end{gathered}$ | $\begin{aligned} & \text { Equation } \\ & \text { A-11 } \end{aligned}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-12 \end{gathered}$ | $\begin{aligned} & \text { Equation } \\ & \text { A-13 } \end{aligned}$ | $\begin{gathered} \text { Equation } \\ \text { A-14 } \end{gathered}$ |
| Re_ ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_Divided_1 | 78.418 | 38.533 | 39.885 | -- | 0.010 | 59.386 | 0.870 | -- | -- | -- | -- | -- |
| Segment_Divided_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 78.418 | 38.533 | 39.885 |  |  |  |  |  |  |  |  |  |
| INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 72.062 | 33.946 | 38.116 | -- | 0.494 | 2565.294 | 5.966 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersesection Totals: | 72.062 | 33.946 | 38.116 |  |  |  |  |  |  |  |  |  |
| COMBINED (sum of column) | 150.480 | 72.479 | 78.001 | 0 | -- | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! |



| Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | SPF Coefficients |  |  | N spf rd | Overdispersion Parameter, $\mathbf{k}$ |  | Calibration <br> Factor, Cr | Predicted average crash frequency, $\mathrm{N}_{\text {predicted rs(d) }}$ (3)* 5$)^{*}$ (6) |
| Crash Severity Level |  |  |  | (6) from Worksheet 1B (a) |  |  |  |
|  | a | b | c |  | from Equation 11-9 | from Equation 11-10 |  |  |
| Total | -9.025 | 1.049 | 1.549 | 175.083 | 0.010 | 0.94 | 1.00 | 164.578 |
| Fatal and Injury (FI) | -8.837 | 0.958 | 1.687 | 80.673 | 0.008 | 0.94 | 1.00 | 75.833 |
| Fatal and Injury ${ }^{\text {a }}\left(\mathrm{Fl}^{\text {a }}\right.$ ) | -8.505 | 0.874 | 1.740 | 46.230 | 0.008 | 0.94 | 1.00 | 43.456 |
| Property Damage Only (PDO) | -- | -- | -- | -- | -- | -- | -- | $\frac{(7)_{\text {TOTAL }}-(7)_{\text {FI }}}{88.745}$ |

$\overline{\text { NOTE: }}$ a Using the KABCO scale, these include only $K A B$ crashes. Crashes with severity level C (possible injury) are not included.

| Worksheet 1D (a) -- Crashes by Severity Level and Collision Type for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | (2) | ( | (4) | (5) | (6) | (7) | (8) | (9) |
|  | Proportion of Collision Tуре(total) | $\mathbf{N}$ predicted risd ( (ToTAL) (crashes/year) | Collision Type(FI) | $\mathbf{N}_{\text {predicted } \mathrm{rs}(\mathrm{d})(\mathrm{FI})}$ (crashes/year) | Proportion of Collision Type ( $\mathrm{FI}^{\text {a }}$ ) | N predicted $\mathrm{rs}\left(\mathrm{Fl}^{\mathrm{a}}\right)$ (crashes/year) | Proportion of Collision Type (PDO) | $\mathbf{N}_{\text {predicted rs(d) (PDO) }}$ (crashes/year) |
|  | $\begin{array}{\|c} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | (7)total from Worksheet 1C <br> (a) | $\begin{gathered} \text { from Table 111 } \\ 6 \end{gathered}$ | (7)f: from Worksheet 1C (a) | $\begin{array}{\|c\|} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | $\begin{gathered} \hline(7)_{\mathrm{F} 1}{ }^{\mathrm{a}} \text { from Worksheet } \\ 1 \mathrm{C} \text { (a) } \\ \hline \end{gathered}$ | $\begin{gathered} \text { from Table } \\ 11-6 \end{gathered}$ | (7)poo from Worksheet 1C <br> (a) |
| Total | 1.000 | 164.578 | 1.000 | 75.833 | 1.000 | 43.456 | 1.000 | 88.745 |
|  |  | (2)* $\left.{ }^{*}\right)_{\text {Total }}$ |  | (4) $\times(5)_{\text {F1 }}$ |  | (6)* ${ }^{*}(7)_{\text {F1 }}{ }^{\text {a }}$ |  | (8)** 9$)_{\text {PDO }}$ |
| Head-on collision | 0.006 | 0.987 | 0.013 | 0.986 | 0.018 | 0.782 | 0.002 | 0.177 |
| Sideswipe collision | 0.043 | 7.077 | 0.027 | 2.047 | 0.022 | 0.956 | 0.053 | 4.703 |
| Rear-end collision | 0.116 | 19.091 | 0.163 | 12.361 | 0.114 | 4.954 | 0.088 | 7.810 |
| Angle collision | 0.043 | 7.077 | 0.048 | 3.640 | 0.045 | 1.956 | 0.041 | 3.639 |
| Single-vehicle collision | 0.768 | 126.396 | 0.727 | 55.131 | 0.778 | 33.809 | 0.792 | 70.286 |
| Other collision | 0.024 | 3.950 | 0.022 | 1.668 | 0.023 | 0.999 | 0.024 | 2.130 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

|  | Worksheet 1E -- Summary Results for Rural Multilane Roadway Segments |  |  |
| :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) |
| Crash severity level | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes/mi/year) |
| Crash severity level | (7) from Worksheet 1C (a) or (b) | Roadway segment length (mi) | (2)/(3) |
| Total | 164.6 | 22.0 | 7.5 |
| Fatal and Injury (FI) | 75.8 | 22.0 | 3.4 |
| Fatal and Injury ${ }^{\text {a }}\left(\mathrm{Fl}^{\text {a }}\right.$ ) | 43.5 | 22.0 | 2.0 |
| Property Damage Only (PDO) | 88.7 | 22.0 | 4.0 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

| General Information |  |  |  | Location Information |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Analyst <br> Agency or Company <br> Date Performed | $\begin{gathered} \text { MWD } \\ \text { CMT } \\ 04 / 07 / 20 \end{gathered}$ |  |  | Roadway Intersection Jurisdiction Analysis Year | US 60 (One-Directional) Standard Intersection MoDOT 2020 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Input Data |  |  |  | Base Conditions | Site Conditions 2020 |
| Intersection type (3ST, 4ST, 4SG) |  |  |  | -- | 4ST |
| $\mathrm{AADT}_{\text {major }}$ (veh/day) | AADT $_{\text {max }}=$ | 78,300 | (veh/day) | -- | 39,370 |
| $\mathrm{AADT}_{\text {minor }}$ (veh/day) | AADT $_{\text {max }}=$ | 7,400 | (veh/day) | -- | 800 |
| Intersection skew angle (degrees) |  |  |  | 0 | 10 |
| Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2) |  |  |  | 0 |  |
| Number of non-STOP-controlled approaches with right-turn lanes ( $0,1,2,3$, or 4 ) |  |  |  | 0 | 0 |
| Intersection lighting (present/not present) |  |  |  | Not Present | Not Present |
| Calibration Factor, $\mathrm{C}_{\mathrm{i}}$ |  |  |  | 1.00 | 1.00 |



| Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|  | Proportion of Collision Type(Total) | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | Proportion of Collision Type(F) | $\mathbf{N}_{\text {predicted int (F) }}$ (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\text {a }}$ ) | N predicted int ( $\mathrm{Fl}^{\mathrm{a}}$ ) <br> (crashes/vear) | Proportion of Collision Type (PDO) | $\mathrm{N}_{\text {predicted int }}$ (PDo) ( (rashes/year) |
|  | from Table 11-9 | (7)Total from Worksheet 2C | $\begin{gathered} \text { from Table } \\ 11-9 \end{gathered}$ | (7)fl from Worksheet 2C | from Table 11-9 | (7) $\mathrm{Fl}^{\text {a }}$ from Worksheet 2C | from Table 11-9 | (7)poo from Worksheet 2C |
| Total | 1.000 | 4.686 | 1.000 | 2.271 | 1.000 | 1.284 | 1.000 | 2.415 |
|  |  | (2)* 3$)_{\text {Total }}$ |  | (4) $\times(5)$ ¢ 1 |  | (6) ${ }^{*}(7)_{\text {F1 }}{ }^{\text {a }}$ |  | $(8)^{*}(9)_{\text {PDO }}$ |
| Head-on collision | 0.016 | 0.075 | 0.018 | 0.041 | 0.023 | 0.030 | 0.015 | 0.036 |
| Sideswipe collision | 0.107 | 0.501 | 0.042 | 0.095 | 0.040 | 0.051 | 0.156 | 0.377 |
| Rear-end collision | 0.228 | 1.068 | 0.213 | 0.484 | 0.108 | 0.139 | 0.240 | 0.580 |
| Angle collision | 0.395 | 1.851 | 0.534 | 1.213 | 0.571 | 0.733 | 0.292 | 0.705 |
| Single-vehicle collision | 0.202 | 0.947 | 0.148 | 0.336 | 0.199 | 0.255 | 0.243 | 0.587 |
| Other collision | 0.052 | 0.244 | 0.045 | 0.102 | 0.059 | 0.076 | 0.054 | 0.130 |

NOTE: ${ }^{a}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included




| Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) |  | (2) |  | (3) | (4) | (5) | (6) | (7) |
| Crash Severity Level | SPF Coefficients |  |  | N spf rd | Overdispersion Parameter, k | Combined CMFs | Calibration <br> Factor, Cr | Predicted average crashfrequency, $\mathrm{N}_{\text {predicted } \mathrm{s} \text { (d) }}$ |
|  |  | Table |  |  |  | (6) from Worksheet 1B (a) |  |  |
|  | a | b | c | from Equation 11-9 | from Equation 11-10 |  |  | $(3)^{*}(5)^{*}(6)$ |
| Total | -9.025 | 1.049 | 1.549 | 240.670 | 0.010 | 0.94 | 1.00 | 226.230 |
| Fatal and Injury (FI) | -8.837 | 0.958 | 1.687 | 107.876 | 0.008 | 0.94 | 1.00 | 101.403 |
| Fatal and Injury ${ }^{\text {a }}$ ( $\mathrm{F}^{\text {a }}$ ) | -8.505 | 0.874 | 1.740 | 60.263 | 0.008 | 0.94 | 1.00 | 56.647 |
| Property Damage Only (PDO) | -- | -- | -- | -- | -- | -- | -- | $\begin{aligned} & (7)_{\text {Total }}-(7)_{\text {FII }} \end{aligned}$ |

$\overline{\text { NOTE: }}$ a Using the KABCO scale, these include only $K A B$ crashes. Crashes with severity level C (possible injury) are not included.

| Worksheet 1D (a) -- Crashes by Severity Level and Collision Type for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}_{\text {predicted rs(d) (TOTAL) }}$ (crashes/year) | Proportion of Collision Type(FI) | $\mathrm{N}_{\text {predicted rs(d) (FI) }}$ (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\mathrm{a}}$ ) | N predicted rs ( $\mathrm{FI}^{\mathrm{a}}$ ) (crashes/year) | Proportion of Collision Type (PDO) | $\mathrm{N}_{\text {predicted rs(d) (PDO) }}$ (crashes/year) |
|  | $\begin{gathered} \hline \text { from Table } \\ 11-6 \\ \hline \end{gathered}$ | (7)Total from Worksheet 1C <br> (a) | $\begin{gathered} \text { from Table } 11- \\ 6 \\ \hline \end{gathered}$ | (7)ff from Worksheet 1 C (a) | $\begin{array}{\|c} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | $\begin{array}{\|c\|} \hline(7)_{\mathrm{FI}}{ }^{\mathrm{a}} \text { from Worksheet } \\ 1 \mathrm{C}(\mathrm{a}) \\ \hline \end{array}$ | $\begin{array}{\|c\|} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | (7)pDo from Worksheet 1C <br> (a) |
| Total | 1.000 | 226.230 | 1.000 | 101.403 | 1.000 | 56.647 | 1.000 | 124.827 |
|  |  | (2)* 3$)_{\text {Total }}$ |  | (4) $\times(5)_{\text {F1 }}$ |  | (6)* ${ }^{*}(7)_{\text {F1 }}{ }^{\text {a }}$ |  | (8)** ${ }^{\text {(9) poo }}$ |
| Head-on collision | 0.006 | 1.357 | 0.013 | 1.318 | 0.018 | 1.020 | 0.002 | 0.250 |
| Sideswipe collision | 0.043 | 9.728 | 0.027 | 2.738 | 0.022 | 1.246 | 0.053 | 6.616 |
| Rear-end collision | 0.116 | 26.243 | 0.163 | 16.529 | 0.114 | 6.458 | 0.088 | 10.985 |
| Angle collision | 0.043 | 9.728 | 0.048 | 4.867 | 0.045 | 2.549 | 0.041 | 5.118 |
| Single-vehicle collision | 0.768 | 173.745 | 0.727 | 73.720 | 0.778 | 44.071 | 0.792 | 98.863 |
| Other collision | 0.024 | 5.430 | 0.022 | 2.231 | 0.023 | 1.303 | 0.024 | 2.996 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
| Crash severity level | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes/mi/year) |
|  | (7) from Worksheet 1C (a) or (b) |  | (2)(3) |
| Total | 226.2 | 22.0 | 10.3 |
| Fatal and Injury (FI) | 101.4 | 22.0 | 4.6 |
| Fatal and Injury ${ }^{\text {a }}$ ( $\mathrm{FI}{ }^{\text {a }}$ ) | 56.6 | 22.0 | 2.6 |
| Property Damage Only (PDO) | 124.8 | 22.0 | 5.7 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.



| Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Collision Type | Proportion of Collision Туре(тотаи) | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | Proportion of <br> Collision <br> Type(FI) <br> Py | $\mathbf{N}_{\text {predicted int (Fl) }}($ crashes/year) | Proportion of Collision Type (F1a) | N predicted int ( $\mathrm{Fl}^{1}$ ) (crashes/vear) | Proportion of Collision Type (PDO) | $\mathbf{N}_{\text {predicted int (PDo) }}$ (crashes/year) |
|  | from Table 11-9 | (7)total from Worksheet 2C | $\begin{gathered} \hline \text { from Table } \\ 11-9 \\ \hline \end{gathered}$ | (7) F f from Worksheet 2 C | from Table 11-9 | (7) $\mathrm{FI}^{a}$ from Worksheet 2C | from Table 11-9 | (7)poo from Worksheet 2C |
| Total | 1.000 | 6.061 | 1.000 | 2.973 | 1.000 | 1.650 | 1.000 | 3.088 |
|  |  | (2)* 3$)_{\text {Total }}$ |  | (4) $\times$ (5) ${ }_{\text {F1 }}$ |  | (6)** 7$)_{\text {F1 }}{ }^{\text {a }}$ |  | $(8)^{*}(9){ }_{\text {PDO }}$ |
| Head-on collision | 0.016 | 0.097 | 0.018 | 0.054 | 0.023 | 0.038 | 0.015 | 0.046 |
| Sideswipe collision | 0.107 | 0.648 | 0.042 | 0.125 | 0.040 | 0.066 | 0.156 | 0.482 |
| Rear-end collision | 0.228 | 1.382 | 0.213 | 0.633 | 0.108 | 0.178 | 0.240 | 0.741 |
| Angle collision | 0.395 | 2.394 | 0.534 | 1.587 | 0.571 | 0.942 | 0.292 | 0.902 |
| Single-vehicle collision | 0.202 | 1.224 | 0.148 | 0.440 | 0.199 | 0.328 | 0.243 | 0.750 |
| Other collision | 0.052 | 0.315 | 0.045 | 0.134 | 0.059 | 0.097 | 0.054 | 0.167 |



| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Site type | Predicted average crash frequency (crashes/year) |  |  | Observed crashes, | Overdispersion Parameter, $k$ | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\text {p/comb }}$ |
|  | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & \text { (TOTAL) } \\ & \hline \end{aligned}$ | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & (\mathrm{FI}) \end{aligned}$ | $\mathrm{N}_{\text {predicted }}$ (PDO) | $\begin{gathered} N_{\text {observed }} \\ \text { (crashes/year) } \end{gathered}$ |  | $\begin{gathered} \text { Equation A-8 } \\ (6)^{*}(2)^{2} \\ \hline \end{gathered}$ | $\begin{aligned} & \text { Equation A-9 } \\ & \text { sart((6)*(2)) } \end{aligned}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-10 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \text { A-11 } \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-12 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-13 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_Divided_1 | 226.230 | 101.403 | 124.827 | -- | 0.010 | 494.261 | 1.478 | -- | -- | -- | -- | -- |
| Segment_Divided_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 226.230 | 101.403 | 124.827 |  |  |  |  |  |  |  |  |  |
| ( INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 169.696 | 83.233 | 86.463 | -- | 0.494 | 14225.653 | 9.156 | -- | -- | -- | -- | -- |
| Intersection_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersesection Totals: | 169.696 | 83.233 | 86.463 |  |  |  |  |  |  |  |  |  |
| COMBINED (sum of column) | 395.927 | 184.636 | 211.290 | 0 | -- | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! |


