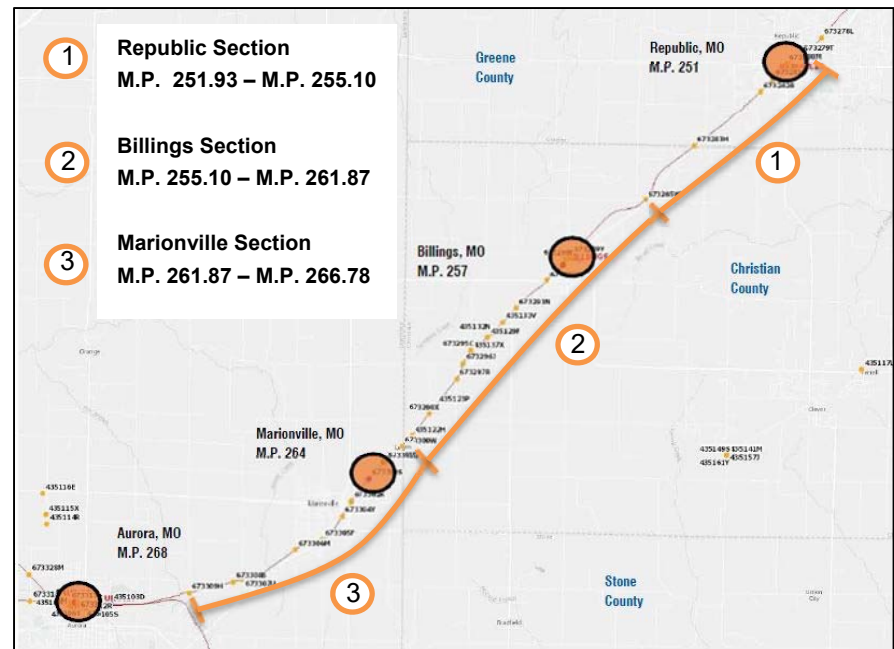


Marionville Summary

1.0 – Introduction

On January 26, 2017 the Missouri Department of Transportation Multi-Modal Division commissioned CMT to perform a safety study of the BNSF Cherokee Subdivision line from M.P. 251 to M.P. 258 in Greene, Christian, and Lawrence counties. **Figure 1-1** illustrates the overview of the study along the Route 60 corridor from Republic, MO to Aurora, MO. The study was divided up into three different sections as illustrated below. This summary will focus on Section 3 that included the City of Marionville, MO.

Figure 1-1
Overall Study Map



All at-grade railroad crossings within the City of Marionville, including the surrounding areas, were included in this section of the safety study as shown above. In all, eight (8) at-grade railroad crossings and one (1) railroad overpass were included as part of the Marionville section of the study as shown in **Figure 1-2** below.

The Marionville section also included crossings in the unincorporated town of Logan in Lawrence County.

Additionally, a table with the railroad at-grade crossing existing condition and accident statistics can be seen below in **Figure 1-3**.

Figure 1-2 Marionville Section Crossing Map

MoDOT - BNFS RAILROAD (CHEROKEE SUB-DIVISION FROM M.P. 251 TO M.P. 268)											
AT-GRADE RAILROAD CROSSING SUMMARY											
STREET	US DOT #	RR M.P.	WARNING DEVICES	RR SPEED	ROADWAY CLASSIFICATION	ROADWAY SPEED LIMIT	# OF TRAFFIC	CMT ADT	ACCIDENTS	INJURY STATUS	
MARIONVILLE SECTION	County Road 2175	673300W	FL/GATES	30	LOCAL	30	2	297	5	Uninjured	3/18/2006
										Uninjured	10/5/1997
										Uninjured	8/9/1995
										Uninjured	9/3/1979
	County Road 2176	673301D	CROSSBUCKS	30	LOCAL	30	2	137	2	Uninjured	10/31/1977
										Killed	7/17/1998
	Lincoln Street	673302K	FL/GATES	25	LOCAL	25	2	929	3	Uninjured	8/25/1989
										Killed	4/22/2015
										Uninjured	9/3/1982
	MO 14	673303S	GRADE SEPARATED	25	MAJOR COLLECTOR	35	2	-	-	-	-
MARIONVILLE SECTION	O'Dell Street	673304Y	FL	25	LOCAL	25	2	912	4	Injured	3/3/2016
										1-Killed, 1-Injured	12/17/2012
										Uninjured	11/26/2010
										2-Killed	2/23/2002
	Central Avenue	673305F	FL/GATES	25	LOCAL	25	2	1072	5	Uninjured	4/15/1995
										Killed	1/16/1995
										4-Injured	6/12/1991
										Uninjured	11/11/1986
	Western Avenue	673306M	FL	25	LOCAL	25	2	1636	2	Uninjured	2/28/1984
										Injured	12/17/2015
MARIONVILLE SECTION	Farm Road 1220	673307U	FL/GATES	25	LOCAL	25	1	103	2	Uninjured	3/8/1979
										Uninjured	3/7/1997
	Farm Road 1210	673309H	FL/GATES	40	LOCAL	40	2	572	1	Uninjured	11/4/1978
										Uninjured	12/24/1999

