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ROUTES MM & ZZ LOCATION STUDY
MISSOURI DEPARTMENT OF TRANSPORTATION

PROJECT NO. J8S0836D & J8S0836C



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1. PURPOSE AND NEED

1.1 PROJECT HISTORY:

Projects J8S0836D and J8S0836C are to address existing and future concerns due to growing traffic volumes within the Routes MM & ZZ corridor. Initially, the J8S0836 project series extended from I-44 to Rte. ZZ in Republic before it was broken into multiple segments. The J8S0836C project addresses the area between Rte. ZZ and US 60, while J8S0836D focuses on the segment between US 60 and Farm Road 160. Another project (J8S0836B) covers the area between Rte. 360 (James River Freeway) and I-44, and the remaining section of Rte. MM between FR 160 and James River Freeway remains under the root project J8S0836.

The necessary corridor improvements were identified through traffic analysis performed by a consulting agency and are discussed in detail in this report. Officials representing the City of Republic, Greene County, and the Ozarks Transportation Organization (OTO) have participated in discussions for this project and MoDOT anticipates strong public support for these improvements.



Existing intersection at US 60, Route MM, & Route M in Republic

1.2 DESCRIPTION OF EXISTING TRANSPORTATION FACILITIES

MO Route ZZ is 8.595-mile north/south major collector in Greene County that extends from Route 14 in Clever to Route M in Republic. Built in 1989, it carries approximately 7,699 veh/day (2019) and is comprised of two 12'-wide lanes of 1.25" type C asphaltic concrete over 8.75" plant mix bituminous base over 4" type 2 aggregate. Intersection improvements to install signals

at ZZ/M in 2008 included the widening of Rte. ZZ to accommodate a left turn lane between Rte. M & Repmo Dr. and a right turn lane on the northbound approach to Rte. M. There is currently no direct access from Rte. ZZ to US 60. Instead, US 60 can be reached from Rte. ZZ via Rte. M, FR 101, and FR 103, with Rte. M ending at a signalized intersection with 60.

Opposite Rte. M at its terminus at US 60, Rte. MM is a 3.95-mile north/south minor arterial with two 12' wide lanes that connects US 60 at its south end to I-44 at its north end. This route sees approximately 9,015 veh/day (2019) and was originally built in 1921. A signalized at-grade railroad crossing with BNSF rail and Rte. MM is located 530' from the intersection at US 60. The existing intersection between Rte. MM and FR 160 is 1.2 miles north of US 60.

US 60 is a 2,655-mile (in total) east/west route that runs 340.8 miles from the Missouri-Kansas border at Seneca to the Missouri-Illinois border in Mississippi County. Within the project vicinity it is a 4-lane divided highway with 12'-wide lanes & 10'-wide shoulders and carries approximately 23,739 veh/day (2020). The existing intersection of US 60, Route M, & Route MM is located at 37° 08' 44.96" N, 93° 25' 44.61" W in Republic and is currently controlled by span-wire signals directing four lanes of travel in the east/west direction and two lanes of travel in the north/south direction with single left-turn lanes in each direction. An existing bridge about 2,400' northeast of the intersection carries BNSF rail over US 60.

Farm Road 103 runs 0.952 miles north/south between US 60 and Rte. M along the quarter line of Section 11, Township 28N, Range 23W. It is a 20'-wide roadway intersected by a BNSF railroad spur a quarter mile south of US 60. FR 103 provides normal access to several adjacent properties.

1.2.1 EXISTING FACILITIES

Rte. MM

Beginning Log Mile	Ending Log Mile	Pavement		Year Built	Roadbed Width	Min. R/W Width	Access Control
		Width	Type				
0.00	2.746	24 ft.	BM	1921	24 ft.	60 ft.	Normal Access

Rte. ZZ

Beginning Log Mile	Ending Log Mile	Pavement		Year Built	Roadbed Width	Min. R/W Width	Access Control
		Width	Type				
0.000	0.052	48 ft.	BM	1989	58 ft.	150 ft.	Normal Access
0.081	0.216	36 ft.	BM	1989	44 ft.	140 ft.	Normal Access

1.2.2 RAILROAD CROSSINGS

Location	No. Tracks	No. Movements	Speed	Present Protection
FR 103	1	2	45	Yield control
Rte. MM/Brookline	1	2	45	Signalized stop control
FR 93/172	1	2	45	Signalized stop control
FR 170	1	2	45	Signalized stop control
E Haile St	2	2	20	Signalized stop control

1.3 PROPOSED DESIGN CRITERIA

A consulting agency (Olsson) was tasked by MoDOT to perform a capacity analysis and traffic study for the corridor to determine the preferred future cross-section of the realigned Rte. MM and extension of Rte. ZZ. Four alternatives were considered as part of this study: three-lane vs five-lane and partial build vs full build (see Appendix A for descriptions of typical section alternatives). It was determined that the full build alternative would most adequately address projected traffic volumes and economic growth in the area, with the construction of a five-lane cross-section between US 60 & FR 160 and a three-lane cross-section between US 60 and Rte. ZZ (Olsson, 2021). This southern segment, while constructed as a three-lane facility, would include the purchase of sufficient right-of-way to widen the segment to five lanes in the future. The decision was made to install sacrificial type A3 shoulders along this section instead of curb and gutter to minimize removal costs and lost value if the road were to be widened to five lanes. Additionally, it was also recommended that Route MM between FR 160 and Route 360 (JRF) be widened to five lanes to accommodate this anticipated growth.

The proposed facility has a functional classification of freeway with a design average daily (ADT) traffic of 30,620 for MM between FR 160 & US 60 and 12,250 for ZZ between US 60 and Rte. Z. In accordance with MoDOT's design criteria, and discussion with the district operations engineer, the following criteria will be used when designing this facility based on the stated functional classification and traffic in level/rolling terrain.

*Based on Routes MM & ZZ Corridor Study by Olsson

Route	Const. ADT (2025)	Design ADT (2045)	Operational (Posted) Speed	No. & Width Of Lanes	Median Width	Roadbed Width	Right of Way	
							Width	Control
MM	7,830 (2020)	22,720-30,620	45	5	14' TWLTL	82'	130'	PCA
ZZ	N/A	12,250	45	3	14' TWLTL	50'	130'	PCA

Proposed typical sections for Routes MM and ZZ are included in Appendix B.

1.4 SYSTEM LINKAGE

Facility at the north end of the projects: J8S0836C: US 60, J8S0836D: FR 160

Facility at the south end of the projects: J8S0836C: Rtes. ZZ/M, J8S0836D: US 60

Rte. ZZ acts as one of the main connections between Republic, Nixa, and Clever. The route is mostly rural but provides access to many residential properties and several traffic generators such as Wilson's Creek National Battlefield and Republic High School.

Rte. MM extends about four miles from US 60 in Republic to I-44. This corridor is expected to continue experiencing heavy development as it provides access to generators like the Amazon STL3 facility, Magellan Midstream Partners L.P., and the McLane distribution center.

1.4.1 LOGICAL TERMINI

The Federal Highway Administration defines logical termini as “rational end points for a transportation improvement and a review of environmental impacts” (FHWA, 1993). Three principles are used to define these points:

1. Termini must be of sufficient length to address environmental matters on a broad scope.
2. Termini must be set such that a project is determined to have independent utility and be a reasonable expenditure.
3. Termini are placed to not restrict any alternatives or foreseeable improvements.

For this study, the logical termini are specified as:

- For J8S0836C (Rte. ZZ extension) – 1.) At the existing intersection of Route ZZ and Route M and 2.) at the proposed intersection of the Route ZZ extension with US 60 and Route MM.
- For J8S0836D (Rte. MM realignment) – 1.) At the existing intersection of Route MM and Farm Road 160 and 2.) at the proposed intersection of the Route MM realignment with US 60 and Route ZZ.
- For J8S0836 (the entire corridor) – 1.) At a point about 300' north of the northernmost ramps at the existing interchange of James River Freeway and Route MM and 2.) at the existing intersection of Route ZZ and Route M.

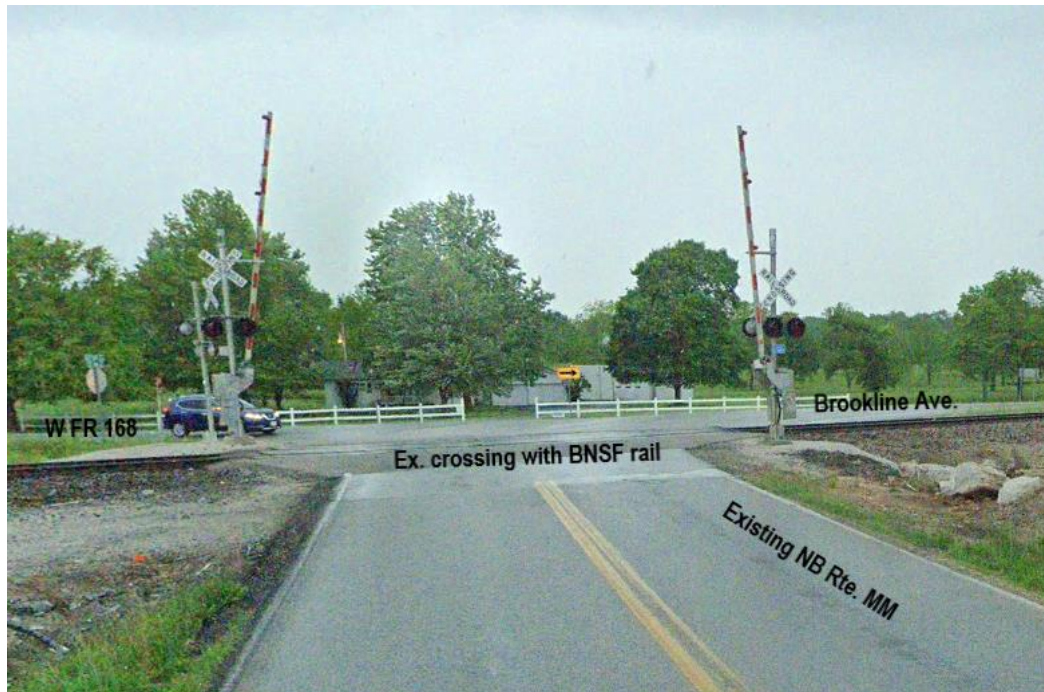
1.5 OVERVIEW OF PURPOSE AND NEED

To address recent and projected growth in the area, Route MM was identified as likely to be over-burdened in the near future, with sections of the corridor already performing at a level of service (LOS) D or F (Olsson, 2021). Its location between I-44 and US 60 as well as the access it provides to existing and future traffic generators make it subject to high levels of congestion,

particularly near its intersections with the interstate and US 60. This congestion is likely to increase as the City of Republic expects population growth of up to 100% by 2040 (Republic, n.d.). Development throughout the corridor has recently accelerated with the construction of new residential properties and commercial facilities such as the Cox Health Center and the Amazon STL3 Fulfillment Center. South of US 60, access to Republic High School via Route M and Farm Road 103 will also see increased usage as development extends east from Republic towards Wilson's Creek National Battlefield and Route ZZ. MoDOT, in cooperation with the City of Republic and Greene County, is proposing significant corridor improvements along Rte. MM between Route 360 (James River Freeway) & US 60 and an extension of Route ZZ from its current terminus at Route M north to US 60 in order to accommodate these future concerns. Recommended improvements include the construction of a five-lane corridor between US 60 & Farm Road 160 and a 3-lane corridor between US 60 & Routes M/ZZ. A new signalized intersection will be constructed at US 60 & Route MM, and the existing intersections of ZZ/M and MM/FR 160 will be converted into dual lane roundabouts. In addition to increasing corridor capacity, another primary objective of this project is to eliminate (or greatly reduce) the negative impacts to traffic caused by trains at the existing rail crossings. In total, four crossings are expected to be eliminated as a result of the realignment of Rte. MM and one as a result of the extension of Rte. ZZ:

1. Rte. M and Farm Road 168, about 600 ft. north of US 60
2. Farm Road 170, just north of US 60 and west of Rte. MM
3. Farm Road 172 & Farm Road 93, just north of US 60 and west of Farm Road 170
4. E Haile Street and E Orr Street, near Brookline Fire Station No. 1
5. Farm Road 103, about 1,400 ft. south of US 60 and east of Rte. MM

These rail crossings see significant usage and are occasionally obstructed by trains causing backups and presenting serious safety concerns. The proposal calls for the permanent closure and removal of these crossings. The realignment of Route MM will include a railroad overpass to eliminate all referenced crossings north of US 60, and the extension of Route ZZ will replace the crossing on Farm Road 103 with another railroad overpass.



Railroad crossing on Rte. MM just north of US 60 and Kum & Go

Congestion at the existing intersection of Farm Road 103 & Route M due to thru traffic was also investigated as part of the study. It was determined that providing an alternate connection between US 60 and Route ZZ could help to alleviate congestion at this intersection and improve the existing roundabout level of service to LOS A by 2045 (Olsson, 2021). One early consideration for the Route ZZ connection was to carry Route ZZ traffic along existing Route M to Farm Road 103 and then along FR 103 to US 60. This was of particular concern to the City of Republic and the Republic School District due to the expected impact of increasing thru traffic volume, and the alternative was abandoned.

1.6 ACCIDENT DATA, SAFETY ENHANCEMENTS AND ACCESS MANAGEMENT

Between 2016 and 2020, there were 77 total crashes (See Appendix E, Accident Summaries) along the existing **Rte. MM** alignment between Farm Rd. 160 (L.M. 2.746) and US 60 (L.M. 3.95). Of these incidents, five resulted in serious injuries, 22 in minor injuries, and 50 accidents resulted in only property damage. There were no fatal crashes in this area over the 5-year study period. Many these were rear end crashes (41), right-angle crashes (8), or out-of-control crashes (11)

OFFSET	TRAVEL WAY ID	DESIGN ACTION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	2603	RT	MM	S	2.746	3.95	6	6	GREENE	GREENE	2.746	3.95	CRD 160 E	US 60 E

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	2	2	0	0	1	5
MINOR INJURY	7	3	4	4	4	22
PROPERTY DAMAGE ONLY	13	9	10	10	8	50
TOTAL	22	14	14	14	13	77
AADT	9201	9283	9377	7400	7785	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	544.09	343.18	339.74	430.5	379.98	
STATE RATE-RT	283.32	274.29	277.06	271.45		ROUTE DESG
STATE RATE-TWO-LANE	211.67	208.06	210.88	194.42	0	ROADWAY TYPE

There were 59 total crashes (See Appendix E, Accident Summaries) on **westbound US 60** in the vicinity of the existing intersection with Rtes. MM & M (L.M. 21.693 to 21.767), comprised of two serious injuries, 11 minor injuries, 46 property damage only accidents, and zero fatalities over the study period. This segment saw a lot of rear end crashes (49) and right-angle collisions (5) from following too close or running the light.

OFFSET	TRAVEL WAY ID	DESIGNATION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	7783	US	60	W	265.042	265.116	6	6	GREENE	GREENE	21.693	21.767	CO US60W TO RTMM N	CO RTMM TO US60W W

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	1	1	0	0	0	2
MINOR INJURY	1	3	2	1	4	11
PROPERTY DAMAGE ONLY	8	8	9	9	12	46
TOTAL	10	12	11	10	16	59
AADT	13171	13290	13091	13504	11505	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	2810.97	3342.96	3110.97	2741.66	5148.83	
STATE RATE-US	116.14	108.89	113.73	114.39		ROUTE DESG
STATE RATE-EXPRESSWAY	133.59	127.2	130.67	118.21	0	ROADWAY TYPE

Along **eastbound US 60** there were 66 total crashes (See Appendix E, Accident Summaries) including three serious injury crashes, nine minor injury crashes, 54 property damage only crashes, and zero fatalities. Like westbound US 60, most accidents were rear end crashes (40).

OFFSET	TRAVEL WAY ID	DESIGNATION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	7782	US	60	E	74.821	75.879	6	6	GREENE	GREENE	4.946	6.004	CRD 170 E	CRD 101 S

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	1	1	0	0	1	3
MINOR INJURY	2	0	3	3	1	9
PROPERTY DAMAGE ONLY	15	12	14	8	5	54
TOTAL	18	13	17	11	7	66
AADT	14571	14702	14482	14870	11719	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	319.89	228.98	303.98	191.56	154.68	
STATE RATE-US	116.14	108.89	113.73	114.39		ROUTE DESG
STATE RATE-EXPRESSWAY	133.59	127.2	130.67	118.21	0	ROADWAY TYPE

At the **existing intersection of Rtes. ZZ and M**, past accident history includes three minor injury crashes and 11 property damage only crashes for a total of 14 crashes (See Appendix E, Accident Summaries) over the past five years. Of these crashes, eight were rear-end crashes, three were right-angle crashes, two were head-on crashes, and one was an out-of-control crash.

OFFSET	TRAVEL WAY ID	DESIGNATION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	2727	RT	ZZ	S	0	0	6	6	GREENE	GREENE	0	0	RT ME	RT ME

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	0	0	0	0	0	0
MINOR INJURY	0	1	0	2	0	3
PROPERTY DAMAGE ONLY	4	3	1	1	2	11
TOTAL	4	4	1	3	2	14
AADT	6816	6874	6831	6871	6609	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	1.61	1.59	0.4	1.2	0.83	
STATE RATE	0.37	0.38	0.34	0.33	0	

Ten total accidents (See Appendix E, Accident Summaries) occurred at the **intersection of FR 103/Commercial Ave. and US 60** between 2016 and 2020, of which one was a fatal crash, two resulted in minor injuries, and seven resulted in property damage only. The lone fatality came from November of 2016 when a westbound car turned southbound to 103 in front of an eastbound car causing a right-angle crash. The front-seat passenger of the westbound vehicle sustained fatal injuries. Five of the ten accidents were rear-end crashes.

OFFSET	TRAVEL WAY ID	DESIGNATION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	7782	US	60	E	76.484	76.484	6	6	GREENE	GREENE	6.609	6.609	CST COMMERCIAL AVE S	CST COMMERCIAL AVE S

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	1	0	0	0	0	1
SERIOUS INJURY	0	0	0	0	0	0
MINOR INJURY	1	0	0	0	1	2
PROPERTY DAMAGE ONLY	2	1	3	1	0	7
TOTAL	4	1	3	1	1	10
AADT	24987	25232	24872	27006	23875	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	0.44	0.11	0.33	0.1	0.11	
STATE RATE	0.37	0.38	0.4	0.41	0	

There was a total of nine accidents (See Appendix E, Accident Summaries) at the **existing intersection of Rte. MM and FR 160**, two of which resulted in minor injuries and seven resulted in property damage only. Three of the accidents were rear-end crashes.

OFFSET	TRAVEL WAY ID	DESIGN ACTION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	2603	RT	MM	S	2.746	2.746	6	6	GREENE	GREENE	2.746	2.746	CRD 160 E	CRD 160 E

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	0	0	0	0	0	0
MINOR INJURY	0	1	0	1	0	2
PROPERTY DAMAGE ONLY	3	2	2	0	0	7
TOTAL	3	3	2	1	0	9
AADT	24039	24256	23892	25617	22517	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	0.34	0.34	0.23	0.11	0	
STATE RATE	0.37	0.38	0.4	0.41	0	

1.7 ROADWAY CAPACITY

Segment	Construction Year (2025)		Design Year (2045)	
	ADT	LOS	ADT	LOS
MM (FR 160 to US 60)	7,830 (2020)	A	22,720- 30,620	A
ZZ (US 60 to Rte. M)	N/A	N/A	12,250	A

Intersection Location	Intersection Type	Construction Year LOS	Design Year LOS
Rte. MM/FR 160 (Existing)	Unsignalized to Roundabout	N/A	A
Rte. MM/Rte. 60/Rte. M (Existing)	Signalized	AM: D, PM: F	AM: B, PM: C
Rte. 60/FR 103 (Existing)	Unsignalized to Signalized	F	E
Rte. ZZ/Rte. M (Existing)	Signalized to Roundabout	AM: C, PM: D	B
Rte. M/FR 103 (Existing)	Ex. Roundabout	B	A

1.8 ROADWAY DEFICIENCIES

Several notable deficiencies exist throughout this corridor that are directly or indirectly correlated with recent crash history. Adequate sight distance is a concern at several intersections as a result of vegetation or geometric constraints. For example, FR 101 intersects Rte. M at a 35° angle creating a challenge for drivers to see approaching vehicles and forcing larger vehicles to enter opposing lanes when making NB-to-EB or SB-to-WB movements. The existing intersections at US 60/FR 101 & US 60/FR 103 present similar concerns, although the 2017 addition of offset left & right turn lanes at these locations has helped address them.

As described above, 62% of the accidents within the study area between 2016 and 2020 were rear-end crashes resulting from vehicles following others too closely or driver inattentiveness, and almost 10% were out-of-control crashes. The sharp curves and lack of shoulders throughout much of the corridor contribute to deficient space for errant vehicle recovery. As the existing route experiences >4,500 AADT, a benefit/cost analysis is likely to show that adding or widening shoulders to the existing roadway would provide a good return on investment (EPG 231.4.2).

Based on current and projected traffic volumes along Route MM and existing roadway features, a minimum clear zone of 22 feet should be maintained (Roadside, 2011). Upon site inspection, several existing culverts can be seen within this clear zone that have been left unprotected by guardrail. This presents a safety concern as these objects can prevent vehicle recovery and introduce more collision potential were a driver to lose control of their vehicle.

This project will remove five existing railroad crossings within the area. The railroad crossings at FR 172 & FR 93, FR 170, Rte. MM & FR 168/Brookline Ave, and at E Haile St. (all north of 60) will be closed as part of J8S0836D while the railroad crossing at FR 103 south of US 60 will be replaced with a bridge over the railroad as part of J8S0836C. Current conditions result in the occasional blockage of these routes by trains causing traffic backups.

1.9 ADDITIONAL JUSTIFICATION

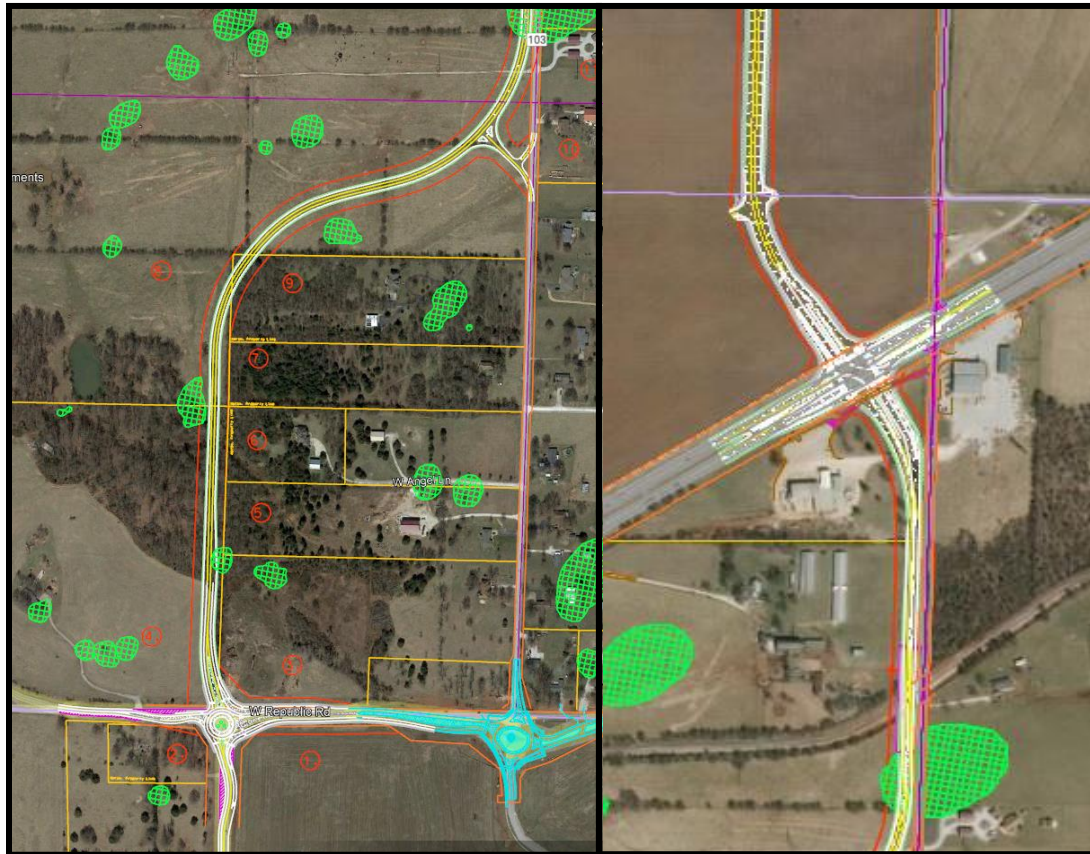
Future development will also add strain the existing system. The US 60 corridor in Republic is experiencing accelerated development. New housing developments and apartment complexes along with commercial properties such as the Cox Health Center and the Amazon STL3 Fulfillment Center are causing increased traffic congestion and a need for improved transportation facilities. The existing intersection at US 60 & Rte. MM was found to currently perform at a LOS D during the AM peak hour and a LOS F during the PM peak hour (Olsson, 2021). The intersection at Rtes. M & ZZ operate at a LOS C in the AM peak hour and a LOS D in the PM peak hour (Olsson, 2021). The existing US 60 & FR 103 intersection performs at a LOS F for both AM and PM peak hours (Olsson, 2021). These intersections will be improved and the new route constructed such that the capacity of the new facilities will be capable of sustaining projected design volumes.

2. ALTERNATIVES ANALYSIS

Multiple alternatives were considered to address crash history and eliminate at-grade railroad crossings in the area. Several, such as incorporating FR 101 as part of the Rte. ZZ extension, splitting the Pig Farm property with the new Rte. ZZ alignment, or realigning Rte. MM along Commercial Ave, were initially discussed and dismissed. A Rte. ZZ realignment along FR 101 was eliminated due to major sinkhole concerns. Upcoming development planned for the Pig Farm was the main deterrent for avoiding that property. Realigning Rte. MM along Commercial Ave. created geometric constraints that would increase the cost of the project significantly and cause greater impact to adjacent residences. Ultimately, three alternatives were identified for further analysis (see Appendix C for alternatives exhibits).

FINAL STUDY ALTERNATIVES:

2.1 Green Line Alternative (Concept 1): Roundabouts at M/ZZ & FR 160/MM



Extension of Rte. ZZ, roundabout at the intersection of M/ZZ, and existing roundabout at intersection of M/FR 103 (in blue).

Signalized intersection at US 60/MM/ZZ.

As part of project J8S0836C, the first alternative includes constructing a 3-lane, 1.039-mile-long extension of Rte. ZZ between the current northern terminus at Rte. M and US 60. A new two-lane roundabout will be installed at the intersection of Rte. M and the new Rte. ZZ extension. Curves in alignment are placed such that requirements for geometry based on superelevation (minimum radii, curve length, etc.) are balanced with limiting impacts to existing properties. A new bridge will be built over the existing BNSF railroad spur, as well as a new signalized intersection with US 60. The proposed roadway will include a sacrificial type A3 shoulder in place of curb & gutter to avoid the lost costs of removing the curb & gutter and storm sewer system if the road was to be widened to five lanes. A new connection between Rte. MM and Commercial Ave. will also be constructed.



Realignment of Rte. MM and roundabout at MM/FR 160.

J8S0836D will include a 5-lane, 0.897-mile-long realignment of Rte. MM between FR 160 and the new intersection at Rte. ZZ & US 60. A new bridge will be constructed over the existing BNSF railroad and a two-lane roundabout will be installed at the new intersection of Rte. MM & FR 160. This design will include curb & gutter and storm sewer facilities. No displacements are expected from Concept 1.

2.2 Blue Line Alternative (Concept 2): Roundabouts Plus Reverse Curves Moved Further South



Reverse curves of Rte. ZZ moved further south.

The second alternative features similar alignment and intersection geometry as Concept 1. However, the curves of the Rte. ZZ extension are further to the south, allowing maximum usage of the existing FR 103 roadbed as well as providing ample space between the curves and the railroad bridge to ensure there is no need for horizontal curvature of the bridge. This alignment requires more inconsistent impacts to existing properties than Concept 1 and will cause at least one displacement, but it is more accommodating to currently proposed development projects in the area.

2.3 Red Line Alternative (Concept 3): Signalized Intersections at M/ZZ & FR 160/MM



Signalized intersection at M/ZZ.

Signalized intersection at MM/FR 160.

The third alternative substitutes the proposed roundabout intersections at Rte. MM/FR 160 & Rtes. M/ZZ with signalized intersections. The alignments for both routes are simplified due to removal of the skewed approaches at the roundabouts, causing Rte. ZZ to run directly north from the new M/ZZ intersection. This results in increasing property impacts to the east of the Rte. ZZ alignment (by including three additional properties) but reducing the impacts to the west of the alignment. No displacements are expected from Concept 3.

Full plan views of each alternative are available in Appendix C.

2.4 COST ESTIMATES

J8S0836C – Route ZZ Extension between Route M & US 60			
(Costs in 1,000's)	Concept 1	Concept 2	Concept 3
Categories	Roundabouts at MM/FR 160 & ZZ/M	Roundabouts plus reverse curves moved further south	Signalized intersections at MM/FR 160 & ZZ/M
Bridge/MSE Wall	5,630	5,630	5,630
Grading/Drainage	6,789	7,024	6,896
Misc.	3,456	3,222	3,486
Pavement/Base	2,906	2,963	2,662
Contract Estimate	18,781	18,839	18,674
Const. Contingency (2%)	376	377	373
Construction Estimate	19,157	19,216	19,047
Utilities	1,675	1,675	1,675
Other Costs	200	200	200
Construction Cost (Total)	21,032	21,091	20,922
Right-of-way Acreage	16.4	17.5	17.3
Right-of-way Costs	3,315	3,537	3,497

J8S0836C (Continued)			
Right-of-way Incidentals	70	70	70
Preliminary Engineering (12%)	2,254	2,261	2,241
Construction Engineering (8%)	1,502	1,507	1,494
Total Project Cost	28,173	28,466	28,224

J8S0836D – Route MM Realignment between Farm Road 160 & US 60			
(Costs in 1,000's)	Concept 1	Concept 2	Concept 3
Categories	Roundabouts at MM/FR 160 & ZZ/M	Roundabouts plus reverse curves moved further south	Signalized intersections at MM/FR 160 & ZZ/M
Bridge/MSE Wall	5,454	5,454	5,454
Grading/Drainage	10,776	10,776	10,955
Misc.	3,893	3,893	4,082
Pavement/Base	2,944	2,944	2,847
Contract Estimate	23,067	23,067	23,338
Const. Contingency (2%)	461	461	467
Construction Estimate	23,528	23,528	23,805
Utilities	1,151	1,151	1,151
Other Costs	200	200	200
Construction Cost (Total)	24,879	24,879	25,156
Right-of-way Acreage	14.1	14.1	14.9
Right-of-way Costs	2,859	2,859	3,021
Right-of-way Incidentals	80	80	80
Preliminary Engineering (12%)	2,768	2,768	2,801
Construction Engineering (8%)	1,845	1,845	1,867
Total Project Cost	32,431	32,431	32,925

CONCEPTUAL COST DATA:

Cost (\$1,000's)

Right of Way Costs: J8S0836D: \$2,939
J8S0836C: \$3,385

Contract Estimate: J8S0836D: \$23,067
J8S0836C: \$18,781

Detailed cost estimates for each concept are included in Appendix D.

2.5 SATISFACTION OF THE PURPOSE AND NEED

Through internal alternative analyses and in concurrence with the traffic study provided by Olsson, each alternative was considered to address the concerns presented by projected growth in the project vicinity. Many economical and practical factors involved in the analyses were considered including necessary right-of-way acquisition, environmental impact, level of service, accessibility to adjacent properties, existing & future traffic volumes, existing crash history &

crash predictions, upcoming development, traffic interaction at intersections, travel time, drainage concerns, geometric constraints, and overall construction costs.

The variation in alignments of each alternative meant that each concept affected a unique area and required different amounts of acquisition. Due to the number of potentially impacted properties (25), Concept 3 was considered undesirable relative to Concepts 1 & 2 which would potentially affect 22 & 24 properties respectively. Concepts 2 & 3 would require more tree clearing than Concept 1, meaning greater potential for negative impacts to threatened or endangered species. Concept 2 was also considered undesirable due to a displacement caused by the alignment.

All three concepts involve limiting access to the relocated routes in order to ensure optimal traffic flow and reduce conflict points. Direct access from Rte. ZZ to adjacent properties will rely on the existing FR 103 remaining in place. A new connection between it and the extension of Rte. ZZ will be constructed to minimize access along the corridor. Due to the location of the curves in Concept 2, additional access point(s) to the west of Rte. ZZ would be required to allow connectivity to residences on the west side. However, Concepts 1 & 3 would keep access to these properties to the east of the new alignment allowing local traffic to continue using FR 103 and reducing access to a single intersection with Rte. ZZ.

Based on expected ADT, the provided traffic study identified the proposed intersection of Routes MM/ZZ and Route M as operating at a LOS D during peak periods if signalized (Concept 3). Alternatively, as a roundabout the intersection is expected operate at a LOS B for AM and LOS C for PM peak hours. With the addition of a westbound slip right-turn lane, the roundabout could operate at LOS B for both AM and PM peak hours, making this (Concepts 1 & 2) the preferred configuration (Olsson, 2021). Furthermore, the roundabouts are expected to require less widening than the signalized intersections would while reducing travel time by introducing continuous flow to the intersections.