| General Information |  |  |  | Location Information |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Analyst <br> Agency or Company <br> Date Performed |  |  |  | Roadway <br> Roadway Section <br> Jurisdiction <br> Analysis Year |  | Hwy AUS-60 to MO 38MoDOT2020 |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Input Data |  |  |  | Base Conditions | Site Conditions |  |  |  |
| Length of segment, L (mi) |  |  |  | -- | 13.94 |  |  |  |
| AADT (veh/day) | AADT $_{\text {max }}=$ | 17,800 | (veh/day) | -- |  |  | 2,590 |  |
| Lane width (ft) |  |  |  | 12 | 12 |  |  |  |
| Shoulder width (ft) |  |  |  | 6 | Right Shld: Right Shld: | 1 | Left Shld: | 1 |
| Shoulder type |  |  |  | Paved |  | Paved | Left Shld: | Paved |
| Length of horizontal curve (mi) |  |  |  | 0 | 0.5 |  |  |  |
| Radius of curvature (ft) |  |  |  | 0 | 820 |  |  |  |
| Spiral transition curve (present/not present) |  |  |  | Not Present | Not Present |  |  |  |
| Superelevation variance (ft/ft) |  |  |  | < 0.01 | 0.035 |  |  |  |
| Grade (\%) |  |  |  | 0 | 3 |  |  |  |
| Driveway density (driveways/mile) |  |  |  | 5 | 5.00 |  |  |  |
| Centerline rumble strips (present/not present) |  |  |  | Not Present | Not Present |  |  |  |
| Passing lanes [present (1 lane)/present (2 lane)/ not present)] |  |  |  | Not Present | Not Present |  |  |  |
| Two-way left-turn lane (present/not present) |  |  |  | Not Present | Not Present |  |  |  |
| Roadside hazard rating (1-7 scale) |  |  |  | 3 | 3 |  |  |  |
| Segment lighting (present/not present) |  |  |  | Not Present | Not Present |  |  |  |
| Auto speed enforcement (present/not present) |  |  |  | Not Present | Not Present |  |  |  |
| Calibration Factor, Cr |  |  |  | 1 | 1.00 |  |  |  |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CMF for Lane Width | CMF for Shoulder Width and Type | CMF for Horizontal Curves | CMF for Superelevation | CMF for Grades | CMF for Driveway Density | CMF for Centerline Rumble Strips | CMF for Passing Lanes | CMF for <br> Two-Way <br> Left-Turn Lane | CMF for <br> Roadside Design | CMF for <br> Lighting | CMF for <br> Automated <br> Speed Enforcemen | Combined CMF |
| CMF 1r | CMF 2r | CMF 3r | CMF 4r | CMR 5r | CMF 6r | CMF 7r | CMF 8r | CMF 9r | CMF 10r | CMF 11r | CMF 12r | CMF comb |
| from Equation 10-11 | $\begin{aligned} & \text { from Equation } \\ & 10-12 \end{aligned}$ | from Equation 10-13 | $\begin{array}{\|c\|} \hline \text { from Equations } \\ 10-14,10-15 \\ \text { or } 10-16 \end{array}$ | $\begin{gathered} \text { from Table } \\ 10-11 \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { from } \\ \text { Equation } 10-17 \\ 17 \end{array}$ | from <br> Section <br> 10.7.1 | $\begin{array}{c\|} \hline \text { from } \\ \text { Section } \\ \text { 10.7.1 } \end{array}$ | from Equation $10-18 \& 10-$ 19 | from Equation 10 - 20 | from Equation 10-21 | $\left\|\begin{array}{c} \text { from Section } \\ \text { 10.7.1 } \end{array}\right\|$ | $\begin{array}{\|c} \hline(1) \times(2) x \\ \ldots \\ x(11) \times(12) \end{array}$ |
| 1.00 | 1.23 | 1.13 | 1.11 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.530 |


| Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Crash Severity Level | N spf rs | Overdispersion Parameter, | Crash Severity Distribution | N spf rs by Severity Distribution | $\begin{gathered} \text { Combined } \\ \text { CMFs } \end{gathered}$ | Calibration Factor, Cr | Predicted average crash frequency, $\qquad$ |
|  | from <br> Equation 10-6 | from Equation 10-7 | from Table 10-3 (proportion) | (2)TOTAL $\times$ (4) | (13) from Worksheet 1B |  | (5) $\mathrm{x}(6) \mathrm{x}(7)$ |
| Total | 9.646 | 0.02 | 1.000 | 9.646 | 1.53 | 1.00 | 14.760 |
| Fatal and Injury (FI) | -- | -- | 0.321 | 3.096 | 1.53 | 1.00 | 4.738 |
| Property Damage Only (PDO) | -- | -- | 0.679 | 6.550 | 1.53 | 1.00 | 10.022 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}$ predicted rs (TOTAL) (crashes/year) | Proportion of Collision Type(FI) | $\mathbf{N}_{\text {predicted } I s \text { ( }}$ (II) (crashes/year) | Proportion of Collision Type(PDO) | $\mathbf{N}_{\text {predicted }}$ s (PDO) (crashes/year) |
|  | from Table $10-4$ | (8)total from Worksheet 1C | from Table 10-4 | (8)f1 from Worksheet 1C | from Table 10-4 | (8)pDo from Worksheet 1C |
| Total | 1.000 | 14.760 | 1.000 | 4.738 | 1.000 | 10.022 |
|  |  | (2) x (3) TOTAL |  | (4) $\mathrm{x}(5) \mathrm{FI}$ |  | (6)x(7)PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.121 | 1.786 | 0.038 | 0.180 | 0.184 | 1.844 |
| Collision with bicycle | 0.002 | 0.030 | 0.004 | 0.019 | 0.001 | 0.010 |
| Collision with pedestrian | 0.003 | 0.044 | 0.007 | 0.033 | 0.001 | 0.010 |
| Overturned | 0.025 | 0.369 | 0.037 | 0.175 | 0.015 | 0.150 |
| Ran off road | 0.521 | 7.690 | 0.545 | 2.582 | 0.505 | 5.061 |
| Other single-vehicle collision | 0.021 | 0.310 | 0.007 | 0.033 | 0.029 | 0.291 |
| Total single-vehicle crashes | 0.693 | 10.229 | 0.638 | 3.023 | 0.735 | 7.366 |
| MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.085 | 1.255 | 0.100 | 0.474 | 0.072 | 0.722 |
| Head-on collision | 0.016 | 0.236 | 0.034 | 0.161 | 0.003 | 0.030 |
| Rear-end collision | 0.142 | 2.096 | 0.164 | 0.777 | 0.122 | 1.223 |
| Sideswipe collision | 0.037 | 0.546 | 0.038 | 0.180 | 0.038 | 0.381 |
| Other multiple-vehicle collision | 0.027 | 0.399 | 0.026 | 0.123 | 0.030 | 0.301 |
| Total multiple-vehicle crashes | 0.307 | 4.531 | 0.362 | 1.715 | 0.265 | 2.656 |


| (1) | (2) | (3) | (4) | (5) |
| :---: | :---: | :---: | :---: | :---: |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes $/ \mathrm{mi} /$ year) |
|  | (4) from Worksheet 1C | (8) from Worksheet 1C |  | (3)/(4) |
| Total | 1.000 | 14.8 | 13.94 | 1.1 |
| Fatal and Injury (FI) | 0.321 | 4.7 | 13.94 | 0.3 |
| Property Damage Only (PDO) | 0.679 | 10.0 | 13.94 | 0.7 |




| Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Collision Type | Proportion of Collision Typeatotal | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | Proportion of Collision Type(FI) | N predicted int (F) (crashes/year) | Proportion of Collision Type(PDO) | N predicted int (PDo) (crashes/year) |
|  | $\begin{gathered} \text { from Table } \\ 10-6 \end{gathered}$ | (8)total from Worksheet 2 C | from Table 10-6 | (8)fı from Worksheet 2C | from Table 10-6 | (8)poo from Worksheet 2C |
| Total | 1.000 | 0.375 | 1.000 | 0.162 | 1.000 | 0.213 |
|  |  | (2) $\times$ (3) Total |  | (4) $\mathrm{x}(5) \mathrm{FI}$ |  | (6) x (7) Pro |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.010 | 0.004 | 0.006 | 0.001 | 0.014 | 0.003 |
| Collision with bicycle | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 |
| Collision with pedestrian | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 |
| Overturned | 0.005 | 0.002 | 0.006 | 0.001 | 0.004 | 0.001 |
| Ran off road | 0.122 | 0.046 | 0.094 | 0.015 | 0.144 | 0.031 |
| Other single-vehicle collision | 0.008 | 0.003 | 0.004 | 0.001 | 0.010 | 0.002 |
| Total single-vehicle crashes | 0.147 | 0.055 | 0.112 | 0.018 | 0.174 | 0.037 |
| MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.431 | 0.162 | 0.532 | 0.086 | 0.354 | 0.076 |
| Head-on collision | 0.040 | 0.015 | 0.060 | 0.010 | 0.025 | 0.005 |
| Rear-end collision | 0.242 | 0.091 | 0.210 | 0.034 | 0.266 | 0.057 |
| Sideswipe collision | 0.101 | 0.038 | 0.044 | 0.007 | 0.144 | 0.031 |
| Other multiple-vehicle collision | 0.039 | 0.015 | 0.042 | 0.007 | 0.037 | 0.008 |
| Total multiple-vehicle crashes | 0.853 | 0.320 | 0.888 | 0.143 | 0.826 | 0.176 |


| Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections |  |  |
| :---: | :---: | :---: |
| (1) | (2) | (3) |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes / year) |
|  | (4) from Worksheet 2C | (8) from Worksheet 2C |
| Total | 1.000 | 0.4 |
| Fatal and Injury (FI) | 0.431 | 0.2 |
| Property Damage Only (PDO) | 0.569 | 0.2 |

Worksheet 4A -- Predicted and Observed Crashes by Severity and Site Type Using the Project-Level EB Method

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Site type | Predicted average crash frequency (crashes/year) |  |  | Observedcrashes,$N_{\text {observed }}$(crashes/year) | Overdispersion Parameter, k | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\text {p/comb }}$ |
|  | $\begin{aligned} & \hline \mathrm{N}_{\text {predicted }} \\ & \text { (TOTAL) } \\ & \hline \end{aligned}$ | $\mathrm{N}_{\text {predicted }}$ (FI) | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & (\mathrm{PDO}) \\ & \hline \end{aligned}$ |  |  | $\begin{gathered} \text { Equation A-8 } \\ (6)^{*}(2)^{2} \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation A-9 } \\ \text { sqrt((6)*(2)) } \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-10 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-11 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \text { A-12 } \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-13 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_1 | 14.760 | 4.738 | 10.022 | -- | 0.017 | 3.688 | 0.500 | -- | -- | -- | -- | -- |
| Segment_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 |  |  |  |  |  |
| Segment_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 14.760 | 4.738 | 10.022 |  |  |  |  |  |  |  |  |  |
| INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 4.873 | 2.100 | 2.773 | -- | 0.240 | 5.700 | 1.081 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection Totals: | 4.873 | 2.100 | 2.773 |  |  |  |  |  |  |  |  |  |
| COMBINED | 19.634 | 6.838 | 12.795 | 0 | -- | 9.388 | 1.581 | 0.677 | 13.282 | 0.925 | 18.170 | 15.726 |



| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CMF for Lane Width | CMF for Shoulder Width and Type | CMF for Horizontal Curves | CMF for Superelevation | CMF for Grades | CMF for Driveway Density | CMF for Centerline Rumble Strips | CMF for Passing Lanes | CMF for <br> Two-Way <br> Left-Turn Lane | CMF for <br> Roadside Design | CMF for <br> Lighting | CMF for <br> Automated <br> Speed Enforcemen | Combined CMF |
| CMF 1r | CMF 2r | CMF 3r | CMF 4r | CMR 5r | CMF 6r | CMF 7r | CMF 8r | CMF 9r | CMF 10r | CMF 11r | CMF 12r | CMF comb |
| from Equation 10-11 | $\begin{aligned} & \text { from Equation } \\ & 10-12 \end{aligned}$ | from Equation 10-13 | $\begin{array}{\|c\|} \hline \text { from Equations } \\ 10-14,10-15 \\ \text { or } 10-16 \end{array}$ | $\begin{gathered} \text { from Table } \\ 10-11 \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { from } \\ \text { Equation } 10-17 \\ 17 \end{array}$ | from <br> Section <br> 10.7.1 | $\begin{array}{c\|} \hline \text { from } \\ \text { Section } \\ \text { 10.7.1 } \end{array}$ | from Equation $10-18 \& 10-$ 19 | from Equation 10 - 20 | from Equation 10-21 | $\left\|\begin{array}{c} \text { from Section } \\ \text { 10.7.1 } \end{array}\right\|$ | $\begin{array}{\|c} \hline(1) \times(2) x \\ \ldots \\ x(11) \times(12) \end{array}$ |
| 1.00 | 1.23 | 1.13 | 1.11 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.530 |


| Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Crash Severity Level | N spf rs | Overdispersion Parameter, k | Crash Severity Distribution | N spf rs by Severity Distribution | $\begin{gathered} \text { Combined } \\ \text { CMFs } \end{gathered}$ | Calibration Factor, Cr | Predicted average crash frequency, $\qquad$ |
|  | from <br> Equation 10-6 | from Equation 10-7 | from Table 10-3 (proportion) | (2)TOTAL $\times$ (4) | (13) from Worksheet 1B |  | (5) $\mathrm{x}(6) \mathrm{x}(7)$ |
| Total | 66.294 | 0.02 | 1.000 | 66.294 | 1.53 | 1.00 | 101.442 |
| Fatal and Injury (FI) | -- | -- | 0.321 | 21.280 | 1.53 | 1.00 | 32.563 |
| Property Damage Only (PDO) | -- | -- | 0.679 | 45.014 | 1.53 | 1.00 | 68.879 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}$ predicted rs (TOTAL) (crashes/year) | Proportion of Collision Type(FI) | $\mathbf{N}_{\text {predicted }}$ ss (FI) (crashes/year) | Proportion of Collision Type(PDO) | $\mathbf{N}_{\text {predicted }}$ ss (PDO) (crashes/year) |
|  | from Table $10-4$ | (8)total from Worksheet 1C | from Table 10-4 | (8)FI from Worksheet 1C | from Table 10-4 | (8)pDo from Worksheet 1C |
| Total | 1.000 | 101.442 | 1.000 | 32.563 | 1.000 | 68.879 |
|  |  | (2) x (3) TOTAL |  | (4) $\mathrm{x}(5) \mathrm{FI}$ |  | (6)x(7)PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.121 | 12.274 | 0.038 | 1.237 | 0.184 | 12.674 |
| Collision with bicycle | 0.002 | 0.203 | 0.004 | 0.130 | 0.001 | 0.069 |
| Collision with pedestrian | 0.003 | 0.304 | 0.007 | 0.228 | 0.001 | 0.069 |
| Overturned | 0.025 | 2.536 | 0.037 | 1.205 | 0.015 | 1.033 |
| Ran off road | 0.521 | 52.851 | 0.545 | 17.747 | 0.505 | 34.784 |
| Other single-vehicle collision | 0.021 | 2.130 | 0.007 | 0.228 | 0.029 | 1.997 |
| Total single-vehicle crashes | 0.693 | 70.299 | 0.638 | 20.775 | 0.735 | 50.626 |
| MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.085 | 8.623 | 0.100 | 3.256 | 0.072 | 4.959 |
| Head-on collision | 0.016 | 1.623 | 0.034 | 1.107 | 0.003 | 0.207 |
| Rear-end collision | 0.142 | 14.405 | 0.164 | 5.340 | 0.122 | 8.403 |
| Sideswipe collision | 0.037 | 3.753 | 0.038 | 1.237 | 0.038 | 2.617 |
| Other multiple-vehicle collision | 0.027 | 2.739 | 0.026 | 0.847 | 0.030 | 2.066 |
| Total multiple-vehicle crashes | 0.307 | 31.143 | 0.362 | 11.788 | 0.265 | 18.253 |


| (1) | (2) | (3) | (4) | (5) |
| :---: | :---: | :---: | :---: | :---: |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes $/ \mathrm{mi} /$ year) |
|  | (4) from Worksheet 1C | (8) from Worksheet 1C |  | (3)/(4) |
| Total | 1.000 | 101.4 | 13.94 | 7.3 |
| Fatal and Injury (FI) | 0.321 | 32.6 | 13.94 | 2.3 |
| Property Damage Only (PDO) | 0.679 | 68.9 | 13.94 | 4.9 |




| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Site type | Predicted average crash frequency(crashes/year) |  |  | Observedcrashes,$\mathrm{N}_{\text {observed }}$(crashes/year) | $\begin{array}{\|c\|} \hline \text { Overdispersion } \\ \text { Parameter, k } \end{array}$ | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\mathrm{p} / \text { comb }}$ |
|  | $\mathrm{N}_{\text {predicted }}$ (TOTAL) | $\mathrm{N}_{\text {predicted }}$ (FI) | $\begin{gathered} \mathrm{N}_{\text {predicted }} \\ \text { (PDO) } \\ \hline \end{gathered}$ |  |  | $\begin{gathered} \text { Equation A-8 } \\ (6)^{*}(2)^{2} \end{gathered}$ | $\begin{aligned} & \hline \text { Equation A-9 } \\ & \text { sqrt((6)*(2)) } \end{aligned}$ | $\begin{array}{\|c\|} \hline \text { Equation } \mathrm{A} \\ 10 \end{array}$ | $\begin{gathered} \hline \text { Equation } \mathrm{A}- \\ 11 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \mathrm{A} \\ 12 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \mathrm{A} \\ 13 \end{gathered}$ | $\begin{gathered} \text { Equation } \mathrm{A}- \\ 14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_1 | 125.281 | 40.215 | 85.066 | -- | 0.017 | 265.716 | 1.456 | - | -- | -- | -- | -- |
| Segment_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 |  |  |  |  |  |
| Segment_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 125.281 | 40.215 | 85.066 |  |  |  |  |  |  |  |  |  |
| INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 19.625 | 8.459 | 11.167 | -- | 0.240 | 92.438 | 2.170 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection Totals: | 19.625 | 8.459 | 11.167 |  |  |  |  |  |  |  |  |  |
| COMBINED | 144.906 | 48.674 | 96.232 | 0 | -- | 358.154 | 3.627 | 0.288 | 41.740 | 0.976 | 141.368 | 91.554 |



| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CMF for Lane Width | CMF for Shoulder Width and Type | CMF for Horizontal Curves | CMF for Superelevation | CMF for Grades | CMF for Driveway Density | CMF for Centerline Rumble Strips | CMF for Passing Lanes | CMF for <br> Two-Way <br> Left-Turn Lane | CMF for <br> Roadside Design | CMF for <br> Lighting | CMF for <br> Automated <br> Speed Enforcemen | Combined CMF |
| CMF 1r | CMF 2r | CMF 3r | CMF 4r | CMR 5r | CMF 6r | CMF 7r | CMF 8r | CMF 9r | CMF 10r | CMF 11r | CMF 12r | CMF comb |
| from Equation 10-11 | $\begin{aligned} & \text { from Equation } \\ & 10-12 \end{aligned}$ | from Equation 10-13 | $\begin{array}{\|c\|} \hline \text { from Equations } \\ 10-14,10-15 \\ \text { or } 10-16 \end{array}$ | $\begin{gathered} \text { from Table } \\ 10-11 \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { from } \\ \text { Equation } 10-17 \\ 17 \end{array}$ | from <br> Section <br> 10.7.1 | $\begin{array}{c\|} \hline \text { from } \\ \text { Section } \\ \text { 10.7.1 } \end{array}$ | from Equation $10-18 \& 10-$ 19 | from Equation 10 - 20 | from Equation 10-21 | $\left\|\begin{array}{c} \text { from Section } \\ \text { 10.7.1 } \end{array}\right\|$ | $\begin{array}{\|c} \hline(1) \times(2) x \\ \ldots \\ x(11) \times(12) \end{array}$ |
| 1.00 | 1.23 | 1.13 | 1.11 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.530 |


| Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Crash Severity Level | N spf rs | Overdispersion Parameter, k | Crash Severity Distribution | N spf rs by Severity Distribution | $\begin{gathered} \text { Combined } \\ \text { CMFs } \end{gathered}$ | Calibration Factor, Cr | Predicted average crash frequency, $\qquad$ |
|  | from <br> Equation 10-6 | from Equation 10-7 | from Table 10-3 (proportion) | (2)TOTAL $\times$ (4) | (13) from Worksheet 1B |  | (5) $\mathrm{x}(6) \mathrm{x}(7)$ |
| Total | 66.294 | 0.02 | 1.000 | 66.294 | 1.53 | 1.00 | 101.442 |
| Fatal and Injury (FI) | -- | -- | 0.321 | 21.280 | 1.53 | 1.00 | 32.563 |
| Property Damage Only (PDO) | -- | -- | 0.679 | 45.014 | 1.53 | 1.00 | 68.879 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}$ predicted rs (TOTAL) (crashes/year) | Proportion of Collision Type(FI) | $\mathbf{N}_{\text {predicted }}$ ss (FI) (crashes/year) | Proportion of Collision Type(PDO) | $\mathbf{N}_{\text {predicted }}$ ss (PDO) (crashes/year) |
|  | from Table $10-4$ | (8)total from Worksheet 1C | from Table 10-4 | (8)FI from Worksheet 1C | from Table 10-4 | (8)pDo from Worksheet 1C |
| Total | 1.000 | 101.442 | 1.000 | 32.563 | 1.000 | 68.879 |
|  |  | (2) x (3) TOTAL |  | (4) $\mathrm{x}(5) \mathrm{FI}$ |  | (6)x(7)PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.121 | 12.274 | 0.038 | 1.237 | 0.184 | 12.674 |
| Collision with bicycle | 0.002 | 0.203 | 0.004 | 0.130 | 0.001 | 0.069 |
| Collision with pedestrian | 0.003 | 0.304 | 0.007 | 0.228 | 0.001 | 0.069 |
| Overturned | 0.025 | 2.536 | 0.037 | 1.205 | 0.015 | 1.033 |
| Ran off road | 0.521 | 52.851 | 0.545 | 17.747 | 0.505 | 34.784 |
| Other single-vehicle collision | 0.021 | 2.130 | 0.007 | 0.228 | 0.029 | 1.997 |
| Total single-vehicle crashes | 0.693 | 70.299 | 0.638 | 20.775 | 0.735 | 50.626 |
| MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.085 | 8.623 | 0.100 | 3.256 | 0.072 | 4.959 |
| Head-on collision | 0.016 | 1.623 | 0.034 | 1.107 | 0.003 | 0.207 |
| Rear-end collision | 0.142 | 14.405 | 0.164 | 5.340 | 0.122 | 8.403 |
| Sideswipe collision | 0.037 | 3.753 | 0.038 | 1.237 | 0.038 | 2.617 |
| Other multiple-vehicle collision | 0.027 | 2.739 | 0.026 | 0.847 | 0.030 | 2.066 |
| Total multiple-vehicle crashes | 0.307 | 31.143 | 0.362 | 11.788 | 0.265 | 18.253 |


| (1) | (2) | (3) | (4) | (5) |
| :---: | :---: | :---: | :---: | :---: |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes $/ \mathrm{mi} /$ year) |
|  | (4) from Worksheet 1C | (8) from Worksheet 1C |  | (3)/(4) |
| Total | 1.000 | 101.4 | 13.94 | 7.3 |
| Fatal and Injury (FI) | 0.321 | 32.6 | 13.94 | 2.3 |
| Property Damage Only (PDO) | 0.679 | 68.9 | 13.94 | 4.9 |




Worksheet 4A -- Predicted and Observed Crashes by Severity and Site Type Using the Project-Level EB Method

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Site type | Predicted average crash frequency (crashes/year) |  |  | $\begin{aligned} & \hline \text { Observed } \\ & \text { crashes, } \\ & \mathrm{N}_{\text {observed }} \\ & \text { (crashes/year) } \\ & \hline \end{aligned}$ | Overdispersion Parameter, k | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\mathrm{p} / \text { comb }}$ |
|  | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & \text { (TOTAL) } \end{aligned}$ | $\mathrm{N}_{\text {predicted }}$ (FI) | $\begin{aligned} & \hline \mathrm{N}_{\text {predicted }} \\ & \text { (PDO) } \end{aligned}$ |  |  | $\begin{gathered} \text { Equation A-8 } \\ (6)^{*}(2)^{2} \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation A-9 } \\ \text { sqrt((6)* }(2)) \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-10 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-11 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-12 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-13 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_1 | 125.281 | 40.215 | 85.066 | -- | 0.017 | 265.716 | 1.456 | -- | -- | -- | -- | -- |
| Segment_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 |  |  |  |  |  |
| Segment_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 125.281 | 40.215 | 85.066 |  |  |  |  |  |  |  |  |  |
| [ INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 19.625 | 8.459 | 11.167 | -- | 0.240 | 92.438 | 2.170 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection Totals: | 19.625 | 8.459 | 11.167 |  |  |  |  |  |  |  |  |  |
| COMBINED | 144.906 | 48.674 | 96.232 | 0 | -- | 358.154 | 3.627 | 0.288 | 41.740 | 0.976 | 141.368 | 91.554 |



| Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) |
| CMF for On-Street Parking | CMF for Roadside Fixed Objects | CMF for Median Width | CMF for Lighting | CMF for Automated Speed Enforcement | Combined CMF |
| CMF 1 r | CMF 2 2r | CMF 3r | CMF 4 r | CMF 5 r | CMF comb |
| from Equation 12-32 | from Equation 12-33 | from Table 12-22 | from Equation 12-34 | from Section 12.7.1 | $(1)^{*}(2)^{*}(3)^{*}(4)^{*}(5)$ |
| 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |


| (1) | (2) |  |  | (4)Initial $\mathrm{N}_{\text {brmv }}$ | Proportion of Total Crashes | (6) | (7) | (8) | $\begin{gathered} \hline \text { (9) } \\ \hline \text { Predicted } \\ \mathrm{N}_{\text {brmv }} \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  |  |  |  | Adjusted | Combined | Calibration Factor, Cr |  |
|  | from Table 12-3 |  | from Table 12-3 | from Equation 12-10 |  | (4)тотаи ${ }^{\text {( }}$ (5) | (6) from |  | (6) $)^{*}(7)^{*}(8)$ |
|  | , | b |  |  |  |  | Worksheet 1B |  |  |
| Total | -12.34 | 1.36 | 1.32 | 822.551 | 1.000 | 822.551 | 1.00 | 1.00 | 822.551 |
| Fatal and Injury (FI) | -12.76 | 1.28 | 1.31 | 231.569 | $\frac{(4)_{F F} /\left((4)_{F_{i}+}(4)_{\text {PDo }}\right.}{0.267}$ | 219.699 | 1.00 | 1.00 | 219.699 |
| Property Damage Only (PDO) | -12.81 | 1.38 | 1.34 | 635.424 | $\frac{(5)_{\text {TOTAL }}-(5)_{\mathrm{FI}}}{0.733}$ | 602.852 | 1.00 | 1.00 | 602.852 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(f) | Predicted $\mathbf{N}$ brmu( (F)) (crashes/year) | Proportion of Collision Type ${ }_{\text {(PDO) }}$ | $\begin{aligned} & \text { Predicted } \mathbf{N}_{\text {irmv (PDo) }} \\ & \text { (crashes/year) } \end{aligned}$ | Predicted $\mathrm{N}_{\text {brmv (total) }}$ (crashes/year) |
|  | from Table 12-4 | (9)ff from Worksheet 1C | from Table 12-4 | (9)poo from Worksheet 1 C | (9)total from Worksheet 1C |
| Total | 1.000 | 219.699 | 1.000 | 602.852 | 822.551 |
|  |  | (2)** ${ }^{\text {F }}$ F। |  | (4)*(5) poo | (3)+(5) |
| Rear-end collision | 0.832 | 182.789 | 0.662 | 399.088 | 581.877 |
| Head-on collision | 0.020 | 4.394 | 0.007 | 4.220 | 8.614 |
| Angle collision | 0.040 | 8.788 | 0.036 | 21.703 | 30.491 |
| Sideswipe, same direction | 0.050 | 10.985 | 0.223 | 134.436 | 145.421 |
| Sideswipe, opposite direction | 0.010 | 2.197 | 0.001 | 0.603 | 2.800 |
| Other multiple-vehicle collision | 0.048 | 10.546 | 0.071 | 42.802 | 53.348 |


| Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  | (3) | (4) | Proportion of Total Crashes | ${ }_{\text {Adjusted }}^{(6)}$ |  | Calibration Factor, Cr | $\frac{(9)}{\text { Predicted }}$ |
|  |  |  | Overdispersion Parameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {brsv }}$ |  | ${ }^{\text {Adusted }}$ | CMFs |  | $\mathrm{N}_{\text {brsv }}$ |
|  | from Table 12-5 |  | from Table 12-5 | from Equation 12-13 |  | (4) Total $^{*}$ (5) | (6) from Worksheet 1B |  | (6)**(7)* $(8)$ |
| Total | -5.05 | 0.47 | 0.86 | 96.895 | 1.000 | 96.895 | 1.00 | 1.00 | 96.895 |
| Fatal and Injury (FI) | -8.71 | 0.66 | 0.28 | 18.663 | $\frac{\left.(4)_{\mathrm{Fl}} /(4)_{\mathrm{F}+}+(4)_{\mathrm{PDO}}\right)}{0.191}$ | 18.481 | 1.00 | 1.00 | 18.481 |
| Property Damage Only (PDO) | -5.04 | 0.45 | 1.06 | 79.182 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FII }}}{0.809}$ | 78.414 | 1.00 | 1.00 | 78.414 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(F) | Predicted $\mathbf{N}_{\text {brss ( }}$ (F) (crashes/year) | Proportion of Collision Type (PDO) | $\begin{aligned} & \text { Predicted } \mathbf{N}_{\text {bisv }} \text { (PDO) } \\ & \text { (crashes/year) } \end{aligned}$ | Predicted $\mathrm{N}_{\text {brsv (Total) }}$ (crashes/year) |
|  | from Table 12-6 | (9)Ff from Worksheet 1E | from Table 12-6 | (9)poo from Worksheet 1E | (9)Trotal from Worksheet 1E |
| Total | 1.000 | 18.481 | 1.000 | 78.414 | 96.895 |
|  |  | (2)** $)_{\text {FI }}$ |  | (4)**(5) ${ }_{\text {poo }}$ | (3)+(5) |
| Collision with animal | 0.001 | 0.018 | 0.063 | 4.940 | 4.959 |
| Collision with fixed object | 0.500 | 9.241 | 0.813 | 63.751 | 72.991 |
| Collision with other object | 0.028 | 0.517 | 0.016 | 1.255 | 1.772 |
| Other single-vehicle collision | 0.471 | 8.705 | 0.108 | 8.469 | 17.173 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Driveway Type | Number of driveways, $\mathrm{n}_{\mathrm{j}}$ | Crashes per driveway per year, $\mathrm{N}_{\mathrm{j}}$ | Coefficient for traffic adjustment, t | Initial $\mathrm{N}_{\text {brdwy }}$ | Overdispersion parameter, k |
|  |  | from Table 12-7 | from Table 12-7 | $\frac{\text { Equation } 12-16}{n_{j}{ }^{*} N_{j}{ }^{*}(\text { AADT/15,000 })^{t}}$ | from Table 12-7 |
| Major commercial | 0 | 0.033 | 1.106 | 0.000 | -- |
| Minor commercial | 0 | 0.011 | 1.106 | 0.000 |  |
| Major industrial/institutional | 0 | 0.036 | 1.106 | 0.000 |  |
| Minor industrial/institutional | 0 | 0.005 | 1.106 | 0.000 |  |
| Major residential | 0 | 0.018 | 1.106 | 0.000 |  |
| Minor residential | 0 | 0.003 | 1.106 | 0.000 |  |
| Other | 0 | 0.005 | 1.106 | 0.000 |  |
| Total | -- | -- | -- | 0.000 | 1.39 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | Initial $\mathrm{N}_{\text {brdwy }}$ | Proportion of total crashes ( $\mathrm{f}_{\mathrm{dwy}}$ ) | $\begin{gathered} \hline \text { Adjusted } \\ \mathbf{N}_{\text {brdwy }} \\ \hline \end{gathered}$ | Combined CMFs | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ |
|  | (5) TOTAL from Worksheet 1 G | from Table 12-7 | (2) TOTAL $^{*}$ (3) | (6) from Worksheet 1B |  | $(4)^{*}(5)^{*}(6)$ |
| Total | 0.000 | 1.000 | 0.000 | 1.00 | 1.00 | 0.000 |
| Fatal and injury (FI) | -- | 0.284 | 0.000 | 1.00 | 1.00 | 0.000 |
| Property damage only (PDO) | -- | 0.716 | 0.000 | 1.00 | 1.00 | 0.000 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\text {br }}$ | $\mathrm{f}_{\text {pedr }}$ |  | Predicted $\mathrm{N}_{\text {podr }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3)+(4) | from Table $12-8$ | factor, $\mathrm{C}_{\mathrm{r}}$ | (5) ${ }^{*}(6)^{*}(7)$ |
| Total | 822.551 | 96.895 | 0.000 | 919.446 | 0.019 | 1.00 | 17.469 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 17.469 |