Figure 1-3
At-Grade Crossing
Summary

2.0 – Jurisdictional Contacts and Limits

The Marionville section of the Rail Crossing Safety Study includes crossings within the city limits of Marionville, including a few crossings that are outside the city limits. Due to this, multiple different agencies have jurisdictional control of the various crossings in this study area. The Jurisdictional contact information can be found below in **Figure 2-1**. Additionally, **Figure 2-2** shows the crossings throughout the Marionville section and the agency with jurisdictional control over them.

Figure 2-1
Jurisdictional
Contact Information

Contact Information				
Name	Agency	Title	Phone Number	Email Address
Doris Rapp	City of Marionville	Mayor	417-258-2466	mayor@marionvillemo.com
Debbie Bateman	City of Marionville	Clerk	417-258-2466	clerk@marionvillemo.com
Barry Kienenberger	City of Marionville	City Collector	417-872-7608	collector@marionvillemo.com
Sam Goodman	Lawrence County	Presiding Commissioner	417-466-3666	lawrence@sos.mo.gov
Tim Selvey	Lawrence County	Eastern Commissioner	417-466-3666	lawrence@sos.mo.gov
David Botts	Lawrence County	Western Commissioner	417-466-3666	lawrence@sos.mo.gov
Gary Emerson	Lawrence County	County Clerk	417-466-3666	lawrence@sos.mo.gov
Billie Sivils	Buck Prairie Road District	N/A	417-499-5743	N/A

Figure 2-2
Jurisdictional Control

At-Grade Crossing Jurisdictional Control			
Crossing	M.P.	DOT#	Jurisdiction
County Road 2175	261.87	673300W	Buck Prairie Special Road District
County Road 2176	262.19	673301D	Buck Prairie Special Road District
Lincoln Street	263.00	673302K	City of Marionville
MO-14	263.19	6733303S	MoDOT
O'Dell Street	263.29	673304Y	City of Marionville
Central Avenue	264.00	673305F	City of Marionville
Western Street	264.58	673306M	City of Marionville
Farm Road 1220	265.74	673307U	Lawrence County
Farm Road 1210	266.78	673309H	Lawrence County

3.0 – Alternate Analysis

Multiple alternatives were developed as part of the study, many of which were generated by participants during the public work sessions. Feedback from the public engagement process was evaluated and reflected in the development of six (6) different alternatives for analysis. During the study, these alternatives were continually modified based on feedback from the public, stakeholders, and city staff. Additional documentation on the public engagement process can be found in Section 2 of the report. All the alternates were technically evaluated based on geometrics, safety, traffic, and public support. Below is a summary of the different alternatives and the supporting documentation that was performed as part of the alternative analysis. (See **Figure 3-1**)