The most significant difference between Concept 2 and the others is the location of the reverse curves between Route M and US 60. The location of these curves was central to the discussion surrounding the projects effects on planned development in the area. The underlying and governing geometric constraints in this case were requirements associated with achieving proper superelevation runoff/runout lengths to provide a comfortable and efficient transition into and out of the curves. 208 feet was calculated as the minimum length required between curves to provide adequate transitions from one curve to the next and 711 feet was found to be the required minimum radius length (MoDOT, 2021 Standard Plans 203.20 & EPG 230.1). The curves were placed such that these constraints were met. Concept 2 places the curves further south than Concepts 1 & 3 while maintaining superelevation requirements. To reduce impacts to existing residences, the curves of Concept 2 were pushed as far south as possible forcing the southernmost curve to begin directly adjacent to the roundabout. This was considered unideal as the curve would reduce southbound sight distance giving approaching drivers less of a warning of the upcoming intersection than if the approach were straight, such as in Concept 3.

As described previously, future development in this area and the impact it will have on traffic congestion is a major concern shared by MoDOT and the City of Republic. Each alternative was chosen with this projected growth in mind, with a focus on minimizing crash potential. To reduce rear-end type crashes (the most common in the area), skewed approaches were added to the roundabouts in Concepts 1 & 2 to slow vehicles approaching the intersections down. It is recommended these approaches are kept at 20°-40° skews to enhance entry deflection (NCHRP, 2010). Extra-long turn lanes were included at the proposed intersection of US 60 and Route MM (and the other two intersections for Concept 3) to allow greater space for deceleration and storage. The addition of railroad overpasses also serves to eliminate stoppage points and reduce the potential for crashes at the existing at-grade railroad crossings.

It should be noted that regardless of the chosen alternative, the traffic study identified a potential level of service concern at the proposed signalized intersection of US 60 & Routes MM and ZZ. Traffic volumes are projected to grow such that this intersection could be operating at a level of service E and approaching capacity by the design year of 2045 (Olsson, 2021). In this case, it's recommended that the intersection be reevaluated at that time and innovative designs be considered to address the increased volumes.

As part of the analysis a no-build option was also considered, but segments of Route MM were found to be approaching or above a volume-to-capacity (v/c) ratio of 1.0 by 2045 – meaning these segments would be operating over-capacity or approaching capacity by the design year (Olsson, 2021). Therefore, the no-build option was found to be undesirable since it will likely contribute to increased congestion throughout the corridor as development continues in the coming years.

3. CONSTRUCTION IMPACTS

3.1 UTILITIES

J8S0836D (FR 160 to US 60): improvements will require relocation of 345' of 12" City of Republic water line in the northwest quadrant of the proposed intersection at Rte. MM & FR 160 and an additional 570' relocation of 12" City of Republic water line along the north side of US 60 and west of FR 103. 330' of encased 12" gravity sewer and three new manholes will be constructed under the proposed alignment of Rte. MM. Southwest Power Administration has a 154 kV transmission line passing over the new alignment with two H-towers on each side that will be raised to obtain proper clearance. AT&T has a direct buried 96-count fiber optic line in easement that will be encased in a split wall duct under the new roadway fill (about 550'). City Utilities has 3-phase electric facilities at the northwest and southwest quadrant of the proposed intersection of Rte. MM and FR 160. A Liberty 69 kV line runs along the east side of the new alignment that will require a new inline tower and turning structure. Ozark Electric Cooperative owns a 3-phase crossing at US 60 and FR 103, with a parallel along the north side of US 60 east of FR 103 for which four poles are estimated for relocation. Spire has a 2" steel crossing at Rte.

MM, a 2" parallel north along the east side and a 2" parallel along the west side south of FR 160. City Utilities also has a 4" gas line along the north side of US 60 which will likely require relocation from FR 103 to west of the new intersection at 60/MM.

J8S0836C (Rte. MM/ZZ to US 60): this project will require relocation of 1026' of City of Republic 12" PVC along the south side of US 60 and 803' of City of Republic 12" PVC along the north side of Rte. M. The City of Republic has sanitary sewer along FR 103 that will require about 955' of relocation and seven new manholes. Ozark Electric Cooperative owns a 3-phase line along the west side of FR 103 and the south side of Rte. M that will require 16 pole adjustments. City Utilities has a 3-phase line buried along the north side of Rte. M, approximately 803' of which will be relocated. City Utilities also has a 345 kV line that will be impacted by the new alignment with two H-towers on each side of Rte. ZZ, a 161 kV line currently under construction that will require a mono-pole on each side of Rte. ZZ, and a 4" plastic gas main along the north side of Rte. M that will require 803' of relocation. AT&T has toll fiber in the north right-of-way of Rte. M and KAMO Electric Cooperative also has existing fiber that may be impacted.

3.2 HANDLING TRAFFIC

A large portion of construction will not affect traffic on existing facilities since much of the construction is of new roadway where there are no existing facilities. Most impacts will be at the proposed intersections where the new alignments will connect to existing ones. Intermittent lane closures will be needed to complete construction of the new intersection at 60/MM/ZZ, as well as the roundabouts at ZZ/M & MM/FR 160. A complete closure of FR 103 will be needed to build the bridge over the southern rail, with a 2-mile detour available along Route M and US 60. There will also be significant multimodal impacts due to the removal/closure of multiple railroad crossings. MoDOT will work with BNSF to coordinate an effective mitigation strategy.

3.3 DISPOSITION OF EXISTING ROUTE

In discussions with local officials from the City of Republic and Greene County, it was agreed that the existing Rte. MM should be left in place to allow access to the relocated Rte. MM from Brookline Ave. as well as to private residences and properties. Ownership and maintenance of the existing Rte. MM from FR 160 to FR 168 will likely become the responsibility of the City of Republic, but discussions on the subject are ongoing. There will be no disposition of Rte. ZZ since there is no relocation associated with it, only an extension of the existing route.

3.4 LAND USE WITHIN THE STUDY AREA

Most of the properties within the study area affected by the projects are classified as agricultural or residential, while three parcels are classified as commercial, one as exempt, and one as railroad utilities. The nearest airport (Springfield-Branson National Airport) is located about five miles north of the northern terminus of J8S0836D at FR 160. No properties that could qualify as 4(f) or 6(f) land or hazardous waste sites within the study area will be impacted by these projects.

No wetlands exist within the area, but more information is required to determine if there is any impact to an existing stream in the southern portion of the area. Future land use within the area based on projected development will primarily include properties for residential, commercial, and industrial activity. See Appendix F for more details.

3.5 ENVIRONMENTAL SUMMARY

The initial estimate for right of way to be acquired is 30.5 acres in total, with approximately 3.5 acres of tree clearing required for Concept 1. Concept 2 is estimated to require 31.6 acres and Concept 3 will require 32.2 acres. These acquisitions will require a farmland impact rating from NCRS. A floodplain development permit from SEMA will be required and possible impacts to threatened & endangered species (Indiana bat, northern long-eared bat) exist due to tree clearing. The projects qualify as Type 1 and will require a noise analysis. An archaeological survey will be performed on all properties that may be affected to determine the extent of potential impacts to cultural resources. No public land impacts are anticipated at this time. No displacements result from Concept 1 or Concept 3, but Concept 2 will have one displacement at 4047 S FR 103. A conceptual Request for Environmental Services (RES) for J8S0836C was reviewed and returned on 10/28/2021 and a conceptual RES for J8S0836D was reviewed and returned on 11/8/2021. A CE2 will be prepared by environmental staff to achieve Section 106 clearance. See Appendix F for more details.

4. COMMENTS AND RECOMMENDATIONS

No pre-location meeting has been conducted, and an initial virtual public meeting is tentatively scheduled for late February of 2022. All potentially affected property owners have been contacted with regards to rights of access to gather data for preliminary geotechnical and environmental studies. MoDOT will ensure sufficient opportunities will be available for addressing property owners' concerns and receiving public input.

As a result of the alternative analysis as presented above and with input from City of Republic officials & Greene County officials, *Concept 1 was chosen as the preferred alternative*. As described previously, the environmental concerns, geometric constraints, necessary right-of-way acquisition, and level of service associated with Concepts 2 & 3 were deemed unfavorable relative to Concept 1. A preference for roundabouts at the proposed intersections of Rte. MM & FR 160 and Rte. ZZ & Rte. M based on construction costs, anticipated maintenance issues, and intersection level of service were the primary reasons for this study's recommendation against Concept 3, while reducing accessibility and right-of-way displacement made a strong case against Concept 2.

Submitted by:

Warner “Bud” Sherman, P.E., PMP
Transportation Project Manager

Design Liaison Engineer’s Comments & Recommendations:

Appendices

Appendix A – Executive Summary of Traffic Analysis Study Performed by Olsson
&
Descriptions of Typical Section Alternatives for Analysis

Appendix B – Proposed Typical Sections

Appendix C – Concept Exhibits and Proposed Layouts

Appendix D – Concept Cost Estimates

Appendix E – Accident Summaries

Appendix F – Review of Environmental Impacts by MoDOT

Appendix G – Final Corridor Traffic Study Provided by Olsson

Appendix H – Project Schedules

Appendix I – References

Approved by:

Steve Campbell, P.E.
District Engineer

cc: Construction and Materials Division
 Traffic Division

Appendix A

Executive Summary of Traffic Analysis Study Performed by Olsson

&

Descriptions of Typical Section Alternatives for Analysis

EXECUTIVE SUMMARY

The purpose and need of this project are to provide traffic analysis, modeling, and forecasting with recommendations for staged project implementation of the conceptual Route MM corridor alignment to meet projected forecasts. This report summarizes the analysis associated with the proposed realignment of Route MM in Republic, Missouri. This realignment would include two rail overpasses and coincide with the closure of multiple at-grade rail crossings in the area.

Considering that this corridor is a critical north-south connector for the region and is experiencing significant development activity in its vicinity, it is important to consider how the future demands can be accommodated to preserve the integrity of the corridor for all users.

Considering that this corridor is a critical north-south connector for the region and is experiencing significant development activity in its vicinity, it is important to consider how the future demands can be accommodated to preserve the integrity of the corridor for all users.

The existing conditions pertaining to the capacity, safety, and roadway and bridge design considerations of the current alignment are described as well as the expected constraints for the future no-build scenario if no improvements are made. In order to determine the future needs of the corridor, the Ozarks Transportation Organization's (OTO) travel demand model was updated to include the expected development interests within the study area.

Four baseline alternatives were considered for the future cross-section of the realigned Route MM: three-lane vs five-lane section and partial build vs full build alignment. Under the partial build alignment, the realignment of Route MM between Farm Road 160 and US 60 would initially be constructed and tie into

Farm Road 103. Full build alignment would continue the realignment south of US 60 and directly tie into Route ZZ rather than Farm Road 103. Based on the findings of this study, Farm Road 103 would quickly reach capacity under the Partial Build alignment. Thus, it was determined that the Full Build alignment would be preferred. Based on the projected traffic volumes, a five-lane cross-section is expected to be needed along Route MM north of US 60 with a three-lane section along Route ZZ between US 60 and Route M.

Under this roadway configuration the expected 2045 design year average daily volumes for the Route MM/ZZ corridor are expected to range from 22,720 vehicles per day to 33,100 vehicles per day between James River Freeway and US 60. The highest ADTs are expected at the development access points nearest to these two main highways. Depending on how these areas develop and access is allowed, raised medians should also be considered immediately south of James River Freeway and immediately north of US 60 to control access points and increase capacity along Route MM. Route ZZ south of US 60 is expected to be approximately 12,250 vehicles per day by 2045 as a three-lane section.

If demand continues in the area as expected, this full build realignment could be programmed by the year 2027 given that Route MM three-lane capacities are expected to be reached between 2027-2032 north of US 60. South of US 60, the full build realignment is recommended as a three-lane roadway based on the volume projections. This section of Route ZZ is expected to be approximately 12,250 vpd, which is below the typical three-lane capacity, by the design year 2045.

The main connection points of the realigned Route MM corridor are at Farm Road 160, US 60, and Route ZZ. The intersection of Route MM and Farm Road 160 is expected to operate acceptably as a dual lane roundabout or signalized intersection, with the roundabout configuration resulting in the shortest delays and queues overall. Two viable roundabout configurations are presented, one of which includes a free westbound right-turn and is preferable considering it is associated with expected lower delays and crash frequency. The intersection of Route MM and US 60 is anticipated to be signalized. If volumes materialize as expected, the intersection will be reaching capacity near 2045 and be in need of re-evaluation, potentially considering innovative intersection types to accommodate demand. The intersection of Route ZZ with Route M is expected to operate acceptably as a hybrid roundabout, a portion of which includes two circulating lanes to accommodate the heaviest movements.

A conceptual cost was also conducted for the anticipated facility types along the corridor. At the time of this report, appropriate cost estimate assumptions were still in discussions with MoDOT staff. A summary of the anticipated costs will be presented in a separate submittal document.

It is understood that construction of the conceptual corridor configuration may not be feasible until funding becomes available. The table below discusses potential traffic outcomes to consider when pairing the various Route MM realignment projects.

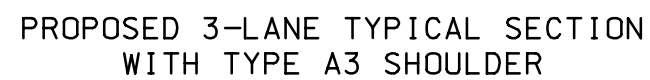
Scenario	Potential Outcome
<u>J8S0836D Constructed, J8S0836C Not Constructed, FR 103 Is Aligned with Full Access</u>	<ul style="list-style-type: none"> Traffic expected to utilize FR 103 until capacity is reached (within 3 years of initial project completion assuming unimproved FR capacity of 5,000 vpd). Once FR 103 capacity is reached, additional traffic likely to reroute to Rt M and US 60.
<u>J8S0836D Constructed, J8S0836C Not Constructed, FR 103 Is Aligned with RIRO Access</u>	<ul style="list-style-type: none"> Traffic expected to reroute to Rt M and US 60. Rt M between US 60 and Rt ZZ design year 2045 ADT increases to 12,840 vpd, potentially warranting widening to 3-lane if left-turn volumes are heavy. US 60 between Rt M and “new” Rt MM design year 2045 ADT increases to 45,180 vpd. According to OTO capacity thresholds, US 60 has a future capacity of 53,250 vpd. While not over capacity, increased congestion would be expected, and a weave scenario from Rt M, to US 60 to New Rt MM would be introduced. FR 103 between US 60 and Rt M design year 2045 ADT of 3,620 vpd (3,300 vpd northbound).
<u>J8S0836D Constructed, J8S0836A Not Constructed</u>	<ul style="list-style-type: none"> Traffic expected to utilize Rt MM until capacity is reached (possibly as early as 2027 north of FR 156 and 2032 south of FR 156). Rt MM capacity north of FR 160 expected to be 17,500 vpd as a 3-lane roadway.

Appendix B


Proposed Typical Sections



MO RTE. MM
STA. XXX+XX.XX TO XXX+XX.XX



TYPICAL SECTION SHEET
SHEET 1 OF XX

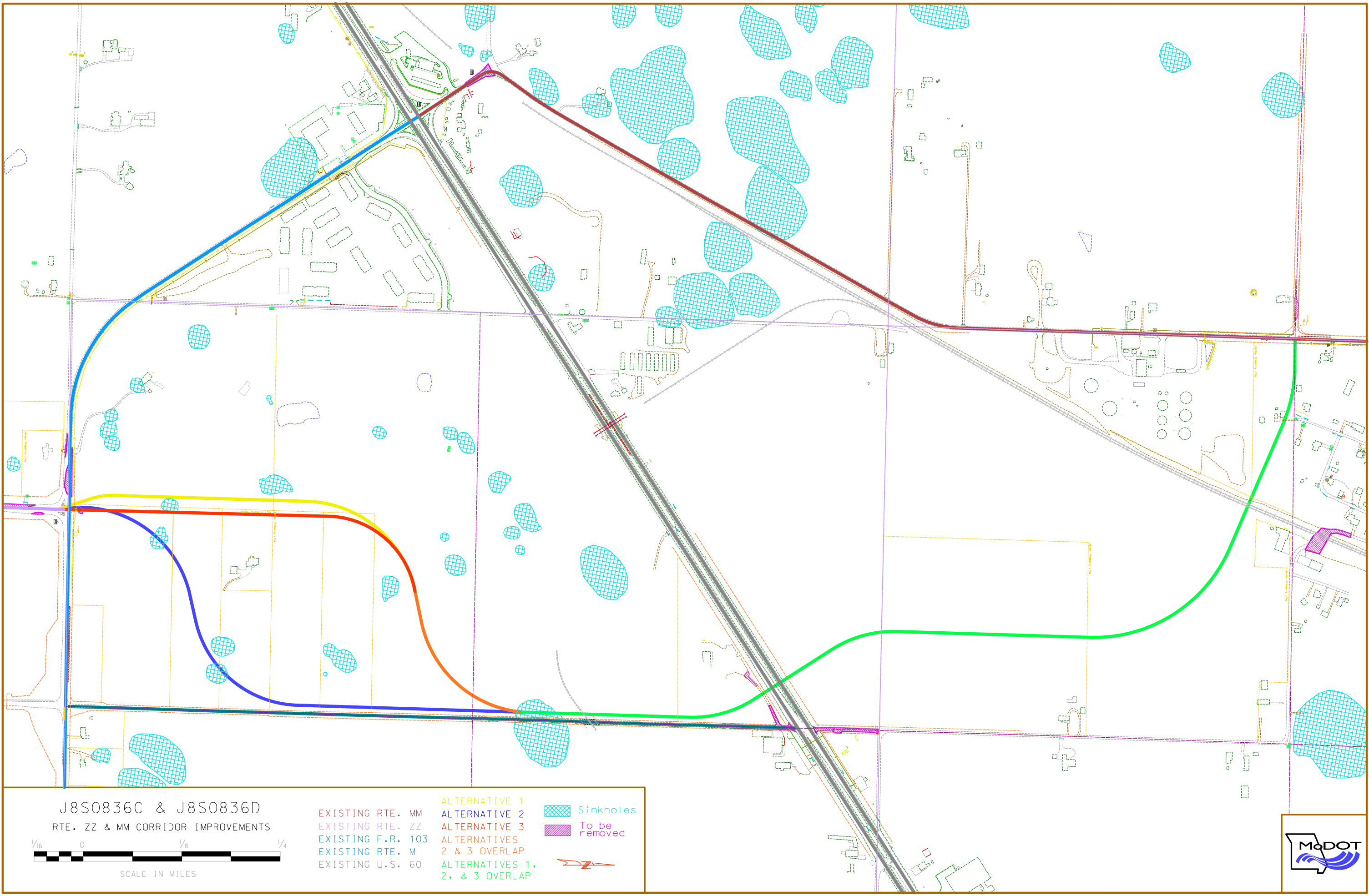


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Appendix C

Concept Exhibits and Proposed Layouts



J8S0836C & J8S0836D

RTE. ZZ & MM CORRIDOR IMPROVEMENTS



SCALE IN MILES

EXISTING RTE. MM
EXISTING RTE. ZZ
EXISTING F.R. 103
EXISTING RTE. M
EXISTING U.S. 60

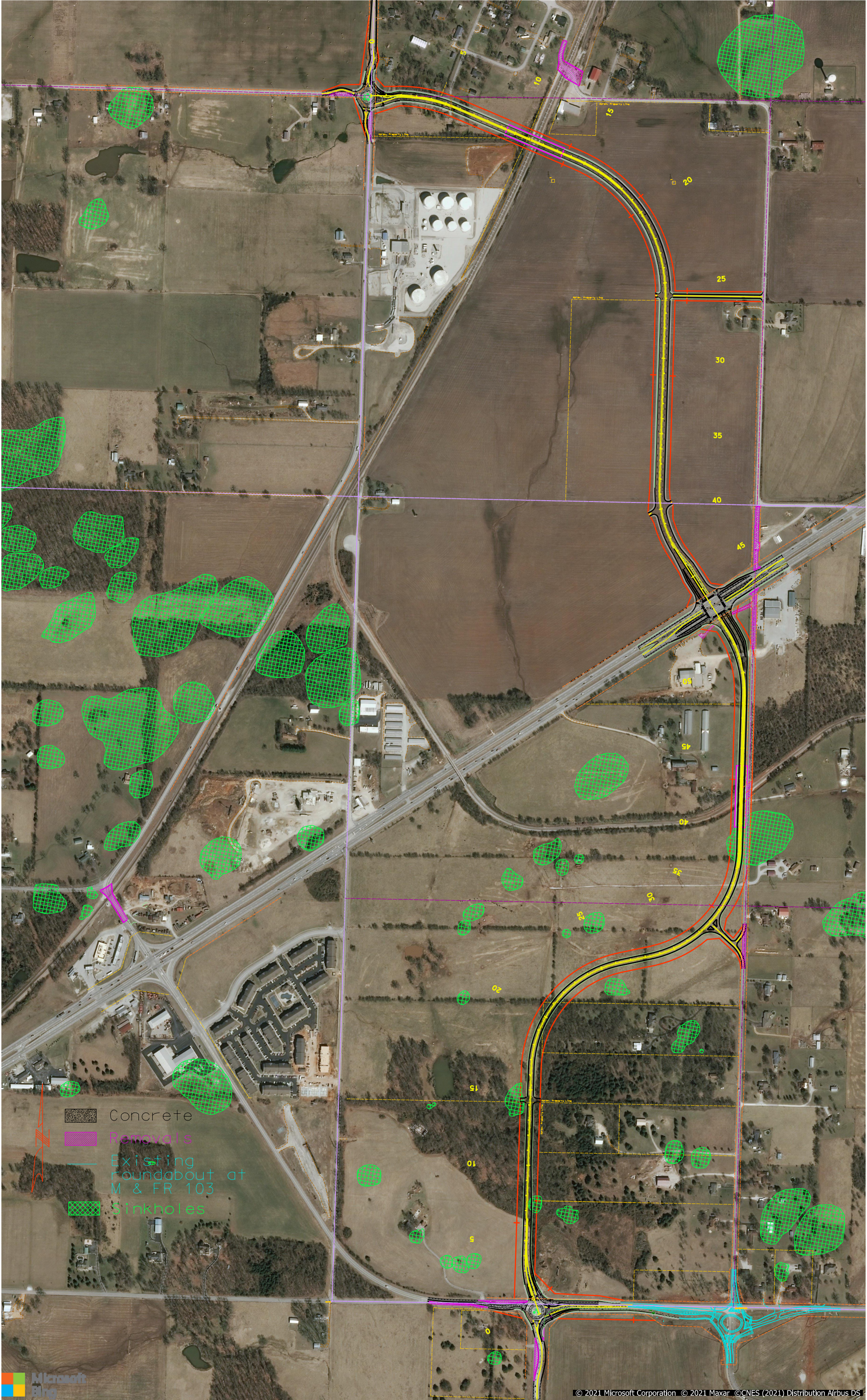
ALTERNATIVE 1
ALTERNATIVE 2
ALTERNATIVE 3
ALTERNATIVES
2 & 3 OVERLAP
ALTERNATIVES 1,
2, & 3 OVERLAP

Sinkholes

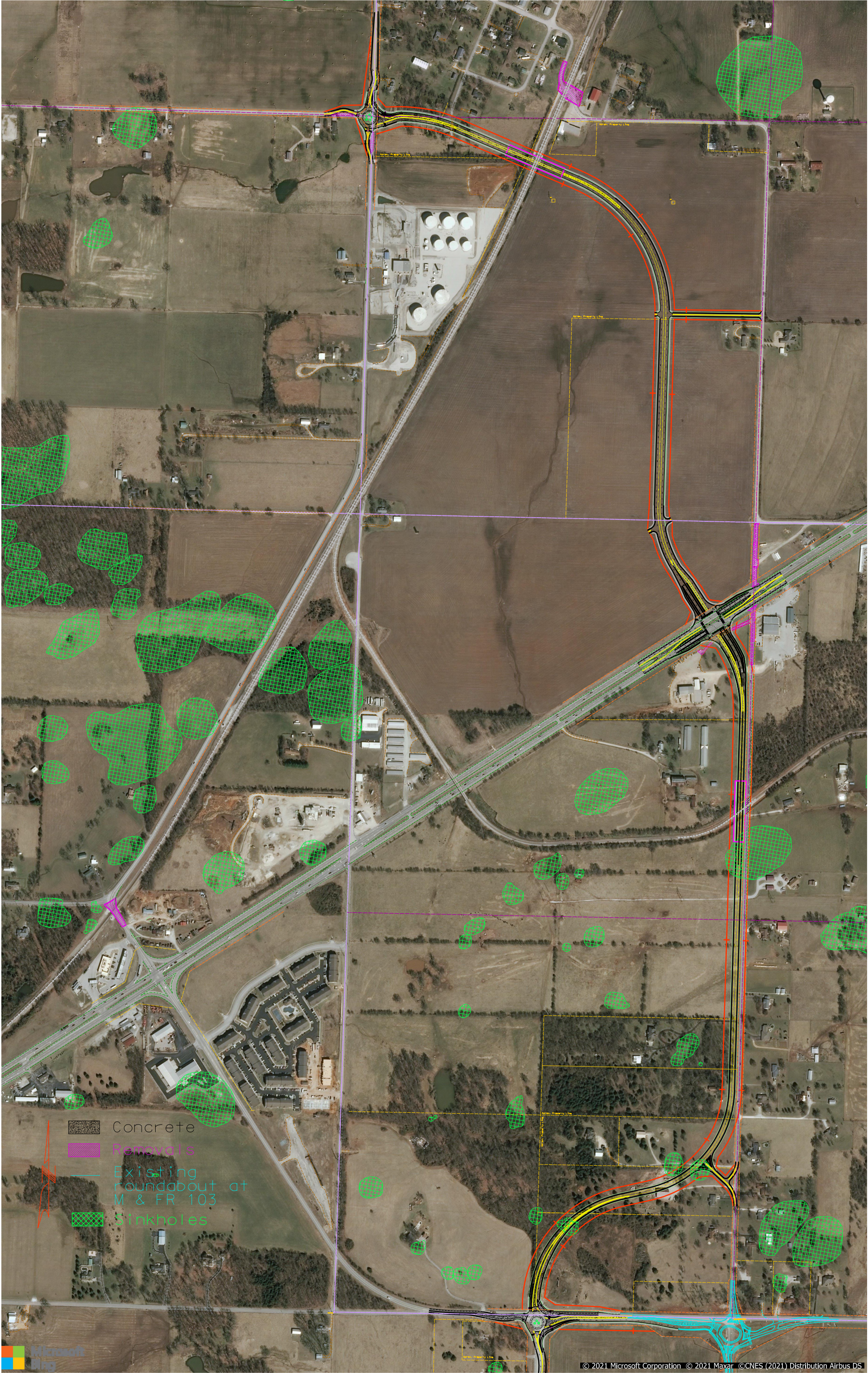
To be removed



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



- Concrete
- Removals
- Existing Roundabout at M & FR 103
- Sinkholes



- Concrete
- Removals
- Existing roundabout at M & FR 103
- Sinkholes



Appendix D

Concept Cost Estimates

Bid Report

Project: Corridor Improvements	Job Number: J8S0836C_Conceptual_Alt1	Bid Date: 09/28/2021	State: MO
Location: Rte. ZZ in Republic			

Project Settings

Primary County: GREENE	Urban / Rural: URBAN ROUTE
Addl Counties:	Project Type: GRADING, DRAINAGE, BRIDGE & PAVING
District: Southwest	Work Type: NEW CONSTRUCTION
Latitude: 37° 08' 47"	Traffic: Heavy Traffic (over 1700 DAT)
Longitude: 93° 24' 59"	Estimator: orren.ricketts@modot.mo.gov
Log Mile: Beg: 8.595	Constr Eng: 0.00%
End: 9.634	Priced Date:
Station: Beg: 0+00	Create Date: 9/28/2021
End: 54+85.69	Fed Project No:
Project Length: 1.0390 miles	Mobe Percent: 6.00%
Route: ZZ	Survey Percent: 1.50%

Project Sections

1 Roadway	\$12,808,146.35	68.20%
10 MGS Guardrail Items	\$42,400.00	0.23%
20 Lighting	\$200,000.00	1.06%
40 Signing	\$100,000.00	0.53%
70 Bridge or Retaining Wall	\$5,630,380.30	29.98%
Total	\$18,780,926.65	100.0%

STIP Information

Construction Cost	\$18,780,926.65	83.33%
PE (12.00% of construction cost)	\$2,253,711.20	10.00%
CE (8.00% of construction cost)	\$1,502,474.13	6.67%
R/W	\$0.00	0.00%
R/W Incidentals	\$0.00	0.00%
Utilities	\$0.00	0.00%
Incentive	\$0.00	0.00%
Total	\$22,537,111.98	100.0%

Major Categories

BRIDGE	\$6,380,640.30	33.97%
GRADE/DRAIN	\$6,789,368.25	36.15%
MISC.	\$2,704,851.35	14.40%
PAVEMENT/BASE	\$2,906,066.75	15.47%
Total	\$18,780,926.65	100.0%

Bid Report

Project: Corridor Improvements	Job Number: J8S0836C_Conceptual_Alt1	Bid Date: 09/28/2021	State: MO
Location: Rte. ZZ in Republic			

Section: Roadway

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	2013000	CLEARING AND GRUBBING	--	17.000	ACRE	3,000.00	\$51,000.00
0	2022010	REMOVAL OF IMPROVEMENTS	--	1.000	L.S.	52,000.00	\$52,000.00
0	2035000	UNCLASSIFIED EXCAVATION	--	56,728.000	C.Y.	11.00	\$624,008.00
0	2035500	EMBANKMENT IN PLACE	--	291,040.000	C.Y.	19.00	\$5,529,760.00
0	2036000	COMPACTING EMBANKMENT	--	49,329.000	C.Y.	2.25	\$110,990.25
0	2037075	COMPACTING IN CUT	--	22.200	STA.	1,500.00	\$33,300.00
0	2063000	CLASS 3 EXCAVATION	--	3,950.000	C.Y.	18.00	\$71,100.00
0	2063300	CLASS 4 EXCAVATION	--	2,256.000	C.Y.	30.00	\$67,680.00
0	2063400	CLASS 4 EXCAVATION IN ROCK	--	34.000	C.Y.	75.00	\$2,550.00
0	2071000	LINEAR GRADING CLASS 1	--	1.500	STA.	1,200.00	\$1,800.00
0	2079903	MISC. {LINEAR GRADING FOR ADA FACILITIES}	--	2,155.000	L.F.	12.00	\$25,860.00
0	2101006A	SUBGRADE COMPACTION (6-INCH DEPTH)	--	15.000	100FT	270.00	\$4,050.00
0	2121000A	SUBGRADING AND SHOULDERING CLASS 1	--	10.000	100FT	2,500.00	\$25,000.00
0	3040143	TYPE 1 AGGREGATE FOR BASE (4 IN. THICK)	--	1,487.000	S.Y.	9.25	\$13,754.75
0	3040504	TYPE 5 AGGREGATE FOR BASE (4 IN. THICK)	--	43,090.000	S.Y.	10.00	\$430,900.00
0	3105002	GRAVEL (A) OR CRUSHED STONE (B)	--	200.000	TON	40.00	\$8,000.00
0	4010151	TYPE A3 SHOULDER	--	7,929.500	S.Y.	65.00	\$515,417.50
0	4019905	MISC. {OPTIONAL PAVEMENT}	--	34,604.900	S.Y.	55.00	\$1,903,269.50
0	5041000	CONCRETE APPROACH PAVEMENT	--	277.800	S.Y.	125.00	\$34,725.00
0	6081010	CONCRETE CURB RAMP	--	206.000	S.Y.	100.00	\$20,600.00
0	6081012	TRUNCATED DOMES	--	384.000	S.F.	30.00	\$11,520.00
0	6083008	8 IN. CONCRETE MEDIAN STRIP	--	3,026.800	S.Y.	80.00	\$242,144.00
0	6086004	"CONCRETE SIDEWALK, 4 IN."	--	1,229.800	S.Y.	45.00	\$55,341.00
0	6091041	CONCRETE GUTTER TYPE A	--	32.000	L.F.	55.00	\$1,760.00
0	6091051	CURB AND GUTTER TYPE A	--	1,666.000	L.F.	35.00	\$58,310.00
0	6091060	PAVED DITCH	--	44.500	S.Y.	70.00	\$3,115.00
0	6096020	FURNISHING TYPE 2 ROCK DITCH LINER	--	353.000	C.Y.	35.00	\$12,355.00
0	6096042	PLACING TYPE 2 ROCK DITCH LINER	--	353.000	C.Y.	30.00	\$10,590.00
0	6097000	ROCK LINING	--	22.000	C.Y.	100.00	\$2,200.00
0	6113020	FURNISHING TYPE 2 ROCK BLANKET	--	978.000	C.Y.	30.00	\$29,340.00
0	6113040	PLACING TYPE 2 ROCK BLANKET	--	978.000	C.Y.	15.00	\$14,670.00
0	6123000A	TRUCK OR TRAILER MOUNTED ATTENUATOR (TMA)	--	1.000	EACH	2,000.00	\$2,000.00
0	6143013	"MANHOLE FRAME AND COVER, TYPE 3"	--	13.000	EACH	300.00	\$3,900.00