|  | Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway ${ }^{\text {S }}$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | (4) | ( | (6) | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Preded |
|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{Nbr}^{\text {b }}$ | $\mathrm{f}_{\text {biker }}$ |  | Predicted $\mathrm{N}_{\text {biker }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1 E | (7) from Worksheet 1H | (2) $+(3)+(4)$ | from Table $12-9$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 822.551 | 96.895 | 0.000 | 919.446 | 0.005 | 1.00 | 4.597 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 4.597 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
|  | Fatal and injury (FI) | Property damage only (PDO) | Total |
| Collision type | (3) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1I and 1J | (5) from Worksheet 1D and 1F; and <br> (7) from Worksheet 1 H | (6) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 l and 1 J |
| MULTIPLE-VEHICLE |  |  |  |
| Rear-end collisions (from Worksheet 1D) | 182.789 | 399.088 | 581.877 |
| Head-on collisions (from Worksheet 1D) | 4.394 | 4.220 | 8.614 |
| Angle collisions (from Worksheet 1D) | 8.788 | 21.703 | 30.491 |
| Sideswipe, same direction (from Worksheet 1D) | 10.985 | 134.436 | 145.421 |
| Sideswipe, opposite direction (from Worksheet 1D) | 2.197 | 0.603 | 2.800 |
| Driveway-related collisions (from Worksheet 1H) | 0.000 | 0.000 | 0.000 |
| Other multiple-vehicle collision (from Worksheet 1D) | 10.546 | 42.802 | 53.348 |
| Subtotal | 219.699 | 602.852 | 822.551 |
| SINGLE-VEHICLE |  |  |  |
| Collision with animal (from Worksheet 1F) | 0.018 | 4.940 | 4.959 |
| Collision with fixed object (from Worksheet 1F) | 9.241 | 63.751 | 72.991 |
| Collision with other object (from Worksheet 1F) | 0.517 | 1.255 | 1.772 |
| Other single-vehicle collision (from Worksheet 1F) | 8.705 | 8.469 | 17.173 |
| Collision with pedestrian (from Worksheet 11) | 17.469 | 0.000 | 17.469 |
| Collision with bicycle (from Worksheet 1J) | 4.597 | 0.000 | 4.597 |
| Subtotal | 40.548 | 78.414 | 118.962 |
| Total | 260.247 | 681.266 | 941.513 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
| Crash Severity Level | Predicted average crash frequency, $\mathrm{N}_{\text {predicted rs }}$ (crashes/year) | Roadway segment length, L (mi) | Crash rate (crashes/mi/year) |
|  | (Total) from Worksheet 1 K |  | (2) / (3) |
| Total | 941.5 | 104.00 | 9.1 |
| Fatal and injury (FI) | 260.2 | 104.00 | 2.5 |
| Property damage only (PDO) | 681.3 | 104.00 | 6.6 |




| (1) | (2) |  | Overdispersion Parameter, $\mathbf{k}$ | (4) | (5) |  | (7)CombinedCMFs(6) fromW | (8)CalibrationFactor, Cr | $(9)$ <br> Predicted <br> $\mathbf{N}_{\text {brmv }}$ <br> $(6)^{*}(7)^{*}(8)$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  |  | $\frac{\text { Initial } \mathrm{N}_{\mathrm{brmv}}}{\text { from Equation 12-10 }}$ | Proportion of Total Crashes |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | from | 12-3 | from Table 12-3 |  |  |  |  |  |  |
| Total | -12.34 | 1.36 | 1.32 | 320.451 | 1.000 | 320.451 | 1.00 | 1.00 | 320.451 |
| Fatal and Injury (FI) | -12.76 | 1.28 | 1.31 | 95.359 | $\frac{(4)_{\left.\mathrm{F} / /(4)_{\mathrm{F}}+(4)_{\mathrm{PDO}}\right)}^{0.281}}{}$ | 90.008 | 1.00 | 1.00 | 90.008 |
| Property Damage Only (PDO) | -12.81 | 1.38 | 1.34 | 244.142 | $\frac{(5)_{\text {TOTAL }}-(5)_{\text {FI }}}{0.719}$ | 230.443 | 1.00 | 1.00 | 230.443 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(FI) | Predicted $\mathbf{N}$ brmv( FI$)$ (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brmv (PDO) (crashes/year) | Predicted $\mathbf{N}_{\text {brmu (total) }}$ (crashes/year) |
|  | from Table 12-4 | (9)ıf from Worksheet 1 C | from Table 12-4 | (9)poo from Worksheet 1C | (9)total from Worksheet 1C |
| Total | 1.000 | 90.008 | 1.000 | 230.443 | 320.451 |
|  |  | $(2)^{*}(3){ }_{\text {F1 }}$ |  | (4)* ${ }^{*}()_{\text {PDo }}$ | (3)+(5) |
| Rear-end collision | 0.832 | 74.887 | 0.662 | 152.553 | 227.440 |
| Head-on collision | 0.020 | 1.800 | 0.007 | 1.613 | 3.413 |
| Angle collision | 0.040 | 3.600 | 0.036 | 8.296 | 11.896 |
| Sideswipe, same direction | 0.050 | 4.500 | 0.223 | 51.389 | 55.889 |
| Sideswipe, opposite direction | 0.010 | 0.900 | 0.001 | 0.230 | 1.131 |
| Other multiple-vehicle collision | 0.048 | 4.320 | 0.071 | 16.361 | 20.682 |


|  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | SPF Coefficients |  | Overdispersi |  | Proportion of Total Crashes | Adjusted | Combin | Calibration Factor, Cr | Predicted |
|  |  |  | Parameter, $\mathbf{k}$ | Initial $\mathrm{N}_{\text {brsv }}$ |  | $\mathrm{N}_{\text {brsv }}$ | CMFs |  | $\mathrm{N}_{\text {brsv }}$ |
|  | from Table 12-5 |  | from Table 12-5 | from Equation 12-13 |  | (4) ${ }_{\text {Total }}{ }^{*}$ (5) | (6) from Worksheet 1B |  | (6)**(7)* 8 ) |
| Total | -5.05 | 0.47 | 0.86 | 69.955 | 1.000 | 69.955 | 1.00 | 1.00 | 69.955 |
| Fatal and Injury (FI) | -8.71 | 0.66 | 0.28 | 11.811 | $\frac{(4)_{F F} /\left((4)_{F_{1}+}(4)_{\mathrm{Poo}}\right)}{0.169}$ | 11.841 | 1.00 | 1.00 | 11.841 |
| Property Damage Only (PDO) | -5.04 | 0.45 | 1.06 | 57.965 | $\frac{(5)_{\text {TOTAL }}-(5)_{\mathrm{FI}}}{0.831}$ | 58.114 | 1.00 | 1.00 | 58.114 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(fI) | Predicted $\mathbf{N}_{\text {brsv (FI) }}$ (crashes/year) | Proportion of Collision Type (PDO) | Predicted $\mathbf{N}$ brsv (PDO) (crashes/year) | Predicted $\mathrm{N}_{\text {bisv (total) }}$ (crashes/year) |
|  | from Table 12-6 | (9)ff from Worksheet 1E | from Table 12-6 | (9)poo from Worksheet | (9)Total from Worksheet 1E |
| Total | 1.000 | 11.841 | 1.000 | 58.114 | 69.955 |
|  |  | $(2)^{*}(3)$ F1 |  | (4)**(5) ${ }_{\text {PDo }}$ | (3)+(5) |
| Collision with animal | 0.001 | 0.012 | 0.063 | 3.661 | 3.673 |
| Collision with fixed object | 0.500 | 5.921 | 0.813 | 47.246 | 53.167 |
| Collision with other object | 0.028 | 0.332 | 0.016 | 0.930 | 1.261 |
| Other single-vehicle collision | 0.471 | 5.577 | 0.108 | 6.276 | 11.854 |


| (1) | (2) | (3) | (4) | (5) | (6) |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Number of driveways, | Crashes per driveway per year, $\mathrm{N}_{\mathrm{j}}$ | Coefficient for traffic adjustment, t | Initial $\mathrm{N}_{\text {brdwy }}$ | Overdispersion parameter, $\mathbf{k}$ |
| Driveway Type |  | from Table 12-7 | from Table 12-7 | $\frac{\text { Equation } 12-16}{n_{j}{ }^{*} N_{j}{ }^{*}(\text { AADT } / 15,000)^{1}}$ | from Table 12-7 |
| Major commercial | 0 | 0.033 | 1.106 | 0.000 |  |
| Minor commercial | 0 | 0.011 | 1.106 | 0.000 |  |
| Major industrial/institutional | 0 | 0.036 | 1.106 | 0.000 |  |
| Minor industrial/institutional | 0 | 0.005 | 1.106 | 0.000 | -- |
| Major residential | 0 | 0.018 | 1.106 | 0.000 |  |
| Minor residential | 0 | 0.003 | 1.106 | 0.000 |  |
| Other | 0 | 0.005 | 1.106 | 0.000 |  |
| Total | -- | -- | -- | 0.000 | 1.39 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Crash Severity Level | Initial $\mathrm{N}_{\text {brdwy }}$ | $\begin{aligned} & \text { Proportion of total } \\ & \text { crashes }\left(\mathrm{f}_{\mathrm{dwy}}\right) \\ & \hline \end{aligned}$ | $\begin{gathered} \hline \text { Adjusted } \\ \mathbf{N}_{\text {brdwy }} \\ \hline \end{gathered}$ | Combined CMFs | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ |
|  | $\overline{(5)_{\text {TOTAL }}}$ from Worksheet 1 G | from Table 12-7 | (2) TOTAL $^{*}$ * (3) | (6) from Worksheet 1B |  | $(4)^{\star}(5)^{*}(6)$ |
| Total | 0.000 | 1.000 | 0.000 | 1.00 | 1.00 | 0.000 |
| Fatal and injury (FI) | -- | 0.284 | 0.000 | 1.00 | 1.00 | 0.000 |
| Property damage only (PDO) | -- | 0.716 | 0.000 | 1.00 | 1.00 | 0.000 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | dicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | dicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{N}_{\text {br }}$ | $\mathrm{f}_{\mathrm{p}}$ |  | Predicted $\mathrm{N}_{\text {pedr }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2)+(3)+(4) | $\begin{gathered} \text { from Table } \\ 12-8 \end{gathered}$ | factor, $\mathrm{C}_{\mathrm{r}}$ | $(5)^{*}(6)^{*}(7)$ |
| Total | 320.451 | 69.955 | 0.000 | 390.406 | 0.019 | 1.00 | 7.418 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 7.418 |


| Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | Predicted $\mathrm{N}_{\text {brmv }}$ | Predicted $\mathrm{N}_{\text {brsv }}$ | Predicted $\mathrm{N}_{\text {brdwy }}$ | Predicted $\mathrm{Nbr}_{\text {br }}$ | $\mathrm{f}_{\text {biker }}$ | Calibration factor, $\mathrm{C}_{\mathrm{r}}$ | Predicted $\mathrm{N}_{\text {biker }}$ |
| Crash Severity Level | (9) from Worksheet 1C | (9) from Worksheet 1E | (7) from Worksheet 1H | (2) $+(3)+(4)$ | $\begin{gathered} \hline \text { from Table } \\ 12-9 \\ \hline \end{gathered}$ |  | $(5)^{*}(6)^{*}(7)$ |
| Total | 320.451 | 69.955 | 0.000 | 390.406 | 0.005 | 1.00 | 1.952 |
| Fatal and injury (FI) | -- | -- | -- | -- | -- | 1.00 | 1.952 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
|  | Fatal and injury (FI) | Property damage only (PDO) | Total |
| Collision type | (3) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J | (5) from Worksheet 1D and 1F; and <br> (7) from Worksheet 1H | (6) from Worksheet 1D and 1F; <br> (7) from Worksheet 1 H ; and <br> (8) from Worksheet 1 I and 1 J |
| MULTIPLE-VEHICLE |  |  |  |
| Rear-end collisions (from Worksheet 1D) | 74.887 | 152.553 | 227.440 |
| Head-on collisions (from Worksheet 1D) | 1.800 | 1.613 | 3.413 |
| Angle collisions (from Worksheet 1D) | 3.600 | 8.296 | 11.896 |
| Sideswipe, same direction (from Worksheet 1D) | 4.500 | 51.389 | 55.889 |
| Sideswipe, opposite direction (from Worksheet 1D) | 0.900 | 0.230 | 1.131 |
| Driveway-related collisions (from Worksheet 1H) | 0.000 | 0.000 | 0.000 |
| Other multiple-vehicle collision (from Worksheet 1D) | 4.320 | 16.361 | 20.682 |
| Subtotal | 90.008 | 230.443 | 320.451 |
| SINGLE-VEHICLE |  |  |  |
| Collision with animal (from Worksheet 1F) | 0.012 | 3.661 | 3.673 |
| Collision with fixed object (from Worksheet 1F) | 5.921 | 47.246 | 53.167 |
| Collision with other object (from Worksheet 1F) | 0.332 | 0.930 | 1.261 |
| Other single-vehicle collision (from Worksheet 1F) | 5.577 | 6.276 | 11.854 |
| Collision with pedestrian (from Worksheet 11) | 7.418 | 0.000 | 7.418 |
| Collision with bicycle (from Worksheet 1J) | 1.952 | 0.000 | 1.952 |
| Subtotal | 21.211 | 58.114 | 79.325 |
| Total | 111.220 | 288.556 | 399.776 |


| (1) | (2) | (3) | (4) |
| :---: | :---: | :---: | :---: |
| Crash Severity Level | Predicted average crash frequency, $\mathbf{N}_{\text {predicted is }}$ (crashes/year) | Roadway segment length, L (mi) | Crash rate (crashes/mi/year) |
|  | (Total) from Worksheet 1K |  | (2)/(3) |
| Total | 399.8 | 104.00 | 3.8 |
| Fatal and injury (FI) | 111.2 | 104.00 | 1.1 |
| Property damage only (PDO) | 288.6 | 104.00 | 2.8 |



| Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) |  | (2) |  | (3) | (4) | (5) | (6) | (7) |
| Crash Severity Level | SPF Coefficients |  |  | N spf rd | Overdispersion Parameter, k | Combined CMFs | Calibration <br> Factor, Cr | Predicted average crashfrequency, $\mathrm{N}_{\text {predicted } \mathrm{s} \text { (d) }}$ |
|  |  | Table |  |  |  | (6) from Worksheet 1B (a) |  |  |
|  | a | b | c | from Equation 11-9 | from Equation 11-10 |  |  | $(3)^{*}(5)^{*}(6)$ |
| Total | -9.025 | 1.049 | 1.549 | 254.062 | 0.003 | 0.94 | 1.00 | 238.819 |
| Fatal and Injury (FI) | -8.837 | 0.958 | 1.687 | 124.841 | 0.003 | 0.94 | 1.00 | 117.351 |
| Fatal and Injury ${ }^{\text {a }}$ ( $\mathrm{F}^{\text {a }}$ ) | -8.505 | 0.874 | 1.740 | 75.915 | 0.003 | 0.94 | 1.00 | 71.361 |
| Property Damage Only (PDO) | -- | -- | -- | -- | -- | -- | -- | $\begin{aligned} & (7)_{\text {Total }}-(7)_{\text {FII }} \end{aligned}$ |

$\overline{\text { NOTE: }}$ a Using the KABCO scale, these include only $K A B$ crashes. Crashes with severity level C (possible injury) are not included.

| Worksheet 1D (a) -- Crashes by Severity Level and Collision Type for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}_{\text {predicted rs(d) (TOTAL) }}$ (crashes/year) | Proportion of Collision Type(FI) | $\mathbf{N}_{\text {predicted }} \mathrm{rs}(\mathrm{d})$ (FI) (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\mathrm{a}}$ ) | N predicted $r$ ( $\mathrm{FI}^{\mathrm{a}}$ ) (crashes/year) | Proportion of Collision Type (PDO) | $\mathbf{N}_{\text {predicted rs(d) (PDO) }}$ (crashes/year) |
|  | $\begin{gathered} \text { from Table } \\ 11-6 \end{gathered}$ | (7)Total from Worksheet 1C <br> (a) | $\begin{gathered} \text { from Table } 11- \\ 6 \end{gathered}$ | (7)f: from Worksheet 1C (a) | $\begin{gathered} \hline \text { from Table } \\ 11-6 \\ \hline \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { (7) } \text { Fl }^{\mathrm{a}} \text { from Worksheet } \\ \text { 1C (a) } \\ \hline \end{array}$ | $\begin{gathered} \hline \text { from Table } \\ 11-6 \end{gathered}$ | (7)poo from Worksheet 1C <br> (a) |
| Total | 1.000 | 238.819 | 1.000 | 117.351 | 1.000 | 71.361 | 1.000 | 121.468 |
|  |  | (2)* 3$)_{\text {Total }}$ |  | (4) $\times(5)_{\text {F1 }}$ |  | (6)* ${ }^{*}()_{\text {F\| }}{ }^{\text {a }}$ |  | (8)** 9$)_{\text {PDO }}$ |
| Head-on collision | 0.006 | 1.433 | 0.013 | 1.526 | 0.018 | 1.284 | 0.002 | 0.243 |
| Sideswipe collision | 0.043 | 10.269 | 0.027 | 3.168 | 0.022 | 1.570 | 0.053 | 6.438 |
| Rear-end collision | 0.116 | 27.703 | 0.163 | 19.128 | 0.114 | 8.135 | 0.088 | 10.689 |
| Angle collision | 0.043 | 10.269 | 0.048 | 5.633 | 0.045 | 3.211 | 0.041 | 4.980 |
| Single-vehicle collision | 0.768 | 183.413 | 0.727 | 85.314 | 0.778 | 55.518 | 0.792 | 96.203 |
| Other collision | 0.024 | 5.732 | 0.022 | 2.582 | 0.023 | 1.641 | 0.024 | 2.915 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

| Worksheet 1E -- Summary Results for Rural Multilane Roadway Segments |  |  |  |
| :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) |
| Crash severity level | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes/mi/year) |
|  | (7) from Worksheet 1C (a) or (b) |  | (2)/(3) |
| Total | 238.8 | 67.0 | 3.6 |
| Fatal and Injury (FI) | 117.4 | 67.0 | 1.8 |
| Fatal and Injury ${ }^{\text {a }}$ ( $\left.F\right\|^{\text {a }}$ ) | 71.4 | 67.0 | 1.1 |
| Property Damage Only (PDO) | 121.5 | 67.0 | 1.8 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.


Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.


| Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | $\begin{array}{\|c} \hline \text { Proportion of } \\ \text { Collision } \\ \text { Type }(\text { FI) } \\ \hline \end{array}$ | $\mathrm{N}_{\text {predicted int (Fl) }}$ (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\text {a }}$ ) | N predicted int ( $\mathrm{Fl}^{\mathrm{a}}$ ) <br> (crashes/vear) | Proportion of Collision Type (PDO) | $\mathbf{N}_{\text {predicted int (PDO) }}$ (crashes/year) |
|  | from Table 11-9 | (7)total from Worksheet 2C | $\begin{gathered} \hline \text { from Table } \\ 11-9 \\ \hline \end{gathered}$ | (7) =1 from Worksheet 2C | from Table 11-9 | (7) $\mathrm{FI}^{a}$ from Worksheet 2C | from Table 11-9 | (7)poo from Worksheet 2C |
| Total | 1.000 | 2.574 | 1.000 | 1.212 | 1.000 | 0.715 | 1.000 | 1.361 |
|  |  | (2)*(3) Total |  | (4) $\times(5)_{\text {F1 }}$ |  | (6)* ${ }^{*}(7)_{\text {F1 }}{ }^{\text {a }}$ |  | $(8)^{*}(9)_{\text {PDO }}$ |
| Head-on collision | 0.016 | 0.041 | 0.018 | 0.022 | 0.023 | 0.016 | 0.015 | 0.020 |
| Sideswipe collision | 0.107 | 0.275 | 0.042 | 0.051 | 0.040 | 0.029 | 0.156 | 0.212 |
| Rear-end collision | 0.228 | 0.587 | 0.213 | 0.258 | 0.108 | 0.077 | 0.240 | 0.327 |
| Angle collision | 0.395 | 1.017 | 0.534 | 0.647 | 0.571 | 0.408 | 0.292 | 0.397 |
| Single-vehicle collision | 0.202 | 0.520 | 0.148 | 0.179 | 0.199 | 0.142 | 0.243 | 0.331 |
| Other collision | 0.052 | 0.134 | 0.045 | 0.055 | 0.059 | 0.042 | 0.054 | 0.074 |



| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Site type | Predicted average crash frequency (crashes/year) |  |  | Observed crashes, | Overdispersion Parameter, $k$ | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\text {p/comb }}$ |
|  | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & \text { (TOTAL) } \\ & \hline \end{aligned}$ | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & (\mathrm{FI}) \end{aligned}$ | $\mathrm{N}_{\text {predicted }}$ (PDO) | $\begin{gathered} N_{\text {observed }} \\ \text { (crashes/year) } \end{gathered}$ |  | $\begin{gathered} \text { Equation A-8 } \\ (6)^{*}(2)^{2} \\ \hline \end{gathered}$ | $\begin{aligned} & \text { Equation A-9 } \\ & \text { sart((6)*(2)) } \end{aligned}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-10 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \text { A-11 } \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-12 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-13 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_Divided_1 | 238.819 | 117.351 | 121.468 | -- | 0.003 | 180.859 | 0.870 | -- | -- | -- | -- | -- |
| Segment_Divided_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 238.819 | 117.351 | 121.468 |  |  |  |  |  |  |  |  |  |
| ( INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 115.814 | 54.556 | 61.258 | -- | 0.494 | 6625.920 | 7.564 | -- | -- | -- | -- | -- |
| Intersection_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersesection Totals: | 115.814 | 54.556 | 61.258 |  |  |  |  |  |  |  |  |  |
| COMBINED (sum of column) | 354.632 | 171.906 | 182.726 | 0 | -- | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! |


| General Information |  |  |  | Location Information |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Analyst <br> Agency or Company <br> Date Performed |  | MWD |  | Roadway | US 60 (One-Directional) |  |
|  |  |  | Смт | Roadway Section | US 65 to US 63 |  |
|  |  | 04/07/20 |  | Jurisdiction <br> Analysis Year |  |  |
|  |  |  |  |  |  |  |
| Input Data |  |  |  | Base Conditions | Site Conditions |  |
| Roadway type (divided / undivided) |  |  |  | Undivided | Divided |  |
| Length of segment, L (mi) |  |  |  | -- | 67 |  |
| AADT (veh/day) AADT $_{\text {max }}=89,300$ (veh/day) |  |  |  | -- | 39,370 |  |
|  |  |  |  | 12 | 12 |  |
| Shoulder type - right shoulder type for divided |  |  |  | 8 |  |  |
|  |  |  |  | Paved | Paved |  |
| Median width ( (ft) - for divided only |  |  |  | 30 | 90 |  |
|  |  |  |  | 1:7 or flatter | Not Applicable |  |
| Lighting (present/not present) <br> Auto speed enforcement (present/not present) |  |  |  | Not Present | Not Present |  |
|  |  |  |  | Not Present | Not |  |
| Calibration Factor, Cr |  |  |  | 1.00 | 1.00 |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| CMF for Lane Width | CMF for Right Shoulde | Width | CMF for Median Width | CMF for Lighting | CMF for Automated Speed Enforcement | Combined CMF |
| CMF 1rd | CMF 2rd |  | CMF 3rd | CMF 4rd | CMF 5rd | CMF comb |
| from Equation 11-16 | from Table 11-17 |  | from Table 11-18 | from Equation 11-17 | from Section 11.7.2 | (1) ${ }^{*}(2)^{*}(3)^{*}(4)^{*}(5)$ |
| 1.00 | 1.00 |  | 0.94 | 1.00 | 1.00 | 0.94 |


| Crash Severity Level |  | (2) |  | (3) | (4) | (5) | (6) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | SPF Coefficients |  |  | N spf rd | Overdispersion Parameter, $\mathbf{k}$ | Combined CMFs | Calibration <br> Factor, Cr | Predicted average crash frequency, $\mathbf{N}_{\text {predicted } \mathbf{r s}(d)}$ |
|  |  | Table |  |  |  | (6) from Worksheet 1B (a) |  |  |
|  | a | b | c | from Equation 11-9 | from Equation 11-10 |  |  | $(3)^{*}(5)^{*}(6)$ |
| Total | -9.025 | 1.049 | 1.549 | 533.207 | 0.003 | 0.94 | 1.00 | 501.214 |
| Fatal and Injury (FI) | -8.837 | 0.958 | 1.687 | 245.687 | 0.003 | 0.94 | 1.00 | 230.946 |
| Fatal and Injury ${ }^{\text {a }}$ ( $\mathrm{Fl}^{\text {a }}$ ) | -8.505 | 0.874 | 1.740 | 140.791 | 0.003 | 0.94 | 1.00 | 132.344 |
| Property Damage Only (PDO) | -- | -- | -- | -- | -- | -- | -- | $\frac{(7)_{\text {TOTAL }}-(7)_{\text {FI }}}{270.268}$ |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Tуре(tтоан) | $\mathrm{N}_{\text {predicted rs(d) (TOTAL) }}$ (crashes/year) | Proportion of Collision Type(FI) | $\mathbf{N}$ predicted rss(d) (FI) (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\text {a }}$ ) | N predicted $\mathrm{rs}\left(\mathrm{Fl}^{\mathrm{a}}\right)$ (crashes/year) | Proportion of Collision Type (PDO) | $\mathbf{N}_{\text {predicted rs(d) (PDO) }}$ (crashes/year) |
|  | $\begin{array}{\|c} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | (7)total from Worksheet 1C <br> (a) | $\begin{array}{\|c} \hline \text { from Table 11- } \\ 6 \end{array}$ | (7)fi from Worksheet 1C (a) | $\begin{gathered} \text { from Table } \\ 11-6 \\ \hline \end{gathered}$ | $\begin{gathered} \text { (7) FI }{ }^{\text {a }} \text { from Worksheet } \\ 1 \mathrm{C} \text { (a) } \end{gathered}$ | $\begin{gathered} \hline \text { from Table } \\ 11-6 \\ \hline \end{gathered}$ | (7)poo from Worksheet 1C <br> (a) |
| Total | 1.000 | 501.214 | 1.000 | 230.946 | 1.000 | 132.344 | 1.000 | 270.268 |
|  |  | (2)* 3$)_{\text {Total }}$ |  | (4)×(5) FI |  | (6)* ${ }^{*}()_{\text {F1 }}{ }^{\text {a }}$ |  | (8)** 9$)_{\text {PDO }}$ |
| Head-on collision | 0.006 | 3.007 | 0.013 | 3.002 | 0.018 | 2.382 | 0.002 | 0.541 |
| Sideswipe collision | 0.043 | 21.552 | 0.027 | 6.236 | 0.022 | 2.912 | 0.053 | 14.324 |
| Rear-end collision | 0.116 | 58.141 | 0.163 | 37.644 | 0.114 | 15.087 | 0.088 | 23.784 |
| Angle collision | 0.043 | 21.552 | 0.048 | 11.085 | 0.045 | 5.955 | 0.041 | 11.081 |
| Single-vehicle collision | 0.768 | 384.933 | 0.727 | 167.898 | 0.778 | 102.963 | 0.792 | 214.052 |
| Other collision | 0.024 | 12.029 | 0.022 | 5.081 | 0.023 | 3.044 | 0.024 | 6.486 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

| (1) | (2) | oadway Segment | (4) |
| :---: | :---: | :---: | :---: |
| Crash severity level | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes/mi/year) |
|  | (7) from Worksheet 1C (a) or (b) |  | (2)/(3) |
| Total | 501.2 | 67.0 | 7.5 |
| Fatal and Injury (FI) | 230.9 | 67.0 | 3.4 |
| Fatal and Injury ${ }^{\text {a }}$ ( $\mathrm{Fl}^{\text {a }}$ ) | 132.3 | 67.0 | 2.0 |
| Property Damage Only (PDO) | 270.3 | 67.0 | 4.0 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

| General Information |  |  |  | Location Information |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Analyst <br> Agency or Company <br> Date Performed | $\begin{gathered} \text { MWD } \\ \text { CMT } \\ 04 / 07 / 20 \end{gathered}$ |  |  | Roadway Intersection Jurisdiction Analysis Year | US 60 (One-Directional) Standard Intersection MoDOT 2020 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Input Data |  |  |  | Base Conditions | Site Conditions 2020 |
| Intersection type (3ST, 4ST, 4SG) |  |  |  | -- | 4ST |
| $\mathrm{AADT}_{\text {major }}$ (veh/day) | AADT $_{\text {max }}=$ | 78,300 | (veh/day) | -- | 39,370 |
| $\mathrm{AADT}_{\text {minor }}$ (veh/day) | AADT $_{\text {max }}=$ | 7,400 | (veh/day) | -- | 800 |
| Intersection skew angle (degrees) |  |  |  | 0 | 10 |
| Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2) |  |  |  | 0 |  |
| Number of non-STOP-controlled approaches with right-turn lanes ( $0,1,2,3$, or 4 ) |  |  |  | 0 | 0 |
| Intersection lighting (present/not present) |  |  |  | Not Present | Not Present |
| Calibration Factor, $\mathrm{C}_{\mathrm{i}}$ |  |  |  | 1.00 | 1.00 |



| Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|  | Proportion of Collision Type(Total) | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | Proportion of Collision Type(F) | $\mathbf{N}_{\text {predicted int (F) }}$ (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\text {a }}$ ) | N predicted int ( $\mathrm{Fl}^{\mathrm{a}}$ ) <br> (crashes/vear) | Proportion of Collision Type (PDO) | $\mathrm{N}_{\text {predicted int }}$ (PDo) ( (rashes/year) |
|  | from Table 11-9 | (7)Total from Worksheet 2C | $\begin{gathered} \text { from Table } \\ 11-9 \end{gathered}$ | (7)fl from Worksheet 2C | from Table 11-9 | (7) $\mathrm{Fl}^{\text {a }}$ from Worksheet 2C | from Table 11-9 | (7)poo from Worksheet 2C |
| Total | 1.000 | 4.686 | 1.000 | 2.271 | 1.000 | 1.284 | 1.000 | 2.415 |
|  |  | (2)* 3$)_{\text {Total }}$ |  | (4) $\times(5)$ ¢ 1 |  | (6) ${ }^{*}(7)_{\text {F1 }}{ }^{\text {a }}$ |  | $(8)^{*}(9)_{\text {PDO }}$ |
| Head-on collision | 0.016 | 0.075 | 0.018 | 0.041 | 0.023 | 0.030 | 0.015 | 0.036 |
| Sideswipe collision | 0.107 | 0.501 | 0.042 | 0.095 | 0.040 | 0.051 | 0.156 | 0.377 |
| Rear-end collision | 0.228 | 1.068 | 0.213 | 0.484 | 0.108 | 0.139 | 0.240 | 0.580 |
| Angle collision | 0.395 | 1.851 | 0.534 | 1.213 | 0.571 | 0.733 | 0.292 | 0.705 |
| Single-vehicle collision | 0.202 | 0.947 | 0.148 | 0.336 | 0.199 | 0.255 | 0.243 | 0.587 |
| Other collision | 0.052 | 0.244 | 0.045 | 0.102 | 0.059 | 0.076 | 0.054 | 0.130 |

NOTE: ${ }^{a}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included


| Worksheet 4A -- Predicted and Observed Crashes by Severity and Site Type Using the Project-Level EB Method |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| Site type | Predicted average crash frequency (crashes/year) |  |  | Observedcrashes,$N_{\text {observed }}$(crashes/year) | Overdispersion Parameter, k | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\text {plcomb }}$ |
|  | $\begin{aligned} & N_{\text {predicted }} \\ & (T O T A L) \\ & \hline \end{aligned}$ | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & (\mathrm{FI}) \end{aligned}$ | $\begin{aligned} & \hline \mathrm{N}_{\text {predicted }} \\ & \text { (PDO) } \\ & \hline \end{aligned}$ |  |  | $\begin{gathered} \text { Equation A-8 } \\ (6)^{*}(2)^{2} \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation A-9 } \\ \text { sqrt((6)* }(2)) \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-10 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-11 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-12 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-13 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_Divided_1 | 501.214 | 230.946 | 270.268 |  | --- | 0.003 | 796.618 | 1.261 | -- | -- | -- | -- | -- |
| Segment_Divided_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Divided_4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 501.214 | 230.946 | 270.268 |  |  |  |  |  |  |  |  |  |
| INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 210.875 | 102.183 | 108.691 | --- | 0.494 | 21967.267 | 10.206 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersesection Totals: | 210.875 | 102.183 | 108.691 |  |  |  |  |  |  |  |  |  |
| COMBINED (sum of column) | 712.089 | 333.130 | 378.959 | 0 | -- | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! |