Figure 3-1
Consolidation
Alternatives

MARIONVILLE SECTION AT-GRADE RAILROAD SAFETY STUDY CONSOLIDATION ALTERNATIVES												
Alternative Number	CR 2175	CR 2176	Lincoln St.	Route 14 (Underpass)	O'Dell St.	Central Ave.	Western Ave.	FR 1220	FR 1210	Closure Summary	Upgrade Summary	Cost
1	OP	UPG	X	UPG	X	OP	UPG	OP	OP	2 Total Closures	3 Total Upgrades	\$3,731,209
2	OP	UPG	OP	OP	UPG	OP	UPG	X	OP	1 Total Closures	3 Total Upgrades	\$1,290,901
3	X	UPG	OP	OP	X	OP	UPG	X	OP	3 Total Closures	2 Total Upgrades	\$1,535,390
3A	X	UPG	OP	OP	X	OP	UPG	OP	OP	2 Total Closures	2 total Upgrades	\$1,552,968
3B	X	UPG	X	UPG	X	OP	UPG	OP	OP	3 Total Closures	3 Total Upgrades	\$4,214,209
4	OP	UPG	OP	OP	UPG	OP	UPG	OP	OP	0 Total Closures	3 Total Upgrades	\$990,193

3.1 Alternate Selection

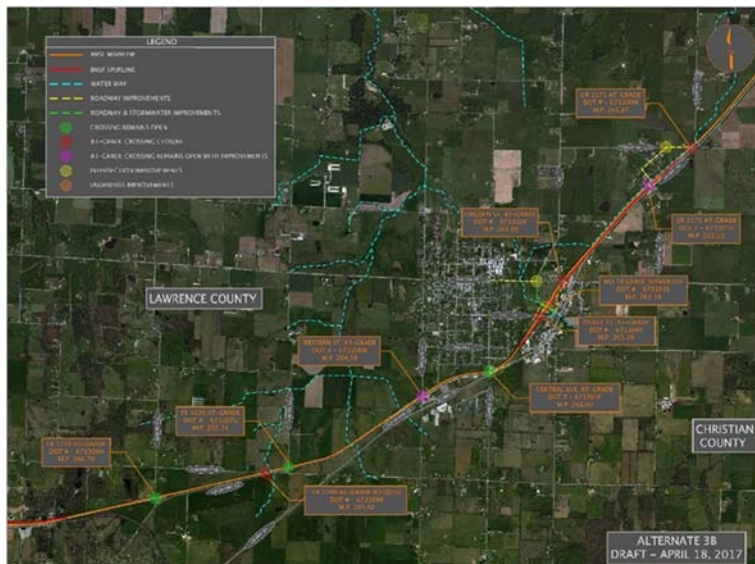
Although the public input played a major role in determining the final recommendation, each alternative was independently analyzed in order to determine which alternatives would provide the largest safety benefit. In order to determine which alternatives provided the largest safety benefit, the existing condition and accident history were both evaluated in order to determine an existing crash probability.

A proposed crash probability was then developed for each crossing by taking into account the proposed improvements for each alternate. This quantitative approach provided the department with evaluation tools to compare the theoretical safety benefits to the anticipated costs of the improvements. More can be found regarding the cost benefit ratio in **Section 6** of this summary.

In conclusion, two alternates were chosen as the alternatives for a final recommendation to increase safety along the corridor, result in a positive cost-benefit for the proposed investment, and had community and local public agency support.

3.1.1 Alternates for Final Recommendation

Figure 3-2
Alternate 3B



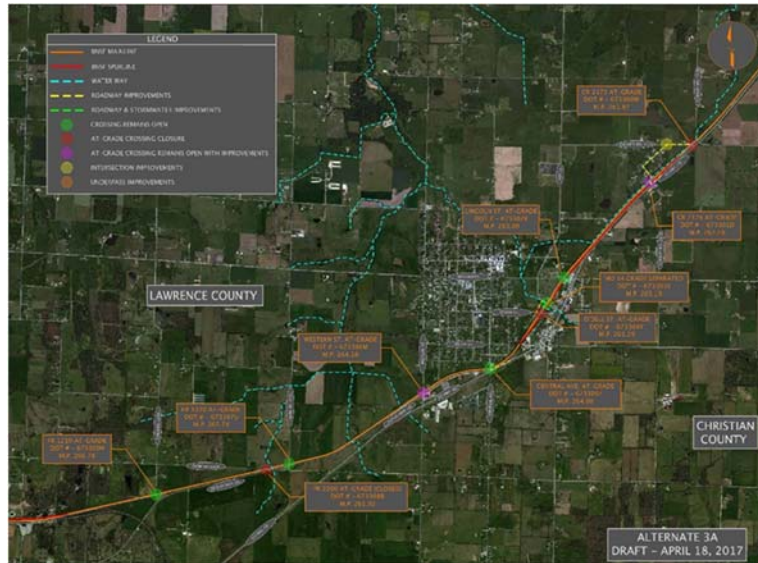
Alternate 3A & 3B both provide a significant safety benefit along the BNSF Railroad in the Marionville Section.