Bid Report

Project: Corridor Improvements			Job Number: J8S0836C_Conceptual_Alt1		Bid Date: 09/28/2021		State: MO	
Location: Rte. ZZ in Republic								
0	6161005	CONSTRUCTION SIGNS	--	800.000	S.F.	7.50	\$6,000.00	
0	6161025	CHANNELIZER (TRIM LINE)	--	150.000	EACH	18.00	\$2,700.00	
0	6161030	TYPE III MOVEABLE BARRICADE	--	24.000	EACH	155.00	\$3,720.00	
0	6161040	FLASHING ARROW PANEL	--	1.000	EACH	1,000.00	\$1,000.00	
0	6161099	"CHANGEABLE MESSAGE SIGN WITH COMMUNICATION INTERFACE, CONTRACTOR FURNISHED, CONTRACTOR RETAINED"	--	4.000	EACH	3,500.00	\$14,000.00	
0	6162002	TEMPORARY LONG-TERM RUMBLE STRIPS	--	10.000	EACH	900.00	\$9,000.00	
0	6169902	MISC. {ADA MOVEABLE BARRICADE}	--	6.000	EACH	200.00	\$1,200.00	
0	6181000	MOBILIZATION	--	1.000	L.S.	1,048,237.77	\$1,048,237.77	
0	6181020	ADDITIONAL MOBILIZATION FOR SEEDING	--	4.000	EACH	600.00	\$2,400.00	
0	6191000	PAVEMENT EDGE TREATMENT	--	10,972.000	L.F.	3.00	\$32,916.00	
0	6200015	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. WHITE"	--	214.000	L.F.	21.00	\$4,494.00	
0	6200021	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, LEFT/RIGHT ARROW"	--	25.000	EACH	255.00	\$6,375.00	
0	6200030	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, WORD (ONLY)"	--	4.000	EACH	350.00	\$1,400.00	
0	6200042	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 12 IN WHITE, YIELD LINE TRIANGLES"	--	104.000	EACH	30.00	\$3,120.00	
0	6200051	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, COMBINATION STR/LT/RT FISH HOOK ARROW"	--	7.000	EACH	600.00	\$4,200.00	
0	6205902A	"6 IN. WHITE HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS"	--	6,382.000	L.F.	0.22	\$1,404.04	
0	6205903A	"6 IN. YELLOW HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS"	--	4,663.000	L.F.	0.22	\$1,025.86	
0	6206000C	"4 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	21,292.000	L.F.	0.12	\$2,555.04	
0	6206001C	"4 IN. YELLOW STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	23,025.000	L.F.	0.12	\$2,763.00	
0	6206124A	"24 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	640.000	L.F.	6.00	\$3,840.00	
0	6206125A	"24 IN. YELLOW STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	18.000	L.F.	4.00	\$72.00	
0	6209902	MISC. {PREFORMED THERMOPLASTIC PAVEMENT MARKING, LANE REDUCTION ARROW}	--	2.000	EACH	350.00	\$700.00	
0	6240103A	PERMANENT EROSION CONTROL GEOTEXTILE	--	500.000	S.Y.	5.00	\$2,500.00	
0	6274000	CONTRACTOR FURNISHED SURVEYING AND STAKING	--	1.000	L.S.	262,059.44	\$262,059.44	
0	7034041	CLASS B-1 CONCRETE (CULVERTS)	--	1,056.000	C.Y.	665.00	\$702,240.00	
0	7061030	REINFORCING STEEL (CULVERTS)	--	27,440.000	LBS	1.75	\$48,020.00	
0	7250318A	18 IN. PIPE GROUP B	--	175.000	L.F.	55.00	\$9,625.00	
0	7250324A	24 IN. PIPE GROUP B	--	1,225.000	L.F.	70.00	\$85,750.00	
0	7250330A	30 IN. PIPE GROUP B	--	700.000	L.F.	85.00	\$59,500.00	
0	7311042	PRECAST CONCRETE DROP INLET 4 FT X 2 FT	--	78.000	L.F.	780.00	\$60,840.00	

Bid Report

Date: 12/29/2021

Time: 01:46:34 PM

Project: Corridor Improvements	Job Number: J8S0836C_Conceptual I_Alt1	Bid Date: 09/28/2021	State: MO
Location: Rte. ZZ in Republic			

0	7320024A	24 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	5.000 EACH	700.00	\$3,500.00
0	7320030A	30 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	1.000 EACH	1,000.00	\$1,000.00
0	8032000A	KENTUCKY BLUEGRASS SODDING	--	8,000.000 S.Y.	30.00	\$240,000.00
0	8051000A	SEEDING - COOL SEASON MIXTURES	--	4.400 ACRE	3,200.00	\$14,080.00
0	8052000A	SEEDING - WARM SEASON MIXTURES	--	4.400 ACRE	4,200.00	\$18,480.00
0	8061001	SEDIMENT BASIN EXCAVATION	--	1,489.000 C.Y.	2.50	\$3,722.50
0	8061002	SEDIMENT BASIN ROCK	--	1,489.000 C.Y.	18.00	\$26,802.00
0	8061003	SEDIMENT TRAP EXCAVATION	--	96.900 C.Y.	28.00	\$2,713.20
0	8061004	SEDIMENT TRAP ROCK	--	96.900 C.Y.	135.00	\$13,081.50
0	8061005	ROCK DITCH CHECK	--	6,000.000 L.F.	13.25	\$79,500.00
0	8061007A	CURB INLET CHECK	--	15.000 EACH	140.00	\$2,100.00
0	8061016	SEDIMENT REMOVAL	--	500.000 C.Y.	21.00	\$10,500.00
0	8061017	TEMPORARY SEEDING AND MULCHING	--	5.000 ACRE	1,200.00	\$6,000.00
0	8061019	SILT FENCE	--	10,000.000 L.F.	3.00	\$30,000.00

Category: Roadway \$12,808,146.35

Section: MGS Guardrail Items

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	6061060	MGS GUARDRAIL	--	800.000 L.F.		24.00	\$19,200.00
0	6061069	MGS BRIDGE APPROACH TRANSITION SECTION (REGULAR/NO CURB)	--	4.000 EACH		3,000.00	\$12,000.00
0	6063014	TYPE A CRASHWORTHY END TERMINAL (MASH)	--	4.000 EACH		2,800.00	\$11,200.00

Category: MGS Guardrail Items \$42,400.00

Section: Lighting

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9019901	MISC. {LIGHTING}	--	1.000 L.S.		200,000.00	\$200,000.00

Category: Lighting \$200,000.00

Section: Signing

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9039901	MISC. {SIGNING}	--	1.000 L.S.		100,000.00	\$100,000.00

Category: Signing \$100,000.00

Section: Bridge or Retaining Wall

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
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Bid Report

Project: Corridor Improvements

Job Number: J8S0836C_Conceptual
Alt1

Bid Date: 09/28/2021

State: MO

Location: Rte. ZZ in Republic

0	7019901	MISC. {NEW BRIDGE}	--	1.000 L.S.	5,630,380.30	\$5,630,380.30
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Category:	Bridge or Retaining Wall	\$5,630,380.30
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Total:	\$18,780,926.65
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REPORT PARAMETERS

Project	J8S0836C_Conceptual_Alt1 - Corridor Improvements
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Comparison	Bid Price
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Bid Report

Project: Alternative 2 - Relocated Reverse Curves	Job Number: J8S0836C_Conceptual_Alt2	Bid Date: 11/04/2021	State: MO
Location: Rte. ZZ in Republic			

Project Settings

Primary County:	GREENE	Urban / Rural:	URBAN ROUTE
Addl Counties:		Project Type:	GRADING, DRAINAGE, BRIDGE & PAVING
District:	Southwest	Work Type:	NEW CONSTRUCTION
Latitude:	0"	Traffic:	Heavy Traffic (over 1700 DAT)
Longitude:	0"	Estimator:	orren.ricketts@modot.mo.gov
Log Mile:	Beg:	Constr Eng:	0.00%
	End:	Priced Date:	
Station:	Beg:	Create Date:	11/4/2021
	End:	Fed Project No:	
Project Length:	0.0000 miles	Mobe Percent:	6.00%
Route:	ZZ	Survey Percent:	1.50%

Project Sections

1 Roadway	\$12,866,359.53	68.30%
10 MGS Guardrail Items	\$42,400.00	0.23%
20 Lighting	\$200,000.00	1.06%
40 Signing	\$100,000.00	0.53%
70 Bridge or Retaining Wall	\$5,630,380.30	29.89%
Total	\$18,839,139.83	100.0%

STIP Information

Construction Cost	\$18,839,139.83	83.33%
PE (12.00% of construction cost)	\$2,260,696.78	10.00%
CE (8.00% of construction cost)	\$1,507,131.19	6.67%
R/W	\$0.00	0.00%
R/W Incidentals	\$0.00	0.00%
Utilities	\$0.00	0.00%
Incentive	\$0.00	0.00%
Total	\$22,606,967.80	100.0%

Major Categories

BRIDGE	\$6,180,566.30	32.81%
GRADE/DRAIN	\$7,023,822.25	37.28%
MISC.	\$2,671,732.53	14.18%
PAVEMENT/BASE	\$2,963,018.75	15.73%
Total	\$18,839,139.83	100.0%

Bid Report

Project: Alternative 2 - Relocated Reverse Curves	Job Number: J8S0836C_Conceptual_Alt2	Bid Date: 11/04/2021	State: MO
Location: Rte. ZZ in Republic			

Section: Roadway

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	2013000	CLEARING AND GRUBBING	--	16.000	ACRE	3,000.00	\$48,000.00
0	2022010	REMOVAL OF IMPROVEMENTS	--	1.000	L.S.	52,000.00	\$52,000.00
0	2035000	UNCLASSIFIED EXCAVATION	--	58,619.000	C.Y.	11.00	\$644,809.00
0	2035500	EMBANKMENT IN PLACE	--	300,741.000	C.Y.	19.00	\$5,714,079.00
0	2036000	COMPACTING EMBANKMENT	--	50,973.000	C.Y.	2.25	\$114,689.25
0	2037075	COMPACTING IN CUT	--	23.500	STA.	1,500.00	\$35,250.00
0	2063000	CLASS 3 EXCAVATION	--	3,950.000	C.Y.	18.00	\$71,100.00
0	2063300	CLASS 4 EXCAVATION	--	2,876.000	C.Y.	30.00	\$86,280.00
0	2063400	CLASS 4 EXCAVATION IN ROCK	--	36.000	C.Y.	75.00	\$2,700.00
0	2071000	LINEAR GRADING CLASS 1	--	2.000	STA.	1,200.00	\$2,400.00
0	2079903	MISC. {LINEAR GRADING FOR ADA FACILITIES}	--	2,155.000	L.F.	12.00	\$25,860.00
0	2101006A	SUBGRADE COMPACTION (6-INCH DEPTH)	--	15.000	100FT	270.00	\$4,050.00
0	2121000A	SUBGRADING AND SHOULDERING CLASS 1	--	10.000	100FT	2,500.00	\$25,000.00
0	3040143	TYPE 1 AGGREGATE FOR BASE (4 IN. THICK)	--	1,089.000	S.Y.	9.25	\$10,073.25
0	3040504	TYPE 5 AGGREGATE FOR BASE (4 IN. THICK)	--	43,880.000	S.Y.	10.00	\$438,800.00
0	3105002	GRAVEL (A) OR CRUSHED STONE (B)	--	200.000	TON	40.00	\$8,000.00
0	4010151	TYPE A3 SHOULDER	--	8,562.500	S.Y.	65.00	\$556,562.50
0	4019905	MISC. {OPTIONAL PAVEMENT}	--	34,815.600	S.Y.	55.00	\$1,914,858.00
0	5041000	CONCRETE APPROACH PAVEMENT	--	277.800	S.Y.	125.00	\$34,725.00
0	6081010	CONCRETE CURB RAMP	--	206.000	S.Y.	100.00	\$20,600.00
0	6081012	TRUNCATED DOMES	--	288.000	S.F.	30.00	\$8,640.00
0	6083008	8 IN. CONCRETE MEDIAN STRIP	--	2,816.300	S.Y.	80.00	\$225,304.00
0	6086004	"CONCRETE SIDEWALK, 4 IN."	--	831.000	S.Y.	45.00	\$37,395.00
0	6091041	CONCRETE GUTTER TYPE A	--	40.000	L.F.	55.00	\$2,200.00
0	6091051	CURB AND GUTTER TYPE A	--	1,505.000	L.F.	35.00	\$52,675.00
0	6091060	PAVED DITCH	--	44.400	S.Y.	70.00	\$3,108.00
0	6096020	FURNISHING TYPE 2 ROCK DITCH LINER	--	412.000	C.Y.	35.00	\$14,420.00
0	6096042	PLACING TYPE 2 ROCK DITCH LINER	--	412.000	C.Y.	30.00	\$12,360.00
0	6097000	ROCK LINING	--	27.000	C.Y.	100.00	\$2,700.00
0	6113020	FURNISHING TYPE 2 ROCK BLANKET	--	978.000	C.Y.	30.00	\$29,340.00
0	6113040	PLACING TYPE 2 ROCK BLANKET	--	978.000	C.Y.	15.00	\$14,670.00
0	6123000A	TRUCK OR TRAILER MOUNTED ATTENUATOR (TMA)	--	1.000	EACH	2,000.00	\$2,000.00
0	6143013	"MANHOLE FRAME AND COVER, TYPE 3"	--	13.000	EACH	300.00	\$3,900.00

Bid Report

Project: Alternative 2 - Relocated Reverse Curves			Job Number: J8S0836C_Conceptual_Alt2		Bid Date: 11/04/2021		State: MO	
Location: Rte. ZZ in Republic								
0	6161005	CONSTRUCTION SIGNS	--	800.000	S.F.	7.50	\$6,000.00	
0	6161025	CHANNELIZER (TRIM LINE)	--	150.000	EACH	18.00	\$2,700.00	
0	6161030	TYPE III MOVEABLE BARRICADE	--	24.000	EACH	155.00	\$3,720.00	
0	6161040	FLASHING ARROW PANEL	--	1.000	EACH	1,000.00	\$1,000.00	
0	6161099	"CHANGEABLE MESSAGE SIGN WITH COMMUNICATION INTERFACE, CONTRACTOR FURNISHED, CONTRACTOR RETAINED"	--	4.000	EACH	3,500.00	\$14,000.00	
0	6162002	TEMPORARY LONG-TERM RUMBLE STRIPS	--	10.000	EACH	900.00	\$9,000.00	
0	6169902	MISC. {ADA MOVEABLE BARRICADE}	--	6.000	EACH	200.00	\$1,200.00	
0	6181000	MOBILIZATION	--	1.000	L.S.	1,051,486.87	\$1,051,486.87	
0	6181020	ADDITIONAL MOBILIZATION FOR SEEDING	--	4.000	EACH	600.00	\$2,400.00	
0	6191000	PAVEMENT EDGE TREATMENT	--	11,052.000	L.F.	3.00	\$33,156.00	
0	6200015	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. WHITE"	--	214.000	L.F.	21.00	\$4,494.00	
0	6200021	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, LEFT/RIGHT ARROW"	--	25.000	EACH	255.00	\$6,375.00	
0	6200030	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, WORD (ONLY)"	--	4.000	EACH	350.00	\$1,400.00	
0	6200042	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 12 IN WHITE, YIELD LINE TRIANGLES"	--	104.000	EACH	30.00	\$3,120.00	
0	6200051	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, COMBINATION STR/LT/RT FISH HOOK ARROW"	--	8.000	EACH	600.00	\$4,800.00	
0	6205902A	"6 IN. WHITE HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS"	--	5,792.000	L.F.	0.22	\$1,274.24	
0	6205903A	"6 IN. YELLOW HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS"	--	4,663.000	L.F.	0.22	\$1,025.86	
0	6206000C	"4 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	21,057.000	L.F.	0.12	\$2,526.84	
0	6206001C	"4 IN. YELLOW STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	24,490.000	L.F.	0.12	\$2,938.80	
0	6206124A	"24 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	640.000	L.F.	6.00	\$3,840.00	
0	6206125A	"24 IN. YELLOW STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	18.000	L.F.	4.00	\$72.00	
0	6209902	MISC. {PREFORMED THERMOPLASTIC PAVEMENT MARKING, LANE REDUCTION ARROW}	--	2.000	EACH	350.00	\$700.00	
0	6240103A	PERMANENT EROSION CONTROL GEOTEXTILE	--	500.000	S.Y.	5.00	\$2,500.00	
0	6274000	CONTRACTOR FURNISHED SURVEYING AND STAKING	--	1.000	L.S.	262,871.72	\$262,871.72	
0	7034041	CLASS B-1 CONCRETE (CULVERTS)	--	774.400	C.Y.	665.00	\$514,976.00	
0	7061030	REINFORCING STEEL (CULVERTS)	--	20,120.000	LBS	1.75	\$35,210.00	
0	7250318A	18 IN. PIPE GROUP B	--	175.000	L.F.	55.00	\$9,625.00	
0	7250324A	24 IN. PIPE GROUP B	--	1,225.000	L.F.	70.00	\$85,750.00	
0	7250330A	30 IN. PIPE GROUP B	--	700.000	L.F.	85.00	\$59,500.00	
0	7311042	PRECAST CONCRETE DROP INLET 4 FT X 2 FT	--	78.000	L.F.	780.00	\$60,840.00	

Bid Report

Date: 01/04/2022

Time: 04:02:58 PM

Project: Alternative 2 - Relocated Reverse Curves	Job Number: J8S0836C_Conceptual_Alt2	Bid Date: 11/04/2021	State: MO
Location: Rte. ZZ in Republic			

0	7320024A	24 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	5.000 EACH	700.00	\$3,500.00
0	7320030A	30 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	1.000 EACH	1,000.00	\$1,000.00
0	8032000A	KENTUCKY BLUEGRASS SODDING	--	8,000.000 S.Y.	30.00	\$240,000.00
0	8051000A	SEEDING - COOL SEASON MIXTURES	--	5.100 ACRE	3,200.00	\$16,320.00
0	8052000A	SEEDING - WARM SEASON MIXTURES	--	5.100 ACRE	4,200.00	\$21,420.00
0	8061001	SEDIMENT BASIN EXCAVATION	--	1,489.000 C.Y.	2.50	\$3,722.50
0	8061002	SEDIMENT BASIN ROCK	--	1,489.000 C.Y.	18.00	\$26,802.00
0	8061003	SEDIMENT TRAP EXCAVATION	--	96.900 C.Y.	28.00	\$2,713.20
0	8061004	SEDIMENT TRAP ROCK	--	96.900 C.Y.	135.00	\$13,081.50
0	8061005	ROCK DITCH CHECK	--	6,200.000 L.F.	13.25	\$82,150.00
0	8061007A	CURB INLET CHECK	--	15.000 EACH	140.00	\$2,100.00
0	8061016	SEDIMENT REMOVAL	--	500.000 C.Y.	21.00	\$10,500.00
0	8061017	TEMPORARY SEEDING AND MULCHING	--	5.000 ACRE	1,200.00	\$6,000.00
0	8061019	SILT FENCE	--	10,000.000 L.F.	3.00	\$30,000.00

Category: Roadway \$12,866,359.53

Section: MGS Guardrail Items

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	6061060	MGS GUARDRAIL	--	800.000 L.F.		24.00	\$19,200.00
0	6061069	MGS BRIDGE APPROACH TRANSITION SECTION (REGULAR/NO CURB)	--	4.000 EACH		3,000.00	\$12,000.00
0	6063014	TYPE A CRASHWORTHY END TERMINAL (MASH)	--	4.000 EACH		2,800.00	\$11,200.00

Category: MGS Guardrail Items \$42,400.00

Section: Lighting

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9019901	MISC. {LIGHTING}	--	1.000 L.S.		200,000.00	\$200,000.00

Category: Lighting \$200,000.00

Section: Signing

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9039901	MISC. {SIGNING}	--	1.000 L.S.		100,000.00	\$100,000.00

Category: Signing \$100,000.00

Section: Bridge or Retaining Wall

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
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Bid Report

Project: Alternative 2 - Relocated Reverse Curves	Job Number: J8S0836C_Conceptual_Alt2	Bid Date: 11/04/2021	State: MO
Location: Rte. ZZ in Republic			

0	7019901	MISC. {NEW BRIDGE}	--	1.000 L.S.	5,630,380.30	\$5,630,380.30
Category: Bridge or Retaining Wall						\$5,630,380.30

Total:	\$18,839,139.83
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REPORT PARAMETERS	
Project	J8S0836C_Conceptual_Alt2 - Alternative 2 - Relocated Reverse Curves
Comparison	Bid Price

Bid Report

Project: Alternative 3 - Signalized ZZ Intersection	Job Number: J8S0836C_Conceptual_Alt3	Bid Date: 11/04/2021	State: MO
Location: Rte. ZZ in Republic			

Project Settings

Primary County:	GREENE	Urban / Rural:	URBAN ROUTE
Addl Counties:		Project Type:	GRADING, DRAINAGE, BRIDGE & PAVING
District:	Southwest	Work Type:	NEW CONSTRUCTION
Latitude:	0"	Traffic:	Heavy Traffic (over 1700 DAT)
Longitude:	0"	Estimator:	orren.ricketts@modot.mo.gov
Log Mile:	Beg:	Constr Eng:	0.00%
	End:	Priced Date:	
Station:	Beg:	Create Date:	11/18/2021
	End:	Fed Project No:	
Project Length:	0.0000 miles	Mobe Percent:	6.00%
Route:	ZZ	Survey Percent:	1.50%

Project Sections

1 Roadway	\$12,401,687.40	66.41%
10 MGS Guardrail Items	\$42,400.00	0.23%
20 Lighting	\$200,000.00	1.07%
30 Signals	\$300,000.00	1.61%
40 Signing	\$100,000.00	0.54%
70 Bridge or Retaining Wall	\$5,630,380.30	30.15%
Total	\$18,674,467.70	100.0%

STIP Information

Construction Cost	\$18,674,467.70	83.33%
PE (12.00% of construction cost)	\$2,240,936.12	10.00%
CE (8.00% of construction cost)	\$1,493,957.42	6.67%
R/W	\$0.00	0.00%
R/W Incidentals	\$0.00	0.00%
Utilities	\$0.00	0.00%
Incentive	\$0.00	0.00%

Major Categories

BRIDGE	\$6,292,377.30	33.70%
GRADE/DRAIN	\$6,895,806.25	36.93%
MISC.	\$2,823,871.65	15.12%
PAVEMENT/BASE	\$2,662,412.50	14.26%
Total	\$18,674,467.70	100.0%

Total	\$22,409,361.24	100.0%
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Bid Report

Project: Alternative 3 - Signalized ZZ Intersection	Job Number: J8S0836C_Conceptual_Alt3	Bid Date: 11/04/2021	State: MO
Location: Rte. ZZ in Republic			

Section: Roadway

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	2013000	CLEARING AND GRUBBING	--	15.000	ACRE	3,000.00	\$45,000.00
0	2022010	REMOVAL OF IMPROVEMENTS	--	1.000	L.S.	52,000.00	\$52,000.00
0	2035000	UNCLASSIFIED EXCAVATION	--	57,989.000	C.Y.	11.00	\$637,879.00
0	2035500	EMBANKMENT IN PLACE	--	297,507.000	C.Y.	19.00	\$5,652,633.00
0	2036000	COMPACTING EMBANKMENT	--	50,425.000	C.Y.	2.25	\$113,456.25
0	2037075	COMPACTING IN CUT	--	20.800	STA.	1,500.00	\$31,200.00
0	2063000	CLASS 3 EXCAVATION	--	3,826.000	C.Y.	18.00	\$68,868.00
0	2063300	CLASS 4 EXCAVATION	--	2,538.000	C.Y.	30.00	\$76,140.00
0	2063400	CLASS 4 EXCAVATION IN ROCK	--	35.000	C.Y.	75.00	\$2,625.00
0	2071000	LINEAR GRADING CLASS 1	--	2.000	STA.	1,200.00	\$2,400.00
0	2079903	MISC. {LINEAR GRADING FOR ADA FACILITIES}	--	2,095.000	L.F.	12.00	\$25,140.00
0	2101006A	SUBGRADE COMPACTION (6-INCH DEPTH)	--	15.000	100FT	270.00	\$4,050.00
0	2121000A	SUBGRADING AND SHOULDERING CLASS 1	--	10.000	100FT	2,500.00	\$25,000.00
0	3040143	TYPE 1 AGGREGATE FOR BASE (4 IN. THICK)	--	972.000	S.Y.	9.25	\$8,991.00
0	3040504	TYPE 5 AGGREGATE FOR BASE (4 IN. THICK)	--	39,375.000	S.Y.	10.00	\$393,750.00
0	3105002	GRAVEL (A) OR CRUSHED STONE (B)	--	200.000	TON	40.00	\$8,000.00
0	4010151	TYPE A3 SHOULDER	--	7,776.000	S.Y.	65.00	\$505,440.00
0	4019905	MISC. {OPTIONAL PAVEMENT}	--	31,118.300	S.Y.	55.00	\$1,711,506.50
0	5041000	CONCRETE APPROACH PAVEMENT	--	277.800	S.Y.	125.00	\$34,725.00
0	6081010	CONCRETE CURB RAMP	--	164.800	S.Y.	100.00	\$16,480.00
0	6081012	TRUNCATED DOMES	--	384.000	S.F.	30.00	\$11,520.00
0	6083008	8 IN. CONCRETE MEDIAN STRIP	--	1,361.000	S.Y.	80.00	\$108,880.00
0	6086004	"CONCRETE SIDEWALK, 4 IN."	--	765.500	S.Y.	45.00	\$34,447.50
0	6091041	CONCRETE GUTTER TYPE A	--	40.000	L.F.	55.00	\$2,200.00
0	6091051	CURB AND GUTTER TYPE A	--	1,443.000	L.F.	35.00	\$50,505.00
0	6091060	PAVED DITCH	--	36.800	S.Y.	70.00	\$2,576.00
0	6096020	FURNISHING TYPE 2 ROCK DITCH LINER	--	372.000	C.Y.	35.00	\$13,020.00
0	6096042	PLACING TYPE 2 ROCK DITCH LINER	--	372.000	C.Y.	30.00	\$11,160.00
0	6097000	ROCK LINING	--	27.000	C.Y.	100.00	\$2,700.00
0	6113020	FURNISHING TYPE 2 ROCK BLANKET	--	880.000	C.Y.	30.00	\$26,400.00
0	6113040	PLACING TYPE 2 ROCK BLANKET	--	880.000	C.Y.	15.00	\$13,200.00
0	6123000A	TRUCK OR TRAILER MOUNTED ATTENUATOR (TMA)	--	1.000	EACH	2,000.00	\$2,000.00
0	6143013	"MANHOLE FRAME AND COVER, TYPE 3"	--	12.000	EACH	300.00	\$3,600.00

Bid Report

Project: Alternative 3 - Signalized ZZ Intersection			Job Number: J8S0836C_Conceptual_Alt3		Bid Date: 11/04/2021		State: MO	
Location: Rte. ZZ in Republic								
0	6161005	CONSTRUCTION SIGNS	--	850.000	S.F.	7.50	\$6,375.00	
0	6161025	CHANNELIZER (TRIM LINE)	--	150.000	EACH	18.00	\$2,700.00	
0	6161030	TYPE III MOVEABLE BARRICADE	--	24.000	EACH	155.00	\$3,720.00	
0	6161040	FLASHING ARROW PANEL	--	1.000	EACH	1,000.00	\$1,000.00	
0	6161099	"CHANGEABLE MESSAGE SIGN WITH COMMUNICATION INTERFACE, CONTRACTOR FURNISHED, CONTRACTOR RETAINED"	--	4.000	EACH	3,500.00	\$14,000.00	
0	6162002	TEMPORARY LONG-TERM RUMBLE STRIPS	--	10.000	EACH	900.00	\$9,000.00	
0	6169902	MISC. {ADA MOVEABLE BARRICADE}	--	6.000	EACH	200.00	\$1,200.00	
0	6181000	MOBILIZATION	--	1.000	L.S.	1,042,295.87	\$1,042,295.87	
0	6181020	ADDITIONAL MOBILIZATION FOR SEEDING	--	4.000	EACH	600.00	\$2,400.00	
0	6191000	PAVEMENT EDGE TREATMENT	--	11,097.000	L.F.	3.00	\$33,291.00	
0	6200015	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. WHITE"	--	236.000	L.F.	21.00	\$4,956.00	
0	6200021	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, LEFT/RIGHT ARROW"	--	34.000	EACH	255.00	\$8,670.00	
0	6200042	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 12 IN WHITE, YIELD LINE TRIANGLES"	--	80.000	EACH	30.00	\$2,400.00	
0	6205902A	"6 IN. WHITE HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS"	--	5,353.000	L.F.	0.22	\$1,177.66	
0	6205903A	"6 IN. YELLOW HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS"	--	6,034.000	L.F.	0.22	\$1,327.48	
0	6206000C	"4 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	31,397.000	L.F.	0.12	\$3,767.64	
0	6206001C	"4 IN. YELLOW STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	21,774.000	L.F.	0.12	\$2,612.88	
0	6206124A	"24 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	540.000	L.F.	6.00	\$3,240.00	
0	6209902	MISC. {PREFORMED THERMOPLASTIC PAVEMENT MARKING, LANE REDUCTION ARROW}	--	2.000	EACH	350.00	\$700.00	
0	6240103A	PERMANENT EROSION CONTROL GEOTEXTILE	--	500.000	S.Y.	5.00	\$2,500.00	
0	6274000	CONTRACTOR FURNISHED SURVEYING AND STAKING	--	1.000	L.S.	260,573.97	\$260,573.97	
0	7034041	CLASS B-1 CONCRETE (CULVERTS)	--	929.300	C.Y.	665.00	\$617,984.50	
0	7061030	REINFORCING STEEL (CULVERTS)	--	25,150.000	LBS	1.75	\$44,012.50	
0	7250318A	18 IN. PIPE GROUP B	--	150.000	L.F.	55.00	\$8,250.00	
0	7250324A	24 IN. PIPE GROUP B	--	1,050.000	L.F.	70.00	\$73,500.00	
0	7250330A	30 IN. PIPE GROUP B	--	525.000	L.F.	85.00	\$44,625.00	
0	7311042	PRECAST CONCRETE DROP INLET 4 FT X 2 FT	--	72.000	L.F.	780.00	\$56,160.00	
0	7320024A	24 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	4.000	EACH	700.00	\$2,800.00	
0	7320030A	30 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	1.000	EACH	1,000.00	\$1,000.00	
0	8032000A	KENTUCKY BLUEGRASS SODDING	--	8,000.000	S.Y.	30.00	\$240,000.00	
0	8051000A	SEEDING - COOL SEASON MIXTURES	--	4.800	ACRE	3,200.00	\$15,360.00	

Bid Report

Date: 01/04/2022

Time: 04:12:34 PM

Project: Alternative 3 - Signalized ZZ Intersection	Job Number: J8S0836C_Conceptual_Alt3	Bid Date: 11/04/2021	State: MO
Location: Rte. ZZ in Republic			

0	8052000A	SEEDING - WARM SEASON MIXTURES	--	4.800	ACRE	4,200.00	\$20,160.00
0	8061001	SEDIMENT BASIN EXCAVATION	--	1,340.100	C.Y.	2.50	\$3,350.25
0	8061002	SEDIMENT BASIN ROCK	--	1,340.100	C.Y.	18.00	\$24,121.80
0	8061003	SEDIMENT TRAP EXCAVATION	--	87.200	C.Y.	28.00	\$2,441.60
0	8061004	SEDIMENT TRAP ROCK	--	87.200	C.Y.	135.00	\$11,772.00
0	8061005	ROCK DITCH CHECK	--	6,200.000	L.F.	13.25	\$82,150.00
0	8061007A	CURB INLET CHECK	--	15.000	EACH	140.00	\$2,100.00
0	8061016	SEDIMENT REMOVAL	--	500.000	C.Y.	21.00	\$10,500.00
0	8061017	TEMPORARY SEEDING AND MULCHING	--	5.000	ACRE	1,200.00	\$6,000.00
0	8061019	SILT FENCE	--	10,000.000	L.F.	3.00	\$30,000.00
Category: Roadway							\$12,401,687.40

Section: MGS Guardrail Items

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	6061060	MGS GUARDRAIL	--	800.000	L.F.	24.00	\$19,200.00
0	6061069	MGS BRIDGE APPROACH TRANSITION SECTION (REGULAR/NO CURB)	--	4.000	EACH	3,000.00	\$12,000.00
0	6063014	TYPE A CRASHWORTHY END TERMINAL (MASH)	--	4.000	EACH	2,800.00	\$11,200.00
Category: MGS Guardrail Items							\$42,400.00

Section: Lighting

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9019901	MISC. {LIGHTING}	--	1.000	L.S.	200,000.00	\$200,000.00
Category: Lighting							\$200,000.00

Section: Signals

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9029901	MISC. {SIGNALS}	--	1.000	L.S.	300,000.00	\$300,000.00
Category: Signals							\$300,000.00

Section: Signing

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9039901	MISC. {SIGNING}	--	1.000	L.S.	100,000.00	\$100,000.00
Category: Signing							\$100,000.00

Section: Bridge or Retaining Wall

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
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Bid Report

Project: Alternative 3 - Signalized ZZ Intersection	Job Number: J8S0836C_Conceptual_Alt3	Bid Date: 11/04/2021	State: MO
Location: Rte. ZZ in Republic			

0	7019901	MISC. {NEW BRIDGE}	--	1.000 L.S.	5,630,380.30	\$5,630,380.30
Category: Bridge or Retaining Wall						\$5,630,380.30

Total:	\$18,674,467.70
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REPORT PARAMETERS	
Project	J8S0836C_Conceptual_Alt3 - Alternative 3 - Signalized ZZ Intersection
Comparison	Bid Price

Bid Report

Project: Corridor Improvements	Job Number: J8S0836D_Conceptual_Alt1	Bid Date: 11/23/2021	State: MO
Location: Rte. MM in Republic			

Project Settings

Primary County: GREENE	Urban / Rural: URBAN ROUTE
Addl Counties:	Project Type: GRADING, DRAINAGE, BRIDGE & PAVING
District: Southwest	Work Type: NEW CONSTRUCTION
Latitude: 37° 09' 24"	Traffic: Heavy Traffic (over 1700 DAT)
Longitude: 93° 25' 03"	Estimator: orren.ricketts@modot.mo.gov
Log Mile: Beg:	Constr Eng: 0.00%
End:	Priced Date:
Station: Beg:	Create Date: 11/23/2021
End:	Fed Project No:
Project Length: 0.8970 miles	Mobe Percent: 6.00%
Route: ZZ	Survey Percent: 1.50%

Project Sections

1 Roadway	\$16,961,337.67	73.53%
10 MGS Guardrail Items	\$52,000.00	0.23%
20 Lighting	\$200,000.00	0.87%
30 Signals	\$300,000.00	1.30%
40 Signing	\$100,000.00	0.43%
70 Bridge or Retaining Wall	\$5,453,744.45	23.64%
Total	\$23,067,082.12	100.0%