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments


| (1) | (2) | (3) | (4) | (5) | Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |
| CMF for Lane Width | CMF for Right Shoulder Width | CMF for Median Width | CMF for Lighting | CMF for Automated Speed Enforcement | Combined CMF |
| CMF 1rd | CMF 2rd | CMF 3rd | CMF 4rd | CMF 5rd | CMF comb |
| from Equation 11-16 | from Table 11-17 | from Table 11-18 | from Equation 11-17 | from Section 11.7.2 | $(1)^{*}(2)^{*}(3)^{*}(4)^{*}(5)$ |
| 1.00 | 1.00 | 0.94 | 1.00 | 1.00 | 0.94 |


| Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) |  | (2) |  | (3) | (4) | (5) | (6) | (7) |
| Crash Severity Level | SPF Coefficients |  |  | N spf rd | Overdispersion Parameter, k | Combined CMFs | Calibration <br> Factor, Cr | Predicted average crashfrequency, $\mathrm{N}_{\text {predicted } \mathrm{s}(\text { d) }}$ |
|  |  | Table |  |  |  | (6) from Worksheet 1B (a) |  |  |
|  | a | b | c | from Equation 11-9 | from Equation 11-10 |  |  | $(3)^{*}(5)^{*}(6)$ |
| Total | -9.025 | 1.049 | 1.549 | 732.951 | 0.003 | 0.94 | 1.00 | 688.974 |
| Fatal and Injury (FI) | -8.837 | 0.958 | 1.687 | 328.530 | 0.003 | 0.94 | 1.00 | 308.818 |
| Fatal and Injury $\left.{ }^{\text {a }}(\mathrm{FI})^{2}\right)$ | -8.505 | 0.874 | 1.740 | 183.528 | 0.003 | 0.94 | 1.00 | 172.516 |
| Property Damage Only (PDO) | -- | -- | -- | -- | -- | -- | -- | (7) ${ }_{\text {Total }}-(7)_{\text {FI }}$ |
|  |  |  |  |  |  |  |  | 380.155 |

$\overline{\text { NOTE: }}{ }^{\text {a }}$ Using the KABCO scale, these include only $K A B$ crashes. Crashes with severity level C (possible iniury) are not included.

| Worksheet 1D (a) -- Crashes by Severity Level and Collision Type for Rural Multilane Divided Roadway Segments |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Collision Type | Proportion of Collision Tуре(тотац) | $\mathrm{N}_{\text {predicted }}$ rs(d) (Total) (crashes/year) | Proportion of <br> Collision <br> Type(FI) | $\mathbf{N}_{\text {predicted }} \mathrm{r}(\mathrm{d})$ (FI) (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\text {a }}$ ) | N predicted rs ( $\mathrm{Fl}^{\mathrm{a}}$ ) (crashes/year) | Proportion of Collision Type (PDO) | $\mathbf{N}_{\text {predicted rs }(d) \text { (PDO) }}$ (crashes/year) |
|  | $\begin{array}{\|c} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | (7)Total from Worksheet 1C <br> (a) | $\begin{gathered} \text { from Table 11- } \\ 6 \end{gathered}$ | $\begin{gathered} \text { (7)ff from Worksheet } \\ \text { 1C (a) } \end{gathered}$ | $\begin{gathered} \hline \text { from Table } \\ 11-6 \\ \hline \end{gathered}$ | $\begin{array}{c\|} \hline(7)_{\text {F1 }}{ }^{\text {a from Worksheet }} \\ 1 \mathrm{C} \text { (a) } \end{array}$ | $\begin{array}{\|c} \hline \text { from Table } \\ 11-6 \\ \hline \end{array}$ | (7)poo from Worksheet 1C <br> (a) |
| Total | 1.000 | 688.974 | 1.000 | 308.818 | 1.000 | 172.516 | 1.000 | 380.155 |
|  |  | (2)* 3$)_{\text {Total }}$ |  | (4) $\times(5)_{\text {F1 }}$ |  | (6)* ${ }^{*}(7)_{\text {Fl }}{ }^{\text {a }}$ |  | (8)** 9$)_{\text {poo }}$ |
| Head-on collision | 0.006 | 4.134 | 0.013 | 4.015 | 0.018 | 3.105 | 0.002 | 0.760 |
| Sideswipe collision | 0.043 | 29.626 | 0.027 | 8.338 | 0.022 | 3.795 | 0.053 | 20.148 |
| Rear-end collision | 0.116 | 79.921 | 0.163 | 50.337 | 0.114 | 19.667 | 0.088 | 33.454 |
| Angle collision | 0.043 | 29.626 | 0.048 | 14.823 | 0.045 | 7.763 | 0.041 | 15.586 |
| Single-vehicle collision | 0.768 | 529.132 | 0.727 | 224.511 | 0.778 | 134.218 | 0.792 | 301.083 |
| Other collision | 0.024 | 16.535 | 0.022 | 6.794 | 0.023 | 3.968 | 0.024 | 9.124 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

| Worksheet 1E -- Summary Results for Rural Multilane Roadway Segments |  |  |  |
| :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) |
| Crash severity level | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes/mi/year) |
|  | (7) from Worksheet 1C (a) or (b) |  | (2)/(3) |
| Total | 689.0 | 67.0 | 10.3 |
| Fatal and Injury (FI) | 308.8 | 67.0 | 4.6 |
| Fatal and Injury ${ }^{\text {a }}\left(\mathrm{Fl}^{\text {a }}\right.$ ) | 172.5 | 67.0 | 2.6 |
| Property Damage Only (PDO) | 380.2 | 67.0 | 5.7 |

NOTE: ${ }^{\text {a }}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.



| Worksheet 2D --C Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}_{\text {predicted int (TOTAL) }}$ (crashes/year) | Proportion of Collision Type(FI) | $\mathrm{N}_{\text {predicted int ( }}^{\text {Fl }}$ ( (crashes/year) | Proportion of Collision Type ( $\mathrm{Fl}^{\mathrm{a}}$ ) | N predicted int ( $\mathrm{Fl}^{\mathrm{a}}$ ) <br> (crashes/vear) | Proportion of Collision Type (PDO) | $\mathbf{N}_{\text {predicted }}$ int (PDo) ( (crashes/year) |
|  | from Table 11-9 | (7)Total from Worksheet 2C | $\begin{aligned} & \text { from Table } \\ & 11-9 \end{aligned}$ | (7)fi from Worksheet 2C | from Table 11-9 | (7) $\mathrm{Fl}^{\text {a }}$ from Worksheet 2C | from Table 11-9 | (7)poo from Worksheet 2C |
| Total | 1.000 | 6.061 | 1.000 | 2.973 | 1.000 | 1.650 | 1.000 | 3.088 |
|  |  | (2)* 3$)_{\text {Total }}$ |  | (4) $\times(5)_{\text {F1 }}$ |  | (6)* ${ }^{*}(7)_{\text {F1 }}{ }^{\text {a }}$ |  | $(8)^{*}(9)_{\text {PDO }}$ |
| Head-on collision | 0.016 | 0.097 | 0.018 | 0.054 | 0.023 | 0.038 | 0.015 | 0.046 |
| Sideswipe collision | 0.107 | 0.648 | 0.042 | 0.125 | 0.040 | 0.066 | 0.156 | 0.482 |
| Rear-end collision | 0.228 | 1.382 | 0.213 | 0.633 | 0.108 | 0.178 | 0.240 | 0.741 |
| Angle collision | 0.395 | 2.394 | 0.534 | 1.587 | 0.571 | 0.942 | 0.292 | 0.902 |
| Single-vehicle collision | 0.202 | 1.224 | 0.148 | 0.440 | 0.199 | 0.328 | 0.243 | 0.750 |
| Other collision | 0.052 | 0.315 | 0.045 | 0.134 | 0.059 | 0.097 | 0.054 | 0.167 |

$\mathrm{NOTE:}^{a}$ Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not include


| Worksheet 4A -- Predicted and Observed Crashes by Severity and Site Type Using the Project-Level EB Method |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) <br> crasved <br> $N_{\text {obseresed }}$ <br> (crashes/year) |  | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| Site type | Predicted average crash frequency (crashes/year) |  |  |  | Overdispersion Parameter, k | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\mathrm{p} / \text { comb }}$ |
|  | $\mathrm{N}_{\text {predicted }}$ (TOTAL) | $\mathrm{N}_{\text {predicted }}$ <br> (FI) | $\begin{aligned} & \hline \mathrm{N}_{\text {predicted }} \\ & \text { (PDO) } \end{aligned}$ |  |  | $\begin{gathered} \hline \text { Equation A-8 } \\ (6)^{*}(2)^{2} \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation A-9 } \\ \text { sqrt((6)*(2)) } \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \mathrm{A} . \\ 10 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \mathrm{A} \\ 11 \\ \hline \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { Equation } \mathrm{A} \\ 12 \\ \hline \end{array}$ | $\begin{gathered} \hline \text { Equation } \mathrm{A} \\ 13 \\ \hline \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { Equation } \mathrm{A} \\ 14 \\ \hline \end{array}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_Divided_1 | 688.974 | 308.818 | 380.155 | --- | 0.003 | 1,505.249 | 1.478 | -- | -- | -- | -- | -- |
| Segment_Divided 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Divided 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Divided 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Divided 7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_Divided_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 688.974 | 308.818 | 380.155 |  |  |  |  |  |  |  |  |  |
| INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 272.726 | 133.768 | 138.958 | -- | 0.494 | 36743.555 | 11.607 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersesection Totals: | 272.726 | 133.768 | 138.958 |  |  |  |  |  |  |  |  |  |
| COMBINED (sum of column) | 961.700 | 442.586 | 519.114 | 0 | -- | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! | \#REF! |



| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CMF for Lane Width | CMF for Shoulder Width and Type | CMF for Horizontal Curves | CMF for Superelevation | CMF for Grades | CMF for Driveway Density | CMF for <br> Centerline <br> Rumble <br> Strips | CMF for Passing Lanes | CMF for <br> Two-Way <br> Left-Turn Lane | CMF for Roadside Design | CMF for <br> Lighting | CMF for Automated Speed Enforcemen | Combined CMF |
| CMF 1r | CMF 2r | CMF 3r | CMF 4r | CMR 5r | CMF 6r | CMF 7r | CMF 8r | CMF 9r | CMF 10r | CMF 11r | CMF 12r | CMF comb |
| from Equation 10-11 | from Equation $10-12$ | $\begin{gathered} \text { from Equation } \\ 10-13 \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { from Equations } \\ 10-14,10-15, \\ \text { or } 10-16 \end{array}$ | $\begin{gathered} \hline \text { from Table } \\ 10-11 \end{gathered}$ | from Equation 10- 17 | from <br> Section <br> 10.7.1 | $\begin{gathered} \hline \text { from } \\ \text { Section } \\ \text { 10.7.1 } \end{gathered}$ | from Equation $10-18 \& 10$ 19 | from Equation 10 - 20 | $\begin{array}{\|c\|} \hline \text { from Equation } \\ 10-21 \end{array}$ | from Section 10.7.1 | $\begin{gathered} \hline(1) \times(2) \mathrm{x} \\ \ldots \\ \mathrm{x}(11) \mathrm{x}(12) \end{gathered}$ |
| 1.00 | 1.17 | 1.07 | 1.11 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.385 |


| Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Crash Severity Level | N spf rs | Overdispersion Parameter, $\qquad$ | Crash Severity Distribution | N spf rs by Severity Distribution | $\begin{gathered} \text { Combined } \\ \text { CMFs } \end{gathered}$ | Calibration Factor, Cr | Predicted average crash frequency, |
|  | from <br> Equation 10-6 | from Equation 10-7 | from Table 10-3 (proportion) | (2)TOTAL $\times$ (4) | (13) from Worksheet 1B |  | (5) $\mathrm{x}(6) \times(7)$ |
| Total | 63.024 | 0.00 | 1.000 | 63.024 | 1.38 | 1.00 | 87.266 |
| Fatal and Injury (FI) | -- | -- | 0.321 | 20.231 | 1.38 | 1.00 | 28.012 |
| Property Damage Only (PDO) | -- | -- | 0.679 | 42.793 | 1.38 | 1.00 | 59.253 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}$ predicted rs (TOTAL) (crashes/year) | Proportion of Collision Type(FI) | $\mathbf{N}_{\text {predicted } I s \text { ( }}$ (II) (crashes/year) | Proportion of Collision Type(PDO) | $\mathbf{N}_{\text {predicted }}$ s (PDO) (crashes/year) |
|  | from Table $10-4$ | (8)total from Worksheet 1C | from Table 10-4 | (8)f1 from Worksheet 1C | from Table 10-4 | (8)pDo from Worksheet 1C |
| Total | 1.000 | 87.266 | 1.000 | 28.012 | 1.000 | 59.253 |
|  |  | (2) x (3) TOTAL |  | (4) $\mathrm{x}(5) \mathrm{FI}$ |  | (6)x(7)PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.121 | 10.559 | 0.038 | 1.064 | 0.184 | 10.903 |
| Collision with bicycle | 0.002 | 0.175 | 0.004 | 0.112 | 0.001 | 0.059 |
| Collision with pedestrian | 0.003 | 0.262 | 0.007 | 0.196 | 0.001 | 0.059 |
| Overturned | 0.025 | 2.182 | 0.037 | 1.036 | 0.015 | 0.889 |
| Ran off road | 0.521 | 45.465 | 0.545 | 15.267 | 0.505 | 29.923 |
| Other single-vehicle collision | 0.021 | 1.833 | 0.007 | 0.196 | 0.029 | 1.718 |
| Total single-vehicle crashes | 0.693 | 60.475 | 0.638 | 17.872 | 0.735 | 43.551 |
| MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.085 | 7.418 | 0.100 | 2.801 | 0.072 | 4.266 |
| Head-on collision | 0.016 | 1.396 | 0.034 | 0.952 | 0.003 | 0.178 |
| Rear-end collision | 0.142 | 12.392 | 0.164 | 4.594 | 0.122 | 7.229 |
| Sideswipe collision | 0.037 | 3.229 | 0.038 | 1.064 | 0.038 | 2.252 |
| Other multiple-vehicle collision | 0.027 | 2.356 | 0.026 | 0.728 | 0.030 | 1.778 |
| Total multiple-vehicle crashes | 0.307 | 26.791 | 0.362 | 10.140 | 0.265 | 15.702 |


| (1) | (2) | (3) | (4) | (5) |
| :---: | :---: | :---: | :---: | :---: |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes $/ \mathrm{mi} /$ year) |
|  | (4) from Worksheet 1C | (8) from Worksheet 1C |  | (3)/(4) |
| Total | 1.000 | 87.3 | 68 | 1.3 |
| Fatal and Injury (FI) | 0.321 | 28.0 | 68 | 0.4 |
| Property Damage Only (PDO) | 0.679 | 59.3 | 68 | 0.9 |




| Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Collision Type | Proportion of Collision Typeitotal | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | Proportion of Collision Type(f) | N predicted int (F) (crashes/year) | Proportion of Collision Type(PDO) | N predicted int (PDo) (crashes/year) |
|  | $\begin{gathered} \text { from Table } \\ 10-6 \end{gathered}$ | (8)total from Worksheet 2 C | from Table 10-6 | (8)FI from Worksheet 2 C | from Table 10-6 | (8)poo from Worksheet 2C |
| Total | 1.000 | 0.325 | 1.000 | 0.135 | 1.000 | 0.190 |
|  |  | (2) $\times$ (3) TOTAL |  | (4) $\times$ (5) F |  | (6) $\times$ (7) PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.019 | 0.006 | 0.008 | 0.001 | 0.026 | 0.005 |
| Collision with bicycle | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 |
| Collision with pedestrian | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 |
| Overturned | 0.013 | 0.004 | 0.022 | 0.003 | 0.007 | 0.001 |
| Ran off road | 0.244 | 0.079 | 0.240 | 0.032 | 0.247 | 0.047 |
| Other single-vehicle collision | 0.016 | 0.005 | 0.011 | 0.001 | 0.020 | 0.004 |
| Total single-vehicle crashes | 0.294 | 0.096 | 0.283 | 0.038 | 0.302 | 0.057 |
| M MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.237 | 0.077 | 0.275 | 0.037 | 0.210 | 0.040 |
| Head-on collision | 0.052 | 0.017 | 0.081 | 0.011 | 0.032 | 0.006 |
| Rear-end collision | 0.278 | 0.090 | 0.260 | 0.035 | 0.292 | 0.056 |
| Sideswipe collision | 0.097 | 0.032 | 0.051 | 0.007 | 0.131 | 0.025 |
| Other multiple-vehicle collision | 0.042 | 0.014 | 0.050 | 0.007 | 0.033 | 0.006 |
| Total multiple-vehicle crashes | 0.706 | 0.230 | 0.717 | 0.097 | 0.698 | 0.133 |


| Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections |  |  |
| :---: | :---: | :---: |
| (1) | (2) | (3) |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes / year) |
|  | (4) from Worksheet 2C | (8) from Worksheet 2C |
| Total | 1.000 | 0.3 |
| Fatal and Injury (FI) | 0.415 | 0.1 |
| Property Damage Only (PDO) | 0.585 | 0.2 |