The preferred alternative recommendation was Alternate 3B since it provides a significant safety benefit due to the closure of an additional crossing at Lincoln St. as shown in **Figure 3-2**. The additional safety benefit comes with a higher price tag when compared to other alternates. The alternative results in a lower benefit cost ratio when compared to Alternative 3A, but it is believed the additional safety benefits outweigh the additional costs. Additional details for this recommended alternative can be found in Section 4 of the Report.

During the study, Alternate 3B received a lack of support from the public due to the closure of Lincoln Street. Although there were many supporters for the closure at Lincoln due to its direct access through the local cemetery and lack of roadway connectivity, the popular use of this route as an alternate truck route and access to a local convenience store business resulted in the City of Marionville rejecting the proposed recommendation. Due to this lack of support, Alternate 3A has been chosen as the recommended alternate, given its combination of public support and safety benefits.

CR 2175	CR 2176	Lincoln St.	Route 14 (Underpass)	O'Dell St.	Central Ave.	Western Ave.	FR 1220	FR 1210
X	UPG	X	UPG	X	OP	UPG	OP	OP

Figure 3-3
Alternate 3A



CR 2175	CR 2176	Lincoln St.	Route 14 (Underpass)	O'Dell St.	Central Ave.	Western Ave.	FR 1220	FR 1210
X	UPG	OP	OP	X	OP	UPG	OP	OP

Alternate 3A provides excellent safety benefits and results in a positive benefit cost ratio. Alternate 3A can be seen in **Figure 3-3** with additional details on the proposed improvements listed below in Section 4.

4.0 - Summary of Improvements – Alternate 3A

Below is a summary of the improvements included in the recommended Alternative 3A. Additional narrative on existing conditions and determining factors that resulted in each of the proposed improvements can be found in Section 1 and Section 4 of the Report.

- 4.1 DOT #673300W** - County Road 2175 At-Grade crossing located at M.P. 261.87. Proposed improvements at this crossing are: Permanent closure of the at-grade crossing that include removal of the existing crossing and adjacent roadway. Roadway improvements to accommodate additional traffic resulting from the closure of CR 2175 include widening CR 2175 from CR 1250 to CR 2176. Intersection improvements made at CR 2175/ 2176 include widening radii to accommodate larger vehicles.
- 4.2 DOT #673310D** - County Road 2176 At-Grade crossing located at M.P. 262.19. Proposed improvements at this crossing include upgrading crossing warning devices from Crossbucks to Flashing Lights and Automatic Gates. Roadway improvements near this crossing include adding a dedicated westbound right turn lane along US Hwy 60 and widening improvements along CR 2176, through the At-Grade crossing.
- 4.3 DOT #673302K** – Lincoln St. At-Grade crossing located at M.P. 263.00. No proposed improvements at this crossing or to surrounding roadway system.

- 4.4 DOT #673303S** – Missouri 14 Railroad Overpass located at M.P. 263.19. No proposed improvements located at this crossing or to surrounding roadway or drainage system.
- 4.5 DOT #673304Y** - O'Dell Street At-Grade crossing located at M.P. 263.29. Proposed improvements at this crossing are: Permanent closure of the at-grade crossing that include removal of the existing crossing and adjacent roadway. Roadway improvements near the crossing include adding a new two (2) lane road connecting MO 14 to O'Dell St. at the O'Dell/ Ash intersection. Necessary drainage improvements will be added as part of the new roadway connection.
- 4.6 DOT #673306M** - Central Avenue At-Grade Crossing located at M.P. 264.00. No proposed improvements at this crossing. Proposed roadway improvements near the crossing include adding a dedicated westbound right turn lane along US 60 at Central Ave.
- 4.7 DOT #673306M** - Western Street At-Grade Crossing located at M.P. 264.58. Proposed improvements at this crossing include: upgrading warning devices with Flashing Lights and Automatic Gates.
- 4.8 DOT #673307U** – Farm Road 1220 At-Grade Crossing located at M.P. 265.74. No proposed improvements at this crossing or to surrounding roadway system.
- 4.9 DOT #673309H** – Farm Road 1210 At-Grade Crossing located at M.P. 266.78. No Proposed improvements at this crossing or to surrounding roadway system.