STIP Information

Construction Cost	\$23,067,082.12	83.33%
PE (12.00% of construction cost)	\$2,768,049.85	10.00%
CE (8.00% of construction cost)	\$1,845,366.57	6.67%
R/W	\$0.00	0.00%
R/W Incidentals	\$0.00	0.00%
Utilities	\$0.00	0.00%
Incentive	\$0.00	0.00%

Major Categories

BRIDGE	\$5,703,836.95	24.73%
GRADE/DRAIN	\$10,775,610.50	46.71%
MISC.	\$3,644,053.42	15.80%
PAVEMENT/BASE	\$2,943,581.25	12.76%
Total	\$23,067,082.12	100.0%

Total	\$27,680,498.54	100.0%
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Bid Report

Project: Corridor Improvements	Job Number: J8S0836D_Conceptual_Alt1	Bid Date: 11/23/2021	State: MO
Location: Rte. MM in Republic			

Section: Roadway

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	2013000	CLEARING AND GRUBBING	--	6.000	ACRE	3,000.00	\$18,000.00
0	2022010	REMOVAL OF IMPROVEMENTS	--	1.000	L.S.	50,000.00	\$50,000.00
0	2035000	UNCLASSIFIED EXCAVATION	--	31,834.000	C.Y.	11.00	\$350,174.00
0	2035500	EMBANKMENT IN PLACE	--	465,742.000	C.Y.	19.00	\$8,849,098.00
0	2036000	COMPACTING EMBANKMENT	--	27,682.000	C.Y.	2.25	\$62,284.50
0	2037075	COMPACTING IN CUT	--	19.200	STA.	1,500.00	\$28,800.00
0	2063000	CLASS 3 EXCAVATION	--	9,378.000	C.Y.	18.00	\$168,804.00
0	2063300	CLASS 4 EXCAVATION	--	752.000	C.Y.	30.00	\$22,560.00
0	2063400	CLASS 4 EXCAVATION IN ROCK	--	12.000	C.Y.	75.00	\$900.00
0	2071000	LINEAR GRADING CLASS 1	--	1.500	STA.	1,200.00	\$1,800.00
0	2079903	MISC. {LINEAR GRADING FOR ADA FACILITIES}	--	10,420.000	L.F.	12.00	\$125,040.00
0	2101006A	SUBGRADE COMPACTION (6-INCH DEPTH)	--	13.000	100FT	270.00	\$3,510.00
0	2121000A	SUBGRADING AND SHOULDERING CLASS 1	--	9.000	100FT	2,500.00	\$22,500.00
0	3040143	TYPE 1 AGGREGATE FOR BASE (4 IN. THICK)	--	8,533.000	S.Y.	9.25	\$78,930.25
0	3040504	TYPE 5 AGGREGATE FOR BASE (4 IN. THICK)	--	44,766.000	S.Y.	10.00	\$447,660.00
0	3105002	GRAVEL (A) OR CRUSHED STONE (B)	--	200.000	TON	40.00	\$8,000.00
0	4010151	TYPE A3 SHOULDER	--	1,103.200	S.Y.	65.00	\$71,708.00
0	4019905	MISC. {OPTIONAL PAVEMENT}	--	40,703.100	S.Y.	55.00	\$2,238,670.50
0	5041000	CONCRETE APPROACH PAVEMENT	--	788.900	S.Y.	125.00	\$98,612.50
0	6081010	CONCRETE CURB RAMP	--	432.600	S.Y.	100.00	\$43,260.00
0	6081012	TRUNCATED DOMES	--	390.000	S.F.	30.00	\$11,700.00
0	6083008	8 IN. CONCRETE MEDIAN STRIP	--	1,053.100	S.Y.	80.00	\$84,248.00
0	6086004	"CONCRETE SIDEWALK, 4 IN."	--	8,172.300	S.Y.	45.00	\$367,753.50
0	6091041	CONCRETE GUTTER TYPE A	--	30.000	L.F.	55.00	\$1,650.00
0	6091051	CURB AND GUTTER TYPE A	--	8,880.000	L.F.	35.00	\$310,800.00
0	6091060	PAVED DITCH	--	72.000	S.Y.	70.00	\$5,040.00
0	6096020	FURNISHING TYPE 2 ROCK DITCH LINER	--	308.000	C.Y.	35.00	\$10,780.00
0	6096042	PLACING TYPE 2 ROCK DITCH LINER	--	308.000	C.Y.	30.00	\$9,240.00
0	6097000	ROCK LINING	--	18.000	C.Y.	100.00	\$1,800.00
0	6113020	FURNISHING TYPE 2 ROCK BLANKET	--	1,094.000	C.Y.	30.00	\$32,820.00
0	6113040	PLACING TYPE 2 ROCK BLANKET	--	1,094.000	C.Y.	15.00	\$16,410.00
0	6123000A	TRUCK OR TRAILER MOUNTED ATTENUATOR (TMA)	--	1.000	EACH	2,000.00	\$2,000.00
0	6143013	"MANHOLE FRAME AND COVER, TYPE 3"	--	38.000	EACH	300.00	\$11,400.00

Bid Report

Project: Corridor Improvements			Job Number: J8S0836D_Conceptual_Alt1		Bid Date: 11/23/2021		State: MO	
Location: Rte. MM in Republic								
0	6161005	CONSTRUCTION SIGNS	--	800.000	S.F.	7.50	\$6,000.00	
0	6161025	CHANNELIZER (TRIM LINE)	--	175.000	EACH	18.00	\$3,150.00	
0	6161030	TYPE III MOVEABLE BARRICADE	--	28.000	EACH	155.00	\$4,340.00	
0	6161040	FLASHING ARROW PANEL	--	1.000	EACH	1,000.00	\$1,000.00	
0	6161099	"CHANGEABLE MESSAGE SIGN WITH COMMUNICATION INTERFACE, CONTRACTOR FURNISHED, CONTRACTOR RETAINED"	--	5.000	EACH	3,500.00	\$17,500.00	
0	6162002	TEMPORARY LONG-TERM RUMBLE STRIPS	--	10.000	EACH	900.00	\$9,000.00	
0	6169902	MISC. {ADA MOVEABLE BARRICADE}	--	18.000	EACH	200.00	\$3,600.00	
0	6181000	MOBILIZATION	--	1.000	L.S.	1,287,465.05	\$1,287,465.05	
0	6181020	ADDITIONAL MOBILIZATION FOR SEEDING	--	4.000	EACH	600.00	\$2,400.00	
0	6191000	PAVEMENT EDGE TREATMENT	--	9,472.000	L.F.	3.00	\$28,416.00	
0	6200015	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. WHITE"	--	100.000	L.F.	21.00	\$2,100.00	
0	6200021	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, LEFT/RIGHT ARROW"	--	2.000	EACH	255.00	\$510.00	
0	6200030	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, WORD (ONLY)"	--	2.000	EACH	350.00	\$700.00	
0	6200042	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 12 IN WHITE, YIELD LINE TRIANGLES"	--	38.000	EACH	30.00	\$1,140.00	
0	6200051	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, COMBINATION STR/LT/RT FISH HOOK ARROW"	--	2.000	EACH	600.00	\$1,200.00	
0	6206000C	"4 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	17,181.000	L.F.	0.12	\$2,061.72	
0	6206001C	"4 IN. YELLOW STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	27,792.000	L.F.	0.12	\$3,335.04	
0	6240103A	PERMANENT EROSION CONTROL GEOTEXTILE	--	500.000	S.Y.	5.00	\$2,500.00	
0	6274000	CONTRACTOR FURNISHED SURVEYING AND STAKING	--	1.000	L.S.	321,866.26	\$321,866.26	
0	7034041	CLASS B-1 CONCRETE (CULVERTS)	--	352.000	C.Y.	665.00	\$234,080.00	
0	7061030	REINFORCING STEEL (CULVERTS)	--	9,150.000	LBS	1.75	\$16,012.50	
0	7250318A	18 IN. PIPE GROUP B	--	1,670.000	L.F.	55.00	\$91,850.00	
0	7250324A	24 IN. PIPE GROUP B	--	5,925.000	L.F.	70.00	\$414,750.00	
0	7250330A	30 IN. PIPE GROUP B	--	4,250.000	L.F.	85.00	\$361,250.00	
0	7311042	PRECAST CONCRETE DROP INLET 4 FT X 2 FT	--	228.000	L.F.	780.00	\$177,840.00	
0	7320024A	24 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	10.000	EACH	700.00	\$7,000.00	
0	7320030A	30 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	5.000	EACH	1,000.00	\$5,000.00	
0	8032000A	KENTUCKY BLUEGRASS SODDING	--	8,000.000	S.Y.	30.00	\$240,000.00	
0	8051000A	SEEDING - COOL SEASON MIXTURES	--	4.000	ACRE	3,200.00	\$12,800.00	
0	8052000A	SEEDING - WARM SEASON MIXTURES	--	4.000	ACRE	4,200.00	\$16,800.00	
0	8061001	SEDIMENT BASIN EXCAVATION	--	1,369.900	C.Y.	2.50	\$3,424.75	

Bid Report

Project: Corridor Improvements	Job Number: J8S0836D_Conceptual_Alt1	Bid Date: 11/23/2021	State: MO
Location: Rte. MM in Republic			

0	8061002	SEDIMENT BASIN ROCK	--	1,369.900	C.Y.	18.00	\$24,658.20
0	8061003	SEDIMENT TRAP EXCAVATION	--	102.300	C.Y.	28.00	\$2,864.40
0	8061004	SEDIMENT TRAP ROCK	--	102.300	C.Y.	135.00	\$13,810.50
0	8061005	ROCK DITCH CHECK	--	2,500.000	L.F.	13.25	\$33,125.00
0	8061007A	CURB INLET CHECK	--	44.000	EACH	140.00	\$6,160.00
0	8061016	SEDIMENT REMOVAL	--	675.000	C.Y.	21.00	\$14,175.00
0	8061017	TEMPORARY SEEDING AND MULCHING	--	5.000	ACRE	1,200.00	\$6,000.00
0	8061019	SILT FENCE	--	8,500.000	L.F.	3.00	\$25,500.00
Category: Roadway							\$16,961,337.67

Section: MGS Guardrail Items

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	6061060	MGS GUARDRAIL	--	1,200.000	L.F.	24.00	\$28,800.00
0	6061069	MGS BRIDGE APPROACH TRANSITION SECTION (REGULAR/NO CURB)	--	4.000	EACH	3,000.00	\$12,000.00
0	6063014	TYPE A CRASHWORTHY END TERMINAL (MASH)	--	4.000	EACH	2,800.00	\$11,200.00
Category: MGS Guardrail Items							\$52,000.00

Section: Lighting

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9019901	MISC. {LIGHTING}	--	1.000	L.S.	200,000.00	\$200,000.00
Category: Lighting							\$200,000.00

Section: Signals

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9029901	MISC. {SIGNALS}	--	1.000	L.S.	300,000.00	\$300,000.00
Category: Signals							\$300,000.00

Section: Signing

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9039901	MISC. {SIGNING}	--	1.000	L.S.	100,000.00	\$100,000.00
Category: Signing							\$100,000.00

Section: Bridge or Retaining Wall

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	7019901	MISC. {NEW BRIDGE}	--	1.000	L.S.	5,453,744.45	\$5,453,744.45
Category: Bridge or Retaining Wall							\$5,453,744.45

Bid Report

Project: Corridor Improvements

Job Number: J8S0836D_Conceptual_Alt1

Bid Date: 11/23/2021

State: MO

Location: Rte. MM in Republic

Total: \$23,067,082.12

REPORT PARAMETERS

Project	J8S0836D_Conceptual_Alt1 - Corridor Improvements
Comparison	Bid Price

Bid Report

Project: Corridor Improvements	Job Number: J8S0836D_Conceptual_Alt3	Bid Date: 11/23/2021	State: MO
Location: Rte. MM in Republic			

Project Settings

Primary County: GREENE	Urban / Rural: URBAN ROUTE
Addl Counties:	Project Type: GRADING, DRAINAGE, BRIDGE & PAVING
District: Southwest	Work Type: NEW CONSTRUCTION
Latitude: 37° 09' 24"	Traffic: Heavy Traffic (over 1700 DAT)
Longitude: 93° 25' 03"	Estimator: orren.ricketts@modot.mo.gov
Log Mile: Beg:	Constr Eng: 0.00%
End:	Priced Date:
Station: Beg:	Create Date: 12/2/2021
End:	Fed Project No:
Project Length: 0.8970 miles	Mobe Percent: 6.00%
Route: ZZ	Survey Percent: 1.50%

Project Sections

1 Roadway	\$17,032,072.48	72.98%
10 MGS Guardrail Items	\$52,000.00	0.22%
20 Lighting	\$200,000.00	0.86%
30 Signals	\$500,000.00	2.14%
40 Signing	\$100,000.00	0.43%
70 Bridge or Retaining Wall	\$5,453,744.45	23.37%
Total	\$23,337,816.93	100.0%

STIP Information

Construction Cost	\$23,337,816.93	83.33%
PE (12.00% of construction cost)	\$2,800,538.03	10.00%
CE (8.00% of construction cost)	\$1,867,025.35	6.67%
R/W	\$0.00	0.00%
R/W Incidentals	\$0.00	0.00%
Utilities	\$0.00	0.00%
Incentive	\$0.00	0.00%

Major Categories

BRIDGE	\$5,703,836.95	24.44%
GRADE/DRAIN	\$10,955,484.75	46.94%
MISC.	\$3,831,702.73	16.42%
PAVEMENT/BASE	\$2,846,792.50	12.20%
Total	\$23,337,816.93	100.0%

Total	\$28,005,380.31	100.0%
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Bid Report

Project: Corridor Improvements	Job Number: J8S0836D_Conceptual_Alt3	Bid Date: 11/23/2021	State: MO
Location: Rte. MM in Republic			

Section: Roadway

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	2013000	CLEARING AND GRUBBING	--	6.000	ACRE	3,000.00	\$18,000.00
0	2022010	REMOVAL OF IMPROVEMENTS	--	1.000	L.S.	50,000.00	\$50,000.00
0	2035000	UNCLASSIFIED EXCAVATION	--	32,650.000	C.Y.	11.00	\$359,150.00
0	2035500	EMBANKMENT IN PLACE	--	477,685.000	C.Y.	19.00	\$9,076,015.00
0	2036000	COMPACTING EMBANKMENT	--	28,391.000	C.Y.	2.25	\$63,879.75
0	2037075	COMPACTING IN CUT	--	19.500	STA.	1,500.00	\$29,250.00
0	2063000	CLASS 3 EXCAVATION	--	9,161.000	C.Y.	18.00	\$164,898.00
0	2063300	CLASS 4 EXCAVATION	--	752.000	C.Y.	30.00	\$22,560.00
0	2063400	CLASS 4 EXCAVATION IN ROCK	--	12.000	C.Y.	75.00	\$900.00
0	2071000	LINEAR GRADING CLASS 1	--	1.500	STA.	1,200.00	\$1,800.00
0	2079903	MISC. {LINEAR GRADING FOR ADA FACILITIES}	--	10,501.000	L.F.	12.00	\$126,012.00
0	2101006A	SUBGRADE COMPACTION (6-INCH DEPTH)	--	13.000	100FT	270.00	\$3,510.00
0	2121000A	SUBGRADING AND SHOULDERING CLASS 1	--	9.000	100FT	2,500.00	\$22,500.00
0	3040143	TYPE 1 AGGREGATE FOR BASE (4 IN. THICK)	--	8,220.000	S.Y.	9.25	\$76,035.00
0	3040504	TYPE 5 AGGREGATE FOR BASE (4 IN. THICK)	--	43,300.000	S.Y.	10.00	\$433,000.00
0	3105002	GRAVEL (A) OR CRUSHED STONE (B)	--	200.000	TON	40.00	\$8,000.00
0	4010151	TYPE A3 SHOULDER	--	1,052.000	S.Y.	65.00	\$68,380.00
0	4019905	MISC. {OPTIONAL PAVEMENT}	--	39,323.000	S.Y.	55.00	\$2,162,765.00
0	5041000	CONCRETE APPROACH PAVEMENT	--	788.900	S.Y.	125.00	\$98,612.50
0	6081010	CONCRETE CURB RAMP	--	309.000	S.Y.	100.00	\$30,900.00
0	6081012	TRUNCATED DOMES	--	300.000	S.F.	30.00	\$9,000.00
0	6083008	8 IN. CONCRETE MEDIAN STRIP	--	617.100	S.Y.	80.00	\$49,368.00
0	6086004	"CONCRETE SIDEWALK, 4 IN."	--	8,013.900	S.Y.	45.00	\$360,625.50
0	6091041	CONCRETE GUTTER TYPE A	--	30.000	L.F.	55.00	\$1,650.00
0	6091051	CURB AND GUTTER TYPE A	--	9,087.000	L.F.	35.00	\$318,045.00
0	6091060	PAVED DITCH	--	72.000	S.Y.	70.00	\$5,040.00
0	6096020	FURNISHING TYPE 2 ROCK DITCH LINER	--	385.000	C.Y.	35.00	\$13,475.00
0	6096042	PLACING TYPE 2 ROCK DITCH LINER	--	385.000	C.Y.	30.00	\$11,550.00
0	6097000	ROCK LINING	--	18.000	C.Y.	100.00	\$1,800.00
0	6113020	FURNISHING TYPE 2 ROCK BLANKET	--	1,052.000	C.Y.	30.00	\$31,560.00
0	6113040	PLACING TYPE 2 ROCK BLANKET	--	1,052.000	C.Y.	15.00	\$15,780.00
0	6123000A	TRUCK OR TRAILER MOUNTED ATTENUATOR (TMA)	--	1.000	EACH	2,000.00	\$2,000.00
0	6143013	"MANHOLE FRAME AND COVER, TYPE 3"	--	34.000	EACH	300.00	\$10,200.00

Bid Report

Project: Corridor Improvements			Job Number: J8S0836D_Conceptual_Alt3		Bid Date: 11/23/2021		State: MO
Location: Rte. MM in Republic							
0	6161005	CONSTRUCTION SIGNS	--	800.000 S.F.	7.50	\$6,000.00	
0	6161025	CHANNELIZER (TRIM LINE)	--	175.000 EACH	18.00	\$3,150.00	
0	6161030	TYPE III MOVEABLE BARRICADE	--	28.000 EACH	155.00	\$4,340.00	
0	6161040	FLASHING ARROW PANEL	--	1.000 EACH	1,000.00	\$1,000.00	
0	6161099	"CHANGEABLE MESSAGE SIGN WITH COMMUNICATION INTERFACE, CONTRACTOR FURNISHED, CONTRACTOR RETAINED"	--	5.000 EACH	3,500.00	\$17,500.00	
0	6162002	TEMPORARY LONG-TERM RUMBLE STRIPS	--	10.000 EACH	900.00	\$9,000.00	
0	6169902	MISC. {ADA MOVEABLE BARRICADE}	--	18.000 EACH	200.00	\$3,600.00	
0	6181000	MOBILIZATION	--	1.000 L.S.	1,302,575.83	\$1,302,575.83	
0	6181020	ADDITIONAL MOBILIZATION FOR SEEDING	--	4.000 EACH	600.00	\$2,400.00	
0	6191000	PAVEMENT EDGE TREATMENT	--	9,378.000 L.F.	3.00	\$28,134.00	
0	6200015	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. WHITE"	--	96.000 L.F.	21.00	\$2,016.00	
0	6200021	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, LEFT/RIGHT ARROW"	--	12.000 EACH	255.00	\$3,060.00	
0	6200030	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, WORD (ONLY)"	--	2.000 EACH	350.00	\$700.00	
0	6200042	"PREFORMED THERMOPLASTIC PAVEMENT MARKING, 12 IN WHITE, YIELD LINE TRIANGLES"	--	38.000 EACH	30.00	\$1,140.00	
0	6206000C	"4 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	20,246.000 L.F.	0.12	\$2,429.52	
0	6206001C	"4 IN. YELLOW STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	28,761.000 L.F.	0.12	\$3,451.32	
0	6206124A	"24 IN. WHITE STANDARD WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS"	--	100.000 L.F.	6.00	\$600.00	
0	6240103A	PERMANENT EROSION CONTROL GEOTEXTILE	--	500.000 S.Y.	5.00	\$2,500.00	
0	6274000	CONTRACTOR FURNISHED SURVEYING AND STAKING	--	1.000 L.S.	325,643.96	\$325,643.96	
0	7034041	CLASS B-1 CONCRETE (CULVERTS)	--	352.000 C.Y.	665.00	\$234,080.00	
0	7061030	REINFORCING STEEL (CULVERTS)	--	9,150.000 LBS	1.75	\$16,012.50	
0	7250318A	18 IN. PIPE GROUP B	--	2,325.000 L.F.	55.00	\$127,875.00	
0	7250324A	24 IN. PIPE GROUP B	--	5,810.000 L.F.	70.00	\$406,700.00	
0	7250330A	30 IN. PIPE GROUP B	--	3,490.000 L.F.	85.00	\$296,650.00	
0	7311042	PRECAST CONCRETE DROP INLET 4 FT X 2 FT	--	204.000 L.F.	780.00	\$159,120.00	
0	7320024A	24 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	9.000 EACH	700.00	\$6,300.00	
0	7320030A	30 IN. OR ALLOWED SUBSTITUTE GROUP B FLARED END SECTION	--	4.000 EACH	1,000.00	\$4,000.00	
0	8032000A	KENTUCKY BLUEGRASS SODDING	--	8,500.000 S.Y.	30.00	\$255,000.00	
0	8051000A	SEEDING - COOL SEASON MIXTURES	--	3.800 ACRE	3,200.00	\$12,160.00	
0	8052000A	SEEDING - WARM SEASON MIXTURES	--	3.800 ACRE	4,200.00	\$15,960.00	
0	8061001	SEDIMENT BASIN EXCAVATION	--	1,381.400 C.Y.	2.50	\$3,453.50	
0	8061002	SEDIMENT BASIN ROCK	--	1,381.400 C.Y.	18.00	\$24,865.20	

Bid Report

Project: Corridor Improvements	Job Number: J8S0836D_Conceptual_Alt3	Bid Date: 11/23/2021	State: MO
Location: Rte. MM in Republic			

0	8061003	SEDIMENT TRAP EXCAVATION	--	117.300	C.Y.	28.00	\$3,284.40
0	8061004	SEDIMENT TRAP ROCK	--	117.300	C.Y.	135.00	\$15,835.50
0	8061005	ROCK DITCH CHECK	--	2,500.000	L.F.	13.25	\$33,125.00
0	8061007A	CURB INLET CHECK	--	44.000	EACH	140.00	\$6,160.00
0	8061016	SEDIMENT REMOVAL	--	690.000	C.Y.	21.00	\$14,490.00
0	8061017	TEMPORARY SEEDING AND MULCHING	--	5.000	ACRE	1,200.00	\$6,000.00
0	8061019	SILT FENCE	--	8,500.000	L.F.	3.00	\$25,500.00
Category: Roadway							\$17,032,072.48

Section: MGS Guardrail Items

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	6061060	MGS GUARDRAIL	--	1,200.000	L.F.	24.00	\$28,800.00
0	6061069	MGS BRIDGE APPROACH TRANSITION SECTION (REGULAR/NO CURB)	--	4.000	EACH	3,000.00	\$12,000.00
0	6063014	TYPE A CRASHWORTHY END TERMINAL (MASH)	--	4.000	EACH	2,800.00	\$11,200.00
Category: MGS Guardrail Items							\$52,000.00

Section: Lighting

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9019901	MISC. {LIGHTING}	--	1.000	L.S.	200,000.00	\$200,000.00
Category: Lighting							\$200,000.00

Section: Signals

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9029901	MISC. {SIGNALS}	--	1.000	L.S.	500,000.00	\$500,000.00
Category: Signals							\$500,000.00

Section: Signing

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	9039901	MISC. {SIGNING}	--	1.000	L.S.	100,000.00	\$100,000.00
Category: Signing							\$100,000.00

Section: Bridge or Retaining Wall

Sort	Pay Item	Description	Count	Quantity	Unit	Unit Price	Extension
0	7019901	MISC. {NEW BRIDGE}	--	1.000	L.S.	5,453,744.45	\$5,453,744.45
Category: Bridge or Retaining Wall							\$5,453,744.45

Total:	\$23,337,816.93
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Bid Report

Project: Corridor Improvements**Job Number:** J8S0836D_Conceptual
I_Alt3**Bid Date:** 11/23/2021**State:** MO**Location:** Rte. MM in Republic**REPORT PARAMETERS****Project** J8S0836D_Conceptual_Alt3 - Corridor Improvements**Comparison** Bid Price

Appendix E

Accident Summaries



OFFSET	TRAVEL WAY ID	DESIGNA TION	TRAVEL WAY NAME	DIRECTIO N	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPT ION	END DESCRIPT ION
	2603	RT	MM	S	2.746	2.746	6	6	GREENE	GREENE	2.746	2.746	CRD 160 E	CRD 160 E

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	0	0	0	0	0	0
MINOR INJURY	0	1	0	1	0	2
PROPERTY DAMAGE ONLY	3	2	2	0	0	7
TOTAL	3	3	2	1	0	9
AADT	24039	24256	23892	25617	22517	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	0.34	0.34	0.23	0.11	0	
STATE RATE	0.37	0.38	0.4	0.41	0	

TYPE	2016	2017	2018	2019	2020	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	0	0	0	0	0
CHANGING LANE	0	1	0	0	0	1
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	0	0	0	0
DEER	0	0	1	0	0	1
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	0	0
HEAD ON	0	0	0	0	0	0
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	0	0	0	0
LEFT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
OTHER	0	1	0	0	0	1

OUT OF CONTROL	0	1	0	1	0	2
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	0	0	1	0	0	1
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	3	0	0	0	0	3
RIGHT ANGLE	0	0	0	0	0	0
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	3	3	2	1	0	9

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OFFSET	TRAVEL WAY ID	DESIGNA TION	TRAVEL WAY NAME	DIRECTIO N	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPT ION	END DESCRIPT ION
	2727	RT	ZZ	S	0	0	6	6	GREENE	GREENE	0	0	RT M E	RT M E

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	0	0	0	0	0	0
MINOR INJURY	0	1	0	2	0	3
PROPERTY DAMAGE ONLY	4	3	1	1	2	11
TOTAL	4	4	1	3	2	14
AADT	6816	6874	6831	6871	6609	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	1.61	1.59	0.4	1.2	0.83	
STATE RATE	0.37	0.38	0.34	0.33	0	

TYPE	2016	2017	2018	2019	2020	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	0	0	0	0	0
CHANGING LANE	0	0	0	0	0	0
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	0	0	0	0
DEER	0	0	0	0	0	0
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	0	0
HEAD ON	1	1	0	0	0	2
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	0	0	0	0
LEFT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
OUT OF CONTROL	0	1	0	0	0	1

PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	0	0	0	0	0	0
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	1	2	1	2	2	8
RIGHT ANGLE	1	0	0	1	0	2
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	1	0	0	0	0	1
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	4	4	1	3	2	14

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OFFSET	TRAVEL WAY ID	DESIGNA TION	TRAVEL WAY NAME	DIRECTIO N	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPT ION	END DESCRIPT ION
	2603	RT	MM	S	2.746	3.95	6	6	GREENE	GREENE	2.746	3.95	CRD 160 E	US 60 E

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	2	2	0	0	1	5
MINOR INJURY	7	3	4	4	4	22
PROPERTY DAMAGE ONLY	13	9	10	10	8	50
TOTAL	22	14	14	14	13	77
AADT	9201	9283	9377	7400	7785	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	544.09	343.18	339.74	430.5	379.98	
STATE RATE-RT	283.32	274.29	277.06	271.45		ROUTE DESG
STATE RATE-TWO-LANE	211.67	208.06	210.88	194.42	0	ROADWAY TYPE

TYPE	2016	2017	2018	2019	2020	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	0	0	0	0	0
CHANGING LANE	0	0	0	0	0	0
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	0	1	0	1
DEER	0	0	0	0	0	0
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	1	1
HEAD ON	1	0	1	1	0	3
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	0	1	0	1
LEFT TURN RIGHT ANGLE COLLISION	2	3	1	0	0	6

OTHER	0	1	1	0	0	2
OUT OF CONTROL	2	2	4	2	1	11
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	1	0	0	0	2	3
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	14	8	5	8	6	41
RIGHT ANGLE	2	0	2	1	3	8
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	22	14	14	14	13	77

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OFFSET	TRAVEL WAY ID	DESIGNA TION	TRAVEL WAY NAME	DIRECTIO N	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPT ION	END DESCRIPT ION
	7782	US	60	E	76.484	76.484	6	6	GREENE	GREENE	6.609	6.609	CST COMMER CIAL AVE S	CST COMMER CIAL AVE S

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	1	0	0	0	0	1
SERIOUS INJURY	0	0	0	0	0	0
MINOR INJURY	1	0	0	0	1	2
PROPERTY DAMAGE ONLY	2	1	3	1	0	7
TOTAL	4	1	3	1	1	10
AADT	24987	25232	24872	27006	23875	

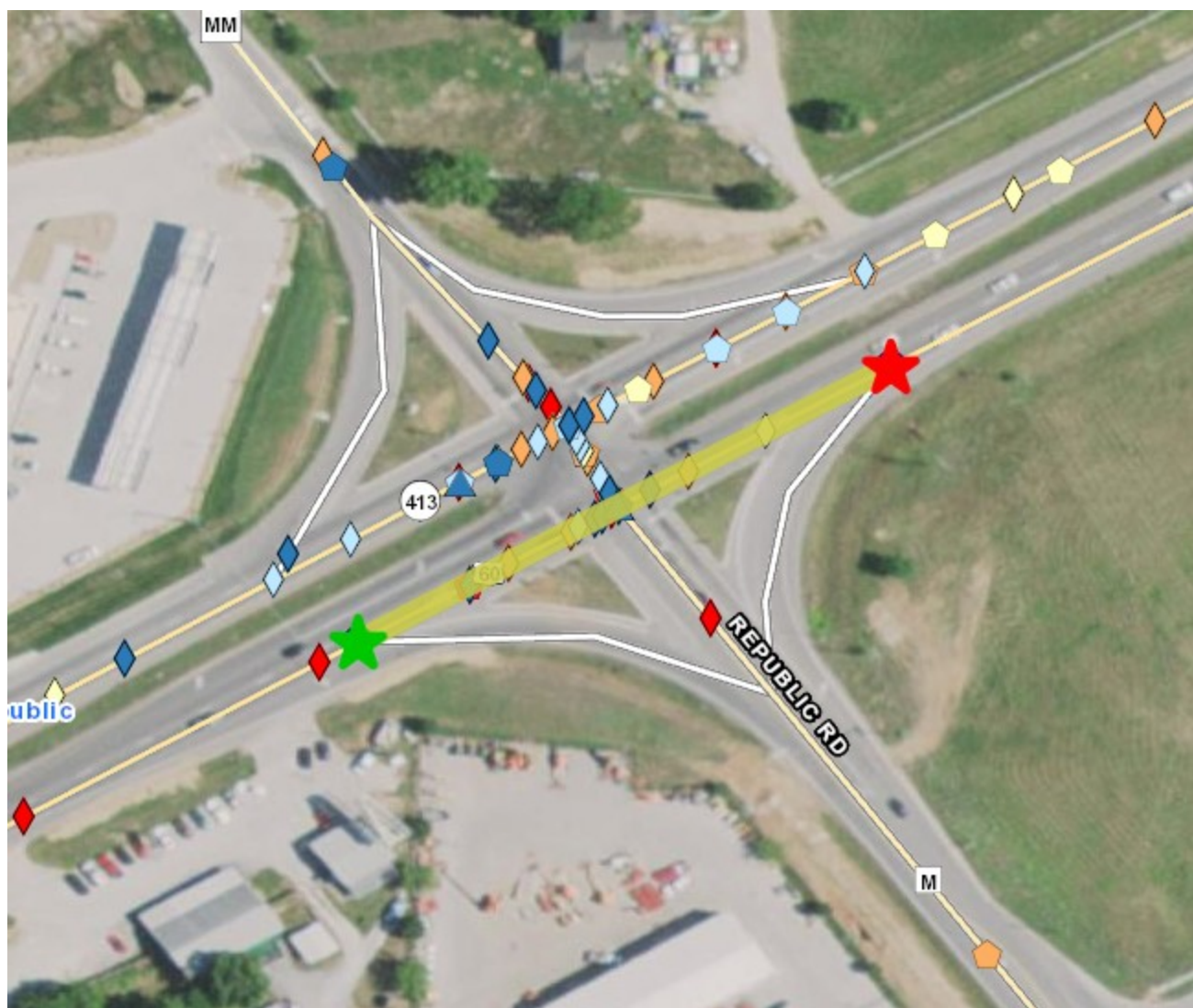
1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	0.44	0.11	0.33	0.1	0.11	
STATE RATE	0.37	0.38	0.4	0.41	0	

TYPE	2016	2017	2018	2019	2020	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	0	0	0	0	0
CHANGING LANE	0	0	0	0	0	0
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	0	0	0	0
DEER	0	0	1	0	0	1
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	0	0
HEAD ON	0	0	0	0	0	0
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	0	0	0	0

LEFT TURN RIGHT ANGLE COLLISION	1	0	0	0	0	1
OTHER	0	0	0	0	0	0
OUT OF CONTROL	0	0	1	1	0	2
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	0	0	0	0	0	0
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	3	1	0	0	1	5
RIGHT ANGLE	0	0	1	0	0	1
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	4	1	3	1	1	10

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OFFSET	TRAVEL WAY ID	DESIGNA TION	TRAVEL WAY NAME	DIRECTIO N	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPT ION	END DESCRIPT ION
	7782	US	60	E	74.821	75.879	6	6	GREENE	GREENE	4.946	6.004	CRD 170 E	CRD 101 S