Worksheet 4A -- Predicted and Observed Crashes by Severity and Site Type Using the Project-Level EB Method

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Site type | Predicted average crash frequency (crashes/year) |  |  | $\begin{aligned} & \hline \text { Observed } \\ & \text { crashes, } \\ & \mathrm{N}_{\text {observed }} \\ & \text { (crashes/year) } \\ & \hline \end{aligned}$ | Overdispersion Parameter, k | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\mathrm{p} / \text { comb }}$ |
|  | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & \text { (TOTAL) } \end{aligned}$ | $\mathrm{N}_{\text {predicted }}$ (FI) | $\begin{aligned} & \hline \mathrm{N}_{\text {predicted }} \\ & \text { (PDO) } \end{aligned}$ |  |  | $\begin{gathered} \text { Equation A-8 } \\ (6)^{*}(2)^{2} \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation A-9 } \\ \text { sqrt((6)* }(2)) \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-10 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-11 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-12 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-13 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_1 | 87.266 | 28.012 | 59.253 | -- | 0.003 | 26.430 | 0.550 | -- | -- | -- | -- | -- |
| Segment_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 |  |  |  |  |  |
| Segment_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 87.266 | 28.012 | 59.253 |  |  |  |  |  |  |  |  |  |
| INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 16.579 | 6.880 | 9.699 | --- | 0.540 | 148.427 | 2.992 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection Totals: | 16.579 | 6.880 | 9.699 |  |  |  |  |  |  |  |  |  |
| COMBINED | 103.845 | 34.893 | 68.952 | 0 | -- | 174.857 | 3.542 | 0.373 | 38.693 | 0.967 | 100.419 | 69.556 |



| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CMF for Lane Width | CMF for Shoulder Width and Type | CMF for Horizontal Curves | CMF for Superelevation | CMF for Grades | CMF for Driveway Density | CMF for Centerline Rumble Strips | CMF for Passing Lanes | CMF for <br> Two-Way <br> Left-Turn Lane | CMF for <br> Roadside Design | CMF for <br> Lighting | CMF for <br> Automated <br> Speed Enforcemen | Combined CMF |
| CMF 1r | CMF 2r | CMF 3r | CMF 4r | CMR 5r | CMF 6r | CMF 7r | CMF 8r | CMF 9r | CMF 10r | CMF 11r | CMF 12r | CMF comb |
| from Equation 10-11 | $\begin{aligned} & \text { from Equation } \\ & 10-12 \end{aligned}$ | from Equation 10-13 | $\begin{array}{\|c\|} \hline \text { from Equations } \\ 10-14,10-15 \\ \text { or } 10-16 \end{array}$ | $\begin{gathered} \text { from Table } \\ 10-11 \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { from } \\ \text { Equation } 10-17 \\ 17 \end{array}$ | from <br> Section <br> 10.7.1 | $\begin{array}{c\|} \hline \text { from } \\ \text { Section } \\ \text { 10.7.1 } \end{array}$ | from Equation $10-18 \& 10-$ 19 | from Equation 10 - 20 | from Equation 10-21 | $\left\lvert\, \begin{gathered} \text { from Section } \\ 10.7 .1 \end{gathered}\right.$ | $\begin{array}{\|c} \hline(1) \times(2) x \\ \ldots \\ x(11) \times(12) \end{array}$ |
| 1.00 | 1.17 | 1.07 | 1.11 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.385 |


| Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Crash Severity Level | N spf rs | Overdispersion Parameter, k | Crash Severity Distribution | N spf rs by Severity Distribution | $\begin{gathered} \text { Combined } \\ \text { CMFs } \end{gathered}$ | Calibration Factor, Cr | Predicted average crash frequency, $\qquad$ |
|  | from <br> Equation 10-6 | from Equation 10-7 | from Table 10-3 (proportion) | (2)TOTAL $\times$ (4) | (13) from Worksheet 1B |  | (5) $\mathrm{x}(6) \mathrm{x}(7)$ |
| Total | 323.387 | 0.00 | 1.000 | 323.387 | 1.38 | 1.00 | 447.774 |
| Fatal and Injury (FI) | -- | -- | 0.321 | 103.807 | 1.38 | 1.00 | 143.736 |
| Property Damage Only (PDO) | -- | -- | 0.679 | 219.579 | 1.38 | 1.00 | 304.039 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}_{\text {predicted rs }}$ (TOTAL) (crashes/year) | Proportion of Collision Type(fl) | $\mathbf{N}_{\text {predicted }}$ rs (FI) (crashes/year) | Proportion of Collision Type(PDO) | $\mathbf{N}_{\text {predicted }}$ ss (PDO) (crashes/year) |
|  | $\begin{gathered} \text { from Table } \\ 10-4 \end{gathered}$ | (8)total from Worksheet 1C | from Table 10-4 | (8)f1 from Worksheet 1C | from Table 10-4 | (8)poo from Worksheet 1C |
| Total | 1.000 | 447.774 | 1.000 | 143.736 | 1.000 | 304.039 |
|  |  | (2) x (3) TOTAL |  | (4) $\mathrm{x}(5) \mathrm{FI}$ |  | (6) x (7) PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.121 | 54.181 | 0.038 | 5.462 | 0.184 | 55.943 |
| Collision with bicycle | 0.002 | 0.896 | 0.004 | 0.575 | 0.001 | 0.304 |
| Collision with pedestrian | 0.003 | 1.343 | 0.007 | 1.006 | 0.001 | 0.304 |
| Overturned | 0.025 | 11.194 | 0.037 | 5.318 | 0.015 | 4.561 |
| Ran off road | 0.521 | 233.290 | 0.545 | 78.336 | 0.505 | 153.540 |
| Other single-vehicle collision | 0.021 | 9.403 | 0.007 | 1.006 | 0.029 | 8.817 |
| Total single-vehicle crashes | 0.693 | 310.308 | 0.638 | 91.703 | 0.735 | 223.469 |
| MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.085 | 38.061 | 0.100 | 14.374 | 0.072 | 21.891 |
| Head-on collision | 0.016 | 7.164 | 0.034 | 4.887 | 0.003 | 0.912 |
| Rear-end collision | 0.142 | 63.584 | 0.164 | 23.573 | 0.122 | 37.093 |
| Sideswipe collision | 0.037 | 16.568 | 0.038 | 5.462 | 0.038 | 11.553 |
| Other multiple-vehicle collision | 0.027 | 12.090 | 0.026 | 3.737 | 0.030 | 9.121 |
| Total multiple-vehicle crashes | 0.307 | 137.467 | 0.362 | 52.032 | 0.265 | 80.570 |


| (1) | (2) | (3) | (4) | (5) |
| :---: | :---: | :---: | :---: | :---: |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes $/ \mathrm{mi} /$ year) |
|  | (4) from Worksheet 1C | (8) from Worksheet 1C |  | (3)/(4) |
| Total | 1.000 | 447.8 | 68 | 6.6 |
| Fatal and Injury (FI) | 0.321 | 143.7 | 68 | 2.1 |
| Property Damage Only (PDO) | 0.679 | 304.0 | 68 | 4.5 |




| Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Collision Type | Proportion of Collision Typentotal | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | Proportion of Collision Type(f) | $\mathbf{N}$ predicted int (F) ( (crashes/year) | Proportion of Collision Type(PDO) | N predicted int (PDO) ( (crashes/year) |
|  | $\begin{gathered} \text { from Table } \\ 10-6 \end{gathered}$ | (8)total from Worksheet 2 C | from Table 10-6 | (8)FI from Worksheet 2 C | from Table 10-6 | (8)poo from Worksheet 2C |
| Total | 1.000 | 1.272 | 1.000 | 0.528 | 1.000 | 0.744 |
|  |  | (2) $\times$ (3) TOTAL |  | (4) $\times$ (5) F |  | (6) x (7) PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.019 | 0.024 | 0.008 | 0.004 | 0.026 | 0.019 |
| Collision with bicycle | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Collision with pedestrian | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Overturned | 0.013 | 0.017 | 0.022 | 0.012 | 0.007 | 0.005 |
| Ran off road | 0.244 | 0.310 | 0.240 | 0.127 | 0.247 | 0.184 |
| Other single-vehicle collision | 0.016 | 0.020 | 0.011 | 0.006 | 0.020 | 0.015 |
| Total single-vehicle crashes | 0.294 | 0.374 | 0.283 | 0.149 | 0.302 | 0.225 |
| M MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.237 | 0.301 | 0.275 | 0.145 | 0.210 | 0.156 |
| Head-on collision | 0.052 | 0.066 | 0.081 | 0.043 | 0.032 | 0.024 |
| Rear-end collision | 0.278 | 0.354 | 0.260 | 0.137 | 0.292 | 0.217 |
| Sideswipe collision | 0.097 | 0.123 | 0.051 | 0.027 | 0.131 | 0.097 |
| Other multiple-vehicle collision | 0.042 | 0.053 | 0.050 | 0.026 | 0.033 | 0.025 |
| Total multiple-vehicle crashes | 0.706 | 0.898 | 0.717 | 0.378 | 0.698 | 0.519 |


| Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections |  |  |
| :---: | :---: | :---: |
| (1) | (2) | (3) |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes / year) |
|  | (4) from Worksheet 2C | (8) from Worksheet 2C |
| Total | 1.000 | 1.3 |
| Fatal and Injury (FI) | 0.415 | 0.5 |
| Property Damage Only (PDO) | 0.585 | 0.7 |

Worksheet 4A -- Predicted and Observed Crashes by Severity and Site Type Using the Project-Level EB Method

| Site type | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Predicted average crash frequency (crashes/year) |  |  | Observedcrashes,$N_{\text {observed }}$(crashes/year) | Overdispersion Parameter, k | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\mathrm{p} \text { /comb }}$ |
|  | $\mathrm{N}_{\text {predicted }}$ (TOTAL) | $\mathrm{N}_{\text {predicted }}$ (FI) | $\begin{aligned} & \hline \mathrm{N}_{\text {predicted }} \\ & (\mathrm{PDO}) \\ & \hline \end{aligned}$ |  |  | Equation A-8 $(6)^{*}(2)^{2}$ | $\begin{aligned} & \text { Equation A-9 } \\ & \text { sart (6)*(2)) } \end{aligned}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-10 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-11 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \text { A-12 } \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-13 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_1 | 568.673 | 182.544 | 386.129 | -- | 0.003 | 1,122.352 | 1.405 | -- | -- | -- | -- | -- |
| Segment_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 |  |  |  |  |  |
| Segment_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 568.673 | 182.544 | 386.129 |  |  |  |  |  |  |  |  |  |
| INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 76.655 | 31.812 | 44.843 | -- | 0.540 | 3173.073 | 6.434 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection Totals: | 76.655 | 31.812 | 44.843 |  |  |  |  |  |  |  |  |  |
| COMBINED | 645.329 | 214.356 | 430.973 | 0 | -- | 4295.425 | 7.839 | 0.131 | 84.289 | 0.988 | 637.584 | 360.936 |



| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| CMF for Lane Width | CMF for Shoulder Width and Type | CMF for Horizontal Curves | CMF for Superelevation | CMF for Grades | CMF for Driveway Density | CMF for Centerline Rumble Strips | CMF for Passing Lanes | CMF for <br> Two-Way <br> Left-Turn Lane | CMF for <br> Roadside Design | CMF for <br> Lighting | CMF for <br> Automated <br> Speed Enforcemen | Combined CMF |
| CMF 1r | CMF 2r | CMF 3r | CMF 4r | CMR 5r | CMF 6r | CMF 7r | CMF 8r | CMF 9r | CMF 10r | CMF 11r | CMF 12r | CMF comb |
| from Equation 10-11 | $\begin{aligned} & \text { from Equation } \\ & 10-12 \end{aligned}$ | from Equation 10-13 | $\begin{array}{\|c\|} \hline \text { from Equations } \\ 10-14,10-15 \\ \text { or } 10-16 \end{array}$ | $\begin{gathered} \text { from Table } \\ 10-11 \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { from } \\ \text { Equation } 10-17 \\ 17 \end{array}$ | from <br> Section <br> 10.7.1 | $\begin{array}{c\|} \hline \text { from } \\ \text { Section } \\ \text { 10.7.1 } \end{array}$ | from Equation $10-18 \& 10-$ 19 | from Equation 10 - 20 | from Equation 10-21 | $\left\lvert\, \begin{gathered} \text { from Section } \\ 10.7 .1 \end{gathered}\right.$ | $\begin{array}{\|c} \hline(1) \times(2) x \\ \ldots \\ x(11) \times(12) \end{array}$ |
| 1.00 | 1.17 | 1.07 | 1.11 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.385 |


| Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Crash Severity Level | N spf rs | Overdispersion Parameter, k | Crash Severity Distribution | N spf rs by Severity Distribution | $\begin{gathered} \text { Combined } \\ \text { CMFs } \end{gathered}$ | Calibration Factor, Cr | Predicted average crash frequency, $\qquad$ |
|  | from <br> Equation 10-6 | from Equation 10-7 | from Table 10-3 (proportion) | (2)TOTAL $\times$ (4) | (13) from Worksheet 1B |  | (5) $\mathrm{x}(6) \mathrm{x}(7)$ |
| Total | 323.387 | 0.00 | 1.000 | 323.387 | 1.38 | 1.00 | 447.774 |
| Fatal and Injury (FI) | -- | -- | 0.321 | 103.807 | 1.38 | 1.00 | 143.736 |
| Property Damage Only (PDO) | -- | -- | 0.679 | 219.579 | 1.38 | 1.00 | 304.039 |


| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Collision Type | Proportion of Collision Type(total) | $\mathbf{N}_{\text {predicted rs }}$ (TOTAL) (crashes/year) | Proportion of Collision Type(fl) | $\mathbf{N}_{\text {predicted }}$ rs (FI) (crashes/year) | Proportion of Collision Type(PDO) | $\mathbf{N}_{\text {predicted }}$ ss (PDO) (crashes/year) |
|  | $\begin{gathered} \text { from Table } \\ 10-4 \end{gathered}$ | (8)total from Worksheet 1C | from Table 10-4 | (8)f1 from Worksheet 1C | from Table 10-4 | (8)poo from Worksheet 1C |
| Total | 1.000 | 447.774 | 1.000 | 143.736 | 1.000 | 304.039 |
|  |  | (2) x (3) TOTAL |  | (4) $\mathrm{x}(5) \mathrm{FI}$ |  | (6) x (7) PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.121 | 54.181 | 0.038 | 5.462 | 0.184 | 55.943 |
| Collision with bicycle | 0.002 | 0.896 | 0.004 | 0.575 | 0.001 | 0.304 |
| Collision with pedestrian | 0.003 | 1.343 | 0.007 | 1.006 | 0.001 | 0.304 |
| Overturned | 0.025 | 11.194 | 0.037 | 5.318 | 0.015 | 4.561 |
| Ran off road | 0.521 | 233.290 | 0.545 | 78.336 | 0.505 | 153.540 |
| Other single-vehicle collision | 0.021 | 9.403 | 0.007 | 1.006 | 0.029 | 8.817 |
| Total single-vehicle crashes | 0.693 | 310.308 | 0.638 | 91.703 | 0.735 | 223.469 |
| MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.085 | 38.061 | 0.100 | 14.374 | 0.072 | 21.891 |
| Head-on collision | 0.016 | 7.164 | 0.034 | 4.887 | 0.003 | 0.912 |
| Rear-end collision | 0.142 | 63.584 | 0.164 | 23.573 | 0.122 | 37.093 |
| Sideswipe collision | 0.037 | 16.568 | 0.038 | 5.462 | 0.038 | 11.553 |
| Other multiple-vehicle collision | 0.027 | 12.090 | 0.026 | 3.737 | 0.030 | 9.121 |
| Total multiple-vehicle crashes | 0.307 | 137.467 | 0.362 | 52.032 | 0.265 | 80.570 |


| (1) | (2) | (3) | (4) | (5) |
| :---: | :---: | :---: | :---: | :---: |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes/year) | Roadway segment length (mi) | Crash rate (crashes $/ \mathrm{mi} /$ year) |
|  | (4) from Worksheet 1C | (8) from Worksheet 1C |  | (3)/(4) |
| Total | 1.000 | 447.8 | 68 | 6.6 |
| Fatal and Injury (FI) | 0.321 | 143.7 | 68 | 2.1 |
| Property Damage Only (PDO) | 0.679 | 304.0 | 68 | 4.5 |




| Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Road Intersections |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Collision Type | Proportion of Collision Typentotal | $\mathbf{N}$ predicted int (TOTAL) (crashes/year) | Proportion of Collision Type(f) | $\mathbf{N}$ predicted int (F) ( (crashes/year) | Proportion of Collision Type(PDO) | N predicted int (PDO) ( (crashes/year) |
|  | $\begin{gathered} \text { from Table } \\ 10-6 \end{gathered}$ | (8)total from Worksheet 2 C | from Table 10-6 | (8)FI from Worksheet 2 C | from Table 10-6 | (8)poo from Worksheet 2C |
| Total | 1.000 | 1.272 | 1.000 | 0.528 | 1.000 | 0.744 |
|  |  | (2) $\times$ (3) TOTAL |  | (4) $\times$ (5) F |  | (6) x (7) PDo |
| SINGLE-VEHICLE |  |  |  |  |  |  |
| Collision with animal | 0.019 | 0.024 | 0.008 | 0.004 | 0.026 | 0.019 |
| Collision with bicycle | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Collision with pedestrian | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Overturned | 0.013 | 0.017 | 0.022 | 0.012 | 0.007 | 0.005 |
| Ran off road | 0.244 | 0.310 | 0.240 | 0.127 | 0.247 | 0.184 |
| Other single-vehicle collision | 0.016 | 0.020 | 0.011 | 0.006 | 0.020 | 0.015 |
| Total single-vehicle crashes | 0.294 | 0.374 | 0.283 | 0.149 | 0.302 | 0.225 |
| M MULTIPLE-VEHICLE |  |  |  |  |  |  |
| Angle collision | 0.237 | 0.301 | 0.275 | 0.145 | 0.210 | 0.156 |
| Head-on collision | 0.052 | 0.066 | 0.081 | 0.043 | 0.032 | 0.024 |
| Rear-end collision | 0.278 | 0.354 | 0.260 | 0.137 | 0.292 | 0.217 |
| Sideswipe collision | 0.097 | 0.123 | 0.051 | 0.027 | 0.131 | 0.097 |
| Other multiple-vehicle collision | 0.042 | 0.053 | 0.050 | 0.026 | 0.033 | 0.025 |
| Total multiple-vehicle crashes | 0.706 | 0.898 | 0.717 | 0.378 | 0.698 | 0.519 |


| Worksheet 2E -- Summary Results for Rural Two-Lane Two-Way Road Intersections |  |  |
| :---: | :---: | :---: |
| (1) | (2) | (3) |
| Crash severity level | Crash Severity Distribution (proportion) | Predicted average crash frequency (crashes / year) |
|  | (4) from Worksheet 2C | (8) from Worksheet 2C |
| Total | 1.000 | 1.3 |
| Fatal and Injury (FI) | 0.415 | 0.5 |
| Property Damage Only (PDO) | 0.585 | 0.7 |

Worksheet 4A -- Predicted and Observed Crashes by Severity and Site Type Using the Project-Level EB Method

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Site type | Predicted average crash frequency (crashes/year) |  |  | $\begin{aligned} & \hline \text { Observed } \\ & \text { crashes, } \\ & \mathrm{N}_{\text {observed }} \\ & \text { (crashes/year) } \\ & \hline \end{aligned}$ | Overdispersion Parameter, k | $\mathrm{N}_{\mathrm{w} 0}$ | $\mathrm{N}_{\mathrm{w} 1}$ | $\mathrm{W}_{0}$ | $\mathrm{N}_{0}$ | $\mathrm{w}_{1}$ | $\mathrm{N}_{1}$ | $\mathrm{N}_{\mathrm{p} / \text { comb }}$ |
|  | $\begin{aligned} & \mathrm{N}_{\text {predicted }} \\ & \text { (TOTAL) } \end{aligned}$ | $\mathrm{N}_{\text {predicted }}$ (FI) | $\begin{aligned} & \hline \mathrm{N}_{\text {predicted }} \\ & (\mathrm{PDO}) \end{aligned}$ |  |  | $\begin{aligned} & \hline \text { Equation A-8 } \\ & (6)^{*}(2)^{2} \\ & \hline \end{aligned}$ | $\begin{gathered} \text { Equation A-9 } \\ \text { sqrt((6)* }(2)) \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-10 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-11 \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \text { A-12 } \\ \hline \end{gathered}$ | $\begin{gathered} \hline \text { Equation } \\ \mathrm{A}-13 \\ \hline \end{gathered}$ | $\begin{gathered} \text { Equation } \\ \mathrm{A}-14 \\ \hline \end{gathered}$ |
| ROADWAY SEGMENTS |  |  |  |  |  |  |  |  |  |  |  |  |
| Segment_1 | 822.114 | 263.899 | 558.215 | -- | 0.003 | 2,345.670 | 1.689 | -- | -- | -- | -- | -- |
| Segment_2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment 6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 |  |  |  |  |  |
| Segment_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Segment Totals: | 822.114 | 263.899 | 558.215 |  |  |  |  |  |  |  |  |  |
| [ INTERSECTIONS |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection_1 | 114.075 | 47.341 | 66.734 | --- | 0.540 | 7027.112 | 7.849 | -- | -- | -- | -- | -- |
| Intersection 2 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_3 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 4 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection 5 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_6 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_7 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection_8 | 0.000 | 0.000 | 0.000 | -- | 0.000 | 0.000 | 0.000 | -- | -- | -- | -- | -- |
| Intersection Totals: | 114.075 | 47.341 | 66.734 |  |  |  |  |  |  |  |  |  |
| COMBINED | 936.189 | 311.240 | 624.949 | 0 | -- | 9372.782 | 9.538 | 0.091 | 85.018 | 0.990 | 926.747 | 505.883 |

## Stakeholder Resolutions \& Letters of Support

## RESOLUTION NO. 2020-02

## A RESOLUTION BY THE COUNTY COMMISSION OF WEBSTER COUNTY, MISSOURI, RECOGNIZING THE SUPPORT FOR THE US 60 CORRIDOR STUDY

WHEREAS, the Webster County Commission contracted a study of the US 60 Corridor within the Webster County Limits; and

WHEREAS, Webster County partnered with the Missouri Department of Transportation, BNSF Railway, and the Southwest Missouri Council of Governments to hire a consultant to perform the US 60 Corridor Study, and

WHEREAS, the US 60 Corridor Study has sought the input of local stakeholders and citizens, including emergency responders, businesses and landowners, municipal leaders, and representatives of affected school districts; and

WHEREAS, the US 60 Corridor Study developed a conceptual plan that recommends roadway and railway improvements as presented in the US 60 Corridor Master Plan and sets forth a plan to promote potential project funding and implementation opportunities, and

NOW THEREFORE BE IT RESOLVED by the County Commission of Webster County, Missouri that the Commission provides its full support of the recommendations outlined in the US 60 Corridor Master Plan and recognizes the transparent public involvement process, and realizes the benefits of improved safety, access, resiliency and economic opportunities set forth by the US 60 Corridor Study.

Approved this 24th day of February, 2020.


Paul Ipock,
Presiding Commissioner


Randy Owens,
Southern District Commissioner


ATTEST:


## RESOLUTION NO. 031620A

## A RESOLUTION BY THE BOARD OF ALDERMEN OF THE CITY OF ROGERSVILLE, MISSOURI, RECOGNIZING THE SUPPORT FOR THE US 60 CORRIDOR STUDY

WHEREAS, the Webster County Commission contracted a study of the US 60 Corridor within the Webster County Limits; and

WHEREAS, Webster County partnered with the Missouri Department of Transportation, BNSF Railway, and the Southwest Missouri Council of Governments to hire a consultant to perform the US 60 Corridor Study, and

WHEREAS, the US 60 Corridor Study has sought the input of local citizens and stakeholders - including emergency responders, businesses and landowners, City of Rogersville leadership, and the Logan-Rogersville R-8 School District; and

WHEREAS, the US 60 Corridor Study developed a conceptual plan that recommends roadway and railway improvements as presented in the US 60 Corridor Master Plan and sets forth a plan to promote potential project funding and implementation opportunities, and

NOW THEREFORE BE IT RESOLVED by the Board of Aldermen of the City of
Rogersville, Missouri that the City of Rogersville provides its full support of the recommendations outlined in the US 60 Corridor Master Plan and recognizes the transparent public involvement process, and realizes the benefits of improved safety, access, resiliency and economic opportunities set forth by the US 60 Corridor Study.


## RESOLUTION NO. 2020

## A RESOLUTION BY THE BOARD OF ALDERMEN OF THE CITY OF FORDLAND, MISSOURI, RECOGNIZING THE SUPPORT FOR THE US 60 CORRIDOR STUDY

WHEREAS, the Webster County Commission contracted a study of the US 60 Corridor within the Webster County Limits; and

WHEREAS, Webster County partnered with the Missouri Department of Transportation, BNSF Railway, and the Southwest Missouri Council of Governments to hire a consultant to perform the US 60 Corridor Study, and

WHEREAS, the US 60 Corridor Study has sought the input of local stakeholders and citizens, including emergency responders, businesses and landowners, City of Fordland leadership, and the Fordland R-3 School District; and

WHEREAS, the US 60 Corridor Study developed a conceptual plan that recommends roadway and railway improvements as presented in the US 60 Corridor Master Plan and sets forth a plan to promote potential project funding and implementation opportunities, and

NOW THEREFORE BE IT RESOLVED by the Board of Aldermen of the City of Fordland, Missouri that the City of Fordland provides its full support of the recommendations outlined in the US 60 Corridor Master Plan and recognizes the transparent public involvement process, and realizes the benefits of improved safety, access, resiliency and economic opportunities set forth by the US 60 Corridor Study.

Read twice and passed by the board of alderman of Fordland, Missouri, this $28^{\text {th }}$ day of January, 2020.


Donald Burks, Mayor

Alderman:


Ken Bowers:


Kathy Bagley:


Attest:


Approved by the Mayor of the City of Fordland, Missouri, on this $28^{\text {th }}$ day of January, 2020


Donald Burks

## RESOLUTION NO. 03092020

## A RESOLUTION BY THE BOARD OF TRUSTEES OF THE VILLAGE OF DIGGINS, MISSOURI, RECOGNIZING THE SUPPORT FOR THE US 60 CORRIDOR STUDY

WHEREAS, the Webster County Commission contracted a study of the US 60 Corridor within the Webster County Limits; and

WHEREAS, Webster County partnered with the Missouri Department of Transportation, BNSF Railway, and the Southwest Missouri Council of Governments to hire a consultant to perform the US 60 Corridor Study, and

WHEREAS, the US 60 Corridor Study has sought the input of local stakeholders and citizens, including emergency responders, businesses and landowners, Village of Biggins leadership, and the Seymour R-2 School District; and

WHEREAS, the US 60 Corridor Study developed a conceptual plan that recommends roadway and railway improvements as presented in the US 60 Corridor Master Plan and sets forth a plan to promote potential project funding and implementation opportunities, and

NOW THEREFORE BE IT RESOLVED by the Board of Trustees of the Village of Digging, Missouri that the Village of Biggins provides its full support of the recommendations outlined in the US 60 Corridor Master Plan and recognizes the transparent public involvement process, and realizes the benefits of improved safety, access, resiliency and economic opportunities set forth by the US 60 Corridor Study.

Done this the $9^{\text {th }}$ day of March, 2020.

Attest:


Barbara Holmes
Chair, Board of Trustees


## RESOLUTION NO. 2020-1

## A RESOLUTION BY THE BOARD OF ALDERMEN OF THE CITY OF SEYMOUR, MISSOURI, RECOGNIZING THE SUPPORT FOR THE US 60 CORRIDOR STUDY

WHEREAS, the Webster County Commission contracted a study of the US 60 Corridor within the Webster County Limits; and

WHEREAS, Webster County partnered with the Missouri Department of Transportation, BNSF Railway, and the Southwest Missouri Council of Governments to hire a consultant to perform the US 60 Corridor Study, and

WHEREAS, the US 60 Corridor Study has sought the input of local stakeholders and citizens, including emergency responders, businesses and landowners, City of Seymour leadership, and the Seymour R-2 School District; and

WHEREAS, the US 60 Corridor Study developed a conceptual plan that recommends roadway and railway improvements as presented in the US 60 Corridor Master Plan and sets forth a plan to promote potential project funding and implementation opportunities, and

NOW THEREFORE BE IT RESOLVED by the Board of Aldermen of the City of Seymour, Missouri that the City of Seymour provides its full support of the recommendations outlined in the US 60 Corridor Master Plan and recognizes the transparent public involvement process, and realizes the benefits of improved safety, access, resiliency and economic opportunities set forth by the US 60 Corridor Study.


Mayor Richard Vinson
City of Seymour, Missouri


[^0]:    3
    https://www.fhwa.dot.gov/freighteconomy/
    American Association of Railroads (June 2019)

[^1]:    7 AASHTO, Highway Capacity Manual, Volume 2 (2010).
    8 CMT Existing Safety Analysis
    9 CMT Proposed Safety Analysis

[^2]:    11 USDOT Railroad-Highway Grade Crossing Handbook (2007)
    12 Missouri Exposure Index Formula (https://library.modot.mo.gov/RDT/reports/Ri01010/RDT03017.pdf)
    13 CMT multiplier (adopted from USDOT Accident Prediction)
    14 BNSF Railway Near-Miss Reports (August 2019)

[^3]:    15 https://library.modot.mo.gov/RDT/reports/Ri01010/RDT03017.pdf
    16 https://safety.fhwa.dot.gov/hsip/xings/com_roaduser/07010/sec03.cfm

[^4]:    18
    18 ESMI 2019
    192017 ACS, Census

[^5]:    Figure 11. U.S. 60 Corridor Location Quotient Change (2019-2029)

[^6]:    *Projected Jobs divided by Employees per Acre (per Table 16)

[^7]:    ${ }^{1}$ Assumes no savings until Year 3 after Contstruction

[^8]:    ${ }^{1}$ Assumes no savings until Year 3 after Contstruction

[^9]:    ${ }^{1}$ Assumes no operations and maintenance savings until Year 3 in Build Scenario

[^10]:    ${ }^{1}$ Assumes no operations and maintenance savings until Year 3 in Build Scenario

[^11]:    ${ }^{1}$ Assumes no operations and maintenance savings until Year 3 in Build Scenario

[^12]:    ${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

[^13]:    ${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

[^14]:    ${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

[^15]:    ${ }^{1}$ It is assumed that benefits will be realized starting in Year 3 when construction is completed

[^16]:    ${ }^{1}$ Assumes no operations and maintenance costs until Year 3 in Build Scenario

[^17]:    ${ }^{1}$ Assumes no operations and maintenance costs until Year 3 in Build Scenario

[^18]:    ${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of

[^19]:    ${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of

[^20]:    ${ }^{1}$ Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway Guide Crossing Handbook-Section 3 Assessment of

[^21]:    ${ }^{1}$ Derived from Appendix Table 1b

[^22]:    ${ }^{1}$ Derived from Appendix Table 1b

[^23]:    Source: Crash Prediction based on U.S. Department of Transportation Accident Prediction Model from Railroad-Highway
    ${ }^{1}$ Derived from Appendix Table 1b

[^24]:    1. The United States Census Bureau 2017 (ACS Data)
[^25]:    2. https://www.fhwa.dot.gov/infrastructure/longest.cfm
    3. CMT U.S. 60 Corridor Study Traffic Counts
    4. American Association of Railroads (June 2019)
[^26]:    7. Webster Co. U.S. 60 Corridor Study, Fordland Public Meeting \#1
    8. Webster Co. U.S. 60 Corridor Study, Seymour Public Meeting \#2
[^27]:    9. Webster County 911 Services
    10. Webster County Commission
[^28]:    11. NWS Advanced Hydrologic Prediction Service-https://water.weather.gov ahps2/hydrograph.php?gage=hzlm7\&wfo=sgf
    12. "Historic Flooding Shuts Down I-44" Ozarks First Newspage. April 2017
    13. Association of American Railroads. June 2019.
    14. USDOT Freight Shipments Projection (August 2014).
    15. ESRI 2019; ESMI 2019; Census
[^29]:    ${ }^{1}$ https://www.transportation.gov/sites/dot.gov/files/2020-01/benefit-cost-analysis-guidance-2020 0.pdf

[^30]:    ${ }^{2}$ See Tables 5-8

[^31]:    ${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps.
    ${ }^{2}$ Traffic Routing assumed if $100 \%$ ADT was rerouted for 24 Hours

[^32]:    ${ }^{1}$ Traffic Routing Times \& Distances retrieved from Google Maps. Travel Delays assumed to increase linearly with ADT
    ${ }^{2}$ Traffic Routing assumed if $100 \%$ ADT was rerouted for 24 Hours
    ${ }^{3}$ Average Reroute Delay per Vehicle assumed to annually increase linearly with ADT