5.0 - Estimated Costs – Alternate 3A

Figure 5-1
Estimated Cost

A breakdown of estimated costs for the proposed improvements described in **Section 4.0** above can be seen in **Figure 5-1** below. A detailed breakdown of the costs associated with Alternate 3A is attached in **Appendix A**.

Alternate 3A Estimated Improvement Costs						
Location	Railroad	Roadway	Right of Way	Utilities	Engineering	Total Cost
County Road 2175	\$30,000.00	\$85,000.00	N/A	\$10,000.00	\$10,000.00	\$135,000.00
County Road 2176	\$250,000.00	\$60,000.00	N/A	\$10,000.00	\$28,000.00	\$348,000.00
Lincoln St.	No Improvements					
MO 14	No Improvements					
O'Dell St.	\$30,000.00	\$427,968.00	\$50,000.00	\$30,000.00	\$42,500.00	\$580,468.00
Central Ave.	N/A	\$195,000.00	N/A	\$10,000.00	\$12,500.00	\$217,500.00
Western St.	\$250,000.00	N/A	N/A	N/A	\$22,000.00	\$272,000.00
Farm Road 1220	No Improvements					
Farm Road 1210	No Improvements					
Total Improvement Cost						\$1,552,968

6.0 – Cost Benefit Analysis

As part of the Railroad Study a cost-benefit analysis was performed to determine which alternative would provide the most benefit. In order to perform a cost benefit analysis, each crossing's safety benefits were determined by comparing the existing crash prediction modal versus the proposed crash prediction modal. The proposed crash prediction formula considered the proposed improvements (described in Section 4) for each at-grade crossing. The comparison of these two models resulted in a theoretical safety benefit for each at-grade crossing. Based on this information the proposed costs for the improvements were valued against the theoretical safety benefit. The Cost-Benefit for each alternative can be seen below in **Figure 6-1**. As shown in the table, the selected Alternate 3A, provided the highest benefit-cost ratio of all alternatives evaluated for this section.

Figure 6-1
Cost Benefit Analysis

MoDOT - BNSF RAILROAD (CHEROKEE SUB-DIVISION FROM M.P. 251 TO M.P. 268)													
BENEFIT-COST CROSSING ALTERNATE SUMMARY													
MARIONVILLE, MO - LAWRENCE CO.													
	Improvement Costs	# Crossing Closures	# Crossing Upgrades	County Road 2175 B/C	County Road 2176 B/C	Lincoln B/C	MO 14 B/C	O'dell B/C	Central B/C	Western B/C	Farm Road 1220 B/C	Farm Road 1210 B/C	Avg. Benefit Cost Ratio
ALT #1	\$ 3,731,208.96	2	3	N/A	0.257959	0.302837	N/A	0.403605	N/A	0.2292096	N/A	N/A	0.397870296
ALT #2	\$ 1,290,900.83	1	3	N/A	0.257959	N/A	N/A	0.227179	N/A	0.2292096	0.913636	N/A	0.40699593
ALT #3	\$ 1,535,389.95	3	2	8.564327	0.257959	N/A	N/A	2.515499	N/A	0.2292096	0.913636	N/A	2.496126133
ALT #3A	\$ 1,325,556.00	2	2	8.564327	0.257959	N/A	N/A	2.515499	N/A	0.2292096	N/A	N/A	2.891748559
ALT #3B	\$ 4,214,209.00	3	3	8.56433	0.25796	0.30284	N/A	0.40361	N/A	0.22921	N/A	N/A	1.951590000
ALT #4	\$ 990,192.55	0	3	8.564327	0.257959	N/A	N/A	0.227179	N/A	0.2292096	N/A	N/A	2.319668663