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	1	1	0	0	1	3
MINOR INJURY	2	0	3	3	1	9
PROPERTY DAMAGE ONLY	15	12	14	8	5	54
TOTAL	18	13	17	11	7	66
AADT	14571	14702	14482	14870	11719	

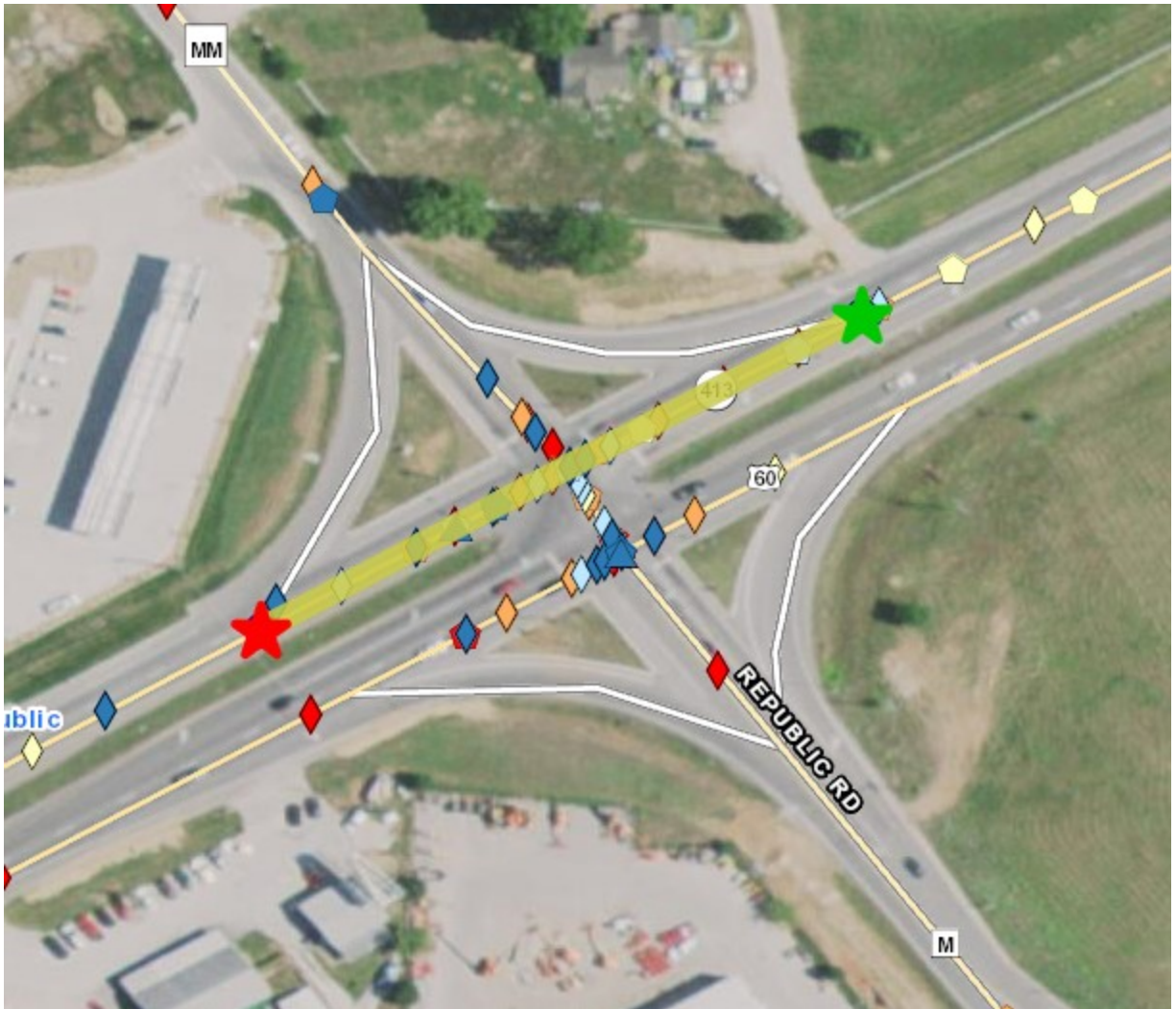
1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	319.89	228.98	303.98	191.56	154.68	
STATE RATE-US	116.14	108.89	113.73	114.39		ROUTE DESG
STATE RATE-EXPRESSWAY	133.59	127.2	130.67	118.21	0	ROADWAY TYPE

TYPE	2016	2017	2018	2019	2020	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	1	0	0	0	0	1
BACKING	0	0	0	0	0	0
CHANGING LANE	0	0	0	0	0	0
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	1	0	1	0	2
DEER	0	1	0	0	0	1
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	0	0
HEAD ON	0	0	0	0	0	0
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	1	1	0	2
LEFT TURN RIGHT ANGLE COLLISION	2	2	0	0	0	4

OTHER	3	0	1	0	1	5
OUT OF CONTROL	0	0	1	2	0	3
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	0	0	2	1	0	3
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	11	9	10	5	5	40
RIGHT ANGLE	1	0	2	1	1	5
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	18	13	17	11	7	66

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OFFSET	TRAVEL WAY ID	DESIGNA TION	TRAVEL WAY NAME	DIRECTIO N	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPT ION	END DESCRIPT ION
	7783	US	60	W	265.042	265.116	6	6	GREENE	GREENE	21.693	21.767	CO US60W TO RTMM N	CO RTMM TO US60W W

TYPE	2016	2017	2018	2019	2020	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	1	1	0	0	0	2
MINOR INJURY	1	3	2	1	4	11
PROPERTY DAMAGE ONLY	8	8	9	9	12	46
TOTAL	10	12	11	10	16	59
AADT	13171	13290	13091	13504	11505	

1 Year Statewide Rate

TYPE	2016	2017	2018	2019	2020	Rate Level
CRASH RATE	2810.97	3342.96	3110.97	2741.66	5148.83	
STATE RATE-US	116.14	108.89	113.73	114.39		ROUTE DESG
STATE RATE-EXPRESSWAY	133.59	127.2	130.67	118.21	0	ROADWAY TYPE

TYPE	2016	2017	2018	2019	2020	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	0	0	0	0	0
CHANGING LANE	0	1	0	0	0	1
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	0	0	0	0
DEER	0	0	0	0	0	0
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	0	0
HEAD ON	0	0	0	1	0	1

JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	0	0	0	0
LEFT TURN RIGHT ANGLE COLLISION	0	1	1	0	0	2
OTHER	0	0	0	0	0	0
OUT OF CONTROL	0	0	0	0	0	0
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	1	0	0	0	2	3
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	7	10	10	9	13	49
RIGHT ANGLE	2	0	0	0	1	3
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	10	12	11	10	16	59

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Appendix F

Review of Environmental Impacts by MoDOT

This RES has been completed, only administrators may edit this document now, they will contact you if any information changes.

Date Completed: 11/30/2021

Completed By: Charlotte Drinkard

Request for Environmental Services Form#:2022-10-00292

☐ Alternative Project Delivery Method (such as Design/Build)

▼ Project Information

Stage:	Location/Conceptual	Previous RES(s):	No RES Selected
Job Number (w/o 'J'):	8S0836C	District:	Southwest
		County:	GREENE
TIP Number:		Rte/Street:	ZZ
Letting Date:		PS&E Due Date:	
Location:	Scoping to extend Rte. ZZ (Wilson's Creek Boulevard) from Rte. M (Republic Road) to Rte. 60.		
TMS Project Description - termini (no stations):	Scoping to extend Rte. ZZ (Wilson's Creek Boulevard) from Rte. M (Republic Road) to Rte. 60.		
Describe RES project improvements in full detail:	Extension of existing Rte. ZZ north to US 60. Project to include new roundabout intersection at M/ZZ, a new bridge over existing railroad, a new signalized intersection at 60, and 1.04 miles of new 3-lane roadway.		

These users will receive a notification when Environmental Services completes the current stage, the person who created this form as well as the person who submits it will also receive notification.

Project Manager:	Warner Sherman - 417-895-7690	TP Designer:	Kevin Fox - 417-829-8015
District Contact:	Orren Ricketts - 417-895-7673	District Contact:	None selected
Contact:	None selected		
Date Desired:	11/17/2021	Submit Date:	10/18/2021
Desired A-Date:	10/01/2022		
Created By:	Orren Ricketts - (10/18/2021 7:41:18 AM) - 417-895-7673	Submitted By:	Orren Ricketts - (10/18/2021 12:00:00 AM) - 417-895-7673

Program Year:

Preliminary Engineering:	2023	Right of Way:	2024
Construction:	2024		

Has the district documented that the project has: 1. Independent utility, 2. Logical termini, and 3. Does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements?:

☒ Yes ☐ No

Changes to project since last RES submittal? If yes, explain:

No
☐ Design/Build ☐ Alternate Technical Concepts

☐ Project breakout from previous or larger project? *If checked explain:*

Acres - From all sources (e.g. donated from public or private entities):

Additional R/W (acres): 16.37

Temp Easement (acres): 1

Permanent Easement (acres): 1

ROW may be needed, but, not yet determined? Yes

Acres of Tree Clearing: 3.5 acres

DO NOT CLEAR TREES W/O MODOT'S PRIOR WRITTEN APPROVAL.

Is ANY Federally-owned land impacted by the project? ☐ Yes ☒ No

Land Disturbance / Stormwater:

Will project involve 1 acre of land disturbance: ☒ Yes ☐ No ☐ Unknown

Define project type (see definitions below): ☒ New Development ☐ Redevelopment ☐ Maintenance

Projects with one acre or greater land disturbance activities must comply with the Land Disturbance Permit requirements.

New Development - Projects (with land disturbance greater than or equal to 1 acre) that are constructed where there was previously no transportation facility.

Redevelopment - Non-maintenance work performed to or on an existing public transportation facility which provides for an increased number of thru lanes of travel unless the work can be accommodated without increasing the width of the existing pavement. Widening of an existing road that does not result in an additional thru lane does not constitute redevelopment. Widening to add shoulders does not constitute a thru lane unless the total widening is greater than or equal to 10 feet.

Maintenance - Projects that do not meet the criteria of redevelopment or new development.

Was coordination with adjacent MS4 communities conducted? ☐ Yes ☒ No

If yes, please provide a short description of the coordination:

Number of Displacements(do not include partial takes that do not displace):

Residential: ☐ Yes ☒ No

Commercial: ☐ Yes ☒ No

No. of People:

Residences:

No. of Employees:

Businesses:

Any Public Involvement planned or completed:

Public meetings, media announcements, etc.

Average Daily Traffic:

ADT Construction Year: 7699

ADT Design Year: 1

Traffic Impacts:

Road Closure Planned: ☒ Yes ☐ No

Days/Months Closed: 3

Bridge Closure Planned: ☐ Yes ☒ No

Detour > 25 mi rural ☐ Yes ☒ No

Detour > 5 mi urban
(inside MPO) ☐ Yes ☒ No

Detour Info (including use of local roads): Closure time for FR 103 is unknown at this time. Largest impact will be bridge construction over existing railroad. Rte. M can be used for detour as necessary.

Bicycle / Pedestrian Consideration

Pedestrian facilities considered: Yes

Bicycle facilities considered: Yes

National Flood Insurance Program (NFIP) and Hydraulic Design Data:

☒ Project is in a FEMA-identified zone "subject to 100-year flooding": If so, what zone?: A

Project is in a FEMA-defined "floodway"

No

☐ Project involves land purchased through FEMA Hazard Mitigation Grant Program (Flood buyout property)

If checked, give details:

☐ Is highway improvement located within 4 miles of an existing airport?

Known Concerns: Provide information you have about these resources that you have observed in the area.

Parkland:

Wetland/404 Permit:

Land Disturbance / Stormwater:

Farmland:

Threatened & Endangered Species:

Migratory Birds: Are there birds nesting on the structure? No,

Hazardous Waste:

Cultural Resources:

District Comments: 10/27/21 update: Added A-date

Project Attachments:

****NOTE: If making updates to an attachment, please use a different filename than the original.**

****The combined size of attachments in one upload must be less than 100MB**

Attachments:

✖ J8S0836_Plan_Conceptual_Alt1_11-29-21.kmz

✖ J8S0836_Plan_Conceptual_Alt1.kmz

✖ J8S0836C Alt1.pdf

Required Information to be attached for each RES stage:

- **Loc/Concp.:** Location map (county map) & topographic map or aerial photo showing project limits – pre-plan sheets or other preliminary maps showing alternatives, if available
- **Prel. Plan:** Prel. Plan sheets

- **R/W:** R/W Plan sheets
- **Final Design:** Final Plans [Location map (county map) & topographic map or aerial photo showing project limits if this is first RES submittal]

RES Environmental Screenings

►Farmland Impact

Status Information: Status Changed By: Kyle Grayson ☐ N/A ☒ Pending ☐ Cleared Clearance Date:

Environmental Response: New ROW and easements for the project will require a farmland impact rating from NRCS.

Environmental Action: Complete AD-1006 form at preliminary plans stage.

District Action: Proceed to preliminary plans.

Attachments:

☒ Farmland Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*
Last Updated: Kyle Grayson - 10/27/2021 7:14:10 AM

►Floodplain/Regulatory Floodway

Status Information: Status Changed By: Kyle Grayson ☐ N/A ☒ Pending ☐ Cleared Clearance Date:

Environmental Response: FEMA FIRMs indicate that the project does cross 1% floodplain. A floodplain development permit from SEMA will be required.

Environmental Action: None

District Action: Obtain a floodplain development permit from SEMA.

Attachments:

☒ Floodplain/Regulatory Floodway Submitted - *Mark submitted when this review is ready to be sent to district staff.*
Last Updated: Kyle Grayson - 10/27/2021 7:21:55 AM

►Land Disturbance / Stormwater

Status Information: Status Changed By: Christopher Hamilton ☒ N/A ☐ Pending ☐ Cleared Clearance Date:

Environmental Response: The project is partially within the TS4 area, but most of the project will take place outside the boundaries, therefore the consideration for permanent stormwater BMPs is not required.

Environmental Action: None

District Action: None

TS4 Area: ☐ Yes ☐ No ☒ Partial Is the project in a TMDL watershed? ☐ Yes ☒ No

Attachments:

☒ Land Disturbance / Stormwater Submitted - *Mark submitted when this review is ready to be sent to district staff.*
Last Updated: Christopher Hamilton - 10/18/2021 8:19:54 AM

►FEMA/SEMA Buyout

Status Information: Status Changed By: Kyle Grayson ☒ N/A ☐ Pending ☐ Cleared Clearance Date:

Environmental Response: TMS Buyout layer indicates no FEMA/SEMA Buyout properties in the project limits.

Environmental Action: None

District Action: None

Attachments:

☒ FEMA/SEMA Buyout Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Kyle Grayson - 10/27/2021 7:23:54 AM

►Socioeconomic Impact

Status Information: Status Changed By: Caitie Wiechman ☐ N/A ☒ Pending ☐ Cleared Comment Date:

Environmental Response: The project does not require commercial or residential displacements, but does require new right of way, temporary easements, and permanent easements that are subject to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. The road will be closed for approximately three months during construction. The road closure time for FR 103 is unknown at this time. Largest impact will be bridge construction over existing railroad. Rte. M can be used for detour as necessary. Public meetings are anticipated for this project. More information about the public meetings and traffic impacts will be needed to continue to assess socioeconomic impacts.

Environmental Action: Continue to assess impacts when more information is known about public involvement and traffic impacts.

District Action: Please provide additional information about the following: 1.) Public Meetings - dates, locations, how many attended, how many comments received, if any major concerns about the project were expressed, and if those concerns were addressed by the District. 2.) Traffic Impacts - determined road closure time for FR 103 and official detour route for road closures Conduct the acquisition of affected properties in accordance with the procedures established in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Provide sufficient public notice of construction work and traffic management plans consistent with MoDOT's public involvement policy and procedures.

Attachments:

☒ Socioeconomic Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Caitlin Wiechman - 10/18/2021 1:00:58 PM

Threatened & Endangered Species

Status Information:

Status Changed By:
McMurray

☐ No Effect ☒ Pending
☐ Cleared

Clearance Date:

Environmental Response: Consultation Code: 03E14000-2022-SLI-0111 Oct 2021 species listed: Ozark cavefish, gray bat, Indiana bat, northern long-eared bat. Monarch butterfly added Sep 2021 as candidate for listing. Federal Action Agencies have no requirement to complete Section 7 consultation for Candidate species. I reviewed the MDC Natural Heritage Database (June 2021) and the MO Speleological Survey cave information (2019) for natural resource references in the project area. There are no known caves within 1.25 miles. Ozark cavefish inhabit cave streams and springs with a gravel bottom, or occasionally in pools over silt and sand bottoms. They are restricted to areas of limestone and dolomite bedrock containing caves, sinkholes and springs in SW Missouri. There is a losing stream in the project limits (south of Rt 60/413), it's unclear at this time if it flows perennially at all. The nearest known designated Ozark cavefish recharge areas just over 2.0 miles west in a different watershed (Pickerel Cr) and this project is anticipated to have No Effect on Ozark cavefish. Gray bats use caves year-round and utilize mainly stream corridors for foraging spring through fall. There is a small losing stream in the project limits--the headwaters of McElhaney Branch of Wilson's Creek. It doesn't appear at this time there will be modification to an existing box culvert between the proposed new ZZ/M (Republic Rd) roundabout and Repmo Rd/M roundabout. Though there will be trees removed for crossing this feature, it's unclear at this point if this is a perennial stream which bats could use for foraging. There is a known transient gray bat cave resource approximately 1.75 mi from the project limits along a perennial section of McElhaney Branch. There could be a determination of may affect, not likely to adversely affect for this project for gray bats with no conservation measures outside seasonal tree clearing for any suitable summer bat roost habitat for IN or NLE bats. Indiana and northern long-eared bats hibernate during winter in caves and spend the breeding season in forested areas of the state where they may utilize suitable summer roost trees. Removal of suitable summer roost trees at any time of the year may affect both species. There will be tree clearing with this project. A field assessment is needed for presence/absence of suitable summer bat roost habitat for IN and NLE bats.

Environmental Action: 11/30/21 McMurray: core team meeting, there is apparently an Alt 2 option. KMZ or conceptual drawing needed for screening. District presented rendered mapping of sinkholes--need copy/source for review. field assessment for stream conditions and suitable summer bat roost trees. Consultation with USFWS if needed.

District Action: 11/30/21 McMurray: upload -0836C job Alt 2 option KMZ and/or conceptual drawing for screening. Provide source/copy of sinkhole mapping presented at core team meeting 11/30 for review. refine location and amount of tree clearing limits as project progresses-slope limits and all access/easements. Impacts for both 8S0836C and 8S0836D may be combined for consultation, depending on letting schedules. (under parent project 8S0836-Rt 360-Rt M/ZZ)

Attachments:

✖ [Official_Species_List_08S0836C.pdf](#)

☒ Threatened & Endangered Species Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Bree McMurray - 11/30/2021 4:16:35 PM

Migratory Birds

Status Information:

Status Changed By:
McMurray

☐ N/A ☒ Pending ☐ Cleared

Clearance Date:

Environmental Response: There is an existing structure near the southern end of the project. It doesn't appear at this time there will be modification to an existing box culvert between the proposed new Rt ZZ/M (Republic Rd) roundabout and Repmo Rd/M roundabout. If there will be, then a Migratory Bird check is needed for this project.

Environmental Action: none at this time

District Action: confirm no planned modification to existing box culvert on Rt M/Republic Road between end of Rt ZZ extension and Repmo Road.

Attachments:

☒ Migratory Birds Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Bree McMurray - 10/19/2021 4:49:10 PM

►Hazardous Waste Impact

Status Information: Status Changed By: Ethan Musick ☐ N/A ☐ Pending ☒ Cleared Clearance Date: 10/21/2021

Environmental Response: The site location was reviewed utilizing the MDNR Interactive E-Start Map. The map contains information about the following types of sites: Superfund sites, Federal Facilities sites, Resource Conservation and Recovery Act Corrective Action sites, Brownfields/Voluntary Cleanup Program sites, Brownfield Assessments, and Petroleum and Hazardous Substance Storage Tank Facilities. No such sites were found within the project area. The potential to encounter wastes from sites unknown to MoDOT should always be a consideration. Any previously unknown sites that are found during project construction will be handled in accordance with Federal and State Laws and Regulations.

Environmental Action: None

District Action: If a hazardous waste site is encountered during the project, contact Ethan Musick, Hazardous Waste Specialist at (573) 508-6907.

Attachments:

☒ Hazardous Waste Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*
Last Updated: Ethan Musick - 10/29/2021 12:56:56 PM

►Wetland Impact (Section 404/401)

Status Information: Status Changed By: Christopher Hamilton ☐ N/A ☒ Pending ☐ Cleared Clearance Date:

Environmental Response: According to the NWI, there are no wetlands within the project area. There will be no wetland impacts. There is a mapped blue-line stream in the southern portion of the project area. The new road extension may impact this stream. historical Google Earth imagery was not sufficient in identifying the presence of this stream. Further investigation is needed to determine where the stream actually lies in present day. A field check may be required.

Environmental Action: Find stream channel

District Action: None

Wetland Permit Information: 404 Permit Number Permit Submitted Permit Received
Permit Expiration Compliance Certification Sent Compliance Certification Received

Attachments:

☒ Wetland Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*
Last Updated: Christopher Hamilton - 10/18/2021 8:37:31 AM

►Noise Impact

Status Information: Status Changed By: Matt Burcham ☐ N/A ☒ Pending ☐ Cleared Clearance Date:

Environmental Response: The project's improvements of a highway on new location qualifies as Type I requiring a noise analysis.

Environmental Action: Assist hiring consultant, noise study and review.

District Action: Hire consultant and assist as necessary.

Attachments:

☒ Noise Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*
Last Updated: Matthew Burcham - 10/18/2021 10:59:57 AM

► Cultural Resources Impact (Section 106/Historic 4f)

Status Information:

☒ Pending ☐ Cleared ☐ ROW Cleared

Status Changed By:
Travis D Tesreau

Clearance Date:

A Date Cleared:

Environmental Action: Based on the information provided, this project will require an extensive cultural resources survey and subsequent SHPO submittal. Landowner permission will be necessary for the archaeological survey to be scheduled. There are no previously recorded archaeological sites within the corridor.

District Action: Please get landowner permission for an archaeological survey on all properties that may be impacted by this project. Inform the Historic Preservation Section as soon as permission has been granted.

Attachments:

☐ Adverse Effect or Conditional No Adverse Effect

☐ Based on the review of the project location and description noted above, there are no identified historic 4(f) resources affected that would preclude the setting of an A-date.

Checked by: on de minimis Approved on:

☒ Cultural Resources Impact Submitted - Mark submitted when this review is ready to be sent to district staff.

Last Updated: Travis Tesreau - 11/30/2021 2:50:12 PM

► Public Land Impact (Section 4f/6f)

Status Information:

Status Changed By:
Caitie Wiechman

☐ N/A ☒ Pending ☐ Cleared

Clearance Date:

Environmental Response: According to Google Earth imagery and ArcMap GIS Public land layers, Sanford Park is located in the direct vicinity of the project area at the intersection of W Republic Road and W Farm Road 168. According to the provided KMZ, the overhead utility is located within the Sanford Park boundary. At this time it is unknown if the utility line will impact the park in any way. More information on this will be needed to continue to assess Park impacts.

Environmental Action: None at this time.

District Action: Please confirm that no new right of way or easements will be needed from the Sanford Park property. In addition confirm that the utility line will not impact the park in any way.

Attachments:

☒ Based on the review of the project location and description noted above, there are no identified 4(f) or 6(f) resources affected that would preclude the setting of an A-date.

Checked by: Caitie Wiechman on 10/18/2021

☒ Public Land Impact Submitted - Mark submitted when this review is ready to be sent to district staff.

Last Updated: Caitlin Wiechman - 10/18/2021 1:17:52 PM

► Other

Status Information:

☒ N/A ☐ Pending ☐ Cleared

Clearance Date:

Environmental Response: There are no additional resource impacts associated with this project.

District Action: None

Attachments:

☒ Other Screening Submitted - Mark submitted when this review is ready to be sent to district staff.

Last Updated: Charlotte Drinkard - 10/18/2021 10:15:08 AM

NEPA Classification

NEPA Right-Of-Way Permission:	Pending	as determined or approved by:
NEPA Approval/Proceed to A-date Request:		Re-evaluation Date: Final Design Complete:
NEPA Classification:	CE2	
This project qualifies for the programmatic categorical exclusion under Item#:		All Environmental Issues Cleared:
Commitments and/or Comments to District:	A CE2 will be needed for this project.	

Attachments:

Last Submitted: 11/30/2021 by [Charlotte Drinkard](#)

This RES has been completed, only administrators may edit this document now, they will contact you if any information changes.

Date Completed: 11/30/2021

Completed By: Charlotte Drinkard

Request for Environmental Services Form#:2022-10-00293

☐ Alternative Project Delivery Method (such as Design/Build)

▼Project Information

Stage:	Location/Conceptual	Previous RES(s):	No RES Selected
Job Number (w/o 'J'):	8S0836D	District:	Southwest
		County:	GREENE
TIP Number:		Rte/Street:	MM
Letting Date:		PS&E Due Date:	
Location:	Relocate roadway and add railroad grade separation from County Road 160 to Rte. 60 in Republic.		
TMS Project Description - termini (no stations):	Relocate roadway and add railroad grade separation from County Road 160 to Rte. 60 in Republic.		
Describe RES project improvements in full detail:	Realignment of existing Rte. MM in Republic between FR 160 and US 60. Project to include a new roundabout intersection at FR 160/MM, a new bridge over existing railroad, a new signalized intersection at US 60, and 0.90 miles of new 5-lane roadway with curb/gutter & sidewalk.		

These users will receive a notification when Environmental Services completes the current stage, the person who created this form as well as the person who submits it will also receive notification.

Project Manager:	Warner Sherman - 417-895-7690	TP Designer:	Kevin Fox - 417-829-8015
District Contact:	Orren Ricketts - 417-895-7673	District Contact:	None selected
Contact:	None selected		
Date Desired:	11/17/2021	Submit Date:	10/18/2021
Desired A-Date:	10/01/2022		
Created By:	Orren Ricketts - (10/18/2021 8:04:33 AM) - 417-895-7673	Submitted By:	Orren Ricketts - (10/18/2021 12:00:00 AM) - 417-895-7673

Program Year:

Preliminary Engineering:	2023	Right of Way:	2024
Construction:	2024		

Has the district documented that the project has: 1. Independent utility, 2. Logical termini, and 3. Does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements?:

☒ Yes ☐ No

Changes to project since last RES submittal? If yes, explain:

No
☐ Design/Build ☐ Alternate Technical Concepts

☐ Project breakout from previous or larger project? *If checked explain:*

Acres - From all sources (e.g. donated from public or private entities):

Additional R/W (acres): 14.12

Temp Easement (acres): 1

Permanent Easement (acres): 1

ROW may be needed, but, not yet determined? Yes

Acres of Tree Clearing: 1 acres

DO NOT CLEAR TREES W/O MODOT'S PRIOR WRITTEN APPROVAL.

Is ANY Federally-owned land impacted by the project? ☐ Yes ☒ No

Land Disturbance / Stormwater:

Will project involve 1 acre of land disturbance: ☒ Yes ☐ No ☐ Unknown

Define project type (see definitions below): ☒ New Development ☐ Redevelopment ☐ Maintenance

Projects with one acre or greater land disturbance activities must comply with the Land Disturbance Permit requirements.

New Development - Projects (with land disturbance greater than or equal to 1 acre) that are constructed where there was previously no transportation facility.

Redevelopment - Non-maintenance work performed to or on an existing public transportation facility which provides for an increased number of thru lanes of travel unless the work can be accommodated without increasing the width of the existing pavement. Widening of an existing road that does not result in an additional thru lane does not constitute redevelopment. Widening to add shoulders does not constitute a thru lane unless the total widening is greater than or equal to 10 feet.

Maintenance - Projects that do not meet the criteria of redevelopment or new development.

Was coordination with adjacent MS4 communities conducted? ☐ Yes ☒ No

If yes, please provide a short description of the coordination:

Number of Displacements(do not include partial takes that do not displace):

Residential: ☒ Yes ☐ No

Commercial: ☐ Yes ☒ No

No. of People: 2 Residences: 1

No. of Employees: Businesses:

Any Public Involvement planned or completed:

Public meetings, media announcements, etc.

Average Daily Traffic:

ADT Construction Year: 8474

ADT Design Year: 1

Traffic Impacts:

Road Closure Planned:	<input type="radio"/> Yes <input checked="" type="radio"/> No	Bridge Closure Planned:	<input type="radio"/> Yes <input checked="" type="radio"/> No
Days/Months Closed:		Detour > 25 mi rural	<input type="radio"/> Yes <input checked="" type="radio"/> No
		Detour > 5 mi urban (inside MPO)	<input type="radio"/> Yes <input checked="" type="radio"/> No
Detour Info (including use of local roads):	Temporary closures may be necessary at proposed FR 160/MM roundabout but uncertain at this time. If necessary, traffic may be rerouted along US 60 to Rte. 360		

Bicycle / Pedestrian Consideration

Pedestrian facilities considered:	Yes	Bicycle facilities considered:	Yes
-----------------------------------	-----	--------------------------------	-----

National Flood Insurance Program (NFIP) and Hydraulic Design Data:

☐ Project is in a FEMA-identified zone "subject to 100-year flooding": *If so, what zone?:*

Project is in a FEMA-defined "floodway"

☐ Project involves land purchased through FEMA Hazard Mitigation Grant Program (Flood buyout property) *If checked, give details:*

☐ Is highway improvement located within 4 miles of an existing airport?

Known Concerns: Provide information you have about these resources that you have observed in the area.

Parkland:	
Wetland/404 Permit:	
Land Disturbance / Stormwater:	
Farmland:	
Threatened & Endangered Species:	
Migratory Birds: Are there birds nesting on the structure?	Unknown,
Hazardous Waste:	
Cultural Resources:	
District Comments:	10/27/21 update: Added A-date

Project Attachments:

****NOTE: If making updates to an attachment, please use a different filename than the original.**
****The combined size of attachments in one upload must be less than 100MB**

Attachments:

☒ J8S0836_Plan_Conceptual_Alt1_11-29-21.kmz

☒ J8S0836_Plan_Conceptual_Alt1.kmz

☒ J8S0836_Plan_Conceptual_Alt1.pdf

Required Information to be attached for each RES stage:

- Loc/Concp.:** Location map (county map) & topographic map or aerial photo showing project limits – pre-plan sheets or other preliminary maps showing alternatives, if available

- **Prel. Plan:** Prel. Plan sheets
- **R/W:** R/W Plan sheets
- **Final Design:** Final Plans [Location map (county map) & topographic map or aerial photo showing project limits if this is first RES submittal]

RES Environmental Screenings

Farmland Impact

Status Information: Status Changed By: Kyle Grayson ☐ N/A ☒ Pending ☐ Cleared Clearance Date:

Environmental Response: New ROW and permanent easements associated with the project will require a farmland impact rating from NRCS.

Environmental Action: Complete AD-1006 form at preliminary plans stage.

District Action: Proceed to preliminary plans.

Attachments:

☒ Farmland Impact Submitted - Mark submitted when this review is ready to be sent to district staff.
Last Updated: Kyle Grayson - 10/27/2021 7:36:23 AM

Floodplain/Regulatory Floodway

Status Information: Status Changed By: Kyle Grayson ☒ N/A ☐ Pending ☐ Cleared Clearance Date:

Environmental Response: FEMA FIRMs indicate that the project does not encroach upon 1% floodplain or regulatory floodway.

Environmental Action: None

District Action: None

Attachments:

☒ Floodplain/Regulatory Floodway Submitted - Mark submitted when this review is ready to be sent to district staff.
Last Updated: Kyle Grayson - 10/27/2021 7:38:25 AM

Land Disturbance / Stormwater

Status Information: Status Changed By: Christopher Hamilton ☒ N/A ☐ Pending ☐ Cleared Clearance Date:

Environmental Response: The project is partially within the TS4 area, but most of the project will take place outside the boundaries, therefore the consideration for permanent stormwater BMPs is not required.

Environmental Action: None

District Action: None

TS4 Area: ☐ Yes ☐ No ☒ Partial Is the project in a TMDL watershed? ☐ Yes ☒ No

Attachments:

☒ Land Disturbance / Stormwater Submitted - Mark submitted when this review is ready to be sent to district staff.
Last Updated: Christopher Hamilton - 10/18/2021 8:33:57 AM

►FEMA/SEMA Buyout

Status Information: Status Changed By: Kyle Grayson ☒ N/A ☐ Pending ☐ Cleared Clearance Date:

Environmental Response: TMS Buyout layer indicates no FEMA/SEMA Buyout properties in the project limits.

Environmental Action: None

District Action: None

Attachments:

☒ FEMA/SEMA Buyout Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Kyle Grayson - 10/27/2021 7:40:08 AM

►Socioeconomic Impact

Status Information: Status Changed By: Caitie Wiechman ☐ N/A ☒ Pending ☐ Cleared Comment Date:

Environmental Response: The project does not require commercial or residential displacements, but does require new right of way, temporary easements, and permanent easements that are subject to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Entire road closures and detours are not expected but temporary closures may be necessary at proposed FR 160/MM roundabout but uncertain at this time. If necessary, traffic may be rerouted along US 60 to Rte. 360. Public meetings are anticipated for this project. More information about the public meetings, displacements, and traffic impacts will be needed to continue to assess socioeconomic impacts.

Environmental Action: Continue to assess impacts when more information is known about public involvement, traffic impacts, and residential displacements.

District Action: Please provide additional information about the following: 1.) Public Meetings - dates, locations, how many attended, how many comments received, if any major concerns about the project were expressed, and if those concerns were addressed by the District. 2.) Traffic Impacts - determined road closure time for FR 103 and official detour route for road closures 3.) Displacements - names of household, how this household will be compensated, any additional information about the displacement Conduct the acquisition of affected properties in accordance with the procedures established in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Provide sufficient public notice of construction work and traffic management plans consistent with MoDOT's public involvement policy and procedures.