7.0 – Implementation Strategy

7.1 Section Priorities

The Marionville Section of the Railroad Study contains four (4) separate locations where the proposed improvements are recommended. These areas are listed above in Section 4 and are listed below from North to South:

- Project Location No. 1 - County Road 2175 & County Road 2176
- Project Location No. 2 - O'Dell St.
- Project Location No. 3 - Central Ave.
- Project Location No. 4 - Western St.

It is recommended that all these project locations be performed under one contract to minimize disruption to local vehicle and rail traffic. Depending on available funding, if all project locations can not be completed under one construction contract, it is recommended that the benefit-cost ratio values be used to determine priorities within this section. Based on this information, the suggested implementation plan is shown in order of theoretical safety benefit:

- Project Location No. 2 - O'Dell St.
- Project Location No. 1 - County Road 2175 & County Road 2176
- Project Location No. 4 - Western St.
- Project Location No. 3 - Central Ave.

It should be mentioned that the Section through Marionville is only one of three sections within the overall study limits and additional priorities for implementation will be outlined in the context of the entire study limits in Section 5 of the Report.

7.2 MOU & Agreements

The department has met with all public agencies and the BNSF Railway on the final recommendations for this section of the study and have obtained verbal approval in moving forward with finalizing a memorandum of understanding (MOU) or construction agreement to implement the improvements as presented. There are anticipated to be two different agreements for the four different project locations that will involve the different parties based on jurisdictional authorities of adjacent roadways:

MOU / Construction Agreement No. 1 – Project Locations 2, 3, and 4

- MoDOT
- BNSF Railway
- City of Marionville

MOU / Construction Agreement No. 2 – Project Location 1

- MoDOT
- BNSF Railway
- Lawrence County / Buck Prairie Special Road District

MoDOT will serve as the sponsor and the lead agency for the development and coordination of the MOU and Construction Agreements with the Railway and Local Public Agencies.

7.3 Funding Sources & Schedule

Although there are no funds committed for the project implementation at this time, MoDOT is pursuing many different funding sources to complete the recommended improvements along the corridor. Opportunities and partnerships to obtain funding for the project include, but are not limited to the following:

- FRA Grant Dollars
- MoDOT Multi-Modal Department – Rail Safety Funding
- MoDOT SW District
- BNSF Railway

It is not anticipated that any of the local public agencies will contribute funding towards the recommended improvements. However, once funding for the projects have been programmed, detailed design for the recommended improvements will need to be completed and a design and construction schedule should be developed and communicated with all parties for implementation.

7.4 Communication Plan

Communication with the public and receiving local input was vital to the success of the Railroad Safety Study. It is recommended that MoDOT, in partnership with the local public agencies continue to update the public and participating partners on the progress towards implementing the project. A master contact list is located in Section 2 of the report and should be used when final plans and funding are obtained for the improvements.

APPENDIX A
MODOT MULTI-MODAL RAIL CROSSING SAFETY STUDY
MARIONVILLE SECTION
Monday, November 27, 2017
Alternate #3A COST ESTIMATE

	TOTAL
DEMOLITION	\$ 10,000
Existing Pavement Removal	\$ 10,000
STRUCTURAL	\$ -
Underpass Construction	N/A
ROADWAY	\$ 399,000
Excavation	\$ 8,000
Embankment	\$ 20,000
Aggregate Base (4")	\$ 40,000
Full Depth Pavement (8")	\$ 250,000
Drainage	\$ 70,000
Pavement Marking	\$ 3,000
Erosion Control	\$ 5,000
Signing	\$ 3,000
ENVIRONMENTAL MITIGATION	\$ -
Hazardous Waste Disposal	N/A
RAILROAD CROSSINGS	\$ 560,000
BNSF RR At-Grade Removal	\$ 60,000
Railroad Crossing Gates	\$ 500,000
MOBILIZATION	\$ 60,000
Assume 6% for Mobilization	\$ 60,000
MAINTENANCE OF TRAFFIC	\$ 15,000
Assume Staged Constuction	\$ 15,000
TOTAL CONSTRUCTION OPINION OF PROBABLE COST (2017 DOLLARS)	\$ 1,044,000
PRELIMINARY DESIGN LEVEL CONTINGENCY (20%)	\$ 208,800
SUB-TOTAL	\$ 1,252,800
INFLATION (3% PER YEAR) ASSUMING CONSRUCTION IN 2019	\$ 75,168
TOTAL CONSTRUCTION OPINION OF PROBABLE COST (2019 DOLLARS)	\$ 1,327,968
UTILITIES	\$ 60,000
Overhead High-Voltage Electrical Relocation	\$ 50,000
Potential Underground Gas Relocation	N/A
Potential Underground FO Relocation	\$ 10,000
Potential Sanitary Sewer Relocate	N/A
Potential Water Main Relocate	N/A
LAND ACQUISITION	\$ 50,000
O'Dell to MO 14 Connector	\$ 50,000
ENGINEERING	\$ 115,000
Phase 2 Design Phase Engineering	\$ 115,000
SUB-TOTAL	\$ 225,000
TOTAL PROGRAM BUDGET (2019 DOLLARS)	\$ 1,552,968
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.	

LEGEND

- BNSF MAINLINE
- BNSF SPURLINE
- WATER WAY
- ROADWAY IMPROVEMENTS
- ROADWAY & STORMWATER IMPROVEMENTS
- CROSSING REMAINS OPEN
- AT-GRADE CROSSING CLOSURE
- AT-GRADE CROSSING REMAINS OPEN WITH IMPROVEMENTS
- INTERSECTION IMPROVEMENTS
- UNDERPASS IMPROVEMENTS