Attachments:

☒ Socioeconomic Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Caitlin Wiechman - 10/18/2021 1:24:52 PM

Threatened & Endangered Species

Status Information:

Status Changed By:
McMurray

☐ No Effect ☒ Pending
☐ Cleared

Clearance Date:

Environmental
Response:

Consultation Code: 03E14000-2022-SLI-0111 Oct 2021 (includes limits of 8S0836C) species listed: Ozark cavefish, gray bat, Indiana bat, northern long-eared bat. Monarch butterfly added Sep 2021 as candidate for listing. Federal Action Agencies have no requirement to complete Section 7 consultation for Candidate species. I reviewed the MDC Natural Heritage Database (June 2021) and the MO Speleological Survey cave information (2019) for natural resource references in the project area. There are no known caves within 1.25 miles. Ozark cavefish inhabit cave streams and springs with a gravel bottom, or occasionally in pools over silt and sand bottoms. They are restricted to areas of limestone and dolomite bedrock containing caves, sinkholes and springs in SW Missouri. There are no known sinkholes, springs, or streams other than surface drainage (not named streams) in the project limits. The nearest known designated Ozark cavefish recharge areas just over 2.0 miles west in a different watershed (Pickerel Cr) and this project is anticipated to have No Effect on Ozark cavefish. Gray bats use caves year-round and utilize mainly stream corridors for foraging spring through fall. There will be no impact to perennial streams or riparian trees in the project area and will be no impact to any caves. There will be No Effect on gray bats. Indiana and northern long-eared bats hibernate during winter in caves and spend the breeding season in forested areas of the state where they may utilize suitable summer roost trees. Removal of suitable summer roost trees at any time of the year may affect both species. There will be tree clearing with this project. A field assessment is needed for presence/absence of suitable summer bat roost habitat for IN and NLE bats.

Environmental Action:

11/30/21 McMurray: core team meeting, there is apparently an Alt 2 option. KMZ or conceptual drawing needed for screening. District presented rendered mapping of sinkholes--need copy/source for review. field assessment for suitable summer bat roost trees. Consultation with USFWS if needed. Could combine impacts with 8S0836C job

District Action:

11/30/21 McMurray: upload -0836D job Alt 2 option KMZ and/or conceptual drawing for screening. Provide source/copy of sinkhole mapping presented at core team meeting 11/30 for review. refine location and amount of tree clearing limits as project progresses-slope limits and all access/easements. Impacts for both 8S0836C and 8S0836D may be combined for consultation, depending on letting schedules. (under parent project 8S0836-Rt 360-Rt M/ZZ)

Attachments:

✖ [Official_Species_List_8S0836C-8S0836D.pdf](#)

☒ Threatened & Endangered Species Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Bree McMurray - 11/30/2021 3:46:09 PM

Migratory Birds

Status Information:

Status Changed By:
McMurray

☐ N/A ☐ Pending ☒ Cleared

Clearance Date:
11/08/2021

Environmental
Response:

There appears to be two small culverts under existing Rt MM, north and south of the intersection with FR 160. These appear too small for MBTA concerns. No Conflict with the Migratory Bird Treaty Act.

Environmental Action:

none

District Action:

none

Attachments:

☒ Migratory Birds Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Bree McMurray - 11/8/2021 11:28:04 AM

►Hazardous Waste Impact

Status Information: Status Changed By: Ethan Musick ☐ N/A ☐ Pending ☒ Cleared Clearance Date: 10/21/2021

Environmental Response: The site location was reviewed utilizing the MDNR Interactive E-Start Map. The map contains information about the following types of sites: Superfund sites, Federal Facilities sites, Resource Conservation and Recovery Act Corrective Action sites, Brownfields/Voluntary Cleanup Program sites, Brownfield Assessments, and Petroleum and Hazardous Substance Storage Tank Facilities. No such sites were found within the project area. The potential to encounter wastes from sites unknown to MoDOT should always be a consideration. Any previously unknown sites that are found during project construction will be handled in accordance with Federal and State Laws and Regulations.

Environmental Action: None

District Action: If a hazardous waste site is encountered during the project, contact Ethan Musick, Hazardous Waste Specialist at (573) 508-6907.

Attachments:

☒ Hazardous Waste Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Ethan Musick - 10/21/2021 8:58:12 AM

►Wetland Impact (Section 404/401)

Status Information: Status Changed By: Christopher Hamilton ☐ N/A ☐ Pending ☐ Cleared Clearance Date:

Environmental Response: . According to the NWI, there are no wetlands within the project area. There will be no wetland or stream impacts. No permit required.

Environmental Action: None

District Action: None

Wetland Permit Information:	404 Permit Number	Permit Submitted	Permit Received
	Permit Expiration	Compliance Certification Sent	Compliance Certification Received

Attachments:

☒ Wetland Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Christopher Hamilton - 10/25/2021 5:06:36 PM

►Noise Impact

Status Information: Status Changed By: Matt Burcham ☐ N/A ☒ Pending ☐ Cleared Clearance Date:

Environmental Response: The project's improvement of a highway on new location qualifies it as a Type I project requiring a noise analysis.

Environmental Action: Assist hiring a consultant, with the noise study, and review of scope and report.

District Action: Hire consultant, and assist as necessary.

Attachments:

☒ Noise Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Matthew Burcham - 10/18/2021 11:19:06 AM

► Cultural Resources Impact (Section 106/Historic 4f)

Status Information:

☒ Pending ☐ Cleared ☐ ROW Cleared

Status Changed By:
Travis D Tesreau

Clearance Date:

A Date Cleared:

Environmental Action: Based on the information provided, this project will require an extensive cultural resources survey and subsequent SHPO submittal. Landowner permission will be necessary for the archaeological survey to be scheduled. There are no previously recorded archaeological sites within the corridor.

District Action: Please get landowner permission for an archaeological survey on all properties that may be impacted by this project. Inform the Historic Preservation Section as soon as permission has been granted.

Attachments:

☐ Adverse Effect or Conditional No Adverse Effect

☐ Based on the review of the project location and description noted above, there are no identified historic 4(f) resources affected that would preclude the setting of an A-date.

Checked by: on de minimis Approved on:

☒ Cultural Resources Impact Submitted - Mark submitted when this review is ready to be sent to district staff.

Last Updated: Travis Tesreau - 11/30/2021 2:49:50 PM

► Public Land Impact (Section 4f/6f)

Status Information:

Status Changed By:
Caitie Wiechman

☐ N/A ☒ Pending ☐ Cleared

Clearance Date:

Environmental Response: According to Google Earth imagery and ArcMap GIS Public land layers, Sanford Park is located in the direct vicinity of the project area at the intersection of W Republic Road and W Farm Road 168. According to the provided KMZ, the overhead utility is located within the Sanford Park boundary. At this time it is unknown if the utility line will impact the park in any way. More information on this will be needed to continue to assess Park impacts.

Environmental Action: None at this time.

District Action: Please confirm that no new right of way or easements will be needed from the Sanford Park property. In addition confirm that the utility line will not impact the park in any way.

Attachments:

☒ Based on the review of the project location and description noted above, there are no identified 4(f) or 6(f) resources affected that would preclude the setting of an A-date.

Checked by: Caitie Wiechman on 10/18/2021

☒ Public Land Impact Submitted - Mark submitted when this review is ready to be sent to district staff.

Last Updated: Caitlin Wiechman - 10/18/2021 1:25:44 PM

► Other

Status Information:

☒ N/A ☐ Pending ☐ Cleared

Clearance Date:

Environmental Response: There are no additional resource impacts associated with this project.

District Action: None

Attachments:

☒ Other Screening Submitted - Mark submitted when this review is ready to be sent to district staff.

Last Updated: Charlotte Drinkard - 10/18/2021 10:16:38 AM

NEPA Classification

NEPA Right-Of-Way Permission:	Pending	as determined or approved by:
NEPA Approval/Proceed to A-date Request:		Re-evaluation Date: Final Design Complete:
NEPA Classification:	CE2	
This project qualifies for the programmatic categorical exclusion under Item#:		All Environmental Issues Cleared:
Commitments and/or Comments to District:	A CE2 is required for this project in conjunction with the C job and the root 8S0836.	

Attachments:

Last Submitted: 11/30/2021 by [Charlotte Drinkard](#)

Appendix G

Final Corridor Traffic Study Provided by Olsson

ROUTE MM/ZZ CORRIDOR STUDY

JAMES RIVER FREEWAY
TO ROUTE M

Prepared for:

Missouri Department of Transportation

December 2021

MoDOT Project No. J8S0836

Olsson Project No. 021-05767



EXECUTIVE SUMMARY

The purpose and need of this project are to provide traffic analysis, modeling, and forecasting with recommendations for staged project implementation of the conceptual Route MM corridor alignment to meet projected forecasts. This report summarizes the analysis associated with the proposed realignment of Route MM in Republic, Missouri. This realignment would include two rail overpasses and coincide with the closure of multiple at-grade rail crossings in the area.

Considering that this corridor is a critical north-south connector for the region and is experiencing significant development activity in its vicinity, it is important to consider how the future demands can be accommodated to preserve the integrity of the corridor for all users.

Considering that this corridor is a critical north-south connector for the region and is experiencing significant development activity in its vicinity, it is important to consider how the future demands can be accommodated to preserve the integrity of the corridor for all users.

The existing conditions pertaining to the capacity, safety, and roadway and bridge design considerations of the current alignment are described as well as the expected constraints for the future no-build scenario if no improvements are made. In order to determine the future needs of the corridor, the Ozarks Transportation Organization's (OTO) travel demand model was updated to include the expected development interests within the study area.

Four baseline alternatives were considered for the future cross-section of the realigned Route MM: three-lane vs five-lane section and partial build vs full build alignment. Under the partial build alignment, the realignment of Route MM between Farm Road 160 and US 60 would initially be constructed and tie into

Farm Road 103. Full build alignment would continue the realignment south of US 60 and directly tie into Route ZZ rather than Farm Road 103. Based on the findings of this study, Farm Road 103 would quickly reach capacity under the Partial Build alignment. Thus, it was determined that the Full Build alignment would be preferred. Based on the projected traffic volumes, a five-lane cross-section is expected to be needed along Route MM north of US 60 with a three-lane section along Route ZZ between US 60 and Route M.

Under this roadway configuration the expected 2045 design year average daily volumes for the Route MM/ZZ corridor are expected to range from 22,720 vehicles per day to 33,100 vehicles per day between James River Freeway and US 60. The highest ADTs are expected at the development access points nearest to these two main highways. Depending on how these areas develop and access is allowed, raised medians should also be considered immediately south of James River Freeway and immediately north of US 60 to control access points and increase capacity along Route MM. Route ZZ south of US 60 is expected to be approximately 12,250 vehicles per day by 2045 as a three-lane section.

If demand continues in the area as expected, this full build realignment could be programmed by the year 2027 given that Route MM three-lane capacities are expected to be reached between 2027-2032 north of US 60. South of US 60, the full build realignment is recommended as a three-lane roadway based on the volume projections. This section of Route ZZ is expected to be approximately 12,250 vpd, which is below the typical three-lane capacity, by the design year 2045.

The main connection points of the realigned Route MM corridor are at Farm Road 160, US 60, and Route ZZ. The intersection of Route MM and Farm Road 160 is expected to operate acceptably as a dual lane roundabout or signalized intersection, with the roundabout configuration resulting in the shortest delays and queues overall. Two viable roundabout configurations are presented, one of which includes a free westbound right-turn and is preferable considering it is associated with expected lower delays and crash frequency. The intersection of Route MM and US 60 is anticipated to be signalized. If volumes materialize as expected, the intersection will be reaching capacity near 2045 and be in need of re-evaluation, potentially considering innovative intersection types to accommodate demand. The intersection of Route ZZ with Route M is expected to operate acceptably as a hybrid roundabout, a portion of which includes two circulating lanes to accommodate the heaviest movements.

A conceptual cost was also conducted for the anticipated facility types along the corridor. At the time of this report, appropriate cost estimate assumptions were still in discussions with MoDOT staff. A summary of the anticipated costs will be presented in a separate submittal document.

It is understood that construction of the conceptual corridor configuration may not be feasible until funding becomes available. The table below discusses potential traffic outcomes to consider when pairing the various Route MM realignment projects.

Scenario	Potential Outcome
<u>J8S0836D Constructed, J8S0836C Not Constructed, FR 103 Is Aligned with Full Access</u>	<ul style="list-style-type: none"> Traffic expected to utilize FR 103 until capacity is reached (within 3 years of initial project completion assuming unimproved FR capacity of 5,000 vpd). Once FR 103 capacity is reached, additional traffic likely to reroute to Rt M and US 60.
<u>J8S0836D Constructed, J8S0836C Not Constructed, FR 103 Is Aligned with RIRO Access</u>	<ul style="list-style-type: none"> Traffic expected to reroute to Rt M and US 60. Rt M between US 60 and Rt ZZ design year 2045 ADT increases to 12,840 vpd, potentially warranting widening to 3-lane if left-turn volumes are heavy. US 60 between Rt M and “new” Rt MM design year 2045 ADT increases to 45,180 vpd. According to OTO capacity thresholds, US 60 has a future capacity of 53,250 vpd. While not over capacity, increased congestion would be expected, and a weave scenario from Rt M, to US 60 to New Rt MM would be introduced. FR 103 between US 60 and Rt M design year 2045 ADT of 3,620 vpd (3,300 vpd northbound).
<u>J8S0836D Constructed, J8S0836A Not Constructed</u>	<ul style="list-style-type: none"> Traffic expected to utilize Rt MM until capacity is reached (possibly as early as 2027 north of FR 156 and 2032 south of FR 156). Rt MM capacity north of FR 160 expected to be 17,500 vpd as a 3-lane roadway.

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Appendix A: Data Collection

Appendix B: Capacity Analysis

Appendix C: Safety Analysis

1. INTRODUCTION AND OBJECTIVE

The Missouri Department of Transportation (MoDOT) contracted with Olsson to provide support for the Route MM corridor improvement project. The corridor project encompasses Route MM beginning at the Route 360/James River Freeway (referred through report as “James River Freeway” or simply “JRF”) interchange, continuing south through US 60, and along Route M east through the roundabout at Farm Road 103. The existing Route MM corridor is being considered for realignment to the east which may include a railroad overpass, new signalized intersection with US 60, and two new roundabout intersections. The objectives of the project were to update the Ozarks Transportation Organization’s (OTO) travel demand model and use it to conduct operational and safety analyses, determine an appropriate lane configuration for the railroad overpass bridge, and review projected costs. At the time of this report, appropriate cost estimate assumptions were still in discussions with MoDOT staff. A summary of the anticipated costs will be presented in a separate submittal document. The conceptual location of the corridor is illustrated on **Figure 1**.

The entire study corridor includes the following sub-sections. Additional sub-sections are also be discussed further, if applicable, later in the report:

- J8S0836A – Route MM between James River Freeway and Farm Road 160 with additional improvements south of Farm Road 160 as needed.
- J8S0836B – Route MM between I-44 and James River Freeway
 - (Planned project, but recommendations to this section are not directly included in the scope of this report)
- J8S0836C – Route ZZ between US 60 and Route M
- J8S0836D – Route MM between Farm Road 160 and US 60

1.1. Project Approach

The work phases included data collection, capacity and safety analyses, evaluation of corridor characteristics, and estimation of improvement costs.

MoDOT provided existing turning movement count data and historical crash data. MoDOT also designated three corridor classification options for consideration.

Historical crash data and Highway Safety Manual (HSM) crash prediction methodology were reviewed to identify existing crash patterns and to determine if the future intersection concepts (Route MM & Farm Road 160 roundabout, Route MM & US 60 signal, and Route ZZ & Route M roundabout) are expected to have a low number of crashes. The re-aligned highway segment was also evaluated to determine the appropriate cross section, three-lane or five-lane road/bridge, to accommodate existing and future traffic growth, and projected costs.

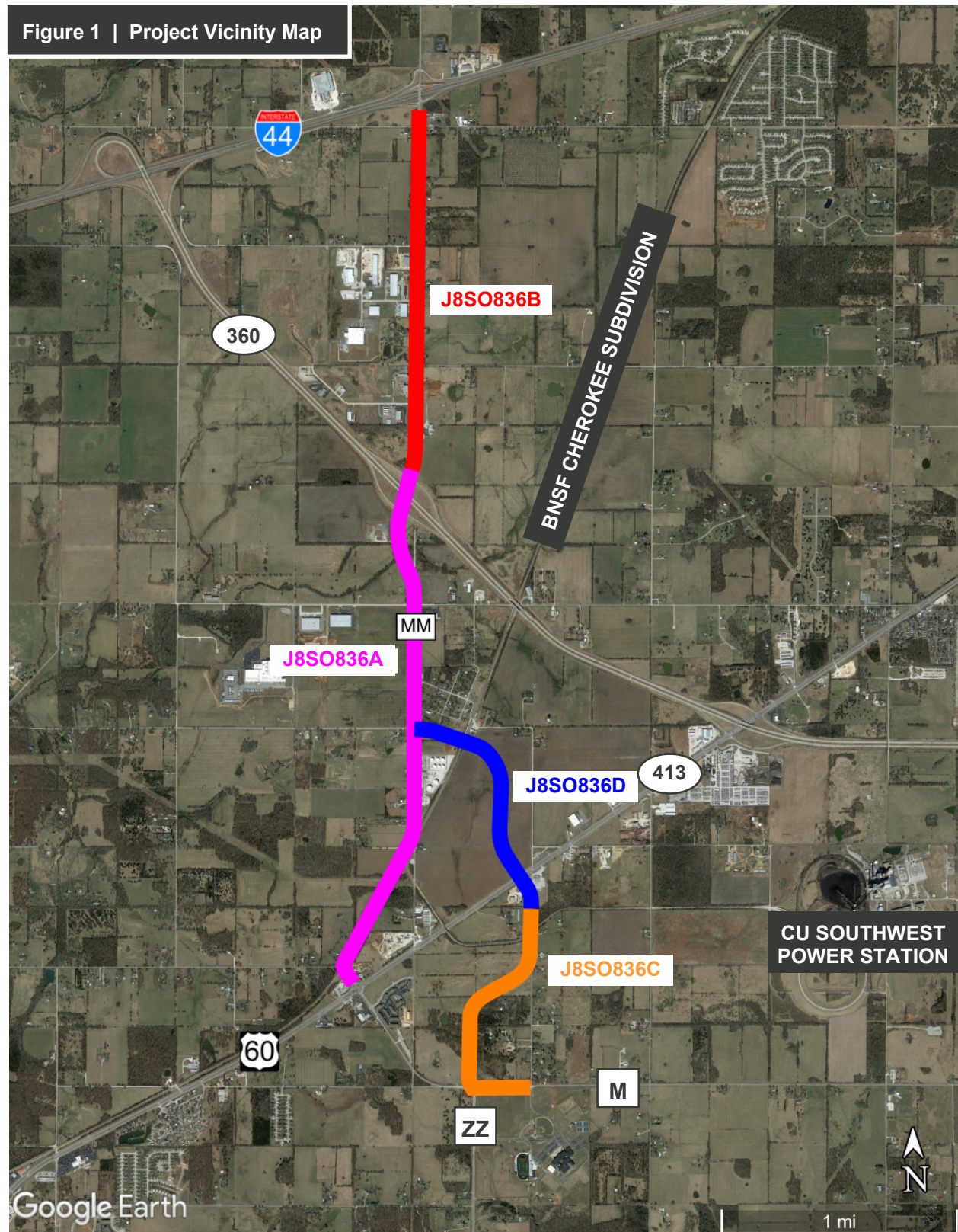


Figure 1. Project Vicinity Map

2. EXISTING CONDITIONS

A review of the existing conditions of the corridor was conducted. Existing turning movement counts (TMC) and annual average daily traffic (AADT) volumes were provided by MoDOT and/or utilized from recent traffic studies along the corridor. Historical crash data, crash rates, and record as-built drawings were also provided by MoDOT. A field review was conducted to identify possible safety or operational concerns along the corridor.

2.1. Traffic Volume and Operations

The traffic pattern along Route MM is development and commuter driven with heavier northbound traffic in the AM peak hour and predominantly southbound traffic in the PM peak hour. A noticeable eastbound traffic pattern was also observed in the AM along US 60, Route M, and JRF with westbound volumes heavier in the PM.

The 2020 AADT along Route MM between JRF and US 60 was approximately 7,830 vehicles per day (vpd) based on data provided on MoDOT's Datalink website.

Capacity analysis was performed for the existing corridor conditions using Synchro Version 11 for signalized and stop-controlled intersections, and Sidra Version 9.0 was used for roundabouts. Based on the existing capacity analysis, results are as follows:

US 60 & Route MM

The intersection of US 60 & Route MM operates at a LOS D during the AM peak hour and LOS F during the PM peak hour. Extensive mainline queueing occurs in the peak directions, eastbound in the AM and westbound in the PM. Mainline left-turning movements as well as side street operations are also at or near capacity. This is primarily due to the heavy commuter traffic (primarily eastbound in AM, westbound in PM) as well as heavy turning movement to and from Route MM. The US 60 corridor is being considered for widening to a 6-lane facility to provide additional capacity. The southbound approach also experiences delay with queueing that at times extends to the at-grade rail crossing, which is undesirable and presents a safety concern.

Route M & Route ZZ

The intersection of Route M & Route ZZ operates a LOS C during the AM peak hour and LOS D during the PM peak hour; however, heavy turning movements to/from the south and east legs of the intersection experience congestion at times. This is exemplified by the westbound left-turn movement which operates at a LOS E in the PM. This left-turn queue may not clear within a given cycle.

US 60 and Farm Road 103

The existing unsignalized intersection of US 60 and Farm Road 103 was also observed to experience poor levels of service for the stop-controlled minor street. Both the northbound and southbound approaches have a LOS F during the AM and PM peak hour periods.

Existing peak hour traffic conditions are illustrated in **Figures 2-4**.

Traffic count data collected for this project is provided in **Appendix A**. Detailed capacity analysis results are provided in **Appendix B**.

FIGURE 2

Existing Conditions
Peak Hour Volumes

J8S0836 Traffic Corridor Study
Route MM from US 360 to
Route M/ZZ

Republic, MO
Greene County

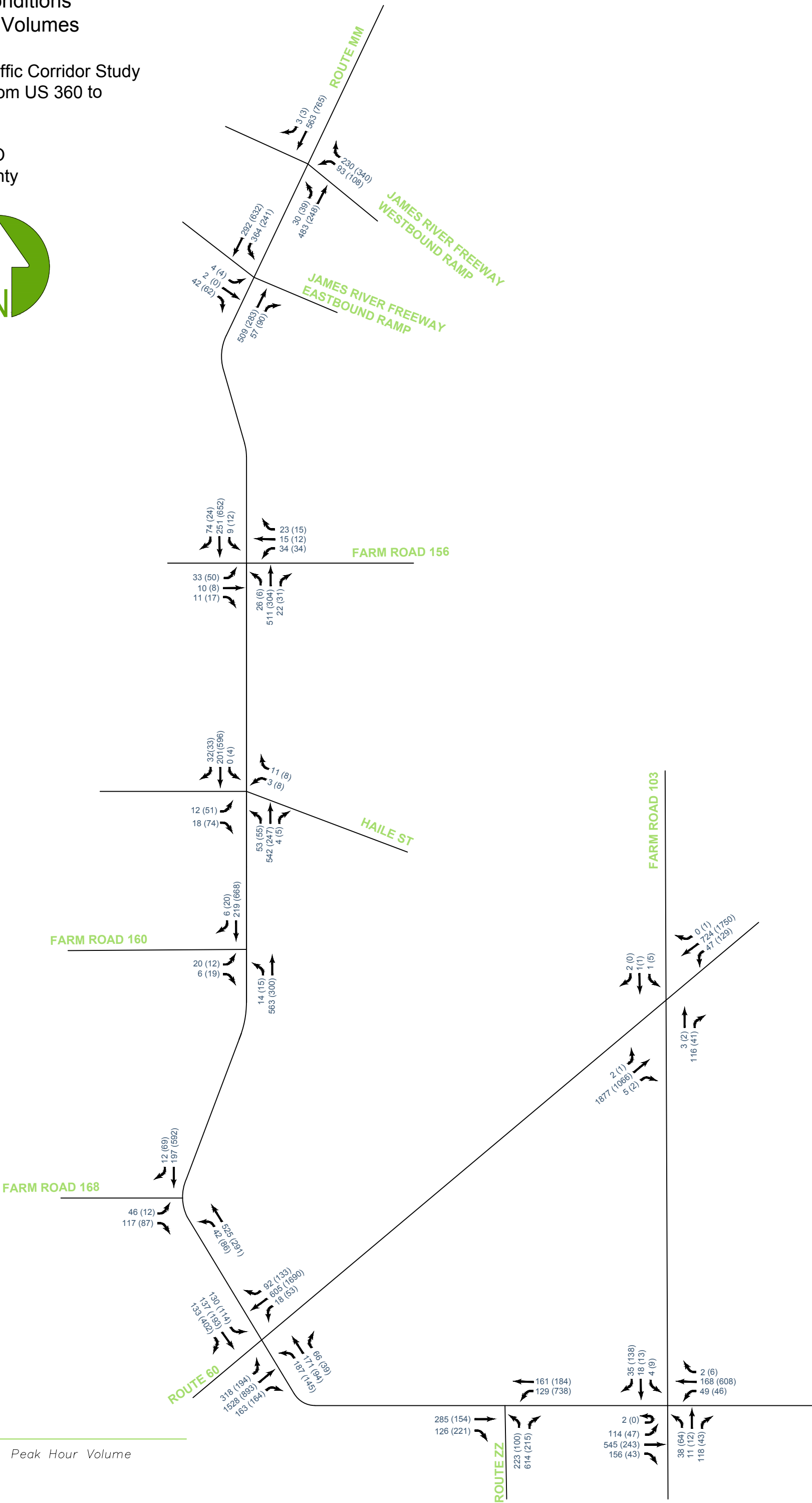


FIGURE 3

Existing Conditions Lane Configuration and Traffic Control

J8S0836 Traffic Corridor Study
Route MM from US 360 to
Route M/ZZ

Republic, MO
Greene County



LEGEND

- xx' → Lane Configuration & Storage Length
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign
- Roundabout Intersection
- TWLTL Two-Way Left-Turn Lane
- ▼ Channelized Right-turn

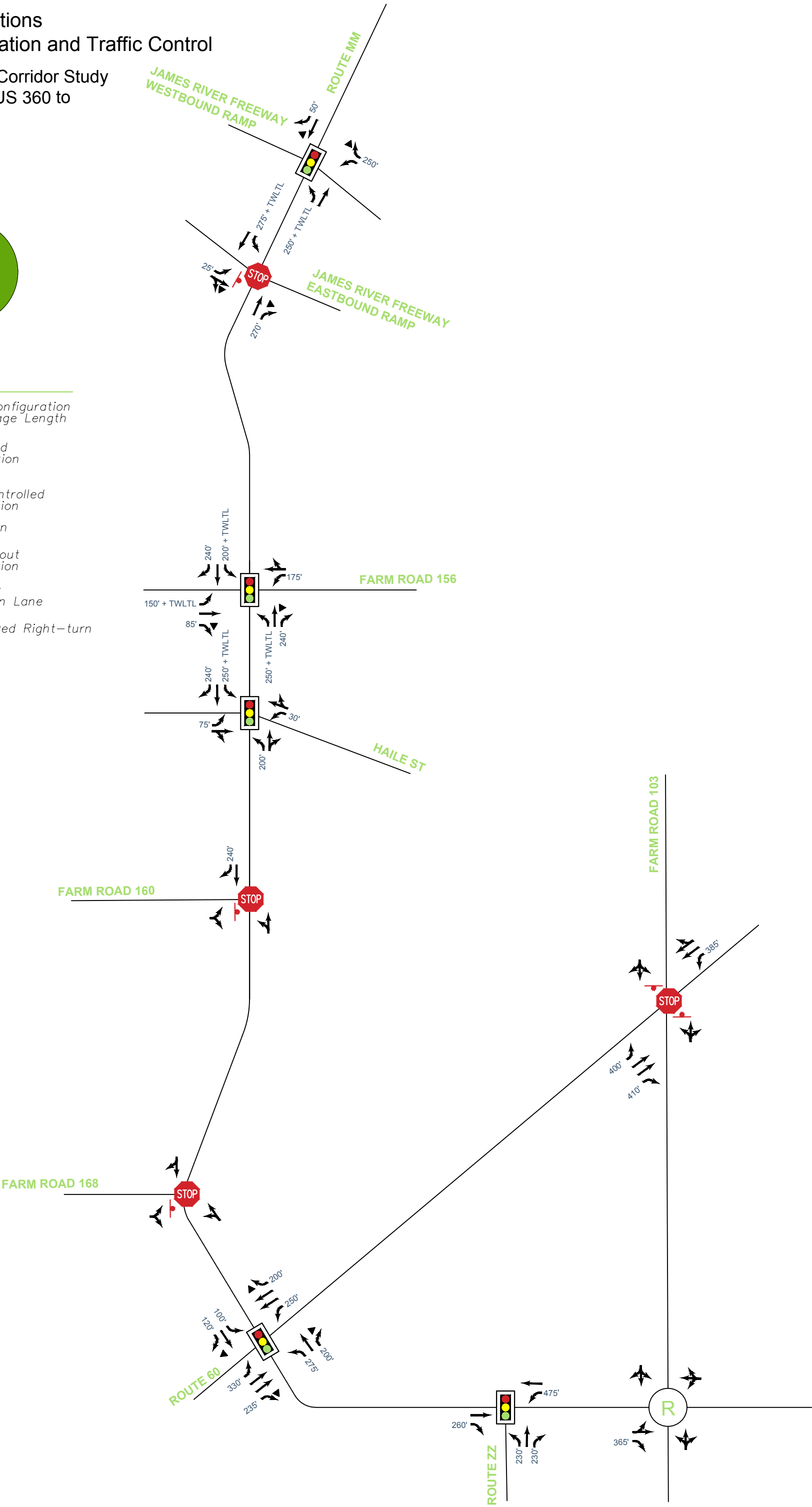
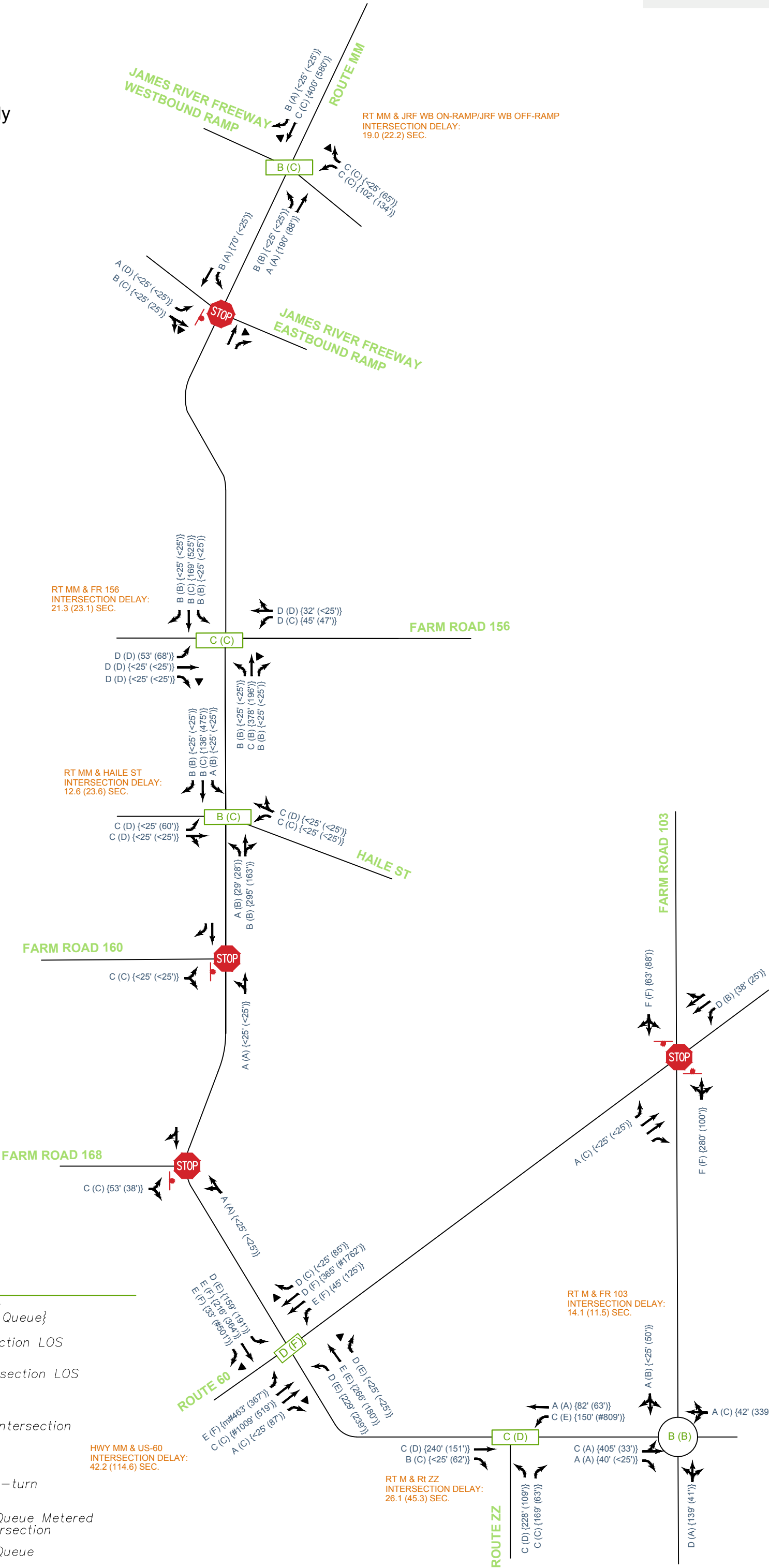
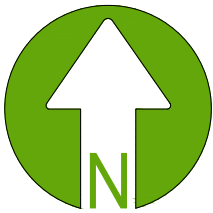


FIGURE 4

Existing Conditions Capacity Analysis

J8S0836 Traffic Corridor Study
Route MM from US 360 to
Route M/ZZ

Republic, MO
Greene County



2.2. Existing Crashes

Crash data from 2015-2019 as well as partial year 2020-2021 were reviewed to identify “hot spots” within the corridor. A map of the existing hot spots is shown in **Figures 5** and **6**. This heat map shows the areas where crashes are most commonly occurring as well as the assigned location of all fatal and injury crashes reviewed for this study. A summary of the crash severity and crash type within the study area is shown in **Table 1**.