LAWRENCE COUNTY

CHRISTIAN COUNTY

FR 1210 AT-GRADE
DOT # - 673309H
M.P. 266.78

FR 1220 AT-GRADE
DOT # - 673307U
M.P. 265.74

WESTERN ST. AT-GRADE
DOT # - 673306M
M.P. 264.58

FR 2200 AT-GRADE (CLOSED)
DOT # - 673308B
M.P. 265.92

LINCOLN ST. AT-GRADE
DOT # - 673302K
M.P. 263.00

CENTRAL AVE. AT-GRADE
DOT # - 673305F
M.P. 264.00

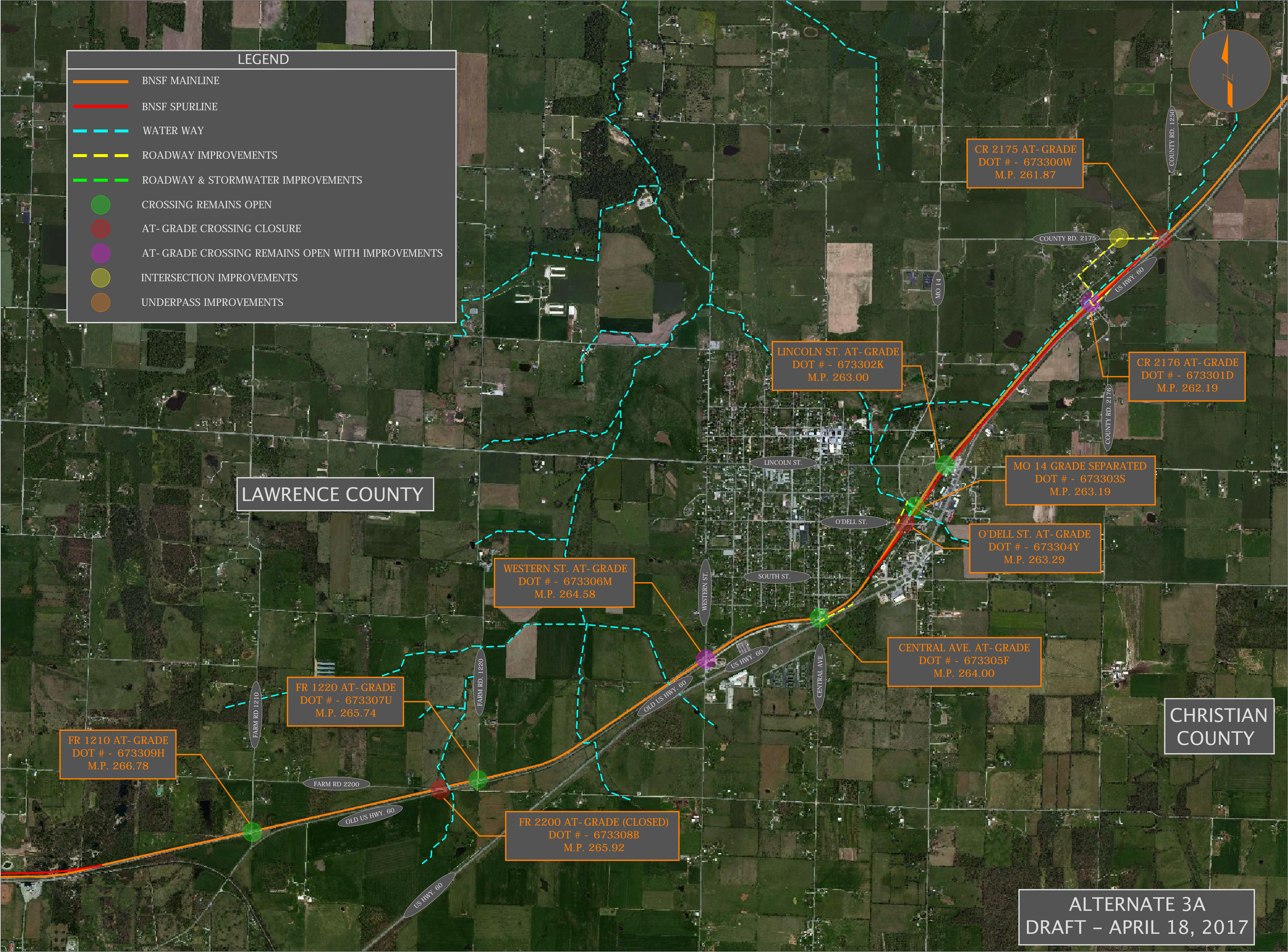
CR 2175 AT-GRADE
DOT # - 673300W
M.P. 261.87

O'DELL ST. AT-GRADE
DOT # - 673304Y
M.P. 263.29

MO 14 GRADE SEPARATED
DOT # - 673303S
M.P. 263.19

CR 2176 AT-GRADE
DOT # - 673301D
M.P. 262.19

ALTERNATE 3A
DRAFT - APRIL 18, 2017



LEGEND

- BNSF MAINLINE
- BNSF SPURLINE
- WATER WAY
- ROADWAY IMPROVEMENTS
- ROADWAY & STORMWATER IMPROVEMENTS
- CROSSING REMAINS OPEN
- AT-GRADE CROSSING CLOSURE
- AT-GRADE CROSSING REMAINS OPEN WITH IMPROVEMENTS
- INTERSECTION IMPROVEMENTS
- UNDERPASS IMPROVEMENTS

LAWRENCE COUNTY

CHRISTIAN COUNTY

ALTERNATE 3B
DRAFT – OCTOBER 2017

FR 1210 AT-GRADE
DOT # - 673309H
M.P. 266.78

FR 1220 AT-GRADE
DOT # - 673307U
M.P. 265.74

WESTERN ST. AT-GRADE
DOT # - 673306M
M.P. 264.58

FR 2200 AT-GRADE (CLOSED)
DOT # - 673308B
M.P. 265.92

LINCOLN ST. AT-GRADE
DOT # - 673302K
M.P. 263.00

CENTRAL AVE. AT-GRADE
DOT # - 673305F
M.P. 264.00

O'DELL ST. AT-GRADE
DOT # - 673304Y
M.P. 263.29

MO 14 GRADE SEPARATED
DOT # - 673303S
M.P. 263.19

CR 2176 AT-GRADE
DOT # - 673301D
M.P. 262.19

CR 2175 AT-GRADE
DOT # - 673300W
M.P. 261.87