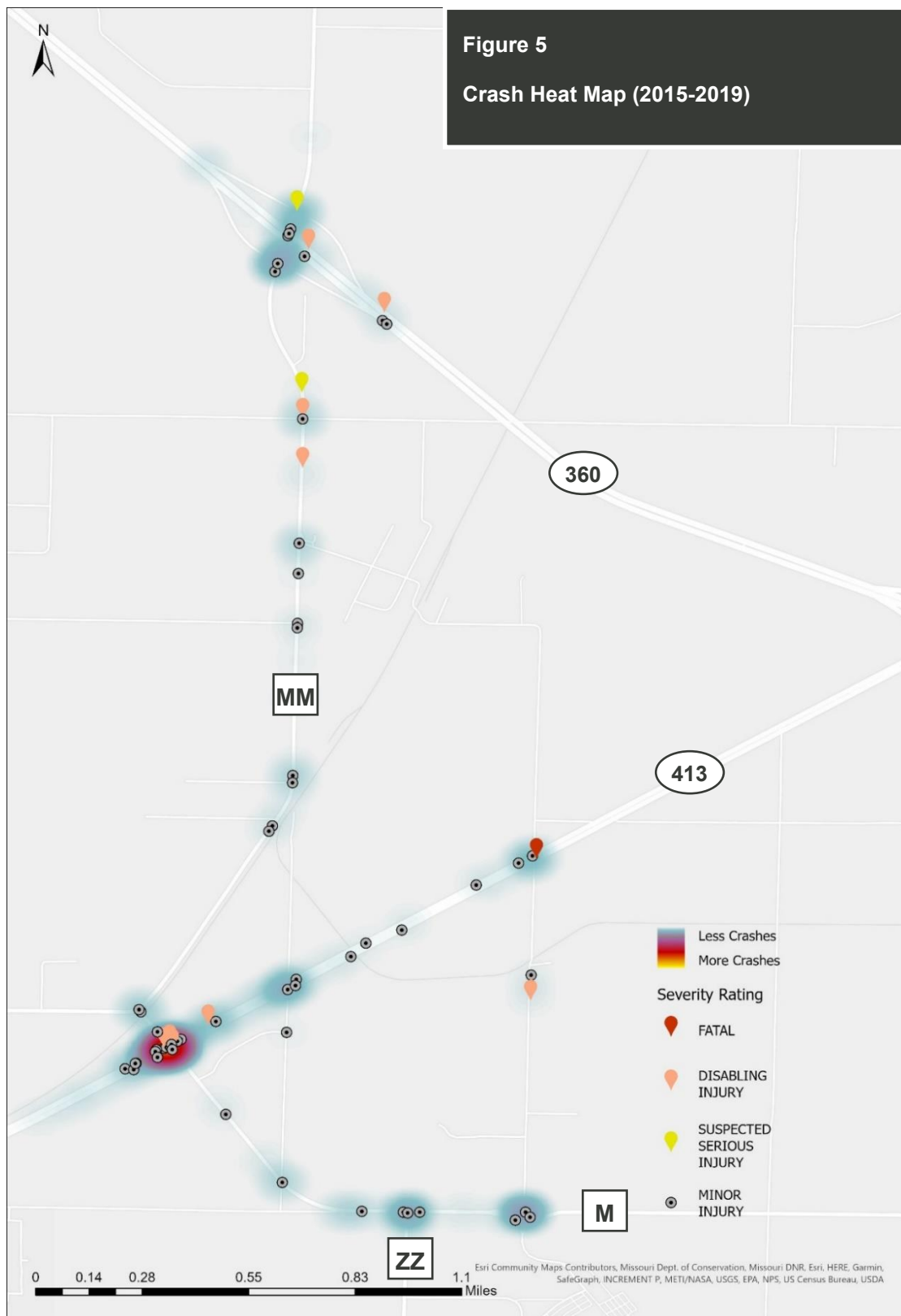


Figure 5. Crash Heat Map (2015-2019)



Figure 6. Crash Heat Map (Partial 2020-2021)

Table 1. Crash Summary Statistics.

	2015-2019 Crashes	2020-2021 Crashes
Crash Severity	74% PDO	68% PDO
	21% Minor Injury	27% Minor Injury
	4% Disabling or Suspected Serious Injury	3% Disabling or Suspected Serious Injury
	<1% Fatal	2% Fatal
Common Crash Types	50% Rear End	46% Rear End
	17% Angle, Left Turn, Left/Right Turn Right Angle	17% Angle, Left Turn, Left/Right Turn Right Angle
	15% Out of Control	18% Out of Control

Note: 2020-2021 crashes are partial years and/or not considered “official” at the time of this report.

Based on the information provided, crashes most commonly occurred at the following locations:

- US-60 & Route MM signalized intersection
 - A high proportion of these crashes were rear end crashes likely related to congestion at the intersection.
 - Injury crashes primarily were characterized as rear end, angle, passing, and head on collisions.
- Route M & Route ZZ signalized intersection
 - Mostly property damage only rear end crashes likely related to congestion at the intersection.
 - Injury crashes were mostly rear ends with one right angle.
- Route M & Farm Road 103 roundabout (constructed late 2019, unsignalized prior)
 - Crashes as an unsignalized intersection mostly included right angle, rear end, and out of control crashes.
 - Immediately after roundabout construction, primarily out of control crashes were observed. It is possible this is a result of the new construction, and the ultimate crash behavior post-construction is to be determined.
- US 60 & Farm Road 103
 - Included one fatal left turn right angle crash occurred at the unsignalized crossing.

- Route MM and James River Freeway Ramps
 - Westbound Ramp: Primarily left/right angle crashes, some of which resulted in injuries. A traffic signal was installed in 2021 which may reduce this crash type.
 - Eastbound Ramp: Included one fatal pedestrian crash where road/light conditions were poor. Multiple left/right turn injury crashes were also noted.
- Horizontal Curves of Route MM
 - Multiple out of control injury crashes. Many of these occur at the sharp, near 90-degree turn north of the rail crossing but were also observed at the curve south of Magellan Pipeline.

Crashes from 2020-2021 were generally more severe than those observed from 2015-2019. This followed the national trend that although traffic volumes were impacted by COVID-19, crashes were generally more severe.

Based on the crash information reviewed for this study, there were no reported crashes that could be attributed to the at-grade rail crossings proposed for removal. However, while there was not a recent historical crash pattern, it does not mean that one could present itself in future years, especially as development activity continues and traffic volumes increase.

Additional crash summary graphics are provided in **Appendix A**.

2.3. Corridor Characteristics

A field review was conducted for the Route MM corridor and study intersections. The field review focused on safety concerns, traffic control, geometric deficiencies, and other pertinent information to the study.

The Route MM corridor is currently classified as 'minor arterial' by MoDOT, referencing the *Functional Classification Map* for the Springfield urban area. The Route MM corridor for the purposes of this report was reviewed in three sections.

- Segment 1: James River Freeway to Farm Road 160
- Segment 2: Farm Road 160 to US 60
- Segment 3: US 60 to Farm Road 103 (Route MM transitions to Route M in this segment)

Segment 1: Route MM was recently upgraded to a three-lane roadway for this entire north-south segment. The posted speed limit is currently 55 mph with plans to be lowered to 45 mph. The north side of this segment has a diamond interchange with James River Freeway. Terrain is highest at the interchange overpass and is mostly level to the south, with horizontal curves between JRF and Farm Road 156.

Existing access is provided on both sides of the corridor, which serves a new Amazon warehouse facility west of Route MM, but otherwise low traffic generators. Two public roadway

intersections, Farm Road 156 which serves commercial development and Haile Street which serves residences in the former Village of Brookline, MO. Traffic signals were recently added at the northern interchange ramp, Farm Road 156, and Haile Street.

The existing bridge consists of skewed 285.2-foot, 2-span continuous composite plate girder bridge with non-integral, semi-deep abutments. The most recent bridge inspection report from August 18, 2020 indicates the overall bridge is in good working condition. The bridge deck rating is shown as satisfactory (6), but an MMA overlay is requested in 2024. If an overlay is completed, new glands at the expansion joints should be considered at that time. No additional deficiencies or recommendations are being made from Olsson's site visit.

With the recent widening between Farm Road 156 and Farm Road 160, a 2-foot shoulder was added along the east side of Route MM. Though the addition of this offset provides a greater clear zone, the large transmission power poles still slightly encroach into the roadway clear zone based on the roadway speed and AADT.

Segment 2: South of Farm Road 160, Route MM is a two-lane undivided roadway that curves southwest and crosses the railroad tracks at-grade at a sharp, near 90-degree turn in close proximity to the signalized intersection with US 60. The posted speed limit is 55 mph with lowered advisory speed limits, 45 mph and 15 mph, at the two horizontal curves. Multiple access points are provided in the vicinity of the Magellan Pipeline with sparse driveway density further south. Terrain of the roadway is mostly level with a sag curve just north of the rail crossing.

Based on the roadway speed and AADT, the following obstructions appear to be located within the desired clear zone:

- Power poles within the northern section of this corridor.
- A crossroad RCB located approximately 190 feet south of Farm Road 160.
- Mature tree growth north of the railroad crossing on the west side of Route MM.

Segment 3: South of US 60, Route MM transitions to Route M and becomes an east-west, two-lane roadway. The posted speed limit is 55 mph with lowered advisory speed limits near the horizontal curve and roundabout with Farm Road 103. Roadway access is primarily limited to public roadway intersections. The roadway is mostly level near US 60 and transitions to rolling terrain in the vicinity of Route ZZ and Farm Road 103.

Notable deficiencies in this segment include:

- The existing Farm Road 101 and Farm 170 intersection Route M at a very sharp angle on a horizontal curve. The intersection angles create difficult head turning movements.
- The Farm Road 101 intersection sight distance is blocked by vegetation along the right-of-way line looking eastward.

3. TRAVEL DEMAND MODEL UPDATE

The OTO regional travel demand model (TDM) was updated for the study area in order to determine future traffic demands along the corridor.

3.1. Future Year Land Uses and Projects

Future Land Uses:

Projected development activity was provided by the City of Republic and included potential areas for residential, commercial, and industrial activity. Projected development utilized in analysis is depicted in **Figure 7**. For TDM input, these areas were assumed to be in place by the year 2045 and were assumed to develop at the following floor-area-ratios (FAR): 0.40 for industrial, 0.3 for office, and 0.22 for retail. Four dwelling units/acre for single family housing and 24 dwelling units/acre for multifamily residential housing were also assumed for projected residential areas.

Conceptual, Planned, and Committed Projects:

Nearby planned roadway improvements influencing traffic patterns were also assumed to be in place for the future year conditions. This primarily includes widening US 60 to a six-lane section (conceptual stage) within the study area and widening Route MM to a 5-lane section between I-44 and James River Freeway north of the study area. This information was derived from Olsson's previous involvement with the J8S3159 MoDOT 413/60 Corridor Study (Phase 1) and a cost share agreement between MoDOT and the City of Republic. The following at-grade railroad crossings were also assumed to be closed: FR 93 north of US 60, FR 170 north of US 60, Route MM north of US 60, Haile/Orr Street north of US 60, and FR 103 south of US 60; FR 101 north of US 60 is expected to remain open until alternate access can be provided. Further information regarding the railroad crossings can be found in the MoDOT safety study of the BNSF Cherokee Subdivision line from M.P. 251 to M.P. 258 in Greene, Christian, and Lawrence Counties completed in 2018.

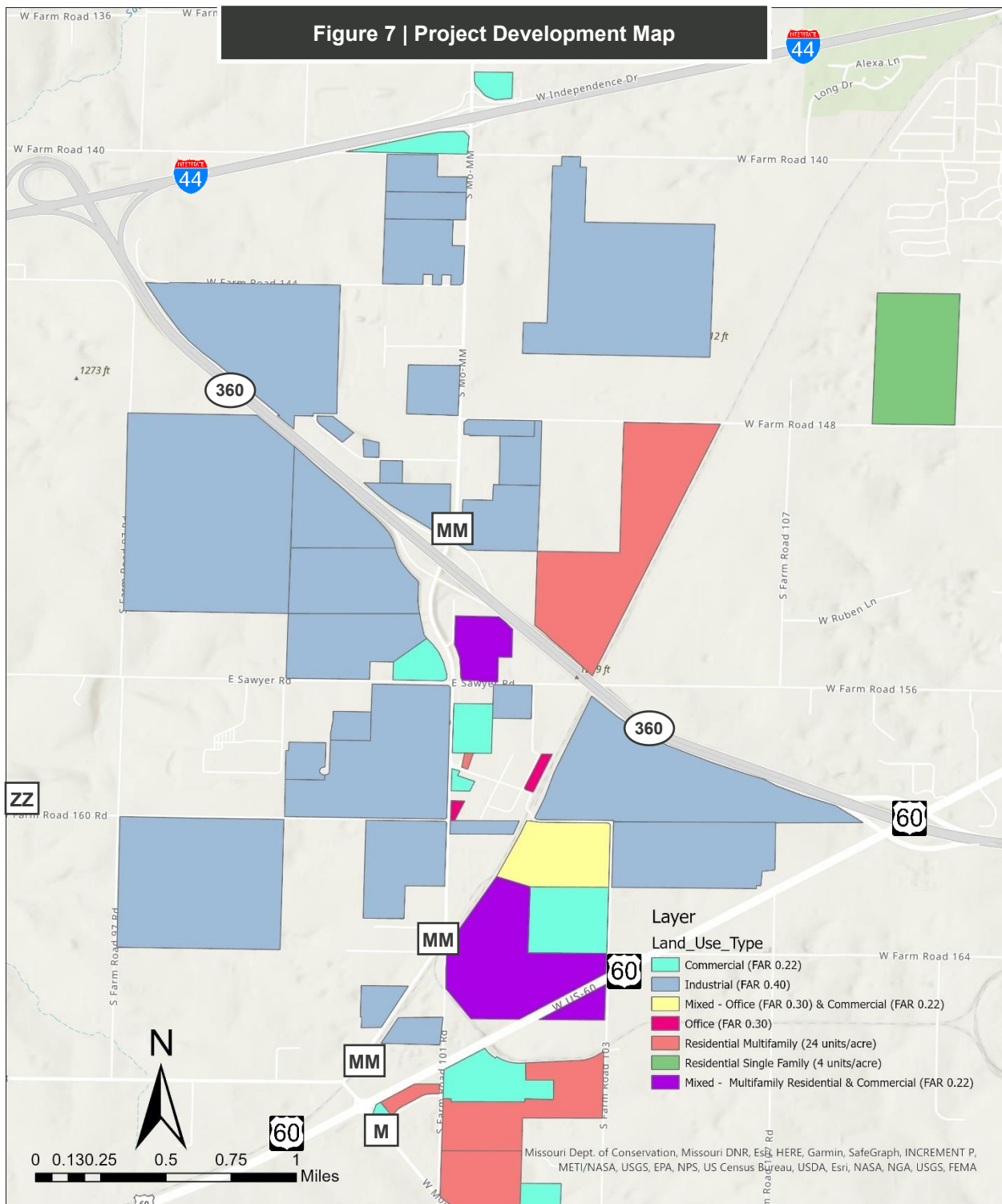


Figure 7. Project Development Map

3.2. Roadway Template Alternatives

The TDM was updated for multiple roadway configurations that were initially considered for this project. These include:

- Five-lane Section of Realigned Route MM
- Three-lane Section Extension of Route ZZ to US 60
- Partial Build Alignment (includes realignment of Route MM from Farm Road 160 with railroad overpass to US 60 and connects with the existing Farm Road 103 alignment)
- Full Build Alignment (includes Partial Build plus extension of Route ZZ to US 60)

Figures 8 and 9 below illustrates the conceptual Partial and Full Build Alignments considered for this study.



Figure 8. Partial Build Alignment



Figure 9. Full Build Alignment

4. ROADWAY ALTERNATIVES INITIAL FINDINGS

During the initial evaluation process, two important discoveries were made when comparing the five-lane vs three-lane and partial build vs full build alignments.

4.1. No Build Option

In addition to evaluating the proposed alternatives, a 'No-Build' base condition was considered. The No-Build condition included consideration of committed roadway improvements such as the widening of US 60 and the widening of Route MM north of JRF. This scenario analysis is intended to check the travel pattern and performance of existing road links while considering potential future developments expected to take place through 2045.

According to the TDM, multiple road segments in the study area are expected to operate with a volume-to-capacity (v/c) ratio close to or above 1.0. A summary of the expected v/c ratios at a few select roadway segments are shown in **Table 2**.

Table 2. Existing Route MM/M Alignment v/c ratio for Future No Build

Location	V/C Ratio
Rt MM between JRF and FR 156	1.22
Rt MM between FR 156 and FR 160	0.98
Rt MM between FR 160 and US 60	0.81
Rt M between US 60 and Rt ZZ	0.59

It should be noted that the segment capacities considered by the TDM are not directly related to the five-lane and three-lane segment capacities described in Section 232.3 of the MoDOT EPG or the directional capacities considered by the OTO. In general, the TDM assigns a higher roadway capacity than typically considered in the EPG. This may result in an artificially high level of attraction to these roadways. Moreover, the model is unable to account for specific interactions such as the negative effect at-grade rail crossings have on capacity. Thus, the projected traffic volumes derived from the TDM are expected to be a conservatively high estimate.

4.2. Future Full Build vs Partial Build Comparison

Under the partial build configuration, the realigned Route MM would form a signalized intersection with Farm Road 103. Vehicles traveling from Route ZZ must either utilize Farm Road 103 or US 60, both of which would include multiple 90-degree turns through controlled intersections.

Based on the TDM projections, Farm Road 103 would quickly reach capacity under the partial build configuration. Assuming a capacity of approximately 5,000 vpd and a linear annual growth rate, Farm Road 103 would be over capacity by the year 2025.

In addition to the needed capacity, the full build configuration would provide the following benefits:

- Improved connectivity from Route ZZ to Route MM
- Reduced traveling distance from Route ZZ to Route MM
- Eliminate delay and travel time encountered at additional, intermediate intersections (the signal at US 60 & Route M and/or the roundabout at Farm Road 103 & Route M)
- Minimize potential conflicts from existing residential driveways

4.3. Five-Lane vs Three-Lane Comparison

Based on the TDM forecasts, Route MM would be expected to have significantly different attraction depending on the ultimate cross section. **Table 3** shows the projected ADTs of the realigned Route MM at different locations along the corridor for the future year 2045.

Table 3. Route MM/ZZ 2045 5-lane and 3-lane Average Daily Traffic Volumes.

Location	5-lane Configuration	V/C Ratio	3-lane Configuration	V/C Ratio
Rt MM between JRF and FR 156	27,100-33,000	1.23	18,790-20,060	1.75
Rt MM between FR 156 and FR 160	24,260-25,160	0.88	16,880-18,480	1.44
Rt MM between FR 160 and US 60	22,970-31,480	1.10	11,900-19,090	1.53
Rt ZZ between US 60 and Rt M	13,800	0.46	10,750	0.72

Note: Volume-to-capacity ratios are based on the segment volumes projected by the TDM divided by the roadway capacities considered by the OTO for each facility type.

As shown in the table above, in comparing the expected future volumes to the expected roadway capacities based on discussions with OTO staff, the three-lane section would be well over capacity for the roadway section north of US 60. Section 232.3 of the MoDOT Engineering Policy Guide (EPG) outlines when three and five lane facilities are typically considered. Three-lane facilities may be used where AADT in the design year is less than 17,500 vpd, whereas five-lane facilities may be used up to 28,000 vpd and a raised median considered where volumes exceed 28,000 vpd. The highest ADTs are expected at the development access points nearest to James River Freeway and US 60 indicating that these roadways are significant attractions for nearby development trips. Depending on how these areas develop, raised medians should also be considered should these volumes materialize to provide additional capacity and controlled access points.

The ADT comparison indicates that there is latent demand if Route MM is constructed as a three-lane roadway, particularly for the section north of US 60. Roadway users prefer to utilize Route MM, given that it is a vital north-south connection, but a three-lane roadway would ultimately become constrained in multiple locations. The Route ZZ segment south of US 60 is not expected to exceed the typical three-lane segment capacity. **Table 4** below details the expected future volumes and v/c ratios of the corridor presented in the TDM if a 5-lane section is constructed north of US 60 and a 3-lane section is constructed south of US 60.

Table 4. Anticipated Route MM/ZZ 2045 Average Daily Traffic Volumes.

Location	5-lane North of US 60, 3-lane South of US 60	V/C Ratio
Rt MM between JRF and FR 156	27,500-33,100	1.20
Rt MM between FR 156 and FR 160	24,110-25,750	0.89
Rt MM between FR 160 and US 60	22,720-30,620	1.08
Rt ZZ between US 60 and Rt M	12,250	0.82

The ultimate 2045 five-lane full build traffic volumes and the typical roadway capacities described in Section 232.3 of the EPG were used to determine the approximate timeline when the expected volumes would exceed a three-lane capacity, and thus when a five-lane facility should be considered. This is illustrated in **Table 5** below assuming a linear growth pattern.

Table 5. Anticipated Timeline of Roadway Improvements.

Location	Expected Timeline for 5-lane Configuration
Rt MM between JRF and FR 156	2027
Rt MM between FR 156 and FR 160	2032
Rt MM between FR 160 and US 60	2030
Rt ZZ between US 60 and Rt M	2065

The time horizon presented in **Table 5** is based on a linear growth pattern interpolated between existing daily traffic volumes to the future year 2045 projected volumes. The estimated year represents the time when the projected traffic volumes exceed a three-lane segment capacity of 17,500 vehicles per hour, per MoDOT EPG. Considering that the earliest time of construction for the recommended improvements is expected to be approximately 2025, the three-lane capacity threshold for all Route MM roadway segments north of US 60 would be within 7 years of anticipated construction. Thus, it is not recommended to construct a three-lane cross-section for Route MM north of US 60. A five-lane cross-section is recommended between James River Freeway and US 60. In addition, raised medians should also be considered in locations where development activity is heaviest (possibly immediately south of James River Freeway and immediately north of US 60) to allow for controlled access points and increased capacity along Route MM.

Based on the projected traffic volumes, the roadway section of Route ZZ between US 60 and Route M is not expected to reach the typical three-lane facility segment capacity for the design year 2045. However, additional capacity may be needed at controlled intersections. See **Section 5** for further discussion on intersection capacities.

It should be noted that these projection years are highly dependent on the rate of development activity and programmed improvements of adjacent roadways. For example, if development grows at a quicker rate, this projected timeline may shorter. Likewise, if Route ZZ or Route M are improved, travel patterns could shift resulting in more vehicles utilizing the southern section of Route ZZ between US 60 and Route M.

5. ANALYSIS OF PREFERRED CONCEPTUAL CONFIGURATION

The preferred concept for the realigned Route MM is expected to include a five-lane cross-section north of US 60 and a three-lane cross-section south of US 60 within the study area. The ultimate traffic condition was reviewed for the 2045 full build out condition with the assumed development areas in place as described in **Section 3.1**.

The following intersection configurations in the vicinity of the study area were considered for analysis:

- Route MM & James River Freeway Westbound Ramps – Traffic signal (existing)
- Route MM & James River Freeway Eastbound Ramps – Traffic signal (recommended due to projected left-turn traffic)
- Route MM & Farm Road 156 – Traffic signal (existing)
- Route MM & Haile Street – Traffic signal (existing)
- Route MM & Farm Road 160 – Roundabout or traffic signal (conceptual)
- “Old” Route MM & US 60 – Traffic signal (existing)
- “New” Route MM & US 60 – Traffic signal (conceptual)
- Route ZZ & Route M – Roundabout or traffic signal (conceptual)
- Route M & Farm Road 103 – Roundabout (existing)

Safety analysis was performed using HSM methodologies for key intersection locations including the intersection of Route MM with Farm Road 160 and US 60 and the intersection of Route ZZ with Route M.

5.1. Safety Analysis

Future crashes for the 2045 design year were predicted using the Federal Highway Association’s (FHWA) Interactive Highway Safety Design Model (IHSDM). This tool applies HSM methodologies to predict crashes for a variety of facility types. For this project, future crashes were reviewed at the critical connection points of the re-aligned Route MM corridor: the conceptual roundabout at Route MM & Farm Road 160, traffic signal at Route MM & US 60, and roundabout at Route ZZ & Route M.

The IHSDM utilizes crash prediction modules developed from National Cooperative Highway Research Program (NCHRP) 17-58 for Six-Lane Urban/Suburban Arterials and NCHRP 17-70 for Roundabouts. These methodologies have recently been developed and thus were not incorporated into the HSM 1st Edition but are likely intended for inclusion in the future HSM 2nd Edition.

A summary of the future year 2045 crashes at these critical connection points are illustrated in **Table 6**. HSM calibration factors have not been developed for these facility types at the time of

this report. Thus, the standard crash outputs provided by the model are provided below. The multiple roundabout configurations considered for this project are included for comparison.

Table 6. Future Year 2045 Crash Prediction.

Intersection	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Total Crash Frequency (crashes/yr)	Predicted Intersection Crash Rate (crashes/ million veh)
Route MM & Farm Road 160 Roundabout (with Free WBR)	1.2	8.5	9.7	2.0
Route MM & Farm Road 160 Roundabout (with Yielding WBR)	1.8	8.5	10.3	2.2
Route MM & US 60 Signal	12.5	11.0	23.5	0.9
Route ZZ & Route M Roundabout (Hybrid without WBR Slip)	1.5	8.5	9.9	2.1
Route ZZ & Route M Roundabout (Hybrid with WBR Slip)	0.9	8.0	8.9	1.9

Based on the crash prediction results, fewer crashes would be expected at the Route MM & Farm Road 160 roundabout configuration with a free westbound slip right-turn lane as opposed to dual yielding right-turn lanes. Similarly, the addition of a yielding westbound slip right-turn lane at the Route ZZ & Route M roundabout is expected to result in fewer crashes as well.

IHSDM input and output data for this crash prediction are provided in **Appendix C**.

5.2. Signalized Intersection Capacity Analysis

Signalized intersection capacity was performed using Synchro Version 11 applying HCM Methodologies. A summary of the future operations expected at each signalized intersection is provided below.

Route MM & James River Freeway Westbound Ramps – Traffic signal (existing)

- LOS B and LOS C overall in AM and PM respectively.
 - Considers widening of Route MM striped as a five-lane section (see JRF Eastbound Ramps for more details regarding bridge widening).

- Considers widened off-ramp to provide dual right-turn and a single left-turn movement.
- Assumed signal coordination along Route MM between James River Freeway and Haile Street.

Route MM & James River Freeway Eastbound Ramps – Traffic signal (recommended)

- LOS A and LOS B overall in AM and PM respectively.
 - Considers six-lane bridge to accommodate two through lanes in each direction and dual southbound left-turn lanes, which are expected to be warranted considering the anticipated development activity.
 - Two receiving lanes would be required on the on-ramp before merging to one.
 - Assumed signal coordination along Route MM between James River Freeway and Haile Street.
 - A heavy northbound right-turn movement is expected and should be monitored, particularly if a traffic signal with dual left-turn lanes is installed.

Route MM & Farm Road 156 – Traffic signal (existing)

- LOS C overall during AM and PM peak hours.
 - Considers widening of Route MM to a five-lane section.
 - Considers single left and right-turn lanes in all directions.
 - Assumed signal coordination along Route MM between James River Freeway and Haile Street.
 - Depending on how the east leg of Farm Road 156 develops (and its future access points), a heavy westbound right-turn movement could be expected and should be monitored.

Route MM & Haile Street – Traffic signal (existing)

- LOS A and LOS B during AM and PM respectively.
 - Considers widening of Route MM to a five-lane section.
 - Considers single left-turn lanes in all directions as well as a dedicated southbound right-turn lane.
 - Assumed signal coordination along Route MM between James River Freeway and Haile Street.

Route MM & Farm Road 160 – Roundabout or traffic signal (conceptual)

A coordinated traffic signal with dual southbound left, dual westbound right-turn lanes, and single left-turn lanes in the remaining directions is expected to operate at a LOS B during peak periods. Variations of a roundabout were also considered at the intersection of Route MM &

Farm Road 160, which are expected to result in less delay and queueing. It should be noted that while considered to be acceptable, the signalized operations are expected to be slightly less desirable while also requiring more approach lanes compared to the roundabout. Roundabout operations are described in the next section.

“Old” Route MM & US 60 – Traffic signal (existing)

- LOS B and LOS C during AM and PM respectively.
 - Considers widening of US 60 to six-lane section.
 - Assumed east-west signal coordination along US 60.
 - North leg only serves local developments since the at-grade rail crossing would be removed.
 - Considers dual northbound left-turn lanes and single-left turn lanes at all other approaches considering the expected turning movements.
 - Considers single north/south through lanes and single right-turn lanes at all approaches.

“New” Route MM & US 60 – Traffic signal (conceptual)

- LOS E during AM and PM peak hours.
 - Considers widening of US 60 to six-lane section.
 - Considers re-aligned Route MM constructed with two north/south through lanes in each direction.
 - Considers dual left-turn lanes the eastbound, westbound, and southbound directions and a single northbound left-turn lane.
 - Considers single right-turn lanes in all directions.
 - Assumed east-west signal coordination along US 60.
 - *Given that this intersection is on the threshold of failure under 2045 full build conditions, special consideration should be given to protect right-of-way in the vicinity of the intersection. This includes but is not limited to considerations for high-capacity alternative intersection geometrics.*
 - *Heavy left-turn movements are expected for the eastbound, westbound, and southbound directions. These traffic patterns are partially driven by the improved north-south corridor but also depend on how the area develops, including the trip split between this intersection and other future development access points (e.g., Farm Road 107 to the east).*

Route ZZ & Route M – Roundabout or traffic signal (conceptual)

Based on the expected segment ADT along Route ZZ between US 60 and Route M, a three-lane section is expected to be adequate. Based on overall intersection delay alone, a traffic

signal with single through and dedicated left and right-turn lanes in all directions would operate at a LOS D during peak periods. However, multiple movements would encounter undesirable amounts of delay which could result in excessive queueing in all four directions.

It is expected that additional lanes would be needed to accommodate this queueing at the signal. Important turn lanes to consider include two through lanes in the northbound and southbound direction as well as dual westbound left-turn lanes. However, this widening at the signal may be difficult to transition back to a three-lane section.

Variations of a roundabout were also considered at the intersection of Route ZZ & Route M, which are described in the next section.

5.3. Roundabout Capacity Analysis

Roundabout intersection capacity was performed using Sidra Version 9.0 applying HCM methodologies. A summary of the future operations expected at each roundabout configuration is provided below.

Route MM & Farm Road 160 – Roundabout or traffic signal (conceptual)

Two roundabout configurations were considered: one with a free westbound slip right-turn lane and the second with dual yielding westbound right-turn lanes. Both configurations are expected to be acceptable. The free right-turn option is expected to have the least amount of delay and is the preferred option. However, as the area develops, consideration should be given to the potential weave scenario that may be introduced with northbound Route MM traffic merging into a single right-turn lane at the roundabout.

- A free westbound slip right-turn results in a LOS A overall in AM and PM peak hours.
 - Considers yielding westbound through/left and free westbound right-turn.
 - Considers two circulating lanes for dual southbound left-turn movements.
 - All approaches are expected to operate at a LOS C or better with acceptable queueing.
- Yielding dual westbound right-turns result in LOS B overall in AM and PM peak hours.
 - Considers westbound through/left/right and dedicated right-turn with both lanes yielding before entering the circulatory roadway.
 - Considers two circulating lanes for dual southbound left-turn movements.
 - The 95th-percentile queue for the westbound approach is expected to be approximately 258 feet during the AM peak hour.

Route ZZ & Route M – Roundabout or traffic signal (conceptual)

Two roundabout configurations were considered: one without a westbound slip right-turn and one with a westbound slip right-turn lane.

- Without a westbound slip right-turn, the roundabout operates at a LOS B and LOS C during AM and PM respectively.
 - Considers two circulating lanes for dual southbound through movements and two southbound receiving lanes on Route ZZ. The analysis results indicate that the second receiving lane should be a minimum of 400 feet.
 - Considers free northbound right-turn lane.
 - Considers four-lane section on the east leg for a dedicated westbound left-turn, shared westbound through/right, eastbound receiving lane from the circulatory roadway and eastbound receiving lane for the free northbound right-turn lane.
 - All approaches are expected to operate at a LOS C or better except for the shared westbound through/right. The westbound through/right is expected to operate at a LOS D with a 95th-percentile queue of 632 feet in the PM peak hour.
- With a westbound slip right-turn, the roundabout operates at a LOS B during both AM and PM peak hours.
 - Considers the same lane configuration as described above with the addition of a dedicated westbound slip right-turn to reduce queueing.
 - All approaches are expected to operate at a LOS C or better. The westbound through lane queue is expected to reduce to approximately 171 feet in the PM.

A traffic signal was also considered at the intersections of Route MM with Farm Road 160 and Route ZZ with Route M; signalized operations of both intersections are described in **Section 5.2**. However, the reviewed roundabout configurations are expected to operate acceptably and require fewer approaching lanes. Because the roundabout is the preferred intersection type at this location, capacity analysis results in the figures below are for the roundabout configurations. Traffic signal operations are provided in the Appendix for comparison.

Route M & Farm Road 103 – Roundabout (existing)

- LOS A overall in both AM and PM peak hours.
 - Considers two circulating lanes to allow two east-westbound lanes in each direction.
 - Considers one approaching lane in the north-south direction.
 - All approaches are expected to operate at a LOS B or better with acceptable queueing.

Future year 2045 peak hour traffic conditions are illustrated in **Figures 10-12**.

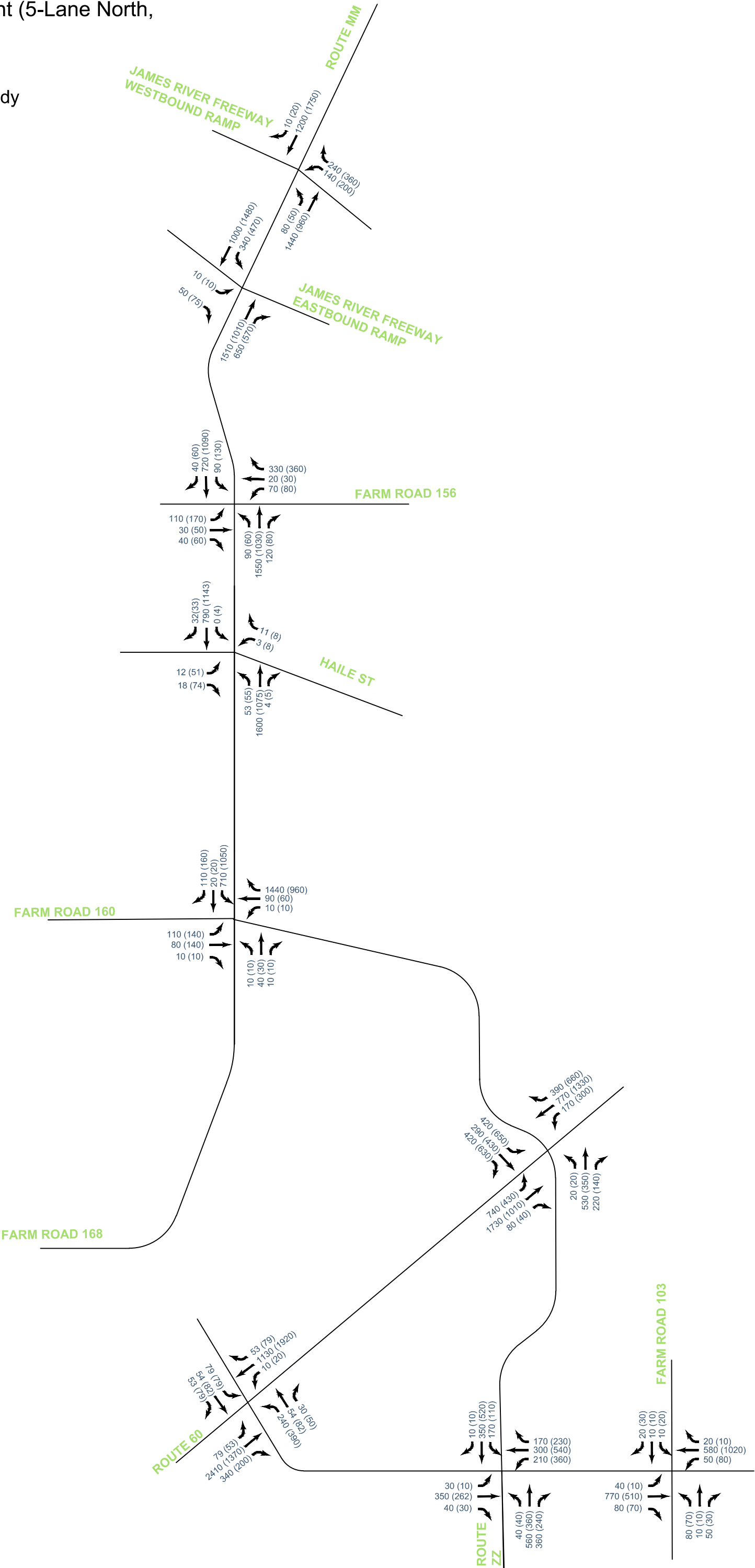
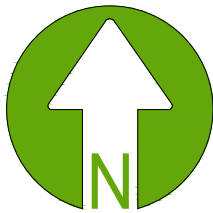
Detailed capacity analysis results are provided in **Appendix B**.

FIGURE 10

2045 Full Build Alignment (5-Lane North,
3-Lane South)
Peak Hour Volumes

J8S0836 Traffic Corridor Study
Route MM from US 360 to
Route M/ZZ

Republic, MO
Greene County



LEGEND

AM (PM) Peak Hour Volume

FIGURE 11

2045 Full Build Alignment (5-Lane North,
3-Lane South)
Lane Configuration and Traffic Control

J8S0836 Traffic Corridor Study
Route MM from US 360 to
Route M/ZZ

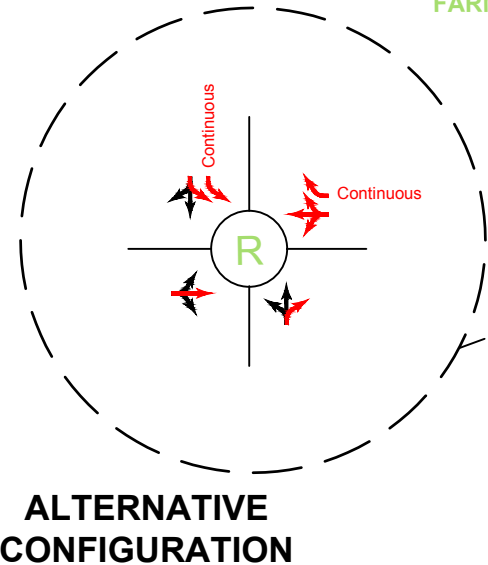
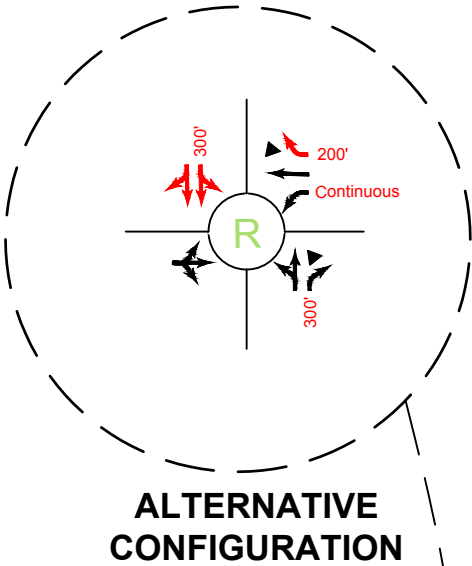
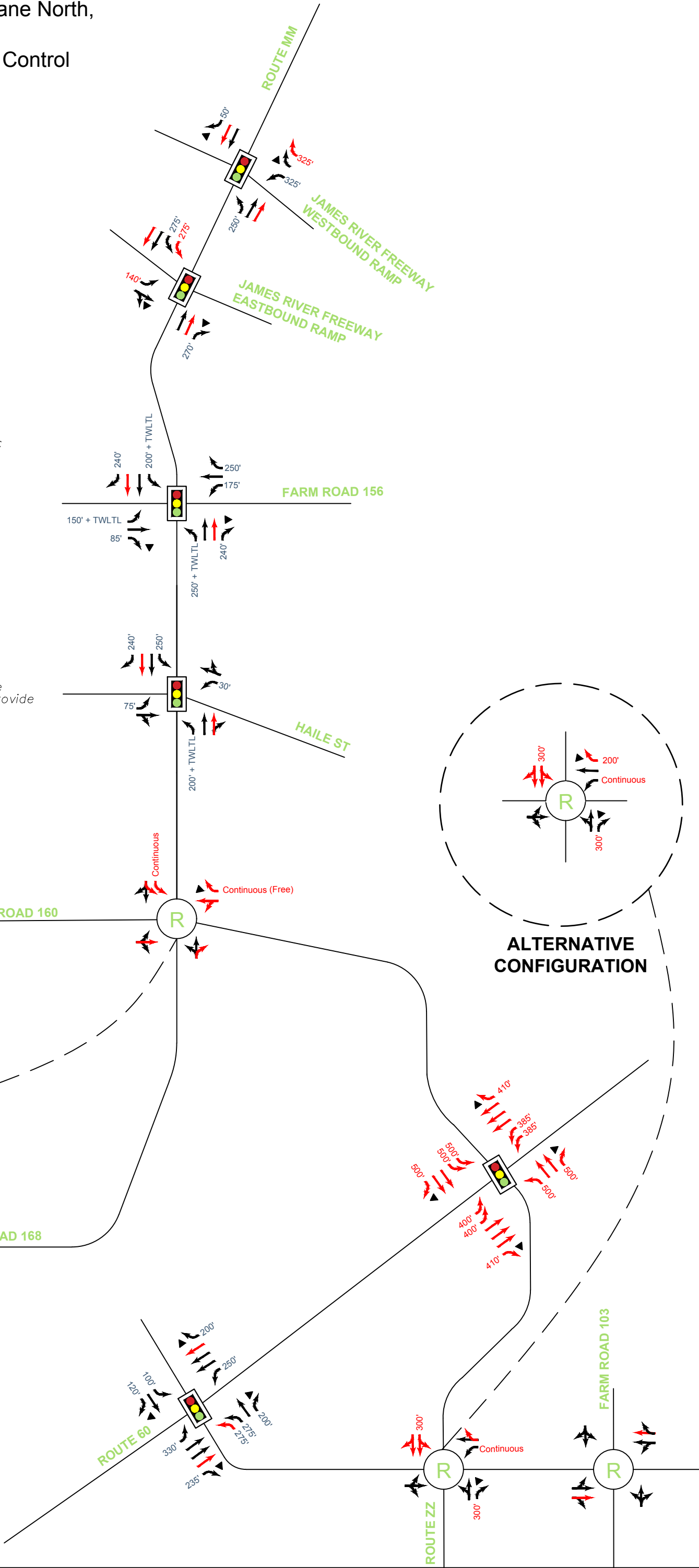
Republic, MO
Greene County



LEGEND

- *xx' → *Lane Configuration & Storage Length
- *xx' → *Future Lane Configuration & Storage Length
- Signalized Intersection
- Stop Controlled Intersection
- Stop Sign
- TWLTL Two-Way Left-Turn Lane
- ▼ Channelized Right-turn

*Assumed turn lane length utilized for capacity analysis. The ultimate turn lane length should at least accommodate the 95th-percentile queue and if possible provide for proper deceleration distance.

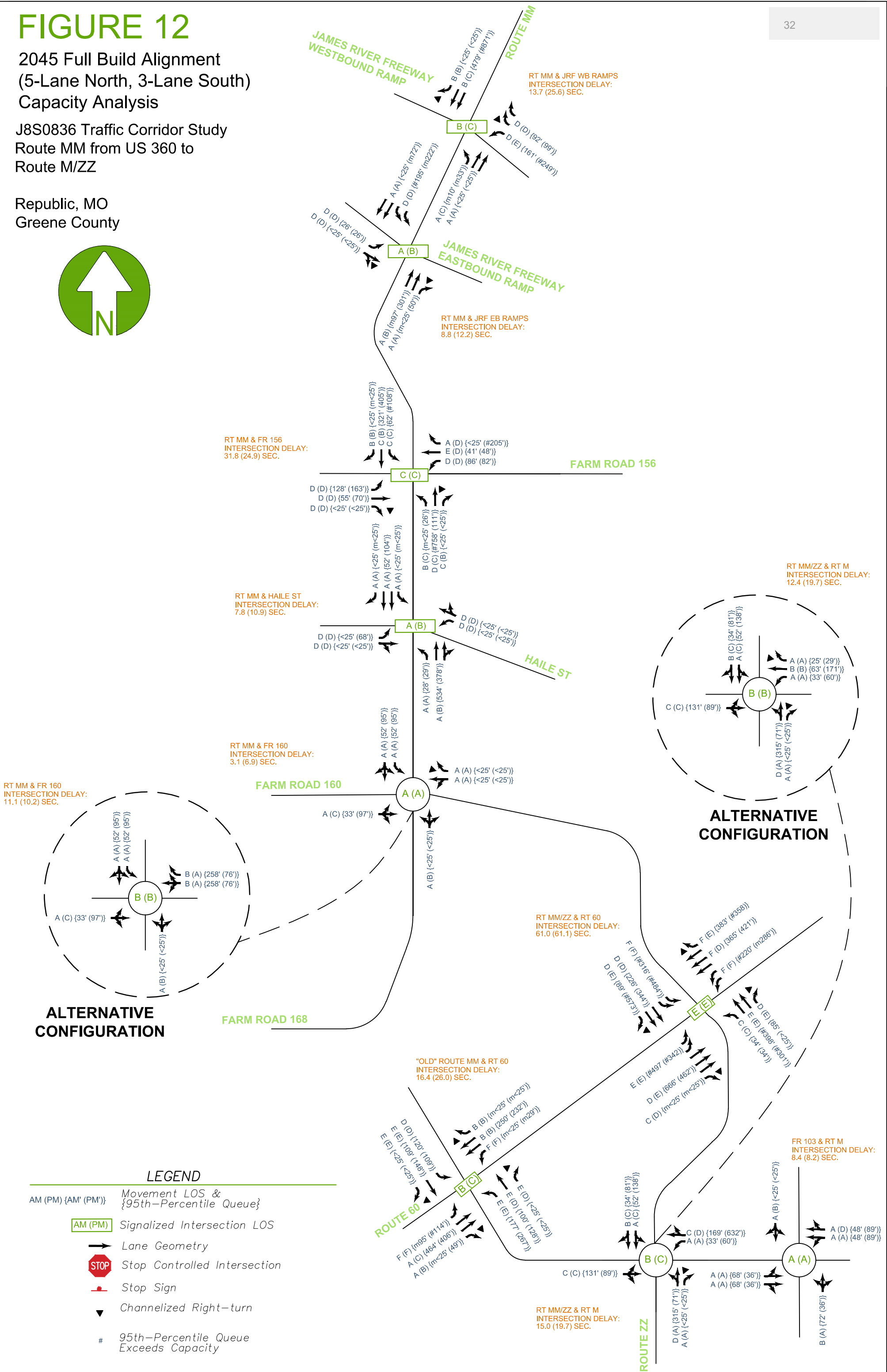
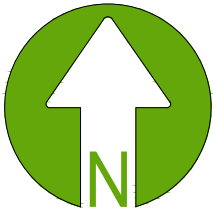


2045 Full Build Alignment (5-Lane North, 3-Lane South) Capacity Analysis

J8S0836 Traffic Corridor Study

Route MM from US 360 to Route M/ZZ

Republic, MO
Greene County



5.4. Additional Corridor Construction Timeline Considerations

It is understood that construction of the preferred conceptual corridor configuration may not be feasible until funding becomes available. At the time of this report, funding for project J8S0836D (from Farm Road 160 to US 60) is currently funded. Funding for projects J8S0836A (from JRF to Farm Road 160) and J8S0836C (from US 60 to Route M) are in the process of being programmed but are not funded at this time. J8S0836B (from I-44 to JRF) is a planned project and not directly included in the scope of this report; this widening is assumed to be in place for this study. For reference, the project map is previously shown in **Figure 1**.

Table 7 below discusses potential outcomes for various scenarios when pairing the Route MM realignment projects assuming development activity continues as expected.

Table 7. Route MM Project Pairing Scenarios.

Scenario	Potential Outcome
<u>J8S0836D Constructed, J8S0836C Not Constructed, FR 103 Is Aligned with Full Access</u>	<ul style="list-style-type: none"> Traffic expected to utilize FR 103 until capacity is reached (within 3 years of initial project completion assuming unimproved FR capacity of 5,000 vpd). Once FR 103 capacity is reached, additional traffic likely to reroute to Rt M and US 60.
<u>J8S0836D Constructed, J8S0836C Not Constructed, FR 103 Is Aligned with RIRO Access</u>	<ul style="list-style-type: none"> Traffic expected to reroute to Rt M and US 60. Rt M between US 60 and Rt ZZ design year 2045 ADT increases to 12,840 vpd, potentially warranting widening to 3-lane if left-turn volumes are heavy. US 60 between Rt M and “new” Rt MM design year 2045 ADT increases to 45,180 vpd. According to OTO capacity thresholds, US 60 has a future capacity of 53,250 vpd. While not over capacity, increased congestion would be expected, and a weave scenario from Rt M, to US 60 to New Rt MM would be introduced. FR 103 between US 60 and Rt M design year 2045 ADT of 3,620 vpd (3,300 vpd northbound).
<u>J8S0836D Constructed, J8S0836A Not Constructed</u>	<ul style="list-style-type: none"> Traffic expected to utilize Rt MM until capacity is reached (possibly as early as 2027 north of FR 156 and 2032 south of FR 156). Rt MM capacity north of FR 160 expected to be 17,500 vpd as a 3-lane roadway.

6. SUMMARY

The purpose and need of this project are to provide traffic analysis, modeling, and forecasting with recommendations for staged project implementation of the conceptual Route MM/ZZ corridor alignment. This report summarizes the analysis associated with the proposed realignment of Route MM and Route ZZ in Republic, Missouri. This realignment would include two rail overpasses and coincide with the closure of multiple at-grade rail crossings in the area. Considering that this corridor is a critical north-south connector for the region and is experiencing significant development activity in its vicinity, it is important to consider how the future demands can be accommodated to preserve the integrity of the corridor for all users.

The existing conditions pertaining to the capacity, safety, and roadway and bridge design considerations of the current alignment are described as well as the expected constraints for the future no-build scenario if no improvements are made. In order to determine the future needs of the corridor, the Ozarks Transportation Organization's (OTO) travel demand model was updated to include the expected development interests within the study area.

Four baseline alternatives were considered for the future cross-section of the realigned Route MM: three-lane vs five-lane section and partial build vs full build alignment. Under the partial build alignment, the realignment of Route MM between Farm Road 160 and US 60 would initially be constructed and tie into Farm Road 103. Full build alignment would continue the realignment south of US 60 and directly tie into Route ZZ. Based on the findings of this study, Farm Road 103 would quickly reach capacity under the Partial Build alignment. Thus, it was determined that the Full Build alignment would be preferred. The corridor is expected Based on the projected traffic volumes, a five-lane cross-section is expected to be needed along Route MM north of US 60 with a three-lane section along Route ZZ between US 60 and Route M.

Under this roadway configuration the expected 2045 design year average daily volumes for the Route MM corridor are expected to range from 22,720 vehicles per day to 33,100 vehicles per day between James River Freeway and US 60. The highest ADTs are expected at the development access points nearest to these two main highways. Depending on how these areas develop, raised medians should also be considered immediately south of James River Freeway and immediately north of US 60 to control access points and increase capacity along Route MM.

If demand continues in the area as expected, this full build realignment could be programmed by the year 2027 given that Route MM three-lane capacities are expected to be reached between 2027-2032 north of US 60. South of US 60, the full build realignment is recommended as a three-lane roadway based on the volume projections. This section of Route ZZ is expected to be approximately 12,250 vpd, which is below the typical three-lane capacity, by the design year 2045.

The main connection points of the realigned Route MM/ZZ corridor are at Farm Road 160, US 60, and Route M. The intersection of Route MM and Farm Road 160 is expected to operate acceptably as a dual lane roundabout or signalized intersection, with the roundabout configuration resulting in the shortest delays and queues overall. Two viable roundabout configurations are presented, one of which includes a free westbound right-turn and is preferable considering it is associated with expected lower delays and crash frequency. The intersection of Route MM and US 60 is anticipated to be signalized. If volumes materialize as expected, the intersection will be reaching capacity near 2045 and be in need of re-evaluation, potentially considering innovative intersection types to accommodate demand. The intersection of Route ZZ and Route M is expected to operate acceptably as a hybrid roundabout, a portion of which includes two circulating lanes to accommodate the heaviest movements.

It is understood that construction of the preferred conceptual corridor configuration may not be feasible until funding becomes available. The table below discusses potential traffic outcomes to consider when pairing the various Route MM realignment projects.

Scenario	Potential Outcome
<u>J8S0836D Constructed, J8S0836C Not Constructed, FR 103 Is Aligned with Full Access</u>	<ul style="list-style-type: none"> Traffic expected to utilize FR 103 until capacity is reached (within 3 years of initial project completion assuming unimproved FR capacity of 5,000 vpd). Once FR 103 capacity is reached, additional traffic likely to reroute to Rt M and US 60.
<u>J8S0836D Constructed, J8S0836C Not Constructed, FR 103 Is Aligned with RIRO Access</u>	<ul style="list-style-type: none"> Traffic expected to reroute to Rt M and US 60. Rt M between US 60 and Rt ZZ design year 2045 ADT increases to 12,840 vpd, potentially warranting widening to 3-lane if left-turn volumes are heavy. US 60 between Rt M and “new” Rt MM design year 2045 ADT increases to 45,180 vpd. According to OTO capacity thresholds, US 60 has a future capacity of 53,250 vpd. While not over capacity, increased congestion would be expected, and a weave scenario from Rt M, to US 60 to New Rt MM would be introduced. FR 103 between US 60 and Rt M design year 2045 ADT of 3,620 vpd (3,300 vpd northbound).
<u>J8S0836D Constructed, J8S0836A Not Constructed</u>	<ul style="list-style-type: none"> Traffic expected to utilize Rt MM until capacity is reached (possibly as early as 2027 north of FR 156 and 2032 south of FR 156). Rt MM capacity north of FR 160 expected to be 17,500 vpd as a 3-lane roadway.

Appendix H

Project Schedules

[illegible]

Activity	Quantity		Production Rate	Work Days																								
	Amount	Unit			10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190					
Mobilization	1	LS	-	15																								
Surveying & Staking	1	LS	-	20																								
Clearing and Grubbing	17	ACRE	0.8	22																								
Removal of Improvements	1	LS	-	7																								
Erosion Control	1	LS	-	22																								
Traffic Control	1	LS	-	4																								
Unclassified Excavation	56,728	CY	2000	29																								
Embankment in Place	291,040	CY	4500	65																								
Compacting Embankment	49,329	CY	1400	36																								
Compacting in Cut	22.2	STA	5	5																								
Class 3 Excavation	3,950	CY	200	20																								
Class 4 Excavation	2,256	CY	250	10																								
Class 4 Excavation in Rock	34	CY	30	2																								
Linear Grading for ADA Facilities	2,155	LF	1000	3																								
Culverts (Steel)	27,440	LBS	1000	28																								
Culverts (Concrete)	1,056	CY	60	18																								
Paved Ditch	45	SY	275	1																								
Drop Inlets	13	EA	4	4																								
Drainage Pipe	2,100	LF	150	14																								
Rock Lining	22	CY	200	1																								
Rock Blanket	978	CY	350	3																								
Rock Ditch Liner	353	CY	350	2																								
Bridge Construction	1	LS	-	85																								
Aggregate Base	44,577	SY	2500	18																								
Curb & Gutter	1,698	LF	150	12																								
Paving	34,605	SY	4000	9																								
Shoulders	7,930	SY	2000	4																								
Concrete Median Strip	3,027	SY	180	17																								
Sidewalk	1,230	SY	200	7																								
Gravel (A) or Crushed Stone (B)	200	TON	500	1																								
Striping	56,234	LF	15000	4																								
Lighting	1	LS	-	7																								
Signs	1	LS	-	9																								
Guardrail	800	LF	1200	1																								
Seeding	9	ACRE	6	2																								
Demobilization	1	LS	-	15																								
Approx. Number of Working Days =				522																								
Approx. Critical Path Working Days =				185																								

Tentative Project Schedule for J8S0836D	Start	Finish
Project Management & Controls		
Develop Scope Management Plan & Project Definition	Jan-21	May-21
Confirm for approval the speed limit requirement of corridor	Jan-21	Mar-21
Establish Project Requirements	Mar-21	May-21
Traffic Study Scope Development	Apr-21	May-21
Traffic Consultant Solicitation	May-21	May-21
Traffic Consultant Selection & Contract Negotiation	Jun-21	Jul-21
USDOT approves STIP/TIP August / September 2021		
Grant/Cooperative Agreement with FRA		
Develop high-level estimates	Oct-21	Dec-22
Develop project schedule	Jan-22	Feb-22
Project-Level 50% Engineering Review	Mar-22	Jun-23
Project-Level 100% Engineering Review	Jun-23	Oct-24
Procurement & Contract Administration		
Legal Agreement Reviews		
Project Management Meetings		
Public Information Meetings	Feb-22	
Construction Agreements with BNSF, MoDOT, County & Local Agencies	Sep-24	Dec-24
FRA Project Coordination Meetings		
BNSF Railway Coordination Meetings		
Environmental Review		
	Apr-21	Oct-24
Environmental Scoping	Apr-21	Sep-21
Public Involvement Coordination	Sep-22	Oct-22
Submit Conceptual RES to ascertain design constraints	Oct-21	Oct-21
Perform desktop review of resources	Oct-21	Dec-21
Prepare and submit right-of-entries for Environmental field work	Nov-21	Jan-22
NEPA Document Development	Oct-21	Apr-24
Submit Preliminary RES with Preliminary Plans	Mar-22	May-22
Conduct field work for Environmental	Dec-21	Jan-22
Submit Right-of-Way RES with Right-of-Way Plans	Sep-22	Dec-22
Permits - 404/401, Floodplain, Stormwater	Apr-22	Jun-22
Environmental performs archeological surveys and submit findings to SHPO	May-22	Aug-22
After SHPO concurs, Environmental to include information in NEPA document, along with T&E and Public Lands info (4F/6F)	Sep-22	Apr-24
NEPA Review & Approval	Apr-24	Sep-24
Submit Final RES at least 60 days before PS&E due date	Jul-24	Oct-24
Design Development		
	Mar-21	Oct-24
Formulate Purpose & Need Document for Location Study	Mar-21	Jul-21
Develop Design Criteria, including Horizontal & Vertical Alignments and Typical Section Elements	Mar-21	Jul-21
Develop Corridor Alignment Selection with Alternatives	Mar-21	Oct-21
Develop At-grade Intersection & Railroad Overpass Design Criteria	Apr-21	May-21

Field Survey Activities	Apr-21	May-21
Traffic Consultant Procurement	May-21	Jul-21
Traffic Review & Kickoff Meeting	Aug-21	Aug-21
Traffic Study and Report Provided by Consultant	Aug-21	Oct-21
Stakeholder Review and Acceptance of Traffic Study	Oct-21	Dec-21
Request Conceptual Environmental Investigation and Provide KMZs	Oct-21	Oct-21
Perform Alternative Analysis for Location Study	Oct-21	Dec-21
Complete Location Study Report	Dec-21	Jan-22
Submit Location Study to Core Team for Review	Jan-22	Jan-22
Final Submittal and Approval of Location Study to Management Team	Jan-22	Jan-22
Develop Exhibits for Public Meeting	Jan-22	Feb-22
Identify Sinkhole Issues and Receive Conceptual Environmental Clearance	Jan-22	Mar-22
Initial Public Meeting	Feb-22	Feb-22
Develop Exhibits for Commission Meeting	Mar-22	Mar-22
Receive Response & Approval from Commission Following Presentation	Apr-22	Apr-22
Preliminary Geotechnical Fieldwork and Obtain Report	Jan-22	Mar-22
Develop Bridge Survey for Submittal to Bridge Division	Feb-22	Mar-22
Bridge Division to Complete Bridge Memo (6 months)	Mar-22	Aug-22
Preliminary Design & Cost Estimate Development (30%)	Mar-22	May-22
Preliminary Design & Cost Estimate Development (100%)	Mar-22	Aug-22
Submit Preliminary Plans & Estimate for DE approval	Aug-22	Aug-22
Public Advertisement for Preliminary Plans (3 weeks)	Sep-22	Sep-22
Conduct Virtual Public Hearing (10 workday comment period)	Sep-22	Oct-22
Respond/Address Comments and Submit Transcripts to Design Liasion for Review/Approval	Sep-22	Oct-22
Design Liasion to Submit Design Approval to Commission	Oct-22	Oct-22
R/W Plans & Cost Estimate Development (60%)	Sep-22	Jan-23
R/W Plans & Cost Estimate Development (100%)	Sep-22	May-23
Submit R/W Plans & Estimate for DE approval	May-23	May-23
Pre-Final Design Development (60%)	Jun-23	Mar-24
Pre-Final Cost Estimate (60%)	Jun-23	Mar-24
Final Design Development (100%)	Jun-23	Oct-24
Final Cost Estimate (100%)	Aug-24	Oct-24
Review of Final Plans by CO and Core Team	Oct-24	Oct-24
Submit 100% Final Design Documents, including NEPA / Utility / R/W Clearances	Oct-24	Nov-24
Right-Of-Way Acquisition	Apr-22	Dec-24
Establish Guidelines & Acquisition Protocols	Apr-22	Jun-22
Prepare ROW estimates	Aug-22	Oct-22
NEPA Classification	Sep-22	Mar-23
Section 106 Clearance	Sep-22	Apr-23
Request for Environmental Services (RES)	Sep-22	Nov-22
R/W Plan Design, Review & Approval	Sep-22	May-23
Identify Acquisition Needs	Nov-22	Mar-23
Begin collecting appraisal data and consider relocation if applicable	Oct-22	Nov-22

Survey for Partial Takings	Apr-23	Apr-23
Title Work	May-23	Jul-23
Right of Way Plans Approval (legal descriptions completed)	May-23	May-23
Right of Way A-Date or Notice to Proceed	May-23	May-23
Appraiser contacts property owners	May-23	May-23
60-day Notice of Intent to Acquire letter sent to all affected property owners	Jun-23	Aug-23
Appraisals completed/ Appraisal Review	Aug-23	Oct-23
Perform negotiations. Make offers to all affected property owners, add time if relocation is required.	Oct-23	May-24
Mediation, if applicable	Oct-23	May-24
Condemnation - Track packs to RCO	Oct-23	May-24
Commission Certify Right of Way Plans	Jun-24	Jul-24
RCO Files Condemnation, obtains a Hearing date	Jul-24	Sep-24
Commissioners Award (45 days following the appointments)	Oct-24	Nov-24
Right of Way Clearance (Due to FHWA 7 weeks prior to Letting)	Nov-24	Dec-24
Utility Clearance	Jul-21	Dec-24
Relocation Design Development	Jul-21	Jun-24
Submit Conceptual Plans to Utilities Section to Identify Impacts and Obtain High-level Estimates	Jul-21	Aug-21
Notify Utility Companies of Potential Conflicts	Aug-21	Sep-21
Submit Preliminary Plans to DUE to Identify Impacts	Dec-21	Dec-21
Submit R/W Plans to DUE to Coordinate Relocations	May-23	May-23
Relocation Design Review	May-23	Aug-24
Acquire Easements and Utility Relocation Agreements	Sep-24	Nov-24
Relocate Impacted Utilities and Achieve Utility Clearance	Nov-24	Dec-24
Pre-Construction	Dec-24	Apr-25
Bid Advertisement	Dec-24	Dec-24
Bid Letting	Jan-25	Jan-25
Bid Approval	Feb-25	Feb-25
Bid Award	Mar-25	Mar-25
Pre-Construction Meeting	Apr-25	Apr-25
Pre-Construction Public Meeting	Apr-25	Apr-25
Project Construction	Apr-25	Aug-26
Notice to Proceed	Apr-25	Apr-25
Mobilization & Beginning of Construction	May-25	May-25
Surveying & Staking	May-25	May-25
Land Clearing & Grubbing	May-25	May-25
Removals of Existing Features	May-25	May-25
Construct Erosion Control Features	May-25	Jun-25
Establish Traffic Control	May-25	May-25
Earthwork - Unclassified Excavation	May-25	Jun-25
Earthwork - Embankment in Place	May-25	Oct-25
Earthwork - Compacting Embankment	May-25	Jun-25

Earthwork - Compacting in Cut	May-25	May-25
Earthwork - Class 3 Excavation	May-25	Aug-25
Earthwork - Class 4 Excavation	Jun-25	Jun-25
Earthwork - Class 4 Excavation in Rock	Jun-25	Jun-25
Earthwork - Linear Grading for Pedestrian Facilities	Aug-25	Aug-25
Drainage - Construct Culverts (Steel & Concrete)	Jul-25	Sep-25
Drainage - Construct Drop Inlets	Jun-25	Jun-25
Drainage - Place Drainage Pipes	Jun-25	Sep-25
Drainage - Construct Paved Ditch	Sep-25	Sep-25
Drainage - Rock Lining, Rock Blanket, & Ditch Liner	Jun-25	Sep-25
Bridge Construction	Jun-25	Oct-25
Paving - Place Aggregate Base	Jul-25	Aug-25
Paving - Construct Curb & Gutter	Aug-25	Oct-25
Paving - Lay Mainline Pavement	Oct-25	Oct-25
Paving - Build Connection to Commercial Ave.	Oct-25	Oct-25
Paving - Build Tie-In to Intersection with US 60	Oct-25	Nov-25
Paving - Construct Roundabout at Farm Road 160	Nov-25	Nov-25
Paving - Build Pavement Shoulders	Nov-25	Nov-25
Paving - Place Concrete Medians and Raised Islands	Apr-26	Apr-26
Paving - Construct Sidewalks & Pedestrian Facilities	Apr-26	May-26
Additional Construction - Pavement Marking & Striping	May-26	Jun-26
Additional Construction - Place Signals & Lights	May-26	Jun-26
Additional Construction - Place Signs	Jun-26	Jul-26
Additional Construction - Construct Guardrail	Jul-26	Jul-26
Additional Construction - Seeding	Jul-26	Jul-26
Demobilization & Construction Completion	Jul-26	Aug-26
Project Walk-Thru & Closeout	Aug-26	Aug-26
Public Opening	Aug-26	Aug-26

Appendix I

References

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